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December 20, 2021

Via Electronic Filing

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: PaPUC Docket No. R-2021-3026116, *et al.*
Pa. P.U.C., *et al.* v. The Borough of Hanover – Hanover Municipal Water Works

Dear Secretary Chiavetta:

We are counsel to the Borough of Hanover – Hanover Municipal Water Works in the above matter and are submitting, via electronic filing with this letter, the Borough's Pre-Served Testimony and Exhibits as listed below. The Pre-Served Testimony and Exhibits were admitted into the evidentiary record pursuant to the Interim Order of Administrative Law Judge Brady, dated December 14, 2021, Granting Joint Stipulation for Admission of Evidence.

Statements of Testimony and Related Exhibits (Verifications for the Statements of Testimony and Related Exhibits are attached to the Statements of Testimony)

Borough of Hanover Statement No. 1 – Direct Testimony of Michael J. Mehaffey
Borough of Hanover Statement No. 1-R – Rebuttal Testimony of Michael J. Mehaffey

Borough of Hanover Statement No. 2 – Direct Testimony of Gregory R. Herbert

Borough of Hanover Exhibit GRH-1 – Rate Study and Data in Support of Proposed Supplement No. 32 to Tariff Water – Pa. P.U.C. No. 3

Borough of Hanover Exhibit GRH-2 – Responses to Filing Requirements Required Under 52 Pa. Code § 53.53 of the Pennsylvania Public Utility Commission Tariff Regulations

Borough of Hanover Statement No. 2-R – Rebuttal Testimony of Gregory R. Herbert with attached Exhibit GRH-1-R

Borough of Hanover Statement No. 3 – Direct Testimony of Constance E. Heppenstall

Borough of Hanover Exhibit CEH-1 – Cost of Service Allocation Study for the Fully Projected Future Test Year Ended December 31, 2022

Borough of Hanover Statement No. 3-R – Rebuttal Testimony of Constance E. Heppenstall

Borough of Hanover Statement No. 4 – Direct Testimony of John J. Spanos

Borough of Hanover Exhibit JJS-1 – Depreciation Study as of December 31, 2020

Borough of Hanover Exhibit JJS-2 – Depreciation Study as of December 31, 2021

Borough of Hanover Exhibit JJS-3 – Depreciation Study as of December 31, 2022

Borough of Hanover Statement No. 5 – Direct Testimony of Harold Walker, III

Borough of Hanover Exhibit HW-1 – Rate of Return

Borough of Hanover Statement No. 5-R – Rebuttal Testimony of Harold Walker, III

Exhibits

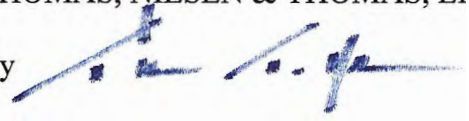
Borough of Hanover Exhibit 1 – Supplement No. 32 to Tariff Water – Pa. P.U.C No. 3

Borough of Hanover Exhibit 2 – Notice to Customers

Copies of this letter are being served in accordance with the attached certificate of service. Please let me know if anything else is required concerning the foregoing.

Very truly yours,

THOMAS, NIESEN & THOMAS, LLC

By 

Thomas T. Niesen

cc: Certificate of Service
The Honorable F. Joseph Brady, Administrative Law Judge (via email)
Nan Dunford (via email)

CERTIFICATE OF SERVICE

I hereby certify that I have this 20th day of December 2021 served a true and correct copy of the foregoing letter, upon the persons and in the manner indicated below:

VIA ELECTRONIC MAIL

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Commonwealth of Pennsylvania
Pennsylvania Public Utility Commission
Harrisburg, PA 17105-3265
EFILING - FILING DETAIL

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Your filing has been electronically received. Upon review of the filing for conformity with the Commission's filing requirements, a notice will be issued acknowledging acceptance or rejection (with reason) of the filing. The matter will receive the attention of the Commission and you will be advised if any further action is required on your part.

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Docket Number: R-2021-3026116
Case Description: PaPUC, et al. v. The Borough of Hanover - Hanover municipal Water Works
Transmission Date: 12/20/2021 11:27 AM
Filed On: 12/20/2021 11:27 AM
eFiling Confirmation Number: 2330825

File Name	Document Type	Upload Date
Letter Re Borough Pre-Served Testimony and Exhibits.pdf	Pre-Served Testimony	12/20/2021 11:17:09 AM
Borough of Hanover Statement No. 1 - Direct Testimony of Michael J. Mehaffey P.E..pdf	Pre-Served Testimony	12/20/2021 11:17:38 AM
Borough of Hanover Statement No. 1-R - Rebuttal Testimony of Michael J. Mehaffey, P.E..pdf	Pre-Served Testimony	12/20/2021 11:19:13 AM
Borough of Hanover Statement No. 2 - Direct Testimony of Gregory R. Herbert.pdf	Pre-Served Testimony	12/20/2021 11:19:27 AM
Borough of Hanover Statement No. 2 - Exhibit GRH-1.pdf	Pre-Served Testimony	12/20/2021 11:19:45 AM
Borough of Hanover Statement No. 2 - Exhibit GRH-2.pdf	Pre-Served Testimony	12/20/2021 11:20:44 AM
Borough of Hanover Statement No. 2 - Exhibit GRH-2.pdf	Pre-Served Testimony	12/20/2021 11:22:08 AM
Borough of Hanover Statement No. 2-R - Reb Test of Gregory R. Herbert (with Ex GRH-1-R).pdf	Pre-Served Testimony	12/20/2021 11:22:52 AM
Borough of Hanover Statement No. 3 - Direct Testimony of Constance E. Heppenstall.pdf	Pre-Served Testimony	12/20/2021 11:23:06 AM
Borough of Hanover Statement No. 3 - Exhibit CEH-1_1.pdf	Pre-Served Testimony	12/20/2021 11:23:19 AM
Borough of Hanover Statement No. 3-R - Rebuttal Testimony of Constance E. Heppenstall.pdf	Pre-Served Testimony	12/20/2021 11:23:32 AM

Borough of Hanover Statement No. 4 - Direct Testimony of John J. Spanos.pdf	Pre-Served Testimony	12/20/2021 11:23:47 AM
Borough of Hanover Statement No. 4 - Exhibit JJS-1.pdf	Pre-Served Testimony	12/20/2021 11:23:57 AM
Borough of Hanover Statement No. 4 - Exhibit JJS-2.pdf	Pre-Served Testimony	12/20/2021 11:24:18 AM
Borough of Hanover Statement No. 4 - Exhibit JJS-3.pdf	Pre-Served Testimony	12/20/2021 11:24:28 AM
Borough of Hanover Statement No. 5 - Direct Testimony of Harold Walker, III.pdf	Pre-Served Testimony	12/20/2021 11:25:21 AM
Borough of Hanover Statement No. 5 - Exhibit HW-1.pdf	Pre-Served Testimony	12/20/2021 11:25:32 AM
Borough of Hanover Statement No. 5-R - Reb Test of Harold Walker, III.pdf	Pre-Served Testimony	12/20/2021 11:25:58 AM
Borough of Hanover Exhibit 1 - Supplement No. 32.pdf	Pre-Served Testimony	12/20/2021 11:26:29 AM
Borough of Hanover Exhibit 2 - Customer Notice.pdf	Pre-Served Testimony	12/20/2021 11:26:38 AM

For filings exceeding 250 pages, the PUC is requiring that filers submit one paper copy to the Secretary's Bureau within three business days of submitting the electronic filing online. Please mail the paper copy along with copy of this confirmation page to Secretary, Pennsylvania Public Utility Commission, 400 North Street, Harrisburg PA 17120 a copy of the filing confirmation page or reference the filing confirmation number on the first page of the paper copy.

No paper submission is necessary for filings under 250 pages.

You can view a record of this filing and previous filings you have submitted to the PUC by using the links in the Filings menu at the top of the page. Filings that have been submitted within the last 30 days can be viewed by using the Recent Filings link. Older filings can be viewed by using the search options available in the Filing History link.

Borough of Hanover Statement No. 1
Docket No. R-2021-3026116

DIRECT TESTIMONY

OF

MICHAEL J. MEHAFFEY, P.E.

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATERWORKS

MUNICIPAL WATER WORKS AND WATER SYSTEM

JUNE 2021

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION
RE: BOROUGH OF HANOVER
DOCKET NO. R-2021-3026116

DIRECT TESTIMONY OF MICHAEL J. MEHAFFEY, P.E.

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Michael J. Mehaffey. My business address is 207 Senate Avenue, Camp Hill, PA 17011.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Gannett Fleming Inc (Gannett Fleming). I am the Water Business Line North Market Leader and a Vice President of the firm.

Q. HOW LONG HAVE YOU BEEN EMPLOYED BY GANNETT FLEMING?

A. I have been employed by the Gannett Fleming for more than 14 years.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I am a graduate of Pennsylvania State University in 2004 with a BS, Civil Engineering and in 2007 with a Meng, Environmental Engineering. I am a registered professional engineer in the Commonwealth of Pennsylvania and in the state of Ohio.

Q. ARE YOU A MEMBER OF ANY PROFESSIONAL ORGANIZATIONS?

A. I belong to the American Water Works Association (AWWA), Central Pennsylvania

Water Quality Association (CPQWA), Pennsylvania Water Environment Association (PWEA).

Q. HOW ARE YOU INVOLVED WITH THE BOROUGH OF HANOVER AND ITS MUNICIPAL WATERWORKS OPERATION?

A. I serve as the Borough's Engineer and as the Client Manager for Gannett Fleming. I manage water and wastewater related projects.

II. SUMMARY OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony is submitted in support of the Borough's filing of Supplement No. 32 to Tariff Water-Pa P.U.C. No. 3. I will provide a brief municipal history of the Borough. I also will address the Borough's current operating organization, the number of customers and locations served by the water system and the scope of water operations.

III. THE BOROUGH OF HANOVER'S MUNICIPAL WATER WORKS

Q. PLEASE BRIEFLY DESCRIBE THE BOROUGH'S MUNICIPAL HISTORY AND CURRENT OPERATING ORGANIZATION?

A. Hanover is an incorporated municipality in southern York County. It was incorporated in 1815 and, presently, has a population of approximately 15,600. Through its Municipal Water Works department, it provides water service inside and outside the Borough's municipal boundaries.

Q. IN WHAT AREAS OUTSIDE ITS MUNICIPAL LIMITS DOES THE BOROUGH FURNISH WATER SERVICE?

A. Outside its municipal limits, the Borough furnishes water service to a population of approximately 26,800 persons in the neighboring Township of Penn, York County, Township of Heidelberg, York County, Township of Conewago, Adams County, and McSherrystown Borough, Adams County.

Q. HOW MANY CUSTOMERS DOES THE BOROUGH SERVE OUTSIDE THE BOROUGH LIMITS?

A. As of December 31, 2020, the Borough was furnishing water to 10,969 customers outside the Borough limits.

Q. HOW MANY CUSTOMERS DOES THE BOROUGH SERVE INSIDE THE BOROUGH LIMITS?

A. As of December 31, 2020, the Borough was furnishing water to 7,010 customers inside the Borough limits.

Q. FOR WHAT PURPOSES DOES THE BOROUGH SUPPLY WATER?

A. The Borough supplies drinking water for residential, commercial, industrial and public uses, and for fire protection purposes.

IV. THE BOROUGH'S WATER SYSTEM

Q. WHAT ARE THE BOROUGH'S WATER SUPPLY SOURCES?

A. The Borough's water collection system (water supply) consists chiefly of two reservoirs, a collection reservoir, intake and pumping station at Slagle's run, aqueducts and supply mains and storage facilities.

The two main reservoirs are the Sheppard and Myers Dam and the Lawrence Baker Sheppard Dam. The Sheppard and Myers Dam, which was constructed in 1932, covers 46 ½ acres with a watershed area of approximately 5.8 square miles. Its capacity is approximately 190,400,000 gallons, and it is required to release 542,000 gallons per day for conservation purposes. The Lawrence Baker Sheppard Dam (also known as Long Arm Dam) was constructed in 1964, covers 225 acres and has a watershed area of approximately 5.62 square miles. This dam has a capacity of 1,660,000,000 gallons and is required to release 552,000 gallons per day for conservation purposes. The water supply for this dam originates in Carroll County, Maryland, and the dam receives water from two main inlet streams (one being Long Arm Creek and the other being unnamed).

The Slagles Run Intake, Pumping Station and Well were constructed in 1994 and have a watershed area of approximately 10.27 square miles. Drainage from the north and east sides of Penn Township, north side of the Borough, and Conewago and Berwick Townships in Adams County goes into streams to form Slagles Run. In addition, ground water from Vulcan Materials Company is pumped into the stream. The Slagle's Run pumping station is permitted for pumping of 4,800,000 gallons per day with a one million gallon per day conservation release when in operation. The water from Slagle's Run is pumped to Clear Lake via a 20" main and is treated at the

Filter Plant. Clear Lake is a man-made holding lake located at the Borough's filter plant. It covers approximately 13 acres and has a capacity of 66,000,000 gallons. The lake serves as a sedimentation basin and a temporary clean source of water in the event of stream degradation. Water from Clear Lake flows by gravity to the filter plant through a 30" and a 16" line to be treated.

In addition to the reservoirs mentioned previously, the Borough's water collection (supply) system also includes the Kitzmiller Diversion Dam. The dam creates a pool holding approximately 15,000,000 gallons in the streambed and covers approximately 3 acres. The watershed area covers approximately 17.02 square miles. Raw water from Kitzmiller is diverted via a 36" reinforced concrete line to Clear Lake. The Borough is required to discharge 1,600,000 gallons per day as a conservation release from this facility.

Q. HOW DOES THE BOROUGH FILTER AND TREAT ITS WATER SUPPLY?

A. The Borough's Filtration Plant contains a total of seven multi-media filters. Five of the smaller filters have a total filtration capacity of approximately 3,600,000 gallons per day. In addition, there are two larger double cell filters which have a total filtration capacity of 8,000,000 gallons per day. Liquid alum for coagulation, sodium permanganate for taste and odor control, and gravity sedimentation assisted by tube settlers are used as pretreatment of water before entering the filters. Post-filtration treatment consists of fluoridation as a dentifrice, sodium hypochlorite for disinfection, and the addition of caustic soda to adjust the pH of the finished water.

Q. WHAT FINISHED WATER STORAGE FACILITIES ARE INCLUDED IN THE BOROUGH'S WATER SYSTEM?

A. There are four finished water storage facilities, including two storage towers or tanks and two reservoirs. The McSherrystown Tower is located in McSherrystown Borough and holds 250,000 gallons of finished water. In addition to its storage function, the McSherrystown tank assists in maintaining adequate pressures throughout McSherrystown Borough and portions of Conewago Township and the Borough. The Terrace tank is located on Terrace Avenue and holds 500,000 gallons of treated water. In addition to the storage function, the tank helps maintain adequate pressures in portions of Penn Township and in the northern portion of the Borough. The two finished water storage reservoirs are located at Parr's Hill on BlackRock Road in Penn Township. One of the reservoirs has a capacity of 5,295,000 gallons, while the second reservoir stores 7,725,000 gallons of finished water. A booster station has been added to increase pressures to the southeast section of the water distribution system. Both of the reservoirs are covered by floating covers in order to maintain the quality of the finished water and to meet Safe Drinking Water Act requirements.

Q. OTHER THAN THE PUMPING OR BOOSTER STATIONS, WHICH YOU HAVE PREVIOUSLY IDENTIFIED, ARE THERE ANY OTHER PUMPING STATIONS OR FACILITIES WHICH FORM A PART OF THE WATER SYSTEM?

A. Yes. There is the Kidd Lane Pump Station, which is located in Penn Township which is on standby. That pumping station serves the purpose of lifting water from Hickory

Lane at Kidd Lane north to properties on Young's Road, northeast and northwest of Kidd Lane, all within Penn Township, if needed.

Q. DOES THE BOROUGH SYSTEM INCLUE TRANSMISSION MAINS AND DISTRIBUTIONS MAINS?

A. Yes. The transmission mains for the system total 88,992 feet of various size mains which are used to serve both inside and outside Borough customers. The distribution mains total approximately 205 miles of various size mains. The distribution mains vary in size from 4" to 24".

Q. ARE ANY OF THE BOROUGH'S WATER SYSTEM FACILITIES DEVOTED TO USE SOLELY BY OUTSIDE BOROUGH CUSTOMERS?

A. Yes. However, the majority of the water system facilities, exclusive of mains, are utilized to provide water service to both inside and outside Borough customers. There are some facilities which are devoted solely to the use of outside Borough customers. These facilities and properties include the Kidd Lane Pump Station which is on standby as I earlier described, and the booster pump station at Parr's Hill which serves only Penn Township customers whose properties are at elevations which could not otherwise be served from the Borough's system. Additionally, there are significant distribution mains located outside the Borough, which serve only outside Borough customers.

Q. WHAT RECENT SIGNFICANT CAPITAL IMPROVEMENTS HAS THE BOROUGH MADE AND IS PROJECTING IN THE SYSTEM?

A. The Borough has completed the following recent significant capital improvements:

- Phase Two Water Filtrations Plant Improvements
- Lawrence Baker Sheppard Myers Dam Rehabilitation
- Annual Water Distribution System Pipe Lining
- Annual Water Distribution System Pipe Replacement
- Annual Water System Meter Replacement

The Borough is projecting the following capital improvements:

- Sheppard Myers Dam Rehabilitation
- Kitzmiller Dam Rehabilitation
- Annual Water Distribution System Pipe Lining
- Annual Water Distribution System Pipe Replacement
- Annual Water System Meter Replacement

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

VERIFICATION

I, Michael J. Mehaffey, hereby state that the facts set forth in my Direct Testimony, Borough of Hanover Statement No. 1, filed with the Public Utility Commission on June 29, 2021, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Michael J. Mehaffey

Dated: June 29, 2021

Borough of Hanover Statement No. 1-R
Docket No. R-2021-3026116

REBUTTAL TESTIMONY

OF

MICHAEL J. MEHAFFEY, P.E.

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATERWORKS

MUNICIPAL WATER WORKS AND WATER SYSTEM

OCTOBER 2021

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION
RE: BOROUGH OF HANOVER
DOCKET NO. R-2021-3026116

REBUTTAL TESTIMONY OF MICHAEL J. MEHAFFEY, P.E.

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Michael J. Mehaffey. My business address is 207 Senate Avenue, Camp Hill, PA 17011.

Q. ARE YOU THE SAME MICHAEL J. MEHAFFEY WHO PROVIDED DIRECT TESTIMONY IN THIS PROCEEDING AS BOROUGH OF HANOVER STATEMENT NO. 1?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to address the direct testimony of Office of Consumer Advocate witness Terry L. Fought. Mr. Fought addresses three items: (1) isolation valves, (2) fire hydrants and (3) customer complaints. I respond to each item separately. I also address the sewer bill portion of the direct testimony of Bureau of Investigation and Enforcement witness Zachari Walker.

II. ISOLATION VALVES

Q. MR. FOUGHT RECOMMENDS THAT THE BOROUGH EXERCISE (OR

ATTEMPT TO EXERCISE) APPROXIMATELY 400 DIFFERENT ISOLATION VALVES PER YEAR IN THE PUC-JURISDICTIONAL AREAS UNTIL ALL THE VALVES HAVE BEEN EXERCISED IN A 5-YEAR PERIOD AND THAT, UPON COMPLETION OF THE 5-YEAR EXERCISING PROGRAM, THE BOROUGH DEVELOP A REASONABLE SCHEDULE GOING FORWARD FOR EXERCISING ITS ISOLATION VALVES; THAT ISOLATION VALVES THAT ARE INOPERABLE BE REPAIRED OR SCHEDULED FOR REPAIR; THAT THE BOROUGH SUBMIT A SCHEDULE TO THE OCA AND OTHER PARTIES BY APRIL 15 OF EACH YEAR FOR REPLACING OR REPAIRING THOSE ISOLATION VALVES THAT COULD NOT BE PROPERLY EXERCISED; AND THAT, AS PART OF ITS NEXT RATE CASE FILING, THE BOROUGH FURNISH THE OCA AND OTHER PARTIES WITH A COPY OF ITS EXERCISING RECORDS FROM 2022 FORWARD, WHICH WILL INCLUDE THE SIZE AND LOCATION OF THE VALVE, WHEN THE VALVE WAS INSTALLED, DATE THE VALVE IS TURNED, NUMBER OF TURNS IT TAKES TO OPEN AND CLOSE THE VALVE, AND ANY PROBLEMS INCURRED IN OPERATING THE VALVE. DO YOU AGREE WITH MR. FOUGHT'S RECOMMENDATION?

A. The Borough exercises isolation valves and accepts Mr. Fought's recommendation modified, however, to provide that the schedule for repair or replacing of valves be submitted by November 15 for the following calendar year and that the schedule and rate case filing requirement be provided to the OCA, I&E and OSBA.

III. FIRE HYDRANTS

Q. MR. FOUGHT RECOMMENDS THAT SIXTEEN HYDRANTS THAT CANNOT PROVIDE MINIMUM FIRE FLOW OF 500 GALLONS PER MINUTE AT 20 POUNDS PER SQUARE INCH BE MARKED AS SUCH SO THAT THEY WILL ONLY BE USED FOR FLUSHING AND BLOW-OFFS. DO YOU AGREE WITH MR. FOUGHT'S RECOMMENDATION?

A. The Borough agrees to mark the sixteen hydrants so that they will only be used for flushing and blow offs.

IV. CUSTOMER COMPLAINTS

Q. MR. FOUGHT RECOMMENDS THAT THE BOROUGH KEEP A SINGLE

COMPLAINT LOG IN A LIVE EXCEL FORMAT THAT INCLUDES WHICH TYPE OF CUSTOMER (JURISDICTIONAL OR NON-JURISDICTIONAL) MADE THE COMPLAINT WITH THE FOLLOWING DETAIL: DATE; LOCATION; DIRTY WATER; RUSTY WATER; WATER TASTE, ODOR, OR COLOR; STAINING (OF LAUNDRY OR PLUMBING FIXTURES); REQUEST FOR WATER TESTING; CUSTOMER PROPERTY DAMAGE; INCOMPLETE SURFACE RESTORATION; AND HEALTH ISSUES; AND THE FINAL DISPOSITION OF THE COMPLAINT. DO YOU AGREE WITH MR. FOUGHT'S RECOMMENDATION?

A. The Borough maintains a customer complaint log. It accepts Mr. Fought's recommendation to maintain the log in the manner he proposes.

V. SEWER BILL

Q. MR. WALKER PROPOSES TO ADJUST THE BOROUGH'S CLAIM FOR SEWER BILLING USING A THREE-YEAR AVERAGE EXPENSE INSTEAD OF THE HISTORIC TEST YEAR ACTUAL EXPENSE CLAIMED BY THE BOROUGH. MR. WALKER POINTS OUT THAT THE BOROUGH HAS STATED THAT THE HISTORIC TEST YEAR EXPENSE INCREASED DUE TO SURCHARGES BASED ON HIGHER CONCENTRATION OF BOD/SS. FIRST, WHAT IS BOD/SS?

A. BOD is the acronym for Biological Oxygen Demand. SS is the acronym for Suspended Solids.

Q. IS THERE A REASON WHY THE BOROUGH IS SEEING HIGHER CONCENTRATIONS OF BOD/SS IN THE SYSTEM?

A. Yes. The higher concentrations are a result of improvements to the water treatment plant that allow water from the waste basin to be decanted and recycled to the treatment process. The remaining slurry in the waste basin then has less volume, but a higher concentration.

Q. DO YOU EXPECT TO CONTINUE TO SEE HIGHER CONCENTRATIONS OF BOD/SS FROM THE SYSTEM AND, CONSEQUENTLY, CONTINUING SURCHARGES ON THE SEWER BILL?

A. Yes.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

VERIFICATION

I, Michael J. Mehaffey, hereby state that the facts set forth in my Rebuttal Testimony, Borough of Hanover Statement No. 1-R, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Michael J. Mehaffey

Dated: October 20, 2021

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
HANOVER, PENNSYLVANIA

DIRECT TESTIMONY

OF

GREGORY R. HERBERT, RATE ANALYST

GANNETT FLEMING
VALUATION AND RATE CONSULTANTS, LLC

FILING REQUIREMENTS, REVENUE
AND REVENUE REQUIREMENTS

June 29, 2021

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION
RE: HANOVER MUNICIPAL WATER WORKS
DOCKET NO. R-2021-3026116

DIRECT TESTIMONY OF GREGORY R. HERBERT

Q. State your name and business address.

A. My name is Gregory R. Herbert. My business address is 1010 Adams Avenue, Audubon, Pennsylvania.

Q. By whom are you employed?

A. I am employed by Gannett Fleming Valuation and Rate Consultants, LLC (Gannett Fleming).

Q. Please state your position with Gannett Fleming and briefly describe your general duties and responsibilities.

A. My position is Rate Analyst, Rate Studies. My duties and responsibilities include the preparation of accounting and financial data for revenue requirements including pro forma adjustments to the historic test year, future test year and fully projected future test year revenue and operation and maintenance expense.

Q. What is your educational background?

A. I have a Bachelor of Science Degree in Economics from the Pennsylvania State University.

Q. Would you please describe your professional affiliations?

A. I am a member of the American Water Works Association and the National Association of Water Companies (NAWC).

Q. Briefly describe your work experience.

A. I joined Gannett Fleming Valuation and Rate Consultants, LLC (Gannett Fleming) in May 2017, as a Rate Analyst. A list of rate cases in which I assisted

Gannett Fleming staff is attached to my testimony. Prior to my employment at Gannett Fleming, I was a Senior Analyst, Performance Reporting Group of Cambridge Associates, LLC where I oversaw the financial preparation of monthly and annual performance and benchmarking reports for public and private endowment clients.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to explain and support the pro forma revenue and expense claims for the historic test year ended December 31, 2020, the future test year ended December 31, 2021, and the fully forecasted future test year ending December 31, 2022, and the statement of income for the Borough of Hanover - Hanover Municipal Water Works ("Borough").

Q. Have you prepared exhibits which present and support the Borough's claims in this proceeding?

A. Yes. I have prepared two exhibits: Exhibit GRH-1 and Exhibit GRH-2. Exhibit GRH-1 presents the filing requirements required under 52 Pa. Code Section 53.52 of the Pennsylvania Public Utility Commission Tariff Regulations. Exhibit GRH-1 presents the Borough's revenue requirements for the twelve months ending December 31, 2020, and December 31, 2022, and the associated data required under 52 Pa. Code Section 53.52 of the Pennsylvania Public Utility Commission Tariff Regulations.

Q. Please explain the contents of Exhibit GRH-2

A. Exhibit GRH-2 includes all the associated filing requirements for a major water rate case in excess of $1 million under 52 Pa. Code 53.53 of the Pennsylvania

Public Utility Commission Tariff Regulations. Where a filing requirement is fulfilled in other exhibits, those exhibits are referenced.

Q. Please explain the contents of Exhibit GRH-1.

A. The Borough provides water service to 7,010 customers located inside the municipal boundaries of the Borough and to 10,969 customers located outside the municipal boundaries of the Borough. The Public Utility Commission regulates the rates for the Borough's water service to its outside Borough customers. Exhibit GRH-1 contains Schedules 1 through 8 presenting the income statement for outside-Borough customers, pro forma revenue and expense statements for both inside-Borough and outside-Borough customers, and a summary of the measure of value for the total system.

Q. How did you determine the revenue requirement associated with outside-Borough customers only?

A. The revenue requirement associated with outside-Borough customers is based on a Cost of Service Allocation Study presented in Exhibit CEH-1 supported by the direct testimony of Ms. Constance E. Heppenstall, in Borough of Hanover Statement No. 3.

Q. What is the revenue requirement for outside-Borough customers?

A. The revenue requirement for outside-Borough customers is $7,222,314 and is presented on Schedule 1 in Exhibit GRH-1. The revenue requirement consists of operation and maintenance expenses of $5,210,095 less amount allocated to inside-Borough customers of $1,745,935 equals $3,464,160, taxes other than income of $165,163 less amount allocated to inside-Borough customers of $54,092 equals $111,071, and depreciation expense of $2,062,625 less amount

allocated to inside-Borough customers of $675,634 equals $1,386,991. The net operating income available for return is $2,260,092. This proposed revenue level produces a rate of return for service outside the Borough of 6.27%.

PRO FORMA OPERATION AND MAINTENANCE EXPENSES

Q. Please explain the development of the pro forma operation and maintenance expenses.

A. The operation and maintenance expenses for combined outside-Borough and inside-Borough customers is developed on Schedule 3 in Exhibit GRH-1. The statement begins on page 13 and shows the operation and maintenance expenses per books for the twelve months ended December 31, 2020, in column 2, identified by account in column 1. The pro forma outside-Borough and inside-Borough adjustments for the historic test year are shown in column 4 and referenced in column 3. The sum of columns 2 and 4 is shown in column 5 which is the pro forma operating expenses as of December 31, 2020. The pro forma outside-Borough and inside-Borough adjustments for the fully projected future test year are shown in column 7 and referenced in column 6. The sum of columns 5 and 7 is shown in column 8 which is the pro forma operating expenses as of December 31, 2022.

Q. Please explain the pro forma operating expense adjustments for the historic test year.

A. The pro forma adjustments for combined outside-Borough and inside-Borough customers or total system are set forth in Schedule 6, pages 21-22 of Exhibit GRH-1.

Adjustment E1 adjusts chemical expense to reflect the projected annual level of chemical usage at the treatment plant and the current unit cost. The total pro forma chemical cost is $257,420 for an increase of $22,620 over the test year expense of $234,800.

Q. Please continue.

A. Adjustment E2 normalizes estimated rate case expenses for this rate case over a 3-year period. Estimated rate case expenses are based on a fully litigated case and include legal fees, professional consulting fees for revenue requirement, rate base, rate of return, and rate design exhibits, supporting data and testimony as well as customer notice expenses.

Adjustment E3 adjusts the level of depreciation expense to include the ratemaking depreciation calculation as of December 31, 2020. The calculation of the ratemaking depreciation expense is found in Exhibit JJS-1, "Depreciation Study - Calculated Annual Depreciation Accruals as of December 31, 2020", sponsored by Mr. John Spanos.

Adjustment E4 transfers capital expenditures from operating expenses to Plant In Service. These items include expenses for main cleaning and service lines and repainting the exterior of the water filtration plant storage tank.

Adjustment E5 adjusts the health insurance premiums to reflect the budgeted level of insurance premiums for the water department employees for 2021. The adjustment is an increase of $95,973 over the pro forma expense of $854,777 for a total expense in the fully projected future test year of $950,750.

Adjustment E6 adjusts the employee benefits including workman's compensation, fire and liability insurance and life insurance to reflect the

Borough's budgeted expense in 2021. The expense is adjusted based on historic increases experienced by the Borough. The adjustment is an increase of $45,719 over the historic test year expense of $217,776 for a total pro forma expense of $263,495.

Adjustment E7 adjusts for the Borough's staffing changes. A laborer was terminated in March of 2020 and the position is considered vacant with no immediate plans to fill the position. The adjustment decreases labor expense by $9,812.

A maintenance mechanic retired in December 2020, and a licensed operator was promoted to fill the maintenance mechanic position for a decrease of $88,795 to labor expense. A laborer was promoted to filter plant trainee to fill the licensed operator position for an increase of $20,211 to labor expense. The water department hired a new laborer to backfill for the laborer promoted to filter plant trainee for an increase of $20,686. These staffing changes net to a total decrease of $57,711 to labor expense.

In May of 2021, the water department's dam maintenance laborer retired, and currently, the Borough has not decided if the position will be filled. A counter clerk retired in June 2021 and the water department is not planning to backfill this position. The resulting adjustment for the retired dam maintenance laborer is a decrease of $66,373, and for the retired counter clerk a decrease of $15,561 to labor expense.

The staffing changes reflected in Adjustment E7 decreases labor expense by a total of $139,643.

Adjustment E8 normalizes over three years an estimated one-time legal fee expense for the proceeding Tim S. McKercher, et al vs. Borough of Hanover, Hanover Municipal Water Works (Docket No. C-2020-3021080). The total adjustment is a decrease of $28,874 over the historic test year expense of $43,311 for a total pro forma expense of $14,437.

Q. Please explain the pro forma future test year and fully forecasted future test year operating expense adjustments.

A. The pro forma future test year and fully forecasted future test year adjustments for the total system (inside-Borough and outside-Borough) are set forth in Exhibit GRH-1, Schedule 6, pages 23-24.

Adjustment E9 adjusts pro forma salaries and wages to reflect the pro forma labor expense for the water employees based on wage rates effective as of January 1, 2021, and January 1, 2022, increase of 2.50% in both 2021 and 2022. The wages and salaries were projected for each employee based on the union contract percentage increase for 2021 and 2022. The total pro forma salaries and wages as of January 1, 2022, is $2,262,234. Subtracting the historic test year pro forma amount of $2,013,583 from the pro forma amount results in an adjustment of $101,938. The adjustment also includes a negative adjustment of $14,889 to payroll taxes as the historic test year pro forma amount is based on the 2020 per books expense and the pro forma future test year and fully projected future test year is based on the FICA tax rates and limits of 7.65% for the pro forma future test year and fully projected future test year labor expense.

Adjustment E10 adjusts Medical Insurance expense to reflect the Borough's expense in 2022. The expense is adjusted based on historic increases

experienced by the Borough. The adjustment is an increase of $57,045 over the pro forma expense of $950,750 for a total expense in the fully projected future test year of $1,007,795.

Adjustment E11 adjusts the level of depreciation expense to the ratemaking depreciation calculation from the historic test year amount to the fully forecasted future test year ending December 31, 2022. The calculation of the ratemaking future test year depreciation expense is found in Exhibit JJS-3, "Depreciation Study - Calculated Annual Depreciation Accruals as of December 31, 2022", sponsored by Mr. John Spanos.

Adjustment E12 adjusts for a new hire staffing change. In April of 2021, the water department hired a new laborer in the distribution department. The total adjustment increases the pro forma labor expense by $62,979.

Q. How are the combined pro forma operating and maintenance expenses then allocated to outside-Borough service?

A. The allocation of the combined pro forma operating and maintenance expenses are allocated to outside-Borough service based on the allocation factors presented in the Cost of Service Allocation Study. The allocated expenses are brought forward to the income statement in Schedule 1 of Exhibit GRH-1.

Q. Does that conclude the pro forma operating expense adjustments for the fully forecasted future test year for both outside-Borough and inside-Borough customers?

A. Yes, it does.

MEASURE OF VALUE

Q. Please explain the original cost measure of value on Schedule 4 of Exhibit GRH-1.

A. The total system (outside-Borough and inside-Borough) original cost measure of value as of December 31, 2020, December 31, 2021, and December 31, 2022, is comprised of the original cost less the ratemaking book reserve for the total utility plant in service less customers' advances for construction. These amounts are set forth in Exhibit GRH-1 and explained by Mr. John J. Spanos in Borough of Hanover Statement No. 4. Cash working capital, calculated by the rule-of-thumb method, is added to the net utility plant. The total original cost measure of value as of December 31, 2020, is $43,717,048, as of December 31, 2021, is $48,764,556, and as of December 31, 2022, is $53,560,839. The outside-Borough rate base amounts as of December 31, 2020, of $29,408,105, and $36,029,944 as of December 31, 2022, for the outside-Borough customers are calculated based on the Cost of Service Allocation Study presented in Exhibit CEH-1 and are brought forward to the operating statement in Schedule 1 to determine the rates of return under present and proposed rates for the outside-Borough customers.

Q. How was the amount of cash working capital determined?

A. The cash working capital claim is based on the rule-of-thumb method. This method is calculated at $671,907 for the fully projected future test year, which is 12.5% or one-eighth of the total system operation and maintenance expense. The outside-Borough cash working capital claim is $436,001 which is based on the Cost of Service Allocation study in Exhibit CEH-1.

PRO FORMA REVENUES

Q. Please explain the development of pro forma revenues under present and proposed rates.

A. The summary of pro forma revenues under present rates for inside-Borough and outside-Borough customers and under proposed rates for outside-Borough customers is presented on Schedule 2, pages 1 and 2, of Exhibit GRH-1. For outside-Borough service on page 2 of Schedule 2, the pro forma revenues under present rates for the historic test year in column 5 are developed by adding the pro forma historic test year revenue adjustments in column 4 to the revenues per books in column 2. The result is the pro forma historic test year revenues as of December 31, 2020, in column 5.

The pro forma revenues under present rates for the fully projected future test year are developed by adding the pro forma future test year revenue adjustments in column 7 to the pro forma historic test year revenues in column 5. The result is the pro forma fully projected future test year revenues as of December 31, 2022, in column 8. The pro forma revenue adjustments are presented in Schedule 5.

The pro forma revenues under proposed rates on page 2 of Schedule 2 for outside-Borough customers in column 11 are developed in Schedule 7. The percent increase and the amount of increase for each customer classification is shown in columns 9 and 10, respectively on Schedule 2.

Q. Please explain the revenue adjustments under present rates for the historic test year in Exhibit GRH-1, Schedule 5.

A. Adjustments R1 and R2 annualize revenue for the average annual gain or loss in the number of customers from December 31, 2019, to December 31, 2020 for

inside and outside-Borough customers, respectively. The change in the number of customers is multiplied by the average annual bill for each classification. One-half of the revenue is reflected in the adjustment assuming that the change in the number of customers occurred at mid-year.

Adjustment R3 imputes revenues for Borough-owned properties and Borough public fire service that are not billed by the Borough. Present rates are applied to the billing units for the Borough-owned properties as of December 31, 2020.

Q. Please explain the revenue adjustments under present rates for the future test year and the fully projected future test year in Schedule 5.

A. Adjustments R4 and R5 annualize revenue for the projected gain in customers through the end of the fully projected future test year based on the average annual gain or loss in the number of customers during 2019 and 2020 for inside and outside-Borough customers, respectively. The change in the number for the year is multiplied by 24 months divided by 12 months to reflect the number of customers added by December 31, 2022. The number of customers added is then multiplied by the average annual bill for each classification.

Adjustment R6 and R7 annualize revenue for the projected gain in private fire lines based on the average annual gain or loss in the number of private fire lines from 12/31/2019 to 12/31/2020 for inside and outside-Borough, respectively. The changes in the number of private fire lines are multiplied by 24 months divided by 12 months to reflect the number of customers added by December 31, 2022. This number of customers is then multiplied by the present monthly and quarterly private fire rates for a 6-inch fire line size.

Q. Describe the development of pro forma revenues under proposed rates.

A. Page 1 of Schedule 7 in Exhibit GRH-1 develops the pro forma revenues under proposed rates for the outside-Borough customers. Column 2 presents the historic test year Per Books revenue. Column 3 shows the application of present rates to the billing determinants in Schedule 8. Column 4 is the development of the adjustment factor based on Columns 2 and 3. Column 5 summarizes the application of proposed rates to the consumption analysis set forth on Schedule 8. Column 6 multiplies Column 5 by the adjustment factor in Column 4. Column 7 summarizes historic and future test year adjustments R8 through R14 from page 2 and 3 of Schedule 7. These adjustments are the same as adjustments R1 through R7 except that proposed rates are used to determine the adjustment amount. The total pro forma revenue under proposed rates, which is the sum of columns 6 and 8, is shown in column 9. The revenues in column 9 are brought forward to the revenue schedules in Schedule 2. An explanation of the proposed rates is provided in the direct testimony of Ms. Constance Heppenstall in Borough of Hanover Statement No 3.

Q. What is the rate of return based on revenues under proposed rates for outside-Borough Customers?

A. Schedule 1 of Exhibit GRH-1 shows a rate of return under proposed rates for outside-Borough customers of 6.27%. It is based on total pro forma revenues of $7,222,314 brought forth from Schedule 2, less operating income deductions of $4,962,222 resulting in income available for return of $2,260,092. The income available for return divided by the original cost measure of value of $36,029,944 results in a rate of return of 6.27%

Q. Is this the rate of return that the Borough can support?

A. Yes. The Borough can support a rate of return of 6.27% as shown in the direct testimony of Mr. Harold Walker, in the Borough of Hanover Statement No. 5 and Exhibit HW-1.

Q. How did you determine the operating revenue adjustments and rate base associated with outside-Borough customers only?

A. The cost of service associated with outside-Borough customers was based on a Cost of Service Allocation Study presented in Exhibit CEH-1 supported by the direct testimony of Constance E. Heppenstall, in Borough of Hanover Statement No. 3.

Q. Does this conclude your direct testimony?

A. Yes, it does.

GREGORY R. HERBERT – LIST OF CASES ASSISTED

	Year	Jurisdiction	Docket No.	Client/Utility	Subject
1.	2017	MO PSC	SR-2017-0286	Missouri-American Water Company	Cost of Service/Rate Design
2.	2018	PA PUC	2018-200208	SUEZ Water Pennsylvania	Revenue Requirements
3.	2018	NJ BPU	WR18050593	SUEZ Water New Jersey, Inc	Cost Allocation and Rate Design
4.	2019	PA PUC	2018-3006814	UGI Utilities Inc. - Gas Division	Cost of Service Allocation Studies
5.	2019	PA PUC	2019-3006904	Newtown Artesian Water Co.	Revenue Reqmts./Rate Design
6.	2019	PA PUC	2019-3010955	City of Lancaster – Sewer Fund	Rev. Reqmts./Cost of Service/Rates
7.	2020	PA PUC	2020-3017206	Philadelphia Gas Works	Cost of Service
8.	2020	PA PUC	2020-3019369	Pennsylvania American Water Co.	Cost of Service/Rate Design
9.	2020	PA PUC	2020-3019371	Pennsylvania American Water Co.	Cost of Service/Rate Design
10.	2020	PA PUC	2020-3020256	City of Bethlehem	Rev. Reqmts./Cost of Service/Rates
11.	2020	CA PUC	A2101003	San Jose Water Company	Rate Design

VERIFICATION

I, Gregory R. Herbert, hereby state that the facts set forth in my Direct Testimony, Borough of Hanover Statement No. 2, and related Exhibits GRH-1 and GRH-2, filed with the Public Utility Commission on June 29, 2021, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Gregory R. Herbert

Dated: June 29, 2021

Exhibit GRH-1

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

Hanover, Pennsylvania

RATE STUDY AND DATA
IN SUPPORT OF
PROPOSED SUPPLEMENT NO. 32 TO
TARIFF WATER PA. P.U.C. NO. 3

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania

Gannett Fleming

Excellence Delivered ***As Promised***

June 29, 2021

Borough of Hanover – Hanover Municipal Water Works
44 Frederick Street
Hanover, PA 17331

Attention: Mr. Samuel Miller, Director of Finance/Treasurer

Pursuant to your authorization, we have prepared a water rate study for the Borough of Hanover based on the level of operations of the Borough of Hanover – Hanover Municipal Water Works (Hanover or Borough) for the twelve-month periods ended December 31, 2020, December 31, 2021 and December 31, 2022. Appropriate ratemaking adjustments for known and measurable changes were made in order to reflect a more current level of cost of service.

On the basis of the supporting data presented in the following report, it is our opinion that the Borough of Hanover cannot continue to operate its water system without rate relief. An increase in water rates will afford the Borough an opportunity to achieve an adequate return on the original cost measure of value of its used and useful property that services outside-Borough customers.

We recommend that the Borough file with the Public Utility Commission, Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3, which proposes an increase in water rates for all general classes of service outside the Borough by approximately 28.9 percent. The overall increase in annual operating revenue from outside-Borough customers is approximately 27.6 percent.

The following report presents our conclusions in appropriate form for filing with the Pennsylvania Public Utility Commission in response to the data required under Subchapter 53.52 of the Commission's Tariff Regulations at Chapter 53 of Title 52 Pa. Code.

Respectfully submitted,

GANNETT FLEMING VALUATION
AND RATE CONSULTANTS, LLC

CONSTANCE E. HEPPENSTALL
Senior Project Manager, Rate Studies

GREGORY R. HERBERT
Rate Analyst

CEH:mle

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BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

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BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

SPECIFIC REASONS FOR PROPOSED INCREASE IN WATER RATES

Pursuant to Subsection 53.52(a)(1) and (b)(1) of Tariff Regulations

The Borough of Hanover – Hanover Municipal Water Works (Hanover or Borough) submits herewith the data required under 52 PA Code § 53.52 of the Pennsylvania Public Utility Commission Tariff Regulations in support of the proposed rates under Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3. The supporting data for the tariff revision is for the twelve-month periods ended December 31, 2020, December 31, 2021 and December 31, 2022, adjusted for ratemaking purposes. The last rate revision was effective in 2015, based on a fully projected future test year ended March 31, 2016.

Since the date of the last rate increase, the Borough has experienced higher levels of operation and maintenance expenses as a result of inflation and labor cost increases. The effect of these increases has reduced the rate of return on rate base to approximately 1.93%.

The specific reasons for Hanover's proposal to increase its rates for water service are as follows:

(a) To provide sufficient revenues to enable it to continue to discharge, properly, its public duty to furnish adequate, safe, and reliable water service pursuant to the safe drinking water standards prescribed and enforced by the PA Department of Environmental Protection and the Federal Environmental Protection Agency;

(b) To provide the cash flow necessary to continue to operate, maintain and renew its facilities properly and meet its financial obligations; and

(c) To afford the opportunity to achieve an adequate rate of return on the original cost invested in the water property.

UTILITY BASIS OF RATEMAKING

Pursuant to 52 PA Code § 53.52 of the Tariff Regulations, the supporting data are presented using the utility basis for ratemaking purposes. The utility basis includes, in addition to operating expenses, a provision for annual depreciation expense and a return on the depreciated original cost of the property (rate base) in place of debt service (lease rental) and renewals and replacements. The rate base and annual depreciation expense are calculated in Exhibit JJS-1, Exhibit JJS-2 and Exhibit JJS-3, as of December 31, 2020, December 31, 2021 and December 31, 2022, respectively.

RATE OF RETURN

Under present and proposed rates, the indicated rates of return for outside-Borough are presented below.

Rate of Return	Under Present Rates	Under Proposed Rates
Outside – Borough	1.93%	6.27%

The outside Borough rate of return of 1.93% under present rates is less than the 6.27% return that the Borough can justify based on an imputed capital structure of 48% debt, 52% equity, as set forth below. The capital structure weightings are based on comparable public utilities.

Debt/Equity	Capital Structure	Cost Rates	Recommended Weighted Cost	11% Tax Adjusted Equity Cost Rate	Weighted Cost
Debt	48.0%	2.98	1.43	--	1.43
Fund Equity	52.0%	10.45	5.43	9.30	4.84
Total	100.0%		6.86		6.27

PROPOSED RATES

Under Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3, general service water rates are increased by varying percentages by classification which would provide an overall 28.9% increase in revenues from outside-Borough customers. Rates for public fire protection remains unchanged. Refer to Schedule 2 for the increases by classification for outside-Borough customers. The revenues under proposed rates are developed in Schedule 8. Support for the proposed rate design is provided in the cost of service allocation study in Exhibit CEH-1. Schedule H in Exhibit CEH-1 provides a comparison of present and proposed rates as well as a comparison of customers' bills at various consumption levels by classification.

The Pennsylvania Public Utility Commission has jurisdiction and power under Section 1301 of the Public Utility Code to regulate rates for utility service furnished by a municipality to customers beyond its corporate boundaries. The requisite data and information in the following report and related exhibits, in support of the proposed rates,

include analyses of Hanover's entire water system property and its operation as well as for outside-Borough customers separately.

The data presented in support of proposed Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3 clearly indicate that the level of revenues from Hanover's present water rates is inadequate, and immediate rate relief is necessary. It is essential that the rates proposed under Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3 become effective as soon as possible, in order that Hanover recover the cost of rendering water service, including a return on the depreciated original cost of the water system's used or useful property, and continue to provide its customers with efficient, safe and reliable service.

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

TOTAL NUMBER OF CUSTOMERS SERVED OUTSIDE THE BOROUGH

Pursuant to Subsection 53.52(a)(2) of Tariff Regulations

OUTSIDE	**2019**	**2020**
RESIDENTIAL	10,177	10,285
COMMERCIAL	420	421
INDUSTRIAL	79	80
PUBLIC	38	40
PRIVATE FIRE	136	139
PUBLIC FIRE	4	4
TOTAL OUTSIDE	**10,854**	**10,969**

NUMBER OF CUSTOMERS WHOSE BILL WILL INCREASE OUTSIDE THE BOROUGH

Pursuant to Subsection 53.52(a)(3) of Tariff Regulations

OUTSIDE	**2019**	**2020**
RESIDENTIAL	10,177	10,285
COMMERCIAL	420	421
INDUSTRIAL	79	80
PUBLIC	38	40
PRIVATE FIRE	136	139
PUBLIC FIRE	4	4
TOTAL OUTSIDE	**10,854**	**10,969**

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

STATEMENT OF THE EFFECT OF THE PROPOSED
TARIFF CHANGES ON THE UTILITY'S CUSTOMERS

Pursuant to Subsection 53.52(a)(4) through (a)(11)
of Tariff Regulations

(a)(4): The proposed tariff changes will increase all customers' rates for outside-Borough water service by 28.9 percent. The overall increase in revenues is approximately 27.6 percent.

(a)(5): Refer to Schedule 1 in response to Subsection 53.52(c)(1), for the effect of the proposed tariff changes on the Borough's revenues and expenses.

(a)(6): The proposed tariff changes will not change the service rendered by the Hanover Borough – Hanover Municipal Water Works.

(a)(7): Not applicable.

(a)(8): Not applicable.

(a)(9): Customer polls were not taken to indicate customer acceptance and desire for the proposed tariff changes. The tariff changes are in the public interest as stated in response to Subsection 53.52(a)(1) of the tariff regulations.

(a)(10): The Borough of Hanover will implement the proposed tariff changes upon the Commission's approval.

(a)(11): Not applicable.

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

NUMBER OF CUSTOMERS WHOSE BILLS WILL BE DECREASED

Pursuant to Subsection 53.52(b)(5) of Tariff Regulations

Under the proposed rates, no customers' bills will be decreased for water service.

CALCULATION OF TOTAL REVENUE DECREASE
UNDER THE PROPOSED RATES PROJECTED TO AN ANNUAL BASIS

Pursuant to Subsection 53.52(b)(6) of Tariff Regulations

Under the proposed rates, operating revenues for water service will not decrease.

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

SUMMARY BY DETAILED PLANT ACCOUNTS
OF THE BOOK VALUE OF WATER UTILITY PLANT IN SERVICE
AS OF DECEMBER 31, 2020, DECEMBER 31, 2021 AND DECEMBER 31, 2022

Pursuant to Subsection 53.52(c)(3) of Tariff Regulations

Refer to Exhibit JJS1, Exhibit JJS-2 and Exhibit JJS-3 titled, "Depreciation Study - Calculated Annual Depreciation Accruals Related to Utility Plant at December 31, 2020", "Depreciation Study - Calculated Annual Depreciation Accruals Related to Utility Plant at December 31, 2021" and "Depreciation Study - Calculated Annual Depreciation Accruals Related to Utility Plant at December 31, 2022," for the book value of water utility plant by plant account.

DEPRECIATION RESERVE PER BOOKS AS OF DECEMBER 31, 2020, DECEMBER 31, 2021, AND DECEMBER 31, 2022, APPLICABLE TO WATER UTILITY PLANT IN SERVICE

Pursuant to Subsection 53.52(c)(4) of Tariff Regulations

Refer to Exhibit JJS1, Exhibit JJS-2 and Exhibit JJS-3 titled, "Depreciation Study - Calculated Annual Depreciation Accruals Related to Utility Plant at December 31, 2020", "Depreciation Study - Calculated Annual Depreciation Accruals Related to Utility Plant at December 31, 2021" and "Depreciation Study - Calculated Annual Depreciation Accruals Related to Utility Plant at December 31, 2022," for the depreciation reserve applicable to water utility plant in service.

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

BALANCE SHEET AS OF DECEMBER 31, 2019 and 2020

Pursuant To Subsection 53.52 (c)(2) of Tariff Regulations

	As of 12/31/2019	As of 12/31/2020
ASSETS		
Current Assets:		
Cash and Cash Equivalents		
Restricted	$ 143,854	$ 117,302
Unrestricted	7,590,303	6,642,700
Accounts Receivable	742,813	867,655
Grants Receivable		
Due from Other Funds	25,246	
Unbilled Services	449,339	439,698
Inventory	504,692	473,620
Prepaid Expenses	95,976	98,377
Total Current Assets	9,552,223	8,639,352
Cash and Cash Equivalents - Restricted	463,167	10,973,974
Net Pension Asset		
Bond Issuance Costs (Net of Accumulated Amortization)		
Capital Assets, Net	42,869,571	45,202,258
Total Assets	$ 52,884,961	$ 64,815,584
LIABILITIES AND FUND EQUITY		
Current Liabilities:		
Accounts Payable and Accrued Expenses	$ 201,471	$ 626,027
Accrued Wages	52,464	28,705
Accrued Compensated Absences	36,000	69,000
Unearned Revenue	3,110	
Accrued Interest Payable	139,934	186,231
Due to Other Funds	87,096	148,723
Consumer Deposits	143,854	117,302
Capital Lease Obligations	10,111	11,002
Bonds Payable (Net of Deferred Amounts)	445,038	848,772
Accounts Payable from Restricted Assets		10,363
Total Current Liabilities	1,119,078	2,046,125
Accrued Compensated Absences	643,053	609,349
Accrued Other Postemployment Benefits	635,240	
Net Pension Liability	(1,039,381)	649,846
Capital Lease Obligations	41,210	30,208
Consumer Deposits	463,167	345,865
Bonds Payable (Net of Current Portion)	18,878,072	28,801,594
Total Liabilities	20,740,439	32,482,987
Fund Equity:		
Invested In Capital Assets, Net of Related Debt	23,796,677	26,466,422
Restricted		
Unrestricted	7,756,394	6,959,539
Total Liabilities and Fund Equity	$ 52,293,510	$ 65,908,948

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF THE CALCULATION OF THE RATE OF RETURN UNDER PRESENT RATES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020
AND DECEMBER 31, 2022, AND THE ANTICIPATED RATE OF RETURN UNDER PROPOSED RATES
FOR OUTSIDE-BOROUGH CUSTOMERS

Pursuant To Subsection 53.52 (b)(2) and (c)(1) of Tariff Regulations

Line No.	Description	12 Months Ended 31-Dec-20	Pro Forma Test Year Adjustments Ref.	Pro Forma Test Year Adjustments Amount	Pro Forma Present Rates, 31-Dec-20	Pro Forma Fully Projected Future Test Year Test Year Adjustments Ref.	Pro Forma Fully Projected Future Test Year Test Year Adjustments Amount	Pro Forma Present Rates, 31-Dec-22	Under Proposed Rates, Supplement No. 32 to Tariff Water Pa-PUC No. 3 Increase	Under Proposed Rates, Supplement No. 32 to Tariff Water Pa-PUC No. 3 Pro Forma 31-Dec-22
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Operating Revenue	$ 5,550,978	Sch. 2	$ 19,322	$ 5,570,300	Sch. 2	$ 88,914	$ 5,659,214	$ 1,563,100	$ 7,222,314
2										
3	Operating Revenue Deductions:									
4	Operation and Maintenance									
5	Expenses	4,273,744	Sch. 3	(957,164)	3,316,579	Sch. 3	147,581	3,464,160		3,464,160
6	Taxes Other Than Income	121,083	Sch. 3	-	121,083	Sch. 3	(10,013)	111,071		111,071
7	Depreciation	747,731	Sch. 6	358,504	1,106,234	Sch. 6	280,756	1,386,991		1,386,991
8										
9	Total Operating									
10	Revenue Deductions	$ 5,142,558		$ (598,661)	$ 4,543,897		$ 418,325	$ 4,962,222	$ -	$ 4,962,222
11										
12										
13	Net Operating Income									
14	Available for Return	$ 408,421		$ 617,983	$ 1,026,403		$ (329,411)	$ 696,992	$ 1,563,100	$ 2,260,092
15										
16										
17	Original Cost Measure of Value	$ 29,408,105		$ -	$ 29,408,105		$ 6,621,839	$ 36,029,944		$ 36,029,944
18										
19	Rate of Return	1.39%			3.49%			1.93%		6.27%

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF OPERATING REVENUES UNDER PRESENT RATES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020 AND DECEMBER 31, 2022
FOR INSIDE-BOROUGH CUSTOMERS BY CUSTOMER CLASSIFICATION

Pursuant To Subsection 53.52 (b)(4) and (c)(5) of Tariff Regulations

Line No.	Customer Classification	Revenues Per Books, 12 Months Ended 31-Dec-20	Historic Test Year Pro Forma Adjustments Under Present Rates Ref.	Historic Test Year Pro Forma Adjustments Under Present Rates Amount	Pro Forma, Present Rates, 31-Dec-20	Fully Projected Future Test Year Pro Forma Adjustments Under Present Rates Ref.	Fully Projected Future Test Year Pro Forma Adjustments Under Present Rates Amount	Pro Forma, Present Rates, 31-Dec-22
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	INSIDE-BOROUGH							
2	Sales of Water							
3	Residential	$ 1,534,279	R1	$ 4,411	$ 1,538,690	R4	$ 17,165	$1,555,855
4	Commercial	419,449	R1	3,259	422,708	R4	8,692	431,400
5	Industrial	407,351			407,351			407,351
6	Public	29,360	R1,R3	737	30,097	R4	514	30,612
7	Private Fire Protection	99,429			99,429	R6	207	99,636
8	Public Fire Protection	-	R3	76,607	76,607			76,607
9								
10	Total Sales of Water	2,489,869		85,014	2,574,883		26,578	2,601,461
11								
12	Other Operating Revenues							
13	Penalties	5,058		-	5,058			5,058
14	Rents	24,678		-	24,678			24,678
15	Misc. Revenue	4,218			4,218			4,218
16	Retirees Reimbursement	16,254		-	16,254			16,254
17	Unmetered Sales	10,684		-	10,684			10,684
18	Merchandising and Jobbing	31,481		-	31,481			31,481
19								
20	Total Other Revenues	92,373		-	92,373		-	92,373
21								
22	Total Inside Borough	$ 2,582,242		$ 85,014	$ 2,667,256		$ 26,578	$ 2,693,834

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF OPERATING REVENUES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020 AND DECEMBER 31, 2022
AND THE CALCULATION OF THE PROPOSED REVENUE INCREASE FROM OUTSIDE-BOROUGH CUSTOMERS BY CUSTOMER CLASSIFICATION

Pursuant To Subsection 53.52 (b)(4) and (c)(5) of Tariff Regulations

Line No.	Customer Classification	Revenues Per Books, 12 Months Ended 31-Dec-20	Historic Test Year Pro Forma Adjustments Under Present Rates		Pro Forma, Present Rates, 31-Dec-20	Fully Projected Future Test Year Pro Forma Adjustments Under Present Rates		Pro Forma, Present Rates, 31-Dec-22	Under Proposed Rates, Supplement No. 32 to Tariff Water Pa-PUC No. 3		
									Increase		Pro Forma, Proposed Rates 31-Dec-22
			Ref.	Amount		Ref.	Amount		Percent	Amount	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	OUTSIDE-BOROUGH										
2	Sales of Water										
3	Residential	$ 2,850,764	R2	$ 14,612	$ 2,865,377	R5	$ 70,898	$ 2,936,274	26.8%	$ 787,988	$ 3,724,262
4	Commercial	339,859	R2	$ 301	340,160	R5	4,817	344,977	25.0%	86,178	431,155
5	Industrial	391,059	R2	$ 1,825	392,884	R5	7,299	400,183	23.7%	94,952	495,136
6	Large Industrial	1,275,662			1,275,662			1,275,662	37.7%	480,790	1,756,452
7	Public	108,941	R2	$ 2,584	111,525	R5	5,167	116,692	28.0%	32,667	149,359
8	Private Fire Protection	200,168			200,168	R7	732	200,901	40.1%	80,526	281,426
9	Public Fire Protection	131,772			131,772			131,772	0.0%	(0)	131,771
10											
11	Total Sales of Water	5,298,226		19,322	5,317,548		88,914	5,406,462	28.9%	1,563,100	6,969,562
12											
13	Other Operating Revenues										
14	Penalties	14,809			14,809			14,809		-	14,809
15	Rents	72,249			72,249			72,249		-	72,249
16	Misc. Revenue	12,348			12,348			12,348		-	12,348
17	Retirees Reimbursement	29,896			29,896			29,896			29,896
18	Unmetered Sales	31,280			31,280			31,280		-	31,280
19	Merchandising and Jobbing	92,169			92,169			92,169		-	92,169
20											
21	Total Other Revenues	252,752		-	252,752		-	252,752	0.0%	-	252,752
22											
23	Total Outside Borough	5,550,978		19,322	5,570,300		88,914	5,659,214	27.6%	1,563,100	7,222,314
24											

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF PRO FORMA OPERATING EXPENSES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020 AND DECEMBER 31, 2022

Pursuant To Subsection 53.52 (c)(5) of Tariff Regulations

Line No.	Account	Per Books, 12 Months Ended 31-Dec-20	Historic Test Year Pro Forma Adjustments Appen. B	Historic Test Year Pro Forma Adjustments Amount	Pro Forma, 31-Dec-20	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Appen. B	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Amount	Pro Forma, 31-Dec-22
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	**OPERATION AND MAINTENANCE EXPENSES**							
2								
3	**Source of Supply**							
4								
5	Operating Expense							
6	350 Labor	$ 254,489	E7	$ (66,373)	$ 188,117	E9	$ 9,523	$ 197,640
7	351 Gas and Diesel	1,860			1,860			1,860
8	351 Miscellaneous Operating Expenses	18,047			18,047			18,047
9	351 Power	11,177			11,177			11,177
10	Total Operating Expense	285,572		(66,373)	219,200		9,523	228,723
11								
12	Maintenance Expense							
13	353 Labor	2,901			2,901	E9	147	3,048
14								
15	353 Miscellaneous Maintenance Expenses	27,602			27,602			27,602
16	Total Maintenance Expense	30,503		-	30,503		147	30,649
17								
18	**Total Source of Supply**	316,075		(66,373)	249,702		9,670	259,373
19								
20	**Water Treatment**							
21								
22	Operating Expense							
23	354 Labor	301,776	E7	(57,710)	244,066	E9	12,356	256,422
24	355 Lab - Water Testing	23,594			23,594			23,594
25	355 Diesel Fuel	-			-			-
26	355 Chemicals	234,800	E1	22,620	257,420			257,420
27	355 Power	52,978			52,978			52,978
28	355 Sewer Bill	323,506			323,506			323,506
29	355 Stormwater Bill	950			950			950
30	355 Miscellaneous	55,691			55,691			55,691
31	Total Operating Expense	993,294		(35,089)	958,205		12,356	970,561

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF PRO FORMA OPERATING EXPENSES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020 AND DECEMBER 31, 2022

Pursuant To Subsection 53.52 (c)(5) of Tariff Regulations

Line No.	Account	Per Books, 12 Months Ended 31-Dec-20	Historic Test Year Pro Forma Adjustments Appen. B	Historic Test Year Pro Forma Adjustments Amount	Pro Forma, 31-Dec-20	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Appen. B	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Amount	Pro Forma, 31-Dec-22
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
32								
33	Maintenance Expense							
34	356 Labor	48,413			48,413	E9	2,451	50,864
35	356 Miscellaneous Maintenance Expenses	16,963			16,963			16,963
36	Total Maintenance Expense	65,376		-	65,376		2,451	67,827
37								
38	**Total Water Treatment**	1,058,670		(35,089)	1,023,581		14,807	1,038,388
39								
40	**Power and Pumping**							
41								
42	Operating Expense							
43	362 Labor	$ 286,098			$ 286,098	E9	$ 14,484	$ 300,582
44	365 Supplies and Expenses	21,038			21,038			21,038
45	366 Power	173,179			173,179			173,179
46	Total Operating Expense	480,315		-	480,315		14,484	494,799
47								
48	Maintenance Expense							
49	367 Pump Station - Labor	48,507			48,507	E9	2,456	50,963
50	367 Supplies and Equipment	26,255			26,255			26,255
51	367 Misc Maintenance Expense	-			-			-
52	Total Maintenance Expense	74,762		-	74,762		2,456	77,218
53								
54	**Total Power and Pumping**	555,077		-	555,077		16,939	572,017
55								

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF PRO FORMA OPERATING EXPENSES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020 AND DECEMBER 31, 2022

Pursuant To Subsection 53.52 (c)(5) of Tariff Regulations

Line No.	Account	Per Books, 12 Months Ended 31-Dec-20	Historic Test Year Pro Forma Adjustments Appen. B	Historic Test Year Pro Forma Adjustments Amount	Pro Forma, 31-Dec-20	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Appen. B	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Amount	Pro Forma, 31-Dec-22
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
56	**Transmission and Distribution**							
57								
58	Operating Expense							
59	368 Labor	219,597			219,597	E9,E12	74,096	293,694
60	369 Meter - Labor	118,259			118,259	E9	5,987	124,245
61	371 Streets Dept.	20,694			20,694			20,694
62	371 Streets Dept. - Misc Exp	3,653			3,653			3,653
63	372 Meter Dept.	1,144			1,144			1,144
64	373 Other Distribution Expense	9,219			9,219			9,219
65	374 Gratuitous Services	-			-	E9	-	-
66	Total Operating Expense	372,567		-	372,567		80,083	452,650
67								
68	Maintenance Expense							
69	375 Transmission Mains - Labor	-			-	E9	-	-
70	375 Transmission Mains - Supplies	-			-			-
71	376 Labor - Cleaning mains	69,310	E4	(69,310)	-			-
72	376 Distribution Mains - Labor	128,610			128,610	E9	6,511	135,121
73	376 Distribution Mains - Supplies	58,327			58,327			58,327
74	376 Distribution Mains - Contract Cleaning	1,450,343	E4	(1,450,343)	-			-
75	377 Service Lines - Labor	86,266			86,266	E9	4,367	90,633
76	377 Service Lines	19,506			19,506			19,506
77	378 Tanks and Reservoirs - Labor	8,622			8,622	E9	437	9,059
78	378 Tanks and Reservoirs	748			748			748
79	378 Tanks and Reservoirs - Tank Painting	56,750	E4	(56,750)	-			-
80	379 Meters -Labor	109,005			109,005	E9	5,518	114,523
81	379 Meters	13,285			13,285			13,285
82	380 Hydrants - Labor	10,772			10,772	E9	545	11,317
83	380 Hydrants	7,400			7,400			7,400
84	Total Maintenance Expense	2,018,944		(1,576,403)	442,541		17,378	459,919
85								
86	**Total Transmission and Distribution**	2,391,510		(1,576,403)	815,108		97,462	912,569

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF PRO FORMA OPERATING EXPENSES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020 AND DECEMBER 31, 2022

Pursuant To Subsection 53.52 (c)(5) of Tariff Regulations

Line No.	Account	Per Books, 12 Months Ended 31-Dec-20	Historic Test Year Pro Forma Adjustments Appen. B	Historic Test Year Pro Forma Adjustments Amount	Pro Forma, 31-Dec-20	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Appen. B	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Amount	Pro Forma, 31-Dec-22
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
87								
88	**Administrative and General Expenses**							
89	382 Wages and Salaries - Professional Staff	$ 43,750			$ 43,750	E9	$ 2,215	$ 45,965
90	383 Wages - General Office	370,177	E7	(15,561)	354,615	E9	17,952	372,568
91	384 Office Supplies	-			-			-
92	386 Misc Office Exp	2,706			2,706			2,706
93	387 General Office - Data Processing Maint.				-			-
94	387 General Office - Computer Support	10,679			10,679			10,679
95	387 General Office - Misc	8,635			8,635			8,635
96	387 General Office - Rent	93,199			93,199			93,199
97	387 General Office - Postage	35,620			35,620			35,620
98	387 General Office - Auditors	10,448			10,448			10,448
99	387 Rate Case Expense		E2	141,033	141,033			141,033
100	388 General Property Expense - Labor	83,775			83,775	E9	4,241	88,016
101	388 General Property Expense - Vehicle	14,117			14,117			14,117
102	388 General Property Expense - Misc	73,891			73,891			73,891
103	392 Legal Expenses	10,854			10,854			10,854
104	392 Legal Expenses - PA PUC Legal Fees	43,311	E8	(28,874)	14,437			14,437
105	396 Insurance - Health	854,777	E5	95,973	950,750	E10	57,045	1,007,795
106	396 Insurance - Workman's Comp	50,752	E6	1,498	52,250			52,250
107	396 Insurance - Fire and Liability	36,730	E6	1,270	38,000			38,000
108	396 Insurance -Life	5,504	E6	171	5,675			5,675
109	396 Insurance -Prescriptions	-			-			-
110	396 Retirees Hospitalization and Health	48,210			48,210			48,210
111	397 Employee Pension	124,790	E6	42,780	167,570			167,570
112	397 Unemployment Compensation	-			-			-
113	134 Professional Services - Engineering Servic	105,690			105,690			105,690
114	401 General Prop. Labor Exp	14,598			14,598	E9	739	15,337
115	608 Bank Fees	5,325			5,325			5,325
116	**Total Administrative and General Expenses**	2,047,538		238,290	2,285,828		82,192	2,368,020

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

STATEMENT OF PRO FORMA OPERATING EXPENSES FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2020 AND DECEMBER 31, 2022

Pursuant To Subsection 53.52 (c)(5) of Tariff Regulations

Line No.	Account	Per Books, 12 Months Ended 31-Dec-20	Historic Test Year Pro Forma Adjustments Appen. B	Historic Test Year Pro Forma Adjustments Amount	Pro Forma, 31-Dec-20	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Appen. B	FutureTest Year And Fully Projected FTY Pro Forma Adjustments Amount	Pro Forma, 31-Dec-22
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
117								
118	**Other Operating Expense**							
119	550 Merchandising and Jobbing - Labor	17,612			17,612	E9	892	18,503
120	550 Merchandising and Jobbing - Misc	41,225			41,225			41,225
121	559 Other Non-operating Expense	-			-			-
122	**Other Operating Expense**	58,837		-	58,837		892	59,728
123								
124	**Total Operation and Maintenance Exp.**	$ 6,427,708		$ (1,439,575)	$ 4,988,133		$ 221,962	$ 5,210,095
125								
126	**Taxes Other Than Income**							
127	390 Payment in Lieu of Taxes	3,325			3,325			3,325
128	Payroll Taxes	176,726			176,726	E9	(14,889)	161,837
129	Total Taxes Other Than Income	180,052		-	180,052		(14,889)	165,163
130								
131								
132	**Depreciation Expense**	1,111,967	E3	533,139	1,645,106	E11	417,519	2,062,625
133								
134								
135	**Total Expenses**	$ 7,719,726		$ (906,436)	$ 6,813,291		$ 624,592	$ 7,437,883

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

ORIGINAL COST MEASURE OF VALUE AS OF DECEMBER 31, 2020,
DECEMBER 31, 2021 AND DECEMBER 31, 2022*

	As of 12/31/2020	As of 12/31/2021	As of 12/31/2022
Original Cost of Utility Plant In Service	$ 60,692,678	$ 67,201,519	$ 73,711,519
Less: Accumulated Depreciation	(17,647,537)	(19,108,871)	(20,822,587)
Net Utility Plant	43,045,141	48,092,648	52,888,932
Add:			
Cash Working Capital	671,907	671,907	671,907
Total Original Cost Measure of Value	$ 43,717,048	$ 48,764,556	$ 53,560,839

* See Exhibits JJS-1, JJS-2 and JJS-3.

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
HISTORIC TEST YEAR

PRO FORMA OPERATING REVENUE ADJUSTMENTS
UNDER PRESENT RATES

Adj. Ref.	Explanation	Adjustment Increase (Decrease)

R1 To annualize Inside-Borough Operating Revenues for the average annual gain or loss in the number of customers from 12/31/2019 to 12/31/2020.

Customer Classification	Number of Customers 31-Dec-19	31-Dec-20	Customer Gain/(Loss)	Average Annual Bill, Present Rates	Annualized Revenue Adjustment (Half Year)	
(1)	(2)	(3)	(4)	(6)	(7)	
Residential	6,144	6,181	37	$ 238.41	$ 4,411	$ 4,411
Commercial	617	629	12	543.23	3,259	3,259
Industrial	52	52	-	-	-	-
Public	31	32	1	514.47	257	257
Total	6,844	6,894	50		$ 7,927	

R2 To annualize Outside-Borough Operating Revenues for the average annual gain or loss in the number of customers from 12/31/2019 to 12/31/2020.

Customer Classification	Number of Customers 31-Dec-19	31-Dec-20	Customer Gain/(Loss)	Average Annual Bill, Present Rates	Annualized Revenue Adjustment (Half Year)	
(1)	(2)	(3)	(5)	(6)	(7)	
Residential	10,177	10,285	108	270.60	$ 14,612	$ 14,612
Commercial	420	421	1	602.18	301	301
Industrial	78	79	1	3,649.63	1,825	1,825
Public	38	40	2	2,583.68	2,584	2,584
Total	10,713	10,825	112		19,322	

R3 To impute Inside-Borough operating revenues for Borough-owned properties and 262 Borough fire hydrants not billed by the Hanover Municipal Water Works

Customer Classification	Number of Bills	Usage, 1,000 Gals.	Present Quarterly Rates	Revenue	
INSIDE-BOROUGH - Public					
5/8" Quarterly	12		$ 26.55	319	
Consumption		51	$ 3.16	161	
Total				$ 480	$ 480
INSIDE-BOROUGH					
Public Fire Protection					
Number of Hydrants	276	Hydrants	$ 69.39	76,607	$ 76,607
Total Historic Test Year, Pro Forma Operating Revenue Adjustments Under Present Rates					$ 104,336

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
FULLY PROJECTED FUTURE TEST YEAR

PRO FORMA OPERATING REVENUE ADJUSTMENTS
UNDER PRESENT RATES

Adj. Ref.	Explanation	FPFTY Adjustment Increase (Decrease)

R4 To adjust Inside-Borough Operating Revenues for the projected gain in the number of customers during the fully projected future test year.

Customer Classification	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Average Annual Bill, Present Rates	FPFTY Revenue Adjustment	
Residential	35	37	36	72	$ 238.41	$ 17,165	$ 17,165
Commercial	4	12	8	16	543.23	8,692	8,692
Industrial		-	-	-		-	-
Public		1	1	1	514.47	514	514
Total	39	50	45	89		$ 26,371	

R5 To adjust Outside-Borough Operating Revenues for the projected gain in the number of customers during the fully projected future test year.

Customer Classification	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Average Annual Bill, Present Rates	FPFTY Revenue Adjustment	
Residential	153	108	131	262	$ 270.60	$ 70,898	$ 70,898
Commercial	7	1	4	8	602.18	4,817	4,817
Industrial	1	1	1	2	3,649.63	7,299	7,299
Public	-	2	1	2	2,583.68	5,167	5,167
Total	161	112	137	274		$ 88,182	

R6 To adjust Inside Borough Operating Revenues for projected gain in the number of private fire lines.

INSIDE BOROUGH - Private Fire Protection:

Size	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Present Quarterly Rates	FPFTY Revenue Adjustment	
6-Inch	1	1	1	2	$ 103.44	$ 207	$ 207

R7 To adjust Outside Borough Operating Revenues for projected gain in the number of private fire lines.

OUTSIDE BOROUGH - Private Fire Protection:

Size	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Present Quarterly Rates	FPFTY Revenue Adjustment	
6-Inch	2	3	3	6	$ 122.04	$ 732	$ 732

Total Future Test Year, Pro Forma Operating Revenue Adjustments Under Present Rates $ 115,492

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PRO FORMA OPERATING EXPENSE ADJUSTMENTS
UNDER PRESENT RATES

Adj. Ref.	Explanation	Adjustment Increase (Decrease)

E1 To adjust chemical expense to reflect the projected annual usage of chemicals required at the treatment plant and current unit prices.

Chemical	Projected Quantity	Units	Current Unit Cost	Units	Pro Forma Cost
Liquid Aluminum	1,005,193	lbs	0.0873	per lb.	$ 87,718
Caustic Soda	305,356	lbs	0.1250	per lb.	38,170
Flouride	59,648	lbs	0.7000	per lb.	41,754
Sodium Perm	25,246	lbs	1.8100	per lb.	45,695
Chlorine 150 Lb	2,250	lbs	1.0200	per lb.	2,295
Sodium Hypochlorite	319,458	lbs	0.0970	per lb.	30,987
Liquid Copper	655	gals	16.4900	per gallon	10,801
Total Pro Forma					257,420
Less Test Year Chemical Expense					234,800
Adjustment					$ 22,620

E2 To normalize operating expenses for the estimated cost of the rate case over three years.

			Adjustment Increase (Decrease)
Revenue Requirement, Rate Base, Depreciation, Rate of Return, Rate Design and Application	$ 244,000		
Legal Fees	175,000		
Customer Notice and Postage	4,100		
Total	$423,100		
Normalized Amount (3-year amortization)		$ 141,033	
Less: Test Year Rate Case Expense		-	
Adjustment			141,033

E3 To adjust depreciation expense as of December 31, 2020 (See Exhibit JJS-1)

		Adjustment Increase (Decrease)
Annual Depreciation Expense as of December 31, 2020	$ 1,645,106	
Less: Depreciation Expense Per Books	1,111,967	
Adjustment		533,139

E4 To transfer capital expenditures from operating expense to Plant In Service.

	2020 Amount	Adjustment Increase (Decrease)
Distribution Mains - Contract Cleaning and Lining per Books	1,450,343	
Labor - Cleaning and Lining Mains	69,310	
Tanks and Reservoirs - Tank Painting	56,750	
Adjustment - Distribution Mains cleaning and lining		$ (1,450,343)
Adjustment - Labor - Cleaning and Lining Mains		(69,310)
Adjustment - Tanks and Reservoirs - Tank Painting		(56,750)

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PRO FORMA OPERATING EXPENSE ADJUSTMENTS
UNDER PRESENT RATES

Adj. Ref.	Explanation			Adjustment Increase (Decrease)
E5	To adjust Hospitalization and Health Insurance Premium to reflect the 2021 Expense. Expense for 2021 is based on the Borough estimate.			
			2021 Amount	
	396 Insurance - Health		$ 950,750	
	Less: Insurance - Health per Books		854,777	
	Adjustment			$ 95,973
E6	To adjust Employee Benefits to reflect the 2021 Expense. Expense for 2021 is based on the Borough estimate.			
			2021 Amount	
	396 Insurance - Workman's Comp		$ 52,250	
	396 Insurance - Fire and Liability		38,000	
	396 Insurance -Life		5,675	
	397 Employee Pension		167,570	
	Total		263,495	
	Less: Insurance - Workman's Comp		50,752	
	Less: Insurance - Fire and Liability		36,730	
	Less: Insurance -Life		5,504	
	Less: Employee Pension		124,790	
	Total		217,776	
	Adjustment			$ 45,719
E7	To adjust labor expense for staffing changes.			

Expense Category	Staff Change	Title	Difference	
Water Treatment	Terminated	Laborer	$ (9,812)	
Water Treatment	Retired	Maintenance Mechanic	(88,795)	
Water Treatment	Promoted	Operator to Maint. Mechanic	20,211	
Water Treatment	Promoted	Laborer to Filter Plant Trainee	20,686	
		Subtotal	(57,710)	
Administrative and General	Retired	Counter Clerk	(15,561)	
		Subtotal	(15,561)	
Source of Supply	Retired	Dam Maintenance	(66,373)	
		Subtotal	(66,373)	
Total			$ (139,643.43)	$ (139,643)

E8	To normalize PA PUC Legal fees for Historic Test Year over three years.			
	392 Legal Expenses - PA PUC Legal Fees	$ 43,311		
	Normalized Amount (3-year amortization)		$ 14,437	
	Less: Test Year Rate Case Expense		43,311	
	Adjustment			$ (28,874)
	TotaL, Pro Forma Operating Expense Adjustments			$ (906,436)

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PRO FORMA OPERATING EXPENSE ADJUSTMENTS
UNDER PRESENT RATES

Adj. Ref.	Explanation	Adjustment Increase (Decrease)

E9 To adjust Pro Forma 2020 salaries and wages to reflect the change in wage rates as of January 1, 2021 and January 1, 2022

Account	Pro Forma 2020	Pro Forma 2021	Pro Forma 2022	Increase (Decrease)	
Source of Supply					
350 Labor	$ 188,117	$ 192,820	$ 197,640	$ 9,523	$ 9,523
353 Labor	2,901	2,974	3,048	147	147
Water Treatment					
354 Labor	244,066	250,168	256,422	12,356	12,356
356 Labor	48,413	49,623	50,864	2,451	2,451
Power and Pumping					
362 Labor	286,098	293,251	300,582	14,484	14,484
367 Pump Station - Labor	48,507	49,720	50,963	2,456	2,456
Transmission and Distribution					
368 Labor	219,597	225,087	230,714	11,117	11,117
369 Meter - Labor	118,259	121,215	124,245	5,987	5,987
374 Gratuitous Services	-	-	-	-	-
375 Transmission Mains - Labor	-	-	-	-	-
376 Distribution Mains - Labor	128,610	131,825	135,121	6,511	6,511
377 Service Lines - Labor	86,266	88,423	90,633	4,367	4,367
378 Tanks and Reservoirs - Labor	8,622	8,838	9,059	437	437
379 Meters -Labor	109,005	111,730	114,523	5,518	5,518
380 Hydrants - Labor	10,772	11,041	11,317	545	545
Administrative and General Expenses					
382 Salaries - Professional Staff	43,750	44,844	45,965	2,215	2,215
383 Wages - General Office	354,615	363,481	372,568	17,952	17,952
388 General Property Expense - Labor	83,775	85,869	88,016	4,241	4,241
401 General Prop. Labor Exp	14,598	14,963	15,337	739	739
Other Operating Expense					
550 Merchandising and Jobbing - Labor	17,612	18,052	18,503	892	892
Total Labor	$ 2,013,583	$ 2,063,923	$ 2,115,521	$ 101,938	
Payroll Taxes	$ 176,726	$ 157,890	$ 161,837	$ (14,889)	(14,889)

E10 To adjust Hospitalization and Health Insurance Premium to reflect the 2022 Expense.

	FPFTY Amount	
396 Insurance - Health	$ 1,007,795	
Less: Insurance - Health Per Books 2020	950,750	
Adjustment		$ 57,045

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PRO FORMA OPERATING EXPENSE ADJUSTMENTS
UNDER PRESENT RATES

Adj. Ref.	Explanation		Adjustment Increase (Decrease)
E11	To adjust depreciation expense as of December 31, 2022 (See Exhibit JJS-2)		
	Annual Depreciation Expense as of December 31, 2022	$ 2,062,625	
	Less: Annual Depreciation Expense as of December 31, 2020	1,645,106	
	Adjustment		$ 417,519
E12	To adjust labor expense for staffing changes.		
		Increase (Decrease)	
New Hire	Laborer (Distribution Dept.)	$ 62,979	
		62,979	$ 62,979
	Total, Pro Forma Operating Expense Adjustments		$ 624,592

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

SUMMARY OF APPLICATION OF PRESENT AND PROPOSED RATES TO CONSUMPTION ANALYSIS AS OF 12/31/2020
AND PRO FORMA REVENUES UNDER PROPOSED RATES AS OF 12/31/2022

Customer Classification	Revenues 12 Months Ended 31-Dec-20	Bill Analysis, Revenues, Present Rates	Adjustment Factor	Application of Proposed Rates to Bill Analysis	Adjusted Revenue at Proposed Rates	Pro Forma Historic, FTY and FPFTY Adjustments Under Proposed Rates		Pro Forma, Proposed Rates, 31-Dec-22
						Ref.	Amount	
(1)	(2)	(3)	(4)=(2)/(3)	(5)	(6)=(5)X(4)	(7)	(8)	(9)
OUTSIDE-BOROUGH								
Residential	$ 2,850,764	$ 2,851,799	0.999637	$ 3,625,661	$ 3,624,345	R9,R12	$ 99,917	$ 3,724,262
Commercial	339,859	342,096	0.993461	427,374	424,579	R9,R12	6,576	431,155
Industrial	391,059	392,531	0.996251	486,669	484,844	R9,R12	10,291	495,136
Large Industrial	1,275,662	1,280,463	0.996251	1,763,062	1,756,452			1,756,452
Public	108,941	108,795	1.001346	140,837	141,026	R9,R12	8,333	149,359
Private Fire	200,168	201,044	0.995645	281,456	280,230	R14	1,196	281,426
Public Fire	131,772	132,119	0.997371	132,119	131,771			131,771
Total Outside	5,298,226	5,308,847		6,857,177	6,843,248		126,313	6,969,562
Total	$ 7,788,095	$ 7,803,962	0.997967	$ 9,352,291	$ 9,333,116		$ 237,905	$ 9,571,021

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
HISTORIC TEST YEAR

PRO FORMA OPERATING REVENUE ADJUSTMENTS
UNDER PROPOSED RATES

Adj. Ref.	Explanation	HTY Adjustment Increase (Decrease)

R8 To annualize Inside-Borough Operating Revenues for the average annual gain or loss in the number of customers from 12/31/2019 to 12/31/2020.

Customer Classification	Number of Customers 31-Dec-19	31-Dec-20	Customer Gain/(Loss)	Average Annual Bill, Proposed Rates	Annualized Revenue Adjustment (Half Year)	
(1)	(2)	(3)	(4)	(6)	(7)	
Residential	6,144	6,181	37	$ 238.41	$ 4,411	$ 4,411
Commercial	617	629	12	543.23	3,259	3,259
Industrial	52	52	-		-	-
Public	31	32	1	514.47	257	257
Total	6,844	6,894	50		$ 7,927	

R9 To annualize Outside-Borough Operating Revenues for the average annual gain or loss in the number of customers from 12/31/2019 to 12/31/2020.

Customer Classification	Number of Customers 31-Dec-19	31-Dec-20	Customer Gain/(Loss)	Average Proposed Rates	Annualized Revenue Adjustment (Half Year)	
(1)	(2)	(3)	(5)	(6)	(7)	
Residential	10,177	10,285	108	345.73	$ 9,335	$ 9,335
Commercial	420	421	1	797.10	199	199
Industrial	78	79	1	4,573.98	1,143	1,143
Public	38	40	2	3,333.19	1,667	1,667
Total	10,713	10,825	112		12,344	

R10 To impute Inside-Borough operating revenues for Borough-owned properties and 262 Borough fire hydrants not billed by the Hanover Municipal Water Works

Customer Classification	Number of Bills	Usage, 1,000 Gals.	Proposed Quarterly Rates	Revenue	
INSIDE-BOROUGH - Public					
5/8" Quarterly	12		$ 26.55	$ 319	
Consumption		51	$ 3.16	161	
Total				$ 480	$ 480
INSIDE-BOROUGH					
Public Fire Protection					
Number of Hydrants	276 Hydrants		$ 69.39	76,607	$ 76,607
Total Historic Test Year, Pro Forma Operating Revenue Adjustments Under Proposed Rates					$ 97,358

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
FULLY PROJECTED FUTURE TEST YEAR

PRO FORMA OPERATING REVENUE ADJUSTMENTS
UNDER PROPOSED RATES

Adj. Ref.	Explanation	FPFTY Adjustment Increase (Decrease)

R11 To adjust Inside-Borough Operating Revenues for the projected gain in the number of customers during the fully projected future test year.

Customer Classification	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Average Annual Bill, Proposed Rates	Annualized Revenue Adjustment	
Residential	35	37	36	72	$ 238.41	$ 17,165	$ 17,165
Commercial	4	12	8	16	543.23	8,692	8,692
Industrial		-	-	-		-	-
Public		1	1	1	514.47	514	514
Total	39	50	45	89		$ 26,371	

R12 To adjust Outside-Brough Operating Revenues for the projected gain in the number of customers during the fully projected future test year.

Customer Classification	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Average Annual Bill, Proposed Rates	Annualized Revenue Adjustment	
Residential	153	108	131	262	$ 345.73	$ 90,582	$ 90,582
Commercial	7	1	4	8	797.10	6,377	6,377
Industrial	1	1	1	2	4,573.98	9,148	9,148
Public	-	2	1	2	3,333.19	6,666	6,666
Total	161	112	137	274		$ 112,773	

R13 To adjust Inside Borough Operating Revenues for projected gain in the number of private fire lines.

INSIDE BOROUGH - Private Fire Protection:

Size	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Proposed Quarterly Rates	Revenue	
6-Inch	1	1	1	2	$ 103.44	$ 207	$ 207

R14 To adjust Outside-Borough Operating Revenues for projected gain in the number of private fire lines.

OUTSIDE BOROUGH - Private Fire Protection:

Size	Gain or Loss in Number of Customers 31-Dec-19	31-Dec-20	Annual Average Customer Gain/(Loss)	FPFTY Customer Gain/(Loss)	Proposed Quarterly Rates	Revenue	
6-Inch	2	3	3	7	$ 170.85	$ 1,196	$ 1,196

Total Future Test Year, Pro Forma Operating Revenue Adjustments Under Proposed Rates $ 140,547

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
INSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Present Revenue	Proposed Rates	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Residential - Quarterly			
Customer Charge						
5/8	23,132		$ 26.55	614,155	$ 26.55	614,155
3/4	172		36.72	6,316	36.72	6,316
1	1,257		57.09	71,762	57.09	71,762
1 1/2	56		108.12	6,055	108.12	6,055
2	59		169.14	9,979	169.14	9,979
3	4		362.64	1,451	362.64	1,451
4	4		617.25	2,469	617.25	2,469
6			1,279.26	-	1,279.26	-
8			1,839.45	-	1,839.45	-
Subtotal	24,684			712,187		712,187
All Usage	-	252,623	3.1600	798,289	3.1600	798,289
Subtotal	-	252,623		798,289		798,289
Total	24,684	252,623		1,510,476		1,510,476
			Residential - Monthly			
Customer Charge						
5/8			$ 8.85	-	$ 8.85	-
3/4			12.24	-	12.24	-
1			19.03	-	19.03	-
1 1/2			36.04	-	36.04	-
2	12		56.38	677	56.38	677
3			120.88	-	120.88	-
4	24		205.75	4,938	205.75	4,938
6			426.42	-	426.42	-
8			613.15	-	613.15	-
Subtotal	36			5,615		5,615
All Usage	-	5,932	3.1600	18,745	3.1600	18,745
Subtotal	-	5,932		18,745		18,745
Total	36	5,932		24,360		24,360
Total Residential	24,720	258,555		1,534,836		1,534,836

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
INSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Present Revenue	Proposed Rates	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Commercial - Quarterly			
Customer Charge						
5/8	1,361		$ 26.55	36,135	$ 26.55	36,135
3/4	240		36.72	8,813	36.72	8,813
1	366		57.09	20,895	57.09	20,895
1 1/2	178		108.12	19,245	108.12	19,245
2	206		169.14	34,843	169.14	34,843
3	40		362.64	14,506	362.64	14,506
4	8		617.25	4,938	617.25	4,938
6	4		1,279.26	5,117	1,279.26	5,117
8			1,839.45	-	1,839.45	-
Subtotal	2,403			144,492		144,491
All Usage	-	84,988	3.1600	268,562	3.1600	268,562
Subtotal	-	84,988		268,562		268,562
Total	2,403	84,988		413,054		413,053
			Commercial - Monthly			
Customer Charge						
5/8			$ 8.85	-	$ 8.85	-
3/4			12.24	-	12.24	-
1	25		19.03	476	19.03	476
1 1/2	36		36.04	1,297	36.04	1,297
2	24		56.38	1,353	56.38	1,353
3	12		120.88	1,451	120.88	1,451
4			205.75	-	205.75	-
6			426.42	-	426.42	-
8			613.15	-	613.15	-
Subtotal	97			4,577		4,577
All Usage	-	1,449	3.1600	4,579	3.1600	4,579
Subtotal	-	1,449		4,579		4,579
Total	97	1,449		9,156		9,156
Total Commercial	2,500	86,437		422,210		422,209

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
INSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Present Revenue	Proposed Rates	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Industrial - Quarterly			
Customer Charge						
5/8	18		$ 26.55	478	$ 26.55	478
3/4	19		36.72	698	36.72	698
1	16		57.09	913	57.09	913
1 1/2	24		108.12	2,595	108.12	2,595
2	36		169.14	6,089	169.14	6,089
3			362.64	-	362.64	-
4			617.25	-	617.25	-
6			1,279.26	-	1,279.26	-
8			1,839.45	-	1,839.45	-
Subtotal	113			10,773		10,773
All Usage	-	13,101	3.1600	41,399	3.1600	41,399
Subtotal	-	13,101		41,399		41,399
Total	113	13,101		52,172		52,172
			Industrial - Monthly			
Customer Charge						
5/8			$ 8.85	-	$ 8.85	-
3/4			12.24	-	12.24	-
1	12		19.03	228	19.03	228
1 1/2	12		36.04	432	36.04	432
2	71		56.38	4,003	56.38	4,003
3	24		120.88	2,901	120.88	2,901
4	107		205.75	22,015	205.75	22,015
6			426.42	-	426.42	-
8			613.15	-	613.15	-
Subtotal	226			29,579		29,580
All Usage	-	103,523	3.1600	327,133	3.1600	327,133
Subtotal	-	103,523		327,133		327,133
Total	226	103,523		356,712		356,713
Total Industrial	339	116,624		408,884		408,885

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
INSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Present Revenue	Proposed Rates	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Public - Quarterly			
Customer Charge						
5/8	20		$ 26.55	531	$ 26.55	531
3/4	12		36.72	441	36.72	441
1	12		57.09	685	57.09	685
1 1/2	8		108.12	865	108.12	865
2	20		169.14	3,383	169.14	3,383
3	16		362.64	5,802	362.64	5,802
4	12		617.25	7,407	617.25	7,407
6			1,279.26	-	1,279.26	-
8			1,839.45	-	1,839.45	-
Subtotal	100			19,114		19,114
All Usage	-	3,230	3.1600	10,207	3.1600	10,207
Subtotal	-	3,230		10,207		10,207
Total	100	3,230		29,321		29,321
			Private Fire - Quarterly			
Customer Charge						
4	100		$ 35.61	3,561	$ 35.61	3,561
6	208		103.44	21,516	103.44	21,516
8	112		221.97	24,861	221.97	24,861
10	12		396.45	4,757	396.45	4,757
12	4		534.39	2,138	534.39	2,138
Hydrant	416		103.44	43,031	103.44	43,031
Total	852			99,864		99,863
Total - Inside	28,511	464,846		2,495,115		2,495,114

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Revenue	Proposed Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Residential - Quarterly			
Customer Charge						
5/8	39,186		$ 26.55	1,040,388	$ 26.55	1,040,388
3/4	405		36.72	14,872	36.72	14,872
1	1,538		57.09	87,804	57.09	87,804
1 1/2	19		108.12	2,054	108.12	2,054
2	24		169.14	4,059	169.14	4,059
3	8		362.64	2,901	362.64	2,901
4	8		617.25	4,938	617.25	4,938
6			1,279.26	-	1,279.26	-
8			1,839.45	-	1,839.45	-
Subtotal	41,188			1,157,016		1,157,016
All Usage	-	438,713	3.8540	1,690,800	5.6153	2,463,505
Subtotal	-	438,713		1,690,800		2,463,505
Total	41,188	438,713		2,847,816		3,620,521
			Residential - Monthly			
Customer Charge						
5/8			$ 8.85	-	$ 8.85	-
3/4			12.24	-	12.24	-
1			19.03	-	19.03	-
1 1/2			36.04	-	36.04	-
2			56.38	-	56.38	-
3	12		120.88	1,451	120.88	1,451
4			205.75	-	205.75	-
6			426.42	-	426.42	-
8			613.15	-	613.15	-
Subtotal	12			1,451		1,451
All Usage	-	657	3.8540	2,532	5.6153	3,689
Subtotal	-	657		2,532		3,689
Total	12	657		3,983		5,140
Total Residential	41,200	439,370		2,851,799		3,625,661

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Revenue	Proposed Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Commercial - Quarterly			
Customer Charge						
5/8	824		$ 26.55	21,877	$ 26.55	21,877
3/4	90		36.72	3,305	36.72	3,305
1	409		57.09	23,350	57.09	23,350
1 1/2	138		108.12	14,921	108.12	14,921
2	157		169.14	26,555	169.14	26,555
3	24		362.64	8,703	362.64	8,703
4	16		617.25	9,876	617.25	9,876
6	8		1,279.26	10,234	1,279.26	10,234
8			1,839.45	-	1,839.45	-
Subtotal	1,666			118,821		118,821
All Usage	-	60,116	3.4450	207,100	4.7989	288,491
Subtotal	-	60,116		207,100		288,491
Total	1,666	60,116		325,921		407,312
			Commercial - Monthly			
Customer Charge						
5/8	12		$ 8.85	106	$ 8.85	106
3/4			12.24	-	12.24	-
1	12		19.03	228	19.03	228
1 1/2			36.04	-	36.04	-
2	36		56.38	2,030	56.38	2,030
3	12		120.88	1,451	120.88	1,451
4	12		205.75	2,469	205.75	2,469
6			426.42	-	426.42	-
8			613.15	-	613.15	-
Subtotal	84			6,284		6,284
All Usage	-	2,871	3.4450	9,891	4.7989	13,778
Subtotal	-	2,871		9,891		13,778
Total	84	2,871		16,175		20,062
Total Commercial	1,750	62,987		342,096		427,374

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Revenue	Proposed Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Industrial - Quarterly			
Customer Charge						
5/8	44		$ 26.55	1,168	$ 26.55	1,168
3/4			36.72	-	36.72	-
1	28		57.09	1,599	57.09	1,599
1 1/2	36		108.12	3,892	108.12	3,892
2	65		169.14	10,994	169.14	10,994
3	24		362.64	8,703	362.64	8,703
4	8		617.25	4,938	617.25	4,938
6			1,279.26	-	1,279.26	-
8			1,839.45	-	1,839.45	-
Subtotal	205			31,294		31,294
All Usage	-	59,126	3.6070	213,267	4.6170	272,985
Subtotal	-	59,126		213,267		272,985
Total	205	59,126		244,561		304,279
			Industrial - Monthly			
Customer Charge						
5/8	24		$ 8.85	212	$ 8.85	212
3/4			12.24	-	12.24	-
1			19.03	-	19.03	-
1 1/2	36		36.04	1,297	36.04	1,297
2	52		56.38	2,932	56.38	2,932
3	36		120.88	4,352	120.88	4,352
4	79		205.75	16,254	205.75	16,254
6			426.42	-	426.42	-
8			613.15	-	613.15	-
Subtotal	227			25,047		25,047
All Usage	-	34,079	3.6070	122,923	4.6170	157,343
Subtotal	-	34,079		122,923		157,343
Total	227	34,079		147,970		182,390
Total Industrial	432	93,205		392,531		486,669
			Large Industrial - Monthly			
Customer Charge						
5/8			$ 8.85	-	$ 8.85	-
3/4			12.24	-	12.24	-
1			19.03	-	19.03	-
1 1/2	12		36.04	432	36.04	432
2			56.38	-	56.38	-
3			120.88	-	120.88	-
4	24		205.75	4,938	205.75	4,938
6	12		426.42	5,117	426.42	5,117
Subtotal	48			10,487		10,487
All Usage	-	395,508	3.2110	1,269,976	4.4312	1,752,575
Subtotal	-	395,508		1,269,976		1,752,575
Total	48	395,508		1,280,463		1,763,062

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Revenue	Proposed Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Public - Quarterly			
Customer Charge						
5/8	20		$ 26.55	531	$ 26.55	531
3/4	8		36.72	294	36.72	294
1	23		57.09	1,313	57.09	1,313
1 1/2	20		108.12	2,162	108.12	2,162
2	44		169.14	7,442	169.14	7,442
3	24		362.64	8,703	362.64	8,703
4	8		617.25	4,938	617.25	4,938
6			1,279.26	-	1,279.26	-
8			1,839.45	-	1,839.45	-
Subtotal	147			25,383		25,383
All Usage	-	22,214	3.4450	76,527	4.7989	106,603
Subtotal	-	22,214		76,527		106,603
Total	147	22,214		101,910		131,986
			Public - Monthly			
Customer Charge						
5/8			8.84	-	8.85	-
3/4			12.24	-	12.24	-
1			19.03	-	19.03	-
1 1/2	12		36.04	432	36.04	432
2			56.37	-	56.38	-
3	12		120.88	1,451	120.88	1,451
4			205.75	-	205.75	-
6			426.42	-	426.42	-
Subtotal	24			1,883		1,883
All Usage	-	1,452	3.4450	5,002	4.7989	6,968
Subtotal	-	1,452		5,002		6,968
Total	24	1,452		6,885		8,851
Total Public	171	23,666		108,795		140,837

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE THE BOROUGH

APPLICATION OF PRESENT RATES AND PROPOSED RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECEMBER 31, 2020

Rate Block 1000 Gallons	Number Of Bills	Total Consumption	Present Rate	Revenue	Proposed Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Private Fire - Quarterly			
Customer Charge						
4	68		$ 42.03	2,858	$ 58.83	4,000
6	248		122.04	30,266	170.85	42,371
8	128		261.87	33,519	366.63	46,929
10	64		467.73	29,935	654.81	41,908
12			597.27	-	836.19	-
Hydrant	856		122.04	104,466	170.85	146,248
Total	1,364			201,044		281,456
			Public Fire - Quarterly			
Customer Charge						
Hydrant	1,904		$ 69.39	132,119	$ 69.39	132,119
Total	1,904			132,119		132,119
Total - Outside	46,869	1,014,736		5,308,847		6,857,177

Exhibit GRH-2

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

Hanover, Pennsylvania

RESPONSES TO FILING REQUIREMENTS REQUIRED UNDER 52 PA. CODE §53.53 OF THE PENNSYLVANIA PUBLIC UTILITY COMMISSION TARIFF REGULATIONS

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania

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Exhibit D I-1

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO STATEMENT OF INCOME
FILING REQUIREMENTS

1. Provide comparative operating statements for the historic test year and the immediately preceding 12 months showing increases and decreases between the two periods. These statements should supply detailed explanation of the causes of the major (greater than 15%) variances between the historic test year and preceding year by detailed account number. Limit the explanation to differences of $10,000 or greater.

RESPONSE

Please refer to attached schedule.

HANOVER BOROUGH - HANOVER MUNICIPAL WATER WORKS

COMPARATIVE OPERATING STATEMENTS FOR YEARS ENDED DECEMBER 31, 2019 AND 2020

	2019	2020	Increases/ Decreases	Percentage Difference	Reason for Variance
Revenue					
Residential	$ 4,191,753	$ 4,385,043	$ 193,290	4.6%	Residential customer growth continued, primarily in Penn Township and within the Borough. Overall consumption in this class increased from 655,489,000 to 754,588,000, particularly in 3rd/4th quarter, as COVID-19 stay-at-home orders, remote working/schooling, etc. likely played a part
Commercial	800,660	759,308	(41,352)	-5.2%	Commercial usage overall was down from 163,775,000 to 150,087,000, primarily in the 2nd/3rd quarters during initial COVID-19 closures and reduced public activities
Industrial	1,976,066	2,074,073	98,007	5.0%	Industrial consumption rose from 547,843,000 to 603,737,000, with almost every billed cycle throughout the year showing increase, especially during the initial COVID-19 wave, as it appeared industrial customers ramped production to meet demands.
Public	149,801	138,302	(11,499)	-7.7%	Decline in Public use from 30,821,000 to 26,591,000 primarily in first three quarters, majority of which correlates with COVID-19 closures for municipal offices and parks/playgrounds (and related facilities).
Private Fire	294,895	299,598	4,703	1.6%	
Public Fire	127,724	131,772	4,048	3.2%	
Total Revenue - Sale of Water	7,540,898	7,788,095			
Other Revenues					
Joyce Bardin	240	240			
Jacob Roads Farm	-	-			
Cell Tower	97,438	96,687			
Rent	-	-			
Rents and Misc. Revenue	97,678	96,927	$ (751)	-0.8%	
Unmetered Sales	41,903	41,964	61	0.1%	
Electricity Buy back	-	-	-		
Penalties	20,860	19,867	(993)	-4.8%	
Reconnection Fees	-	1	1		
Retirees reimbursment	43,092	46,151	3,059	7.1%	
Merchandising and Jobbing	114,951	123,650	8,700	7.6%	
Total Other Revenues	318,484	328,561			
Total Revenue	7,859,382	8,116,655			

HANOVER BOROUGH - HANOVER MUNICIPAL WATER WORKS

COMPARATIVE OPERATING STATEMENTS FOR YEARS ENDED DECEMBER 31, 2019 AND 2020

	2019	2020	Increases/ Decreases	Percentage Difference	Reason for Variance
Operation and Maintenance					
Source of Supply					
Operating Expense					
350 Labor	223,856	254,489	$ 30,633	13.7%	This is the "home" labor account for dams maintenance and management; partial increase for contract rates, and partial increase due to COVID-19 stay-at-home periods where other project work was not performed.
351 Gas and Diesel	2,974	1,860	(1,114)	-37.5%	
351 Miscellaneous Operating Expenses	22,075	18,047	(4,028)	-18.2%	
351 Power	8,550	11,177	2,627	30.7%	
Total Operating Expense	257,455	285,572			
Maintenance Expense					
353 Labor	1,988	2,901	913	45.9%	
353 Miscellaneous Maintenance Expenses	16,258	27,602	11,344	69.8%	$10,780 related to the budgeted replaced roof on caretaker home and garage
Total Maintenance Expense	18,246	30,503			
Total Source of Supply	275,702	316,075			
Water Treatment					
Operating Expense					
354 Labor	312,942	301,776	(11,166)	-3.6%	Related to more Plant personnel time shifting to repair/maintenance of the plant and pump stations (see below).
355 Lab - Water Testing	27,747	23,594	(4,154)	-15.0%	
355 Diesel Fuel	1,032	-	(1,032)	-100.0%	
355 Chemicals	226,113	234,800	8,686	3.8%	
355 Power	58,710	52,978	(5,732)	-9.8%	
355 Sewer Bill	157,755	323,506	165,752	105.1%	Increased due to surcharges to the quarterly billings based on higher concentration of BOD/SS.
355 Stormwater Bill	1,901	950			
355 Miscellaneous	53,354	55,691	2,338	4.4%	
Total Operating Expense	839,553	993,294			
Maintenance Expense					
356 Labor	33,995	48,413	14,418	42.4%	Related to more Plant personnel time shifting to repair/maintenance of the plant and pump stations (see above).
356 Miscellaneous Maintenance Expenses	18,992	16,963	(2,029)	-10.7%	
Total Maintenance Expense	52,987	65,376			
Total Water Treatment	892,540	1,058,670			

HANOVER BOROUGH - HANOVER MUNICIPAL WATER WORKS

COMPARATIVE OPERATING STATEMENTS FOR YEARS ENDED DECEMBER 31, 2019 AND 2020

	2019	2020	Increases/ Decreases	Percentage Difference	Reason for Variance
Power and Pumping					
Operating Expense					
362 Labor	297,647	286,098	(11,549)	-3.9%	Related to more Plant personnel time shifting to repair/maintenance of the plant and pump stations (see below).
365 Supplies and Expenses	23,181	21,038	(2,144)	-9.2%	
366 Power	164,009	173,179	9,170	5.6%	
Total Operating Expense	484,838	480,315			
Maintenance Expense					
367 Pump Station - Labor	33,861	48,507	14,646	43.3%	Related to more Plant personnel time shifting to repair/maintenance of the plant and pump stations (see above).
367 Supplies and Equipment	22,662	26,255	3,594	15.9%	
367 Misc Maintenance Expense	-	-	-		
Total Maintenance Expense	56,523	74,762			
Total Power and Pumping	541,361	555,077			
Transmission and Distribution					
Operating Expense					
368 Labor	152,642	219,597	66,955	43.9%	This is the "home" labor account for distribution maintenance and management; partial increase for contract rates, and primary increase due to COVID-19 stay-at-home periods where other project/capital work was not performed.
369 Meter - Labor	117,778	118,259	481	0.4%	
371 Streets Dept.	21,989	20,694	(1,295)	-5.9%	
371 Streets Dept. - Misc Exp	238	3,653	3,415	1433.6%	
372 Meter Dept.	1,981	1,144	(837)	-42.2%	
373 Other Distribution Expense	8,937	9,219	282	3.2%	
374 Gratutious Services	69	-	(69)	-100.0%	
Total Operating Expense	303,634	372,567			
Maintenance Expense					
375 Transmission Mains - Labor	-	-	-		
375 Transmission Mains - Supplies	-	-	-		

HANOVER BOROUGH - HANOVER MUNICIPAL WATER WORKS

COMPARATIVE OPERATING STATEMENTS FOR YEARS ENDED DECEMBER 31, 2019 AND 2020

	2019	2020	Increases/ Decreases	Percentage Difference	Reason for Variance
376 Labor - Cleaning mains	31,277	69,310	38,032	121.6%	Increase due to ramp up in cleaning program.
376 Distribution Mains - Labor	168,557	128,610	(39,947)	-23.7%	Bulk of capital labor outsourced in 2020; also, stay-at-home time classification for COVID-19 periods shifted above (see 368).
376 Distribution Mains - Supplies	75,680	58,327	(17,353)	-22.9%	Reduced restoration/repair due to stay-at-home periods during COVID-19.
376 Distribution Mains - Contract Cleaning	501,256	1,450,343	949,087	189.3%	Contract cleaning is capitalized. Borough significantly expanded their water line replacement and cleaning/lining programs in 2018 through 2020 for system investment through use of reserves above a "standard" annual spending campaign (roughly $750,000-$1million).
377 Service Lines - Labor	81,257	86,266	5,009	6.2%	
377 Service Lines - Labor - Carlisle St. Project	-	-	-		
377 Service Lines	26,529	19,506	(7,023)	-26.5%	
377 Service Lines - Carlisle St. Project	-	-	-		
378 Tanks and Reservoirs - Labor	13,608	8,622	(4,986)	-36.6%	
378 Tanks and Reservoirs	8,224	57,498	49,275	599.2%	Cost to repaint the exterior of the Water Filtration Plant storage tank (other storage tanks evaluated were moderate or better; but will require painting in the future).
379 Meters -Labor	106,867	109,005	2,138	2.0%	
379 Meters	10,280	13,285	3,005	29.2%	
380 Hydrants - Labor	8,191	10,772	2,581	31.5%	
380 Hydrants	2,365	7,400	5,035	212.9%	
Total Maintenance Expense	1,034,090	2,018,944			
Total Transmission and Distribution	1,337,725	2,391,510			
Administrative and General Expenses					
382 Wages and Salaries - Professional Staff	37,053	43,750	6,697	18.1%	
383 Wages - General Office	347,525	370,177	22,652	6.5%	
384 Office Supplies	-	-	-		
386 Misc Office Exp	6,638	2,706	(3,932)	-59.2%	
387 General Office - Data Processing Maint.	-	-	-		
387 General Office - Computer Programs	13,758	10,679	(3,079)	-22.4%	
387 General Office - Misc	8,255	8,635	380	4.6%	
387 General Office - Rent	91,229	93,199	1,970	2.2%	
387 General Office - Postage	32,206	35,620	3,414	10.6%	
388 General Office - Rate Study	-	-	-		
387 General Office - Auditors	7,200	10,448	3,248	45.1%	
387 General Office - Public Relations	-	-	-		
388 General Property Expense - Labor	80,547	83,775	3,228	4.0%	
388 General Property Expense - Vehicle	18,852	14,117	(4,735)	-25.1%	
388 General Property Expense - Misc	69,095	73,891	4,797	6.9%	
390 Taxes	2,949	3,325	376	12.7%	

HANOVER BOROUGH - HANOVER MUNICIPAL WATER WORKS

COMPARATIVE OPERATING STATEMENTS FOR YEARS ENDED DECEMBER 31, 2019 AND 2020

	2019	2020	Increases/ Decreases	Percentage Difference	Reason for Variance
391 Return Customer Check	-	-			
392 Legal Expenses	18,185	54,165	35,980	197.9%	Legal support for claim filed against the Borough to the PUC involving the Borough moving a distribution main in Penn Township and requirements of customers to cover the costs to move their customer-side lines due to the main movement, at their own cost. The case is in mediation with additional legal fees in early 2021.
396 Insurance - Hospitalization	732,151	854,777	122,626	16.7%	Increase in insurance rates under IIC/Benecon cost-sharing consortium; also significant decline in return of "surplus" (occurs in year following) from consortium due to higher utilization rates in 2019 (overall refund in 2019 was $482k, and only $268k in 2020 -- allocated on pro-rata basis across funds).
396 Insurance - Workman's Comp	47,353	50,752	3,399	7.2%	
396 Insurance - Fire and Liability	35,808	36,730	922	2.6%	
396 Insurance -Life	5,222	5,504	282	5.4%	
396 Insurance -Prescriptions	-	-	-		
396 Retirees Hospitalization and Health	30,454	48,210	17,756	58.3%	Four additional employees retired, and reduced surplus received in 2020 (see above).
397 Employee Pension	123,512	124,790	1,278	1.0%	
397 Unemployment Compensation	-	-	-		
401 General Prop. Labor Exp	13,788	14,598	810	5.9%	
608 Bank Fees	2,353	5,325	2,972	126.3%	
Total Administrative and General Expenses	1,724,133	1,945,173			
Total Operation and Maintenance Exp.	4,771,461	6,266,506			
Non-Operating Expense					
550 Merchandising and Jobbing - Labor	22,419	17,612	(4,807)	-21.4%	
550 Merchandising and Jobbing - Misc	33,027	41,225	8,198	24.8%	
559 Other Non-operating Expense	-	-	-		
Total Non-Operating Expense	55,446	58,837			
Unappropriated Reserves					
Contribution to Social Security	169,469	176,726	7,257	4.3%	
TOTAL	4,996,376	6,502,069			

Exhibit D I-2

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO STATEMENT OF INCOME
FILING REQUIREMENTS

2. Prepare an income statement for the various time frames of the rate proceeding including:
   Col. 1 - Book recorded income statement for the test year.
   Col. 2 - Adjustments to book recorded income statement to annualize and normalize under present rates.
   Col. 3 - Income statement under present rates after adjustments in Col. 2.
   Col. 4 - Adjustments to Col. 3 for revenue increase requested.
   Col. 5 - Income statement under proposed rates.

RESPONSE

Please refer to Exhibit GRH-1.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO STATEMENT OF INCOME
FILING REQUIREMENTS

3. If a company has separate operating divisions, an income statement must be shown for each division, plus an income statement for the company as a whole.

RESPONSE

The Borough Water Fund does not have separate operating divisions.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO STATEMENT OF INCOME
FILING REQUIREMENTS

4. Provide operating income claims under:
   a. Present rates.
   b. Pro forma present rates (annualized & normalized).
   c. Proposed rates (annualized & normalized).

RESPONSE

Please refer to Exhibit GRH-1.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO STATEMENT OF INCOME
FILING REQUIREMENTS

5. Provide rate of return on original cost under:
   a. Present rates.
   b. Pro forma present rates.
   c. Proposed rates.

RESPONSE

Please refer to Exhibit GRH-1.

Exhibit D II-1

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

1. Prepare a summary of operating revenues for the historic test year and the year preceding the historic test year, providing the following information:
   a. For each classification of customers:
      (i) Number of customers as of year-end.
      (ii) Gallons sold.
      (iii) Revenues.
   b. Customers' penalties and miscellaneous water revenues.

RESPONSE

a&b) Please refer to 'Exhibit D II-1 Attachment' and response to Exhibit D I-1 and II-6.

BOROUGH OF HANOVER - BUREAU OF WATER
SUMMARY OF OPERATING REVENUES PER DATA REQUEST EXHIBIT D II-1

	2019			2020		
INSIDE	Number of Customers	1,000 Gallons Sold	Revenues	Number of Customers	1,000 Gallons Sold	Revenues
RESIDENTIAL	6,144	245,983	$ 1,466,649	6,181	258,555	$ 1,534,279
COMMERCIAL	617	97,015	442,292	629	86,437	419,449
INDUSTRIAL	52	106,029	388,102	52	116,624	407,351
PUBLIC	31	3,516	31,802	32	3,230	29,360
PRIVATE FIRE	115	-	97,868	116	-	99,429
TOTAL INSIDE	6,959	452,543	$ 2,426,713	7,010	464,846	$ 2,489,869
OUTSIDE						
RESIDENTIAL	10,177	410,648	$ 2,725,104	10,285	439,370	$ 2,850,764
COMMERCIAL	420	66,270	358,368	421	62,987	339,859
INDUSTRIAL	78	102,754	372,580	79	93,205	391,059
LARGE INDUSTRIAL	1	357,948	1,215,383	1	395,508	1,275,662
PUBLIC	38	26,241	117,999	40	23,666	108,941
PRIVATE FIRE	136	-	197,026	139	-	200,168
PUBLIC FIRE	4	-	127,724	4	-	131,772
TOTAL OUTSIDE	10,854	963,861	$ 5,114,185	10,969	1,014,736	$ 5,298,226
TOTAL CITY	17,813	1,416,404	$ 7,540,898	17,979	1,479,582	$ 7,788,095

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

2. Prepare a summary of operating revenues for the historic test year, providing the following information:
   a. For each classification of customers and for customers' penalties and miscellaneous water or wastewater revenues:
      (i) Revenues.
      (ii) Annualizing and normalizing adjustments to arrive at adjusted operating revenues for ratemaking.
      (iii) Proposed increase in operating revenues.
      (iv) Percent increase in operating revenues.
      (v) Operating revenues under proposed rates.

RESPONSE

Please refer to Exhibit GRH-1.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

3. Provide a schedule of present and proposed tariff rates showing dollar change and percent of change by block. Provide increases to customers at various monthly uses (each 5,000 gallon consumption increment) showing billings at existing and proposed rates. Provide also an explanation of any change in block structure and the reason therefore. Provide a copy of the proposed tariff or tariff supplement on a red line basis, to easily identify any changes.

RESPONSE

Please refer to Exhibit GRH-1 for comparative schedules of present and proposed rates and typical bills.

Refer to Supplement No. 30 to Tariff Water – PA P.U.C. No. 3 for the proposed tariff.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

4. Provide for the future test year a detailed customer consumption analysis and the application of rates to support present and proposed revenues by customer classification and tariff rate schedule.

RESPONSE

Please refer to Exhibit GRH-1.

Exhibit D II-5

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

5. Provide detailed computations of the determination of accrued revenues as of historic test year-end and year-end immediately preceding the historic test year, together with a detailed explanation of the procedures and methods used in developing accrued revenues.

RESPONSE

Please refer to following schedule, 'Exhibit D II-5 Attachment'.

2019 Monthly	Totals with Adjustments			
Month	Hanover Boro	Penalties for Boro	Townships and McSh Boro	2019 Total Revenue
January	$402,167.72	$612.95	$107,560.66	
Adjmt	($92.83)	($15.81)	($58.89)	
Total	**$402,074.89**	**$597.14**	**$107,501.77**	**$510,173.80**
February	$38,377.04	$1,513.87	$673,735.39	
	($313.06)	($2.24)	($252.77)	
Total	**$38,063.98**	**$1,511.63**	**$673,482.62**	**$713,058.23**
March	$156,841.40	$417.31	$414,718.88	
	($630.26)	($12.93)	($168.22)	
Total	**$156,211.14**	**$404.38**	**$414,550.66**	**$571,166.18**
April	$391,123.99	$535.22	$133,420.60	
	($278.73)	($4.12)	($68.99)	
Total	**$390,845.26**	**$531.10**	**$133,351.61**	**$524,727.97**
May	$37,955.05	$1,164.20	$654,149.69	
	($117.21)	($1.94)	($408.74)	
	($113.97)			
Total	**$37,723.87**	**$1,162.26**	**$653,740.95**	**$692,627.08**
June	$161,139.08	$482.91	$431,972.05	
	($444.17)	($12.64)	($244.99)	

Total	**$160,694.91**	**$470.27**	**$431,727.06**	**$592,892.24**
July	$420,400.59	$563.37	$133,688.45	
	($296.84)	($8.07)	($387.18)	
Total	**$420,103.75**	**$555.30**	**$133,301.27**	**$553,960.32**
August	$46,162.56	$1,206.20	$753,692.16	
	($61.86)	$37.03	($634.14)	
Total	**$46,100.70**	**$1,243.23**	**$753,058.02**	**$800,401.95**
September	$166,470.02	$463.86	$469,821.72	
	($89.52)	($4.61)	($128.56)	
			$0.01	
Total	**$166,380.50**	**$459.25**	**$469,693.17**	**$636,532.92**
October	$420,029.88	$667.06	$177,585.07	
	($164.36)	($0.94)	($71.81)	
Total	**$419,865.52**	**$666.12**	**$177,513.26**	**$598,044.90**
November	$40,515.75	$1,407.65	$729,656.49	
	($727.25)	($390.17)	($286.79)	
Total	**$39,788.50**	**$1,017.48**	**$729,369.70**	**$770,175.68**
December	$160,420.33	$461.98	$431,426.82	
	($182.03)	($14.79)	($201.32)	
Total	**$160,238.30**	**$447.19**	**$431,225.50**	**$591,910.99**
Journal for Unbilled Revenue	**$247,556.85**		**$195,368.66**	**$442,925.51**
	$2,685,648.17	**$9,065.35**	**$5,303,884.25**	**$7,998,597.77**

2020 Monthly Month	Totals with Adjustments Hanover Boro	Penalties for Boro	Townships and McSh Boro	2020 Total Revenue
January	$419,859.73	$451.48	$132,853.42	
Adjmt	($43.96)	($1.14)		
Total	**$419,815.77**	**$450.34**	**$132,853.42**	**$553,119.53**
February	$39,661.77	$1,321.16	$710,344.28	
	($163.62)	($0.98)	($35.83)	
Total	**$39,498.15**	**$1,320.18**	**$710,308.45**	**$751,126.78**
March	$154,113.31		$414,321.28	
	($76.03)	($10.22)	($19.72)	
Total	**$154,037.28**	**($10.22)**	**$414,301.56**	**$568,328.62**
April	$400,136.55		$129,206.58	
	($18.00)		($48.00)	
Total	**$400,118.55**	**$0.00**	**$129,158.58**	**$529,277.13**
May	$45,782.65		$676,419.48	
	($163.38)		($355.97)	
Total	**$45,619.27**	**$0.00**	**$676,063.51**	**$721,682.78**
June	$168,634.30		$457,764.00	
	($91.06)		($1,085.21)	

Total	**$168,543.24**	**$0.00**	**$456,678.79**	**$625,222.03**
July	$417,781.06	$792.66	$167,020.28	
	($530.51)	($1.23)	($127.71)	
Total	**$417,250.55**	**$791.43**	**$166,892.57**	**$584,934.55**
August	$49,269.70	$1,422.16	$769,356.07	
	($82.78)	($38.30)	($90.18)	
Total	**$49,186.92**	**$1,383.86**	**$769,265.89**	**$819,836.67**
September	$173,978.76	$844.38	$501,963.50	
	($205.13)	($4.09)	($396.39)	
Total	**$173,773.63**	**$840.29**	**$501,567.11**	**$676,181.03**
October	$421,891.95	$899.08	$169,535.72	
	($352.77)	($1.61)	($2,639.99)	
			($217.12)	
Total	**$421,539.18**	**$897.47**	**$166,678.61**	**$589,115.26**
November	$36,741.65	$1,700.83	$972,860.30	
	($133.80)	($4.77)	($227,093.41)	
Total	**$36,607.85**	**$1,696.06**	**$745,766.89**	**$784,070.80**
December	$164,082.98	$658.82	$444,150.22	
	($227.25)	($89.93)	($280.31)	
Total	**$163,855.73**	**$568.89**	**$443,869.91**	**$608,294.53**
Journal for Unbilled Revenue	**$249,912.26**		**$189,785.78**	**$439,698.03**
	$2,739,758.38	**$7,938.30**	**$5,503,191.07**	**$8,250,887.74**

Exhibit D II-6

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

6. Provide a detailed breakdown of miscellaneous water revenues for the historic test year and the two years immediately preceding the historic test year. For the historic test year, provide a monthly breakdown and an explanation of monthly variances greater than 15%.

RESPONSE

The detailed breakdown of Rent and Miscellaneous Water Revenue is listed below. The variations from month to month are due to one cell tower rent customer having rent payments occur from February 1, 2020 through December 31, 2020, and three cell tower rent customers' monthly rent payments increased during the year 2020. Additionally, there were timber/hay sales revenues incurred during the months of May and September.

BOROUGH OF HANOVER - BUREAU OF WATER

Rent and Miscellaneous Revenues

	2018	2019	2020
Joyce Bardin Restitution	$ 240	$ 240	$ 240
Cell Tower	95,935	97,438	96,687
Miscellaneous	2,251	6,555	6,810
Misc. - Timber/Hay Sales	14,810	18,720	9,756
	$ 113,235	$ 122,953	$ 113,493

Monthly Revenue:	
Jan-20	$ 8,172.14
Feb-20	9,002.53
Mar-20	9,511.77
Apr-20	7,586.97
May-20	10,555.93
Jun-20	8,435.44
Jul-20	8,295.44
Aug-20	8,714.64
Sep-20	17,027.68
Oct-20	8,730.14
Nov-20	8,694.97
Dec-20	8,764.97
	$ 113,492.62

Exhibit D II-7

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

7. Provide a monthly summary of customers added and lost by customer classification for the historic test year and the current year-to-date.

RESPONSE

The Borough does not account for the number of customers on a monthly basis.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

8. Provide for the historic test year and the current year-to-date, the number of customers and monthly consumption for each classification of customers.

RESPONSE

The Borough does not account for the number of customers and consumption on a monthly basis.

Exhibit D II-9

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

9. Provide by customer classification for the historic test year and for the 2 prior years the number of customers and consumption, and projected number of customers and consumption for the 2 subsequent years.

RESPONSE

Please refer to following schedule, 'Exhibit D II-9 Attachment'.

BOROUGH OF HANOVER - BUREAU OF WATER
SUMMARY OF NUMBER OF CUSTOMERS AND CONSUMPTION AND PROJECTIONS PER DATA REQUEST EXHIBIT D II-9

	2018		2019		2020		2021		2022	
INSIDE	Number of Customers	1,000 Gallons Sold	Number of Customers	1,000 Gallons Sold	Number of Customers	1,000 Gallons Sold	Number of Customers	1,000 Gallons Sold	Number of Customers	1,000 Gallons Sold
RESIDENTIAL	6,109	250,768	6,144	245,983	6,181	258,555	6,253	261,570	6,325	264,585
COMMERCIAL	613	109,972	617	97,015	629	86,437	645	88,709	661	90,980
INDUSTRIAL	52	112,245	52	106,029	52	116,624	52	116,624	52	116,624
PUBLIC	31	2,908	31	3,516	32	3,230	33	3,242	34	3,254
PRIVATE FIRE	114	-	115	-	116	-	116	-	116	-
TOTAL INSIDE	6,919	475,893	6,959	452,543	7,010	464,846	7,099	470,145	7,188	475,444
OUTSIDE										
RESIDENTIAL	10,024	413,621	10,177	410,648	10,285	439,370	10,547	450,548	10,809	461,727
COMMERCIAL	413	64,582	420	66,270	421	62,987	429	64,177	437	65,367
INDUSTRIAL	77	100,155	78	102,754	79	93,205	81	95,862	83	98,518
LARGE INDUSTRIAL	1	280,355	1	357,948	1	395,508	1	395,508	1	395,508
PUBLIC	38	20,402	38	26,241	40	23,666	42	24,887	44	26,109
PRIVATE FIRE	134	-	136	-	139	-	139	-	139	-
PUBLIC FIRE	4	-	4	-	4	-	4	-	4	-
TOTAL OUTSIDE	10,691	879,115	10,854	963,861	10,969	1,014,736	11,243	1,030,982	11,517	1,047,229
TOTAL CITY	17,610	1,355,008	17,813	1,416,404	17,979	1,479,582	18,342	1,501,127	18,705	1,522,672

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

10. Provide a breakdown of the number and size of private fire services according to the general water service class of customers.
    a. Provide a listing of all private fire protection customers at historic test year-end and the pro forma billing of current rates for each customer.

RESPONSE

See Exhibit GRH-1.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

11. Provide a detailed schedule of sales for resale revenues for the historic test year and 2 preceding years showing revenues and units sold by customer.

RESPONSE

The Borough does not have any sales for resale customers.

Exhibit D II-12

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

12. Provide for the historic test year and the 2 prior years consumption and billings for the ten largest customers at current rates. Provide the historic and future test year consumption priced at proposed rates.

RESPONSE

Please refer to following schedule, 'Exhibit D II-12 Attachment'.

HANOVER BOROUGH - HANOVER MUNICIPAL WATER WORKS
TOP TEN CUSTOMERS PER DATA REQUEST EXHIBIT D II-12

2018

Line No.	Outside-Borough Customer	Annual Consumption	Annual Billings
1	Hanover Foods	280,650,000	$ 913,002.60
2	Homewood Retirement	16,858,000	93,637
3	Snyder's-Lance	23,058,000	89,264
4	The ESAB Group, Inc.	14,301,000	60,176
5	Curation Foods	13,565,000	53,337
6	Trone Rental Properties	6,702,000	50,795
7	Burkentine & Sons	4,732,000	45,325
8	Treehouse Private Brands	11,635,000	44,911
9	Codorus State Park	9,399,000	34,849
10	Conewago North Ride Properties	6,640,000	32,306

2019

Line No.	Outside-Borough Customer	Annual Consumption	Annual Billings
1	Hanover Foods	358,239,000	$ 1,162,924.48
2	Snyder's-Lance	29,285,000	109,962
3	Homewood Retirement	15,465,000	88,563
4	Burkentine & Sons	6,159,000	57,445
5	Curation Foods	14,137,000	54,993
6	Trone Rental Properties	6,986,000	53,660
7	The ESAB Group, Inc.	10,622,000	45,556
8	Treehouse Private Brands	11,724,000	45,218
9	Codorus State Park	11,849,000	43,289
10	South Western School District	6,021,000	31,072

2020

Line No.	Outside-Borough Customer	Annual Consumption	Annual Billings	HTY & FPFTY Billings Under Proposed Rates
1	Hanover Foods	396,024,000	$ 1,285,995	$ 1,780,937
2	Snyder's-Lance	27,008,000	102,630	134,083
3	Homewood Retirement	14,139,000	84,851	105,010
4	Burkentine & Sons	7,564,000	68,550	81,990
5	Trone Rental Properties	7,451,000	56,695	69,672
6	The ESAB Group, Inc.	11,348,000	49,612	65,130
7	Treehouse Private Brands	11,874,000	45,759	60,721
8	Codorus State Park	12,284,000	44,787	62,561
9	Curation Foods	8,764,000	34,393	44,528
10	UTZ Quality Foods	6,536,000	31,487	36,332

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING REVENUES
FILING REQUIREMENTS

13. Provide for the historic test year and the 2 prior years consumption and billings for the ten largest sales for resale customers if such sales are not included in sales to the ten largest customers requested in Part II.12.

RESPONSE

The Borough does not have any sales for resale customers.

Exhibit D III-1

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

1. Prepare a summary of operating expenses by operating expense account for the historic test year and the 2 years preceding the test year.

RESPONSE

See the following schedule, 'Exhibit D III-1 Attachment'.

Exhibit D III-2

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

2. Prepare a summary of operating expenses for the historic test year providing annualizing and normalizing adjustments to arrive at adjusted future operating expenses for ratemaking, including supporting data.

RESPONSE

Please see Exhibit GRH-1.

Exhibit D III-3

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

3. List extraordinary property losses as a separate item, not included in operating expenses or depreciation and amortization. Sufficient supporting data must be provided, such as explanation and breakdown of costs.

RESPONSE

The Borough Water Fund does not have any extraordinary property losses.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

4. Supply detailed calculations of normalization of rate case expense, including supporting data for outside services rendered. Provide the items comprising the rate case expense claim (include the actual billings or invoices in support of each kind of rate case expense) and the items comprising the actual expenses of the prior rate cases.

RESPONSE

The Borough is claiming an additional $423,100 of costs normalized over 4 years. The bills rendered as of the date of the filing are in the following schedule, 'Exhibit D III-4 Attachment'.

The actual expense for the prior rate case, Docket No. R-2014-2428304, is summarized as follows:

Gannett Fleming	$185,752
Legal Fees	$159,679
Customer Notice	$5,400
Total	$350,831

Gannett Fleming
Excellence Delivered As Promised

Project: 068281
Invoice No: 068281*5925
Invoice Date: February 18, 2021

Gannett Fleming Valuation and Rate Consultants, LLC

Phase 100 -- Depreciation and Rate Base

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*	
John J. Spanos	0.50	$ 285.00	$ 142.50	
Support Staff	1.00	120.00	120.00	
		Total Labor Costs		**$ 262.50**
		Total Phase -- 100		**$ 262.50**

Phase 200 -- RevReqTrifPrepCostAllocRateDsgn

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*	
Associate Analyst	5.00	170.00	850.00	
Constance E. Heppenstall	2.00	240.00	480.00	
Support Staff	1.00	120.00	120.00	
		Total Labor Costs		**$ 1,450.00**
		Total Phase -- 200		**$ 1,450.00**

Gannett Fleming

Excellence Delivered As Promised

INVOICE

Gannett Fleming Valuation and Rate Consultants, LLC

ACH/EFT Payment Information:
ABA: 031312738
Account No.: 5003165655
Account Name: Gannett Fleming

Borough of Hanover
Attn: R. Samuel Miller, Director of Finance
44 Frederick Street
Hanover, PA 17331

Check Payment Information:
Gannett Fleming Valuation and Rate Consultants, LLC
PO Box 829160
Philadelphia, PA 19182-9160

Project: 068281
Invoice No: 068281*5962
Invoice Date: March 19, 2021

Federal EIN: 46-4413705
Send Remit Info: AccountsReceivabley gfnet.com

Note: TO PRTVTNT EMPOSTTR FRAUD. If you receive any notification of a change in payment instructions, you should call our Accounts Receivable department at 717-763-7211 to verify the authenticity of the change. We cannot be held responsible for a misdirected payment as a result of your not confirming authenticity of requested changes to payment instructions or "imposter hacks" to your system.

Invoice Period: January 30, 2021 through February 27, 2021

Project Manager : Constance E. Heppenstall cheppenstall@gfnet.com

2021 Rate Filing - Hanover Municipal Water Works - Depreciation and Rate Base, Revenue Requirements and Tariff Preparation, Cost Allocation & Rate Design Study, and Rate of Return

Summary of Current Charges

Phase 100	- DEPRECIATION AND RATE BASE	$ 960.00
Phase 200	- REV REQ-TRIF PREP-COST ALLOC-RATE DSGN	15,450.00
Phase 300	- RATT OF RTTURN	360.00
	Total Charges	$ 16,770.00
	Total Due This Invoice	**$16,770.00**

Gannett Fleming
Excellence Delivered As Promised

Project: 068281
Invoice No: 068281*5962
Invoice Date: March 19, 2021

Gannett Fleming Valuation and Rate Consultants, LLC

Phase 100 -- Depreciation and Rate Base

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Assistant Analyst I	2.00	$ 120.00	$ 240.00
Analyst	0.50	180.00	90.00
John J. Spanos	2.00	285.00	570.00
Support Staff	0.50	120.00	60.00
Total Labor Costs			**$ 960.00**
Total Phase -- 100			**$ 960.00**

Phase 200 -- RevReqTrifPrepCostAllocRateDsgn

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Associate Analyst	63.00	170.00	10,710.00
Constance T. Heppenstall	17.50	240.00	4,200.00
Michael J. Mehaffey	2.00	240.00	480.00
Support Staff	0.50	120.00	60.00
Total Labor Costs			**$ 15,450.00**
Total Phase -- 200			**$ 15,450.00**

Phase 300 -- Rate of Return

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Support Staff	3.00	120.00	360.00
Total Labor Costs			**$ 360.00**
Total Phase -- 300			**$ 360.00**

Gannett Fleming

Excellence Delivered As Promised

INVOICE

Gannett Fleming Valuation and Rate Consultants, LLC

ACH/EFT Payment Information:
ABA: 031312738
Account No.: 5003165655
Account Name: Gannett Fleming

Borough of Hanover
Attn: R. Samuel Miller, Director of Finance
44 Frederick Street
Hanover, PA 17331

Check Payment Information:
Gannett Fleming Valuation and Rate Consultants, LLC
PO Box 829160
Philadelphia, PA 19182-9160

Project: 068281
Invoice No: 068281*113799
Invoice Date: April 28, 2021

Federal EIN: 46-4413705
Send Remit Info: AccountsReceivabley gfnet.com

Note: TO PRTVTNT EMPOSTTR FRAUD. If you receive any notification of a change in payment instructions, you should call our Accounts Receivable department at 717-763-7211 to verify the authenticity of the change. We cannot be held responsible for a misdirected payment as a result of your not confirming authenticity of requested changes to payment instructions or "imposter hacks" to your system.

Invoice Period: February 28, 2021 through April 2, 2021

Project Manager : Constance E. Heppenstall cheppenstall@gfnet.com

2021 Rate Filing - Hanover Municipal Water Works - Depreciation and Rate Base, Revenue Requirements and Tariff Preparation, Cost Allocation & Rate Design Study, and Rate of Return

Summary of Current Charges

Phase 100	- DTPRTCEATEON AND RATT BAST	$ 4,425.00
Phase 200	- RTV RTQ-TREF PRTP-COST ALLOC-RATT DSGN	20,940.00
Phase 300	- RATT OF RTTURN	12,910.00
	Total Charges	$ 38,275.00
	Total Due This Invoice	**$38,275.00**

Gannett Fleming
Excellence Delivered As Promised

Project: 068281
Invoice No: 068281*113799
Invoice Date: April 28, 2021

Gannett Fleming Valuation and Rate Consultants, LLC

Phase 100 -- Depreciation and Rate Base

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Analyst	18.00	$ 180.00	$ 3,240.00
John J. Spanos	1.00	285.00	285.00
Support Staff	0.50	120.00	60.00
Assistant Analyst I	7.00	120.00	840.00
Total Labor Costs			**$ 4,425.00**
Total Phase -- 100			**$ 4,425.00**

Phase 200 -- RevReqTrifPrepCostAllocRateDsgn

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Assistant Analyst IE	2.00	130.00	260.00
Associate Analyst	86.00	170.00	14,620.00
Constance T. Heppenstall	19.00	240.00	4,560.00
Michael J. Mehaffey	6.00	240.00	1,440.00
Support Staff	0.50	120.00	60.00
Total Labor Costs			**$ 20,940.00**
Total Phase -- 200			**$ 20,940.00**

Phase 300 -- Rate of Return

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Harold Walker	48.50	260.00	12,610.00
Support Staff	2.50	120.00	300.00
Total Labor Costs			**$ 12,910.00**
Total Phase -- 300			**$ 12,910.00**

Gannett Fleming

Excellence Delivered As Promised

INVOICE

Gannett Fleming Valuation and Rate Consultants, LLC

ACH/EFT Payment Information:
ABA: 031312738
Account No.: 5003165655
Account Name: Gannett Fleming

Borough of Hanover
Attn: R. Samuel Miller, Director of Finance
44 Frederick Street
Hanover, PA 17331

Check Payment Information:
Gannett Fleming Valuation and Rate Consultants, LLC
PO Box 829160
Philadelphia, PA 19182-9160

Project: 068281
Invoice No: 068281*115509
Invoice Date: Mab 28, 2021

Federal EIN: 46-4413705
Send Remit Info: AccountsReceivayleN gfnet.com

Tote: TO PREVETT UMPOSTER FRAy D. Ubou receive anb notification of a change in pabment instructions, bou should call our Accounts Receivayle department at 717-763-7211 to verifb the authenticitb of the change. We cannot ye held responsiyle for a misdirected pabment as a result of bour not confirming authenticitb of requested changes to pabment instructions or "imposter hacks" to bour sbstem.

Invoice Period: April 3, 2021 through May 7, 2021

Project Manager : Constance E. Heppenstall cheppenstall@gfnet.com

2021 Rate Filing - Hanover Municipal Water Works - Depreciation and Rate Base, Revenue Requirements and Tariff Preparation, Cost Allocation & Rate Design Studb, and Rate of Return

Summary of Current Charges

Phase 100	- DEPRECUATUDT ATD RATE BASE	$ 7,410.00
Phase 200	- REV REQ-TRIF PREP-COST ALLOC-RATE DSGN	15,710.00
	Total Charges	$ 23,120.00
	Total Due This Invoice	**$23,120.00**

Gannett Fleming
Excellence Delivered As Promised

Project: 068281
Invoice No: 068281*115509
Invoice Date: Mab 28, 2021

Gannett Fleming Valuation and Rate Consultants, LLC

Phase 100 -- Depreciation and Rate Base

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*	
Analbst	24.00	$ 180.00	$ 4,320.00	
John J. Spanos	6.00	285.00	1,710.00	
Support Staff	0.50	120.00	60.00	
Assistant Analyst I	11.00	120.00	1,320.00	
	Total Labor Costs			**$ 7,410.00**
	Total Phase -- 100			**$ 7,410.00**

Phase 200 -- RevReqTrifPrepCostAllocRateDsgn

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*	
Associate Analbst	49.00	170.00	8,330.00	
Constance E. Heppenstall	25.00	240.00	6,000.00	
Michael J. Mehaffeb	5.50	240.00	1,320.00	
Support Staff	0.50	120.00	60.00	
	Total Labor Costs			**$ 15,710.00**
	Total Phase -- 200			**$ 15,710.00**

Gannett Fleming

Excellence Delivered As Promised

INVOICE

Gannett Fleming Valuation and Rate Consultants, LLC

ACH/EFT Payment Information:
ABA: 031312738
Account No.: 5003165655
Account Name: Gannett Fleming

Borough of Hanover
Attn: R. Samuel Miller, Director of Finance
44 Frederick Street
Hanover, PA 17331

Check Payment Information:
Gannett Fleming Valuation and Rate Consultants, LLC
PO Box 829160
Philadelphia, PA 19182-9160

Project: 068281
Invoice No: 068281*116424
Invoice Date: bune 17, 2021

Federal EIN: 46-4413705
Send Remit Info: AccountsReceivayleN gfnet.com

Tote: TO PREVETT UMPOSTER FRAy D. Uf Wou receive anWhotification of a change in paWment instructions, Wou should call our Accounts Receivayle department at 717-763-7211 to verifWthe authenticitW of the change. q e cannot ye held responsiyle for a misdirected paWment as a result of Wour not confirming authenticitWof re" uested changes to paWment instructions or &mposter hacks&to Wour sWstem.

Invoice Period: May 8, 2021 through June 4, 2021

Project Manager : Constance E. Heppenstall cheppenstall@gfnet.com

2021 Rate Filing - Hanover Municipal q ater q orks - Depreciation and Rate Base, Revenue Re" uirements and Tariff Preparation, Cost Allocation $ Rate Design StudW and Rate of Return

Summary of Current Charges

Phase 100	- DEPRECUATUDT ATD RATE BASE	Q	3,127.50
Phase 200	- REV REJ TRUF PREP COST ALLOC RATE DSGT		9,400.00
Phase 300	- RATE OF RETyRT		4,280.00
Phase 400	- DSUC		2,520.00
	Total Charges		Q19,327.50
	Total Due This Invoice		**$19,327.50**

Gannett Fleming

Excellence Delivered As Promised

Project: 068281
Invoice No: 068281*116424
Invoice Date: bune 17, 2021

Gannett Fleming Valuation and Rate Consultants, LLC

Phase 100 -- Depreciation and Rate Base

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
AnalWst	8.00	$ 180.00	$ 1,440.00
bohn b. Spanos	5.50	285.00	1,567.50
Support Staff	1.00	120.00	120.00
Total Labor Costs			**$ 3,127.50**
Total Phase -- 100			**$ 3,127.50**

Phase 200 -- RevRe" TrifPrepCostAllocRateDsgn

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Associate AnalWst	26.00	170.00	4,420.00
Constance E. Heppenstall	20.00	240.00	4,800.00
Michael b. MehaffeW	0.50	240.00	120.00
Support Staff	0.50	120.00	60.00
Total Labor Costs			**$ 9,400.00**
Total Phase -- 200			**$ 9,400.00**

Phase 300 -- Rate of Return

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Harold q alker	16.00	260.00	4,160.00
Support Staff	1.00	120.00	120.00
Total Labor Costs			**$ 4,280.00**
Total Phase -- 300			**$ 4,280.00**

Phase 400 -- DSUC

Labor Costs

Labor Classification	*Hours*	*Rate*	*Amount*
Michael b. MehaffeW	10.00	240.00	2,400.00
Support Staff	1.00	120.00	120.00
Total Labor Costs			**$ 2,520.00**
Total Phase -- 400			**$ 2,520.00**

THOMAS, NIESEN & THOMAS, LLC
Attorneys and Counsellors at Law

May 25, 2021

THE BOROUGH OF HANOVER

TO: THOMAS, NIESEN & THOMAS, LLC
212 Locust Street
Suite 302
Harrisburg, PA 17101

[redacted] *Invoice No. 13143 (2021 Rate Filing)* [redacted]

For professional services rendered to The Borough of Hanover during March 2021 and April 2021 in connection with the following matters:

[redacted]

HANOV-0002 **2021 Rate Filing**

[redacted] $ 357.50

Disbursements $ 0.00

[redacted]

[redacted]

THOMAS, NIESEN & THOMAS, LLC
Attorneys and Counsellors at Law

June 24, 2021

THE BOROUGH OF HANOVER

TO: THOMAS, NIESEN & THOMAS, LLC
212 Locust Street
Suite 302
Harrisburg, PA 17101

[redacted] *Invoice No. 13173 (2021 Rate Filing)*

For professional services rendered to The Borough of Hanover during May 2021 in connection with the following matters:

[redacted]

[redacted]

[redacted]

HANOV-0002 **2021 Rate Filing**

[redacted] $ 1,705.00

Disbursements $ 0.00

[redacted]

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

5. Submit detailed computation of adjustments to operating expenses for salary, wage and fringe benefit increases (union and nonunion merit, progression, promotion and general) granted during the historic test year and during the 12 months subsequent to the historic test year. Supply data for the historic test year showing:
   a. Actual payroll expense (regular and overtime separately) by categories of operating expenses, i.e., maintenance, operating transmission, distribution, other.
   b. Date, percentage increase and annual amount of each general payroll increase during the historic test year and future test year.
   c. Dates and annual amounts of merit increases or management salary adjustments.
   d. Total annual payroll increases in the historic and future test years.
   e. Proof that the actual payroll plus the increases equal the payroll expense claimed in the supporting data by categories of expenses.
   f. Detailed list of employee benefits and cost thereof for union and nonunion personnel. Specific benefits for executives and officers should be included, and costs thereof
   g. Support the annualized pension cost figures by providing the following:
      (i) State whether these figures include any unfunded pension costs. Explain.
      (ii) Provide latest actuarial study used for determining pension accrual rates.
   h. Submit a schedule showing any deferred income and consultant fee, paid to both, corporate officers and employees in historic and future test years.

RESPONSE

   a. Please see Exhibit GRH-1.
   b. See ‘Exhibit D III-5 Attachment A’ for Union Contact.
   c. Management typically receives the same increase as Union employees.
   d. Please see Exhibit GRH-1.
   e. Please see Exhibit GRH-1.
   f. Please see attached schedule, ‘Exhibit D III-5 Attachment B’ and response to filing requirement Exhibit D III-23.
   g. (i) The annualized pension costs include unfunded pension costs.
      (ii) See response to filing requirement Exhibit D III-14.
   h. The Borough has no deferred income and consultant fee paid to corporate officers or employees.

COLLECTIVE BARGAINING AGREEMENT

Between

THE BOROUGH OF HANOVER

And

UNITED STEEL, PAPER AND FORESTRY, RUBBER, MANUFACTURING, ENERGY, ALLIED INDUSTRIAL AND SERVICE WORKERS INTERNATIONAL UNION, AFL-CIO-CLC

LOCAL UNION 7343-07



JANUARY 1, 2019 – DECEMBER 31, 2023

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AGREEMENT

THIS AGREEMENT, is by and between The Borough of Hanover, York County, Pa., hereinafter referred to as the "Employer", and the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union, AFL-CIO-CLC, hereinafter referred to as the "Union" on behalf of its members in Local Union No. 7343-07.

ARTICLE I – RECOGNITION

The employer hereby recognizes and accepts the Union as the official and exclusive bargaining agent for its members under this contract, in all matters of wages, rates of pay, hours of work and other conditions of employment, in the maintenance, distribution, and processing departments, pumping station, filter plant, impounding basin and reservoir, and excluding all managerial, clerical salaries and supervisory employees. It is recognized by the parties hereto that the employer is engaged in furnishing an essential public service, which vitally affects the health, safety, comfort, and general well-being of a large number of people in the communities furnished with water service by the employer. The responsibility of uninterrupted service to the public is a mutual responsibility of employees and management, which requires that any disputes arising between employees and management be settled in an orderly way without interruption of water service, and both parties to this agreement hereby recognize this mutual responsibility.

ARTICLE II - MAINTENANCE AND MEMBERSHIP

Each employee, who on the effective date of this agreement, is a member of the Union and each employee who becomes a member after that date shall maintain his membership in the Union, provided that such employee may resign from the Union during a period of fifteen (15) days prior to the expiration of this Agreement.

ARTICLE III – CHECK-OFF

Upon signed and dated authorization from any employee, the Employer shall deduct his/her non-recurring initiation fees and monthly dues to the Union from his/her first pay of each month until the termination of this contract. However, if the employer does not receive written revocation of such authorization upon the termination of this contract, such authorization shall continue in effect as legally permissible for the duration of this contract or renewal thereof. A copy of such revocation shall be furnished the Union and any such revocation shall be submitted during any period of fifteen (15) days prior to the above mentioned termination dates. All monies deducted under Article III shall be paid to the International Treasurer of the Union on or before the 15th day of the month in which the money is checked off, together with a list of employees from whom the money was deducted and also together with a list of those employees who had no dues deducted for said month, stating in each case the reason for no dues deduction. A copy

of such lists shall also be forwarded to the Local Union Office at 310 Linden Avenue, Hanover, PA 17331.

ARTICLE IV – GRIEVANCE PROCEDURE

Should any dispute involving wages, hours of labor or other conditions within the scope of the agreement arise between the Employer and any employee there shall be no suspension of work by an employee on account of such dispute or trouble, but an earnest effort shall be made to settle the matter under the following steps of the grievance procedure.

STEP 1. The grievance shall, within five (5) days after its occurrence, be taken up with the employee's supervisor. The supervisor shall give his answer to the grievance within three (3) days, excluding Saturday, Sunday and Holidays.

STEP 2. If the supervisor's answer does not settle the grievance, the grievance shall be reduced to writing by the steward and presented within three (3) days by the Union to the Manager, who shall give his/her answer within three (3) days, excluding Saturday, Sunday and Holidays. The Union shall advise the Manager within three (3) days excluding Saturday, Sunday and Holidays whether his/her answer has satisfied the grievance or if the Union desires to have a conference called between the Grievance Committee and the Manager to discuss the grievance. A copy of the minutes of such conference shall be forwarded to the International Representative at the

International Union's Sub-District Office, 245 Centerville Road, Suite 9, Lancaster, PA 17603.

STEP 3. Failing to effect a settlement of the grievance at this time, the Union Committee (which shall be composed of no more than 3 members of the Local Bargaining Unit) shall call in the International Union representative to assist in a settlement of said grievance. Notice should be given to the Employer within three (3) days after receipt of the Step 2 minutes and a Step 3 conference shall be held within ten (10) days after the conclusion of the Step 2 meeting unless extended by mutual agreement by the parties.

STEP 4. If the parties fail to come to agreement, then it is agreed by and between the parties hereto that the matter shall be referred to arbitration. It is agreed between the parties that in the event of arbitration and after the request for arbitration, then the arbitrator shall be selected by and under the rules of the American Arbitration Association. The arbitrator's award shall be based on the terms of this contract and he may not add to, subtract from or change in any way, the terms and provisions of this contract. The arbitrator's fee and expenses shall be paid jointly by the Employer and the Union. The arbitrator's decision shall be final and binding upon both parties for the duration of this contract.

The function of the arbitrator is to determine the interpretation and application of the specific provisions of this Agreement. There shall be no right in arbitration of a grievance to obtain, and no arbitrator shall have any

authority or power to award or determine, any change in, modification or alteration of, addition to, or detraction from, any of the provisions of this Agreement.

ARTICLE V – STRIKES, SLOW DOWNS, STOPPAGE, AND LOCKOUTS

The Union agrees that there shall be no slowdown of work, no stoppage of work and no strikes, and the Employer agrees that there shall be no lock out for the duration of this agreement or any renewal thereof.

ARTICLE VI – WAGES

The Parties agree to the following general wage increases for each year of the contract, coupled with the elimination of the CPI calculation set forth below.

1/1/2019	3%
1/1/2020	2.75%
1/1/2021	2.5%
1/1/2022	2.5%
1/1/2023	2.5%

Longevity increases for employees hired prior to January 1, 2007 shall be reflected in employee's hourly pay as follows on the anniversary date of employment:

(A) 3% added after 6 years of service.

(B) 6% added after 10 years of service.

(C) 8% added after 15 years of service.

(D) 10% added after 20 years of service.

Longevity shall not be compounded but shall apply to an employee's base rate as of January 1st each year or on attainment or change due to his anniversary date as specified herein following appropriate years of service. The Borough hereby agrees to begin longevity increases on the day of the employee's anniversary.

Employees hired after January 1, 2007 will not be eligible for longevity benefits.

The Employer agrees to provide for direct deposit of paychecks by delivering checks to a bank for disposition as directed by the employee in that depository or via transfer to another bank. Deposit shall be made in employees account and available for withdrawal no later than Saturday Noon of the pay week.

In the event a holiday falls on a Friday, the Borough of Hanover shall make every effort to deliver all checks to the bank for direct deposit prior to 12 noon on the Thursday preceding the holiday. All employees shall be required to have direct deposit.

ARTICLE VII – HOURS OF WORK – OVERTIME NIGHT DIFFERENTIAL

SECTION 1. (A) For all employees except employees at the Water Filtration Plant, the workweek shall consist of 5 consecutive 8-hour work days in any pre-established work schedule.f

(B) At the Water Filtration Plant, the workweek shall consist of either of the following:

1. Five (5) consecutive 8 hour work days in any pre-established work schedule; or
2. Five (5) 8 hour workdays in any pre-established work schedule but not necessarily consecutive days.

SECTION 2. The workday shall consist of any 24 hours in a pre-established work schedule.

SECTION 3. The regular hours of work for any shift shall be consecutive except that they may be interrupted by a lunch period.

SECTION 4. The work schedule showing the employee's shifts, workdays, and hours shall be posted on applicable work site bulletin boards. Except for emergencies, changes will be posted two (2) weeks in advance.

SECTION 5. Time and one half shall be paid in excess of 8 hours in any one day and 40 hours in any one week. For purposes of computing weekly overtime, the work week shall be considered as beginning Monday of each week with the punch-in time of any shift or schedule which ends on Monday being considered as the beginning of the calendar or overtime week.

SECTION 6. Time and one half shall also be paid for any work performed by an employee on the first scheduled day off in any calendar week and double time shall be paid for any work performed by an employee on the second scheduled day off in any calendar week. For purposes of this

section, a sick day, vacation day, or holiday, falling within an employee's regular scheduled workweek shall not be considered as breaking the regular 5-day working schedule if absence from work for any of the above reasons is scheduled and approved by the employee's supervisor.

SECTION 7. This article is intended only to provide a basis for the calculation of overtime. None of its provisions shall be construed as a guarantee of minimum or maximum number of hours of work or schedules of work to any employee or groups of employees.

SECTION 8. A holiday, whether worked or not, shall be considered a day worked for the purpose of computing weekly overtime.

SECTION 9. Employees called back to work after completing their regular shift or after completing their regular workweek shall be paid at the applicable overtime rate for the actual hours worked, but for no less than 3 hours at the applicable overtime rate. Further, employees shall not be asked to do work other than emergency work of a type for which they were called out.

1. An emergency will be defined as anything needing immediate attention; all other situations will be considered as an added shift. When employees are provided twenty-four (24) hours or more notification to work an added shift, the employee shall not be entitled to receive a half hour paid lunch period. When employees are provided less than twenty-four (24) hours

notification to work an added shift, the employee shall be paid for the half hour lunch period and shall be entitled to a maximum reimbursement of ten ($10.00) dollars per diem..

2. During negotiations for the 1995–1997 contract, it was agreed management would not require Water Department employees to carry pagers so long as employees were available by telephone for emergency work call-ins. It was also agreed that if an employee does not maintain a phone or problems in reaching employees for emergency work occurs, management may require employees to carry pagers to notify employees of emergency call-ins, (Memorandum of Agreement June 1995).

SECTION 10. Overtime shall not be pyramided, this is both daily and weekly overtime shall not be paid for the same hours worked.

SECTION 11. Overtime work shall be divided in seniority order as equally as possible within respective job classifications within each department.

SECTION 12. If an employee is temporarily assigned to a higher rated position for a period of two (2) hours or more then the employee shall be paid the established rate for the position for that period of time. Employees temporarily assigned to a lower rated classification, unless permanently demoted, shall retain their regular rate.

SECTION 13. All employees shall receive a rest period of 15 minutes during the first half of the workday and 15 minutes during the second half of the workday.

SECTION 14. (A) Any employee who is required to work more than 2 hours beyond his regular work shift shall receive a ½ hour paid meal period and shall be entitled to a maximum reimbursement of ten ($10.00) per diem. After each additional 4 hours of continuous work the employee shall receive a ½ hour unpaid meal period and shall be entitled to ten dollars ($10.00) per diem.

When employees are provided twenty-four (24) hours or more notification to work an added shift, the employee shall not be entitled to receive a ½ hour paid lunch period. When employees are provided less than twenty-four (24) hours notification to work an added shift, the employee shall be paid for a ½ hour lunch period and shall be entitled to ten ($10.00) dollars per diem.

(B) On emergency callouts, after 4 or more hours of continuous work, an employee shall receive a ½ hour paid meal period and shall be entitled to ten ($10.00) dollars per diem for one paid meal. After each additional four (4) hours of continuous work the employee shall receive a ½ hour non-paid meal period and shall be entitled to ten ($10.00) dollars per diem for one paid meal.

SECTION 15. An employee shall have the right to request relief from working more than sixteen consecutive hours, except in emergencies.

SECTION 16. Any employee who has continued work eight hours or more beyond his shift shall not be required to report for work for at least eight hours from the time his overtime work ended.

SECTION 17. Any employee already working who is to be assigned to a late shift within a twenty-four hour period shall not be sent home before the completion of his current shift.

SECTION 18. SHIFT SCHEDULES. Shift schedules shall begin within the following times: first shift – 7 a.m. to 8 a.m.; second shift – 3 p.m. to 4 p.m.; third shift – 11 p.m. to 12 midnight. Management agrees that shift schedules from one working shift to another working shift shall not be changed for less than one week at a time.

SECTION 19. CHRISTMAS EVE OVERTIME. Double time shall be paid to any personnel for all hours worked, after his regular scheduled shift, on an overtime basis on Christmas Eve.

ARTICLE VIII – HOLIDAYS

New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Black Friday and Christmas Day shall be considered legal holidays and Six (6) Personal Days shall be considered personal holidays for which employees shall be paid eight (8) hours straight time holiday pay after having been employed ninety (90) days prior to the holiday. Double time shall be paid for all hours worked on the seven (7) legal holidays in addition to the holiday pay. Floating days cannot be combined with vacation days.

Employees may use no more than (2) consecutive personal days or may combine (1) personal day with a holiday.

In the event a holiday falls on a Saturday, then the previous Friday shall be considered and observed as the holiday; if the legal holiday falls on a Sunday then the following Monday shall be considered and observed as the holiday.

Employees shall not be paid for legal holidays unless they work the day before and the day after the legal holiday if those days are their regular workdays unless excused by the Manager. Except in the case of bona-fide emergencies, employees shall submit requests for use of personal holidays at least three (3) working days in advance of the day on which the personal holiday is to be taken.

At the Water Filtration Plant, should a legal holiday fall on a Saturday or a Sunday then the double time holiday rate shall apply for work performed on those days and the regular straight time rate shall apply for work performed on the Borough recognized Friday preceding or the Monday following the legal holiday. The straight time holiday pay shall be paid to employees working the Saturday or Sunday legal holiday on the day worked. All other employees shall receive their straight time holiday pay on the Borough recognized Friday or Monday holiday. The straight time holiday pay shall be counted as eight (8) hours worked as part of the regularly scheduled forty (40) hour work week.

ARTICLE IX – VACATIONS

All permanent full time employees shall be eligible for vacation according to the following schedule:

ANNUAL LEAVE ENTITLEMENT

SERVICE	PER YEAR	PER MONTH
0-12 months	5	5/12
12-72 months	10	5/6
72-144 months	15	1 ¼
144 months and up	22	1 5/6

A week of vacation shall be a calendar week, and the total weekly vacation wage shall be at the employee's regular weekly wage, whenever a regular paid holiday falls on a vacation day, the employee shall be entitled to an extra days' vacation. All vacations must be arranged for times which shall be most convenient to the orderly conduct of the employer's business and with due regard to the employee's duty to serve the public's interest at all times. In the event that too many employees in one department shall request vacations at the same period of time, preference shall be given in accordance with seniority of service and with consideration of the individual's duty in serving the public. At least one calendar week of vacation must be taken in the year in which earned. The taking of a vacation of less than a full week at a time will be permitted only for such employees entitled to more than one week of vacation per year, and then shall be restricted to and

deducted from the period of vacation in excess of the one week. In cases where the employee is entitled to more than one week of vacation, such employee may accumulate only that portion of the vacation in excess of the one-week, with a maximum accumulation of 22 days, and the taking of this 22 days' vacation at any one time must be approved by the Manager.

Vacation eligibility shall be on an anniversary date of employment basis and all employees entitled to a change in benefits because celebration of their first, second, sixth or twelfth anniversary date falls within a calendar year shall be entitled, within that calendar year, to the increased vacation benefit time off with pay following their anniversary date in addition to the vacation time off with pay benefit to which they were previously eligible. In no event will any employee receive more vacation time off within any calendar year than that to which he is eligible.

Except in the case of a bono-fide emergency, any vacation request which will cause a schedule change, and result in payments of overtime, shall be automatically disapproved.

ARTICLE X – SICK LEAVE

All permanent full time employees shall be granted twelve (12) days of sick leave up to 10 years of service and eighteen (18) days of sick leave in each calendar year following completion of 10 years of service. Employees may use up to twelve (12) days of sick leave in any one year to care for a sick family member including physician appointments for those family members.

All sick leave not used in a given calendar year shall be carried forward and credited as accrued sick leave which may then be used in the following calendar years. In each instance of illness, less than three working days is subject to approval by the Hanover Borough Manager. Three or more consecutive working days must be certified by an attending physician and shall be subject to approval by the Hanover Borough Manager. Sick leave pay shall equal the straight time salary or hourly wage based on a forty-hour workweek for the employee's job classification. For the purpose of this section, "sick leave" shall include time lost due to illness or injury. In case of injuries to employees covered under the provisions of the Workmen's Compensation Act, or in which a portion of sick leave pay is funded by insurance carried and paid for by the Employer, the Employer shall pay the difference between the compensation or insurance received and the employee's full salary or hourly rate based on a forty hour week until the expiration of the employee's paid sick leave, but in no case shall the total amount paid an employee exceed the straight time salary or hourly rate fixed for the job classification. That percentage of the employee's time off the job deemed to be reimbursed by Workmen's Compensation shall, in this instance, not be considered as paid sick leave.

Disability benefits shall not be payable to individuals receiving unemployment compensation. The employer reserves the right in any and all cases to designate a nurse or physician to examine an employee obtaining

paid sick leave and to report as to his condition. Any employee abusing the intent and purpose of this section providing sick leave with pay for actual illness or injury by taking same when employee is not actually sick or injured will be subject to dismissal. All permanent full-time employees shall earn sick leave from their date of hire. No sick leave shall be paid to probationary employees. Sick leave is accrued at the rate of one day per month with less than 10 years of service and 1 ½ day per month with more than 10 years of service. All sick leave not used by an employee in a calendar year shall be carried forward and shall be credited as accrued sick leave which may be used in the following calendar years up to a maximum of 300 days. Upon termination of his/her employment resulting from retirement, layoff, or death. Maximum number of days collectable shall be limited to 85 full days pay for employees hired on or before April 29, 2019, and 40 days for employees hired on or after April 30, 2019.

ARTICLE XI – BEREAVEMENT LEAVE

(1) Employees shall be granted bereavement leave for the death of spouse, parent, step-parent, child, brother, sister, aunt, uncle, grandparent, grandchild, half brother, half sister, foster child, step child, father-in-law, mother-in-law, son-in-law and daughter-in-law, from day of death up to and including the day following the funeral; not to exceed a maximum of five (5) working days.

(2) Employees shall be granted bereavement leave for the death of brother-in-law and sister-in-law for the day of death and the day of funeral.

(3) Employees shall be granted bereavement leave for the death of grandchild-in-law for the day of funeral.

(4) In addition, at the discretion and upon approval of the department head, additional time off may be granted as bereavement leave provided such additional time is charged to either accrued vacation or accrued sick leave benefits. **The employee shall designate his/her preference in the request for additional time off as bereavement leave.**

ARTICLE XII – SENIORITY

SECTION 1. Seniority is defined as the length of any employee's service with the employer and it shall apply as to the employee's promotion, transfers, layoffs, and re-hiring as hereinafter defined.

SECTION 2. Should a laid-off employee be capable of doing work other than that from which he was laid off, he may (A) By action of the Employer, or (B) By taking the matter up under the grievance procedure established in this agreement, replace the last hired employee on such other work in any other department, providing such employee has greater seniority than such last hired employee. When plant operations resume on a normal or increased schedule, employees affected shall be restored to their normal status or re-employed in the reverse order in which they were laid off in accordance with their overall hiring date seniority.

SECTION 3. Whenever possible, employees shall be temporarily transferred to other work according to seniority and qualifications rather than be laid off. The Employer will make its best effort when assigning semi-skilled laborers from dam maintenance to construction jobs and pipe repair jobs to make assignments rotating dam security personnel in an equal assignment basis with semi-skilled laborers in so far as it can be done without compromising security work and coverage at the dams.

SECTION 4. An employee having been transferred from his work due to lack of work shall be given a chance to transfer to his original work when such work becomes available in accordance with his seniority.

SECTION 5. No new employee will be hired as long as there are laid-off employees with seniority who can qualify to do other available work.

SECTION 6. An employee's seniority shall terminate for any of the following reasons:

(A) Discharge for proper cause

(B) When an employee quits his job.

(C) Failure to report for work within five (5) workdays after being recalled by registered mail notice. The Employer shall notify the local Union at the time the employee is notified to return to work.

(D) Is laid off without recall for a period equal to his amount of service or no more than two (2) years at any time after the execution of this Agreement.

SECTION 7A. In the event a vacancy occurs on any job or a new job is established, a notification of such vacancy or establishment of such new job shall be posted on the Department's bulletin boards for 10 working days and such job shall be filled from the employees throughout the Department who have the ability and who are qualified to do the work, and the job shall be for the same class pay/grade as the individual vacating the position being

posted. All job vacancies shall be posted at all major Water Department facilities: Filter Plant, Tangers Building, and Water Shed Caretaker's Garages. In all such cases, if qualifications are equal, seniority shall govern. Eligible employees not notifying the Borough Manager of their interest in such job within 10 working days from the date of posting shall forfeit all rights in such cases and shall wait until the next vacancy occurs. In the event that employees do make application through the bidding procedure, the jobs involved must be filled by the applicant most qualifying within 10 days of the completion of such bidding procedure in each instance. In the event of disputes, the job in question shall be considered only temporarily filled until the matter is properly disposed of through the established grievance procedure. If training is required for any job, incumbent employees will be given the opportunity for such training for a reasonable time before any new employees are hired.

SECTION 7B. For purposes of this section, a new job or vacancy shall not be interpreted to include hiring of summer employees or of hiring a high school student on a typical work program where said high school student attends classes of formal education half days and works the balance of the day. The work term of summer employees shall be limited between May 15 and September 15 of any calendar years. Summer employees or students shall not be subject to contractual terms contained in this agreement. The

Borough agrees not to exceed two (2) summer employees and/or two (2) students at any one time.

In so far as possible, the Borough agrees to utilize summer employees as roving laborers, assisting permanent personnel in their assigned jobs and not replacing them. Similarly the Union understands these youth job assignments are limited by child labor law restrictions and the Borough has the right to assign employees to the best advantage to accomplish the work at hand.

It is agreed that, during the course of completing large or multiple projects, should the Borough discover the need for summer employees in excess of the number stated above, then the Borough and the Union shall meet and discuss the need for additional summer employees. Upon mutual agreement between the Borough and the Union as to the need and function of said excess summer employees, the Borough shall hire said employees for the agreed on function which shall not constitute a violation of this contract.

SECTION 8. The employer shall have the right to fill such vacancy or job on a temporary basis at its discretion during the posting period.

SECTION 9. Any local Union member shall be given, upon his request, a leave of absence without compensation not to exceed a period of two (2) years for the purpose of working for the local Union or the International Union, with the provision that such leave of absence shall not constitute any

break in the employee's record of continuous service, and the period of leave of absence shall be included in such record of continuous service.

SECTION 10. Seniority shall be accumulated due to illness, accidents, vacation period, and leave of absence due to Union business. During layoff, seniority will accumulate for a two year period per each layoff.

SECTION 11. Upon application to the Employer, a leave of absence may be granted to employees at the discretion of the Employer without discrimination. Thirty (30) calendar days shall be the maximum period of time for which such leave of absence may be granted except in extreme cases, whereupon before the thirty (30) calendar day period expires, satisfactory evidence shall be presented before such leave of absence may be extended. Ninety (90) calendar days shall be the maximum period of time permissible for such leave of absence. Continuous service shall not be deemed to have been broken because of leave of absence, provided however, that failure of an employee to return to work at the proper time after leave of absence shall break the continuous service of such employee.

SECTION 12. The Employer shall give written notification to the local Union Steward of all layoffs, employees returned to work, department transfers and new employees once each week in which any such events occur.

SECTION 13. A seniority list of all employees shall be supplied by the Employer to the Local Union, The International Union Office, Harrisburg, Pa., and copies shall be posted on the bulletin boards in all departments. Any

errors in the seniority list as posted will be corrected if called to the Employer's attention within thirty (30) days of the posting.

SECTION 14. Newly hired employees shall be on probation the first ninety (90) days of their employment and may be discharged at the discretion of the Employer. Employees retained after such ninety (90) days shall have seniority, beginning with the first day of their employment. The 90 day probationary period will apply to promotions as well as new hires provided, however, that no promoted individual will be paid less per hour than his rate prior to promotion during the probationary period. In order to qualify for Skilled Laborer, Grade III Pay, for purposes of permanent promotion, the employee will undertake a job skills test of actual job related tasks, as established by agreement between Union Stewarts and the Borough. Said test will be appended to the job descriptions when developed. While the Parties agree that the Borough has the right to change the duties set forth in a job description, the Borough will agree to meet and discuss with the Union if changes are made to the provisions of a job description. The classifications will remain unchanged and the Borough will supply the Union with any job description upon request. All employees promoted to a new job classification will be given a five (5) day trial period at his or her pre-promotion pay rate. If at the end of five (5) working days the employee does not accept the promotion, he/she may return to his/her pre-promotion job classification, without prejudice from management and without added pay for the time

served in the promotion position. However, if the employee does accept the promotion following the five (5) day trial, said employee will be compensated the difference in pay between his old pay and the pay for the new job classification for the hours worked in the five (5) day trial period. In the case of Filter Plant promotions if both the Borough and the employee agree, the trial may be extended under the terms stated in the preceding paragraph, for a longer period, not to exceed ninety (90) days.

ARTICLE XIII – SAFETY & HEALTH

SECTION 1. The employer and the Union will cooperate on the continuing objective to eliminate accident and health hazards by the formation of a Safety Committee made up of two Employer representatives and two union members. A regular schedule of meetings will be established, at least quarterly for filter plant employees and as needed for construction and meter reader employees. The Employer shall continue to make reasonable provisions for the safety and health of its employees while at work. Employee comment regarding safety of working conditions due to inclement weather conditions shall be taken into consideration by Employer so as to protect the health and safety of the employee.

SECTION 2. Protective devices and equipment necessary to protect employees from injury shall be provided by the Employer in accordance with practices now prevailing at such employment and such practices shall be improved from time to time by the Employer. Goggles, gas masks, face

shields, respirators, special purpose gloves and fireproof water-proof raincoats, oil-skins suits, coveralls, articles, or acid-proof protective clothing, when necessary and required, shall be provided by the Employer without cost. The Employer has agreed to provide a Boot allowance for up to a maximum of $100.00 per year for the purchases of one pair of work boots that are necessitated by the employee's job responsibilities. The employee will be reimbursed for the purchase of one pair of work boots upon providing to the Borough a receipt for the purchase of said boots and also providing that the Union assures that the members will wear the boots purchased as a condition of said employment. Where any equipment or clothing is now provided, the present practice shall continue. Carelessness on the part of the employees which would result in injury to themselves or fellow employees or willful breakage of equipment, or failure to wear or use safety protective devices provided by the Employer or to abide by safety rules, will subject employees to disciplinary action. The Uniform Contract calls for work pant, long sleeve shirt (winter) and tee shirt (summer). The employee will have the option to wear jeans provided they purchase and clean the jeans to provide a neat, clean appearance. Once uniforms are issued, the employee will not have the option to change the uniform issued until the uniform

contract is renewed. The revision will remain in effect the length of this contract.

SECTION 3. The Union hereby agrees to random Drug and Alcohol testing for all employees covered under this contract. The policy procedure for Drug and Alcohol testing is attached.

ARTICLE XIV – MANAGEMENT

The management of the Borough and the direction of its working forces including the right to plan, direct and control its operations, the right to hire, layoff, discharge, promote, demote or transfer its employees, all for just cause; the right to make such rules relating to operations as the management shall deem advisable are vested exclusively in the management, subject to the provisions of this agreement.

ARTICLE XV – INSURANCE PLAN

SECTION 1. The Employer will continue throughout the period when this agreement is in effect to provide insurance including group life, accidental death and dismemberment, hospitalization and medical expense benefits upon the terms and conditions set forth in the group plan for the Borough of Hanover a summary of which is hereto attached, made a part hereof and marked Schedule C. Prescription benefits shall be paid upon the basis of the reasonable and customary fee in the community for the prescription service provided, less, a deductible as outlined in Schedule C for each prescription. The insured disability shall be $200.00 per week. Employee's life insurance

will be paid for by the Borough while same is an active employee with the Borough effective February 1, 2002 at two time's annual salary with a maximum of $50,000, and $50,000 accidental death and dismemberment. The Borough will provide as part of health and welfare coverage, medical, surgical, and hospitalization insurance equal to the plan known as Custom Blue currently offered through Blue Cross on an employee if single and on an employee and dependents (spouse and/or children) consistent with present coverage carried on all other Borough employees at no cost to the employee. The Borough will also provide eye care for employees and dependents. The foregoing, including Schedule C, is a summary of the insurance plan and in all cases the provision of The Borough of Hanover group plan contract will be the governing factor in determining coverage and eligibilities. The Borough further agrees that if these plans are improved for any bargaining unit during negotiations while this contract is in effect, the same benefits will be given to Water Department employees. Water Department employees will be eligible to purchase health and accident insurance at group rates at their time of retirement, provided, however, any such employees hired on or after January 1, 2019, shall not be eligible to purchase health and accident insurance at group rates at their time of retirement.

SECTION 2. Effective January 1, 2019, employees shall be responsible for paying the following amounts per weekly pay:

Year	1/1/2019	1/1/2020	1/1/2021	1/1/2022	1/1/2023
Single	$10.00	$12.50	$15.00	$17.50	$20.00
H&W	$15.00	$17.50	$20.00	$22.50	$25.00
Family	$20.00	$22.50	$25.00	$27.50	$30.00

SECTION 3. The Parties agree that it is in their mutual interest that the health coverage available under this Agreement shall at all times comply with the Patient Protection and Affordable Care Act ("PPACA"), as amended or as may be replaced with other statutory language, including standards relating to affordability, minimum value and minimal essential coverage and any chosen safe harbor relating to these and other compliance requirements. To the extent that it is determined that the coverage available under this Agreement fails to meet any PPACA requirement or would otherwise trigger an assessable payment, statutory or excise tax, then either party shall have the right to reopen the contract to negotiate health care changes to avoid the cost of these changes. If no agreement is reached within thirty (30) days, either party shall have the right to demand arbitration regarding desired health care changes if an agreement cannot be reached. The parties will proceed to an expedited arbitration proceeding with an arbitrator selected pursuant to the terms of the Collective Bargaining Agreement's grievance and arbitration procedure. The sole purpose for that expedited arbitration proceeding will be for the arbitrator to

modify the plan, plan design and/or plan carrier in order to eliminate the exposure to discretionary changes mandated by law which potentially affect the health care benefits provided by the Borough. The decision of the arbitrator on this issue shall be issued within forty (40) calendar days of his or her appointment.

SECTION 4. It is specifically understood between the parties that disputes relating to the administration of or coverage decision made by any insurance policy which are not the result of the Borough direction, choice or decision, but rather are made strictly under the sole discretion of the carrier, shall not be subject to the contractual grievance procedure. This does not limit the right of any individual to file a claim against the insurance company for denial of coverage with any appropriate agency. In any case where the coverage decision was the result of the Borough's decision, the matter may be grieved.

ARTICLE XVI – PENSION PLAN

The employer agrees to provide pension for retired and disabled employees in accordance with The Employee Pension Fund Plan effective July 1, 1975, in accordance with Ordinance No. 1311 and amendments thereto, a copy of which is hereto attached and made a part hereof.

457 PLAN – The Borough will administer a plan providing for payroll deductions into 457 Plan Accounts established by the employee.

ARTICLE XVII – UNION NOTICES

Bulletin boards are provided in each department where notices of interest to employees may be posted after approval has been secured from the supervisor. Each bulletin shall be signed by the Union official responsible for its posting and unsigned notices may not be posted. The following bulletins, however, do not require prior approval by the Supervisor:

1. Notices of Union recreational or social affairs.
2. Notices of Union elections.
3. Notices of Union appointments and results of Union elections.
4. Notices of Union meetings.

The Union or its duly authorized representative shall have the responsibility for the prompt removal of notices from the bulletin boards after they have served their purposes. If the notices are not removed, the Supervisor or other company official may remove the notice.

ARTICLE XVIII – TERM OF CONTRACT

This Agreement, effective January 1, 2019 shall continue in full force and effect until midnight on December 31, 2023, and shall automatically renew itself from year to year. If either party desires to terminate, modify or otherwise change any of the terms of this agreement, such party must serve written notice upon the other party postmarked on or before May 1, 2023 and if sent by the Employer, shall be sent to the United Steelworkers of America, Sub-District Office, 245 Centerville Road, Suite 9, Lancaster, PA

17603, and if the Union desires to notify the employer of the termination or modification of said agreement, the same shall be sent to the Manager of the Borough, Hanover, Pennsylvania.

ARTICLE XIX – SUCCESSORS

It is hereby agreed that the terms and provisions of this Agreement shall be binding upon the successors or assigns of the respective parties.

ARTICLE XX – EQUAL OPPORTUNITY

It is the continuing policy of the employer and Union that the provisions of the agreements shall be applied to all employees covered by this agreement without discrimination on account of race, color, national origin, sex, age or creed.

ARTICLE XXI – CONTINUITY OF SERVICE

1. Interbargaining unit transfers of Borough personnel shall not constitute a break in continuous Borough service for the purpose of calculating benefits with the exception of bargaining unit seniority.

2. Borough personnel transferred who is at a later date re-transferred to their original bargaining unit shall regain their bargaining unit seniority in that bargaining unit for all purposes from date of hire in the bargaining unit.

3. In no case will interbargaining unit bidding or bumping of jobs be allowed.

SIGNATURE SHEET

This Agreement, made and entered into this **1st day of January 2019,** by and between The Borough of Hanover and the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union, AFL-CIO · CLC, on **Behalf Of Local 7343-07** and to continue in effect through December 31, 2023.

USW	USW-Local Union 7343-07	The Borough of Hanover
Thomas M. Conway President	Tim Bankert Unit President	William Reichart II President
John E. Shinn Secretary-Treasurer	Sam Smith Unit Griever	Dorothy Felix Borough Secretary
D.R. McCall Vice-President-Administration	Frank Groft Committee Member	
Frederick D. Redmond Vice-President-Human Affairs	Richard Krysiak Committee Member	
Bobby "Mac" McAuliffe Director-District 10	Douglas Rummel Committee Member	
Joseph B. Pozza, III Sub-District Director	Kevan Anschuetz Committee Member	
Leroy A. Atwater Jr. Staff Representative		

2019– WATER DEPARTMENT – 3.00%

JOB CLASSIFICATION	CLASS PAY GRADE	BASE PAY RATE
Laborer (Probationary & Permanent)	Probationary	$19.81
	I (First Year)	$20.17
	I (Second Year)	$20.95
	I (Third Year)	$22.29
Dam Maintenance, Semi-skilled Laborer	II (First Year)	$23.84
	II (Second Year)	$25.11
	II (Third Year)	$27.72
Skilled Laborer, Meter Repairman, Filter Plant Trainee Meter Reader	III	$28.05
Class C Filter Plant Operator, Maintenance Mechanic at Filter Plant	IV	$28.42
Class B Filter Plant Operator	V	$28.78
Crew Leader	V	$28.88
Filter Plant Operator – A License	VI	$29.09
Filter Plant Lead Man	VII	$30.21

2020 – WATER DEPARTMENT – 2.75%

JOB CLASSIFICATION	CLASS PAY GRADE	BASE PAY RATE
Laborer (Probationary & Permanent)	Probationary	$20.35
	I (First Year)	$20.72
	I (Second Year)	$21.53
	I (Third Year)	$22.90
Dam Maintenance, Semi-skilled Laborer	II (First Year)	$24.50
	II (Second Year)	$25.80
	II (Third Year)	$28.48
Skilled Laborer, Meter Repairman, Filter Plant Trainee Meter Reader	III	$28.82
Class C Filter Plant Operator, Maintenance Mechanic at Filter Plant	IV	$29.20
Class B Filter Plant Operator	V	$29.57
Crew Leader	V	$29.67
Filter Plant Operator – A License	VI	$29.89
Filter Plant Lead Man	VII	$31.04

2021 – WATER DEPARTMENT – 2.50%

JOB CLASSIFICATION	CLASS PAY GRADE	BASE PAY RATE
Laborer (Probationary & Permanent)	Probationary	$20.86
	I (First Year)	$21.24
	I (Second Year)	$22.06
	I (Third Year)	$23.47
Dam Maintenance, Semi-skilled Laborer	II (First Year)	$25.11
	II (Second Year)	$26.45
	II (Third Year)	$29.19
Skilled Laborer, Meter Repairman, Filter Plant Trainee Meter Reader	III	$29.54
Class C Filter Plant Operator, Maintenance Mechanic at Filter Plant	IV	$29.93
Class B Filter Plant Operator	V	$30.31
Crew Leader	V	$30.41
Filter Plant Operator – A License	VI	$30.64
Filter Plant Lead Man	VII	$31.82

2022 – WATER DEPARTMENT – 2.50%

JOB CLASSIFICATION	CLASS PAY GRADE	BASE PAY RATE
Laborer (Probationary & Permanent)	Probationary	$21.38
	I (First Year)	$21.77
	I (Second Year)	$22.61
	I (Third Year)	$24.06
Dam Maintenance, Semi-skilled Laborer	II (First Year)	$25.74
	II (Second Year)	$27.11
	II (Third Year)	$29.92
Skilled Laborer, Meter Repairman, Filter Plant Trainee Meter Reader	III	$30.28
Class C Filter Plant Operator, Maintenance Mechanic at Filter Plant	IV	$30.68
Class B Filter Plant Operator	V	$31.07
Crew Leader	V	$31.17
Filter Plant Operator – A License	VI	$31.41
Filter Plant Lead Man	VII	$32.62

2023 – WATER DEPARTMENT – 2.50%

JOB CLASSIFICATION	CLASS PAY GRADE	BASE PAY RATE
Laborer (Probationary & Permanent)	Probationary	$21.91
	I (First Year)	$22.31
	I (Second Year)	$23.18
	I (Third Year)	$24.66
Dam Maintenance, Semi-skilled Laborer	II (First Year)	$26.38
	II (Second Year)	$27.79
	II (Third Year)	$30.67
Skilled Laborer, Meter Repairman, Filter Plant Trainee Meter Reader	III	$31.04
Class C Filter Plant Operator, Maintenance Mechanic at Filter Plant	IV	$31.45
Class B Filter Plant Operator	V	$31.85
Crew Leader	V	$31.95
Filter Plant Operator – A License	VI	$32.20
Filter Plant Lead Man	VII	$33.44

SCHEDULE A

NEW EMPLOYEE PROBATION, MILEAGE, JURY DUTY, EDUCATION, AND SHIFT DIFFERENTIAL

New employee's probation: During his probationary period referred to in Section 14 of Article XII of the Agreement to which this Schedule A is attached, an employee shall be paid 35 cents per hour less than the rate established above for the classification he is appointed to. This paragraph shall not apply to newly hired employees in Job Class – Pay Grade I.

The job classification of each employee shall be stated in the seniority list to be prepared and posted in accordance with the provisions of Section 13 of Article XII of the Agreement to which this schedule is attached.

In addition to the economic benefits set forth above in this Agreement, the employer agrees as follows:

Mileage – The Borough will pay to any employee using his own motor vehicle for company business a mileage reimbursement equivalent to mileage reimbursement allowed by law and paid by the Commonwealth of Pennsylvania at any given time.

Jury Duty – The employer will pay to any employee summoned for jury duty or who is subpoenaed as a witness in a legal proceeding and who actually serves as a member of a jury panel or appears in response to such witness subpoena, an amount equal to the difference between his straight time pay for each day of such jury or witness duty and the amount of his jury or witness fees.

Education – The employer will pay tuition, mileage and other costs incurred for educational purposes when such educational purposes are, by mutual agreement of the employer and the concerned employee, necessary in connection with the employment of such employee.

Shift Differential – The shift differential of one ($1.00) Dollar per hour in 2019, 2020, 2021, 2022, 2023 will be paid to both the second and third shifts for each hour worked within that period. Second and third shifts are defined as any shift either starting or ending on a scheduled basis between the hours of 6 P.M. and 6 A.M. Shift differential will be applied only to a regular shift schedule or a continuation of a regular shift schedule for a basis of computing both regular pay and overtime. Shift differential shall not apply to emergency callouts.

SCHEDULE B

PROBATIONARY PERIOD INSURANCE SUMMARY

Probationary Period:

Life insurance – three months
Hospitalization insurance – three months

In order to obtain coverage, it is necessary to fill in the enrollment form promptly.

After your coverage becomes effective, it is necessary to notify your employer of any change in the number of your dependents.

If you wish to include a new dependent, you must make a separate request to your employer and meet any other requirements for this coverage.

Life Insurance, Accidental Death & Dismemberment – principal sum

Weekly Disability Benefit

Non-Contributory – Schedule of Basic Insurance

Classification	Life	Acc. D & D
All employees	Two times annual salary to a maximum of $50,000	Two times annual salary to a maximum of $50,000

Contributory – Schedule of Supplemental Insurance

Classification	Life	Acc. D & D
All employees		
Option I	$2,500	One time life benefit
Option II	$5,000	One time life benefit
Option III	$7,500	One time life benefit

SCHEDULE C

DISABILITY INSURANCE SUMMARY

Weekly Disability Benefit

Classification	Weekly Disability
All Employees	$200.00

Weekly disability benefit provisions:

The amount of weekly benefit is subject to a limit of 70% of your average weekly earnings as defined in the group policy at any time that no Federal Social Security benefits are payable.

At any time that Federal Social Security benefits are payable, the amount of your weekly benefit will not exceed an amount which, when added to any benefit payable for the same weekly period under the Federal Social Security Act, would equal 70% of your weekly earnings.

The term "any benefit payable under the Federal Social Security Act" will include disability or retirement benefits payable to you or your spouse, children or dependents by reason or your retirement or disability under the Act and is not limited to benefits actually received, but include benefits which would have been available if the individual had complied with the provisions for making claim for such benefits.

It is agreed disability benefits shall not be payable to individuals receiving unemployment compensation.

Wait period days: First seven days of any disability period due to disease. There is no waiting period for a disability period due to injury.

Maximum period of payment: 26 weeks.

SCHEDULE D

DENTAL CARE INSURANCE SUMMARY

Basic program

100% usual, customary & reasonable charge
Examination & cleaning – once in any period of six consecutive months
Full mouth x-rays – once in any period of 36 consecutive months
Fluoride application – children under 19 years of age – once in any period of six consecutive months.

Orthodontics

50% usual, customary & reasonable charge
Only children under 19 years of age
Maximum payment - $2,000 – lifetime

Pereodontics

50% usual customary and reasonable charge.

Oral Surgery

100% usual customary and reasonable charge.

Predetermination is required for:

All treatment plans of $150.00 or more; extraction of six or more teeth. Orthodontics

SCHEDULE E

EYE CARE INSURANCE SUMMARY

Examinations

Usual, customary & reasonable charge
Under 19 years of age – once during 12-month period
Over 19 years of age – once during 24-month period

Frames	Allowance - $125.00
Type of Lenses	
Single Vision	Allowance - $110.00 per pair
Bifocal	Allowance - $140.00 per pair
Trifocal	Allowance - $165.00 per pair
Aphakic (replaces natural Lens of the eye)	Allowance - $325.00 per pair

Contact Lenses	**Allowance per pair**
Hard	$200
Soft	$250
Cosmetic	$100 yearly

SCHEDULE F

EMPLOYEES HIRED BEFORE RATIFICATION

The Borough acknowledges a verbal agreement that all new hires that have been hired before ratification will have all the benefits and provisions of the expired agreement.

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331-3501
717-637-3877
AN EQUAL OPPORTUNITY EMPLOYER

MEMORANDUM OF UNDERSTANDING

Date: October 24, 2019

Between: United Steel Workers Local 7343 and the Borough of Hanover

Subject: Implementation of Contract for the period 1/1/2019-12/31/2023

This memorandum of understanding is to memorialize the agreement between United Steel Workers Local 7343 and the Borough of Hanover that USW employees are working under the terms of the subject contract.

Employees who, during the course of 2019, used vacation or floating holidays for a purpose that under the subject contract are eligible for the use of sick leave may trade sick time for the used floating holidays and or vacation, with said floating holidays or vacation being restored to the employee. The local representatives will provide a list to Sam Miller that provides the names and hours of floating holiday or vacation that are eligible for exchange for sick leave.

Employees who have taken their birthday as a holiday during 2019 will use either a floating holiday or vacation day for Black Friday. Employees who have not taken their birthday as a holiday will be paid holiday pay Black Friday.

Pay rates, health insurance provisions and all other benefits or conditions of employment that under the subject contract are subject to retroactivity to 1/1/2019 shall be implemented as soon as practicable.

Executed this 24th day of October 2019

Timothy Bankert

Michael J. O'Rourke

Samuel Smith

Samuel Miller

HIGHMARK. PPO Blue

IIC-Borough of Hanover
PPO Blue Benefit Summary – Water
Group Numbers – 025633-71,-72 and -73

On the chart below, you'll see what your plan pays for specific services. You may be responsible for a facility fee, clinic charge or similar fee or charge (in addition to any professional fees) if your office visit or service is provided at a location that qualifies as a hospital department or a satellite building of a hospital.

Benefit	Network	Out-of-Network
General Provisions		
Benefit Period(1)	Contract Year	
Deductible (per benefit period) Individual Family	 None None	 $325 $650
Plan Pays – payment based on the plan allowance	100%	80% after deductible
Out-of-Pocket Limit (Once met, plan pays 100% coinsurance for the rest of the benefit period) Individual Family	 None None	 $380 $760
Total Maximum Out-of-Pocket (Includes deductible, coinsurance, copays, prescription drug cost sharing and other qualified medical expenses, Network only)(2) Once met, the plan pays 100% of covered services for the rest of the benefit period. Individual Family	 $8,150 $16,300	 Not Applicable Not Applicable
Office/Clinic/Urgent Care Visits (one copay per provider per date of service)		
Retail Clinic Visits & Virtual Visits	100% after $25 copay	80% after deductible
Primary Care Provider Office Visits & Virtual Visits	100% after $25 copay	80% after deductible
Specialist Office & Virtual Visits	100% after $35 copay	80% after deductible
Virtual Visit Originating Site Fee	100%	80% after deductible
Urgent Care Center Visits	100% after $25 copay	80% after deductible
Telemedicine Services(3)	100% after $10 copay	Not Covered
Preventive Care(4)		
Routine Adult Physical exams	 100%	 80% after deductible
Adult immunizations	100%	80% after deductible
Routine gynecological exams, including a Pap Test	100%	80% (deductible does not apply)
Mammograms, annual routine	100%	80% after deductible
Mammograms, medically necessary	100%	80% after deductible
Diagnostic services and procedures	100%	80% after deductible
PSA Testing (19 years and older)	100%	80% after deductible
Routine Pediatric Physical exams	 100%	 80% after deductible
Pediatric immunizations	100%	80% (deductible does not apply)
Diagnostic services and procedures	100%	80% after deductible
Emergency Services		
Emergency Room Services	100% after $35 copay (waived if admitted)	
Ambulance – Emergency	100% (deductible does not apply)	
Ambulance – Non-Emergency	100%	80% after deductible
Hospital and Medical/Surgical Expenses (including maternity)		
Hospital Inpatient	100%	80% after deductible
Hospital Outpatient	100%	80% after deductible
Maternity (non-preventive facility & professional services) including dependent daughter – Exclude ACT 81	100%	80% after deductible
Medical Care (including inpatient visits and consultations)/Surgical Expenses	100%	80% after deductible
Therapy and Rehabilitation Services (one copay per provider per date of service)		
Physical Medicine	100% after $35 copay Limit: Unlimited visits/benefit period	80% after deductible
Respiratory Therapy	100%	80% after deductible
Speech & Occupational Therapy	100% after $35 copay Limit: 30 visits per therapy/benefit period	80% after deductible
Spinal Manipulations	100% after $35 copay Limit: Unlimited visits/benefit period	80% after deductible
Other Therapy Services (Cardiac Rehab, Infusion Therapy, Chemotherapy, Radiation Therapy and Dialysis)	100%	80% after deductible

Benefit	Network	Out-of-Network
Mental Health/Substance Abuse (one copay per provider per date of service)		
Inpatient Mental Health Services	100%	80% after deductible
Inpatient Detoxification / Rehabilitation	100%	80% after deductible
Outpatient Mental Health Services (includes virtual behavioral health visits)	100% after $35 copay	80% after deductible
Outpatient Substance Abuse Services	100%	80% after deductible
Other Services		
Allergy Extracts and Injections	100%	80% after deductible
Applied Behavior Analysis for Autism Spectrum Disorder(5)	100%	80% after deductible
Assisted Fertilization Procedures	Not Covered	Not Covered
Dental Services Related to Accidental Injury	100%	80% after deductible
Diagnostic Services *Advanced Imaging* (MRI, CAT, PET scan, etc.)	100%	80% after deductible
Basic Diagnostic Services (standard imaging, diagnostic medical, lab/pathology, allergy testing)	100%	80% after deductible
Durable Medical Equipment, Orthotics and Prosthetics	100% Diabetic Pump and Diabetic Pump supplies – covered procedure codes A9274, A9276	80% after deductible Diabetic Pump and Diabetic Pump supplies – covered procedure codes, A9274, A9276
Home Health Care	100% Limit: 90 visits/benefit period	80% after deductible
Hospice	100%	80% after deductible
Infertility Counseling, Testing and Treatment(6)	100%	80% after deductible
Private Duty Nursing	100% Limit: 240 hours/benefit period	80% after deductible
Skilled Nursing Facility Care	100% Limit: 100 days/benefit period	80% after deductible
Transplant Services	100%	80% after deductible
Precertification Requirements(7)	Yes	
Prescription Drugs		
Prescription Drug Deductible Individual Family	None None	
Prescription Drug Program(8) Soft Mandatory Generic Defined by the National Pharmacy Network - Not Physician Network. Prescriptions filled at a non-network pharmacy are not covered. Your plan uses the Comprehensive Formulary with an Incentive Benefit Design.	**Retail Drugs (30-day Supply)** $17 generic copay $27 formulary brand copay $52 non-formulary brand copay **Maintenance Drugs through Mail Order (90-day Supply)** $30 generic copay $50 formulary brand copay $65 non-formulary brand copay	

Signature of Client Representative

5/5/2020
Date

BOROUGH MANAGER
Title

This is not a contract. This benefits summary presents plan highlights only. Please refer to the policy/ plan documents, as limitations and exclusions apply. The policy/ plan documents control in the event of a conflict with this benefits summary.

(1) Your group's benefit period is based on a Contract Year. The Contract Year is a consecutive 12-month period beginning on your employer's effective date. Contact your employer to determine the effective date applicable to your program.
(2) The Network Total Maximum Out-of-Pocket (TMOOP) is mandated by the federal government. TMOOP must include deductible, coinsurance, copays, prescription drug cost share and any qualified medical expense.
(3) Services are provided for acute care for minor illnesses. Services must be performed by a Highmark approved telemedicine provider. Virtual Behavioral Health visits provided by a Highmark approved telemedicine provider are eligible under the Outpatient Mental Health benefit.
(4) Services are limited to those listed on the Highmark Preventive Schedule (Women's Health Preventive Schedule may apply).
(5) Coverage for eligible members to age 21. After initial analysis, services will be paid according to the benefit category (e.g. speech therapy). Treatment for autism spectrum disorders does not reduce visit/day limits.
(6) Treatment includes coverage for the correction of a physical or medical problem associated with infertility. Infertility drug therapy may or may not be covered depending on your group's prescription drug program.
(7) Highmark Medical Management & Policy (MM&P) must be contacted prior to a planned inpatient admission or within 48 hours of an emergency or maternity-related inpatient admission. Be sure to verify that your provider is contacting MM&P for precertification. If this does not occur and it is later determined that all or part of the inpatient stay was not medically necessary or appropriate, you will be responsible for payment of any costs not covered.
(8) The Highmark formulary 7is an extensive list of Food and Drug Administration (FDA) approved prescription drugs selected for their quality, safety and effectiveness. The formulary was developed by Highmark Pharmacy Services and approved by the Highmark Pharmacy and Therapeutics Committee made up of clinical pharmacists and physicians. All plan formularies include products in every major therapeutic category. Plan formularies vary by the number of different drugs they cover and in the cost-sharing requirements. Your program includes coverage for both formulary and non-formulary drugs at the copayment or coinsurance amounts listed above. Under the soft mandatory generic provision, when you purchase a brand drug that has a generic equivalent, you will be responsible for the brand-drug copayment plus the difference in cost between the brand and generic drugs, unless your doctor requests that the brand drug be dispensed.

Hanover Borough

January 1, 2020 Renewal Summary

Stop Loss Carrier	Everest Re	Everest Re
Administrator	Highmark Blue Shield	Highmark Blue Shield
Specific Deductible	$75,000	$75,000
Specific Contract Basis	24/12	36/12
Aggregate Corridor	115%	115%
Cross Share	30.0%	30.0%
Aggregate Contract Basis	24/12	36/12

	In-Force Rates		Annual Costs	Renewal Rates		Annual Costs	Renewal Change	
	Single	**Family**		**Single**	**Family**		**$ Change**	**% Change**
Census Enrollment	36	111		36	111			
Administrative								
Administration Fee	$21.36	$21.36	$37,679	$21.36	$21.36	$37,679	$0	0.0%
Benecon Management Fee	$39.11	$39.11	$68,990	$39.79	$39.79	$70,190	$1,200	1.7%
Broker Fee	$20.00	$20.00	$35,280	$20.00	$20.00	$35,280	$0	0.0%
Stop Loss Insurance								
Specific Premium	$103.47	$248.33	$375,475	$113.82	$273.16	$413,019	$37,545	10.0%
Aggregate Premium	$6.00	$6.00	$10,584	$6.00	$6.00	$10,584	$0	0.0%
Spec Share								
Spec Share Fund	$68.39	$164.14	$248,179	$75.23	$180.55	$272,992	$24,813	10.0%
Claim Fund								
Aggregate Factors	$754.09	$1,801.42	$2,725,258	$804.64	$1,922.75	$2,908,707	$183,449	6.7%
Total Rates	**$1,012.42**	**$2,300.36**	**$3,501,445**	**$1,080.84**	**$2,463.61**	**$3,748,451**	**$247,006**	**7.1%**
Annual Maximum Costs			**$3,501,445**			**$3,748,451**		
Annual Expected Costs			**$3,147,357**			**$3,370,435**		

DELTA DENTAL

www.deltadentalins.com

July 13, 2018

Borough of Hanover
44 Frederick St
Hanover, PA 17331

RE: Contract Renewal for Borough of Hanover
Delta Dental PPO℠ Group# 05113

We appreciate your business and thank you for choosing Delta Dental of Pennsylvania. Your employees are among the millions nationwide who trust their smiles to Delta Dental.

We are pleased to present you with your dental plan contract renewal information. We are committed to providing you with quality plan designs combined with excellent customer service.

When reviewing your dental plan, we considered cost factors related to your group's dental service utilization and claims experience. Our analysis indicates that no change in your current rate is necessary.

We have calculated your rates based on the employer/employee contribution levels in your contract remaining the same. If the contribution levels and/or enrollment guidelines have changed or will change, please notify us immediately, as such a change may affect your renewal rate.

The following is the renewal information for your Delta Dental PPO℠ dental plan:

Effective Date	***January 01, 2019***	
Contract Term	***January 01, 2019 - December 31, 2020***	
% increase	***0.00%***	
Division #00001	***Current Rates***	***Renewal Rates***
Enrollee Only	***$34.39***	***$34.39***
Enrollee + 1 or More Dependents	***$84.07***	***$84.07***

Delta Dental Insurance Company
Telephone: 800-521-2651

Delta Dental of California
Telephone: 888-335-8227

Delta Dental Mid-Atlantic Region
Delta Dental of Delaware, Inc.
Delta Dental of the District of Columbia
Delta Dental of New York, Inc.
Delta Dental of Pennsylvania (Maryland)
Delta Dental of West Virginia
Telephone: 800-932-0783

Division #00002	***Current Rates***	***Renewal Rates***
Enrollee Only	***$36.41***	***$36.41***
Enrollee + 1 or More Dependents	***$92.55***	***$92.55***
Division #00003, 00004	***Current Rates***	***Renewal Rates***
Enrollee Only	***$37.46***	***$37.46***
Enrollee + 1 or More Dependents	***$96.93***	***$96.93***

To renew your dental plan contract, please follow these steps:

1) Review this letter for changes to your dental plan for January 01, 2019
2) Begin paying the rates outlined in this letter with your new contract term.

Upon your renewal you will receive a formal amendment to your contract. If you would like to review an amendment prior to renewing your plan, please contact your Account Manager and an amendment will be provided.

If you have any questions about your renewal, your Account Manager will be happy to help. We appreciate your continued confidence in Delta Dental. We are proud of our association with you and look forward to a long and mutually successful relationship.

Sincerely,

Delta Dental of Pennsylvania



MohammadReza Navid
Group Vice President, Sales

The American Dental Association (ADA) annually updates its standard dental procedure coding system, which is a component of its Code on Dental Procedures and Nomenclature (CDT Code) reference manual. When the ADA changes the codes, carriers must adopt the changes. We process claims according to the current CDT reference manual. Changes made to comply with the CDT Code do not constitute a material change to your dental plan design.

Capital BLUE

Summary of Rates
Renewal Healthcare Benefit Programs

The Borough of Hanover
00504100

Renewal Date: January 1, 2020

Program	*Current Average Monthly Expense*	*Renewal Average Monthly Expense*	*Percentage Change (Renewal vs. Current)*
BlueCross *Vision*	$1,874	$1,874	0.00%
GRAND TOTAL	**$1,874**	**$1,874**	**0.00%**

This financial summary is based on providing benefits similar to your current program.

Current monthly amounts shown are for illustrative purposes only and are used solely to estimate the overall projected rate change. The average monthly amounts shown do not represent actual amounts for any given month, but rather are based upon current contract counts (e.g., employees) and type of coverage (i.e., subscriber, subscriber and spouse, family) by type of product selected.

Healthcare benefit programs issued or administered by Capital BlueCross and/or its subsidiaries, Capital Advantage Insurance Company®, Capital Advantage Assurance Company®, and Keystone Health Plan® Central. Independent licensees of the BlueCross BlueShield Association. Communications issued by Capital BlueCross in its capacity as administrator of programs and provider relations for all companies.

1126608-02

THE BOROUGH OF HANOVER

2020 Renewal Summary

Policy 110413

Thank you for choosing Standard Insurance Company (The Standard) as your employee benefits partner since June 1, 2016. We appreciate your business and the opportunity to renew our commitment. We strive to provide THE BOROUGH OF HANOVER and your employees outstanding value, expertise and personal service.

As always, our goal is to help you take care of your business and your employees. Our team remains committed to helping you achieve strategic goals for your benefits program, streamline administration and increase employee satisfaction. In short — better results with less noise. Thank you again for your continued business.

Our Approach to Renewals — Continued Partnership

The renewal rates for your Group Life insurance will be effective May 1, 2020.

For your renewal, we utilized manual rates to determine the appropriate rate for renewal. Our manual rates use the demographics of your employees to determine the appropriate rates. Factors such as gender, age, salary, occupation and plan design contribute to determining the manual rate.

Please consider this renewal package the next step in our ongoing conversation about how we can best meet your needs. We may be able to work together to help you get more value out of your benefits program or reduce overall costs. We'd be happy to re-evaluate your plan design and benefits usage and discuss your options.

Your Basic Life Renewal

We understand that handling a Life insurance claim takes a special touch. Our Life benefits analysts complete annual grief training. This program helps them empathize with beneficiaries and recognize when they need special attention. We strive to help you make a tough time easier. Our goal is to provide support with easy claim filing, timely decisions, and prompt payment of approved claims.

Census Demographics for Basic Life

Categories	Prior Calculation	Current Calculation	Change
Female Lives	28	26	-2
Male Lives	125	128	3
Benefit Volume	$7,315,869	$7,325,960	$10,091
% Benefit Volume Age 50 +	48%	44%	-4%

Based on our thorough analysis, we're offering the renewal rate[s] listed below.

Renewal Date	Current Rate *	Renewal Rate *	Monthly Premium Change **
May 1, 2020	$0.230	$0.230	$0

* Rate mode is Per $1000 of Benefit

** Final premium change will be determined based on your group's composition at billing time

Rate will be guaranteed for 2 years until May 1, 2022.

The Standard is committed to helping you provide employees and their beneficiaries with the support they need. Below is a reminder of the additional services and tools offered with your Life plan.

The Life Services Toolkit

For employees, online services include estate planning and state-specific will preparation, identity theft prevention, financial calculators, wellness resources and more. For beneficiaries, the Life Services Toolkit offers grief and loss support by phone, online and face-to-face. They can also take advantage of access to financial counselors, legal consultation and other support services. This service is offered through a vendor that is not affiliated with The Standard.

Travel Assistance

Travel Assistance can provide a sense of security for your employees and their eligible family members anytime they travel from home or internationally for business or pleasure with minimal restrictions. Available 24 hours a day — with access online or through a single phone call — Travel Assistance offers a full range of trip planning and travel support, including emergency evacuation services and medical, legal, and translation service referrals. This service is offered through a vendor that is not affiliated with The Standard.

Your Additional Life Renewal

Your Additional Life insurance from The Standard allows you to expand the benefit options you offer your employees. Your Additional Life plan can offer choice, flexibility, convenience and greater peace of mind for employees.

Census Demographics for Additional Life

Categories	Prior Calculation	Current Calculation	Change
Female Lives	8	10	2
Male Lives	49	59	10
Benefit Volume	$440,000	$522,500	$82,500
% Benefit Volume Age 50 +	33%	27%	-6%

Based on our thorough analysis, we're offering the renewal rate[s] listed below.

Age Graded Rates for Additional Life:

Age Band	Current Rate *	Renewal Rate *	Volume	Monthly Premium Change **
0 – 30	$0.100	$0.100	$100,000	$0
31 – 34	$0.110	$0.110	$75,000	$0
35 – 39	$0.160	$0.160	$77,500	$0
40 – 44	$0.260	$0.260	$57,500	$0
45 – 49	$0.440	$0.440	$72,500	$0
50 – 54	$0.760	$0.760	$37,500	$0
55 – 59	$1.210	$1.210	$75,000	$0
60 – 64	$1.400	$1.400	$27,500	$0
65 – 69	$2.500	$2.500	$0	$0
70 – 74	$5.170	$5.170	$0	$0
75 – 79	$8.520	$8.520	$0	$0
80 – 84	$13.310	$13.310	$0	$0
85 – 89	$21.010	$21.010	$0	$0
90 – 94	$33.200	$33.200	$0	$0
95 and over	$52.450	$52.450	$0	$0
			Total Monthly Premium Change:	$0

* Rate mode is Per $1000 of Benefit

** Final premium change will be determined based on your group's composition at billing time

Rate will be guaranteed for 2 years until May 1, 2022.

Thank You and Next Steps

We appreciate the opportunity to continue our partnership with THE BOROUGH OF HANOVER.

A summary of our Renewal Offer is in the chart below. Thank you for allowing Standard Insurance Company the opportunity to support your insurance needs.

Product & Services *	Through 04/30/20	Effective 05/01/20
Basic Life	$0.230 Per $1000 of Benefit	$0.230 Per $1000 of Benefit
Travel Assistance	Included in Rates for Life	Included in Rates for Life
Basic AD&D	$0.030 Per $1000 of Benefit	$0.030 Per $1000 of Benefit
Additional Life	Rate Varies	Rate Varies, no change

*The above shown rates are monthly.

You can count on us to help you retain and attract employees by providing the benefits and services they value – now and for years to come. We're always available to address any questions you have about this renewal or for any service needs. Please reach out to the Philadelphia group office at (610) 989-4103 and we'll be happy to help.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

6. Supply an exhibit showing an analysis, by functional accounts, of the charges by affiliates (service corporations, etc.) for services rendered included in the operating expenses of the filing company for the historic and future test years and for the 12-month period ended prior to the historic test year:
   a. Supply a copy of contracts, if applicable.
   b. Explain the nature of the services provided.
   c. Explain the basis on which charges are made.
   d. If charges are allocated, identify allocation factors used.
   e. Supply the components and amounts comprising the expense in this account.
   f. Provide details of initial source of charge and reason thereof

RESPONSE

The Borough has no affiliates or service corporations.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

7. Describe costs relative to leasing equipment, computer rentals, and office space, including terms and conditions of the lease. Explain the method of calculating monthly or annual payments. If allocated from the parent company, provide the method of allocation.

RESPONSE

Currently, the Water Fund has two open leases for light-duty vehicles. Within the five-year plan, there are two new leases expected in 2025. The Borough's fleet and heavy equipment acquisition/Lease schedules are in the following schedule, 'Exhibit D III-7 Attachment'.

Open - End (Equity) Lease Schedule

Quote No: 3720900

Supplemental to and part of Master Equity Lease Agreement date: 01/11/2018

1. Lessee Name Borough of Hanover — **Delivery Date** 06/15/2018
Address 44 Frederick St — **Customer#** 574829
City Hanover — **State** PA — **Postal Code** 17331-3501
ATTN
Driver — **Alternate Driver** T37
Address 44 Frederick St — **Garage County** ADAMS
City HANOVER — **State** PA — **Postal Code** 17331-3501

2. Lease Term Commencing on the delivery date of the vehicle and ending 60 months after the first full monthly rental payment date with an option to continue month-to-month for an unlimited period of time.

3. Vehicle Description **Year** 2018 **Make** Ford **Model** F-350
Series XL 4x4 SD Regular Cab 8 ft. box 142
License # MG7767k **Unit #** 22P3QP **Replacement Unit #** **VIN#** 1FDRF3B63JEC20595

4. Monthly Rental and Other Payments Due

4A. Calculation of Monthly Rental

$41,798.32	Capitalized Price of Vehicle
$0.00	Initial License Fee
$0.00	License and Certain Other Charges
$555.00	Other: (See Page 2)
$0.00	Extended Mechanical Service Program
$0.00	Less Gain Applied From Prior Unit
$7,161.00	Less Capitalized Price Reduction
$35,192.32	Total Capitalized Amount (Delivered Price)
$475.10	Depreciation Reserve @1.35%
$152.00	Monthly Lease Charge
$627.10	**Total Monthly Rental Excluding Additional Services**

Additional Services

$0.00 Full Maintenance[1] **Contract Miles** 0 **Overmileage Charge** $0.0000 Per Mile
Incl: # Brake Sets (1 Set = 1Axle) 0 **# Tires** 0 **Loaner Vehicle Not Included**
Master Policy Enrollment Fees
$0.00 Physical Damage Management — Comp/Collision Deductible 0/0
$0.00 Commercial Automobile Liability Enrollment
Liability Limit $0.00
$627.10 Monthly Rental Sub-Total
$0.00 Sales Tax 0.0000 State PA
$627.10 **Total Monthly Rental Including Additional Services**

4B. Initial Charges

$332.61	Pro-Rated Rental
$627.10	First Month's Rental
$0.00	Security Deposit
$7,161.00	Capitalized Price Reduction
$0.00	Sales Tax on Capitalized Price Reduction
$0.00	Tax on Gain On Prior
$0.00	Tax on Incentive (Taxable Incentive Total : $0.00)
$106.00	License and Certain Other Charges
$0.00	Aftermarket Equipment
$0.00	Other
$8,226.71	**Total Initial Charges**

4C. Service Charge **$395.00** **Service Charge Due at Lease Termination**
4D. Reduced Book Value **$6,504.96** **Reduced Book Value at Lease Termination**

Quote based on estimated annual mileage of **5,000**

Special Provisions

As set forth in the Master Open - End (Equity) Lease Agreement, the terms and provisions contained in this schedule shall be conclusive and binding on Lessee unless Lessee objects in writing to the same within ten (10) days after the date of delivery of the vehicle.

Enterprise FM Trust, a Delaware statutory trust, is the owner of the vehicle covered by this Schedule. Enterprise FM Trust (not Enterprise Fleet Management) is and shall be deemed to be the Lessor of such vehicle under the Master Open - End (Equity) Lease Agreement and shall have all rights and obligations of the Lessor under the Master Open - End (Equity) Lease Agreement with respect to such vehicle. All rental and other payments owed by the Lessee with respect to such vehicle under the Master Open - End (Equity) Lease Agreement shall be paid to Enterprise Fleet Management in its capacity as the servicer for Enterprise FM Trust. All references in Sections 11(a) and 12 of the Master Open - End (Equity) Lease Agreement to the "Lessor" shall include any servicer(s) and/or other agent(s) for or of Enterprise FM Trust.

[1]The inclusion herein of references to maintenance fees/services are solely for the administrative convenience of Lessee. Notwithstanding the inclusion of such references in this [Invoice/Schedule/Quote], all such maintenance services are to be performed by Enterprise Fleet Management, Inc., and all such maintenance fees are payable by Lessee solely for the account of Enterprise Fleet Management, Inc., pursuant to that certain separate [Maintenance Agreement] entered into by and between Lessee and Enterprise Fleet Management, Inc.; provided that such maintenance fees are being billed by Enterprise FM Trust, and are payable at the direction of Enterprise FM Trust, solely as an authorized agent for collection on behalf of Enterprise Fleet Management, Inc.

Open - End (Equity) Lease Schedule

Quote No: 3720900

Aftermarket Equipment Totals

Description	(B)illed or (C)apped	Price
Total Billed		**$0.00**
8 Ft western plow and Knapheide service body model 696j1 ladder rack	**C**	**$14,322.00**
Quote saved in SF as AME - 3720900		
Total Capitalized		**$14,322.00**
Total		**$14,322.00**

Other Totals

Description	(B)illed or (C)apped	Price
Total Billed		**$0.00**
Initial Administration Fee	**C**	**$205.00**
Pricing Plan Delivery Charge	**C**	**$150.00**
COURTESY DELIVERY	**C**	**$200.00**
Courtesy Delivery Fee	**C**	**$0.00**
Total Capitalized		**$555.00**
Total		**$555.00**

Open - End (Equity) Lease Schedule

Quote No: 3720944

Supplemental to and part of Master Equity Lease Agreement date: 01/11/2018

1. Lessee Name Borough of Hanover — **Delivery Date** 05/25/2018
Address 44 Frederick St — **Customer#** 574829
City Hanover — **State** PA — **Postal Code** 17331-3501
ATTN
Driver — **Alternate Driver** T6
Address 44 Frederick St — **Garage County** ADAMS
City HANOVER — **State** PA — **Postal Code** 17331-3501

2. Lease Term Commencing on the delivery date of the vehicle and ending 60 months after the first full monthly rental payment date with an option to continue month-to-month for an unlimited period of time.

3. Vehicle Description **Year** 2018 **Make** Ford **Model** F-150
Series XL 4x4 SuperCrew Cab Styleside 6.5
License # MG5954K **Unit #** 22P3QD **Replacement Unit #** **VIN#** 1FTFW1E50JFC81623

4. Monthly Rental and Other Payments Due

4A. Calculation of Monthly Rental

$30,277.16	Capitalized Price of Vehicle
$0.00	Initial License Fee
$0.00	License and Certain Other Charges
$570.00	Other: (See Page 2)
$0.00	Extended Mechanical Service Program
$0.00	Less Gain Applied From Prior Unit
$0.00	Less Capitalized Price Reduction
$30,847.16	Total Capitalized Amount (Delivered Price)
$416.44	Depreciation Reserve @1.35%
$129.45	Monthly Lease Charge
$545.89	**Total Monthly Rental Excluding Additional Services**

Additional Services

$0.00 Full Maintenance[1] **Contract Miles** 0 **Overmileage Charge** $0.0000 Per Mile
Incl: # Brake Sets (1 Set = 1Axle) 0 **# Tires** 0 **Loaner Vehicle Not Included**
Master Policy Enrollment Fees
$0.00 Physical Damage Management — Comp/Collision Deductible 0/0
$0.00 Commercial Automobile Liability Enrollment
Liability Limit $0.00
$545.89 Monthly Rental Sub-Total
$0.00 Sales Tax 0.0000 State PA
$545.89 **Total Monthly Rental Including Additional Services**

4B. Initial Charges

$123.27	Pro-Rated Rental
$545.89	First Month's Rental
$0.00	Security Deposit
$0.00	Capitalized Price Reduction
$0.00	Sales Tax on Capitalized Price Reduction
$0.00	Tax on Gain On Prior
$0.00	Tax on Incentive (Taxable Incentive Total : $0.00)
$138.00	License and Certain Other Charges
$0.00	Aftermarket Equipment
$0.00	Other
$807.16	**Total Initial Charges**

4C. Service Charge **$395.00** **Service Charge Due at Lease Termination**
4D. Reduced Book Value **$5,860.76** **Reduced Book Value at Lease Termination**

Quote based on estimated annual mileage of **10,000**

Special Provisions

As set forth in the Master Open - End (Equity) Lease Agreement, the terms and provisions contained in this schedule shall be conclusive and binding on Lessee unless Lessee objects in writing to the same within ten (10) days after the date of delivery of the vehicle.

Enterprise FM Trust, a Delaware statutory trust, is the owner of the vehicle covered by this Schedule. Enterprise FM Trust (not Enterprise Fleet Management) is and shall be deemed to be the Lessor of such vehicle under the Master Open - End (Equity) Lease Agreement and shall have all rights and obligations of the Lessor under the Master Open - End (Equity) Lease Agreement with respect to such vehicle. All rental and other payments owed by the Lessee with respect to such vehicle under the Master Open - End (Equity) Lease Agreement shall be paid to Enterprise Fleet Management in its capacity as the servicer for Enterprise FM Trust. All references in Sections 11(a) and 12 of the Master Open - End (Equity) Lease Agreement to the "Lessor" shall include any servicer(s) and/or other agent(s) for or of Enterprise FM Trust.

[1]The inclusion herein of references to maintenance fees/services are solely for the administrative convenience of Lessee. Notwithstanding the inclusion of such references in this [Invoice/Schedule/Quote], all such maintenance services are to be performed by Enterprise Fleet Management, Inc., and all such maintenance fees are payable by Lessee solely for the account of Enterprise Fleet Management, Inc., pursuant to that certain separate [Maintenance Agreement] entered into by and between Lessee and Enterprise Fleet Management, Inc.; provided that such maintenance fees are being billed by Enterprise FM Trust, and are payable at the direction of Enterprise FM Trust, solely as an authorized agent for collection on behalf of Enterprise Fleet Management, Inc.

Open - End (Equity) Lease Schedule

Quote No: 3720944

Aftermarket Equipment Totals

Description	(B)illed or (C)apped	Price
Total Billed		**$0.00**
SADDLE BOX - ALUMINUM E-LINE	**C**	**$841.00**
Quote in SF as - AME - 3720944		
Total Capitalized		**$841.00**
Total		**$841.00**

Other Totals

Description	(B)illed or (C)apped	Price
Total Billed		**$0.00**
Initial Administration Fee	**C**	**$205.00**
Pricing Plan Delivery Charge	**C**	**$150.00**
COURTESY DELIVERY	**C**	**$215.00**
Courtesy Delivery Fee	**C**	**$0.00**
Total Capitalized		**$570.00**
Total		**$570.00**

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

8. Submit detailed calculations (or best estimates) of the cost resulting from storm damage.

RESPONSE

The Borough Water Fund is not claiming costs associated with storm damage.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

9. Submit details of expenditures for advertising (national, institutional and local media). Provide a schedule of advertising expense by media categories for the historic test year and the prior two comparable years with respect to:
   a. Public health and safety.
   b. Conservation of energy.
   c. Explanation of billing practices, rates, rules and regulations.
   d. Provision of factual and objective data programs in educational institutions.
   e. Other advertising programs.
   f Total advertising expense.

RESPONSE

All advertising expense is related to Borough requirement for advertising for bidding purposes.

	2018	2019	2020
Advertising Expense	$1,651	$1,551	$1,572

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

10. Prepare a detailed schedule for the historic test year showing types of social and service organization memberships paid for by the company and the cost thereof

RESPONSE

The Borough Water Fund does not pay for social and service organization memberships.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

11. Submit a schedule showing a breakdown by the expenditures associated with outside services employed, regulatory commission expenses, showing expenses relating to rate cases separately, and miscellaneous general expenses, for the historic test year and prior 2 comparable years.

RESPONSE

See below:

	2018	2019	2020
Computer Support	$ 7,289	$ 13,758	$ 10,679
Data Processing Expense	5,853	-	-
Auditors Expense	14,400	7,200	10,448
Legal Expenses	23,588	18,185	54,165
Professional Services	990	25,188	26,429
Professional Services - Engineering	-	-	105,690
Total	$ 52,120	$ 64,331	$ 207,412

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

12. Submit details of information covering research and development expenditures, by project, within the company and note forecasted company programs.

RESPONSE

The Borough Water Fund is not claiming any operating costs associated with research and development.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

13. Provide a detailed schedule of all charitable and civic contributions by recipient and amount for the historic test year.

RESPONSE

The Borough Water Fund made no charitable or civic contributions.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

14. Provide the two most recent actuarial studies for both pension expense and postretirement benefits other than pensions (OPEBs).

RESPONSE

See the following documents labeled, 'Exhibit D III-14 Attachment'.

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Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation
as of January 1, 2017
for Purposes of
Governmental Accounting Standards Board
Statement No. 45 Reporting

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Borough of Hanover Postemployment Benefits Plan
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Actuarial Assumptions and Methods

Section 1 - Calculations for GASB No. 45 Reporting

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2017
Disclosure Statement

Purpose

Actuarial computations under Governmental Accounting Standards Board Statement No. 45 (GASB No. 45) are for purposes of fulfilling employer accounting requirements. The calculations reported herein have been performed in accordance with generally accepted actuarial principles and practices, and on a basis consistent with our understanding of GASB No. 45. In preparing this report, we have relied upon information furnished to us by the Borough of Hanover. This information includes data pertaining to the Plan, as well as a description of the substantive plan. The information has been reviewed and determined to be reasonable and consistent; however, we have not audited the data or reviewed plan provisions for compliance with IRS or DOL regulations.

Determinations for purposes other than meeting the employer financial accounting requirements may be significantly different from the results reported herein. The funded status, measured by comparing the Accrued Liability against the Actuarial Value of Plan Assets, is not an appropriate measure for assessing the sufficiency of the plan assets to cover the estimated cost of settling the plan's benefit obligations upon plan termination nor is it appropriate for measuring the need for, or the amount of, future contributions. Accordingly, additional determinations are needed for other purposes, such as judging benefit security at termination or adequacy of funding for an ongoing plan. The actuarial calculations contained in this report are not intended or written to be used, and cannot be used, for the purposes of avoiding penalties under the Internal Revenue Code.

This valuation involves estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and the healthcare cost trend. Amounts determined regarding the funded status of the plan and the annual required contributions of the employer are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future.

Calculations are based on the types of benefits provided under the terms of the substantive plan at the time of the valuation and on the pattern of sharing of costs between the employer and plan members to that point. Calculations reflect a long-term perspective, so methods and assumptions used include techniques that are designed to reduce short-term volatility in actuarial accrued liabilities and the actuarial value of assets.

Benefits Not Included

Defined contribution benefits and insured benefits under GASB No. 45 paragraph 28, pension benefits accounted for under GASB 27 (or as amended by GASB 68), and benefits for compensated absences under GASB 16 are not included in this valuation.

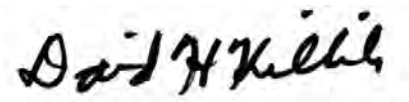
Multiple Year Reporting

Pursuant to GASB No. 45, this valuation can be used for a multiple year period. As such, this valuation provides all of the actuarial figures necessary to comply with GASB No. 45 over the applicable period. Nonetheless, some non-actuarial figures have been determined based on estimated contributions for the period. These figures may need to be adjusted for actual contributions deposited to the trust or claims paid on behalf of plan benefits.

A new valuation should be performed if, since this valuation, material changes have occurred that affect the results of this valuation, including significant changes in benefit provisions, the size or composition of the population covered by the plan, or other changes that impact long-term assumptions.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2017
Disclosure Statement

I am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this valuation.



David H. Killick, F.S.A.
Consulting Actuary

December 5, 2017
Date

DHK/JRM

Police

Health Insurance Benefits:

The Borough shall provide the basic medical and hospitalization benefits as provided at any point in time to active Officers, to Officers retiring under the Borough of Hanover Police Pension Plan after attainment of age 50 and completion of 25 years of service or upon disability. Said medical benefits shall extend for a period of 5 years from the date of the Officer's retirement and shall only be provided if the Officer certifies, in writing, on or before the anniversary date of his or her retirement that he or she is not eligible for coverage under any other employer-sponsored healthcare plan, including a plan sponsored by the employer of his or her spouse. Further, in cases where the retired Officer is eligible for coverage and his or her spouse is not eligible for coverage under any other employer-sponsored healthcare plan, the Borough, for the same 5 year period, will pay 50% of the cost of coverage for the retired Officer's spouse. For spousal coverage, the Officer must be legally married to his or her spouse at the time of retirement. The Borough's cost for the Officer's and/or spouse's coverage will not exceed a total of $600.00 per month. Upon expiration of this coverage, the Officer shall be permitted to maintain health insurance coverage as a member of the Borough Group Plan to age 65. The Officer shall then be required to pay all premiums for coverage for himself or herself and any eligible dependents. Upon reaching age 65, the retired Officer and/or the retired Officer's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retired Officer, the surviving spouse will be allowed to continue coverage under the health insurance plan at the single rate. If the death of a retired Officer occurs within the 5 year period in which the Borough is providing basic medical and hospitalization benefits, the 50% spousal portion will continue to be in effect for the remainder of the 5 year period. All retired officers are permitted to purchase medical, prescription drug, dental, and vision insurance.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an Officer within 90 days after his or her date of hire, may be carried by an Officer when retired and continued into retirement at the sole expense of the retired Officer at the group life insurance rate in effect under the group life insurance policy of the Borough.

Fire Drivers

Health Insurance Benefits:

All members of the Bargaining Unit shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Fire Drivers' Pension Plan after attainment of age 55 and completion of 25 years of service, or after attainment of age 62 and completion of 10 years of service, if earlier, or upon disability at the Borough's cost for the plan. Upon reaching age 65, the retired employee and/or the retired employee's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retiree, the surviving spouse may continue on the health insurance plan at the single rate.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an employee within 90 days after his or her date of hire, may be carried by an employee when retired and continued into retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough.

Water Department and Nonuniformed Employees

Health Insurance Benefits:

All retired employees shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Employees Pension Plan after attainment of age 55 and completion of 25 years of service, or after attainment of age 62 and completion of 10 years of service, if earlier, or upon disability after attainment of age 45 and completion of 15 years of service at the Borough's cost for the plan. Upon reaching age 65, the retired employee and/or the retired employee's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retiree, the surviving spouse may continue on the health insurance plan at the single rate.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an employee within 90 days after his or her date of hire, may be carried by an employee when retired and continued into retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough.



Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2017
Actuarial Assumptions and Methods (1 of 2)

Interest Rate

4.50%

Salary

An assumption for salary increases is used only for spreading contributions over future pay under the entry age normal cost method. For this purpose, annual salary increases are assumed to be 5.0%.

Withdrawal

Table D-3: Rates of withdrawal at selected ages:

Age	Rate	Age	Rate	Age	Rate
20	7.0000%	35	4.5000%	50	1.5000%
25	5.5000%	40	4.0000%	55	0.5000%
30	5.0000%	45	3.0000%	60	0.0000%

Mortality

IRS 2017 Small Plan Combined Static Mortality Table

Incorporated into the table are rates for annuitants projected 7 years and rates for non-annuitants projected 15 years using Scale AA to reflect mortality improvement.

Disability

SOA 1987 Group LTD Table - Males, 6-month elimination. Sample rates are shown below.

Age	Rate	Age	Rate	Age	Rate
20	0.0764%	35	0.1242%	50	0.5396%
25	0.0854%	40	0.1760%	55	0.9770%
30	0.0986%	45	0.2944%	60	1.4774%

Retirement

Police:
Latest of age 53, age at the completion of 25 years of service, or age on the valuation date.

Fire Drivers, Water Department, and Nonuniformed Employees:
The earlier of (1) latest of age 55, age at the completion of 25 years of service, or age on the valuation date; or (2) latest of age 62, age at the completion of 10 years of service, or age on the valuation date.

Percent of Eligible Retirees Electing Coverage in Plan

60% of employees are assumed to elect coverage.

Percent Married at Retirement

25% of employees are assumed to be married and have a spouse covered by the plan at retirement.

Spouse Age

Wives are assumed to be two years younger than their husbands.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2017
Actuarial Assumptions and Methods (2 of 2)

Per Capita Claims Cost

The per capita claims cost for medical and prescription drug is based on the expected portion of the group's overall cost attributed to individuals in the specified age and gender brackets. Dental and vision costs are assumed to not vary with age or gender. The resulting costs are as follows:

Police:

	Medical and Prescription Drug Combined	
Age	Males	Females
45-49	$7,805	$11,273
50-54	$10,337	$12,740
55-59	$12,591	$13,331
60-64	$16,430	$15,314
65+	$4,167	$4,167

Fire Drivers:

	Medical and Prescription Drug Combined	
Age	Males	Females
45-49	$7,774	$11,227
50-54	$10,295	$12,688
55-59	$12,539	$13,277
60-64	$16,363	$15,252
65+	$4,167	$4,167

Nonuniformed Employees:

	Medical and Prescription Drug Combined	
Age	Males	Females
45-49	$7,807	$11,276
50-54	$10,340	$12,744
55-59	$12,594	$13,334
60-64	$16,434	$15,318
65+	$4,167	$4,167

Retiree Contributions

Retiree contributions are assumed to increase at the same rate as the Health Care Cost Trend Rate.

Life Insurance

It is assumed that the annual cost to provide life insurance varies by age. The assumed cost is equal to the amount of coverage times the applicable mortality factor contained in the valuation mortality table. Retirees are responsible for paying the full premium to maintain this coverage.

Health Care Cost Trend Rate

6.0% in 2017, and 5.5% in 2018 through 2023. Rates gradually decrease from 5.4% in 2024 to 3.9% in 2075 and later based on the Society of Actuaries Long-Run Medical Cost Trend Model.

Actuarial Value of Assets

Equal to the Market Value of Assets

Actuarial Cost Method - Entry Age Normal

Under the Entry Age Normal Cost Method, the Normal Cost is the present value of benefits allocated to the year following the valuation date. Benefits are allocated on a level basis over the earnings of an individual between the date of hire and the assumed retirement age. The Accrued Liability as of the valuation date is the excess of the present value of future benefits over the present value of future Normal Cost. The Unfunded Accrued Liability is the excess of the Accrued Liability over the Actuarial Value of Assets. Actuarial gains and losses serve to reduce or increase the Unfunded Accrued Liability.

Participant Data

Based on census information as of January 1, 2017.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation
as of January 1, 2017

Section 1

Calculations for GASB No. 45 Reporting

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2017
Summary of Key Results (1 of 2)

Demographic Information	Police	Fire Drivers	Nonuniformed Employees	Total
Active Participants	26	16	102	144
Vested Former Participants	0	0	0	0
Retired Participants	4	6	20	30
Total	30	22	122	174
Annual Payroll of Active Participants	$2,077,787	$1,080,471	$5,462,801	$8,621,059
Asset Information				
Market Value of Assets	$0	$0	$0	$0
Actuarial Value of Assets	$0	$0	$0	$0
Actuarial Calculations				
Accrued Liability[1]	$504,675	$386,108	$2,080,354	$2,971,137
Normal Cost[2]	$38,701	$17,095	$63,748	$119,544
Annual Required Contribution (ARC)[3]	$69,684	$40,799	$191,464	$301,947
ARC as a Percentage of Payroll	3.35%	3.78%	3.50%	3.50%

1 **Accrued Liability** is the present value of all benefits attributed to past service of current plan participants as of the valuation date.

2 **Normal Cost** is the present value of benefits allocated to the year beginning on the valuation date.

3 **Annual Required Contribution (ARC)** represents the amount needed to fund 1) the cost of benefits attributed to the current year, plus 2) an amortized portion of unfunded liability. It serves as the basis for determining the financial costs.

Summary of Key Results (2 of 2)

Financial Statement Calculations[6]	Police	Fire Drivers	Nonuniformed Employees	Total
Annual OPEB Cost[1,2]				
For Period January 1, 2017 to December 31, 2017	$66,537	$39,175	$180,737	$286,449
Estimated Net OPEB Obligation at End of Year[3,4]				
As of December 31, 2017	$258,401	$114,862	$705,586	$1,078,849
Estimated Annual Pay-As-You-Go Cost Including Implicit Rate Subsidy[5]				
For Period January 1, 2017 to December 31, 2017	$151	$23,361	$129,559	$153,071

1 **Other Postemployment Benefits (OPEB)** is postemployment benefits other than pension benefits. OPEB includes postemployment healthcare benefits, and all postemployment benefits provided separately from a pension plan, excluding benefits defined as termination offers and benefits.

2 **Annual OPEB Cost** is the amount recognized as the expense in the employer's financial statements.

3 **Net OPEB Obligation** is the cumulative difference between the annual OPEB cost and the employer's contributions to the plan. It is the amount that appears as a liability on the employer's financial statements. Please note that if a plan is not funded, the contribution is equal to the amount paid for benefits.

4 **Note:** These amounts are estimates only. These amounts may be adjusted for actual contributions deposited or benefit payments made during the fiscal year. In addition, a new valuation should be performed if there have been significant changes in benefit provisions, the size or composition of the population covered by the plan, or other changes that impact long-term assumptions.

5 For plans that do not track actual claims and expenses separately for retirees, employers should be aware that the entity's costs for retirees generally exceeds premium amounts to the Trust or Insurance Company. GASB 45 requires the liabilities reflect this "hidden subsidy." Correspondingly, employers should reduce amounts otherwise paid for active employees. For example, if the retirees' Annual Pay-As-You-Go cost is $1,000,000 but the total premium paid for retirees is $750,000 for retirees, this means the hidden subsidy valued is $250,000. As such, the active employees' premium costs should be reduced by $250,000.

6 This report reflects only one fiscal year since GASB 75 (which revises GASB 45) will be applicable for the fiscal year beginning January 1, 2018.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2017

Unfunded Accrued Liability and Amortization of Unfunded Accrued Liability

	Police	Fire Drivers	Nonuniformed Employees	Total
Actuarial Present Value of Total Projected Benefits [1]				
Active Participants	$955,445	$467,797	$2,600,154	$4,023,396
Retired Participants	0	113,679	93,804	207,483
Total Actuarial Present Value of Projected Benefits	$955,445	$581,476	$2,693,958	$4,230,879
Accrued Liability				
Active Participants	$504,675	$272,429	$1,986,550	$2,763,654
Retired Participants	0	113,679	93,804	207,483
Total Accrued Liability	$504,675	$386,108	$2,080,354	$2,971,137
Unfunded Accrued Liability				
Accrued Liability	$504,675	$386,108	$2,080,354	$2,971,137
Less: Actuarial Value of Assets	0	0	0	0
Unfunded Accrued Liability	$504,675	$386,108	$2,080,354	$2,971,137
Amortization of Unfunded Accrued Liability				
Unfunded Accrued Liability	$504,675	$386,108	$2,080,354	$2,971,137
Amortization Factor [2]	16.2889	16.2889	16.2889	16.2889
Amortization of Unfunded Accrued Liability	$30,983	$23,704	$127,716	$182,403

[1] **Actuarial Present Value of Total Projected Benefits** is the present value of all benefits expected to be earned by current plan participants from their date of employment through their date of retirement.

[2] Amortization at the end of the year based on level dollar, 30 year open period.

Annual Required Contribution (ARC)

Annual Required Contribution (ARC)	Police	Fire Drivers	Nonuniformed Employees	Total
Normal Cost as of January 1, 2017	$37,034	$16,359	$61,003	$114,396
Interest	1,667	736	2,745	5,148
Total Normal Cost	$38,701	$17,095	$63,748	$119,544
Total Normal Cost	$38,701	$17,095	$63,748	$119,544
Amortization of Unfunded Accrued Liability	30,983	23,704	127,716	182,403
Annual Required Contribution (ARC)	$69,684	$40,799	$191,464	$301,947
Annual Required Contribution (ARC)	$69,684	$40,799	$191,464	$301,947
Covered Payroll	2,077,787	1,080,471	5,462,801	8,621,059
ARC as a Percentage of Payroll	3.35%	3.78%	3.50%	3.50%

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2017
Annual OPEB Cost and Net OPEB Obligation

	Police	Fire Drivers	Nonuniformed Employees	Total
For Fiscal Year January 1, 2017 to December 31, 2017 [4]				
Annual Required Contribution (ARC)	$69,684	$40,799	$191,464	$301,947
Interest on Net OPEB Obligation[1]	8,641	4,457	29,448	42,546
Adjustment to ARC[2]	(11,788)	(6,081)	(40,175)	(58,044)
Annual OPEB Cost	$66,537	$39,175	$180,737	$286,449
Contributions Made (Estimated)	(151)	(23,361)	(129,559)	(153,071)
Estimated Increase in Net OPEB Obligation	$66,386	$15,814	$51,178	$133,378
Net OPEB Obligation - Beginning of Year	$192,015	$99,048	$654,408	$945,471
Estimated Net OPEB Obligation - End of Year[3]	$258,401	$114,862	$705,586	$1,078,849

1 Interest on Net OPEB Obligation is calculated at the discount rate of 4.50%.

2 Net OPEB Obligation - End of prior year divided by the amortization factor of 16.2889.

3 **Note:** These amounts are estimates only. These amounts may be adjusted for actual contributions deposited or benefit payments made during the fiscal year. In addition, a new valuation should be performed if there have been significant changes in benefit provisions, the size or composition of the population covered by the plan, or other changes that impact long-term assumptions.

4 This report reflects only one fiscal year since GASB 75 (which revises GASB 45) will be applicable for the fiscal year beginning January 1, 2018.

Required Supplementary Information[1]

	Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) - Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / c)
Police	1/1/2017	$0	$504,675	$504,675	0.00%	$2,077,787	24.29%
	1/1/2014	$0	$397,275	$397,275	0.00%	$1,825,978	21.76%
	1/1/2011	$0	$269,303	$269,303	0.00%	$1,405,946	19.15%
Fire Drivers	1/1/2017	$0	$386,108	$386,108	0.00%	$1,080,471	35.74%
	1/1/2014	$0	$369,377	$369,377	0.00%	$939,602	39.31%
	1/1/2011	$0	$214,053	$214,053	0.00%	$983,929	21.75%
Nonuniformed Employees	1/1/2017	$0	$2,080,354	$2,080,354	0.00%	$5,462,801	38.08%
	1/1/2014	$0	$2,053,000	$2,053,000	0.00%	$5,533,638	37.10%
	1/1/2011	$0	$1,081,455	$1,081,455	0.00%	$4,982,663	21.70%
Total	1/1/2017	$0	$2,971,137	$2,971,137	0.00%	$8,621,059	34.46%
	1/1/2014	$0	$2,819,652	$2,819,652	0.00%	$8,299,218	33.97%
	1/1/2011	$0	$1,564,811	$1,564,811	0.00%	$7,372,538	21.22%

[1] This information is shown for the three most recent valuations, if available.

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Borough of Hanover Employees Pension Plan
Actuarial Valuation
as of January 1, 2017

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Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017

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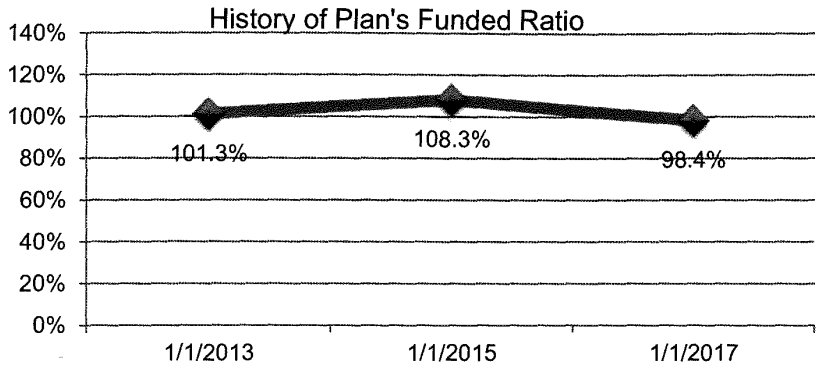
Section 3 - Supplemental Information

Appendix

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Executive Summary

The purpose of the valuation report is to determine the actuarial status of the Plan and to serve as the basis for satisfying the reporting requirements under Act 205. The actuarial calculations contained in this report will be used to determine future minimum municipal obligations.

The Summary of Principal Plan Benefit Provisions (SPPB) may be found following the Actuarial Certification. This summary represents our understanding of the current plan provisions in effect at January 1, 2017. Following the SPPB is a summary of the Actuarial Assumptions and Methods used in this valuation report. Changes to any assumptions from the prior valuation are indicated on the second page which include a change to the mortality assumption.



	1/1/2013	1/1/2015	1/1/2017
Market Value of Assets (MVA)	$ 24,143,044	$ 28,077,952	$28,602,322
Actuarial Accrued Liability (AAL)	$ 23,834,834	$ 25,929,009	$29,077,451
Unfunded Actuarial Accrued Liability (UAAL)	$ (308,210)	$ (2,148,943)	$ 475,129
Normal Cost	$ 525,485	$ 503,375	$ 341,342
W-2 Payroll	$ 5,294,038	$ 5,239,614	$ 5,462,801
Percentage of W-2 Payroll	9.9%	9.6%	6.2%
Average Age	48.2	47.7	48.8
Interest	7.00%	7.00%	7.00%
Salary Scale	5.00%	5.00%	5.00%
Average Life Expectancy*	21.24	21.24	23.33
Mortality Basis	RP2000	RP2000	IRS 2017 Small Plan Combined Static
Participant Counts:			
Active	107	106	106
Vested Former	2	2	2
Receiving Benefits	44	50	52
Total	153	158	160

*Based on a male currently aged 60.

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Executive Summary

Section 1

At the beginning of Section 1, there is a summary of the receipts and disbursements for 2015 and 2016. The Plan received contributions of $581,374 during 2015, and $419,919 during 2016. There were monthly benefit payments to former participants totaling $800,748 during 2015, and $874,219 during 2016. The investment return earned by the plan assets was approximately (0.0%) for 2015, and approximately 5.0% for 2016.

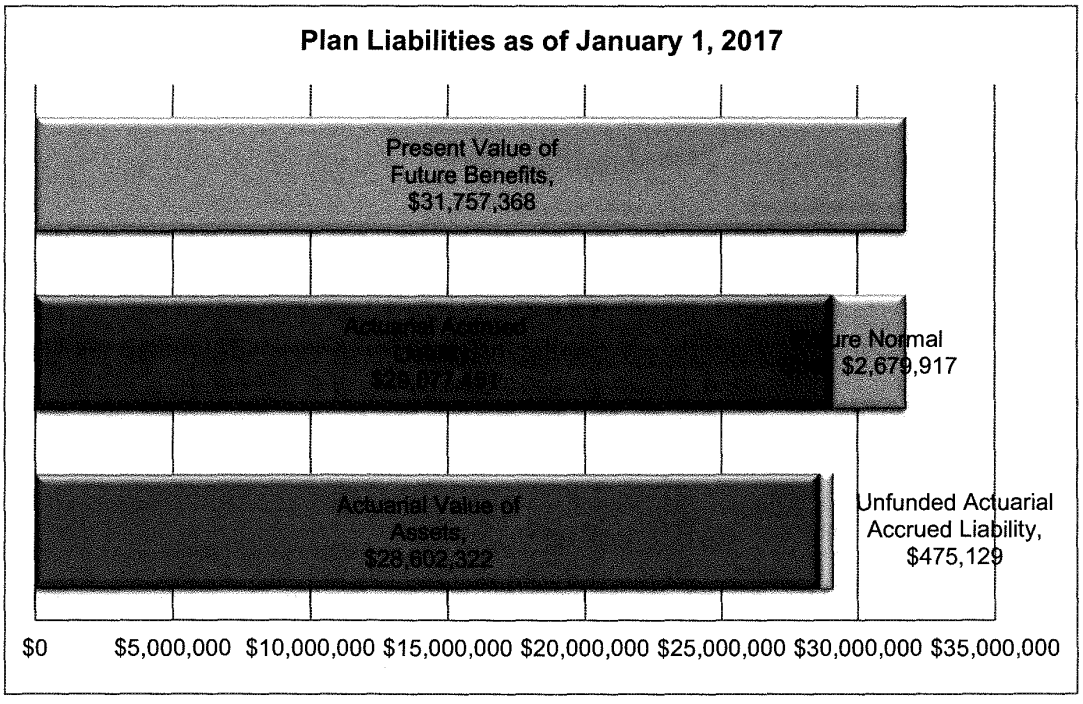
The following is a summary of the net dollar-weighted rates of investment return for the past six calendar years:

2011	2012	2013	2014	2015	2016
0.5%	11.1%	13.5%	2.9%	(0.0%)	5.0%

Section 2

The Act 205 funding calculations are included in Section 2.

The actuarial present value of future benefits is $31,757,368. Since the present value of future normal costs is $2,679,917, the actuarial accrued liability at January 1, 2017, is $29,077,451. Subtracting the actuarial value of assets of $28,602,322 results in an unfunded actuarial accrued liability of $475,129.



Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Executive Summary

Components of Financial Requirements

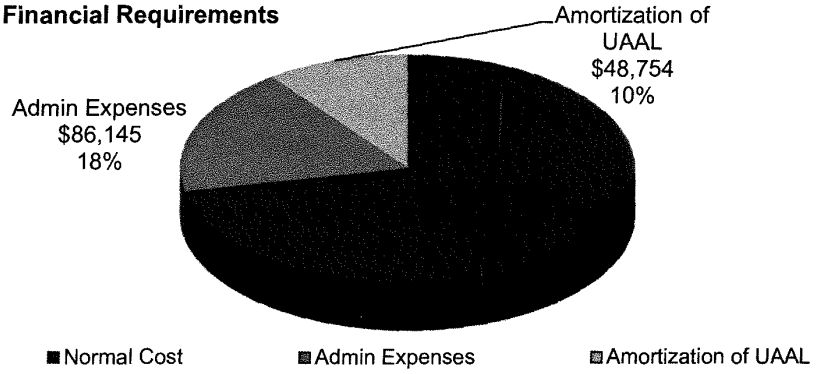
There are three cost components that make up the financial requirement of a Plan's minimum municipal obligation.

1. Normal Cost – This is the cost of pension and other benefits earned during the current year. The normal cost of the Plan is $341,342. The normal cost represents approximately 6.2% of annual payroll.

2. Administrative Expenses – Examples of administrative expenses paid from the plan assets are expenses for: investment advisory services, actuarial services and trustee services. The Plan's estimated annual administrative expenses are $86,145.

3. Amortization of the Unfunded Actuarial Accrued Liability – The amount of this cost is comprised of the amortization of the various gains and losses, plan amendments, and changes in actuarial assumptions that have occurred in the Plan over time. The Plan had a loss as of January 1, 2017, of $1,189,911 due to the change in actuarial assumptions. In addition, the Plan had an actuarial loss of $1,507,945 for the previous two-year period. The amortization of the Unfunded Actuarial Accrued Liability is $48,754.

Estimated Financial Requirements



Please note that the figures shown below are for illustrative purposes only. The actual minimum municipal obligation is determined through the annual budgeting process.

Illustration of Minimum Municipal Obligation

Financial Requirements	
Normal Cost	$341,342
Administrative Expenses	$86,145
Amortization of Unfunded Actuarial Accrued Liability (UAAL)	$48,754
Total	$476,241
Expected Member Contributions	($150,923)
Minimum Municipal Obligation (not less than $0)	$325,318

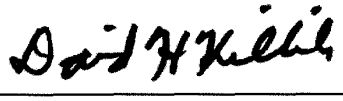
Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Actuarial Certification

In preparing this report, we have relied upon the data furnished to us. The data with respect to receipts and disbursements and assets of the Plan was furnished by WIlmington Trust. The data with respect to participants and beneficiaries was furnished by the Borough of Hanover. The data has been reviewed and has been determined to be reasonable and consistent.

The information as contained in this report is a projection of liabilities based upon stated assumptions and is not an exact statement of the Plan's ultimate benefits and liabilities. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as at the end of an amortization period or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of the assignment, an analysis of the potential range of such future measurements was not performed.

I certify that all costs, liabilities, rates of interest, and other factors under the Plan in Section 2 of the report have been determined on the basis of actuarial assumptions and methods, each of which is reasonable (taking into account the experience of the Plan and reasonable expectations) or which, in the aggregate, result in a total contribution equivalent to that which would be determined if each such assumption and method were reasonable, and which, in combination, offer my best estimate of anticipated experience under the Plan.

I am a member of the American Academy of Actuaries, a Fellow of the Society of Actuaries, and an Enrolled Actuary under ERISA, and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.



8/31/2017
Date

David H. Killick, F.S.A.
Consulting Actuary
Enrolled Actuary No. 17-03880

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Summary of Principal Plan Benefit Provisions

Eligibility

All full-time employees of the Borough, excluding police officers and fire drivers, are eligible to join the Plan on the July 1 following the date of employment.

Normal Retirement

The normal retirement date is the first day of the month following attainment of age 55 and completion of 25 years of vesting service, but not later than attainment of age 62 and completion of 10 years of vesting service, if earlier. However, for non-union, non-uniformed employees hired on or after July 1, 2014, the normal retirement date is the first day of the month following attainment of age 60 and completion of 25 years of vesting service, but not later than attainment of age 65 and completion of 10 years of vesting service, if earlier.

The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.5% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year. The minimum monthly pension for employees with 30 or more years of vesting service is equal to 70% of average monthly compensation, less 100% of Social Security benefits. However, for non-union, non-uniformed employees hired on or after July 1, 2014, the normal retirement pension is equal to 1.0% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year.

Average monthly compensation is based on the highest consecutive 36 months of compensation out of the last 60 months preceding retirement.

Disability Retirement

Active members are eligible for disability retirement after attainment of age 45 and completion of 15 years of vesting service, following 6 months of permanent disability. The monthly disability retirement pension is equal to the benefit accrued to the date of disability.

If the disability is determined to be service-connected, the monthly disability retirement pension is equal to the projected normal retirement pension based upon years of benefit service that would be credited to the member until attainment of age 62.

Death Benefits

The monthly death benefit for a member who has attained 60 years, where years equals the sum of the member's age and years of vesting service, and has completed at least 10 years of vesting service is a survivor pension for his spouse, or children under age 19 if there is no surviving spouse, equal to 50% of the benefit accrued to the date of death. In lieu of the above, the employee's contributions plus interest may be elected as a preretirement death benefit.

The excess, if any, of the employee's contributions plus interest over the benefits paid after retirement shall be payable as a postretirement death benefit.

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Summary of Principal Plan Benefit Provisions

Vesting

A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Accrued Pension

The benefit accrued at any date other than the normal retirement date is equal to the normal retirement benefit formula, but based upon compensation and benefit service to date.

Employee Contributions

Employees contribute at the rate of 3.0% of compensation up to attainment of age 62 and completion of 10 years of vesting service. The contributions are credited with interest at the rate of 4.0% per year.

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Actuarial Assumptions and Methods

Interest

7.00%

Salary

5.00% Annual Increase

Withdrawal

Table D-3: Rates of withdrawal at selected ages:

Age	Rate	Age	Rate	Age	Rate
20	7.0000%	35	4.5000%	50	1.5000%
25	5.5000%	40	4.0000%	55	0.5000%
30	5.0000%	45	3.0000%	60	0.0000%

Mortality

IRS 2017 Static Combined Table for Small Plans

Incorporated into the table are rates for annuitants projected 7 years and rates for non-annuitants projected 15 years using Scale AA to reflect mortality improvement.

Disability

SOA 1987 Group LTD Table - Males, 6-month elimination. Sample rates are shown below.

Age	Rate	Age	Rate	Age	Rate
20	0.0764%	35	0.1242%	50	0.5396%
25	0.0854%	40	0.1760%	55	0.9770%
30	0.0986%	45	0.2944%	60	1.4774%

100% of disabilities are assumed to be service-related.

Retirement

Normal Retirement Age, or age on valuation date, if greater.

Preretirement Death Benefit

Liabilities computed on the assumption that all participants will have spouses of the same age at the date of eligibility for the benefit.

Expenses

Provision for administrative expenses added to annual contribution requirement, per Act 205 of 1984.

Inflation

Moderate inflation based on long term historical average rates is a component of the actuarial assumptions used herein. Provision is not made for advance funding of sharply higher rates of inflation experienced in some years. The effects of such higher rates are reflected in the funding after their occurrence.

Actuarial Value of Assets

Market Value as determined by the trustee.

Actuarial Cost Method

Entry Age Normal (required by Act 205 of 1984)

Changes in Actuarial Assumptions and Methods

	Prior	Current
Mortality	RP2000 Table	IRS 2017 Static Combined Table for Small Plans

Borough of Hanover Employees Pension Plan
Actuarial Valuation
as of January 1, 2017

Section 1

Summary of Plan Assets and Summary of Plan Membership

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Receipts and Disbursements - January 1, 2015 to December 31, 2015

Market Value at 1/1/2015			$ 28,077,952.39
Receipts			
Employer Contributions Received		$ 0.00	
Employee Contributions			
Received	$ 142,396.01		
Receivable at 1/1/2015	0.00		
Receivable at 12/31/2015	15,041.70		
Total Employee Contributions		157,437.71	
State Contributions Received		423,936.00	
Investment Income			
Income Received	$ 479,954.24		
Accrued Income at 1/1/2015	(29,800.92)		
Accrued Income at 12/31/2015	29,385.60		
Total Investment Income		479,538.92	
Change in Market Value		(488,007.33)	
Total Receipts			572,905.30
Disbursements			
Monthly Benefit Payments		$ (800,747.79)	
Administrative Expenses		(94,023.07)	
Total Disbursements			(894,770.86)
Market Value at 12/31/2015			$ 27,756,086.83
Approximate Net Dollar-Weighted Rate of Investment Return			(0.03%)

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Receipts and Disbursements - January 1, 2016 to December 31, 2016

Market Value at 1/1/2016			$ 27,756,086.83
Receipts			
Employer Contributions Received		$ 0.00	
Employee Contributions			
Received	$ 155,949.92		
Receivable at 1/1/2016	(15,041.70)		
Receivable at 12/31/2016	15,244.47		
Total Employee Contributions		156,152.69	
State Contributions Received		263,766.00	
Investment Income			
Income Received	$ 403,839.65		
Accrued Income at 1/1/2016	(29,385.60)		
Accrued Income at 12/31/2016	33,288.05		
Total Investment Income		407,742.10	
Change in Market Value		971,059.03	
Total Receipts			1,798,719.82
Disbursements			
Monthly Benefit Payments		$ (866,581.28)	
Refund of Employee Contributions		(7,637.50)	
Administrative Expenses		(78,265.58)	
Total Disbursements			(952,484.36)
Market Value at 12/31/2016			$ 28,602,322.29
Approximate Net Dollar-Weighted Rate of Investment Return			5.01%

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Assets and Liabilities

Assets		
Cash	$ 13,153.18	
Money Markets	1,036,828.56	
U.S. Government Securities	2,838,617.08	
Corporate Bonds	1,601,326.53	
Common Stocks	7,089,928.39	
Mutual Funds	14,770,297.53	
Closed End Funds	1,203,638.50	
Total Assets in Fund		$ 28,553,789.77
Employee Contributions Receivable		15,244.47
Accrued Income		33,288.05
Total Assets		$ 28,602,322.29
Liabilities		
Total Liabilities		0.00
Net Assets		$ 28,602,322.29

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Summary of Plan Membership

Active Members	Number of Members	Annual Payroll
Active Members as of 1/1/2015	106	
New Members During the Period	8	
Returned to Active	0	
Members No Longer Active:		
Retired with Disability Benefit	(1)	
Retired with Service Retirement Benefit	(3)	
Separated with Deferred Benefit	0	
Separated with Refund of Contributions	(3)	
Separated with Neither Deferred Benefit nor Refund of Contributions	0	
Deceased	(1)	
Total	(8)	
Active Members as of 1/1/2017	106	$ 5,462,801

Vested Former Members	Number of Members	Annual Benefit
Vested Former Members as of 1/1/2015	2	
Separated with Deferred Benefit	0	
Beneficiary of Deceased Participant	0	
Returned to Active	0	
Retired with Service Retirement Benefit	0	
Deceased or Paid in Full	0	
Vested Former Members as of 1/1/2017	2	$ 19,231

Retired Members		
Retired Members as of 1/1/2015	34	
Retired with Service Retirement Benefit	3	
Deceased or Paid in Full	(2)	
Retired Members as of 1/1/2017	35	$ 789,784

Disabled Members		
Disabled Members as of 1/1/2015	1	
Retired with Disability Benefit	1	
Deceased	0	
Disabled Members as of 1/1/2017	2	$ 37,686

Spouse Beneficiaries of Deceased Members		
Spouse Beneficiaries of Deceased Members as of 1/1/2015	15	
Additional Spouse Beneficiaries of Deceased Members	3	
Deceased	(3)	
Spouse Beneficiaries of Deceased Members as of 1/1/2017	15	$ 99,110

Borough of Hanover Employees Pension Plan
Actuarial Valuation
as of January 1, 2017

Section 2

Act 205 Funding Calculations

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Unfunded Actuarial Accrued Liability and Normal Cost

Unfunded Actuarial Accrued Liability

Actuarial Present Value of Future Benefits		
Active Members Retirement Pension Benefits	$ 20,856,931	
Active Members Vested Withdrawal Benefits	774,673	
Active Members Disability Benefits	519,810	
Active Members Preretirement Death Benefits	54,929	
Active Members Refund of Member Contributions	37,773 [1]	
Refund of Employee Contributions to Terminated Members	17,927	
Vested Former Members Benefits	193,964	
Retired Members Benefits	8,036,929	
Disabled Members Benefits	463,460	
Surviving Spouses Benefits	800,972	
Total		$ 31,757,368
Actuarial Present Value of Future Normal Costs		(2,679,917)
Actuarial Accrued Liability		$ 29,077,451
Actuarial Value of Assets		(28,602,322)
Unfunded Actuarial Accrued Liability		$ 475,129

Normal Cost

Normal Cost	$ 341,342
Normal Cost as a Percentage of Annual Payroll	6.2%

[1] Accumulated Member Contributions Without Interest as of 1/1/2017 = $2,408,671
Accumulated Member Contributions With Interest as of 1/1/2017 = $4,076,667

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Analysis of the Change in the Unfunded Actuarial Accrued Liability

Unfunded Actuarial Accrued Liability at 1/1/2015		$ (2,148,943)
Additions		
Normal Costs	$ 1,031,919	
Administrative Expenses	172,289	
Interest on Unfunded Actuarial Accrued Liability, Normal Costs, and Administrative Expenses	(188,603)	
Total		1,015,605
Contributions		
Employer Contributions	$ 0	
Employee Contributions	(313,590)	
State Contributions	(687,702)	
Interest on Contributions	(88,097)	
Total		(1,089,389)
Modification in the Benefit Plan		0
Change in Actuarial Assumptions		1,189,911
Actuarial Loss		
Investment Loss	$ 2,656,779	
Experience Gain	(1,148,834)	
Total		1,507,945
Unfunded Actuarial Accrued Liability at 1/1/2017		$ 475,129

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Amortization of Unfunded Actuarial Accrued Liability

Initial Date	Initial Amount	Outstanding Balance	Amortization Amount	Remaining Amortization	Nature
January 1, 2017	$ 475,129	$ 475,129	$ 48,754	15 Years	Assumption Chg.

Projected plan year in which the unfunded accrued liability is fully amortized is 2031.

Aggregation of Changes in Unfunded Actuarial Accrued Liability

Date of Aggregation	Aggregated Target Date	Outstanding Balance	Amortization Amount	Remaining Amortization
January 1, 2017	2031	$ 475,129	$ 48,754	15 Years

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Illustration of Minimum Municipal Obligation

Financial Requirements		
Normal Cost	$ 341,342	
Administrative Expenses	86,145 [1]	
Amortization of Unfunded Actuarial Accrued Liability	48,754	
Total		$ 476,241
Expected Member Contributions		(150,923)
Minimum Municipal Obligation		$ 325,318 [2]
Estimated Allocation of General Municipal Pension System State Aid		(263,766)
Net Minimum Municipal Obligation		$ 61,552 [2]

[1] Total Administrative Expenses for Plan Year 1/1/2015 to 12/31/2015 - $ 94,023
Total Administrative Expenses for Plan Year 1/1/2016 to 12/31/2016 - $ 78,266

[2] This is not an actual MMO. Figures from this report will be used to prepare actual MMOs in future years.

Borough of Hanover Employees Pension Plan
Actuarial Valuation
as of January 1, 2017

Section 3

Supplemental Information

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Supplemental Information

Schedule of Funding Progress

Valuation Date	Market Value of Assets (a)	Entry Age Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Net Position as a % of Total Liability (b-a)/b	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
1/1/2011	$ 21,669,484	$ 21,885,499	$ 216,015	1.0%	99.0%	$ 4,982,663	4.3%
1/1/2012	21,745,163						
1/1/2013	24,143,044	23,834,834	(308,210)	-1.3%	101.3%	5,294,038	-5.8%
1/1/2014	27,482,377						
1/1/2015	28,077,952	25,929,009	(2,148,943)	-8.3%	108.3%	5,239,614	-41.0%
1/1/2016	27,756,087						
1/1/2017	28,602,322	29,077,451	475,129	1.6%	98.4%	5,462,801	8.7%

Schedule of Interest Rate Sensitivity Testing

Interest Rate [1]	Market Value of Assets (a)	Entry Age Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Net Position as a % of Total Liability (b-a)/b	Funded Ratio (a/b)
6.00%	$ 28,602,322	$ 32,126,221	$ 3,523,899	11.0%	89.0%
7.00%	28,602,322	29,077,451	475,129	1.6%	98.4%
8.00%	28,602,322	26,488,381	(2,113,941)	-8.0%	108.0%

[1] Valuation interest rate is 7.00%

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2017
Supplemental Information

Schedule of Contributions from the Employer and Other Contributing Entities

Year	Actuarially [1] Determined Contribution	Contributions [2] From Employer	Contribution Deficiency/ (Surplus)
2007	$ 572,854	$ 572,854	$ 0
2008	443,583	443,583	0
2009	461,088	461,088	0
2010	460,768	460,768	0
2011	458,651	458,651	0
2012	482,645	482,645	0
2013	574,943	574,943	0
2014	448,010	448,010	0
2015	423,936	423,936	0
2016	263,766	263,766	0

[1] Minimum Municipal Obligation under Act 205 of 1984
[2] Includes general municipal pension system State aid

Supplemental Information for Assumptions for Act 205 Funding Calculations

In accordance with regulations under Act 205 of 1984, all actuarial assumptions are selected jointly by the actuary and the governing body of the pension Plan.

Interest Rates

The interest rate assumption is the long term expected rate of return on pension plan investments. It is based on the Plan's current asset allocation, expected long term inflation, and historical long term expected real rates of return on the Plan's major asset classes.

Salary

Based on expected long term salary increases for active participants, considering the effects of future inflation.

Withdrawal

Historical rates of withdrawal were considered as well as future expectations of withdrawal for the affected population.

Mortality

Based on the most current IRS mortality table for funding purposes.

Disability

Based on the Society of Actuaries Group LTD Table – Males, 6-month elimination (1987).

Retirement

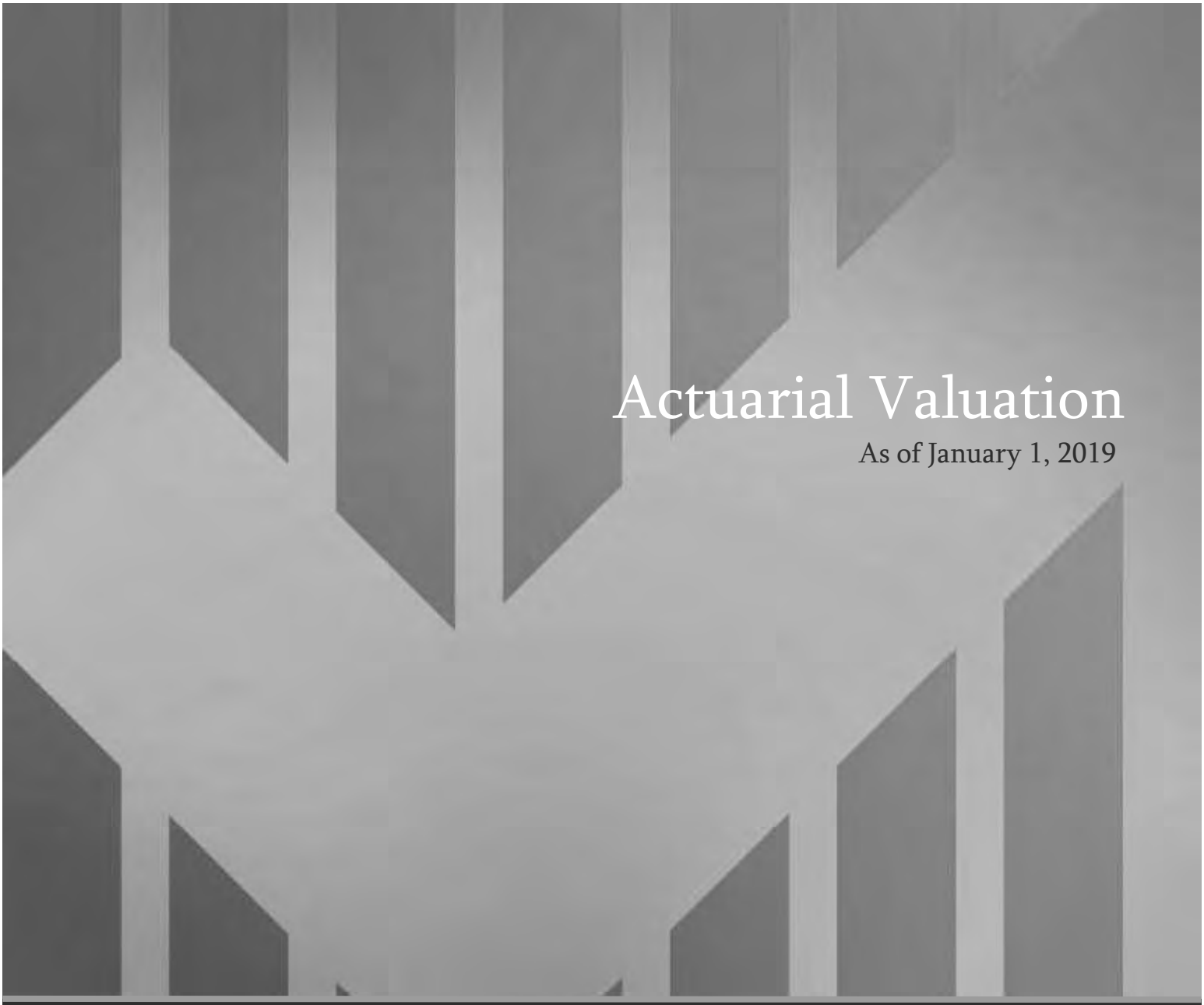
Due to the plan size and design, use of a single retirement age was assumed. The use of retirement rates is not expected to produce materially different results.

Expenses

Expected expenses are determined by averaging the two prior year's expenses.

Inflation

Moderate inflation based on long term historical average rates is a component of the actuarial assumptions used herein.



Actuarial Valuation

As of January 1, 2019

Borough of Hanover Employees Pension Plan

ConradSiegel

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019

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Executive Summary

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Summary of Principal Plan Benefit Provisions (SPPB)

Actuarial Assumptions and Methods

Section 1 - Summary of Plan Assets and Summary of Plan Membership

Section 2 - Act 205 Funding Calculations

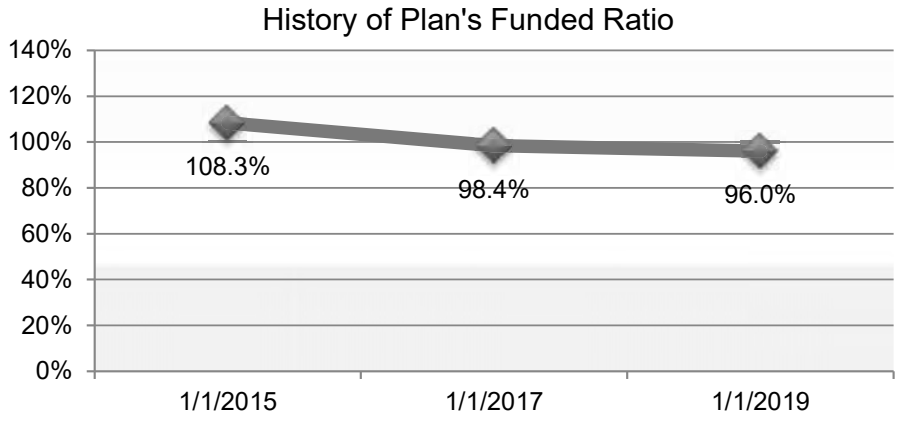
Section 3 - Supplemental Information

Appendix

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Executive Summary

The purpose of the valuation report is to determine the actuarial status of the Plan and to serve as the basis for satisfying the reporting requirements under Act 205. The actuarial calculations contained in this report will be used to determine future minimum municipal obligations.

The Summary of Principal Plan Benefit Provisions (SPPB) may be found following the Actuarial Certification. This summary represents our understanding of the current plan provisions in effect at January 1, 2019. Following the SPPB is a summary of the Actuarial Assumptions and Methods used in this valuation report. Changes to any assumptions from the prior valuation are indicated on the second page which include a change to the mortality assumption.



	1/1/2015	1/1/2017	1/1/2019
Market Value of Assets (MVA)	$ 28,077,952	$ 28,602,322	$30,313,438
Actuarial Accrued Liability (AAL)	$ 25,929,009	$ 29,077,451	$31,584,718
Unfunded Actuarial Accrued Liability (UAAL)	$ (2,148,943)	$ 475,129	$ 1,271,280
Normal Cost	$ 503,375	$ 341,342	$ 329,117
W-2 Payroll	$ 5,239,614	$ 5,462,801	$ 5,614,113
Percentage of W-2 Payroll	9.6%	6.2%	5.9%
Average Age	47.7	48.8	49.7
Interest	*7.00%*	*7.00%*	*7.00%*
Salary Scale	*5.00%*	*5.00%*	*5.00%*
*Average Life Expectancy**	*81.24*	*83.33*	*85.46*
Mortality Basis	*RP2000*	*IRS 2017 Small Plan Combined Static*	*PubG-2010*
Participant Counts:			
Active	106	106	103
Vested Former	2	2	3
Receiving Benefits	50	52	59
Total	158	160	165

*Based on a male currently aged 60.

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Executive Summary

History of Investment Results

The following is a summary of the net dollar-weighted rates of investment return for the past six calendar years:

2013	2014	2015	2016	2017	2018
13.5%	2.9%	(0.0%)	5.0%	17.7%	(5.8%)

Components of Financial Requirements

There are three cost components that make up the financial requirement of a Plan's Minimum Municipal Obligation.

1. Normal Cost – This is the cost of pension and other benefits earned during the current year.

2. Administrative Expenses – Examples of administrative expenses paid from the plan assets are expenses for: investment advisory services, actuarial services and trustee services.

3. Amortization of the Unfunded Actuarial Accrued Liability – The amount of this cost is comprised of the amortization of the various gains and losses, plan amendments, and changes in actuarial assumptions that have occurred in the Plan over time. The Plan had a loss as of January 1, 2019, of $922,934 due to the change in actuarial assumptions. In addition, the Plan had an actuarial gain of $87,644 for the previous two-year period.

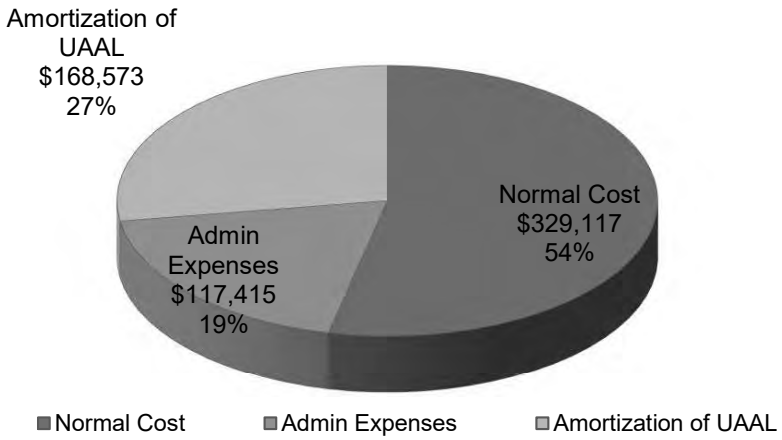


Illustration of Minimum Municipal Obligation

Financial Requirements		
Normal Cost	$	329,117
Administrative Expenses	$	117,415
Amortization of Unfunded Actuarial Accrued Liability (UAAL)	$	168,573
Total Financial Requirements	$	615,105
Expected Member Contributions	$	(145,253)
Minimum Municipal Obligation (not less than $0)	$	469,852

Please note that the figures shown above are for illustrative purposes only. The actual minimum municipal obligation is determined through the annual budgeting process.

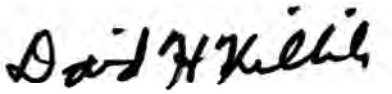
Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Actuarial Certification

In preparing this report, we have relied upon the data furnished to us. The data with respect to receipts and disbursements and assets of the Plan was furnished by Wilmington Trust. The data with respect to participants and beneficiaries was furnished by the Borough of Hanover. The data has been reviewed and has been determined to be reasonable and consistent.

The information as contained in this report is a projection of liabilities based upon stated assumptions and is not an exact statement of the Plan's ultimate benefits and liabilities. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as at the end of an amortization period or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of the assignment, an analysis of the potential range of such future measurements was not performed.

I certify that all costs, liabilities, rates of interest, and other factors under the Plan in Section 2 of the report have been determined on the basis of actuarial assumptions and methods, each of which is reasonable (taking into account the experience of the Plan and reasonable expectations) or which, in the aggregate, result in a total contribution equivalent to that which would be determined if each such assumption and method were reasonable, and which, in combination, offer my best estimate of anticipated experience under the Plan.

I am a member of the American Academy of Actuaries, a Fellow of the Society of Actuaries, and an Enrolled Actuary under ERISA, and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.



10/9/2019
Date

David H. Killick, FSA, EA, MAAA
Partner & Consulting Actuary
Enrolled Actuary No. 17-03880

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Summary of Principal Plan Benefit Provisions

Eligibility

All full-time employees of the Borough, excluding police officers and fire drivers, are eligible to join the Plan on the July 1 following the date of employment.

Normal Retirement

The normal retirement date is the first day of the month following attainment of age 55 and completion of 25 years of vesting service, but not later than attainment of age 62 and completion of 10 years of vesting service, if earlier. However, for non-union, non-uniformed employees hired on or after July 1, 2014, the normal retirement date is the first day of the month following attainment of age 60 and completion of 25 years of vesting service, but not later than attainment of age 65 and completion of 10 years of vesting service, if earlier.

The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.5% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year. The minimum monthly pension for employees with 30 or more years of vesting service is equal to 70% of average monthly compensation, less 100% of Social Security benefits. However, for non-union, non-uniformed employees hired on or after July 1, 2014, the normal retirement pension is equal to 1.0% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year.

Average monthly compensation is based on the highest consecutive 36 months of compensation out of the last 60 months preceding retirement.

Disability Retirement

Active members are eligible for disability retirement after attainment of age 45 and completion of 15 years of vesting service, following 6 months of permanent disability. The monthly disability retirement pension is equal to the benefit accrued to the date of disability.

If the disability is determined to be service-connected, the monthly disability retirement pension is equal to the projected normal retirement pension based upon years of benefit service that would be credited to the member until attainment of age 62.

Death Benefits

The monthly death benefit for a member who has attained 60 years, where years equals the sum of the member's age and years of vesting service, and has completed at least 10 years of vesting service is a survivor pension for his spouse, or children under age 19 if there is no surviving spouse, equal to 50% of the benefit accrued to the date of death. In lieu of the above, the employee's contributions plus interest may be elected as a preretirement death benefit.

The excess, if any, of the employee's contributions plus interest over the benefits paid after retirement shall be payable as a postretirement death benefit.

Vesting

A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Accrued Pension

The benefit accrued at any date other than the normal retirement date is equal to the normal retirement benefit formula, but based upon compensation and benefit service to date.

Employee Contributions

Employees contribute at the rate of 3.0% of compensation up to attainment of age 62 and completion of 10 years of vesting service. The contributions are credited with interest at the rate of 4.0% per year.

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Actuarial Assumptions and Methods

Interest

7.00%

Salary

5.00% Annual Increase

Withdrawal

Table D-3: Rates of withdrawal at selected ages:

Age	Rate	Age	Rate	Age	Rate
20	7.0000%	35	4.5000%	50	1.5000%
25	5.5000%	40	4.0000%	55	0.5000%
30	5.0000%	45	3.0000%	60	0.0000%

Mortality

PubG-2010 mortality table, including rates for disabled retirees and contingent survivors.

Incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvement.

Disability

SOA 1987 Group LTD Table - Males, 6-month elimination. Sample rates are shown below.

Age	Rate	Age	Rate	Age	Rate
20	0.0764%	35	0.1242%	50	0.5396%
25	0.0854%	40	0.1760%	55	0.9770%
30	0.0986%	45	0.2944%	60	1.4774%

100% of disabilities are assumed to be service-related.

Retirement

Normal Retirement Age, or age on valuation date, if greater.

Preretirement Death Benefit

Liabilities computed on the assumption that all participants will have spouses of the same age at the date of eligibility for the benefit.

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Actuarial Assumptions and Methods

Expenses

Provision for administrative expenses added to annual contribution requirement, per Act 205 of 1984.

Inflation

Moderate inflation based on long term historical average rates is a component of the actuarial assumptions used herein. Provision is not made for advance funding of sharply higher rates of inflation experienced in some years. The effects of such higher rates are reflected in the funding after their occurrence.

Actuarial Value of Assets

Market Value as determined by the trustee.

Actuarial Cost Method

Entry Age Normal (required by Act 205 of 1984)

Changes in Actuarial Assumptions and Methods

	Prior	Current
Mortality	IRS 2017 Static Combined Table for Small Plans	See Above

Borough of Hanover Employees Pension Plan
Actuarial Valuation
as of January 1, 2019

Section 1

Summary of Plan Assets and Summary of Plan Membership

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Receipts and Disbursements - January 1, 2017 to December 31, 2017

Market Value at 1/1/2017			$ 28,602,322.29
Receipts			
Employer Contributions Received		$ 0.00	
Employee Contributions			
Received	$ 151,909.96		
Receivable at 1/1/2017	(15,244.47)		
Receivable at 12/31/2017	14,754.34		
Total Employee Contributions		151,419.83	
State Contributions Received		268,797.00	
Investment Income			
Income Received	$ 651,969.43		
Accrued Income at 1/1/2017	(33,288.05)		
Accrued Income at 12/31/2017	35,910.77		
Total Investment Income		654,592.15	
Change in Market Value		4,367,120.36	
Total Receipts			5,441,929.34
Disbursements			
Monthly Benefit Payments		$ (940,645.36)	
Refund of Employee Contributions		(8,842.01)	
Administrative Expenses		(140,922.87)	
Total Disbursements			(1,090,410.24)
Market Value at 12/31/2017			$ 32,953,841.39
Approximate Net Dollar-Weighted Rate of Investment Return			17.74%

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Receipts and Disbursements - January 1, 2018 to December 31, 2018

Market Value at 1/1/2018			$ 32,953,841.39
Receipts			
Employer Contributions Received		$ 0.00	
Employee Contributions			
Received	$ 165,669.54		
Receivable at 1/1/2018	(14,754.34)		
Receivable at 12/31/2018	0.00		
Total Employee Contributions		150,915.20	
State Contributions Received		249,949.00	
Investment Income			
Income Received	$ 600,845.35		
Accrued Income at 1/1/2018	(35,910.77)		
Accrued Income at 12/31/2018	48,665.38		
Total Investment Income		613,599.96	
Change in Market Value		(2,502,489.22)	
Total Receipts			(1,488,025.06)
Disbursements			
Monthly Benefit Payments		$ (1,051,464.30)	
Refund of Employee Contributions		(7,007.83)	
Administrative Expenses		(93,906.67)	
Total Disbursements			(1,152,378.80)
Market Value at 12/31/2018			$ 30,313,437.53
Approximate Net Dollar-Weighted Rate of Investment Return			(5.80%)

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Assets and Liabilities

Assets		
Cash	$ (23,474.35)	
Money Markets	507,253.55	
U.S. Government Securities	4,623,080.85	
Corporate Bonds	1,790,814.30	
Common Stocks	6,678,449.87	
Mutual Funds	16,723,635.67	
Total Assets in Fund		$ 30,299,759.89
Employee Contributions Receivable		0.00
Accrued Income		48,665.38
Total Assets		$ 30,348,425.27
Liabilities		
Benefits Payable	$ (34,987.74)	
Total Liabilities		(34,987.74)
Net Assets		$ 30,313,437.53

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Summary of Plan Membership

Active Members	Number of Members	Annual Payroll
Active Members as of 1/1/2017	106	
New Members During the Period	9	
Returned to Active	0	
Members No Longer Active:		
Retired with Disability Benefit	0	
Retired with Service Retirement Benefit	(5)	
Separated with Deferred Benefit	(3)	
Separated with Refund of Contributions	(3)	
Separated with Neither Deferred Benefit nor Refund of Contributions	0	
Deceased	(1)	
Total	(12)	
Active Members as of 1/1/2019	103	$ 5,614,113

Vested Former Members	Number of Members	Annual Benefit
Vested Former Members as of 1/1/2017	2	
Separated with Deferred Benefit	3	
Beneficiary of Deceased Participant	0	
Returned to Active	0	
Retired with Service Retirement Benefit	(2)	
Deceased or Paid in Full	0	
Vested Former Members as of 1/1/2019	3	$ 33,073

Retired Members		
Retired Members as of 1/1/2017	35	
Retired with Service Retirement Benefit	7	
Deceased or Paid in Full	(2)	
Retired Members as of 1/1/2019	40	$ 927,242

Disabled Members		
Disabled Members as of 1/1/2017	2	
Retired with Disability Benefit	0	
Deceased	0	
Disabled Members as of 1/1/2019	2	$ 37,686

Spouse Beneficiaries of Deceased Members (Includes QDROs)		
Spouse Beneficiaries of Deceased Members as of 1/1/2017	15	
Additional Spouse Beneficiaries of Deceased Members	4	
Deceased	(2)	
Spouse Beneficiaries of Deceased Members as of 1/1/2019	17	$ 127,026

Borough of Hanover Employees Pension Plan
Actuarial Valuation
as of January 1, 2019

Section 2

Act 205 Funding Calculations

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Unfunded Actuarial Accrued Liability and Normal Cost

Unfunded Actuarial Accrued Liability

Actuarial Present Value of Future Benefits		
Active Members Retirement Pension Benefits	$ 21,450,299	
Active Members Vested Withdrawal Benefits	835,787	
Active Members Disability Benefits	424,013	
Active Members Preretirement Death Benefits	45,852	
Active Members Refund of Member Contributions	38,054 [1]	
Refund of Employee Contributions to Terminated Members	19,140	
Vested Former Members Benefits	341,158	
Retired Members Benefits	9,609,259	
Disabled Members Benefits	381,295	
Surviving Spouses Benefits	1,266,270	
Total		$ 34,411,127
Actuarial Present Value of Future Normal Costs		(2,826,409)
Actuarial Accrued Liability		$ 31,584,718
Actuarial Value of Assets		(30,313,438)
Unfunded Actuarial Accrued Liability		$ 1,271,280

Normal Cost

Normal Cost	$ 329,117
Normal Cost as a Percentage of Annual Payroll	5.9%

[1] Accumulated Member Contributions Without Interest as of 1/1/2019 = $2,423,257
Accumulated Member Contributions With Interest as of 1/1/2019 = $4,204,660

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Analysis of the Change in the Unfunded Actuarial Accrued Liability

Unfunded Actuarial Accrued Liability at 1/1/2017		$ 475,129
Additions		
Normal Costs	$ 699,751	
Administrative Expenses	234,830	
Interest on Unfunded Actuarial Accrued Liability, Normal Costs, and Administrative Expenses	161,824	
Total		1,096,405
Contributions		
Employer Contributions	$ 0	
Employee Contributions	(302,335)	
State Contributions	(518,746)	
Interest on Contributions	(68,531)	
Total		(889,612)
Adjustment for Funding Deviation		(245,932)
Modification in the Benefit Plan		0
Change in Actuarial Assumptions		922,934
Actuarial Gain		
Investment Loss	$ 922,686	
Experience Gain	(1,256,262)	
Funding Deviation	245,932	
Total		(87,644)
Unfunded Actuarial Accrued Liability at 1/1/2019		$ 1,271,280

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019

Amortization of Unfunded Actuarial Accrued Liability

Initial Date	Initial Amount	Outstanding Balance	Amortization Amount	Remaining Amortization	Nature
January 1, 2017	$ 475,129	$ 435,990	$ 48,754	13 Years	Assumption Chg.
January 1, 2019	922,934	922,934	132,391	9 Years	Assumption Chg.
January 1, 2019	(87,644)	(87,644)	(12,572)	9 Years	Actuarial Gain
Total	$ 1,310,419	$ 1,271,280	$ 168,573		

Projected plan year in which the unfunded accrued liability is fully amortized is 2029.

Aggregation of Changes in Unfunded Actuarial Accrued Liability

Date of Aggregation	Aggregated Target Date	Outstanding Balance	Amortization Amount	Remaining Amortization
January 1, 2019	2029	$ 1,271,280	$ 168,573	11 Years

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Illustration of Minimum Municipal Obligation

Financial Requirements			
Normal Cost	$ 329,117		
Administrative Expenses	117,415 [1]		
Amortization of Unfunded Actuarial Accrued Liability	168,573		
Total		$	615,105
Expected Member Contributions			(145,253)
Minimum Municipal Obligation		$	469,852 [2]

[1] Total Administrative Expenses for Plan Year 1/1/2017 to 12/31/2017 - $ 140,923
Total Administrative Expenses for Plan Year 1/1/2018 to 12/31/2018 - $ 93,907

[2] This is not an actual MMO. Figures from this report will be used to prepare actual MMOs in future years.

Borough of Hanover Employees Pension Plan
Actuarial Valuation
as of January 1, 2019

Section 3

Supplemental Information

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Supplemental Information

Schedule of Funding Progress

Valuation Date	Market Value of Assets (a)	Entry Age Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Net Position as a % of Total Liability (b-a)/b	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
1/1/2011	$ 21,669,484	$ 21,885,499	$ 216,015	1.0%	99.0%	$ 4,982,663	4.3%
1/1/2012	21,745,163						
1/1/2013	24,143,044	23,834,834	(308,210)	-1.3%	101.3%	5,294,038	-5.8%
1/1/2014	27,482,377						
1/1/2015	28,077,952	25,929,009	(2,148,943)	-8.3%	108.3%	5,239,614	-41.0%
1/1/2016	27,756,087						
1/1/2017	28,602,322	29,077,451	475,129	1.6%	98.4%	5,462,801	8.7%
1/1/2018	32,953,841						
1/1/2019	30,313,438	31,584,718	1,271,280	4.0%	96.0%	5,614,113	22.6%

Schedule of Interest Rate Sensitivity Testing

Interest Rate [1]	Market Value of Assets (a)	Entry Age Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Net Position as a % of Total Liability (b-a)/b	Funded Ratio (a/b)
6.00%	$ 30,313,438	$ 35,005,088	$ 4,691,650	13.4%	86.6%
7.00%	30,313,438	31,584,718	1,271,280	4.0%	96.0%
8.00%	30,313,438	28,705,475	(1,607,963)	-5.6%	105.6%

[1] Valuation interest rate is 7.00%

Borough of Hanover Employees Pension Plan
Actuarial Valuation as of January 1, 2019
Supplemental Information

Schedule of Contributions from the Employer and Other Contributing Entities

Year	Actuarially [1] Determined Contribution	Contributions [2] From Employer	Contribution Deficiency/ (Surplus)
2009	$ 461,088	$ 461,088	$ 0
2010	460,768	460,768	0
2011	458,651	458,651	0
2012	482,645	482,645	0
2013	574,943	574,943	0
2014	448,010	448,010	0
2015	423,936	423,936	0
2016	263,766	263,766	0
2017	268,797	268,797	0
2018	249,949	249,949	0

[1] Minimum Municipal Obligation under Act 205 of 1984

[2] Includes general municipal pension system State aid

Pension Plan Risks

Measuring pension obligations and calculating actuarially determined contributions requires the use of assumptions regarding future economic and demographic experience. Future experience may differ from the assumptions used in these calculations resulting in a different outcome than expected. This uncertainty inherent in pension plans results in required contribution and funding level volatility. In many cases when discussing risks, the focus is on downside risk, there is also upside risk. It is essential that the entity taking on the risk understands the risk, bears the potential loss or reaps the potential reward.

The following are examples of risks that may significantly affect the plan's future financial condition:

1. Investment risk is the potential that investment returns will be different than expected. Investment returns less than expected will lead to lower asset values, a reduction to the plan's funded status, and higher contribution requirements. The reverse is true if investment returns are higher than expected.

2. Asset/liability mismatch risk is the potential that changes in asset values do not match changes in the value of liabilities. If there is a change in asset values relative to liabilities which reduces the plan's funded status, higher contributions may be required in order for the Plan to meet its benefit payment obligations as they become due.

3. Interest rate risk is the potential that interest rates will be different than expected. A decrease in the interest rates used to value plan liabilities results in an increase in liabilities and vice versa. The interest rates used for valuing liabilities for contribution determination is based on the expected long term rate of investment return for the plan's assets. A change to the investment allocation could warrant a change to the interest rate used, a lower long-term return would result in higher contribution requirement and vice versa. An illustration of the impact of a 1% change to the interest rates is provided in Section 3 of this report.

4. Longevity and other demographic risks are the potential that mortality or other demographic experience will be different than anticipated. This can lead to actuarial gains or losses. For example, if fewer participants die than expected, this will create an actuarial loss and may result in a higher required contribution.

5. Contribution risk is the potential of actual future contributions deviating from expected future contributions. For example, if actual contributions are not made in accordance with the plan's funding policy or there are material changes in the anticipated number of employees or covered payroll, it may impact future contributions.

There are a variety of different maturity measures that can help assess this risk. A mature plan may have more difficulty recovering from adverse experience. A plan that is closed to new entrants will mature over time as the member population ages. There are a number of ways to measure plan maturity. The following maturity measures are relevant to this plan:

1. The ratio of the retired members' liability to the total accrued liability is 35.64%. To the extent that the expected benefit payment streams for retired members are not supported by investments that provide matching income streams (asset/liability mismatch), the risk of a larger funding shortfall with respect to the retired member liability rises as this percentage increases.

2. The ratio of prior year contributions reduced by prior year benefit payments to market value of assets is -2.17%. A negative percentage indicates negative cash flow, which leads to lower asset values and may amplify investment risk. If the plan experiences lower than expected investment returns in combination with negative cash flow, the plan will be more underfunded (or less overfunded), and may have higher contribution requirements than would otherwise be the case if it had positive cash flow. A positive percentage indicates positive cash flow, which leads to higher asset values and may mitigate the effect of investment risk.

   Negative cash flow is expected for a mature or well-funded plan. It does not indicate that a plan had been poorly managed.

3. Duration measures the sensitivity of the liability to interest rate changes. The duration of the plan's liability is 12.64 years. This means for every 1% decrease in the interest rate, the present value of future benefits liability will increase by approximately 12.64% and vice versa. The lower the duration, the less sensitive the liabilities are to a change in interest rate.

Supplemental Information for Assumptions for Act 205 Funding Calculations

In accordance with regulations under Act 205 of 1984, all actuarial assumptions are selected jointly by the actuary and the governing body of the pension plan.

Interest Rates

The interest rate assumption is the long term expected rate of return on pension plan investments. It is based on the Plan's current asset allocation, expected long term inflation, and historical long term expected real rates of return on the Plan's major asset classes.

Salary

Based on expected long term salary increases for active participants, considering the effects of future inflation.

Withdrawal

Historical rates of withdrawal were considered as well as future expectations of withdrawal for the affected population.

Mortality

Uses the most recent study of public sector data prepared by the Society of Actuaries and takes into account the occupational makeup of the participant group.

Disability

Based on the Society of Actuaries Group LTD Table – Males, 6-month elimination (1987).

Retirement

Due to the plan size and design, use of a single retirement age was assumed. The use of retirement rates is not expected to produce materially different results.

Preretirement Survivor Death Benefit

A conservative assumption was made of percent married compared to current marital statistics for the general population.

Expenses

Expected expenses are determined by averaging the two prior year's expenses.

Inflation

Moderate inflation based on long term historical average rates is a component of the actuarial assumptions used herein.

Actuarial Valuation for Other Postemployment Benefits Accounting

As of January 1, 2019

Borough of Hanover Postemployment Benefits Plan

For purposes of
Governmental Accounting Standards Board Statement No. 75
for Fiscal Year January 1, 2020 to December 31, 2020

Conrad Siegel

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2019 for Fiscal Year Ending December 31, 2020

Table of Contents

Disclosure Statement

Summary of Plan Provisions

Actuarial Assumptions and Methods

Calculations for GASB No. 75 Reporting

Purpose

Actuarial computations under Governmental Accounting Standards Board Statement No. 75 (GASB No. 75) are for purposes of fulfilling employer accounting requirements. The calculations reported herein have been performed in accordance with generally accepted actuarial principles and practices, and on a basis consistent with our understanding of GASB No. 75. In preparing this report, we have relied upon information furnished to us by Borough of Hanover. This information includes data pertaining to the Plan, as well as a description of the substantive plan. The information has been reviewed and determined to be reasonable and consistent; however, we have not audited the data or reviewed plan provisions for compliance with IRS or DOL regulations.

Determinations for purposes other than meeting the employer financial accounting requirements may be significantly different from the results reported herein. The funded status, measured by comparing the Accrued Liability against the Actuarial Value of Plan Assets, is not an appropriate measure for assessing the sufficiency of the plan assets to cover the estimated cost of settling the plan's benefit obligations upon plan termination nor is it appropriate for measuring the need for, or the amount of, future contributions. Accordingly, additional determinations are needed for other purposes, such as judging benefit security at termination or adequacy of funding for an ongoing plan. The actuarial calculations contained in this report are not intended or written to be used, and cannot be used, for the purposes of avoiding penalties under the Internal Revenue Code.

This valuation involves estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and the healthcare cost trend. Amounts determined regarding the funded status of the plan and the annual required contributions of the employer are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future.

Calculations are based on the types of benefits provided under the terms of the substantive plan at the time of the valuation and on the pattern of sharing of costs between the employer and plan members to that point. Calculations reflect a long-term perspective, so methods and assumptions used include techniques that are designed to reduce short-term volatility in actuarial accrued liabilities and the actuarial value of assets.

Benefits Not Included

Defined contribution benefits and insured benefits under GASB No. 75 paragraph 11, pension benefits accounted for under GASB 68, and benefits for compensated absences under GASB 16 are not included in this valuation.

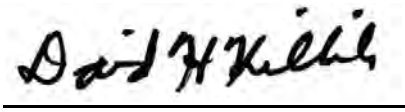
Multiple Year Reporting

Pursuant to GASB No. 75, an actuarial valuation can be used over a two-year period. The figures in this report are reflected as of the measurement date for the specified fiscal year and are based on an actuarial valuation date or rolled forward from an actuarial valuation date. Some figures have been determined based on estimated contributions for the period. These figures may need to be adjusted for actual contributions deposited to the trust or claims paid on behalf of plan benefits.

A new valuation should be performed if, between the actuarial valuation date and measurement date, material changes have occurred that affect the results of this valuation, including significant changes in benefit provisions, the size or composition of the population covered by the plan, or other changes that impact long-term assumptions. If roll forward procedures have been used, this report reflects any necessary adjustments to the interest rate as of the measurement date.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2019 for Fiscal Year Ending December 31, 2020
Disclosure Statement

I am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this valuation.



David H. Killick, FSA, EA, MAAA
Partner & Consulting Actuary

December 29, 2020
Date

DHK/NVP

Police

Health Insurance Benefits:

The Borough shall provide the basic medical and hospitalization benefits as provided at any point in time to active Officers, to Officers retiring under the Borough of Hanover Police Pension Plan after attainment of age 50 and completion of 25 years of service or upon disability. Said medical benefits shall extend for a period of 5 years from the date of the Officer's retirement and shall only be provided if the Officer certifies, in writing, on or before the anniversary date of his or her retirement that he or she is not eligible for coverage under any other employer-sponsored healthcare plan, including a plan sponsored by the employer of his or her spouse. Further, in cases where the retired Officer is eligible for coverage and his or her spouse is not eligible for coverage under any other employer-sponsored healthcare plan, the Borough, for the same 5 year period, will pay 50% of the cost of coverage for the retired Officer's spouse. For spousal coverage, the Officer must be legally married to his or her spouse at the time of retirement. The Borough's cost for the Officer's and/or spouse's coverage will not exceed a total of $600.00 per month. Upon expiration of this coverage, the Officer shall be permitted to maintain health insurance coverage as a member of the Borough Group Plan to age 65. The Officer shall then be required to pay all premiums for coverage for himself or herself and any eligible dependents. Upon reaching age 65, the retired Officer and/or the retired Officer's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retired Officer, the surviving spouse will be allowed to continue coverage under the health insurance plan at the single rate. If the death of a retired Officer occurs within the 5 year period in which the Borough is providing basic medical and hospitalization benefits, the 50% spousal portion will continue to be in effect for the remainder of the 5 year period. All retired officers are permitted to purchase medical, prescription drug, dental, and vision insurance.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an Officer within 90 days after his or her date of hire, may be carried by an Officer when retired and continued into retirement at the sole expense of the retired Officer at the group life insurance rate in effect under the group life insurance policy of the Borough.

Fire Drivers

Health Insurance Benefits:

All members of the Bargaining Unit hired prior to January 1, 2015 shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Fire Drivers' Pension Plan after attainment of age 55 and completion of 25 years of service, or after attainment of age 62 and completion of 10 years of service, if earlier, or upon disability at the Borough's cost for the plan. Upon reaching age 65, the retired employee and/or the retired employee's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retiree, the surviving spouse may continue on the health insurance plan at the single rate.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an employee within 90 days after his or her date of hire, may be carried by an employee when retired and continued into retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough.

Water Department

Health Insurance Benefits:

All members of the Bargaining Unit hired prior to January 1, 2019 shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Employees Pension Plan after attainment of age 55 and completion of 25 years of service, or after attainment of age 62 and completion of 10 years of service, if earlier, or upon disability after attainment of age 45 and completion of 15 years of service at the Borough's cost for the plan. Upon reaching age 65, the retired employee and/or the retired employee's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retiree, the surviving spouse may continue on the health insurance plan at the single rate.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an employee within 90 days after his or her date of hire, may be carried by an employee when retired and continued into retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough.

Nonuniformed Employees (Blue Collar)

Health Insurance Benefits:

All retired employees shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Employees Pension Plan after attainment of age 55 and completion of 25 years of service, or after attainment of age 62 and completion of 10 years of service, if earlier, or upon disability after attainment of age 45 and completion of 15 years of service at the Borough's cost for the plan. Upon reaching age 65, the retired employee and/or the retired employee's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retiree, the surviving spouse may continue on the health insurance plan at the single rate.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an employee within 90 days after his or her date of hire, may be carried by an employee when retired and continued into retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough.

Nonuniformed Employees (White Collar)

Health Insurance Benefits:

All members of the Bargaining Unit hired prior to January 1, 2019 shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Employees Pension Plan after attainment of age 55 and completion of 25 years of service, or after attainment of age 62 and completion of 10 years of service, if earlier, or upon disability after attainment of age 45 and completion of 15 years of service at the Borough's cost for the plan. Upon reaching age 65, the retired employee and/or the retired employee's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retiree, the surviving spouse may continue on the health insurance plan at the single rate.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an employee within 90 days after his or her date of hire, may be carried by an employee when retired and continued into retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough.

Non-Union Employees

Health Insurance Benefits:

All retired employees hired prior to July 1, 2014 shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Employees Pension Plan after attainment of age 55 and completion of 25 years of service, or after attainment of age 62 and completion of 10 years of service, if earlier, or upon disability after attainment of age 45 and completion of 15 years of service at the Borough's cost for the plan.

All retired employees hired on or after July 1, 2014 shall be permitted to purchase their medical, prescription drug, dental, and vision insurance upon retirement under the Borough of Hanover Employees Pension Plan after attainment of age 60 and completion of 25 years of service, or after attainment of age 65 and completion of 10 years of service, if earlier, or upon disability after attainment of age 45 and completion of 15 years of service at the Borough's cost for the plan.

Upon reaching age 65, the retired employee and/or the retired employee's spouse will be covered under a Post-65 medical plan and a Post-65 prescription drug plan. Upon the death of a retiree, the surviving spouse may continue on the health insurance plan at the single rate.

Life Insurance Benefits:

Optional life insurance in increments of $2,500 (up to a maximum of $7,500), elected by an employee within 90 days after his or her date of hire, may be carried by an employee when retired and continued into retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2019 for Fiscal Year Ending December 31, 2020
Actuarial Assumptions and Methods (1 of 2)

Discount Rate

3.26% Based on S&P Municipal Bond 20-Year High Grade Rate Index at January 1, 2020.

Salary

An assumption for salary increases is used only for spreading contributions over future pay under the entry age normal cost method. For this purpose, annual salary increases are assumed to be 5.0%.

Withdrawal

Table D-3: Rates of withdrawal at selected ages:

Age	Rate	Age	Rate	Age	Rate
20	7.0000%	35	4.5000%	50	1.5000%
25	5.5000%	40	4.0000%	55	0.5000%
30	5.0000%	45	3.0000%	60	0.0000%

Mortality

Police and Fire Drivers:
PubS-2010 mortality table, including rates for disabled retirees and contingent survivors.

Water Department, Nonuniformed employees, and Non-Union employees:
PubG-2010 mortality table, including rates for disabled retirees and contingent survivors.

Incorporated into the tables are rates projected generationally using Scale MP-2018 to reflect mortality improvement.

Disability

SOA 1987 Group LTD Table - Males, 6-month elimination. Sample rates are shown below.

Age	Rate	Age	Rate	Age	Rate
20	0.0764%	35	0.1242%	50	0.5396%
25	0.0854%	40	0.1760%	55	0.9770%
30	0.0986%	45	0.2944%	60	1.4774%

Retirement

Police:
Latest of age 53, age at the completion of 25 years of service, or age on the valuation date.

Fire Drivers, Water Department, Nonuniformed employees, and Non-Union employees hired before 7/1/14:
The earlier of (1) latest of age 55, age at the completion of 25 years of service, or age on the valuation date; or (2) latest of age 62, age at the completion of 10 years of service, or age on the valuation date.

Non-Union employees hired on or after 7/1/14:
The earlier of (1) latest of age 60, age at the completion of 25 years of service, or age on the valuation date; or (2) latest of age 65, age at the completion of 10 years of service, or age on the valuation date.

Percent of Eligible Retirees Electing Coverage in Plan

60% of employees are assumed to elect coverage.

Percent Married at Retirement

25% of employees are assumed to be married and have a spouse covered by the plan at retirement.

Spouse Age

Wives are assumed to be two years younger than their husbands.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2019 for Fiscal Year Ending December 31, 2020
Actuarial Assumptions and Methods (2 of 2)

Per Capita Claims Cost

The per capita claims cost for medical and prescription drug is based on the expected portion of the group's overall cost attributed to individuals in the specified age and gender brackets. Dental and vision costs are assumed to not vary with age or gender. The resulting costs are as follows:

Police:

	Medical and Prescription Drug Combined	
Age	Males	Females
45-49	$8,518	$12,301
50-54	$11,281	$13,903
55-59	$13,740	$14,547
60-64	$17,929	$16,711
65+	$3,978	$3,978

Fire Drivers:

	Medical and Prescription Drug Combined	
Age	Males	Females
45-49	$8,484	$12,253
50-54	$11,236	$13,848
55-59	$13,685	$14,490
60-64	$17,858	$16,645
65+	$3,978	$3,978

Water Department, Nonuniformed Employees, and Non-Union Employees:

	Medical and Prescription Drug Combined	
Age	Males	Females
45-49	$8,520	$12,304
50-54	$11,284	$13,906
55-59	$13,743	$14,551
60-64	$17,934	$16,716
65+	$3,978	$3,978

Retiree Contributions

Retiree contributions are assumed to increase at the same rate as the Health Care Cost Trend Rate.

Life Insurance

It is assumed that the annual cost to provide life insurance varies by age. The assumed cost is equal to the amount of coverage times the applicable mortality factor contained in the valuation mortality table. Retirees are responsible for paying the full premium to maintain this coverage.

Health Care Cost Trend Rate

5.5% in 2019 through 2023. Rates gradually decrease from 5.4% in 2024 to 4.0% in 2075 and later based on the Society of Actuaries Long-Run Medical Cost Trend Model.

Actuarial Value of Assets

Equal to the Market Value of Assets

Actuarial Cost Method - Entry Age Normal

Under the Entry Age Normal Cost Method, the Normal Cost is the present value of benefits allocated to the year following the valuation date. Benefits are allocated on a level basis over the earnings of an individual between the date of hire and the assumed retirement age. The Accrued Liability as of the valuation date is the excess of the present value of future benefits over the present value of future Normal Cost. The Unfunded Accrued Liability is the excess of the Accrued Liability over the Actuarial Value of Assets. Actuarial gains and losses serve to reduce or increase the Unfunded Accrued Liability.

Participant Data

Based on census information as of January 1, 2019.

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation
as of January 1, 2019
for Purposes of Other Postemployment Benefits Accounting
for Fiscal Year January 1, 2020 to
December 31, 2020

Calculations for GASB No. 75 Reporting

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2019 for Fiscal Year Ending December 31, 2020
GASB No. 75 Summary Information

Demographic Information	Police	Fire Drivers	Nonuniformed Employees	Total
Active Participants	23	12	102	137
Vested Former Participants	0	0	0	0
Retired Participants	7	6	25	38
Total	30	18	127	175
Annual Payroll of Active Participants	$1,978,380	$919,357	$5,689,415	$8,587,152

Financial Information				
Total OPEB Liability	$ 665,673	$ 307,849	$ 1,814,582	$ 2,788,104
Plan Fiduciary Net Position	0	0	0	0
Net OPEB Liability (Asset)	$ 665,673	$ 307,849	$ 1,814,582	$ 2,788,104
Deferred Outflows of Resources	$ 50,038	$ 29,778	$ 232,527	$ 312,343
Deferred Inflows of Resources	$ 90,823	$ 96,314	$ 351,832	$ 538,969
Plan Fiduciary Net Position as a % of Total OPEB Liability	0.00%	0.00%	0.00%	0.00%
Net OPEB Liability as a % of Covered-Employee Payroll	33.65%	33.49%	31.89%	32.47%
OPEB Expense	$ 45,101	$ 2,635	$ 51,628	$ 99,364

Ties to computation on GASB 75 tab on w/p 8430

Changes in the Net OPEB Liability

Total OPEB Liability	Police	Fire Drivers	Nonuniformed Employees	Total
Fiscal Year Ending 12/31/2020				
Balance at 1/1/2019	$ 586,125	$ 284,592	$ 1,774,767	$ 2,645,484
Service Cost	36,028	12,313	56,004	104,345
Interest[2]	22,491	10,607	64,007	97,105
Changes of Benefit Terms	0	0	0	0
Differences between Expected and Actual Experience[1]	0	0	0	0
Changes of Assumptions[1]	28,913	10,484	53,320	92,717
Benefit Payments[2]	(7,884)	(10,147)	(133,516)	(151,547)
Other Changes	0	0	0	0
Net Changes	79,548	23,257	39,815	142,620
Balance at 1/1/2020	**$ 665,673**	**$ 307,849**	**$ 1,814,582**	**$ 2,788,104**

Changes of Assumptions

The discount rate changed from 3.64% to 3.26%. The trend assumption was updated.

Changes of Benefit Terms

[1]Each year's loss (or gain) is recognized over a closed period, using the average of the expected remaining service lives of all active and inactive employees that are currently receiving a benefit or may be eligible to receive a benefit in the future.
[2]These figures are based on estimated benefit payments. These amounts may be adjusted for actual benefit payments made during the year.

Deferred Outflows/Inflows and Sensitivity

Deferred Outflows of Resources	Police	Fire Drivers	Nonuniformed Employees	Total
Differences between Expected and Actual Experience	$ 0	$ 0	$ 0	$ 0
Changes of Assumptions	41,968	16,928	87,182	146,078
Benefit Payments subsequent to the Measurement Date (1/1/2020)[1]	8,070	12,850	145,345	166,265
Total Deferred Outflows	**$ 50,038**	**$ 29,778**	**$ 232,527**	**$ 312,343**

Deferred Inflows of Resources				
Differences between Expected and Actual Experience	$ 69,485	$ 88,148	$ 304,024	$ 461,657
Changes of Assumptions	21,338	8,166	47,808	77,312
Total Deferred Inflows	**$ 90,823**	**$ 96,314**	**$ 351,832**	**$ 538,969**

Sensitivity of Net OPEB Liability to Changes in the Discount Rate

The following presents the net OPEB liability of the Plan, as well as what the Plan's net OPEB liability would be if it were calculated using a discount rate that is 1-percentage-point lower or 1-percentage-point higher than the current rate:

Net OPEB Liability (Asset)				
1% Increase (4.26%)	$ 600,383	$ 284,173	$ 1,697,513	$ 2,582,069
Current Discount Rate (3.26%)	$ 665,673	$ 307,849	$ 1,814,582	$ 2,788,104
1% Decrease (2.26%)	$ 738,586	$ 333,832	$ 1,944,533	$ 3,016,951

Sensitivity of Net OPEB Liability to Changes in the Healthcare Cost Trend Rate

The following presents the net OPEB liability of the Plan, as well as what the Plan's net OPEB liability would be if it were calculated using healthcare cost trend rates that are 1-percentage-point lower or 1-percentage-point higher than the current healthcare cost trend rates:

Net OPEB Liability (Asset)				
1% Increase	$ 757,530	$ 346,659	$ 2,006,885	$ 3,111,074
Current Rates	$ 665,673	$ 307,849	$ 1,814,582	$ 2,788,104
1% Decrease	$ 589,143	$ 274,729	$ 1,651,712	$ 2,515,584

[1]These figures are based on estimated benefit payments. These amounts may be adjusted for actual benefit payments made.

OPEB Expense and Future Recognition of Deferred Outflows and (Inflows)

OPEB Expense

	Police	Fire Drivers	Nonuniformed Employees	Total
Fiscal Year Ending 12/31/2020				
Service Cost	$ 36,028	$ 12,313	$ 56,004	$ 104,345
Interest on Total OPEB Liability	22,491	10,607	64,007	97,105
Changes of Benefit Terms	0	0	0	0
Contributions - Employee	0	0	0	0
Amortization of Deferred Outflows	9,288	3,794	19,575	32,657
Amortization of Deferred Inflows	(22,706)	(24,079)	(87,958)	(134,743)
Other Changes	0	0	0	0
Total OPEB Expense	**$ 45,101**	**$ 2,635**	**$ 51,628**	**$ 99,364**

Future Deferred Outflows and (Inflows) to be Recognized as OPEB Expense (Income)

Fiscal Year Ending				
December 31, 2021	$ (13,418)	$ (20,285)	$ (68,383)	$ (102,086)
December 31, 2022	(13,418)	(20,285)	(68,383)	(102,086)
December 31, 2023	(13,418)	(20,285)	(68,383)	(102,086)
December 31, 2024	(13,419)	(20,280)	(68,386)	(102,085)
December 31, 2025	4,818	1,749	8,885	15,452
Thereafter	0	0	0	0

Borough of Hanover Postemployment Benefits Plan
Actuarial Valuation as of January 1, 2019 for Fiscal Year Ending December 31, 2020
Deferred Outflows and Inflows of Resources Bases

Deferred Outflows of Resources

Date	Initial Balance	Annual Recognition	Remaining Balance	Remaining Recognition Period	Type
January 1, 2018	120,426	17,204	68,814	4 years	Assumption Change
January 1, 2020	92,717	15,453	77,264	5 years	Assumption Change
Total		32,657	146,078		

Deferred Inflows of Resources

Date	Initial Balance	Annual Recognition	Remaining Balance	Remaining Recognition Period	Type
January 1, 2019	692,487	115,415	461,657	4 years	Experience Change
January 1, 2019	115,968	19,328	77,312	4 years	Assumption Change
Total		134,743	538,969		

Tied each to recap on DEFERRAL AMORT tab at bottom.

Required Supplementary Information

Fiscal Year Ending[1]	2020	2019	2018
Total OPEB Liability			
Service Cost	$ 104,345	$ 152,618	$ 133,310
Interest	97,105	108,558	118,997
Changes of Benefit Terms	0	(10,531)	0
Differences between Expected and Actual Experience	0	(692,487)	0
Changes of Assumptions	92,717	(115,968)	120,426
Benefit Payments	(151,547)	(173,416)	(153,071)
Other Changes	0	0	0
Net Change	142,620	(731,226)	219,662
Total OPEB Liability - Beginning	2,645,484	3,376,710	3,157,048
Total OPEB Liability - Ending	**$ 2,788,104**	**$ 2,645,484**	**$ 3,376,710**
Covered-Employee Payroll	$ 8,587,152	$ 8,587,152	$ 8,621,059
Total OPEB Liability as a % of Covered-Employee Payroll	32.47%	30.81%	39.17%

[1]This information is shown for the last 10 years, if available.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

15. Identify the total pension expense under statement of accounting standards (SFAS 87) for the historic test year and the portion charged to operation and maintenance (O&M). Include an analysis showing the contribution to the pension plan and the amount deferred or expensed for each of the past 2 years and the historic test year. Also provide any estimates for the future year.

RESPONSE

The Water Fund is not subject to Accounting Standards SFAS 87. The Water Fund has not deferred pension expense in each of the past two years and the historic year. See below the pension plan expense for the historic test year and the prior two years.

2018 - $89,074
2019 - $123,512
2020 - $124,790

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

16. Provide an analysis of OPEBs showing the accrual amount under SFAS 106 and the pay-as-you-go expense.

RESPONSE

The Borough Water Fund is not subject to the requirements of SFAS 106. See attachment to Exhibit D III-14 for the Borough's actuarial study for OPEBs.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

17. Reconcile the historic and future test year SFAS No. 106 expense levels with the amount identified in the actuarial report.

RESPONSE

The Borough Water Fund is not subject to the requirements of SFAS No. 106.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

18. Identify the actual or projected amounts contributed to SFAS No. 106 funds for the historic and future test years. Identify the actual or projected dates and amounts of the contributions.

RESPONSE

The Borough is not subject to the requirements of SFAS No. 106.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

19. Explain the funding options or plans which are being used for SFAS No. 106 costs. Identify the portion of costs which are eligible for tax preferred funding.

RESPONSE

The Borough is not subject to the requirements of SFAS No. 106.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

20. State whether the company is studying or anticipating any changes to its postretirement benefits offered to employees as a result of SFAS No. 106 or for other reasons. If yes, provide the study and explain the anticipated change.

RESPONSE

The Borough is not subject to the requirements of SFAS No. 106.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

21. State whether the historic test year expenses reflect any accruals for postemployment benefits under SFAS 112. If yes, provide complete details including supporting documentation, assumptions, and funding mechanisms.

RESPONSE

The Borough Water Fund is not subject to the requirements of SFAS 112.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

22. Provide a copy of all incentive compensation and bonus plans and provide the level of related bonus payments included in the cost of service. Provide information for the preceding 2 years and any changes since the last rate case.

RESPONSE

The Borough Water Fund does not have incentive compensation and bonus plans.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

23. Provide the most recent insurance premiums for each type of insurance coverage, both employee benefit and those purchased for the company, reflected in the company's filing. If available, provide estimated premiums for the subsequent calendar year.

RESPONSE

Please refer to 'Exhibit D III-23 Attachment' for the bills for insurance coverage purchased from Weber Insurance by the Borough for 2020 and for the Bureau of Water share.

Insurance-Health for the Bureau of Water in 2020 was $854,777 and is projected to be $950,750 in 2021 based on the budgeted expense and $1,007,795 in 2022 based on historic increases experienced by the Borough. The Insurance-Health expense includes medical, dental, vision, life insurance, and benefits consulting fee costs. The December 2020 bills for The Standard (life insurance), Intergovernmental Insurance Cooperative (medical), Capital Blue Cross (vision), and Delta Dental are attached. The Borough also pays COBRA and employee benefit management from this account.

Weber INSURANCE

Phone: (717) 637-1247
Fax: (717) 632-4860
Email: info@weber-ins.com

Invoi # 7510	Page 1 of 1
Account Number	Date
HANOBOR-01	6/30/2020
BALANCE DUE ON	
8/1/2020	
AMOUNT PAID	Amount Due
	$49,626.00

124892

Hanover Borough
44 Frederick Street
Hanover, PA 17331

Commercial Package PolicyNumber: S 2209499 Effective: 1/1/2020 to 1/1/2021 CSR: Carol J Smith

Item #	Due Date	Trans	Description	Amount
109,722	8/1/2020	INST	Package 4th Installment	$43,376.00
109,726	8/1/2020	AFEE	4th Installment Commission Agreement	$6,250.00

Total Invoice Balance: **$49,626.00**

- 6250.00

43,376.00

DATE REC'D JUL - 2 2020
APPROVED no
DATE PAID 7/16/20
CHECK NO. 4103
ACCOUNT NO.

8207.55	01·410·3500·3520
1187.70	01·411·3500·3520
5350.80	01·420·3500·3520
700.00	01·427·3500·3520
78.50	01·454·3500·3520
6640.39	01·486·3500·3520
9169.50	06·448·396·304923
6800.33	08·496·3500·3520
186.75	09·444·3500·3520
1003.74	14·406·3500·3520
945.37	16·406·3500·3520
3105.37	17·456·3500·3520

Weber INSURANCE

Phone: (717) 637-1247
Fax: (717) 632-4860
Email: info@weber-ins.com

Invoice # 7510 | Page 1 of 1
Account Number: HANOBOR-01 | Date: 6/30/2020
BALANCE DUE ON: 8/1/2020
AMOUNT PAID: | Amount Due: $49,626.00

124893

Hanover Borough
44 Frederick Street
Hanover, PA 17331

Commercial Package | PolicyNumber: S 2209499 | Effective: 1/1/2020 to 1/1/2021 | CSR: Carol J Smith

Item #	Due Date	Trans	Description	Amount
109,722	8/1/2020	INST	Package 4th Installment	$43,376.00
109,726	8/1/2020	AFEE	4th Installment Commission Agreement	$6,250.00

Total Invoice Balance: **$49,626.00**

43,376.00
6250.00

JUL - 7 2020
7/16/20
4103

1508.24 01-410-1500-1630
741.97 01-411-1500-1630
1364.98 01-420-1500-1630
112.43 01-427-1500-1630
48.23 01-454-1500-1630
43.91 01-484-1500-1630
1380.60 06-448-396-304922
481.48 08-496-1500-1630
8.50 09-444-1500-1630
281.10 14-406-1500-1630
232.25 16-406-1500-1630
46.31 17-456-1500-1630

Weber INSURANCE

Phone: (717) 637-1247
Fax: (717) 632-4860
Email: info@weber-ins.com

Invoi # 7515	Page 1 of 1
Account Number	Date
HANOBOR-01	6/30/2020
BALANCE DUE ON	
8/1/2020	
AMOUNT PAID	Amount Due
	$49,128.00

124894

Hanover Borough
44 Frederick Street
Hanover, PA 17331

Worker's Comp PolicyNumber: WC 9028566 Effective: 1/1/2020 to 1/1/2021 CSR: Carol J Smith

Item #	Due Date	Trans	Description	Amount
109,733	8/1/2020	INST	Workers Comp 4th Installment	$48,245.00
109,737	8/1/2020	WCTX	Worker's Compensation Tax	$883.00

Total Invoice Balance: **$49,128.00**

DATE REC JUL - 2 2020
APPROVED JO
DATE PAID 7/16/20
CHECK NO 4103
ACCOUNT NO

11,855.50	01.410.1500.1630
5832.25	01.411.1500.1630
10,729.36	01.420.1500.1630
883.79	01.427.1500.1630
379.12	01.454.1500.1630
345.08	01.484.1500.1630
10,852.20	06.448.396.304922
3784.70	08-496.1500.1630
66.80	09.444.1500.1630
2209.61	14.406.1500.1630
1825.59	16-406.1500.1630
364.00	17.456.1500.1630

Weber INSURANCE

Phone: (717) 637-1247
Fax: (717) 632-4860
Email: info@weber-ins.com

Invoi # 8278	Page 1 of 1
Account Number	Date
HANOBOR-01	6/15/2020
BALANCE DUE ON	
6/12/2020	
AMOUNT PAID	Amount Due
	($444.26)

124895

Hanover Borough
44 Frederick Street
Hanover, PA 17331

Commercial Package PolicyNumber: S 2209499 Effective: 1/1/2020 to 1/1/2021 CSR: Carol J Smith

Item #	Due Date	Trans	Description	Amount
120,831	6/12/2020	CFEE	Selective COVID-19 Credit Program (May)	($444.26)

Total Invoice Balance: **($444.26)**

DATE REC JUL - 2 2020
APPROVED
DATE PAID 7/16/20
CHECK NO 4103
ACCOUNT NO -35.08 01-410-3500-3520
-30.68 01-411-3500-3520
-215.13 01-420-3500-3520
-16.02 01-427-3500-3520
-77.24 06-448-396-304923
-29.93 08-496-3500-3520
-21.55 14-406-3500-3520
-18.53 16-406-3500-3520

THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER, PA 17331

127414

FUND: ALL PURPOSE

DATE 11/16/2020

TO: STANDARD INSURANCE COMPANY
P. O. BOX 5676
PORTLAND, OR 97228-5676

Policy 00 110413

FOR: Life Insurance premium for December 2020 **$2,247.45**

ACCT.#		
	01.410.1500.1580	$340.59
	01.411.1500.1580	$225.05
	01.420.1500.1580	$356.84
	01.427.1500.1580	$26.00
	01.486.1500.1580	$83.38
	01.487.1500.1580	$326.58
	06.448.396.304924	$461.93
	08.496.1500.1580	$145.11
	14.406.1500.1580	$94.46
	16.406.1500.1580	$80.67
	17.456.1500.1580	$106.84

Date Rec'd
Approved By ND
Date Paid 12/4/20
Check No. 4998

TheStandard®
Positively different.

THE BOROUGH OF HANOVER
ATTN SANDRA MALLETTE
44 FREDERICK ST
HANOVER PA 17331

00 110413 0001

Payment Coupon for Premium Submittal Only

Please send any correspondence or billing changes separately - not with your premium payment.

To report any changes to employee or policyholder information, please submit a Billing Change Form to Standard Insurance Company as follows. You may:

1) Fax The Standard at: (800)378-2403 , or
2) Mail your completed form to us in one of the supply envelopes provided to you:
THE STANDARD,PSR3A/NE,920 SW 6TH AVENUE,PORTLAND,OR,97204

Please detach and send lower portion with your check, made payable to **The Standard,** in the window envelope provided (no correspondence here please). Please fax or submit any billing changes or other correspondence to us separately as indicated above.

00 110413 0001 THE BOROUGH OF HANOVER

TOTAL THIS BILL	2484.87	DATE PRINTED:	NOV. 16, 2020
OUTSTANDING BAL AS OF 11/16/20	.00	PREMIUM DUE DATE:	DEC. 01, 2020
PLEASE PAY THIS AMOUNT	2484.87	ENTER AMOUNT PAID:	

STANDARD INSURANCE COMPANY RD
PO BOX 5676
PORTLAND OR 97228-5676

RAS/PHL

1100110413000010000000000021201201000024848700002484870000000000000000000000004

BILLING STATEMENT

PLEASE SEND YOUR PAYMENT COUPON AND PAYMENT TO
STANDARD INSURANCE COMPANY RD
PO BOX 5676
PORTLAND OR 97228-5676

NAME & ADDRESS
THE BOROUGH OF HANOVER
ATTN SANDRA MALLETTE
44 FREDERICK ST
HANOVER PA 17331

POLICY NUMBER DIVSN
00 110413 0001

DATE PRINTED
NOV. 16, 2020

PREMIUM DUE DATE
DEC. 01, 2020

PLEASE REVIEW YOUR ACCOUNT AND INCLUDE NEW ENROLLMENTS, TERMS AND UPDATES ON YOUR NEXT BILLING STATEMENT. UPDATES CAN BE MADE IN ADMINEASE. ADMINEASE ALSO OFFERS ONLINE BILL PAY AND PAPERLESS BILLING. LOG IN TO ADMINEASE: HTTPS://LOGIN.STANDARD.COM/

LINE	MEMBER ID	NAME	BILL CAT	EFFECTIVE DATE	BLIFE PREM	BLIFE VOL	AD&D PREM	AD&D VOL	ALIFE PREM	ALIFE VOL	PREMIUM DUE
1	*****7111		0100	06/01/15	11.50	50,000	1.50	50,000			13.00
2	*****2294		0100	06/01/15	11.50	50,000	1.50	50,000			13.00
3	*****2742		0100	06/01/15	11.50	50,000	1.50	50,000			13.00
4	*****9059		0100	06/01/15	11.50	50,000	1.50	50,000	11.40	15,000	24.40
5	*****7083		0100	06/12/15	11.50	50,000	1.50	50,000			13.00
6	*****2622		0100	06/01/15	11.50	50,000	1.50	50,000	18.15	15,000	31.15
7	*****6434		0100	06/01/15	11.50	50,000	1.50	50,000	2.40	15,000	15.40
8	*****0873		0100	06/01/15	11.50	50,000	1.50	50,000	6.60	15,000	19.50
9	*****6289		0100	12/17/17	11.50	50,000	1.50	50,000			13.00
10	*****7476		0100	06/01/15	11.50	50,000	1.50	50,000	3.90	15,000	16.90
11	*****7307		0100	12/04/17	11.50	50,000	1.50	50,000			13.00
12	*****1430		0100	06/01/15	11.50	50,000	1.50	50,000			13.00
13	*****6794		0100	06/01/15	11.50	50,000	1.50	50,000	3.90	15,000	16.90
14	*****3718		0100	06/01/15	11.50	50,000	1.50	50,000			13.00
15	*****6667		0100	06/01/15	11.50	50,000	1.50	50,000			13.00
16	*****2543		0100	06/01/15	11.50	50,000	1.50	50,000	6.60	15,000	19.50
17	*****9249		0100	06/01/15	11.50	50,000	1.50	50,000			13.00
18								SUBTOTAL FOR BILLING CATEGORY 0100			273.95
19	*****7795		0200	09/16/18	11.50	50,000	1.50	50,000	.75	7,500	13.75
20	*****6213		0200	06/01/15	11.50	50,000	1.50	50,000	.83	7,500	13.83
21	*****3211		0200	06/01/15	11.50	50,000	1.50	50,000	1.20	7,500	14.20
22	*****1542		0200	06/01/15	11.50	50,000	1.50	50,000	3.30	7,500	16.30
23	*****0965		0200	06/01/15	11.50	50,000	1.50	50,000	3.30	7,500	16.30
24	*****9468		0200	06/01/15	11.50	50,000	1.50	50,000	.80	5,000	13.80
25	*****5040		0200	06/01/15	11.50	50,000	1.50	50,000	5.70	7,500	18.70
26	*****0441		0200	09/09/18	11.50	50,000	1.50	50,000	.83	7,500	13.83
27	*****3793		0200	06/01/15	11.50	50,000	1.50	50,000	1.95	7,500	14.95
28	*****4074		0200	09/29/19	11.50	50,000	1.50	50,000	.50	5,000	13.50
29	*****5974		0200	06/01/15	11.50	50,000	1.50	50,000	.83	7,500	13.83
30	*****3073		0200	06/01/15	11.50	50,000	1.50	50,000	3.80	5,000	16.80
31	*****8052		0200	04/07/19	11.50	50,000	1.50	50,000	.75	7,500	13.75
32	*****0828		0200	06/01/15	11.50	50,000	1.50	50,000	1.20	7,500	14.20
33	*****6187		0200	06/01/15	11.50	50,000	1.50	50,000			13.00
34	*****8924		0200	06/01/15	11.50	50,000	1.50	50,000	1.20	7,500	14.20
35	*****3851		0200	06/01/15	11.50	50,000	1.50	50,000	3.30	7,500	16.30
36	*****5191		0200	06/01/15	11.50	50,000	1.50	50,000			13.00
37	*****5287		0200	06/01/15	11.50	50,000	1.50	50,000			13.00

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Positively different.

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BILLING STATEMENT

PLEASE SEND YOUR PAYMENT COUPON AND PAYMENT TO
STANDARD INSURANCE COMPANY RD
PO BOX 5676
PORTLAND OR 97228-5676

NAME & ADDRESS
(CONT) THE BOROUGH OF HANOVER
ATTN SANDRA MALLETTE
44 FREDERICK ST
HANOVER PA 17331

POLICY NUMBER 00 110413 DIVSN 0001

DATE PRINTED NOV. 16, 2020

PREMIUM DUE DATE DEC. 01, 2020

LINE	MEMBER ID	NAME	BILL CAT	EFFECTIVE DATE	BLIFE PREM	BLIFE VOL	AD&D PREM	AD&D VOL	ALIFE PREM	ALIFE VOL	PREMIUM DUE
38	*****0911		0200	06/01/16	11.50	50,000	1.50	50,000			13.00
39	*****1796		0200	04/07/19	11.50	50,000	1.50	50,000			13.00
40	*****2551		0200	06/01/16	11.50	50,000	1.50	50,000	1.90	2,500	14.90
41	*****6155		0200	06/01/16	11.50	50,000	1.50	50,000			13.00
42	*****4668		0200	06/01/16	11.50	50,000	1.50	50,000	.83	7,500	13.83
43								SUBTOTAL FOR BILLING CATEGORY 0200			344.97
44	*****3647		0300	06/01/16	11.50	50,000	1.50	50,000	1.20	7,500	14.20
45	*****1859		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
46	*****9813		0300	07/22/18	11.50	50,000	1.50	50,000	.83	7,500	13.83
47	*****8870		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
48	*****9821		0300	06/01/16	11.50	50,000	1.50	50,000	.83	7,500	13.83
49	*****7842		0300	06/01/16	11.50	50,000	1.50	50,000	.40	2,500	13.40
50	*****8991		0300	11/03/19	11.50	50,000	1.50	50,000	.50	5,000	13.50
51	*****6836		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
52	*****4600		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
53	*****1526		0300	06/01/16	11.50	50,000	1.50	50,000	9.08	7,500	22.08
54	*****7242		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
55	*****7988		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
56	*****4540		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
57	*****2485		0300	06/01/16	11.50	50,000	1.50	50,000	.55	5,000	13.55
58	*****6006		0300	04/14/19	11.50	50,000	1.50	50,000	.75	7,500	13.75
59	*****9392		0300	06/01/16	11.50	50,000	1.50	50,000	.75	7,500	13.75
60	*****1082		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
61	*****2924		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
62	*****6674		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
63	*****6897		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
64	*****4797		0300	06/01/16	11.50	50,000	1.50	50,000	1.95	7,500	14.95
65	*****2974		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
66	*****1915		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
67	*****4727		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
68	*****6748		0300	04/21/19	11.50	50,000	1.50	50,000	.75	7,500	13.75
69	*****1595		0300	06/01/16	11.50	50,000	1.50	50,000			13.00
70								SUBTOTAL FOR BILLING CATEGORY 0300			355.59
71	*****9959		0400	05/05/19	11.50	50,000	1.50	50,000	.75	7,500	13.75
72	*****8125		0400	06/01/16	11.50	50,000	1.50	50,000			13.00
73	*****3831		0400	06/01/16	11.50	50,000	1.50	50,000			13.00
74	*****3115		0400	04/09/17	11.50	50,000	1.50	50,000			13.00
75	*****1605		0400	06/01/16	11.50	50,000	1.50	50,000	1.30	5,000	14.30
76	*****1052		0400	06/01/16	11.50	50,000	1.50	50,000			13.00
77	*****9458		0400	11/30/17	11.50	50,000	1.50	50,000	1.95	7,500	14.95
78	*****8371		0400	05/01/16	5.75	25,000	.75	25,000			6.50
79	*****5551		0400	06/01/16	11.50	50,000	1.50	50,000			13.00

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POLICYOWNER COPY

BILLING STATEMENT

PLEASE SEND YOUR PAYMENT COUPON AND PAYMENT TO
STANDARD INSURANCE COMPANY RD
PO BOX 5676
PORTLAND OR 97228-5676

NAME & ADDRESS
(CONT) THE BOROUGH OF HANOVER
ATTN SANDRA MALLETTE
44 FREDERICK ST
HANOVER PA 17331

POLICY NUMBER DIVSN
00 110413 0001

DATE PRINTED
NOV. 16, 2020

PREMIUM DUE DATE
DEC. 01, 2020

LINE	MEMBER ID	NAME	BILL CAT	EFFECTIVE DATE	BLIFE PREM	BLIFE VOL	AD&D PREM	AD&D VOL	ALIFE PREM	ALIFE VOL	PREMIUM DUE
80	*****5269		0400	06/01/16	11.50	50,000	1.50	50,000			13.00
81	*****2232		0400	06/01/16	11.50	50,000	1.50	50,000			13.00
82	*****2590		0400	10/27/19	9.81	42,640	1.28	42,640			11.09
83	*****5090		0400	06/01/16	10.79	46,930	1.41	46,930	3.30	7,500	15.50
84	*****6264		0400	09/01/19	11.50	50,000	1.50	50,000	2.20	5,000	15.20
85	*****9241		0400	06/01/16	11.50	50,000	1.50	50,000	10.50	7,500	23.50
86	*****9358		0400	06/01/16	11.50	50,000	1.50	50,000			13.00
87	*****3915		0400	06/01/16	11.50	50,000	1.50	50,000	9.08	7,500	22.08
88								SUBTOTAL FOR BILLING CATEGORY 0400			240.87
89	*****7529		0500	04/05/20	11.50	50,000	1.50	50,000	.75	7,500	13.75
90	*****1449		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
91	*****4884		0500	06/01/16	11.50	50,000	1.50	50,000	.55	5,000	13.55
92	*****5320		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
93	*****3032		0500	06/01/16	11.50	50,000	1.50	50,000	1.20	7,500	14.20
94	*****6847		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
95	*****8960		0500	12/31/18	11.50	50,000	1.50	50,000	.75	7,500	13.75
96	*****7310		0500	09/27/19	11.50	50,000	1.50	50,000			13.00
97	*****4244		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
98	*****1698		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
99	*****4711		0500	10/15/17	11.50	50,000	1.50	50,000	.50	5,000	13.50
100	*****4057		0500	07/14/19	11.50	50,000	1.50	50,000	1.20	7,500	14.20
101	*****2877		0500	06/01/16	11.50	50,000	1.50	50,000	.40	2,500	13.40
102	*****8137		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
103	*****7373		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
104	*****7780		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
105	*****8787		0500	06/14/20	11.50	50,000	1.50	50,000	.83	7,500	13.33
106	*****9233		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
107	*****7286		0500	06/01/16	11.50	50,000	1.50	50,000	5.70	7,500	18.70
108	*****4111		0500	06/01/16	11.50	50,000	1.50	50,000	1.20	7,500	14.20
109	*****4189		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
110	*****4345		0500	06/01/16	11.50	50,000	1.50	50,000	.55	5,000	13.55
111	*****2220		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
112	*****6412		0500	06/30/19	11.50	50,000	1.50	50,000			13.00
113	*****8107		0500	09/01/19	11.50	50,000	1.50	50,000	.83	7,500	13.83
114	*****5074		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
115	*****4969		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
116	*****8340		0500	06/01/16	11.50	50,000	1.50	50,000	9.08	7,500	22.08
117	*****3109		0500	10/13/18	11.50	50,000	1.50	50,000	.75	7,500	13.75
118	*****9245		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
119	*****3208		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
120	*****7062		0500	06/01/16	11.50	50,000	1.50	50,000	.83	7,500	13.83
121	*****2482		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
122	*****0821		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
123	*****8662		0500	06/01/16	11.50	50,000	1.50	50,000			13.00

TheStandard
Positively different.

POLICYOWNER COPY

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HANOVER PA 17331

POLICY NUMBER 00 110413 DIVSN 0001

DATE PRINTED NOV. 16, 2020

PREMIUM DUE DATE DEC. 01, 2020

LINE	MEMBER ID	NAME	BILL CAT	EFFECTIVE DATE	BLIFE PREM	BLIFE VOL	AD&D PREM	AD&D VOL	ALIFE PREM	ALIFE VOL	PREMIUM DUE
124	*****9772		0500	01/13/19	11.50	50,000	1.50	50,000	.75	7,500	13.75
125	*****6359		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
126	*****7704		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
127	*****6704		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
128	*****0126		0500	06/01/16	11.50	50,000	1.50	50,000			13.00
129	*****4847		0500	10/20/19	11.50	50,000	1.50	50,000	.75	7,500	13.75
130	*****7768		0500	10/15/17	11.50	50,000	1.50	50,000	.50	5,000	13.50
131	*****1139		0500	06/01/16	11.50	50,000	1.50	50,000	10.50	7,500	23.50
132								SUBTOTAL FOR BILLING CATEGORY 0500			596.62
133	*****3843		0600	11/16/17	11.50	50,000	1.50	50,000	3.30	7,500	16.30
134	*****4685		0600	06/01/16	11.50	50,000	1.50	50,000	9.08	7,500	22.08
135	*****4777		0600	06/01/16	11.50	50,000	1.50	50,000	7.00	5,000	20.00
136	*****3918		0600	04/01/20	11.50	50,000	1.50	50,000	18.75	7,500	31.75
137	*****5593		0600	06/01/16	11.50	50,000	1.50	50,000	9.08	7,500	22.08
138	*****5511		0600	06/01/16	11.50	50,000	1.50	50,000	10.50	7,500	23.50
139	*****1472		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
140	*****6524		0600	06/01/16	11.50	50,000	1.50	50,000	9.08	7,500	22.08
141	*****2308		0600	05/04/20	11.50	50,000	1.50	50,000			13.00
142	*****7789		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
143	*****5354		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
144	*****6963		0600	06/01/16	10.52	45,760	1.37	45,760	.50	5,000	12.39
145	*****7636		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
146	*****9353		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
147	*****3873		0600	06/04/19	11.50	50,000	1.50	50,000	9.08	7,500	22.08
148	*****7296		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
149	*****5965		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
150	*****7017		0600	06/01/16	11.50	50,000	1.50	50,000			13.00
151	*****2236		0600	08/10/20	11.50	50,000	1.50	50,000	1.95	7,500	14.95
152	*****6475		0600	06/01/16	11.50	50,000	1.50	50,000	9.08	7,500	22.08
153								SUBTOTAL FOR BILLING CATEGORY 0600			346.29
154	*****2010		0700	06/01/16	63.90	7,500					63.90
155	*****1385		0700	06/01/16	18.75	7,500					18.75
156	*****0798		0700	06/01/16	10.50	7,500					10.50
157	*****6250		0700	06/01/16	6.25	2,500					6.25
158	*****2377		0700	06/01/16	63.90	7,500					63.90
159	*****8421		0700	06/01/16	5.70	7,500					5.70
160	*****6525		0700	06/01/16	157.58	7,500					157.58
161								SUBTOTAL FOR BILLING CATEGORY 0700			326.58

BILLING STATEMENT

PLEASE SEND YOUR PAYMENT COUPON AND PAYMENT TO

STANDARD INSURANCE COMPANY RD
PO BOX 5676
PORTLAND OR 97228-5676

NAME & ADDRESS

(CONT) THE BOROUGH OF HANOVER
ATTN SANDRA MALLETTE
44 FREDERICK ST
HANOVER PA 17331

POLICY NUMBER DIVSN
00 110413 0001

DATE PRINTED
NOV. 16, 2020

PREMIUM DUE DATE
DEC. 01, 2020

- - - - - DIVISION TOTALS BY COVERAGE - - - - -

		MEMBER			DEPENDENT	
	CVRG	LIVES	VOLUME	PREMIUM	LIVES	PREMIUM
162	BLIFE	154	7357830	2007.95	0	.00
163	AD&D	147	7310330	219.31	0	.00
164	ALIFE	73	552500	257.61	0	.00
165						
166						

BILL SUMMARY TOTALS

TOTAL PREMIUMS	2484.87
TOTAL MEMBER ADJUSTMENTS	.00
TOTAL THIS BILL	2484.87
OUTSTANDING BAL AS OF 11/16/20	.00
PLEASE PAY THIS AMOUNT	2484.87

167

CHANGES: SEE INSTRUCTIONS ON BILLING CHANGE FORM. ADJUSTMENTS WILL APPEAR ON SUBSEQUENT BILL.
PLEASE SEND PAYMENT AND COUPON FOR AMOUNT BILLED.
BILLING QUESTIONS? Please call (800)348-3228
POLICYOWNER COPY

PAGE 5

TheStandard

REFERENCE	DATE	AMOUNT	
20201106023	11/06/20	19.31	VCH 126970; P/R LIFE 11/06/20
20201113023	11/13/20	19.31	VCH 127135; P/R LIFE 11/13/20
20201113023	11/13/20	79.97	VCH 127144; P/R LIFE 11/13/20
20201120023	11/20/20	19.43	VCH 127308; P/R LIFE 11/20/20
20201127023	11/27/20	19.43	VCH 127360; P/R LIFE 11/27/20
20201127023	11/27/20	79.97	VCH 127369; P/R LIFE 11/27/20

VENDOR NO.	CHECK NO.	CHECK DATE	TOTAL AMOUNT PAID
0000004795	00002815	11/27/20	********237.42

WARNING – THIS CHECK IS PROTECTED BY SPECIAL SECURITY GUARD PROGRAM™ FEATURES

THE BOROUGH OF HANOVER
PAYROLL ACCOUNT
44 Frederick St Hanover, PA 17331
717-637-3877

M & T BANK 60-295-313

CHECK NUMBER 00002815

CHECK DATE 11/27/2020

NOT VALID AFTER 90 DAYS

*TWO HUNDRED THIRTY-SEVEN AND 42/100 DOLLARS**********

CHECK AMOUNT $********237.42

PAY TO THE ORDER OF
STANDARD INSURANCE COMPANY
P. O. BOX 5676
PORTLAND, OR 97228-5676

HEAT SENSITIVE RUB AREA TO VERIFY

COUNCIL PRESIDENT

THIS CHECK CONTAINS MULTIPLE SECURITY FEATURES – SEE BACK FOR DETAILS

⑈002815⑈ ⑆031302955⑆ 9854496776⑈

BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331

FUND: ALL PURPOSE FUND

DATE 11-16-20
Invoice # 44108-0

TO: Intergovernmental Insurance Cooperative
P. O. Box 5406
Lancaster, PA 17606-5406

#127344

FOR: Medical Insurance Premium for December 2020 $326,850.68

ACCT.#		
	01.410.1500.1560	$57,140.01
	01.411.1500.1560	$39,115.83
	01.420.1500.1560	$57,009.75
	01.427.1500.1560	$4,927.22
	01.486.1500.1560	$11,612.78
	01.487.1500.1560	$10,029.49
	06.448.396.304921	$75,403.98
	06.448.396.304927	$2,161.68
	08.496.1500.1560	$24,055.62
	14.406.1500.1560	$15,255.68
	16.406.1500.1560	$13,900.58
	17.456.1500.1560	$16,238.06

Date Rec'd
Approved By ND
Date Paid 11-24-20
Check No. 49716

Intergovernmental Insurance Cooperative

The Borough of Hanover
1200

Coverage Dates:	01-Dec-2020 to 31-Dec-2020
Invoice ID:	44108-0
Invoice Created Date:	11/16/20
Invoice Due Date:	12/01/20
Open Balance:	$0.00
Invoice Amount:	$326,850.68
Surplus Credit:	$0.00
Amount Due:	**$326,850.68**

		Medical				Total
	Month	Admin	Stop Loss	Claim Fund	Total	
Medical						
02563365	Dec 2020	$6,005.10	$29,254.66	$122,157.52	$157,417.28	$157,417.28
02563367	Dec 2020	$568.05	$1,630.01	$6,750.59	$8,948.65	$8,948.65
02563368	Dec 2020	$1,947.60	$9,974.40	$41,673.56	$53,595.56	$53,595.56
02563370	Dec 2020	$81.15	$195.05	$804.64	$1,080.84	$1,080.84
02563371	Dec 2020	$2,353.35	$12,008.29	$50,169.20	$64,530.84	$64,530.84
02563373	Dec 2020	$162.30	$390.10	$1,609.28	$2,161.68	$2,161.68
02565167	Dec 2020	$1,379.55	$7,285.75	$30,450.53	$39,115.83	$39,115.83
Sub-Total		$12,497.10	$60,738.26	$253,615.32	**$326,850.68**	**$326,850.68**
INVOICE GRAND TOTAL		$12,497.10	$60,738.26	$253,615.32	$326,850.68	

Coverage Dates:	01-Dec-2020 to 31-Dec-2020
Invoice ID:	44108-0
Invoice Created Date:	11/16/20
Invoice Due Date:	12/01/20
Open Balance:	$0.00
Invoice Amount:	$326,850.68
Surplus Credit:	$0.00
Amount Due:	**$326,850.68**

The Borough of Ha
200

Remittance Info

Electronic Payment

Intergovernmental Insurance Cooperative
Jersey Shore State Bank
Williamsport, PA
Account #1622803
Wire ABA #031306993

Check:

Payable to: Intergovernmental Insurance Cooperative
PO Box 5406
Lancaster, PA 17606-5406

you have questions about this invoice, please contact Lori Murlin at 717-723-4600 x202

Med Group Number	Combined Name	Med Cov Code	Cov Begin Date	Cov End Date	Admin Fee	Admin anagement Fe	Admin CC3 Fee	Admin Broker Fee	Stop Loss ecific	Stop Loss Lo'egating	Stop Loss Stop ting	Stop Loss Specific S	Claim Fund	Claim Fund	PEPM Total	Contract Count
02563365		ECH	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ECH	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		E1D	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ECH	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		E1D	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82		6	75.23	804.64		1080.84	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1
02563365		ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16		6	180.55	1922.75		2463.61	1

02563365	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563365	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563365	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
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02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
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02563365	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	E1D	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563365	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563365	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563367	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563367	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563367	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563367	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563367	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563368	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1

02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	ECH	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
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02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563368	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563370	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	EID	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02563371	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1

02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563371	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02563373	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02565167	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02565167	IND	12/1/2020	12/31/2020	21.36	39.79	0	20	113.82	6	75.23	804.64	1080.84	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	ESP	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1
02565167	FAM	12/1/2020	12/31/2020	21.36	39.79	0	20	273.16	6	180.55	1922.75	2463.61	1

THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER, PA 17331

FUND: ALL PURPOSE FUND DATE 11/10/2020

TO: CAPITAL BLUE CROSS
PAYMENT PROCESSING
P. O. BOX 371482
PITTSBURGH, PA 15250-7482

Invoice # 203210034886

#127345

FOR: VISION INSURANCE PREMIUM FOR DECEMBER 2020 $1,963.78

ACCT.#			
	#1	01.410.1500.1560	$300.48
	#2	01.411.1500.1560	$194.94
	#3	01.420.1500.1560	$402.55
	#4	01.427.1500.1560	$33.04
	#5	01.486.1500.1560	$79.05
	#6	01.487.1500.1560	$85.54
	#7	06.448.396.304921	$392.57
	#8	06.448.396.304927	$9.72
	#9	08.496.1500.1560	$181.09
	#10	14.406.1500.1560	$99.71
	#11	16.406.1500.1560	$91.74
	#12	17.456.1500.1560	$93.35

Date Rec'd 11-26-20
Approved By ND
Date Paid 11-24-20
Check No. 49626

Capital BLUE

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PlusBilling® Member Statement **Date: 11/16/2020**

Group/Subgroup ID:	005041000000	A2CF	**Current Enrollment:**	$1,963.78
Invoice Number:	203210034886		**Retroactive Adjustment:**	$0.00
Payment Due Date:	12/01/2020		**Discretionary Fees:**	$0.00
			Adjustment:	$0.00
			Past Due Premium:	$0.00
THE BOROUGH OF HANOVER 44 FREDERICK ST HANOVER, PA 17331-3501			**Total Premium Due:**	$1,963.78

This is your monthly billing statement from Capital BlueCross. **Please use this statement to verify your membership**, including confirmation of enrollment changes processed since your last invoice. If you have any specific questions about your group payment, contact the Account Administration Department at Capital BlueCross. All other questions should be directed to your group services area via the phone number provided to you, which is also available in your Group Administrator Manual. Enrollment changes are accepted on a daily basis allowing greater flexibility in maintaining enrollment within your group. Do not send enrollment changes on these forms. Please provide any change of information on the appropriate application or change form and send it to us through your normal channels. Premium payments are due on or before the due date to ensure prompt claims service.

PLEASE PAY THE AMOUNT LISTED ABOVE UNDER "TOTAL PREMIUM DUE." ADJUSTMENTS FOR ACTIVITY NOT REPORTED ON THIS STATEMENT WILL BE REFLECTED ON YOUR NEXT BILLING STATEMENT.

NOV 19 2020

...E REC... ...UP CHECK IT OUT, MAKE CHECK PAYABLE TO CAPITAL BLUE CROSS AND ...ROUP ID ON YOUR CHECK. TO ENSURE PROPER CREDIT, DETACH THE BOTTOM ...IT WITH YOUR PAYMENT IN THE ENCLOSED ENVELOPE TO:

APPROVED_____

DATE PAID_____

CHECK NO_____

ACCOUNT NO_____

PAYMENT PROCESSING
PO BOX 371482
PITTSBURGH, PA 15250-7482

PLEASE REMOVE THE BOTTOM PORTION OF THIS STATEMENT BY CAREFULLY TEARING ALONG THE PERFORATION.

DO NOT FOLD OR STAPLE

Group/ Subgroup ID	Coverage Period	Payment Due Date	Amount Due	Amount Paid
005041000000	12/01/2020 - 12/31/2020	12/01/2020	$1,963.78	1963.78

Invoice No: **203210034886** A2CF **196378**

RETURN THIS PORTION WITH YOUR PAYMENT TO:

8-9
THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER, PA 17331-3501

PAYMENT PROCESSING
PO BOX 371482
PITTSBURGH, PA 15250-7482

1600504100000002000000000001201200202100320000196378A0

Capital BLUE

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Group/Subgroup ID: 005041000000 Invoice Number: 203210034886 Date: 11/16/2020

Coverage Period: 12/01/2020 - 12/31/2020

Ind	Class ID	Subscriber ID	Subscriber Name	Employee ID	Product ID & FI	Covered Members	Eff Date	Amount
**** CURRENT EMPLOYEE ENROLLMENTS ****								
	FIRE	800671162			BCV0029Y A	4		$13.26
	FIRE	800671176			BCV0029Y B	2		$8.70
	FIRE	801370506		114903	BCV0029Y A	4		$13.26
	FIRE	800671140			BCV0029Y A	5		$13.26
	FIRE	801898288		114908	BCV0029Y A	4		$13.26
	FIRE	800671200			BCV0029Y A	3		$13.26
	FIRE	801135046			BCV0029Y A	5		$13.26
	FIRE	800953986			BCV0029Y A	4		$13.26
	FIRE	802166937		114909	BCV0029Y D	2		$8.70
	FIRE	801732404		114907	BCV0029Y A	5		$13.26
	FIRE	802127131		112517	BCV0029Y C	1		$4.86
	FIRE	801557144		114905	BCV0029Y C	1		$4.86
	FIRE	801146828			BCV0029Y A	5		$13.26
	FIRE	800951526			BCV0029Y A	3		$13.26
	FIRE	800671195			BCV0029Y B	2		$8.70
	FIRE	801712373		114906	BCV0029Y A	3		$13.26
	FIRE	801370519		114902	BCV0029Y A	3		$13.26
	FIRR	801104125			BCV0029Y C	1		$4.86
	NONR	800671064			BCV0029X B	2		$13.09
	NONR	802319651			BCV0029X C	1		$7.31
	NONR	802373845			BCV0029X C	1		$7.31
	NONR	800670575			BCV0029X B	2		$13.09
	NONR	800670696			BCV0029X B	2		$13.09
	NONR	802337599			BCV0029X C	1		$7.31
	NONR	800670537			BCV0029X C	1		$7.31
	NONR	800670521			BCV0029X B	2		$13.09
	NONR	800670489			BCV0029X B	2		$13.09
	NONU	802127145		112717	BCV0029X D	3		$19.95
	NONU	802348540		106317	BCV0029X C	1		$7.31
	NONU	802461738		101120	BCV0029X C	1		$7.31
	NONU	800670551			BCV0029X A	3		$19.95
	NONU	801014631			BCV0029X B	2		$13.09
	NONU	800670738			BCV0029X B	2		$13.09
	NONU	800670494			BCV0029X A	4		$19.95
	NONU	800670815			BCV0029X A	3		$19.95
	NONU	800670711			BCV0029X D	3		$19.95
	NONU	802127162		112117	BCV0029X C	1		$7.31
	NONU	802318473		103618	BCV0029X C	1		$7.31
	NONU	802389114		102319	BCV0029X B	2		$13.09
	NONU	801308220			BCV0029X B	2		$13.09
	NONU	800917583			BCV0029X C	1		$7.31
	NONU	800670701			BCV0029X D	2		$13.09
	NONU	800670803			BCV0029X C	1		$7.31
	NONU	801438643		107216	BCV0029X B	2		$13.09
	NONU	801452475		109512	BCV0029X C	1		$7.31
	NONU	802110543		101217	BCV0029X C	1		$7.31
	NONU	801729812		110415	BCV0029X A	5		$19.95

Capital BLUE

Group/Subgroup ID: 005041000000 Invoice Number: 203210034886 Date: 11/16/2020

Coverage Period: 12/01/2020 - 12/31/2020

Ind	Class ID	Subscriber ID	Subscriber Name	Employee ID	Product ID & FI	Covered Members	Eff Date	Amount
			**** CURRENT EMPLOYEE ENROLLMENTS ****					
	NONU	802371066		105819	BCV0029X B	2		$13.09
	NONU	800670632			BCV0029X B	2		$13.09
	NONU	800670609			BCV0029X B	2		$13.09
	NONU	800971266			BCV0029X D	3		$19.95
	NONU	800671324			BCV0029X A	3		$19.95
	NONU	800670801			BCV0029X A	4		$19.95
	NONU	800786432			BCV0029X B	2		$13.09
	NONU	802472630		104320	BCV0029X D	2		$13.09
	NONU	802127150		119417	BCV0029X A	5		$19.95
	NONU	800670625			BCV0029X B	2		$13.09
	NONU	801071786			BCV0029X A	3		$19.95
	NONU	801024609			BCV0029X B	2		$13.09
	NONU	800671325			BCV0029X A	4		$19.95
	NONU	801376441		100511	BCV0029X A	5		$19.95
	NONU	801739404		105015	BCV0029X A	4		$19.95
	NONU	800670660			BCV0029X B	2		$13.09
	NONU	802366084		105719	BCV0029X C	1		$7.31
	NONU	800670620			BCV0029X A	3		$19.95
	NONU	802383738	T	104419	BCV0029X C	1		$7.31
	NONU	802467584		111820	BCV0029X A	3		$19.95
	NONU	801809635		118915	BCV0029X A	5		$19.95
	NONU	800670485			BCV0029X B	2		$13.09
	NONU	800670512			BCV0029X B	2		$13.09
	NONU	801607073		110514	BCV0029X A	4		$19.95
	NONU	801745028		105315	BCV0029X C	1		$7.31
	NONU	800670503			BCV0029X B	2		$13.09
	NONU	800670730			BCV0029X B	2		$13.09
	NONU	800670811			BCV0029X B	2		$13.09
	NONU	802254996		102518	BCV0029X C	1		$7.31
	NONU	800670560			BCV0029X B	2		$13.09
	NONU	802400491		105919	BCV0029X B	2		$13.09
	NONU	802351616		111919	BCV0029X C	1		$7.31
	NONU	800670785			BCV0029X B	2		$13.09
	NONU	800670509			BCV0029X A	3		$19.95
	NONU	800670600			BCV0029X B	2		$13.09
	NONU	800670895			BCV0029X C	1		$7.31
	NONU	801011216			BCV0029X A	4		$19.95
	NONU	801443139		104712	BCV0029X A	4		$19.95
	NONU	800670546			BCV0029X B	2		$13.09
	NONU	800670718			BCV0029X B	2		$13.09
	NONU	801704057		119214	BCV0029X A	4		$19.95
	NONU	802318477		105318	BCV0029X C	1		$7.31
	NONU	802483781		110620	BCV0029X C	1		$7.31
	NONU	802382513		109019	BCV0029X A	4		$19.95
	NONU	800670777			BCV0029X B	2		$13.09
	NONU	800860952			BCV0029X A	4		$19.95
	NONU	801341777		118516	BCV0029X C	1		$7.31

Capital BLUE

Group/Subgroup ID: 005041000000 Invoice Number: 203210034886 Date: 11/16/2020

Coverage Period: 12/01/2020 - 12/31/2020

Ind	Class ID	Subscriber ID	Subscriber Name	Employee ID	Product ID & FI	Covered Members	Eff Date	Amount
**** CURRENT EMPLOYEE ENROLLMENTS ****								
	NONU	800670630			BCV0029X D	2		$13.09
	NONU	800670735			BCV0029X A	4		$19.95
	NONU	801399912		118811	BCV0029X B	2		$13.09
	NONU	800670880			BCV0029X A	4		$19.95
	NONU	800670614			BCV0029X C	1		$7.31
	NONU	802395720		100419	BCV0029X C	1		$7.31
	NONU	802110542		101017	BCV0029X A	4		$19.95
	NONU	800670866			BCV0029X A	3		$19.95
	POLI	802251027		117715	BCV0029Y C	1		$4.86
	POLI	801224768		117706	BCV0029Y B	2		$8.70
	POLI	801043011			BCV0029Y A	4		$13.26
	POLI	800670936			BCV0029Y A	4		$13.26
	POLI	800671319			BCV0029Y C	1		$4.86
	POLI	801043007			BCV0029Y A	5		$13.26
	POLI	800671005			BCV0029Y A	4		$13.26
	POLI	802249985		117714	BCV0029Y A	3		$13.26
	POLI	801542607		117712	BCV0029Y D	5		$13.26
	POLI	802392582			BCV0029Y A	3		$13.26
	POLI	801180395			BCV0029Y A	6		$13.26
	POLI	800670945			BCV0029Y A	3		$13.26
	POLI	802337894		117717	BCV0029Y C	1		$4.86
	POLI	801097001			BCV0029Y A	4		$13.26
	POLI	801763158		117713	BCV0029Y A	4		$13.26
	POLI	801455936		117710	BCV0029Y A	6		$13.26
	POLI	800670965			BCV0029Y A	4		$13.26
	POLI	801150752			BCV0029Y A	3		$13.26
	POLI	800749986			BCV0029Y C	1		$4.86
	POLI	801150741			BCV0029Y A	5		$13.26
	POLI	802337896		117718	BCV0029Y A	4		$13.26
	POLI	800670920			BCV0029Y A	4		$13.26
	POLI	801321195		117708	BCV0029Y A	4		$13.26
	POLI	801180401			BCV0029Y A	5		$13.26
	POLR	800670995			BCV0029Y C	1		$4.86
	WATE	800671334			BCV0029Y A	4		$13.26
	WATE	800671023			BCV0029Y B	2		$8.70
	WATE	801513979		107913	BCV0029Y A	5		$13.26
	WATE	802229899		108318	BCV0029Y A	4		$13.26
	WATE	801496098		108212	BCV0029Y A	3		$13.26
	WATE	801168380		107723	BCV0029Y C	1		$4.86
	WATE	800671090			BCV0029Y A	8		$13.26
	WATE	802407429		109219	BCV0029Y C	1		$4.86
	WATE	800860946			BCV0029Y A	4		$13.26
	WATE	800671115			BCV0029Y C	1		$4.86
	WATE	800671077			BCV0029Y A	3		$13.26
	WATE	800671125			BCV0029Y A	3		$13.26
	WATE	800671030			BCV0029Y C	1		$4.86
	WATE	800671133			BCV0029Y B	2		$8.70

Page 4 of 6

Capital BLUE

Group/Subgroup ID: 005041000000 Invoice Number: 203210034886 Date: 11/16/2020

Coverage Period: 12/01/2020 - 12/31/2020

Ind	Class ID	Subscriber ID	Subscriber Name	Employee ID	Product ID & FI	Covered Members	Eff Date	Amount
**** CURRENT EMPLOYEE ENROLLMENTS ****								
	WATE	800671044			BCV0029Y B	2		$8.70
	WATE	801032325			BCV0029Y A	4		$13.26
	WATE	802342648		108719	BCV0029Y D	2		$8.70
	WATE	801513977		108913	BCV0029Y A	4		$13.26
	WATE	800671053			BCV0029Y A	3		$13.26
	WATE	800671097			BCV0029Y C	1		$4.86
	WATE	800671069			BCV0029Y B	2		$8.70
	WATE	800671057			BCV0029Y B	2		$8.70
	WATE	800940640			BCV0029Y A	4		$13.26
	WATE	801885603		109615	BCV0029Y A	3		$13.26
	WATE	801514748		108613	BCV0029Y A	4		$13.26
	WATE	800671084			BCV0029Y A	4		$13.26
	WATE	800860950			BCV0029Y A	4		$13.26
	WATE	802342649		109719	BCV0029Y A	4		$13.26
	WATE	800671112			BCV0029Y B	2		$8.70
	WATR	800671061			BCV0029Y C	1		$4.86
	WATR	801933057		spouseR	BCV0029Y C	1		$4.86

Subscriber Count: 158 Current Enrollment Total: $1,963.78

****** Class ID Totals ******

Class ID	Total
FIRE	$194.94
FIRR	$4.86
[illegible]NR	$94.69
NONU	$1,064.01
[illegible]LG	$280.08
POLR	$4.86
WATE	$310.62
WATR	$9.72
Grand Total:	$1,963.78

Page 5 of 6

Capital BLUE

Group/Subgroup ID: 005041000000 Invoice Number: 203210034886 Date: 11/16/2020

Coverage Period: 12/01/2020 - 12/31/2020

****** Discretionary Fees ******

Description	Total
Grand Total:	

****** Product ID/Class ID Totals ******

Product ID	Class ID	Total
BCV0029X		
	NONR	$94.69
	NONU	$1,064.01
BCV0029Y		
	FIRE	$194.94
	FIRR	$4.86
	POLI	$280.08
	POLR	$4.86
	WATE	$310.62
	WATR	$9.72
Grand Total:		$1,963.78

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THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER, PA 17331

FUND: ALL PURPOSE

DATE 11/23/2020

TO: DELTA DENTAL OF PENNSYLVANIA
Attn: Accounts Receivable
P. O. Box 825506
Philadelphia, PA 19182-5506

#1273143

Invoice # BE004189605

FOR: Dental Insurance premium for December 2020

$11,942.31

ACCT.#	#1	01.410.1500.1560	$2,206.90
	#2	01.411.1500.1560	$1,528.87
	#3	01.420.1500.1560	$1,899.54
	#4	01.427.1500.1560	$168.14
	#5	01.486.1500.1560	$469.65
	#6	01.487.1500.1560	$483.79
	#7	06.448.396.304921	$2,748.62
	#8	06.448.396.304927	$72.82
	#9	08.496.1500.1560	$808.82
	#10	14.406.1500.1560	$545.74
	#11	16.406.1500.1560	$462.78
	#12	17.456.1500.1560	$546.64

Date Rec'd 11-23-20
Approved By KD
Date Paid 11-24-20
Check No. 4967

DELTA DENTAL



Invoice

Delta Dental of Pennsylvania
One Delta Drive
Mechanicsburg, PA 17055-6999

Plan underwritten and administered by:
Delta Dental of Pennsylvania
One Delta Drive
Mechanicsburg, PA 17055-6999

BOROUGH OF HANOVER
ATTN: BARBARA KREBS
44 FREDERICK ST
HANOVER, PA 17331-3501

CAN WE HELP?
Visit our web site
deltadentalins.com
For eligibility inquiries call
1-800-471-7068
For billing inquiries call
1-800-471-7068

- **Invoice number:** BE004189605
- **Invoice date:** December 1, 2020

BOROUGH OF HANOVER

- **Account number:** 39-0511300000
- **Purchase Order #:**

Period of coverage:
December 1, 2020 to December 31, 2020

Enrollment changes
Enrollment changes not reflected on this invoice will be adjusted on your next invoice.

Total amount this period **$11,942.31**

Total amount due **$11,942.31**

Remittance

CUSTOMER NAME	ACCOUNT NUMBER	AMOUNT DUE	AMOUNT ENCLOSED
BOROUGH OF HANOVER	39-0511300000	$ 11,942.31	$

Payment Options

You have two options for sending your payment - by electronic funds transfer or by mail:

By electronic funds transfer

Delta Dental of Pennsylvania
Union Bank
200 Pringle Avenue, Suite 250
Walnut Creek, CA 94596
A/C# 7000180372
RTN# 122000496

By mail
Make your check payable to:
Attn: Accounts Receivable
Delta Dental of Pennsylvania
PO Box 825506
Philadelphia, PA 19182-5506

Page 1 of 10

DELTA DENTAL

Group summary

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113

COVERAGE OPTION	NUMBER OF ENROLLEES	PREMIUM PER ENROLLEE	TOTAL AMOUNT DUE
EE Only	7	$36.41	$254.87
EE Only	28	$34.39	$962.92
EE Only	8	$37.46	$299.68
EE + Spouse	4	$96.93	$387.72
EE + Spouse	7	$92.55	$647.85
EE + Spouse	31	$84.07	$2,606.17
Family	16	$92.55	$1,480.80
Family	30	$96.93	$2,907.90
Family	22	$84.07	$1,849.54
EE + 1 Child	1	$96.93	$96.93
EE + 1 Child	1	$92.55	$92.55
EE + 1 Child	1	$84.07	$84.07
EE + Children	2	$84.07	$168.14
Group sub-total	**158**		**$11,839.14**
Adjustments			$103.17
Group total:			**$11,942.31**

Division summary

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
BOROUGH OF HANOVER Division: 00001

COVERAGE OPTION	NUMBER OF ENROLLEES	PREMIUM PER ENROLLEE	TOTAL AMOUNT DUE
EE Only	28	$34.39	$962.92
EE + Spouse	31	$84.07	$2,606.17
Family	22	$84.07	$1,849.54
EE + 1 Child	1	$84.07	$84.07
EE + Children	2	$84.07	$168.14
Division sub-total	**84**		**$5,670.84**
Adjustments			$103.17
Division total:			**$5,774.01**

DELTA DENTAL

Enrollee adjustments

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00001

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	ADJUSTMENT EFFECTIVE DATE	ADJUSTMENT	COVERAGE OPTION	AMOUNT DUE ($)
	CURTIN, DOREEN T	09/01/2020	Addition	EE Only	103.17

Total enrollee adjustments for group 05113 division 00001: $103.17

List of enrollees and premiums

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00001

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		12/01/2017		EE + Children	84.07
		05/04/2019		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		04/06/2020		EE Only	34.39
		01/01/2019		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		Family	84.07
		07/01/2009		Family	84.07
		07/01/2009		EE Only	34.39
		12/01/2017	CBR 1201	EE Only	34.39
		08/01/2019		EE Only	34.39
		12/02/2018		EE Only	34.39
		09/27/2019		EE + Spouse	84.07
		02/01/2011		EE + Spouse	84.07
		07/01/2009		EE Only	34.39
		07/01/2009		EE Only	34.39
		07/01/2009		EE Only	34.39
		07/15/2012		EE + Spouse	84.07
		09/08/2012		EE Only	34.39
		10/17/2017		EE Only	34.39
		06/01/2015		Family	84.07
		07/15/2019		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07

continued next page

DELTA DENTAL

List of enrollees and premiums (Continued)

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00001

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		07/01/2009		EE + Children	84.07
		07/01/2009		Family	84.07
		07/01/2009		Family	84.07
		07/01/2009		EE + Spouse	84.07
		06/14/2020		EE + 1 Child	84.07
		12/01/2017		Family	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		Family	84.07
		12/25/2011		Family	84.07
		07/17/2015		Family	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2019		EE Only	34.39
		09/03/2019		EE Only	34.39
		07/01/2009		Family	84.07
		05/04/2020		Family	84.07
		09/01/2020	COBRA912	EE Only	34.39
		12/15/2015		Family	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		06/09/2014		Family	84.07
		08/11/2015		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		10/15/2018		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		10/29/2019		EE + Spouse	84.07
		06/04/2019		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		05/01/2020		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		07/01/2009		Family	84.07
		07/01/2009		EE Only	34.39
		04/01/2019		EE Only	34.39
		07/29/2012		Family	84.07

continued next page

DELTA DENTAL

List of enrollees and premiums (Continued)

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00001

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		07/01/2009		EE + Spouse	84.07
		07/01/2009		EE + Spouse	84.07
		01/15/2019		EE Only	34.39
		08/10/2020		EE Only	34.39
		03/02/2015		Family	84.07
		09/03/2019		Family	84.07
		07/01/2009		EE + Spouse	84.07
		07/01/2009		Family	84.07
		07/02/2011		EE Only	34.39
		07/01/2009		Family	84.07
		07/01/2009		EE Only	34.39
		07/01/2009		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		01/29/2012		EE + Spouse	84.07
		07/01/2009		Family	84.07
		11/05/2018		EE Only	34.39
		07/01/2009		EE + Spouse	84.07
		10/22/2019		EE Only	34.39
		10/17/2017		Family	84.07
		07/01/2009		Family	84.07

Current premiums for group 05113 division 00001: **$5,670.84**
Total number of enrollees: 84

DELTA DENTAL

Division summary

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00002

BOROUGH OF HANOVER

COVERAGE OPTION	NUMBER OF ENROLLEES	PREMIUM PER ENROLLEE	TOTAL AMOUNT DUE
EE Only	7	$36.41	$254.87
EE + Spouse	7	$92.55	$647.85
Family	16	$92.55	$1,480.80
EE + 1 Child	1	$92.55	$92.55
Division sub-total	**31**		**$2,476.07**
Adjustments			$0.00
Division total:			**$2,476.07**

Enrollee adjustments

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00002

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	ADJUSTMENT EFFECTIVE DATE	ADJUSTMENT	COVERAGE OPTION	AMOUNT DUE ($)
Total enrollee adjustments for group 05113 division 00002:					**$0.00**

List of enrollees and premiums

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00002

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		07/01/2009		Family	92.55
		07/01/2009		EE + Spouse	92.55
		05/05/2013		Family	92.55
		07/23/2018		Family	92.55
		01/20/2013		Family	92.55
		07/19/2009		EE Only	36.41
		07/01/2009		Family	92.55
		11/05/2019		EE Only	36.41
		07/01/2009		Family	92.55
		07/01/2009		EE Only	36.41
		07/01/2009		EE + Spouse	92.55

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DELTA DENTAL

List of enrollees and premiums (Continued)

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00002

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		07/01/2009		Family	92.55
		07/01/2009		EE Only	36.41
		07/01/2009		EE + Spouse	92.55
		07/01/2009		EE + Spouse	92.55
		07/01/2009		EE Only	36.41
		07/01/2009		Family	92.55
		04/14/2019		EE + 1 Child	92.55
		05/06/2013		Family	92.55
		07/01/2009		Family	92.55
		07/01/2009		EE Only	36.41
		07/01/2009		EE + Spouse	92.55
		04/15/2016		Family	92.55
		07/01/2009		EE + Spouse	92.55
		07/01/2009		Family	92.55
		05/12/2013		Family	92.55
		07/01/2009		Family	92.55
		07/01/2009		Family	92.55
		04/21/2019		Family	92.55
		09/01/2016		EE Only	36.41
		07/01/2009		EE + Spouse	92.55

Current premiums for group 05113 division 00002: **$2,476.07**
Total number of enrollees: 31

DELTA DENTAL

Division summary

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00003

BOROUGH OF HANOVER

COVERAGE OPTION	NUMBER OF ENROLLEES	PREMIUM PER ENROLLEE	TOTAL AMOUNT DUE
EE Only	5	$37.46	$187.30
EE + Spouse	1	$96.93	$96.93
Family	19	$96.93	$1,841.67
Division sub-total	**25**		**$2,125.90**
Adjustments			$0.00
Division total:			**$2,125.90**

Enrollee adjustments

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00003

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	ADJUSTMENT EFFECTIVE DATE	ADJUSTMENT	COVERAGE OPTION	AMOUNT DUE ($)
Total enrollee adjustments for group 05113 division 00003:					**$0.00**

List of enrollees and premiums

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00003

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		09/18/2018		EE Only	37.46
		04/17/2010		EE + Spouse	96.93
		07/01/2009		Family	96.93
		07/01/2009		Family	96.93
		07/01/2009		EE Only	37.46
		07/01/2009		Family	96.93
		07/01/2009		Family	96.93
		09/11/2018		Family	96.93
		10/01/2013		Family	96.93
		10/01/2019		Family	96.93
		10/03/2009		Family	96.93
		07/01/2009		Family	96.93

continued next page

DELTA DENTAL

List of enrollees and premiums (Continued)

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00003

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		04/05/2019		EE Only	37.46
		07/01/2009		Family	96.93
		10/06/2015		Family	96.93
		09/25/2012		Family	96.93
		07/01/2009		Family	96.93
		07/01/2009		Family	96.93
		07/01/2009		EE Only	37.46
		07/01/2009		Family	96.93
		04/05/2019		Family	96.93
		07/01/2009		Family	96.93
		07/01/2009		EE Only	37.46
		04/15/2011		Family	96.93
		10/03/2009		Family	96.93

Current premiums for group 05113 division 00003: **$2,125.90**
Total number of enrollees: 25

Division summary

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00004

BOROUGH OF HANOVER

COVERAGE OPTION	NUMBER OF ENROLLEES	PREMIUM PER ENROLLEE	TOTAL AMOUNT DUE
EE Only	3	$37.46	$112.38
EE + Spouse	3	$96.93	$290.79
Family	11	$96.93	$1,066.23
EE + 1 Child	1	$96.93	$96.93
Division sub-total	**18**		**$1,566.33**
Adjustments			$0.00
Division total:			**$1,566.33**

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DELTA DENTAL

Enrollee adjustments

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00004

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	ADJUSTMENT EFFECTIVE DATE	ADJUSTMENT	COVERAGE OPTION	AMOUNT DUE ($)

Total enrollee adjustments for group 05113 division 00004: **$0.00**

List of enrollees and premiums

December 1, 2020 to December 31, 2020
Invoice number: BE004189605
Group: 05113
Division: 00004

BOROUGH OF HANOVER

ENROLLEE ID	ENROLLEE NAME	EFFECTIVE DATE	EMPLOYER REFERENCE	COVERAGE OPTION	AMOUNT DUE ($)
		07/01/2009		Family	96.93
		07/01/2009		EE + Spouse	96.93
		11/15/2011		Family	96.93
		07/01/2009		Family	96.93
		06/10/2016		Family	96.93
		07/01/2009		Family	96.93
		07/01/2009		Family	96.93
		07/01/2009		Family	96.93
		12/15/2017		EE + 1 Child	96.93
		06/12/2015		Family	96.93
		12/01/2017		EE Only	37.46
		01/01/2019		EE Only	37.46
		12/16/2013		EE Only	37.46
		07/01/2009		Family	96.93
		07/01/2009		Family	96.93
		07/01/2009		EE + Spouse	96.93
		04/10/2015		EE + Spouse	96.93
		11/15/2011		Family	96.93

Current premiums for group 05113 division 00004: **$1,566.33**
Total number of enrollees: 18

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

24. Provide the level of payments made to industry organizations included in the cost of service along with a description of each payee organization.

RESPONSE

The total payments made to industry organizations are as follows:

AWWA - $242.00

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

25. If the company has included any costs associated with canceled construction projects or obsolete inventory in requested rates, separately identify the items, provide the related amounts and explain the reason for the cancellation or obsolescence.

RESPONSE

The Borough Water Fund is not claiming any such costs in this case.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

26. Explain how the company accounts for vacation pay for book and ratemaking purposes.

RESPONSE

Vacation pay is included in the claim for salaries and wages.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

27. Indicate whether any employee positions have been eliminated since the commencement of the historic test year or are expected to be eliminated during the future test year.

RESPONSE

In March of the historic test year, one water department laborer was terminated, and the position is considered vacant with no immediate plans to fill the position.

In December of the historic test year, one maintenance mechanic retired, and a licensed operator was promoted to maintenance mechanic to fill the position. A laborer was promoted to Filter Plant Trainee to fill the licensed operator position, and to fill the laborer position, the water department hired a new laborer in March 2021.

In May of the future test year (2021), the water department's dam maintenance laborer retired, and at this time, the Borough has not decided if the position will be filled. A counter clerk will retire June 4, 2021 and the water department is not planning to backfill this position. In June of the future test year, the water department expects to have a fleet superintendent retire, and the borough plans on promoting within and backfilling for this position.

See Exhibit GRH-1, Adjustment E7 and E12 for the labor expense adjustments.

In addition to the future test year planned retirements and backfills, the water department plans to hire a Director of Water Resources to oversee the water department with a planned hire date of September 2021. The Director of Water Resources replaces the Borough's Meter Supervisor who retired in January of the future test year. See attached 'Exhibit D III-27 Attachment' for the Water Resource Director job description.

DRAFT
BOROUGH OF HANOVER
POSITION DESCRIPTION

Title: Director

Department: Department of Water Resources

Affiliation: Non-union

Grade: $90,000 - $115,000 depending on qualifications

Effective Date:

SUMMARY OF DUTIES

The Director of Water Resources is a senior manager in the Borough's organization with overall responsibility for the business and operations of the Borough's water and wastewater systems. The Director is also responsible for professional work involved in planning, execution and day-to-day management and engineering associated with Borough water and wastewater projects.

SUPERVISION RECEIVED

The work is performed under the general supervision of the Borough Manager with considerable leeway granted for the exercise of independent judgment and initiative.

SUPERVISION EXERCISED

Directly or indirectly supervises approximately 45 full-time employees, working at or with the water filtration plant, dams / public water supplies, water distribution system, water meters, wastewater treatment plant, pumping stations, and wastewater collection system.

ESSENTIAL FUNCTIONS

The essential functions below are intended to be representative of the responsibilities assumed, and tasks performed within this position. The omission of an essential function does not preclude management from assigning duties not listed herein if such functions are a logical assignment to the position.

- Responsible for oversight, reliability, and productivity in all divisions of the water and wastewater systems including water filtration plant, water distribution, dams / public water supply, water storage, water meters, wastewater treatment plant, wastewater collections system, and pumping stations.
- Responsible for business management of the Borough's water and wastewater enterprises; develops and maintains long-term business plans.

- Responsible for development and monitoring of annual revenue and expense operating budgets.
- Responsible for development of the annual and long-term capital plans for all water and wastewater system components.
- Responsible, with the Borough Manager, for general oversight, management, and training of all personnel in an effectively structured department, in a manner that is consistent with all Borough policies and collective bargaining agreements.
- Responsible for environmental safety and the safety of the public water supply and for ensuring regulatory compliance and the filing of all required reports.
- Provides engineering services and project management; procures and oversees engineering contractors.
- Responsible for the development and oversight of infrastructure and plant maintenance plans.
- Responsible for innovation, technology, and energy conservation.
- Responsible for management and security of the inventories of equipment and supplies
- Oversees cost effective, leally compliant and accountable procurement system.
- Approves all departmental invoices.
- Responsible, with the Finance Director, for rate setting and design of customer billing system.
- Responsible for managing the Borough's relationships with industrial customers and with connecting municipalities.
- Responsible for development and maintenance of all departmental policies and agreements.
- Primary responsibility for the development and management of the Borough's Geographic Information System. (GIS)
- Responsible for communications with the public including public education and the maintenance of a departmental website page.
- Primary responsibility for leading effective emergency responses and the development of remedial plans; on-call.
- Works as part of the Borough management team.
- Responsible for professional staffing of the Borough Council Water and Sewer Committee.

RECOMMENDED MINIMUM QUALIFICATIONS

- Education: A Bachelor's Degree from an accredited four-year college or university with a major in civil engineering or a closely related field; graduate degree preferred.
- Experience: No less than 10 years of progressive leadership experience in the water and wastewater field, preferably in the public sector; experience developing and managing capital water and wastewater projects.
- Substitutions: Any equivalent combination of experience and training which provides the knowledge, skills and abilities necessary to perform the work.
- Licenses / Certificates:
    - Must possess a valid Pennsylvania Driver's license.
    - Must possess a professional engineer's license issued by the Pennsylvania State

Registration Board for Professional Engineers.
- PA Water Treatment License, Class B
- PA Wastewater Treatment, Class A

KNOWLEDGE, SKILLS, AND ABILITIES:

- Broad vision of water resource management, emerging trends, best practices, utility financing, rate structures and the use of technology to enhance service delivery.
- Comprehensive knowledge of all federal, state, public utility commission laws and regulations pertaining to water quality, the operation of public treatment plants and environmental controls.
- Knowledge of water and wastewater collection and distributions systems and treatment equipment including chemical, bacteriologic, and biological processes.
- Knowledge of, and ability to use, computers and software applications relevant to civil engineering; skilled in the use of Microsoft Office products (Word, Outlook, PowerPoint and Excel),
- Strong business management and organizational skills particularly as applied to public water and wastewater systems.
- Strong skills in the use of AutoCAD and ESRI ArcGIS (and AGOL) software / platforms.
- Experience writing and managing grant applications related to infrastructure development and environmental services.
- Ability to read and write engineering plans and specifications and provide effective engineering project management oversight.
- Ability to analyze and define problems, identify alternative solutions, estimate consequences of proposed actions, and implement recommendations in support of goals.
- Ability to determine and calculate necessary engineering computations.
- Ability to meet and deal with the public with tact and diplomacy; ability to establish and maintain effective and cooperative working relationships with those contacted in the course of duties.
- Ability to communicate effectively, verbally and in writing.
- Ability to maintain high level of organization of records, plans, efforts, etc.
- Ability to work cooperatively as part of an integrated senior management team.

PHYSICAL REQUIREMENTS

The position requires light physical effort while performing duties under typical office conditions; frequently required to sit, hear, talk; required to spend limited hours walking and standing; must have physical agility required to access all potential development sites which includes rough terrain; vision must be correctable to normal ranges; must be able to judge distances and spatial relationships; has ability to operate a keyboard.

This job description does not constitute an employment agreement between the employer and employee. And is subject to change by the employer as the needs of the employer and requirements of the job change.

Exhibit D III-28

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OPERATING EXPENSE
FILING REQUIREMENTS

28. Furnish the name of each supplier, gallonage and expense for water purchased as recorded in Water Purchased for Resale-Account 706 for the historic test year and two preceding years.

RESPONSE

The Borough does not purchase water.

Exhibit D IV-1

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

1. Provide a copy of the latest Pennsylvania Corporate Tax report and the latest Pennsylvania Corporate Tax settlement.

RESPONSE

The Borough does not pay Pennsylvania Corporate Tax.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

2. Submit details of calculations for taxes, other than income, where a company is assessed taxes for doing business in another state, or on its property located in another state.

RESPONSE

The Borough does not do business outside of the Commonwealth of Pennsylvania.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

3. Submit a schedule showing for the last 3 years the Income Tax refunds, plus interest, net of taxes, received from the Federal government due to prior years' claims.

RESPONSE

The Borough does not pay Income Tax to the Federal Government.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

4. Provide detailed computations showing the deferred income taxes derived by using accelerated tax depreciation applicable to post-1969 utility property that increases productive capacity, and accelerated depreciation rate (ADR) rates on property (separate between State and Federal; also, rate used). If based on the historic test year, justify.

   a. State whether tax depreciation is based on all rate base items claimed as of the end of the future test year, and whether it is the annual tax depreciation at the end of the future test year.
   b. Reconcile any difference between the deferred tax balance, as shown as a reduction to measures of value (rate base), and the deferred tax balance as shown on the balance sheet.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

5. Submit a schedule showing a breakdown of accumulated investment tax credits, (3%, 4%, 7%, 10% and 11%), together with details of methods used to write-off the unamortized balances.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

6. Submit a schedule showing the adjustments for taxable net income per book, including below-the-line items, and pro-forma under existing rates, together with an explanation of any difference between the adjustments. Indicate charitable donations and contributions in the tax calculation for ratemaking purposes.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

7. Submit detailed calculations supporting historic and future taxable income before State and Federal Income Taxes where the income tax is subject to allocation due to operations in another state, or due to operation of other taxable utility or nonutility business, or by operating divisions or areas.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

8. Furnish a breakdown of major items comprising prepaid and deferred Income Tax charges and other deferred income tax credits and reserves by accounting areas.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

9. Explain the reason for the use of cost of removal of any retired plant figures in the Income Tax calculations.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

10. State whether all tax savings due to accelerated depreciation on property installed prior to 1970 have been passed through to income. If not, explain.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

11. Show any income tax loss/gain carryovers from previous years that may affect historic test year income taxes or future test year Income Taxes. Show loss or gain carryovers by years of origin and amounts remaining by years at the end of the historic test year.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

12. Provide a detailed analysis of taxes accrued per books as of the historic and future test year date. Also supply the basis for the accrual and the amount of taxes accrued monthly.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

13. Under Section 1552 of the Internal Revenue Code and Regulations at 1.1552-1 if applicable, a parent company, in filing a consolidated Income Tax return for the group, must choose one of four options by which it must allocate total income tax liability of the group to the participating members to determine each member's tax liability to the Federal government. If this request is not applicable, provide an explanation.
    a. State what option has been chosen by the group.
    b. Provide, in summary form, the amount of tax liability that has been allocated to each of the participating members in the consolidated Income Tax return.
    c. Provide a schedule, in summary form, of contributions, which were determined on the basis of separate tax return calculations, made by each of the participating members to the tax liability indicated in the consolidated group tax return. Provide total amounts of actual payments to the tax depository for the tax year, as computed on the basis of separate returns of members.
    d. Provide annual Income Tax return for group, and if Income Tax return shows net operating loss, provide details of amount of net operating loss allocated to the Income Tax returns of each of the members of the consolidated group.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

14. Provide a copy of the Corporate Federal Tax Returns and supporting schedules for the preceding 3 years and, if applicable, a copy of the calculation workpapers for the company's consolidated tax savings adjustment.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

15. Provide a schedule of Federal and Pennsylvania taxes, other than Income Taxes, calculated on the basis of test year per book, pro forma at present rates, and pro forma at proposed rates, to include the following categories:
    a. Social Security.
    b. Unemployment.
    c. Capital Stock.
    d. Public Utility Realty.
    e. PUC assessment.
    f. Other property.
    g. Any other appropriate categories.

RESPONSE

The Borough pays Payment in Lieu of Taxes and Social Security taxes and Unemployment taxes as shown in Exhibit GRH-1.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

16. Submit a schedule showing a breakdown of the deferred Income Taxes by State and Federal per book, pro forma, existing rates, and under proposed rates.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

17. With respect to determination of income taxes, Federal and State:
    a. Show Income Tax results of the annualizing and normalizing adjustments to the historic test year before any rate increase.
    b. Show Income Taxes for the annualized and normalized test year.
    c. Show Income Tax effect of the rate increase requested.
    d. Show Income Taxes for the normalized and annualized test year after application of the full rate increase.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO TAXES
FILING REQUIREMENTS

18. State amount of debt interest utilized for Income Tax calculations, and details of debt interest computations, under each of the following rate case bases:
    a. Actual per book test year.
    b. Annualized historic test year-end.
    c. Proposed future test year-end.

RESPONSE

Not applicable.

Exhibit D V-1

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

1. Provide a schedule showing the measures of value and the rates of return at the original cost in the current case. All claims made on this exhibit should be cross-referenced to appropriate exhibits.

RESPONSE

See Exhibit GRH-1.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

2. If a claim is made for construction work in progress, include, in the form of an exhibit, the summary page from all work orders, amount expended at the end of the historic and future test year and anticipated in-service dates. Indicate if any of the construction work in progress will result in insurance recoveries, reimbursements, or retirements of existing facilities. Describe in exact detail the necessity of each project claimed if not detailed on the summary page from the work order. Include final completion dates and estimated total amounts to be spent on each project. This exhibit should be updated at the conclusion of these proceedings.

RESPONSE

The Borough is not claiming construction work in progress.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

3. If a claim is made for nonrevenue producing construction work in progress, include, in the form of an exhibit, the summary page from all work orders, amount expended at the end of the historic and future test year and anticipated in-service dates. Indicate if any of the construction work in progress will result in insurance recoveries, reimbursements, or retirements of existing facilities. Describe in exact detail the necessity of each project claimed if not detailed on the summary page from the work order. Include a list of items needed to complete each project, such as landscaping and fencing, and estimated total amounts to be spent to complete each project. These exhibits should be updated at the conclusion of these proceedings.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

4. If a claim is made for plant held for future use, supply the following:
   a. A brief description of the plant or land site and its original cost.
   b. Expected date of use for each item claimed.
   c. Explanation as to why it is necessary to acquire each item in advance of its date of use.
   d. Date when each item was acquired.
   e. Date when each item was placed in the plant held for future use account.

RESPONSE

The Borough is not making a claim for plant held for future use.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

5. If fuel stocks comprise part of the cash working capital claim, provide an exhibit showing the actual book balances, noting quantity and price for the fuel inventories by type of fuel for the 13 months prior to the end of the historic test year by location, station, etc. Explain the method of determining the claim if other than that described above.

RESPONSE

Fuel stocks do not comprise part of the cash working capital claim.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

6. Explain in detail by statement or exhibit the appropriateness of claiming any additional items, not previously mentioned, in the measures of value.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

7. Provide schedules and data in support of the following working capital items:
   a. Prepayments__list and identify all items.
   b. Federal Income Tax accrued or prepaid.
   c. Pennsylvania State Income Tax accrued or prepaid.
   d. Pennsylvania Capital Stock Tax accrued or prepaid.
   e. Pennsylvania Public Utility Realty Tax accrued or prepaid.
   f. Payroll taxes accrued or prepaid.
   g. Any adjustments related to the above items for ratemaking purposes.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

8. Supply an exhibit supporting the claim for cash working capital requirement based on the lead-lag method.
   a. Pro forma expenses and revenues are to be used in lieu of book data for computing lead-lag days.

RESPONSE

Working capital is based on 1/8 of pro forma operation and maintenance expense. The Borough did not perform a lead-lag study.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

9. Indicate if amortized expenses have been removed from the lead-lag study. If so, please provide documentation showing such removal. If not, provide a list of such amortization expenses included.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

10. Identify the funds availability arrangements or terms which the company has with its banks with respect to deposits of customer checks. For example, does the company have same day or next day access to funds deposited?

RESPONSE

The Borough generally has next day access to funds deposited.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

11. In reference to materials and supplies:
    a. What method of inventory valuation was used to develop the claim for materials and supplies?
    b. Does the utility use a material and supply model to calculate needed material and supply levels?
    c. If so, provide the model. Supply an illustrative example of how the monthly balances are derived.
    d. Provide the actual monthly value for the inventory of materials and supplies for the past 12 months. Supply as of the end of the historic test year, a 13-month average, by month, for the material and supply account.
    e. Provide the monthly level of materials and supplies for 3 years prior to the conclusion of the historic test year.

RESPONSE

The Borough is not claiming materials and supplies as an asset.

Exhibit D V-12

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

12. For each nonblanket or projected plant addition to cost the greater of $100,000 or 0.5% of current rate base, included in the future test year, please provide:
    a. Description of the project.
    b. Original budgeted cost broken down by allowance for funds used during construction (AFUDC) and non-AFUDC components.
    c. Current budgeted cost broken down by AFUDC and non-AFUDC components.
    d. Reason for change in budgeted cost.
    e. Original estimated date of completion and in service.
    f. Current estimated date of completion and in service.
    g. Reason for change in completion date.
    h. Anticipated retirement related to the plant addition.
    i. Starting date of project.
    j. Amount expended to date.
    k. Percent of project currently complete.
    1. The depreciation rate applicable.
    m. Identify which projects are due to a Pennsylvania Department of Environmental Protection (PA-DEP) or Federal Environmental Protection Agency (EPA) requirement.

RESPONSE

The projects included are described in the following chart, 'Exhibit D V-12 Attachment'. Descriptions of the projects are included in Borough of Hanover Statement No. 1.

There has been no change in budgeted costs, or estimated completion date. See Exhibits JJS-2 and JJS-3 for anticipated retirements related to the plant addition and for the depreciation rates that are applicable. None of the projects are due to a PA-DEP or EPA requirement.

BOROUGH OF HANOVER - BUREAU OF WATER

PROJECTED PLANT ADDITIONS PER DATA REQUEST EXHIBIT D-V-12 FOR THE FUTURE TEST YEAR AND FULLY PROJECTED FUTURE TEST YEAR

Project	Total Amount	Start Date	Completion Date	Amount Expended To Date	Percent Complete
Future Test Year Plant Additions					
Annual Meter Replacement Budget	$ 355,000	2021	2021	$ 161,666.27	45.5%
Vehicles/Heavy Equipment	145,000	2021	2021	1,018.18	0.7%
Facilities & Plant Additions	127,692	2021	2021	15,044.25	12%
Cleaning/relining	2,249,778	2020	2021	55,873.22	2%
Replacing Existing Pipe	1,866,395	2020	2021	370,430.52	20%
S&M Dam Project & Kitzmiller Dam Projects	2,000,000	2017	2021	1,052,129.25	53%
Fully Projected Future Test Year Plant Additions					
S&M Dam Project & Kitzmiller Dam Projects	4,000,000	2021	2022	-	0%
Cleaning/relining	792,326	2022	2022	-	0%
Replaceing Existing Pipe	1,438,999	2022	2022	-	0%
Annual Meter Replacement Budget	405,000	2022	2022	-	0%

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

13. Explain how the future test year plant balances were projected and provide supporting workpapers and documentation.

RESPONSE

See Exhibit JJS-2 and Exhibit JJS-3.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

14. Are all of the assets used in the plant-in-service claim used exclusively by the water or wastewater utility? If not, provide the estimated percentage that each shared asset is used by other entities.

RESPONSE

All assets used in the plant-in-service claim are used exclusively by the water utility.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

15. Is all plant included in rate base currently being used in providing water or wastewater service? If not, provide a schedule which presents those plant items which are not, and indicate the corresponding amounts and account numbers. Further, provide a detailed narrative explaining the reason why such plant is not being used and the anticipated future disposition of the plant.

RESPONSE

Yes.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE BASE
FILING REQUIREMENTS

16. Provide all workpapers and supporting documentation showing the derivation of the projected balances of contributions in aid of construction, customer advances for construction and company service line and customer deposits for the future test year.

RESPONSE

See Exhibit JJS-2 and JJS-3.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO DEPRECIATION
FILING REQUIREMENTS

If any of the following questions under this section have been previously answered pursuant to 52 Pa. Code Chapter 73, please note in your response. It is not necessary to provide responses to questions previously answered.

1. Provide a description of the depreciation methods used to calculate annual depreciation amounts and depreciation reserves, together with a discussion of the factors which were considered in arriving at estimates of service life and dispersion by account. Supply a comprehensive statement of any changes made in method of depreciation. Provide dates of all field inspections and facilities visited.

RESPONSE

The depreciation methods used in calculating annual and accrued depreciation are discussed in Exhibit JJS-2 in the section titled "Methods Used in the Study," beginning on page I-2 and the section titled “Service Life Analysis” beginning on page III-2.

Field trips and facilities visited during this service life study for the Borough of Hanover are set forth on page III-3 of Exhibit JJS-2.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO DEPRECIATION
FILING REQUIREMENTS

2. Set forth, in exhibit form, charts depicting the original and estimated survivor curves and a tabular presentation of the original life table plotted on the chart for each account where the retirement rate method of analysis is utilized.

RESPONSE

Charts depicting the original and estimated survivor curves and a tabular presentation of the original life table plotted on the chart of each account where the retirement rate method of analysis is utilized are set forth on pages VI-2 through V-83 of Exhibit JJS-2.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO DEPRECIATION
FILING REQUIREMENTS

3. Provide the surviving original cost at historic test year-end by vintage by account and include applicable depreciation reserves and accruals. These calculations should be provided for plant in service as well as other categories of plant, including contributions in aid of construction and customers' advances for construction.

RESPONSE

The surviving original cost at the end of the historical test year December 31, 2020 by vintage by account and the applicable depreciation reserve for utility plant are presented in Exhibit JJS-1 as of December 31, 2020 beginning on page II-2, in Exhibit JJS-2 as of December 31, 2021 beginning on page VII-2, and in Exhibit JJS-3 as of December 31, 2022 beginning on page II-2.

Exhibit D VI-4

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO DEPRECIATION
FILING REQUIREMENTS

4. Provide a comparison of the calculated depreciation reserve used for ratemaking purposes v. the book reserve by account at the end of the test year, if they differ.

RESPONSE

A comparison of the calculated depreciation reserve v. book reserve by account as of December 31, 2020, as of December 31, 2021 and as of December 31, 2022, is listed on the following schedule, 'Exhibit D VI-4 Attachment' pages 1 through 6 for the Borough of Hanover.

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOOK DEPRECIATION RESERVE VERSUS CALCULATED ACCRUED
AS OF DECEMBER 31, 2020

	DEPRECIABLE GROUP	BOOK DEPRECIATION RESERVE	CALCULATED ACCRUED
	(1)	(2)	(3)
	DEPRECIABLE PLANT		
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING		
	SHEPPARD AND MYERS RESERVOIR	474,941	509,300
	L. B. SHEPPARD (LONG ARM) RESERVOIR	1,389,296	1,489,802
	DREDGING	284,254	304,818
	TOTAL ACCOUNT 208	2,148,491	2,303,920
210	SPRINGS AND WELLS	169,369	181,622
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING		
	CLEAR LAKE	143,236	153,598
	KITZMILLER DAM	42,242	45,298
	TOTAL ACCOUNT 212.2	185,478	198,896
214	AQUEDUCTS AND SUPPLY MAINS	1,350,337	1,448,025
217	SEDIMENTATION BASINS	475,020	509,385
219	FILTERS	1,160,525	1,244,481
220	CLEAR WATER BASIN AND CLEARWELL	100,331	107,589
223	CHEMICAL TREATMENT PLANT		
	CHEMICAL BUILDING	584,209	626,473
	CHEMICAL TREATMENT EQUIPMENT	2,442,766	2,619,484
	PARR'S HILL CHLORINATION FACILITY	116,115	124,515
	TOTAL ACCOUNT 223	3,143,090	3,370,472
224	LABORATORY EQUIPMENT	14,951	16,033
236	STRUCTURES AND IMPROVEMENTS - PUMPING		
	PUMPING STRUCTURES	321,419	344,671
	PARR'S HILL BOOSTER STATION	329,976	353,848
	KIDD LANE PUMP STATION	6,549	7,023
	SLAGLE RUN PUMP STATION	22,230	23,838
	TOTAL ACCOUNT 236	680,174	729,380
237	PUMPS AND PUMPING EQUIPMENT	596,529	639,684
242	ELECTRICAL EQUIPMENT	204,965	219,793
243	OTHER PUMP STATION EQUIPMENT	15,771	16,912
246	TRANSMISSION MAINS	767,571	823,100
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	482,193	517,076
248	DISTRIBUTION MAINS	2,985,231	3,201,192
249	SERVICES	722,286	774,538
250	METERS	981,069	1,052,043
251	HYDRANTS	15,969	17,124
257	STRUCTURES AND IMPROVEMENTS - GENERAL	145,480	156,005

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOOK DEPRECIATION RESERVE VERSUS CALCULATED ACCRUED
AS OF DECEMBER 31, 2020

	DEPRECIABLE GROUP	BOOK DEPRECIATION RESERVE	CALCULATED ACCRUED
	(1)	(2)	(3)
258	GENERAL OFFICE EQUIPMENT		
	OFFICE FURNITURE	24,402	26,167
	OFFICE EQUIPMENT	41,532	44,537
	COMPUTER EQUIPMENT	31,951	34,262
	TOTAL ACCOUNT 258	97,885	104,966
259	OTHER GENERAL EQUIPMENT		
	CARS	106,512	114,217
	TRUCKS	260,243	279,070
	TOOLS, SHOP AND GARAGE EQUIPMENT	622,695	667,743
	COMMUNICATION EQUIPMENT	215,372	230,953
	TOTAL ACCOUNT 259	1,204,822	1,291,983
	TOTAL DEPRECIABLE PLANT	**17,647,537**	**18,924,219**

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOOK DEPRECIATION RESERVE VERSUS CALCULATED ACCRUED
AS OF DECEMBER 31, 2021

	DEPRECIABLE GROUP	BOOK DEPRECIATION RESERVE	CALCULATED ACCRUED
	(1)	(2)	(3)
	DEPRECIABLE PLANT		
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING		
	SHEPPARD AND MYERS RESERVOIR	468,303	538,800
	L. B. SHEPPARD (LONG ARM) RESERVOIR	1,435,459	1,519,681
	DREDGING	293,269	312,920
	TOTAL ACCOUNT 208	2,197,031	2,371,401
210	SPRINGS AND WELLS	180,519	191,604
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING		
	CLEAR LAKE	151,774	161,172
	KITZMILLER DAM	39,632	47,400
	TOTAL ACCOUNT 212.2	191,406	208,572
214	AQUEDUCTS AND SUPPLY MAINS	1,610,111	1,712,612
217	SEDIMENTATION BASINS	494,968	526,869
219	FILTERS	1,392,282	1,468,326
220	CLEAR WATER BASIN AND CLEARWELL	125,563	132,324
223	CHEMICAL TREATMENT PLANT		
	CHEMICAL BUILDING	697,716	737,947
	CHEMICAL TREATMENT EQUIPMENT	2,743,868	2,871,965
	PARR'S HILL CHLORINATION FACILITY	123,758	129,066
	TOTAL ACCOUNT 223	3,565,342	3,738,978
224	LABORATORY EQUIPMENT	16,147	16,774
236	STRUCTURES AND IMPROVEMENTS - PUMPING		
	PUMPING STRUCTURES	335,317	354,647
	PARR'S HILL BOOSTER STATION	354,305	375,509
	KIDD LANE PUMP STATION	6,920	7,346
	SLAGLE RUN PUMP STATION	23,890	25,419
	TOTAL ACCOUNT 236	720,432	762,921
237	PUMPS AND PUMPING EQUIPMENT	628,311	681,574
242	ELECTRICAL EQUIPMENT	169,849	237,293
243	OTHER PUMP STATION EQUIPMENT	16,553	17,327
246	TRANSMISSION MAINS	782,904	844,066
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	518,353	548,505
248	DISTRIBUTION MAINS	3,089,709	3,313,658
249	SERVICES	752,962	800,922
250	METERS	1,014,143	1,080,112
251	HYDRANTS	16,437	17,450
257	STRUCTURES AND IMPROVEMENTS - GENERAL	158,123	167,337

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOOK DEPRECIATION RESERVE VERSUS CALCULATED ACCRUED
AS OF DECEMBER 31, 2021

	DEPRECIABLE GROUP	BOOK DEPRECIATION RESERVE	CALCULATED ACCRUED
	(1)	(2)	(3)
258	GENERAL OFFICE EQUIPMENT		
	OFFICE FURNITURE	25,134	26,221
	OFFICE EQUIPMENT	42,067	44,717
	COMPUTER EQUIPMENT	34,982	36,534
	TOTAL ACCOUNT 258	102,183	107,472
259	OTHER GENERAL EQUIPMENT		
	CARS	117,856	119,258
	TRUCKS	308,324	314,159
	TOOLS, SHOP AND GARAGE EQUIPMENT	663,667	700,416
	COMMUNICATION EQUIPMENT	275,696	288,944
	TOTAL ACCOUNT 259	1,365,543	1,422,777
	TOTAL DEPRECIABLE PLANT	**19,108,871**	**20,368,874**

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOOK DEPRECIATION RESERVE VERSUS CALCULATED ACCRUED
AS OF DECEMBER 31, 2022

	DEPRECIABLE GROUP	BOOK DEPRECIATION RESERVE	CALCULATED ACCRUED
	(1)	(2)	(3)
	DEPRECIABLE PLANT		
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING		
	SHEPPARD AND MYERS RESERVOIR	572,044	703,860
	L. B. SHEPPARD (LONG ARM) RESERVOIR	1,480,958	1,562,607
	DREDGING	302,284	321,400
	TOTAL ACCOUNT 208	2,355,286	2,587,867
210	SPRINGS AND WELLS	191,624	201,646
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING		
	CLEAR LAKE	160,261	168,230
	KITZMILLER DAM	43,222	61,453
	TOTAL ACCOUNT 212.2	203,483	229,683
214	AQUEDUCTS AND SUPPLY MAINS	1,890,138	1,990,306
217	SEDIMENTATION BASINS	514,916	543,515
219	FILTERS	1,622,839	1,691,629
220	CLEAR WATER BASIN AND CLEARWELL	150,743	156,856
223	CHEMICAL TREATMENT PLANT		
	CHEMICAL BUILDING	813,452	850,891
	CHEMICAL TREATMENT EQUIPMENT	3,045,041	3,122,363
	PARR'S HILL CHLORINATION FACILITY	134,762	135,841
	TOTAL ACCOUNT 223	3,993,255	4,109,095
224	LABORATORY EQUIPMENT	17,255	17,456
236	STRUCTURES AND IMPROVEMENTS - PUMPING		
	PUMPING STRUCTURES	349,092	364,572
	PARR'S HILL BOOSTER STATION	378,459	398,552
	KIDD LANE PUMP STATION	7,289	7,689
	SLAGLE RUN PUMP STATION	25,544	26,904
	TOTAL ACCOUNT 236	760,384	797,717
237	PUMPS AND PUMPING EQUIPMENT	676,661	733,027
242	ELECTRICAL EQUIPMENT	179,537	289,087
243	OTHER PUMP STATION EQUIPMENT	17,293	17,723
246	TRANSMISSION MAINS	812,549	871,140
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	554,135	577,294
248	DISTRIBUTION MAINS	3,216,881	3,438,208
249	SERVICES	783,595	827,136
250	METERS	1,050,992	1,116,383
251	HYDRANTS	16,896	17,731
257	STRUCTURES AND IMPROVEMENTS - GENERAL	170,700	178,693

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOOK DEPRECIATION RESERVE VERSUS CALCULATED ACCRUED
AS OF DECEMBER 31, 2022

	DEPRECIABLE GROUP	BOOK DEPRECIATION RESERVE	CALCULATED ACCRUED
	(1)	(2)	(3)
258	GENERAL OFFICE EQUIPMENT		
	OFFICE FURNITURE	25,386	26,269
	OFFICE EQUIPMENT	42,602	44,896
	COMPUTER EQUIPMENT	37,900	38,748
	TOTAL ACCOUNT 258	105,888	109,913
259	OTHER GENERAL EQUIPMENT		
	CARS	134,105	130,274
	TRUCKS	358,291	352,929
	TOOLS, SHOP AND GARAGE EQUIPMENT	709,121	740,676
	COMMUNICATION EQUIPMENT	336,020	346,934
	TOTAL ACCOUNT 259	1,537,537	1,570,813
	TOTAL DEPRECIABLE PLANT	**20,822,587**	**22,072,918**

Exhibit D VI-5

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO DEPRECIATION
FILING REQUIREMENTS

5. Supply a schedule by account and depreciable group showing the survivor curve and annual accrual rate estimated to be appropriate:
   a. For the purposes of this filing.
   b. For the purposes of the most recent rate increase filing prior to the current proceedings.

RESPONSE

a. Refer to Table 1 in Exhibits JJS-1, JJS-2 and JJS-3.
b. Refer to the following schedule, 'Exhibit D VI-5 Attachment' pages 1 through 6 for survivor curves and annual accrual rates estimated to be appropriate in the most recent prior rate filing.

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT DECEMBER 31, 2013

	DEPRECIABLE GROUP	SURVIVOR CURVE		ORIGINAL COST AT DECEMBER 31, 2013	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	ANNUAL ACCRUAL RATE, PERCENT	COMPOSITE REMAINING LIFE
	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
DEPRECIABLE PLANT									
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING								
	SHEPPARD AND MYERS RESERVOIR	125-R2.5	*	745,649.36	464,549	281,100	14,088	1.89	20.0
	L. B. SHEPPARD (LONG ARM) RESERVOIR	125-R2.5	*	2,615,554.53	1,184,775	1,430,780	30,323	1.16	47.2
	DREDGING	125-R2.5	*	648,584.23	234,043	414,541	8,943	1.38	46.4
	JACOBS ROAD	125-R2.5	*	4,531.11	498	4,033	112	2.47	36.0
	TOTAL ACCOUNT 208			4,014,319.23	1,883,865	2,130,454	53,466	1.33	39.8
210	SPRINGS AND WELLS	45-R4		458,864.60	101,932	356,933	10,977	2.39	32.5
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING								
	CLEAR LAKE	125-R2.5	*	256,410.04	93,882	162,528	8,093	3.16	20.1
	KITZMILLER DAM	125-R2.5	*	78,938.03	26,052	52,886	2,630	3.33	20.1
	TOTAL ACCOUNT 212.2			335,348.07	119,934	215,414	10,723	3.20	20.1
214	AQUEDUCTS AND SUPPLY MAINS	100-S2.5	*	3,185,071.61	688,231	2,496,841	122,162	3.84	20.4
217	SEDIMENTATION BASINS	75-S1.5	*	779,765.45	389,964	389,801	15,967	2.05	24.4
219	FILTERS	65-R3	*	733,879.04	406,074	327,805	14,244	1.94	23.0
220	CLEAR WATER BASIN AND CLEARWELL	65-R4	*	62,313.73	35,304	27,010	1,528	2.45	17.7
223	CHEMICAL TREATMENT PLANT								
	CHEMICAL BUILDING	70-R4	*	274,311.15	138,095	136,216	7,979	2.91	17.1
	CHEMICAL TREATMENT EQUIPMENT	30-L3		2,388,396.65	1,714,771	673,626	79,818	3.34	8.4
	PARR'S HILL CHLORINATION FACILITY	40-S2.5	*	127,899.59	103,887	24,013	3,973	3.11	6.0
	TOTAL ACCOUNT 223			2,790,607.39	1,956,753	833,855	91,770	3.29	9.1
224	LABORATORY EQUIPMENT	30-S0.5		21,174.13	12,626	8,548	706	3.33	12.1
236	STRUCTURES AND IMPROVEMENTS - PUMPING								
	PUMPING STRUCTURES	70-R4	*	409,984.58	258,916	151,069	11,557	2.82	13.1
	PARR'S HILL BOOSTER STATION	70-R4	*	512,652.64	200,083	312,570	10,763	2.10	29.0
	KIDD LANE PUMP STATION	70-R4	*	13,552.02	4,300	9,252	353	2.60	26.2
	SLAGLE RUN PUMP STATION	70-R4	*	54,562.09	12,343	42,219	1,406	2.58	30.0
	TOTAL ACCOUNT 236			990,751.33	475,642	515,110	24,079	2.43	21.4
237	PUMPS AND PUMPING EQUIPMENT	50-R2.5		979,567.82	321,751	657,817	22,002	2.25	29.9
242	ELECTRICAL EQUIPMENT	50-R3		393,290.00	125,569	267,721	8,905	2.26	30.1
243	OTHER PUMP STATION EQUIPMENT	35-S2.5		23,694.60	12,629	11,066	753	3.18	14.7
246	TRANSMISSION MAINS	100-R3		2,173,139.37	631,498	1,541,641	24,178	1.11	63.8
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	60-S4		1,003,087.21	501,613	501,474	19,017	1.90	26.4
248	DISTRIBUTION MAINS	100-S2.5		9,442,792.61	2,376,402	7,066,390	105,220	1.11	67.2
249	SERVICES	65-S2.5		1,703,563.76	561,523	1,142,041	27,079	1.59	42.2
250	METERS	36-S4		1,523,827.18	854,289	669,538	48,271	3.17	13.9
251	HYDRANTS	70-R3		29,253.72	13,899	15,355	457	1.56	33.6
257	STRUCTURES AND IMPROVEMENTS - GENERAL	55-R3		288,474.49	83,690	204,784	5,938	2.06	34.5

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT DECEMBER 31, 2013

	DEPRECIABLE GROUP	SURVIVOR CURVE	ORIGINAL COST AT DECEMBER 31, 2013	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	ANNUAL ACCRUAL RATE, PERCENT	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
258	GENERAL OFFICE EQUIPMENT							
	OFFICE FURNITURE	20-SQ	27,232.87	24,267	2,966	1,622	5.96	1.8
	OFFICE EQUIPMENT	15-SQ	45,084.14	41,114	3,970	1,787	3.96	2.2
	COMPUTER EQUIPMENT	5-SQ	48,097.99	39,149	8,949	4,398	9.14	2.0
	TOTAL ACCOUNT 258		120,415.00	104,530	15,885	7,807	6.48	2.0
259	OTHER GENERAL EQUIPMENT							
	CARS	7-L3	91,314.83	57,358	33,957	11,378	12.46	3.0
	TRUCKS	10-L2.5	443,913.51	260,650	183,264	46,650	10.51	3.9
	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	809,352.67	442,770	366,583	41,041	5.07	8.9
	COMMUNICATION EQUIPMENT	10-SQ	66,862.99	57,836	9,027	3,085	4.61	2.9
	TOTAL ACCOUNT 259		1,411,444.00	818,614	592,831	102,154	7.24	5.8
	TOTAL DEPRECIABLE PLANT		**32,464,644.34**	**12,476,332**	**19,988,314**	**717,403**	2.21	27.9
	NONDEPRECIABLE PLANT							
205	LAND		21,951.59					
206	LAND		11,174.98					
207	LAND		2,689.89					
207.02	LAND		429,396.00					
207.03	LAND		74,314.20					
207.04	LAND		347,487.85					
207.05	LAND		36,800.00					
207.06	LAND		59,663.56					
207.1	TREES		24,916.00					
212.1	LAND		7,307.00					
234	LAND		78,564.00					
234.1	LAND - SLAGLE RUN		12,112.50					
245	RIGHTS OF WAY		17,188.92					
245.01	RIGHTS OF WAY		9,701.88					
246.03	REAL ESTATE - BOOSTER		2,293.05					
247.1	LAND - PARR'S HILL		37,130.00					
247.12	LAND - NEW STORAGE W.T.		9,310.05					
	TOTAL NONDEPRECIABLE PLANT		**1,182,001.47**					
	TOTAL UTILITY PLANT IN SERVICE		**33,646,645.81**	**12,476,332**	**19,988,314**	**717,403**		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT DECEMBER 31, 2014

	DEPRECIABLE GROUP	SURVIVOR CURVE		ORIGINAL COST AT DECEMBER 31, 2014	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	ANNUAL ACCRUAL RATE, PERCENT	COMPOSITE REMAINING LIFE
	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
DEPRECIABLE PLANT									
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING								
	SHEPPARD AND MYERS RESERVOIR	125-R2.5	*	862,051.59	479,742	382,310	20,159	2.34	19.0
	L. B. SHEPPARD (LONG ARM) RESERVOIR	125-R2.5	*	3,040,554.53	1,217,580	1,822,975	39,327	1.29	46.4
	DREDGING	125-R2.5	*	648,584.23	242,993	405,591	8,852	1.36	45.8
	JACOBS ROAD	125-R2.5	*	4,531.11	610	3,921	112	2.47	35.0
	TOTAL ACCOUNT 208			4,555,721.46	1,940,925	2,614,797	68,450	1.50	38.2
210	SPRINGS AND WELLS	45-R4		458,864.60	112,899	345,966	10,952	2.39	31.6
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING								
	CLEAR LAKE	125-R2.5	*	256,410.04	101,985	154,425	8,077	3.15	19.1
	KITZMILLER DAM	125-R2.5	*	78,938.03	28,681	50,257	2,624	3.32	19.2
	TOTAL ACCOUNT 212.2			335,348.07	130,666	204,682	10,701	3.19	19.1
214	AQUEDUCTS AND SUPPLY MAINS	100-S2.5	*	3,185,071.61	810,538	2,374,534	122,154	3.84	19.4
217	SEDIMENTATION BASINS	75-S1.5	*	779,765.45	405,949	373,816	15,802	2.03	23.7
219	FILTERS	65-R3	*	733,879.04	420,311	313,568	14,216	1.94	22.1
220	CLEAR WATER BASIN AND CLEARWELL	65-R4	*	62,313.73	36,831	25,483	1,527	2.45	16.7
223	CHEMICAL TREATMENT PLANT								
	CHEMICAL BUILDING	70-R4	*	374,311.15	147,532	226,779	13,568	3.62	16.7
	CHEMICAL TREATMENT EQUIPMENT	30-L3		2,513,496.65	1,795,043	718,454	76,103	3.03	9.4
	PARR'S HILL CHLORINATION FACILITY	40-S2.5	*	127,899.59	107,865	20,035	3,675	2.87	5.5
	TOTAL ACCOUNT 223			3,015,707.39	2,050,440	965,268	93,346	3.10	10.3
224	LABORATORY EQUIPMENT	30-S0.5		21,174.13	13,331	7,843	660	3.12	11.9
236	STRUCTURES AND IMPROVEMENTS - PUMPING								
	PUMPING STRUCTURES	70-R4	*	419,784.58	269,816	149,969	12,382	2.95	12.1
	PARR'S HILL BOOSTER STATION	70-R4	*	1,700,775.85	206,174	1,494,602	51,369	3.02	29.1
	KIDD LANE PUMP STATION	70-R4	*	13,552.02	4,652	8,900	354	2.61	25.1
	SLAGLE RUN PUMP STATION	70-R4	*	54,562.09	13,751	40,811	1,406	2.58	29.0
	TOTAL ACCOUNT 236			2,188,674.54	494,393	1,694,282	65,511	2.99	25.9
237	PUMPS AND PUMPING EQUIPMENT	50-R2.5		1,716,476.23	334,972	1,381,504	41,928	2.44	32.9
242	ELECTRICAL EQUIPMENT	50-R3		516,544.06	135,850	380,694	11,671	2.26	32.6
243	OTHER PUMP STATION EQUIPMENT	35-S2.5		23,694.60	13,382	10,313	734	3.10	14.1
246	TRANSMISSION MAINS	100-R3		2,173,139.37	655,620	1,517,519	24,088	1.11	63.0
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	60-S4		2,181,653.39	467,388	1,714,265	39,088	1.79	43.9
248	DISTRIBUTION MAINS	100-S2.5		9,889,122.61	2,480,970	7,408,153	109,854	1.11	67.4
249	SERVICES	65-S2.5		1,795,308.76	588,129	1,207,180	28,369	1.58	42.6
250	METERS	36-S4		1,557,942.18	903,135	654,807	46,900	3.01	14.0
251	HYDRANTS	70-R3		36,528.72	14,412	22,117	580	1.59	38.1
257	STRUCTURES AND IMPROVEMENTS - GENERAL	55-R3		288,474.49	89,633	198,841	5,867	2.03	33.9
258	GENERAL OFFICE EQUIPMENT								
	OFFICE FURNITURE	20-SQ		27,232.87	25,890	1,343	127	0.47	10.6
	OFFICE EQUIPMENT	15-SQ		45,084.14	42,899	2,185	1,139	2.53	1.9
	COMPUTER EQUIPMENT	5-SQ		48,097.99	43,545	4,553	2,510	5.22	1.8
	TOTAL ACCOUNT 258			120,415.00	112,334	8,081	3,776	3.14	2.1

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT DECEMBER 31, 2014

	DEPRECIABLE GROUP	SURVIVOR CURVE	ORIGINAL COST AT DECEMBER 31, 2014	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	ANNUAL ACCRUAL RATE, PERCENT	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
259	OTHER GENERAL EQUIPMENT							
	CARS	7-L3	91,314.83	68,736	22,579	6,788	7.43	3.3
	TRUCKS	10-L2.5	468,913.51	308,619	160,295	39,031	8.32	4.1
	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	809,352.67	483,804	325,549	35,679	4.41	9.1
	COMMUNICATION EQUIPMENT	10-SQ	66,862.99	60,918	5,945	2,625	3.93	2.3
	TOTAL ACCOUNT 259		1,436,444.00	922,077	514,368	84,123	5.86	6.1
TOTAL DEPRECIABLE PLANT			**37,072,263.43**	**13,134,185**	**23,938,081**	**800,297**	2.16	29.9
CONTRIBUTIONS IN AID OF CONSTRUCTION								
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	60-S4	333,333.00	0	333,333	5,783	1.73	57.6
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION			**333,333.00**	**0**	**333,333**	**5,783**		
NONDEPRECIABLE PLANT								
205	LAND		21,951.59					
206	LAND		11,174.98					
207	LAND		2,689.89					
207.02	LAND		429,396.00					
207.03	LAND		74,314.20					
207.04	LAND		347,487.85					
207.05	LAND		36,800.00					
207.06	LAND		59,663.56					
207.1	TREES		24,916.00					
212.1	LAND		7,307.00					
234	LAND		78,564.00					
234.1	LAND - SLAGLE RUN		12,112.50					
245	RIGHTS OF WAY		17,188.92					
245.01	RIGHTS OF WAY		9,701.88					
246.03	REAL ESTATE - BOOSTER		2,293.05					
247.1	LAND - PARR'S HILL		37,130.00					
247.12	LAND - NEW STORAGE W.T.		9,310.05					
TOTAL NONDEPRECIABLE PLANT			**1,182,001.47**					
TOTAL UTILITY PLANT IN SERVICE			**37,920,931.90**	**13,134,185**	**23,604,748**	**794,514**		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT MARCH 31, 2016

	DEPRECIABLE GROUP	SURVIVOR CURVE		ORIGINAL COST AT MARCH 31, 2016	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	ANNUAL ACCRUAL RATE, PERCENT	COMPOSITE REMAINING LIFE
	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
DEPRECIABLE PLANT									
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING								
	SHEPPARD AND MYERS RESERVOIR	125-R2.5	*	862,051.59	504,957	357,095	20,070	2.33	17.8
	L. B. SHEPPARD (LONG ARM) RESERVOIR	125-R2.5	*	3,040,554.53	1,266,609	1,773,946	38,486	1.27	46.1
	DREDGING	125-R2.5	*	648,584.23	254,019	394,565	8,850	1.36	44.6
	JACOBS ROAD	125-R2.5	*	4,531.11	750	3,781	112	2.47	33.8
	TOTAL ACCOUNT 208			4,555,721.46	2,026,335	2,529,387	67,518	1.48	37.5
210	SPRINGS AND WELLS	45-R4		458,864.60	126,608	332,257	10,933	2.38	30.4
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING								
	CLEAR LAKE	125-R2.5	*	256,410.04	112,081	144,329	8,045	3.14	17.9
	KITZMILLER DAM	125-R2.5	*	78,938.03	31,957	46,981	2,617	3.32	18.0
	TOTAL ACCOUNT 212.2			335,348.07	144,038	191,310	10,662	3.18	17.9
214	AQUEDUCTS AND SUPPLY MAINS	100-S2.5	*	3,185,071.61	963,421	2,221,651	122,105	3.83	18.2
217	SEDIMENTATION BASINS	75-S1.5	*	779,765.45	425,736	354,029	15,616	2.00	22.7
219	FILTERS	65-R3	*	733,879.04	438,108	295,771	13,979	1.90	21.2
220	CLEAR WATER BASIN AND CLEARWELL	65-R4	*	62,313.73	38,739	23,575	1,525	2.45	15.5
223	CHEMICAL TREATMENT PLANT								
	CHEMICAL BUILDING	70-R4	*	6,028,651.15	286,739	5,741,912	354,689	5.88	16.2
	CHEMICAL TREATMENT EQUIPMENT	30-L3		9,526,396.65	1,975,948	7,550,449	336,866	3.54	22.4
	PARR'S HILL CHLORINATION FACILITY	40-S2.5	*	127,899.59	112,453	15,447	3,222	2.52	4.8
	TOTAL ACCOUNT 223			15,682,947.39	2,375,140	13,307,808	694,777	4.43	19.2
224	LABORATORY EQUIPMENT	30-S0.5		21,174.13	14,157	7,017	597	2.82	11.8
236	STRUCTURES AND IMPROVEMENTS - PUMPING								
	PUMPING STRUCTURES	70-R4	*	419,784.58	285,296	134,489	12,286	2.93	10.9
	PARR'S HILL BOOSTER STATION	70-R4	*	1,700,775.85	270,378	1,430,398	51,354	3.02	27.9
	KIDD LANE PUMP STATION	70-R4	*	13,552.02	5,094	8,458	354	2.61	23.9
	SLAGLE RUN PUMP STATION	70-R4	*	54,562.09	15,511	39,051	1,406	2.58	27.8
	TOTAL ACCOUNT 236			2,188,674.54	576,279	1,612,396	65,400	2.99	24.7
237	PUMPS AND PUMPING EQUIPMENT	50-R2.5		1,716,476.23	387,325	1,329,151	40,161	2.34	33.1
242	ELECTRICAL EQUIPMENT	50-R3		516,544.06	150,442	366,102	11,369	2.20	32.2
243	OTHER PUMP STATION EQUIPMENT	35-S2.5		23,694.60	14,300	9,395	708	2.99	13.3
246	TRANSMISSION MAINS	100-R3		2,173,139.37	685,772	1,487,367	24,024	1.11	61.9
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	60-S4		3,499,653.39	530,948	2,968,705	61,654	1.76	48.2
248	DISTRIBUTION MAINS	100-S2.5		10,760,942.61	2,611,515	8,149,428	119,221	1.11	68.4
249	SERVICES	65-S2.5		1,943,393.76	621,009	1,322,385	30,480	1.57	43.4
250	METERS	36-S4		1,608,407.18	962,702	645,705	45,163	2.81	14.3
251	HYDRANTS	70-R3		64,593.72	14,107	50,487	1,057	1.64	47.8
257	STRUCTURES AND IMPROVEMENTS - GENERAL	55-R3		288,474.49	96,953	191,521	5,630	1.95	34.0
258	GENERAL OFFICE EQUIPMENT								
	OFFICE FURNITURE	20-SQ		27,232.87	26,050	1,183	120	0.44	9.9
	OFFICE EQUIPMENT	15-SQ		65,084.14	44,641	20,443	1,507	2.32	13.6
	COMPUTER EQUIPMENT	5-SQ		48,097.99	46,683	1,415	1,154	2.40	1.2
	TOTAL ACCOUNT 258			140,415.00	117,374	23,041	2,781	1.98	8.3

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT MARCH 31, 2016

	DEPRECIABLE GROUP	SURVIVOR CURVE	ORIGINAL COST AT MARCH 31, 2016	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	ANNUAL ACCRUAL RATE, PERCENT	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
259	OTHER GENERAL EQUIPMENT							
	CARS	7-L3	91,314.83	77,217	14,098	4,863	5.33	2.9
	TRUCKS	10-L2.5	468,913.51	357,386	111,528	28,045	5.98	4.0
	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	809,352.67	528,420	280,933	32,689	4.04	8.6
	COMMUNICATION EQUIPMENT	10-SQ	66,862.99	64,203	2,660	1,625	2.43	1.6
	TOTAL ACCOUNT 259		1,436,444.00	1,027,226	409,219	67,222	4.68	6.1
TOTAL DEPRECIABLE PLANT			**52,175,938.43**	**14,348,234**	**37,827,707**	**1,412,582**	2.71	26.8
CONTRIBUTIONS IN AID OF CONSTRUCTION								
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	60-S4	333,333.00	7,208	326,125	5,783	1.73	56.4
TOTAL CONTRIBUTIONS IN AID OF CONSTRUCTION			**333,333.00**	**7,208**	**326,125**	**5,783**		
NONDEPRECIABLE PLANT								
205	LAND		21,951.59					
206	LAND		11,174.98					
207	LAND		2,689.89					
207.02	LAND		429,396.00					
207.03	LAND		74,314.20					
207.04	LAND		347,487.85					
207.05	LAND		36,800.00					
207.06	LAND		59,663.56					
207.1	TREES		24,916.00					
212.1	LAND		7,307.00					
234	LAND		78,564.00					
234.1	LAND - SLAGLE RUN		12,112.50					
245	RIGHTS OF WAY		17,188.92					
245.01	RIGHTS OF WAY		9,701.88					
246.03	REAL ESTATE - BOOSTER		2,293.05					
247.1	LAND - PARR'S HILL		37,130.00					
247.12	LAND - NEW STORAGE W.T.		9,310.05					
TOTAL NONDEPRECIABLE PLANT			**1,182,001.47**					
TOTAL UTILITY PLANT IN SERVICE			**53,024,606.90**	**14,341,026**	**37,501,582**	**1,406,799**		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO DEPRECIATION
FILING REQUIREMENTS

6. Provide an exhibit showing gross salvage, cost of removal, and net salvage for the 5 most recent calendar or fiscal years by account.

RESPONSE

There has been no cost of removal, gross salvage or net salvage recorded for the last 5 years.

``

Exhibit D VII-1

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

1. Provide capitalization and capitalization ratios for the last 5-year period and projected through the next 2 years (with short-term debt and without short-term debt) for the company, parent and consolidated system.
   a. Provide year-end interest coverages before and after taxes for the last 3 years and at the latest date, including indenture and Securities and Exchange Commission (SEC) bases, for the company, parent and consolidated system.
   b. Provide year-end preferred stock dividend coverages for the last 3 years and at latest date, including charter and SEC bases.

RESPONSE

Not applicable, the respondent is a fund of a borough government. Below is the requested information for the Water Fund.

Hanover Municipal Water Works
Capitalization and Capitalization Ratios

	2015	2016	2017	2018	2019
Short-Term Debt	$0	$0	$0	$0	$0
Long-Term Debt	21,168,636	20,643,515	20,660,186	20,084,148	19,323,110
Fund Equity	22,785,046	25,414,338	28,175,276	29,492,691	31,553,071
Total	$43,953,682	$46,057,853	$48,835,462	$49,576,839	$50,876,181
Short-Term Debt	0.0%	0.0%	0.0%	0.0%	0.0%
Long-Term Debt	48.2%	44.8%	42.3%	40.5%	38.0%
Fund Equity	51.8%	55.2%	57.7%	59.5%	62.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

a. Not applicable, the respondent is a fund of a borough government.
b. Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-2

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

2. Provide latest prospectus for the company and the parent.

RESPONSE

Attached is requested information.

NEW ISSUE—BOOK-ENTRY ONLY

RATING: Moody's: "Aa3" (Underlying)
(See "RATING" herein)

In the opinion of Bond Counsel, under existing statutes, regulations, rulings and court decisions, interest on the Bonds, will not be includible in gross income of the holders thereof for federal income tax purposes, assuming continuing compliance by the Borough with the requirements of the Internal Revenue Code of 1986, as amended (the "Code"). Interest on the Bonds will not be a specific preference item for purposes of computing the federal alternative minimum tax on individuals. Under the laws of the Commonwealth of Pennsylvania, as enacted and construed on the date hereof, interest on the Bonds is exempt from Pennsylvania personal income tax and Pennsylvania corporate net income tax. See "TAX MATTERS" herein.

$9,440,000
Borough of Hanover
(York County, Pennsylvania)
General Obligation Bonds, Series D of 2020

Bonds Dated: Date of Delivery
Interest Due: April 1 and October 1

Principal Due: October 1, as shown on inside cover
First Interest Payment: April 1, 2021

The General Obligation Bonds, Series D of 2020 (the "Bonds"), in the aggregate principal amount of $9,440,000 of the Borough of Hanover, York County, Pennsylvania (the "Borough") are issuable as fully registered Bonds, without coupons, and when issued, will be registered in the name of Cede & Co., as partnership nominee for The Depository Trust Company, New York, New York ("DTC"), which will act as securities depository for the Bonds. Beneficial ownership interest in the Bonds will be recorded in book-entry-only form in denominations of $5,000 and any integral multiple thereof. Interest on the Bonds will be payable semi-annually on April 1 and October 1, of each year, commencing on April 1, 2021, at the rates shown on the inside cover. The Bonds will be payable as to principal upon presentation and surrender thereof at the designated corporate trust office of Manufacturers and Traders Trust Company located in Harrisburg, Pennsylvania, in its capacity as Paying Agent (the "Paying Agent"). So long as DTC or its partnership nominee, Cede & Co., is the registered owner of the Bonds, payments of the principal of and interest on the Bonds will be made directly to Cede & Co., which will remit such payments to the DTC participant, which will in turn remit such payments to the beneficial owners of the Bonds. Purchasers will not receive physical delivery of the Bonds, see "Book-Entry Only System" herein.

The Bonds are subject to redemption as described herein.

The Bonds are general obligations of the Borough, payable from the tax and other general revenues of the Borough, which presently include an annual ad valorem tax which may be levied on all taxable real property within the Borough without limitation as to rate or amount for the payment of debt service on the Bonds. The Borough has covenanted, in the Ordinance (hereinafter defined), that the Borough shall do the following: (1) include the amount of the debt service for the Bonds for each fiscal year in which such sums are payable in its budget for that year; (2) appropriate those amounts from its general revenues for the payment of such debt service, and (3) duly and punctually pay or cause to be paid from its Sinking Fund, as hereinafter defined, or any other of its revenues or funds, the principal of and interest on each of the Bonds at the dates and places and in the manner stated in the Bonds, according to the true intent and meaning thereof. For such budgeting, appropriation and payment in respect of the Bonds, the Borough, under said Ordinance, has irrevocably pledged its full faith, credit and taxing power. Water rates and charges collected from users of the public water system operated by the Borough, although not specifically pledged, are intended to be used by the Borough as the source of funds from which to pay the principal of and interest on the Bonds.

Proceeds of the Bonds will provide funds for and toward: (i) funding the Borough's water projects and (ii) paying the costs, fees and expenses incurred in connection with the issuance of the Bonds.

MATURITIES, AMOUNTS, RATES, INITIAL OFFERING YIELDS, AND CUSIPS
{As Shown on Inside Cover}

These Bonds are offered when, as and if issued by the Borough and received by the Underwriter and subject to the receipt of the unqualified approving legal opinion of Eckert Seamans Cherin & Mellott, LLC, Harrisburg, Pennsylvania, Bond Counsel, to be furnished upon delivery of the Bonds. Certain legal matters pertaining to the Borough will be passed upon for the Borough by Salzmann Hughes, P.C., Borough Solicitor, Hanover, Pennsylvania. It is expected the Bonds will be available for delivery in New York, New York on or about December 17, 2020.



Official Statement Dated: December 2, 2020.

$9,440,000
Borough of Hanover
(York County, Pennsylvania)
General Obligation Bonds, Series D of 2020

Dated: Date of Delivery
Interest Due: April 1 and October 1

Principal Due: October 1, as shown below
First Interest Payment: April 1, 2021

PRINCIPAL MATURITY DATES AND AMOUNTS, INTEREST RATES, INTIAL OFFERING YIELDS AND CUSIP NUMBERS

Maturity Date (October 1) Year	Principal Amounts	Interest Rates	Initial Offering Yields	CUSIP Numbers[(1)]
2022	$245,000	3.000%	0.370%	410718QZ6
2023	250,000	4.000	0.450	410718RA0
2024	260,000	4.000	0.540	410718RB8
2025	270,000	4.000	0.620	410718RC6
2026	285,000	4.000	0.700*	410718RD4
2027	295,000	4.000	0.750*	410718RE2
2028	305,000	4.000	0.770*	410718RF9
2029	320,000	4.000	0.790*	410718RG7
2030	330,000	4.000	0.850*	410718RH5
2032**	705,000	4.000	0.960*	410718RJ1
2035**	1,155,000	4.000	1.100*	410718RK8
2037**	855,000	4.000	1.220*	410718RL6
2038	450,000	4.000	1.260*	410718RM4
2039	470,000	4.000	1.300*	410718RN2
2040	490,000	4.000	1.340*	410718RP7
2042**	1,040,000	4.000	1.470*	410718RQ5
2045**	1,715,000	4.000	1.600*	410718RR3

[(1)]The above CUSIP (Committee on Uniform Securities Identification Procedures) numbers have been assigned by an organization not affiliated with the Borough or the Underwriter, and such parties are not responsible for the selection or use of the CUSIP numbers. The CUSIP numbers are included solely for the convenience of bondholders and no representation is made as to the correctness of such CUSIP numbers. CUSIP numbers assigned to securities may be changed during the term of such securities based on a number of factors including, but not limited to, the refunding or defeasance of such issue or the use of secondary market financial products. Neither the Borough nor the Underwriter has agreed to, and there is no duty or obligation to, update this Official Statement to reflect any change or correction in the CUSIP numbers set forth above.
*Yield to First Optional Redemption Date of April 1, 2026.
**Term Bonds.

BOROUGH OF HANOVER

(York County, Pennsylvania)

MAYOR

Myneca Ojo

BOROUGH COUNCIL

William W. Reichart II ..... President
Barbara A. Rupp ..... Vice President
Heath Chesney ..... Member
Darlene Funk ..... Member
Charles Hegberg ..... Member
Ray Hoover ..... Member
Christopher Lockard ..... Member
Jeanine Pranses ..... Member
Scott Roland ..... Member
Vacant ..... Member

BOROUGH MANAGER

Nan Dunford

FINANCE DIRECTOR

R. Samuel Miller, CPA, CGFM, MBA

BOROUGH SOLICITOR

Salzmann Hughes, P.C.
Hanover, Pennsylvania

PAYING AGENT AND SINKING FUND DEPOSITORY

Manufacturers and Traders Trust Company
Harrisburg, Pennsylvania and Buffalo, New York

BOND COUNSEL

Eckert Seamans Cherin & Mellott, LLC
Harrisburg, Pennsylvania

FINANCIAL ADVISOR

PFM Financial Advisors LLC
Harrisburg, Pennsylvania

CONSULTING ENGINEER

Gannett Fleming, Inc.
Camp Hill, Pennsylvania

UNDERWRITER

PNC Capital Markets LLC
Philadelphia, Pennsylvania

BOROUGH ADDRESS

44 Frederick Street
Hanover, Pennsylvania 17331

No dealer, broker, salesman or other person has been authorized by the Borough to give information or to make any representations, other than those contained in this Official Statement, and if given or made, such other information or representations must not be relied upon. This Official Statement does not constitute an offer to sell or the solicitation of an offer to buy, nor shall there be any sale of the Bonds in any jurisdiction in which it is unlawful to make such offer, solicitation or sale. The information set forth herein has been obtained from the Borough and from other sources which are believed to be reliable but the Borough does not guarantee the accuracy or completeness of information from sources other than the Borough. The information and expressions of opinion herein are subject to change without notice and neither the delivery of this Official Statement nor any sale made hereunder shall, under any circumstances, create any implication that there has been no change in any of the information set forth herein since the date hereof.

The quotations from and summaries and explanation of provisions of laws and documents contained herein, including the cover page, inside cover page and Appendices attached hereto, do not purport to be complete. Reference is made to such laws and documents for full and complete statements of their provisions. Any statements made in this Official Statement involving estimates or matters of opinion, whether or not expressly so stated, are intended merely as estimates or opinions and not as representations of fact.

The Underwriter may offer and sell the Bonds to certain dealers (including dealers depositing the Bonds into investment trust(s)) and others at prices lower than the public offering prices stated on the inside cover hereof.

IN CONNECTION WITH THIS OFFERING, THE UNDERWRITER MAY OVER ALLOT OR EFFECT TRANSACTIONS WHICH STABILIZE OR MAINTAIN THE MARKET PRICE OF THE BONDS AT A LEVEL ABOVE THAT WHICH MIGHT OTHERWISE PREVAIL IN THE OPEN MARKET, SUCH STABILIZING, IF COMMENCED MAY BE DISCONTINUED AT ANY TIME, WITHOUT PRIOR NOTICE.

THE ORDER AND PLACEMENT OF MATERIALS IN THIS OFFICIAL STATEMENT, INCLUDING THE APPENDICES HERETO AND INFORMATION INCORPORATED HEREIN BY REFERENCE, ARE NOT TO BE DEEMED TO BE A DETERMINATION OF RELEVANCE, MATERIALITY OR IMPORTANCE, AND THIS OFFICIAL STATEMENT, INCLUDING THE APPENDICES HERETO AND INFORMATION INCORPORATED HEREIN BY REFERENCE, MUST BE CONSIDERED IN ITS ENTIRETY. THE OFFERING OF THE BONDS IS MADE ONLY BY MEANS OF THIS ENTIRE OFFICIAL STATEMENT.

IN MAKING AN INVESTMENT DECISION, INVESTORS MUST RELY ON THEIR OWN EXAMINATION OF THE TERMS OF THE OFFERING, INCLUDING THE MERITS AND RISKS INVOLVED. THE BONDS HAVE NOT BEEN RECOMMENDED BY ANY FEDERAL OR STATE SECURITIES COMMISSION OR REGULATORY AUTHORITY. FURTHERMORE, THE FOREGOING AUTHORITIES HAVE NOT CONFIRMED THE ACCURACY OR DETERMINED THE ADEQUACY OF THIS DOCUMENT AND ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

The Underwriter has provided the following sentence for inclusion in this Official Statement: The Underwriter has reviewed the information in this Official Statement in accordance with, and as part of, its responsibilities to investors under the federal securities laws as applied to the facts and circumstances of this transaction, but the Underwriter does not guarantee the accuracy or completeness of such information.

This Table of Contents is for convenience of reference only and does not list all of the subjects in this Official Statement. In all instances, references should be made of the complete Official Statement to determine the subjects discussed in it. The order and placement of material in this Official Statement, including the Appendices, are not to be deemed a determination of relevance, materiality or importance, and this Official Statement, including the Appendices, must be considered in its entirety.

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OFFICIAL STATEMENT

$9,440,000
Borough of Hanover
(York County, Pennsylvania)
General Obligation Bonds, Series D of 2020

INTRODUCTION

This Official Statement, including the cover page, inside cover page and the attached appendices, is to provide information regarding the offering by the Borough of Hanover, York County, Pennsylvania (the "Borough") of $9,440,000 General Obligation Bonds, Series D of 2020 (the "Bonds"), dated as of the date of delivery thereof (the "Date of Delivery"). The Bonds are issued in accordance with the requirements of the Local Government Unit Debt Act, 53 Pa.C.S.Chs. 80-82 (the "Debt Act"), of the Commonwealth of Pennsylvania (the "Commonwealth") and pursuant to an ordinance of the Borough enacted October 28, 2020 (the "Ordinance"). Manufacturers and Traders Trust Company, having offices in Harrisburg, Pennsylvania and Buffalo, New York, has been appointed as the Paying Agent, Registrar and Sinking Fund Depository (the "Paying Agent") for the Bonds.

The Bonds are general obligations of the Borough, payable from the tax and other general revenues of the Borough, which presently include an annual ad valorem tax which may be levied on all taxable real property within the Borough without limitation as to rate or amount for the payment of debt service on the Bonds. The Borough has covenanted, in the Ordinance, that the Borough shall do the following: (1) include the amount of the debt service for the Bonds for each fiscal year in which sums are payable in its budget for that year; (2) appropriate those amounts from its general revenues for the payment of such debt service; and (3) duly and punctually pay or cause to be paid from its Sinking Fund, as herein defined, or any other of its revenues or funds, the principal of and interest on each of the Bonds at the dates and places and in the manner stated in the Bonds, according to the true intent and meaning thereof. For such budgeting, appropriation and payment in respect of the Bonds, the Borough, under the Ordinance, has irrevocably pledged its full faith, credit and taxing power.

Neither the delivery of this Official Statement nor any sale of the Bonds hereunder shall, under any circumstances, create an implication that thereafter there have been no changes in the affairs of the Borough since the date of this Official Statement or the earliest date as of which certain information contained herein is given.

AUTHORITY FOR THE ISSUANCE

The Bonds are issued in accordance with the requirements of the Debt Act and pursuant to the Ordinance.

Issuance of the Bonds will be approved by the Department of Community and Economic Development (the "Department") of the Commonwealth pursuant to the Debt Act prior to their delivery.

PURPOSE OF THE ISSUE

Proceeds of the Bonds will provide funds for and toward: (i) funding the Borough's water projects, including but not limited to, the rehabilitation of the Bourgh's Sheppard-Myers Reservoir and Dam and (ii) paying the costs, fees and expenses incurred in connection with the issuance of the Bonds.

Sources and Uses of Bond Proceeds

The following is a summary of the sources and uses of the proceeds from the issuance of the Bonds.

Sources of Funds	**Total**
Bond Proceeds	$9,440,000.00
Original Issue Premium	1,307,179.45
Total Sources of Funds	$10,747,179.45
Uses of Funds	
Project Fund Deposit	$10,619,149.45
Issuance Costs[(1)]	128,030.00
Total Uses of Funds	$10,747,179.45

[(1)]Includes legal, financial advisor, printing, rating, underwriter's discount, CUSIP, paying agent, and miscellaneous costs and fees.

THE BONDS

Description

The Bonds will be issued in book-entry only form, in denominations of $5,000 principal amount and integral multiples thereof. The Bonds will be issued in the aggregate principal amount of $9,440,000, dated the Date of Delivery, and will bear interest at the rates and mature in the amounts and on the dates set forth on the inside cover of this Official Statement. Interest on the Bonds will be payable initially on April 1, 2021, and thereafter, semiannually on April 1 and October 1, of each year until the maturity date of such Bond or, if such Bond is subject to redemption prior to maturity, until the date fixed for redemption thereof, if payment of the redemption price has been duly made or provided for.

When issued, the Bonds will be registered in the name of Cede & Co., as the partnership nominee for The Depository Trust Company ("DTC"), New York, New York. Purchasers of the Bonds (the "Beneficial Owners") will not receive any paper of bond certificates, and beneficial ownership of the Bonds will be evidenced only by electronic book entries. See "BOOK–ENTRY ONLY SYSTEM" herein.

Payment of Principal and Interest

So long as Cede & Co., as nominee of DTC, is the registered owner of the Bonds, payments of principal of, redemption premium, if any, and interest on the Bonds, when due, are to be made to DTC and all such payments shall be valid and effective to satisfy fully and to discharge the obligations of the Borough with respect to, and to the extent of, principal, redemption premium, if any, and interest so paid. If the use of the book-entry only system for the Bonds is discontinued for any reason, bond certificates will be issued to the Beneficial Owners of the Bonds and payment of principal, redemption premium, if any, and interest on the Bonds shall be made as described in the following paragraphs:

The principal of any certificated Bonds, when due upon maturity or upon any earlier redemption, will be paid to the owners of such Bonds, or assigns, determined from registration records maintained by Manufacturers and Traders Trust Company (the "Paying Agent"), acting as paying agent and sinking fund depository for the Bonds, upon surrender of such certificated Bonds at its specified corporate trust office (or to any successor paying agent or alternate designated office(s)).

Interest on certificated Bonds will be payable to the registered owner of such Bond from the interest payment date next preceding the date of registration and authentication of such Bond, unless: (a) such Bond is registered and authenticated as of an interest payment date, in which event such Bond shall bear interest from said interest payment date, or (b) such Bond is registered and authenticated after a Record Date (hereinafter defined) and before the next succeeding interest payment date, in which event such Bond shall bear interest from such interest payment date, or (c) such Bond is registered and authenticated on or prior to the Record Date preceding April 1, 2021, in which event such Bond shall bear interest from the Date of Delivery, or (d) as shown by the records of the Paying Agent, interest on such Bond shall be in default, in which event such Bond shall bear interest from the date to which interest was last paid on such Bond. Interest on certificated Bonds will be payable by check drawn on the Paying Agent, which shall be mailed to the registered owner whose name and address shall appear, at the close of business on the fifteenth (15^{th}) day (whether or not a day on which the Paying Agent is open for business) next preceding each interest payment date (the "Record Date"), on the registration books maintained by the Paying Agent, irrespective of any transfer or exchange of the Bond subsequent to such Record Date and prior to such interest payment date, unless the Borough shall be in default in payment of interest due on such interest payment date. In the event of any such default, such defaulted interest shall be payable to the person in whose name such Bond is registered at the close of business on a special record date for the payment of such defaulted interest established by notice mailed by the Paying Agent to the registered owners of such Bonds not less than fifteen (15) days preceding such special record date. Such notice shall be mailed to the persons in whose names such Bonds are registered at the close of business on the fifth (5^{th}) day preceding the date of mailing.

If the date for payment of the principal of or interest on any Bonds shall be a Saturday, Sunday, legal holiday or a day on which banking institutions in the Commonwealth are authorized or required by law or executive order to close, then the date for payment of such principal or interest shall be the next succeeding day which is not a Saturday, Sunday, legal holiday or a day on which such banking institutions are authorized or required to close, and payment on such date shall have the same force and effect as if made on the nominal date established for such payment.

Transfer, Exchange and Registration of Bonds

Subject to the provisions described below under "Book-Entry Only System", certificated Bonds are transferable or exchangeable by the registered owners thereof upon surrender of such Bonds to the Paying Agent, accompanied by a written instrument or instruments in form, with instructions, and with guaranty of signature satisfactory to the Paying Agent, duly executed by the registered owner of such Bond or his attorney-in-fact or legal representative. The Paying Agent shall enter any transfer of ownership of certificated Bonds in the registration books and shall authenticate and deliver at the earliest practicable time in the name of the transferee or transferees a new fully registered bond or bonds of authorized denominations of the same series, maturity and interest rate for the aggregate principal amount which the registered owner is entitled to receive. The Borough and the Paying Agent may deem and treat the registered owner of any certificated Bond as the absolute owner thereof (whether or not a Bond shall be overdue) for the purpose of receiving payment of or on account of principal and interest and for all other purposes, and the Borough and the Paying Agent shall not be affected by any notice to the contrary.

The Borough and the Paying Agent shall not be required (a) to register the transfer of or exchange any Bonds then considered for redemption during a period beginning at the close of business on the fifteenth (15th) day next preceding any date of selection of Bonds to be redeemed and ending at the close of business on the day on which the applicable notice of redemption is mailed or (b) to register the transfer of or exchange any portion of any Bond selected for redemption until after the redemption date. Bonds may be exchanged for a like aggregate principal amount of Bonds of other authorized denominations of the same series, maturity and interest rate.

REDEMPTION OF BONDS

Optional Redemption

The Bonds stated to mature on or after October 1, 2026, shall be subject to redemption prior to maturity, at the option of the Borough, as a whole, on April 1, 2026, or on any date thereafter, or from time to time, in part (and if in part, in any order of maturity as selected by the Borough and within a maturity by lot), in either case upon payment of a redemption price of 100% of the principal amount of such Bonds redeemed, together with accrued interest to the redemption date.

Mandatory Redemption

The Bonds stated to mature on October 1, 2032, October 1, 2035, October 1, 2037, October 1, 2042 and October 1, 2045 are subject to redemption prior to maturity as required by the Ordinance, in the amounts and on October 1 of the years shown below, from moneys in the Sinking Fund created pursuant to the Ordinance, upon payment of the principal amount being redeemed, together with interest accrued to the date fixed for redemption.

Bonds stated to mature October 1, 2032:

2031	$345,000
2032*	360,000

*Maturity

Bonds stated to mature October 1, 2035:

2033	$370,000
2034	385,000
2035*	400,000

*Maturity

Bonds stated to mature October 1, 2037:

2036	$420,000
2037*	435,000

*Maturity

Bonds stated to mature October 1, 2042:

2041	$510,000
2042*	530,000

*Maturity

Bonds stated to mature October 1, 2045:

2043	$550,000
2044	570,000
2045*	595,000

*Final Maturity

Notice of Redemption

So long as Cede & Co., as nominee of DTC, is the registered owner of the Bonds, however, the Borough and the Paying Agent shall send redemption notices only to Cede & Co. See "BOOK-ENTRY ONLY SYSTEM" herein for further information regarding conveyance of notices to Beneficial Owners.

Notice of any redemption of Bonds shall be given by depositing a copy of the redemption notice by first class mail not more than forty-five (45) days nor less than twenty (20) days prior to the date fixed for redemption addressed to each of the registered owners of any certificated Bonds to be redeemed, in whole or in part, at the addresses shown on the registration books maintained by the Paying Agent; provided, however, that failure to give such notice by mailing, or any defect therein or in the mailing thereof, shall not affect the validity of any proceeding for redemption of other Bonds so called for redemption as to which proper notice has been given.

On the date designated for redemption, notice having been provided as aforesaid, and money for payment of the redemption price being held by the Paying Agent, interest on the Bonds or portions thereof so called for redemption shall cease to accrue and such Bonds or portions thereof shall cease to be entitled to any benefit or security under the Ordinance, and registered owners of such Bonds or portions thereof so called for redemption shall have no rights with respect to such Bonds, except to receive payment of the principal of and accrued interest on such Bonds to the date fixed for redemption.

If at the time of mailing a notice of redemption the Borough shall not have deposited with the Paying Agent money sufficient to redeem all the Bonds called for redemption, such notice may state that it is conditional; i.e. that it is subject to the deposit of the redemption money with the Paying Agent no later that the opening of business on the redemption date, and such notice shall be of no effect unless such money is so deposited.

Manner of Redemption

So long as Cede & Co., as nominee of DTC, is the registered owner of the Bonds, payment of the redemption price shall be made to Cede & Co. in accordance with the existing arrangements by and among the Borough, the Paying Agent and DTC and, if less than all Bonds of any particular maturity are to be redeemed, the amount of the interest of each DTC Participant, Indirect Participant and Beneficial Owner in such Bonds to be redeemed shall be determined by the governing arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. See "BOOK-ENTRY ONLY SYSTEM" herein for further information regarding redemption of Bonds registered in the name of Cede & Co.

If a Bond is of a denomination larger than $5,000, a portion of such Bond may be redeemed. For the purposes of redemption, a Bond shall be treated as representing that number of Bonds that is equal to the principal amount thereof divided by $5,000, each $5,000 portion of such Bond being subject to redemption. In the case of partial redemption of a Bond, payment of the redemption price shall be made only upon surrender of a certificated Bond in exchange for Bonds of authorized denominations in an aggregate principal amount equal to the unredeemed portion of the principal amount thereof.

If the redemption date for any Bonds shall be a Saturday, Sunday, legal holiday or a day on which banking institutions in the Commonwealth are authorized or required by law or executive order to close, then the date for payment of the principal, premium, if any, and interest upon such redemption shall be the next succeeding day which is not a Saturday, Sunday, legal holiday or a day on which such banking institutions are authorized or required to close, and payment on such date shall have the same force and effect as if made on the nominal date of redemption.

BOOK-ENTRY ONLY SYSTEM

The information in this section has been obtained from materials provided by DTC for such purpose. The Borough (herein referred to as the "Issuer") and the Underwriter do not guaranty the accuracy or completeness of such information, and such information is not to be construed as a representation of the Borough or the Underwriter.

The Depository Trust Company ("DTC"), New York, NY, will act as securities depository for the securities (the "Securities"). The Securities will be issued as fully-registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully-registered Security certificate will be issued for the Securities, in the aggregate principal amount of such issue, and will be deposited with DTC.

DTC the world's largest securities depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System. a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934. DTC holds and provides asset servicing for over 3.5 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments (from over 100 countries) that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities, through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations, and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation, all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). DTC has a Standard & Poor's rating of AA+. The DTC Rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at www.dtcc.com.

Purchases of Securities under the DTC system must be made by or through Direct Participants, which will receive a credit for the Securities on DTC's records. The ownership interest of each actual purchaser of each Security ("Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the Securities are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in Securities, except in the event that use of the book-entry system for the Securities is discontinued.

To facilitate subsequent transfers, all Securities deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of Securities with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the Securities: DTC's records reflect only the identity of the Direct Participants to whose accounts such Securities are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. Beneficial Owners of Securities may wish to take certain steps to augment the transmission to them of notices of significant events with respect to the Securities, such as redemptions, tenders, defaults, and proposed amendments to the Security documents. For example, Beneficial Owners of Securities may wish to ascertain that the nominee holding the Securities for their benefit has agreed to obtain and transmit notices to Beneficial Owners. In the alternative, Beneficial Owners may wish to provide their names and addresses to the registrar and request that copies of notices be provided directly to them.

Redemption notices shall be sent to DTC. If less than all of the Securities within an issue are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such issue to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to Securities unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to Issuer as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts Securities are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Redemption proceeds, distributions, and dividend payments on the Securities will be made to Cede & Co., or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from Issuer or Agent, on payable date in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participant and not of DTC, Agent, or Issuer, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of redemption proceeds, distributions, and dividend payments to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of Issuer or Agent, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

A Beneficial Owner shall give notice to elect to have its Securities purchased or tendered, through its Participant, to Tender Agent, and shall effect delivery of such Securities by causing the Direct Participant to transfer the Participant's interest in the Securities, on DTC's records, to Tender Agent. The requirement for physical delivery of Securities in connection with an optional tender or a mandatory purchase will be deemed satisfied when the ownership rights in the Securities are transferred by Direct Participants on DTC's records and followed by a book-entry credit of tendered Securities to Tender Agent's DTC account.

DTC may discontinue providing its services as depository with respect to the Securities at any time by giving reasonable notice to Issuer or Agent. Under such circumstances, in the event that a successor depository is not obtained, Security certificates are required to be printed and delivered.

Issuer may decide to discontinue use of the system of book-entry-only transfers through DTC (or a successor securities depository). In that event, Security certificates will be printed and delivered to DTC.

The information in this section concerning DTC and DTC's book-entry system has been obtained from sources that Issuer believes to be reliable, but Issuer takes no responsibility for the accuracy thereof.

NEITHER THE ISSUER NOR THE PAYING AGENT WILL HAVE ANY RESPONSIBILITY OR OBLIGATION TO ANY DTC PARTICIPANT, INDIRECT PARTICIPANT OR BENEFICIAL OWNER OR ANY OTHER PERSON WITH RESPECT TO: (1) THE BONDS; (2) THE ACCURACY OF ANY RECORDS MAINTAINED BY DTC OR ANY DTC PARTICIPANT OR INDIRECT PARTICIPANT; (3) THE PAYMENT BY DTC OR ANY DTC PARTICIPANT OR INDIRECT PARTICIPANT OF ANY AMOUNT DUE TO ANY BENEFICIAL OWNER IN RESPECT OF THE PRINCIPAL OR REDEMPTION PRICE OF OR INTEREST ON THE BONDS; (4) THE DELIVERY TO ANY BENEFICIAL OWNER BY DTC OR ANY DTC PARTICIPANT OR INDIRECT PARTICIPANT OF ANY NOTICE WHICH IS REQUIRED OR PERMITTED UNDER THE TERMS OF THE ORDINANCE TO BE GIVEN TO BONDHOLDERS; (5) THE SELECTION OF THE BENEFICIAL OWNERS TO RECEIVE PAYMENT IN THE EVENT OF ANY PARTIAL REDEMPTION OF THE BONDS; OR (6) ANY OTHER ACTION TAKEN BY DTC AS BONDHOLDER.

The Issuer and the Paying Agent cannot give any assurances that DTC or the Participants will distribute payments of the principal or redemption price of and interest on the Bonds paid to DTC or its nominee, as the registered owner of the Bonds, or any redemption or other notices, to the Beneficial Owners or that they will do so on a timely basis, or that DTC will serve and act in the manner described in this Official Statement.

SECURITY FOR THE BONDS

General Obligation Pledge

The Bonds will be general obligations of the Borough, payable from its tax and other general revenues. The Borough has covenanted that it will include in its budget for each year, and will appropriate from its general revenues in each such year, the amount of the debt service due on the Bonds for such year, and will duly and punctually pay or cause to be paid from its Sinking Fund, as hereinafter defined, or any other of its revenues or funds, the principal of each of the Bonds and the interest thereon at the dates and place and in the manner stated on the Bonds, and for such budgeting, appropriation and payment the Borough irrevocably has pledged its full faith, credit and taxing power, which taxing power presently includes the power to levy ad valorem taxes on all taxable property within the Borough, presently without limitation as to rate or amount for such purpose. The Act presently provides for enforcement of debt service payments as hereinafter described (see “Defaults and Remedies” herein).

Bonds Sinking Fund

As required by the Debt Act, a sinking fund for the payment of debt service due on the Bonds, designated “Borough of Hanover, General Obligation Bonds, Series D of 2020 Sinking Fund” (the “Sinking Fund”), has been created under the Ordinance and is maintained by the Paying Agent, as sinking fund depository. The Borough shall deposit in the Sinking Fund a sufficient sum not later than the date when interest and/or principal is to become due on the Bonds so that on each payment date the Sinking Fund will contain an amount which, together with any other funds previously available therein, is sufficient to pay, in full, interest and/or principal then due on the Bonds.

The Sinking Fund shall be held by the Paying Agent, as sinking fund depository, and invested by the Paying Agent in such securities or shall be deposited in such funds or accounts as are authorized by the Debt Act, upon direction of the Borough. Such deposits and securities shall be in the name of the Borough, but subject to withdrawal or collection only by the Paying Agent, as sinking fund depository, and such deposits and securities, together with the interest thereon, shall be a part of the Sinking Fund.

The Paying Agent, as sinking fund depository, is authorized without further order from the Borough to pay from the Sinking Fund the principal of and interest on the Bonds, as and when due and payable.

THE BOROUGH

Introduction

The Borough is a political subdivision of the Commonwealth of Pennsylvania, located in southwestern York County in south/central Pennsylvania, approximately 37 miles southwest of Harrisburg and 45 miles northwest of the City of Baltimore, Maryland. The 2010 U.S. Census population of the Borough was 15,289.

BOROUGH FINANCES

Financial Reporting

The Borough's General Fund financial statements are presented on a modified accrual basis. The Borough has its financial records audited by an independent certified public accounting firm annually. The General Fund presentations include the following internally-segregated funds that are grouped for audit presentation: General (Operating) Fund and Guthrie Memorial Library Fund.

The Borough's 2016 through 2017 financial statements were audited by RLH CPAs & Business Advisors, LLC, of Hanover, Pennsylvania. The Borough's 2018 and 2019 financial statements were audited by Hamilton & Musser, P.C., of Mechanicsburg, Pennsylvania.

The Borough's auditor has not been engaged to perform, and has not performed, since the date of its report included in an Appendix to this Official Statement, any procedure on the financial statements addressed in that report. Such auditor also has not performed any procedures relating to this Official Statement.

Summary and Discussion of Financial Results

A summary of the General Fund revenues and expenditures fiscal year fund balances and the balance sheet are presented in Tables 1 and 2 which follow.

TABLE 1
BOROUGH OF HANOVER
GENERAL FUND REVENUES AND EXPENDITURES
(Fiscal Years Ending December 31)

Revenues	**2015**	**2016**	**2017**	**2018**	**2019**	**Budgeted 2020(1)**
Taxes	$8,387,046	$8,167,234	$8,441,385	$8,783,539	$8,734,647	$8,699,200
Licenses and Permits	34,134	47,053	52,764	79,941	126,207	207,100
Fines and Forfeits	208,826	202,871	183,014	156,577	178,921	162,750
Interest, Rents, and Royalties	171,211	159,772	261,697	360,449	391,182	376,118
Intergovernmental Revenues	1,335,358	1,220,042	3,646,838	1,352,029	1,950,740	1,789,697
Charges for Services	4,347,351	4,460,380	4,654,133	4,906,692	5,046,142	4,872,650
Donations from Private Sources	670,214	551,369	357,552	474,410	322,243	328,240
Miscellaneous	723	1,309	798	132	126	0
TOTAL REVENUES	$15,154,863	$14,810,030	$17,598,181	$16,113,769	$16,750,208	$16,435,755
Expenditures						
General Government	$973,271	$883,346	$874,994	$920,590	$749,984	$832,724
Public Safety	5,386,658	5,478,575	5,829,828	6,090,681	6,711,134	6,914,684
Health and Sanitation	3,507,764	3,700,433	5,873,994	4,097,650	4,370,247	4,645,440
Highways	913,553	964,255	973,922	1,482,880	1,104,318	918,688
Culture and Recreation	996,590	1,405,376	1,521,662	1,305,274	1,422,997	1,504,992
Debt Service	1,214,525	778,067	927,757	1,038,923	1,086,389	1,120,769
Capital outlay	1,428,248	293,722	842,818	1,269,933	767,444	752,790
Miscellaneous	713,415	460,649	435,503	595,412	313,135	384,466
TOTAL EXPENDITURES	$15,134,024	$13,964,423	$17,280,478	$16,801,343	$16,525,648	$17,074,553
Excess/Deficit of Revenues over Expenditures	$20,839	$845,607	$317,703	($687,574)	$224,560	($638,798)
Other Financing Sources (Uses)						
Interfund Transfers	$53,180	$94,480	$0	$0	$24,777	$0
Sale of Capital Assets	130	0	128,651	396,831	167,586	132,999
Proceeds from Notes, Leases and Bond Issuance	4,311,461	2,428,513	722,738	829,653	264,249	165,000
Refunded Debt Service - Principal	(4,145,000)	(2,335,000)	(500,077)	0	0	0
Total other financing sources (uses)	$219,771	$187,993	$351,312	$1,226,484	$456,612	$297,999
Changes in Fund Balance	$240,610	$1,033,600	$669,015	$538,910	$681,172	($340,799)
Fund Balances, January 1	$7,142,835	$7,383,445	$8,417,045	$9,086,060	$9,624,970	$10,306,142
Fund Balance, December 31	$7,383,445	$8,417,045	$9,086,060	$9,624,970	$10,306,142	$9,965,343

(1)Budgeted, as adopted December 2019.
Source: Borough's Annual Audited Financial Reports and Budget Report.

TABLE 2

BOROUGH OF HANOVER
GENERAL FUND BALANCE SHEET
(Fiscal Years Ending December 31)

	2015	2016	2017	2018	2019
Assets					
Cash and cash equivalents	$6,436,683	$7,848,158	$8,198,613	$8,569,828	$9,063,200
Accounts receivable	150,346	172,069	223,695	193,822	181,955
Taxes Receivable	790,936	741,715	833,225	707,693	768,144
Grants Receivable	126,174	47,298	2,042,770	40,420	371,323
Unbilled Services	92,580	54,110	106,532	124,681	134,032
Pledges Receivable	46,600	52,800	37,200	21,600	20,000
Lease Receivable	0	0	0	728,298	614,784
Accrued Interest Receivable	490	145	0	0	0
Due from Other Governments	0	0	70,489	102,970	117,780
Due from Component Unit	0	0	0	22,163	13,000
Inventory	47,452	50,706	65,192	64,894	45,756
Beneficial Interest in Assets Held by Others	0	0	103,107	97,705	98,221
Prepaid Expenses and Deposits	215,288	194,489	66,142	239,857	257,030
Total Assets	$7,906,549	$9,161,490	$11,746,965	$10,913,931	$11,685,225
Liabilities and Fund Balance Liabilities					
Accounts payable and Accrued Expenses	$155,292	$382,116	$182,325	$216,219	$314,326
Grants Payable	0	0	2,000,000	0	0
Accrued Wages	22,902	44,535	67,431	82,144	108,589
Accrued Compensated Absences	47,000	0	0	0	0
Payable from Restricted Assets	0	0	0	0	0
Due to Other Funds					25,246
Unearned Revenue	14,814	11,664	7,899	4,125	5,350
Total Liabilities	$240,008	$438,315	$2,257,655	$302,488	$453,511
Deferred Inflows of Resources					
Deferred Revenue	$283,096	$306,130	$403,250	$986,473	$925,572
Total Deferred Inflows of Resources	$283,096	$306,130	$403,250	$986,473	$925,572
Fund Balances:					
Nonspendable	$262,740	$245,195	$131,334	$304,751	$302,786
Restricted	285,958	233,390	100,291	72,772	63,981
Assigned	617,606	795,222	1,150,005	792,564	340,799
Unassigned	6,217,141	7,143,238	7,704,430	8,454,883	9,598,576
Total Fund Balances	$7,383,445	$8,417,045	$9,086,060	$9,624,970	$10,306,142
Total Liabilities, Deferred Inflows of Resources and Fund Balances	$7,906,549	$9,161,490	$11,746,965	$10,913,931	$11,685,225

Source: Borough Annual Audit and Financial Reports.

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General Taxing Power

Borough Council adopts an annual budget (which includes various funds including the Sewer Fund, Regional Wastewater Fund and Water Fund), and also levies local taxes prior to the beginning of the fiscal year on January 1. Under provisions of 8 Pa. Cons. Stat. §§1302, 1304, the Borough may levy the following taxes:

Annual tax on all taxable real estate, not to exceed 30 mills for general borough purposes (plus an additional 5 mills with court approval). The Council of any borough may levy different rates of taxation on all real estate classified as buildings or land.

The following additional taxes may be levied:

Purpose	Levy
Fire Services**	3.0 mills
Firehouse, fire training school and center, lock-up and/or municipal building**	2.0 mills
Ambulance and Rescue Service**	0.50 mills
Debt Service	Unlimited
Special Fund for permanent street improvements	5 mills
Pension and retirement	½ mill
Shade Trees	1/10 mill
Gas, Water and Electric**	8 mills
Street Lighting	8 mills
Library purposes***	Unlimited
Parks and recreation	Unlimited

**Additional mills may be levied, if approved at referendum.
***Where establishment of library and initial library tax are approved at referendum

Under the Act of December 31, 1965, P.L. 1257, effective January 1, 1966, the Pennsylvania Local Tax Enabling Act, additional taxes may be levied by Boroughs (subject to division with the local school district authorized to levy similar taxes on the same person, subject, business, transaction or privilege), subject to the following limitations:

Tax	Levy
Per Capita	$10.00
Wages, salaries, commissions and other earned income of individuals	1.00%
Transfer of title of real property	1.00%
Flat rate occupation tax	$10.00
Local Services Tax*	$52.00
Admissions (except Motion Picture Theaters)	10.00%
Occupation (if a millage or percentage of the assessed valuation of occupation is used as base)	No limit
Gross Receipts of Wholesalers	1 mill
Gross Receipts of Retailers	1.5 mills

*Note: Restricted in use to: (1) police, fire and/or emergency services; (2) road construction and/or maintenance; or (3) reduction of property taxes.
Source: Borough Officials

Tax Levy Trends

Table 3 shows the comparative trend of real property tax rates levied by the Borough, the Hanover Public School District and York County.

TABLE 3
BOROUGH OF HANOVER
TAX RATES (2020)

	Borough of Hanover (2020)	Hanover Public School District (2019-20)	County of York
Real Estate (Mills)	5.650	23.060	5.900
Per Capita	$5.00	$5.00	--
Real Estate Transfer	½%	½%	--
Earned Income (resident)	½%	½%	--
Local Services	$52.00	--	--
Business Privilege (Mills)	2.000	--	--
Occupation	--	$10.00	--

Source: Pennsylvania Department of Community and Economic Development

Real Property Tax

The real property tax is levied on January 1 of each year. Taxpayers who remit by April 15th receive a 2% discount, and those who remit after June 15th are assessed a 10% penalty.

Legislation in Response to COVID-19 Authorizes the Borough to Waive Penalties on Late Payments of Real Estate Taxes

Pennsylvania Senate Bill 841, which was signed into law on April 20, 2020, directs taxing districts, following receipt of a resolution approved by the governing body of a local government entity, to: (i) accept real estate taxes paid at the prescribed discount rate until August 31, 2020, and (ii) waive any late fee or penalty on property taxes if they are paid in full by December 31, 2020. The Borough authorized to waive any late fee or penalty if paid in full by December 31, 2020. The 2% discount period was not extended.

The following tables summarize recent trends of assessed and market valuations of real property and real property tax collection data. The last countywide assessment in York County was in 2006.

TABLE 4
BOROUGH OF HANOVER
REAL PROPERTY ASSESSMENTS

Year	Market Value	Assessed Value	Ratio
2015	$964,530,949	$974,414,225	101.02%
2016	936,477,036	976,033,760	104.22%
2017	941,567,106	982,873,556	104.39%
2018	920,035,476	984,189,686	106.97%
2019	925,316,263	989,273,316	106.91%
Compound Average Annual Percentage Change	-0.83%	0.30%	

Source: Pennsylvania State Tax Equalization Board (STEB)/Tax Equalization Division (TED).

TABLE 5
BOROUGH OF HANOVER
ASSESSMENT BY LAND USE

	2015	2016	2017	2018	2019
Residential	$633,875,302	$642,020,881	$641,712,951	$643,724,231	$643,609,951
Lots	8,885,683	2,009,149	3,601,180	2,003,290	2,023,930
Industrial	45,771,244	45,720,324	45,920,334	47,532,154	46,269,134
Commercial	285,788,986	286,190,396	291,546,081	290,837,001	297,327,441
Land	93,010	93,010	93,010	93,010	42,860
Totals	$974,414,225	$976,033,760	$982,873,556	$984,189,686	$989,273,316

Source: Pennsylvania State Tax Equalization Board (STEB)/Tax Equalization Division (TED).

TABLE 6
BOROUGH OF HANOVER
REAL PROPERTY TAX COLLECTION DATA

	Assessed Valuation Real Estate	Millage	Amount of Levy	Adjusted Levy [1]	Current Collection Amount[2] (Jan. 1- Dec. 31)	Current Collection as Percent of Total Tax Levy	Total Collections Amount[2]	Total Collections as Percent of Total Tax Levy
2015	$974,414,225	5.65	$5,505,440	$5,432,895	$5,336,055	98.2%	$5,432,509	100.0%
2016	976,033,760	5.65	5,514,591	5,473,109	5,373,088	98.2%	5,467,645	99.9%
2017	981,736,996	5.65	5,546,814	5,521,139	5,418,038	98.1%	5,507,595	99.8%
2018	983,431,836	5.65	5,556,390	5,497,549	5,435,478	98.9%	5,534,455	100.7%
2019	989,273,316	5.65	5,589,394	5,514,008	5,404,014	98.0%	5,481,139	99.4%

[1]Net of Discounts, penalties, exonerations and credits.
[2]Include both annual and interim assessment amounts collected, net of discounts, penalties, exonerations and credit
Source: Borough Officials

The names of the ten largest real property taxpayers, together with their 2020 assessed values, are shown on Table 7. The aggregate assessed value of these ten taxpayers totals approximately 8.6% of the Borough's total assessed value.

TABLE 7
BOROUGH OF HANOVER
TEN LARGEST REAL PROPERTY TAXPAYERS, 2020

Owner	Property/Business	2020 Assessed Value
Ridge North Shopping Center Associates (ACL Realty Corp.)	Shopping Center	$15,775,630
North Hanover Centre Realty LLC (North Hanover Mall)	Shopping Mall	14,734,500
Home Depot USA Inc.	Building Supply Store	9,466,301
Crisman Corp.	Building Materials	8,402,970
Sams Real Estate Business Trust	Retail (Sam's Club)	8,072,441
Ridge North Shopping Center Associates LP	Retail	7,610,000
H.P. Altman Hanover LP	Apartment Complex	6,074,370
Trone Family Trust (Clearview Shopping Center)	Shopping Center	5,328,740
HF Real Estate Partnership	Retail (Rite Aid)	4,884,000
Kohl's Department Store	Retail	4,826,260
Total		$85,175,212

Source: Borough Officials.

THE BOROUGH OF HANOVER
SEWER SYSTEM

Pursuant to an order of the Department of Environmental Resources, a regional sewer committee was formed by the Borough of Hanover, the Township of Conewago and the Borough of McSherrystown (collectively the "Municipalities"). The Municipalities entered into a Service Agreement (see the "Service Agreement") pursuant to which the Borough agreed to construct the Regional Treatment Plant with each of the Municipalities reserving capacity for treatment.

The Regional Treatment Plant, pumping station and interceptor lines (construction completed in 1986) serve the Municipalities and provide comprehensive service for the Borough's drainage area. The Treatment Plant was constructed to provide adequate treatment capacity for normal projected population growth over a 20 year period. Interceptor lines were sized for 40 years of service. The treatment works and pump station were upgraded in 1999 and 2011-2012 resulting in a peak capacity of 28 MGD.

The Regional Treatment Plant is located in Conewago Township, approximately three (3) miles from the Borough and has a maximum average flow capacity of 7.28 MGD. Flows to the treatment plant averaged 5.43 MGD in 2019. The plant has a peak instantaneous flow design of 28 MGD; recent instantaneous maximum flows have been recorded as high as 28 MGD.

Under the terms of the Service Agreement (hereinafter defined), the Municipalities share the operating and capital costs of the Regional Treatment Plant and Edgegrove Pumping Station as follows for 2019:

	Treatment	Conveyance
Hanover	82.06%	93.19%
Conewago	11.87%	6.80%
McSherrystown	6.08%	0.01%

The customers of the sewer system as of December 31, 2019 consisted of 7,543 residential, 1,060 commercial and public, and 56 industrial billed units.

SEWER RATES

The average annual residential sewer bill in the Borough for sewer service based on water usage of 20,000 gallons per quarter, for a family of four, is currently $623.96. The charge for sewer service is based on a quarterly per-1,000 gallon charge (based on water consumption) and a quarterly base charge to the relating customer. The rates and base charge reflect operation, maintenance, and administrative costs for the sewer collection and treatment systems as well as assistance with needed infrastructure improvements.

SEWER CUSTOMERS

The following table provides a breakdown of the Borough's Sewer customers by type for the past five years.

	2015	2016	2017	2018	2019
Residential	7,230	7,433	7,470	7,507	7,543
Commercial and Public	1,054	1,060	1,060	1,060	1,060
Industrial	60	60	59	58	56

The Borough's Sewer and Regional Wastewater Funds are presented on an accrual basis. The following comparative statement of revenues, expenses and change in net position of the Borough's Sewer and Regional Wastewater Funds for the years ended December 31, 2015 through 2019 has been extracted and summarized from the financial statements of the Borough audited by its Independent Certified Public Accountants.

TABLE 8
BOROUGH OF HANOVER
Comparative Statement of Revenues, Expenses and Change in Net Position
Combined Sewer Fund and Regional Wastewater Fund (1)

Operating Revenues	**2015**	**2016**	**2017**	**2018**	**2019**
Sewer Fees	$4,399,902	$4,479,712	$4,589,933	$4,769,522	$4,801,138
Wastewater Treatment Charges	1,995,688	1,998,070	1,860,719	1,987,005	2,096,202
Other Revenues	0	0	0	0	21,245
Total Operating Revenues	$6,395,590	$6,477,782	$6,450,652	$6,756,527	$6,918,585
Operating Expenses					
Administrative and General	$161,806	$130,106	$152,232	$155,781	$118,189
Contractual Services	127,375	178,607	248,215	248,441	292,226
Depreciation	1,569,511	1,583,255	1,583,052	1,609,415	1,658,487
Materials and Supplies	235,302	179,833	184,664	189,492	190,833
Personnel Services	1,644,765	2,062,656	1,852,772	2,036,355	1,514,999
Repairs and Maintenance	219,769	168,333	220,591	224,656	230,574
Treatment	1,526,852	1,540,500	1,513,271	1,566,223	1,637,594
Utilities	347,439	354,602	345,882	344,445	347,207
Total Operating Expenses	$5,832,819	$6,197,892	$6,100,679	$6,374,808	$5,990,109
Operating Income (Loss)	$562,771	$279,890	$349,973	$381,719	$928,476
Nonoperating Revenues (Expenses)					
Gain on Disposition of Assets	($279)	$61,593	$54,677	$49,473	$2,350
Interest and Rents	31,018	33,403	47,651	85,060	192,149
Other Revenues	250	22,210	57,823	50,435	56,562
Interest Income/(expense)	(924,452)	(825,690)	(695,284)	(676,768)	(683,111)
Total Nonoperating Revenues (Expenses)	($893,463)	($708,484)	($535,133)	($491,800)	($432,050)
Income (Loss) Before Contributions and Transfers	($330,692)	($428,594)	($185,160)	($110,081)	$496,426
Capital Contributions	438,687	204,224	0	0	480,654
Transfers to Other Funds	(17,659)	(28,784)	0	0	13,117
Change in Net Position	$90,336	($253,154)	($185,160)	($110,081)	$990,197
Total Net Position, January 1	$19,931,254	$20,243,398 *	$20,139,635 *	$19,688,979 *	$19,578,898
Total Net Position, December 31	$20,021,590	$19,990,244	$19,954,475	$19,578,898	$20,569,095

(1) Includes Sanitary Sewer Fund and Regional Wastewater Fund
*As restated.
Source: Borough's Annual Audited Financial Reports.

SERVICE AGREEMENT

A Service Agreement, dated as of November 15, 1982 (the "Service Agreement"), was entered into by the Borough, the Borough of McSherrystown, the Township of Conewago and the Conewago Township Municipal Authority. The Service Agreement provides that the Borough would undertake the construction and operation of a Treatment Plant, Interceptor System and Pumping Station, as such terms are defined in the Service Agreement, for rendering sewage treatment and disposal service for the parties to the Service Agreement. The parties to the Service Agreement each provide for transportation of sewage in their own respective sewage collection systems; and jointly share in the costs of construction of the Treatment Plant, Interceptor System and Pumping Station and the costs incurred in connection with the receipt, transportation, treatment and disposal of sewage.

The Service Agreement allocates capacity of the facilities among the municipalities, and provides for adjustments in such allocations pursuant to formulas in the Service Agreement. Operating costs are allocated on the basis of metered flows. Municipalities have the option under the Service Agreement to either provide a capital contribution or to share in the debt service charges incurred by the Borough. Each has determined to make a capital contribution.

The Service Agreement requires all parties to share costs of any upgrading of the Treatment Plant required by law. The Service Agreement also provides a procedure for payment of construction requisitions and for final adjustment of cost allocations based upon the actual cost of construction. In the event the Borough fails to receive moneys due under the Service Agreement, the Borough may finance such costs and is entitled to be reimbursed for such amounts borrowed, together with any penalties, charges and financing costs thereof.

Each Municipality has acknowledged that a portion of the Borough's capacity in the Regional Treatment Plant will be utilized by the residents of the Township of Penn whose sewage is presently being treated by the Borough.

WATER SYSTEM

The Borough's water system consists of a distribution system (capable of filtering 11.5 million gallons daily [MGD] and delivering [pumping] 8 MGD to the residents of the Borough and surrounding areas), one raw water pump station on Slagle's Run (capable of withdrawing 4.8 MGD), three dams with a holding capacity of two billion gallons of water (two located in West Manheim Township and one in Conewago Township), a man-made raw water sedimentation basin (located in Conewago Township), two finished water reservoirs with the capacity to store 13 million gallons of filtered water (both located in Penn Township) a water filtration plant and two elevated tanks.

Approximately 34% of the Borough's water revenues are derived from residents of the Borough and 66% of the water revenues are derived from customers in Penn Township, Conewago Township, Heidelberg Township and McSherrystown Borough.

The customers of the Borough's water system as of December 31, 2019 consisted of 16,133 residential, 1,095 commercial and public, and 130 industrial billed units.

WATER RATES

The average annual residential bill for water service based on water usage of 20,000 gallons per quarter for a family of four inside the Borough is $359.00 and outside the Borough, as authorized by the Public Utilities Commission, is $414.52. Outside of the Borough, water services are provided to customers in Penn Township, Conewago Township, and McSherrystown Borough. The charge for water service is based on a quarterly per-1,000 gallon charge for consumption and a quarterly base charge established on the meter size providing service to the relating customer. The rates and base charge reflect operation, maintenance, and administrative costs for the water delivery system as well as assistance with needed infrastructure improvements.

WATER CUSTOMERS

The following table provides a breakdown of the Borough's Water customers by type for the past five years.

	2015	2016	2017	2018	2019
Residential	15,541	15,744	15,958	16,133	16,294
Commercial and Public	1,062	1,068	1,069	1,095	1,105
Industrial	127	127	126	130	131

The Borough's Water Fund is presented on an accrual basis. The following comparative statement of revenues, expenses and change in net position of the Borough's Water Fund for the years ended December 31, 2015 through 2019 has been extracted and summarized from the financial statements of the Borough audited by its Independent Certified Public Accountants.

TABLE 9
BOROUGH OF HANOVER
Comparative Statement of Revenues, Expenses and Change in Net Position
Water Fund

Operating Revenues	**2015**	**2016**	**2017**	**2018**	**2019**
Water Fees	$6,938,610	$7,465,899	$7,322,407	$7,371,067	$7,622,382
Other Revenues	236,489	94,109	94,125	243,691	115,041
Total Operating Revenues	$7,175,099	$7,560,008	$7,416,532	$7,614,758	$7,737,423
Operating Expenses					
Administrative and General	$212,156	$201,077	$202,910	$236,863	$178,314
Contractual Services	0	46,283	46,172	73,007	125,692
Depreciation	627,544	802,249	866,210	923,697	1,070,991
Materials and Supplies	466,581	118,584	133,317	149,221	186,175
Personnel Services	2,932,151	3,194,208	2,849,616	3,380,290	2,917,433
Repairs and Maintenance	124,629	68,967	63,067	51,204	58,170
Treatment	19,235	229,347	257,466	268,289	328,187
Utilities	517,019	563,745	477,445	433,291	474,364
Total Operating Expenses	$4,899,315	$5,224,460	$4,896,203	$5,515,862	$5,339,326
Operating Income (Loss)	$2,275,784	$2,335,548	$2,520,329	$2,098,896	$2,398,097
Nonoperating Revenues (Expenses)					
Gain on Disposition of Assets	$31,842	$20,784	$75,925	($89,493)	($140,727)
Interest and Rents	173,269	174,530	200,305	257,823	274,618
Other Revenues	14,298	7,773	93,877	89,314	123,752
Interest Income/(expense)	(604,113)	(584,833)	(546,191)	(606,625)	(597,028)
Total Nonoperating Revenues (Expenses)	($384,704)	($381,746)	($176,084)	($348,981)	($339,385)
Income (Loss) Before Contributions and Transfers	$1,891,080	$1,953,802	$2,344,245	$1,749,915	$2,058,712
Capital Contributions	19,635	191,385	416,693	66,413	741
Transfers to Other Funds	(47,310)	(50,500)	0	0	927
Change in Net Position	$1,863,405	$2,094,687	$2,760,938	$1,816,328	$2,060,380
Total Net Position, January 1	$20,921,641	$23,319,651 *	$25,414,338	$27,676,363 *	$29,492,691
Total Net Position, December 31	$22,785,046	$25,414,338	$28,175,276	$29,492,691	$31,553,071

* As restated
Source: Borough's Annual Audited Financial Reports.

BOROUGH DEBT AND DEBT LIMITS

Debt Statement

The Table 10 shows the current debt of the Borough of Hanover, including the issuance of the Bonds.

TABLE 10
BOROUGH OF HANOVER
STATEMENT OF INDEBTEDNESS*
(As of December 2, 2020)

NONELECTORAL DEBT	Gross Outstanding
General Obligation Bonds, Series D of 2020 (last maturity 2045) (1)	$9,440,000
General Obligation Bonds, Series C of 2020 (last maturity 2029) (2)	5,085,000
General Obligation Bonds, Series B of 2020 (last maturity 2025) (3)	4,455,000
General Obligation Bonds, Series of A of 2020 (last maturity 2032) (4)	9,400,000
General Obligation Bonds, Series of 2020 (last maturity 2039) (5)	8,145,000
General Obligation Bonds, Series of 2017 (last maturity 2038) (6)	9,445,000
General Obligation Bonds, Series of 2016 (last maturity 2026) (7)	1,775,000
General Obligation Bonds, Series A of 2015 (last maturity 2024) (8)	1,965,000
General Obligation Bonds, Series of 2013 (last maturity 2022) (9)	235,000
General Obligation Bonds, Series of 2012 (last maturity 2022) (10)	1,740,000
Subtotal	$51,685,000
Less: Self-Liquidating/Subsidized Debt(11)	(47,224,000)
TOTAL NET NONELECTORAL DEBT	$4,461,000
LEASE RENTAL DEBT	
TOTAL LEASE RENTAL DEBT	$0
TOTAL PRINCIPAL OF NET DIRECT DEBT	$4,461,000
OVERLAPPING DEBT	
Hanover Public School District	$18,180,000
York County, General Obligation(12)	8,843,309
TOTAL OVERLAPPING DEBT	$27,023,309
TOTAL NET DIRECT AND OVERLAPPING DEBT	$31,484,309
DEBT RATIOS	
Per Capita	$2,044.04
Percent 2019 Assessed Value	3.18%
Percent 2019 Market Value	3.40%

(1) Attributable to Water Fund projects. Certification of this amount as self-liquidating debt from water revenues will be sought after final pricing of the Bonds.
(2) Includes $45,000 attributable to General Fund projects; $700,000 attributable to Water Fund projects and certified as self-liquidating from water revenues; and $4,340,000 attributable to Sewer Fund projects and certified as self-liquidating from sewer revenues.
(3) Attributable to Sewer Fund projects and certified as self-liquidating from sewer revenues.
(4) Includes $190,000 attributable to General Fund projects; $2,650,000 attributable to Water Fund projects and certified as self-liquidating from water revenues; and $6,560,000 attributable to Sewer Fund projects and certified as self-liquidating from sewer revenues.
(5) Attributable to Water Fund projects and to be certified as self-liquidating from water revenues.
(6) Includes $486,000 attributable to General Fund projects; $6,896,000 attributable to Water Fund projects and certified as self-liquidating from water revenues; and $2,090,000 attributable to Sewer Fund projects and certified as self-liquidating from sewer revenues.
(7) Attributable to General Fund projects.
(8) Attributable to General Fund projects.
(9) Attributable to Water Fund projects and certified as self-liquidating from water revenues.
(10) Attributable to Sewer Fund projects and certified as self-liquidating from sewer revenues.
(11) Assumes that $9,440,000 principal amount of the Bonds will be approved by the Department of Community and Economic as self-liquidating debt as referenced in footnote (1) above.
(12) Pro rata 3.16% share of $279,717,079 principal amount outstanding.

Sources: Borough officials and overlapping debt as reported by the Pennsylvania Department of Community and Economic Development, Debt Statement as of October 6, 2020.

Types of Indebtedness under the Debt Act

The Debt Act establishes three forms of debt for a local government unit: (i) electoral debt (debt incurred with the approval of the electors for which there is no limitation on the amount that may be so incurred), (ii) nonelectoral debt (debt of a local government unit not being electoral or lease rental debt for which the limitation on all such net debt which may be incurred is 250% of the borrowing base for the Borough), and (iii) lease rental debt (the principal amount of municipal authority debt or debt of another local government unit to be repaid by the local government unit pursuant to a lease, subsidy contract guarantee or other form of agreement where such debt is or may be payable out of the tax revenues and other general revenues; the limitation on all such net debt which may be incurred, including any net nonelectoral debt incurred, is 350% of the borrowing base for the Borough). Any debt which is approved by the Pennsylvania Department of Community and Economic Development as subsidized or self-liquidating may be deducted or excluded from the determination of any such debt incurred in determining the net debt of the local governmental unit to which such limitations are applicable. Certain other deductions are allowed in determining net debt.

Debt Limit and Remaining Borrowing Capacity

The statutory borrowing limit of the Borough under the Debt Act is computed as a percentage of the Borough's "Borrowing Base". The "Borrowing Base" is defined as the annual arithmetic average of Total Revenues (as defined by the Act), for the three full fiscal years ended next preceding the date of incurring debt. The Borough calculates its present borrowing base and borrowing capacity as follows:

Total Revenues for 2017	$15,979,463
Total Revenues for 2018	16,724,819
Total Revenues for 2019	17,109,832
Total	$49,813,114
Annual Arithmetic Average (Borrowing Base)	$16,604,705

Under the Debt Act as presently in effect, (i) new nonelectoral debt may not be incurred if the net amount of such new nonelectoral debt plus all outstanding net nonelectoral debt would cause total net nonelectoral debt to exceed 250% of the Borrowing Base and (ii) new lease rental debt or new nonelectoral debt may not be incurred if the net amount of such new debt plus all outstanding net nonelectoral debt and net lease rental debt would cause the total net nonelectoral plus net lease rental debt to exceed 350% of the Borrowing Base. The application of the aforesaid percentages to the Borough's Borrowing Base produces the following products:

	Legal Limit	Net Debt Outstanding*	Remaining Borrowing Capacity
Net Nonelectoral Debt Limit:			
250% of Borrowing Base	$41,511,763	$4,461,000	$37,050,763
Net Nonelectoral and Lease Rental Debt Limit:			
350% of Borrowing Base	$58,116,468	$4,461,000	$53,655,468

*Includes the Bonds offered through this Official Statement and excludes the principal amount of debt which may be excluded as "self-liquidating" or "subsidized" under the Debt Act from water system and sewer system revenues.

TABLE 11
BOROUGH OF HANOVER
DEBT SERVICE REQUIREMENTS*

Year	Other General Obligation Debt Outstanding	Series D of 2020 Principal	Series D of 2020 Interest	Subtotal	Total Requirements
2020	$3,773,023	$0	$0	$0	$3,773,023
2021	3,814,850	0	295,952	295,952	4,110,802
2022	3,787,094	245,000	375,150	620,150	4,407,244
2023	3,775,231	250,000	367,800	617,800	4,393,031
2024	3,785,981	260,000	357,800	617,800	4,403,781
2025	3,779,581	270,000	347,400	617,400	4,396,981
2026	3,804,981	285,000	336,600	621,600	4,426,581
2027	3,518,856	295,000	325,200	620,200	4,139,056
2028	3,095,286	305,000	313,400	618,400	3,713,686
2029	3,060,936	320,000	301,200	621,200	3,682,136
2030	3,109,161	330,000	288,400	618,400	3,727,561
2031	3,133,586	345,000	275,200	620,200	3,753,786
2032	3,140,086	360,000	261,400	621,400	3,761,486
2033	2,374,086	370,000	247,000	617,000	2,991,086
2034	2,381,209	385,000	232,200	617,200	2,998,409
2035	1,321,224	400,000	216,800	616,800	1,938,024
2036	1,317,646	420,000	200,800	620,800	1,938,446
2037	1,323,189	435,000	184,000	619,000	1,942,189
2038	1,321,938	450,000	166,600	616,600	1,938,538
2039	543,913	470,000	148,600	618,600	1,162,513
2040	0	490,000	129,800	619,800	619,800
2041	0	510,000	110,200	620,200	620,200
2042	0	530,000	89,800	619,800	619,800
2043	0	550,000	68,600	618,600	618,600
2044	0	570,000	46,600	616,600	616,600
2045	0	595,000	23,800	618,800	618,800
Total	$56,161,858	$9,440,000	$5,710,302	15,150,302	$71,312,160

(*)Totals may not add due to rounding.

Future Financing

The Borough does not anticipate issuing additional long term (non-refunding) debt in the next 2-3 years.

LABOR RELATIONS

There are five (5) non-affiliated unions which represent approximately 118 current employees:

Water Department

Approximately twenty-four (24) employees are represented by the U.S. Steelworkers Union. The present contract expires December 31, 2023.

Public Works, Sewer Inflow & Infiltration, Sewer Treatment and Stormwater

Approximately forty-five (45) Streets, Sewer, Stormwater, Grounds and Building employees are represented by AFSCME. The present contract expires December 31, 2022.

Office and Police Clerical

Approximately eleven (11) office/police administration and clerical employees are represented by are represented by AFSCME. The present contract expires December 31, 2021.

Firefighters

Approximately fifteen (15) employees are represented by the International Association of Firefighters. The present contract expires December 31, 2022.

Police

Twenty-three (23) uniformed police officers are represented by the local association of the Fraternal Order of Police. The present contract expired December 31, 2019. Negotiations are underway to renew the contract.

Pension Plans

Police Pension Plan

Plan Administration - The plan is a single-employer defined benefit plan that covers all fulltime members of the police force upon employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council and the Police Pension Fund Committee, consisting of three voting members appointed by the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. A member is eligible for normal retirement after attainment of age 50 and completion of 25 years of vesting service; however, if the member continues working after their normal retirement date, their pension does not start until they actually retire. The normal retirement pension, payable monthly for the member's lifetime and continuing to the member's surviving spouse or eligible child for their respective lifetime, is equal to 50% of average monthly compensation (based on the last 36 months of employment preceding retirement), plus a service increment of $100 per month for each completed year of benefit service in excess of 25 years. Disability benefits are available to a participant disabled in the line of duty. If a participant is eligible for retirement at the time of death, a monthly death benefit is payable.

Employees retiring after January 1, 1980 are entitled to an annual cost-of-living increase equal to six percent per year or the actual cost-of-living increase based on the Consumer Price Index, whichever is smaller. A member's benefits vest upon completion of 12 years of vesting service. The vested benefit is deferred monthly pension beginning at normal retirement equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough ordinance and plan agreement, are required to contribute three percent of their compensation per year. Member contributions are credited with interest at the rate of three percent per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Police Pension Plan are financed through investment earnings.

Fire Drivers' Pension Plan

Plan Administration - The plan is a single-employer defined benefit plan that covers all fulltime fire drivers on July 1st following the date of employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 with completion of 25 years of vesting service, but not later than attainment of age 62 and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.9% of average monthly compensation (highest consecutive 60 months of compensation out of the last 120 months preceding retirement) multiplied by the total number of complete years of benefit service.

Disability benefits are available to a participant who becomes totally and permanently disabled. The death benefit for a participant who has attained age 50 and has completed ten years of vesting service is a survivor pension. A monthly death benefit, payable to a surviving spouse, is also available if the participant is killed in the line of duty. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough ordinance and plan agreement, are required to contribute 3.7% of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at the rate of four percent per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Fire Drivers' Pension Plan are financed through investment earnings.

Hanover Employees' Pension Plan

Plan Administration - The plan is a single-employer defined benefit pension plan that covers all full-time employees of the Borough, excluding uniformed police officers and fire drivers, on July 1st following the date of employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 (60 for non-union hires after July 1, 2014) and completion of 25 years of vesting service, but not later than attainment of age 62 (65 for non-union hires after July 1, 2014) and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.5% (1.0% for nonunion hires after July 1, 2014) of average monthly compensation (highest consecutive 36 months of compensation out of the last 60 months preceding retirement) multiplied by the total number of years of benefit service rounded to the nearest one-half year. The minimum monthly pension for employees with 30 or more years of vesting service is equal to 70% of average monthly compensation, less 100% of social security benefits received.

Disability benefits are available after attainment of age 45 and completion of 15 years of vesting service, following six months of permanent disability. The monthly death benefit for a participant who has attained 60 years (sum of member's age and years of vesting service) and has completed ten years of vesting service is a survivor pension. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough ordinance and plan agreement, are required to contribute three percent of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at the rate of four percent per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Hanover Employees' Pension Plan are financed through investment earnings.

Plan Membership

Membership of the plans consisted of the following as of December 31, 2019:

	Police	Fire Drivers'	Hanover Employees'
Inactive Plan Members and Beneficiaries Currently Receiving Benefits	20	14	65
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	1	0	3
Active Plan Members	25	17	104
Totals	**46**	**31**	**172**

Changes in the Net Pension Liability (Asset)

Police

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability (Asset)
Balances as of December 31, 2018	$13,856,029	$11,817,070	$2,038,959
Service Cost	363,436	0	363,436
Interest Cost	966,806	0	966,806
Changes for Experience	(468,572)		(468,572)
Changes for Assumptions	373,371		373,371
Employer Contributions	0	545,941	(545,941)
Plan Member Contributions	0	67,525	(67,525)
Net Investment Income	0	2,243,761	(2,243,761)
Benefit Payments	(625,499)	(625,499)	0
Administrative Expense	0	(8,100)	8,100
Net Changes	609,542	2,223,628	(1,614,086)
Balances as of December 31, 2019	$14,465,571	$14,040,698	$424,873

Fire Drivers'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability (Asset)
Balances as of December 31, 2018	$7,270,469	$6,255,158	$1,105,311
Service Cost	157,461	0	157,461
Interest Cost	524,881	0	524,881
Changes for Experience	9,699	0	9,699
Changes for Assumptions	261,458	0	261,458
Employer Contributions	0	158,627	(158,627)
Plan Member Contributions	0	47,625	(47,625)
Net Investment Income	0	1,267,942	(1,267,942)
Benefit Payments	(401,574)	(401,574)	0
Administrative Expense	0	(6,100)	6,100
Net Changes	551,925	1,066,520	(514,595)
Balances as of December 31, 2019	$7,822,394	$7,321,678	$500,716

Hanover Employees'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability (Asset)
Balances as of December 31, 2018	$31,918,045	$30,313,438	$1,604,607
Service Cost	329,117	0	329,117
Interest Cost	2,191,743	0	2,191,743
Changes of Benefit Terms.....	21,757	0	21,757
Changes for Experience	(1,256,261)	0	(1,256,261)
Changes for Assumptions	922,934	0	922,934
Employer Contributions.....	0	347,424	(347,424)
Plan Member Contributions	0	155,335	(155,335)
Net Investment Income	0	6,231,414	(6,231,414)
Benefit Payments	(1,206,451)	(1,206,451)	0
Administrative Expense	0	(16,400)	16,400
Net Changes.....	1,002,839	5,511,322	(4,508,483)
Balances as of December 31, 2019	$32,920,884	$35,824,760	($2,903,876)

Source: 2019 Audited Financial Statements.

Other Post-Employment Benefits

The Borough offers a single-employer defined benefit healthcare plan for the police, fire drivers and non-uniformed employees of the Borough. The plan is established and administered by the Borough through the Intergovernmental Insurance Cooperative (IIC) (a trust agent), and management of the plan is administered by the ten elected members of the Borough Council. The plan is funded on a pay-as-you-go basis. There is no irrevocable trust established for the plan that meets the criteria in GASB Statement No. 75, paragraph 4, and the Borough does not have accumulated assets for the future payment of OPEB benefit payments.

The post-employment health insurance plan provides medical and hospitalization, prescription drug, dental, vision and life insurance benefits to eligible active plan members and retirees and their spouses, and is authorized by the Borough Council.

The plan is unfunded, with premium payments made by the Borough, and any corresponding reimbursements from retirees and spouses, on a pay-as-you-go basis. For the year ended December 31, 2019, the Borough paid premium costs of $236,213 for retirees and their spouses, of which $217,181 was reimbursed by plan members in accordance with their respective bargaining agreements.

Source: 2019 Audited Financial Statements.

MUNICIPAL BANKRUPTCY LAW

Enforcement of holder of the Bonds' rights may be limited by and be subject to the provisions of bankruptcy, insolvency and distressed municipality laws, as now or hereafter enacted, or to other laws or equitable principles which may affect enforcement of creditors' rights.

The rights and remedies of holders of the Bonds are subject to the provisions of Chapter 9 of the Federal Bankruptcy Code. In general, that chapter permits, under prescribed circumstances (but only after an authorization by the applicable state legislature or by a governmental officer or organization empowered by state law to give such authorization), a political subdivision of a state to file a petition for relief in a bankruptcy court of the United States if it is insolvent or unable to meet its debts as they mature and desires to effect a plan to adjust its debt. Such plan may, on being approved by a certain percentage of creditors and the court, include provisions modifying or altering the rights of creditors.

The Pennsylvania Distressed Municipalities Act, Act No. 1987-47, authorizes a municipality, such as the Borough, to file a municipal debt readjustment action pursuant to the Federal Bankruptcy Code only if one of the following conditions is present: (1) such action has been recommended by a state coordinator following a determination by the Department of Community and Economic Development that the municipality is financially distressed, within the meaning of such Act; (2) there is imminent jeopardy of an action by a creditor, a claimant or a supplier of goods and services that is likely to substantially interrupt or restrict the ability of the municipality to provide health or safety services; (3) one or more creditors of the municipality has rejected the proposed or adopted plan for relieving the municipality's financial distress and efforts to negotiate a resolution with such creditor(s) has been unsuccessful; (4) a condition affecting the municipality's financial distress is potentially solvable only through utilization of a remedy under the Federal Municipal Debt Readjustment Act; or (5) a majority of the governing body of the municipality has failed to adopt a plan for relieving the financial distress or to carry out the recommendations of the state coordinator.

DEFAULTS AND REMEDIES

In the event of any failure of the Borough to pay or cause to be paid the interest on or principal of the Bonds, as the same becomes due and payable, the holders of the Bonds shall be entitled to remedies specified by the Debt Act. Among the remedies, if the failure to pay shall continue for 30 days, holders of the Bonds shall have the right to recover the amount due by bringing a lawsuit in the Court of Common Pleas of the York County, in which the Borough is located. The Debt Act provides that any judgment shall have an appropriate priority upon the funds next coming into the treasury of the Borough. The Debt Act also provides that upon a default of at least 30 days, holders of at least 25% of the Bonds may appoint a trustee to represent them. The Debt Act provides other remedies in the event of default, and further qualifies the remedies herein described.

TAX MATTERS

Federal

Exclusion of Interest from Gross Income

In the opinion of Bond Counsel, under existing statutes, regulations, rulings and court decisions, interest on the Bonds, will not be includible in gross income of the holders thereof for federal income tax purposes assuming continuing compliance by the Borough with the requirements of the Internal Revenue Code of 1986, as amended (the "Code"). Interest on the Bonds will not be a specific preference item for purposes of computing the federal alternative minimum tax on individuals.

In rendering its opinion, Bond Counsel has assumed compliance by the Borough with its covenants contained in the Ordinance and its representations in the Tax Compliance Certificate executed by the Borough on the date of issuance of the Bonds relating to actions to be taken by the Borough after issuance of the Bonds necessary to effect or maintain the exclusion from gross income of the interest on the Bonds for federal income tax purposes. These covenants and representations relate to, inter alia, the use and investment of proceeds of the Bonds, and the rebate to the United States Department of Treasury of specified arbitrage earnings, if any. Failure to comply with such covenants could result in interest on the Bonds becoming includible in gross income for federal income tax purposes from the date of issuance of the Bonds.

Other Federal Tax Matters

Ownership or disposition of the Bonds may result in other federal tax consequences to certain taxpayers, including, without limitation, certain S corporations, foreign corporations with branches in the United States, property and casualty insurance companies, taxpayers who have an initial basis in the Bonds greater or less than the principal amount thereof, individual recipients of Social Security or Railroad Retirement benefits, and taxpayers, including banks, thrift institutions and other financial institutions subject to Section 265 of the Code, who may be deemed to have incurred or continued indebtedness to purchase or to carry the Bonds.

Bond Counsel is not rendering any opinion regarding any federal tax matters other than as described under the caption "Exclusion of Interest From Gross Income" above and expressly stated in the form of the opinion of Bond Counsel included as APPENDIX B. Prospective purchasers of the Bonds should consult their independent tax advisors with regard to all federal tax matters.

Pennsylvania

In the opinion of Bond Counsel, under the laws of the Commonwealth as enacted and construed on the date hereof, interest on the Bonds is exempt from Pennsylvania personal income tax and Pennsylvania corporate net income tax; however, under the laws of the Commonwealth, as enacted and construed on the date hereof, any profits, gains or income derived from the sale, exchange or other disposition of the Bonds will be subject to Pennsylvania taxes and local taxes within the Commonwealth.

Bond Counsel is not rendering any opinion as to any Commonwealth of Pennsylvania tax matters other than those described under the caption "Pennsylvania" above and expressly stated in the form of the opinion of Bond Counsel included as APPENDIX B hereto.

Prospective purchasers of the Bonds should consult their independent tax advisors with regard to all Commonwealth of Pennsylvania tax matters.

Other

The Bonds and the interest thereon may be subject to state and local taxes in jurisdictions other than the Commonwealth under applicable state or local tax laws.

Purchasers of the Bonds should consult their independent tax advisors with regard to all state and local tax matters that may affect them.

QUALIFIED TAX-EXEMPT OBLIGATIONS

Each of the Bonds will be designated by the Borough as a "qualified tax-exempt obligation" pursuant to Section 265(b)(3) of the Code.

INVESTMENT CONSIDERATIONS

No Assurance of Secondary Market for the Bonds

There can be no guarantee that there will be a secondary market for the Bonds or, if a secondary market exists, that the Bonds can be sold for any particular price. Accordingly, purchasers of the Bonds should be prepared to have their funds committed until the Bonds mature. Prices of issues for which a market is being made will depend upon then prevailing circumstances. Such prices could be substantially different than the original purchase price.

Given current market irregularities and volatility, at present, there is a limited secondary market for the Bonds. No assurance is given, and none can be given, by the Borough or the Underwriter that a more robust secondary market for the Bonds will be re-established (in the near or longer term) or, if re-established, will not be disrupted by ongoing world events including, but not limited to, the current pandemic associated with the COVID-19 virus (See "Coronavirus COVID-19" herein). As a result, no assurances are given as to the ability of investors to reoffer any Bonds purchased in the secondary market. Moreover, while the Underwriter expects to reoffer the Bonds in secondary market, the Underwriter is not specifically required to do so.

Coronavirus COVID-19

The outbreak of COVID-19, a respiratory disease caused by a new strain of coronavirus, has been characterized as a pandemic (the "Pandemic") by the World Health Organization and is currently affecting many parts of the world, including the United States and the Commonwealth of Pennsylvania. On March 13, 2020, the President of the United States declared the outbreak of COVID-19 in the United States a national emergency. Pennsylvania Governor Tom Wolf ordered all non-life-sustaining businesses in Pennsylvania to close their physical locations as of 8:00 p.m. March 19, 2020 to slow the spread of COVID-19. On April 1, 2020, the Governor issued a Stay-at-Home order for all Pennsylvania Counties, to which no Pennsylvania Counties are currently subject. York County where the Borough is located, transitioned from a "yellow phase" to a "green phase" effective June 12, 2020, further easing restrictions on business and social interaction.

The spread of the strain of coronavirus commonly known as COVID-19 is altering the behavior of businesses and people in a manner that is having substantial disruptive effects on global, national, state and local economies. While it is not possible at this time to assess the full impact of COVID-19 on the Borough, some possible negative consequences include: 1. The Borough's finances may be materially adversely affected by the continued spread of COVID-19 from delayed or reduced property tax collections, which could adversely impact the amount and timing of funds available to make debt service payments on its financial obligations. See "GENERAL TAXING POWER" for a discussion of funding sources of the Borough including property tax revenue. 2. The ability of individuals and businesses to afford and pay property taxes, whether timely or otherwise, could be adversely affected. Consequently, there can be no assurance that collection of taxes will remain at or past levels. 3. Demands and costs for Borough social services have increased which can be expected to continue into the future. 4. Management of the Borough and its facilities and finances could be interrupted because of mandatory closures or other "social distancing" initiatives. Because of these and other factors, as well as the continued spread of the virus and the changing manner in which governments at the national, state and local levels are addressing the issue, the Borough cannot predict all effects that the spread of COVID-19 will have on its finances or operations. Such effects could be significant and adverse to the Borough, however, at this time, the Borough does not currently anticipate a material negative impact on its ability to pay debt service on the Bonds .

CONTINUING DISCLOSURE UNDERTAKING

In accordance with the requirements of Rule 15c2-12 (the "Rule") promulgated by the Securities and Exchange Commission ("SEC"), and the Ordinance authorizing the issuance of the Bonds, the Borough will execute and deliver a written continuing disclosure certificate with respect to the Bonds. See the form of the Continuing Disclosure Certificate (the "Certificate") as Appendix D to this Official Statement.

Under the terms of the Certificate, the Borough will undertake to file with the MSRB financial and other information concerning the Borough (annual audited financial statements and annual budget (as and when available) and notice of certain events affecting the Borough). The Borough's obligations with respect to continuing disclosure as it relates to the Bonds shall terminate upon the prior redemption or payment in full of all of the Bonds.

The MSRB has been designated by the SEC to be the central and sole repository for continuing disclosure information filed by issuers of municipal securities since July 1, 2009. Information and notices filed by municipal issuers (and other "obligated persons" with respect to municipal securities issues) are made available through the MSRB's Electronic Municipal Market Access (EMMA) System, which may be accessed on the internet at http://www.emma.msrb.org.

Existing Continuing Disclosure Filing History

The Borough has previously executed Continuing Disclosure Certificates with respect to each one of its previously issued bond issues that are currently outstanding. The Borough's filing history of its annual financial and operating information during the past five (5) years is outlined in the table below.

Fiscal Year	Filing	Financial Statements		Budget		Operating Data	
Ending	Deadline [1]	Filing Date	EMMA ID [2]	Filing Date	EMMA ID [2]	Filing Date	EMMA ID [2]
12/31/2015	8/27/2016	4/4/2016	ER752314	2/9/2016	EP721001	4/4/2016	ER752315
12/31/2016	8/28/2017	4/21/2017	ES804392	1/5/2017	ES791233	4/21/2017	ES804389
12/31/2017	8/28/2018	4/25/2018	ES889106	1/10/2018	ES848181	4/25/2018	ES889107
12/31/2018	8/28/2019	4/5/2019	ER936995	1/7/2019	ER918350	4/5/2019	ER937003
12/31/2019	8/27/2020	4/14/2020	RE1021635	12/26/2019	ER993488	4/14/2020	RE1021638

Notes

[1] For these purposes, assumes the shortest filing deadline of the Borough's previous Continuing Disclosure Certificates

[2] Submission ID is the EMMA Submission ID for each filing. To access a filing, insert the Submission ID to the end of the web address below: http://emma.msrb.org/ContinuingDisclosureView/ContinuingDisclosureDetails.aspx?submissionId=

Based on the information above, the Borough's annual financial and operating filing history over the past five (5) years can be summarized as follows:

For fiscal year ending December 31, 2015, the Borough filed the audit report and operating data timely on April 4, 2016 and the budget report timely on February 9, 2016.

For fiscal year ending December 31, 2016, the Borough filed the audit report and operating data timely on April 21, 2017 and the budget report timely on January 5, 2017.

For fiscal year ending December 31, 2017, the Borough filed the audit report and operating data timely on April 25, 2018 and the budget report timely on January 10, 2018.

For fiscal year ending December 31, 2018, the Borough filed the audit report and operating data timely on April 5, 2019 and the budget report timely on January 7, 2019.

For fiscal year ending December 31, 2019, the Borough filed the audit report and operating data timely on April 14, 2020 and the budget report timely on December 26, 2019.

LITIGATION

There is not now pending or, to the best of the Borough's knowledge, threatened any litigation restraining or enjoining the issuance or delivery of the Bonds or questioning or affecting the validity of the Bonds, the proceedings and authority under which they are to be issued, nor is the creation, organization, or existence of the Borough being contested. Nor is there any litigation pending or, to the best of the Borough's knowledge, threatened which (i) in any manner questions the right of the Borough to conduct its activities in accordance with the provisions of the Act and of the Ordinance or (ii) if determined adversely to the Borough, would have a material adverse impact on the financial condition of the Borough.

The Borough is subject to a variety of suits and proceedings arising out of its ordinary course of its affairs, some of which may be adjudicated adversely to the Borough. Any such litigation is of a routine nature which does not affect the right of the Borough to conduct its affairs or the validity of its obligations.

NEGOTIABILITY OF BONDS

Under the Debt Act, the Bonds have all the qualities and incidents of securities under Article 8 of the Uniform Commercial Code and are negotiable instruments.

RATING

Moody's Investors Service, Inc. has assigned a rating of "Aa3" to the Bonds. Moody's Investors Service, Inc., is located at: 7 World Trade Center at 250 Greenwich Street, New York, New York 10007. Generally, a rating agency bases its rating on the information and materials furnished to it and on investigations, studies and assumptions of its own. There is no assurance that any such rating will continue for any given period of time or that it will not be revised downward or withdrawn entirely by the rating agency, if circumstances so warrant. Any such downward revision or withdrawal of such rating may have an adverse effect on the market price of the Bonds.

UNDERWRITING

The Bonds are being purchased for reoffering by the Underwriter. The Underwriter has agreed to purchase the Bonds from the Borough, subject to the terms of the purchase agreement and addendum thereto between the Borough and the Underwriter (the "Bond Purchase Agreement"), at an aggregate purchase price of $10,692,899.45, exclusive of accrued interest. Such amount represents the principal amount of the Bonds of $9,440,000.00, plus original issue premium of $1,307,179.45, and less an Underwriters' discount of $54,280.00. The Bond Purchase Agreement provides that all of the Bonds will be purchased if any Bonds are purchased and are subject to certain terms and conditions set forth therein. The initial public offering prices stated on the inside cover page hereof may be changed from time to time by the Underwriter without prior notice.

The Underwriter may offer and sell the Bonds to certain dealers (including dealers depositing the Bonds into investment trusts and others) at prices lower than such initial public offering prices as are stated inside the cover page hereof. The public offering prices may be changed from time to time by the Underwriter.

RELATED PARTIES

PNC Capital Markets LLC and PNC Bank, National Association are both wholly-owned subsidiaries of the PNC Financial Service Group, Inc. PNC Capital Markets LLC, serving as an Underwriter, is not a bank, and is a distinct legal entity form PNC Bank, National Association. PNC Bank, National Association has other banking and financial relationships with the Borough.

LEGAL OPINION

The Bonds are offered subject to the receipt of the unqualified approving legal opinion of Eckert Seamans Cherin & Mellott, LLC, Bond Counsel, of Harrisburg, Pennsylvania. Certain legal matters will be passed upon for the Borough by Salzmann Hughes, P.C., of Hanover, Pennsylvania, Borough Solicitor.

FINANCIAL ADVISOR

The Borough has retained PFM Financial Advisors LLC, having an office in Harrisburg, Pennsylvania, as financial advisor (the "Financial Advisor") in connection with the preparation, authorization and issuance of the Bonds. The Financial Advisor is not obligated to undertake, and has not undertaken to make, an independent verification or to assume responsibility for the accuracy, completeness, or fairness of the information contained in the Official Statement. The Financial Advisor is an independent advisory firm and is not engaged in the business of underwriting, trading or distributing municipal securities or other public securities.

MISCELLANEOUS

This Official Statement has been prepared under the direction of the Borough by the Financial Advisor, in its capacity as independent financial advisor to the Borough. The information set forth in this Official Statement has been obtained from the Borough and from other sources believed to be reliable. Insofar as any statement herein includes matters of opinion or estimates about future conditions, it is not intended as representation of fact, and there is no guarantee that it is, or will be, realized. Summaries or descriptions of the Bonds, the Ordinance, the Debt Act, and all references to other materials not purporting to be quoted in full are only brief outlines of some of the provisions thereof. Reference is hereby made to the complete documents, copies of which will be furnished by the Borough or the Financial Advisor upon request. The information assembled in this Official Statement is not to be construed as a contract with holders of the Bonds.

The Borough has authorized the distribution of this Official Statement.

BOROUGH OF HANOVER
York County, Pennsylvania

By: /s/ William W. Reichart II
Council President

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APPENDIX A
Demographic and Economic Information
Relating to the Borough of Hanover

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Location and Character

The Borough of Hanover (the "Borough") is located in south central Pennsylvania on the southwest border of York County. Covering an area of 3.9 square miles, the Borough is situated in a fertile agricultural area fifteen miles east of the Borough of Gettysburg, 18 miles southwest of the City of York, the County seat, 37 miles southwest of the City of Harrisburg and 45 miles northwest of the City of Baltimore, Maryland. The Borough is surrounded on the north, east and south by the Township of Penn (York County), on the west by the Township of Conewago (Adams County) and is about eight miles north of the border of the State of Maryland.

Hanover is the commercial center for the surrounding agricultural area. York County, with 2,400 farms occupying over 50% of the land area, ranks first in the Commonwealth for production of barley, wheat and soybeans, second for corn, grain and potatoes, third for pork products and fourth for apples.

The Hanover area is the home of nationally known horse farms including Hanover Shoe Farms, the world's largest standard-bred horse breeding farm, and Kosmos Horse Breeders.

State Routes 94, 116 and 194 intersect in Hanover and U.S. Highway Route 30 is five miles to the north of the Borough via Routes 94 and 194. Interstate 83, connecting York with Baltimore, is approximately fifteen miles to the east of the Borough.

Population

Table A-1 shows population trends for the Borough, the County, and the Commonwealth. The Borough's population increased from 15,289 to 15,403 between 2010 and 2015 (est.), an increase of 114 in that period. Table A-2 shows 2015 (est.) of the age composition of the Borough, York County and for the Commonwealth. Average household size for the County was slightly lower than the statewide average.

TABLE A-1
POPULATION TRENDS*

Population trends for the Borough, York County and the Commonwealth of Pennsylvania for 2010 and 2015 (estimated) are shown below:

Area	2010	2015(est.)	Compound Average Annual Percentage Change 2010-2015(est.)
Hanover Borough	15,289	15,403	0.07%
York County	434,972	439,660	0.11%
Pennsylvania	12,702,379	12,779,559	0.06%

Source: U.S. Census Bureau, Census and U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

TABLE A-2
AGE COMPOSITION

	0-19	20-64	65+
Hanover Borough	22.7	58.1	19.1
York County	26	59	15
Pennsylvania	24	59	16

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

Employment

Overall employment data are not compiled for the Borough, but such data are compiled for the York- Hanover MSA (the "MSA") (an area which includes the Borough).

TABLE A-3
DISTRIBUTION OF EMPLOYMENT
YORK-HANOVER METROPOLITAN STATISTICAL AREA
(York County)
NONFARM JOBS

	Industry Employment				Net Change From:	
ESTABLISHMENT DATA	**Sep 2020**	**Aug 2020**	**July 2020**	**Sep 2019**	**Aug 2020**	**Sep 2019**
TOTAL NONFARM	179,800	177,100	175,000	189,100	2,700	-9,300
TOTAL PRIVATE	160,100	159,000	158,100	169,000	1,100	-8,900
GOODS-PRODUCING	42,700	42,800	42,800	44,300	-100	-1,600
Mining, Logging, and Construction	10,800	10,800	10,800	12,200	0	-1,400
Manufacturing	31,900	32,000	32,000	32,100	-100	-200
SERVICE-PROVIDING	137,100	134,300	132,200	144,800	2,800	-7,700
PRIVATE SERVICE-PROVIDING	117,400	116,200	115,300	124,700	1,200	-7,300
Trade, Transportation, and Utilities	38,400	37,800	37,100	38,000	600	400
Wholesale trade	6,200	6,200	6,100	6,800	0	-600
Retail trade	20,500	20,600	20,200	19,600	-100	900
Grocery stores	3,700	3,700	3,700	3,800	0	-100
General merchandise stores	4,200	4,400	4,200	3,900	-200	300
Transportation, Warehousing & Utilities	11,700	11,000	10,800	11,600	700	100
Information	1,300	1,300	1,300	1,500	0	-200
Financial Activities	5,400	5,400	5,400	5,300	0	100
Professional and Business Services	23,900	23,300	23,400	24,300	600	-400
Educational and Health Services	30,300	29,700	29,500	29,100	600	1,200
Health care and social assistance	24,700	24,600	24,500	26,800	100	-2,100
Leisure and Hospitality	10,900	11,500	11,400	16,300	-600	-5,400
Other Services	7,200	7,200	7,200	10,200	0	-3,000
Government	19,700	18,100	16,900	20,100	1,600	-400
Federal Government	4,600	4,700	4,500	4,400	-100	200
State Government	1,100	1,100	1,100	1,100	0	0
Local Government	14,000	12,300	11,300	14,600	1,700	-600

Source: Pennsylvania Department of Labor & Industry, Center for Workforce and Information Analysis.

The largest employers in the Borough and immediate surrounding area and their approximate number of employees are as follows:

Name	Industry	No. of Employees
Utz Quality Foods Inc.	Snack Food	1,287
Hanover Hospital	Health Care	1,117
R.H. Sheppard Co., Inc.	Foundry	1,043
Hanover Direct, Inc.	Direct Marketing	700
Bookspan	Book Club Operator	700
Hanover Foods Corp.	Food Processor	600
Walmart	Retail	531
Snyder's-Lance	Snack Food	500
The Sheridan Press	Printing & Communication	402
Performance Group	Temp Employment	386
ESAB Welding & Cutting	Metal Welding & Cutting	380
Temp Staff	Temp Employment	329
Shultz Foods Company	Snack Food	320
Hanover Area YMCA	Recreation	311
Hanover Public School Dist.	Education	258
SKF USA Inc.	Ball Bearing Manufacturing	245
Hanover Hall	Nursing	239
IWM International	Wirecloth Manufacturing	227
The Clarks Companies	Shoe Manufacturing	200

Source: Borough Officials and Borough Chamber of Commerce

Table A-4 shows recent trends in labor force, employment and unemployment for the County and the Commonwealth.

TABLE A-4

RECENT TRENDS IN LABOR FORCE, EMPLOYMENT AND UNEMPLOYMENT*

	2015	2016	2017	2018	2019	2020(1)	Rate
York County							
Civilian Labor Force (000)	232.8	235	234.4	234.1	236.4	232.5	-0.03%
Employment (000)	222.1	224.1	224.1	225.1	227.3	217.9	-0.38%
Unemployment (000)	10.7	10.9	10.2	9	9.1	14.7	6.56%
Unemployment Rate	4.6	4.6	4.4	3.9	3.8	6.3%	
Pennsylvania							
Civilian Labor Force (000)	6,424.0	6,450.0	6,425.0	6,424.0	6,492.0	6,355.0	-0.22%
Employment (000)	6,094.0	6,103.0	6,111.0	6,149.0	6,208.0	5,866.0	-0.76%
Unemployment (000)	330.0	347.0	314.0	276.0	284.0	489.0	8.18%
Unemployment Rate	5.1	5.4	4.9	4.3	4.4	7.70%	

(1)As of September 2020.
Source: Pennsylvania Department of Labor & Industry

Income

The data in Table A-5 shows trends in per capita income for the County and the Commonwealth over the 2010-2015 (est.) period. Per capita income for the Borough and County was lower than the average per capita income for the Commonwealth.

TABLE A-5

RECENT TRENDS IN PER CAPITA INCOME*

	2010 Per Capita Income	2015 (est.) Per Capita Income	Compound Average Annual Percentage Change 2010-2015(est.)
Hanover Borough	$25,527	$25,501	0.10%
York County	27,196	28,403	0.44%
Pennsylvania	27,049	29,291	0.80%

Source: U.S. Census Bureau, 2010 Census and U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates
*Income is defined by the Bureau of the Census as the sum of wage and salary income, non-farm self-employment income, net self-employment income, Social Security and Railroad retirement income, public assistance income, interest, dividends, pensions, etc. before deductions for personal income taxes, Social Security, etc. Income is the population-weighted average for political subdivisions.

Commercial Activity

Table A-6 shows trends for retail sales in the County and the Commonwealth.

TABLE A-6

TOTAL RETAIL SALES
(000)

	2013	2014	2015	2016	2017
York County	6,969,245	4,990,291	5,191,839	5,230,725	6,308,973
Pennsylvania	187,412,600	199,975,258	198,215,135	207,887,941	213,005,475

Source: Neilson Company

Education

The Hanover Public School District operates three elementary schools, one middle school and one high school. Students may also attend the York County School of Technology, formerly known as York County Area Vocational-Technical School in the City of York. There are also two parochial elementary schools and one parochial high school in the area and a number of institutions of higher learning within a 50-mile radius of the County including: York College, Dickinson College, Gettysburg College, Franklin & Marshall College, Harrisburg Community College, Dickinson Law School of Penn State University, Elizabethtown College, Messiah College, Lebanon Valley College, Millersville University and Shippensburg University.

Housing

	Total Housing Units	Occupied	Owner	Median Value	Persons Per Household
Hanover Borough	7,180	6,562	6,562	$153,500	2.32
York County	180,237	167,416	124,269	168,400	2.57
Pennsylvania	5,585,611	4,958,859	4,958,859	166,000	2.49

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

Medical Facilities

Hanover General Hospital is a 93 bed acute care facility. Hanover Hall Nursing Home & Villa has 152 beds and Homewood Retirement Village has 101 assisted living units and 120 skilled nursing units.

Transportation Facilities

Through the accessibility of existing highways, Hanover is connected to all major metropolitan areas via expressways such as the Pennsylvania Turnpike, Baltimore Beltway, Interstate 83, and Route 30. There are more than a dozen interstate and intrastate motor freight carriers, both independent and unionized, which utilize the area. CSX Transportation, Inc., with the acquisition of the Western Maryland Railroad, has increased the already existing service provided by the railroad for carload as well as piggyback trailer service. In addition, Hanover offers its own light aircraft airports, which are available to provide flights and are accessible to the larger airports of York, Harrisburg, Baltimore and Washington.

Lincoln Bus Lines, Inc. offers chartered bus service to all parts of the country. Rabbit Transit also provides bus service in the Hanover area.

The York Airport is located 16 miles northeast of Hanover at Thomasville and will accommodate larger planes on an asphalt runway. Major commercial airline service is provided at both the Harrisburg International and the Baltimore-Washington International Airports both located approximately 45 miles from Hanover.

Utilities

Met-Ed/First Energy Corp. provides electric services to the Hanover area. Gas service is provided by Colombia Gas of Pennsylvania, Inc. within the Borough of Hanover. Water and Sewer service is provided by the Borough of Hanover. CenturyLink and Verizon provide telephone service to residents of the Borough.

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APPENDIX B
Form of Opinion of Bond Counsel

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FORM OF OPINION OF BOND COUNSEL

The form of the approving legal opinion of Eckert Seamans Cherin & Mellott, LLC, Bond Counsel, is set forth below. The actual opinion will be signed and delivered on the date of delivery of the Bonds and may vary from the form set forth to reflect circumstances both factual and legal at the time of such delivery. Recirculation of this Preliminary Official Statement or Official Statement shall create no implication that Eckert Seamans Cherin & Mellott, LLC, has reviewed any of the matters set forth in such opinion subsequent to the date thereof.

December 17, 2020

To the Purchasers of the
Within-Described 2020D Bonds

Re: Borough of Hanover, York County, Pennsylvania
$9,440,000 General Obligation Bonds, Series D of 2020

We have served as Bond Counsel to the Borough of Hanover, York County, Pennsylvania ("Borough"), in connection with the issuance of its $9,440,000 aggregate principal amount General Obligation Bonds, Series D of 2020 (the "2020D Bonds"). The 2020D Bonds are issued pursuant to, and are secured by, the Pennsylvania Local Government Unit Debt Act, 53 Pa. C.S. §8001 *et seq*. (the "Act"), and an ordinance (the "Ordinance") enacted on October 28, 2020, by the Council of the Borough ("Council").

The 2020D Bonds are being issued for the purpose of providing funds to: (i) undertake certain capital additions, replacements and improvements to the Borough's water system facilities, to the extent of available funds (collectively, the "Capital Project") and (ii) pay the costs and expenses of issuing the 2020D Bonds.

As Bond Counsel for the Borough, we have examined: (a) the relevant provisions of the Constitution of the Commonwealth of Pennsylvania ("Commonwealth"); (b) the Act; (c) the relevant provisions of the Borough Code, as amended; (d) the Ordinance and the Debt Statement of the Borough filed with the Pennsylvania Department of Community and Economic Development ("Department"); (e) the proceedings of the Council with respect to the authorization, issuance, and sale of the 2020D Bonds; (f) the Certificate of Approval issued by the Department in respect of the proceedings authorizing the issuance of the 2020D Bonds; and (g) certain statements, certifications, affidavits, and other documents and matters of law which we have considered relevant, including, without limitation, a certificate dated the date hereof ("Tax Compliance Certificate") of officials of the Borough having responsibility for issuing the Bonds, given pursuant to the Internal Revenue Code of 1986, as amended, and the regulations promulgated thereunder ("Code"), an opinion of the Solicitor to the Borough as to various matters, and the other documents, certifications, and instruments listed in the Closing Memorandum filed with the Paying Agent (hereinafter defined) on the date of original delivery of the 2020D Bonds. We have also

examined a fully executed and authenticated Bond of each series, or true copies thereof, and assume all other Bonds are in such forms and are similarly executed and authenticated.

The Borough has designated each Bond constituting a part of the 2020D Bonds as a "qualified tax-exempt obligation" as defined in and for the purposes of Section 265(b)(3) of the Code.

In rendering the opinion set forth below, we have relied upon the genuineness, accuracy, and completeness of all documents, records, certifications, and other instruments we have examined, including, without limitation, the authenticity of all signatures appearing thereon. We have also relied, in the opinion set forth below, upon the opinion of the Solicitor of the Borough as to all matters of fact and law set forth therein.

Except with respect to paragraph 6 below, our opinion is given only with respect to the internal laws of the Commonwealth as enacted and construed on the date hereof.

Based on the foregoing, we are of the opinion that:

1. The Borough is authorized under the provisions of the Constitution, the Act and other applicable laws of the Commonwealth to issue the 2020D Bonds.

2. The Borough has established, in accordance with the Debt Act, a sinking fund, one for the 2020D Bonds (the "Sinking Fund"), with Manufacturers and Traders Trust Company, as paying agent, registrar, and sinking fund depository ("Paying Agent"), and has covenanted in the Ordinance to deposit in the Sinking Fund such amounts sufficient to pay the principal of and interest on the 2020D Bonds as the same becomes due and payable, and to apply the amounts so deposited therein to the payment of such principal and interest.

3. The Borough has effectively covenanted: (i) to include the amount of debt service on the 2020D Bonds in each fiscal year of the Borough in which such sums are due and payable in its budget for that fiscal year; (ii) to appropriate such amounts from its general revenues for the payment of such debt service; and (iii) to duly and punctually pay, or cause to be paid, from the Sinking Fund or any other of its general revenues or funds, the principal or redemption price of and interest on the 2020D Bonds on the dates and in the places and in the manner stated in the 2020D Bonds according to the true intent and meaning thereof. For such budgeting, appropriation, and payment the Borough has pledged, with respect to the 2020D Bonds, its full faith, credit, and taxing power.

4. The 2020D Bonds have been duly authorized, executed, authenticated, issued, and delivered by the Borough, and are the legal, valid, and binding general obligations of the Borough, enforceable in accordance with the terms thereof, except to the extent that enforcement thereof may be affected by bankruptcy, insolvency, reorganization, moratorium, or other similar laws or legal or equitable principles affecting the enforcement of creditors' rights.

5. Under the laws of the Commonwealth as enacted and construed on the date hereof, interest on the 2020D Bonds is exempt from Pennsylvania personal income tax and

Pennsylvania corporate net income tax; however, under the laws of the Commonwealth as enacted and construed on the date hereof, any profits, gains, or income derived from the sale, exchange or other disposition of the 2020D Bonds will be subject to Commonwealth taxes and local taxes within the Commonwealth.

6. Under existing statutes, regulations, rulings, and court decisions, interest on the 2020D Bonds, including interest accruing in the form of original issue discount, will not be includible in gross income of the holders thereof for federal income tax purposes, assuming continuing compliance by the Borough with the requirements of the Code. Interest on the 2020D Bonds will not be a specific preference item for purposes of computing the federal alternative minimum tax on individuals.

In rendering this opinion, we have assumed compliance by the Borough with the covenants contained in the Ordinance and its representations in the Tax Compliance Certificate relating to actions to be taken by the Borough after the issuance of the 2020D Bonds necessary to effect or maintain the exclusion from gross income of the interest on the 2020D Bonds for federal income tax purposes. These covenants and representations relate to, inter alia, the use and investment of proceeds of the 2020D Bonds, and the rebate to the United States Department of Treasury of specified arbitrage earnings, if any. Failure to comply with such covenants could result in the interest on the 2020D Bonds becoming includible in gross income for federal income tax purposes from the date of issuance of the 2020D Bonds.

We express no opinion as to any matter not set forth in the numbered paragraphs herein. This opinion is rendered on the basis of federal law and the laws of the York Borough, Pennsylvania as enacted and construed on the date hereof. This opinion is given as of the date hereof and we assume no obligation to supplement this opinion to reflect changes in law that may hereafter occur or changes in facts or circumstances that may hereafter come to our attention. Without limiting the generality of the foregoing, we express no opinion with respect to, and assume no responsibility for, the accuracy, adequacy or completeness of the preliminary official statement or the official statement prepared in respect of the 2020D Bonds, and make no representation that we have independently verified the contents thereof.

Very truly yours,

ECKERT SEAMANS CHERIN & MELLOT, LLC

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APPENDIX C
Audited Financial Statements

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THE BOROUGH OF HANOVER, PENNSYLVANIA

BASIC FINANCIAL STATEMENTS AND REQUIRED AND OTHER SUPPLEMENTARY INFORMATION

FOR THE YEAR ENDED DECEMBER 31, 2019

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HAMILTON & MUSSER, P.C.
Certified Public Accountants • Consultants to Management

DAVID A. HAMILTON, CPA • BARRY E. MUSSER, CPA, CFP®
JAMES A. KRIMMEL, MBA, CPA, CFE, CFF • ROBERT D. MAST, CPA • WILLIAM P. ASHMAN, CPA

INDEPENDENT AUDITOR'S REPORT

To the Borough Council
The Borough of Hanover
Hanover, Pennsylvania

Report on the Financial Statements

We have audited the accompanying financial statements of the governmental activities, the business-type activities, the discretely presented component unit, the blended presented component unit, each major fund, and the aggregate remaining fund information of The Borough of Hanover, Pennsylvania, as of and for the year ended December 31, 2019, and the related notes to the financial statements, which collectively comprise the Borough of Hanover's basic financial statements of the Borough's primary government as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We did not audit the financial statements of the Hanover Public Library Association, Inc. Those statements were audited by other auditors whose report has been furnished to us, and our opinion, insofar as it relates to the amounts included for the discretely presented component unit, is based solely on the report of the other auditors. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

Auditor's Responsibility (Continued)

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, based on our audit and the report of other auditors, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities, the business-type activities, the blended component unit, the discretely presented component unit, each major fund, and the aggregate remaining fund information of the primary government of the Borough of Hanover, Pennsylvania, as of December 31, 2019, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, budgetary comparison information, schedule of changes in the Borough's net pension liability (asset) and related ratios - pension plans, schedules of Borough contributions and investment returns – pension plans, and schedule of changes in the Borough's total OPEB liability and related ratios on pages 4-21 and 89-102 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming opinions on the financial statements that collectively comprise the Borough of Hanover, Pennsylvania's basic financial statements. The combining schedule of Fiduciary Net Pension and combining schedule of changes in fiduciary net position on pages 103 and 104 are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The combining schedules are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has not been subjected to the auditing procedures applied in the audit of the basic financial statements and accordingly, we do not express an opinion or provide any assurance on them.

Emphasis of a Matter

As further explained in Note 24, the Borough is operating in an environment that has been economically impacted by the COVID-19 pandemic.

Hamilton & Musser, P.C.

March 30, 2020

Mechanicsburg, Pennsylvania *Certified Public Accountants*

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

INTRODUCTION

The following discussion and analysis of The Borough of Hanover's (the "Borough") financial statements provides a narrative overview and analysis of the financial activities of the Borough for the fiscal year ended December 31, 2019. Readers are encouraged to consider the information presented here in conjunction with the year-end financial statements and accompanying notes following this analysis.

The Management's Discussion and Analysis (MD&A) is an element of the reporting model adopted by the Governmental Accounting Standards Board (GASB) in their statement No. 34, *Basic Financial Stations - and Management's Discussion and Analysis - for State and Local Governments*, issued June 1999. Certain comparative information between the current year and prior year is required to be presented in this section.

FINANCIAL HIGHLIGHTS OF 2019

- The assets and deferred outflows of resources of the Borough exceeded its liabilities and deferred inflows of resources at the close of the fiscal year ended December 31, 2019 by $68,227,880 (net position). The Borough's net position value increased $4,220,629 from 2018's total of $64,007,251. The majority of the Borough's net position ($49,019,382, or 71.85%) is invested in capital assets and is not available for future spending.
- Fund balances increased in the General Fund by $681,172 from $9,624,970 to $10,306,142 in 2019.
- The Borough entered into three new capital lease obligations in 2019 relating to various heavy-duty vehicles and related equipment, totaling $589,329.
- The Borough's bond rating was confirmed as Aa3 as issued by Moody's, denoting a very strong capacity to meet financial commitments.
- The Borough had $45,615,000 in general obligation debt outstanding as of December 31, 2019. This represents a net decrease of $2,495,000 from 2019, based on principal payments made. The Non-Electoral Debt Capacity remaining is $36,411,958 and Non-Electoral Debt and Lease Rental Debt Capacity remaining is $52,998,341.

- Overall, the Borough's pension plans' funded ratio is 103.58%, which significantly outpaces the total funded ratio of all Commonwealth of Pennsylvania local government defined benefit self-insured pension plans (65.80%), based on January 1, 2019 actuarial data analyzed by the Municipal Pension Reporting Program of the Commonwealth of Pennsylvania.

OVERVIEW OF FINANCIAL STATEMENTS

This MD&A section is intended to serve as an introduction to the Borough's basic financial statements and provides an overview of the Borough's financial activities. The basic financial statements are comprised of three components: 1) government-wide financial statements; 2) fund financial statements; and 3) notes to basic financial statements. This report also contains required and other supplementary information in addition to the basic financial statements themselves.

Government-Wide Financial Statements - The government-wide financial statements are designed to provide readers with a broad overview of the Borough's finances in a manner similar to a private-sector business.

The *Statement of Net Position* presents information on all of the Borough's assets, deferred outflows of resources, liabilities, and deferred inflows of resources, with the difference reported as net position. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position of the Borough is improving or deteriorating.

The *Statement of Activities* presents information showing how the Borough's net position changed during the most recent fiscal year. All changes in net position (revenues and expenses) are reported as soon as the underlying event giving rise to the change occurs, *regardless of the timing of related cash flows*. Thus, revenues and expenses are reporting in this statement for some items that will only result in cash flows in future fiscal periods (e.g. uncollected taxes and earned, but unused, compensated absences). The focus of this statement is on the net cost of providing various activities to the citizens of the Borough.

Both the *Statement of Net Position* and the *Statement of Activities* distinguish functions of the Borough that are principally supported by taxes and intergovernmental revenues (*governmental activities*) from other functions that are intended to recover all or a significant portion of their costs through user fees and charges (business-type activities*).*

- Governmental Activities - The activities reflected in this section are general government; public safety (police, fire, and emergency management); roads; health and sanitation; cultural and recreation; and other departments and programs. These activities are primarily supported by operating grants and contributions, charges for services, real estate taxes, and departmental revenues.

- Business-Type Activities - The activities reflected in this section are water works; regional wastewater; sanitary sewer; stormwater (*through the Hanover Borough Stormwater Authority, a blended component unit*); and market house. These activities are intended to recover their cost of operation, including depreciation, primarily through user charges.

Fund Financial Statements - A *fund* is a grouping of related accounts that is used to maintain control over resources that have been segregated for specific activities or objectives. State law requires some funds be segregated, while other funds are established to control and manage resources designated for specific purposes.

The Borough has three types of funds:

- Governmental Funds - Most of the Borough's basic services are included in governmental funds, which focus on: 1) the flow of cash and other financial assets that can readily be converted into cash, and 2) the balances left at year-end that are available for spending. Consequently, the governmental funds statements provide a detailed near-term view that helps determine the financial requirements for current Borough's programs. The Borough's major governmental fund is the General Fund. The Capital Projects, Highway Liquid Fuels, Recreation, Recreation Endowment, and Library Endowment Funds are non-major governmental funds of the Borough.

  Because the focus of governmental funds is narrower than that of the government-wide financial statements, it is useful to compare the information presented for governmental funds with similar information presented for governmental activities in the government-wide financial statements. By doing so, readers may better understand the long-term impact of the Borough's near-term financing decisions. Both the governmental funds Balance Sheet and the governmental funds Statement of Revenues, Expenditures, and Changes in Fund Balances provide a reconciliation to facilitate the comparison between governmental funds and governmental activities.

The Borough adopts an annual appropriated budget for its General, Recreation, and Highway Liquid Fuels Funds. A budgetary comparison statement for the General Fund has been provided as required supplementary information for this major fund to demonstrate compliance with its budgets.

- Enterprise Funds - Used to report the same functions presented as business-type activities in the government-wide financial statements, which provide services for the Borough's other programs and activities, in more detail. The Borough reports five enterprise funds: Water, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds, which are each reported as major funds, and the Market House Fund, which is presented as non-major.

- Fiduciary Funds - The Borough is the trustee, or fiduciary, for its three separate employees' pension plans for police, fire drivers, and non-uniformed employees, collectively reported as the Borough's Pension Trust Funds, and the Fire Drivers' Post Employment Health Plan (PEHP) Fund (*discretely presented component unit*). The Borough is responsible for ensuring that the assets reported in the funds are used for the intended purposes. All of the Borough's fiduciary assets, deferred outflows of resources, liabilities, and deferred inflows of resources balances are reported in the Statement of Fiduciary Net Position. A Statement of Changes in Fiduciary Net Position is presented for the Pension Trust Funds only. All fiduciary activities are excluded from the Borough's government-wide financial statements because the Borough cannot use these assets to finance its operations.

Component Units - Component units are organizations that are legally separate, tax-exempt entities that have the following characteristics: 1) the economic resources received or held are almost entirely for the direct benefit of the Borough (known as the *primary government*), 2) the primary government has the ability to access a majority of the economic resources held by the separate organization, and 3) the assets held by the separate entity are significant to the primary government. Blended component units are component units that are so intertwined with the primary government that they are, in substance, the same as the primary government and are presented as part of the primary government. The Borough has only one blended component unit: the Hanover Borough Stormwater Authority.

The government-wide financial statements include not only the primary government, but also legally separate, discretely presented entities for which the Borough is financially accountable. Financial information for *discretely presented component units* are reported separately from the financial information presented for the primary government itself. The Borough has two discretely presented component units: the Hanover Public Library Association, and the Fire Drivers' PEHP Fund.

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

Notes to Basic Financial Statements and Other Information - The notes provide additional information that is essential to a full understanding of the data provided in the government-wide and fund financial statements. In addition to the basic financial statements and accompanying notes, this report also presents certain required supplementary information concerning the Borough's progress in funding its obligation to provide pension and other postemployment benefits to its employees, and combining schedules of net position and activities for the individual Pension (and Other Employee Benefit) Trust Funds of the Borough.

GOVERNMENT WIDE FINANCIAL ANALYSIS

Net Position - The following is a condensed presentation of the Borough's net position as of December 31, 2019 and 2018:

	Governmental Activities		Business-Type Activities		Totals	
	2019	2018	2019	2018	2019	2018
Assets:						
Current and Other Assets	$ 12,528,079	$ 11,658,734	$ 15,993,983	$ 15,874,030	$ 28,522,062	$ 27,532,764
Capital Assets, Net	15,592,297	15,799,257	79,969,249	79,501,831	95,561,546	95,301,088
Total Assets	28,120,376	27,457,991	95,963,232	95,375,861	124,083,608	122,833,852
Deferred Outflows of Resources	1,706,961	3,671,375	1,710,937	2,639,227	3,417,898	6,310,602
Liabilities:						
Current Liabilities	1,836,424	1,429,835	3,025,835	3,618,195	4,862,259	5,048,030
Long-Term Liabilities	8,575,811	13,766,160	39,837,390	44,522,427	48,413,201	58,288,587
Total Liabilities	10,412,235	15,195,995	42,863,225	48,140,622	53,275,460	63,336,617
Deferred Inflows of Resources	3,546,897	1,139,358	2,451,269	661,228	5,998,166	1,800,586
Net Position:						
Net Investment in Capital Assets	9,092,898	8,761,551	39,926,484	37,958,060	49,019,382	46,719,611
Restricted	582,290	574,399	7,200	7,200	589,490	581,599
Unrestricted	6,193,017	5,458,063	12,425,991	11,247,978	18,619,008	16,706,041
Total Net Position	$ 15,868,205	$ 14,794,013	$ 52,359,675	$ 49,213,238	$ 68,227,880	$ 64,007,251

As noted earlier, net position may serve as a useful indicator of a government's financial position. In the case of the Borough, assets and deferred outflows of resources exceeded liabilities and deferred inflows of resources by $68,227,880 at the close of the fiscal year.

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

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By far the largest portion of the Borough's combined net position (71.85%) reflects its investments in capital assets (e.g. land, buildings, equipment, improvements, construction in progress, and infrastructure), less any debt used to acquire those assets that are still outstanding. The Borough uses these capital assets to provide services to citizens; consequently, these assets are not available for future spending. Although the Borough's investment in its capital assets is reported net of related debt, it should be noted that the resources needed to repay this debt must be provided from other sources, since the capital assets themselves cannot be used to liquidate these liabilities.

An additional portion of the Borough's net position (0.86%) represents resources that are subject to external restrictions on how they may be used. The remaining balance of *unrestricted net position* (27.29%) may be used to meet the government's ongoing obligations to citizens and creditors. At the end of the current year, the Borough is able to report positive balances in all net position categories for both reported years.

Changes in Net Position - The following is a condensed presentation of the Borough's changes in net position for the years ended December 31, 2019 and 2018:

	Governmental Activities		Business-Type Activities		Totals	
	2019	2018	2019	2018	2019	2018
Revenues:						
Program Revenues:						
Charges for Services	$ 5,537,313	$ 5,322,025	$ 16,076,440	$ 14,512,465	$ 21,613,753	$ 19,834,490
Operating Grants and Contributions	2,148,564	2,122,316	198,283	139,259	2,346,847	2,261,575
Capital Grants and Contributions	599,020	197,346	517,112	66,413	1,116,132	263,759
General Revenues:						
Taxes:						
Property and Per Capita Taxes	5,888,623	5,728,583	-	-	5,888,623	5,728,583
Income Taxes	1,701,683	1,700,057	-	-	1,701,683	1,700,057
Business Privilege Taxes	603,251	584,811	-	-	603,251	584,811
Local Services Taxes	593,187	630,415	-	-	593,187	630,415
Interest and Investment Earnings	240,353	211,691	268,972	244,798	509,325	456,489
Loss Compensation for Capital Assets	-	217,500	-	-	-	217,500
Transfers	(14,044)	-	14,044	-	-	-
Total Revenues	17,297,950	16,714,744	17,074,851	14,962,935	34,372,801	31,677,679

Expenses:						
Governmental Activities:						
General Government	734,165	989,701	-	-	734,165	989,701
Public Safety	7,222,151	7,704,241	-	-	7,222,151	7,704,241
Health and Sanitation	4,540,747	4,511,534	-	-	4,540,747	4,511,534
Highway	1,879,407	2,387,321	-	-	1,879,407	2,387,321
Culture and Recreation	1,688,020	1,785,293	-	-	1,688,020	1,785,293
Interest on Long-Term Debt	159,268	177,727	-	-	159,268	177,727
Business-Type Activities:						
Water Services	-	-	6,077,081	6,211,980	6,077,081	6,211,980
Regional Wastewater Services	-	-	3,961,548	4,032,760	3,961,548	4,032,760
Sewer Services	-	-	2,709,322	2,969,343	2,709,322	2,969,343
Stormwater Services	-	-	1,118,301	-	1,118,301	-
Market House Services	-	-	62,162	43,265	62,162	43,265
Total Expenses	16,223,758	17,555,817	13,928,414	13,257,348	30,152,172	30,813,165
Changes in Net Position	1,074,192	(841,073)	3,146,437	1,705,587	4,220,629	864,514
Net Position - Beginning	14,794,013	15,635,086	49,213,238	47,507,651	64,007,251	63,142,737
Net Position - Ending	$ 15,868,205	$ 14,794,013	$ 52,359,675	$ 49,213,238	$ 68,227,880	$ 64,007,251

During the current fiscal year, net position for governmental activities increased $1,074,192, primarily the result of tax revenue growth in excess of depreciation on capital assets. The net position of the business-type activities increased $3,146,437, primarily related to various utility and service connection charges, currently outpacing depreciation on newer infrastructure and related improvements.

FINANCIAL ANALYSIS OF THE BOROUGH'S FUNDS

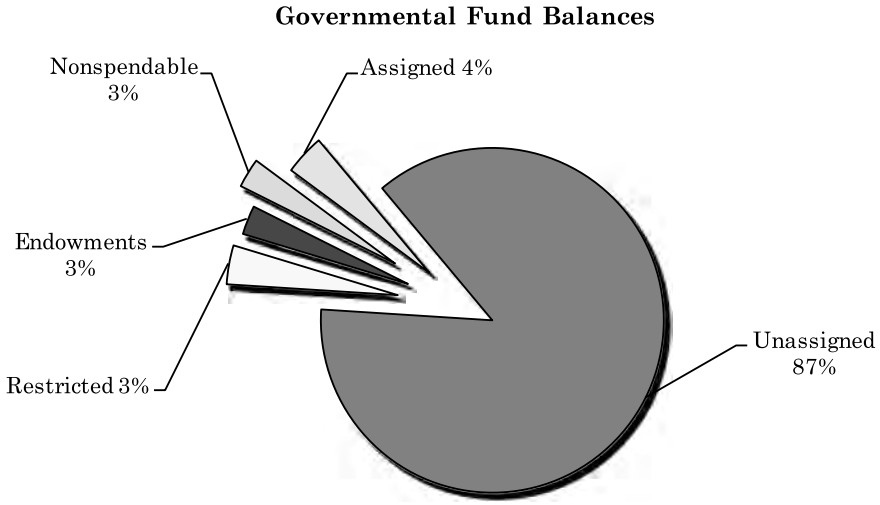
The Borough uses fund accounting to assure and demonstrate compliance with local government regulations.

Governmental Funds - The focus of the Borough's *governmental funds* is to provide information on near-term inflows, outflows, and balances of *spendable resources*. Such information is useful in assessing the Borough's financing requirements. In particular, *unassigned fund balance* may serve as a useful measure of a government's net spendable, "available" resources at the end of the fiscal year.

At the end of the current fiscal year, the Borough's governmental funds reported combined ending fund balances of $11,018,061, of which $402,751 was externally restricted, such as by legal restrictions or intention of grantors, donors, or trustees, $302,786 was in nonspendable

form (e.g. inventory, deposits and prepaid expenses), $298,156 was held in endowment funds for recreation purposes, and $415,792 was assigned, primarily for 2020 budgetary reserve needs. The remaining $9,598,576 (87.12%) is unassigned and can be used for any lawful purpose.

The following graphic summarizes fund balances as of December 31, 2019 by relative percentage:



The General Fund is the Borough's primary operating fund. It tracks services of administration, police, fire, emergency management, planning, health and sanitation, highways, library, recreation and parks, shade trees, public events, and insurance costs. At the end of the current fiscal year, unassigned fund balance of the General Fund was $9,598,576 and total fund balance was $10,306,142, reflecting a $681,172 (7.08%) increase over the prior year. As a measure of the General Fund's liquidity, it may be useful to compare the unassigned General Fund balance to General Fund expenditures. Unassigned General Fund balance represents 58.08% of total General Fund expenditures.

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

The condensed changes in fund balance for the General Fund were as follows for the years ended December 31:

	2019	2018
Revenues	$ 16,750,208	$ 16,113,769
Expenses	16,525,648	16,801,343
Net Other Financing Sources (Uses)	456,612	1,226,484
Changes in Fund Balance	$ 681,172	$ 538,910

The $636,439 increase in revenues in 2019 primarily related to Federal and State capital grants received during the year as well as start of cable television franchise fee collection in late 2019. Expenses decreased $275,695 in 2019, primarily related to the $160,437 in excess State Pension Aid received (above the Borough's minimum municipal pension obligation) in 2018 paid into the relating pension funds as well as $70,875 in 2018 spending towards consulting fees for Phase 1 of the Borough's Strategic Management Planning Program (STMP) project. Net other financing sources (uses) were less significant in 2019, with capital lease proceeds recognized for two heavy-duty vehicles and related equipment ($264,249), and proceeds from dispositions of several Borough owned properties and other assets ($167,586).

THE BOROUGH OF HANOVER, PENNSYLVANIA

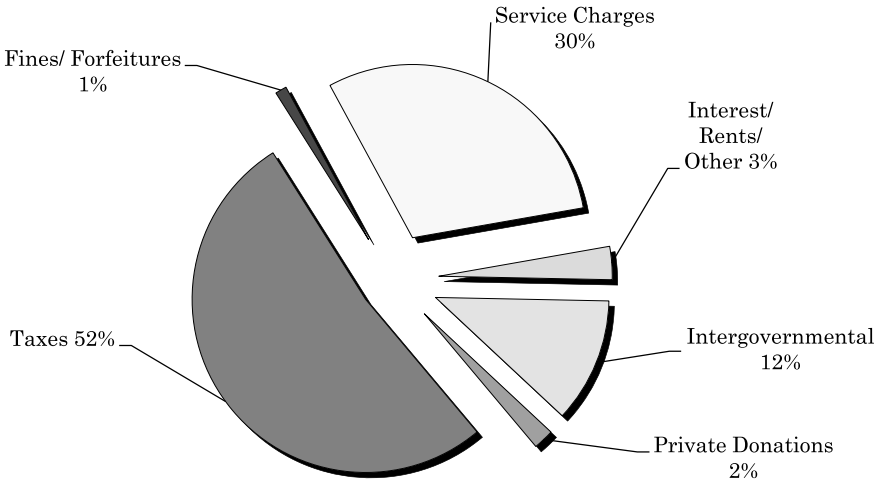
MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

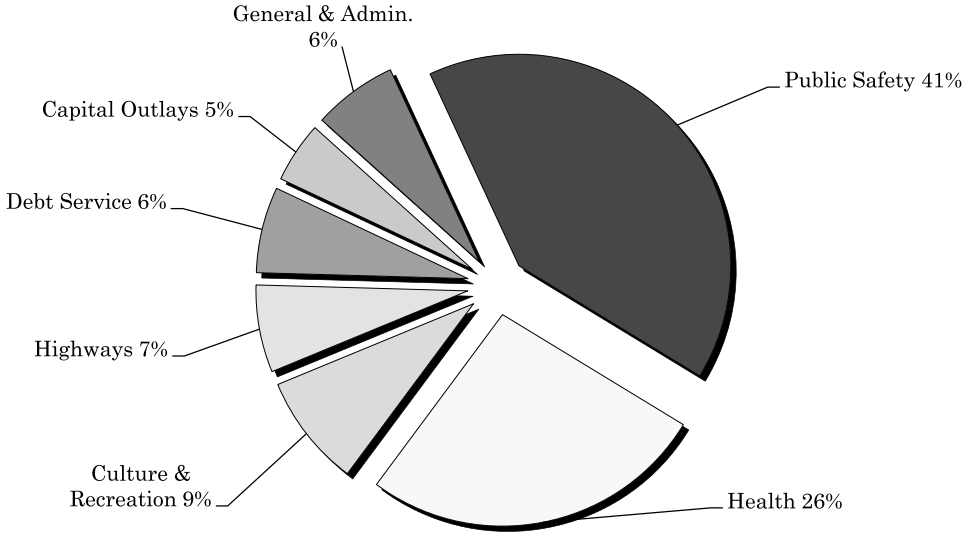
UNAUDITED

The following charts summarizes revenues and expenditures by major source for the General Fund by relative percentage for the year ended December 31, 2019:

General Fund - Revenues



General Fund - Expenditures



THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

Enterprise Funds - The Borough's enterprise funds provide the same type of information found in the government-wide financial statements.

As of December 31, 2019, the net position of the Borough's Water Fund totaled $31,505,282; the Regional Wastewater Treatment Plant Fund totaled $12,985,895; the Sanitary Sewer Fund totaled $7,560,066; Stormwater Authority Fund totaled $106,026; and the Market House totaled $121,513. The following summarizes the significant changes to net position for the Borough's major Enterprise Funds during the current fiscal year:

- Water operating revenues increased $122,665 from 2018 results of $7,614,758 to $7,737,423, primarily related to increased industrial water consumption. Operating expenses decreased by $176,536 (from $5,515,862 to $5,339,326) in 2019, primarily related to offsetting decline in net pension expense, relating to highly favorable returns in 2019 ($315,140), and increase in depreciation on infrastructure and related capital assets ($147,294). Non-operating activities, capital contributions, and interfund transfers were relatively comparable to 2018. Total change in net position for 2019 was an increase of $2,060,380.
- Regional Wastewater operating revenues increased $75,897 from 2018 results of $2,041,550 to $2,117,447, primarily related to intergovernmental billings for shared facility costs based on their respective budgeted flow shares to the facilities. Operating expenses decreased by $114,764 (from $3,479,314 to $3,364,550) in 2019, primarily related to decline in net pension expense, relating to highly favorable returns in 2019 ($91,835). Non-operating activities, capital contributions, and interfund transfers were relatively comparable to 2018. Total change in net position for 2019 was a decrease of $202,356.
- Sewer operating revenues increased $31,616 from 2018 results of $4,769,522 to $4,801,138, primarily due to increased revenues from sewer service charges, including sanitary sewer flow exchange arrangements with Penn Township. Operating expenses decreased by $269,935 (from $2,895,494 to $2,625,559) in 2019, primarily related to decline in net pension expense, relating to highly favorable returns in 2019, and related allocations for shared staff for Stormwater Authority functions ($63,923), and in health and related insurance coverage costs, relating to surplus premium dividends received in 2019 ($170,095). Non-operating activities, capital contributions, and interfund transfers increased in 2019, primarily related to improved interest earnings and $480,654 in dedicated sewer mains, manholes, and land easement, contributed from a private community in 2019. Total change in net position for 2019 was an increase of $1,192,553.

- The total change in net position for the Stormwater Authority Fund in 2019 was an increase of $115,996. This year marked the first year of operation for the Stormwater Authority.

GENERAL FUND BUDGETARY HIGHLIGHTS

The original budget for the General Fund was amended once by the Borough Council during 2019 for reclassifications within the fund, including significant adjustments for reporting sublease revenue/expense activity with the Hanover Area Fire and Rescue Commission ($132,999), subrecipient grant coordination with the Hanover Public School District (HPSD) for stormwater improvements ($258,729), and refuse disposal fees for increased tonnage delivery ($175,000). The final budgeted change in fund balance for 2019 was a reduction of $767,164. Actual results for 2019 (GAAP Basis) were an increase to fund balance of $681,172, resulting in a positive budget-actual variance of $1,448,336.

Overall, actual operating revenues during the current fiscal year bested budget expectations by $281,911, primarily due to the following:

- Tax revenue exceeded the budgeted amounts by $222,297 for earned income, real estate transfer, and business privilege taxes in excess of budget.
- Intergovernmental revenue, primarily from State grants and State aid for pensions, actual results were under expectations by $121,847, primarily related to shift in budgeted grant activity for the West Hanover Street Park Improvements project to anticipated 2020 spending ($141,892).
- Charges for Services revenues exceeded the budgeted amount by $95,882, primarily due to increased use of the Transfer Station facilities.

Overall, expenditures were $1,077,812 less than planned, primarily due to the following:

- Public Safety expenses were less than budget by $208,662, primarily due to budgeted labor for several Police positions that went unfilled during the year and health insurance costs for Police and Fire employees lower than expected with surplus premium dividends received in 2019.
- Highway expenses were less than budget by $106,828, primarily related to amended budget for subrecipient grant coordination with the HPSD against actual spending through year-end ($258,729 budget, $137,882 actual).

- Culture and Recreation expenses were less than budget by $220,202, primarily related to less-than-anticipated spending towards downtown projects, parks and playground repairs and maintenance, and health insurance costs for Library employees lower than expected with surplus premium dividends received in 2019.
- Capital Outlay expenses were less than budget by $386,200, primarily due to shift in budgeted grant activity for the West Hanover Street Park Improvements project (see above) and budgeted amounts for allocated multipurpose wash bay proposal forgone for further facilities evaluation ($121,000).

CAPITAL ASSETS AND DEBT ADMINISTRATION

Capital Assets - The Borough's investment in capital assets, net of accumulated depreciation, totaled $95,561,546 at the end of 2019. Capital assets consist of land and improvements, infrastructure, buildings and improvements, machinery & equipment and construction in progress.

A summary of the capital assets, net of accumulated depreciation, as of December 31, 2019 and 2018 follows:

	Governmental Activities		Business-Type Activities	
	2019	2018	2019	2018
Land and Land Rights	$ 571,261	$ 571,261	$ 1,027,255	$ 891,549
Inactive Wells	-	-	-	137,044
Construction in Progress	32,865	47,732	1,459,743	1,358,068
Improvements Other Than Buildings	179,287	134,038	8,910	10,165
Machinery and Equipment	1,824,044	1,636,542	1,940,051	1,719,414
Other Buildings and Related Improvements	8,315,573	8,544,676	519,115	519,074
Plant and Infrastructure	4,669,267	4,865,008	75,014,175	74,866,517
	$ 15,592,297	$ 15,799,257	$ 79,969,249	$ 79,501,831

Significant capital investments/activity in 2019 related to the following:

- The Borough entered into three new capital lease obligations relating to various heavy-duty vehicles and related equipment, totaling $589,329.
- Dedicated sanitary sewer mains, manhole, and land easement in relation to private community assets contributed to the Borough in 2019, with estimated value of $480,654.

- Continued rehabilitation design for the Sheppard & Myers Dam ($221,533 in 2019 costs, and cumulative project costs of $922,242; *bids for construction anticipated in 2020, pending State permit approval*).
- Substantial completion of 2018-2019 Water Main Replacement project for West Hanover Street, West Middle Street, and Forney Avenue lines ($581,804 in 2019 costs, and cumulative project costs of $818,313).
- Completion of Sanitary Sewer System 2018 improvements project ($311,048 in accumulated project costs), and accumulated costs of $237,810 for 2019 improvements project, *to be completed in 2020*.

Additional information on the Borough's capital assets can be found in the notes to basic financial statements (Capital Assets note).

The Borough is committed under the following contracts for purchases and construction projects, excluding any accounts payable and accrued expenses (retainage payable) on those contracts, as of December 31, 2019:

Project	Contract Amount	Contract Amount Outstanding
General Fund		
Ejector Trailer Purchases (2)	$ 121,932	$ 121,932
Water Fund		
Water Main Lining Project Construction	$ 392,670	$ -0-
Sanitary Sewer Fund		
Sewer Main Lining Project Construction	$ 270,346	$ 63,729

Long-Term Debt - On December 31, 2019, the Borough's general obligation debt (gross) outstanding totaled $45,615,000, all related to capital purchases and projects. All debt is backed by the full faith and credit of the Borough, and all business-type debt has been certified as self-liquidating in the respective funds. This was a net decrease of $2,495,000 (5.47%) from 2018, primarily due to principal payments made. No revenue bond debt exists.

THE BOROUGH OF HANOVER, PENNSYLVANIA

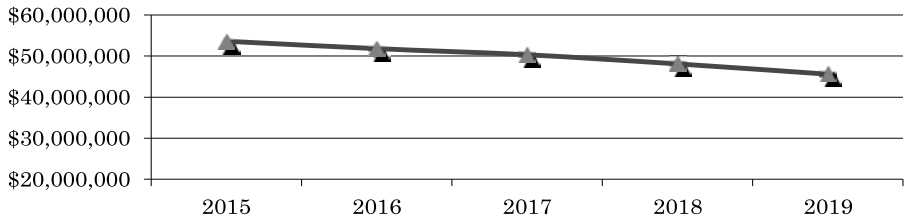
MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

The following represents the growth of the Borough's general obligation debt (gross) over the past five fiscal years:

Outstanding General Obligation Debt (Gross)



All bonds issued are rated Aa3 by Moody's Investors Service, denoting a very strong capacity to meet financial commitments. **The Borough of Hanover has never failed to meet any bond payment obligations.** The Borough continues to evaluate refunding opportunities for its outstanding bonds to reduce interest costs, which has resulted in significant savings for the Borough over the past several years. There were no debt limitations, restrictions, or commitments during the year ended December 31, 2019 that may affect the Borough's plans during the fiscal year ending December 31, 2020.

The following is a summary of outstanding long-term debt for the years ended December 31, 2019 and 2018:

	Governmental Activities		Business-Type Activities	
	2019	2018	2019	2018
General Obligation Bonds Payable, Net	$ 5,114,137	$ 5,692,441	$ 40,464,422	$ 42,384,085
Accrued Compensated Absences	1,705,447	1,681,579	1,160,056	1,124,039
Consumer Deposits	-	-	607,021	750,880
Capital Lease Obligations	1,538,875	1,531,212	349,571	230,035
	$ 8,358,459	$ 8,905,232	$ 42,581,070	$ 44,489,039

Additional information on the Borough's long-term debt can be found in the notes to basic financial statements (Long-Term Debt note).

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

ECONOMIC FACTORS AND NEXT YEAR'S BUDGET AND RATES

The fiscal year 2020 budget has been constructed to leverage positive economic trends by continuing long overdue investments in infrastructure and equipment. The local economy has provided a stable fiscal environment, though growth is limited.

The Borough will continue to experience challenges meeting a balanced budget, particularly in the General Fund, as fixed expenditures continue to rise and revenues continue to flatten. The requirement to fund and improve infrastructure also provides budgetary stress. Key economic factors and trends affecting the Borough in 2020 and future years include the following items:

- General Fund - There were no changes to the Borough's tax rates for the 2020 budget as adopted. Property taxes are the single largest source of revenue for the Borough and represent 34.37% of total General Fund budgeted revenue. However, annual growth in the assessable base of the Borough has been limited to approximately 0.31% over the past five years. Collections of the current levy and agency collection on delinquent taxes have remained strong, resulting in a historical ten-year collection rate of 100.38% of the 2019 assessable base of the Borough.

- Water, Stormwater (Authority), and Sewer Fund Operations and Improvements - There were no changes to the Water, Stormwater, and Sanitary Sewer Fund charges for services in the 2020 budget as adopted. The Borough will continue to address upgrades and maintenance to the Borough's water infrastructure systems over the next several fiscal years, including upgrading water meter technology, researching validity and viability of well sources, and needed improvements to the Sheppard Myers and Kitzmillers Dams. Service charges will be reviewed to ensure adequate funding is available to support the infrastructure needs of the systems.

- Bonds - Borough staff has continued to review and implement internal policies to strengthen financial review and oversight as well as long-range planning in efforts to continuously improve the climate for bond rating increases. Future bond financing will be necessary to implement a comprehensive utilities infrastructure rehabilitation program, with initial review in early 2020 and continued planning thereafter.

- Minimum Municipal Obligation for Borough Pension Plans and Funding Progress - Pension funds budgeted for 2020 total $1,121,538 for the minimum municipal obligation to the pension plans as set forth by Conrad Siegel, Inc., the Borough's pension plan actuary. Approved changes relating to the January 1, 2019 actuarial valuation assumption for mortality rates will have a moderate impact in increasing

minimum municipal obligation costs in future years. **The Borough of Hanover has never failed to make the required minimum municipal obligation to the pension plans.** The Borough's three pension plans' funded ratios were estimated at 97.06%, 93.60%, and 108.82% for the Police, Fire Drivers', and Hanover Employees' Pension Trust Funds, respectively, as of December 31, 2019, exemplifying sound investment, management, and performance.

The above significant economic factors and trends, amongst others, were considered in preparation of the 2020 operating budgets for all funds. Based on anticipated results of operations for the Borough, projected fund balance and financial reserves for 2021, excluding restricted Consumer Deposit Agreement escrows, are $16,306,559, or 23.95% of net position as of December 31, 2019.

While the Borough's current financial position is strong, there are some indicators of future financial stress. First, a review of the strengths: The Borough's tax base value is strong compared to many other urbanized municipalities in Pennsylvania and the corresponding benefit is that the municipal tax rate is low compared with municipalities providing similar services. The Borough hosts many large value industrial and commercial properties, including big-box stores, national specialty merchants, service organizations, and manufacturing. The Borough's modified accrual fund balances exceeded the goals set in its adopted fund balance and financial reserves policy for all relating funds.

Notwithstanding these indicators of financial health, the Borough is facing challenges common to most urban municipalities in Pennsylvania. Expenditures rise due to inflation and world markets. A real estate tax base provides increased revenue three ways: increase in the tax base value due to development; increase in tax base value due to a county-wide reassessment; and/or increase in the physical tax rate. County Commissioners have expressed an unwillingness to conduct a county-wide reassessment, and pressures exist to operate without tax increases. The last reassessment was implemented in 2006. The Borough is developed to its borders; hence the rate of increase of real estate tax base value is less than 1% per year. There are other indicators of future financial distress, including tenant occupancy in excess of 46.9% (significantly higher than that of York County [25.6%], Pennsylvania [31.0%], and the United States as a whole [36.2%]), more than 50% of students on free or reduced lunch, and property blight.

Recognizing these indicators of long-term financial stress, the Borough continued to act to change the financial trajectory. The Borough has prepared its fifth internal five-year budget projection for the period 2020 through 2024, including a capital improvement program for major equipment and vehicles for the same period. The projection demonstrates, in stark manner, the decay of the Borough's financial condition if the Borough was to do nothing to

increase revenue and accommodate the natural growth in expenditures. In such a scenario, revenues stay relatively level while expenditures grow around 4% per year.

As an additional means of assessment, the Borough is currently beginning Phase II evaluation in Pennsylvania's Strategic Management Planning Program (STMP). The program is administered by the Governor's Center for Local Government Services of the Department of Community and Economic Development (DCED). Most municipalities wait until they are at the abyss of financial distress before taking advantage of a program like the STMP. Consequently, the study is typically rushed and completed with a sense of urgency. Recommendations are implemented quickly resulting in some implementations being faulty. By embarking on this exhaustive study now, the Borough will receive a thorough analysis and have ample time to evaluate and implement recommendations.

The program provides grant funding, which the Borough matches, used to hire a third-party firm to conduct an exhaustive analysis of the administration and operations of all the departments of the municipality with the goal of providing opportunities and suggestions for efficiencies, technology, alternate modes of operation, and staffing levels. The study also addresses resources and strategies to clear blight, evaluate and consolidate facilities, and more effectively enforce codes. The results of that study are under review for implementation of initiatives over the coming years.

CONTACTING THE BOROUGH'S FINANCIAL MANAGEMENT

This financial report is designed to provide our citizens, taxpayers, customers, investors and creditors with a general overview of the Borough's finances. Questions about this report or requests for additional information can be directed to The Borough of Hanover, Attn: Nan Dunford, Borough Manager at The Borough of Hanover, 44 Frederick Street, Hanover, PA 17331.

Separately issued financial statements for the Hanover Public Library Association (component unit of the Borough) can be requested at the Guthrie Memorial Library, 2 Library Place, Hanover, PA 17331.

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BASIC FINANCIAL STATEMENTS

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION

DECEMBER 31, 2019

	Primary Government			Component Unit
	Governmental Activities	Business-Type Activities	Total	Hanover Public Library Association
ASSETS				
CURRENT ASSETS				
Cash and Cash Equivalents				
Unrestricted	$ 9,074,029	$ 11,427,205	$ 20,501,234	$ 90,586
Restricted	427,774	151,054	578,828	-
Certificates of Deposit	-	10,000	10,000	-
Accounts Receivable	182,433	1,417,469	1,599,902	-
Taxes Receivable, Net	768,144	-	768,144	-
Grants Receivable	371,323	35,717	407,040	-
Due from Other Governments	117,780	459,875	577,655	-
Due from Other Funds	-	12,246	12,246	-
Unbilled Services	134,032	1,169,385	1,303,417	-
Pledges Receivable	20,000	-	20,000	-
Lease Receivable	614,784	-	614,784	-
Inventory	45,756	600,731	646,487	-
Accrued Interest Receivable	-	5,807	5,807	-
Prepaid Expenses and Deposits	257,030	176,014	433,044	-
TOTAL CURRENT ASSETS	**12,013,085**	**15,465,503**	**27,478,588**	**90,586**
NON-CURRENT ASSETS				
Cash and Cash Equivalents - Restricted	416,773	463,167	879,940	152,612
Investments - Restricted	-	-	-	2,431,994
Due from Other Governments	-	65,313	65,313	-
Beneficial Interest in Assets Held by Others	98,221	-	98,221	-
Property and Equipment				
Land and Land Rights	571,261	1,027,255	1,598,516	-
Construction in Progress	32,865	1,459,743	1,492,608	-
Improvements Other than Buildings	408,335	62,168	470,503	-
Machinery and Equipment	6,744,977	4,732,228	11,477,205	-
Other Buildings and Related Improvements	12,906,045	859,863	13,765,908	-
Plant and Infrastructure	14,054,326	114,899,763	128,954,089	-
	34,717,809	123,041,020	157,758,829	-
Less: Accumulated Depreciation	19,125,512	43,071,771	62,197,283	-
Net Property and Equipment	15,592,297	79,969,249	95,561,546	-
TOTAL NON-CURRENT ASSETS	**16,107,291**	**80,497,729**	**96,605,020**	**2,584,606**
TOTAL ASSETS	**28,120,376**	**95,963,232**	**124,083,608**	**2,675,192**
DEFERRED OUTFLOWS OF RESOURCES				
Deferred Amounts from OPEB	124,297	113,268	237,565	-
Deferred Amounts from Pensions	1,547,668	826,441	2,374,109	-
Deferred Amounts on Refunding	34,996	771,228	806,224	-
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**1,706,961**	**1,710,937**	**3,417,898**	**-**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION

DECEMBER 31, 2019

	Primary Government			Component Unit
	Governmental Activities	Business-Type Activities	Total	Hanover Public Library Association
LIABILITIES				
CURRENT LIABILITIES				
Accounts Payable and Accrued Expenses	314,326	549,500	863,826	4,800
Accrued Wages	108,589	85,964	194,553	-
Accrued Compensated Absences	146,000	68,000	214,000	-
Due to Other Funds	12,246	-	12,246	-
Unearned Revenue	83,180	40,534	123,714	-
Accrued Interest Payable	40,510	290,245	330,755	-
Capital Lease Obligations	393,629	114,075	507,704	-
Bonds Payable (Net of Discounts/Premiums)	594,304	1,733,663	2,327,967	-
Payable from Restricted Assets				
Accounts Payable and Accrued Expenses	143,640	-	143,640	-
Consumer Deposits	-	143,854	143,854	-
TOTAL CURRENT LIABILITIES	**1,836,424**	**3,025,835**	**4,862,259**	**4,800**
NON-CURRENT LIABILITIES				
Accrued Compensated Absences	1,559,447	1,092,056	2,651,503	-
OPEB Liability	1,570,214	1,075,270	2,645,484	-
Net Pension Liability	(218,929)	(1,759,358)	(1,978,287)	-
Capital Lease Obligations	1,145,246	235,496	1,380,742	-
Bonds Payable (Net of Discounts/Premiums)	4,519,833	38,730,759	43,250,592	-
Payable from Restricted Assets				
Consumer Deposits	-	463,167	463,167	-
TOTAL NON-CURRENT LIABILITIES	**8,575,811**	**39,837,390**	**48,413,201**	**-**
TOTAL LIABILITIES	**10,412,235**	**42,863,225**	**53,275,460**	**4,800**
DEFERRED INFLOWS OF RESOURCES				
Deferred Amounts from Beneficial Interest	98,221	-	98,221	-
Deferred Amounts from OPEB	407,258	266,454	673,712	-
Deferred Amounts from Pensions	3,041,418	2,184,815	5,226,233	-
TOTAL DEFERRED INFLOWS OF RESOURCES	**3,546,897**	**2,451,269**	**5,998,166**	**-**
NET POSITION				
Net Investment in Capital Assets	9,092,898	39,926,484	49,019,382	-
Restricted				
Expendable	284,134	7,200	291,334	-
Nonexpendable	298,156	-	298,156	2,584,606
Unrestricted	6,193,017	12,425,991	18,619,008	85,786
TOTAL NET POSITION	**$ 15,868,205**	**$ 52,359,675**	**$ 68,227,880**	**$ 2,670,392**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF ACTIVITIES

FOR THE YEAR ENDED DECEMBER 31, 2019

Functions/Programs	Expenses	Program Revenues: Charges for Services	Program Revenues: Operating Grants and Contributions	Program Revenues: Capital Grants and Contributions	Net (Expenses) Revenues and Changes in Net Position: Primary Government: Governmental Activities	Primary Government: Business-Type Activities	Primary Government: Total	Component Unit: Hanover Public Library Association
PRIMARY GOVERNMENT								
Governmental Activities								
General Government	$ 734,165	$ 356,653	$ 40,007	$ -	$ (337,505)	$ -	$ (337,505)	$ -
Public Safety	7,222,151	312,610	555,395	17,677	(6,336,469)	-	(6,336,469)	-
Health and Sanitation	4,540,747	4,740,321	214,279	238,876	652,729	-	652,729	-
Highways	1,879,407	1,964	533,051	243,604	(1,100,788)	-	(1,100,788)	-
Culture and Recreation	1,688,020	125,765	805,832	98,863	(657,560)	-	(657,560)	-
Interest on Long-Term Debt	159,268	-	-	-	(159,268)	-	(159,268)	-
Total Governmental Activities	**16,223,758**	**5,537,313**	**2,148,564**	**599,020**	**(7,938,861)**	**-**	**(7,938,861)**	**-**
Business-Type Activities								
Water	6,077,081	7,835,100	123,512	741	-	1,882,272	1,882,272	-
Regional Wastewater	3,961,548	2,117,697	38,745	-	-	(1,805,106)	(1,805,106)	-
Sanitary Sewer	2,709,322	4,806,788	17,567	480,654	-	2,595,687	2,595,687	-
Stormwater	1,118,301	1,276,386	18,459	35,717	-	212,261	212,261	-
Market House	62,162	40,469	-	-	-	(21,693)	(21,693)	-
Total Business-Type Activities	**13,928,414**	**16,076,440**	**198,283**	**517,112**	**-**	**2,863,421**	**2,863,421**	**-**
TOTAL PRIMARY GOVERNMENT	**$ 30,152,172**	**$ 21,613,753**	**$ 2,346,847**	**$ 1,116,132**	**(7,938,861)**	**2,863,421**	**(5,075,440)**	**-**
COMPONENT UNIT								
Culture and Recreation	**$ 630,947**	**$ 245**	**$ 305,410**	**$ -**	**-**	**-**	**-**	**(325,292)**
GENERAL REVENUES								
Taxes								
Property and Per Capita Taxes					5,888,623	-	5,888,623	-
Income Taxes					1,701,683	-	1,701,683	-
Business Privilege Taxes					603,251	-	603,251	-
Local Services Taxes					593,187	-	593,187	-
Interest and Investment Earnings					240,353	268,972	509,325	66,797
Contributions to Permanent Endowments					-	-	-	450,000
Transfers					(14,044)	14,044	-	-
TOTAL GENERAL REVENUES					**9,013,053**	**283,016**	**9,296,069**	**516,797**
CHANGES IN NET POSITION					**1,074,192**	**3,146,437**	**4,220,629**	**191,505**
Net Position - Beginning of Year, as Restated					14,794,013	49,213,238	64,007,251	2,478,887
NET POSITION - END OF YEAR					**$ 15,868,205**	**$ 52,359,675**	**$ 68,227,880**	**$ 2,670,392**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

BALANCE SHEET - GOVERNMENTAL FUNDS

DECEMBER 31, 2019

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
ASSETS AND DEFERRED OUTFLOWS OF RESOURCES			
ASSETS			
Cash and Cash Equivalents			
Unrestricted	$ 8,999,219	$ 74,810	$ 9,074,029
Restricted	63,981	780,566	844,547
Accounts Receivable	181,955	478	182,433
Taxes Receivable, Net	768,144	-	768,144
Grants Receivable	371,323	-	371,323
Unbilled Services	134,032	-	134,032
Pledges Receivable	20,000	-	20,000
Lease Receivable	614,784	-	614,784
Due from Other Governments	117,780	-	117,780
Due from Other Funds	13,000	-	13,000
Inventory	45,756	-	45,756
Prepaid Expenses and Deposits	257,030	-	257,030
Beneficial Interest in Assets Held by Others	98,221	-	98,221
TOTAL ASSETS	**11,685,225**	**855,854**	**12,541,079**
DEFERRED OUTFLOWS OF RESOURCES	-	-	-
TOTAL ASSETS AND DEFERRED OUTFLOWS OF RESOURCES	**$ 11,685,225**	**$ 855,854**	**$12,541,079**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

BALANCE SHEET - GOVERNMENTAL FUNDS

DECEMBER 31, 2019

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
LIABILITIES, DEFERRED INFLOWS OF RESOURCES, AND FUND BALANCES			
LIABILITIES			
Accounts Payable and Accrued Expenses	$ 314,326	$ -	$ 314,326
Accrued Wages	108,589	-	108,589
Due to Other Funds	25,246	-	25,246
Unearned Revenue	5,350	295	5,645
Payable from Restricted Assets			
Accounts Payable and Accrued Expenses	-	143,640	143,640
TOTAL LIABILITIES	**453,511**	**143,935**	**597,446**
DEFERRED INFLOWS OF RESOURCES			
Deferred Amounts from Lease Receivable	614,784	-	614,784
Deferred Amounts from Beneficial Interest	98,221	-	98,221
Deferred Amounts from Tax Revenues	212,567	-	212,567
TOTAL DEFERRED INFLOWS OF RESOURCES	**925,572**	**-**	**925,572**
FUND BALANCES			
Nonspendable			
Not in Spendable Form			
Inventory	45,756	-	45,756
Prepaid Expenses and Deposits	257,030	-	257,030
Legally/Contractually Required to be Maintained Intact			
Recreation Purposes	-	298,156	298,156
Restricted			
Capital Projects	-	118,617	118,617
Public Safety Purposes	14,192	-	14,192
Recreation Purposes	49,789	31,381	81,170
Roads and Bridges	-	188,772	188,772
Assigned			
Budgetary Reserve	340,799	-	340,799
Capital Projects	-	10,787	10,787
Recreation Purposes	-	64,206	64,206
Unassigned	9,598,576	-	9,598,576
TOTAL FUND BALANCES	**10,306,142**	**711,919**	**11,018,061**
TOTAL LIABILITIES, DEFERRED INFLOWS OF RESOURCES, AND FUND BALANCES	**$ 11,685,225**	**$ 855,854**	**$12,541,079**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

RECONCILIATION OF THE BALANCE SHEET - GOVERNMENTAL FUNDS TO THE STATEMENT OF NET POSITION

DECEMBER 31, 2019

TOTAL FUND BALANCES - GOVERNMENTAL FUNDS	**$ 11,018,061**
Amounts reported for governmental activities in the statement of net position are different because:	
Capital assets used in governmental activities are not current financial resources and, therefore, are not reported in the governmental funds.	15,592,297
Property and other tax revenues are recognized in the period for which levied, rather than when "available." A portion of the property and other tax revenues are not available and, therefore, are deferred revenue in the governmental funds.	212,567
Other long-term assets are not available to pay for current-period resources and, therefore, are deferred in the governmental funds.	572,245
Net pension liability (asset) and related deferred amounts in governmental activities are not current financial resources and, therefore, are not reported in the governmental funds.	(1,274,821)
Long-term accrued compensated absences and other postemployment benefits (OPEB) are not payable in the current period and, therefore, are reported as wages and insurance expenses in the period during which the absence and service occurs in the governmental funds.	(3,558,622)
Long-term liabilities, including capital lease obligations, bonds payable and related unamortized discounts and premiums, and accrued interest are not due and payable in the current period and, therefore, are not reported in the governmental funds.	(6,693,522)
TOTAL NET POSITION OF GOVERNMENTAL ACTIVITIES	**$ 15,868,205**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCES - GOVERNMENTAL FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
REVENUES			
Taxes	$ 8,734,647	$ -	$ 8,734,647
Licenses and Permits	126,207	-	126,207
Fines and Forfeitures	178,921	-	178,921
Interest and Rents	391,182	30,328	421,510
Intergovernmental	1,950,740	466,414	2,417,154
Charges for Services	5,046,142	4,760	5,050,902
Donations from Private Sources	322,243	8,187	330,430
Miscellaneous	126	-	126
TOTAL REVENUES	**16,750,208**	**509,689**	**17,259,897**
EXPENDITURES			
General Government	749,984	-	749,984
Public Safety	6,711,134	-	6,711,134
Health and Sanitation	4,370,247	16,477	4,386,724
Highways	1,104,318	302,382	1,406,700
Culture and Recreation	1,422,997	10,216	1,433,213
Debt Service	1,086,389	-	1,086,389
Capital Outlays	767,444	384,193	1,151,637
Miscellaneous	313,135	-	313,135
TOTAL EXPENDITURES	**16,525,648**	**713,268**	**17,238,916**
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	**224,560**	**(203,579)**	**20,981**
OTHER FINANCING SOURCES (USES)			
Proceeds from Disposal of Capital Assets	167,586	-	167,586
Interfund Transfers	24,777	(24,777)	-
Proceeds from Capital Lease Obligations	264,249	208,780	473,029
TOTAL OTHER FINANCING SOURCES (USES)	**456,612**	**184,003**	**640,615**
CHANGES IN FUND BALANCES	**681,172**	**(19,576)**	**661,596**
Fund Balances - Beginning of Year	9,624,970	731,495	10,356,465
FUND BALANCES - END OF YEAR	**$ 10,306,142**	**$ 711,919**	**$ 11,018,061**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCES - GOVERNMENTAL FUNDS TO THE STATEMENT OF ACTIVITIES

FOR THE YEAR ENDED DECEMBER 31, 2019

CHANGES IN FUND BALANCES - TOTAL GOVERNMENTAL FUNDS	**$ 661,596**
Amounts reported for governmental activities in the statement of activities are different because:	
Governmental funds report capital outlays as expenditures. However, in the statement of activities, the cost of those assets is allocated over their estimated useful lives as depreciation expense.	
Add: Capital Outlays	1,151,637
Less: Depreciation Expense	(1,229,305)
Debt proceeds provide current financial resources to governmental funds, but issuing debt and lease financing increases long-term liabilities in the statement of net position. Repayment of debt and capital lease obligations principal are expenditures in the governmental funds, but the repayment reduces long-term liabilities in the statement of net position. Other costs related to debt issuance and retirement use governmental fund resources, but recognition of expense is deferred and reported as amortization on the statement of net position.	
Amortization of Deferred Amounts on Refunding	4,379
Payments on Capital Lease Obligations	349,118
Payments on Bonds Payable	567,000
Proceeds from Capital Lease Obligations	(473,029)
Property and other tax revenues in the statement of activities that do not provide current financial resources are not reported as revenues in the governmental funds, including applicable future tax credits payable.	52,097
The net effect of various miscellaneous transactions involving capital assets (i.e. sales, interfund transfers, trade-ins) is to decrease net position.	(126,558)
In the statement of activities, certain expenses do not require the use of current financial resources and, therefore, are not reported as expenditures in the governmental funds. These expenses include the changes in:	
Net Pension Liability (Asset)	3,996,767
Amortization of Deferred Amounts from Pensions	(4,014,310)
Accrued Interest Payable	6,624
Accrued Compensated Absences	(23,868)
OPEB Liability	502,246
Amortization of Deferred Amounts from OPEB	(350,202)
CHANGES IN NET POSITION OF GOVERNMENTAL ACTIVITIES	**$ 1,074,192**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION - PROPRIETARY FUNDS

DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
ASSETS						
CURRENT ASSETS						
Cash and Cash Equivalents						
Unrestricted	$ 7,590,303	$ 304,951	$ 3,445,716	$ 46,704	$ 39,531	$ 11,427,205
Restricted	143,854	-	-	-	7,200	151,054
Certificates of Deposit	-	-	10,000	-	-	10,000
Accounts Receivable	742,813	2,283	567,233	104,863	277	1,417,469
Grants Receivable	-	-	-	35,717	-	35,717
Due from Other Governments	-	100,000	359,875	-	-	459,875
Due from Other Funds	25,246	70,497	184,126	-	-	279,869
Unbilled Services	449,339	-	577,397	142,649	-	1,169,385
Inventory	504,692	47,431	40,719	7,889	-	600,731
Accrued Interest Receivable	-	5,786	21	-	-	5,807
Prepaid Expenses	95,976	48,602	14,621	16,761	54	176,014
TOTAL CURRENT ASSETS	**9,552,223**	**579,550**	**5,199,708**	**354,583**	**47,062**	**15,733,126**
NON-CURRENT ASSETS						
Cash and Cash Equivalents - Restricted	463,167	-	-	-	-	463,167
Due from Other Governments	-	65,313	-	-	-	65,313
Property and Equipment						
Land and Land Rights	902,320	-	124,935	-	-	1,027,255
Construction in Progress	1,221,933	-	237,810	-	-	1,459,743
Improvements Other than Buildings	39,139	-	-	-	23,029	62,168
Machinery and Equipment	2,717,657	803,710	1,169,676	39,685	1,500	4,732,228
Other Buildings and Related Improvements	426,033	61,127	156,419	-	216,284	859,863
Plant and Infrastructure	54,102,396	53,595,382	7,193,286	-	8,699	114,899,763
	59,409,478	54,460,219	8,882,126	39,685	249,512	123,041,020
Less: Accumulated Depreciation	16,539,907	22,631,479	3,723,069	3,969	173,347	43,071,771
Net Property and Equipment	42,869,571	31,828,740	5,159,057	35,716	76,165	79,969,249
TOTAL NON-CURRENT ASSETS	**43,332,738**	**31,894,053**	**5,159,057**	**35,716**	**76,165**	**80,497,729**
TOTAL ASSETS	**52,884,961**	**32,473,603**	**10,358,765**	**390,299**	**123,227**	**96,230,855**
DEFERRED OUTFLOWS OF RESOURCES						
Deferred Amounts from OPEB	66,916	20,982	11,410	13,960	-	113,268
Deferred Amounts from Pensions	488,239	153,093	83,254	101,855	-	826,441
Deferred Amounts on Refunding	301,537	380,406	89,285	-	-	771,228
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**856,692**	**554,481**	**183,949**	**115,815**	**-**	**1,710,937**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION - PROPRIETARY FUNDS

DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
LIABILITIES						
CURRENT LIABILITIES						
Accounts Payable and Accrued Expenses	201,471	57,279	256,092	34,045	613	549,500
Accrued Wages	52,464	15,567	8,059	9,741	133	85,964
Accrued Compensated Absences	36,000	-	8,000	24,000	-	68,000
Unearned Revenue	3,110	37,424	-	-	-	40,534
Accrued Interest Payable	139,934	128,839	21,472	-	-	290,245
Due to Other Funds	87,096	167,527	13,000	-	-	267,623
Capital Lease Obligations	10,111	3,599	100,365	-	-	114,075
Bonds Payable (Net of Discounts/Premiums)	445,038	1,278,554	10,071	-	-	1,733,663
Payable from Restricted Assets						
Consumer Deposits	143,854	-	-	-	-	143,854
TOTAL CURRENT LIABILITIES	**1,119,078**	**1,688,789**	**417,059**	**67,786**	**746**	**3,293,458**
NON-CURRENT LIABILITIES						
Accrued Compensated Absences	643,053	235,216	108,284	104,535	968	1,092,056
OPEB Liability	635,240	199,187	108,321	132,522	-	1,075,270
Net Pension Liability	(1,039,381)	(325,910)	(177,234)	(216,833)	-	(1,759,358)
Capital Lease Obligations	41,210	14,112	180,174	-	-	235,496
Bonds Payable (Net of Discounts/Premiums)	18,878,072	17,761,728	2,090,959	-	-	38,730,759
Payable from Restricted Assets						
Consumer Deposits	463,167	-	-	-	-	463,167
TOTAL NON-CURRENT LIABILITIES	**19,621,361**	**17,884,333**	**2,310,504**	**20,224**	**968**	**39,837,390**
TOTAL LIABILITIES	**20,740,439**	**19,573,122**	**2,727,563**	**88,010**	**1,714**	**43,130,848**
DEFERRED INFLOWS OF RESOURCES						
Deferred Amounts from OPEB	157,414	49,359	26,842	32,839	-	266,454
Deferred Amounts from Pensions	1,290,729	404,723	220,094	269,269	-	2,184,815
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**1,448,143**	**454,082**	**246,936**	**302,108**	**-**	**2,451,269**
NET POSITION						
Net Investment in Capital Assets	23,796,677	13,151,153	2,866,773	35,716	76,165	39,926,484
Restricted	-	-	-	-	7,200	7,200
Unrestricted	7,756,394	(150,273)	4,701,442	80,280	38,148	12,425,991
TOTAL NET POSITION	**$ 31,553,071**	**$ 13,000,880**	**$ 7,568,215**	**$ 115,996**	**$ 121,513**	**$ 52,359,675**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND NET POSITION - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
OPERATING REVENUES						
Water, Sewer, and Stormwater Fees	$ 7,622,382	$ -	$ 4,801,138	$ 1,178,814	$ -	$ 13,602,334
Wastewater Treatment Charges	-	2,096,202	-	-	-	2,096,202
Market Stall Rents	-	-	-	-	38,038	38,038
Other Revenues	115,041	21,245	-	-	-	136,286
TOTAL OPERATING REVENUES	**7,737,423**	**2,117,447**	**4,801,138**	**1,178,814**	**38,038**	**15,872,860**
OPERATING EXPENSES						
Administrative and General	178,314	40,837	77,352	36,207	2,103	334,813
Contractual Services	125,692	197,335	94,891	185,670	-	603,588
Depreciation	1,070,991	1,382,437	276,050	3,969	11,157	2,744,604
Materials and Supplies	186,175	184,202	6,631	98,165	949	476,122
Personnel Services	2,917,433	1,024,393	490,606	767,358	19,523	5,219,313
Repairs and Maintenance	58,170	192,606	37,968	20,039	16,057	324,840
Treatment	328,187	-	1,637,594	-	-	1,965,781
Utilities	474,364	342,740	4,467	6,893	12,373	840,837
TOTAL OPERATING EXPENSES	**5,339,326**	**3,364,550**	**2,625,559**	**1,118,301**	**62,162**	**12,509,898**
OPERATING INCOME (LOSS)	**2,398,097**	**(1,247,103)**	**2,175,579**	**60,513**	**(24,124)**	**3,362,962**
NON-OPERATING REVENUES (EXPENSES)						
Gain (Loss) on Disposition of Assets	(140,727)	2,000	350	-	-	(138,377)
Interest and Rents	274,618	18,865	173,284	1,307	1,557	469,631
Non-Capital Contributions	123,512	38,745	17,567	-	-	179,824
Other Revenues	240	250	-	-	2,431	2,921
Interest Expense	(597,028)	(598,998)	(84,113)	-	-	(1,280,139)
TOTAL NON-OPERATING REVENUES (EXPENSES)	**(339,385)**	**(539,138)**	**107,088**	**1,307**	**3,988**	**(766,140)**
INCOME (LOSS) BEFORE CAPITAL CONTRIBUTIONS AND TRANSFERS	**2,058,712**	**(1,786,241)**	**2,282,667**	**61,820**	**(20,136)**	**2,596,822**
Capital Contributions	741	-	480,654	54,176	-	535,571
Interfund Transfers	927	1,583,885	(1,570,768)	-	-	14,044
CHANGES IN NET POSITION	**2,060,380**	**(202,356)**	**1,192,553**	**115,996**	**(20,136)**	**3,146,437**
Net Position - Beginning of Year	29,492,691	13,203,236	6,375,662	-	141,649	49,213,238
NET POSITION - END OF YEAR	**$ 31,553,071**	**$ 13,000,880**	**$ 7,568,215**	**$ 115,996**	**$ 121,513**	**$ 52,359,675**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CASH FLOWS - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
CASH FLOWS FROM OPERATING ACTIVITIES						
Inflows						
Cash Received from Customers	$ 7,677,897	$ 347,124	$ 4,690,962	$ 912,543	$ 38,039	$ 13,666,565
Cash Received for Interfund Services	19,132	1,449,601	63,385	18,759	-	1,550,877
	7,697,029	1,796,725	4,754,347	931,302	38,039	15,217,442
Outflows						
Cash Paid to Suppliers	1,129,504	923,608	136,069	319,763	45,167	2,554,111
Cash Paid for Interfund Services	170,212	13,797	1,497,078	17,816	3,413	1,702,316
Cash Paid to Employees	3,132,392	1,103,644	636,216	527,100	2,001	5,401,353
	4,432,108	2,041,049	2,269,363	864,679	50,581	9,657,780
NET CASH PROVIDED (USED) BY OPERATING ACTIVITIES	**3,264,921**	**(244,324)**	**2,484,984**	**66,623**	**(12,542)**	**5,559,662**
CASH FLOWS FROM NON-CAPITAL FINANCING ACTIVITIES						
Inflows						
Receipt of Non-Capital Contributions	123,512	38,745	17,567	-	-	179,824
Net Cash Received from Other Funds	-	-	110,613	-	-	110,613
	123,512	38,745	128,180	-	-	290,437
Outflows						
Net Cash Paid to Other Funds	-	110,613	-	-	-	110,613
NET CASH PROVIDED (USED) BY NON-CAPITAL FINANCING ACTIVITIES	**123,512**	**(71,868)**	**128,180**	**-**	**-**	**179,824**
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES						
Inflows						
Proceeds from Sale of Capital Assets	1,300	1,000	350	-	-	2,650
Proceeds from Long-Term Debt	-	-	116,300	-	-	116,300
Receipt of Contributed Capital and Development Charges	-	100,000	-	18,459	-	118,459
	1,300	101,000	116,650	18,459	-	237,409

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CASH FLOWS - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Outflows						
Interest Paid	582,127	1,577	615,712	-	-	1,199,416
Purchase of Capital Assets	2,614,831	76,995	524,223	39,685	-	3,255,734
Payments on Long-Term Debt	772,291	3,321	1,265,400	-	-	2,041,012
Repayment of Consumer Deposits	143,859	-	-	-	-	143,859
	4,113,108	81,893	2,405,335	39,685	-	6,640,021
NET CASH PROVIDED (USED) BY CAPITAL AND RELATED FINANCING ACTIVITIES	**(4,111,808)**	**19,107**	**(2,288,685)**	**(21,226)**	**-**	**(6,402,612)**
CASH FLOWS FROM INVESTING ACTIVITIES						
Inflows						
Miscellaneous Income Received	6,795	250	-	-	2,431	9,476
Rent Income Received	100,547	-	-	-	-	100,547
Interest Received	177,181	22,365	173,284	1,307	1,557	375,694
	284,523	22,615	173,284	1,307	3,988	485,717
NET CASH PROVIDED BY INVESTING ACTIVITIES	**284,523**	**22,615**	**173,284**	**1,307**	**3,988**	**485,717**
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	**(438,852)**	**(274,470)**	**497,763**	**46,704**	**(8,554)**	**(177,409)**
Cash and Cash Equivalents - Beginning of Year	8,636,176	579,421	2,947,953	-	55,285	12,218,835
CASH AND CASH EQUIVALENTS - END OF YEAR	**$ 8,197,324**	**$ 304,951**	**$ 3,445,716**	**$ 46,704**	**$ 46,731**	**$ 12,041,426**
RECONCILIATION OF CASH AND CASH EQUIVALENTS TO THE STATEMENT OF NET POSITION						
CURRENT ASSETS						
Cash and Cash Equivalents						
Unrestricted	$ 7,590,303	$ 304,951	$ 3,445,716	$ 46,704	$ 39,531	$ 11,427,205
Restricted	143,854	-	-	-	7,200	151,054
NON-CURRENT ASSETS						
Cash and Cash Equivalents - Restricted	463,167	-	-	-	-	463,167
CASH AND CASH EQUIVALENTS - END OF YEAR	**$ 8,197,324**	**$ 304,951**	**$ 3,445,716**	**$ 46,704**	**$ 46,731**	**$ 12,041,426**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF FIDUCIARY NET POSITION

DECEMBER 31, 2019

	Pension (and Other Employee Benefit) Trust Funds
ASSETS	
Cash and Cash Equivalents	$ 1,554,807
Contributions Receivable	47,804
Accrued Interest Receivable	87,878
Investments	55,808,455
TOTAL ASSETS	**57,498,944**
DEFERRED OUTFLOWS OF RESOURCES	-
LIABILITIES	
Pension Benefits Payable	744
TOTAL LIABILITIES	**744**
DEFERRED INFLOWS OF RESOURCES	-
NET POSITION	
Restricted for Pension Benefits	57,498,200
TOTAL NET POSITION	**$ 57,498,200**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

FOR THE YEAR ENDED DECEMBER 31, 2019

	Pension (and Other Employee Benefit) Trust Funds
ADDITIONS	
Contributions	
Employer	$ 121,485
Commonwealth	957,533
Plan Members	270,485
Total Contributions	1,349,503
Investment Earnings	
Interest Income	802,058
Dividends	439,453
	1,241,511
Less: Investment Expense	230,666
Net Investment Earnings	1,010,845
TOTAL ADDITIONS	**2,360,348**
DEDUCTIONS	
Benefits	2,241,694
Administrative Expense	30,600
TOTAL DEDUCTIONS	**2,272,294**
NET APPRECIATION IN FAIR VALUE OF INVESTMENTS	**8,783,886**
CHANGES IN NET POSITION	**8,871,940**
Net Position - Beginning of Year	48,626,260
NET POSITION - END OF YEAR	**$ 57,498,200**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 1. Summary of Significant Accounting Policies

Reporting Entity

The Borough of Hanover, Pennsylvania (the "Borough") operates under a Council-manager form of government and provides the following services as authorized by the Borough Code: Public Safety - Police and Fire, Highways and Streets, Sanitation, Public Service, Health and Social Services, Culture and Recreation, Public Improvements, Planning and Zoning, Water, Sanitary Sewer, Stormwater, Market House Rentals, and General Administrative Services.

The Borough's financial statements are prepared in accordance with accounting principles generally accepted in the United States of America (GAAP). The Governmental Accounting Standards Board (GASB) is responsible for establishing GAAP for state and local governments through its pronouncements (Statements and Interpretations).

Component Units

In evaluating how to define the Borough for financial reporting purposes, management has considered all potential component units. The basis for determining component units is the governing body's ability to exercise oversight responsibility. The most significant manifestation of this ability is financial interdependency. Other manifestations of the ability to exercise oversight responsibility include, but are not limited to, the selection of governing authority, the designation of management, the ability to significantly influence operations, and the accountability for fiscal matters. The other criterion used to evaluate potential component units for inclusion or exclusion from the reporting entity is the existence of special financing relationships, regardless of whether the Borough is able to exercise oversight responsibilities. Blended component units, although legally separate entities, are in substance, part of the Borough's operations and so data from these units are combined with data from the Borough, the primary government. Based upon the application of these criteria, the following are component units of the Borough:

Borough of Hanover Stormwater Authority ("Authority") - *Blended Component Unit* - in November 2018, Certificate of Incorporation was filed to create the Authority to manage the Borough's implementation and operation of the Municipal Separate Storm Sewer (MS4) Program, with permit currently pending State approval. The Borough Council appoints a voting majority of the Authority's Board, and guides all management functions of the entity. Separate financial statements of the Authority are not prepared.

Hanover Public Library Association (HPLA), Inc. - *Major Discretely Presented Component Unit* - the HPLA, founded in 1910, was incorporated particularly to promote and stimulate interest among members and people of Hanover and vicinity and render assistance in the building, equipping, and maintaining of the Guthrie Memorial Library, and to provide support for literacy and educational undertakings.

The HPLA's economic resources almost entirely directly benefit the Borough. The HPLA's fiscal year ended March 31, 2019 audited financial statements have been prepared in accordance with Accounting Standards Codification (ASC) 958, *Not-for-Profit Entities*, which is a basis of accounting that differs from the Borough. Financial presentations of the component unit in the Borough's government-wide financial statements and selected following disclosures are presented based on the ASC 958 guidance. Separate audited financial statements of the HPLA are available upon request at the Guthrie Memorial Library.

Fire Drivers' Post Employment Health Plan (PEHP) - *Blended (Fiduciary) Component Unit* - the Fire Drivers' PEHP, created in 2009, was established by the Borough, pursuant to Internal Revenue Code Section 501(c)(9), to provide contributions, on behalf of its eligible employees, to assist with post-employment health care needs and expenses. Separate financial statements of the Fire Drivers' PEHP are not prepared.

Joint Ventures

A joint venture is a legal entity that results from a contractual arrangement owned, operated, or governed by two or more participants as a separate and specific activity subject to joint control, in which the participants retain an ongoing financial interest or responsibility. Joint control means no single participant has the ability to unilaterally control the financial or operating policies of the joint venture. The purpose of a joint venture is to pool resources and share the costs, risks, and rewards of providing goods or services. The Borough has the following significant joint venture relationships:

Hanover Area Fire and Rescue Commission (the "Commission") - in December 2016, the Borough (through Ordinance) approved an Intergovernmental Cooperation Agreement with Penn Township for creation of the "Hanover Area Fire and Rescue" district, formally effective February 1, 2018 for an initial period of seven years. All Fire Department personal and real property of the Borough was transferred to the Commission shortly thereafter. The Commission pooled resources and funds to establish and operate a regional fire and emergency services response district under Commission control. The Commission includes appointed members from the Borough, Penn Township, volunteer fire and rescue organization, and an at-large member - no one organization appoints a majority of the members. The Commission continues to be serviced by employees of the respective municipalities' paid Fire Departments, with a joint Fire Chief and Executive Secretary, equally funded by each municipality.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

New Accounting Pronouncements Adopted

The following summarizes GASB Statements implemented by the Borough during the year ended December 31, 2019, and the relating effects on the financial statements presentation and disclosure, as applicable:

> GASB Statement No. 84, *Fiduciary Activities* - The objective of this statement is to improve guidance regarding the identification of fiduciary activities for accounting and financial reporting purposes, and how those activities should be reported. The statement establishes criteria for identifying fiduciary activities of all state and local governments, focusing on the governments control of the activity's assets, and the beneficiaries with whom a fiduciary relationship exists. The provisions of this statement are effective for periods beginning after December 15, 2018, and were implemented by the Borough as of January 1, 2019 with recognition of the Fire Drivers' PEHP fiduciary component unit noted above.

Basic Financial Statements - Government-Wide Financial Statements

The Borough's basic financial statements include both the government-wide (reporting the Borough as a whole) and fund financial statements (reporting the Borough's major funds). Both the government-wide and fund financial statements categorize primary activities as either governmental or business-type.

The Borough's general administrative, public safety, health and sanitation, highways, and culture and recreation services are classified as governmental activities. The Borough's water, regional wastewater, sanitary sewer, stormwater, and market house services are classified as business-type activities. Administrative overhead charges are made to funds and programs and are thereby included in the direct expenses of those funds and programs.

This government-wide focus is more on the sustainability of the Borough as an entity and the change in the Borough's net position resulting from the current year's activities.

In the government-wide statement of net position, both the governmental and business-type activities columns are (a) presented on a consolidated basis by column, and (b) reported on a full accrual, economic resource basis, which recognizes all long-term assets, receivables, and deferred outflows of resources as well as long-term debt and obligations and deferred inflows of resources. Fiduciary funds are not included in the government-wide financial statements. The Borough's net position is reported in three parts - net investment in capital assets; restricted net position; and unrestricted net position. The Borough first utilizes restricted resources to finance qualifying activities.

The government-wide statement of activities reports both the gross and net cost per functional category (public safety, highways, etc.), which are otherwise being supported by general government revenues (property and income taxes, certain intergovernmental revenues, etc.). The statement of activities reduces gross expenses (including depreciation) by related program revenues and operating and capital grants and contributions. The program revenues must be directly associated with the function or business-type activity. Program revenues include revenues from licenses and permit fees, fines and forfeitures, and charges for services. Operating grants include operating-specific and discretionary (either operating or capital) grants while the capital grant column reflects capital-specific grants.

The net costs (by function or business-type activity) are normally covered by general revenues (property and income taxes, certain intergovernmental revenues, interest income, etc.) The Borough does not allocate indirect costs.

Basic Financial Statements - Fund Financial Statements

The financial transactions of the Borough are reported in individual funds in the fund financial statements. Each fund is accounted for by providing a separate set of self-balancing accounts that comprises its assets, deferred outflows of recourses, liabilities, deferred inflows of resources, fund equity, revenues, and expenditures/expenses. The various funds are reported by generic classification within the financial statements.

The Borough utilizes various criteria (percentage of the assets and deferred outflows of resources, liabilities and deferred inflows of resources, and revenues or expenditures/expenses of either fund category or the governmental and enterprise combined) for the determination of major funds.

Governmental Funds

Governmental funds are those through which most governmental functions of the Borough are financed. Governmental fund reporting focuses on the sources, uses, and balances of current financial resources. Expendable assets and deferred outflows of resources are assigned to the various governmental funds according to the purpose for which they may or must be used. Current liabilities and deferred inflows of resources are assigned to the fund from which they will be paid. The difference between governmental fund assets and deferred outflows of resources and liabilities and deferred inflows of resources is reported as fund balance. The following is a description of the Borough's major governmental fund:

General Fund - The General Fund accounts for all financial resources, except those required to be accounted for in another fund. The General Fund consists of the following internal reporting funds: General Operating and Guthrie Memorial Library Funds.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

The following is a description of the Borough's Non-Major Governmental Funds:

Capital Projects Fund - The Capital Projects Fund accounts for financial resources used for the acquisition and construction of major capital facilities that are not financed by proprietary funds. This fund includes certain road improvement and construction projects related to the Guthrie Memorial Library, and general obligation bond issuances for governmental fund purposes. Fund balance has been specifically restricted or assigned, as applicable, for these purposes.

Highway Liquid Fuels Fund - The Highway Liquid Fuels Fund accounts for legally restricted revenues derived from Commonwealth gasoline taxes. Expenditures are restricted by Commonwealth law to Borough road and bridge repairs, maintenance, and improvement programs. Fund balance has been specifically restricted for these purposes.

Recreation Fund - The Recreation Fund accounts for donations and recreation activities charges to benefit the Borough's recreation facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Hanover Recreation Board.

Recreation Endowment Fund - The Recreation Endowment Fund accounts for contributions to a permanent endowment for benefit of the Borough's recreation facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Hanover Recreation Board.

Library Endowment Fund - The Library Endowment Fund accounts for contributions restricted for benefit of the Guthrie Memorial Library facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Borough.

Proprietary Funds

The focus of proprietary fund measurement is upon determination of operating income, change in net position, financial position, and cash flows. The GAAP applicable are those similar to businesses in the private sector. Proprietary funds distinguish operating revenues and expenses from non-operating items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with the proprietary fund's principal ongoing operations. The principal operating revenues for the Borough's proprietary funds are charges for water, sewer, and wastewater treatment services and market stall rentals. Operating expenses for the Borough's proprietary funds include administrative and general costs, contractual services, depreciation on capital assets, materials and supplies, personnel services, transmission and distribution repairs and maintenance, water and sewer treatment costs, and utilities.

All revenues or expenses not meeting this definition are reported as non-operating revenues/expenses.

The Borough's proprietary funds are all classified as enterprise funds. Enterprise funds are required to be used to account for operations for which a fee is charged to external users for goods or services and the activity (a) is financed with debt that is solely secured by a pledge of the net revenues, (b) has third party requirements that the cost of providing services, including capital costs, be recovered with fees and charges, or (c) establishes fees and charges based on a pricing policy designed to recover similar costs. The following is a description of the Borough's major enterprise funds:

Water Fund - The Water Fund is used to account for the revenues generated from the charges for distribution of water to residential, commercial, industrial, and public users of the Borough.

Regional Wastewater Fund - The Regional Wastewater Fund is used to account for the revenues generated from the charges for sanitary sewer services provided for residential, commercial, industrial, and public users located outside of the Borough limits on behalf of regional municipalities participating in regional wastewater treatment plant use governed by intermunicipal agreements, and for interfund charges for sanitary sewer usage.

Sanitary Sewer Fund - The Sanitary Sewer Fund is used to account for the revenues generated from the charges for sanitary sewer services provided for the residential, commercial, industrial, and public users of the Borough.

Stormwater Authority Fund (*blended component unit*) - The Stormwater Authority Fund is used to account for the revenues generated from the charges for stormwater services provided for residential, commercial, industrial, and public users of the Borough.

The following is a description of the Borough's Non-Major Proprietary Fund:

Market House Fund - The Market House Fund is used to account for the revenues generated from vendors renting space for a farmers market.

Fiduciary Funds

Fiduciary funds are used to account for resources held by the Borough in a trustee capacity for individuals, private organizations, or other governments and therefore are not available to support the Borough's own programs. The fiduciary funds of the Borough are the Pension (and Other Employee Benefit) Trust Funds.

For accounting measurement purposes, the Pension (and Other Employee Benefit) Trust Funds are accounted for in essentially the same manner as proprietary funds. The Pension (and Other Employee Benefit) Trust Funds account for resources of the Borough's Police, Fire Drivers' and Hanover Employees' Pension Funds Plans, and the Fire Drivers' PEHP Fund Plan.

Basis of Accounting

Basis of accounting refers to the point at which revenues or expenditures/expenses are recognized in the accounts and reported in the financial statements. It relates to the timing of the measurements made regardless of the measurement focus applied.

Accrual - Both governmental and business-type activities in the government-wide, proprietary funds, and fiduciary funds financial statements are presented on the accrual basis of accounting. Revenues are recognized when earned and expenses are recognized when incurred, regardless of the timing of related cash flows. Property and other taxes are recognized as revenues in the year for which they are levied. Grants and similar items are recognized as revenues as soon as all eligible requirements imposed by the provider have been met.

Modified Accrual - The governmental funds financial statements are presented on the modified accrual basis of accounting. Under the modified accrual basis of accounting, revenues are recorded when susceptible to accrual; i.e., both measurable and available. "Available" means collectible within the current period or within 60 days after year-end. Expenditures are generally recognized under the modified accrual basis of accounting when the related liability is incurred. The exception to this general rule is that principal and interest on general obligation long-term debt, if any, is recognized when due.

In applying the "susceptible to accrual" concept to intergovernmental revenues, the provider should recognize liabilities and expenses and the recipient should recognize receivables and revenues when the applicable eligibility requirements, including time requirements, are met.

Resources transmitted before the eligibility requirements are met should, under most circumstances, be reported as advances by the provider and as unearned revenue or a deferred inflow of resources by the recipient.

Cash and Cash Equivalents and Depository Pool

For purposes of the statement of cash flows, the Borough considers all highly liquid certificates of deposit and investments purchased with a maturity of three months or less to be cash equivalents, and the carrying amount approximates estimated fair value because of the short maturity of those instruments. The majority of the Borough's cash deposits are pooled into a

common pooled account in order to maximize investment opportunity. Each fund whose monies are deposited in the pooled account has equity therein, and interest earned on the account is allocated based upon relative equity at month-end.

Investments

Investment purchases and sales are recorded as of the trade date. Dividend income is recognized on the ex-dividend date. Other investment income is recognized when earned.

Investments are reported at fair value. Fair value is the amount reasonably expected to be received for an investment in a current sale between a willing buyer and a willing seller. Fixed income securities, real estate investment trusts (REITs), bond and mutual funds, and common and preferred stocks are valued based on published market prices and quotations from national security exchanges and securities pricing services. Money market investments that have a remaining maturity at the time of purchase of one year or less are measured at amortized cost.

Net appreciation (depreciation) is determined by calculating the change in the fair value of investments between the beginning of the year and the end of the year, less purchases of investments at cost, plus sales of investments at fair value. Investment expenses consist of external expenses directly related to investment operations, as well as the internal administrative expenses associated with the investment program.

Fair Value

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Borough categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The fair value hierarchy categorizes the inputs to valuation techniques used to measure fair value into three levels based on the extent to which inputs used in measuring fair value are observable in the market:

Level 1 - Inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2 - Inputs are those other than quoted prices within level 1 - that are observable for an asset or liability, either directly or indirectly.

Level 3 - Inputs are unobservable inputs for an asset or liability.

If the fair value of an asset or liability is measured using inputs from more than one level of the fair value hierarchy, the measurement is considered to be based on the lowest priority level input that is significant to the entire measurement.

Inventory

Inventories of materials and supplies are maintained in the General, Water, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds.

Materials and supplies maintained in the General, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds are carried in an inventory account at cost using the first-in, first-out method. Materials and supplies maintained in the Water Fund are carried in an inventory account at cost using an average costing method. All funds subsequently charge inventory to expenditures when consumed.

All other fund types expense inventoriable items when purchased.

Capital Assets

Capital assets used in governmental fund type operations are accounted for in the government-wide financial statements, rather than in governmental funds.

All capital assets are valued at historical cost or estimated historical cost if actual historical cost is not available. Donated fixed assets are valued at their estimated acquisition value on the date donated. Capital assets with a value of $5,000 or more are capitalized by the Borough except for Water Fund additions, which are capitalized if their value is $750 or greater, per National Association of Regulatory Utility Commissioners (NARUC) Accounting Instruction standards adopted by the Pennsylvania Public Utilities Commission (PUC). Effective January 1, 2018, the cost of interest incurred during the construction of capital assets is expensed as incurred for all funds.

Capital assets are depreciated using the straight-line method over the following estimated useful lives:

Improvements Other than Buildings	5-20 years
Machinery and Equipment	5-20 years
Other Buildings and Related Improvements	5-50 years
Plant and Infrastructure	20-125 years

Government-Wide Financial Statements - In the government-wide financial statements, fixed assets are accounted for as capital assets. The Borough elected to retroactively report all general infrastructure assets in a prior year, which includes roads, bridges, traffic signals, utility facilities, and storm sewers and drains. The Borough elected not to retroactively report intangible assets identified as having indefinite useful lives or being internally generated. All intangible assets identified as having indefinite useful lives acquired or being internally generated after December 31, 2009 are reported at historical cost.

Depreciation of all exhaustible fixed assets is recorded as a direct expense in the statement of activities, with accumulated depreciation reflected in the statement of net position.

Additions are recorded at cost or, if contributed property, at their estimated fair value at time of contribution. Repairs and maintenance are recorded as expenditures/expenses; renewals and betterments are capitalized. The sale or disposal of fixed assets is recorded by removing cost and accumulated depreciation from the accounts and charging the resulting gain or loss to income.

Fund Financial Statements - In the fund financial statements, fixed assets used in governmental funds operations are accounted for as capital outlay expenditures of the governmental funds upon acquisition. Fixed assets used in proprietary funds operations are accounted for in the same manner as in the government-wide financial statements.

Deferred Outflows and Inflows of Resources

In addition to assets, the statement of net position and balance sheet will sometimes report a separate section for deferred outflows of resources. This separate financial statement element represents a consumption of net position or fund balance that applies to a future period(s) and so will not be recognized as an outflow of resources (expense/expenditure) until that time. In addition to deferrals related to pensions (disclosed in respective notes below), the Borough reports deferred amounts on refunding in the statement of net position, resulting from the difference in the carrying value of the refunded debt and its reacquisition price, which is deferred and amortized over the shorter of the life of the refunded or refunding debt.

In addition to liabilities, the statement of net position and balance sheet will sometimes report a separate section for deferred inflows of resources. This separate financial statement element represents an acquisition of net position or fund balance that applies to a future period(s) and so will not be recognized as an inflow of resources (revenue) until that time. Deferrals related to pensions, beneficial interest in assets held by others, and tax revenues are disclosed in their respective notes below.

Unearned Revenue

Charges for services and other amounts collected in advance are recorded as unearned revenue as a current liability.

Interfund Activity

Sales of goods and services between funds are reported as revenues in the seller funds and as expenditures/expenses in the purchaser funds. Flows of cash or goods from one fund to another, without a requirement for repayment, are reported as interfund transfers. Interfund transfers are reported as other financing sources/uses in governmental funds, and after non-

operating revenues/expenses in proprietary funds. Interfund balances are expected to be repaid within the following calendar year.

The Borough allocates to several funds a percentage of the salaries and wages and related costs of personnel who perform general and administrative services for such funds but are paid through the General Fund. Health and life insurance costs are allocated based on the respective employees' primary fund and function.

Accrued Compensated Absences

Through various collective bargaining agreements and Codification, the Borough permits employees to accumulate and carry over various levels of vacation and sick leave, a portion of each are payable at termination. The salary-related payments representing the employer's share of Social Security and Medicare taxes have been accrued. The vested annual leave is expensed as incurred in the appropriate funds.

Accrued compensated absences are accrued when incurred in the government-wide financial statements and in the proprietary funds, with current portions recognized for anticipated or known retirements as of the reporting date. In the governmental fund financial statements, the portion of the liability which is matured and payable is included in accrued compensated absences liability and the unmatured portion is not reported.

Bond Discounts, Premiums, Deferred Amounts on Refunding, and Issuance Costs

In the government-wide and proprietary funds financial statements, bond discounts, premiums, and deferred amounts on refunding are capitalized and amortized over the terms of the respective bonds using a method that approximates the effective interest method. Unamortized bond discounts and premiums are netted against bonds payable for presentation, and unamortized deferred amounts on refunding are presented as deferred outflows of resources. Bond issuance costs, excluding amounts prepaid for bond insurance, are expensed as incurred.

In the governmental funds financial statements, bond discounts, premiums, and issuance costs are expensed in the year of the bond issuance. Bond discounts and premiums are netted against bond proceeds and reported as "Other Financing Sources." Bond issuance costs are expensed as "Debt Service."

Net Position and Fund Balances

In the government-wide, proprietary funds, and fiduciary funds financial statements, net position is classified in the following categories:

Net Investment in Capital Assets - This category groups all capital assets, including infrastructure, into one component of net position. Accumulated depreciation and the outstanding balances of debt and accounts payable and retainage payable that are attributable to the acquisition, construction, or improvement of these assets reduce this category.

Restricted Net Position - This category presents external restrictions imposed by creditors, grantors, contributors (including those who have donated to the Guthrie Memorial Library and recreation endowments, in both expendable and nonexpendable forms) or laws or regulations of other governments and restrictions imposed by law through constitutional provisions or enabling legislation.

Unrestricted Net Position - This category represents the net position of the Borough that is not restricted for any project or other purpose. However, these funds may be constrained for specific projects or purposes in the fund financial statements.

In the governmental fund financial statements, fund balances are classified in the following categories:

Nonspendable Fund Balance - This category represents amounts that are not in spendable form (such as inventory and long-term receivables) or are required to be maintained intact (such as permanent endowments).

Restricted Fund Balance - This category represents amounts constrained to specific purposes by their providers (such as grantors, bondholders, and higher levels of government), through constitutional provisions, or by enabling legislation.

Committed Fund Balance - This category represents amounts constrained to specific purposes by a government itself, using its highest level of decision-making authority; to be reported as committed, amounts cannot be used for any other purpose unless the government takes the same highest-level action to remove or change the constraint.

Assigned Fund Balance - This category represents amounts a government intends to use for a specific purpose; intent can be expressed by the governing body or by an official or body to which the governing body delegates the authority.

Unassigned Fund Balance - This category represents amounts that are available for any purpose.

The Borough has adopted a fund balance and financial reserves policy. For the classification of fund balances, the policy considers restricted or unrestricted amounts to have been spent when an expenditure is incurred for the purposes for which both restricted and unrestricted

fund balance is available. When an expense is incurred for purposes for which both restricted and unrestricted fund balances are available, restricted resources are applied first. Also, for the classification of fund balances, the Borough considers committed, assigned, or unassigned amounts to have been spent when an expenditure is incurred for purposes for which amounts in any of those unrestricted fund balance classification could be used.

For committed fund balance, the Borough's highest level of decision-making authority is the Borough Council. The formal action that is required to be taken to establish and modify or rescind a fund balance commitment is an ordinance.

For assigned fund balance, the Borough Council is authorized to assign amounts to a specific purpose. The authorization policy is a formal motion.

Budgets and Budgetary Accounting

The Borough adopts an annual operating budget for the General, Highway Liquid Fuels, Water, Regional Wastewater, Sanitary Sewer, Stormwater Authority, and Non-Major Proprietary Fund. Each budget is presented on a basis consistent with the modified accrual basis of accounting. All appropriations lapse at the end of each year and must be reappropriated.

The following procedures are followed in establishing the budgetary data reflected in the financial statements:

1. Beginning at least 30 days prior to the adoption of the budget, a proposed budget for the ensuing year shall be prepared in the manner designated by the Borough Council. This budget shall be kept on file for public inspection for a period of ten days.

2. After the ten-day period has expired, the Borough Council shall make such revisions in the budget as shall be deemed advisable.

3. Upon completion of the budget, which shall be no later than December 31st, it shall be the duty of the Borough Council to adopt an ordinance, levying the taxes referred to in this act for the fiscal year, for approval of the Mayor or passage over his/her veto.

The budget is prepared by fund and department, and is approved at the department level. The department level presented in the Budgetary Comparison Schedule, included as required supplementary information, represents the legal level of budgetary control. Once a budget is approved, it can be amended by the Borough Council with reasonable discretion. There was one budget revision approved by the Borough Council during the year ended December 31, 2019.

Estimates

Management uses estimates and assumptions in preparing financial statements in conformity with GAAP. Those estimates and assumptions affect the reported amounts of assets, deferred outflows of resources, liabilities, and deferred inflows of resources, the disclosure of contingencies, and the reported revenues and expenditures/expenses. Actual results could vary from the estimates that were used. Significant areas where estimates are made include allowance for doubtful accounts and depreciable lives.

Subsequent Events

In preparing these financial statements, the Borough has evaluated events and transactions for potential recognition or disclosure through March 30, 2020, the date the financial statements were available to be issued.

Note 2. Deposits and Investments

Primary Government

The Borough is governed by the deposit and investment limitations of Commonwealth of Pennsylvania (Commonwealth) law. Commonwealth statutes require that any depository holding public funds maintain investment securities in amounts equal to the total of all public funds on deposit. The securities may be held in the name of the depository, but must be pledged as collateral for those public funds. As of December 31, 2019, the market value of securities held by M&T Bank, the Borough's primary depository, to pledge all public funds on deposit were at 90.39% of the pooled public funds in excess of Federal Deposit Insurance Corporation (FDIC) coverage, thus in violation of the Commonwealth statutes, but no losses were incurred.

The Borough is authorized to invest in United States (U.S.) Treasury bills, obligations of the U.S. Government or Commonwealth of Pennsylvania and related agencies, repurchase agreements, and qualifying money market investments, including pooled investment funds such as the Pennsylvania Local Government Investment Trust (PLGIT). Act 10 of 2016 permitted the expansion of investments, including commercial paper, bankers' acceptances, and negotiable certificates of deposit. In addition, the Municipal Codes authorize additional investment options for pension funds as indicated in the Pennsylvania Uniform Trust Act (20 PA C.S.), including (but not limited to) common and preferred stocks, corporate bonds, REIT's, and mutual funds.

The Borough has separate investment policies for each of its three pension plans. In addition, the Borough has a formal investment policy ("operating investment policy") in relation, but not limited, to operating and reserve funds, proceeds from certain bond issues, and designated or other pledged assets under the direction of the Borough.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Deposits and Cash on Hand

The deposits held as of December 31, 2019 were as follows:

Type	Maturities	Carrying Value
Demand Deposits		$ 3,562,915
Money Market Deposits		18,368,182
Certificate of Deposit, 2.47%	10/2020	10,000
Cash on Hand		1,364
		$ 21,942,461

Reconciliation to Financial Statements	
Statement of Net Position	
Current Assets	
Cash and Cash Equivalents	
Unrestricted	$ 20,501,234
Restricted	563,456
Certificates of Deposit	10,000
Non-Current Assets	
Cash and Cash Equivalents - Restricted	867,771
	$ 21,942,461

Custodial Credit Risk - Custodial credit risk is the risk that in the event of a bank failure, the Borough's deposits may not be returned to it. The Borough's operating investment policy establishes insurance, collateral, pledging, and reporting requirements for financial institutions to limit exposure of custodial credit risk. The Borough does not have written policy for custodial credit risk in relation to its pension funds. As of December 31, 2019, deposits in financial institutions had a bank balance of $22,401,905, of which $21,898,875 was exposed to custodial credit risk and was unsecured and collateralized by securities pledged and held by the financial institutions' trust departments or agents, not in the Borough's name.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Investments

The composition of investments held as of December 31, 2019, reported at fair value, were as follows:

	Interest Maturities (in Years) (Unaudited)					
Type and Ratings*	Less than 1	1 - 5	6 - 10	More than 10	Not Applicable	Total Fair Value
Corporate Bonds - AA+ to BBB-	$ 718,463	$ 2,283,927	$ 1,236,688	$ 503,076	$ -	$ 4,742,154
Equity Securities and Equity Mutual Funds - N/A	-	-	-	-	35,371,905	35,371,905
Fixed Income Mutual Funds - AAA to B	-	1,001,235	3,173,452	-	-	4,174,687
Money Market Investments - AAAm, A+, or Not Rated	1,582,348	-	-	-	-	1,582,348
Municipal Bonds - AA2	-	-	156,158	-	-	156,158
Other Equity Investments - N/A	-	-	-	-	6,022,804	6,022,804
U.S. Agencies - Bonds - AGY	215	-	-	-	-	215
U.S. Agencies - Pools - AA+ or AGY	-	-	65,080	1,569,678	-	1,634,758
U.S. Treasury Obligations - AAA or TSY	195,179	1,993,303	937,491	579,801	-	3,705,774
	$ 2,496,205	$ 5,278,465	$ 5,568,869	$ 2,652,555	$ 41,394,709	$ 57,390,803

* Ratings are unaudited; information from Standard and Poor's (S&P). U.S. Treasury Obligations issued are explicitly guaranteed by the U.S. Government.

Reconciliation to Financial Statements	
Statement of Net Position	
Current Assets	
Cash and Cash Equivalents - Restricted	$ 15,372
Non-Current Assets	
Cash and Cash Equivalents - Restricted	12,169
Statement of Fiduciary Net Position	
Pension (and Other Employee Benefit) Trust Funds	
Cash and Cash Equivalents	1,554,807
Investments	55,808,455
	$ 57,390,803

Custodial Credit Risk - Investment custodial credit risk is the risk that the counterparty to an investment transaction will fail and the government will not recover the value of the investment or collateral securities that are in possession of an outside party. The Borough's formal investment policies require for financial institutions to purchase securities in the Borough's name, and hold by a custodian bank on the Borough's behalf to limit exposure of custodial credit risk. The Borough does not have written policy for investment custodial credit risk in relation to its pension funds. All of the Borough's

investments are held by the financial institutions' trust departments or agents, not in the Borough's name.

The institutions holding the Borough's investments are members of the Securities Investor Protection Corporation (SIPC). SIPC insures the cash and securities in each investor's account up to $500,000 against loss in the case of a failed brokerage firm or misappropriation of assets by the broker, however only up to $250,000 for cash. The Borough has over $500,000 in investments at each of the institutions, thus would be insured $500,000 at each institution by the SIPC in the event such failure or misappropriation occurs.

Interest Rate Risk - The Hanover Employees' Pension Plan's formal investment policy states that at the time of purchase, the maximum final maturity for any single issue will not exceed 100 years and the portfolio average effective duration will not exceed seven years and will be within +/- 20% of the specified performance benchmark. The Borough's operating investment policy limits maximum final maturity for operating funds for any single issue to 397 days from purchase date to maturity date, and for reserve funds for any single issue to five years from purchase date to maturity date. The Borough does not have formal investment policies that limit exposure to fair value losses arising from increasing interest rates for the Police and Fire Drivers' Pension Plans as well as the Fire Drivers' PEHP. Maturities of investments held as of December 31, 2019 are provided in the previous schedule.

Credit Risk and Concentration of Credit Risk - Investments in entities that are subject to credit risk are limited to those held by the Pension Trust and Non-Major Governmental Funds. The ratings for all investments currently held by the Pension Trust and Non-Major Governmental Funds are summarized in the previous schedule. The Borough does not have formal investment policy that limits exposure to credit and concentration of credit risk for the Fire Drivers' PEHP Fund Plan. The investment policies for the Borough's Pension Trust Funds limit its investment choices and maximum investment in any one fixed income security issuer as follows:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Prohibited Investments	None	Non-"traditional asset classes"	Non-U.S. dollar-denominated securities, and non-"traditional asset classes"
Maximum Concentration for Any Single Issue at Time of Purchase	None	None	5%, except for U.S. Treasuries, Government Agencies, Asset-Backed Securities (ABS), and Municipal Securities (limited to 5% of portfolio)

The Hanover Employees' Pension Plan investment policy also addresses the eligible fixed income investments permitted and their respective ratings, based on one or more nationally recognized statistical rating organizations, and portfolio limits, and all Pension Trust Fund investment policies provide asset allocation guidelines for minimum, maximum, and benchmark levels of investment holdings of the respective plans.

The Borough's operating investment policy sets various limits for the percentage of maximum allocation and maximum invested in a single issuer (excluding U.S Government Securities, certain money market funds, and Local Government Investment Pools) for various classes of security types, and further restrictions for registered money market mutual funds of Local Government Investment Pools to maximum invested of 10% of the outstanding shares of said fund or Pool.

There were no investments that exceeded 5% of plan net position for these funds as of December 31, 2019.

Restrictions

Restricted deposits and investments of governmental funds as of December 31, 2019 are comprised of the following:

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Public Safety Purposes	$ 14,192	$ -	$ 14,192
Funds Held for Future Recreation Purposes	49,789	31,381	81,170
Funds Held for Roads and Bridges	-	332,412	332,412
Non-Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Recreation Purposes	-	298,156	298,156
Funds Held for Future Capital Expansion	-	118,617	118,617
Total Restricted Deposits and Investments	$ 63,981	$ 780,566	$ 844,547

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Restricted deposits and investments of proprietary funds as of December 31, 2019 are comprised of the following:

	Water Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Capital Expansion	$ -	$ 7,200	$ 7,200
Consumer Deposit Agreement Refunds	143,854	-	143,854
Non-Current Assets			
Cash and Cash Equivalents			
Consumer Deposit Agreement Refunds	463,167	-	463,167
Total Restricted Cash and Cash Equivalents	$ 607,021	$ 7,200	$ 614,221

The Borough is required to refund the majority of consumer deposit agreements over a straight-line ten-year period following the year of receipt. A corresponding liability for consumer deposits has been recognized (see Long-Term Debt note for additional disclosure).

HPLA

Cash

The HPLA maintains its cash accounts at one financial institution, with balances insured by FDIC up to $250,000. The HPLA has no uninsured funds as of March 31, 2019.

Investments

Investments of the endowment fund by type consisted of the following as of March 31, 2019:

Type	Cost	Market Value
Cash and Cash Equivalents	$ 152,612	$ 152,612
Equities	1,560,128	1,682,392
Fixed Income Securities	757,406	749,602
	$ 2,470,146	$ 2,584,606

Investment activity for the year ended March 31, 2019 totaled $473,641, comprised of $450,000 in contributions, $43,040 in distributions, and $66,681 of investment return, net of fees of $10,417.

Note 3. Donor-Restricted Endowments and Related Arrangements

Primary Government

The Borough maintains donor-restricted permanent endowments with principal balances of $285,987 and $12,169 reported within the Non-Major Governmental Funds (Recreation Endowment and Library Endowment Funds, respectively) as of December 31, 2019. Financial Commissions for each fund are authorized to supervise the endowment investments and recommend to the Borough Council for authorization and spending of earnings in relation to the respective endowment purposes. Endowment funds in the Library Endowment Fund are limited to a Community Foundation investment fund.

The Borough does not have a formal policy related to spending rate or total return in relation to the respective endowment funds, but follows the provisions of the Pennsylvania Uniform Trust Act (20 PA C.S.), which defines prudent investor requirements (appropriate degree of care and "special skills" as an investor) and overall investment strategy reasonably suited to the endowments.

Net appreciation on the donor-restricted endowments that was available for authorization for expenditure by the Borough as of December 31, 2019 was $15,302 and $15,372 reported within the Non-Major Governmental Funds (Recreation Endowment and Library Endowment Funds, respectively) as cash and cash equivalents.

In addition, the Borough recognized a beneficial interest in assets held by others and a corresponding deferred inflow of resources relating to two qualifying irrevocable split-interest trust agreements meeting the Statement No. 81 criteria with a fair value as of December 31, 2019 of $98,221. The Borough's Guthrie Memorial Library also is a named beneficiary for several other revocable and perpetual, irrevocable trusts not meeting the recognition criteria in GASB Statement No. 81, and thus not recognized in the financial statements that generate annual support for the library's operations, some of which are restricted in nature.

HPLA

The State of Pennsylvania has not adopted the Uniform Prudent Management of Institutional Fund Act (UPMIFA) as of March 31, 2019. Pennsylvania's Act 141 allows nonprofits the option to elect a spending fund withdrawal rate based on a total return policy of 2% to 7% of the average fair value of the endowment assets over a period of three or more years of the actual investment income of the fund. The Association has elected to use a three-year average for the mean fair value of the fund, and will assess the spending rate annually within the allowed Act 141 range.

Note 4. Fair Value

Primary Government

The categorization of investments and beneficial interest in assets held by others within the fair value hierarchy are based upon the pricing transparency of the instruments and should not be perceived as the particular asset's risk. Investments classified in Level 1 of the fair value hierarchy are valued directly from a predetermined primary external pricing vendor. Beneficial interest in assets held by others classified in Level 2 is measured using the present value of future distributions projected to be received discounted at appropriate rate (income approach). Investments classified in Level 2 are subject to pricing by an alternative pricing source due to lack of information available by the primary vendor. The Borough has no investments classified in Level 3.

The Borough's fair value hierarchy of investments ($55,808,455) by type as of December 31, 2019 was as follows:

		Fair Value Measurements Using	
	Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)
Beneficial Interest in Assets Held by Others	$ 98,221	$ -	$ 98,221
Investments			
Investments by Fair Value Level			
Debt Securities			
Corporate Bonds	$ 4,742,154	$ -	$ 4,742,154
Fixed Income Mutual Funds	88,069	88,069	-
Municipal Bonds	156,158	-	156,158
U.S. Agencies - Bonds	215	-	215
U.S. Agencies - Pools	1,634,758	-	1,634,758
U.S. Treasury Obligations	3,705,774	492,542	3,213,232
Total Debt Securities	10,327,128	580,611	9,746,517
Equity Securities	20,866,249	20,866,249	-
	$ 31,193,377	$ 21,446,860	$ 9,746,517

The valuation method for investments measured at the net asset value (NAV) per share, or equivalent, as of December 31, 2019 was as follows:

Investments Measured at the Net Asset Value (NAV)	Fair Value	Redemption Frequency	Redemption Notice Period
Commingled Equity Mutual Funds	$ 20,528,460	Daily	One Day
Commingled Fixed Income Mutual Funds	4,086,618	Daily	One Day
Total Investments Measured at the NAV	$ 24,615,078		

Eight fixed income mutual funds and 30 equity mutual funds are considered to be commingled in nature and include hedge funds. The fair value of the underlying investments are used to determine NAV per share (or its equivalent) for these investments.

HPLA

ASC 820, *Fair Value Measurements*, provides a framework for measuring fair value that is similar to GASB standards summarized in Note 1.

The estimated fair values of HPLA's investments as of March 31, 2019 are as follows:

Type	Level 1	Total
Cash and Cash Equivalents	$ 152,612	$ 152,612
Equities	1,682,392	1,682,392
Fixed Income Securities	749,602	749,602
	$ 2,584,606	$ 2,584,606

Note 5. Property and Other Taxes and Tax Abatements

The Borough's ad valorem property tax is levied each year on the assessed value listed as of the prior year for all real property located in the Borough. The assessed value of the duplicate tax roll for which the 2019 tax levy was based was $989,273,316. The property tax rate for 2019 was 5.65 mills.

From the effective date of the budget, the amount stated thereon as the amount to be raised by the property tax shall constitute a determination of the amount of the tax levy in the corresponding tax year. Taxpayers receive a 2% discount if paid by the 15th day of April. For the year ended December 31, 2019, $99,777 in discounts were netted with tax revenues reported. Taxes shall be due and payable on the 15th day of June in the year for which they are levied. Taxpayers will owe an additional 10% penalty if paid after the 15th day of June. Taxes shall be overdue and in arrears on the 30th day of the following April.

Taxes are recorded in the funds as revenue by the Borough when received from the tax collectors, and accruals are recorded at year-end for taxes expected to be received within 60 days of December 31, 2019 in accordance with the modified accrual basis of accounting. Taxes are shown net of an allowance for uncollectible accounts, calculated based on the age of receivables for Per Capita Taxes. Taxes receivable and deferred tax revenue, recognized as deferred amounts from tax revenues, as of December 31, 2019 and related tax revenues for the year then ended for the General Fund, net of relating allowance for uncollectible accounts, were as follows:

	Taxes Receivable, Net	Deferred Tax Revenue	Tax Revenues
Property Taxes	$ 301,339	$ 192,756	$ 5,788,803
Income Taxes	277,083	-	1,701,683
Business Privilege Taxes	35,591	-	603,251
Local Services Taxes	130,522	-	593,187
Per Capita Taxes	93,401	89,603	47,723
Total Taxes, Gross	837,936	282,359	8,734,647
Less: Allowance for Uncollectible Taxes	69,792	69,792	-
Total Taxes, Net	$ 768,144	$ 212,567	$ 8,734,647

The Borough provides a single tax abatement program to promote improvements to certain industrial, commercial, and other business properties within designated jurisdictions of the Borough under the Pennsylvania Local Economic Revitalization Tax Assistance Act (LERTA), Act No 76 of 1977. Abatements are obtained through application by the property owner for property taxes related to improvements to deteriorated properties on a declining basis from 100% to 0% over a ten-year period, based on increased assessed value as a result of permitted improvements to the qualifying property. Revocation provisions exist with failure to satisfy any fees and costs as due to the Borough.

For the year ended December 31, 2019, several LERTA applications have been filed, but no abatements have yet occurred, pending completion and assessment of improvements.

Note 6. Due from Other Governments

In 1982, the Borough entered into an agreement with two local municipalities to jointly share the costs of constructing a regional wastewater treatment plant and related infrastructure. Under the agreement, the Borough operates the facilities, and charges the local municipalities quarterly service charges through the Regional Wastewater Fund for their allocated share of

costs based on flow usage for the entire system. Any charges received in excess of costs or deficit amounts are accounted for in subsequent budgets as an adjustment to the quarterly service charges to the participating municipalities, $204,951 of which was recognized as unearned revenue as of December 31, 2019, $37,424 of which was due from other governments. The contract also stipulates that the municipalities will share in the costs of facilities additions and upgrades as required by other authorized agencies.

Due to revised environmental compliance standards, the Borough was compelled to perform substantial improvements to the treatment plant and related infrastructure, and has recognized the local municipalities' share of these costs through December 31, 2019 as amounts due from other governments in the Regional Wastewater Fund. Beginning in 2011, one of the local municipalities agreed on repayment terms for their share of costs as follows: $395,000 due February 15, 2012, and annual payments due February 15th thereafter of $100,000 plus interest accrued on the outstanding principal balance at 4% per annum until fully repaid. Interest income recognized under the agreement totaled $6,613 for the year ended December 31, 2019, and $5,786 was accrued as of December 31, 2019.

As of December 31, 2019, $165,313 has been incurred by the Borough and is unpaid by the municipality in relation to improvements relating to the local municipality's share, and future minimum payments from the agreement based on costs incurred through December 31, 2019 is as follows for the years ending December 31:

	Regional Wastewater Fund
2020	$ 100,000
2021	65,313
	$ 165,313

In addition, the Borough has a flow exchange agreement with another municipality from 1983 for sewer treatment services charged through the Sanitary Sewer Fund, and $359,875 was due and payable from the municipality for flow exchange services through December 31, 2019.

Finally, the Borough has intergovernmental agreements for equally sharing employee costs of a joint Fire Chief and Executive Secretary that support both municipalities as part of the Commission, and $114,558 was due and payable from the municipality for said shared costs through December 31, 2019.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 7. Capital Assets

A summary of governmental activities follows:

Capital Assets	Balance 12/31/18	Increases	Decreases	Transfers	Balance 12/31/19
Non-Depreciable Assets					
Land and Land Rights	$ 571,261	$ -	$ -	$ -	$ 571,261
Construction in Progress	47,732	40,808	-	(55,675)	32,865
Total Non-Depreciable Assets	618,993	40,808	-	(55,675)	604,126
Depreciable Assets					
Improvements Other than Buildings	352,660	-	-	55,675	408,335
Machinery and Equipment	6,410,204	869,771	355,136	(179,862)	6,744,977
Other Buildings and Improvements	12,843,522	62,523	-	-	12,906,045
Plant and Infrastructure	13,874,791	179,535	-	-	14,054,326
Total Depreciable Assets	33,481,177	1,111,829	355,136	(124,187)	34,113,683
Total Capital Assets	34,100,170	1,152,637	355,136	(179,862)	34,717,809
Accumulated Depreciation					
Improvements Other than Buildings	218,622	10,426	-	-	229,048
Machinery and Equipment	4,773,662	551,977	355,136	(49,570)	4,920,933
Other Buildings and Improvements	4,298,846	291,626	-	-	4,590,472
Plant and Infrastructure	9,009,783	375,276	-	-	9,385,059
Total Accumulated Depreciation	18,300,913	1,229,305	355,136	(49,570)	19,125,512
Total Capital Assets, Net	$ 15,799,257	$ (76,668)	$ -	$ (130,292)	$ 15,592,297

Accumulated costs attributed to projects included in construction in progress as of December 31, 2019 were as follows:

Design and Extension/Rehabilitation of Storm Sewer Drainage	$ 10,709
Transfer Station Improvements and Enhancements	13,455
Parks and Playground Equipment and Facilities Upgrades	8,701
	$ 32,865

Depreciation expense, including amortization expense on assets under capital lease, was charged to governmental functions for the year ended December 31, 2019:

General Government	$ 20,557
Public Safety	90,734
Health and Sanitation	265,844
Highways	522,838
Culture and Recreation	329,332
	$ 1,229,305

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

A summary of business-type activities follows:

Capital Assets	Balance 12/31/18	Increases	Decreases	Transfers	Balance 12/31/19
Non-Depreciable Assets					
Land and Land Rights	$ 891,549	$ 101,895	$ -	$ 33,811	$ 1,027,255
Inactive Wells	137,044	-	137,044	-	-
Construction in Progress	1,358,068	1,249,501	-	(1,147,826)	1,459,743
Total Non-Depreciable Assets	2,386,661	1,351,396	137,044	(1,114,015)	2,486,998
Depreciable Assets					
Improvements Other than Buildings	62,168	-	-	-	62,168
Machinery and Equipment	4,237,821	410,123	95,578	179,862	4,732,228
Other Buildings and Improvements	829,587	30,276	-	-	859,863
Plant and Infrastructure	112,384,379	1,442,986	41,617	1,114,015	114,899,763
Total Depreciable Assets	117,513,955	1,883,385	137,195	1,293,877	120,554,022
Total Capital Assets	119,900,616	3,234,781	274,239	179,862	123,041,020
Accumulated Depreciation					
Improvements Other than Buildings	52,003	1,255	-	-	53,258
Machinery and Equipment	2,518,407	311,918	87,718	49,570	2,792,177
Other Buildings and Improvements	310,513	30,235	-	-	340,748
Plant and Infrastructure	37,517,862	2,401,196	33,470	-	39,885,588
Total Accumulated Depreciation	40,398,785	2,744,604	121,188	49,570	43,071,771
Total Capital Assets, Net	$ 79,501,831	$ 490,177	$ 153,051	$ 130,292	$ 79,969,249

Accumulated costs attributed to projects included in construction in progress as of December 31, 2019 were as follows:

Water Fund	
Sheppard & Myers Dam Rehabilitation	$ 922,242
Storage Building	115,697
Water Mains and Water Laterals	183,994
	$ 1,221,933
Sanitary Sewer Fund	
Sanitary Sewer System Improvements	$ 237,810

Depreciation expense, including amortization expense on assets under capital lease, was charged to business-type functions as follows for the year ended December 31, 2019:

Water Fund	$ 1,070,991
Regional Wastewater Fund	1,382,437
Sanitary Sewer Fund	276,050
Stormwater Authority Fund	3,969
Non-Major Proprietary Fund	11,157
	$ 2,744,604

Note 8. Capital Leases

The Borough is party to several lease agreements for vehicles and equipment as of December 31, 2019. The leases bear stated or implicit interest rates ranging from 1.91% to 8.80%, and each lease is secured by the capital asset under the respective lease. Vehicles and equipment under capital lease included in capital assets as of December 31, 2019 were as follows:

	Governmental Activities	Business-Type Activities
Machinery and Equipment	$ 1,409,303	$ 546,413
Less: Accumulated Depreciation	372,135	135,001
	$ 1,037,168	$ 411,412

As of December 31, 2019, future minimum payments required under the leases and the present values of minimum capital lease payments are as follows:

	Governmental Activities	Business Type Activities
2020	$ 439,082	$ 128,785
2021	428,186	128,785
2022	360,879	88,952
2023	246,348	34,817
2024	177,261	-
Total Minimum Lease Payments	1,651,756	381,339
Less: Amount Representing Interest	112,881	31,768
Present Values of Minimum Lease Payments Due Under Capital Leases Included in General Long-Term Debt	1,538,875	349,571
Less: Current Portion	393,629	114,075
Long-Term Portion	$ 1,145,246	$ 235,496

The payments above include a non-cancelable subleased fire vehicle with the Commission, excluded from the Borough's machinery and equipment listed above, with future minimum rentals to be received under the sublease and present values of minimum capital lease rentals as of December 31, 2019 as follows:

	Governmental Activities
2020	$ 132,999
2021	132,999
2022	132,999
2023	132,998
2024	132,998
Total Minimum Lease Rentals	664,993
Less: Amount Representing Interest	50,209
Present Values of Minimum Lease Rentals Due Under Capital Leases Included in General Long-Term Debt	614,784
Less: Current Portion	116,552
Long-Term Portion	$ 498,232

Note 9. Long-Term Debt

Amounts outstanding under bonds payable as of December 31, 2019 consisted of the following:

$9,770,000 2012 Series - $9,520,000 Serial and $250,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $1,255,000 to $1,380,000 through October 1, 2025 with remaining interest rates ranging from 2% to 2.125%; bonds are secured by the credit and taxing power of the Borough	$ 7,905,000
$10,000,000 2013 Series, partially refunded in 2017 - original issue of $3,170,000 Serial and $6,830,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $110,000 to $125,000 through October 1, 2022 with remaining interest rates ranging from 2% to 2.375%; all term bonds were refunded; bonds are secured by the credit and taxing power of the Borough	355,000
$3,790,000 2015 A Series - Serial Bonds; due in remaining annual principal installments ranging from $435,000 to $505,000 through October 1, 2024 with remaining interest rates of 2%; bonds are secured by the credit and taxing power of the Borough	2,400,000

$9,100,000 2015 B Series - $3,545,000 Serial and $5,555,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $325,000 to $380,000 through October 1, 2027 with remaining interest rates ranging from 2% to 2.75%; term bonds divided into four lots with $1,200,000 paying 3% due October 1, 2030, $2,260,000 paying 3.25% due October 1, 2035, $1,010,000 paying 3.5% due October 1, 2037, and $1,085,000 paying 3.5% due October 1, 2039; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	8,355,000
$10,000,000 2015 C Series - $3,890,000 Serial and $6,110,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $25,000 to $2,025,000 through October 1, 2030 with remaining interest rates ranging from 2% to 3.45%; term bonds divided into four lots with $780,000 paying 2.625% due October 1, 2025, $1,915,000 paying 3.125% due October 1, 2028, $3,000,000 paying 3.6% due October 1, 2032, and $415,000 paying 3.5% due October 1, 2032; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	9,755,000
$6,770,000 2015 D Series - $5,270,000 Serial and $1,500,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $340,000 to $1,815,000 through October 1, 2027 with remaining interest rates ranging from 2% to 2.75%; term bonds divided into three lots with $20,000 paying 2.125% due October 1, 2022, $30,000 paying 2.5% due October 1, 2025, and $1,450,000 paying 2.95% due October 1, 2029; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	5,475,000
$4,750,000 2016 Series - $3,445,000 Serial and $1,305,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $105,000 to $125,000 through October 1, 2024 with remaining interest rates ranging from 2% to 3.5%; term bonds divided into two lots with $645,000 paying 2% due October 1, 2025 and $660,000 paying 2% due October 1, 2026; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	1,880,000
$9,580,000 2017 Series - $2,955,000 Serial and $6,625,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $45,000 to $750,000 through October 1, 2038 with remaining interest rates ranging from 2% to 3.25%; term bonds divided into two lots with $1,180,000 paying 3% due October 1, 2031 and $5,445,000 paying 3.15% due October 1, 2037; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	9,490,000
Total Bonds Payable	$ 45,615,000

As of December 31, 2019, $7,340,000 of the outstanding general obligation 2009 Series bonds are considered defeased.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Interest and related costs incurred for governmental and business-type activities for the year ended December 31, 2019 were $159,268 and $1,280,139, of which all were expensed.

The following is a summary of changes in long-term debt for the year ended December 31, 2019:

	Balance 12/31/18	Additions	Reductions	Transfers	Balance 12/31/19	Due Within One Year
Governmental Activities						
Bonds Payable						
2015 A Serial and Term Bonds	$ 2,820,000	$ -	$ 420,000	$ -	$ 2,400,000	$ 435,000
2015 C Serial and Term Bonds	200,000	-	-	-	200,000	-
2015 D Serial and Term Bonds	115,000	-	35,000	-	80,000	35,000
2016 Serial and Term Bonds	1,985,000	-	105,000	-	1,880,000	105,000
2017 Serial and Term Bonds	501,000	-	7,000	-	494,000	8,000
	5,621,000	-	567,000	-	5,054,000	583,000
Bond Discounts and Premiums	71,441	-	11,304	-	60,137	11,304
Total Bonds Payable, Net	5,692,441	-	578,304	-	5,114,137	594,304
Accrued Compensated Absences	1,681,579	23,868	-	-	1,705,447	146,000
Capital Lease Obligations	1,531,212	473,029	349,118	(116,248)	1,538,875	393,629
Total Governmental Activities Debt	$ 8,905,232	$ 496,897	$ 927,422	$ (116,248)	$ 8,358,459	$ 1,133,933
Business-Type Activities						
Bonds Payable						
2012 Serial and Term Bonds	$ 9,035,000	$ -	$ 1,130,000	$ -	$ 7,905,000	$ 1,255,000
2013 Serial and Term Bonds	475,000	-	120,000	-	355,000	120,000
2015 B Serial and Term Bonds	8,675,000	-	320,000	-	8,355,000	-
2015 C Serial and Term Bonds	9,580,000	-	25,000	-	9,555,000	25,000
2015 D Serial and Term Bonds	5,690,000	-	295,000	-	5,395,000	305,000
2016 Serial and Term Bonds	-	-	-	-	-	-
2017 Serial and Term Bonds	9,034,000	-	38,000	-	8,996,000	37,000
	42,489,000	-	1,928,000	-	40,561,000	1,742,000
Bond Discounts and Premiums	(104,915)	-	(8,337)	-	(96,578)	(8,337)
Total Bonds Payable, Net	42,384,085	-	1,919,663	-	40,464,422	1,733,663
Accrued Compensated Absences	1,124,039	36,017	-	-	1,160,056	68,000
Capital Lease Obligations	230,035	116,300	113,012	116,248	349,571	114,075
Consumer Deposits	750,880	-	143,859	-	607,021	143,854
Total Business-Type Activities Debt	$ 44,489,039	$ 152,317	$ 2,176,534	$ 116,248	$ 42,581,070	$ 2,059,592

Other long-term liabilities in governmental activities are liquidated from general revenues in the General Fund. Accrued compensated absences and capital lease obligations in business-type activities are liquidated from general revenues in the respective Water, Regional Wastewater, Sanitary Sewer, Stormwater Authority, and Non-Major Proprietary Fund. Consumer deposits are liquidated from general revenues in the Water Fund.

The principal and interest requirements to maturity of the bonds payable debt of all funds are as follows for the years ending December 31:

	Governmental Activities		Business-Type Activities	
	Principal	Interest	Principal	Interest
2020	$ 583,000	$ 105,292	$ 2,067,000	$ 1,140,601
2021	633,000	93,634	2,097,000	1,099,258
2022	653,000	79,322	2,147,000	1,057,157
2023	663,000	66,164	2,187,000	1,012,962
2024	678,000	52,752	2,232,000	967,487
2025-2029	1,844,000	74,070	11,981,000	4,002,564
2030-2034	-	-	12,405,000	2,066,962
2035-2039	-	-	5,445,000	507,955
	$ 5,054,000	$ 471,234	$ 40,561,000	$ 11,854,946

Note 10. Interfund Activity

Interfund balances between funds as of December 31, 2019 on the fund financial statements were as follows:

	Due to				
Due From	General Fund	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Total
General Fund	$ -	$ 25,246	$ -	$ -	$ 25,246
Water Fund	-	-	70,497	16,599	87,096
Regional Wastewater Fund	-	-	-	167,527	167,527
Sanitary Sewer Fund	13,000	-	-	-	13,000
Total	$ 13,000	$ 25,246	$ 70,497	$ 184,126	$ 292,869

Interfund balances result from the time lag between the dates that (1) interfund goods and services are provided or reimbursable expenditures occur, (2) transactions are recorded in the accounting system, and (3) payments between funds are made. All balances are expected to be repaid with the following year.

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NOTES TO BASIC FINANCIAL STATEMENTS

Interfund transfers for the year ended December 31, 2019 on the fund financial statements were as follows:

	Transfers from			
Transfers to	Non-Major Governmental Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Total
General Fund	$ 24,777	$ -	$ -	$ 24,777
Water Fund	-	927	-	927
Regional Wastewater Fund	-	-	1,695,425	1,695,425
Sanitary Sewer Fund	-	110,613	-	110,613
Total	$ 24,777	$ 111,540	$ 1,695,425	$ 1,831,742

Transfers are used to (1) move revenues from the fund that statute or budget requires to collect them to the fund that statute or budget requires to expend them, (2) move receipts restricted to debt service from the funds collecting the receipts to the debt service fund as debt service payments become due, (3) use unrestricted revenues collected in the General Fund to finance various programs accounted for in other funds in accordance with budgetary authorizations, and (4) transfer capital assets from the fund that paid for the assets to the fund that will utilize them within proprietary funds.

In addition, interfund transfers of capital assets, and related debt as applicable, between governmental and business-type activities, recognized on the government-wide statements, totaled $14,044.

Significant interfund transfers for the year ended December 31, 2019 include the following: the Sanitary Sewer Fund transferred $1,584,812 to the Regional Wastewater Fund to be used for debt service and reclassification of interfund debt, net of reimbursements of capital costs received from other municipalities for the shared regional wastewater treatment improvements disclosed above.

Finally, the Borough provided a temporary, short-term, non-interest-bearing operating loan of $250,000 to the Stormwater Authority during 2019, which was repaid in full prior to the promissory note requirement of satisfaction at payment intervals up to February 2020.

Note 11. Communication Tower Lease Agreements

The Borough has entered into communication tower lease agreements, which are expected to provide the following minimum annual rental income for the years ending December 31,

	Water Fund
2020	$ 79,634
2021	24,440
2022	17,772
2023	13,626
	$ 135,472

All lease agreements have various consecutive renewal options at the lessee's discretion.

Note 12. Defined Benefit Pension Plans

The Borough offers three single-employer defined benefit pension plans: Police Pension Plan, Fire Drivers' Pension Plan, and Hanover Employees' Pension Plan. The plans do not issue stand-alone financial reports.

A. Plan Descriptions and Funding Policies

Police Pension Plan

Plan Administration - The plan is a single-employer defined benefit plan that covers all full-time members of the police force upon employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council and the Police Pension Fund Committee, consisting of three voting members appointed by the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. A member is eligible for normal retirement after attainment of age 50 and completion of 25 years of vesting service; however, if the member continues working after their normal retirement date, their pension does not start until they actually retire. The normal retirement pension, payable monthly for the member's lifetime and continuing to the member's surviving spouse or eligible child for their respective lifetime, is equal to 50% of average monthly compensation (based on the last 36 months of employment preceding retirement), plus a service increment of $100 per month for each completed year of benefit service in excess of 25 years. Disability benefits are available to a participant disabled in the line of duty. If a participant is eligible for retirement at the time of death, a monthly death benefit is payable.

Employees retiring after January 1, 1980 are entitled to an annual cost-of-living increase equal to 6% per year or the actual cost-of-living increase based on the Consumer Price Index, whichever is smaller. A member's benefits vest upon completion of 12 years of vesting service. The vested benefit is deferred monthly pension beginning at normal retirement equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3% of their compensation per year. Member contributions are credited with interest at the rate of 3% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Police Pension Plan are financed through investment earnings.

Fire Drivers' Pension Plan

Plan Administration - The plan is a single-employer defined benefit plan that covers all full-time fire drivers on July 1st following the date of employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 with completion of 25 years of vesting service, but not later than attainment of age 62 and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.9% of average monthly compensation (highest consecutive 60 months of compensation out of the last 120 months preceding retirement) multiplied by the total number of complete years of benefit service.

Disability benefits are available to a participant who becomes totally and permanently disabled. The death benefit for a participant who has attained age 50 and has completed ten years of vesting service is a survivor pension. A monthly death benefit, payable to a surviving spouse, is also available if the participant is killed in the line of duty. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3.7% of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at

the rate of 4% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Fire Drivers' Pension Plan are financed through investment earnings.

Hanover Employees' Pension Plan

Plan Administration - The plan is a single-employer defined benefit pension plan that covers all full-time employees of the Borough, excluding uniformed police officers and fire drivers, on July 1st following the date of employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 (60 for non-union hires after July 1, 2014) and completion of 25 years of vesting service, but not later than attainment of age 62 (65 for non-union hires after July 1, 2014) and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.5% (1% for non-union hires after July 1, 2014) of average monthly compensation (highest consecutive 36 months of compensation out of the last 60 months preceding retirement) multiplied by the total number of years of benefit service rounded to the nearest one-half year. The minimum monthly pension for employees with 30 or more years of vesting service is equal to 70% of average monthly compensation, less 100% of social security benefits received.

Disability benefits are available after attainment of age 45 and completion of 15 years of vesting service, following six months of permanent disability. The monthly death benefit for a participant who has attained 60 years (sum of member's age and years of vesting service) and has completed ten years of vesting service is a survivor pension. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3% of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at the rate of 4% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by

Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Hanover Employees' Pension Plan are financed through investment earnings.

Plan Membership

Membership of the plans consisted of the following as of December 31, 2019:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Inactive Plan Members or Beneficiaries Currently Receiving Benefits	20	14	65
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	1	-	3
Active Plan Members	25	17	104
Totals	46	31	172

Investment Policies, Concentrations, and Rates of Return

Disclosures regarding investment policies and concentrations of the plans' investments are located in Note 2 to the financial statements. The annual money-weighted rates of return on plans' investments, net of plans' investment expenses, were as follows for the year ended December 31, 2019: 18.76% for the Police, 20.42% for the Fire Drivers', and 20.69% for the Hanover Employees' Pension Funds' Plans. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

B. Net Pension Liability

The net pension liability was measured as of December 31, 2019, and the total pension liability was determined by rolling forward the liabilities from an actuarial valuation as of January 1, 2019. No significant events or changes in assumptions occurred between the valuation date and the fiscal year end.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Actuarial Assumptions - The total pension liability as determined by an actuarial valuation as of January 1, 2019, using the following actuarial assumptions, applied to all periods included in the measurement:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Actuarial Assumptions:			
Inflation Assumption	Moderate	Moderate	Moderate
Cost-of-Living Adjustments	3%	None	None
Projected Salary Increases	5%	5%	5%
Investment Rate of Return	7%, net of pension plan investment expense, including inflation	7%, net of pension plan investment expense, including inflation	7%, net of pension plan investment expense, including inflation
Disability Rates	SOA 1987 Group LTD Tables - Males, six-month elimination	SOA 1987 Group LTD Tables - Males, six-month elimination	SOA 1987 Group LTD Tables - Males, six-month elimination

Mortality rates were based on the PubS-2010 (Police and Fire Drivers') and PubG-2010 (Hanover Employees') mortality tables, projected generationally using Scale MP-2018 to reflect mortality improvement.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighing the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The target allocations and best estimates of arithmetic real rates of return for each major asset class of the pension plans are summarized in the following tables:

	Target Allocations (as of December 31, 2019)		
Asset Class	Police	Fire Drivers'	Hanover Employees'
Corporate Bonds	0%	0%	7%
Equity Securities and Equity Mutual Funds	70%	65%	65%
Fixed Income Mutual Funds	30%	32%	10%
Money Markets	0%	3%	3%
U.S. Treasuries and Agencies - Bonds and Pools	0%	0%	15%

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NOTES TO BASIC FINANCIAL STATEMENTS

	Long-Term Expected Real Rates of Return (as of December 31, 2019)		
Asset Class	Police	Fire Drivers'	Hanover Employees'
Corporate Bonds	N/A	N/A	3% - 5%
Equity Securities and Equity Mutual Funds	5% - 7%	5% - 7%	5% - 7%
Fixed Income Mutual Funds	1% - 3%	1% - 3%	1% - 3%
Money Markets	N/A	0% - 1%	0% - 1%
U.S. Treasuries and Agencies - Bonds and Pools	N/A	N/A	1% - 3%

Discount Rate - The discount rate used to measure the total pension liability for all plans was 7%. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current respective contribution rates and that Borough contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rates. Based on those assumptions, the pension plans' fiduciary net position is projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Changes in the Net Pension Liability

	Police		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balances as of December 31, 2018	$ 13,856,029	$ 11,817,070	$ 2,038,959
Service Cost	363,436	-	363,436
Interest Cost	966,806	-	966,806
Changes for Experience	(468,572)	-	(468,572)
Changes for Assumptions	373,371	-	373,371
Employer Contributions	-	545,941	(545,941)
Plan Member Contributions	-	67,525	(67,525)
Net Investment Income	-	2,243,761	(2,243,761)
Benefit Payments	(625,499)	(625,499)	-
Administrative Expense	-	(8,100)	8,100
Net Changes	609,542	2,223,628	(1,614,086)
Balances as of December 31, 2019	$ 14,465,571	$ 14,040,698	$ 424,873

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Fire Drivers'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balances as of December 31, 2018	$ 7,270,469	$ 6,255,158	$ 1,105,311
Service Cost	157,461	-	157,461
Interest Cost	524,881	-	524,881
Changes for Experience	9,699	-	9,699
Changes for Assumptions	261,458	-	261,458
Employer Contributions	-	158,627	(158,627)
Plan Member Contributions	-	47,625	(47,625)
Net Investment Income	-	1,267,942	(1,267,942)
Benefit Payments	(401,574)	(401,574)	-
Administrative Expense	-	(6,100)	6,100
Net Changes	551,925	1,066,520	(514,595)
Balances as of December 31, 2019	$ 7,822,394	$ 7,321,678	$ 500,716

Hanover Employees'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balances as of December 31, 2018	$ 31,918,045	$ 30,313,438	$ 1,604,607
Service Cost	329,117	-	329,117
Interest Cost	2,191,743	-	2,191,743
Changes of Benefit Terms	21,757	-	21,757
Changes for Experience	(1,256,261)	-	(1,256,261)
Changes for Assumptions	922,934	-	922,934
Employer Contributions	-	347,424	(347,424)
Plan Member Contributions	-	155,335	(155,335)
Net Investment Income	-	6,231,414	(6,231,414)
Benefit Payments	(1,206,451)	(1,206,451)	-
Administrative Expense	-	(16,400)	16,400
Net Changes	1,002,839	5,511,322	(4,508,483)
Balances as of December 31, 2019	$ 32,920,884	$ 35,824,760	$ (2,903,876)

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Sensitivity of the Net Pension Liability to Changes in the Discount Rate - The following presents the net pension liability of the Borough, calculated using the discount rate of 7%, as well as what the Borough's net pension liability would be if it were calculated using a discount rate that is one-percentage-point lower (6%) or one-percentage-point higher (8%) than the current rate:

	Pension Plans - Long-Term Expected Real Rates of Return		
Borough's Net Pension Liability	Police	Fire Drivers'	Hanover Employees'
One-Percent Decrease (6%)	$ 2,436,940	$ 1,382,325	$ 511,257
Current Discount Rate (7%)	$ 424,873	$ 500,716	$ (2,903,876)
One-Percent Increase (8%)	$ (1,225,602)	$ (240,025)	$ (5,779,455)

Pension Expense and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions - For the year ended December 31, 2019, the Borough recognized pension expense totaling $879,067, comprised of $562,684, $274,567, and $41,816 from the Police, Fire Drivers', and Hanover Employees' pension plans, respectively.

As of December 31, 2019, the Borough reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Changes of Assumptions		
Police	$ 595,410	$ 66,779
Fire Drivers'	375,700	-
Hanover Employees'	1,364,066	-
	2,335,176	66,779
Differences Between Expected and Actual Experience		
Police	-	746,554
Fire Drivers'	38,933	42,099
Hanover Employees'	-	1,814,712
	38,933	2,603,365
Net Difference Between Projected and Actual Earnings on Pension Plan Investments		
Police	-	404,135
Fire Drivers'	-	360,562
Hanover Employees'	-	1,791,392
	-	2,556,089
Total	$ 2,374,109	$ 5,226,233

Amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense as follows for the years ending December 31:

2020	$ 829,571
2021	796,051
2022	(68,659)
2023	1,299,059
2024	21,236
Thereafter	(25,134)
	$ 2,852,124

Note 13. Deferred Compensation Plan

The Borough, in accordance with the Borough Council's approval, offers a deferred compensation plan created in accordance with Internal Revenue Code Section 457(b). The plan is available to all Borough employees. The plan had 39 active participants as of December 31, 2019.

The plan permits employees to defer a portion of their salary until future years, which the employees are fully vested in upon contribution, with no forfeiture provision. The Borough does not contribute to the deferred compensation plan. Employees can defer the lesser of $19,000, and up to an additional $6,000 catch-up for employees age 50 or over, or 100% of their includable salaries over the plan year. Employee contributions made to the 457(b) plan for the year ended December 31, 2019 were $139,047.

All amounts of compensation deferred under the plan and all income attributable to those amounts are held in trust for the exclusive benefit of participants and their beneficiaries. The assets will not be diverted to any other purpose. The Plan Administrator, ICMA-RC, is the trustee of the investments.

Note 14. Defined Benefit Other Postemployment Benefits Plan (OPEB)

The Borough offers a single-employer, defined benefit post-employment health insurance plan that provides OPEB for the police, fire drivers, and non-uniformed (Hanover) employees of the Borough. The plan does not issue a stand-alone financial report.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

A. Plan Description and Funding Policies

Plan Administration

The plan is established and administered by the Borough through the Intergovernmental Insurance Cooperative (IIC) (a trust agent), and management of the plan is administered by the ten elected members of the Borough Council. This plan does not include the pension benefits discussed in Note 12 above. The plan is funded on a pay-as-you-go basis. There is no irrevocable trust established for the plan that meets the criteria in GASB Statement No. 75, paragraph 4, and the Borough does not have accumulated assets for the future payment of OPEB benefit payments.

Benefits Provided

The post-employment health insurance plan provides medical and hospitalization, prescription drug, dental, vision and life insurance benefits to eligible active plan members and retirees and their spouses, and is authorized by the Borough. Benefit provisions are established and amended by the Borough Council. Retirement provisions for age and service for OPEB mirror those for pension discussed in Note 12 above. The plan provides the following benefits based on employee group (collective bargaining agreements) upon retirement:

> *Police* - Health insurance coverage for five years subsequent to the retirement date of the Officer provided certification is received they are not eligible for any other employer-sponsored health insurance plan, including a plan sponsored by the Officer's spouse. Spousal coverage for the five-year period is limited to 50% of the health insurance coverage cost provided they are not eligible for any other employer-sponsored health insurance plan. The maximum Borough cost for Officer and/or spouse health insurance coverage is limited to $600 per month. Upon expiration of this paid coverage, the retiree and spouse shall be permitted to maintain health insurance coverage as a member of the plan with the entire cost paid by the retiree.
>
> *Fire Drivers and Hanover Employees* - eligible retirees and spouses shall be permitted to maintain health insurance coverage as a member of the plan with the entire cost paid by the retiree.

For all employee groups, upon attaining age 65, eligible retirees and their spouses are transitioned to a post-65 medical and prescription plan if they are eligible and wish to continue coverage. In addition, optional life insurance coverage is allowable in increments of $2,500 (up to a maximum of $7,500), elected by the retiree within 90 days of hire and continuing through retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough. Separate Borough-paid life insurance benefits for eligible employees ceases at retirement.

Contributions

The plan is unfunded, with premium payments made by the Borough, and any corresponding reimbursements from retirees and spouses, on a pay-as-you-go basis. For the year ended December 31, 2019, the Borough paid premium costs of $236,213 for retirees and their spouses, of which $217,181 was reimbursed by plan members in accordance with their respective collective bargaining agreements.

Plan Membership

Membership of the plan consisted of the following categories as of December 31, 2019:

	OPEB Plan		
	Police	Fire Drivers'	Hanover Employees'
Retirees and Beneficiaries Receiving Benefits	7	6	25
Active Plan Members	23	12	102
Totals	30	18	127

B. Total OPEB Liability

Actuarial Assumptions - The net OPEB liability was measured as of December 31, 2019, and the total OPEB liability was determined by rolling forward the liabilities from an actuarial valuation as of January 1, 2019. The following actuarial assumptions applied to all periods in the measurement, unless otherwise specified:

	OPEB Plan
Actuarial Assumptions:	
Actuarial Cost Method	Entry Age Normal Cost Method
Salary Increases/Inflation	5.0%
Municipal Bond Rate	3.64% (S&P Municipal Bond 20-Year High Grade Rate Index)
Healthcare Cost Trend Rates	5.5% per year graded down by the Society of Actuaries Long-Run Medical Cost Trend Model to an ultimate rate of 3.8% per year
Mortality	PubS-2010 Mortality Table for Police and Fire Drivers, and PubG-2010 Mortality Table for Nonuniformed Employees

The following changes in actuarial assumption have been made since the prior measurement date: discount rate changed from 3.16% to 3.64%, and the mortality table was updated from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers, and to the PubG-2010 Mortality Table for Nonuniformed Employees.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Discount Rate - The discount rate used to measure the total OPEB liability was 3.64% for the plan, relating to the S&P Municipal Bond 20-Year High Grade Rate Index as of January 1, 2019. No assets have been accumulated in an irrevocable trust, so the municipal rate has been applied to all periods.

Changes in the Total OPEB Liability

Balances as of December 31, 2018	$ 3,376,710
Service Cost	152,618
Interest Cost	108,558
Changes of Benefit Terms	(10,531)
Changes for Experience	(692,487)
Changes for Assumptions	(115,968)
Benefit Payments (Estimated)	(173,416)
Net Changes	(731,226)
Balances as of December 31, 2019	$ 2,645,484

Sensitivity of the Total OPEB Liability to Changes in the Discount Rate - The following presents the total OPEB liability of the Borough, calculated using the discount rate of 3.64%, as well as what the Borough's total OPEB liability would be if it were calculated using a discount rate that is one-percentage-point lower (2.64%) or one-percentage-point higher (4.64%) than the current rate:

	Borough's Total OPEB Liability
One-Percent Decrease (2.64%)	$ 2,861,561
Current Discount Rate (3.64%)	$ 2,645,484
One-Percent Increase (4.64%)	$ 2,450,906

Sensitivity of the Total OPEB Liability to Changes in the Healthcare Cost Trend Rate - The following presents the total OPEB liability of the Borough, calculated using the healthcare cost trend rate of 5.5% decreasing to 3.8%, as well as what the Borough's total OPEB liability would be if it were calculated using a healthcare cost trend rate that is one-percentage-point lower (4.5% decreasing to 2.8%) or one-percentage-point higher (6.5% decreasing to 4.8%) than the current rate:

	Borough's Total OPEB Liability
One-Percent Decrease (4.5% decreasing to 2.8%)	$ 2,413,026
Current Healthcare Cost Trend Rate (5.5% decreasing to 3.8%)	$ 2,645,484
One-Percent Increase (6.5% decreasing to 4.8%)	$ 2,919,131

OPEB Expense and Deferred Outflows of Resources Related to OPEB - For the year ended December 31, 2019, the Borough recognized OPEB expense totaling $133,106. As of December 31, 2019, the Borough reported deferred outflows of resources related to OPEB from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Changes of Assumptions	$ 86,018	$ 96,640
Changes for Experience	-	577,072
Benefit Payments Subsequent to the Measurement Date	151,547	-
	$ 237,565	$ 673,712

Deferred outflows of $151,547 for benefit payments subsequent to the measurement date will be recognized as a reduction of the total OPEB liability in the year ended December 31, 2020. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows for the years ending December 31:

2020	$ 117,539
2021	117,539
2022	117,539
2023	117,539
2024	117,538
	$ 587,694

Note 15. Defined Contribution Other Postemployment Benefits Plan

The Borough, in accordance with the Borough Council's approval, offers a defined contribution post-employment health plan (PEHP) created in accordance with Internal Revenue Code Section 501(c)(9). The PEHP is funded through a voluntary employees' beneficiary association (VEBA) to provide post-retirement reimbursement of qualifying medical care expenses and health care insurance premiums. The plan requires mandatory participation by all active members of the Hanover Professional Firefighters Local 2045 bargaining unit, and is not available to any other employees of the Borough. The plan had 15 active participants as of December 31, 2019.

The plan requires annual contributions by the Borough for each active participant ($700 for 2019), and active participants employed before January 1, 2009 receive an additional Borough contribution ($30 of pay up to a maximum of $780 annually) in lieu of receiving Emergency Medical Technician/ Automated External Defibrillator (EMT/AED) pay. In addition, up to five

days of accumulated sick leave is annually deposited per active participant at their current pay rate for those having been employed by the Borough for at least ten years, and up to 60 days of accumulated sick leave (less those previously deposited) are contributed upon retirement. Employee salary deferrals are not permitted to the plan. Borough contributions of $27,026 were accrued for the 501(c)(9) plan for the year ended December 31, 2019.

All amounts of compensation deferred under the plans and all income attributable to those amounts are held in trust for the exclusive benefit of participants and their beneficiaries. The assets will not be diverted to any other purpose. The Plan Administrator, Nationwide Retirement Solutions, is the trustee of the investments.

Note 16. Concentration of Credit Risk

The Borough receives real estate and per capita taxes from residents within the Borough limits. The Borough uses a tax collector to collect all current real estate and per capita taxes. The Borough may lien any property associated with the real estate tax assessment, therefore an allowance for uncollectible real estate taxes is not considered necessary. The Borough also provides water, sewer, and garbage service to customers within the Hanover area, and grants credit to its residents for these services. This area is located in York and Adams Counties, which are in south central Pennsylvania. The Borough may lien any property receiving service for uncollected bills, therefore an allowance for uncollectible services is not considered necessary.

Note 17. Risk Management

The Borough is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. The Borough purchases commercial insurance coverage for these types of losses, including workers' compensation. Settled claims resulting from these risks have not exceeded commercial insurance coverage in any of the past three fiscal years, and there have been no significant reductions in insurance coverage.

In 2018, the Borough began participation in the Intergovernmental Insurance Cooperative (IIC) through a perpetual-duration agreement, continuing until terminated pursuant to terms and conditions as defined therein. The IIC is a public entity risk pool established by certain units of local governments in Pennsylvania to provide health and welfare plan benefits directly to eligible employees, their families, and dependents of the participating municipal members. The IIC receives, processes, and pays such claims as may occur within the benefit program of each municipal member. Management consists of a Board of Directors compromised of seven appointed representatives from the municipal membership. The

Borough does not exercise any control over the activities of the IIC beyond its representation on the Board of Directors.

Under the trust plan, the Borough pays reasonable and customary healthcare expenses, including premiums for reinsurance, as there is an overall plan loss limitation, which is recalculated annually. The plan coverage is retrospectively rated, with final premium determination after loss experience is known. The Borough is responsible for its share of cross recovery of all municipal members as a net reduction in return of any premiums paid in excess of actual claims costs on an annual basis, and is subject to supplemental assessments by municipal members if deemed necessary by the IIC. For the year ended December 31, 2018, the Borough paid premiums of $3,607,824, and received $477,130 for premiums paid in excess of actual claims cost for 2018 following dividend declaration in 2019.

The Borough also pays unemployment costs on a claims-made basis. Total unemployment expense for the year ended December 31, 2019 was $1,066.

Note 18. Environmental Concerns

The Borough has underground storage tanks for fuel, and performs necessary testing in the surrounding land areas as necessary for leaks and potential contamination, and operates a wastewater facility. In addition, the Borough, as part of the closure plan for the Black Rock Landfill, performs well tests and water analysis in the landfill and surrounding areas. If a leak or contamination occurs, the Borough could become liable for the cost to remediate. In 2018, the Borough executed a budget modification with a third-party engineering firm for additional off-site migration control activities due to testing results, including recovery well installation, and requests by the Pennsylvania Department of Environmental Protection (DEP), which were completed in 2019 and in continued monitoring and reporting. Total costs for the additional equipment, testing, and regular monitoring were $119,868 for the year ended December 31, 2019, and are not expected to have a material effect on the Borough's financial position after giving effect to the provision for clean-up costs noted above.

Note 19. Contingencies and Commitments

The Borough participates in a number of federal, state, and county programs that are fully or partially funded by grants received from other governmental units. Expenditures financed by grants are subject to audit by or for the appropriate grantor government. If expenditures are disallowed due to noncompliance with grant program regulations, the Borough may be required to reimburse the grantor government. The Borough believes that disallowed expenditures, if any, based on subsequent audits will not have a material effect on any of the individual governmental funds or the overall financial position of the Borough.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

The Borough is subject to real estate tax assessment appeals on an ongoing basis. If tax appeals are successful, the result is a loss of tax revenue to the Borough. It is anticipated that any material loss of tax revenue on individual tax appeals will be offset with additional revenues from other properties or other sources of revenue and would not create a financial hardship to the Borough.

The Borough is involved with various lawsuits in the normal course of operations. In most cases, management cannot predict the outcome of the lawsuits or estimate the amount of any loss that may result. Management believes that losses resulting from these matters, if any, would be substantially covered under the Borough's professional liability insurance policy and would not have a material effect on the financial position of the Borough.

The Borough is committed under an Intergovernmental Cooperation Agreement related to the implementation of the York County Regional Chesapeake Bay Pollutant Reduction Plan, a County-based consortium to address stormwater discharges and implement pollution reduction plans. The agreement term is through December 31, 2023, with annual contribution to the consortium of $102,490.

As disclosed in Note 1, the Borough also is committed under an Intergovernmental Cooperation Agreement for operating and capital program costs for operation of the Commission for an initial period of seven years. The Commissions budget is funded equally from the Borough and Penn Township in quarterly allotments. Gross allotments paid to the Commission for the year ended December 31, 2019 totaled $682,070. In addition, various reimbursements for shared costs between the Borough and Commission occurred during the year ended December 31, 2019, decreasing total net costs for the Commission to $636,105. Any difference between allotments made and actual Commission costs are retained by the Commission and considered in relation to future budget needs. The agreement stipulates no return or refund of such excess. As of December 31, 2019, the Commission held cash and investments totaling $310,948 (unaudited), each equally funded by the Borough and Penn Township. The Commission has cash-basis audited financial statements available upon request.

In addition, the Borough is committed under the following significant contracts for purchases and construction projects outstanding, excluding any accounts payable and accrued expenses (retainage payable) on those contracts, as of December 31, 2019:

Project	Contract Amount	Contract Amount Outstanding
General Fund		
Ejector Trailer Purchases (2)	$ 121,932	$ 121,932
Water Fund		
Water Main Lining Project Construction	$ 392,670	$ -0-
Sanitary Sewer Fund		
Sewer Main Lining Project Construction	$ 270,346	$ 63,729

Note 20. Operating Leases

The Borough leases several office machines for various departments, which are accounted for as operating leases with terms extending over the next several years. Renewal options are available for several of the leases. Future minimum payments required under the non-cancelable operating leases are as follows for the years ending December 31,

2020	$ 14,378
2021	11,968
2022	11,878
2023	2,980
	$ 41,204

Total operating lease expenditures for the year ended December 31, 2019 were $37,830.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 21. Reconciliation of Operating Income (Loss) to Net Cash Provided (Used) by Operating Activities

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Operating Income (Loss)	$ 2,398,097	$ (1,247,103)	$ 2,175,579	$ 60,513	$ (24,124)	$ 3,362,962
Adjustments to Reconcile Operating Income (Loss) to Net Cash Provided by Operating Activities						
Depreciation	1,070,991	1,382,437	276,050	3,969	11,157	2,744,604
(Increase) Decrease in						
Accounts Receivable	(33,056)	60	21,448	(104,863)	1	(116,410)
Due from Other Governments	-	-	(10,492)	-	-	(10,492)
Due from Other Funds	(25,246)	(70,497)	199,555	-	-	103,812
Unbilled Services	(7,338)	24,185	(57,747)	(142,649)	-	(183,549)
Inventory	13,334	7,657	(481)	(7,889)	-	12,621
Prepaid Expenses	(24,573)	(19,528)	5,643	(16,761)	150	(55,069)
Increase (Decrease) in						
Accounts Payable and Accrued Expenses	(24,671)	32,186	21,039	34,045	172	62,771
Accrued Wages	10,667	995	(1,389)	9,741	36	20,050
Accrued Compensated Absences	1,707	(19,321)	(74,970)	128,535	66	36,017
Due to Other Funds	87,096	(216,154)	-	-	-	(129,058)
Unearned Revenue	-	(58,316)	-	-	-	(58,316)
Total OPEB Liability	(204,172)	(73,987)	(83,343)	132,522	-	(228,980)
Net Deferred Amounts from OPEB	113,621	35,995	20,672	18,879	-	189,167
Net Pension Liability	(1,599,592)	(519,324)	(304,648)	(216,833)	-	(2,640,397)
Net Deferred Amounts from Pensions	1,488,056	496,391	298,068	167,414	-	2,449,929
Net Cash Provided (Used) by Operating Activities	$ 3,264,921	$ (244,324)	$ 2,484,984	$ 66,623	$ (12,542)	$ 5,559,662

The Borough had the following significant non-cash capital, financing, and investing activities for the year ended December 31, 2019:

Debt Financing - The Sanitary Sewer Fund recognized an interfund transfer of $1,695,425 to subsidize the Regional Wastewater Fund's debt service payments made.

Contributed Assets and Inventory - The Water Fund recognized $741 for perpetual easements received on a property for utilities access, and the Sanitary Sewer Fund received $480,654 for perpetual easements and sewer main/related apparatus infrastructure received related to a development within the Borough.

Note 22. New Governmental Accounting Standards Board Pronouncements

The GASB has issued several pronouncements prior to the year ended December 31, 2019 and through the date the financial statements were available to be issued that have effective dates that may impact future financial presentations:

GASB Statement No. 87, *Leases* - The objective of this statement is to increase usefulness of governments' financial statements by requiring a single model for lease accounting, both capital and operating (previously not recognized as assets and liabilities) leases, based on the payment provisions of the contract and the foundational principle that leases are financings of the right to use an underlying asset. The provisions of this statement are effective for periods beginning after December 15, 2019. The implementation of this statement is expected to have significant effect on the financial statements of the Borough in the year of implementation; however, the effects of said implementation are not yet quantifiable.

GASB Statement No. 91, *Conduit Debt Obligations* - The objective of this statement is to provide a single method of reporting conduit debt obligations by issuers and eliminate diversity in practice associated with (1) commitments extended by issuers, (2) arrangements associated with conduit debt obligations, and (3) related note disclosures. The provisions of this statement are effective for periods beginning after December 15, 2020. The implementation of this statement is not expected to have significant effect on the financial statements of the Borough in the year of implementation.

GASB Statement No. 92, *Omnibus 2020* - The objective of this statement is to improve consistency of authoritative literature by addressing practice issues that have been identified during implementation and application of certain GASB Statements. The provisions of this statement are predominately effective for periods beginning after June 15, 2020. The implementation of this statement is not expected to have significant effect on the financial statements of the Borough in the year of implementation.

Note 23. Prior Period Adjustment - HPLA

HPLA

During the year ended March 31, 2019, the HPLA reached an agreement with and paid the Borough $97,834, representing partial disbursement of a prior fully-accrued estate distribution ($146,725 as accrued as of March 31, 2018). The beginning net position of the HPLA was adjusted to reflect the reduced payable as of March 31, 2018 by $48,891 for a total of $2,220,448.

Note 24. Subsequent Events

Primary Government

In January 2020, the Borough issued $8,495,000 of refunding bonds to advance refund $8,355,000 of the 2015 Series B bonds to provide resources to purchase U.S. government securities that were placed in an irrevocable trust to generate resources for all future debt service payments. As a result, the refunded bonds are considered to be defeased and the liabilities have been removed. The 2015 Series B bonds are set for call April 2020, at which time all refunded bonds are to be called and redeemed with accumulated trust resources. The current refunding reduced total debt service payments over the next 20 years by $506,735. This resulted in an economic gain (difference between the present values of the debt service payments on the old and new debt) of $407,666.

In February 2020, the Borough approved capital lease financing totaling $158,560 for the acquisition of a dump truck with a plow. The terms of the lease are for five years, with first annual installment due at closing, at 1.95% stated interest rate and secured by the relating capital asset.

Subsequent to December 31, 2019, the Borough has been operating in an environment that has been economically impacted by the COVID-19 pandemic. The full impact of the pandemic on the Borough is not known as of the release of these financial statements; however, management continues to monitor the current conditions and their potential impact on the financial statements.

REQUIRED SUPPLEMENTARY INFORMATION

Schedule "1"

THE BOROUGH OF HANOVER, PENNSYLVANIA

BUDGETARY COMPARISON SCHEDULE - GENERAL FUND

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

	Budgeted Amounts			
	Original Budget	Final Budget	Actual	Variance
REVENUES				
Taxes	$ 8,512,350	$ 8,512,350	$ 8,734,647	$ 222,297
Licenses and Permits	61,650	85,650	126,207	40,557
Fines and Forfeitures	179,450	179,450	178,921	(529)
Interest and Rents	343,950	343,950	391,182	47,232
Intergovernmental	1,813,858	2,072,587	1,950,740	(121,847)
Charges for Services	4,795,010	4,950,260	5,046,142	95,882
Donations from Private Sources	324,050	324,050	322,243	(1,807)
Miscellaneous	-	-	126	126
TOTAL REVENUES	**16,030,318**	**16,468,297**	**16,750,208**	**281,911**
EXPENDITURES				
General Government	837,534	837,534	749,984	87,550
Public Safety	6,756,797	6,919,796	6,711,134	208,662
Health and Sanitation	4,150,521	4,358,021	4,370,247	(12,226)
Highways	952,417	1,211,146	1,104,318	106,828
Culture and Recreation	1,643,199	1,643,199	1,422,997	220,202
Debt Service	1,082,768	1,082,768	1,086,389	(3,621)
Capital Outlays	1,211,894	1,153,644	767,444	386,200
Miscellaneous	397,352	397,352	313,135	84,217
TOTAL EXPENDITURES	**17,032,482**	**17,603,460**	**16,525,648**	**1,077,812**
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	**(1,002,164)**	**(1,135,163)**	**224,560**	**1,359,723**
OTHER FINANCING SOURCES				
Proceeds from Disposal of Capital Assets	-	132,999	167,586	34,587
Interfund Transfers	-	-	24,777	24,777
Proceeds from Capital Lease Obligations	235,000	235,000	264,249	29,249
TOTAL OTHER FINANCING SOURCES	**235,000**	**367,999**	**456,612**	**88,613**
CHANGES IN FUND BALANCE	**(767,164)**	**(767,164)**	**681,172**	**1,448,336**
Fund Balance - Beginning of Year	9,624,970	9,624,970	9,624,970	-
FUND BALANCE - END OF YEAR	**$ 8,857,806**	**$ 8,857,806**	**$ 10,306,142**	**$ 1,448,336**

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2019			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 363,436	$ 157,461	$ 329,117	$ 850,014
Interest	966,806	524,881	2,191,743	3,683,430
Changes of Benefit Terms	-	-	21,757	21,757
Changes for Experience	(468,572)	9,699	(1,256,261)	(1,715,134)
Changes of Assumptions	373,371	261,458	922,934	1,557,763
Benefit Payments, Including Refunds of Plan Member Contributions	(625,499)	(401,574)	(1,206,451)	(2,233,524)
NET CHANGES IN TOTAL PENSION LIABILITY	**609,542**	**551,925**	**1,002,839**	**2,164,306**
Total Pension Liability - Beginning of Year	13,856,029	7,270,469	31,918,045	53,044,543
TOTAL PENSION LIABILITY - END OF YEAR (A)	**14,465,571**	**7,822,394**	**32,920,884**	**55,208,849**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	545,941	158,627	347,424	1,051,992
Contributions - Plan Members	67,525	47,625	155,335	270,485
Net Investment Income	2,243,761	1,267,942	6,231,414	9,743,117
Benefit Payments, Including Refunds of Plan Member Contributions	(625,499)	(401,574)	(1,206,451)	(2,233,524)
Administrative Expense	(8,100)	(6,100)	(16,400)	(30,600)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**2,223,628**	**1,066,520**	**5,511,322**	**8,801,470**
Plan Fiduciary Net Position - Beginning of Year	11,817,070	6,255,158	30,313,438	48,385,666
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**14,040,698**	**7,321,678**	**35,824,760**	**57,187,136**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 424,873**	**$ 500,716**	**$ (2,903,876)**	**$ (1,978,287)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	97.06%	93.60%	108.82%	103.58%
COVERED-EMPLOYEE PAYROLL	$ 2,242,984	$ 1,287,145	$ 5,660,980	$ 9,191,109
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	18.94%	38.90%	(51.30%)	(21.52%)

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2018			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 393,942	$ 136,679	$ 358,409	$ 889,030
Interest	926,381	488,774	2,122,719	3,537,874
Changes of Benefit Terms	-	210,301	-	210,301
Changes in Experience	-	-	-	-
Changes of Assumptions	-	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(608,734)	(401,574)	(1,058,472)	(2,068,780)
NET CHANGES IN TOTAL PENSION LIABILITY	**711,589**	**434,180**	**1,422,656**	**2,568,425**
Total Pension Liability - Beginning of Year	13,144,440	6,836,289	30,495,389	50,476,118
TOTAL PENSION LIABILITY - END OF YEAR (A)	**13,856,029**	**7,270,469**	**31,918,045**	**53,044,543**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	564,507	42,787	249,949	857,243
Contributions - Plan Members	64,231	43,009	150,915	258,155
Net Investment Income	(830,854)	(420,640)	(1,976,195)	(3,227,689)
Benefit Payments, Including Refunds of Plan Member Contributions	(608,734)	(401,574)	(1,058,472)	(2,068,780)
Administrative Expense	(4,600)	(4,000)	(6,600)	(15,200)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**(815,450)**	**(740,418)**	**(2,640,403)**	**(4,196,271)**
Plan Fiduciary Net Position - Beginning of Year	12,632,520	6,995,576	32,953,841	52,581,937
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**11,817,070**	**6,255,158**	**30,313,438**	**48,385,666**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 2,038,959**	**$ 1,015,311**	**$ 1,604,607**	**$ 4,658,877**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	85.28%	86.04%	94.97%	91.22%
COVERED-EMPLOYEE PAYROLL	$ 1,978,380	$ 1,208,992	$ 5,614,113	$ 8,801,485
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	103.06%	83.98%	28.58%	52.93%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2017			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 375,183	$ 122,036	$ 341,342	$ 838,561
Interest	877,558	459,512	2,026,083	3,363,153
Changes of Benefit Terms	-	-	-	-
Changes in Experience	(529,608)	48,992	(1,148,834)	(1,629,450)
Changes of Assumptions	440,603	242,550	1,189,911	1,873,064
Benefit Payments, Including Refunds of Plan Member Contributions	(539,320)	(375,372)	(949,487)	(1,864,179)
NET CHANGES IN TOTAL PENSION LIABILITY	**624,416**	**497,718**	**1,459,015**	**2,581,149**
Total Pension Liability - Beginning of Year	12,520,024	6,338,571	29,036,374	47,894,969
TOTAL PENSION LIABILITY - END OF YEAR (A)	**13,144,440**	**6,836,289**	**30,495,389**	**50,476,118**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	399,759	46,440	268,797	714,996
Contributions - Plan Members	64,049	41,439	151,420	256,908
Net Investment Income	1,557,534	1,061,777	4,891,289	7,510,600
Benefit Payments, Including Refunds of Plan Member Contributions	(539,320)	(375,372)	(949,487)	(1,864,179)
Administrative Expense	(6,200)	(6,100)	(10,500)	(22,800)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**1,475,822**	**768,184**	**4,351,519**	**6,595,525**
Plan Fiduciary Net Position - Beginning of Year	11,156,698	6,227,392	28,602,322	45,986,412
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**12,632,520**	**6,995,576**	**32,953,841**	**52,581,937**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 511,920**	**$ (159,287)**	**$ (2,458,452)**	**$ (2,105,819)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	96.11%	102.33%	108.06%	104.17%
COVERED-EMPLOYEE PAYROLL	$ 2,107,504	$ 1,081,258	$ 5,507,764	$ 8,696,526
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	24.29%	(14.73%)	(44.64%)	(24.21%)

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2016			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 316,342	$ 109,094	$ 528,544	$ 953,980
Interest	837,000	426,339	1,928,172	3,191,511
Changes of Benefit Terms	-	-	-	-
Changes in Experience	-	-	-	-
Changes of Assumptions	-	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(548,229)	(356,656)	(874,219)	(1,779,104)
NET CHANGES IN TOTAL PENSION LIABILITY	**605,113**	**178,777**	**1,582,497**	**2,366,387**
Total Pension Liability - Beginning of Year	11,914,911	6,159,794	27,453,877	45,528,582
TOTAL PENSION LIABILITY - END OF YEAR (A)	**12,520,024**	**6,338,571**	**29,036,374**	**47,894,969**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	419,625	37,805	263,766	721,196
Contributions - Plan Members	62,334	39,220	156,153	257,707
Net Investment Income	675,893	303,972	1,308,135	2,288,000
Benefit Payments, Including Refunds of Plan Member Contributions	(548,229)	(356,656)	(874,219)	(1,779,104)
Administrative Expense	(4,900)	(3,800)	(7,600)	(16,300)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**604,723**	**20,541**	**846,235**	**1,471,499**
Plan Fiduciary Net Position - Beginning of Year	10,551,975	6,206,851	27,756,087	44,514,913
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**11,156,698**	**6,227,392**	**28,602,322**	**45,986,412**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 1,363,326**	**$ 111,179**	**$ 434,052**	**$ 1,908,557**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	89.11%	98.25%	98.51%	96.02%
COVERED-EMPLOYEE PAYROLL	$ 2,077,787	$ 1,080,471	$ 5,462,803	$ 8,621,061
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	65.61%	10.29%	7.95%	22.14%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2015			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 301,278	$ 103,899	$ 503,375	$ 908,552
Interest	797,720	414,642	1,822,241	3,034,603
Changes of Benefit Terms	-	-	-	-
Changes in Experience	(27,836)	(112,264)	(1,160,455)	(1,300,555)
Changes of Assumptions	(133,554)	-	-	(133,554)
Benefit Payments, Including Refunds of Plan Member Contributions	(557,605)	(356,611)	(800,748)	(1,714,964)
NET CHANGES IN TOTAL PENSION LIABILITY	**380,003**	**49,666**	**364,413**	**794,082**
Total Pension Liability - Beginning of Year	11,534,908	6,110,128	27,089,464	44,734,500
TOTAL PENSION LIABILITY - END OF YEAR (A)	**11,914,911**	**6,159,794**	**27,453,877**	**45,528,582**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	478,308	64,277	423,936	966,521
Contributions - Plan Members	64,012	36,883	157,438	258,333
Net Investment Income	(446,203)	(25,197)	(91,891)	(563,291)
Benefit Payments, Including Refunds of Plan Member Contributions	(557,605)	(356,611)	(800,748)	(1,714,964)
Administrative Expense	(7,600)	(6,500)	(10,600)	(24,700)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**(469,088)**	**(287,148)**	**(321,865)**	**(1,078,101)**
Plan Fiduciary Net Position - Beginning of Year	11,021,063	6,493,999	28,077,952	45,593,014
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**10,551,975**	**6,206,851**	**27,756,087**	**44,514,913**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 1,362,936**	**$ (47,057)**	**$ (302,210)**	**$ 1,013,669**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	88.56%	100.76%	101.10%	97.77%
COVERED-EMPLOYEE PAYROLL	$ 2,160,409	$ 1,020,433	$ 5,586,454	$ 8,767,296
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	63.09%	(4.61%)	(5.41%)	11.56%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2014			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 264,674	$ 92,224	$ 551,759	$ 908,657
Interest	773,726	410,195	1,795,624	2,979,545
Changes of Benefit Terms	-	-	-	-
Changes in Experience	-	-	-	-
Changes of Assumptions	-	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(584,107)	(319,985)	(715,865)	(1,619,957)
NET CHANGES IN TOTAL PENSION LIABILITY	**454,293**	**182,434**	**1,631,518**	**2,268,245**
Total Pension Liability - Beginning of Year	11,080,615	5,927,694	25,457,946	42,466,255
TOTAL PENSION LIABILITY - END OF YEAR (A)	**11,534,908**	**6,110,128**	**27,089,464**	**44,734,500**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	478,718	66,988	448,010	993,716
Contributions - Plan Members	61,406	37,484	160,897	259,787
Net Investment Income	781,847	155,116	722,392	1,659,355
Benefit Payments, Including Refunds of Plan Member Contributions	(584,107)	(319,985)	(715,865)	(1,619,957)
Administrative Expense	(2,700)	(1,800)	(7,900)	(12,400)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**735,164**	**(62,197)**	**607,534**	**1,280,501**
Plan Fiduciary Net Position - Beginning of Year	10,285,899	6,556,196	27,470,418	44,312,513
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**11,021,063**	**6,493,999**	**28,077,952**	**45,593,014**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 513,845**	**$ (383,871)**	**$ (988,488)**	**$ (858,514)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	95.55%	106.28%	103.65%	101.92%
COVERED-EMPLOYEE PAYROLL	$ 1,902,925	$ 962,980	$ 5,239,612	$ 8,105,517
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	27.00%	(39.86%)	(18.87%)	(10.59%)

NOTES TO SCHEDULE:

This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 68.

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

SCHEDULE OF BOROUGH CONTRIBUTIONS

Police Pension Plan	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially Determined Contribution	$ 545,941	$ 404,070	$ 398,330	$ 398,325	$ 478,308	$ 478,718	$ 380,559	$ 348,397	$ 342,788	$ 224,850
Contribution in Relation to the Actuarially Determined Contribution	545,941	564,507	399,759	419,625	478,308	478,718	380,559	348,397	342,788	224,850
Contribution Deficiency (Excess)	$ -	$ (160,437)	$ (1,429)	$ (21,300)	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 2,242,984	$ 1,978,380	$ 2,107,504	$ 2,077,787	$ 2,160,409	$ 1,902,925	$ 1,713,930	$ 1,782,147	$ 1,405,946	$ 1,507,503
Contribution as a Percentage of Covered-Employee Payroll	24.34%	28.53%	18.97%	20.20%	22.14%	25.16%	22.20%	19.55%	24.38%	14.92%

Fire Drivers' Pension Plan	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially Determined Contribution	$ 158,627	$ 42,787	$ 46,440	$ 37,805	$ 64,277	$ 66,988	$ 203,763	$ 187,994	$ 188,128	$ 150,422
Contribution in Relation to the Actuarially Determined Contribution	158,627	42,787	46,440	37,805	64,277	66,988	203,763	187,994	188,128	150,422
Contribution Deficiency (Excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 1,287,145	$ 1,208,992	$ 1,081,258	$ 1,080,471	$ 1,020,433	$ 962,980	$ 913,768	$ 967,608	$ 983,929	$ 1,035,282
Contribution as a Percentage of Covered-Employee Payroll	12.32%	3.54%	4.29%	3.50%	6.30%	6.96%	22.30%	19.43%	19.12%	14.53%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

Hanover Employees' Pension Plan	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially Determined Contribution	$ 347,424	$ 249,949	$ 268,797	$ 263,766	$ 423,936	$ 448,010	$ 574,943	$ 482,645	$ 458,651	$ 460,768
Contribution in Relation to the Actuarially Determined Contribution	347,424	249,949	268,797	263,766	423,936	448,010	574,943	482,645	458,651	460,768
Contribution Deficiency (Excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 5,660,980	$ 5,614,113	$ 5,507,764	$ 5,462,803	$ 5,586,454	$ 5,239,612	$ 5,294,038	$ 5,364,775	$ 4,982,663	$ 5,082,520
Contribution as a Percentage of Covered-Employee Payroll	6.14%	4.45%	4.88%	4.83%	7.59%	8.55%	10.86%	9.00%	9.20%	9.07%

NOTES TO SCHEDULE:

Valuation Date - Actuarially determined contribution rates are calculated as of January 1, two to four years prior to the end of the fiscal year in which the contributions are reported. The total pension liability is based on a roll forward from this date.

Actuarial Assumptions:

Actuarial Cost Method	Entry age normal
Asset Valuation Method	Market value as determined by the trustee
Inflation Assumption	3%
Projected Salary Increases	5%
Investment Rate of Return	7%, net of pension plan investment expense, including inflation

Exhibit D VII-2 Attachment
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THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Amortization Method	Level dollar closed	Level dollar closed	Level dollar closed
Remaining Amortization Period	11 years	13 years	11 years
Mortality	Based on PubS-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)	Based on PubS-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)	Based on PubG-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)
Retirement Age	Active members at age 53 and completion of 25 years of service or age on valuation date, if greater; vested former members at normal retirement age, or age of valuation date, if greater	Normal retirement age, or age of valuation date, if greater	Normal retirement age, or age of valuation date, if greater

Changes in Benefits Terms - In 2014, benefits for non-union, non-uniformed employees in the Hanover Employees' Pension Plan hired on or after July 1, 2014 changed:

1) Normal retirement date is attained at age 60 and completion of 25 years of vesting service (previously age 55), or attainment of age 65 and completion of 10 years of vesting service (previously age 62).

2) Normal retirement pension is 1% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year (previously 1.5%).

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

In 2018, the Fire Drivers' Pension Plan pension benefit increased from 1.75% to 1.9% of average monthly compensation.

In 2019, through unionization, benefits for certain prior non-union members hired after July 1, 2014 of the Hanover Employees' Pension Plan changed :

1) Normal retirement date is attained at age 55 and completion of 25 years of vesting service (previously age 60), or attainment of age 62 and completion of 10 years of vesting service (previously age 65).
2) Normal retirement pension is 1.5% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year (previously 1%).

Change in Assumptions - In 2015, the cost-of-living increase assumption for the Police Pension Plan was revised from 4% to 3% per year to reflect recent history of cost-of-living increases.

In 2017, the mortality assumptions for all pension plans were revised from the RP-2000 Mortality Tables for Males and Females for expectation of retired life mortality to the IRS 2017 Static Combined Table for Small Plans.

In 2019, the mortality assumptions for all pension plans were revised from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers' Pension Plans, and the PubG-2010 Mortality Table for Hanover Employees' Pension Plan.

Exhibit D VII-2 Attachment
Page 154 of 172

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF INVESTMENT RETURNS - PENSION PLANS
LAST 10 FISCAL YEARS*

UNAUDITED

	2019			2018			2017		
	Pension Plans			Pension Plans			Pension Plans		
	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'
Average Money-Weighted Rate of Return, Net of Investment Expense	18.76%	20.42%	20.69 %	(6.55)%	(6.14)%	(6.04)%	13.87%	17.37%	17.20%

	2016			2015			2014		
	Pension Plans			Pension Plans			Pension Plans		
	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'
Average Money-Weighted Rate of Return, Net of Investment Expense	6.36%	4.99%	4.74%	(4.02)%	(0.39)%	(0.33%)	6.41%	2.40%	2.38%

NOTES TO SCHEDULE:

* This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 68.

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S TOTAL OPEB LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2019	2018
TOTAL OPEB LIABILITY		
Service Cost	$ 152,618	$ 133,310
Interest	108,558	118,997
Changes of Benefit Terms	(10,531)	-
Changes for Experience	(692,487)	-
Changes of Assumptions	(115,968)	120,426
Benefit Payments (Estimated)	(173,416)	(153,071)
NET CHANGES IN TOTAL OPEB LIABILITY	**(731,226)**	**219,662**
Total OPEB Liability - Beginning of Year	3,376,710	3,157,048
TOTAL OPEB LIABILITY - END OF YEAR	**2,645,484**	**3,376,710**
COVERED-EMPLOYEE PAYROLL	8,587,152	8,621,059
BOROUGH'S TOTAL OPEB LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	30.81%	39.17%

NOTES TO SCHEDULE:

The total OPEB liability amount presented for each fiscal year was determined as of the fiscal year-end. No assets have been accumulated in a trust that meets the criteria in GASB Statement No. 75, paragrap 4, to pay related benefits. This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 75.

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S TOTAL OPEB LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

Valuation Date - Actuarially determined contribution rates are calculated as of January 1, two to four years prior to the end of the fiscal year in which the contributions are reported. The total OPEB Liability is based on a roll forward from this date.

Actuarial Assumptions:

Actuarial Cost Method	Entry Age Normal Cost Method
Salary Increase/Inflation	5.0%
Municipal Bond Rate	3.64% (S&P Municipal Bond 20-Year High Grade Rate Index)
Healthcare Cost Trend Rates	5.5% per year graded down by the Society of Actuaries Long-Run Medical Cost Trend Model to an ultimate rate of 3.8% per year
Mortality	PubS-2010 Mortality Table for Police and Fire Drivers, and PubG-2010 Mortality Table for Nonuniformed Employees

Change in Benefit Terms - After January 1, 2015, new Fire Driver employees are not eligible to purchase health insurance through the Borough after retirement. After January 1, 2019, new Water Department and Nonuniformed White Collar employees are not eligible to purchase health insurance through the Borough after retirement.

Change in Assumptions - In 2019, the discount rate changed from 3.16% to 3.64%. The mortality table was updated from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers, and to the PubG-2010 Mortality Table for Non-uniformed Employees.

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OTHER SUPPLEMENTARY INFORMATION

THE BOROUGH OF HANOVER, PENNSYLVANIA

COMBINING SCHEDULE OF FIDUCIARY NET POSITION

DECEMBER 31, 2019

UNAUDITED

	Pension (and Other Employee Benefit) Trust Funds				
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Component Unit - Fire Drivers' PEHP Fund	Total Pension (and Other Employee Benefit) Trust Funds
ASSETS					
Cash and Cash Equivalents	$ 608,568	$ 182,925	$ 744,010	$ 19,304	$ 1,554,807
Contributions Receivable	5,392	3,422	11,964	27,026	47,804
Accrued Interest Receivable	36,290	1,985	49,603	-	87,878
Investments	13,390,448	7,133,346	35,019,927	264,734	55,808,455
TOTAL ASSETS	**14,040,698**	**7,321,678**	**35,825,504**	**311,064**	**57,498,944**
DEFERRED OUTFLOWS OF RESOURCES	-	-	-	-	-
LIABILITIES					
Pension Benefits Payable	-	-	744	-	744
LIABILITIES	-	-	**744**	-	**744**
DEFERRED INFLOWS OF RESOURCES	-	-	-	-	-
NET POSITION					
Restricted for Pension Benefits	14,040,698	7,321,678	35,824,760	311,064	57,498,200
TOTAL NET POSITION	**$ 14,040,698**	**$ 7,321,678**	**$ 35,824,760**	**$ 311,064**	**$ 57,498,200**

THE BOROUGH OF HANOVER, PENNSYLVANIA

COMBINING SCHEDULE OF CHANGES IN FIDUCIARY NET POSITION

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

	Pension (and Other Employee Benefit) Trust Funds				
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Component Unit - Fire Drivers' PEHP Fund	Total Pension (and Other Employee Benefit) Trust Funds
ADDITIONS					
Contributions					
Employer	$ -	$ -	$ 94,459	$ 27,026	$ 121,485
Commonwealth	545,941	158,627	252,965	-	957,533
Plan Members	67,525	47,625	155,335	-	270,485
Total Contributions	613,466	206,252	502,759	27,026	1,349,503
Investment Earnings					
Interest Income	108,927	112,448	580,683	-	802,058
Dividends	243,452	35,123	160,484	394	439,453
	352,379	147,571	741,167	394	1,241,511
Less: Investment Expense	78,265	34,149	117,652	600	230,666
Net Investment Earnings	274,114	113,422	623,515	(206)	1,010,845
TOTAL ADDITIONS	**887,580**	**319,674**	**1,126,274**	**26,820**	**2,360,348**
DEDUCTIONS					
Benefits	625,499	401,574	1,206,451	8,170	2,241,694
Administrative Expense	8,100	6,100	16,400	-	30,600
TOTAL DEDUCTIONS	**633,599**	**407,674**	**1,222,851**	**8,170**	**2,272,294**
NET APPRECIATION IN FAIR VALUE OF INVESTMENTS	**1,969,647**	**1,154,520**	**5,607,899**	**51,820**	**8,783,886**
CHANGES IN NET POSITION	**2,223,628**	**1,066,520**	**5,511,322**	**70,470**	**8,871,940**
Net Position - Beginning of Year	11,817,070	6,255,158	30,313,438	240,594	48,626,260
NET POSITION - END OF YEAR	**$ 14,040,698**	**$ 7,321,678**	**$ 35,824,760**	**$ 311,064**	**$ 57,498,200**

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APPENDIX D
Form of Continuing Disclosure Certificate

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[FORM OF CONTINUING DISCLOSURE CERTIFICATE]

$9,440,000
BOROUGH OF HANOVER
York County, Pennsylvania
GENERAL OBLIGATION BONDS, SERIES D OF 2020

CONTINUING DISCLOSURE CERTIFICATE

This **CONTINUING DISCLOSURE CERTIFICATE**, dated December 17, 2020 (the "**Disclosure Certificate**"), is executed and delivered by the **BOROUGH OF HANOVER, York County, Pennsylvania** (the "**Issuer**"), in connection with the issuance of the Issuer's $9,440,000, aggregate principal amount, General Obligation Bonds, Series D of 2020 (the "**Bonds**"). The Bonds are being issued pursuant to an ordinance duly enacted by the Township on October 28, 2020.

In consideration of the purchase of the Bonds by the Underwriter (defined below), the Issuer, hereby covenants and agrees as follows:

ARTICLE I
The Undertaking

Section 1.1. Purpose. This Disclosure Certificate shall constitute a written undertaking for the benefit of the holders of the Bonds, and is being executed and delivered solely to assist the Underwriter in complying with subsection (b)(5) of the Rule.

Section 1.2. Annual Financial Information. (a) The Issuer shall provide Annual Financial Information with respect to each fiscal year of the Issuer, commencing with the fiscal year ending December 31, 2020, by no later than the following September 1st after the end of each respective fiscal year, to the MSRB through the EMMA System.

(b) The Issuer shall provide, in a timely manner, notice of any failure of the Issuer to provide the Annual Financial Information by the date specified in subsection (a) above to the MSRB through the EMMA System.

Section 1.3. Audited Financial Statements. If not provided as part of the Annual Financial Information by the date required by Section 1.2 hereof, the Issuer shall provide Audited Financial Statements when and if available, to the MSRB through the EMMA System.

Section 1.4. Disclosure Event Notices. (a) If a Disclosure Event occurs, the Issuer shall provide, in a timely manner not in excess of (10) ten business days after the occurrence of the Disclosure Event, notice of such Disclosure Event to the MSRB through the EMMA System.

(b) Any such notice of a defeasance of Bonds shall state whether the Bonds have been escrowed to maturity or to an earlier redemption date and the timing of such maturity or redemption.

Section 1.5. Additional Disclosure Obligations. The Issuer acknowledges and understands that other state and federal laws, including, but not limited to, the Securities Act of 1933 and Rule 10b-5 promulgated under the Securities Exchange Act of 1934, may apply to the Issuer and that, under some circumstances, additional disclosures or other action may be required to enable the Issuer to fully discharge all of its duties and obligations under such laws.

Section 1.6. Additional Information. Nothing in this Disclosure Certificate shall be deemed to prevent the Issuer from disseminating any other information, using the means of dissemination set forth in this Disclosure Certificate or any other means of communication, or including any other information in any Annual Financial Information or notice of Disclosure Event hereunder, in addition to that which is required by this Disclosure Certificate. If the Issuer chooses to do so, the Issuer shall have no obligation under this Disclosure Certificate to update such additional information or include it in any future Annual Financial Information or notice of a Disclosure Event hereunder.

ARTICLE II
Operating Rules

Section 2.1. Reference to Other Documents. It shall be sufficient for purposes of Section 1.2 hereof if the Issuer provides Annual Financial Information by specific reference to documents (i) either (1) provided to the MSRB through the EMMA System, or (2) filed with the SEC, or (ii) if such document is a Final Official Statement, available from the MSRB.

Section 2.2. Submission of Information. Annual Financial Information may be provided in one document or multiple documents, and at one time or in part from time to time.

Section 2.3. Disclosure Event Notices. Each notice of a Disclosure Event hereunder shall be captioned "Notice of Disclosure Event" and shall prominently state the title, date and CUSIP numbers of the Bonds.

Section 2.4. Transmission of Information and Notices. Unless otherwise required by law and, in the Issuer's sole determination, subject to technical and economic feasibility, the Issuer shall employ such methods of information and notice transmission as shall be requested or recommended by the herein-designated recipients of the Issuer's information and notices.

Section 2.5. Fiscal Year. (a) The Issuer's current fiscal year is January 1 to December 31, and the Issuer shall promptly provide written notice of each change in its fiscal year. The Issuer shall provide such notice to (i) the MSRB through the EMMA System.

(b) Annual Financial Information shall be provided at least annually notwithstanding any fiscal year longer than 12 calendar months.

ARTICLE III
Effective Date, Termination, Amendment, Default, and Enforcement

Section 3.1. Effective Date, Termination. (a) This Disclosure Certificate shall be effective upon the issuance of the Bonds.

(b) The Issuer's obligations under this Disclosure Certificate shall terminate upon a legal defeasance, prior redemption or payment in full of all of the Bonds or on the date that the Issuer shall no longer be deemed an "obligated person" with respect to the Bonds within the meaning of the Rule.

(c) This Disclosure Certificate, or any provision hereof, shall be null and void in the event that (1) the Issuer receives an opinion of Counsel to the effect that those portions of the Rule which require this Disclosure Certificate, or such provision, as the case may be, do not or no longer apply to the Bonds, whether because such portions of the Rule are invalid, have been repealed, or otherwise, as shall be specified in such opinion, and (2) the Issuer delivers a copy of such opinion to the MSRB through the EMMA System.

Section 3.2. Amendment. (a) This Disclosure Certificate may be amended, without the consent of the holders of the Bonds, if all of the following conditions are satisfied: (1) such amendment is made in connection with a change in circumstances that arises from a change in legal (including regulatory) requirements, a change in law (including rules or regulations) or in interpretations thereof, or a change in the identity, nature or status of the Issuer or the type of business conducted thereby, (2) this Disclosure Certificate as so amended would have complied with the requirements of the Rule as of the date of this Disclosure Certificate, after taking into account any amendments or interpretations of the Rule, as well as any change in circumstances, (3) the Issuer shall have received an opinion of Counsel to the same effect as set forth in clause (2) above, (4) the Issuer shall have received an opinion of Counsel or a determination by a person, in each case unaffiliated with the Issuer (such as bond counsel or the paying agent) and acceptable to the Issuer, addressed to the Issuer, to the effect that the amendment does not materially impair the interests of the holders of the Bonds, and (5) the Issuer shall have delivered copies of such opinion(s) and amendment to the MSRB through the EMMA System.

(b) In addition to subsection (a) above, this Disclosure Certificate may be amended without the consent of the holders of the Bonds, if all of the following conditions are satisfied: (1) an amendment to the Rule is adopted, or a new or modified official interpretation of the Rule is issued, after the effective date of this Disclosure Certificate which is applicable to this Disclosure Certificate, (2) the Issuer shall have received an opinion of Counsel to the effect that performance by the Issuer under this Disclosure Certificate as so amended will not result in a violation of the Rule and (3) the Issuer shall have delivered copies of such opinion and amendment to the MSRB through the EMMA System.

(c) To the extent any amendment to this Disclosure Certificate results in a change in the type of financial information or operating data provided pursuant to this Disclosure Certificate, the first Annual Financial Information provided thereafter shall include a narrative explanation of the reasons for the amendment and the impact of the change in the type of operating data or financial information being provided.

(d) If an amendment is made to the accounting principles to be followed by the Issuer in preparing its financial statements, the Annual Financial Information for the fiscal year in which the change is made shall present a comparison between the financial statements or information prepared on the basis of the new accounting principles and those prepared on the basis of the former accounting principles. Such comparison shall include a qualitative and, to the extent reasonably feasible, quantitative discussion of the differences in the accounting principles and the impact of the change in the accounting principles on the presentation of the financial information.

Section 3.3. Default. In the event of a failure of the Issuer to comply with any provision of this Disclosure Certificate, the rights of the holders of the Bonds to enforce the provisions of this Disclosure Certificate shall be limited solely to the right, by action in mandamus or for specific performance, to cause the Issuer to comply with obligations under this Disclosure Certificate. The sole remedy under this Disclosure Certificate in the event of any failure of the Issuer to comply with this Disclosure Certificate shall be an action to compel performance, and no person or entity shall be entitled to recover monetary damages under this Disclosure Certificate.

Section 3.4. Benefit: Third-Party Beneficiaries: Enforcement. (a) The provisions of this Disclosure Certificate shall constitute a contract with and inure solely to the benefit of the Underwriter and the holders from time to time of the Bonds, except that beneficial owners of Bonds shall be third-party beneficiaries of this Disclosure Certificate and shall be deemed to be holders of Bonds for purposes of Section 3.4(b) hereof. The provisions of this Disclosure Certificate shall create no rights in any person or entity except as provided in this subsection (a).

(b) The obligations of the Issuer to comply with the provisions of this Disclosure Certificate shall be enforceable in the case of enforcement of obligations to provide financial statements, financial information, operating data and notices, by any holder of the Bonds. The holders' rights to enforce the provisions of this Disclosure Certificate shall be limited solely to a right, by action in mandamus or for specific performance, to compel performance of the Issuer's obligations under this Disclosure Certificate.

(c) This Disclosure Certificate shall be construed and interpreted in accordance with the laws of the State, and any suits and actions arising out of this Disclosure Certificate shall be instituted in a court of competent jurisdiction in the State; provided, however, that to the extent this Disclosure Certificate addresses matters of federal securities laws, including the Rule, this Disclosure Certificate shall be construed in accordance with such federal securities laws and official interpretations thereof.

ARTICLE IV
Definitions

Section 4.1. Definitions. The following terms used in this Disclosure Certificate shall have the following respective meanings:

"**Annual Financial Information**" means, collectively,

(i) financial statements for the most recent fiscal year (unaudited, if the annual audit is not yet available);
(ii) a summary or a copy of the budget for the current fiscal year;
the aggregate assessed value and aggregate market value of all taxable real estate for the current fiscal year;
(iii) the taxes and millage rates imposed for the current fiscal year;
(iv) the real property tax collection results for the most recent fiscal year, including (1) the real estate levy imposed (expressed both as a millage rate and an aggregate dollar amount), (2) the dollar amount of real estate taxes collected that represented current collections (expressed both as a percentage of such fiscal year's levy and as an aggregate dollar amount), (3) the amount of real estate taxes collected that represented taxes levied in prior years (expressed as an aggregate dollar amount), and (4) the total amount of real estate taxes collected (expressed both as a percentage of the current year's levy and as an aggregate dollar amount); and
a list of the ten (10) largest real estate taxpayers and, for each, the total assessed value of real estate for the current fiscal year; and
(v) the information regarding amendments to this Disclosure Certificate required pursuant to Sections 3.2(c) and (d) of this Disclosure Certificate.

"**Audited Financial Statements**" means the annual financial statements, if any, of the Issuer, audited by the Issuer's independent public accountants. Audited Financial Statements shall be prepared in accordance with GAAP.

"**Counsel**" means any nationally recognized bond counsel or counsel expert in federal securities laws.

"**Disclosure Event**" means any of the following events with respect to the Bonds, whether relating to the Issuer or otherwise:

(1) Principal and interest payment delinquencies;
(2) Non-payment related defaults, if material;

(3) Unscheduled draws on debt service reserves reflecting financial difficulties;
(4) Unscheduled draws on credit enhancements reflecting financial difficulties;
(5) Substitution of credit or liquidity providers, or their failure to perform;
(6) Adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701-TEB) or other material notices or determinations with respect to the tax status of the Bonds, or other material events affecting the tax status of the Bonds;
(7) Modifications to rights of security holders, if material;
(8) Bond calls, if material, and tender offers;
(9) Defeasances;
(10) Release, substitution, or sale of property securing repayment of the Bonds;
(11) Rating changes;
(12) Bankruptcy, insolvency, receivership or similar event of the obligated person;
(13) The consummation of a merger, consolidation, or acquisition involving an obligated person or the sale of all or substantially all of the assets of the obligated person, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material;
(14) Appointment of a successor or additional trustee or the change of name of a trustee, if material;
(15) Incurrence of a Financial Obligation of the obligated person, if material, or agreement to covenants, events of default, remedies, priority rights, or other similar terms of a Financial Obligation of the obligated person, any of which affect security holders, if material; and
(16) Default, event of acceleration, termination event, modification of terms, or other similar events under the terms of a Financial Obligation of the obligated person, any of which reflect financial difficulties.

For the purposes of the event identified in paragraph (12) above, the event is considered to occur when any of the following occur: the appointment of a receiver, fiscal agent or similar officer for an obligated person in a proceeding under the U.S. Bankruptcy Code or in any other proceeding under state or federal law in which a court or governmental authority has assumed jurisdiction over substantially all of the assets or business of the obligated person, or if such jurisdiction has been assumed by leaving the existing governing body and officials or officers in possession but subject to the supervision and orders of a court or governmental authority, or the entry of an order confirming a plan of reorganization, arrangement or liquidation by a court or governmental authority having supervision or jurisdiction over substantially all of the assets or business of the obligated person.

"**EMMA System**" means the MSRB's Electronic Municipal Market Access system (http://emma.msrb.org/), or such other electronic system prescribed by the MSRB.

"**Final Official Statement**" means a "final official statement," as defined in paragraph (f)(3) of the Rule.

"**Financial Obligation**" means a: (A) debt obligation; (B) derivative instrument entered into in connection with, or pledged as security or a source of payment for, an existing or planned debt obligation; or (C) guarantee of (A) or (B). The term Financial Obligation shall not include municipal securities as to which a Final Official Statement has been provided to the MSRB consistent with the Rule.

"**GAAP**" means generally accepted accounting principles as prescribed from time to time by the Financial Accounting Standards Board or any successor to the duties or responsibilities thereof.

"**MSRB**" means the Municipal Securities Rulemaking Board established pursuant to Section 15B(b)(1) of the Securities Exchange Act of 1934.

"**Rule**" means Rule 15c2-12 promulgated by the SEC under the Securities Exchange Act of 1934 (17 CFR Part 240, §240.15c2-12), as in effect on the date of this Disclosure Certificate, including any official interpretations thereof issued either before or after the effective date of this Disclosure Certificate which are applicable to this Disclosure Certificate.

"**SEC**" means the United States Securities and Exchange Commission.

"**Underwriter**" shall have the meaning given thereto under Rule 15c2-12, or any successor to such underwriter or underwriters known to the Issuer.

ARTICLE V
Miscellaneous

Section 5.1. Disclosure Dissemination Agent. The Issuer may appoint a disclosure dissemination agent to assume the responsibilities for compliance with disclosure requirements pursuant to the Rule performed by the Issuer under this Disclosure Certificate for the benefit of the holders of the Bonds and Underwriter.

Section 5.2. Severability. If any provision hereof shall be held invalid or unenforceable by a court of competent jurisdiction, the remaining provisions hereof shall survive and continue in full force and effect.

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[FORM OF CONTINUING DISCLOSURE CERTIFICATE]

IN WITNESS WHEREOF, the Issuer has caused its duly authorized officer to execute this Disclosure Certificate as of the day and year first written above.

BOROUGH OF HANOVER, York County, Pennsylvania

By:_____
President of the Council

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Exhibit D VII-3

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

3. Supply projected capital requirements and the sources of company, parent and consolidated system for the historic test year and each of 3 comparable future years.

RESPONSE

Please see EXHIBIT D XI-4 and EXHIBIT D V-12.

``

Exhibit D VII-4

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

4. Provide a schedule of debt and preferred stock of company, parent and consolidated system as of historic test year-end and latest date, detailing for each issue (if applicable):
   a. Date of issue.
   b. Date of maturity.
   c. Amount issued.
   d. Amount outstanding.
   e. Amount retired.
   f. Amount required.
   g. Gain on reacquisition.
   h. Coupon rate.
   i. Discount or premium at issuance.
   j. Issuance expenses.
   k. Net proceeds.
   1. Sinking fund requirements.
   m. Effective interest rate.
   n. Dividend rate.
   o. Effective cost rate.
   p. Total average weighted effective cost rate.

RESPONSE

Attached is requested information.

	General Obligation Bonds, Series of 2013	General Obligation Bonds, Series of 2017	General Obligation Bonds, Series of 2020	General Obligation Bonds, Series A of 2020	General Obligation Bonds, Series C of 2020	General Obligation Bonds, Series D of 2020
Date of issue	6/5/2013	8/15/2017	12/4/2019	6/2/2020	6/22/2020	12/2/2020
Date of maturity	10/1/2038	10/1/2038	10/1/2039	10/1/2032	10/1/2029	10/1/2045
Amount issued	10,000,000.00	9,580,000.00	8,495,000.00	9,445,000.00	5,480,000.00	9,440,000.00
Amount outstanding	235,000.00	6,869,000.00	8,145,000.00	2,650,000.00	700,000.00	9,440,000.00
Amount retired	NA	NA	NA	NA	NA	NA
Amount required	NA	NA	NA	NA	NA	NA
Gain on reacquisition	NA	NA	NA	NA	NA	NA
Coupon rate	Varying Coupons	Varying Coupons	Varying Coupons	Varying Coupons	Varying Coupons	Varying Coupons
Discount or premium at issuance	(88,667.85)	11,086.15	99,220.10	610,947.80	136,500.85	1,307,179.45
Issuance expenses	154,450.00	293,025.21	519,173.38	505,336.47	259,294.30	128,030.00
Net proceeds	9,756,882.15	9,298,060.94	8,075,046.72	9,550,611.33	5,357,206.55	10,619,149.45
Sinking fund requirements	Multiple Series	Multiple Series	Multiple Series	Multiple Series	Multiple Series	Multiple Series
Effective interest rate	NA	NA	NA	NA	NA	NA
Dividend rate	NA	NA	NA	NA	NA	NA
Effective cost rate	3.78%	3.18%	3.04%	2.80%	2.24%	2.88%
Total average weighted effective cost rate	3.78%	3.18%	3.04%	2.80%	2.24%	2.88%

``

Exhibit D VII-5

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

5. Supply financial data of company and/or parent for last 5 years:
   a. Earnings-price ratio (average).
   b. Earnings-book value ratio (per share basis) (average book value).
   c. Dividend yield (average).
   d. Earnings per share (dollar).
   e. Dividends per share (dollars).
   f. Average book value per share yearly.
   g. Average yearly market price per share (monthly high-low basis).
   h. Pre-tax funded debt interest coverage.
   i. Post-tax funded debt interest coverage.
   j. Market price-book value ratio.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-6

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

6. Provide AFUDC charged by company at historic test year-end and latest date, explain method by which rate was calculated and provide workpapers showing derivation of the company's current AFUDC rate.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-7

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

7. Set forth provisions of company's and parent's charter and indentures, if applicable, which describe coverage requirements, limits on proportions of types of capital outstanding, and restrictions on dividend payouts.

RESPONSE

Not applicable, the respondent is a fund of a borough government and receives all financing through the borough and through the issuance of general obligation bonds by the borough.

``

Exhibit D VII-8

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

8. Attach copies of the summaries of the company's projected revenues, expenses and capital budgets for the next 2 years.

RESPONSE

Attached is requested information.

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type R	**Revenue**				
Dept 006	**.**				
06.006.34280.000501 RENTS - TERRACE AVE (AT&T) CELL TOWER		16,800.00	16,791.00	16,791.00	18,144.00
06.006.34285.000501 RENTS - RAILROAD ST (VERIZON) CELL TOWER		8,796.00	8,785.00	8,785.00	8,448.00
06.006.34290.000501 RENTS - TERRACE AVE (SHENTEL) CELL TOWER		18,660.00	18,662.00	18,662.00	18,660.00
06.006.34292.000501 RENTS - FILTER PLANT (TOWER CO) CELL TOWER		15,330.00	15,775.00	16,248.00	16,734.00
06.006.34297.000501 RENTS - OXFORD AVE (AT&T) CELL TOWER		17,280.00	17,280.00	17,280.00	18,432.00
06.006.34298.000501 RENTS - OXFORD AVE (SHENTEL) CELL TOWER		18,660.00	18,662.00	18,662.00	18,660.00
06.006.35407.000040 STATE - GRANTS		342,975.00	0.00	0.00	0.00
06.006.37811.000300 METERED REVENUE - DOMESTIC		4,100,000.00	4,150,000.00	4,170,000.00	4,172,500.00
06.006.37812.000301 METERED REVENUE - COMMERCIAL		850,000.00	850,000.00	835,000.00	835,000.00
06.006.37813.000302 METERED REVENUE - INDUSTRIAL		1,775,000.00	1,725,000.00	1,700,000.00	1,750,000.00
06.006.37814.000304 METERED REVENUE - PUBLIC		125,000.00	125,000.00	115,000.00	125,000.00
06.006.37816.000315 METERED REVENUE - PENALTIES		18,000.00	19,000.00	22,000.00	21,000.00
06.006.37830.000310 UNMETERED REVENUE - SALE OF WATER		30,000.00	40,000.00	40,000.00	40,000.00
06.006.37840.000309 UNMETERED REVENUE - PRIVATE FIRE PROTECTION		275,000.00	287,500.00	290,000.00	293,500.00
06.006.37850.000311 UNMETERED REVENUE - PUBLIC FIRE PROTECTION		122,500.00	122,750.00	124,500.00	125,000.00
06.006.38000.000314					

THE BOROUGH OF HANOVER
Annual Budget Book - Continuing Disclosure

Fiscal Year: 2020 Period From: 1 To: 12

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type R	**Revenue**				
Dept 006	**.**				
06.006.38000.000314 MISCELLANEOUS		12,500.00	18,000.00	18,500.00	17,500.00
06.006.38313.000500 MISC - MERCHANDISING & JOBBING REVENUES		100,000.00	160,000.00	152,500.00	115,000.00
06.006.38314.000504 INTEREST		15,000.00	35,000.00	115,000.00	145,000.00
06.006.38315.000511 MISC - JOYCE BARDIN RESTITUTION		240.00	240.00	240.00	240.00
06.006.38320.000511 STATE - MUNICIPAL PENSION AID		93,637.00	89,074.00	123,512.00	124,789.00
06.006.38327.000511 MISC - RETIREES INSURANCE REIMBURSEMENTS		44,250.00	50,750.00	55,000.00	52,000.00
Total Dept 006					
.		**(7,999,628.00)**	**(7,768,269.00)**	**(7,857,680.00)**	**(7,915,607.00)**
Total Type R					
Revenue		**(7,999,628.00)**	**(7,768,269.00)**	**(7,857,680.00)**	**(7,915,607.00)**

Exhibit D VII-8 Attachment
Page 2 of 37

THE BOROUGH OF HANOVER

Annual Budget Book - Continuing Disclosure

Fiscal Year: 2020 Period From: 1 To: 12

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00134.308100 PROF. SERVICES - ENGINEERING & ARCHITECTURAL SERVICES - PRELIM. CHARGES		40,000.00	40,000.00	45,000.00	85,000.00
06.448.00208.140172 LABOR - CAPITAL OUTLAY - LBS PARKING LOT		0.00	0.00	0.00	4,000.00
06.448.00208.142202 LABOR - CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS		0.00	5,000.00	15,000.00	7,000.00
06.448.00208.701040 CAPITAL OUTLAY - LBS PARKING LOT		0.00	0.00	0.00	10,000.00
06.448.00208.704301 CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS		0.00	80,000.00	26,000.00	12,000.00
06.448.00208.705640 CAPITAL OUTLAY - CARETAKER HOUSE #1 (N. STORMES) IMPROV.		0.00	0.00	0.00	4,000.00
06.448.00246.146500 LABOR - CAPITAL OUTLAY - BAUGHER DR TRANSMISSION MAIN		32,500.00	6,000.00	25,000.00	0.00
06.448.00246.606500 CAPITAL OUTLAY - BAUGHER DR TRANSMISSIONS MAINS		84,000.00	6,000.00	127,000.00	0.00
06.448.00248.146600 LABOR - CAPITAL OUTLAY - NEW DISTRIBUTION MAINS		0.00	0.00	8,000.00	157,600.00
06.448.00248.146626 LABOR - CAPITAL OUTLAY - LOCUST ST-SPRING AVE NEW MAIN		0.00	0.00	10,500.00	0.00
06.448.00248.146638 LABOR - CAPITAL OUTLAY - STONEWICKE DEVELOPMENT (MYERS)		0.00	23,000.00	0.00	0.00
06.448.00248.146640 LABOR - CAPITAL OUTLAY - CDA MAIN - GLADE VILLAGE		13,000.00	0.00	0.00	0.00
06.448.00248.146643 LABOR - CAPITAL OUTLAY - E CHESTNUT ST MAIN		0.00	20,000.00	0.00	0.00
06.448.00248.146644 LABOR - CAPITAL OUTLAY - CHARLES AVE MAIN		24,500.00	0.00	0.00	0.00

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00248.146648 LABOR - CAPITAL OUTLAY - BAER AVENUE MAIN		6,500.00	0.00	0.00	0.00
06.448.00248.146649 LABOR - CAPITAL OUTLAY - FAIR AVENUE MAIN		10,000.00	0.00	0.00	0.00
06.448.00248.146653 LABOR - CAPITAL OUTLAY - WILSON AVE MAIN		17,000.00	0.00	0.00	0.00
06.448.00248.146654 LABOR - CAPITAL OUTLAY - HEIGHTS AVE MAIN		5,000.00	5,000.00	0.00	0.00
06.448.00248.146655 LABOR - CAPITAL OUTLAY - CDA MAIN - S SECOND ST (SHAFFER)		16,000.00	0.00	0.00	0.00
06.448.00248.146657 LABOR - CAPITAL OUTLAY - A-STREET MAIN		12,500.00	0.00	6,000.00	6,000.00
06.448.00248.606600 CAPITAL OUTLAY - MISC. CDA'S & DISTRIBUTION MAINS		60,000.00	60,000.00	0.00	0.00
06.448.00248.606621 CAPITAL OUTLAY - W HANOVER ST & FORNEY AVE MAIN (MATS. & PROF. SVC.)		0.00	268,821.00	636,464.00	0.00
06.448.00248.606625 CAPITAL OUTLAY - NEW DISTRIBUTION MAINS		0.00	0.00	8,000.00	2,098,915.00
06.448.00248.606626 CAPITAL OUTLAY - LOCUST ST-SPRING AVE NEW MAIN		0.00	0.00	55,000.00	36,780.00
06.448.00248.606635 CAPITAL OUTLAY - CDA MAIN - BROOKSIDE HEIGHTS PHASE II-III		0.00	125,000.00	0.00	0.00
06.448.00248.606638 CAPITAL OUTLAY - STONEWICKE DEVELOPMENT (MYERS)		0.00	16,750.00	0.00	0.00
06.448.00248.606640 CAPITAL OUTLAY - CDA MAIN - GLADE VILLAGE		15,500.00	0.00	0.00	0.00
06.448.00248.606643 CAPITAL OUTLAY - E CHESTNUT ST MAIN		0.00	14,000.00	0.00	0.00
06.448.00248.606644					

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Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00248.606644 CAPITAL OUTLAY - CHARLES AVENUE MAIN		35,000.00	0.00	0.00	0.00
06.448.00248.606648 CAPITAL OUTLAY - BAER AVENUE MAIN		5,000.00	0.00	0.00	0.00
06.448.00248.606649 CAPITAL OUTLAY - FAIR AVENUE MAIN		17,500.00	0.00	0.00	0.00
06.448.00248.606653 CAPITAL OUTLAY - WILSON AVE MAIN		7,000.00	0.00	0.00	0.00
06.448.00248.606654 CAPITAL OUTLAY - HEIGHTS AVE MAIN		7,000.00	7,000.00	0.00	0.00
06.448.00248.606655 CAPITAL OUTLAY - CDA MAIN - S SECOND ST (SHAFFER)		15,000.00	0.00	0.00	0.00
06.448.00248.606657 CAPITAL OUTLAY - A-STREET MAIN		5,000.00	0.00	5,000.00	5,000.00
06.448.00249.146700 LABOR - CAPITAL OUTLAY - NEW SERVICE LATERALS		6,000.00	6,000.00	6,000.00	7,500.00
06.448.00249.146740 LABOR - CAPITAL OUTLAY - CDA LATERAL - GLADE VILLAGE		4,500.00	0.00	0.00	0.00
06.448.00249.146755 LABOR - CAPITAL OUTLAY - CDA LATERAL - S SECOND ST (SHAFFER)		3,000.00	0.00	0.00	0.00
06.448.00249.606700 CAPITAL OUTLAY - NEW SERVICE LATERALS		5,000.00	5,000.00	5,000.00	7,500.00
06.448.00249.606735 CAPITAL OUTLAY - CDA LATERAL - BROOKSIDE HEIGHTS PHASE II-III		0.00	40,250.00	0.00	0.00
06.448.00249.606740 CAPITAL OUTLAY - CDA LATERAL - GLADE VILLAGE		5,000.00	0.00	0.00	0.00
06.448.00249.606755 CAPITAL OUTLAY - CDA LATERAL - S SECOND ST (SHAFFER)		3,000.00	0.00	0.00	0.00
06.448.00250.146400 LABOR - CAPITAL OUTLAY - METERS & EQUIPMENT		5,500.00	8,500.00	10,000.00	13,500.00
06.448.00250.706400					

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00250.706400 CAPITAL OUTLAY - METERS & EQUIPMENT		60,000.00	90,000.00	150,000.00	150,000.00
06.448.00259.706014 CAPITAL OUTLAY - VEHICLES - PLANT		0.00	50,000.00	0.00	0.00
06.448.00259.706015 CAPITAL OUTLAY - EQUIPMENT - PLANT		0.00	0.00	26,000.00	20,000.00
06.448.00259.706018 CAPITAL OUTLAY - VEHICLES - DISTRIB. DEPT.		80,500.00	0.00	106,000.00	60,000.00
06.448.00259.706019 CAPITAL OUTLAY - EQUIPMENT - DISTRIB. DEPT.		0.00	398,187.00	45,000.00	189,500.00
06.448.00259.706021 CAPITAL OUTLAY - BUILDINGS & FACILITIES - PLANT		0.00	0.00	0.00	34,500.00
06.448.00259.706022 CAPITAL OUTLAY - BUILDINGS & FACILITIES - DISTRIB. DEPT		0.00	0.00	143,750.00	70,000.00
06.448.00350.001401.0001 LABOR - DAMS & WELLS		88,000.00	107,500.00	232,000.00	238,500.00
06.448.00350.001401.0002 LABOR - LBS DAM		94,000.00	113,750.00	0.00	0.00
06.448.00350.001401.0008 LABOR - PATROLLING DAMS (OVERTIME)		37,500.00	0.00	0.00	0.00
06.448.00351.002006.0001 UTILITIES - GASOLINE & DIESEL - DAMS & WELLS		3,500.00	3,500.00	6,000.00	4,000.00
06.448.00351.002006.0002 UTILITIES - GASOLINE & DIESEL - LBS DAM		3,500.00	3,500.00	0.00	0.00
06.448.00351.002007.0001 MATERIALS & SUPPLIES - DAMS & WELLS		2,500.00	2,500.00	14,000.00	15,000.00
06.448.00351.002007.0002 MATERIALS & SUPPLIES - LBS DAM		2,500.00	2,500.00	0.00	0.00
06.448.00351.002007.0004 MATERIALS & SUPPLIES - RAW WATER INTAKES		2,000.00	2,000.00	4,000.00	5,000.00
06.448.00351.002007.0005					

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00351.002007.0005 MATERIALS & SUPPLIES - CLEAR LAKE		4,000.00	1,000.00	0.00	0.00
06.448.00351.002007.0006 MATERIALS & SUPPLIES - SLAGLE RUN P.S.		1,000.00	1,000.00	0.00	0.00
06.448.00351.002007.0007 MATERIALS & SUPPLIES - WELLS		1,000.00	0.00	0.00	0.00
06.448.00351.003002.0001 UTILITIES - GARBAGE - DAMS & WELLS		1,820.00	1,820.00	3,640.00	2,500.00
06.448.00351.003002.0002 UTILITIES - GARBAGE - LBS DAM		1,820.00	1,820.00	0.00	0.00
06.448.00351.003003.0001 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - S&M DAM		700.00	700.00	0.00	0.00
06.448.00351.003003.0002 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - LBS DAM		700.00	700.00	0.00	0.00
06.448.00351.003004.0001 UTILITIES - TELEPHONE - DAMS & WELLS		860.00	700.00	1,750.00	750.00
06.448.00351.003004.0002 UTILITIES - TELEPHONE - LBS DAM		600.00	700.00	0.00	0.00
06.448.00351.003004.0003 UTILITIES - TELEPHONE - RAW WATER INTAKES		1,300.00	1,000.00	1,000.00	800.00
06.448.00351.003005.0002 UTILITIES - ELECTRIC - DAMS & WELLS		2,500.00	2,500.00	3,000.00	2,750.00
06.448.00351.003005.0003 UTILITIES - ELECTRIC - RAW WATER INTAKES		7,200.00	7,500.00	10,000.00	30,000.00
06.448.00351.003005.0004 UTILITIES - ELECTRIC - KITZMILLERS		1,500.00	1,500.00	0.00	0.00
06.448.00351.003042.0003 UTILITIES - STORMWATER USER FEES - SLAGLE RUN P.S.		0.00	80.00	80.00	90.00
06.448.00351.003042.0013 UTILITIES - STORMWATER USER FEES - DAMS & WELLS		0.00	0.00	1,400.00	1,400.00
06.448.00351.003044.0001 UTILITIES - CELL PHONE - S&M DAM		250.00	250.00	0.00	0.00
06.448.00351.003044.0002					

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00351.003044.0002 UTILITIES - CELL PHONE - LBS DAM		250.00	250.00	0.00	0.00
06.448.00353.001420.0001 LABOR - REPAIRS & MAINT. - DAMS & WELLS		250.00	250.00	5,000.00	500.00
06.448.00353.001420.0002 LABOR - REPAIRS & MAINT. - LBS DAM		3,500.00	3,500.00	0.00	0.00
06.448.00353.001420.0004 LABOR - REPAIRS & MAINT. - RAW WATER INTAKES		500.00	500.00	1,500.00	1,500.00
06.448.00353.001420.0005 LABOR - REPAIRS & MAINT. - CLEAR LAKE		500.00	500.00	0.00	0.00
06.448.00353.001420.0007 LABOR - REPAIRS & MAINT. - SLAGLE RUN P.S.		500.00	500.00	0.00	0.00
06.448.00353.001431.0006 LABOR - REPAIRS & MAINT. - CARETAKERS HOUSES		1,000.00	1,000.00	1,000.00	1,000.00
06.448.00353.001431.0007 LABOR - REPAIRS & MAINT. - CARETAKERS HOUSE - LBS DAM		1,000.00	1,000.00	0.00	0.00
06.448.00353.002007.0001 REPAIRS & MAINT. - DAMS & WELLS		2,000.00	5,000.00	30,000.00	10,000.00
06.448.00353.002007.0002 REPAIRS & MAINT. - LBS DAM		2,000.00	5,000.00	0.00	0.00
06.448.00353.002007.0006 REPAIRS & MAINT. - SLAGLE RUN P.S.		1,000.00	0.00	0.00	0.00
06.448.00353.002020.0001 REPAIRS & MAINT. - M&E - S&M DAM		8,000.00	10,000.00	0.00	0.00
06.448.00353.002020.0002 REPAIRS & MAINT. - M&E - LBS DAM		8,000.00	10,000.00	0.00	0.00
06.448.00353.002020.0004 REPAIRS & MAINT. - RAW WATER INTAKES		800.00	800.00	7,000.00	15,000.00
06.448.00353.002020.0005 REPAIRS & MAINT. - M&E - CLEAR LAKE		1,000.00	500.00	0.00	0.00
06.448.00353.002020.0006 REPAIRS & MAINT. - M&E - CARETAKERS HOUSES		2,000.00	2,000.00	3,000.00	11,500.00

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00353.002020.0007 REPAIRS & MAINT. - M&E - CARETAKERS HOUSE #3		1,000.00	1,000.00	0.00	0.00
06.448.00353.002020.0009 REPAIRS & MAINT. - M&E - SLAGLE RUN P.S.		1,000.00	2,000.00	0.00	0.00
06.448.00353.002022.0001 REPAIRS & MAINT. - VALVE MAINTENANCE - S&M DAM		1,000.00	0.00	0.00	0.00
06.448.00353.002022.0002 REPAIRS & MAINT. - VALVE MAINTENANCE - LBS DAM		1,000.00	0.00	0.00	0.00
06.448.00353.002024.0001 REPAIRS & MAINT. - LOTS - S&M DAM		1,000.00	0.00	0.00	0.00
06.448.00353.002024.0002 REPAIRS & MAINT. - LOTS - LBS DAM		1,000.00	0.00	0.00	0.00
06.448.00353.002026.0001 REPAIRS & MAINT. - INTAKE TOWER & OUTLET PIPE - S&M DAM		1,000.00	0.00	0.00	0.00
06.448.00353.002026.0002 REPAIRS & MAINT. - INTAKE TOWER & OUTLET PIPE - LBS DAM		1,000.00	0.00	0.00	0.00
06.448.00354.001401 LABOR - WATER FILTER PLANT		292,500.00	292,500.00	293,750.00	295,750.00
06.448.00355.002005 MATERIALS & SUPPLIES - WATER TESTING - PLANT		41,600.00	36,560.00	30,000.00	30,000.00
06.448.00355.002007.0008 MATERIALS & SUPPLIES - PLANT		12,000.00	12,000.00	28,000.00	20,000.00
06.448.00355.002008.0008 UTILITIES - GAS (HEAT) - PLANT		15,000.00	15,000.00	14,000.00	14,000.00
06.448.00355.002009.0008 MATERIALS & SUPPLIES - LABORATORY - PLANT		11,000.00	11,000.00	0.00	0.00
06.448.00355.002010.0008 MATERIALS & SUPPLIES - CHEMICAL EQUIP. - PLANT		3,000.00	3,000.00	0.00	0.00
06.448.00355.002018.0008 UTILITIES - DIESEL FUEL (GENERATOR) - PLANT		4,000.00	4,000.00	4,000.00	4,000.00
06.448.00355.002028.0008					

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00355.002028.0008 MATERIALS & SUPPLY - BOILER REPAIR - PLANT		600.00	600.00	0.00	0.00
06.448.00355.002040.0008 MATERIALS & SUPPLY - CHEMICALS - PLANT		250,000.00	250,000.00	265,000.00	225,000.00
06.448.00355.003002.0008 UTILITIES - GARBAGE - PLANT		1,820.00	1,820.00	1,819.00	2,100.00
06.448.00355.003003.0008 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - PLANT		1,000.00	1,000.00	0.00	0.00
06.448.00355.003004.0008 UTILITIES - TELEPHONE - PLANT		2,500.00	1,400.00	1,400.00	1,500.00
06.448.00355.003005.0008 UTILITIES - ELECTRIC - PLANT		75,000.00	75,000.00	62,500.00	58,500.00
06.448.00355.003009 UTILITIES - SEWER - PLANT		175,000.00	115,000.00	110,000.00	125,000.00
06.448.00355.003042.0008 UTILITIES - STORMWATER USER FEES - PLANT		0.00	2,000.00	1,901.00	1,000.00
06.448.00355.003043.0008 PROF. SERVICES - COMMUNITY WATER SYSTEM FEES-PLANT		0.00	0.00	25,000.00	25,000.00
06.448.00355.003044.0008 UTILITIES - CELL PHONE - PLANT		400.00	200.00	0.00	0.00
06.448.00355.003045.0008 UTILITIES - CABLE & INTERNET - PLANT		400.00	650.00	700.00	800.00
06.448.00356.001430.0008 LABOR - REPAIRS & MAINT. - PLANT		37,500.00	36,500.00	37,000.00	37,750.00
06.448.00356.002020.0008 REPAIRS & MAINT. - PLANT		400.00	400.00	16,500.00	19,000.00
06.448.00356.002030.0008 REPAIRS & MAINT. - SUPPLY EQUIP. - PLANT		15,000.00	12,000.00	0.00	0.00
06.448.00356.002030.0015 REPAIRS & MAINT. - FILTERS - PLANT		300.00	300.00	0.00	0.00
06.448.00356.002030.0016 REPAIRS & MAINT. - ACCESS ROAD - PLANT		1,000.00	1,000.00	0.00	0.00
06.448.00356.002030.0017					

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00356.002030.0017 REPAIRS & MAINT. - FILTER BLDG. - PLANT		1,000.00	1,000.00	0.00	0.00
06.448.00356.002031.0008 REPAIRS & MAINT. - SUPPLY BLDG. - PLANT		500.00	500.00	0.00	0.00
06.448.00356.002038.0008 REPAIRS & MAINT. - INTERIOR PAINT - PLANT		250.00	0.00	0.00	0.00
06.448.00362.001401 LABOR - PUMPING STATION (P.S.)		276,500.00	276,000.00	279,500.00	280,000.00
06.448.00365.002007.0010 MATERIALS & SUPPLIES - PUMPING STATION (P.S.)		9,000.00	9,000.00	11,500.00	12,000.00
06.448.00365.002008.0010 UTILITIES - GAS (HEAT) - P.S.		15,000.00	15,000.00	14,000.00	14,000.00
06.448.00365.002018.0010 UTILITIES - DIESEL FUEL (GENERATOR) - P.S.		4,000.00	4,000.00	4,000.00	4,000.00
06.448.00365.002028.0010 MATERIALS & SUPPLIES - BOILER REPAIR - P.S.		1,500.00	1,500.00	0.00	0.00
06.448.00365.003002.0010 UTILITIES - GARBAGE - P.S.		0.00	0.00	0.00	2,100.00
06.448.00365.003003.0010 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - P.S.		1,000.00	1,000.00	0.00	0.00
06.448.00365.003004.0010 UTILITIES - TELEPHONE - P.S.		2,500.00	1,400.00	1,400.00	1,500.00
06.448.00365.003042.0010 UTILITIES - STORMWATER USER FEES - P.S.		0.00	0.00	0.00	1,000.00
06.448.00365.003044.0010 UTILITIES - CELL PHONE - P.S.		400.00	200.00	0.00	0.00
06.448.00365.003045.0010 UTILITIES - CABLE & INTERNET - P.S.		400.00	650.00	700.00	800.00
06.448.00366.003005.0010 UTILITIES - ELECTRIC - P.S.		225,000.00	225,000.00	187,500.00	180,000.00
06.448.00367.001430.0010 LABOR - REPAIRS & MAINT. - P.S.		36,500.00	36,500.00	37,000.00	37,750.00

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00367.002030.0010 REPAIRS & MAINT. - P.S.		9,000.00	9,000.00	15,000.00	20,000.00
06.448.00367.002031.0010 REPAIRS & MAINT. - BLDG. MAINT. - P.S.		1,000.00	1,000.00	0.00	0.00
06.448.00367.002032.0010 REPAIRS & MAINT. - PUMP MAINT. - P.S.		7,000.00	5,000.00	0.00	0.00
06.448.00367.002038.0010 REPAIRS & MAINT. - INTERIOR PAINTING - P.S.		250.00	0.00	0.00	0.00
06.448.00368.001401.0035 LABOR - DISTRIBUTION/FLUSHING		10,400.00	105,547.00	245,000.00	110,000.00
06.448.00369.001401 LABOR - METER DEPT. (BUCKET)		129,000.00	135,500.00	135,500.00	115,000.00
06.448.00371.002007 MATERIALS & SUPPLIES - STREET DEPT.		20,000.00	25,000.00	25,000.00	25,000.00
06.448.00371.003003 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - STREET DEPT.		1,500.00	1,500.00	1,500.00	2,250.00
06.448.00371.003004 UTILITIES - TELEPHONE - STREET DEPT.		400.00	400.00	400.00	0.00
06.448.00371.003004.0020 PROF. SERVICES - LOCATES - STREET DEPT.		2,200.00	2,200.00	2,000.00	2,000.00
06.448.00372.002007 MATERIALS & SUPPLIES - METER DEPT.		5,500.00	0.00	0.00	0.00
06.448.00372.003003 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - METER DEPT.		1,000.00	1,000.00	1,000.00	1,250.00
06.448.00372.003004 UTILITIES - TELEPHONE - METER DEPT.		275.00	275.00	275.00	0.00
06.448.00373.003004.0036 UTILITIES - CELL PHONE - SCADA SYSTEM COMMUNICATIONS		1,500.00	6,000.00	7,500.00	7,500.00
06.448.00373.003005.0032 UTILITIES - ELECTRIC - TANKS		600.00	600.00	2,000.00	2,000.00
06.448.00373.003005.0033 UTILITIES - ELECTRIC - OXFORD AVE. - DISTRIB. DEPT.		1,000.00	1,000.00	0.00	0.00
06.448.00373.003008.0036					

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00373.003008.0036 UTILITIES - GAS (HEAT) - PARRS - P.S.		500.00	500.00	500.00	400.00
06.448.00374.001401 LABOR - GRATUITOUS SERVICES - METER DEPT.		250.00	250.00	0.00	0.00
06.448.00374.002007 MATERIALS & SUPPLIES - GRATUITOUS SERVICES - DISTRIB. DEPT.		500.00	500.00	500.00	500.00
06.448.00375.001420 LABOR - REPAIRS & MAINT. - TRANSMISSION MAINS		4,000.00	4,000.00	0.00	0.00
06.448.00375.002020 MATERIALS & SUPPLIES - TRANSMISSION MAINS		15,000.00	15,000.00	0.00	0.00
06.448.00376.001420 LABOR - REPAIRS & MAINT. - DISTRIBUTION MAINS		115,000.00	87,500.00	128,500.00	125,000.00
06.448.00376.002019 MATERIALS & SUPPLIES - CLEANING - DISTRIBUTION MAINS		13,000.00	13,000.00	0.00	0.00
06.448.00376.002020 MATERIALS & SUPPLIES - DISTRIBUTION MAINS		30,000.00	30,000.00	50,000.00	50,000.00
06.448.00376.003019 PROF. SERVICES - CLEANING & LINING - DISTRIBUTION MAINS		30,000.00	30,000.00	0.00	0.00
06.448.00376.141901 LABOR - CAPITAL OUTLAY - CARLISLE ST CLEANING & LINING		82,500.00	64,000.00	0.00	0.00
06.448.00376.141902 LABOR - CAPITAL OUTLAY - FULTON ST CLEANING & LINING		20,000.00	0.00	0.00	0.00
06.448.00376.141903 LABOR - CAPTIAL OUTLAY - CLEANING & LINING		0.00	97,100.00	62,300.00	132,010.00
06.448.00376.201901 CAPITAL OUTLAY - CARLISLE ST CLEANING & LINING (MATERIALS)		98,500.00	71,250.00	0.00	0.00
06.448.00376.201902 CAPITAL OUTLAY - FULTON ST CLEANING & LINING (MATERIALS)		7,500.00	0.00	0.00	0.00
06.448.00376.201903					

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00376.201903	CAPITAL OUTLAY - MATERIALS - CLEANING & LINING	0.00	36,600.00	78,800.00	0.00
06.448.00376.201908	CAPITAL OUTLAY - PLEASANT ST CLEANING & LINING (MATS. & PROF. SVC)	0.00	0.00	0.00	215,250.00
06.448.00376.301901	CAPITAL OUTLAY - PROF. SERVICES - CARLISLE ST CLEANING & LINING	305,000.00	40,000.00	0.00	0.00
06.448.00376.301902	CAPITAL OUTLAY - PROF. SERVICES - FULTON ST CLEANING & LINING	50,000.00	0.00	0.00	0.00
06.448.00376.301903	CAPITAL OUTLAY - PROF.SERVICES - CLEANING & LINING	0.00	324,900.00	781,470.00	1,944,836.00
06.448.00377.001420	LABOR - SERVICE LINES	100,000.00	52,500.00	75,000.00	68,500.00
06.448.00377.001420.0025	LABOR - WATER HAULING STATION	1,000.00	1,000.00	500.00	500.00
06.448.00377.002020	MATERIALS & SUPPLIES - SERVICE LINES	25,000.00	25,000.00	20,000.00	20,000.00
06.448.00377.002020.0025	MATERIALS & SUPPLIES - WATER HAULING STATION	500.00	500.00	650.00	245.00
06.448.00378.001420	LABOR - TANKS & RESERVOIRS	13,500.00	13,500.00	12,500.00	15,000.00
06.448.00378.002020	MATERIALS & SUPPLIES - TANKS & RESERVOIRS	7,500.00	7,500.00	7,500.00	8,000.00
06.448.00378.707113	REPAIRS & MAINT. - PAINTING TANKS & RESERVOIRS	0.00	0.00	0.00	70,000.00
06.448.00379.001420	LABOR - METER MAINTENANCE	145,500.00	137,500.00	130,000.00	132,500.00
06.448.00379.002020	MATERIALS & SUPPLIES - METER DEPT.	40,000.00	25,000.00	25,000.00	20,000.00
06.448.00379.300619	UTILITIES - WATER & SEWER - TANGER BLDG. - METER DEPT.	3,100.00	3,100.00	3,600.00	4,250.00

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00379.300719 UTILITIES - SEWER - TANGER BLDG. - METER DEPT.		500.00	500.00	0.00	0.00
06.448.00380.001420 LABOR - FIRE HYDRANTS		15,500.00	15,500.00	15,500.00	12,500.00
06.448.00380.002020 MATERIALS & SUPPLIES - FIRE HYDRANTS		5,000.00	8,000.00	7,500.00	5,500.00
06.448.00382.130115 LABOR - BOROUGH MANAGER		36,500.00	31,250.00	37,150.00	44,000.00
06.448.00383.140115 LABOR - ADMINISTRATIVE STAFF		270,000.00	295,500.00	375,500.00	386,500.00
06.448.00384.200715 MATERIALS & SUPPLIES - OFFICE SUPPLIES		4,000.00	4,000.00	3,000.00	0.00
06.448.00386.200700 DUES, TRAINING, PERMITS, & MEMBERSHIPS		750.00	1,500.00	1,500.00	10,000.00
06.448.00387.002700 PROF. SERVICES - COMPUTER & SUPPORT SERVICES/SUBSCRIPTIONS		10,000.00	10,000.00	10,000.00	6,500.00
06.448.00387.200715 MATERIALS & SUPPLIES - OFFICE & RENTAL EXPENSES		10,000.00	10,000.00	17,500.00	4,500.00
06.448.00387.300415 UTILITIES - TELEPHONE - OFFICE		1,500.00	750.00	1,000.00	1,350.00
06.448.00387.301115 DATA PROCESSING MATERIALS, SUPPLIES, & PROF. SERVICES		6,000.00	6,000.00	0.00	0.00
06.448.00387.301215 RENTS - OFFICE RENT (GENERAL FUND)		77,429.00	91,962.00	90,710.00	93,199.00
06.448.00387.301315 ADVERTISING		3,000.00	3,000.00	3,000.00	3,000.00
06.448.00387.301415 MATERIALS & SUPPLIES - POSTAGE - OFFICE		40,000.00	40,000.00	35,000.00	37,500.00
06.448.00387.301515 RENTS - EQUIPMENT RENTAL - OFFICE		1,600.00	1,600.00	1,500.00	1,000.00
06.448.00387.301615 PROF. SERVICES - ACCOUNTING &		17,000.00	13,200.00	12,400.00	12,100.00

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00387.301715 PROF. SERVICES - RATE CASE ENGINEERING & RELATED SUPPLIES		0.00	150,000.00	0.00	200,000.00
06.448.00388.140116 LABOR - PIPE YARD - DISTRIB. MAINS		6,750.00	5,500.00	5,500.00	5,500.00
06.448.00388.140117 LABOR - SHED - DISTRIB. MAINS		15,000.00	20,000.00	20,000.00	20,000.00
06.448.00388.140118 LABOR - PUBLIC WORKS MECHANICS		32,500.00	34,500.00	50,000.00	43,000.00
06.448.00388.140119 LABOR - PUBLIC WORKS MECHANICS (MISC.)		12,500.00	12,500.00	0.00	0.00
06.448.00388.200618 UTILITIES - GASOLINE & OIL		30,000.00	30,000.00	27,500.00	25,000.00
06.448.00388.200716 MATERIALS & SUPPLIES - PIPE YARD		3,000.00	3,000.00	1,000.00	500.00
06.448.00388.200720 MATERIALS & SUPPLIES - TANGER BUILDING		2,000.00	2,000.00	2,000.00	2,500.00
06.448.00388.201819 UTILITIES - DIESEL FUEL		15,000.00	15,000.00	15,000.00	15,000.00
06.448.00388.202018 REPAIRS & MAINT. - VEHICLES		15,000.00	15,000.00	17,500.00	17,500.00
06.448.00388.202019 REPAIRS & MAINT. - EQUIPMENT		20,000.00	25,000.00	25,000.00	25,000.00
06.448.00388.203618 REPAIRS & MAINT. - TANGER BUILDING		1,500.00	1,500.00	3,750.00	3,000.00
06.448.00388.300419 UTILITIES - TELEPHONE - TANGER BUILDING		1,650.00	1,650.00	1,650.00	1,650.00
06.448.00388.300517 UTILITIES - ELECTRIC - TOOL SHED - R/R ST		1,250.00	1,250.00	0.00	0.00
06.448.00388.300518 UTILITIES - ELECTRIC - TOOL SHED - TANGER BUILDING		10,000.00	10,000.00	8,000.00	7,500.00
06.448.00388.300617 UTILITIES - WATER - TOOL SHED - R/R ST		200.00	200.00	0.00	0.00
06.448.00388.300619					

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00388.300619	UTILITIES - WATER, SEWER & STORMWATER - TOOL SHED - TANGER BUILDING	1,000.00	1,000.00	2,200.00	2,500.00
06.448.00388.300717	UTILITIES - SEWER - TOOL SHED - R/R ST	250.00	325.00	0.00	0.00
06.448.00388.300719	UTILITIES - SEWER - TOOL SHED - TANGER BUILDING	250.00	325.00	0.00	0.00
06.448.00388.300817	UTILITIES - GAS (HEAT) - TOOL SHED - R/R ST	2,000.00	2,000.00	0.00	0.00
06.448.00388.300818	UTILITIES - GAS (HEAT) - TANGER BUILDING	5,500.00	5,500.00	5,500.00	5,500.00
06.448.00388.300819	UTILITIES - GARBAGE - TANGER	0.00	1,650.00	4,500.00	3,500.00
06.448.00388.300917	UTILITIES - WATER - R/R ST PIPE YARD	150.00	150.00	0.00	0.00
06.448.00388.304018	UTILITIES - CABLE & INTERNET - TANGER BUILDING	1,250.00	1,250.00	1,250.00	1,250.00
06.448.00388.304417	UTILITIES - CELL PHONES	1,500.00	1,500.00	1,500.00	1,000.00
06.448.00390.404600	TAXES - CELL TOWER PROPERTY TAXES	5,000.00	4,000.00	4,000.00	4,500.00
06.448.00392.304700	PROF. SERVICES - SPECIAL LEGAL SERVICES	2,500.00	2,500.00	0.00	0.00
06.448.00392.304702	PROF. SERVICES - RATE CASE LEGAL & RELATED SUPPLIES	0.00	150,000.00	0.00	175,000.00
06.448.00392.304703	PROF. SERVICES - LABOR NEGOTIATIONS	0.00	15,000.00	0.00	0.00
06.448.00392.304704	PROF. SERVICES - LEGAL SERVICES	6,500.00	6,500.00	7,500.00	8,000.00
06.448.00396.304921	BENEFITS/TAXES - HEALTH & HOSPITALIZATION INSURANCE	730,000.00	765,000.00	888,500.00	875,000.00
06.448.00396.304922					

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00396.304922 BENEFITS/TAXES - WORKMANS COMPENSATION		54,500.00	54,500.00	66,750.00	63,500.00
06.448.00396.304923 FIRE & LIABILITY INSURANCE		73,500.00	55,000.00	50,000.00	40,000.00
06.448.00396.304924 BENEFITS/TAXES - LIFE INSURANCE		5,500.00	5,500.00	5,800.00	5,700.00
06.448.00396.304926 BENEFITS/TAXES - RETIREE PRESCRIPTIONS INSURANCE		9,750.00	8,750.00	0.00	0.00
06.448.00396.304927 BENEFITS/TAXES - RETIREE HEALTH & HOSPITALIZATION INSURANCE		34,500.00	42,000.00	55,000.00	47,000.00
06.448.00397.305028 BENEFITS/TAXES - PENSION		93,637.00	89,074.00	123,512.00	124,789.00
06.448.00401.140100 LABOR - REPAIRS & MAINT. - PROPERTY		11,750.00	11,750.00	13,500.00	13,500.00
06.448.00550.140100 LABOR - MERCHANDISING & JOBBING		25,000.00	45,000.00	50,000.00	37,500.00
06.448.00550.200700 MATERIALS & SUPPLIES - MERCHANDISING & JOBBING		85,000.00	115,000.00	75,000.00	50,000.00
06.448.00559.305100 MISC - CONTRIBUTION TO PLEASANT HILL VFD - FIRE PREVENTION		2,500.00	0.00	0.00	0.00
06.448.00608.504205 DEBT - FEES - G.O.B. 2013 SERIES		390.00	390.00	0.00	0.00
06.448.00608.504206 DEBT - FEES - G.O.B. 2015B SERIES		780.00	780.00	0.00	0.00
06.448.00608.504208 DEBT - FEES - G.O.B. 2015C SERIES (REFI. 2010)		227.00	227.00	0.00	0.00
06.448.00608.504209 DEBT - FEES - G.O.B. 2015D SERIES (REFI. 2010)		242.00	242.00	0.00	0.00
06.448.00608.504210 DEBT - FEES - G.O.B. SERIES (ALL)		0.00	585.00	2,224.00	2,500.00
06.448.04710.505238 DEBT - PRINCIPAL - G.O.B. NEW SERIES PROPOSED		0.00	0.00	0.00	500,000.00

Account Description		Adjusted 2017 Budget	Adjusted 2018 Budget	Adjusted 2019 Budget	2020 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.04710.505245 DEBT - PRINCIPAL - G.O.B. 2013 SERIES		110,000.00	115,000.00	120,000.00	120,000.00
06.448.04710.505246 DEBT - PRINCIPAL - G.O.B. 2015B SERIES		140,000.00	145,000.00	320,000.00	325,000.00
06.448.04710.505247 DEBT - PRINCIPAL - G.O.B. 2015C SERIES (REFI. 2010)		10,000.00	10,000.00	10,000.00	10,000.00
06.448.04710.505248 DEBT - PRINCIPAL - G.O.B. 2015D SERIES (REFI. 2010)		275,000.00	280,000.00	285,000.00	290,000.00
06.448.04710.505249 DEBT - PRINCIPAL - G.O.B. 2017 SERIES (REFI.2013)		0.00	28,000.00	28,000.00	27,000.00
06.448.04710.505257 DEBT - PRINCIPAL - LEASES (ENTERPRISE)		0.00	0.00	9,295.00	10,115.00
06.448.04720.505345 DEBT - INTEREST - G.O.B. 2013 SERIES		259,450.00	12,369.00	10,069.00	7,669.00
06.448.04720.505346 DEBT - INTEREST - G.O.B. 2015B SERIES		258,232.00	255,430.00	252,530.00	246,132.00
06.448.04720.505347 DEBT - INTEREST - G.O.B. 2015C SERIES (REFI. 2010)		76,422.00	76,422.00	76,222.00	76,022.00
06.448.04720.505348 DEBT - INTEREST - G.O.B. 2015D SERIES (REFI. 2010)		41,462.00	35,963.00	30,362.00	24,663.00
06.448.04720.505349 DEBT - INTEREST - G.O.B. 2017 SERIES (REFI.2013)		0.00	206,565.00	206,005.00	205,444.00
06.448.04720.505357 DEBT - INTEREST - LEASES (ENTERPRISE)		0.00	0.00	4,785.00	3,970.00
Total Dept 448 WATER SYSTEM		**6,700,466.00**	**7,802,839.00**	**8,519,413.00**	**12,094,179.00**
Dept 486	**INSURANCE PREMIUMS**				
06.486.01500.001610 BENEFITS/TAXES - SOCIAL SECURITY		160,000.00	162,500.00	178,500.00	179,750.00

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 486	**INSURANCE PREMIUMS**				
Total Dept 486 INSURANCE PREMIUMS		**160,000.00**	**162,500.00**	**178,500.00**	**179,750.00**
Total Type E Expense		**6,860,466.00**	**7,965,339.00**	**8,697,913.00**	**12,273,929.00**
Total Fund 06 WATER REVENUE FUND		**(1,139,162.00)**	**197,070.00**	**840,233.00**	**4,358,322.00**

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Account Description		Adjusted 2018 Budget	Adjusted 2019 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type R	**Revenue**				
Dept 006	**.**				
06.006.34280.000501 RENTS - TERRACE AVE (AT&T) CELL TOWER		16,791.00	16,791.00	18,144.00	18,816.00
06.006.34285.000501 RENTS - RAILROAD ST (VERIZON) CELL TOWER		8,785.00	8,785.00	8,448.00	8,728.00
06.006.34290.000501 RENTS - TERRACE AVE (SHENTEL) CELL TOWER		18,662.00	18,662.00	18,660.00	22,392.00
06.006.34292.000501 RENTS - FILTER PLANT (TOWER CO) CELL TOWER		15,775.00	16,248.00	16,734.00	17,241.00
06.006.34297.000501 RENTS - OXFORD AVE (AT&T) CELL TOWER		17,280.00	17,280.00	18,432.00	20,736.00
06.006.34298.000501 RENTS - OXFORD AVE (SHENTEL) CELL TOWER		18,662.00	18,662.00	18,660.00	22,081.00
06.006.35970 CONTRIBUTED CAPITAL		0.00	0.00	0.00	111,500.00
06.006.37811.000300 METERED REVENUE - DOMESTIC		4,150,000.00	4,170,000.00	4,172,500.00	4,280,000.00
06.006.37812.000301 METERED REVENUE - COMMERCIAL		850,000.00	835,000.00	835,000.00	825,000.00
06.006.37813.000302 METERED REVENUE - INDUSTRIAL		1,725,000.00	1,700,000.00	1,750,000.00	1,900,000.00
06.006.37814.000304 METERED REVENUE - PUBLIC		125,000.00	115,000.00	125,000.00	130,000.00
06.006.37816.000315 METERED REVENUE - PENALTIES		19,000.00	22,000.00	21,000.00	21,000.00
06.006.37830.000310 UNMETERED REVENUE - SALE OF WATER		40,000.00	40,000.00	40,000.00	40,000.00
06.006.37840.000309 UNMETERED REVENUE - PRIVATE FIRE PROTECTION		287,500.00	290,000.00	293,500.00	300,000.00
06.006.37850.000311 UNMETERED REVENUE - PUBLIC FIRE PROTECTION		122,750.00	124,500.00	125,000.00	130,000.00
06.006.38000.000314 MISCELLANEOUS		18,000.00	18,500.00	17,500.00	17,500.00
06.006.38313.000500 MISC - MERCHANDISING & JOBBING REVENUES		160,000.00	152,500.00	115,000.00	112,500.00
06.006.38314.000504 INTEREST		35,000.00	115,000.00	145,000.00	70,000.00
06.006.38315.000511					

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Fund 06	**WATER REVENUE FUND**				
Type R	**Revenue**				
Dept 006	**.**				
06.006.38315.000511 MISC - JOYCE BARDIN RESTITUTION		240.00	240.00	240.00	240.00
06.006.38318.000511 MISC - TIMBER/HAY SALES		0.00	0.00	0.00	26,500.00
06.006.38320.000511 STATE - MUNICIPAL PENSION AID		89,074.00	123,512.00	124,789.00	0.00
06.006.38327.000511 MISC - RETIREES INSURANCE REIMBURSEMENTS		50,750.00	55,000.00	52,000.00	52,650.00
Total Dept 006					
.		**(7,768,269.00)**	**(7,857,680.00)**	**(7,915,607.00)**	**(8,126,884.00)**
Total Type R					
Revenue		**(7,768,269.00)**	**(7,857,680.00)**	**(7,915,607.00)**	**(8,126,884.00)**

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00134.308100 PROF. SERVICES - ENGINEERING SERVICES - PRELIM. CHARGES		40,000.00	45,000.00	85,000.00	85,000.00
06.448.00208.140172 LABOR - CAPITAL OUTLAY - LBS PARKING LOT		0.00	0.00	4,000.00	0.00
06.448.00208.142202 LABOR - CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS		5,000.00	15,000.00	7,000.00	0.00
06.448.00208.701040 CAPITAL OUTLAY - LBS PARKING LOT		0.00	0.00	10,000.00	0.00
06.448.00208.704301 CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS		80,000.00	26,000.00	12,000.00	30,000.00
06.448.00208.705640 CAPITAL OUTLAY - CARETAKER HOUSE #1 (N. STORMES) IMPROV.		0.00	0.00	4,000.00	4,000.00
06.448.00246.146500 LABOR - CAPITAL OUTLAY - BAUGHER DR TRANSMISSION MAIN		6,000.00	25,000.00	0.00	0.00
06.448.00246.606500 CAPITAL OUTLAY - BAUGHER DR TRANSMISSIONS MAINS		6,000.00	127,000.00	0.00	0.00
06.448.00248.146600 LABOR - CAPITAL OUTLAY - NEW DISTRIBUTION MAINS		0.00	8,000.00	157,600.00	118,500.00
06.448.00248.146614 LABOR - CAPITAL OUTLAY - E HANOVER ST		0.00	0.00	0.00	2,000.00
06.448.00248.146626 LABOR - CAPITAL OUTLAY - LOCUST ST-SPRING AVE NEW MAIN		0.00	10,500.00	0.00	0.00
06.448.00248.146638 LABOR - CAPITAL OUTLAY - STONEWICKE DEVELOPMENT (MYERS)		23,000.00	0.00	0.00	0.00
06.448.00248.146643 LABOR - CAPITAL OUTLAY - E CHESTNUT ST MAIN		20,000.00	0.00	0.00	0.00
06.448.00248.146646 LABOR - CAPITAL OUTLAY - YORK STREET		0.00	0.00	0.00	55,000.00
06.448.00248.146654 LABOR - CAPITAL OUTLAY - HEIGHTS AVE MAIN		5,000.00	0.00	0.00	0.00
06.448.00248.146657 LABOR - CAPITAL OUTLAY - A-STREET MAIN		0.00	6,000.00	6,000.00	0.00
06.448.00248.606600 CAPITAL OUTLAY - MISC. CDA'S & DISTRIBUTION MAINS		60,000.00	0.00	0.00	0.00

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00248.606600 06.448.00248.606613 CAPITAL OUTLAY - THIRD ST		0.00	0.00	0.00	306,450.00
06.448.00248.606614 CAPITAL OUTLAY - E HANOVER ST		0.00	0.00	0.00	350,000.00
06.448.00248.606615 CAPITAL OUTLAY - BROADWAY		0.00	0.00	0.00	118,800.00
06.448.00248.606621 CAPITAL OUTLAY - W HANOVER ST & FORNEY AVE MAIN (MATS. & PROF. SVC.)		268,821.00	636,464.00	0.00	0.00
06.448.00248.606625 CAPITAL OUTLAY - NEW DISTRIBUTION MAINS		0.00	8,000.00	2,098,915.00	598,500.00
06.448.00248.606626 CAPITAL OUTLAY - LOCUST ST-SPRING AVE NEW MAIN		0.00	55,000.00	36,780.00	36,780.00
06.448.00248.606635 CAPITAL OUTLAY - CDA MAIN - BROOKSIDE HEIGHTS PHASE II-III		125,000.00	0.00	0.00	0.00
06.448.00248.606638 CAPITAL OUTLAY - STONEWICKE DEVELOPMENT (MYERS)		16,750.00	0.00	0.00	0.00
06.448.00248.606643 CAPITAL OUTLAY - E CHESTNUT ST MAIN		14,000.00	0.00	0.00	0.00
06.448.00248.606646 CAPITAL OUTLAY -YORK STREET		0.00	0.00	0.00	160,000.00
06.448.00248.606654 CAPITAL OUTLAY - HEIGHTS AVE MAIN		7,000.00	0.00	0.00	0.00
06.448.00248.606657 CAPITAL OUTLAY - A-STREET MAIN		0.00	5,000.00	5,000.00	0.00
06.448.00249.146700 LABOR - CAPITAL OUTLAY - NEW SERVICE LATERALS		6,000.00	6,000.00	7,500.00	5,000.00
06.448.00249.606700 CAPITAL OUTLAY - NEW SERVICE LATERALS		5,000.00	5,000.00	7,500.00	7,500.00
06.448.00249.606735 CAPITAL OUTLAY - CDA LATERAL - BROOKSIDE HEIGHTS PHASE II-III		40,250.00	0.00	0.00	0.00
06.448.00250.146400 LABOR - CAPITAL OUTLAY - METERS & EQUIPMENT		8,500.00	10,000.00	13,500.00	12,000.00
06.448.00250.706400					

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Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00250.706400 CAPITAL OUTLAY - METERS & EQUIPMENT		90,000.00	150,000.00	150,000.00	150,000.00
06.448.00259.706014 CAPITAL OUTLAY - VEHICLES - PLANT		50,000.00	0.00	0.00	29,500.00
06.448.00259.706015 CAPITAL OUTLAY - EQUIPMENT - PLANT		0.00	26,000.00	20,000.00	13,000.00
06.448.00259.706018 CAPITAL OUTLAY - VEHICLES - DISTRIB. DEPT.		0.00	106,000.00	60,000.00	103,000.00
06.448.00259.706019 CAPITAL OUTLAY - EQUIPMENT - DISTRIB. DEPT.		398,187.00	45,000.00	189,500.00	0.00
06.448.00259.706021 CAPITAL OUTLAY - BUILDINGS & FACILITIES - PLANT		0.00	0.00	34,500.00	59,000.00
06.448.00259.706022 CAPITAL OUTLAY - BUILDINGS & FACILITIES - DISTRIB. DEPT		0.00	143,750.00	70,000.00	34,697.00
06.448.00350.001401.0001 LABOR - DAMS & WELLS		107,500.00	232,000.00	238,500.00	283,500.00
06.448.00350.001401.0002 LABOR - LBS DAM		113,750.00	0.00	0.00	0.00
06.448.00351.002006.0001 UTILITIES - GASOLINE & DIESEL - DAMS & WELLS		3,500.00	6,000.00	4,000.00	3,000.00
06.448.00351.002006.0002 UTILITIES - GASOLINE & DIESEL - LBS DAM		3,500.00	0.00	0.00	0.00
06.448.00351.002007.0001 MATERIALS & SUPPLIES - DAMS & WELLS		2,500.00	14,000.00	15,000.00	12,500.00
06.448.00351.002007.0002 MATERIALS & SUPPLIES - LBS DAM		2,500.00	0.00	0.00	0.00
06.448.00351.002007.0004 MATERIALS & SUPPLIES - RAW WATER INTAKES		2,000.00	4,000.00	5,000.00	3,000.00
06.448.00351.002007.0005 MATERIALS & SUPPLIES - CLEAR LAKE		1,000.00	0.00	0.00	0.00
06.448.00351.002007.0006 MATERIALS & SUPPLIES - SLAGLE RUN P.S.		1,000.00	0.00	0.00	0.00
06.448.00351.003002.0001 UTILITIES - GARBAGE - DAMS & WELLS		1,820.00	3,640.00	2,500.00	1,600.00
06.448.00351.003002.0002 UTILITIES - GARBAGE - LBS DAM		1,820.00	0.00	0.00	0.00

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Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00351.003003.0001 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - S&M DAM		700.00	0.00	0.00	0.00
06.448.00351.003003.0002 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - LBS DAM		700.00	0.00	0.00	0.00
06.448.00351.003004.0001 UTILITIES - TELEPHONE - DAMS & WELLS		700.00	1,750.00	750.00	500.00
06.448.00351.003004.0002 UTILITIES - TELEPHONE - LBS DAM		700.00	0.00	0.00	0.00
06.448.00351.003004.0003 UTILITIES - TELEPHONE - RAW WATER INTAKES		1,000.00	1,000.00	800.00	0.00
06.448.00351.003005.0002 UTILITIES - ELECTRIC - DAMS & WELLS		2,500.00	3,000.00	2,750.00	2,750.00
06.448.00351.003005.0003 UTILITIES - ELECTRIC - RAW WATER INTAKES		7,500.00	10,000.00	30,000.00	20,000.00
06.448.00351.003005.0004 UTILITIES - ELECTRIC - KITZMILLERS		1,500.00	0.00	0.00	0.00
06.448.00351.003042.0003 UTILITIES - STORMWATER USER FEES - SLAGLE RUN P.S.		80.00	80.00	90.00	90.00
06.448.00351.003042.0013 UTILITIES - STORMWATER USER FEES - DAMS & WELLS		0.00	1,400.00	1,400.00	1,375.00
06.448.00351.003044.0001 UTILITIES - CELL PHONE - S&M DAM		250.00	0.00	0.00	0.00
06.448.00351.003044.0002 UTILITIES - CELL PHONE - LBS DAM		250.00	0.00	0.00	0.00
06.448.00353.001420.0001 LABOR - REPAIRS & MAINT. - DAMS & WELLS (FLEET)		250.00	5,000.00	500.00	500.00
06.448.00353.001420.0002 LABOR - REPAIRS & MAINT. - LBS DAM		3,500.00	0.00	0.00	0.00
06.448.00353.001420.0004 LABOR - REPAIRS & MAINT. - RAW WATER INTAKES (RWWT)		500.00	1,500.00	1,500.00	1,500.00
06.448.00353.001420.0005 LABOR - REPAIRS & MAINT. - CLEAR LAKE		500.00	0.00	0.00	0.00
06.448.00353.001420.0007 LABOR - REPAIRS & MAINT. - SLAGLE RUN P.S.		500.00	0.00	0.00	0.00
06.448.00353.001431.0006					

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00353.001431.0006 LABOR - REPAIRS & MAINT. - CARETAKERS HOUSES		1,000.00	1,000.00	1,000.00	0.00
06.448.00353.001431.0007 LABOR - REPAIRS & MAINT. - CARETAKERS HOUSE - LBS DAM		1,000.00	0.00	0.00	0.00
06.448.00353.002007.0001 REPAIRS & MAINT. - DAMS & WELLS		5,000.00	30,000.00	10,000.00	9,000.00
06.448.00353.002007.0002 REPAIRS & MAINT. - LBS DAM		5,000.00	0.00	0.00	0.00
06.448.00353.002020.0001 REPAIRS & MAINT. - M&E - S&M DAM		10,000.00	0.00	0.00	0.00
06.448.00353.002020.0002 REPAIRS & MAINT. - M&E - LBS DAM		10,000.00	0.00	0.00	0.00
06.448.00353.002020.0004 REPAIRS & MAINT. - RAW WATER INTAKES		800.00	7,000.00	15,000.00	4,000.00
06.448.00353.002020.0005 REPAIRS & MAINT. - M&E - CLEAR LAKE		500.00	0.00	0.00	0.00
06.448.00353.002020.0006 REPAIRS & MAINT. - M&E - CARETAKERS HOUSES		2,000.00	3,000.00	11,500.00	3,000.00
06.448.00353.002020.0007 REPAIRS & MAINT. - M&E - CARETAKERS HOUSE #3		1,000.00	0.00	0.00	0.00
06.448.00353.002020.0009 REPAIRS & MAINT. - M&E - SLAGLE RUN P.S.		2,000.00	0.00	0.00	0.00
06.448.00353.002021.0001 REPAIRS & MAINT. - FORESTRY MANAGEMENT		0.00	0.00	0.00	26,500.00
06.448.00354.001401 LABOR - WATER FILTER PLANT		292,500.00	293,750.00	295,750.00	306,000.00
06.448.00355.002005 MATERIALS & SUPPLIES - WATER TESTING - PLANT		36,560.00	30,000.00	30,000.00	24,000.00
06.448.00355.002007.0008 MATERIALS & SUPPLIES - PLANT		12,000.00	28,000.00	20,000.00	22,000.00
06.448.00355.002008.0008 UTILITIES - GAS (HEAT) - PLANT		15,000.00	14,000.00	14,000.00	9,000.00
06.448.00355.002009.0008 MATERIALS & SUPPLIES - LABORATORY - PLANT		11,000.00	0.00	0.00	0.00
06.448.00355.002010.0008 MATERIALS & SUPPLIES - CHEMICAL EQUIP. - PLANT		3,000.00	0.00	0.00	0.00

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Fund 06 WATER REVENUE FUND				
Type E Expense				
Dept 448 WATER SYSTEM				
06.448.00355.002018.0008 UTILITIES - DIESEL FUEL (GENERATOR) - PLANT	4,000.00	4,000.00	4,000.00	500.00
06.448.00355.002028.0008 MATERIALS & SUPPLIES - BOILER REPAIR - PLANT	600.00	0.00	0.00	0.00
06.448.00355.002040.0008 MATERIALS & SUPPLIES - CHEMICALS - PLANT	250,000.00	265,000.00	225,000.00	240,000.00
06.448.00355.003002.0008 UTILITIES - GARBAGE - PLANT	1,820.00	1,819.00	2,100.00	1,500.00
06.448.00355.003003.0008 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - PLANT	1,000.00	0.00	0.00	0.00
06.448.00355.003004.0008 UTILITIES - TELEPHONE - PLANT	1,400.00	1,400.00	1,500.00	1,300.00
06.448.00355.003005.0008 UTILITIES - ELECTRIC - PLANT	75,000.00	62,500.00	58,500.00	55,000.00
06.448.00355.003009 UTILITIES - SEWER - PLANT	115,000.00	110,000.00	125,000.00	170,000.00
06.448.00355.003042.0008 UTILITIES - STORMWATER USER FEES - PLANT	2,000.00	1,901.00	1,000.00	1,000.00
06.448.00355.003043.0008 PROF. SERVICES - COMMUNITY WATER SYSTEM FEES-PLANT	0.00	25,000.00	25,000.00	25,000.00
06.448.00355.003044.0008 UTILITIES - CELL PHONE - PLANT	200.00	0.00	0.00	0.00
06.448.00355.003045.0008 UTILITIES - CABLE & INTERNET - PLANT	650.00	700.00	800.00	800.00
06.448.00356.001430.0008 LABOR - REPAIRS & MAINT. - PLANT	36,500.00	37,000.00	37,750.00	35,250.00
06.448.00356.002020.0008 REPAIRS & MAINT. - PLANT	400.00	16,500.00	19,000.00	25,000.00
06.448.00356.002030.0008 REPAIRS & MAINT. - SUPPLY EQUIP. - PLANT	12,000.00	0.00	0.00	0.00
06.448.00356.002030.0015 REPAIRS & MAINT. - FILTERS - PLANT	300.00	0.00	0.00	0.00
06.448.00356.002030.0016 REPAIRS & MAINT. - ACCESS ROAD - PLANT	1,000.00	0.00	0.00	0.00
06.448.00356.002030.0017				

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Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00356.002030.0017 REPAIRS & MAINT. - FILTER BLDG. - PLANT		1,000.00	0.00	0.00	0.00
06.448.00356.002031.0008 REPAIRS & MAINT. - SUPPLY BLDG. - PLANT		500.00	0.00	0.00	0.00
06.448.00362.001401 LABOR - PUMPING STATION (P.S.)		276,000.00	279,500.00	280,000.00	288,000.00
06.448.00365.002007.0010 MATERIALS & SUPPLIES - PUMPING STATION (P.S.)		9,000.00	11,500.00	12,000.00	12,000.00
06.448.00365.002008.0010 UTILITIES - GAS (HEAT) - P.S.		15,000.00	14,000.00	14,000.00	9,000.00
06.448.00365.002018.0010 UTILITIES - DIESEL FUEL (GENERATOR) - P.S.		4,000.00	4,000.00	4,000.00	500.00
06.448.00365.002028.0010 MATERIALS & SUPPLIES - BOILER REPAIR - P.S.		1,500.00	0.00	0.00	0.00
06.448.00365.003002.0010 UTILITIES - GARBAGE - P.S.		0.00	0.00	2,100.00	1,500.00
06.448.00365.003003.0010 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - P.S.		1,000.00	0.00	0.00	0.00
06.448.00365.003004.0010 UTILITIES - TELEPHONE - P.S.		1,400.00	1,400.00	1,500.00	1,300.00
06.448.00365.003042.0010 UTILITIES - STORMWATER USER FEES - P.S.		0.00	0.00	1,000.00	1,000.00
06.448.00365.003044.0010 UTILITIES - CELL PHONE - P.S.		200.00	0.00	0.00	0.00
06.448.00365.003045.0010 UTILITIES - CABLE & INTERNET - P.S.		650.00	700.00	800.00	800.00
06.448.00366.003005.0010 UTILITIES - ELECTRIC - P.S.		225,000.00	187,500.00	180,000.00	175,000.00
06.448.00367.001430.0010 LABOR - REPAIRS & MAINT. - P.S.		36,500.00	37,000.00	37,750.00	35,250.00
06.448.00367.002030.0010 REPAIRS & MAINT. - P.S.		9,000.00	15,000.00	20,000.00	27,000.00
06.448.00367.002031.0010 REPAIRS & MAINT. - BLDG. MAINT. - P.S.		1,000.00	0.00	0.00	0.00
06.448.00367.002032.0010 REPAIRS & MAINT. - PUMP MAINT. - P.S.		5,000.00	0.00	0.00	0.00

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00368.001401.0035 LABOR - DISTRIBUTION/FLUSHING		105,547.00	245,000.00	110,000.00	115,000.00
06.448.00369.001401 LABOR - METER DEPT. (BUCKET)		135,500.00	135,500.00	115,000.00	103,500.00
06.448.00371.002007 MATERIALS & SUPPLIES - STREET DEPT.		25,000.00	25,000.00	25,000.00	20,000.00
06.448.00371.003003 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - STREET DEPT.		1,500.00	1,500.00	2,250.00	2,250.00
06.448.00371.003004 UTILITIES - TELEPHONE - STREET DEPT.		400.00	400.00	0.00	0.00
06.448.00371.003004.0020 PROF. SERVICES - LOCATES - STREET DEPT.		2,200.00	2,000.00	2,000.00	1,500.00
06.448.00372.003003 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - METER DEPT.		1,000.00	1,000.00	1,250.00	1,250.00
06.448.00372.003004 UTILITIES - TELEPHONE - METER DEPT.		275.00	275.00	0.00	0.00
06.448.00373.003004.0036 UTILITIES - CELL PHONE - SCADA SYSTEM COMMUNICATIONS		6,000.00	7,500.00	7,500.00	7,500.00
06.448.00373.003005.0032 UTILITIES - ELECTRIC - TANKS		600.00	2,000.00	2,000.00	1,500.00
06.448.00373.003005.0033 UTILITIES - ELECTRIC - OXFORD AVE. - DISTRIB. DEPT.		1,000.00	0.00	0.00	0.00
06.448.00373.003008.0036 UTILITIES - GAS (HEAT) - PARRS - P.S.		500.00	500.00	400.00	300.00
06.448.00374.001401 LABOR - GRATUITOUS SERVICES - METER DEPT.		250.00	0.00	0.00	0.00
06.448.00374.002007 MATERIALS & SUPPLIES - GRATUITOUS SERVICES - DISTRIB. DEPT.		500.00	500.00	500.00	500.00
06.448.00375.001420 LABOR - REPAIRS & MAINT. - TRANSMISSION MAINS		4,000.00	0.00	0.00	0.00
06.448.00375.002020 MATERIALS & SUPPLIES - TRANSMISSION MAINS		15,000.00	0.00	0.00	0.00
06.448.00376.001420 LABOR - REPAIRS & MAINT. - DISTRIBUTION MAINS		87,500.00	128,500.00	125,000.00	115,000.00

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Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00376.002019 MATERIALS & SUPPLIES - CLEANING - DISTRIBUTION MAINS		13,000.00	0.00	0.00	0.00
06.448.00376.002020 MATERIALS & SUPPLIES - DISTRIBUTION MAINS		30,000.00	50,000.00	50,000.00	50,000.00
06.448.00376.003019 PROF. SERVICES - CLEANING & LINING - DISTRIBUTION MAINS		30,000.00	0.00	0.00	0.00
06.448.00376.141901 LABOR - CAPITAL OUTLAY - CARLISLE ST CLEANING & LINING		64,000.00	0.00	0.00	0.00
06.448.00376.141903 LABOR - CAPITAL OUTLAY - CLEANING & LINING		97,100.00	62,300.00	132,010.00	82,500.00
06.448.00376.201901 CAPITAL OUTLAY - CARLISLE ST CLEANING & LINING (MATERIALS)		71,250.00	0.00	0.00	0.00
06.448.00376.201903 CAPITAL OUTLAY - MATERIALS - CLEANING & LINING		36,600.00	78,800.00	0.00	0.00
06.448.00376.201908 CAPITAL OUTLAY - PLEASANT ST CLEANING & LINING (MATS. & PROF. SVC)		0.00	0.00	215,250.00	0.00
06.448.00376.301901 CAPITAL OUTLAY - PROF. SERVICES - CARLISLE ST CLEANING & LINING		40,000.00	0.00	0.00	0.00
06.448.00376.301903 CAPITAL OUTLAY - PROF.SERVICES - CLEANING & LINING		324,900.00	781,470.00	1,944,836.00	2,052,500.00
06.448.00377.001420 LABOR - SERVICE LINES		52,500.00	75,000.00	68,500.00	82,000.00
06.448.00377.001420.0025 LABOR - WATER HAULING STATION		1,000.00	500.00	500.00	0.00
06.448.00377.002020 MATERIALS & SUPPLIES - SERVICE LINES		25,000.00	20,000.00	20,000.00	20,000.00
06.448.00377.002020.0025 MATERIALS & SUPPLIES - WATER HAULING STATION		500.00	650.00	245.00	650.00
06.448.00378.001420 LABOR - TANKS & RESERVOIRS		13,500.00	12,500.00	15,000.00	12,500.00
06.448.00378.002020 MATERIALS & SUPPLIES - TANKS & RESERVOIRS		7,500.00	7,500.00	8,000.00	8,000.00
06.448.00378.707113					

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Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00378.707113 REPAIRS & MAINT. - TANKS & RESERVOIRS		0.00	0.00	70,000.00	0.00
06.448.00379.001420 LABOR - METER MAINTENANCE		137,500.00	130,000.00	132,500.00	147,500.00
06.448.00379.002020 MATERIALS & SUPPLIES - METER DEPT.		25,000.00	25,000.00	20,000.00	6,500.00
06.448.00379.300619 UTILITIES - WATER & SEWER - TANGER BLDG. - METER DEPT.		3,100.00	3,600.00	4,250.00	4,000.00
06.448.00379.300719 UTILITIES - SEWER - TANGER BLDG. - METER DEPT.		500.00	0.00	0.00	0.00
06.448.00380.001420 LABOR - FIRE HYDRANTS		15,500.00	15,500.00	12,500.00	13,000.00
06.448.00380.002020 MATERIALS & SUPPLIES - FIRE HYDRANTS		8,000.00	7,500.00	5,500.00	5,000.00
06.448.00382.130115 LABOR - BOROUGH MANAGER		31,250.00	37,150.00	44,000.00	44,900.00
06.448.00383.140115 LABOR - ADMINISTRATIVE STAFF (EXEC./OFFICE)		295,500.00	375,500.00	386,500.00	369,000.00
06.448.00384.200715 MATERIALS & SUPPLIES - OFFICE SUPPLIES		4,000.00	3,000.00	0.00	0.00
06.448.00386.200700 DUES, TRAINING, PERMITS, & MEMBERSHIPS		1,500.00	1,500.00	10,000.00	6,500.00
06.448.00387.002700 PROF. SERVICES - COMPUTER & SUPPORT SERVICES/SUBSCRIPTIONS		10,000.00	10,000.00	6,500.00	12,500.00
06.448.00387.200715 MATERIALS & SUPPLIES - OFFICE & RENTAL EXPENSES		10,000.00	17,500.00	4,500.00	6,000.00
06.448.00387.300415 UTILITIES - TELEPHONE - OFFICE		750.00	1,000.00	1,350.00	1,350.00
06.448.00387.301115 DATA PROCESSING MATERIALS, SUPPLIES, & PROF. SERVICES		6,000.00	0.00	0.00	0.00
06.448.00387.301215 RENTS - OFFICE RENT (GENERAL FUND)		91,962.00	90,710.00	93,199.00	105,424.00
06.448.00387.301315 ADVERTISING		3,000.00	3,000.00	3,000.00	2,000.00
06.448.00387.301415					

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Account Description		Adjusted 2018 Budget	Adjusted 2019 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00387.301415 MATERIALS & SUPPLIES - POSTAGE - OFFICE		40,000.00	35,000.00	37,500.00	40,500.00
06.448.00387.301515 RENTS - EQUIPMENT RENTAL - OFFICE		1,600.00	1,500.00	1,000.00	0.00
06.448.00387.301615 PROF. SERVICES - ACCOUNTING & AUDITING - OFFICE		13,200.00	12,400.00	12,100.00	9,500.00
06.448.00387.301715 PROF. SERVICES - ENGINEERING SERVICES - RATE CASE		150,000.00	0.00	200,000.00	175,000.00
06.448.00388.140116 LABOR - PIPE YARD - DISTRIB. MAINS		5,500.00	5,500.00	5,500.00	6,000.00
06.448.00388.140117 LABOR - SHED - DISTRIB. MAINS		20,000.00	20,000.00	20,000.00	18,500.00
06.448.00388.140118 LABOR - PUBLIC WORKS MECHANICS		34,500.00	50,000.00	43,000.00	50,000.00
06.448.00388.140119 LABOR - PUBLIC WORKS MECHANICS (MISC.)		12,500.00	0.00	0.00	0.00
06.448.00388.200618 UTILITIES - GASOLINE & OIL		30,000.00	27,500.00	25,000.00	20,000.00
06.448.00388.200716 MATERIALS & SUPPLIES - PIPE YARD		3,000.00	1,000.00	500.00	0.00
06.448.00388.200720 MATERIALS & SUPPLIES - OTHER BUILDINGS & STORAGE		2,000.00	2,000.00	2,500.00	2,500.00
06.448.00388.201819 UTILITIES - DIESEL FUEL		15,000.00	15,000.00	15,000.00	10,500.00
06.448.00388.202018 REPAIRS & MAINT. - VEHICLES		15,000.00	17,500.00	17,500.00	17,500.00
06.448.00388.202019 REPAIRS & MAINT. - EQUIPMENT		25,000.00	25,000.00	25,000.00	19,000.00
06.448.00388.203618 REPAIRS & MAINT. - OTHER BUILDINGS & STORAGE		1,500.00	3,750.00	3,000.00	3,000.00
06.448.00388.300419 UTILITIES - TELEPHONE - TANGER BUILDING		1,650.00	1,650.00	1,650.00	1,650.00
06.448.00388.300517 UTILITIES - ELECTRIC - TOOL SHED - R/R ST		1,250.00	0.00	0.00	0.00
06.448.00388.300518 UTILITIES - ELECTRIC - TOOL SHED - TANGER BUILDING		10,000.00	8,000.00	7,500.00	5,000.00
06.448.00388.300617					

Account Description		Adjusted 2018 Budget	Adjusted 2019 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.00388.300617 UTILITIES - WATER - TOOL SHED - R/R ST		200.00	0.00	0.00	0.00
06.448.00388.300619 UTILITIES - WATER, SEWER & STORMWATER - TOOL SHED - TANGER BUILDING		1,000.00	2,200.00	2,500.00	1,750.00
06.448.00388.300717 UTILITIES - SEWER - TOOL SHED - R/R ST		325.00	0.00	0.00	0.00
06.448.00388.300719 UTILITIES - SEWER - TOOL SHED - TANGER BUILDING		325.00	0.00	0.00	0.00
06.448.00388.300817 UTILITIES - GAS (HEAT) - TOOL SHED - R/R ST		2,000.00	0.00	0.00	0.00
06.448.00388.300818 UTILITIES - GAS (HEAT) - TANGER BUILDING		5,500.00	5,500.00	5,500.00	4,500.00
06.448.00388.300819 UTILITIES - GARBAGE - TANGER		1,650.00	4,500.00	3,500.00	4,500.00
06.448.00388.300917 UTILITIES - WATER - R/R ST PIPE YARD		150.00	0.00	0.00	0.00
06.448.00388.304018 UTILITIES - CABLE & INTERNET - TANGER BUILDING		1,250.00	1,250.00	1,250.00	1,250.00
06.448.00388.304417 UTILITIES - CELL PHONES		1,500.00	1,500.00	1,000.00	800.00
06.448.00390.404600 TAXES - CELL TOWER & WATERSHED PROPERTY TAXES		4,000.00	4,000.00	4,500.00	4,000.00
06.448.00392.304700 PROF. SERVICES - LEGAL SERVICES - SPECIAL		2,500.00	0.00	0.00	0.00
06.448.00392.304702 PROF. SERVICES - LEGAL SERVICES - RATE CASE		150,000.00	0.00	175,000.00	150,000.00
06.448.00392.304703 PROF. SERVICES - LEGAL SERVICES - LABOR NEG./STLMTS.		15,000.00	0.00	0.00	0.00
06.448.00392.304704 PROF. SERVICES - LEGAL SERVICES		6,500.00	7,500.00	8,000.00	8,000.00
06.448.00396.304921 BENEFITS/TAXES - HEALTH & HOSPITALIZATION INSURANCE		765,000.00	888,500.00	875,000.00	950,750.00
06.448.00396.304922 BENEFITS/TAXES - WORKMANS COMPENSATION		54,500.00	66,750.00	63,500.00	52,250.00
06.448.00396.304923					

THE BOROUGH OF HANOVER
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Account Description	Adjusted 2018 Budget	Adjusted 2019 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06 WATER REVENUE FUND				
Type E Expense				
Dept 448 WATER SYSTEM				
06.448.00396.304923 FIRE & LIABILITY INSURANCE	55,000.00	50,000.00	40,000.00	38,000.00
06.448.00396.304924 BENEFITS/TAXES - LIFE INSURANCE	5,500.00	5,800.00	5,700.00	5,675.00
06.448.00396.304926 BENEFITS/TAXES - RETIREE PRESCRIPTIONS INSURANCE	8,750.00	0.00	0.00	0.00
06.448.00396.304927 BENEFITS/TAXES - RETIREE HEALTH & LIFE INSURANCE	42,000.00	55,000.00	47,000.00	50,000.00
06.448.00397.305028 BENEFITS/TAXES - PENSION	89,074.00	123,512.00	124,789.00	167,570.00
06.448.00401.140100 LABOR - REPAIRS & MAINT. - FACILITIES (PW)	11,750.00	13,500.00	13,500.00	12,000.00
06.448.00550.140100 LABOR - MERCHANDISING & JOBBING	45,000.00	50,000.00	37,500.00	35,000.00
06.448.00550.200700 MATERIALS & SUPPLIES - MERCHANDISING & JOBBING	115,000.00	75,000.00	50,000.00	50,000.00
06.448.00608.504205 DEBT - FEES - G.O.B. 2013 SERIES	390.00	0.00	0.00	0.00
06.448.00608.504206 DEBT - FEES - G.O.B. 2015B SERIES	780.00	0.00	0.00	0.00
06.448.00608.504208 DEBT - FEES - G.O.B. 2015C SERIES (REFI. 2010)	227.00	0.00	0.00	0.00
06.448.00608.504209 DEBT - FEES - G.O.B. 2015D SERIES (REFI. 2010)	242.00	0.00	0.00	0.00
06.448.00608.504210 DEBT - FEES - G.O.B. SERIES (ALL)	585.00	2,224.00	2,500.00	3,050.00
06.448.04710.505238 DEBT - PRINCIPAL - G.O.B. 2020D SERIES	0.00	0.00	500,000.00	565,000.00
06.448.04710.505245 DEBT - PRINCIPAL - G.O.B. 2013 SERIES	115,000.00	120,000.00	120,000.00	125,000.00
06.448.04710.505246 DEBT - PRINCIPAL - G.O.B. 2020 (2015B) SERIES	145,000.00	320,000.00	325,000.00	325,000.00
06.448.04710.505247 DEBT - PRINCIPAL - G.O.B. 2020A SERIES (REFI. 2010/2015C)	10,000.00	10,000.00	10,000.00	290,000.00
06.448.04710.505248				

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Account Description		Adjusted 2018 Budget	Adjusted 2019 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
Type E	**Expense**				
Dept 448	**WATER SYSTEM**				
06.448.04710.505248 DEBT - PRINCIPAL - G.O.B. 2020C SERIES (REFI. 2010/2015D)		280,000.00	285,000.00	290,000.00	0.00
06.448.04710.505249 DEBT - PRINCIPAL - G.O.B. 2017 SERIES (REFI.2013)		28,000.00	28,000.00	27,000.00	30,000.00
06.448.04710.505257 DEBT - PRINCIPAL - LEASES (ENTERPRISE)		0.00	9,295.00	10,115.00	11,005.00
06.448.04720.505345 DEBT - INTEREST - G.O.B. 2013 SERIES		12,369.00	10,069.00	7,669.00	5,269.00
06.448.04720.505346 DEBT - INTEREST - G.O.B. 2020 (2015B) SERIES		255,430.00	252,530.00	246,132.00	220,944.00
06.448.04720.505347 DEBT - INTEREST - G.O.B. 2020A SERIES (REFI. 2010/2015C)		76,422.00	76,222.00	76,022.00	83,050.00
06.448.04720.505348 DEBT - INTEREST - G.O.B. 2020C SERIES (REFI. 2010/2015D)		35,963.00	30,362.00	24,663.00	14,000.00
06.448.04720.505349 DEBT - INTEREST - G.O.B. 2017 SERIES (REFI.2013)		206,565.00	206,005.00	205,444.00	204,904.00
06.448.04720.505357 DEBT - INTEREST - LEASES (ENTERPRISE)		0.00	4,785.00	3,970.00	3,075.00
Total Dept 448 **WATER SYSTEM**		**7,802,839.00**	**8,519,413.00**	**12,094,179.00**	**11,314,358.00**
Dept 486	**INSURANCE PREMIUMS & SOCIAL SECURITY**				
06.486.01500.001610 BENEFITS/TAXES - SOCIAL SECURITY		162,500.00	178,500.00	179,750.00	179,350.00
Total Dept 486 **INSURANCE PREMIUMS & SOCIAL SECURITY**		**162,500.00**	**178,500.00**	**179,750.00**	**179,350.00**
Total Type E **Expense**		**7,965,339.00**	**8,697,913.00**	**12,273,929.00**	**11,493,708.00**
Total Fund 06					

THE BOROUGH OF HANOVER
Annual Budget Book - Continuing Disclosure

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Account Description		Adjusted 2018 Budget	Adjusted 2019 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**				
WATER REVENUE FUND		**197,070.00**	**840,233.00**	**4,358,322.00**	**3,366,824.00**

``

Exhibit D VII-9

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

9. Describe long-term debt reacquisitions by company and parent as follows:
   a. Reacquisitions by issue by year.
   b. Total gain on reacquisitions by issue by year.
   c. Accounting of gain for income tax and book purposes.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-10

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

10. Provide the following information concerning compensating bank balance requirements for actual per book test year:
    a. Name of each bank.
    b. Address of each bank.
    c. Type of accounts with each bank (checking, savings, escrow, other services, etc.).
    d. Average daily balance in each account.
    e. Amount and percentage requirements for compensating bank balances at each bank.
    f. Average daily compensating bank balance at each bank.
    g. Documents from each bank explaining compensating bank balance requirements.
    h. Interest earned on each type of account.

RESPONSE

Not applicable, the respondent is a fund of a borough government. The respondent has no short-term debt.

``

Exhibit D VII-11

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

11. Provide the following information concerning bank notes payable for actual per book test year:
    a. Line of credit at each bank.
    b. Average daily balances of notes payable to each bank, by name of bank.
    c. Interest rate charged on each bank note (prime rate, formula).
    d. Purpose of each bank note, (for example, construction, fuel storage, working capital, debt retirement).
    e. Prospective future need for this type of financing.

RESPONSE

Not applicable, the respondent is a fund of a borough government. The respondent has no bank notes payable.

``

Exhibit D VII-12

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

12. Submit details on company or parent common stock offerings for the past 5 years to present, as follows:
    a. Date of prospectus.
    b. Date of offering.
    c. Record date.
    d. Offering period including dates and number of days.
    e. Amount and number of shares of offering.
    f. Offering ratio, if rights offering.
    g. Percent subscribed.
    h. Offering price.
    i. Gross proceeds per share.
    j. Expenses per share.
    k. Net proceeds per share in (12.) i and j.
    1. Market price per share.
        (1) At record date.
        (2) At offering date.
        (3) One month after close of offering.
    m. Average market price during offering.
        (1) Price per share.
        (2) Rights per share-average value of rights.
    n. Latest reported earnings per share at time of offering.
    o. Latest reported dividends at time of offering.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-13

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

13. Attach a chart explaining company's corporate relationship to its affiliates showing system structure.

RESPONSE

Not applicable, the respondent is a fund of a borough government. Please see EXHIBIT D XI-2 for a description of the relationship of borough and respondent.

``

Exhibit D VII-14

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

14. If the utility plans to make a formal claim for a specified allowable rate of return, provide the following data in statement or exhibit form:
    a. Claimed capitalization and capitalization ratios with supporting data.
    b. Claimed cost of long-term debt with supporting data.
    c. Claimed cost of short-term debt with supporting data.
    d. Claimed cost of total debt with supporting data.
    e. Claimed cost of preferred stock with supporting data.
    f. Claimed cost of common equity with supporting data.

RESPONSE

Please see Schedule 1 of Exhibit HW-1.

``

Exhibit D VII-15

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

15. Supply copies of the following documents for the company and, if applicable, its parent:
    a. Most recent annual report to shareholders including any statistical supplements.
    b. Most recent SEC form 10K.
    c. All SEC form 10Q reports issued within the preceding 12 months of the date of submittal of the rate increase request.

RESPONSE

a. Please see EXHIBIT D XI-2.
b. Not applicable, the respondent is a fund of a borough government.
c. Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-16

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

16. Supply copies of the company's balance sheets for each month for the last 2 years.

RESPONSE

Please see EXHIBIT D X-1.

``

Exhibit D VII-17

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

17. Provide the bond rating history for the company and, if applicable, its parent from the major credit rating agencies for the last five years.

RESPONSE

The respondent does not have bonds rated. However, the Borough of Hanover, which provides the debt financing, has an AA- bond rating. The Borough of Hanover has had an AA- bond rating since August 17, 2010.

``

Exhibit D VII-18

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

18. Provide copies of all bond rating reports relating to the company and, if applicable, its parent for the past 2 years.

RESPONSE

Attached is the requested information.

MOODY'S
INVESTORS SERVICE

CREDIT OPINION
27 May 2020

Rate this Research

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EMEA	44-20-7772-5454

Hanover (Borough of) PA

Update to credit analysis

Summary

Hanover Borough, PA (Aa3) maintains a strong financial position which has seen healthy year-over-year growth in reserve levels. The borough's strong financial position is offset by its small, largely built out tax base which has contracted in recent years and has a degree of commercial concentration. While the population has been stable, resident wealth and incomes are below average. The borough's water and sewer utility is well managed with ample liquidity. As a significant portion of the borough's debt associated with its water and sewer utilities and is self-liquidating, its net direct debt burden is below-average and its pension liabilities are manageable.

We regard the coronavirus outbreak as a social risk under our ESG framework, given the substantial implications for public health and safety. We do not see any material immediate credit risks for the Borough of Hanover. However, the situation surrounding coronavirus is rapidly evolving and the longer term impact will depend on both the severity and duration of the crisis. If our view of the credit quality of the Borough of Hanover changes, we will update the rating and/or outlook.

Credit strengths

» Strong financial position with steadily increasing reserves and liquidity

» Well managed water and sewer utilities

» Below-average debt and pension liabilities

Credit challenges

» Small tax base which has recently contracted

» Below-average resident wealth and incomes

Rating outlook

Moody's generally does not assign outlooks to local government issuers with this amount of debt outstanding.

Factors that could lead to an upgrade

» Significant tax base growth and diversification

» Material improvement in resident wealth and income profile

» Maintenance of structurally balanced operations and continued stability of financial reserves

Factors that could lead to a downgrade

» Failure to maintain balanced operations resulting in material draws on reserves

» Significant tax base contraction

» Deterioration of resident wealth and income profile

Key indicators

Exhibit

Hanover Borough	2015	2016	2017	2018	2019
Economy/Tax Base					
Total Full Value ($000)	$963,493	$964,531	$936,477	$941,567	$920,035
Population	15,403	15,429	15,506	15,563	15,563
Full Value Per Capita	$62,552	$62,514	$60,394	$60,500	$59,117
Median Family Income (% of US Median)	88.4%	86.9%	86.3%	80.2%	80.2%
Finances					
Operating Revenue ($000)	$15,208	$14,905	$17,942	$17,340	$17,207
Fund Balance ($000)	$6,835	$7,938	$8,854	$9,247	$9,939
Cash Balance ($000)	$6,437	$7,848	$8,199	$8,570	$9,063
Fund Balance as a % of Revenues	44.9%	53.3%	49.4%	53.3%	57.8%
Cash Balance as a % of Revenues	42.3%	52.7%	45.7%	49.4%	52.7%
Debt/Pensions					
Net Direct Debt ($000)	$54,757	$52,805	$49,212	$27,396	$6,643
3-Year Average of Moody's ANPL ($000)	$16,680	$16,311	$17,656	$19,890	$22,665
Net Direct Debt / Full Value (%)	5.7%	5.5%	5.3%	2.9%	0.7%
Net Direct Debt / Operating Revenues (x)	3.6x	3.5x	2.7x	1.6x	0.4x
Moody's - adjusted Net Pension Liability (3-yr average) to Full Value (%)	1.7%	1.7%	1.9%	2.1%	2.5%
Moody's - adjusted Net Pension Liability (3-yr average) to Revenues (x)	1.1x	1.1x	1.0x	1.1x	1.3x

Sources: US Census Bureau, Moody's Investors Service and Borough of Hanover audited financial statements

Profile

The Borough of Hanover is in the south central portion of the Commonwealth of Pennsylvania (Aa3 stable) within York County, approximately 37 miles south of Harrisburg and 45 miles northwest of Baltimore, MD (Aa2 stable). The borough covers approximately 3.9 square miles and has a population of 15,563.

Detailed credit considerations

Economy and tax base: small tax base and below-average resident wealth

The borough's tax base is small with a full valuation of $920.0 million. The tax base has contracted at a compound annual rate of 1.8% over the last five years. While residential properties make up a majority of the tax base at 65.4%, there is a notable commercial presence, at nearly 30% of the base which is concentrated in retail. While the borough is mostly built out, there are a few notable new developments underway, which could bring growth to the base over the longer term.

Taxpayer concentration is moderate with the top ten taxpayers accounting for 8.7% of assessed value. While management reports that all top taxpayers' operations are currently stable, the coronavirus is driving an unprecedented economic slowdown which is adversely affecting retail businesses. We currently forecast that US GDP will decline significantly during 2020 with a gradual recovery commencing toward the end of the year. Local governments with the highest exposure to the tourism, healthcare, retail, oil and gas and international trade sectors could suffer particularly severe impacts.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

The borough's population of 15,563 (2018 American Community Survey) has been relatively stable, increasing modestly year-over-year. Resident wealth and incomes are below-average, with median family income at 80.2% of the national level and full value per capita is $59,117. The borough's poverty level is average at 14.0%.

Financial operations and reserves: stable financial position with strong reserves and liquidity

The borough's financial position is strong, with steadily improving and ample reserves. Over the last five years, available fund balance has increased at a compound annual rate of 12.8%. In fiscal 2019, the borough realized a sizeable budget to actual positive variance. While the adopted budget appropriated approximately $767,000 million in reserves, the borough saw an operating surplus of approximately $681,000 which brought available fund balance to $9.9 million representing a very strong 57.8% of revenues. Based on year-to-date operations, management expects an additional general fund operating surplus and does not expect the coronavirus to have a material affect on its finances.

The borough's revenue streams have been fairly stable with the majority of general fund revenues coming from local taxes, which accounted for 50.8% of revenues in fiscal 2019, followed by fees and charges for services at 30.4%. As management has noted the potential for reserves to be utilized for capital expenditures in the coming years, the borough's ability to maintain strong reserve levels will be an area of focus for future reviews.

LIQUIDITY

The borough's cash position is strong and is expected to remain so in the near term given better than expected financial performance year-to-date. At the close of fiscal 2019 the borough had $9.1 million in net cash in the general fund, which represented a strong 52.7% of revenues.

Debt and pensions: below-average debt burden due to self-liquidating water & sewer debt

Following the issuance of the Series A of 2020 bonds, the borough will have gross direct debt of $47.3 million. As much of this debt is self supporting by the borough's water and sewer enterprises, net direct debt is significantly less at $6.6 million which represents a below-average 0.7% of full valuation. In fiscal 2019, debt service covered by the general fund totaled $1.1 million which represents a manageable 6.3% of revenues. Amortization of principal is slightly slower than average with 49.2% of principal retired within ten years.

DEBT STRUCTURE

All of the borough's debt is fixed rate and amortizes over the long-term.

DEBT-RELATED DERIVATIVES

The borough is not party to any swaps or other derivative agreements.

PENSIONS AND OPEB

The borough administers two defined benefit pension plans, one for uniformed employees and another for non-uniformed employees. The borough's three-year average adjusted net pension liability (ANPL), based on a 3.2% discount rate or assumed return on pension assets, was $26.2 million in fiscal 2019. In comparison, on a GASB reported basis the borough's pensions are over-funded by $2.0 million based on a discount rate of 7.0%. In fiscal 2019, the borough's pension contributions of $1.1 million represented 6.1% of operating revenues and were above our “tread water” indicator, the amount required to prevent reported net pension liabilities from growing given the entity's actuarial assumptions. To the extent that the borough fails to achieve the assumed rate of return on pension assets annual pension contributions will increase.

The borough funds retiree healthcare (OPEB) on a pay-as-you-go basis. In fiscal 2019, OPEB payments were approximately $151,000 accounting for 0.9% of operating revenues. As the number of retirees increases and they age annual OPEB expense will likely increase.

Fixed costs for fiscal 2019 (pension costs, OPEB, and debt service)totaled $2.3 million representing a manageable 13.3% of operating revenues. Increased OPEB and pension contributions could result in higher future fixed costs.

ESG considerations

Physical environmental risk associated with climate change represents a limited credit risk for the borough over the next several years, however may become more significant over time. Of the physical climate risks Moody's affiliate Four Twenty Seven evaluates, the borough's most significant exposure is to extreme rainfall and flooding. This assessment is based on evaluation of risks at the county level. Four Twenty Seven tracks data at the county and metropolitan level and thus no data is currently available for local governments

with fewer than 50,000 residents. The borough is mitigating its exposure to extreme rainfall events through ongoing investment in road repairs, and drainage and sewer upgrades among other capital improvements and we do not believe this environmental risk to be material to the borough's credit profile.

Social considerations factored into the rating include the borough's demographic profile, which is characterized by resident wealth and incomes which are below-average. Additionally, we regard the coronavirus outbreak as a social risk under our ESG framework, given the substantial implications for public health and safety. We do not see any material immediate credit risks for the Borough of Hanover. However, the situation surrounding coronavirus is rapidly evolving and the longer term impact will depend on both the severity and duration of the crisis. If our view of the credit quality of the Borough of Hanover changes, we will update the rating and/or outlook at that time.

Borough management is strong, as shown by conservative budgeting practices and adherence to a fund balance policy that dictates unassigned reserves of no less than 25% of annual expenditures.

Pennsylvania Cities have an Institutional Framework score of Aa, which is strong compared to the nation. Institutional Framework scores measure a sector's legal ability to increase revenues and decrease expenditures. Cities major revenue sources, property taxes, are moderately predictable but most cities are also exposed to economically sensitive income taxes. Unpredictable revenue fluctuations tend to be moderate, or between 5-10% annually. Across the sector, fixed and mandated costs are generally less than 25% of expenditures. However, Pennsylvania has public sector unions, which can limit the ability to cut expenditures. Unpredictable expenditure fluctuations tend to be moderate, between 5-10% annually.

Rating methodology and scorecard factors

The US Local Government General Obligation Debt methodology includes a scorecard, a tool providing a composite score of a local government's credit profile based on the weighted factors we consider most important, universal and measurable, as well as possible notching factors dependent on individual credit strengths and weaknesses. Its purpose is not to determine the final rating, but rather to provide a standard platform from which to analyze and compare local government credits.

Exhibit 2

Borough of Hanover, PA

Hanover Borough		
Scorecard Factors and Subfactors	**Measure**	**Score**
Economy/Tax Base (30%) [1]		
Tax Base Size: Full Value (in 000s)	$920,035	A
Full Value Per Capita	$59,117	A
Median Family Income (% of US Median)	80.2%	A
Notching Factors:[2]		
Other Analyst Adjustment to Economy/Taxbase Factor: Recent declines in full value; degree of retail concentration		Down
Finances (30%)		
Fund Balance as a % of Revenues	57.8%	Aaa
5-Year Dollar Change in Fund Balance as % of Revenues	26.2%	Aaa
Cash Balance as a % of Revenues	52.7%	Aaa
5-Year Dollar Change in Cash Balance as % of Revenues	22.4%	Aa
Notching Factors:[2]		
Other Analyst Adjustment to Finances Factor: Adherence to strong fund balance policies		Up
Management (20%)		
Institutional Framework	Aa	Aa
Operating History: 5-Year Average of Operating Revenues / Operating Expenditures	1.0x	Aa
Debt and Pensions (20%)		
Net Direct Debt / Full Value (%)	0.7%	Aaa
Net Direct Debt / Operating Revenues (x)	0.4x	Aa
3-Year Average of Moody's Adjusted Net Pension Liability / Full Value (%)	2.5%	A
3-Year Average of Moody's Adjusted Net Pension Liability / Operating Revenues (x)	1.3x	A
	Scorecard-Indicated Outcome	Aa2
	Assigned Rating	Aa3

[1] Economy measures are based on data from the most recently year available.
[2] Notching factors are specifically defined in the US Local Government General Obligation Debt methodology.
[3] Standardized adjustments are outlined in the GO Methodology Scorecard Inputs publication.
Sources: US Census Bureau, Moody's Investors Service, Borough of Hanover audited financial statements and preliminary official statement

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REPORT NUMBER 1230577

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MOODY'S
INVESTORS SERVICE

Rating Action: Moody's assigns Aa3 to the Borough of Hanover, PA's GO bonds, Series D of 2020

13 Nov 2020

New York, November 13, 2020 -- Moody's Investors Service has assigned a Aa3 general obligation unlimited tax (GOULT) rating to the Borough of Hanover, PA's $9.45 million General Obligation Bonds, Series D of 2020. Moody's maintains the Aa3 rating on the borough's outstanding GOULT debt.

RATINGS RATIONALE

The Aa3 rating reflects the borough's strong and improving financial position, as well as the small tax base and below-average resident wealth and incomes. Additionally, the rating considers the borough's modest direct debt burden, net of self-supporting utility debt, average pension liabilities, and manageable fixed costs.

We regard the coronavirus outbreak as a social risk under our ESG framework, given the substantial implications for public health and safety. However, management reports minimal impact to revenues due to a low reliance on economically sensitive revenues. Moreover, the borough expects a modest surplus in fiscal 2020, followed by a small deficit in fiscal 2021, with reserves remaining strong and above 50% of revenues.

RATING OUTLOOK

Moody's generally does not assign outlooks to local government issuers with this amount of debt outstanding.

FACTORS THAT COULD LEAD TO AN UPGRADE OF THE RATING

- Significant growth and diversification of the tax base

- Material improvement in resident wealth and income levels

- Maintenance of structurally balanced operations with continued stability of reserve levels

FACTORS THAT COULD LEAD TO A DOWNGRADE OF THE RATING

- Failure to maintain balanced operations resulting in consistent material draws on reserves

- Significant contraction of the tax base

- Deterioration of resident wealth and income levels

LEGAL SECURITY

The General Obligation Bonds, Series D of 2020 are considered general obligation unlimited tax (GOULT) as they are secured by the borough's full faith, credit and ad valorem taxing power.

USE OF PROCEEDS

Proceeds from the General Obligation Bonds, Series D of 2020 will be used to fund various water infrastructure projects.

PROFILE

The Borough of Hanover is in the south central portion of the Commonwealth of Pennsylvania (Aa3 stable) within York County, approximately 37 miles south of Harrisburg and 45 miles northwest of the City of Baltimore, MD (Aa2 stable). The borough covers approximately 3.9 square miles and has a population of approximately 15,563.

METHODOLOGY

The principal methodology used in this rating was US Local Government General Obligation Debt published in

July 2020 and available at https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBM_1230443. Alternatively, please see the Rating Methodologies page on www.moodys.com for a copy of this methodology.

REGULATORY DISCLOSURES

For further specification of Moody's key rating assumptions and sensitivity analysis, see the sections Methodology Assumptions and Sensitivity to Assumptions in the disclosure form. Moody's Rating Symbols and Definitions can be found at: https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_79004.

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Exhibit D VII-19

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

19. Supply copies of all presentations by the company's and, if applicable, its parent's management and securities analysts during the past 2 years, including presentations of financial projections.

RESPONSE

Not applicable, the respondent is a fund of a borough government and neither the borough nor the respondent utilize or prepare the requested information.

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Exhibit D VII-20

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

20. Provide a listing of all securities issuances for the company and, if applicable, its parent projected for the next 2 years. The response shall identify for each projected issuance the date, dollar amount, type of security, and effective cost rate.

RESPONSE

Not applicable, the respondent is a fund of a borough government and neither the borough nor the respondent utilize or prepare the requested information.

``

Exhibit D VII-21

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

21. Identify any plan by the company to refinance high cost long-term debt or preferred stock.

RESPONSE

The Borough of Hanover refinances high cost long-term debt from time to time when the refinancing is economically cost effective to the Borough.

``

Exhibit D VII-22

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

22. Provide copies of all securities analysts' reports relating to the company and its parent, or both, issued within the past 2 years.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-23

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

23. If applicable, supply a listing of all common equity infusions from the parent to the company over the past 5 years. In each case, identify date and dollar amount.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

24. If applicable, identify the company's common dividend payments to its parent for each of the last 5 years.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-25

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

25. Provide the latest year-by-year financial projections for the company for the next 5 years. Also, please indicate the date these projections were prepared; whether approved by management; and whether the projections have been submitted to bond rating agencies. The information will be treated in a confidential manner, if requested by the company in writing, as set forth in 52 Pa. Code § 5.423.

RESPONSE

Not applicable, the respondent is a fund of a borough government and neither the borough nor the respondent utilizes or prepares the requested information.

``

Exhibit D VII-26

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

26. Provide the company's 5-year construction budget.

RESPONSE

Please see EXHIBIT D V-12.

``

Exhibit D VII-27

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

27. Identify the company's and, if applicable, its parent's capital structure targets (percentages of capital types). Provide the complete basis for the capital structure targets.

RESPONSE

The respondent would like to increase their level of fund equity through improved earnings.

``

Exhibit D VII-28

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

28. For each month, of the most recent 24 months, supply the company's:
    a. Short-term debt balance.
    b. Short-term debt interest rate.
    c. Balance of construction work in progress.
    d. Balance of construction work in progress which is eligible for AFUDC accrual:

RESPONSE

a. The respondent has no short-term debt.
b. The respondent has no short-term debt.
c. The respondent had a construction work in progress balance of $1,051,511 at 12/31/18 and a balance of $1,221,933 at 12/31/19.
d. The respondent does not have the requested information.

``

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

29. Fully identify all debt, other than instruments traded in public markets, owed to all shareholders, corporate officers, or members of the board of directors, its affiliates, parent company, or subsidiaries.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-30

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

30. Provide a summary statement of all stock dividends, splits, or par value changes during the 2-year calendar period preceding the rate case filing.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

``

Exhibit D VII-31

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

31. If a claim of the filing utility is based on utilization of the capital structure or capital costs of the parent company and consolidated system, the reasons for this claim must be fully stated and supported.

RESPONSE

Not applicable, the respondent is filing using a hypothetical capital structure.

``

Exhibit D VII-32

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

32. To the extent not provided elsewhere, supply financial data of the company, and its parent, if applicable, for the last 5 years.
    a. Times interest earned ratio _ pre- and post tax basis.
    b. Preferred stock dividend coverage ratio__ post tax basis.
    c. Times fixed charges earned ratio _ pretax basis.
    d. Dividend payout ratio.
    e. AFUDC as a percent of earnings available for common equity.
    f. Construction work in progress as a percent of net utility plant.
    g. Effective income tax rate.
    h. Internal cash generations as a percent of total capital requirements.

RESPONSE

Not applicable, the respondent is a fund of a borough government.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   a. A description of the allocation methods used. A comparison of the allocated cost of service by class with the present and proposed revenues. A cost of service schedule showing the rate of return produced by present and proposed rates by class of service.

RESPONSE

A description of the methods used for the cost of service study is provided on pages 2 through 5 of Exhibit CEH-1 and in Statement No. 3. A comparison of the allocated cost of service by class with the present and proposed revenues is provided on Schedule A of Exhibit CEH-1. Schedule B of Exhibit CEH-1 shows the rate of return produced by present and proposed rates by customer classification.

Exhibit D VIII-1b

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   b. Indicate if the method used for establishing the allocation factors in the cost of service study deviates from the previous study submitted in the last rate case. If yes, indicate which allocation factors were changed and discuss the reason for the changes.

RESPONSE

The method used for establishing the allocation factors in the cost of service study does not deviate from the previous study submitted in the last rate case.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:

   c. Supply the average day, the maximum day and the maximum hour deliveries to the system adjusted for storage for the historic test year and 2 prior years. Also provide workpapers, analyses, comparative data or other documentation supporting the estimated maximum day and peak hour demands by customer class reflected in the company's cost of service study.

RESPONSE

Refer to Exhibit CEH-1, Schedule E for the average day and maximum day system deliveries for the years 2006 through 2020. Estimated maximum day and peak hour demands by customer class were based on judgment considering the system max day ratio, observations of the service areas, field studies conducted by our firm of other Pennsylvania water utilities and generally accepted maximum day and hour ratios, and were the same ratios used in prior Borough rate cases.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   d. Explain thoroughly the methodology employed if the company distinguishes between transmission and distribution or collection mains in its allocation of costs.

RESPONSE

For cost allocation purposes, mains that are larger than 10-inch are considered to be transmission mains and are allocated using Factor 3, which is based on average and maximum day extra capacity demands plus the daily requirement for fire demand. Mains sized 10-inch and under are considered distribution mains and are allocated using Factor 4, which is based on average and maximum hour extra capacity demands plus the hourly requirement for fire demands.

Exhibit D VIII-1e

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   e. Provide a detailed explanation of how storage is utilized to meet base, maximum day and maximum hour demands.

RESPONSE

Storage facilities have been considered to be adequate if the effective volume of the facility, or groups of facilities acting together, provided sufficient volume during peak hour demands and to meet equalization needs on the maximum day and provide a fire protection reserve. The effective volume of storage is that quantity, which can be used from the tank while maintaining adequate system pressures under the domestic, and fire flow conditions for distribution mains. The equalization volume is that quantity of water needed to allow production plant or booster station output rates to be constant and equal to the daily demand on the maximum day of the year. The use of equalization storage enables a reasonably constant rate of treatment plant operation and thereby promotes overall system efficiently and economy.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   f. Provide workpapers, calculations and supporting documentation which develop the equivalent meters and equivalent service line weights reflected in the company's cost of service study.

RESPONSE

The 5/8-inch meter equivalents were used for equivalent meters:

Meter Size	5/8-Inch Equivalent
5/8"	1.00
3/4"	1.50
1"	2.50
1 1/2"	5.00
2”	8.00
3”	15.00
4”	25.00
6”	50.00
8”	80.00

Response to Exhibit D VIII-1f Continued:

The 3/4-inch dollar equivalent was developed using the average installation costs by size, as follows:

Meter Size	3/4-Inch Dollar Equivalent
3/4"	1.00
1"	1.06
1-1/2"	1.28
2"	1.50
3”	2.37
4”	2.50
6”	2.79
8”	3.11
10”	4.12
12”	4.65

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   g. Provide all workpapers and supporting documentation for the fire flow requirement and duration utilized in the cost of service study.

RESPONSE

The source for the estimated fire protection demand of 3,500 gpm is published fire flow criteria for the population served and judgement.

General fire-fighting requirements, based on population established by the National Board of Fire Underwriters, are as follows:

a) For populations of 200,000 or less, $Q = 1020\sqrt{P}\,(1 - 0.01\sqrt{P})$ where Q is the fire draft in gpm and P is the population in thousands.

b) For populations in excess of 200,000, Q = 12,000 gpm plus 2,000 to 8,000 gpm for a potential second fire.

Inasmuch as the Borough serves a population of 42,643 the maximum fire flow of approximately 6,000 gpm would apply. However, this amount was adjusted for judgement.

The foregoing requirements were published in Volume I, "Water and Wastewater Engineering," by Fair, Geyer & Okon, published in 1966 by John Wiley & Sons, Inc.

The required fire flow duration is four hours.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   h. Provide a breakdown of the number and size of private fire services according to the general water service class of customer.

RESPONSE

Please refer to filing requirement Exhibit D II-10 in Exhibit GRH-2.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   i. Provide a calculation of the company's base cost of water or wastewater per unit of consumption or usage.

RESPONSE

The calculation of the base cost of water per 1000 gallons is as follows:

	Total System	Inside Borough	Outside Borough
Base Cost of Water (See attached functional allocation)	$4,977,122	$1,202,613	$3,774,509
Pro forma Water Consumption (1000 gallons)	1,505,126	471,869	1,033,258
Base cost per 1000 gallons	$3.307	$2.549	$3.653

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE STRUCTURE AND COST OF SERVICE FILING REQUIREMENTS

1. Provide a complete, fully allocated, cost of service study if an interval of 3 years has passed between a previous cost of service study and the historic test year date of the current filing. The cost of service study shall provide the necessary data to determine if the water or wastewater rate structure is fair and equitable to all classifications of water or wastewater customers (including public and private fire protection customers) and reflects, as nearly as possible, the cost of providing the service. The study shall correspond to the test year proposed revenue requirements (future test year only, if used). Summaries of conclusions and all back-up calculations shall be made part of the submission of the cost of service study, and shall include the following:
   j. Provide a detailed cost analysis that supports the company's customer charges, by meter size, showing all direct and indirect costs included.

RESPONSE

Refer to the schedule below and the following schedule 'Exhibit VII-1j Attachment' for the functional cost allocation.

OUTSIDE BOROUGH

	Cost of Service	Number of Units		Unit Cost Per Quarter
Meters	$ 636,918	14,119	5/8" Meter Equivalents	$ 11.28
Services	302,275	11,651	3/4" Service Equivalents	6.49
Billing and Collecting	148,306	44,875	Bills	3.30
Subtotal				$ 21.07
Unrecovered Public Fire	69,384	11,651	5/8" Meter Equivalents	$ 1.49
Total				$ 22.56

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2021
ALLOCATED TO FUNCTIONS

ACCOUNT	FACTOR REF	COST OF SERVICE	INSIDE								OUTSIDE							
				EXTRA CAPACITY				CUSTOMER	PRIVATE	PUBLIC		EXTRA CAPACITY				CUSTOMER	PRIVATE	PUBLIC
			BASE	MAX DAY	MAX HOUR	METERS	SERVICES	ACCTG	FIRE	FIRE	BASE	MAX DAY	MAX HOUR	METERS	SERVICES	ACCTNG	FIRE	FIRE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
OPERATION AND MAINTENANCE EXPENSES																		
Source of Supply																		
Operating Expense:																		
Labor	2	197,640	38,461	26,345	-	-	-	-	158	119	84,293	47,770	-	-	-	-	316	178
Gas and Diesel	2	1,860	362	248	-	-	-	-	1	1	793	449	-	-	-	-	3	2
Miscellaneous Operating Expenses	2	18,047	3,512	2,406	-	-	-	-	14	11	7,697	4,362	-	-	-	-	29	16
Power	1	11,177	3,483	-	-	-	-	-	13	10	7,626	-	-	-	-	-	28	17
Total Operation Expense		228,723	45,817	28,999	0	0	0	0	187	141	100,409	52,581	0	0	0	0	376	213
Maintenance Expense:																		
Labor	2	3,048	593	406	-	-	-	-	2	2	1,300	737	-	-	-	-	5	3
Miscellaneous Maintenance Expenses	2	27,602	5,371	3,679	-	-	-	-	22	17	11,772	6,671	-	-	-	-	44	25
Total Maintenance Expense		30,649	5,964	4,086	-	-	-	-	25	18	13,072	7,408	-	-	-	-	49	28
Total Source of Supply		259,373	51,782	33,085	-	-	-	-	212	159	113,481	59,989	-	-	-	-	425	240
Water Treatment																		
Operating Expense:																		
Labor	2	256,422	49,900	34,181	-	-	-	-	205	154	109,364	61,977	-	-	-	-	410	231
Lab - Water Testing	2	23,594	4,591	3,145	-	-	-	-	19	14	10,063	5,703	-	-	-	-	38	21
Diesel Fuel	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemicals	1	257,420	80,212	-	-	-	-	-	309	232	175,638	-	-	-	-	-	644	386
Power	1	52,978	16,508	-	-	-	-	-	64	48	36,147	-	-	-	-	-	132	79
Sewer Bill	1	323,506	100,805	-	-	-	-	-	388	291	220,728	-	-	-	-	-	809	485
Stormwater Bill	1	950	296	-	-	-	-	-	1	1	648	-	-	-	-	-	2	1
Miscellaneous	2	55,691	10,837	7,424	-	-	-	-	45	33	23,752	13,461	-	-	-	-	89	50
Total Operating Expense		970,561	263,149	44,750	0	0	0	0	1,030	773	576,340	81,140	0	0	0	0	2,124	1,254
Maintenance Expense																		
Labor	2	50,864	9,898	6,780	-	-	-	-	41	31	21,693	12,294	-	-	-	-	81	46
Miscellaneous Maintenance Expenses	2	16,963	3,301	2,261	-	-	-	-	14	10	7,235	4,100	-	-	-	-	27	15
Total Maintenance Expense		67,827	13,199	9,041	-	-	-	-	54	41	28,928	16,394	-	-	-	-	109	61
Total Water Treatment		1,038,388	276,348	53,791	0	0	0	0	1,085	813	605,268	97,534	0	0	0	0	2,233	1,315
Power and Pumping																		
Operating Expense																		
Labor	3	300,582	53,023	36,280	-	-	-	-	5,982	4,238	116,085	65,827	-	-	-	-	11,873	7,274
Supplies and Expenses	3	21,038	3,711	2,539	-	-	-	-	419	297	8,125	4,607	-	-	-	-	831	509
Power	1	173,179	53,963	-	-	-	-	-	208	156	118,160	-	-	-	-	-	433	260
Total Operating Expense		494,799	110,696	38,819	0	0	0	0	6,608	4,691	242,370	70,435	0	0	0	0	13,137	8,043
Maintenance Expense																		
Pump Station - Labor	3	50,963	8,990	6,151	-	-	-	-	1,014	719	19,682	11,161	-	-	-	-	2,013	1,233
Supplies and Equipment	3	26,255	4,631	3,169	-	-	-	-	522	370	10,140	5,750	-	-	-	-	1,037	635
Misc Maintenance Expense	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Maintenance Expense		77,218	13,621	9,320	-	-	-	-	1,537	1,089	29,822	16,911	-	-	-	-	3,050	1,869
Total Power and Pumping		572,017	124,318	48,140	-	-	-	-	8,145	5,779	272,191	87,345	-	-	-	-	16,187	9,912

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2021
ALLOCATED TO FUNCTIONS

ACCOUNT	FACTOR REF	COST OF SERVICE	INSIDE								OUTSIDE							
			BASE	EXTRA CAPACITY MAX DAY	EXTRA CAPACITY MAX HOUR	METERS	SERVICES	CUSTOMER ACCTG	PRIVATE FIRE	PUBLIC FIRE	BASE	EXTRA CAPACITY MAX DAY	EXTRA CAPACITY MAX HOUR	METERS	SERVICES	CUSTOMER ACCTNG	PRIVATE FIRE	PUBLIC FIRE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Transmission and Distribution																		
Operating Expense																		
Labor	10	293,694	9,545	-	13,216	51,602	21,205	-	5,903	7,607	22,967	1,468	23,965	75,450	34,068	-	12,834	13,862
Meter - Labor	8	124,245	-	-	-	50,469	-	-	-	-	-	-	-	73,777	-	-	-	-
Streets Dept.	10	20,694	673	-	931	3,636	1,494	-	416	536	1,618	103	1,689	5,316	2,401	-	904	977
Streets Dept. - Misc Exp	10	3,653	119	-	164	642	264	-	73	95	286	18	298	938	424	-	160	172
Meter Dept.	8	1,144	-	-	-	465	-	-	-	-	-	-	-	679	-	-	-	-
Other Distribution Expense	10	9,219	300	-	415	1,620	666	-	185	239	721	46	752	2,368	1,069	-	403	435
Gratuitous Services	10	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Operating Expense		452,650	10,636	0	14,727	108,433	23,628	0	6,578	8,476	25,592	1,636	26,704	158,529	37,962	0	14,301	15,447
Maintenance Expense																		
Transmission Mains - Labor	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transmission Mains - Supplies	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Labor - Cleaning mains	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Distribution Mains - Labor	6	135,121	12,311	-	17,221	-	-	-	8,111	5,744	29,764	-	33,365	-	-	-	17,702	10,903
Distribution Mains - Supplies	6	58,327	5,314	-	7,434	-	-	-	3,501	2,480	12,848	-	14,403	-	-	-	7,641	4,706
Distribution Mains - Contract Cleaning	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Service Lines - Labor	9	90,633	-	-	-	-	34,767	-	-	-	-	-	-	-	55,866	-	-	-
Service Lines	9	19,506	-	-	-	-	7,482	-	-	-	-	-	-	-	12,023	-	-	-
Tanks and Reservoirs - Labor	5	9,059	1,323	-	1,544	-	-	-	118	85	2,902	2,709	-	-	-	-	233	145
Tanks and Reservoirs	5	748	109	-	128	-	-	-	10	7	240	224	-	-	-	-	19	12
	5																	
Meters -Labor	8	114,523	-	-	-	46,519	-	-	-	-	-	-	-	68,004	-	-	-	-
Meters	8	13,285	-	-	-	5,396	-	-	-	-	-	-	-	7,889	-	-	-	-
Hydrants - Labor	7	11,317	-	-	-	-	-	-	-	4,153	-	-	-	-	-	-	-	7,164
Hydrants	7	7,400	-	-	-	-	-	-	-	2,716	-	-	-	-	-	-	-	4,684
Total Maintenance Expense		459,919	19,059	-	26,326	51,916	42,249	-	11,739	15,185	45,753	2,933	47,768	75,893	67,890	-	25,595	27,614
Total Transmission and Distribution		912,569	29,695	0	41,052	160,349	65,878	0	18,317	23,662	71,344	4,570	74,472	234,422	105,852	0	39,896	43,061
Administrative and General Expenses																		
Wages and Salaries - Professional Staff	13	45,965	5,033	2,992	910	3,553	1,462	942	593	657	11,169	5,525	1,650	5,194	2,344	1,503	1,255	1,181
Wages - General Office	13	297,833	32,613	19,389	5,897	23,022	9,471	6,106	3,842	4,259	72,373	35,800	10,692	33,655	15,189	9,739	8,131	7,654
Wages - Billing and Collecting	11	74,735	-	-	-	-	-	28,758	-	-	-	-	-	-	-	45,977	-	-
Office Supplies	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc Office Exp	13	2,706	296	176	54	209	86	55	35	39	658	325	97	306	138	88	74	70
General Office - Data Processing Maint.	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Office - Computer Programs	11	10,679	-	-	-	-	-	4,109	-	-	-	-	-	-	-	6,570	-	-
General Office - Misc	13	8,635	946	562	171	667	275	177	111	123	2,098	1,038	310	976	440	282	236	222
General Office - Rent	13	93,199	10,205	6,067	1,845	7,204	2,964	1,911	1,202	1,333	22,647	11,203	3,346	10,531	4,753	3,048	2,544	2,395
General Office - Postage	11	35,620	-	-	-	-	-	13,706	-	-	-	-	-	-	-	21,913	-	-
General Office - Auditors	13	10,448	1,144	680	207	808	332	214	135	149	2,539	1,256	375	1,181	533	342	285	269
Rate Case Expense	18	141,033	-	-	-	-	-	-	-	-	76,412	26,303	6,953	12,890	6,107	2,990	5,317	4,062
General Property Expense - Labor	13	88,016	9,638	5,730	1,743	6,804	2,799	1,804	1,135	1,259	21,388	10,580	3,160	9,946	4,489	2,878	2,403	2,262
General Property Expense - Vehicle	13	14,117	1,546	919	280	1,091	449	289	182	202	3,430	1,697	507	1,595	720	462	385	363
General Property Expense - Misc	13	73,891	8,091	4,810	1,463	5,712	2,350	1,515	953	1,057	17,956	8,882	2,653	8,350	3,768	2,416	2,017	1,899
Legal Expenses	13	10,854	1,189	707	215	839	345	223	140	155	2,638	1,305	390	1,227	554	355	296	279
Legal Expenses - PA PUC Legal Fees	13A	14,437	-	-	-	-	-	-	-	-	5,407	2,675	798	2,515	1,135	728	608	572
Insurance - Hospitalization	14	1,007,795	108,842	65,003	19,047	85,360	32,753	17,737	12,698	13,605	241,065	120,230	34,265	124,866	52,607	28,319	26,908	24,489
Insurance - Workman's Comp	14	52,250	5,643	3,370	988	4,426	1,698	920	658	705	12,498	6,233	1,777	6,474	2,727	1,468	1,395	1,270
Insurance - Fire and Liability	14	38,000	4,104	2,451	718	3,219	1,235	669	479	513	9,090	4,533	1,292	4,708	1,984	1,068	1,015	923
Insurance -Life	14	5,675	613	366	107	481	184	100	72	77	1,357	677	193	703	296	159	152	138
Insurance -Prescriptions	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Retirees Hospitalization and Health	14	48,210	5,207	3,110	911	4,083	1,567	849	607	651	11,532	5,751	1,639	5,973	2,517	1,355	1,287	1,172
Employee Pension	14	167,570	18,098	10,808	3,167	14,193	5,446	2,949	2,111	2,262	40,083	19,991	5,697	20,762	8,747	4,709	4,474	4,072
Unemployment Compensation	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Professional Services - Engineering Services	13	105,690	11,573	6,880	2,093	8,170	3,361	2,167	1,363	1,511	25,683	12,704	3,794	11,943	5,390	3,456	2,885	2,716
General Prop. Labor Exp	13	15,337	1,679	998	304	1,186	488	314	198	219	3,727	1,844	551	1,733	782	502	419	394
Bank Fees	13	5,325	583	347	105	412	169	109	69	76	1,294	640	191	602	272	174	145	137
Total Administrative and General Expenses		2,368,020	227,042	135,366	40,224	171,439	67,434	85,623	26,585	28,853	585,043	279,191	80,330	266,129	115,492	140,500	62,231	56,538

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2021
ALLOCATED TO FUNCTIONS

ACCOUNT	FACTOR REF	COST OF SERVICE	INSIDE								OUTSIDE							
			BASE	EXTRA CAPACITY MAX DAY	EXTRA CAPACITY MAX HOUR	METERS	SERVICES	CUSTOMER ACCTG	PRIVATE FIRE	PUBLIC FIRE	BASE	EXTRA CAPACITY MAX DAY	EXTRA CAPACITY MAX HOUR	METERS	SERVICES	CUSTOMER ACCTNG	PRIVATE FIRE	PUBLIC FIRE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Other Operating Expense																		
Merchandising and Jobbing - Labor	13	18,503	2,026	1,205	366	1,430	588	379	239	265	4,496	2,224	664	2,091	944	605	505	476
Merchandising and Jobbing - Misc	13	41,225	4,514	2,684	816	3,187	1,311	845	532	590	10,018	4,955	1,480	4,658	2,102	1,348	1,125	1,059
Other Non-operating Expense	13	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Other Operating Expense		59,728	6,540	3,888	1,183	4,617	1,899	1,224	770	854	14,514	7,179	2,144	6,749	3,046	1,953	1,631	1,535
Total Operation and Maintenance		5,210,095	715,724	274,270	82,459	336,404	135,211	86,848	55,114	60,121	1,661,842	535,808	156,946	507,301	224,390	142,454	122,603	112,601
Depreciation Expense																		
Collecting and Impounding Reservoirs - Imp	1	331,302	103,234	-	-	-	-	-	398	298	226,047	-	-	-	-	-	828	497
Springs and Wells	2	11,035	2,147	1,471	-	-	-	-	9	7	4,706	2,667	-	-	-	-	18	10
Collecting and Impounding Reservoirs - Coll	1	36,203	11,281	-	-	-	-	-	43	33	24,701	-	-	-	-	-	91	54
Aqueducts and Supply Mains	2	287,581	55,963	38,335	-	-	-	-	230	173	122,653	69,508	-	-	-	-	460	259
Sedimentation Basins	2	19,760	3,845	2,634	-	-	-	-	16	12	8,428	4,776	-	-	-	-	32	18
Filters	2	230,193	44,796	30,685	-	-	-	-	184	138	98,177	55,638	-	-	-	-	368	207
Clear Water Basin & Clearwell	2	25,178	4,900	3,356	-	-	-	-	20	15	10,738	6,086	-	-	-	-	40	23
Chemical Treatment Plant	2	411,660	80,109	54,874	-	-	-	-	329	247	175,573	99,498	-	-	-	-	659	370
Parr's Hill Chlorination Facility	2A	5,106	-	-	-	-	-	-	-	-	3,172	1,915	-	-	-	-	12	7
Laboratory Equipment	2	1,019	198	136	-	-	-	-	1	1	435	246	-	-	-	-	2	1
Structures and Improvements - Pumping	3	13,687	2,414	1,652	-	-	-	-	272	193	5,286	2,997	-	-	-	-	541	331
Parr's Hill Booster Station	3A	24,142	-	-	-	-	-	-	-	-	13,587	8,201	-	-	-	-	1,458	896
Kidd Lane Pump Station	3A	368	-	-	-	-	-	-	-	-	207	125	-	-	-	-	22	14
Slagle Run Pump Station	3	1,646	290	199	-	-	-	-	33	23	636	360	-	-	-	-	65	40
Pumps and Pumping Equipment	3	70,356	12,411	8,492	-	-	-	-	1,400	992	27,171	15,408	-	-	-	-	2,779	1,703
Electrical Equipment	3	75,451	13,310	9,107	-	-	-	-	1,501	1,064	29,139	16,524	-	-	-	-	2,980	1,826
Other Pump Station Equipment	3	699	123	84	-	-	-	-	14	10	270	153	-	-	-	-	28	17
Transmission Mains	3	35,658	6,290	4,304	-	-	-	-	710	503	13,771	7,809	-	-	-	-	1,408	863
Distribution Reservoirs and Standpipes	5	35,161	5,137	-	5,991	-	-	-	457	331	11,262	10,517	-	-	-	-	904	563
Distribution Mains	6	136,474	12,435	-	17,393	-	-	-	8,192	5,802	30,062	-	33,699	-	-	-	17,879	11,012
Services	9	32,364	-	-	-	-	12,415	-	-	-	-	-	-	-	19,949	-	-	-
Meters	8	81,809	-	-	-	33,231	-	-	-	-	-	-	-	48,578	-	-	-	-
Hydrants	7	450	-	-	-	-	-	-	-	165	-	-	-	-	-	-	-	285
Structures and Improvements - General	13	12,475	1,366	812	247	964	397	256	161	178	3,031	1,499	448	1,410	636	408	341	321
General Office Equipment	13	3,509	384	228	69	271	112	72	45	50	853	422	126	397	179	115	96	90
Other General Equipment	13	179,339	19,638	11,675	3,551	13,863	5,703	3,676	2,313	2,565	43,579	21,557	6,438	20,265	9,146	5,864	4,896	4,609
Depreciation Expense		2,062,625	380,271	168,044	27,252	48,329	18,626	4,004	16,329	12,798	853,486	325,906	40,711	70,650	29,911	6,387	35,905	24,014
Taxes Other Than Income	14	$ 3,325	359	214	63	282	108	59	42	45	795	397	113	412	174	93	89	81
Taxes Other Than Income - Payment in Lieu	15	161,837	28,613	11,312	4,483	2,541	1,667	113	2,411	1,764	64,185	22,317	7,283	3,722	2,687	194	5,244	3,301
Utility Operating Income Available for Return - Inside	16A	218,172	117,311	46,558	18,414	10,996	7,047	655	9,927	7,265	-	-	-	-	-	-	-	-
Utility Operating Income Available for Return - Outside	16B	2,260,092	-	-	-	-	-	-	-	-	1,325,996	462,641	150,974	80,911	57,180	5,198	108,484	68,707
TOTAL COST OF SERVICE		9,916,147	1,242,278	500,398	132,671	398,552	162,659	91,678	83,823	81,993	3,906,305	1,347,069	356,028	662,996	314,341	154,326	272,325	208,705
LESS: OTHER WATER REVENUES																		
PENALTIES - INSIDE	17	19,867	2,305	928	232	789	316	185	151	153	8,024	2,762	729	1,353	642	314	558	427
RENTS	17	96,927	11,244	4,526	1,134	3,848	1,541	901	737	746	39,149	13,473	3,557	6,601	3,131	1,531	2,724	2,084
MISCELLANEOUS REVENUE	17	16,566	1,922	774	194	658	263	154	126	128	6,691	2,303	608	1,128	535	262	465	356
RETIREES REIMBURSEMENT	14	46,151	4,984	2,977	872	3,909	1,500	812	581	623	11,039	5,506	1,569	5,718	2,409	1,297	1,232	1,121
UNMETERED SALES	17	41,964	4,868	1,960	491	1,666	667	390	319	323	16,949	5,833	1,540	2,858	1,355	663	1,179	902
MERCHANDISING AND JOBBING	17	123,650	14,343	5,774	1,447	4,909	1,966	1,150	940	952	49,942	17,187	4,538	8,421	3,994	1,954	3,475	2,658
TOTAL OTHER WATER REVENUES		345,125	39,665	16,939	4,370	15,778	6,254	3,593	2,854	2,925	131,795	47,063	12,541	26,078	12,066	6,021	9,633	7,549
REALLOCATION OF PUBLIC FIRE - OUTSIDE	19													69,384				(69,384)
REALLOCATION OF PUBLIC FIRE - INSIDE	20					79,068				(79,068)								
TOTAL COST OF SERVICE RELATED TO SALES OF WATER		9,571,021	1,202,613	483,459	128,301	461,841	156,405	88,086	80,969	0	3,774,509	1,300,006	343,486	706,302	302,275	148,306	262,692	131,772

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO RATE OF RETURN
FILING REQUIREMENTS

2. Provide a listing of negotiated special rate contracts which includes a comparison of revenues under special rate contracts and under tariff rates. Provide the cost of service treatment of any deficiency in revenues resulting from the negotiated special rate contracts. Special rates are defined as rates not contained in the currently effective tariff.

RESPONSE

The Borough does not have any negotiated special rate contracts.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO QUALITY OF SERVICE
FILING REQUIREMENTS

1. Indicate whether the company is in violation of any provision of the Pennsylvania Safe Drinking Water Act (SDWA) or any rule, regulation or order, or any condition of any permit, variance or exemption granted by the Pennsylvania Department of Environmental Protection (PA-DEP), or its predecessor.
   a. Provide information indicating whether the company is in compliance with SDWA provisions at 25 Pa. Code § 109.407 regarding general public notification requirements:
      (i) Provide a copy of each public notification given in accordance with this section, since the last rate proceeding.
      (ii) Provide a detailed explanation of all actions taken to remedy an acute violation, and to comply with the requirements prescribed by a variance or exemption.
      (iii) State whether any fines or penalties were assessed by PA-DEP, and indicate the amounts paid by the company.
   b. Provide the most recent copies of all annual consumer confidence reports issued pursuant to SDWA Amendments of 1996 since the last rate proceeding.
      (i) Provide any annual consumer confidence reports which reflect violations of State and Federal safe drinking water requirements.
      (ii) Explain how these violations were resolved.

RESPONSE

a. See below:
   (i) The Borough had certain instances requiring public notification requirements for violations/noncompliance with the SDWA since the last rate proceeding. See 'Exhibit D IX-1 Attachment A' for all related documents relative to the incident(s). In addition, see 'Exhibit D IX-1 Attachment B' for notices provided in relation to identified water main breaks and subsequent "boil water" advisories to impacted customers, pending sample results after repair completion, including communications to the Commonwealth Department of Environmental Protection (DEP).
   (ii) For certain periods of time from February 7, 2015 through March 2015, the disinfection treatment was not operating at a level sufficient to meet the required level of inactivation of pathogenic organisms in the drinking water provided to some of our customers. During these periods, the filtration process performance achieved regulatory requirements, but did not maintain the required chlorine concentration. The Borough failed to notify our customers and DEP within 24 hours of the problem. DEP

Response to Exhibit D IX-1 Continued:

was notified on March 10, 2015.

Effective March 10, 2015, the chlorine concentration was increased to achieve the required level of inactivation and the Borough has met treatment technique requirements since that time. After increasing chlorine, meeting with DEP and consulting engineer to develop a targeted improvement plan.

The incident was a Tier 2 Violation- failure to respond to a disinfection treatment breakdown. A CodeRed notification for entire system for the dates of March 7, 2015 and March 8, 2015 was activated. The Borough ensured the delivery of notifications to affected customers showing multiple days of violations between March 1, 2015 and March 9, 2015. The Borough instituted hand delivery of notifications to affected customers for violations which occurred on February 7, 2015 and multiple days between February 26, 2015 and March 9, 2015.

See 'Exhibit D IX-1 Attachment A' for all related documents relative to the violation.

(iii) No financial fines were assessed. See 'Exhibit D IX-1 Attachment A' for all related documents relative to the violation.

b. See 'Exhibit D IX-1 Attachment C' for the Consumer Confidence Reports ("CCR") on water quality from 2015 to 2019.

(i) As documented in the 2018 CCR Report, during routine sampling of the distribution system, two results out of 610 samples collected and analyzed were below the 0.02 ppm MinRDL. Both corresponding bacteria samples were negative. No violations occurred.

(ii) N/A.

From: Scheetz, Lynne [lscheetz@pa.gov]
Sent: Tuesday, March 31, 2015 9:27 AM
To: Michael Mehaffey
Cc: Anderson, Angela; Chescattie, Edgar; bkrebs@borough.hanover.pa.us; Tim Mayers; Terry Sterner; Jamie Shambaugh; Stoner, Stephanie; Hess, Michael; Philip Grapes; Nesmith, Rodney; Shaul, Thomas; Porta, Megan
Subject: Hanover Public Notice

Attachments: Hanover CT Tier 2 - 2 Violations.doc

Mike,
As we discussed today, attached is a copy of the Public Notice (PN) with the Department's edits. Correction of the dates to March 7 and 8 is the big one. The others are just recommendations.

Additionally, the Department wants to avoid any confusion from the public as to why there are 3 different versions of the Public Notice. In order to avoid that, we will require Hanover to hand deliver the PN to the 8 customers who are receiving a version which includes 6 days or 8 days, and to explain to them why their Public Notice is different from the one that will be publicly available. The only PN that should be on the website or disseminated to the general public should be the one showing 2 days, March 7 & 8.

Please remember to send the Department a copy of the final PN, along with a signed Public Notice Certification Form after the PN has been delivered.
If you have any other questions, please feel free to contact me.

Lynne L. Scheetz | Environmental Group Manager
Department of Environmental Protection | Safe Drinking Water Program
Southcentral Regional Office
909 Elmerton Avenue | Harrisburg, PA 17110
Phone: 717.705.4933 | Fax: 717.705.4930
www.depweb.state.pa.us

From: Michael Mehaffey [mailto:mmehaffey@gfnet.com]
Sent: Monday, March 30, 2015 7:18 PM
To: Scheetz, Lynne
Cc: Anderson, Angela; Chescattie, Edgar; bkrebs@borough.hanover.pa.us; Tim Mayers; Terry Sterner; Jamie Shambaugh; Stoner, Stephanie; Hess, Michael; Philip Grapes; Nesmith, Rodney; Shaul, Thomas
Subject: RE: Hanover - Additional CT Data

Lynne – Attached are the three proposed Public Notices as discussed in your email below. Pending your approval, these notices will be issued on April 1, 2015. Please let me know if you have any comments or questions.

Thank you,

Mike

From: Scheetz, Lynne [mailto:lscheetz@pa.gov]
Sent: Friday, March 27, 2015 11:12 AM
To: Michael Mehaffey
Cc: Anderson, Angela; Chescattie, Edgar; bkrebs@borough.hanover.pa.us; Tim Mayers; Terry Sterner; Jamie Shambaugh; Stoner, Stephanie; Hess, Michael; Philip Grapes; Nesmith, Rodney; Shaul, Thomas
Subject: RE: Hanover - Additional CT Data

All,

After review, the Department accepts your submission and conclusions. We approve your plan to provide Public Notice (PN) as originally requested, which proposed issuing PN covering 8 days to the first set of customers on the 12" line, 6 days to the first set of customers on the 18" line, and 2 days to customers on the remainder of the system. Please forward me a copy of your proposed PN prior to issuance. We will review the PN as soon as possible and provide comments or approval in short order. The proposed PN should then be issued no later than April 1 in order to comply with the 30-day time frame for a Tier 2 PN. (For the first 2 customers on the 12" line, the PN is already technically overdue, even for a Tier 2 PN.)

Please let me know if you have any other comments or questions.

Lynne L. Scheetz | Environmental Group Manager
Department of Environmental Protection | Safe Drinking Water Program
Southcentral Regional Office
909 Elmerton Avenue | Harrisburg, PA 17110
Phone: 717.705.4933 | Fax: 717.705.4930
www.depweb.state.pa.us

From: Michael Mehaffey [mailto:mmehaffey@gfnet.com]
Sent: Friday, March 27, 2015 9:17 AM
To: Scheetz, Lynne
Cc: Anderson, Angela; Chescattie, Edgar; bkrebs@borough.hanover.pa.us; Tim Mayers; Terry Sterner; Jamie Shambaugh; Stoner, Stephanie; Hess, Michael; Philip Grapes
Subject: Hanover - Additional CT Data

Lynne,

As a follow up to our discussion yesterday, we are offering the attached CT calculations and results for your review and consideration. The CT summary table and data sheets show the log inactivation achieved prior to the next set of customers off of the 18-inch transmission main.

The next set of customers are serviced by a 12-inch line which branches off the 18-inch transmission at Racehorse Rd (map attached – development about 1.25 miles to the west of 18" connection). The length of the 12-inch line is greater than 5,000 feet, but 5,000 feet was the conservative value used for this analysis. Additionally, the peak flow through the 12-inch main is assumed to be equal to the peak

flow through the 18-inch main. Finally, the chlorine residual at the end of the 12-inch line is calculated using the increased detention time and the same chlorine degradation constant found in testing.

The CT calculations indicate that there is one occurrence, on March 8, when the log inactivation was less than 0.95 through the Old and New Plant. However, if the Department is agreeable, we would propose issuing a Borough wide PN for two violations, on March 7th and March 8th, as presented with the previously submitted Mt. Pleasant data. Separate notices would be issued to the residents more local to the WTP, where additional violations occurred.

Please let me know if you have any comments or questions.

Thank you,

Michael J. Mehaffey| Senior Project Engineer/Project Manager
Gannett Fleming, Inc. | PO Box 67100, Harrisburg, PA 17106-7100
t 717.763.7211 x2169 | mmehaffey@gfnet.com
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Hanover Municipal Waterworks
Chlorine Degradation Test and Pipeline CT Evaluation

1.0 Introduction

Due to breakdown of treatment technique, Hanover WTP did not achieve the required log inactivation of *Giardia* on multiple days between January 14 and March 9, 2015. The initial investigation identified 23 dates when the combined volume of the Old and New Plant sedimentation basins and filters, and in the Clear Basin common to both plants, did not provide sufficient CT to achieve 1.0-log inactivation of *Giardia*. Hanover conducted an evaluation to determine the additional CT provided in previously-unaccounted plant facilities, such as the New Plant Clearwell and the High Service Pump Clearwells No. 1 & 2, and in the transmission mains leaving the WTP site prior to customer service connections to determine the specific number of days when the required CT was not achieved prior to customer service connections and to identify the distribution service areas that were affected.

2.0 Service Areas

There are three (3) transmission mains leaving the WTP site: parallel 18- and 20-inch mains which deliver water in the direction of Hanover Borough and a 12-inch main which delivers water to the Parr's Hill Reservoir. The first customer connection on the 18-inch main is approximately 3,400 ft from the WTP. The next connection on the 18-inch main, as well as the first connection on the 20-inch main, is more than 5,000 ft from the WTP. The first connection on the 12-inch main is a 6-inch lateral located approximately 3,620 ft from the WTP. The length of the lateral is approximately 865 ft. The next connection on the 12-inch main is located in the Mount Pleasant area, which is a distance of approximately 9,580 ft from the WTP. The first 12-inch connection affects two (2) residents and the first 18-inch connection affects six (6) residents. The exact number of residents affected at the next connections on the 12- and 18-mains has not been determined, so is assumed to be borough-wide.

3.0 CT Calculation

A chlorine degradation test was conducted to determine the CT achieved in the transmission mains. On March 23 and 24, WTP personnel collected grab samples from the finished water leaving through the 12- and 18-inch transmission mains. Following a period of time equal to the pipeline detention time, a grab sample was collected at the location of the first customer on each main, as well as at the location of the first Mount Pleasant area customer. This data was used to calculate a first-order chlorine degradation constant using Equation 3.1:

Equation 3.1: $k = ln (C/C0)/-t$

Where:
- k — Degradation constant, min^{-1}
- C — Concentration at sample site, mg/L
- C0 — Concentration at WTP, mg/L
- t — Detention time, min

The test determined an average chlorine degradation constant of 0.007 for the segment of the 12-inch transmission main before the first customer and a constant of 0.002 for the total segment until the Mount Pleasant service area. The average degradation constant for the segment of the 18-inch main before the first customer was 0.002. The test data is summarized in Tables 3-1 through 3-3.

Table 3-1: Chlorine Degradation Test Results, 1st Connection on 12-inch main

Date	WTP Residual, C0	Detention Time, t	Site Residual, C	ln (c/c0)	k
3/23/15	0.95	20	0.78	-0.1972	0.010
3/23/15	0.90	20	0.72	-0.2231	0.011
3/23/15	0.87	20	0.72	-0.1892	0.009
3/23/15	0.95	20	0.75	-0.2364	0.012
3/23/15	1.00	20	0.86	-0.1508	0.008
3/24/15	1.38	20	1.15	-0.1823	0.009
3/24/15	1.29	20	1.18	-0.0891	0.004
3/24/15	1.23	20	1.09	-0.1208	0.006
3/24/15	1.27	20	1.12	-0.1257	0.006
3/24/15	1.20	20	1.12	-0.0690	0.003
3/24/15	1.22	20	1.14	-0.0678	0.003
3/24/15	1.18	20	1.07	-0.0979	0.005
3/24/15	1.18	20	1.09	-0.0793	0.004
3/24/15	1.16	20	1.04	-0.1092	0.005
3/24/15	1.16	20	1.02	-0.1286	0.006
3/24/15	1.13	20	1.05	-0.0734	0.004
3/24/15	1.15	20	1.05	-0.0910	0.005
3/24/15	1.12	20	1.04	-0.0741	0.004
3/24/15	1.15	20	0.89	-0.2563	0.013
			Average (3/23 & 3/24)		**0.007**

Table 3-2: Chlorine Degradation Test Results, Mt. Pleasant Connection on 12-inch main

Date	WTP Residual, C0	Detention Time, t	Site Residual, C	ln (c/c0)	k
3/23/15	0.95	50	0.82	-0.1472	0.003
3/23/15	0.90	50	0.80	-0.1178	0.002
3/23/15	0.87	50	0.80	-0.0839	0.002
3/23/15	0.95	50	0.86	-0.0995	0.002
3/23/15	1.00	50	0.93	-0.0726	0.001
3/24/15	1.38	50	1.24	-0.1070	0.002
3/24/15	1.29	50	1.18	-0.0891	0.002
3/24/15	1.23	50	1.14	-0.0760	0.002
3/24/15	1.27	50	1.14	-0.1080	0.002
3/24/15	1.20	50	1.14	-0.0513	0.001
3/24/15	1.22	50	1.14	-0.0678	0.001
3/24/15	1.18	50	1.11	-0.0612	0.001
3/24/15	1.18	50	1.07	-0.0979	0.002
3/24/15	1.16	50	1.09	-0.0622	0.001
3/24/15	1.16	50	1.07	-0.0808	0.002
3/24/15	1.13	50	1.05	-0.0734	0.001
3/24/15	1.15	50	1.02	-0.1200	0.002
3/24/15	1.12	50	1.02	-0.0935	0.002
3/24/15	1.15	50	1.02	-0.1200	0.002
			Average (3/23 & 3/24)		**0.002**

Table 3-3: Chlorine Degradation Test Results, 1st Connection on 18-inch main

Date	WTP Residual, C0	Detention Time, t	Site Residual, C	ln (c/c0)	k
3/23/15	0.92	35	0.86	-0.0674	0.002
3/23/15	0.94	35	0.78	-0.1866	0.005
3/23/15	0.91	35	0.83	-0.0920	0.003
3/23/15	0.95	35	0.84	-0.1231	0.004
3/23/15	1.01	35	0.94	-0.0718	0.002
3/24/15	1.37	35	1.27	-0.0758	0.002
3/24/15	1.28	35	1.28	0.0000	0.000
3/24/15	1.26	35	1.17	-0.0741	0.002
3/24/15	1.27	35	1.19	-0.0651	0.002
3/24/15	1.23	35	1.16	-0.0586	0.002
3/24/15	1.21	35	1.15	-0.0509	0.001
3/24/15	1.17	35	1.13	-0.0348	0.001
3/24/15	1.20	35	1.12	-0.0690	0.002
3/24/15	1.15	35	1.13	-0.0175	0.001
3/24/15	1.17	35	1.10	-0.0617	0.002
3/24/15	1.15	35	1.10	-0.0445	0.001
3/24/15	1.13	35	1.09	-0.0360	0.001
3/24/15	1.14	35	1.08	-0.0541	0.002
3/24/15	1.12	35	1.07	-0.0457	0.001
			Average (3/23 & 3/24)		**0.002**

The chlorine degradation constant was used to calculate the chlorine residual concentration at the locations described in Section 2.0 based on the finished water chlorine residual data at the WTP effluent shown in the WTP records.

4.0 Log Inactivation

The revised CT calculations, which include the additional inactivation achieved both at the plant and through the three (3) pipe segments [12-inch main to first customer, 12-inch main to Mount Pleasant, and 18-inch main to first customer] reduce the total number of days where sufficient CT was not provided and reduce the total affected service area. If the CT achieved in the pipelines is included, the 12-inch / first connection main was affected a total of eight (8) days, the 12-inch / Mount Pleasant area was affected a total of two (2) days, and the 18-inch / first connection main was affected a total of six (6) days. Please note that this includes occurrences on the same day.

The CT calculation data sheets for each plant, and for each pipe segment, are included in Appendix A. The data summarizing the log inactivation achieved for each segment is summarized in Table 4-1.

Table 4-1: 12-inch main, CT at 1st customer

No.	Date	Old Plant log removal		New Plant log removal		Violation
		WTP	with Main	WTP	with Main	
1	Jan 14	0.92	1.20	> 1	N/A	N
2	Jan 23	> 1	N/A	0.99	1.35	N
3	Jan 29	> 1	N/A	0.93	1.26	N
4	Jan 30	0.90	1.15	0.72	1.03	N
5	Feb 01	> 1	N/A	0.72	1.05	N
6	Feb 07	0.67	**0.91**	> 1	N/A	Y
7	Feb 09	0.99	1.23	> 1	N/A	N
8	Feb 10	0.94	1.18	> 1	N/A	N
9	Feb 14	0.87	1.13	> 1	N/A	N
10	Feb 16	0.89	1.13	> 1	N/A	N
11	Feb 21	0.88	1.11	> 1	N/A	N
12	Feb 24	0.91	1.22	> 1	N/A	N
13	Feb 25	0.73	0.96	0.68	1.00	N
14	Feb 26	0.60	**0.85**	0.82	1.19	Y
15	Feb 27	> 1	N/A	0.64	0.95	N
16	Feb 28	> 1	N/A	0.96	1.30	N
17	Mar 01	> 1	N/A	0.50	**0.75**	Y
18	Mar 02	0.98	1.23	0.48	**0.77**	Y
19	Mar 05	> 1	N/A	0.75	1.05	N
20	Mar 06	> 1	N/A	0.42	**0.68**	Y
21	Mar 07	> 1	N/A	0.35	**0.59**	Y
22	Mar 08	0.32	**0.53**	0.12	**0.36**	Y
23	Mar 09	0.45	**0.68**	0.83	1.11	Y
					Count	8

N/A: Not applicable

Table 4-2: 12-inch main, CT at Mt. Pleasant

No.	Date	Old Plant log removal		New Plant log removal		Violation
		WTP	with Main	WTP	with Main	
1	Jan 14	0.92	1.67	> 1	N/A	N
2	Jan 23	> 1	N/A	0.99	1.81	N
3	Jan 29	> 1	N/A	0.93	1.65	N
4	Jan 30	0.90	1.56	0.72	1.45	N
5	Feb 01	> 1	N/A	0.72	1.48	N
6	Feb 07	0.67	1.31	> 1	N/A	N
7	Feb 09	0.99	1.65	> 1	N/A	N
8	Feb 10	0.94	1.60	> 1	N/A	N
9	Feb 14	0.87	1.56	> 1	N/A	N
10	Feb 16	0.89	1.52	> 1	N/A	N
11	Feb 21	0.88	1.50	> 1	N/A	N
12	Feb 24	0.91	1.72	> 1	N/A	N
13	Feb 25	0.73	1.34	0.68	1.38	N
14	Feb 26	0.60	1.28	0.82	1.61	N
15	Feb 27	> 1	N/A	0.64	1.38	N
16	Feb 28	> 1	N/A	0.96	1.72	N
17	Mar 01	> 1	N/A	0.50	1.09	N
18	Mar 02	0.98	1.64	0.48	1.18	N
19	Mar 05	> 1	N/A	0.75	1.44	N
20	Mar 06	> 1	N/A	0.42	1.02	N
21	Mar 07	> 1	N/A	0.35	**0.94**	Y
22	Mar 08	0.32	**0.88**	0.12	**0.74**	Y
23	Mar 09	0.45	1.06	0.83	1.49	N
					Count	2

N/A: Not applicable

Table 4-3: 18-inch main, CT at 1st customer

No.	Date	Old Plant log removal		New Plant log removal		Violation
		WTP	with Main	WTP	with Main	
1	Jan 14	0.92	1.40	> 1	N/A	N
2	Jan 23	> 1	N/A	0.99	1.55	N
3	Jan 29	> 1	N/A	0.93	1.43	N
4	Jan 30	0.90	1.33	0.72	1.21	N
5	Feb 01	> 1	N/A	0.72	1.24	N
6	Feb 07	0.67	1.08	> 1	N/A	N
7	Feb 09	0.99	1.41	> 1	N/A	N
8	Feb 10	0.94	1.36	> 1	N/A	N
9	Feb 14	0.87	1.32	> 1	N/A	N
10	Feb 16	0.89	1.30	> 1	N/A	N
11	Feb 21	0.88	1.28	> 1	N/A	N
12	Feb 24	0.91	1.43	> 1	N/A	N
13	Feb 25	0.73	1.13	0.68	1.16	N
14	Feb 26	0.60	1.04	0.82	1.37	N
15	Feb 27	> 1	N/A	0.64	1.14	N
16	Feb 28	> 1	N/A	0.96	1.48	N
17	Mar 01	> 1	N/A	0.50	**0.90**	Y
18	Mar 02	0.98	1.41	0.48	**0.94**	Y
19	Mar 05	> 1	N/A	0.75	1.21	N
20	Mar 06	> 1	N/A	0.42	**0.82**	Y
21	Mar 07	> 1	N/A	0.35	**0.74**	Y
22	Mar 08	0.32	**0.68**	0.12	**0.53**	Y
23	Mar 09	0.45	**0.85**	0.83	1.27	Y
					Count	6

N/A: Not applicable

5.0 Public Notice

As a result of the reduced number of days and affected service area identified by the CT evaluation that includes credit for CT achieved in the pipelines, Hanover is proposing the following Public Notice schedule:

- Notify the two (2) residents located at the first connection of the 12-inch main of eight (8) violations occurring on Feb 7 & 26, and on Mar 1, 2, 6, 7, 8, & 9.
- Notify the six (6) residents located at the first connection of the 18-inch main of six (6) violations occurring on Mar 1, 2, 6, 7, 8, & 9.
- Notify **all** customers of two (2) violations occurring on Mar 7 & 8.

Appendix A

CT Calculation Data Sheets

OLD PLANT - 12-inch main, CT at 1st customer.

ASSUMPTIONS: Flow split: 3100 gpm split 45/55% between18/20-inch mains. Remaining to 12-inch

Baffle factors: O.P. Sed Basin 0.32; O.P. Filters 0.50; Clear Basin 0.80; CW 1 & 2 0.1

Transmission Mains

Diameter	Length	Volume, gal	B.F.
18	-	-	1.00
20	-	-	1.00
12	3,620	21,256	1.00
6	865	1,270	1.00

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
January 14, 2015	O.P. Sed Basin	0.41	7.03	2.8	1,392	235,530	54.1	22.2	161.53	0.41	9.96	8.92
Previously Reported:	O.P. Filters	0.36	7.01	2.8	1,392	32,468	11.7	4.2	160.22	0.08	9.96	1.69
0.92	Clear Basin	0.35	6.99	2.8	4,243	341,000	64.3	22.5	159.10	0.42	9.96	9.04
	CW 1 & 2	1.11	7.56	2.8	4,243	25,900	0.6	0.7	212.58	0.01	9.96	0.27
WTP Cl residual	12-inch	0.97	7.56	2.8	1,143	21,256	18.6	18.0	208.86	0.26	9.96	7.23
1.11	6-inch	0.97	7.56	2.8	1,143	1,270	1.1	1.1	208.86	0.02	9.96	0.43
	System TOTAL									**1.20**		**44.43**
January 30, 2015	O.P. Sed Basin	0.40	7.03	2.2	1,044	235,530	72.2	28.9	168.81	0.51	10.49	11.01
Previously Reported:	O.P. Filters	0.38	7.04	2.2	1,044	24,351	11.7	4.4	169.40	0.08	10.49	1.69
0.90	Clear Basin	0.27	7.07	2.2	4,243	341,000	64.3	17.4	171.19	0.30	10.49	6.62
	CW 1 & 2	1.11	7.76	2.2	4,243	25,900	0.6	0.7	239.87	0.01	10.49	0.26
WTP Cl residual	12-inch	0.97	7.76	2.2	1,143	21,256	18.6	18.0	235.45	0.23	10.49	6.86
1.11	6-inch	0.97	7.76	2.2	1,143	1,270	1.1	1.1	235.45	0.01	10.49	0.41
	System TOTAL									**1.15**		**42.85**
February 7, 2015	O.P. Sed Basin	0.30	7.14	2.2	1,740	235,530	43.3	13.0	175.44	0.22	10.49	4.96
Previously Reported:	O.P. Filters	0.34	7.07	2.2	1,740	40,585	11.7	4.0	171.19	0.07	10.49	1.51
0.67	Clear Basin	0.32	7.01	2.2	4,243	341,000	64.3	20.6	167.63	0.37	10.49	7.85
	CW 1 & 2	1.09	7.78	2.2	4,243	25,900	0.6	0.7	241.05	0.01	10.49	0.25
WTP Cl residual	12-inch	0.95	7.78	2.2	1,143	21,256	18.6	17.7	236.65	0.22	10.49	6.73
1.09	6-inch	0.95	7.78	2.2	1,143	1,270	1.1	1.1	236.65	0.01	10.49	0.40
	System TOTAL									**0.91**		**37.41**
February 9, 2015	O.P. Sed Basin	0.45	7.00	2.8	2,088	235,530	36.1	16.2	160.53	0.30	9.96	6.53
Previously Reported:	O.P. Filters	0.52	7.03	2.8	2,088	48,702	11.7	6.1	163.49	0.11	9.96	2.44
0.99	Clear Basin	0.47	7.00	2.8	4,243	341,000	64.3	30.2	160.88	0.56	9.96	12.14
	CW 1 & 2	1.10	7.85	2.8	4,243	25,900	0.6	0.7	236.64	0.01	9.96	0.27
WTP Cl residual	12-inch	0.96	7.85	2.8	1,143	21,256	18.6	17.8	232.29	0.23	9.96	7.16
1.10	6-inch	0.96	7.85	2.8	1,143	1,270	1.1	1.1	232.29	0.01	9.96	0.43
	System TOTAL									**1.23**		**45.67**
February 10, 2015	O.P. Sed Basin	0.42	7.04	2.2	1,392	235,530	54.1	22.7	169.77	0.40	10.49	8.67
Previously Reported:	O.P. Filters	0.51	7.03	2.2	1,392	32,468	11.7	5.9	170.86	0.10	10.49	2.27
0.94	Clear Basin	0.36	6.91	2.2	4,243	341,000	64.3	23.1	161.83	0.43	10.49	8.83
	CW 1 & 2	1.13	7.82	2.2	4,243	25,900	0.6	0.7	245.95	0.01	10.49	0.26
WTP Cl residual	12-inch	0.98	7.82	2.2	1,143	21,256	18.6	18.3	241.30	0.23	10.49	6.98
1.13	6-inch	0.98	7.82	2.2	1,143	1,270	1.1	1.1	241.30	0.01	10.49	0.42
	System TOTAL									**1.18**		**43.72**
February 14, 2015	O.P. Sed Basin	0.28	7.03	2.8	1,044	235,530	72.2	20.2	161.35	0.38	9.96	8.12
Previously Reported:	O.P. Filters	0.35	7.05	2.8	1,044	24,351	11.7	4.1	162.49	0.08	9.96	1.64
0.87	Clear Basin	0.35	7.00	2.8	4,243	341,000	64.3	22.5	159.66	0.42	9.96	9.04
	CW 1 & 2	1.09	7.76	2.8	4,243	25,900	0.6	0.7	228.52	0.01	9.96	0.27
WTP Cl residual	12-inch	0.95	7.76	2.8	1,143	21,256	18.6	17.7	224.42	0.24	9.96	7.10
1.09	6-inch	0.95	7.76	2.8	1,143	1,270	1.1	1.1	224.42	0.01	9.96	0.42
	System TOTAL									**1.13**		**43.14**
February 16, 2015	O.P. Sed Basin	0.45	7.09	2.2	1,740	235,530	43.3	19.5	173.36	0.34	10.49	7.43
Previously Reported:	O.P. Filters	0.48	7.05	2.2	1,740	40,585	11.7	5.6	171.51	0.10	10.49	2.13
0.89	Clear Basin	0.40	7.04	2.2	4,243	341,000	64.3	25.7	169.40	0.46	10.49	9.81
	CW 1 & 2	1.06	7.81	2.2	4,243	25,900	0.6	0.6	242.81	0.01	10.49	0.25
WTP Cl residual	12-inch	0.92	7.81	2.2	1,143	21,256	18.6	17.2	238.46	0.22	10.49	6.55
1.06	6-inch	0.92	7.81	2.2	1,143	1,270	1.1	1.0	238.46	0.01	10.49	0.39
	System TOTAL									**1.13**		**41.84**
February 21, 2015	O.P. Sed Basin	0.20	7.14	1.7	696	235,530	108.3	21.7	182.92	0.36	10.93	7.92
Previously Reported:	O.P. Filters	0.15	7.12	1.7	696	16,234	11.7	1.7	181.64	0.03	10.93	0.64
0.88	Clear Basin	0.46	7.06	1.7	4,243	341,000	64.3	29.6	179.05	0.50	10.93	10.82
	CW 1 & 2	1.10	7.81	1.7	4,243	25,900	0.6	0.7	254.67	0.01	10.93	0.25
WTP Cl residual	12-inch	0.96	7.81	1.7	1,143	21,256	18.6	17.8	249.91	0.21	10.93	6.52
1.10	6-inch	0.96	7.81	1.7	1,143	1,270	1.1	1.1	249.91	0.01	10.93	0.39
	System TOTAL									**1.11**		**41.75**
February 24, 2015	O.P. Sed Basin	0.40	7.03	5.6	1,392	235,530	54.1	21.7	136.66	0.48	7.76	11.16
Previously Reported:	O.P. Filters	0.39	7.00	5.6	1,392	32,468	11.7	4.5	135.22	0.10	7.76	2.34
0.91	Clear Basin	0.23	6.94	5.6	4,243	341,000	64.3	14.8	132.38	0.34	7.76	7.62
	CW 1 & 2	1.12	7.84	5.6	4,243	25,900	0.6	0.7	199.89	0.01	7.76	0.35
WTP Cl residual	12-inch	0.98	7.84	5.6	1,143	21,256	18.6	18.1	196.30	0.28	7.76	9.35
1.12	6-inch	0.98	7.84	5.6	1,143	1,270	1.1	1.1	196.30	0.02	7.76	0.56
	System TOTAL									**1.22**		**53.21**

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
February 25, 2015	O.P. Sed Basin	0.38	7.12	1.7	1,044	235,530	72.2	27.4	181.64	0.45	10.93	10.04
Previously Reported:	O.P. Filters	0.33	7.07	1.7	1,044	24,351	11.7	3.8	178.48	0.06	10.93	1.41
0.73	Clear Basin	0.20	7.11	1.7	4,243	341,000	64.3	12.9	181.00	0.21	10.93	4.70
	CW 1 & 2	1.08	7.82	1.7	4,243	25,900	0.6	0.7	254.94	0.01	10.93	0.24
WTP Cl residual	12-inch	0.94	7.82	1.7	1,143	21,256	18.6	17.5	250.24	0.21	10.93	6.40
1.08	6-inch	0.94	7.82	1.7	1,143	1,270	1.1	1.0	250.24	0.01	10.93	0.38
	System TOTAL									**0.96**		**38.11**
February 26, 2015	O.P. Sed Basin	0.27	7.11	2.8	1,392	235,530	54.1	14.6	165.94	0.26	9.96	5.87
Previously Reported:	O.P. Filters	0.26	7.09	2.8	1,392	32,468	11.7	3.0	164.78	0.06	9.96	1.22
0.60	Clear Basin	0.24	7.12	2.8	4,243	341,000	64.3	15.4	166.52	0.28	9.96	6.20
	CW 1 & 2	1.10	7.81	2.8	4,243	25,900	0.6	0.7	233.13	0.01	9.96	0.27
WTP Cl residual	12-inch	0.96	7.81	2.8	1,143	21,256	18.6	17.8	228.87	0.23	9.96	7.16
1.10	6-inch	0.96	7.81	2.8	1,143	1,270	1.1	1.1	228.87	0.01	9.96	0.43
	System TOTAL									**0.85**		**37.85**
March 2, 2015	O.P. Sed Basin	0.40	6.90	1.1	696	235,530	108.3	43.3	177.70	0.73	11.47	15.11
Previously Reported:	O.P. Filters	0.38	6.91	1.1	696	16,234	11.7	4.4	178.32	0.07	11.47	1.55
0.98	Clear Basin	0.17	7.00	1.1	4,243	341,000	64.3	10.9	184.08	0.18	11.47	3.81
	CW 1 & 2	1.12	7.56	1.1	4,243	25,900	0.6	0.7	246.18	0.01	11.47	0.24
WTP Cl residual	12-inch	0.98	7.56	1.1	1,143	21,256	18.6	18.1	241.63	0.23	11.47	6.33
1.12	6-inch	0.98	7.56	1.1	1,143	1,270	1.1	1.1	241.63	0.01	11.47	0.38
	System TOTAL									**1.23**		**42.18**
March 8, 2015	O.P. Sed Basin	0.20	6.93	1.1	1,044	235,530	72.2	14.4	179.59	0.24	11.47	5.04
Previously Reported:	O.P. Filters	0.17	6.92	1.1	1,044	24,351	11.7	2.0	178.96	0.03	11.47	0.69
0.32	Clear Basin	0.04	7.00	1.1	4,243	341,000	64.3	2.6	184.08	0.04	11.47	0.90
	CW 1 & 2	1.04	7.82	1.1	4,243	25,900	0.6	0.6	268.34	0.01	11.47	0.22
WTP Cl residual	12-inch	0.91	7.82	1.1	1,143	21,256	18.6	16.8	263.48	0.19	11.47	5.88
1.04	6-inch	0.91	7.82	1.1	1,143	1,270	1.1	1.0	263.48	0.01	11.47	0.35
	System TOTAL									**0.53**		**26.79**
March 9, 2015	O.P. Sed Basin	0.10	6.83	1.1	696	235,530	108.3	10.8	173.35	0.19	11.47	3.78
Previously Reported:	O.P. Filters	0.09	6.84	1.1	696	16,234	11.7	1.0	173.96	0.02	11.47	0.37
0.45	Clear Basin	0.23	6.96	1.1	4,243	341,000	64.3	14.8	181.50	0.24	11.47	5.16
	CW 1 & 2	1.13	7.77	1.1	4,243	25,900	0.6	0.7	266.59	0.01	11.47	0.24
WTP Cl residual	12-inch	0.98	7.77	1.1	1,143	21,256	18.6	18.3	261.45	0.21	11.47	6.39
1.13	6-inch	0.98	7.77	1.1	1,143	1,270	1.1	1.1	261.45	0.01	11.47	0.38
	System TOTAL									**0.68**		**31.21**

OLD PLANT - 12-inch main, CT at Mt. Pleasant

ASSUMPTIONS: Flow split: 3100 gpm split 45/55% between18/20-inch mains. Remaining to 12-inch

Baffle factors: O.P. Sed Basin 0.32; O.P. Filters 0.50; Clear Basin 0.80; CW 1 & 2 0.1

Transmission Mains

Diameter	Length	Volume, gal	B.F.
18	-	-	1.00
20	-	-	1.00
12	9,580	56,252	1.00
6	-	-	1.00

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
January 14, 2015	O.P. Sed Basin	0.41	7.03	2.8	1,392	235,530	54.1	22.2	161.53	0.41	9.96	8.92
Previously Reported:	O.P. Filters	0.36	7.01	2.8	1,392	32,468	11.7	4.2	160.22	0.08	9.96	1.69
0.92	Clear Basin	0.35	6.99	2.8	4,243	341,000	64.3	22.5	159.10	0.42	9.96	9.04
	CW 1 & 2	1.11	7.56	2.8	4,243	25,900	0.6	0.7	212.58	0.01	9.96	0.27
WTP Cl residual	12-inch	1.07	7.56	2.8	1,143	56,252	49.2	52.5	211.47	0.75	9.96	21.10
1.11	6-inch	1.07	7.56	2.8	1,143	0	0.0	0.0	211.47	0.00	9.96	0.00
	System TOTAL									**1.67**		**58.31**
January 30, 2015	O.P. Sed Basin	0.40	7.03	2.2	1,044	235,530	72.2	28.9	168.81	0.51	10.49	11.01
Previously Reported:	O.P. Filters	0.38	7.04	2.2	1,044	24,351	11.7	4.4	169.40	0.08	10.49	1.69
0.90	Clear Basin	0.27	7.07	2.2	4,243	341,000	64.3	17.4	171.19	0.30	10.49	6.62
	CW 1 & 2	1.11	7.76	2.2	4,243	25,900	0.6	0.7	239.87	0.01	10.49	0.26
WTP Cl residual	12-inch	1.07	7.76	2.2	1,143	56,252	49.2	52.5	238.55	0.66	10.49	20.03
1.11	6-inch	1.07	7.76	2.2	1,143	0	0.0	0.0	238.55	0.00	10.49	0.00
	System TOTAL									**1.56**		**56.02**
February 7, 2015	O.P. Sed Basin	0.30	7.14	2.2	1,740	235,530	43.3	13.0	175.44	0.22	10.49	4.96
Previously Reported:	O.P. Filters	0.34	7.07	2.2	1,740	40,585	11.7	4.0	171.19	0.07	10.49	1.51
0.67	Clear Basin	0.32	7.01	2.2	4,243	341,000	64.3	20.6	167.63	0.37	10.49	7.85
	CW 1 & 2	1.09	7.78	2.2	4,243	25,900	0.6	0.7	241.05	0.01	10.49	0.25
WTP Cl residual	12-inch	1.05	7.78	2.2	1,143	56,252	49.2	51.6	239.73	0.65	10.49	19.67
1.09	6-inch	1.05	7.78	2.2	1,143	0	0.0	0.0	239.73	0.00	10.49	0.00
	System TOTAL									**1.31**		**50.35**
February 9, 2015	O.P. Sed Basin	0.45	7.00	2.8	2,088	235,530	36.1	16.2	160.53	0.30	9.96	6.53
Previously Reported:	O.P. Filters	0.52	7.03	2.8	2,088	48,702	11.7	6.1	163.49	0.11	9.96	2.44
0.99	Clear Basin	0.47	7.00	2.8	4,243	341,000	64.3	30.2	160.88	0.56	9.96	12.14
	CW 1 & 2	1.10	7.85	2.8	4,243	25,900	0.6	0.7	236.64	0.01	9.96	0.27
WTP Cl residual	12-inch	1.06	7.85	2.8	1,143	56,252	49.2	52.0	235.34	0.66	9.96	20.91
1.10	6-inch	1.06	7.85	2.8	1,143	0	0.0	0.0	235.34	0.00	9.96	0.00
	System TOTAL									**1.65**		**59.42**
February 10, 2015	O.P. Sed Basin	0.42	7.04	2.2	1,392	235,530	54.1	22.7	169.77	0.40	10.49	8.67
Previously Reported:	O.P. Filters	0.51	7.03	2.2	1,392	32,468	11.7	5.9	170.86	0.10	10.49	2.27
0.94	Clear Basin	0.36	6.91	2.2	4,243	341,000	64.3	23.1	161.83	0.43	10.49	8.83
	CW 1 & 2	1.13	7.82	2.2	4,243	25,900	0.6	0.7	245.95	0.01	10.49	0.26
WTP Cl residual	12-inch	1.09	7.82	2.2	1,143	56,252	49.2	53.5	244.56	0.66	10.49	20.39
1.13	6-inch	1.09	7.82	2.2	1,143	0	0.0	0.0	244.56	0.00	10.49	0.00
	System TOTAL									**1.60**		**57.12**
February 14, 2015	O.P. Sed Basin	0.28	7.03	2.8	1,044	235,530	72.2	20.2	161.35	0.38	9.96	8.12
Previously Reported:	O.P. Filters	0.35	7.05	2.8	1,044	24,351	11.7	4.1	162.49	0.08	9.96	1.64
0.87	Clear Basin	0.35	7.00	2.8	4,243	341,000	64.3	22.5	159.66	0.42	9.96	9.04
	CW 1 & 2	1.09	7.76	2.8	4,243	25,900	0.6	0.7	228.52	0.01	9.96	0.27
WTP Cl residual	12-inch	1.05	7.76	2.8	1,143	56,252	49.2	51.6	227.29	0.68	9.96	20.72
1.09	6-inch	1.05	7.76	2.8	1,143	0	0.0	0.0	227.29	0.00	9.96	0.00
	System TOTAL									**1.56**		**56.77**
February 16, 2015	O.P. Sed Basin	0.45	7.09	2.2	1,740	235,530	43.3	19.5	173.36	0.34	10.49	7.43
Previously Reported:	O.P. Filters	0.48	7.05	2.2	1,740	40,585	11.7	5.6	171.51	0.10	10.49	2.13
0.89	Clear Basin	0.40	7.04	2.2	4,243	341,000	64.3	25.7	169.40	0.46	10.49	9.81
	CW 1 & 2	1.06	7.81	2.2	4,243	25,900	0.6	0.6	242.81	0.01	10.49	0.25
WTP Cl residual	12-inch	1.02	7.81	2.2	1,143	56,252	49.2	50.2	241.51	0.62	10.49	19.13
1.06	6-inch	1.02	7.81	2.2	1,143	0	0.0	0.0	241.51	0.00	10.49	0.00
	System TOTAL									**1.52**		**54.42**
February 21, 2015	O.P. Sed Basin	0.20	7.14	1.7	696	235,530	108.3	21.7	182.92	0.36	10.93	7.92
Previously Reported:	O.P. Filters	0.15	7.12	1.7	696	16,234	11.7	1.7	181.64	0.03	10.93	0.64
0.88	Clear Basin	0.46	7.06	1.7	4,243	341,000	64.3	29.6	179.05	0.50	10.93	10.82
	CW 1 & 2	1.10	7.81	1.7	4,243	25,900	0.6	0.7	254.67	0.01	10.93	0.25
WTP Cl residual	12-inch	1.06	7.81	1.7	1,143	56,252	49.2	52.0	253.24	0.62	10.93	19.04
1.10	6-inch	1.06	7.81	1.7	1,143	0	0.0	0.0	253.24	0.00	10.93	0.00
	System TOTAL									**1.50**		**54.27**
February 24, 2015	O.P. Sed Basin	0.40	7.03	5.6	1,392	235,530	54.1	21.7	136.66	0.48	7.76	11.16
Previously Reported:	O.P. Filters	0.39	7.00	5.6	1,392	32,468	11.7	4.5	135.22	0.10	7.76	2.34
0.91	Clear Basin	0.23	6.94	5.6	4,243	341,000	64.3	14.8	132.38	0.34	7.76	7.62
	CW 1 & 2	1.12	7.84	5.6	4,243	25,900	0.6	0.7	199.89	0.01	7.76	0.35
WTP Cl residual	12-inch	1.08	7.84	5.6	1,143	56,252	49.2	53.0	198.81	0.80	7.76	27.31
1.12	6-inch	1.08	7.84	5.6	1,143	0	0.0	0.0	198.81	0.00	7.76	0.00
	System TOTAL									**1.72**		**71.18**

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
February 25, 2015	O.P. Sed Basin	0.38	7.12	1.7	1,044	235,530	72.2	27.4	181.64	0.45	10.93	10.04
Previously Reported:	O.P. Filters	0.33	7.07	1.7	1,044	24,351	11.7	3.8	178.48	0.06	10.93	1.41
0.73	Clear Basin	0.20	7.11	1.7	4,243	341,000	64.3	12.9	181.00	0.21	10.93	4.70
	CW 1 & 2	1.08	7.82	1.7	4,243	25,900	0.6	0.7	254.94	0.01	10.93	0.24
WTP Cl residual	12-inch	1.04	7.82	1.7	1,143	56,252	49.2	51.1	253.54	0.60	10.93	18.69
1.08	6-inch	1.04	7.82	1.7	1,143	0	0.0	0.0	253.54	0.00	10.93	0.00
	System TOTAL									**1.34**		**50.40**
February 26, 2015	O.P. Sed Basin	0.27	7.11	2.8	1,392	235,530	54.1	14.6	165.94	0.26	9.96	5.87
Previously Reported:	O.P. Filters	0.26	7.09	2.8	1,392	32,468	11.7	3.0	164.78	0.06	9.96	1.22
0.60	Clear Basin	0.24	7.12	2.8	4,243	341,000	64.3	15.4	166.52	0.28	9.96	6.20
	CW 1 & 2	1.10	7.81	2.8	4,243	25,900	0.6	0.7	233.13	0.01	9.96	0.27
WTP Cl residual	12-inch	1.06	7.81	2.8	1,143	56,252	49.2	52.0	231.86	0.67	9.96	20.91
1.10	6-inch	1.06	7.81	2.8	1,143	0	0.0	0.0	231.86	0.00	9.96	0.00
	System TOTAL									**1.28**		**51.60**
March 2, 2015	O.P. Sed Basin	0.40	6.90	1.1	696	235,530	108.3	43.3	177.70	0.73	11.47	15.11
Previously Reported:	O.P. Filters	0.38	6.91	1.1	696	16,234	11.7	4.4	178.32	0.07	11.47	1.55
0.98	Clear Basin	0.17	7.00	1.1	4,243	341,000	64.3	10.9	184.08	0.18	11.47	3.81
	CW 1 & 2	1.12	7.56	1.1	4,243	25,900	0.6	0.7	246.18	0.01	11.47	0.24
WTP Cl residual	12-inch	1.08	7.56	1.1	1,143	56,252	49.2	53.0	244.82	0.65	11.47	18.49
1.12	6-inch	1.08	7.56	1.1	1,143	0	0.0	0.0	244.82	0.00	11.47	0.00
	System TOTAL									**1.64**		**54.34**
March 8, 2015	O.P. Sed Basin	0.20	6.93	1.1	1,044	235,530	72.2	14.4	179.59	0.24	11.47	5.04
Previously Reported:	O.P. Filters	0.17	6.92	1.1	1,044	24,351	11.7	2.0	178.96	0.03	11.47	0.69
0.32	Clear Basin	0.04	7.00	1.1	4,243	341,000	64.3	2.6	184.08	0.04	11.47	0.90
	CW 1 & 2	1.04	7.82	1.1	4,243	25,900	0.6	0.6	268.34	0.01	11.47	0.22
WTP Cl residual	12-inch	1.00	7.82	1.1	1,143	56,252	49.2	49.2	266.89	0.55	11.47	17.16
1.04	6-inch	1.00	7.82	1.1	1,143	0	0.0	0.0	266.89	0.00	11.47	0.00
	System TOTAL									**0.88**		**38.07**
March 9, 2015	O.P. Sed Basin	0.10	6.83	1.1	696	235,530	108.3	10.8	173.35	0.19	11.47	3.78
Previously Reported:	O.P. Filters	0.09	6.84	1.1	696	16,234	11.7	1.0	173.96	0.02	11.47	0.37
0.45	Clear Basin	0.23	6.96	1.1	4,243	341,000	64.3	14.8	181.50	0.24	11.47	5.16
	CW 1 & 2	1.13	7.77	1.1	4,243	25,900	0.6	0.7	266.59	0.01	11.47	0.24
WTP Cl residual	12-inch	1.09	7.77	1.1	1,143	56,252	49.2	53.5	265.05	0.61	11.47	18.65
1.13	6-inch	1.09	7.77	1.1	1,143	0	0.0	0.0	265.05	0.00	11.47	0.00
	System TOTAL									**1.06**		**43.47**

OLD PLANT - 18-inch main, CT at 1st customer

ASSUMPTIONS: Flow split: 3100 gpm split 45/55% between18/20-inch mains. Remaining to 12-inch

Baffle factor: O.P. Sed Basin 0.32; O.P. Filters 0.50; Clear Basin 0.80; CW 1 & 2 0.1

Transmission Mains

Diameter	Length	Volume, gal	B.F.
18	3,400	44,919	1.00
20	-	-	1.00
12	-	-	1.00
6	-	-	1.00

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
January 14, 2015	O.P. Sed Basin	0.41	7.03	2.8	1,392	235,530	54.1	22.2	161.53	0.41	9.96	8.92
Previously Reported:	O.P. Filters	0.36	7.01	2.8	1,392	32,468	11.7	4.2	160.22	0.08	9.96	1.69
0.92	Clear Basin	0.35	6.99	2.8	4,243	341,000	64.3	22.5	159.10	0.42	9.96	9.04
WTP Cl residual	CW 1 & 2	1.11	7.56	2.8	4,243	25,900	0.6	0.7	212.58	0.01	9.96	0.27
1.11	18-inch	1.04	7.56	2.8	1,395	44,919	32.2	33.5	210.79	0.48	9.96	13.47
	System TOTAL									**1.40**		**33.39**
January 30, 2015	O.P. Sed Basin	0.40	7.03	2.2	1,044	235,530	72.2	28.9	168.81	0.51	10.49	11.01
Previously Reported:	O.P. Filters	0.38	7.04	2.2	1,044	24,351	11.7	4.4	169.40	0.08	10.49	1.69
0.90	Clear Basin	0.27	7.07	2.2	4,243	341,000	64.3	17.4	171.19	0.30	10.49	6.62
WTP Cl residual	CW 1 & 2	1.11	7.76	2.2	4,243	25,900	0.6	0.7	239.87	0.01	10.49	0.26
1.11	18-inch	1.04	7.76	2.2	1,395	44,919	32.2	33.5	237.75	0.42	10.49	12.79
	System TOTAL									**1.33**		**32.37**
February 7, 2015	O.P. Sed Basin	0.30	7.14	2.2	1,740	235,530	43.3	13.0	175.44	0.22	10.49	4.96
Previously Reported:	O.P. Filters	0.34	7.07	2.2	1,740	40,585	11.7	4.0	171.19	0.07	10.49	1.51
0.67	Clear Basin	0.32	7.01	2.2	4,243	341,000	64.3	20.6	167.63	0.37	10.49	7.85
WTP Cl residual	CW 1 & 2	1.09	7.78	2.2	4,243	25,900	0.6	0.7	241.05	0.01	10.49	0.25
1.09	18-inch	1.02	7.78	2.2	1,395	44,919	32.2	32.9	238.94	0.41	10.49	12.56
	System TOTAL									**1.08**		**27.12**
February 9, 2015	O.P. Sed Basin	0.45	7.00	2.8	2,088	235,530	36.1	16.2	160.53	0.30	9.96	6.53
Previously Reported:	O.P. Filters	0.52	7.03	2.8	2,088	48,702	11.7	6.1	163.49	0.11	9.96	2.44
0.99	Clear Basin	0.47	7.00	2.8	4,243	341,000	64.3	30.2	160.88	0.56	9.96	12.14
WTP Cl residual	CW 1 & 2	1.10	7.85	2.8	4,243	25,900	0.6	0.7	236.64	0.01	9.96	0.27
1.10	18-inch	1.03	7.85	2.8	1,395	44,919	32.2	33.2	234.55	0.42	9.96	13.35
	System TOTAL									**1.41**		**34.72**
February 10, 2015	O.P. Sed Basin	0.42	7.04	2.2	1,392	235,530	54.1	22.7	169.77	0.40	10.49	8.67
Previously Reported:	O.P. Filters	0.51	7.03	2.2	1,392	32,468	11.7	5.9	170.86	0.10	10.49	2.27
0.94	Clear Basin	0.36	6.91	2.2	4,243	341,000	64.3	23.1	161.83	0.43	10.49	8.83
WTP Cl residual	CW 1 & 2	1.13	7.82	2.2	4,243	25,900	0.6	0.7	245.95	0.01	10.49	0.26
1.13	18-inch	1.06	7.82	2.2	1,395	44,919	32.2	34.1	243.71	0.42	10.49	13.02
	System TOTAL									**1.36**		**33.05**
February 14, 2015	O.P. Sed Basin	0.28	7.03	2.8	1,044	235,530	72.2	20.2	161.35	0.38	9.96	8.12
Previously Reported:	O.P. Filters	0.35	7.05	2.8	1,044	24,351	11.7	4.1	162.49	0.08	9.96	1.64
0.87	Clear Basin	0.35	7.00	2.8	4,243	341,000	64.3	22.5	159.66	0.42	9.96	9.04
WTP Cl residual	CW 1 & 2	1.09	7.76	2.8	4,243	25,900	0.6	0.7	228.52	0.01	9.96	0.27
1.09	18-inch	1.02	7.76	2.8	1,395	44,919	32.2	32.9	226.55	0.44	9.96	13.23
	System TOTAL									**1.32**		**45.65**
February 16, 2015	O.P. Sed Basin	0.45	7.09	2.2	1,740	235,530	43.3	19.5	173.36	0.34	10.49	7.43
Previously Reported:	O.P. Filters	0.48	7.05	2.2	1,740	40,585	11.7	5.6	171.51	0.10	10.49	2.13
0.89	Clear Basin	0.40	7.04	2.2	4,243	341,000	64.3	25.7	169.40	0.46	10.49	9.81
WTP Cl residual	CW 1 & 2	1.06	7.81	2.2	4,243	25,900	0.6	0.6	242.81	0.01	10.49	0.25
1.06	18-inch	0.99	7.81	2.2	1,395	44,919	32.2	32.0	240.72	0.40	10.49	12.21
	System TOTAL									**1.30**		**31.83**
February 21, 2015	O.P. Sed Basin	0.20	7.14	1.7	696	235,530	108.3	21.7	182.92	0.36	10.93	7.92
Previously Reported:	O.P. Filters	0.15	7.12	1.7	696	16,234	11.7	1.7	181.64	0.03	10.93	0.64
0.88	Clear Basin	0.46	7.06	1.7	4,243	341,000	64.3	29.6	179.05	0.50	10.93	10.82
WTP Cl residual	CW 1 & 2	1.10	7.81	1.7	4,243	25,900	0.6	0.7	254.67	0.01	10.93	0.25
1.10	18-inch	1.03	7.81	1.7	1,395	44,919	32.2	33.2	252.38	0.39	10.93	12.16
	System TOTAL									**1.28**		**31.78**
February 24, 2015	O.P. Sed Basin	0.40	7.03	5.6	1,392	235,530	54.1	21.7	136.66	0.48	7.76	11.16
Previously Reported:	O.P. Filters	0.39	7.00	5.6	1,392	32,468	11.7	4.5	135.22	0.10	7.76	2.34
0.91	Clear Basin	0.23	6.94	5.6	4,243	341,000	64.3	14.8	132.38	0.34	7.76	7.62
WTP Cl residual	CW 1 & 2	1.12	7.84	5.6	4,243	25,900	0.6	0.7	199.89	0.01	7.76	0.35
1.12	18-inch	1.05	7.84	5.6	1,395	44,919	32.2	33.8	198.16	0.51	7.76	17.44
	System TOTAL									**1.43**		**38.92**
February 25, 2015	O.P. Sed Basin	0.38	7.12	1.7	1,044	235,530	72.2	27.4	181.64	0.45	10.93	10.04
Previously Reported:	O.P. Filters	0.33	7.07	1.7	1,044	24,351	11.7	3.8	178.48	0.06	10.93	1.41
0.73	Clear Basin	0.20	7.11	1.7	4,243	341,000	64.3	12.9	181.00	0.21	10.93	4.70
WTP Cl residual	CW 1 & 2	1.08	7.82	1.7	4,243	25,900	0.6	0.7	254.94	0.01	10.93	0.24
1.08	18-inch	1.01	7.82	1.7	1,395	44,919	32.2	32.6	252.68	0.39	10.93	11.93
	System TOTAL									**1.13**		**28.32**
February 26, 2015	O.P. Sed Basin	0.27	7.11	2.8	1,392	235,530	54.1	14.6	165.94	0.26	9.96	5.87
Previously Reported:	O.P. Filters	0.26	7.09	2.8	1,392	32,468	11.7	3.0	164.78	0.06	9.96	1.22
0.60	Clear Basin	0.24	7.12	2.8	4,243	341,000	64.3	15.4	166.52	0.28	9.96	6.20
WTP Cl residual	CW 1 & 2	1.10	7.81	2.8	4,243	25,900	0.6	0.7	233.13	0.01	9.96	0.27
1.10	18-inch	1.03	7.81	2.8	1,395	44,919	32.2	33.2	231.08	0.43	9.96	13.35
	System TOTAL									**1.04**		**26.91**

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
March 2, 2015	O.P. Sed Basin	0.40	6.90	1.1	696	235,530	108.3	43.3	177.70	0.73	11.47	15.11
Previously Reported:	O.P. Filters	0.38	6.91	1.1	696	16,234	11.7	4.4	178.32	0.07	11.47	1.55
0.98	Clear Basin	0.17	7.00	1.1	4,243	341,000	64.3	10.9	184.08	0.18	11.47	3.81
WTP Cl residual	CW 1 & 2	1.12	7.56	1.1	4,243	25,900	0.6	0.7	246.18	0.01	11.47	0.24
1.12	18-inch	1.05	7.56	1.1	1,395	44,919	32.2	33.8	243.99	0.42	11.47	11.80
	System TOTAL									**1.41**		**32.51**
March 8, 2015	O.P. Sed Basin	0.20	6.93	1.1	1,044	235,530	72.2	14.4	179.59	0.24	11.47	5.04
Previously Reported:	O.P. Filters	0.17	6.92	1.1	1,044	24,351	11.7	2.0	178.96	0.03	11.47	0.69
0.32	Clear Basin	0.04	7.00	1.1	4,243	341,000	64.3	2.6	184.08	0.04	11.47	0.90
WTP Cl residual	CW 1 & 2	1.04	7.82	1.1	4,243	25,900	0.6	0.6	268.34	0.01	11.47	0.22
1.04	18-inch	0.98	7.82	1.1	1,395	44,919	32.2	31.4	266.00	0.35	11.47	10.96
	System TOTAL									**0.68**		**17.80**
March 9, 2015	O.P. Sed Basin	0.10	6.83	1.1	696	235,530	108.3	10.8	173.35	0.19	11.47	3.78
Previously Reported:	O.P. Filters	0.09	6.84	1.1	696	16,234	11.7	1.0	173.96	0.02	11.47	0.37
0.45	Clear Basin	0.23	6.96	1.1	4,243	341,000	64.3	14.8	181.50	0.24	11.47	5.16
WTP Cl residual	CW 1 & 2	1.13	7.77	1.1	4,243	25,900	0.6	0.7	266.59	0.01	11.47	0.24
1.13	18-inch	1.06	7.77	1.1	1,395	44,919	32.2	34.1	264.12	0.39	11.47	11.91
	System TOTAL									**0.85**		**21.45**

N PLANT - 12-inch main, CT at 1st customer.

ASSUMPTIONS: Flow split: 3100 gpm split 45/55% between18/20-inch mains. Remaining to 12-inch

Baffle factors: N.P. Sed Basin 0.43 N.P. CW 0.5
N.P. Filters 0.50
Clear Basin 0.80 CW 1 & 2 0.1

Transmission Mains

Diameter	Length	Volume, gal	B.F.
18	-	-	1.00
20	-	-	1.00
12	3,620	21,256	1.00
6	865	1,270	1.00

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
January 23, 2015	N.P. Sed Basin	0.37	6.98	2.8	3,611	659,736	78.6	29.1	158.55	0.55	9.96	11.68
Previously Reported:	N.P. Filters Avg.	0.34	7.01	2.8	3,611	50,894	7.0	2.4	160.22	0.04	9.96	0.96
0.99	NP Clearwell	0.32	6.94	2.8	3,611	94,660	13.1	4.2	156.33	0.08	9.96	1.69
	Clear Basin	0.32	6.94	2.8	4,243	341,000	64.3	20.6	156.33	0.39	9.96	8.27
	CW 1 & 2	1.15	7.68	2.8	4,243	25,900	0.6	0.7	223.46	0.01	9.96	0.28
WTP Cl residual	12-inch	1.00	7.68	2.8	1,143	21,256	18.6	18.6	219.33	0.25	9.96	7.49
1.15	6-inch	1.00	7.68	2.8	1,143	1,270	1.1	1.1	219.33	0.02	9.96	0.45
	System TOTAL									**1.35**		**48.27**
January 29, 2015	N.P. Sed Basin	0.35	7.05	2.2	3,611	659,736	78.6	27.5	170.00	0.49	10.49	10.49
Previously Reported:	N.P. Filters Avg.	0.29	7.10	2.2	3,611	50,894	7.0	2.0	173.00	0.04	10.49	0.78
0.93	NP Clearwell	0.35	6.93	2.2	3,611	94,660	13.1	4.6	162.98	0.08	10.49	1.75
	Clear Basin	0.35	6.93	2.2	4,243	341,000	64.3	22.5	162.98	0.41	10.49	8.58
	CW 1 & 2	1.07	7.83	2.2	4,243	25,900	0.6	0.7	244.95	0.01	10.49	0.25
WTP Cl residual	12-inch	0.93	7.83	2.2	1,143	21,256	18.6	17.3	240.50	0.22	10.49	6.61
1.07	6-inch	0.93	7.83	2.2	1,143	1,270	1.1	1.0	240.50	0.01	10.49	0.39
	System TOTAL									**1.26**		**44.27**
January 30, 2015	N.P. Sed Basin	0.28	7.11	2.2	3,611	659,736	78.6	22.0	173.61	0.38	10.49	8.39
Previously Reported:	N.P. Filters Avg.	0.28	7.14	2.2	3,611	50,894	7.0	2.0	175.44	0.03	10.49	0.75
0.72	NP Clearwell	0.27	7.07	2.2	3,611	94,660	13.1	3.5	171.19	0.06	10.49	1.35
	Clear Basin	0.27	7.07	2.2	4,243	341,000	64.3	17.4	171.19	0.30	10.49	6.62
	CW 1 & 2	1.11	7.76	2.2	4,243	25,900	0.6	0.7	239.87	0.01	10.49	0.26
WTP Cl residual	12-inch	0.97	7.76	2.2	1,143	21,256	18.6	18.0	235.45	0.23	10.49	6.86
1.11	6-inch	0.97	7.76	2.2	1,143	1,270	1.1	1.1	235.45	0.01	10.49	0.41
	System TOTAL									**1.03**		**40.64**
February 1, 2015	N.P. Sed Basin	0.23	7.07	2.8	3,611	659,736	78.6	18.1	163.63	0.33	9.96	7.26
Previously Reported:	N.P. Filters Avg.	0.20	7.10	2.8	3,611	50,894	7.0	1.4	165.36	0.03	9.96	0.57
0.72	NP Clearwell	0.30	6.98	2.8	3,611	94,660	13.1	3.9	158.55	0.07	9.96	1.58
	Clear Basin	0.30	6.98	2.8	4,243	341,000	64.3	19.3	158.55	0.36	9.96	7.75
	CW 1 & 2	1.13	7.86	2.8	4,243	25,900	0.6	0.7	238.44	0.01	9.96	0.28
WTP Cl residual	12-inch	0.98	7.86	2.8	1,143	21,256	18.6	18.3	233.96	0.23	9.96	7.36
1.13	6-inch	0.98	7.86	2.8	1,143	1,270	1.1	1.1	233.96	0.01	9.96	0.44
	System TOTAL									**1.05**		**42.39**
February 25, 2015	N.P. Sed Basin	0.17	7.07	1.7	1,806	659,736	157.1	26.7	178.48	0.45	10.93	9.77
Previously Reported:	N.P. Filters Avg.	0.14	7.12	1.7	1,806	25,447	7.0	1.0	181.64	0.02	10.93	0.36
0.68	NP Clearwell	0.20	7.11	1.7	1,806	94,660	26.2	5.2	181.00	0.09	10.93	1.92
	Clear Basin	0.20	7.11	1.7	4,243	341,000	64.3	12.9	181.00	0.21	10.93	4.70
	CW 1 & 2	1.08	7.82	1.7	4,243	25,900	0.6	0.7	254.94	0.01	10.93	0.24
WTP Cl residual	12-inch	0.94	7.82	1.7	1,143	21,256	18.6	17.5	250.24	0.21	10.93	6.40
1.08	6-inch	0.94	7.82	1.7	1,143	1,270	1.1	1.0	250.24	0.01	10.93	0.38
	System TOTAL									**1.00**		**38.71**
February 26, 2015	N.P. Sed Basin	0.18	7.08	2.8	1,806	659,736	157.1	28.3	164.21	0.52	9.96	11.36
Previously Reported:	N.P. Filters Avg.	0.17	7.10	2.8	1,806	25,447	7.0	1.2	165.36	0.02	9.96	0.48
0.82	NP Clearwell	0.24	7.12	2.8	1,806	94,660	26.2	6.3	166.52	0.11	9.96	2.53
	Clear Basin	0.24	7.12	2.8	4,243	341,000	64.3	15.4	166.52	0.28	9.96	6.20
	CW 1 & 2	1.10	7.81	2.8	4,243	25,900	0.6	0.7	233.13	0.01	9.96	0.27
WTP Cl residual	12-inch	0.96	7.81	2.8	1,143	21,256	18.6	17.8	228.87	0.23	9.96	7.16
1.10	6-inch	0.96	7.81	2.8	1,143	1,270	1.1	1.1	228.87	0.01	9.96	0.43
	System TOTAL									**1.19**		**45.13**
February 27, 2015	N.P. Sed Basin	0.24	6.98	2.8	3,611	659,736	78.6	18.9	158.55	0.36	9.96	7.58
Previously Reported:	N.P. Filters Avg.	0.20	7.03	2.8	3,611	50,894	7.0	1.4	161.35	0.03	9.96	0.57
0.64	NP Clearwell	0.23	7.22	2.8	3,611	94,660	13.1	3.0	172.45	0.05	9.96	1.21
	Clear Basin	0.23	7.22	2.8	4,243	341,000	64.3	14.8	172.45	0.26	9.96	5.94
	CW 1 & 2	1.12	7.82	2.8	4,243	25,900	0.6	0.7	234.60	0.01	9.96	0.27
WTP Cl residual	12-inch	0.98	7.82	2.8	1,143	21,256	18.6	18.1	230.25	0.24	9.96	7.29
1.12	6-inch	0.98	7.82	2.8	1,143	1,270	1.1	1.1	230.25	0.01	9.96	0.44
	System TOTAL									**0.95**		**40.30**
February 28, 2015	N.P. Sed Basin	0.32	7.01	2.8	3,611	659,736	78.6	25.1	160.22	0.47	9.96	10.10
Previously Reported:	N.P. Filters Avg.	0.28	7.07	2.8	3,611	50,894	7.0	2.0	163.63	0.04	9.96	0.79
0.96	NP Clearwell	0.40	7.21	2.8	3,611	94,660	13.1	5.2	171.85	0.09	9.96	2.11
	Clear Basin	0.40	7.21	2.8	4,243	341,000	64.3	25.7	171.85	0.45	9.96	10.33
	CW 1 & 2	1.09	7.81	2.8	4,243	25,900	0.6	0.7	232.83	0.01	9.96	0.27
WTP Cl residual	12-inch	0.95	7.81	2.8	1,143	21,256	18.6	17.7	228.61	0.23	9.96	7.10
1.09	6-inch	0.95	7.81	2.8	1,143	1,270	1.1	1.1	228.61	0.01	9.96	0.42
	System TOTAL									**1.30**		**47.67**

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
March 1, 2015	N.P. Sed Basin	0.20	7.21	1.1	3,611	659,736	78.6	15.7	198.20	0.24	11.47	5.48
Previously Reported:	N.P. Filters Avg.	0.18	7.10	1.1	3,611	50,894	7.0	1.3	190.68	0.02	11.47	0.44
0.50	NP Clearwell	0.25	7.21	1.1	3,611	94,660	13.1	3.3	198.20	0.05	11.47	1.14
	Clear Basin	0.25	7.21	1.1	4,243	341,000	64.3	16.1	198.20	0.24	11.47	5.61
	CW 1 & 2	1.07	7.99	1.1	4,243	25,900	0.6	0.7	286.99	0.01	11.47	0.23
WTP Cl residual	12-inch	0.93	7.99	1.1	1,143	21,256	18.6	17.3	281.50	0.18	11.47	6.05
1.07	6-inch	0.93	7.99	1.1	1,143	1,270	1.1	1.0	281.50	0.01	11.47	0.36
	System TOTAL									**0.75**		**33.42**
March 2, 2015	N.P. Sed Basin	0.22	6.96	1.1	3,611	659,736	78.6	17.3	181.50	0.29	11.47	6.03
Previously Reported:	N.P. Filters Avg.	0.17	7.01	1.1	3,611	50,894	7.0	1.2	184.73	0.02	11.47	0.42
0.48	NP Clearwell	0.17	7.00	1.1	3,611	94,660	13.1	2.2	184.08	0.04	11.47	0.78
	Clear Basin	0.17	7.00	1.1	4,243	341,000	64.3	10.9	184.08	0.18	11.47	3.81
	CW 1 & 2	1.12	7.56	1.1	4,243	25,900	0.6	0.7	246.18	0.01	11.47	0.24
WTP Cl residual	12-inch	0.98	7.56	1.1	1,143	21,256	18.6	18.1	241.63	0.23	11.47	6.33
1.12	6-inch	0.98	7.56	1.1	1,143	1,270	1.1	1.1	241.63	0.01	11.47	0.38
	System TOTAL									**0.77**		**32.75**
March 5, 2015	N.P. Sed Basin	0.28	7.06	1.1	3,611	659,736	78.6	22.0	188.02	0.35	11.47	7.67
Previously Reported:	N.P. Filters Avg.	0.26	7.07	1.1	3,611	50,894	7.0	1.8	188.68	0.03	11.47	0.64
0.75	NP Clearwell	0.35	6.96	1.1	3,611	94,660	13.1	4.6	181.50	0.08	11.47	1.60
	Clear Basin	0.35	6.96	1.1	4,243	341,000	64.3	22.5	181.50	0.37	11.47	7.85
	CW 1 & 2	1.07	7.75	1.1	4,243	25,900	0.6	0.7	262.51	0.01	11.47	0.23
WTP Cl residual	12-inch	0.93	7.75	1.1	1,143	21,256	18.6	17.3	257.69	0.20	11.47	6.05
1.07	6-inch	0.93	7.75	1.1	1,143	1,270	1.1	1.0	257.69	0.01	11.47	0.36
	System TOTAL									**1.05**		**38.51**
March 6, 2015	N.P. Sed Basin	0.17	6.79	1.1	3,611	659,736	78.6	13.4	170.91	0.23	11.47	4.66
Previously Reported:	N.P. Filters Avg.	0.16	6.94	1.1	3,611	50,894	7.0	1.1	180.23	0.02	11.47	0.39
0.42	NP Clearwell	0.16	6.97	1.1	3,611	94,660	13.1	2.1	182.14	0.03	11.47	0.73
	Clear Basin	0.16	6.97	1.1	4,243	341,000	64.3	10.3	182.14	0.17	11.47	3.59
	CW 1 & 2	1.05	7.84	2.8	4,243	25,900	0.6	0.6	234.23	0.01	9.96	0.26
WTP Cl residual	12-inch	0.91	7.84	1.1	1,143	21,256	18.6	17.0	265.74	0.19	11.47	5.93
1.05	6-inch	0.91	7.84	1.1	1,143	2,200	1.9	1.8	265.74	0.02	11.47	0.61
	System TOTAL									**0.68**		**29.76**
March 7, 2015	N.P. Sed Basin	0.16	6.91	0.6	3,611	659,736	78.6	12.6	187.69	0.20	11.91	4.22
Previously Reported:	N.P. Filters Avg.	0.15	6.95	0.6	3,611	50,894	7.0	1.1	190.37	0.02	11.91	0.35
0.35	NP Clearwell	0.13	6.92	0.6	3,611	94,660	13.1	1.7	188.35	0.03	11.91	0.57
	Clear Basin	0.13	6.92	0.6	4,243	341,000	64.3	8.4	188.35	0.13	11.91	2.81
	CW 1 & 2	1.07	7.75	0.6	4,243	25,900	0.6	0.7	276.63	0.01	11.91	0.22
WTP Cl residual	12-inch	0.93	7.75	0.6	1,143	21,256	18.6	17.3	271.49	0.19	11.91	5.82
1.07	6-inch	0.93	7.75	0.6	1,143	1,270	1.1	1.0	271.49	0.01	11.91	0.35
	System TOTAL									**0.59**		**27.92**
March 8, 2015	N.P. Sed Basin	0.06	6.91	1.1	3,611	659,736	78.6	4.7	178.32	0.08	11.47	1.64
Previously Reported:	N.P. Filters Avg.	0.03	6.95	1.1	3,611	50,894	7.0	0.2	180.86	0.00	11.47	0.07
0.12	NP Clearwell	0.04	7.00	1.1	3,611	94,660	13.1	0.5	184.08	0.01	11.47	0.18
	Clear Basin	0.04	7.00	1.1	4,243	341,000	64.3	2.6	184.08	0.04	11.47	0.90
	CW 1 & 2	1.15	7.82	1.1	4,243	25,900	0.6	0.7	272.34	0.01	11.47	0.24
WTP Cl residual	12-inch	1.00	7.82	1.1	1,143	21,256	18.6	18.6	266.96	0.21	11.47	6.50
1.15	6-inch	1.00	7.82	1.1	1,143	1,270	1.1	1.1	266.96	0.01	11.47	0.39
	System TOTAL									**0.36**		**25.09**
March 9, 2015	N.P. Sed Basin	0.40	6.84	1.1	3,611	659,736	78.6	31.4	173.96	0.54	11.47	10.96
Previously Reported:	N.P. Filters Avg.	0.32	6.82	1.1	3,611	50,894	7.0	2.3	172.73	0.04	11.47	0.79
0.83	NP Clearwell	0.23	6.96	1.1	3,611	94,660	13.1	3.0	181.50	0.05	11.47	1.05
	Clear Basin	0.23	6.96	1.1	4,243	341,000	64.3	14.8	181.50	0.24	11.47	5.16
	CW 1 & 2	1.13	7.77	1.1	4,243	25,900	0.6	0.7	266.59	0.01	11.47	0.24
WTP Cl residual	12-inch	0.98	7.77	1.1	1,143	21,256	18.6	18.3	261.45	0.21	11.47	6.39
1.13	6-inch	0.98	7.77	1.1	1,143	1,270	1.1	1.1	261.45	0.01	11.47	0.38
	System TOTAL									**1.11**		**39.87**

N PLANT - 12-inch main, CT at Mt. Pleasant

ASSUMPTIONS: Flow split: 3100 gpm split 45/55% between18/20-inch mains. Remaining to 12-inch

Baffle factors: N.P. Sed Basin 0.43 NP CW bf 0.5
N. P. Filters 0.50
Clear Basin 0.80 CW 1 & 2 0.1

Transmission Mains

Diameter	Length	Volume, gal	B.F.
18	-	-	1.00
20	-	-	1.00
12	9,580	56,252	1.00
6	-	-	1.00

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
January 23, 2015	N.P. Sed Basin	0.37	6.98	2.8	3,611	659,736	78.6	29.1	158.55	0.55	9.96	11.68
Previously Reported:	N.P. Filters Avg.	0.34	7.01	2.8	3,611	50,894	7.0	2.4	160.22	0.04	9.96	0.96
0.99	NP Clearwell	0.32	6.94	2.8	3,611	94,660	13.1	4.2	156.33	0.08	9.96	1.69
	Clear Basin	0.32	6.94	2.8	4,243	341,000	64.3	20.6	156.33	0.39	9.96	8.27
	CW 1 & 2	1.15	7.68	2.8	4,243	25,900	0.6	0.7	223.46	0.01	9.96	0.28
WTP Cl residual	12-inch	1.11	7.68	2.8	1,143	56,252	49.2	54.4	222.22	0.73	9.96	21.86
1.15	6-inch	1.11	7.68	2.8	1,143	0	0.0	0.0	222.22	0.00	9.96	0.00
	System TOTAL									**1.81**		**62.65**
January 29, 2015	N.P. Sed Basin	0.35	7.05	2.2	3,611	659,736	78.6	27.5	170.00	0.49	10.49	10.49
Previously Reported:	N.P. Filters Avg.	0.29	7.10	2.2	3,611	50,894	7.0	2.0	173.00	0.04	10.49	0.78
0.93	NP Clearwell	0.35	6.93	2.2	3,611	94,660	13.1	4.6	162.98	0.08	10.49	1.75
	Clear Basin	0.35	6.93	2.2	4,243	341,000	64.3	22.5	162.98	0.41	10.49	8.58
	CW 1 & 2	1.07	7.83	2.2	4,243	25,900	0.6	0.7	244.95	0.01	10.49	0.25
WTP Cl residual	12-inch	1.03	7.83	2.2	1,143	56,252	49.2	50.6	243.62	0.62	10.49	19.31
1.07	6-inch	1.03	7.83	2.2	1,143	0	0.0	0.0	243.62	0.00	10.49	0.00
	System TOTAL									**1.65**		**56.97**
January 30, 2015	N.P. Sed Basin	0.28	7.11	2.2	3,611	659,736	78.6	22.0	173.61	0.38	10.49	8.39
Previously Reported:	N.P. Filters Avg.	0.28	7.14	2.2	3,611	50,894	7.0	2.0	175.44	0.03	10.49	0.75
0.72	NP Clearwell	0.27	7.07	2.2	3,611	94,660	13.1	3.5	171.19	0.06	10.49	1.35
	Clear Basin	0.27	7.07	2.2	4,243	341,000	64.3	17.4	171.19	0.30	10.49	6.62
	CW 1 & 2	1.11	7.76	2.2	4,243	25,900	0.6	0.7	239.87	0.01	10.49	0.26
WTP Cl residual	12-inch	1.07	7.76	2.2	1,143	56,252	49.2	52.5	238.55	0.66	10.49	20.03
1.11	6-inch	1.07	7.76	2.2	1,143	0	0.0	0.0	238.55	0.00	10.49	0.00
	System TOTAL									**1.45**		**53.81**
February 1, 2015	N.P. Sed Basin	0.23	7.07	2.8	3,611	659,736	78.6	18.1	163.63	0.33	9.96	7.26
Previously Reported:	N.P. Filters Avg.	0.20	7.10	2.8	3,611	50,894	7.0	1.4	165.36	0.03	9.96	0.57
0.72	NP Clearwell	0.30	6.98	2.8	3,611	94,660	13.1	3.9	158.55	0.07	9.96	1.58
	Clear Basin	0.30	6.98	2.8	4,243	341,000	64.3	19.3	158.55	0.36	9.96	7.75
	CW 1 & 2	1.13	7.86	2.8	4,243	25,900	0.6	0.7	238.44	0.01	9.96	0.28
WTP Cl residual	12-inch	1.09	7.86	2.8	1,143	56,252	49.2	53.5	237.10	0.68	9.96	21.48
1.13	6-inch	1.09	7.86	2.8	1,143	0	0.0	0.0	237.10	0.00	9.96	0.00
	System TOTAL									**1.48**		**56.51**
February 25, 2015	N.P. Sed Basin	0.17	7.07	1.7	1,806	659,736	157.1	26.7	178.48	0.45	10.93	9.77
Previously Reported:	N.P. Filters Avg.	0.14	7.12	1.7	1,806	25,447	7.0	1.0	181.64	0.02	10.93	0.36
0.68	NP Clearwell	0.20	7.11	1.7	1,806	94,660	26.2	5.2	181.00	0.09	10.93	1.92
	Clear Basin	0.20	7.11	1.7	4,243	341,000	64.3	12.9	181.00	0.21	10.93	4.70
	CW 1 & 2	1.08	7.82	1.7	4,243	25,900	0.6	0.7	254.94	0.01	10.93	0.24
WTP Cl residual	12-inch	1.04	7.82	1.7	1,143	56,252	49.2	51.1	253.54	0.60	10.93	18.69
1.08	6-inch	1.04	7.82	1.7	1,143	0	0.0	0.0	253.54	0.00	10.93	0.00
	System TOTAL									**1.38**		**51.00**
February 26, 2015	N.P. Sed Basin	0.18	7.08	2.8	1,806	659,736	157.1	28.3	164.21	0.52	9.96	11.36
Previously Reported:	N.P. Filters Avg.	0.17	7.10	2.8	1,806	25,447	7.0	1.2	165.36	0.02	9.96	0.48
0.82	NP Clearwell	0.24	7.12	2.8	1,806	94,660	26.2	6.3	166.52	0.11	9.96	2.53
	Clear Basin	0.24	7.12	2.8	4,243	341,000	64.3	15.4	166.52	0.28	9.96	6.20
	CW 1 & 2	1.10	7.81	2.8	4,243	25,900	0.6	0.7	233.13	0.01	9.96	0.27
WTP Cl residual	12-inch	1.06	7.81	2.8	1,143	56,252	49.2	52.0	231.86	0.67	9.96	20.91
1.10	6-inch	1.06	7.81	2.8	1,143	0	0.0	0.0	231.86	0.00	9.96	0.00
	System TOTAL									**1.61**		**58.88**
February 27, 2015	N.P. Sed Basin	0.24	6.98	2.8	3,611	659,736	78.6	18.9	158.55	0.36	9.96	7.58
Previously Reported:	N.P. Filters Avg.	0.20	7.03	2.8	3,611	50,894	7.0	1.4	161.35	0.03	9.96	0.57
0.64	NP Clearwell	0.23	7.22	2.8	3,611	94,660	13.1	3.0	172.45	0.05	9.96	1.21
	Clear Basin	0.23	7.22	2.8	4,243	341,000	64.3	14.8	172.45	0.26	9.96	5.94
	CW 1 & 2	1.12	7.82	2.8	4,243	25,900	0.6	0.7	234.60	0.01	9.96	0.27
WTP Cl residual	12-inch	1.08	7.82	2.8	1,143	56,252	49.2	53.0	233.30	0.68	9.96	21.29
1.12	6-inch	1.08	7.82	2.8	1,143	0	0.0	0.0	233.30	0.00	9.96	0.00
	System TOTAL									**1.38**		**54.30**
February 28, 2015	N.P. Sed Basin	0.32	7.01	2.8	3,611	659,736	78.6	25.1	160.22	0.47	9.96	10.10
Previously Reported:	N.P. Filters Avg.	0.28	7.07	2.8	3,611	50,894	7.0	2.0	163.63	0.04	9.96	0.79
0.96	NP Clearwell	0.40	7.21	2.8	3,611	94,660	13.1	5.2	171.85	0.09	9.96	2.11
	Clear Basin	0.40	7.21	2.8	4,243	341,000	64.3	25.7	171.85	0.45	9.96	10.33
	CW 1 & 2	1.09	7.81	2.8	4,243	25,900	0.6	0.7	232.83	0.01	9.96	0.27
WTP Cl residual	12-inch	1.05	7.81	2.8	1,143	56,252	49.2	51.6	231.57	0.67	9.96	20.72
1.09	6-inch	1.05	7.81	2.8	1,143	0	0.0	0.0	231.57	0.00	9.96	0.00
	System TOTAL									**1.72**		**61.30**

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
March 1, 2015	N.P. Sed Basin	0.20	7.21	1.1	3,611	659,736	78.6	15.7	198.20	0.24	11.47	5.48
Previously Reported:	N.P. Filters Avg.	0.18	7.10	1.1	3,611	50,894	7.0	1.3	190.68	0.02	11.47	0.44
0.50	NP Clearwell	0.25	7.21	1.1	3,611	94,660	13.1	3.3	198.20	0.05	11.47	1.14
	Clear Basin	0.25	7.21	1.1	4,243	341,000	64.3	16.1	198.20	0.24	11.47	5.61
	CW 1 & 2	1.07	7.99	1.1	4,243	25,900	0.6	0.7	286.99	0.01	11.47	0.23
WTP Cl residual	12-inch	1.03	7.99	1.1	1,143	56,252	49.2	50.6	285.35	0.53	11.47	17.66
1.07	6-inch	1.03	7.99	1.1	1,143	0	0.0	0.0	285.35	0.00	11.47	0.00
	System TOTAL									**1.09**		**45.03**
March 2, 2015	N.P. Sed Basin	0.22	6.96	1.1	3,611	659,736	78.6	17.3	181.50	0.29	11.47	6.03
Previously Reported:	N.P. Filters Avg.	0.17	7.01	1.1	3,611	50,894	7.0	1.2	184.73	0.02	11.47	0.42
0.48	NP Clearwell	0.17	7.00	1.1	3,611	94,660	13.1	2.2	184.08	0.04	11.47	0.78
	Clear Basin	0.17	7.00	1.1	4,243	341,000	64.3	10.9	184.08	0.18	11.47	3.81
	CW 1 & 2	1.12	7.56	1.1	4,243	25,900	0.6	0.7	246.18	0.01	11.47	0.24
WTP Cl residual	12-inch	1.08	7.56	1.1	1,143	56,252	49.2	53.0	244.82	0.65	11.47	18.49
1.12	6-inch	1.08	7.56	1.1	1,143	0	0.0	0.0	244.82	0.00	11.47	0.00
	System TOTAL									**1.18**		**44.90**
March 5, 2015	N.P. Sed Basin	0.28	7.06	1.1	3,611	659,736	78.6	22.0	188.02	0.35	11.47	7.67
Previously Reported:	N.P. Filters Avg.	0.26	7.07	1.1	3,611	50,894	7.0	1.8	188.68	0.03	11.47	0.64
0.75	NP Clearwell	0.35	6.96	1.1	3,611	94,660	13.1	4.6	181.50	0.08	11.47	1.60
	Clear Basin	0.35	6.96	1.1	4,243	341,000	64.3	22.5	181.50	0.37	11.47	7.85
	CW 1 & 2	1.07	7.75	1.1	4,243	25,900	0.6	0.7	262.51	0.01	11.47	0.23
WTP Cl residual	12-inch	1.03	7.75	1.1	1,143	56,252	49.2	50.6	261.07	0.58	11.47	17.66
1.07	6-inch	1.03	7.75	1.1	1,143	2,200	1.9	2.0	261.07	0.02	11.47	0.69
	System TOTAL									**1.44**		**50.12**
March 6, 2015	N.P. Sed Basin	0.17	6.79	1.1	3,611	659,736	78.6	13.4	170.91	0.23	11.47	4.66
Previously Reported:	N.P. Filters Avg.	0.16	6.94	1.1	3,611	50,894	7.0	1.1	180.23	0.02	11.47	0.39
0.42	NP Clearwell	0.16	6.97	1.1	3,611	94,660	13.1	2.1	182.14	0.03	11.47	0.73
	Clear Basin	0.16	6.97	1.1	4,243	341,000	64.3	10.3	182.14	0.17	11.47	3.59
	CW 1 & 2	1.05	7.84	2.8	4,243	25,900	0.6	0.6	234.23	0.01	9.96	0.26
WTP Cl residual	12-inch	1.01	7.84	1.1	1,143	56,252	49.2	49.7	269.22	0.55	11.47	17.33
1.05	6-inch	1.01	7.84	1.1	1,143	0	0.0	0.0	269.22	0.00	11.47	0.00
	System TOTAL									**1.02**		**41.16**
March 7, 2015	N.P. Sed Basin	0.16	6.91	0.6	3,611	659,736	78.6	12.6	187.69	0.20	11.91	4.22
Previously Reported:	N.P. Filters Avg.	0.15	6.95	0.6	3,611	50,894	7.0	1.1	190.37	0.02	11.91	0.35
0.35	NP Clearwell	0.13	6.92	0.6	3,611	94,660	13.1	1.7	188.35	0.03	11.91	0.57
	Clear Basin	0.13	6.92	0.6	4,243	341,000	64.3	8.4	188.35	0.13	11.91	2.81
	CW 1 & 2	1.07	7.75	0.6	4,243	25,900	0.6	0.7	276.63	0.01	11.91	0.22
WTP Cl residual	12-inch	1.03	7.75	0.6	1,143	56,252	49.2	50.6	275.09	0.55	11.91	17.00
1.07	6-inch	1.03	7.75	0.6	1,143	0	0.0	0.0	275.09	0.00	11.91	0.00
	System TOTAL									**0.94**		**39.10**
March 8, 2015	N.P. Sed Basin	0.06	6.91	1.1	3,611	659,736	78.6	4.7	178.32	0.08	11.47	1.64
Previously Reported:	N.P. Filters Avg.	0.03	6.95	1.1	3,611	50,894	7.0	0.2	180.86	0.00	11.47	0.07
0.12	NP Clearwell	0.04	7.00	1.1	3,611	94,660	13.1	0.5	184.08	0.01	11.47	0.18
	Clear Basin	0.04	7.00	1.1	4,243	341,000	64.3	2.6	184.08	0.04	11.47	0.90
	CW 1 & 2	1.15	7.82	1.1	4,243	25,900	0.6	0.7	272.34	0.01	11.47	0.24
WTP Cl residual	12-inch	1.11	7.82	1.1	1,143	56,252	49.2	54.4	270.73	0.60	11.47	18.98
1.15	6-inch	1.11	7.82	1.1	1,143	0	0.0	0.0	270.73	0.00	11.47	0.00
	System TOTAL									**0.74**		**37.57**
March 9, 2015	N.P. Sed Basin	0.40	6.84	1.1	3,611	659,736	78.6	31.4	173.96	0.54	11.47	10.96
Previously Reported:	N.P. Filters Avg.	0.32	6.82	1.1	3,611	50,894	7.0	2.3	172.73	0.04	11.47	0.79
0.83	NP Clearwell	0.23	6.96	1.1	3,611	94,660	13.1	3.0	181.50	0.05	11.47	1.05
	Clear Basin	0.23	6.96	1.1	4,243	341,000	64.3	14.8	181.50	0.24	11.47	5.16
OP 1	CW 1 & 2	1.13	7.77	1.1	4,243	25,900	0.6	0.7	266.59	0.01	11.47	0.24
WTP Cl residual	12-inch	1.09	7.77	1.1	1,143	56,252	49.2	53.5	265.05	0.61	11.47	18.65
1.13	6-inch	1.09	7.77	1.1	1,143	0	0.0	0.0	265.05	0.00	11.47	0.00
	System TOTAL									**1.49**		**52.13**

N PLANT - 18-inch main, CT at 1st customer.

ASSUMPTIONS: Flow split: 3100 gpm split 45/55% between18/20-inch mains. Remaining to 12-inch

Baffle factors: N.P. Sed Basin 0.43 NP CW bf 0.5
N.P. Filters 0.50
Clear Basin 0.80 CW 1 & 2 0.1

Transmission Mains

Diameter	Length	Volume, gal	B.F.
18	3,400	44,919	1.00
20	-	-	1.00
12	-	-	1.00
6	-	-	1.00

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
January 23, 2015	N.P. Sed Basin	0.37	6.98	2.8	3,611	659,736	78.6	29.1	158.55	0.55	9.96	11.68
Previously Reported:	N.P. Filters Avg.	0.34	7.01	2.8	3,611	50,894	7.0	2.4	160.22	0.04	9.96	0.96
0.99	NP Clearwell	0.32	6.94	2.8	3,611	94,660	13.1	4.2	156.33	0.08	9.96	1.69
	Clear Basin	0.32	6.94	2.8	4,243	341,000	64.3	20.6	156.33	0.39	9.96	8.27
WTP Cl residual	CW 1 & 2	1.15	7.68	2.8	4,243	25,900	0.6	0.7	223.46	0.01	9.96	0.28
1.15	18-inch	1.08	7.68	2.8	1,395	44,919	32.2	34.7	221.47	0.47	9.96	13.96
	System TOTAL									**1.55**		**36.83**
January 29, 2015	N.P. Sed Basin	0.35	7.05	2.2	3,611	659,736	78.6	27.5	170.00	0.49	10.49	10.49
Previously Reported:	N.P. Filters Avg.	0.29	7.10	2.2	3,611	50,894	7.0	2.0	173.00	0.04	10.49	0.78
0.93	NP Clearwell	0.35	6.93	2.2	3,611	94,660	13.1	4.6	162.98	0.08	10.49	1.75
	Clear Basin	0.35	6.93	2.2	4,243	341,000	64.3	22.5	162.98	0.41	10.49	8.58
WTP Cl residual	CW 1 & 2	1.07	7.83	2.2	4,243	25,900	0.6	0.7	244.95	0.01	10.49	0.25
1.07	18-inch	1.00	7.83	2.2	1,395	44,919	32.2	32.3	242.81	0.40	10.49	12.32
	System TOTAL									**1.43**		**34.17**
January 30, 2015	N.P. Sed Basin	0.28	7.11	2.2	3,611	659,736	78.6	22.0	173.61	0.38	10.49	8.39
Previously Reported:	N.P. Filters Avg.	0.28	7.14	2.2	3,611	50,894	7.0	2.0	175.44	0.03	10.49	0.75
0.72	NP Clearwell	0.27	7.07	2.2	3,611	94,660	13.1	3.5	171.19	0.06	10.49	1.35
	Clear Basin	0.27	7.07	2.2	4,243	341,000	64.3	17.4	171.19	0.30	10.49	6.62
WTP Cl residual	CW 1 & 2	1.11	7.76	2.2	4,243	25,900	0.6	0.7	239.87	0.01	10.49	0.26
1.11	18-inch	1.04	7.76	2.2	1,395	44,919	32.2	33.5	237.75	0.42	10.49	12.79
	System TOTAL									**1.21**		**30.15**
February 1, 2015	N.P. Sed Basin	0.23	7.07	2.8	3,611	659,736	78.6	18.1	163.63	0.33	9.96	7.26
Previously Reported:	N.P. Filters Avg.	0.20	7.10	2.8	3,611	50,894	7.0	1.4	165.36	0.03	9.96	0.57
0.72	NP Clearwell	0.30	6.98	2.8	3,611	94,660	13.1	3.9	158.55	0.07	9.96	1.58
	Clear Basin	0.30	6.98	2.8	4,243	341,000	64.3	19.3	158.55	0.36	9.96	7.75
WTP Cl residual	CW 1 & 2	1.13	7.68	2.8	4,243	25,900	0.6	0.7	222.90	0.01	9.96	0.28
1.13	18-inch	1.06	7.86	2.8	1,395	44,919	32.2	34.1	236.29	0.43	9.96	13.71
	System TOTAL									**1.24**		**31.15**
February 25, 2015	N.P. Sed Basin	0.17	7.07	1.7	1,806	659,736	157.1	26.7	178.48	0.45	10.93	9.77
Previously Reported:	N.P. Filters Avg.	0.14	7.12	1.7	1,806	25,447	7.0	1.0	181.64	0.02	10.93	0.36
0.68	NP Clearwell	0.20	7.11	1.7	1,806	94,660	26.2	5.2	181.00	0.09	10.93	1.92
	Clear Basin	0.20	7.11	1.7	4,243	341,000	64.3	12.9	181.00	0.21	10.93	4.70
WTP Cl residual	CW 1 & 2	1.08	7.82	1.7	4,243	25,900	0.6	0.7	254.94	0.01	10.93	0.24
1.08	18-inch	1.01	7.82	1.7	1,395	44,919	32.2	32.6	252.68	0.39	10.93	11.93
	System TOTAL									**1.16**		**28.93**
February 26, 2015	N.P. Sed Basin	0.18	7.08	2.8	1,806	659,736	157.1	28.3	164.21	0.52	9.96	11.36
Previously Reported:	N.P. Filters Avg.	0.17	7.10	2.8	1,806	25,447	7.0	1.2	165.36	0.02	9.96	0.48
0.82	NP Clearwell	0.24	7.12	2.8	1,806	94,660	26.2	6.3	166.52	0.11	9.96	2.53
	Clear Basin	0.24	7.12	2.8	4,243	341,000	64.3	15.4	166.52	0.28	9.96	6.20
WTP Cl residual	CW 1 & 2	1.10	7.81	2.8	4,243	25,900	0.6	0.7	233.13	0.01	9.96	0.27
1.10	18-inch	1.03	7.81	2.8	1,395	44,919	32.2	33.2	231.08	0.43	9.96	13.35
	System TOTAL									**1.37**		**34.19**
February 27, 2015	N.P. Sed Basin	0.24	6.98	2.8	3,611	659,736	78.6	18.9	158.55	0.36	9.96	7.58
Previously Reported:	N.P. Filters Avg.	0.20	7.03	2.8	3,611	50,894	7.0	1.4	161.35	0.03	9.96	0.57
0.64	NP Clearwell	0.23	7.22	2.8	3,611	94,660	13.1	3.0	172.45	0.05	9.96	1.21
	Clear Basin	0.23	7.22	2.8	4,243	341,000	64.3	14.8	172.45	0.26	9.96	5.94
WTP Cl residual	CW 1 & 2	1.12	7.82	2.8	4,243	25,900	0.6	0.7	234.60	0.01	9.96	0.27
1.12	18-inch	1.05	7.82	2.8	1,395	44,919	32.2	33.8	232.51	0.44	9.96	13.59
	System TOTAL									**1.14**		**29.16**
February 28, 2015	N.P. Sed Basin	0.32	7.01	2.8	3,611	659,736	78.6	25.1	160.22	0.47	9.96	10.10
Previously Reported:	N.P. Filters Avg.	0.28	7.07	2.8	3,611	50,894	7.0	2.0	163.63	0.04	9.96	0.79
0.96	NP Clearwell	0.40	7.21	2.8	3,611	94,660	13.1	5.2	171.85	0.09	9.96	2.11
	Clear Basin	0.40	7.21	2.8	4,243	341,000	64.3	25.7	171.85	0.45	9.96	10.33
WTP Cl residual	CW 1 & 2	1.09	7.81	2.8	4,243	25,900	0.6	0.7	232.83	0.01	9.96	0.27
1.09	18-inch	1.02	7.81	2.8	1,395	44,919	32.2	32.9	230.80	0.43	9.96	13.23
	System TOTAL									**1.48**		**36.83**

Sample Date	Treatment Stage	Residual Conc. (C) (mg/L)	pH	Temp. (Celsius)	Peak Flow (GPM)	Volume (gal)	Contact Time (T) (min)	CT_{calc}	3-log CT_{req}	Log Inactivation (*Giardia*)	4-log CT_{req}	Log Inactivation (viruses)
March 1, 2015	N.P. Sed Basin	0.20	7.21	1.1	3,611	659,736	78.6	15.7	198.20	0.24	11.47	5.48
Previously Reported:	N.P. Filters Avg.	0.18	7.10	1.1	3,611	50,894	7.0	1.3	190.68	0.02	11.47	0.44
0.50	NP Clearwell	0.25	7.21	1.1	3,611	94,660	13.1	3.3	198.20	0.05	11.47	1.14
	Clear Basin	0.25	7.21	1.1	4,243	341,000	64.3	16.1	198.20	0.24	11.47	5.61
WTP Cl residual	CW 1 & 2	1.07	7.68	1.1	4,243	25,900	0.6	0.7	255.77	0.01	11.47	0.23
1.07	18-inch	1.00	7.99	1.1	1,395	44,919	32.2	32.3	284.36	0.34	11.47	11.27
	System TOTAL									**0.90**		**24.18**
March 2, 2015	N.P. Sed Basin	0.22	6.96	1.1	3,611	659,736	78.6	17.3	181.50	0.29	11.47	6.03
Previously Reported:	N.P. Filters Avg.	0.17	7.01	1.1	3,611	50,894	7.0	1.2	184.73	0.02	11.47	0.42
0.48	NP Clearwell	0.17	7.00	1.1	3,611	94,660	13.1	2.2	184.08	0.04	11.47	0.78
	Clear Basin	0.17	7.00	1.1	4,243	341,000	64.3	10.9	184.08	0.18	11.47	3.81
WTP Cl residual	CW 1 & 2	1.12	7.68	1.1	4,243	25,900	0.6	0.7	257.45	0.01	11.47	0.24
1.12	18-inch	1.05	7.56	1.1	1,395	44,919	32.2	33.8	243.99	0.42	11.47	11.80
	System TOTAL									**0.94**		**23.08**
March 5, 2015	N.P. Sed Basin	0.28	7.06	1.1	3,611	659,736	78.6	22.0	188.02	0.35	11.47	7.67
Previously Reported:	N.P. Filters Avg.	0.26	7.07	1.1	3,611	50,894	7.0	1.8	188.68	0.03	11.47	0.64
0.75	NP Clearwell	0.35	6.96	1.1	3,611	94,660	13.1	4.6	181.50	0.08	11.47	1.60
	Clear Basin	0.35	6.96	1.1	4,243	341,000	64.3	22.5	181.50	0.37	11.47	7.85
WTP Cl residual	CW 1 & 2	1.07	7.68	1.1	4,243	25,900	0.6	0.7	255.77	0.01	11.47	0.23
1.07	18-inch	1.00	7.75	1.1	1,395	44,919	32.2	32.3	260.19	0.37	11.47	11.27
	System TOTAL									**1.21**		**29.26**
March 6, 2015	N.P. Sed Basin	0.17	6.79	1.1	3,611	659,736	78.6	13.4	170.91	0.23	11.47	4.66
Previously Reported:	N.P. Filters Avg.	0.16	6.94	1.1	3,611	50,894	7.0	1.1	180.23	0.02	11.47	0.39
0.42	NP Clearwell	0.16	6.97	1.1	3,611	94,660	13.1	2.1	182.14	0.03	11.47	0.73
	Clear Basin	0.16	6.97	1.1	4,243	341,000	64.3	10.3	182.14	0.17	11.47	3.59
WTP Cl residual	CW 1 & 2	1.05	7.68	2.8	4,243	25,900	0.6	0.6	220.67	0.01	9.96	0.26
1.05	18-inch	0.98	7.84	1.1	1,395	44,919	32.2	31.7	268.32	0.35	11.47	11.06
	System TOTAL									**0.82**		**20.69**
March 7, 2015	N.P. Sed Basin	0.16	6.91	0.6	3,611	659,736	78.6	12.6	187.69	0.20	11.91	4.22
Previously Reported:	N.P. Filters Avg.	0.15	6.95	0.6	3,611	50,894	7.0	1.1	190.37	0.02	11.91	0.35
0.35	NP Clearwell	0.13	6.92	0.6	3,611	94,660	13.1	1.7	188.35	0.03	11.91	0.57
	Clear Basin	0.13	6.92	0.6	4,243	341,000	64.3	8.4	188.35	0.13	11.91	2.81
WTP Cl residual	CW 1 & 2	1.07	7.68	0.6	4,243	25,900	0.6	0.7	269.53	0.01	11.91	0.22
1.07	18-inch	1.00	7.75	0.6	1,395	44,919	32.2	32.3	274.15	0.35	11.91	10.85
	System TOTAL									**0.74**		**19.03**
March 8, 2015	N.P. Sed Basin	0.06	6.91	1.1	3,611	659,736	78.6	4.7	178.32	0.08	11.47	1.64
Previously Reported:	N.P. Filters Avg.	0.03	6.95	1.1	3,611	50,894	7.0	0.2	180.86	0.00	11.47	0.07
0.12	NP Clearwell	0.04	7.00	1.1	3,611	94,660	13.1	0.5	184.08	0.01	11.47	0.18
	Clear Basin	0.04	7.00	1.1	4,243	341,000	64.3	2.6	184.08	0.04	11.47	0.90
WTP Cl residual	CW 1 & 2	1.15	7.68	1.1	4,243	25,900	0.6	0.7	258.46	0.01	11.47	0.24
1.15	18-inch	1.08	7.82	1.1	1,395	44,919	32.2	34.7	269.75	0.39	11.47	12.12
	System TOTAL									**0.53**		**15.16**
March 9, 2015	N.P. Sed Basin	0.40	6.84	1.1	3,611	659,736	78.6	31.4	173.96	0.54	11.47	10.96
Previously Reported:	N.P. Filters Avg.	0.32	6.82	1.1	3,611	50,894	7.0	2.3	172.73	0.04	11.47	0.79
0.83	NP Clearwell	0.23	6.96	1.1	3,611	94,660	13.1	3.0	181.50	0.05	11.47	1.05
	Clear Basin	0.23	6.96	1.1	4,243	341,000	64.3	14.8	181.50	0.24	11.47	5.16
WTP Cl residual	CW 1 & 2	1.13	7.68	1.1	4,243	25,900	0.6	0.7	257.79	0.01	11.47	0.24
1.13	18-inch	1.06	7.77	1.1	1,395	44,919	32.2	34.1	264.12	0.39	11.47	11.91
	System TOTAL									**1.27**		**30.11**

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Instructions for issuing a Tier 2 Public Notice for failing to respond to a disinfection treatment breakdown

For groundwater systems providing 4-log treatment of viruses: Failure to maintain a minimum 0.40 mg/L disinfectant residual (or other DEP-approved minimum residual) for more than 4 hours at the entry point to the distribution system OR failure to maintain adequate CTs for more than 4 hours constitutes a breakdown in treatment.

For surface water systems: Failure to maintain a minimum 0.2 mg/L disinfectant residual at the entry point to the distribution system for more than 4 hours constitutes a breakdown in treatment.

A breakdown in treatment requires a Tier 1 PN. When a water supplier fails to issue a Tier 1 PN, DEP staff can require the supplier to issue the following Tier 2 PN to explain to the consumers that this breakdown in treatment occurred. Water suppliers must provide public notice to persons served as soon as practical but within 30 days after they learn of the violation.

Community systems must use one of the following methods:

- Hand or direct delivery
- Mail, as a separate notice or included with the bill

Noncommunity systems must use one of the following methods:

- Posting in conspicuous locations
- Hand delivery
- Mail or direct delivery to each customer and service connection, when known.

In addition, both community and noncommunity systems must use *another* method reasonably calculated to reach others if they would not be reached by the first method. Such methods could include newspapers, e-mail, or delivery to community organizations. If you mail, post, or hand deliver, print your notice on your system's letterhead, if available.

The notice on the reverse is appropriate for mailing, posting, or hand delivery. If you modify this notice, you must still include all required PN elements and leave the mandatory language unchanged (see below).

Mandatory Language
Mandatory language on health effects and special notice language must be included as written (with blanks filled in) and are presented in this notice in italics and with an asterisk on either end.

You must also include standard language to encourage the distribution of the public notice to all persons served. This language is also presented in this notice in italics and with an asterisk on either end.

Corrective Action
In your notice, describe corrective actions you took.

PN Certification

Send a copy of each type of notice and the certification form (3800-FM-WSFR0076) to DEP within ten days after you issued the notice.

Template Form Field Instructions:

When you place the cursor in the form field of the following template, look in the bottom left corner of your computer (row above the START button) for instructions about the information you enter in that field.

(i.e. first form field instructions read: Insert date and time when measured EP residual was below the required minimum residual)

3900-FM-BSDW0492 Rev. 11/2012
Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

ESTE INFORME CONTIENE INFORMACION IMPORTANTE ACERCA DE SU AGUA POTABLE.
HAGA QUE ALGUIEN LO TRADUZCA PARA USTED, O HABLE CON ALGUIEN QUE LO ENTIENDA.

Hanover Municipal Waterworks did not meet treatment technique requirements on February 7, 2015 and multiple days between February 26, 2015 and March 9, 2015.

We are required to provide continuous filtration and disinfection of our drinking water, and this treatment is required to meet a certain level of inactivation of disease-causing organisms. On February 7 and 7 days between February 26 and March 9, it was determined that we did not achieve our required inactivation levels. Because of this, we were unable to certify that the water provided to our customers did not contain disease-causing organisms.

What we should have done:

We were required to notify you that *boiled or bottled water should have been used* for drinking, making ice, brushing teeth, washing dishes, and food preparation until the problem was corrected. Boiling kills bacteria and other organisms in the water. **PLEASE NOTE: IT IS NOT NECESSARY TO BOIL YOUR WATER NOW BECAUSE THE PROBLEM HAS ALREADY BEEN CORRECTED**.

Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.

What happened? What was done?

- For certain periods of time on February 7 and 26; and March 1, 2, 6, 7, 8, and 9, our disinfection treatment was not operating at a level sufficient to meet the required level of inactivation of pathogenic organisms in the drinking water provided to our customers. During these periods, the filtration process performance achieved regulatory requirements, but we did not maintain the required chlorine concentration.
- We failed to notify our customers and DEP within 24 hours of the problem. DEP was notified on March 10, 2015.
- Effective March 10, 2015, the chlorine concentration was increased to achieve the required level of inactivation and we have met treatment technique requirements since that time. After increasing chlorine, we met with DEP and our consulting engineer to develop a targeted improvement plan.
- As part of a proactive approach, water treatment facility improvements, which will minimize the potential of not achieving the required inactivation level in the future, have already been designed, bid/awarded, and are in the process of being constructed.
- A water treatment process audit is being conducted at the water treatment facility in order to optimize the disinfection process and the manner in which associated calculation and reporting requirements are achieved.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or by distributing copies by hand or mail.

For more information, please contact: The Hanover Borough Office
44 Frederick Street
Hanover, PA 17331
at 717-637-3877

This notice is being sent to you by *Hanover Municipal Waterworks*.

PWS ID: 7670076 Date distributed: _____

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Instructions for issuing a Tier 2 Public Notice for failing to respond to a disinfection treatment breakdown

For groundwater systems providing 4-log treatment of viruses: Failure to maintain a minimum 0.40 mg/L disinfectant residual (or other DEP-approved minimum residual) for more than 4 hours at the entry point to the distribution system OR failure to maintain adequate CTs for more than 4 hours constitutes a breakdown in treatment.

For surface water systems: Failure to maintain a minimum 0.2 mg/L disinfectant residual at the entry point to the distribution system for more than 4 hours constitutes a breakdown in treatment.

A breakdown in treatment requires a Tier 1 PN. When a water supplier fails to issue a Tier 1 PN, DEP staff can require the supplier to issue the following Tier 2 PN to explain to the consumers that this breakdown in treatment occurred. Water suppliers must provide public notice to persons served as soon as practical but within 30 days after they learn of the violation.

Community systems must use one of the following methods:

- Hand or direct delivery
- Mail, as a separate notice or included with the bill

Noncommunity systems must use one of the following methods:

- Posting in conspicuous locations
- Hand delivery
- Mail or direct delivery to each customer and service connection, when known.

In addition, both community and noncommunity systems must use *another* method reasonably calculated to reach others if they would not be reached by the first method. Such methods could include newspapers, e-mail, or delivery to community organizations. If you mail, post, or hand deliver, print your notice on your system's letterhead, if available.

The notice on the reverse is appropriate for mailing, posting, or hand delivery. If you modify this notice, you must still include all required PN elements and leave the mandatory language unchanged (see below).

Mandatory Language
Mandatory language on health effects and special notice language must be included as written (with blanks filled in) and are presented in this notice in italics and with an asterisk on either end.

You must also include standard language to encourage the distribution of the public notice to all persons served. This language is also presented in this notice in italics and with an asterisk on either end.

Corrective Action
In your notice, describe corrective actions you took.

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Send a copy of each type of notice and the certification form (3800-FM-WSFR0076) to DEP within ten days after you issued the notice.

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3900-FM-BSDW0492 Rev. 11/2012
Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

ESTE INFORME CONTIENE INFORMACION IMPORTANTE ACERCA DE SU AGUA POTABLE.
HAGA QUE ALGUIEN LO TRADUZCA PARA USTED, O HABLE CON ALGUIEN QUE LO ENTIENDA.

Hanover Municipal Waterworks did not meet treatment technique requirements on multiple days between March 1, 2015 and March 9, 2015.

We are required to provide continuous filtration and disinfection of our drinking water, and this treatment is required to meet a certain level of inactivation of disease-causing organisms. On 6 days between March 1 and March 9, it was determined that we did not achieve our required inactivation levels. Because of this, we were unable to certify that the water provided to our customers did not contain disease-causing organisms.

What we should have done:

We were required to notify you that *boiled or bottled water should have been used* for drinking, making ice, brushing teeth, washing dishes, and food preparation until the problem was corrected. Boiling kills bacteria and other organisms in the water. **PLEASE NOTE: IT IS NOT NECESSARY TO BOIL YOUR WATER NOW BECAUSE THE PROBLEM HAS ALREADY BEEN CORRECTED**.

Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.

What happened? What was done?

- For certain periods of time on March 1, 2, 6, 7, 8, and 9, our disinfection treatment was not operating at a level sufficient to meet the required level of inactivation of pathogenic organisms in the drinking water provided to our customers. During these periods, the filtration process performance achieved regulatory requirements, but we did not maintain the required chlorine concentration.
- We failed to notify our customers and DEP within 24 hours of the problem. DEP was notified on March 10, 2015.
- Effective March 10, 2015, the chlorine concentration was increased to achieve the required level of inactivation and we have met treatment technique requirements since that time. After increasing chlorine, we met with DEP and our consulting engineer to develop a targeted improvement plan.
- As part of a proactive approach, water treatment facility improvements, which will minimize the potential of not achieving the required inactivation level in the future, have already been designed, bid/awarded, and are in the process of being constructed.
- A water treatment process audit is being conducted at the water treatment facility in order to optimize the disinfection process and the manner in which associated calculation and reporting requirements are achieved.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or by distributing copies by hand or mail.

For more information, please contact: The Hanover Borough Office
44 Frederick Street
Hanover, PA 17331
at 717-637-3877

This notice is being sent to you by *Hanover Municipal Waterworks*.

PWS ID: 7670076 Date distributed: _____

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Instructions for issuing a Tier 2 Public Notice for failing to respond to a disinfection treatment breakdown

For groundwater systems providing 4-log treatment of viruses: Failure to maintain a minimum 0.40 mg/L disinfectant residual (or other DEP-approved minimum residual) for more than 4 hours at the entry point to the distribution system OR failure to maintain adequate CTs for more than 4 hours constitutes a breakdown in treatment.

For surface water systems: Failure to maintain a minimum 0.2 mg/L disinfectant residual at the entry point to the distribution system for more than 4 hours constitutes a breakdown in treatment.

A breakdown in treatment requires a Tier 1 PN. When a water supplier fails to issue a Tier 1 PN, DEP staff can require the supplier to issue the following Tier 2 PN to explain to the consumers that this breakdown in treatment occurred. Water suppliers must provide public notice to persons served as soon as practical but within 30 days after they learn of the violation.

Community systems must use one of the following methods:

- Hand or direct delivery
- Mail, as a separate notice or included with the bill

Noncommunity systems must use one of the following methods:

- Posting in conspicuous locations
- Hand delivery
- Mail or direct delivery to each customer and service connection, when known.

In addition, both community and noncommunity systems must use *another* method reasonably calculated to reach others if they would not be reached by the first method. Such methods could include newspapers, e-mail, or delivery to community organizations. If you mail, post, or hand deliver, print your notice on your system's letterhead, if available.

The notice on the reverse is appropriate for mailing, posting, or hand delivery. If you modify this notice, you must still include all required PN elements and leave the mandatory language unchanged (see below).

Mandatory Language
Mandatory language on health effects and special notice language must be included as written (with blanks filled in) and are presented in this notice in italics and with an asterisk on either end.

You must also include standard language to encourage the distribution of the public notice to all persons served. This language is also presented in this notice in italics and with an asterisk on either end.

Corrective Action
In your notice, describe corrective actions you took.

PN Certification

Send a copy of each type of notice and the certification form (3800-FM-WSFR0076) to DEP within ten days after you issued the notice.

Template Form Field Instructions:

When you place the cursor in the form field of the following template, look in the bottom left corner of your computer (row above the START button) for instructions about the information you enter in that field.

(i.e. first form field instructions read: Insert date and time when measured EP residual was below the required minimum residual)

3900-FM-BSDW0492 Rev. 11/2012
Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

ESTE INFORME CONTIENE INFORMACION IMPORTANTE ACERCA DE SU AGUA POTABLE.
HAGA QUE ALGUIEN LO TRADUZCA PARA USTED, O HABLE CON ALGUIEN QUE LO ENTIENDA.

Hanover Municipal Waterworks did not meet treatment technique requirements on March 7, 2015 and March 8, 2015.

We are required to provide continuous filtration and disinfection of our drinking water, and this treatment is required to meet a certain level of inactivation of disease-causing organisms. On March 7 and March 8, it was determined that we did not achieve our required inactivation levels. Because of this, we were unable to certify that the water provided to our customers did not contain disease-causing organisms.

What we should have done:

We were required to notify you that *boiled or bottled water should have been used* for drinking, making ice, brushing teeth, washing dishes, and food preparation until the problem was corrected. Boiling kills bacteria and other organisms in the water. **PLEASE NOTE: IT IS NOT NECESSARY TO BOIL YOUR WATER NOW BECAUSE THE PROBLEM HAS ALREADY BEEN CORRECTED**.

Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.

What happened? What was done?

- For certain periods of time on March 7 and March 8, our disinfection treatment was not operating at a level sufficient to meet the required level of inactivation of pathogenic organisms in the drinking water provided to some of our customers. During these periods, the filtration process performance achieved regulatory requirements, but we did not maintain the required chlorine concentration.
- We failed to notify our customers and DEP within 24 hours of the problem. DEP was notified on March 10, 2015.
- Effective March 10, 2015, the chlorine concentration was increased to achieve the required level of inactivation and we have met treatment technique requirements since that time. After increasing chlorine, we met with DEP and our consulting engineer to develop a targeted improvement plan.
- As part of a proactive approach, water treatment facility improvements, which will minimize the potential of not achieving the required inactivation level in the future, have already been designed, bid/awarded, and are in the process of being constructed.
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For more information, please contact: The Hanover Borough Office
44 Frederick Street
Hanover, PA 17331
at 717-637-3877

This notice is being sent to you by *Hanover Municipal Waterworks*.

PWS ID: 7670076 Date distributed: _____

Websites Manager www.hanoverboroughyorkcounty... Account Help

View Page: Home (index) Page Settings Insert Save Preview Publish

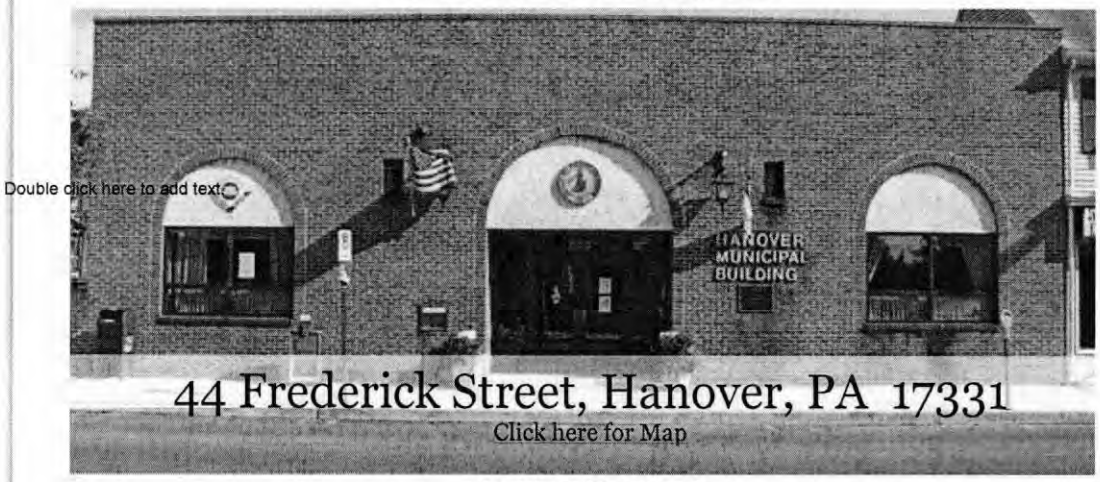
Borough of Hanover, York County, Pennsylvania

Welcome to The Borough of Hanover *Official Site*

Call us: 717-637-3877
Fax 717-637-2805

Home Directory Codes & Regulations Departments Forms Employment
Bid Specifications Calendar Council Minutes Community Links

CHANGE OF OFFICE HOURS BEGINNING DEC 30, 2013
MONDAY THROUGH FRIDAY 8:00 AM TO 4:30 PM



Double click here to add text

44 Frederick Street, Hanover, PA 17331
Click here for Map

On-Line Bill Pay Link

ON LINE BILL PAY LINK NOW AVAILABLE
MCSHERRYSTOWN SEWER IS NOT PAYABLE ONLINE.

Richard M'Calister laid out the town of Hanover in 1763 and officially incorporated on March 4, 1815 as The Borough of Hanover, named for the German City of Hannover to honor the British from the House of Hannover. The citizens celebrated the 150th Anniversary of The Battle of Hanover in 2013. A town committed to its people, Hanover remains a safe and happy community celebrating the future as well as the past. Downtown revitalization is a current priority, working with community members and organizations such as the Chamber of Commerce to reconnect with the appeal of the downtown and ignite that hometown character once again. Hanover Borough was designated an official Keystone Main Street on May 30th, 2014.

Important Information About Your Drinking Water - Notice 4-1-15

Contact Us

Discover Hanover Brochure & Map

Special Events

I, Dorothy C. Miller, Secretary of The Borough of Hanover certify that the above link entitled "Important Information About Your Drinking Water Notice 4-1-15" was posted on the Hanover Borough website at 4:00 PM on Wednesday, April 1, 2015, and was linked to the attached document.

3900-FM-BSDW0492 Rev. 11/2012
Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

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For more information, please contact: The Hanover Borough Office
44 Frederick Street
Hanover, PA 17331
at 717-637-3877

This notice is being sent to you by *Hanover Municipal Waterworks*.

PWS ID: 7670076

Date distributed: April 1, 2015

Dorothy C. Miller

From: Richard M. Rorrer <rrorrer@borough.hanover.pa.us>
Sent: Thursday, April 02, 2015 9:03 AM
To: 'Dorothy C. Miller'
Subject: FW: --- CodeRED Notification--- Job# 448153 has completed its dialing ---

-----Original Message-----
From: webmaster@ecnetwork.com [mailto:CodeRed@ecnetwork.com]
Sent: Wednesday, April 01, 2015 5:04 PM
To: rrorrer@borough.hanover.pa.us; gvanopdorp@ecnetwork.com
Subject: --- CodeRED Notification--- Job# 448153 has completed its dialing
---

--- Notification From Emergency Communications Network ---
--- CodeRED Job# 448153 has completed its dialing ---

AutoRecall of Job#448150 water notice 4-1-15 Call At: 7176373877
Submitted:4/1/2015 4:55:54 PM

Calling Started : 4/1/2015 4:56:14 PM
Calling Finished : 4/1/2015 5:03:23 PM
Numbers called : 5800
Connections : 1026 17.68%

Logon to https://login.coderedweb.com/exec/index.cfm for detailed statistics

Dorothy C. Miller

From: Richard M. Rorrer <rrorrer@borough.hanover.pa.us>
Sent: Thursday, April 02, 2015 9:04 AM
To: 'Dorothy C. Miller'
Subject: FW: --- CodeRED Notification--- Job# 448150 has completed its dialing ---

-----Original Message-----
From: webmaster@ecnetwork.com [mailto:CodeRed@ecnetwork.com]
Sent: Wednesday, April 01, 2015 4:56 PM
To: rrorrer@borough.hanover.pa.us; gvanopdorp@ecnetwork.com
Subject: --- CodeRED Notification--- Job# 448150 has completed its dialing
---

--- Notification From Emergency Communications Network ---
--- CodeRED Job# 448150 has completed its dialing ---

water notice 4-1-15 Call At: 7176373877

Calling Started : 4/1/2015 4:42:26 PM
Calling Finished : 4/1/2015 4:55:05 PM
Numbers called : 12884
Connections : 7084 54.98%

Logon to https://login.coderedweb.com/exec/index.cfm for detailed statistics

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

April 3, 2015

NOTICE OF VIOLATION

Ms. Barbara Krebs, Borough Manager
Hanover Municipal Waterworks
44 Frederick Street
Hanover, PA 17331

Re: Safe Drinking Water Act Violations
Hanover Municipal Waterworks
PWS ID 7670076
Hanover Borough, York County

Dear Ms. Krebs:

On March 10, your certified operator emailed the Department with questions regarding some issues he was having with his treatment process. Through follow-up discussions, it was revealed that the Hanover Municipal Waterworks filter plant had failed to achieve treatment technique requirements for pathogenic organisms on multiple dates in 2015. Each day the treatment technique was not achieved constitutes a breakdown in treatment.

After the initial conversation with your certified operator, the Department requested all CT calculations for calendar year 2015. After many conversations between representatives for Hanover and the Department, Hanover determined that one or both of your filter plants did not maintain the required 1-log inactivation of Giardia cysts in water serving a limited area of the distribution system on February 7 and 26, 2015 and on March 1, 2, 6, 7, 8 and 9, 2015, and to the entire distribution system on March 7 and 8, 2015. On each of these dates, Hanover had a breakdown in treatment which required a Tier 1 public notice to be issued within 24 hours, and notification to the Department within 1 hour. Hanover did not issue Tier 1 public notice within 24 hours on each of the days, and also did not notify the Department of a breakdown in treatment. As a result, Hanover violated the following regulations of 25 Pa. Code, Chapter 109, the Safe Drinking Water regulations:

25 Pa Code, Chapter 109.4 states: "Public water supplies shall: (2) Provide treatment adequate to assure that the public health is protected. (3) Provide and effectively operate and maintain public water system facilities. (4) Take whatever investigative or corrective action is necessary to assure that safe and potable water is continuously supplied to the users.

25 Pa Code, Chapter 109.202 (c)(1)(ii) requires that the combined total effect of disinfection processes utilized in a filtration plant shall achieve at least a 90% (1-log) inactivation of Giardia cysts as determined by CTs. Failure to maintain this treatment level for a period of more than 4 hours constitutes a breakdown in treatment, and requires 1-hour notification of the breakdown to the Department.

25 Pa Code, Chapter 109.701(a)(3)(i) requires that the public water supplier contact the Department within 1 hour of a failure or significant interruption in key water treatment equipment or failing to meet a treatment technique requirement.

25 Pa Code, Chapter 109.408(b)(2) requires that public water suppliers report the circumstances to the Department within 1 hour of discovery of the violation or situation in accordance with §109.701(a)(3).

25 Pa Code, Chapter 109.408(a)(11) requires that Tier 1 Public Notice shall be issued for violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure.

25 Pa Code, Chapter 109.408 (b)(1) requires that public water suppliers provide a public notice as soon as possible but no later than 24 hours after the water supplier learns of the violation.

This Notice of Violation is neither an order nor any other final action of the Department. It neither imposes nor waives any enforcement action available to the Department under any of its statutes. If the Department determines that an enforcement action is appropriate, you will be notified of the action.

If you have any questions, please contact me at 717.771.4481.

Sincerely,

Angela L Anderson

Angela L. Anderson
Safe Drinking Water Supervisor
Safe Drinking Water Program

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Hanover Municipal Waterworks	:	Violations of the Pennsylvania Safe
44 Frederick Street	:	Drinking Water Act and Regulations
Hanover, PA 17331	:	Hanover Municipal Waterworks
	:	PWSID No. 7670076
	:	Hanover Borough, York County

CONSENT ASSESSMENT OF CIVIL PENALTY

This Consent Assessment of Civil Penalty is entered into this____day of _____, 2015, by and between the Commonwealth of Pennsylvania, Department of Environmental Protection ("Department") and Hanover Municipal Waterworks ("Hanover").

The Department has found and determined the following:

FINDINGS

A. The Department is the executive agency with the duty and authority to administer and enforce, inter alia, the Pennsylvania Safe Drinking Water Act, 35 P.S. § 721.1 et seq. ("SDWA"), Section 1917-A of the Administrative Code, the Act of April 9, 1929, P. L. 177 as amended, 71 P.S. § 510-17 ("Administrative Code"), and the Rules and Regulations promulgated there under.

B. Hanover Municipal Waterworks (hereinafter "Hanover") is a Pennsylvania Municipal Authority organized and existing pursuant to the Pennsylvania Municipal Authorities Act, 53 Pa. C.S. § 5601, et seq., is registered with the Pennsylvania Department of State, and maintains a mailing address of 44 Frederick Street, Hanover, PA 17331.

C. Hanover is a "person" and a "public water supplier" as these terms are defined by Section 109.1 of the Safe Drinking Water Regulations, 25 Pa. Code § 109.1.

D. Hanover operates a "public water system" and a "community water system" as these terms are defined by Section 109.1 of the Safe Drinking Water Regulations, 25 Pa. Code § 109.1.

E. The Hanover water system currently consists of five permanent surface water sources, two conventional filtration plants, gaseous chlorination for disinfection, fluoridation, soda ash for pH control, pumping facilities, storage facilities, and transmission and distribution facilities. The Hanover water system serves approximately 37,247 individuals through approximately 16,850 service connections.

F. Hanover operates pursuant to numerous SDWA Operation Permits, including, but not limited to: Nos. 6701509 MA, 6709510 MA, 6711506 MA, 6713504 MA, 6713510 MA, 6713511, 6791505, and 6792505, all issued to Hanover Municipal Waterworks.

GENERAL OPERATIONAL VIOLATIONS

G. On March 10, 2015, Hanover reported to the Department that they had failed to meet the treatment technique requirements for *Giardia* inactivation during 23 days in 2015, as determined by Hanover's CT

calculations using the disinfection detention times provided within the filter plants. CT is defined in 25 Pa. Code 109.1 § as "the product of residual disinfectant concentration (C) measured in mg/L in a representative sample of water prior to the first customer, and disinfectant contact time (T); that is, C x T." Upon further discussion with the Department, the Department determined that it was appropriate for Hanover to also consider the detention times in their finished water transmission mains, prior to the first customers.

H. After including the additional detention times of each transmission main in their CT calculations, the Department determined that Hanover failed to meet the treatment technique requirements for *Giardia* inactivation on the following 8 days in 2015: February 7 and 26; March 1, 2, 6, 7, 8, and 9.

I. Section 109.4(2) of the Safe Drinking Water Regulations, 25 Pa. Code § 109.4(2), states that "Public water suppliers shall provide treatment adequate to assure that the public health is protected."

J. Section 109.4(4) of the Safe Drinking Water Regulations, 25 Pa. Code § 109.4(4), states that "Public water suppliers shall take whatever investigative or corrective action is necessary to assure that safe and potable water is continuously supplied to the users."

K. Section 109.202(c)(1)(ii) of the Safe Drinking Water Regulations, 25 Pa. Code § 109.202(c)(1)(ii), requires public water suppliers providing filtration of surface water or GUDI sources to achieve at least a 90% inactivation of *Giardia* cysts and a 99.9% inactivation of viruses, as determined by CTs and measurement methods established by the EPA.

L. Hanover failed to meet the required treatment technique requirements for *Giardia* inactivation during 8 days in February and March 2015, in violation of Sections 109.4(2), 109.4(4), and 109.202(c)(1)(ii) of the Safe Drinking Water Regulations, 25 Pa. Code §§ 109.4(2), 109.4(4), and 109.202(c)(1)(ii).

NOTIFICATION VIOLATIONS

M. Section 109.701(a)(3) of the Safe Drinking Water Regulations, 25 Pa. Code § 109.701(a)(3), states "A public water supplier shall report the circumstances to the Department within 1 hour of discovery for the following violations or situations: (i) A primary MCL or an MRDL has been exceeded or a treatment technique requirement has been violated under Subchapter B, K, L or M."

N. Section 109.408(b) of the Safe Drinking Water Regulations, 25 Pa. Code § 109.408(b), states "A public water supplier shall do the following: (1) Provide a public notice as soon as possible, but not later than 24 hours after the water supplier learns of the violation or situation under subsection (a). (2) Report the circumstances to the Department within 1 hour of discovery of the violation or situation in accordance with § 109.701(a)(3)."

O. Section 109.408(a) of the Safe Drinking Water Regulations, 25 Pa. Code § 109.408(a), states "A public water supplier shall provide Tier 1 public notice for the following circumstances:...(11) Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Department on a case-by-case basis."

P. Section 109.202(c)(1)(ii) of the Safe Drinking Water Regulations, 25 Pa. Code § 109.202(c)(1)(ii), states "...A system that experiences a breakdown in treatment shall, under § 109.701(a)(3) (relating to reporting and recordkeeping), notify the Department within 1 hour after the water system learns of the violation or the situation, and shall provide public notice in accordance with § 109.408."

Q. During 8 days in 2015, Hanover failed to notify the Department within 1 hour of discovery of its failure to achieve 1-log *Giardia* inactivation, in violation of Sections 109.701(a)(3)(i), 109.408(b)(2), and

109.202(c)(1)(ii) of the Safe Drinking Water Regulations, 25 Pa. Code §§ 109.701(a)(3)(i), 109.408(b)(2), and 109.202(c)(1)(ii).

R. During 8 days in 2015, Hanover failed to issue Tier 1 Public Notice within 24 hours in response to the breakdown in treatment caused by the failure to achieve 1-log *Giardia* inactivation, in violation of Sections 109.408(a)(11), 109.408(b)(1), and 109.202(c)(1)(ii) of the Safe Drinking Water Regulations, 25 Pa. Code §§ 109.408(a)(11), 109.408(b)(1), and 109.202(c)(1)(ii).

S. The violations described in Paragraphs G. through R., above constitute unlawful conduct under the Safe Drinking Water Act, 35 P.S. § 721.1 et seq., and the Safe Drinking Water regulations, 25 PA Chapter 109, and subjects Hanover to a claim for civil penalties under Section 13 (g) of the SDWA, 35 P.S. § 721.13(g).

After full and complete negotiation of all matters set forth in this CACP and upon mutual exchange of covenants contained herein, the parties desiring to avoid further litigation and intending to be legally bound, it is hereby ASSESSED by the Department and AGREED to by Hanover as follows:

1. **Assessment.** In resolution of the Department's claim for civil penalties, which the Department is authorized to pursue under Section 13(g) of the SDWA, 35 P.S. § 721.13(g), the Department hereby assesses a civil penalty of **$20,000.00 (TWENTY THOUSAND DOLLARS)**, which Hanover hereby agrees to pay.

2. **Civil Penalty Settlement.** Hanover shall pay the civil penalty assessed in Paragraph 1. This payment is in settlement of the Department's claim for civil penalties for the violations set forth in Paragraphs G. through R., above.

3. **Payment.**
   a) Hanover shall submit payment in the amount of $20,000.00 to the Department with the return of the three copies of this signed document, no later than July 1, 2015.

   b) Payment of the Civil Penalty shall be made by check or the like, made payable to the "**Commonwealth Of Pennsylvania**", and sent to:

Lynne Scheetz
PA DEP / Safe Drinking Water Program
909 Elmerton Avenue
Harrisburg, PA 17110-8200

4. **Findings.**
   a) Hanover agrees that the findings in Paragraphs A. through S. are true and correct and, in any matter or proceeding involving Hanover and the Department, Hanover shall not challenge the accuracy or validity of these findings.

   b) The parties do not authorize any other persons to use the findings in this CACP in any matter or proceeding.

5. **Remedies.** Hanover agrees that failure to submit payment and the signed CACP copies on or before July 1, 2015 voids the Department's offer to accept the penalty. In that event, the Department may pursue any remedy available for failure to pay a civil penalty, including an action for breach of contract or the filing of this CACP as a lien in any county in this Commonwealth.

6. **Reservation of Rights.** The Department reserves all other rights with respect to any matter addressed by this CACP, including the right to require abatement of any conditions resulting from the events described in the Findings. Hanover reserves the right to challenge any action which the Department may take, but waives the right to challenge the content or validity of this CACP.

IN WITNESS WHEREOF, the parties have caused this CACP to be executed by their duly authorized representatives. The undersigned certifies, under penalty of law, as provided by 18 PA C. S. Section 4904, that they are authorized to execute this CACP on behalf of Hanover, that Hanover consents to the entry of this CACP as an ASSESSMENT of the Department; that Hanover hereby knowingly waives any right to a hearing under the statutes referenced in this CACP; and that Hanover knowingly waives its right to appeal this CACP, which rights may be available under Section 4 of the Environmental Hearing Board Act, Act of July 13, 1988, P.L. 530, 35 P.S. § 7514; the Administrative Agency Law, 2 Pa. C.S. § 103(a) and Chapters 5A and 7A; or any other provision of law.

FOR:

HANOVER MUNICIPAL WATERWORKS

Barbara Krebs
Hanover Municipal Waterworks

Counsel for Hanover Municipal Waterworks

THE COMMONWEALTH OF PENNSYLVANIA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

Rodney L. Nesmith, P.E.
Program Manager

Ann R. Johnston
Assistant Counsel

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 845-3496

FROM: Dale Auet

DATE: 7-14-20 NO. PAGES W/COVER: 8

SUBJECT: S. Franklin St, Granger St & Ave St Shut Down

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: S. Franklin St, Granger St & Oliver St Shut-Down

DATE: July 14, 2020

Dear Sheena,

On 6-22-2020 we notified you that we were turning the water off to 80 customers on our system to do a tie-in for a new pipe line. We also notified the customers the day before we turned their water off. We finished the job, notified the customers of the boil advisory and flushed. We pulled samples and took them to LABS, Inc. in Cross Keys, PA. We received the results back that were clear and notified you and our customers of the advisory being over on 6-24-20.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault dcf

Dale Ault

DA/dcf

80 Customers notified

403 S Franklin Street
421 S Franklin Street
420 S Franklin Street
423 S Franklin Street
422 S Franklin Street
424 S Franklin Street
428 S Franklin Street
430 S Franklin Street
432 S Franklin Street
432 ½ S Franklin Street
434 S Franklin Street
434 – 2nd Fl S Franklin Street
434 ½ - 2nd Fl S Franklin Street
434 ½ A S Franklin Street
436 S Franklin Street
438 S Franklin Street
440 S Franklin Street
442 S Franklin Street
444 S Franklin Street
500 S Franklin Street
502 S Franklin Street
504 S Franklin Street
506 S Franklin Street
508 A S Franklin Street
508 B S Franklin Street
512 S Franklin Street
514 S Franklin Street
520 A S Franklin Street
520 B S Franklin Street
528 S Franklin Street
528 Rear S Franklin Street
529 S Franklin Street
525 S Franklin Street
523 S Franklin Street
519 S Franklin Street
517 S Franklin Street
520 ½ S Franklin Street
511 S Franklin Street
451 S Franklin Street
449 S Franklin Street
447 S Franklin Street
445 ½ S Franklin Street
445 S Franklin Street
441 S Franklin Street
439 S Franklin Street
437 S Franklin Street
435 S Franklin Street

433 S Franklin Street
431 S Franklin Street
429 S Franklin Street
427 S Franklin Street
425 S Franklin Street
424 Rear S Franklin Street

201 Oliver Street
200 Oliver Street
215 Oliver Street
200 Rear Oliver Street

60 Granger Street
62 Granger Street
64 Granger Street
66 Granger Street
68 Granger Street
Trailer Park – 16 customers - Granger Street

Dear Customer:

On 6-22-20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8 AM to 2 PM.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

S. FRANKLIN
&
W. GRANGER

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☑ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☐ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 6-22 & 6-23 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 6-24-20

For more information, please contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

6-22-20

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANT SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 6-22 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive da by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 717-476-271 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially th who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or r

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

6-24

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/24/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**062320-168Z**
DATE & TIME COLLECTED:	**06/23/20 @ 1005**
DATE & TIME RECEIVED:	**06/23/20 @ 1030**
DATE & TIME TCD LAB PREP:	**06/23/20 @ 1215**
COLLECTED BY:	**DA**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	Granger St/S Franklin St	<1	MPN/ 100 mL	SM 9223	1	06/24/20/0800	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/24/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**062320-168Y**
DATE & TIME COLLECTED:	**06/22/20 @ 1515**
DATE & TIME RECEIVED:	**06/23/20 @ 1030**
DATE & TIME TCD LAB PREP:	**06/23/20 @ 1215**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	Granger St/S Franklin St	<1	MPN/ 100 mL	SM 9223	1	06/24/20/0800	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 845-3496

FROM: Dale Ault

DATE: 6-22-20 NO. PAGES W/COVER: 7

SUBJECT: YCR 11 street shut Down

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: York Street Shut-Down CORRECTION

DATE: June 22, 2020

Dear Sheena,

On 6-1-2020 we notified you that we were going to do a shut down on 6-2-20 to install a new valve on York Street. It was between the intersection of Pleasant Street and Spring Avenue in the Hanover Borough. We also at that time notified our customers. We started the project around 8:30 AM and had the water back on around 10:30 AM. We then notified the customers of the boil advisory, flushed the lines, pulled the first sample. The samples were taken to LABS Inc. to be tested for bacteria. We repeated the flushing and sampling the following day. When we received the call from LABS the next day on 6-4-20 we lifted the boil advisory

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

DA/dcf

Customers notified

413 York Street (2)
415 York Street
417 York Street
419 York Street
421 York Street
423 York Street
425 York Street (2)
433 York Street (2)
443 York Street
445 York Street
447 York Street
449 York Street (2)

Dear Customer:

On 6-2-2020 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8:30Am to 10:30Am.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

6/2020

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 6-2 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

6-4-20

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☒ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☒ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 6-2/6-3 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 6-9-2020

For more information, please contact Dale Ault 717 476 2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are availabl from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who ma not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by han or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works 6-2

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/3/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**060220-168Z**
DATE & TIME COLLECTED:	**06/02/20 @ 1130**
DATE & TIME RECEIVED:	**06/02/20 @ 1221**
DATE & TIME TCD LAB PREP:	**06/02/20 @ 1330**
COLLECTED BY:	**TB**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	York St & Pleasant St	<1	MPN/ 100 mL	SM 9223	1	06/02/20/1530	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: /Maureen M Dunlap/, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.
125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766
PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/4/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**060320-168Z**
DATE & TIME COLLECTED:	**06/03/20 @ 0810**
DATE & TIME RECEIVED:	**06/03/20 @ 0833**
DATE & TIME TCD LAB PREP:	**06/03/20 @ 1300**
COLLECTED BY:	**TB**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	York St & Pleasant St	<1	MPN/ 100 mL	SM 9223	1	06/04/20/0730	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services. Inc.

HP LaserJet MFP M426fdw

Fax Confirmation

Jun-23-2020 12:53AM

Job	Date	Time	Type	Identification	Duration	Pages	Result
4849	6/23/2020	12:52:51AM	Send	7178453496	0:40	1	OK

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: York Street Shut-Down

DATE: June 22, 2020

correction

Dear Sheena,

On 6-1-2020 we notified you that we were going to do a shut down on 6-2-20 to install a new valve on York Street. It was between the intersection of Pleasant Street and Spring Avenue in the Hanover Borough. We also at that time notified our customers. We started the project around 8:30 AM and had the water back on around 10:30 AM. We then notified the customers of the boil advisory, flushed the lines, pulled the first sample. The samples were taken to LABS Inc. to be tested for bacteria. We repeated the flushing and sampling the following day. When we received the call from LABS the next day on 6-4-20 we lifted the boil advisory

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

DA/dcf

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 845-3496

FROM: Dale Ault

DATE: 6-22-20 NO. PAGES W/COVER: 7

SUBJECT: Lafayette Street Shut Down

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: Lafayette Street Shut-Down

DATE: June 22, 2020

Dear Sheena,

On 6-2-2020 we notified 14 customers the water was going to be turned off on 6-3-20 for a few hours. We also notified you and Justin Blashaw. We turned the water off around 8:00 AM, completed the project, and handed boil advisory notices. We then turned the water back on and flushed and sampled. We also re-flushed and sampled again the following day. After receiving results of clear, no bacteria, we lifted the advisory on 6-5-20 and renotified you and Justin of our procedure.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault/dcf
Dale Ault

DA/dcf

Customers notified

552 Lafayette Street
555 Lafayette Street
570 Lafayette Street
575 Lafayette Street
587 Lafayette Street
589 Lafayette Street
596 Lafayette Street
593 Lafayette Street
601 Lafayette Street
598 Lafayette Street
603 Lafayette Street
605 Lafayette Street

590 Martha Street
589 Martha Street

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 6-3-2020 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 7174762712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

6-5

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☒ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☐ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 6-3 & 6-4 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 6-5-20

For more information, please contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are availabl from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who ma not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by han or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works 6-3-20

Dear Customer:

On 6.3.20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 7am to 3pm.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

6-2-20

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/5/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**060420-168Z**
DATE & TIME COLLECTED:	**06/04/20 @ 2:15**
DATE & TIME RECEIVED:	**06/04/20 @ 2:50**
DATE & TIME TCD LAB PREP:	**06/04/20 @ 1500**
COLLECTED BY:	**Jeremy Ritz**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	603 S Frnklin St	<1	MPN/ 100 mL	SM 9223	1	06/05/20/0900	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/4/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**060320-168Z**
DATE & TIME COLLECTED:	**06/03/20 @ 1445**
DATE & TIME RECEIVED:	**06/03/20 @ 1515**
DATE & TIME TCD LAB PREP:	**06/03/20 @ 1530**
COLLECTED BY:	**Jeremy Ritz**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	603 S Frnklin St	<1	MPN/ 100 mL	SM 9223	1	06/04/20/0930	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 845-3496

FROM: Dale Auet

DATE: 6-22-20 NO. PAGES W/COVER: 7

SUBJECT: Lafayette Street Shut down (2)

☐ URGENT ☑ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: Lafayette Street Shut-Down

DATE: June 22, 2020

Dear Sheena,

On 6-16-2020 we notified 43 customers on Lafayette Street and 2 on Centennial Avenue that their water would be off for about 6 hours, due to tying in a new water line on South Franklin Street. We completed the work and handed out boil advisory notices to property owners. The water was turned back on, flushed, sampled and repeated the following day. After receiving the clear – good to go call from LABS, Inc. in Crosskeys, we lifted the advisory on 6-18-20.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault /dcf

Dale Ault

DA/dcf

Customers notified

2 Lafayette Street (2)
4 Lafayette Street
7 Lafayette Street
9 Lafayette Street
10 Lafayette Street (35 apartments)
11 Lafayette Street

555 Centennial Avenue
Aldus Brewing Company (Centennial Avenue)

Dear Customer:

On 6-16-20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8 AM to 2 PM.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

STE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 6-16-20 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 717 476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

6-18

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

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What happened?
☒ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☐ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 6/16 & 6/17 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 6-15-20

For more information, please contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

6-16-20

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/17/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**061620-168Z**
DATE & TIME COLLECTED:	**06/16/20 @ 1040**
DATE & TIME RECEIVED:	**06/16/20 @ 1105**
DATE & TIME TCD LAB PREP:	**06/16/20 @ 1230**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	Hydt-Lafayette St	<1	MPN/ 100 mL	SM 9223	1	06/17/20/0800	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

6/18/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**061720-168Z**
DATE & TIME COLLECTED:	**06/17/20 @ 0635**
DATE & TIME RECEIVED:	**06/17/20 @ 0744**
DATE & TIME TCD LAB PREP:	**06/17/20 @ 1300**
COLLECTED BY:	**DA**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	Hydt-Lafayette St& Centennial	<1 MPN/	100 mL	SM 9223	1	06/18/20/0800	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 845-3496

FROM: Dale Ault

DATE: 6-5-20 NO. PAGES W/COVER: 7

SUBJECT: McAllister Street Shut Down

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: McAllister Street Shut-Down

DATE: June 5, 2020

Dear Sheena,

On 5-18-2020 we notified you and 40 of our customers on McAllister Street we were going to turn the water off for about four hours on 5-19/20 for the purpose of installing a valve. We installed the valve, and notified the customers of the water boil advisory before turning back on. We then flushed and sampled, and repeated flushing and sampling the second day, and took the samples to LABS, Inc. We received notice of zero bacteria and lifted the boil advisory on 5-21-20.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault/dcf
Dale Ault

DA/dcf

Customers notified

McAllister Street, Middle Street to Hanover Street

13 McAllister Street
15 McAllister Street
17 McAllister Street
19 McAllister Street
21A & 21B McAllister Street
25 McAllister Street
27 McAllister Street
29 McAllister Street
31 McAllister Street
33 McAllister Street
35 McAllister Street
37 McAllister Street
39 McAllister Street
41 McAllister Street
41 ½ McAllister Street
43 McAllister Street
45 McAllister Street
47 McAllister Street
49 McAllister Street
51 McAllister Street
Hanover Street Elementary School
40 McAllister Street
38 McAllister Street
36 McAllister Street
34 McAllister Street
32 McAllister Street
32 1st Fl McAllister Street
30 ½ McAllister Street
28 McAllister Street
26 McAllister Street
24 ½ McAllister Street
24 McAllister Street
18 ½ McAllister Street
18 McAllister Street
16 ½ McAllister Street
16 McAllister Street
14 McAllister Street

Dear Customer:

On 5-19-20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8am to 12noon.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

5-18-20

Dear Customer:

On 5-19-20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8am to 12noon.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

5-18-20

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

3OIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

Vhat should I do?

)O NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

Vhat happened?

☑ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

Vhat was done?

☑ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:

VATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 5-19/5-20 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 5-21-20

For more information, please contact Dale Ault 476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTA SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CC ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Wor you were notified on 5-19-20 of a water warning concerning c drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive by a Pennsylvania Department of Environmental Protection certified laborat and they have confirmed no bacteria is present in the system. It is no longe necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

Public Water System ID #: 7670076

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinweb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

5/20/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**051920-168Z**
DATE & TIME COLLECTED:	**05/19/20 @ 1255**
DATE & TIME RECEIVED:	**05/19/20 @ 1400**
DATE & TIME TCD LAB PREP:	**05/19/20 @ 1500**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	51 Mcallister	<1 MPN/	100 mL	SM 9223	1	05/20/20/0900	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap / Office Manager

From:

Laboratory, Analytical, & Biological Services, Inc.
125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766
PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

5/21/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670075**
SAMPLE ID:	**052020-168Z**
DATE & TIME COLLECTED:	**05/20/20 @ 0815**
DATE & TIME RECEIVED:	**05/20/20 @ 0915**
DATE & TIME TCD LAB PREP:	**05/20/20 @ 1230**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	51 Mcallister	<1	MPN/ 100 mL	SM 9223	1	05/21/20/0730	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap / Office Manager

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 717-845-3496

FROM: Dale Auttdodt

DATE: 4-24-20 NO. PAGES W/COVER: 6

SUBJECT: Scenic Drive

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: Scenic Drive Shut-Down

DATE: April 22, 2020

Dear Sheena,

On 3-18-2020 we notified you of a water shut down on Scenic Drive for the purpose of replacing a leaking valve. We shut down 12 customers on Scenic Drive and 1 customer on Overlook Drive (corner property with service off Scenic Dr.) The water was off for about 3 hours. We then notified them of the boil advisory. After the replacement was made, we turned the water back on, flushed, sampled and reflushed. We again sampled the next day and the samples were taken to LABS, Inc. After we received the no bacteria results, we called you and then lifted the advisory on 3-20-20.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

Dale Ault

DA/dcf

Customers notified

2 Overlook Drive

10 Scenic Drive
14 Scenic Drive
20 Scenic Drive
22 Scenic Drive
19 Scenic Drive
21 Scenic Drive
23 Scenic Drive
25 Scenic Drive
27 Scenic Drive
29 Scenic Drive
31 Scenic Drive
33 Scenic Drive

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 3-18 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 717 476 2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

3-20

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice.** Boiling kills bacteria and other organisms in the water.

What happened?
☒ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☒ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 3-18/3-19 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 3-20-2020

For more information, please contact Dale Ault 717 476 2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are availabl from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who ma not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by han or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

3-18-2

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

3/20/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**031920-168Z**
DATE & TIME COLLECTED:	**03/19/20 @ 1240**
DATE & TIME RECEIVED:	**03/19/20 @ 1309**
DATE & TIME TCD LAB PREP:	**03/19/20 @ 1500**
COLLECTED BY:	**TB**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	31 Scenic Dr	<1	MPN/ 100 mL	SM 9223	1	03/20/20/0900	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

3/20/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**031920-168Y**
DATE & TIME COLLECTED:	**03/18/20 @ 1550**
DATE & TIME RECEIVED:	**03/19/20 @ 1309**
DATE & TIME TCD LAB PREP:	**03/19/20 @ 1500**
COLLECTED BY:	**TB**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	31 Scenic Dr	<1	MPN/ 100 mL	SM 9223	1	03/20/20/0900	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

2

THE BOROUGH OF HANOVER

44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple **FAX #** 845-3496

FROM: Dale Ault

DATE: 3-17-20 **NO. PAGES W/COVER:** 7

SUBJECT: Mt. Royal Ave - Boil Water Notice

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: Mount Royal Avenue Tie-In

DATE: March 17, 2020

Dear Sheena,

On 2-17-2020 we notified you that we were turning off water to about 17 customers on Mount Royal Avenue. We notified them Friday February 14th that they would be without water for about 5 hours on Monday, February 17th for the purpose of tying in a new water line. Once the work was completed, we notified them of the boil advisory. We then turned water back on, flushed and pulled samples to check for bacteria. The samples were taken to LABS, Inc. When we received the results of clear samples, we lifted the advisory on February 19th, 2020.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

DA/dcf

Customers notified

500 Baltimore Street

5 Mount Royal Avenue
7 & 7 ½ Mount Royal Avenue
9 Mount Royal Avenue
10 &12 Mount Royal Avenue
11 Mount Royal Avenue
8 Mount Royal Avenue
18 & 20 Mount Royal Avenue
14 & 16 Mount Royal Avenue
22 & 24 Mount Royal Avenue

Dear Customer:

On 2-17-20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 9am to 2pm.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

2-14-20

Dear Customer:

On 2-17-20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 9am to 2pm.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

MT. ROYAL AVE. 2-14-20

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 2-17 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale. Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USIN

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIE

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☑ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☑ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 2-17, 2-18 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 2-19-20

For more information, please contact DALE AULT 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are availa from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by h or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works
2-17-2

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

2/19/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**021820-168A**
DATE & TIME COLLECTED:	**02/18/20 @ 0900**
DATE & TIME RECEIVED:	**02/18/20 @ 0915**
DATE & TIME TCD LAB PREP:	**02/18/20 @ 1230**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	Mt Royal Tie-In	<1	MPN/ 100 mL	SM 9223	1	02/19/20/0730	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: *Maureen M Dunlap*, Maureen M Dunlap / Office Manager

DRINKING WATER CHAIN OF CUSTODY

Laboratory, Analytical, & Biological Services, Inc.
125 Enterprise Drive New Oxford PA 17350
Phone: 717-259-6550 Fax: 717-259-0766
www.labsinceb.com

ALL SAMPLES MUST BE DELIVERED ON ICE

Client : BOROUGH OF HANOVER Lab Client # 168

Address: 44 FREDERICK ST.
HANOVER, PA 17331

Contact: TERRY STERNER 717-632-5152 or 717-476-2710 (cell)

PWSID #: 7670076

Field Data:

Sample Receipt

Temp @ Receipt: 10.2 °C

Samples received on ice? Y N

Sample Type CODE KEY

D = Distribution	R = Raw
E = Entry Point	S = Special
C = Check	A = Startup

Container Codes

Size	Type
L = Liter	P = Plastic
500 = 500mL	G = Glass
250 = 250mL	V = VOA Vial
120 = 120mL	S = Sterile
40 = 40mL	O = Other

Preservative Codes

C = HCL T= $Na_2S_2O_3$
N = HNO_3 E = EDTA
S = H_2SO_4 L = NH_4CL
P = H_3PO_4 Z = Zinc Acetate
H = NaOH A = Ascorbic Acid
O = Other:

Sample(s) Collected By: F.G.

Sample ID (LABS use only)	Sample Description (Location Name)	Date of Collection	Time of Collection	Bottle Count	Sample Type	Analyses Requested: Total Coliform	Nitrates as N	Nitrites as N	Lead & Copper	Regulated VOC's	TTHM/HAA5	E.Coli	Chlorine
						Container Size:	120						120
						Container Type:	S	P	P	P	VOA		S
						pH:							
						Preservative:	T						T
						Chlorine? Y or N							
						Within Hold Time? Y or N	Y						
021820-168A	MT ROYAL TIE-IN	2-18-20	9:00	1	S	X							
TC	C 1/1120 2/18/20 1230 AH												
	OUT 2/19/20 0730 AH												
	As soon as results are known												
	call Dale Ault at												
	717-476-2712												
	Send hard copy of report												
	to Boro Office ATT: Dale Ault												

Comments: from 717 965-2167 P.O. 25933 W

Relinquished By: Frank Graft	Date: 2-18-20	Time: 9:15	Received By: MS	Date: 2/19/20	Time: 9:16
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

In Field Chlorine Residual:

COC Approved By: (LABS Initials)

From:

02/19/2020 12:45 #647 P.002/002

-665-

Exhibit D IX-1 Attachment B
Page 50 of 84

2

THE BOROUGH OF HANOVER

44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 845-3496

FROM: Dale Ault

DATE: 3/17/20 NO. PAGES W/COVER: 7

SUBJECT: John Street Shut Down

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: John Street Shut-Down

DATE: March 17, 2020

Dear Sheena,

On 2-17-2020 we handed out about 46 notices to customers that their water would be turned off 2-18-20 around 4:30 PM to about 8:30 PM for the purpose or replacing valves and fittings. After work was completed, we handed out boil advisory notices and then flushed, pulled a sample. We repeated flushing and sampling the following day, taking the samples to LABS, Inc. We received notice 2-20-20 that both samples were free of bacteria, and we lifted the boil advisory, while keeping you informed of our procedure.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

Dale Ault

DA/dcf

Customers notified

310 John Street
600 John Street
608 John Street
606 John Street
604 John Street
602 John Street

17 Wayne Avenue
19 Wayne Avenue
21 Wayne Avenue
23 Wayne Avenue
25 Wayne Avenue
27 Wayne Avenue
100 Wayne Avenue
101 Wayne Avenue
102 Wayne Avenue
104 Wayne Avenue
105 Wayne Avenue
108 Wayne Avenue

411 Wirt Avenue
409 Wirt Avenue
408 Wirt Avenue
407 Wirt Avenue
406 Wirt Avenue
405 Wirt Avenue
404 Wirt Avenue
403 Wirt Avenue
402 Wirt Avenue
401 Wirt Avenue
400 Wirt Avenue
310 Wirt Avenue
313 Wirt Avenue
311 Wirt Avenue
308 Wirt Avenue
309 Wirt Avenue
307 Wirt Avenue
306 Wirt Avenue
305 Wirt Avenue
304 Wirt Avenue
303 Wirt Avenue
302 Wirt Avenue
301 Wirt Avenue

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 2-18 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice.** Boiling kills bacteria and other organisms in the water.

What happened?
☒ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☒ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 2-18, 2-19 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 2-20

For more information, please contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works
2-18-20

Dear Customer:

On 2-18-2020 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 4:30pm to 8:30pm.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

2-17-2020

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

2/20/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**021920-168Z**
DATE & TIME COLLECTED:	**02/18/20 @ 2134**
DATE & TIME RECEIVED:	**02/19/20 @ 1000**
DATE & TIME TCD LAB PREP:	**02/19/20 @ 1300**
COLLECTED BY:	**TB**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	FH Baer & Wirt	<1 MPN/	100 mL	SM 9223	1	02/20/20/0730	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

2/20/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**021920-168Y**
DATE & TIME COLLECTED:	**02/19/20 @ 1535**
DATE & TIME RECEIVED:	**02/19/20 @ 1350**
DATE & TIME TCD LAB PREP:	**02/19/20 @ 1600**
COLLECTED BY:	**TB**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	FH Baer & Wirt	<1	MPN/ 100 mL	SM 9223	1	02/20/20/1000	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: /s/ Maureen M Dunlap, Maureen M Dunlap / Office Manager

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Rippel FAX # 845-3496

FROM: Dale Auet

DATE: 2-17-20 NO. PAGES W/COVER: 6

SUBJECT: Baer Avenue Boil Advisory

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☑ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: Baer Avenue Maintenance Work

DATE: February 17, 2020

Dear Shenna,

On Tuesday February 4, 2020, we notified 3 customers at 1101 Baer Avenue, 1190 Baer Avenue and 412 Wirt Avenue that their water would be turned off on 2-5-20 for maintenance work to the water line. We completed the work on that day, handed out boil advisory notices, flushed and pulled samples. The samples were taken to LABS, Inc. in New Oxford, and after testing they notified us the samples were clear of bacteria. We then lifted the boil advisory on 2-7-20.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

DA/dcf

Dear Customer:

On 2-5-2020 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8 Am to 2 pm.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

2-4-2020

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 2-5-2020 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 7174762712
or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

2-7-2020

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USIN

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA B

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☒ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☒ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTE
The water must now be tested for the next two consecutive days, 2-5/2-
to ensure that no bacteria are present in the system. Testing will be completed
Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to b
your water. We anticipate resolving the problem by 2-7-2020

For more information, please contact Dale Ault 717476 2
or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are a
from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those
not have received this notice directly (for example, people in apartments, nursing homes, s
and businesses). You can do this by posting this notice in a public place or distributing copie
or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works 2-5-

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

2/6/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670078**
SAMPLE ID:	**020520-168Z**
DATE & TIME COLLECTED:	**02/05/20 @ 1221**
DATE & TIME RECEIVED:	**02/05/20 @ 1145**
DATE & TIME TCD LAB PREP:	**02/05/20 @ 1330**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	POL	Date/Time	Tech
Total Coliform-S	1180 Baer Ave	<1 MPN/	100 mL	SM 9223	1	02/06/20/0730	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

From:

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinccb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

2/7/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**020620-1682**
DATE & TIME COLLECTED:	**02/06/20 @ 0905**
DATE & TIME RECEIVED:	**02/06/20 @ 0924**
DATE & TIME TCD LAB PREP:	**02/06/20 @ 1500**
COLLECTED BY:	**TB**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	1190 Baer Ave	<1	MPN/ 100 mL	SM 9223	1	02/07/20/0900	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: *Maureen McDunlap*, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.

02/07/2020 11:17 #636 P.001/001

From:

2

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Sheena Ripple FAX # 845-3496

FROM: Dale Ault/dcf

DATE: 2-17-20 NO. PAGES W/COVER: 7

SUBJECT: E. Granger

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Sheena Ripple

RE: East Granger Street Tie-In

DATE: February 17, 2020

Dear Shenna,

On Friday January 24, 2020, we notified 21 customers on East Granger Street that their water would be turned off for 5 hours on 1-24-20 for maintenance work. We completed our work, tying into a new 6" water main on that street. We notified the customers of the boil advisory. We then turned on the water, flushed and sampled. Then flushed and sampled the next day. The samples were taken to LABS, Inc. We received good results of no bacteria, advised, and lifted the boil advisory on 1-29-20, keeping you informed of the project.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault/dcf

Dale Ault

DA/dcf

Customers notified

524 East Granger St
12 East Granger St
14 East Granger St
16 East Granger St
30 East Granger St
33 East Granger St
31 East Granger St
29 East Granger St
27 East Granger St
25 East Granger St
23 East Granger St
21 East Granger St
19 East Granger St
17 East Granger St
15 East Granger St
13 East Granger St
11 East Granger St
9 East Granger St
7 East Granger St
5 East Granger St
3 East Granger St

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 1-27-2020 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Hult 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

1-29-2020

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USIN

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIE

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☑ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☑ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 1-27/1-28 to ensure that no bacteria are present in the system. Testing will be completed by c Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 1-29-2020

For more information, please contact Dale Hult 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are availa from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who n not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by h or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works 1-27-202

Dear Customer:

On 1-21-19 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 9 Am to 2 pm.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

1-24-20

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 359-6550
Fax (717) 359-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

1/29/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**012720-168Z**
DATE & TIME COLLECTED:	**01/27/20 @ 1240**
DATE & TIME RECEIVED:	**01/27/20 @ 1445**
DATE & TIME TCD LAB PREP:	**01/27/20 @ 1500**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	E. Granger Blowoff	<1	MPN/ 100 mL	SM 9223	1	01/28/20/0900	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap / Office Manager

From:

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

1/29/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**012820-168A**
DATE & TIME COLLECTED:	**01/28/20 @ 0830**
DATE & TIME RECEIVED:	**01/28/20 @ 1015**
DATE & TIME TCD LAB PREP:	**01/28/20 @ 1300**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	E. Granger Blowoff	<1 MPN/	100 mL	SM 9223	1	01/29/20/0730	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap. Maureen M Dunlap / Office Manager

From:

2

THE BOROUGH OF HANOVER

44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Shenna Repple FAX # 845-3496

FROM: Dale Auth

DATE: 1-2-20 NO. PAGES W/COVER: 7

SUBJECT: Oxford Avenue Main Break

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

Boil water advisory

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Shenna Ripple

RE: Oxford Avenue Water Main Break

DATE: January 2, 2020

Dear Shenna,

On Friday afternoon, December 20, 2019, we had a water main break on Oxford Avenue in McSherrystown. It caused the water to be turned off and pipe separated. 27 customers needed to be put on a boil advisory. After repair was made, we flushed and pulled two consecutive samples. After receiving negative results, late Sunday afternoon, we lifted the advisory first think Monday morning December 23, 2019.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

DA/dcf

Oxford Avenue Main Break – 27 Customers had water shut off

639 North St
627 North St
625 North St
621 North St
617 North St
615 North St
615A North St
609 North St
609 2nd fl North St
607 North St
605 North St
601 North St
642 North St
640 North St
638 North St
636 North St
634 North St
630 North St
628 North St
624 North St
622 North St
618 North St
616 North St
612 North St
608 ½ North St
608 North St
602 North St

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 12-20 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

12-23

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☑ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☑ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 12-21 & 12-2 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 12-23

For more information, please contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are availab from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who m not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by ha or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

Dear Customer:

On 12-20 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8 PM to 10 PM.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

12-20

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

12/23/2019
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**122119-168A**
DATE & TIME COLLECTED:	**12/20/19 @ 12215**
DATE & TIME RECEIVED:	**12/21/19 @ 0915**
DATE & TIME TCD LAB PREP:	**12/21/19 @ 2130**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	642 North ST McSherrystown	<1	MPN/ 100 mL	SM 9223	1	12/22/19/1530	BS

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

12/23/2019
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**122119-168B**
DATE & TIME COLLECTED:	**12/21/19 @ 1930**
DATE & TIME RECEIVED:	**12/21/19 @ 0915**
DATE & TIME TCD LAB PREP:	**12/21/19 @ 2130**
COLLECTED BY:	**FG**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	642 North ST McSherrystown	<1	MPN/ 100 mL	SM 9223	1	12/22/19/1530	BS

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

(2)

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNSYLVANIA 17331
PHONE # (717) 637-3877
FAX # (717) 637-2805

FACSIMILE TRANSMITTAL

TO: Shenna Ripple FAX # 845-3496

FROM: Dale Ault

DATE: 1-23-20 NO. PAGES W/COVER: 7

SUBJECT: Charles Avenue Lic - FW Boil Advisory

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

COMMENTS:

If all pages are not legible, please call 717-637-3877

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PA 17331
(717) 637-3877 Fax (717) 637-2805
AN EQUAL OPPORUNITY BOROUGH

TO: DEP

ATTN: Shenna Ripple

RE: Charles Avenue Tie-In

DATE: January 23, 2020

Dear Shenna,

On Friday January 10, 2020, we notified customers on John Street between Fair Avenue and Wayne Avenue that their water would be turned off between 8:00 AM and 3:00 pm for the purpose of needed line repairs on Monday, January 13, 2020.

Our crews made the repairs and handed out boil advisory notices. Then we turned on water while flushing and pulled a sample. We repeated the flushing and sampling the next day. We took the samples to LABS, Inc. We received the clear-no bacteria call on the samples on January 15, 2020 and lifted the advisory, keeping you informed of our procedures.

If you have any questions, please call 717-476-2712.

Sincerely,

FOR THE BOROUGH OF HANOVER
WATER DEPARTMENT

Dale Ault

DA/dcf

Customers notified

202 John Street
203 John Street
206 John Street
210 John Street
211 John Street
215 John Street
214 John Street
214A John Street
219 John Street
216 John Street
216A John Street
218 John Street
218A John Street
221 John Street
223 John Street
222 John Street
300 John Street

20 Fair Avenue
100 Fair Avenue

127 John Street
125 John Street
123 John Street
121 John Street
117 John Street
115 (2 units) John Street
113 John Street
111 John Street
114 John Street
118 John Street

17 Charles Avenue
15 Charles Avenue
13 Charles Avenue
10 Charles Avenue
8 Charles Avenue
9 Charles Avenue
6 (2 units) Charles Avenue
5 Charles Avenue
3 Charles Avenue
2 Charles Avenue
1 (2 units) Charles Avenue

DRINKING WATER PROBLEM CORRECTED

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER. TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

As a customer of The Borough of Hanover - Hanover Municipal Water Works, you were notified on 1-13-2020 of a water warning concerning our drinking water and were advised to boil your water before using.

We are pleased to report that the water has been tested for two consecutive days by a Pennsylvania Department of Environmental Protection certified laboratory and they have confirmed no bacteria is present in the system. It is no longer necessary to boil your water before using.

We apologize for any inconvenience and thank you for your patience.

Any questions you may contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses).
You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

Public Water System ID #: 7670076

1-15-2020
Date Distributed:

DRINKING WATER WARNING

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

BOIL YOUR WATER BEFORE USING

HIERVAN EL AGUA ANTES DE USARLA ESTE INFORME CONTIENE INFORMACION MUY IMPORTANTE SOBRE SU AGUA DE BEBER.
TRADUZCALO O HABLE CON ALGUIEN QUE LO ENTIENDA BIEN.

What should I do?
DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.
Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?
☑ **WATER MAIN BREAK** ☐ **WATER CONTAMINATED**
☐ **FAILED BACTERIA TEST**

What was done?
☐ **WATER MAIN REPAIRED** ☐ **CONTAMINATION ELIMINATED**

Corrective Action:
WATER LINES WERE FLUSHED & RECHLORINATED TO KILL BACTERIA
The water must now be tested for the next two consecutive days, 1-13 & 1-14 to ensure that no bacteria are present in the system. Testing will be completed by a Pennsylvania Department of Environmental Protection certified laboratory.

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem by 1-15-2020

For more information, please contact Dale Ault 717-476-2712 or The Borough of Hanover, 44 Frederick St., Hanover.
General guidelines on ways to lessen the risk of infection by microbes are availabl from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who ma not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by han or mail.

This notice is being sent to you by:
The Borough of Hanover Hanover Municipal Water Works

Public Water System ID #: 7670076

1-13-2020
Date Distributed:

Dear Customer:

On 1-13-2020 the Water Dept. will be doing maintenance work on the water lines in the area. This work will necessitate turning off the water supply. We estimate that the water will be off from approximately 8AM to 3PM.

Every effort will be made to do the work as quickly as possible and restore your water service without delay.

BOROUGH OF HANOVER
WATER DEPARTMENT

Laboratory, Analytical, & Biological Services, Inc.
125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766
PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

1/14/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**011320-168Z**
DATE & TIME COLLECTED:	**01/13/20 @ 1510**
DATE & TIME RECEIVED:	**01/13/20 @ 1530**
DATE & TIME TCD LAB PREP:	**01/13/20 @ 1545**
COLLECTED BY:	**DA**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	John St & Wayne Ave FH	<1	MPN/ 100 mL	SM 9223	1	01/14/20/0945	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

From:

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

1/15/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**011420-168Z**
DATE & TIME COLLECTED:	**01/14/20 @ 1235**
DATE & TIME RECEIVED:	**01/14/20 @ 1310**
DATE & TIME TCD LAB PREP:	**01/14/20 @ 1230**
COLLECTED BY:	**DA**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	John St & Wayne Ave FH	<1	MPN/ 100 mL	SM 9223	1	01/15/20/0730	AH

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2019 ANNUAL DRINKING WATER QUALITY REPORT

THE BOROUGH OF HANOVER / HANOVER MUNICIPAL WATER WORKS

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien. (This report contains important information about your drinking water. Translate it, or speak with someone who understands it.)

The Drinking Water Quality Report is being provided to you by The Borough of Hanover/Hanover Municipal Water Works as a snapshot of last year's water quality. Included are details about where your water comes from, what it contains, and how it compares to Environmental Protection Agency (EPA) and state standards. We are committed to providing you with information because informed customers are our best allies.

Additional information or questions concerning this report or the water department can be obtained by contacting The Borough of Hanover (owner and operator of the Hanover Municipal Water Works) 44 Frederick Street, Hanover, Pa. 17331 at 717/637-3877 during regular business hours, Monday through Friday, 8:00am to 4:30pm. The Borough's regularly scheduled meetings are the fourth Wednesday of each month beginning at 7:00pm in the Borough municipal building (44 Frederick Street).

The sources of raw water the water department treats into drinking water include the Sheppard Myers Dam, Lawrence Baker Sheppard Dam (both located in W. Manheim Township, York County), Kitzmiller Dam and Slagles Run Intake and Pump Station (both located in Conewago Township, Adams County). All of our water sources are surface water and each is used as needed to supply the treatment facility located in Conewago Township, Adams County.

Source Water Assessment and Protection (SWAP): As defined by a 1996 amendment to the Safe Drinking Water Act, The Susquehanna River Basin Commission developed the SWAP report under contract with The Pennsylvania Department of Environmental Protection (PADEP) for our source water. The susceptibility analysis summary covered four sources: Sheppard Myers Dam, Lawrence B. Sheppard Dam, Kitzmiller Dam each received a B and C rating; Slagles Run Intake and Pump Station was rated A, B and C. A susceptibility rating (A=high priority, F=low priority) is used to rank protection priorities for the potential sources of contamination. Ex. Rating "A" auto repair shops, gas/service stations, roadways; Rating "B" urban developments, industrial discharges, wastewater treatment plants, agricultural; Rating "C" on-lot septic systems and underground tanks. Summary reports of the Assessment are available by writing to The Borough of Hanover/Hanover Municipal Water Works, 44 Frederick St., Hanover, Pa. 17331 and will be available on the PADEP website at www.dep.state.pa.us (Keyword: "DEP source water"). Complete reports were distributed to municipalities, water supplier, local planning agencies and PADEP offices. Copies of the complete report are available for review at the PADEP, Southcentral Regional Office (Harrisburg), Records Management Unit at 717/705-4709.

Source Water Protection Plan: In 2020, the Hanover Municipal Water Works completed a comprehensive Source Water Protection Plan to protect their water sources. This project delineated areas for the water sources, identified potential sources of contamination, planned for potential pollution events, and selected management strategies that can be implemented in the future. This assessment found that our sources are potentially most susceptible to runoff from impervious surfaces in the Hanover area, with additional concerns about agricultural impact near the reservoirs. Public education and wathershed improvements are a focus of the program, which will benefit all residents and companies working and living in our service area. More information is available by contacting the Hanover Municipal Water Works at 717-637-3877.

******ADDITIONAL INFORMATION******

- An alert service offered by The Borough of Hanover is used to notify residents of emergencies and general notifications using a service called CODERED®. All citizens are encouraged to sign up for this notification. You may register to receive the message on more than one phone in addition to email. Not sure if you are signed up, register again; the system will not duplicate your information. You may sign up by going to the Borough web site and click on Community Links then click on the CODERED® icon. If you don't have internet service you may contact the Borough office and give them your information. The data collected is not shared with anyone else.
- Borough utility bills may be paid on line by going to the Borough web site and clicking on "On-Line Bill Pay Link". Note there is a small fee for paying on line with a credit card. Payments are accepted also by paying through your personal bank account. There is a night deposit drop on the front and side entrance of the Borough building to drop payments after hours.
- Common types of leaks found in the home include worn toilet flappers, dripping faucets and other leaking valves.
- Fixing easily corrected household leaks can help save about 10 percent on water bills.

BOROUGH WEB SITE: www.hanoverboroughpa.gov

PLEASE FOLD PAGE DOWN FOR ADDITIONAL INFORMATION

THE BOROUGH OF HANOVER

HANOVER MUNICIPAL
WATER WORKS

**Public Water System
Identification Number
7670076**

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
44 Frederick Street
Hanover, PA. 17331

2019

ANNUAL WATER QUALITY

CONSUMER CONFIDENCE REPORT

PRST. STD.
U.S. POSTAGE
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HANOVER, PA
PERMIT # 140

W A T E R Q U A L I T Y T A B L E

The table below lists all the drinking water contaminants that we detected during the 2019 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 - December 31, 2019. The state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Chemical Contaminants

Substance (Units)	Sample Date	MCL	MCLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Barium (ppm)	02/20/19	2	2	<0.400	NA	No	Erosion of natural deposits; Discharge of drilling wastes; Discharge from metal refineries
Fluoride (ppm)	2019	2**	2	Avg: 0.75	0.68 – 0.85	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate as nitrogen (ppm)	02/20/19	10	10	2.50	NA	No	Erosion of natural deposits; Runoff from fertilizer use; Leaching from septic tanks, sewage
Total Trihalomethanes (TTHMs) (ppb)	2019	80	NA	34.0*	7.1 – 85.9	No	By-product of drinking water chlorination,***running annual avg**.
Haloacetic Acids (HAA) (ppb)	2019	60	NA	24.2*	7.0 – 29.6	No	By-product of drinking water chlorination,***running annual avg**.

**EPA's MCL for fluoride is 4 ppm. However, Pennsylvania has set a lower MCL to better protect human health

Entry Point Disinfectant Residual

Substance (Units)	Sample Date	MRDL	Lowest Level Detected	Range of Detections	Violation	Source of Contamination
Free Chlorine (ppm)	2019	4	0.39	.39 – 1.86	No	Water additive used to control microbes.

Distribution Disinfection Residuals

Substance (Units)	Sample Date	MRDL	MRDLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Free Chlorine (ppm)	2019	4	4	Avg: 1.00	0.09 – 1.86	No	Water additive used to control microbes. Monthly averages.

LEAD AND COPPER (Tap water samples were collected from 30 customers taps)

Substance (Units)	Sample Date	AL	MCLG	90th Percentile	Sites above the AL	Violation	Sources of Contamination
Lead (ppb)	2019	15	0	ND	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits
Copper (ppm)	2019	1.3	1.3	0.350	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives

Turbidity – A measure of the clarity of the water

Substance (Units)	Sample Date	MCL	Highest Single Measurement	Violation	Sources of Contamination
Turbidity (NTU)	2019	TT=1 NTU for a single measurement	0.740 NTU	No	Soil Runoff
	2019	TT=at least 95% of monthly samples ≤0.3 NTU	99.99% of monthly samples ≤0.3	No	

Cryptosporidium – microbial pathogen found in surface water

Substance (Units)	Sample Date	Samples taken from raw water Average should be <0.075	Highest Result of All Samples	Violation	Sources of Contamination
Cryptosporidium (oocysts/Liter)	2016-18	0.026	0.50 out of 48 Samples taken	No	Naturally present in surface water

Total Organic Carbon (TOC)

Substance	Sample Date	Performance Ratio Avg. Required	Range of Performance Ratio Achieved	Number of quarters out of compliance	Violation	Source of Contamination
TOC PLANT #300 = 2019		≥1.00	.99 – 1.49	0	No	Naturally present in the environment
TOC PLANT #302 = 2019		≥1.00	1.08 – 1.39	0	No	

TABLE DEFINITIONS:

Parts per million (ppm): One part per million or milligrams per liter (mg/L).

Parts per billion (ppb): One part per billion or micrograms per liter (ug/L).

ND: Not detectable at testing limits.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

Minimum Residual Disinfectant Level (MinRDL): The minimum level of residual disinfectant required at the entry point to the distribution system.

Nephelometric Turbidity Unit (NTU): Measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

NA: Not Applicable

Range of Detections: The analytical results provided by a certified laboratory which reports the lowest and highest result for that contaminant.

CONTAMINANTS THAT MAY BE PRESENT IN SOURCE WATER INCLUDE:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can, also, come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to assure that tap water is safe to drink, EPA and DEP prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration and DEP regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Information about Lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Hanover Municipal Water Works is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tab for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

2018 ANNUAL DRINKING WATER QUALITY REPORT

THE BOROUGH OF HANOVER / HANOVER MUNICIPAL WATER WORKS

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien. (This report contains important information about your drinking water. Translate it, or speak with someone who understands it.)

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- Borough utility bills may be paid on line by going to the Borough web site and clicking on "On-Line Bill Pay Link". Note there is a small fee for paying on line with a credit card. Payments are accepted also by paying through your personal bank account. There is a night deposit drop on the front and side entrance of the Borough building to drop payments after hours.
- Common types of leaks found in the home include worn toilet flappers, dripping faucets and other leaking valves.
- Fixing easily corrected household leaks can help save about 10 percent on water bills.

BOROUGH WEB SITE: www.hanoverboroughpa.gov

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PERMIT # 140

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
44 Frederick Street
Hanover, PA. 17331

Public Water System
Identification Number
7670076

THE BOROUGH OF HANOVER

HANOVER MUNICIPAL
WATER WORKS

2018

ANNUAL WATER QUALITY

CONSUMER CONFIDENCE REPORT

W A T E R Q U A L I T Y T A B L E

The table below lists all the drinking water contaminants that we detected during the 2018 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 - December 31, 2018. The state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Chemical Contaminants

Substance (Units)	Sample Date	MCL	MCLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Barium (ppm)	02/15/18	2	2	<0.400	NA	No	Erosion of natural deposits; Discharge of drilling wastes; Discharge from metal refineries
Fluoride (ppm)	2018	2**	2	Avg: 0.75	0.66 – 0.81	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate as nitrogen (ppm)	02/14/18	10	10	2.67	NA	No	Erosion of natural deposits; Runoff from fertilizer use; Leaching from septic tanks, sewage
Total Trihalomethanes (TTHMs) (ppb)	2018	80	NA	40.6*	11.8 – 104.0	No	By-product of drinking water chlorination,***running annual avg**.
Haloacetic Acids (HAA) (ppb)	2018	60	NA	24.2*	11.0 – 49.0	No	By-product of drinking water chlorination,***running annual avg**.

****EPA's MCL for fluoride is 4 ppm. However, Pennsylvania has set a lower MCL to better protect human health.

Entry Point Disinfectant Residual

Substance (Units)	Sample Date	MRDL	Lowest Level Detected	Range of Detections	Violation	Source of Contamination
Free Chlorine (ppm)	2018	4	1.12	1.12 – 1.76	No	Water additive used to control microbes.

Distribution Disinfection Residuals

Substance (Units)	Sample Date	MRDL	MRDLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Free Chlorine (ppm)	2018	4	4	Avg: 0.82	0.01 – 1.90	*Yes	Water additive used to control microbes. Monthly averages.

*During routine sampling of the distribution system 2 results out of 610 samples collected and analyzed were below the 0.02 ppm MinRDL. Both corresponding bacteria sample results were negative. The issues have since been corrected.

LEAD AND COPPER (Tap water samples were collected from 30 customers taps)

Substance (Units)	Sample Date	AL	MCLG	90th Percentile	Sites above the AL	Violation	Sources of Contamination
Lead (ppb)	2016	15	0	ND	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits
Copper (ppm)	2016	1.3	1.3	0.290	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives

Turbidity – A measure of the clarity of the water

Substance (Units)	Sample Date	MCL	Highest Monthly Average of All Readings	Violation	Sources of Contamination
Turbidity (NTU)	2018	TT=1 NTU for a single measurement	0.078 NTU	No	Soil Runoff
	2018	TT=at least 95% of monthly samples ≤0.3 NTU	100% of monthly samples ≤0.3	No	

Cryptosporidium – microbial pathogen found in surface water

Substance (Units)	Sample Date	Samples taken from raw water Average should be <0.075	Highest Result of All Samples	Violation	Sources of Contamination
Cryptosporidium (oocysts/Liter)	2016-18	0.017 - 0.067	0.50 out of 48 Samples taken	No	Naturally present in surface water

Total Organic Carbon (TOC)

Substance	Sample Date	Performance Ratio Avg. Required	Range of Performance Ratio Achieved	Number of quarters out of compliance	Violation	Source of Contamination
TOC	2018	≥1.00	1.22 – 1.39	0	No	Naturally present in the environment

TABLE DEFINITIONS:

Parts per million (ppm): One part per million or milligrams per liter (mg/L).

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ND: Not detectable at testing limits.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

Minimum Residual Disinfectant Level (MinRDL): The minimum level of residual disinfectant required at the entry point to and including the distribution system.

Nephelometric Turbidity Unit (NTU): Measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

NA: Not Applicable

Range of Detections: The analytical results provided by a certified laboratory which reports the lowest and highest result for that contaminant.

CONTAMINANTS THAT MAY BE PRESENT IN SOURCE WATER INCLUDE:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can, also, come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to assure that tap water is safe to drink, EPA and DEP prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration and DEP regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Information about Lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Hanover Municipal Water Works is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tab for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

2017 ANNUAL DRINKING WATER QUALITY REPORT

THE BOROUGH OF HANOVER / HANOVER MUNICIPAL WATER WORKS

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien. (This report contains important information about your drinking water. Translate it, or speak with someone who understands it.)

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Employees of the Water Department monitor the raw water and the finished drinking water for many contaminants in compliance with State and Federal laws to insure delivery of a safe product to you, the consumer. Included in this report is a table showing the results of analyses performed.

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- Common types of leaks found in the home include worn toilet flappers, dripping faucets and other leaking valves.
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THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
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Hanover, PA. 17331

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THE BOROUGH OF HANOVER
HANOVER MUNICIPAL
WATER WORKS

Public Water System
Identification Number
7670076

2017
ANNUAL WATER QUALITY
CONSUMER CONFIDENCE REPORT

W A T E R Q U A L I T Y T A B L E

The table below lists all the drinking water contaminants that we detected during the 2017 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 - December 31, 2017. The state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Chemical Contaminants

Substance (Units)	Sample Date	MCL	MCLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Barium (ppm)	02/15/17	2	2	<0.400	NA	No	Erosion of natural deposits; Discharge of drilling wastes; Discharge from metal refineries
Fluoride (ppm)	2017	2**	2	Avg: 0.77	0.68 – 0.89	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate as nitrogen (ppm)	02/15/17	10	10	2.07	NA	No	Erosion of natural deposits; Runoff from fertilizer use; Leaching from septic tanks, sewage
Total Trihalomethanes (TTHMs) (ppb)	2017	80	NA	49.4*	9.9 – 67.7	No	By-product of drinking water chlorination,***running annual avg**.
Haloacetic Acids (HAA) (ppb)	2017	60	NA	26.0*	11.0 – 37.0	No	By-product of drinking water chlorination,***running annual avg**.

******EPA's MCL for fluoride is 4 ppm. However, Pennsylvania has set a lower MCL to better protect human health

Entry Point Disinfectant Residual

Substance (Units)	Sample Date	MRDL	Lowest Level Detected	Range of Detections	Violation	Source of Contamination
Free Chlorine (ppm)	2017	4	1.06	1.06 – 1.57	No	Water additive used to control microbes.

Distribution Disinfection Residuals

Substance (Units)	Sample Date	MRDL	MRDLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Free Chlorine (ppm)	2017	4	4	Avg: 0.71	0.02 – 1.69	No	Water additive used to control microbes. Monthly averages.

LEAD AND COPPER (Tap water samples were collected from 30 customers taps)

Substance (Units)	Sample Date	AL	MCLG	90th Percentile	Sites above the AL	Violation	Sources of Contamination
Lead (ppb)	2016	15	0	ND	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits
Copper (ppm)	2016	1.3	1.3	0.290	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives

Turbidity – A measure of the clarity of the water

Substance (Units)	Sample Date	MCL	Highest Monthly Average of All Readings	Violation	Sources of Contamination
Turbidity (NTU)	2017	TT=1 NTU for a single measurement	0.049 NTU	No	Soil Runoff
	2017	TT=at least 95% of monthly samples ≤0.3 NTU	100% of monthly samples ≤0.3	No	

Microbiological Contaminants

Substance (Units)	Sample Date	MCL	MCLG	Highest # of Positive Samples	Violation	Sources of Contamination
Total Coliform Bacteria	2017	5% of monthly samples are positive	0	0	No	Naturally present in the environment

Total Organic Carbon (TOC)

Substance	Sample Date	Performance Ratio Avg. Required	Range of Performance Ratio Achieved	Number of quarters out of compliance	Violation	Source of Contamination
TOC	2017	≥1.00	1.00 – 1.37	0	No	Naturally present in the environment

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Reason for monitoring Turbidity: Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

In order to assure that tap water is safe to drink, EPA and DEP prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration and DEP regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

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2016 ANNUAL DRINKING WATER QUALITY REPORT

THE BOROUGH OF HANOVER / HANOVER MUNICIPAL WATER WORKS

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HANOVER MUNICIPAL WATER WORKS
44 Frederick Street
Hanover, PA. 17331

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THE BOROUGH OF HANOVER
HANOVER MUNICIPAL
WATER WORKS

Public Water System
Identification Number
7670076

2016
ANNUAL DRINKING WATER
QUALITY REPORT

WATER QUALITY TABLE

The table below lists all the drinking water contaminants that we detected during the 2016 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 - December 31, 2016. The state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Chemical Contaminants

Substance (Units)	Sample Date	MCL	MCLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Barium (ppm)	02/10/16	2	2	0.040	NA	No	Erosion of natural deposits; Discharge of drilling wastes; Discharge from metal refineries
Fluoride (ppm)	2016	2**	2	Avg: 0.74	0.60 – 0.86	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate as nitrogen (ppm)	02/10/16	10	10	2.25	NA	No	Erosion of natural deposits; Runoff from fertilizer use; Leaching from septic tanks, sewage
Total Trihalomethanes (TTHMs) (ppb)	2016	80	NA	48.8*	9.7 – 110.5	No	By-product of drinking water chlorination, *running annual avg.
Haloacetic Acids (HAA) (ppb)	2016	60	NA	35.0*	18.0 – 54.0	No	By-product of drinking water chlorination, *running annual avg.

**EPA's MCL for fluoride is 4 ppm. However, Pennsylvania has set a lower MCL to better protect human health

Entry Point Disinfectant Residual

Substance (Units)	Sample Date	MRDL	Lowest Level Detected	Range of Detections	Violation	Source of Contamination
Free Chlorine (ppm)	2016	4	1.07	1.07 – 1.55	No	Water additive used to control microbes.

Distribution Disinfection Residuals

Substance (Units)	Sample Date	MRDL	MRDLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Free Chlorine (ppm)	2016	4	4	Avg: 0.64	0.50 – 1.00	No	Water additive used to control microbes. Monthly averages.

LEAD AND COPPER (Tap water samples were collected from 30 customers taps)

Substance (Units)	Sample Date	AL	MCLG	90th Percentile	Sites above the AL	Violation	Sources of Contamination
Lead (ppb)	2016	15	0	ND	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits
Copper (ppm)	2016	1.3	1.3	0.290	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives

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Substance (Units)	Sample Date	MCL	Highest Monthly Average of All Readings	Violation	Sources of Contamination
Turbidity (NTU)	2016	TT=1 NTU for a single measurement	0.046 NTU	No	Soil Runoff
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Substance (Units)	Sample Date	MCL	MCLG	Highest # of Positive Samples	Violation	Sources of Contamination
Total Coliform Bacteria	2016	5% of monthly samples are positive	0	0	No	Naturally present in the environment

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Substance	Sample Date	Performance Ratio Avg. Required	Range of Performance Ratio Achieved	Number of quarters out of compliance	Violation	Source of Contamination
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2015 ANNUAL DRINKING WATER QUALITY REPORT

THE BOROUGH OF HANOVER / HANOVER MUNICIPAL WATER WORKS

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The water department is operating under a State permit with no variances or exemptions. During the year 2015, the department did not experience any violations of the National Primary Drinking Water Regulations (NPDWR) or Maximum Contaminant Levels (MCLs).

Employees of the Water Department monitor the raw water and the finished drinking water for many contaminants in compliance with State and Federal laws to insure delivery of a safe product to you, the consumer. Included in this report is a table showing the results of analyses performed.

Source Water Assessment and Protection (SWAP): As defined by a 1996 amendment to the Safe Drinking Water Act, The Susquehanna River Basin Commission developed the SWAP report under contract with The Pennsylvania Department of Environmental Protection (PADEP) for our source water. The susceptibility analysis summary covered four sources: Sheppard Myers Dam, Lawrence B. Sheppard Dam, Kitzmiller Dam each received a B and C rating; Slagles Run Intake and Pump Station was rated A, B and C. A susceptibility rating (A=high priority, F=low priority) is used to rank protection priorities for the potential sources of contamination. Ex. Rating "A" auto repair shops, gas/service stations, roadways; Rating "B" urban developments, industrial discharges, wastewater treatment plants, agricultural; Rating "C" on-lot septic systems and underground tanks. Summary reports of the Assessment are available by writing to The Borough of Hanover/Hanover Municipal Water Works, 44 Frederick St., Hanover, Pa. 17331 and will be available on the PADEP website at www.dep.state.pa.us (Keyword: "DEP source water"). Complete reports were distributed to municipalities, water supplier, local planning agencies and PADEP offices. Copies of the complete report are available for review at the PADEP, Southcentral Regional Office (Harrisburg), Records Management Unit at 717/705-4709.

******ADDITIONAL INFORMATION******

An alert service offered by The Borough of Hanover is used to notify residents of emergencies and general notifications using a service called CODERED®. All citizens are encouraged to sign up for this notification. You may register to receive the message on more than one phone in addition to email. Not sure if you are signed up, register again; the system will not duplicate your information. You may sign up by going to the Borough web site and click on Community Links then click on the CODERED® icon. If you don't have internet service you may contact the Borough office and give them your information. The data collected is not shared with anyone else.

The Borough of Hanover has established a new Hotline that will be used for emergencies and general information. This will be used in addition to the other forms of communication. Please call the number at various times to check on any communications 717/646-2888.

Borough utility bills may be paid on line by going to the Borough web site and clicking on "On-Line Bill Pay Link". Note there is a small fee for paying on line with a credit card. Payments are accepted also by paying through your personal bank account. There is a night deposit drop on the front and side entrance of the Borough building to drop payments after hours.

Borough Web Site: www.hanoverboroughyorkcountypa.info

PLEASE FOLD PAGE DOWN FOR ADDITIONAL INFORMATION

2015
ANNUAL DRINKING WATER
QUALITY REPORT

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL
WATER WORKS

Public Water System
Identification Number
7670076

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
44 Frederick Street
Hanover, PA. 17331

PRST. STD.
U.S. POSTAGE
PAID
HANOVER, PA
PERMIT # 140

W A T E R Q U A L I T Y T A B L E

The table below lists all the drinking water contaminants that we detected during the 2015 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 - December 31, 2015. The state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Chemical Contaminants

Substance (Units)	Sample Date	MCL	MCLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Barium (ppm)	02/11/15	2	2	0.019	NA	No	Erosion of natural deposits; Discharge of drilling wastes; Discharge from metal refineries
Fluoride (ppm)	2015	2**	2	Avg: 0.75	0.68 – 0.83	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate as nitrogen (ppm)	02/11/15	10	10	2.87	NA	No	Erosion of natural deposits; Runoff from fertilizer use; Leaching from septic tanks, sewage
Total Trihalomethanes (TTHMs) (ppb)	2015	80	NA	57.5*	9.3 – 82.9	No	By-product of drinking water chlorination, *running annual avg.
Haloacetic Acids (HAA) (ppb)	2015	60	NA	54.3*	19.5 – 67.5	No	By-product of drinking water chlorination, *running annual avg.

**EPA's MCL for fluoride is 4 ppm. However, Pennsylvania has set a lower MCL to better protect human health

Entry Point Disinfectant Residual

Substance (Units)	Sample Date	MinRDL	Lowest Level Detected	Range of Detections	Violation	Source of Contamination
Free Chlorine (ppm)	2015	0.2	1.00	1.00 – 1.54	No	Water additive used to control microbes.

Distribution Disinfection Residuals

Substance (Units)	Sample Date	MRDL	MRDLG	Level Detected	Range of Detections	Violation	Sources of Contamination
Total Chlorine (ppm)	2015	4	4	Avg: 0.81	0.02 – 1.58	No	Water additive used to control microbes.

LEAD AND COPPER (Tap water samples were collected from 30 customers taps)

Substance (Units)	Sample Date	AL	MCLG	90th Percentile	Sites above the AL	Violation	Sources of Contamination
Lead (ppb)	2013	15	0	3.5	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits
Copper (ppm)	2013	1.3	1.3	0.580	0 out of 30 Every 3 years	No	Corrosion of household plumbing system; Erosion of natural deposits; Leaching from wood preservatives

Turbidity – A measure of the clarity of the water

Substance (Units)	Sample Date	MCL	Highest Monthly Average of All Readings	Violation	Sources of Contamination
Turbidity (NTU)	2015	TT=1 NTU for a single measurement	0.048 NTU	No	Soil Runoff
	2015	TT=at least 95% of monthly samples ≤0.3 NTU	100% of monthly samples ≤0.3	No	

Microbiological Contaminants

Substance (Units)	Sample Date	MCL	MCLG	Highest # of Positive Samples	Violation	Sources of Contamination
Total Coliform Bacteria	2015	5% of monthly samples are positive	0	0	No	Naturally present in the environment

Total Organic Carbon (TOC)

Substance	Sample Date	Range of % Removal Required	Range of percent removal achieved	Number of quarters out of compliance	Violation	Source of Contamination
TOC	2015	25 – 35%	33.3 – 40.7%	0	No	Naturally present in the environment

TABLE DEFINITIONS:

Parts per million (ppm): One part per million or milligrams per liter (mg/L).

Parts per billion (ppb): One part per billion or micrograms per liter (ug/L).

ND: Not detectable at testing limits.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

Minimum Residual Disinfectant Level (MinRDL): The minimum level of residual disinfectant required at the entry point to the distribution system.

Nephelometric Turbidity Unit (NTU): Measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

NA: Not Applicable

OTHER VIOLATION:
During February and March, 2015 our system issued a public notice for not maintaining the proper disinfection levels at the Filter Plant.

Our sampling for Trihalomethanes (TTHM) and Haloacetic Acids (HAA) were collected at the proper time during the fourth (4th) quarter of 2015 but the samples were not properly preserved by the laboratory and had to be recollected, but outside of the proper time frame.

CONTAMINANTS THAT MAY BE PRESENT IN SOURCE WATER INCLUDE:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can, also, come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to assure that tap water is safe to drink, EPA and DEP prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration and DEP regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791).

Reason for monitoring Turbidity: Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Exhibit D IX-2

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO QUALITY OF SERVICE
FILING REQUIREMENTS

2. Indicate whether the company is in compliance with 52 Pa. Code, § 65.6(a) regarding normal operating pressure standards, and with 52 Pa. Code, § 65.6(d) regarding pressure surveys at regular intervals.
   a. Provide details on any water pressure problems, lasting longer than 5 days, which had occurred since the last rate proceeding in any part of the water transmission and distribution system.
   b. Describe any action taken on a temporary basis, and the long term solutions developed to address any water pressure problems.

RESPONSE

The Borough is in compliance and has no water pressure problems lasting longer than 5 days since the last rate proceeding. All water mains leaving the Water Filtration Plant are continuously monitored for pressure and flow. The Borough's SCADA system surveys pressure at our Parr's Hill Reservoir continuously. In addition, there are two pressure chart recorders placed in the system at our water storage tank in McSherrystown and at the Kidd Lane Booster Pump Station. Those recorders are manually charted and surveyed weekly to monitor pressure.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO QUALITY OF SERVICE
FILING REQUIREMENTS

3. Provide support to demonstrate that water or wastewater service is being furnished on a continuous basis by supplying a summary of the company's records of each service interruption greater than 24 hours since the last rate proceeding.

RESPONSE

The Borough has not had a service interruption longer than 24 hours since the last rate proceeding.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO QUALITY OF SERVICE
FILING REQUIREMENTS

4. Provide a discussion of the company's policy, or provide a copy of the policy if in written form, on tracking and responding to customer complaints.
   a. Provide a summary report demonstrating the company's compliance with 52 Pa. Code, § 65.3 regarding the full and prompt investigation of service or facility complaints and the recordkeeping requirements of such complaints.

RESPONSE

A complaint form is filled out when a customer complaint is issued regarding water quality or pressure. The complaint is logged into the Complaint Book which contains the date, name, address, phone number, nature of the complaint, action taken and the results. See the attached form and Complaint Book entries.

Customer complaints typically originate at the Borough's main office, accepted by Counter Clerks or Billing Clerk, who initially log the complaint in a ledger (see 'Exhibit D IX-4 Attachment A' for a sample of recent ledger entries). Complaints not requiring sampling (i.e., obtaining Rid-B-Gone for damaged laundry) are managed in-office. For all other complaints, an electronic work order ("WO") is created in our KVS Enterprise Resource Planning ("ERP") system and provided to the Meter Department to coordinate as on-site sample, summarizing information on the complaint (party and contract information, identified concerns, property address, time/dates, etc.).

A Complaint Reporting Sheet ("CRS") is manually prepared by the Meter Department to detail the customer complaint and document on-site sample observations and occurrence. Meter Department then provides the WO and CRS to the Water Filtration Plant for performance of testing, and a Chemical and Physical Drinking Water Analysis Results (CPDWAR) report is prepared to document the results of the sample and final comments. Those results are provided to Administrative Assistance, who prepares and mails response on Borough letterhead to the customer regarding the results of the sample, along with a copy of the CPDWAR. See 'Exhibit D IX-4 Attachment B' for a sample of recent packets retained for each complaint instance.

The Borough continues to evaluate software to fully automate the process from received complaint to response provided and WO closure for recordkeeping purposes.

Date: 6/9/2020	Complaint: Rusty water (day #2) from hydrant flushing.
Name: Mrs. Snyder	
Address: 39 Monroe St.	Action Taken: Coming in for Red-B-Gone
Phone #:	
Employee: MS	Work Order #: Completed:

Date:	Complaint: Dirty laundry
Name: Don Eltz	
Address: 65 Carson Avenue	Action Taken: Gave Red-B-Gone
Phone #: (717) 632-3648	
Employee: PDC	Work Order #: Completed:

Date: 7/29/2020	Complaint: Bad taste, water. Taking water sample
Name: Everett Grove	
Address: 711 W Elm Ave	Action Taken:
Phone #: 717-465-6104	
Employee:	Work Order #: Completed:

Date: 11/27/2021	Complaint: Awful tasting water, stated she had her sister taste it also and she said the same. Did not notice any odor to it.
Name: Kimberlynn Riley	
Address: 5891/2 McAllister St.	Action Taken: Called Chad. advised he wasn't aware of any work being done in area and would look into it
#:	
Employee:	Work Order #: Completed: PDC

Date: 2-11-2020	Complaint: Said around the beginning of every month he has brown water
Name: Robert Mohondro	
Address: 912 Sherwood St	Action Taken: Called Tom
Phone #: 443-244-2130	
Employee:	Work Order #: Completed:

Date: 4-6-2020	Complaint: dirty water
Name: Trinity Church	
Address: 116 York St	Action Taken: per Dale he told them to run the water
Phone #:	
Employee: DH	Work Order #: Completed:

Date: 5/4/20	Complaint: Dirty Water Sheets are stained
Name: Karen Stevens (owner)	
Address: 309 Fulton St	Action Taken: Gave Red. B - Gone
Phone #: 717-965-2461	
Employee: D.S.	Work Order #: Completed:

Date: 6/3/2020	Complaint: Really rusty water
Name: Jeff Spielman	
Address: 512 Locust Street	Action Taken: Contacted Dale- Stated may be possible it is from the draw of a hydrant
Phone #: (717) 451-9908	
Employee: DH	Work Order #: Completed:

Date: 10/10/19	Complaint: Dirty Clothes
Name: Linda Hoffmins	
Address: 509 Mowl Ave	Action Taken: Gave packet of Fed-B-Gone
Phone #: 717-632-7875	
Employee:	Work Order #: Completed:

Date: 12/10/19	Complaint: Dirty water for past 2 months
Name: Zims Estates	
Address: 864 Broadway ENT DOCTOR'S OFFICE	Action Taken: Called Dale to Look into problem. Gave him contact information. Getting water sample & sending for test.
Phone #: 717-632-2221 X 107 Megan	
Employee: Donna	Work Order #: Completed:

Date: 1/15/2020	Complaint: Rusty water (advised this happens to him quite frequently)
Name: Schnum, Richard	(*) neighbor at 305 Washington Avenue called for same thing (Kerianne)
Address: 306 Washington Avenue 305 Washington Ave.	Action Taken: Tammy called Sam Smith and he was going to drive over to check things out
Phone #:	
Employee: BK	Work Order #: Completed:

Date: 1/17/2020	Complaint: Strong chlorine odor - needs to boil water for dog (gets sick, otherwise)
Name: Theresa Head	
Address: 101 Bowman Rd.	Action Taken: W/O for testing of sample Sample are very good and well within limits
#: 717-542-9186	
Employee:	Work Order #: Completed:

Date: 10/9/19	Complaint: Dirty Laundry
Name: Alexis Hoke	
Address: 216 West Avenue	Action Taken: Gave Red-B-Gone
Phone #: (717)873-0273	
Employee: BDC	Work Order #: Completed:

Date: 10-10	Complaint: Dirty Laundry
Name: Barb Baker	
Address: 524 Mount Ave	Action Taken: Gave Red B Gone
Phone #: 717-637-8644	
Employee:	Work Order #: Completed:

Date: 10/10/19	Complaint: Dirty Laundry
Name: Ron Mummert	
Address: 230 Grant Dr.	Action Taken: Gave Red-B-Gone
Phone #: 717-637-2462	
Employee:	Work Order #: Completed:

Date: 10/10/19	Complaint: Dirty/Rusty laundry
Name: Jane Fortino	
Address: 1335 Broadway	Action Taken: Gave Red-B-Gone
Phone #: (717)698-5854	
Employee: BDC	Work Order #: Completed:

Date: 10/9/18	Complaint: Dirty laundry
Name: Pat Haun	
Address: 173 Sherry Drive McSherrystown	Action Taken: Gave Bottle of Red-B-Gone
Phone #: 717-637-6997	
Employee: BE	Work Order #: Completed:

Date: 10/9/18	Complaint: Dirty Laundry
Name: Cindy Overmiller	
Address: 16 Redwood Lane	Action Taken: Gave Red B Gone
Phone #:	
Employee:	Work Order #: Completed:

Date: 10/9/18	Complaint: Dirty Clothes.
Name: Alvaro Alandete	
Address: 264 McKinley Ave	Action Taken: Gave Red B Gone
Phone #: ~~717~~ 717-880-9090	
Employee:	Work Order #: Completed:

Date: 10-9-2018	Complaint: Dirty Clothes
Name: Alexis Holce	
Address: 216 West Ave	Action Taken: Gave Red B Gone
Phone #: 717 873-0273	
Employee:	Work Order #: Completed:

Date: 10/7/2019	Complaint: Discolored water - Stained load of laundry.
Name: Earl Markle	
Address: 412 E. Elm Ave	Action Taken: Gave Red-B-Gone
Phone #:	
Employee: Aspasy	Work Order #: Completed:

Date: 10/7/19	Complaint: Discolored water Stained load of laundry
Name: Susanne Smith	
Address: 111 Main St McSherrystown PA	Action Taken: Gave Red B Gone
Phone #:	
Employee: Donna Stransbagh	Work Order #: Completed:

Date: 10-8-2019	Complaint: laundry got stained - flushing hydrants
Name: Sister Ann Leonard	
Address: 90 Main St	Action Taken: gave Red B Gone
Phone #: no	
Employee: Aaron	Work Order #: Completed:

Date: 10/8/19	Complaint: Discolored towels
Name: Wayne Miller	
Address: 705 Eichelberger St.	Action Taken: Gave Red-B-Gone
Phone #: 717-633-5233	
Employee: RR	Work Order #: Completed:

Date: 9/16/19	Complaint:
Name: Dale Ault	
Address: Per Phone Call to Dale on Sunday - Dirty water Penn St - Between Grant & McKinley Ave	Action Taken:
Phone #:	
Employee:	Work Order #: Completed:

Date: 9-24-19	Complaint: Water is discolored
Name: Victor Rudle.	
Address: 524 Ridge Ave Mt Kennystown	Action Taken: Ran cold only, at a pencil Stream
Phone #: 717-521-4106	
Employee: Aaron	Work Order #: Completed:

Date: 10/4/19	Complaint: Dirty water
Name: Megan Corey	
Address: 279 Sunset Ave	Action Taken: Told them Hospital Flushed Hydrants on 10/2 & 10/3/19
Phone #: 717-521-2190	
Employee:	Work Order #: Completed:

Date: 10/7/19	Complaint: Dirty water. - 2nd time Two weeks ASK Dale to call her - She would'nt listen to anything we told her.
Name: Kathy Green	
Address: 292 Hillcrest Dr.	Action Taken:
e #:	
Employee: CJC	Work Order #: Completed:

Date:	Complaint:
Name: Rosenstock, Brittany	- Dirty water - rusted/discolored laundry
Address: 717 McAllister St.	Action Taken: Tom dropped off bottle of Red-B-Gone @ house
Phone #: (717) 586-4386	
Employee: PDE	Work Order #: Completed:

Date: 9-11-2019	Complaint: Brown water
Name: Christine Dell	
Address: 485 High St	Action Taken: Checked w/ Dale, no work being done in their area. Advised to run cold a period & follow up w/ us if not better
Phone #: 717-476-1785	
Employee: CH	Work Order #: Completed:

Date: 9/16/2019	Complaint: Rust colored water over the weekend - white wash is discolored.
Name: Schramm, Richard	
Address: 306 Washington Ave.	Action Taken: Chad w/ Tammy/Dale - NO WORK in area. Suggested coming in for Red-B-Gone. Gave Bottle of Red-B-Gone
Phone #: 632-4306	
Employee: Tammy	Work Order #: Completed:

Date: 9/17/19	Complaint: Dirty Water
Name: Paul Holcomb	
Address: 4 Tyler Drive	Action Taken: Advised the guys did flushings on Clover Lane earlier this AM
Phone #: (717) 632-6931	
Employee: PDE	Work Order #: Completed:

Date:	Complaint: Dirty water/white wash got stained
Name: Debra Sell	
Address: 325 Brandywine Ln	Action Taken: gave a bottle of rust b gone
Phone #: 717-632-6895	
Employee: gh	Work Order #: Completed:

Date: 8/22/19	Complaint: Dirty water, discolored laundry (due to flushings)
Name: Pittinger, Brandi	
Address: 38 McAllister St.	Action Taken: Gave bottle of Red-B-Gone
Phone #: 7/476-6747	
Employee: BK	Work Order #: Completed:

Date: 8/23/19	Complaint: Dirty water - Cleared / Dale advised no flushings near
Name: Carey Crumling	
Address: 380 Sonny St.	Action Taken:
Phone #: 717-632-0863	
Employee: BK	Work Order #: Completed:

Date: 9/5/19	Complaint: Water has been smelling like fish for the past week, becoming very offensive
Name: William Hoffman	
Address: 524 main St. McSherrystown	Action Taken: Called Sam Smith
#: 7/632-4043	
mployee: BK	Work Order #: Completed:

Date: 8/15/19	Complaint: Dirty water - Again.
Name: Greg Becker	
Address: 210 Penn St.	Action Taken: Gave 2 bottles of Powder
Phone #: 637-6781	
Employee: CJK.	Work Order #: Completed:

Date:	Complaint: Dirty Water
Name: Warren Melhorn	
Address: 300 Linden Ave	Action Taken: Cold Run water slowly
Phone #: 717-637-4521	
Employee: gh	Work Order #: Completed:

Date: 8.18.19	Complaint: She called Dale Sunday 8/18 dirty water.
Name:	
Address: 506 High St	Action Taken:
Phone #: —	
Employee: TLS	Work Order #: Completed:

Date: 8/20/19	Complaint: Dirty water last night - Cleared after few hrs.
Name:	
Address: 102 George St	Action Taken:
Phone #: —	
Employee:	Work Order #: Completed:

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNA. 17331
717-637-3877 FAX 717-637-2805
AN EQUAL OPPORTUNITY BOROUGH

December 30, 2020

Mr. Sean Logue
90 Henry St.
Hanover, Pa. 17331

Dear Mr. Logue,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 90 Henry St, Hanover to be tested for your toilet being scummy.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Assistant.

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Sean Louge
LOCATION: 90 Henry St.
TESTS BY: JS
COMPLAINT: Scummy Toilet

DATE: 12/28/20
TIME: 0955
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.075	0.04
Fluoride	1.30 mg/l	0.7	0.71
Iron	0.30 mg/l	0.018	0.004
Manganese	0.05 mg/l	0.007	0.017
Copper	1.00 mg/l	0.11	0.02
Ammonia Nitrogen	10.00 mg/l	0.01	0.01
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l		
Ph	6.5 to 8.5 units	7.94	7.78
Alkalinity	500 mg/l		
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.27	1.52
Free chlorine MCL	4.0 mg/l		

COMMENTS: Results of this sample are very good and well within the limits.

SIGNED:

August 24, 2020

Mr. Everett Grove
711 W. Elm Ave
Hanover, Pa. 17331

Dear Mr. Grove,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 711 W. Elm Ave, Hanover to be tested for water smells and taste bad (earthy).

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Everett Grove
LOCATION: 711 W. Elm Ave.
TESTS BY: TM
COMPLAINT: Water smells and tasts bad.(earthy)

DATE: 8/19/20
TIME: 10am
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.106	0.041
Fluoride	1.30 mg/l	0.73	0.74
Iron	0.30 mg/l	0.01	0.005
Manganese	0.05 mg/l	0.008	0.004
Copper	1.00 mg/l	0.04	0.02
Ammonia Nitrogen	10.00 mg/l	0	0
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	NT	NT
Ph	6.5 to 8.5 units	7.90	7.82
Alkalinity	500 mg/l	NT	NT
CHLORINE			
Free chlorine	Minimum 0.2 mg/l	0.97	1.56
Free chlorine	MCL 4.0 mg/l		

COMMENTS: Results of this sample are very good and well within the limits.
Threshold odor test had a slight chlorine odor which is normal.

SIGNED: Mark Stein

THE BOROUGH OF HANOVER
WORK ORDER

Work Order Date: 08/18/2020

Account No: 54-0695890-2
SBL#:

Phone(H): (717) 465-6104
Phone(W): (000) 000-0000

Name: GROVE, EVERETT
Location Address: 711 W ELM AVE, HANOVER
Billing Address: GROVE, PATRICIA, 711 ELM AVE,, HANOVER, PA 17

Meter: 001
Install Date: 04/26/2010 Mt Code:
Meter Serial No: 25516144
Connector: ARB #: 10011354
Manf Cd: Pipe Size: 5/8"
Grid #: L14 User:
Meter Note: LS
Meter Location:
W/O Codes:

WO
W/O Read:

Appointment Date: 08/19/2020 TIME: 10:00 Assigned To: METER DEPT
Appointment Day: WEDNESDAY EMail:

Meter Reading History: (Last Three Readings)

Date	Reading	Consumption	Type
06/2020	1331	24	A
03/2020	1307	22	A
12/2019	1285	25	A

Comments:
TAKE WATER SAMPLE-WATER TASTING REALY BAD-SOMEONE WILL BE THERE AT 10:00AM
EVERETT GROVE 717-465-6104
*
*
*

Findings/Action Taken:
*
8.19.20
*
*
*
*
*
*
*
*
*

Ordered by:
Completed By:
Signature:

Date:

Created By: CJK

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 8-19-2020

Name of person calling in complaint EVERETT GROVE

Address of complaint 711 W. ELM AVE.

Nature of complaint: Odor _____ Taste ✓

(For taste and odor see table below)

Dirty _____ Other _____

Customer's discription: _____

Where is problem found? (kitchen, bath, outside, hot or cold water, etc.) _____

_____

(Ask if problem is only from a specific location or all through the address)

When did problem begin? _____

Name or initials of person taking complaint information: CJK

Name or initials of person collecting sample : T. Musselman

(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? No

Observations during sample collection:

OWNER SAID WATER TASTES & SMELLS EARTHY

COLD TAP IS VERY WARM

Date and time sample was collected: 8-19-20 10:00 AM

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
(musty)	oily	solvent	aftertaste	
(earthy)	fishy	papery	plastic	
chemical	septic	grassy	bitter	

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNA. 17331
717-637-3877 FAX 717-637-2805
AN EQUAL OPPORTUNITY BOROUGH

August 4, 2020

Mr. Joe Massicot
219 Second Ave
Hanover, Pa. 17331

Dear Mr. Massicot,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 219 Second Ave, Hanover to be tested for water is destroying the water heater.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori Musselman

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Joe Massicot
LOCATION: 219 Second Ave.
TESTS BY: KA
COMPLAINT: Water is destroying the water heater.

DATE: 8/3/20
TIME: 1130
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.138	0.041
Fluoride	1.30 mg/l	0.75	0.77
Iron	0.30 mg/l	0.018	0
Manganese	0.05 mg/l	0.011	0.007
Copper	1.00 mg/l	0.01	0
Ammonia Nitrogen	10.00 mg/l	0	0
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	85	85
Ph	6.5 to 8.5 units	8.22	7.89
Alkalinity	500 mg/l	53	60
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.47	1.62
Free chlorine MCL	4.0 mg/l		

COMMENTS: Results of this sample are very good and well within the limits.

SIGNED: 

June 5, 2020

Ms. Tanya Miner
2015 Youngs Rd.
Hanover, Pa. 17331

Dear Ms. Miner,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 2015 Youngs Rd, Hanover to be tested for water for high levels of copper.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Tanya Miner DATE: 6/4/20
LOCATION: 2015 Youngs Rd. TIME: 1040
TESTS BY: BB WORK ORDER #:
COMPLAINT: Neiderers pool says that high copper is ruining her pool and hot tub
And causing her health issues.

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	Youngs Rd Blow-off
Turbidity	2 NTU's	0.072	0.057
Fluoride	1.30 mg/l	0.69	0.70
Iron	0.30 mg/l	0.014	0.009
Manganese	0.05 mg/l	0.011	0.01
Copper	1.00 mg/l	0.01	0
Ammonia Nitrogen	10.00 mg/l	0.01	0
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	68	76.5
Ph	6.5 to 8.5 units	8.22	8.27
Alkalinity	500 mg/l	NT	NT
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.56	0.72
Free chlorine MCL	4.0 mg/l		

COMMENTS: We ran your sample along with the Youngs Rd. Blow-off sample to compare the quality.
Both samples are very good and the copper levels are not elevated which is normal for our system.

SIGNED:

THE BOROUGH OF HANOVER
WORK ORDER

Work Order Date: 06/03/2020

Account No: 52-0386500-1
SBL#:

Phone(H): (717) 698-3683
Phone(W): (000) 000-0000

Name: KONZEL, MATTHEW P.
Location Address: 2015 YOUNGS RD, HANOVER
Billing Address: MINER, TANYA L., 2015 YOUNGS RD,, HANOVER, PA

Meter: 001
Install Date: 03/08/2012 Mt Code:PIT
Meter Serial No: 26621574
Connector: ARB #: 06819591
Manf Cd: SENSUS Pipe Size: 1"
Grid #: 30 User:
Meter Note: 1" IDPIT PIGEON HILLS RES. CEMENT BLOCK
Meter Location:
W/O Codes:

WO
W/O Read:

Appointment Date: 06/04/2020 TIME: 9:30 Assigned To: METER DEPT
Appointment Day: THURSDAY EMail:

Meter Reading History: (Last Three Readings)

Date	Reading	Consumption	Type
05/2020	1103	20	A
02/2020	1083	22	A
11/2019	1061	23	A

Comments:
TAKE SAMPLE AT HOUSE AND BLOW OFF
CUSTOMER IS STATING MAY BE HIGH LEVELS OF COPPER
*
*
*

Findings/Action Taken:
* FILTER PLANT: TREAT LIKE A COMPLAINT SAMPLE
*
*
*
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*
*
*

Ordered by: Date: Created By:TLS
Completed By:
Signature:

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 6-3-2020

Name of person calling in complaint TANYA MINER

Address of complaint 2015 YOUNGS RD.

Nature of complaint: Odor _____ Taste _____
(For taste and odor see table below)

Dirty _____ Other HIGH COPPER

Customer's discription: SHE CLAIMS THAT HIGH COPPER IS RUINING HER POOL + HOT TOP + CAUSING HER HEALTH ISSUES

Where is problem found? (kitchen, bath, outside, hot or cold water, etc.) _____

(Ask if problem is only from a specific location or all through the address)

When did problem begin? _____

Name or initials of person taking complaint information: TAMMY

Name or initials of person collecting sample : _____
(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? _____

Observations during sample collection: _____

Date and time sample was collected: 6-4-2020

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
musty	oily	solvent	aftertaste	
earthy	fishy	papery	plastic	
chemical	septic	grassy	bitter	

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNA. 17331
717-637-3877 FAX 717-637-2805
AN EQUAL OPPORTUNITY BOROUGH

May 14, 2020

Ms. Elizabeth Reese
360 Grant Dr
Hanover, Pa. 17331

Dear Ms. Reese,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 360 Grant Dr, Hanover to be tested for water tasting bad every time its rain.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori Musselman

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Elizabeth Reese
LOCATION: 360 Grant Drive
TESTS BY: JS
COMPLAINT: Everytime it rains the water tasts bad. All locations in the house.

DATE: 5/12/20
TIME: 1030
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.111	0.04
Fluoride	1.30 mg/l	0.74	0.73
Iron	0.30 mg/l	0.021	0.003
Manganese	0.05 mg/l	0.007	0.016
Copper	1.00 mg/l	0.02	0.02
Ammonia Nitrogen	10.00 mg/l	0.01	0.01
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	NT	NT
Ph	6.5 to 8.5 units	8.01	7.83
Alkalinity	500 mg/l	NT	NT
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.63	1.37
Free chlorine MCL	4.0 mg/l		

COMMENTS: Results of this sample are very good and well within the limits.
Threshold odor test had a slight chlorine odor which is normal.

SIGNED: [signature]

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 5-12-20 JOHN NEIDERER

Name of person calling in complaint ELIZABETH REESE

Address of complaint 360 GRANT DR.

Nature of complaint: Odor _____ Taste _____
(For taste and odor see table below)

Dirty _____ Other _____

Customer's discription: EVERYTIME IT RAINS THE WATER TASTES BAD

Where is problem found? (kitchen, bath, outside, hot or cold water, etc.) _____

EVERY WHERE IN HOUSE
(Ask if problem is only from a specific location or all through the address)

When did problem begin? _____

Name or initials of person taking complaint information: _____

Name or initials of person collecting sample : J. SHEELY
(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? NA

Observations during sample collection: NA

Date and time sample was collected: 5-12-20 10:30AM

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
musty	oily	solvent	aftertaste	
earthy	fishy	papery	plastic	
chemical	septic	grassy	bitter	

Thomas Sheely

From: Falyn Morningstar
Sent: Tuesday, May 12, 2020 10:20 AM
To: Tim Mayers
Cc: Eric Mains; Dale Ault; I and I; Thomas Sheely
Subject: RE: GraniteNet lines

Thanks for the information.

All – please keep me involved with the process to solution as I am recording it in detail.

Best,
Falyn

From: Tim Mayers <tmayers@hanoverboroughpa.gov>
Sent: Tuesday, May 12, 2020 10:18 AM
To: Falyn Morningstar <fmorningstar@hanoverboroughpa.gov>
Subject: RE: GraniteNet lines

Falyn

Tom Sheely is checking with the home owner

From: Falyn Morningstar
Sent: Tuesday, May 12, 2020 10:16 AM
To: I and I; Dale Ault; Eric Mains; Thomas Sheely
Cc: Tim Mayers
Subject: GraniteNet lines

Good morning.

Terry - Thank I&I for cleaning out the inlets near 360 Grant Drive. Just a reminder that SURVEY 123 can be collected if not done so recently to continue to create the database for inlets. I looked through the GraniteNet lines in the vicinity of 360 Grant Drive (3 lines as noted below). These were done last July so it is updated. There are videos for A-26-P0015 and A-26-P0016 however the video does not come up for the middle line, A-26-P0014. Are you and Harlon able to see why this is not jiving please? I did not see the camera go through a manhole so I don't think I missed anything. Keep me posted! Thanks.

Dale and Tom, I have you both copied because I am not sure who does residential water testing. Elizabeth Reese has a concern with the water. I've attached her voicemail so you can understand her concerns. Besides the dampness after rain events, she has noticed the water smells and tasty odd.

If there is anything else we can do Eric please let me know.
Thanks all,
Falyn



March 11, 2020

Ms. Mary Fralic
735 Washington Ave
Hanover, Pa. 17331

Dear Ms. Fralic,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 735 Washington Ave, Hanover to be tested for high levels of copper in the water.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Mary Fralic
LOCATION: 735 Washington Ave.
TESTS BY: BB
COMPLAINT: Said dog passed away in January due to high levels of copper. Was told it was in his water supply & to have it tested. ??

DATE: 3/6/20
TIME: 1500
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.049	0.033
Fluoride	1.30 mg/l	0.54	0.72
Iron	0.30 mg/l	0.012	0.003
Manganese	0.05 mg/l	0.013	0.014
Copper	1.00 mg/l	0.13	0
Ammonia Nitrogen	10.00 mg/l	0.01	0
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	76.5	76.5
Ph	6.5 to 8.5 units	7.99	7.92
Alkalinity	500 mg/l	NT	NT
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.79	1.45
Free chlorine MCL	4.0 mg/l		

COMMENTS: Results of this sample are very good and well within the limits. The copper level of this sample is in the range that we expect in the distribution system.

SIGNED: [signature]

THE BOROUGH OF HANOVER
WORK ORDER

Work Order Date: 03/04/2020

Account No: 51-0228123-1
SBL#:

Phone(H): (717) 698-1520
Phone(W): (000) 000-0000

Name: FRALIC, MARY L.
Location Address: 735 WASHINGTON AVE, HANOVER
Billing Address: 735 WASHINGTON AVE, HANOVER, PA 17331

Meter: 001
Install Date: 05/20/2010 Mt Code:
Meter Serial No: 39776120
Connector: ARB #: 13353102
Manf Cd: SENSUS Pipe Size: 1"
Grid #: User:
Meter Note:
Meter Location:
W/O Codes:

WO
W/O Read:

Appointment Date: 03/06/2020 TIME: 2-3:00PM Assigned To: WATER DEPT
Appointment Day: FRIDAY EMail:

Meter Reading History: (Last Three Readings)

Date	Reading	Consumption	Type
01/2020	556	10	A
10/2019	546	13	A
07/2019	533	9	A

Comments:
WATER TESTING
717-698-1520 (SCOTT)
*
*
*

Findings/Action Taken:
DOG PASSED AWAY IN JAN DUE TO HIGH LEVELS OF COPPER-TOLD IT WAS IN HIS WATER SUPPLY & TO GET IT TESTED
*
*
got sample
*
*
*
*
*
*

Ordered by: RK
Completed By:
Signature: BB

Date: 3-6-20

Created By:RKS

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 3-6-2020

Name of person calling in complaint MARY FRALIC

Address of complaint 735 WASHINGTON AVE

Nature of complaint: Odor _____ Taste _____

(For taste and odor see table below)

Dirty _____ Other _____

Customer's discription: SAID DOG DIED BECAUSE OF HIGH COPPER IN WATER

Where is problem found? (kitchen, bath, outside, hot or cold water, etc.) whole House

(Ask if problem is only from a specific location or all through the address)

When did problem begin? -- He doesn't

Name or initials of person taking complaint information: RKS

Name or initials of person collecting sample : RJK

(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? No

Observations during sample collection: Everything seemed normal

Date and time sample was collected: 3-6-2020

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
musty	oily	solvent	aftertaste	
earthy	fishy	papery	plastic	
chemical	septic	grassy	bitter	

February 17, 2020

Mr. Stuart Fishelman
10 Ruel Ave
Hanover, Pa. 17331

Dear Mr. Fishelman,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 10 Ruel Ave, Hanover for having abdominal problems.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Stuart Fishelman
LOCATION: 10 Ruel Ave.
TESTS BY: JS
COMPLAINT: Abdominal problems every time he uses the water

DATE: 2/12/20
TIME: 0828
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at Clair's Restaurant on the same date.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	Clair's Restaurant
Turbidity	2 NTU's	0.076	0.066
Fluoride	1.30 mg/l	0.75	0.75
Iron	0.30 mg/l	0.012	0.004
Manganese	0.05 mg/l	0.004	0.005
Copper	1.00 mg/l	0.01	NT
Ammonia Nitrogen	10.00 mg/l	0.01	0.01
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	76.5	68
Ph	6.5 to 8.5 units	9.12	7.87
Alkalinity	500 mg/l	NT	NT
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.05	0.83
Free chlorine MCL	4.0 mg/l		

COMMENTS: The water purification system at your location is taking out the chlorine to the point that is below DEP's limit. It is also raising the Ph level above the recommended limit. This is a problem within the residents
We also collected a sample for Total Coliform Bacteria which was run by an independent lab. The results came back clean.

SIGNED: [signature]

Laboratory, Analytical, & Biological Services, Inc.

125 Enterprise Drive • New Oxford, PA 17350
Phone (717) 259-6550
Fax (717) 259-0766

PADEP LAB ID # 01-550
MDE ID # 300
www.labsinceb.com

Borough of Hanover
Attention: Dale Ault
44 Frederick Street
Hanover, PA 17331

2/13/2020
Report of Analysis

SAMPLE NAME:	**Borough of Hanover - 7670076**
SAMPLE ID:	**021220-168G**
DATE & TIME COLLECTED:	**02/12/20 @ 0828**
DATE & TIME RECEIVED:	**02/12/20 @ 1330**
DATE & TIME TCD LAB PREP:	**02/12/20 @ 1530**
COLLECTED BY:	**JF**

Analysis	Sample Location	Result	Units	Method	PQL	Date/Time	Tech
Total Coliform-S	10 Ruel Ave	<1	MPN/ 100 mL	SM 9223	1	02/13/20/0930	AH

Sincerely,
Laboratory, Analytical & Biological Services, Inc.

Reviewed and Approved by: Maureen M Dunlap, Maureen M Dunlap / Office Manager

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 2-12-2020

Name of person calling in complaint STUART FISHELMAN

Address of complaint 10 RUEL AVE.

Nature of complaint: Odor _____ Taste _____
(For taste and odor see table below)

Dirty _____ Other _____

Customer's discription: ABDOMINAL PROBLEMS EVERY TIME HE USES WATER

Where is problem found? (kitchen, bath, outside, hot or cold water, etc.) _____

(Ask if problem is only from a specific location or all through the address)

When did problem begin? 2-3 MONTHS AGO

Name or initials of person taking complaint information: RKS

Name or initials of person collecting sample : JF
(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? LOOKED FINE

Observations during sample collection: GUY IS ON ALOT OF MEDICATION, + HAS A WATER PURIFICATION SYSTEM.

Date and time sample was collected: 2-12-20 8:28 AM

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
musty	oily	solvent	aftertaste	
earthy	fishy	papery	plastic	
chemical	septic	grassy	bitter	

THE BOROUGH OF HANOVER
WORK ORDER

Work Order Date: 02/10/2020

Account No: 52-0457892-1
SBL#:

Phone(H): (717) 969-8650
Phone(W): (000) 000-0000

Name: FISHELMAN, STUART R.
Location Address: 10 RUEL AVE, HANOVER
Billing Address: 10 RUEL AVE, HANOVER, PA 17331

Meter: 001
Install Date: 09/03/2014 Mt Code:
Meter Serial No: 27360892
Connector: ARB #: 31075880
Manf Cd: SENSUS Pipe Size: 5/8"
Grid #: 18 User:
Meter Note: L.S.
Meter Location:
W/O Codes:

WO
W/O Read:

Appointment Date: 02/12/2020 TIME: 8:30-9:30AM Assigned To: WATER DEPT
Appointment Day: WED EMail:

Meter Reading History: (Last Three Readings)

Date	Reading	Consumption	Type
11/2019	448	2	A
08/2019	446	3	A
05/2019	443	2-	A

Comments:
WATER TESTING--HAS HAD ABDOMINAL PROBLEMS EVERY TIME HE IS IN HIS HOME & USES THE WATER FOR ANYTHING. BEGAN 2-3 MONTHS AGO, DOES NOT OCCUR WHEN TRAVELING.
*
*

Findings/Action Taken:
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*

GET NORMAL SAMPLE + BACTERIA SAMPLE
FLUSHED THE COLD WATER FOR 10 MIN
+ GOT BOTH SAMPLES. TOOK TO THE PLANT.

Ordered by:
Completed By: JF
Signature:

Date: 2-12-20

Created By:RKS

February 7, 2020

Mr. Carl Waldman
5225 Grandview Rd
Hanover, Pa. 17331

Dear Mr. Waldman,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 5225 Grandview Rd, Hanover to be tested for the reason of the water having a chlorine smell and leaving slime on bathroom sink.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Carl Waldman
LOCATION: 5225 Grandview Rd
TESTS BY: DS
COMPLAINT: Smells like Chlorine, Leaves slime on bathroom sink

DATE: 2/6/20
TIME: 0830
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.081	0.035
Fluoride	1.30 mg/l	0.76	0.76
Iron	0.30 mg/l	0.017	0.003
Manganese	0.05 mg/l	0.009	0.009
Copper	1.00 mg/l	NT	NT
Ammonia Nitrogen	10.00 mg/l	0.02	0
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l		68
Ph	6.5 to 8.5 units		7.8
Alkalinity	500 mg/l		39
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.77	1.46
Free chlorine MCL	4.0 mg/l		

COMMENTS: Results of this sample are very good and well within the limits. Chlorine in our system is higher than in the past due to DEP regulations changing. This change is for customer safety.

SIGNED:

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 2-6-2020

Name of person calling in complaint CARL WALDMAN

Address of complaint 5225 GRANDVIEW RD.

Nature of complaint: Odor CHLORINE Taste _____
(For taste and odor see table below)

Dirty _____ Other _____

Customer's discription: smells like chlorine, & leaves a slime on sink

Where is problem found? (kitchen, (bath) outside, hot or (cold) water, etc.) _____

Only notice it in bathroom sink
(Ask if problem is only from a specific location or all through the address)

When did problem begin? A month ago

Name or initials of person taking complaint information: RKS

Name or initials of person collecting sample : RK
(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? No

Observations during sample collection: _____

Date and time sample was collected: 2-6-20 @ 8:30

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
musty	oily	solvent	aftertaste	
earthy	fishy	papery	plastic	
chemical	septic	grassy	bitter	

5225
GRANDVIEW RD.
2-6-20

February 6, 2020

Ms. Theresa Head
101 Bowman Rd
Hanover, Pa. 17331

Dear Ms. Theresa Head,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 101 Bowman Rd, Hanover to be tested for the reason of the water having a strong chlorine smell and taste.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Theresa Head
LOCATION: 101 Bowman Rd
TESTS BY: JS
COMPLAINT: Strong Chlorine Taste and Smell

DATE: 2/5/20
TIME: 1100
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.051	0.035
Fluoride	1.30 mg/l	0.79	0.76
Iron	0.30 mg/l	0.006	0.003
Manganese	0.05 mg/l	0.01	0.018
Copper	1.00 mg/l	0.03	0.01
Ammonia Nitrogen	10.00 mg/l	0.01	0.01
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	NA	
Ph	6.5 to 8.5 units	NA	
Alkalinity	500 mg/l	NA	
CHLORINE			
Free chlorine Minimum	0.2 mg/l	1.11	1.45
Free chlorine MCL	4.0 mg/l		

COMMENTS: Results of this sample are very good and well within the limits. Chlorine in our system is higher than in the past due to DEP regulations changing. This change is for customer safety.

SIGNED:

THE BOROUGH OF HANOVER
WORK ORDER

Work Order Date: 02/03/2020

Account No: 52-0356120-1
SBL#:

Phone(H): (717) 542-9188
Phone(W): (000) 000-0000

Name: HEAD, THERESA A.
Location Address: 101 BOWMAN RD, HANOVER
Billing Address: 101 BOWMAN RD, HANOVER, PA 17331

Meter: 001
Install Date: 04/08/2004 Mt Code:
Meter Serial No: 62951863
Connector: ARB #: 55717031
Manf Cd: SENSUS Pipe Size: 5/8"
Grid #: 11 User:
Meter Note: BOX RIGHT
Meter Location:
W/O Codes:

WO
W/O Read:

Appointment Date: 02/05/2020 TIME: 8:30-9:00AM Assigned To: WATER DEPT
Appointment Day: WED EMail:

Meter Reading History: (Last Three Readings)

Date	Reading	Consumption	Type
11/2019	610	5	A
08/2019	605	6	A
05/2019	599	5	A

Comments:
WATER TESTING SAMPLE--STRONG CHLORINE ODOR/TASTE
THERESA 717-542-9188
*
*
*

Findings/Action Taken:
*
* Collected Sample 2-5-20
*
*
* *This is a reschedule from 1/22/2020
*
*
*
*

Ordered by:
Completed By:
Signature:

Date:

Created By:RKS

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 1-22-2020

Name of person calling in complaint THERESA HEAD

Address of complaint 101 BOWMAN RD.

Nature of complaint: Odor STRONG CHLORINE Taste STRONG CHLORINE
(For taste and odor see table below)

Dirty _____ Other _____

Customer's discription: _____

Where is problem found? (kitchen, bath, outside, hot or cold water, etc.) _____

_____
(Ask if problem is only from a specific location or all through the address)

When did problem begin? _____

Name or initials of person taking complaint information: RKS

Name or initials of person collecting sample : RKS
(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? She smelled it. - I Did Not

Observations during sample collection: Everything seemed Normal. Woman is used to well water.

Date and time sample was collected: 2-5-20

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
musty	oily	solvent	aftertaste	
earthy	fishy	papery	plastic	
chemical	septic	grassy	bitter	

THE BOROUGH OF HANOVER
44 FREDERICK STREET
HANOVER, PENNA. 17331
717-637-3877 FAX 717-637-2805
AN EQUAL OPPORTUNITY BOROUGH

December 23, 2019

Ms. Shannon Morris
244 Locust St
Hanover, Pa. 17331

Dear Ms. Morris,

Enclosed please find a copy of the test results from the sample of water that was collected at your property 244 Locust St, Hanover to be tested for the reason of the water tasting bitter.

Should you have any questions please feel free to contact Mike Harman, Supervisor of the Water Filtration Plant at 717-632-5152, Monday through Friday from 7:00 AM to 3:00 PM.

Sincerely,
For The Borough of Hanover

Lori A. Musselman
Administrative Asst. to Manager

WATER DEPARTMENT - BOROUGH OF HANOVER
CHEMICAL AND PHYSICAL DRINKING WATER ANALYSIS RESULTS

NAME: Shannon Morris
LOCATION: 244 Locust St
TESTS BY: TM
COMPLAINT: Bitter taste

DATE: 12/18/19
TIME: 1:00 pm
WORK ORDER #:

The following limits are the latest available from the United States Public Health Service. Compare the limits with your results. Test results should normally not exceed the limits listed. If you have any questions concerning this form, call the Filter Plant at 632-5152, Mon thru Fri, 7 AM to 3 PM and someone will try to answer them. Your sample is compared with a sample taken at the Filter Plant lab on the same date or the day before.

NT indicates NO TEST run

TEST FOR	U.S.P.H.S. LIMITS	YOUR SAMPLE	OUR LAB SAMPLE
Turbidity	2 NTU's	0.269	0.03
Fluoride	1.30 mg/l	0.76	0.73
Iron	0.30 mg/l	0.015	0
Manganese	0.05 mg/l	0.014	0.022
Copper	1.00 mg/l	0.03	0
Ammonia Nitrogen	10.00 mg/l	0	0.01
RECOMMENDED LIMITS NOT COVERED BY U.S.P.H.S.			
Hardness (total)	150 mg/l	NT	NT
Ph	6.5 to 8.5 units	7.78	7.79
Alkalinity	500 mg/l	NT	NT
CHLORINE			
Free chlorine Minimum	0.2 mg/l	0.63	1.70

COMMENTS: Results of this sample are very good and well within the limits. Chlorine in our system is higher than in the past due to DEP regulations changing. This change is for customer safty.

SIGNED:

HANOVER WATER DEPT. COMPLAINT REPORTING SHEET

This form to be filled out by person taking complaint over phone AND person picking up sample and brought along with sample to filter plant lab.

Date: 12-18-19

Name of person calling in complaint SHANNON MORRIS

Address of complaint 244 LOCUST ST. HANOVER

Nature of complaint: Odor _____ Taste BITTER

(For taste and odor see table below)

Dirty _____ Other _____

Customer's discription: BITTER

Where is problem found? (kitchen, bath, outside, hot or cold water, etc.) ENTIRE HOUSE

(Ask if problem is only from a specific location or all through the address)

When did problem begin? 2 WEEKS AGO

Name or initials of person taking complaint information: TOM SHEELY

Name or initials of person collecting sample : T.S.

(Person collecting sample should try to complete any questions not answered above)

Was the problem noticed at the time of sample collection? SHE SAID YES

Observations during sample collection: I TASTED THE WATER; I THOUGHT IT TASTED O.K.

Date and time sample was collected: 12-18-19 1:00 PM

EXAMPLES OF TASTES AND ODORS TO HELP CUSTOMER

chlorine	medicinal	sulfur	rusty	metallic
musty	oily	solvent	aftertaste	
earthy	fishy	papery	plastic	
chemical	septic	grassy	bitter	

Exhibit D IX-5

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO QUALITY OF SERVICE
FILING REQUIREMENTS

5. Indicate whether the company is in compliance with 52 Pa. Code, § 65.4(b) regarding complete and current mapping of the entire distribution or collection system.

RESPONSE

The Borough is complying with and continues to maintain and update GIS mapping of its entire distribution system. This includes mapping additions (and attribution) for new system expansions, updates per capital improvement projects (for both lining and replacement) as well as daily maintenance entries (valve replacement, water main breaks, etc.). The mapping includes, but is not limited to, distribution mains, service laterals/lines, valves, hydrants, and service boundaries of our system, and Distribution/Dams staff utilize iPad's in the field for real-time access to and update of the system, and work with third-party engineers in relation to new infrastructure addition to the mapping. Manual mapping records are maintained as a backup to the electronic records.



Exhibit 5.1 – Screenshot of Hanover Borough ArcGIS Online (AGOL) Water System Mapping

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO QUALITY OF SERVICE
FILING REQUIREMENTS

6. Provide a summary report demonstrating the company's efforts in water conservation, since the last rate proceeding, pursuant to 52 Pa. Code, § 65.20.

RESPONSE

EDUCATION, COMMUNICATION, EFFICIENCY - Within a memo section on every water bill generated by the Borough, information is regularly provided to customers stressing the need to conserve water, as well as participate in our CodeRED notification system for emergency and informational notices on the system (i.e., hydrant flushing), which rotate on a quarterly billing basis. In addition, the Borough has prepared water conservation and efficiency plumbing fixtures information for the public that is placed on the Borough's website (hanoverboroughpa.gov/206/water) and included annually in mailed newsletters, and will be noted on all water bills moving forward as accessible online and information for print request if desired. See 'Exhibit D IX-6 Attachment A' for a copy of these last cycle bills, and 'Exhibit D IX-6 Attachment B' for the most-recent educational notice.

UNACCOUNTED-FOR WATER - In 2019, the Borough worked directly with George Kunkel, Outreach Assistance Coordinator with Pennsylvania's Department of Environmental Protection's ("DEP") Bureau of Safe Drinking Water, and Mark Billus, with DEP's Capability Enhancement Program, to compile a standard American Water Works Association ("AWWA") water audit to improve non-revenue water management. The study identified that non-revenue water was estimated at 15.5% of 2018 volume leaving the Water Filtration Plant, with 4.9% representing apparent customer loss and 10.6% representing real (leakage) loss. See 'Exhibit D IX-6 Attachment C' for the final report issued by the above personnel on the assessment.

LEAK DETECTION - Annual leak detection program work is completed by Distribution/Dams staff on a section of service lines annually (464 in 2020), and on all fire hydrants (764) twice a year. In addition, about 160 different main line valves were leak detected and operated in 2020 as part of implemented program for improving exercising valves on a regular, annual basis.

METERING - All permanent residences and commercial/industrial/public properties require metered service, excluding private hydrant and separate fire service lines. All efforts are made for any temporary water service required to have those lines temporarily metered for the period of use; estimated usage for unmetered water use is only approved on an emergency request basis. The Borough has been transitioning

RESPONSE to IX-6 Continued:

from reconditioning meters to replacing meters to improve system accuracy for meters in service for more than ten (10) years. The Borough complies with all guidelines for testing and replacement of meters set forth by the PUC through electronic metering inventory maintained within our KVS Enterprise Resource Planning ("ERP") system.

CONSERVATION PLAN - As part of the Borough's Emergency Response Plan, a Drought Contingency Plan is in place and regularly monitored for communication to customers (as present in Attachment A, notice was provided in billings to customer of voluntary restrictions, and was advertised on the Borough's website, provided through CodeRED notification system, and issued in a Press Release to local media outlets and social media platforms. The plan is available on the Borough's website (hanoverboroughpa.gov/206/water). See 'Exhibit D IX-6 Attachment D' for the current plan.

BILL DATE 01/31/21
DUE DATE 02/20/21
BILL #: 0051841

THE BOROUGH OF HANOVER
WATER/SEWER/STORMWTR BILL
(717) 637-3877

ACCOUNT NO. 51-0258104-0

FOR SERVICE AT:
100 EISENHOWER DR STE 240
GREAT CLIPS

Meter Readings

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water	Sewer/Storm	Total
001	10/09/20	78	1/14/21	85	A	7@ 3.16	$22.12	$59.40	$81.52
						BASE	$57.09		$57.09
						Total	$79.21	$59.40	

Based on ongoing drought conditions, the Borough of Hanover is encouraging Voluntary Water Use Conservation. Water customers are requested to voluntarily restrict their use of water for nonessential uses, including but not limited to watering lawns, washing vehicles, and washing sidewalks.

A- acutal reading E- estimated reading

PREVIOUS BALANCE	$1.73
TOTAL CURRENT CHARGES	$138.61
AMT. DUE IF PAID AFTER 02/20/21	$142.08
AMT. DUE IF PAID BY 02/20/21	$140.34

Please keep this portion for your records

Please include this portion with your payment
Water $80.20
Sewer $60.14

WATER/SEWER/STORMWTR BILL

Bill Date: 01/31/21
Bill #: 0051841
Account #: 51-0258104-0
Service Address: 100 EISENHOWER DR STE 240
GREAT CLIPS
Name: 100 EISENHOWER DR LP

Amount Due if paid by 02/20/21: $140.34
Amount Due if paid after 02/20/21: $142.08

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 51-0258104-0

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

100 EISENHOWER DR LP
C/O CLIPPER PARTNERSHIP
P.O. BOX 221
HANOVER PA 17331

PSEMPZ-B-NP
67319
Patent Number US 7,975,904 B2

BILL DATE 12/31/20
DUE DATE 01/20/21
BILL #: 0011031

THE BOROUGH OF HANOVER
WATER/SEWER/STORMWTR BILL
(717) 637-3877

ACCOUNT NO. 53-0661701-1

FOR SERVICE AT:
400 PINE ST APT A

Meter Readings

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water	Sewer/Storm	Total
001	9/03/20	612	12/02/20	616	A	4@ 3.16	$12.64	$59.40	$72.04
						BASE	$26.55		$26.55
						STORMWTR		$20.76	$20.76
						Total	$39.19	$80.16	

Based on ongoing drought conditions, the Borough of Hanover is encouraging Voluntary Water Use Conservation. Water customers are requested to voluntarily restrict their use of water for nonessential uses, including but not limited to watering lawns, washing vehicles, and washing sidewalks.

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$119.35
AMT. DUE IF PAID AFTER 01/20/21	$120.84
AMT. DUE IF PAID BY 01/20/21	$119.35

Please keep this portion for your records

A

WATER/SEWER/STORMWTR BILL

Bill Date: 12/31/20
Bill #: 0011031
Account #: 53-0661701-1
Service Address: 400 PINE ST APT A

Name: ZUMBRUM, CHARLES

Amount Due if paid by 01/20/21: $119.35
Amount Due if paid after 01/20/21: $120.84

If payment is not received by due date a 1.25% penalty will be added to amount due.

Please include this portion with your payment

Water	$39.19
Sewer	$59.40
Stormwater	$20.76

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 53-0661701-1

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

ZUMBRUM, CHARLES
411 ROCKY RIDGE RD
SPRING GROVE PA 17362

PSEMPZ-B-NP
67319
Patent Number US 7,975,904 B2

BILL DATE 11/30/20
DUE DATE 12/20/20
BILL #: 0006827

THE BOROUGH OF HANOVER
WATER BILL
(717) 637-3877

ACCOUNT NO. 52-0344210-1

FOR SERVICE AT:
1415 BAER AVE

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water		Total
001	8/11/20	895	11/09/20	897	A	2@ 3.85	$7.71		$7.71
						BASE	$26.55		$26.55
						Total	$34.26	$0.00	

Based on ongoing drought conditions, the Borough of Hanover is encouraging Voluntary Water Use Conservation. Water customers are requested to voluntarily restrict their use of water for nonessential uses, including but not limited to watering lawns, washing vehicles, and washing sidewalks.

A- actual reading E- estimated reading

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$34.26
AMT. DUE IF PAID AFTER 12/20/20	$34.69
AMT. DUE IF PAID BY 12/20/20	$34.26

Please keep this portion for your records

Please include this portion with your payment
Water $34.26

WATER BILL

Bill Date: 11/30/20
Bill #: 0006827
Account #: 52-0344210-1
Service Address: 1415 BAER AVE

Name: HOVANEC, REBECCA

Amount Due if paid by 12/20/20: $34.26
Amount Due if paid after 12/20/20: $34.69

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 52-0344210-1

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

HOVANEC, REBECCA
1415 BAER AVE
HANOVER PA 17331

PSEMPZ-B-NP
67123
Patent Number US 7,975,604 B2

BILL DATE 10/31/20
DUE DATE 11/20/20
BILL #: 0019529

THE BOROUGH OF HANOVER
WATER/SEWER/STORMWTR BILL
(717) 637-3877

ACCOUNT NO. 51-0093570-0

FOR SERVICE AT:
433 YORK ST FRONT

Meter Readings									
Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water	Sewer/Storm	Total
001	7/08/20	530	10/07/20	530	A	0@ 3.16		$59.40	$59.40
						BASE	$26.55		$26.55
						Total	$26.55	$59.40	

Sign up for the CODE RED notification system on the Borough's website under Community Links to ensure you receive general and emergency notices via phone and/or email.

A-actual reading E- estimated reading

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$85.95
AMT. DUE IF PAID AFTER 11/20/20	$87.02
AMT. DUE IF PAID BY 11/20/20	$85.95

Please keep this portion for your records

WATER/SEWER/STORMWTR BILL

Bill Date: 10/31/20
Bill #: 0019529
Account #: 51-0093570-0
Service Address: 433 YORK ST FRONT

Name: FIRESTONE, JOANN

Amount Due if paid by 11/20/20: $85.95
Amount Due if paid after 11/20/20: $87.02

If payment is not received by due date a 1.25% penalty will be added to amount due.

Please include this portion with your payment

Water	$26.55
Sewer	$59.40

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 51-0093570-0

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

FIRESTONE, JOANN
3155 RIDINGS WAY
YORK PA 17408

BILL DATE 09/30/20
DUE DATE 10/20/20
BILL #: 0001624

THE BOROUGH OF HANOVER
WATER BILL
(717) 637-3877

ACCOUNT NO. 54-0737509-0

FOR SERVICE AT:
124 PANTHER DR

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water		Total
001	6/12/20	1038	9/15/20	1041	A	3@ 3.85	$11.56		$11.56
						BASE	$26.55		$26.55
						Total	$38.11	$0.00	

Sign up for the CODE RED notification system on the Borough's website under Community Links to ensure you receive general and emergency notices via phone and/or email.

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$38.11
AMT. DUE IF PAID AFTER 10/20/20	$38.58
AMT. DUE IF PAID BY 10/20/20	$38.11

Please keep this portion for your records

A- actual reading E- estimated reading

Please include this portion with your payment
Water $38.11

WATER BILL

Bill Date: 09/30/20
Bill #: 0001624
Account #: 54-0737509-0
Service Address: 124 PANTHER DR

Name: ZYLKA, ROBERT

Amount Due if paid by 10/20/20: $38.11
Amount Due if paid after 10/20/20: $38.58

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 54-0737509-0

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

ZYLKA, ROBERT
ZYLKA, DEBORAH
124 PANTHER DR
HANOVER PA 17331

PSEMPZ-B-NP
67123
Patent Number US 7,975,904 B2

BILL DATE 08/31/20
DUE DATE 09/20/20
BILL #: 0035531

THE BOROUGH OF HANOVER
WATER BILL
(717) 637-3877

ACCOUNT NO. 52-0403020-2

FOR SERVICE AT:
202 WESTMINSTER AVE

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water		Total
001	5/13/20	874	8/14/20	904	A	30@ 3.85	$115.62		$115.62
						BASE	$26.55		$26.55
						Total	$142.17	$0.00	

Sign up for the CODE RED notification system on the Borough's website under Community Links to ensure you receive general and emergency notices via phone and/or email.
A- actual reading E- estimated reading

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$142.17
AMT. DUE IF PAID AFTER 09/20/20	$143.95
AMT. DUE IF PAID BY 09/20/20	$142.17

Please keep this portion for your records

Please include this portion with your payment
Water $142.17

WATER BILL

Bill Date: 08/31/20
Bill #: 0035531
Account #: 52-0403020-2
Service Address: 202 WESTMINSTER AVE

Name: MILBURN, MATTHEW

Amount Due if paid by 09/20/20: $142.17
Amount Due if paid after 09/20/20: $143.95

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

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THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 52-0403020-2

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

MILBURN, MATTHEW
C/O HULSON HOMES
P.O. BOX 556
HANOVER PA 17331

BILL DATE 07/31/20
DUE DATE 08/20/20
BILL #: 0053440

THE BOROUGH OF HANOVER
WATER/SEWER/STORMWTR BILL
(717) 637-3877

ACCOUNT NO. 51-0061020-2

FOR SERVICE AT:
204 YORK ST

Meter Readings

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water	Sewer/Storm	Total
001	4/06/20	2877	7/06/20	2891	A	14@ 3.16	$44.24	$111.41	$155.65
						BASE	$26.55		$26.55
						STORMWTR		$16.61	$16.61
						Total	$70.79	$128.02	

To assist with our reading please keep your exterior meter pad clear of brush and debris.
A- actual reading E- estimated reading

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$198.81
AMT. DUE IF PAID AFTER 08/20/20	$201.29
AMT. DUE IF PAID BY 08/20/20	$198.81

Please keep this portion for your records

WATER/SEWER/STORMWTR BILL

Bill Date: 07/31/20
Bill #: 0053440
Account #: 51-0061020-2
Service Address: 204 YORK ST

Name: ROLAND, SCOTT & KAREN

Amount Due if paid by 08/20/20: $198.81
Amount Due if paid after 08/20/20: $201.29

If payment is not received by due date a 1.25% penalty will be added to amount due.

Please include this portion with your payment

Water	$70.79
Sewer	$111.41
Stormwater	$16.61

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

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THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 51-0061020-2

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

ROLAND, SCOTT & KAREN
C/O HULSON HOMES
118 CARLISLE ST
HANOVER PA 17331

PSEMPZ-B-NP
65042

BILL DATE 06/30/20
DUE DATE 07/20/20
BILL #: 0004332

THE BOROUGH OF HANOVER
WATER/SEWER/STORMWTR BILL
(717) 637-3877

ACCOUNT NO. 53-0661440-1

FOR SERVICE AT:
400 PINE ST

Meter Readings									
Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water	Sewer/Storm	Total
001	3/03/20	1624	6/03/20	1670	A	46@ 3.16	$145.36	$346.86	$492.22
						BASE	$108.12		$108.12
						STORMWTR		$1,029.82	$1,029.82
						Total	$253.48	$1,376.68	

To assist with our reading please keep your exterior meter pad clear of brush and debris. Thank you !

A- actual reading E- estimated reading

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$1,630.16
AMT. DUE IF PAID AFTER 07/20/20	$1,650.54
AMT. DUE IF PAID BY 07/20/20	$1,630.16

Please keep this portion for your records

WATER/SEWER/STORMWTR BILL

Bill Date: 06/30/20
Bill #: 0004332
Account #: 53-0661440-1
Service Address: 400 PINE ST

Name: R.H. SHEPPARD COMPANY INC

Amount Due if paid by 07/20/20: $1,630.16
Amount Due if paid after 07/20/20: $1,650.54

If payment is not received by due date a 1.25% penalty will be added to amount due.

Please include this portion with your payment

Water	$253.48
Sewer	$346.86
Stormwater	$1,029.82

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 53-0661440-1

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

R.H. SHEPPARD COMPANY INC
P.O. BOX 877
HANOVER PA 17331

PSEMPZ-B-NP

65042

Patent Number US 7,975,904 B2

BILL DATE 05/31/20
DUE DATE 06/20/20
BILL #: 0000048

THE BOROUGH OF HANOVER
WATER BILL
(717) 637-3877

ACCOUNT NO. 62-0970130-0

FOR SERVICE AT:
300 O'BRIEN LN

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water		Total
						BASE	$40.68		$40.68
						Total	$40.68	$0.00	

To assist with our reading please keep your exterior meter pad clear of brush and debris. Thank you !

A-actual reading E-estimated reading

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$40.68
AMT. DUE IF PAID AFTER 06/20/20	$40.68
AMT. DUE IF PAID BY 06/20/20	$40.68

Please keep this portion for your records

Please include this portion with your payment
Water $40.68

WATER BILL

Bill Date: 05/31/20
Bill #: 0000048
Account #: 62-0970130-0
Service Address: 300 O'BRIEN LN

Name: BOROUGH OF HANOVER-RWWT

Amount Due if paid by 06/20/20: $40.68
Amount Due if paid after 06/20/20: $40.68

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 62-0970130-0

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HANOVER, PA 17331
PERMIT NO. 140

BOROUGH OF HANOVER-RWWT
44 FREDERICK ST
HANOVER PA 17331

BILL DATE 04/30/20
DUE DATE 05/20/20
BILL #: 0000048

THE BOROUGH OF HANOVER
WATER BILL
(717) 637-3877

ACCOUNT NO. 62-0970130-0

FOR SERVICE AT:
300 O'BRIEN LN

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water		Total
						BASE	$40.68		$40.68
						Total	$40.68	$0.00	

To assist with our reading please keep your exterior meter pad clear of brush and debris. Thank you !

A- actual reading E- estimated reading

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$40.68
AMT. DUE IF PAID AFTER 05/20/20	$40.68
AMT. DUE IF PAID BY 05/20/20	$40.68

Please keep this portion for your records

Please include this portion with your payment
Water $40.68

WATER BILL

Bill Date: 04/30/20
Bill #: 0000048
Account #: 62-0970130-0
Service Address: 300 O'BRIEN LN

Name: BOROUGH OF HANOVER-RWWT

Amount Due if paid by 05/20/20: $40.68
Amount Due if paid after 05/20/20: $40.68

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

PSEMP2-B-NP

65042

Patent Number US 7,975,904 B2

See Reverse Side For Easy Opening Instructions

THE BOROUGH OF HANOVER
44 FREDERICK ST
HANOVER PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 62-0970130-0

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HANOVER, PA 17331
PERMIT NO. 140

BOROUGH OF HANOVER-RWWT
44 FREDERICK ST
HANOVER PA 17331

BILL DATE 02/29/20
DUE DATE 03/20/20
BILL #: 0007553

THE BOROUGH OF HANOVER
WATER BILL
(717) 637-3877

ACCOUNT NO. 52-0381410-0

FOR SERVICE AT:
888 YORK ST

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water		Total
001	11/06/19	379	2/13/20	383	A	4@ 3.85	$15.42		$15.42
						BASE	$26.55		$26.55
						Total	$41.97	$0.00	

Help our efforts to conserve water.
It's for life.

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$41.97
AMT. DUE IF PAID AFTER 03/20/20	$42.49
AMT. DUE IF PAID BY 03/20/20	$41.97

A

CODE A: actual reading E: estimated reading

Please keep this portion for your records

Please include this portion with your payment
Water $41.97

WATER BILL

Bill Date: 02/29/20
Bill #: 0007553
Account #: 52-0381410-0
Service Address: 888 YORK ST

Name: WENTZ, STACY E.

Amount Due if paid by 03/20/20: $41.97
Amount Due if paid after 03/20/20: $42.49

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

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44 FREDERICK ST.
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 52-0381410-0

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HANOVER, PA 17331
PERMIT NO. 140

WENTZ, STACY E.
888 YORK ST
HANOVER PA 17331

PSEMPZ-B-NP

64752

Patent Number US 7,975,904 B2

BILL DATE 01/31/20
DUE DATE 02/20/20
BILL #: 0021348

THE BOROUGH OF HANOVER
WATER/SEWER/STORMWTR BILL
(717) 637-3877

ACCOUNT NO. 51-0255910-0

FOR SERVICE AT:
228 N STEPHEN PL

Meter Readings

Mtr ID	Previous DATE	Previous Reading	Present DATE	Present Reading	Bill Code	Usage	Water	Sewer/Storm	Total
001	10/07/19	617	1/08/20	626	A	9@ 3.16	$28.44	$74.26	$102.70
						BASE	$26.55		$26.55
						STORMWTR		$20.76	$20.76
						Total	$54.99	$95.02	

Help our efforts to conserve water.
It's for life.

PREVIOUS BALANCE	$0.00
TOTAL CURRENT CHARGES	$150.01
AMT. DUE IF PAID AFTER 02/20/20	$151.89
AMT. DUE IF PAID BY 02/20/20	$150.01

Please keep this portion for your records

A

CODE A- actual reading E- estimated reading

WATER/SEWER/STORMWTR BILL

Please include this portion with your payment

Water	$54.99
Sewer	$74.26
Stormwater	$20.76

Bill Date: 01/31/20
Bill #: 0021348
Account #: 51-0255910-0
Service Address: 228 N STEPHEN PL

Name: LAABS, GARY

Amount Due if paid by 02/20/20: $150.01
Amount Due if paid after 02/20/20: $151.89

If payment is not received by due date a 1.25% penalty will be added to amount due.

Make Checks Payable To:

THE BOROUGH OF HANOVER
44 FREDERICK ST.
HANOVER, PA 17331
OFFICE HOURS: 8:00AM - 4:30PM
MONDAY THRU FRIDAY
AMOUNT PAID: $_____

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44 FREDERICK ST
HANOVER, PA 17331
ADDRESS SERVICE REQUESTED
Acct No: 51-0255910-0

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
HANOVER, PA 17331
PERMIT NO. 140

LAABS, GARY
228 N STEPHEN PL
HANOVER PA 17331

PSEMPZ-B-NP

65042

Patent Number US 7,975,904 B2

Water Conservation Guide
The Borough of Hanover, York County, Pennsylvania



CONTACT A BOROUGH REPRESENTATIVE TODAY:

44 Frederick Street, Hanover, PA 17331
(717) 637-3877 (Phone) (717) 637-2805 (Fax)

OFFICIAL WEBSITE:

www.hanoverboroughpa.gov/206/water

General Tips for Inside Your Home



Water conservation efforts can take many forms, and not only help protect to ensure we have water supply for future generations to come, but also save you money on a regular basis. Below are some general recommendations to consider for inside your home on a year-round basis.

Inside your Home

- Regularly check your toilets, faucets, showerheads, and ice makers for any signs of continuously running water. Keep icemakers free of ice blocks.
    - *Toilets can be the largest producers of "water waste" within a home. To ensure a tight connection from your tank to bowl, place a few drops of food coloring in the tank and after 25 minutes, see if any spreads into the bowl -- if so, you have a leak.*
- Routinely inspect pipes connecting these devices for any leaks or condensation.
- Consider energy-efficient upgrades to your fixtures to reduce your consumption, and possibly enjoy manufacturer's or State program rebates for qualifying upgrades!
    - *Conventional toilets can use up to 3.5 gallons per flush, versus low-flow toilets at 1.6 gallons per flush; this cane save thousands of gallons a year and reduce your water and sewer service costs!*
- In lieu of upgrades, consider retrofitting older fixtures -- installation of devices to restrict (lessen) flow, such as a pressure regulator. Ensure these devices are inspected routinely and replaced as necessary.
- Turn off the faucet when brushing your teeth or washing dishes in the sink.
- Utilize "water miser" features for clothes and dish washers to reduce cycle use, and refrain from running the appliances without a full load.
- Routinely check your water meter (typically installed in the basement) before and after a two-hour period when no water is being used. Any change in the meter would likely indicate a leak!

Winter Weather Guidance

- Ensure areas around pipes and fixtures inside the home are in heated areas where sources of cold air (i.e., drafty windows, untight exterior door jams, etc.) are addressed timely. For lines and fixtures in unheated areas, consider insulation/wrapping of pipes to protect them from freezing. For lines running through cabinets, vanities, or other fixtures with door-entry, leave those doors opened to promote warm air entry in these areas.
- Know where to shut your water off in your home (master valve, and other shut-off valves) so you are prepared for an emergency.
- In prolonged periods of below-freezing temperatures, consider keeping water moving through your pipes by having a small trickle of water run regularly on a faucet.
- In an event of pipes freezing:
    - *Shut off the water immediately.*
    - *Thaw pipes with warm air from a space heater or hair dryer (refrain from open-flame devices).*
    - *Cautiously turn service on when thawed in a slow manner and check for any cracks in pipes/joints.*



General Tips for Outside Your Home

Water consumption typically increases for the average household over the summer periods, whether the use be for recreational (e.g., topping off the family swimming pool) or cosmetic (e.g., watering that freshly manicured lawn). Conservation techniques applied can save thousands of gallons of this precious utility, and put a few Benjamins back in your pocket! Below are some general recommendations to consider for outside your home throughout the year.

Outside your Home

- For outdoor spigots, regularly check to ensure there are no drips or leaks. Disconnect hoses when not in use so it is visually evident when the water is left on.
    - *Be sure to winterize your spigots -- turn off inside valve to the spigot and open the spigot line to drain any remaining water from the line before colder weather sets in even if they are marketed as "freeze proof"! Consider installing insulated outdoor faucet covers to further protect these sensitive fixtures.*
- Use a broom instead of water hose to clean your driveway, sidewalks, and/or patio/porch.
- When it comes to watering your lawn, absent fresh seeding and/or planting, be mindful of the following, since its estimated nearly 50% of outdoor water use during the summer months is not needed to support a healthy landscape:
    - *Water early in the morning, as almost 30 percent of water can be lost to evaporation!*
    - *Perform slow gradual deep-soaking watering to encourage stronger turf and deep root growth, rather than frequent "quick" waterings.*
    - *Ensure you have tight hose connections (including at the sprinkler head juncture), and hoses without leaks.*
    - *Consider use of drip irrigation hoses to water plants.*
    - *Lawns typically only need an inch or so of water per week during the summer months. Watch the forecast, and only supplement if needed!*
- Include drought-resistant species in your gardens and ensure your plant species are well supported in our climate region. And mulch, mulch, mulch (promotes retention of moisture and prevention of weeds); but not too much mulch (two to three inches should do the trick).
- Wash vehicles wisely -- washing with a soapy bucket, versus a running hose, can use far less water.
- Set your lawnmower one notch higher than the "standard" level (at 2.5 to 3.5 inches) to promote more drought-tolerant growth.



"Water Conservation - It's for Life!"

PA DEP Drinking Water Outreach Assistance Program
Non-Revenue Water Management: Assessment and Comments for Hanover Borough Water Department, Hanover, York County, PA

George Kunkel, P.E. DEP Outreach Assistance Provider

INTRODUCTION

The Pennsylvania Department of Environmental Protection (DEP) assisted Hanover Borough Water Department (HBWD) in compiling a standard American Water Works Association (AWWA) water audit using the AWWA Free Water Audit Software. Included are observations from the water audit process and considerations for HBWD to improve their Non-revenue Water (NRW) management.

COMPILING THE WATER AUDIT

DEP's Outreach Assistance Program (OAP) and Capability Enhancement Program (CEP) have been assisting utilities with water audits since 2017. AWWA defines the best practice water audit method in its M36 Guidance Manual *Water Audits and Loss Control Programs* and provides the AWWA Free Water Audit Software (Software) at no cost for utilities to compile the standard water audit. DEP staff met with HBWD staff on September 10, 2019 to compile the water audit with 2018 data. Once data was input into the Software, it calculated performance indicators that assess the annual loss volumes and cost impacts to HBWD. The data was compared to data of other Pennsylvania water utilities. The water audit results and discussions with HBWD helped to develop a list of considerations for HBWD.

ASSESSMENT OF WATER AUDIT RESULTS FOR HANOVER BOROUGH WATER DEPARTMENT

Findings of the HBWD water audit are given below. Most of the water audit data inputs were based on estimates; thus, the results are preliminary in nature.

- HBWD withdrew and treated 1,613.16 million gallons (mg) of water from its water sources in 2018. Accounting for flowmeter error it was determined that HBWD provided a total adjusted volume of 1,629.445 mg of treated water to its distribution system in 2018.
- Of this total, 1,377.073 mg of authorized customer consumption was quantified in the water audit, including 1,365.443 mg of billed customer consumption (meter and unmetered) and 11.630 mg of unbilled authorized consumption. The water audit breaks down the water supplied volume into components of customer consumption and losses.
- Water Losses were quantified at 252.382 mg: including apparent (customer) losses of 79.353 mg and real (leakage) losses of 173.029 mg.
  - Apparent loss performance indicator: 12.45 gallons per customer service connection per day, which is higher than the median (middle) value of 4.58 gal/conn/day of 153 PA water utilities studied by the author in an independent study.[1] Apparent losses may be under-stated, which makes the volume of real losses over-stated.
  - Real (leakage) loss performance indicator: 27.15 gal/service connection/day. This value is lower than the median value of 35.71 gal/connection/day from 147 PA water utilities studied by the author.[1]

[1] Report on the Evaluation of Water Audit Data for Pennsylvania Water Utilities, NRDC, (2017)

- The Software calculated percent NRW by volume as 16.2%. This performance indicator is similar to the percent unaccounted-for water measure employed by DEP. DEP typically defines levels of unaccounted-for water above 20% as concerning and looks for water utilities above this level to implement actions to reduce NRW.

The apparent loss cost impact is $272,180 in potentially uncaptured revenue, or 3.57% of the 2018 revenue of $7,614,758. This is a modest revenue loss, that occurs at HBWD's moderate Customer Retail Unit Cost (CRUC) of $3.43 / 1,000 gallons, a charge which is notably lower than the median value of $7.66 / 1,000 gallons from 151 PA water utilities. The average age of the customer meter population is roughly 31 years; an advanced age for customer meters. HBWD is actively planning for water meter replacement in the near-term future, possibly along with an upgrade of the existing Automatic Meter Reading (AMR) system to an Advanced Metering Infrastructure (AMI) system.

An average monthly residential consumption value for HBWD was calculated as 3,439.1 gallons/customer/month (based on data reported to DEP); a rate that is slightly under the range of 3,500 -3,800 gallons/customer/month expected for small PA water utilities. The possibility exists that the moderately low level of customer consumption may reflect – in part – under-registration of customer water meters due to wear of the mechanical parts from aging. HBWD efforts to renew its customer meter population should help to reduce NRW and ensure optimum revenue capture. HBWD customer billing operations are managed with a software system that is dated and does include the functionality that HBWD desires. HBWD is considering replacement of this software package but realizes that their billing software package replacement should not occur at the same time as customer meter replacement, due to the complexity of each undertaking.

The real (leakage) loss cost impact is $43,212 of excessive production costs for Filtration and pumping. This cost is derived by multiplying the annual leakage volume (173.029 mg) by the Variable Production Costs (VPC) $249.74 per million gallons, which is notably lower than the median value of $520.00 per million gallons listed for 129 PA water utilities. The leakage cost impact is 0.80% of the system operating expenses of $5,515,862; a low impact to the HBWD operating budget. HBWD conducts periodic leak detection work and opportunity exists to better program leakage management efforts to further reduce leakage levels and reduce source water withdrawal volumes.

HBWD provided well validated data for the cost components of the water audit, but the other numbers input to the water audit were based largely on estimates. The AWWA Free Water Audit Software calculated a Data Validity Score (DVS) of 76 for the HBWD water audit. This DVS represents good data quality and places HBWD in the fourth of five levels of DVS values. HBWD will increase its data validity after customer meter replacement occurs. Validity can also be increased by measuring the average length of customer service connections, along with other improved data management methods.

GENERAL ASSESSMENT OF HANOVER BOROUGH WATER SYSTEM WATER SUPPLY EFFICIENCY

The HBWD water audit results find that the system is operating with relatively low losses and a good level of water efficiency performance. The system appears to be well managed and has invested in current technology production flowmeters, a Geographic Information System (GIS), a hydraulic model

of the water distribution system, and other current technology. The real (leakage) loss rate is below the median value from a list of Pennsylvania water utilities. The customer population is growing due to new residential buildings in the jurisdictions surrounding Hanover Borough.

The greatest challenge for HBWD is the need to pursue replacement of the customer meter population as well as the meter reading system and – further in the future – replace the customer billing software system. The average age of customer meters is very advanced at over 30 years. Current meter reading practices are time consuming and unsustainable give the rapid growth rate in the service area. Meter reading is conducted using an auto-gun reader to touch a touchpad to obtain the meter readings; a laborious process for a system with more than 17,000 customer accounts.

HBWD is keenly aware of the need for meter replacement and planning is under way for this project. Prior to the water audit meeting DEP staff – including the water auditor George Kunkel – met with HBWD on July 2, 2019 to discuss customer metering and meter reading technologies and trends in the drinking water industry. DEP staff later provided a variety of information and references to HBWD including purchase specification templates and information on Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) technologies. AMI includes real time communications to the customer meters and eliminates the need to visit customer premises as readings are collected remotely via a permanently installed electronic communication system. Meter reading currently occurs monthly for large meter customers and quarterly for residential customers. However, highly efficient monthly meter reading is feasible for all customers in the AMI environment and this might allow HBWD to move to monthly meter reading and billing for residential customers. There is a general belief in the drinking water industry that customer payment patterns are more reliable at the monthly frequency rather than the quarterly frequency.

Key costs of the HBWD are low compared to other Pennsylvania water systems. Both the Customer Retail Unit Cost (CRUC) of $3.43/ 1,000 gallons and Variable Production Cost of $249.74 per million gallons of water produced are well below the median values in the dataset of roughly 150 Pennsylvania water utilities. This may suggest that HBWD has opportunity to implement reasonable water rate increases in the near future to fund the meter replacement project and other system improvements.

HBWD is strongly encouraged to continue to compile the AWWA standard water audit on an annual basis, particularly to compare the data of upcoming years with the data of the 2018 water audit, which can serve as the baseline year of data. HBWD has opportunity to increase the validity of its water audit data and to improve the reliability of the water audit as a tool to assist decision-making.

To improve the validity of the water audit and accelerate water loss reduction, HBWD can consider undertaking a variety of activities over the next several months and years, as listed in the next section, in consultation with its Certified Operator. These are offered as considerations to assist HBWD's decision-making and they are presented in timelines of short-term and long-term implementation. It is important for HBWD to contact DEP technical services section in the Southcentral Regional Office in Harrisburg, PA at 717-705-4700 to discuss necessary approvals / permits that may apply for certain activities.

PA DEP Drinking Water Outreach Assistance Program
Non-Revenue Water Management: Assessment and Comments for
Hanover Borough Water Department, Hanover, York County, PA
George Kunkel, P.E. DEP Outreach Assistance Provider

IMPORTANT NOTE:

The following section of this report provides comments for consideration by water system operators, managers, and engineers. These comments are based on interpretation of data trends from the water system and observations / discussions from the site visit on September 10, 2019 with Sam Miller, HBWD Director of Finance/Treasurer, Tom Sheely, Meter Supervisor, Dale Auit, Distribution Supervisor, and Mike Harman, Filtration Plant Superintendent. Water system staff should meet to review, discuss, and carefully consider options for addressing these comments in a manner that would result in improved water efficiency and reduced water and revenue losses for HBWD. In some cases, water system staff may determine that addressing certain comments is not feasible and/or would not result in reduced water loss. The operator(s) in responsible charge for the water system plays a key role in the decision making moving forward since that operator is the individual designated by the owner to make process control decisions that maintain or change the water quality or quantity of a water system in a manner that may affect the public health or the environment. Ideally, decisions on how to address comments and modify existing practices is a consensus decision reached after all applicable water system personnel have met and thoroughly discussed the below comments and associated system-specific options.

The DEP Outreach Assistance Provider is not an operator in responsible charge of this public water system, which is why the comments provided below are not specific recommendations but rather point out areas of concern, for additional investigation and consideration by appropriate personnel for HBWD. In most instances, the first step toward improving performance is to consider operational modifications to existing processes, which are typically low- or no-cost adjustments to historical operating practices. In general, it is advisable to make one operational modification at a time, collect additional data to determine the impact that modification actually had, then move forward with the next priority process control modification.

In some instances, operational adjustments alone may not be enough to meet loss reduction goals and consistently maintain compliance; therefore, the need to make physical modifications to the existing facilities may be a necessary step to consider. Prior to implementing physical modifications, installing additional Filtration or equipment, it is critical to contact the DEP Safe Drinking Water Program, at 717-705-4700 to discuss necessary approvals / permits. Additionally, water system personnel should consider potential simultaneous compliance concerns related to any modifications they plan to make; more specifically, staff should consider if there are unintended consequences that may result in any violations of the Safe Drinking Water regulations. An important consideration to always keep in mind is ensuring that water quantity is adequate to meet minimum pressures and fire protection needs throughout the entire distribution system.

Comments for Short-term consideration (6-12 months)

1. HBWD is planning for replacement of the meter population in the near future. This is encouraged as the current customer meter stock has most likely exceeded its useful life. HBWD might also evaluate installing some or most customer meters in outdoor meter pits near the curbstop which is the delineation point of customer ownership of the service line.

PA DEP Drinking Water Outreach Assistance Program
Non-Revenue Water Management: Assessment and Comments for
Hanover Borough Water Department, Hanover, York County, PA
George Kunkel, P.E. DEP Outreach Assistance Provider

2. A water meter replacement project can also present the opportunity to take inventory of the customer service line population, including identifying service pipe material to determine if any lead lines exist. A reliable count of connections can be obtained, lengths of service lines measured from curbstop to building, and observations made to detect any unauthorized connections or buildings with water service that don't appear in billing records.

3. HBWD is considering installation of Advanced Metering Infrastructure (AMI) system for enhanced meter reading and a host of efficiency and customer service capabilities. DEP provided HBWD with information on this technology and two Pennsylvania water utility contacts involved with the installation of an AMI system after its meeting of July 2, 2019.

4. As part of the meter replacement initiative HBWD can evaluate the use of alternative meter types for its larger commercial and institutional customer accounts. These include magnetic, ultrasonic and floating ball turbine meters. Buildings with older turbine meters sized 2-inch, 3-inch, 4-inch, or 6-inch may have a meter that is over-sized and failing to register low flowrates. Replacing such meters with more accurate meters could gain additional flow registration and revenue.

5. HBWD can consider reviewing and updating its water regulations/ordnances and billing operations to make sure they are current, and ready to handle the meter replacement process, particularly if the meter reading process moves to a fully automated method such as AMI.

6. HBWD can consider investigating whether occasional fluctuations in the untreated and treated water production flow data are still occurring, with treated volumes sometimes erroneously exceeding untreated volumes. DEP provided HBWD with a description of the Mass Balance technique as a way to track production flows measured in series, which may aid in identifying data anomalies.

7. HBWD has banks of large flowmeters in series upstream (influent) to the Filtration plant and downstream (effluent) of the Filtration plant which is a configuration that may allow for a clearwell drop test to be conducted as a means of testing the accuracy of the effluent production flowmeters. DEP provided HBWD with a drop test procedure document for consideration.

8. HBWD could benefit from setting up a flow chart showing the raw (untreated) water pipelines and flowmeters to trace the flow path that water takes through the Filtration plant and is measured by the effluent flowmeters. The flow chart could also note which water flow volumes are tracked and archived by the Supervisory Control and Data Acquisition (SCADA) system. With two banks of raw water flowmeters, HBWD could confirm which of these flowmeters is the most appropriate to report source water withdrawal volumes to the DEP Primary Facility report. The first (furthest upstream of the Filtration plant) of the two banks of raw water meters might be the best to provide the raw source water withdrawals for DEP's Chapter 110 reporting requirements. It is uncertain whether this first (furthest upstream) bank of flowmeters is tracked and archived by the SCADA system. It is best if these flowmeters are monitored by the SCADA system if their data is to be reported to DEP.

9. HBWD can consider configuring a SCADA system report to include balancing of flows leaving the Filtration plant with flows into and out of the water storage facilities at Parr's Hill, Terrace Ave, and Oxford Ave. DEP provided an example of a typical flow balancing report included in the SCADA system of Ames, Iowa as an example.

10. HBWD can improve record-keeping by logging data (open time/closed time, estimated flowrate) for fire hydrant flushings to improve the accuracy of the unbilled, unmetered consumption volume in the water audit. DEP provided a standard electronic form to use for this purpose.

Comments for Long-term consideration (12-36 months)

1. HBWD can benefit from continuing to compile the AWWA standard water audit annually.

2. HBWD envisions replacing the customer billing system software after the customer meter replacement project is complete. This is good planning as it is advisable to not conduct customer billing system replacement at the same time as meter/meter reading system replacement due to the complexities of each project and the interactions of the systems.

3. HBWD can consider moving to a monthly billing frequency for all customers. It is believed by many water industry stakeholders that customer payment patterns are more reliable with monthly billing, rather than a longer billing frequency. This would be best considered as part of the installation of new customer billing software.

4. HBWD can consider contracting with an acoustic leak detection service provider about conducting additional leak detection work to further reduce leakage. HBWD may also consider establishing a more regular schedule of annual acoustic leak detection work and keeping detailed records on the areas covered by leak detection survey work.

5. HBWD can consider installing additional pressure sensors in the distribution system, connected to the SCADA system for continuous monitoring.

6. HBWD can benefit from recording data on leak and water main break repairs in an electronic format. DEP provided spreadsheet software for this purpose. HBWD can note how many customer service line leaks occur and response times to address leaks and main breaks. By cataloging leak/break repair data in this manner, HBWD can better reveal water distribution failure patterns that can assist planning for leak detection and water main replacement.

7. HBWD may be able to enhance its leakage reduction efforts by monitoring flows in the two existing pressure zones and operating them as formal District Metered Areas (DMA). This technique has advantages for identifying newly emerging, hidden leakage.

8. Once a new meter population exists, and has been in-service for at least five years, a restructured meter accuracy testing program that follows AWWA meter test protocols as well as PA PUC protocols, could be considered by HBWD. Obtaining new meter accuracy testing apparatus might also be considered since the existing Ford test bench is over 20 years old.

EMERGENCY RESPONSE PLAN

FOR

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER DEPARTMENT
44 FREDERICK STREET
HANOVER, PA. 17331

PLAN INCLUDES

DROUGHT CONTINGENCY PLAN

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A. Public Water Supply Agency

The Borough of Hanover
Hanover Municipal Water Department
44 Frederick Street
Hanover, Pa. 17331

Phone: 717/637-3877

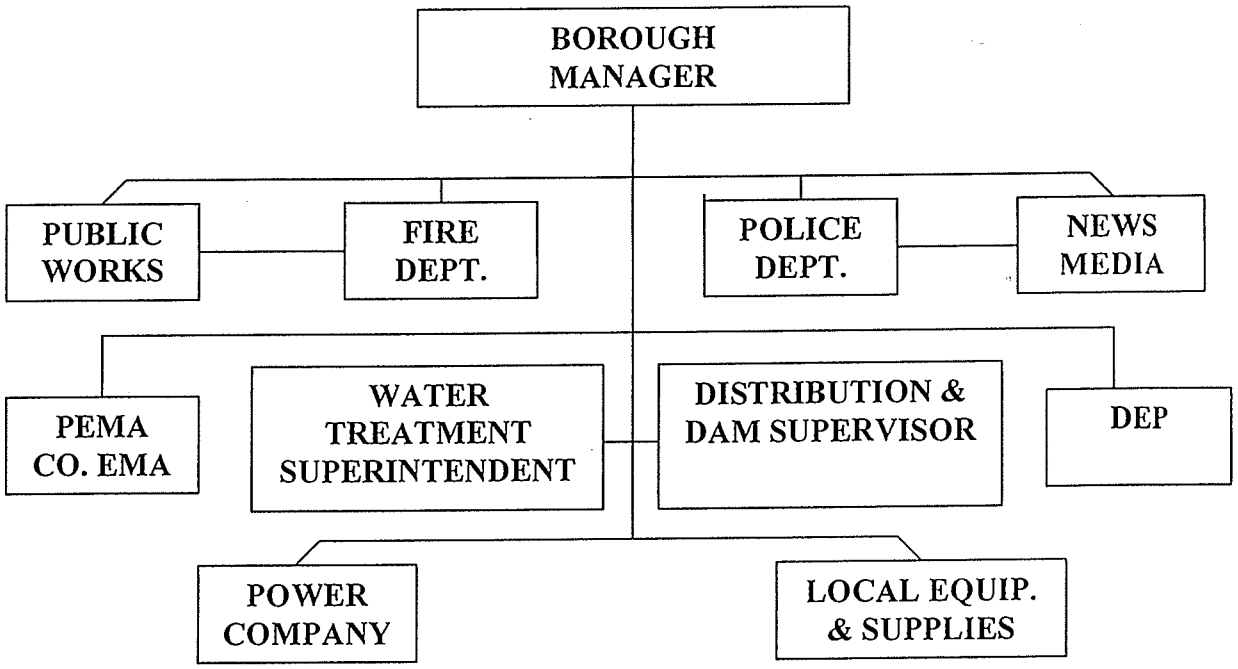
B. Emergency Organizational Structure

a. Personnel responsible for the public water system during any type of emergency. Note personnel listed in order of calling priority.

Michael O'Rourke	Borough Manager	717/637-3877 717/476-4478 (cell)
Timothy Mayers	Water Treatment Superintendent	717/359-4588 (home) 717/476-2709 (cell)

Dale Ault	Distribution & Dam Supervisor	717/632-7264 (home) 717/476-2712 (cell)
Terry Sterner	Water Treatment Supervisor	744-5052 (home) 476-2710 (cell)

b. Organizational Chart



C. Emergency Contacts:

a. Governmental Agencies:

DEP	Angela Anderson, Sheryl Martin	717/771-4481
DEP Emergency Response	Southcentral	877/333-1904 (24hrs)
DEP Emergency Response	Statewide	800/541-2050 (24hrs)
PEMA	Harrisburg Office	800/424-7362
York County EMA	Michael Fetrow	800/762-8218 (office)
		717/840-2990 (office)
		9-1-1 (after hours)

b. Public Relations:

Radio: WHVR-AM	Local Station	717/637-3831
Radio: WYCR-FM	Local Station	717/637-3831
TV: WGAL	Local Coverage Area	717/848-6132
Newspaper: Evening Sun	Local Paper	717/637-3736

c. Other Contacts:

Met-Ed	Electric Company	717/632-9104
Fire Department	Hanover Fire Dept.	717/637-6671
		9-1-1 (emergency)
Fire Department, Fire Chief	Jan Cromer	717/637-3877 (office)
		717/465-4268 (cell)
Police	Hanover Police Dept.	717/637-5575
		9-1-1 (emergency)
Public Works Dept. Director	A. J. Grimm	717/632-3939 (office)
		717/843-6892 (home)
		717/818-3680 (cell)
Pumps-DeLaval		609/890-5000
Pump Motors-Swam Electric		717/637-3821
Chlorinators-Capitol Controls		215/723-7234

D. Anticipated Emergencies:

The following list includes in the order of probable occurrences those emergency situations most likely to occur in the Hanover Borough Public Water System:

a. Distribution System Problems
b. Disinfection Failure
c. Power Outages
d. Pump Failure
e. Depletion of Impoundment Supply—Drought
f. Flooding of Filtration Plant-Pumping Station
g. Contamination of Supply

E. Background and Assessment of the Hanover Borough Water System

A large drawing of the Hanover Borough Water System is located in the engineering department showing the Distribution System Service Area, the Impounding Dams, and Filtration Plant & Pumping Stations.

a. Source of Supply:

1. Sheppard & Myers and Lawrence Baker Sheppard Dams:

The Sheppard Myers Watershed covers an area of five and one half square miles while the Lawrence Baker Sheppard Watershed covers five and ninety-two hundredths square miles. The combined acreage owned by the Borough is 2,525 acres and 124.622 perches. All but 391 acres, 115 perches, located in Manchester District, Carroll County, Maryland, are located in Pennsylvania. Approximately 2,355 acres of the watershed area has been reforested in pine to prevent soil erosion and subsequent siltation in the two impoundments.

2. Slagles Run Intake:

Natural drainage originates north and east of the site in Penn Township, York County and Berwick Township, Adams County from springs and their tributaries to form Slagle's Run. Stream flow, from which the intake to this raw water pumping station will be taken, is essentially derived from the discharge of ground water that is pumped from the Vulcan Material Co. operations immediately upstream from the intake, and the drainage from the Slagle's Run drainage area.

b. Storage Reserve:

1. Raw Water:

The total storage capacity of the two impounding dams is 1,732,200,000 gallons. Raw water collected in the Sheppard Myers and Lawrence Baker Sheppard Impoundments is released via sluice gates to match the water demand of the treatment plant when flow over the two spillways is not sufficient. Water thus released flows from both impoundments to a diversion dam known as Kitzmillers. Here water is diverted to a thirty-six inch gravity main, which carries the raw water to a 52,000,000-gallon holding basin known as Clear Lake. The flow to the Clear Lake is controlled by an electrically operated gate valve in the thirty-six inch main. The Clear Lake functions as a sedimentation basin and as a standby reserve which can be used during period of high stream turbidity. When period of high stream turbidity occur the thirty-six inch valve is closed and the degraded water is then bypassed over the Kitzmiller diversion dam, while the treatment plant draws its' supply for the Clear Lake.

2. Finished Water:

Finished water is stored in two covered reservoirs known as Parr's Hill on the Black Rock Road. This reservoir system has a total capacity of 13,020,000 gallons and floats on the distribution system. There is a booster pump station connected to the reservoirs, which serves the southeastern section of the distribution system, an area that would otherwise suffer low pressure.

Finished water is also stored in two elevated tanks, one 500,000-gallon tank on Terrace Avenue in the Borough and one 250,000-gallon tank on Oxford Road in McSherrystown Borough. Both of the tanks float on the distribution system.

c. Pumping Facilities:

Pumping of finished water to the distribution system is accomplished through the use of four electrically driven pumps at the Filtration Plant. Two pumps with a capacity of 2,916 gallons per minute are connected to an eighteen-inch main running to the center of the distribution system. A third pump with a capacity of 1,250 gallons per minute is connected to a twelve inch main running directly to the Parr's' Hill reservoirs, and the fourth pump with a capacity of 3,100 gallons per minute is connected to a 20" main.

d. Filters:

There are five single rapid sand filters and two double unit filters located at the Filter Plant. The total capacity of all filters is 12,500,000 gallons of water per day. Water fed to the filters is prechlorinated for removal of iron and manganese, coagulated with Aluminum Sulphate and settled. The filtered water is then disinfected with gaseous chlorine and the pH adjusted with caustic soda. Finally the water is fluoridated and sent to the pump intakes.

e. Water Analysis:

Analysis of raw and finished water for operational control is performed in the Treatment Plant Laboratory. Bacteriological testing is performed by an approved independent laboratory in conformance with DEP regulations. Analyses for radioactive and volatile organic contaminants are performed by an approved independent laboratory.

f. Mains:

There are approximately 205 miles of water main in the distribution system consisting of cast iron or ductile iron in sizes from four to twenty inches in diameter.

g. Service Connections:

There are now 16,969 service connections taken off the Distribution Mains.

F. Communications:

Telephone is the primary link to convey information. Should this be lost, cellular phones and two-way radios will be used.

G. Power Supply:

Electricity is obtained from Met-Ed. A transformer can be replaced in ten hours. An emergency back up generator is available at the Filter Plant that has the capacity to operate the plant for as long as needed or until normal power is back on line.

H. Assessment of Equipment Available:

a. Backup Communications:

Eighteen (16) two-way radios are located within the Water Department vehicles:

1. Ford Escape	P-12	7. Ford Utility	T-30	13. GMC Dump	T-5
2. Ford Utility	T-37	8. Chev Pickup	T-1	14. Chev Dump	T-31
3. Ford Pickup	T-6	9. Ford Pickup	T-9	15. Intl. Dump	T-23
4. GMC Van	T-4	10. Ford Pickup	T-44	16. Chev Van	P-7
5. Ford Pickup	T-44	11. Chev. Blazer	P-15	17. Ford Utility	T-11
6. Ford Utility	T-8	12. Chev Pickup	T-2	18. Mack Dump	T-21

b. Emergency Power Supply:

A Caterpillar Model 3512 1135 KW generator is on location at the Filter Plant and can operate the complete plant. An emergency generator is located at Parr's Hill Reservoir in the event of a power outage at that location.

c. Backhoe – Front End Loader:

There are four available within the Water Department:

1. Case 590	E-12
2. Case 590	E-85
3. Ford New Holland 555	E-26
4. Case 590	E-118

d. Dump Trucks:

There are four available within the Water Department:

1. 6 Ton GMC	T-5
2. 10 Ton Int.	T-23
3. 10 Ton Chev.	T-31
4. 20 Ton Mack	T-21

I. Emergency Measures:

a. Distribution System Problems:

Breaks are corrected as they occur. Breaks are usually reported by customers in the vicinity of the break or by the police department.

Immediate Response is:

1. Identify the specific location of the break.
2. Call in crew to repair.
3. Contact PA 1-call 1-800-242-1776
4. Determine the boundaries of the area that will need to be valved off for doing repairs.
5. Notify the customers that will be affected. (One Call System may be used)
6. Complete repairs and flush line.

b. Disinfection Failure:

The only treatment provided to the water is gaseous chlorination, when chlorination is inoperative, the filter plant, pumping station would be shut off until repairs can be made. Plant operator would notify the Filter Plant Supervisor, who in turn would notify DEP, and issue a boil water notice by way of the news, TV, radio media, and One Call System may be used.

c. Power Outage:

Power outages can be remedied within minutes due to portable generator on site at the Filter Plant which is designed to take over power supply automatically in the event of a power failure. Transformer replacement would take approximately 10 hours.

d. Pump Failure:

There are two identical eighteen-inch (18") high duty pumps and one twenty-inch (20") high duty pump. The fourth high duty pump is a twelve-inch (12"). Normal operation consists of operating a combination of two of the four pumps, leaving two on standby. When a pump fails it is repaired as soon as possible by our personnel who are very familiar with these pumps. We carry in stock most spare parts.

e. Depletion of Impoundment Supply:

The Hanover Borough raw water storage consists of two surface impoundments. The Sheppard Myers Dam, which holds 73MG, (DEP mandated level) and the Lawrence Baker Sheppard Dam, which holds 1.659 BG, both discharge to a common diversion. In the event of a prolonged drought the smaller Sheppard Myers Dam would be drawn down first and then the Lawrence Baker Dam would be used as the sole supply. The elevations of the water in this dam would be monitored which is a normal procedure and would be used as a trigger to commence certain events according to the months in which it occurs. (see attachments "Dam Storage Curves").

1. Stage I:

   Notify public that possibility of impending shortage is probable. Notify York County Office of Emergency Management of status. Implement Voluntary Conservation Measures – see attached copy of "Drought Contingency Plan". Advise DEP and Vulcan Materials Co. of status.

2. Stage II:

   Mandatory Conservation Measures placed in affect. Notify DEP of status. Request assistance from York County Emergency Management Office.

   NOTE: In 1964 The Borough of Hanover suffered a water shortage. A cooperative effort between the Borough, Bethlehem Mines Corporation (now Vulcan Materials Co.), York County Civil Defense (now EMA), The Pennsylvania State Council of Civil Defense (now PEMA), and The United States Defense Department led to the laying of a temporary pipeline from the Mines to the Filter Plant using loaned equipment. Contacting the York County Office of Emergency Management would trigger all needed contacts to other agencies. The Borough would provide all transport, set up and breakdown and return of materials used to provide the pipeline. The Borough Manager would be kept informed on all phases of this operation.

   Informal conversations with Vulcan Materials Co. indicates that the mines would favor cooperation with The Borough should the need occur.

   Contacts:

Michael O'Rourke	Borough Manager	717/637-3877
Joseph Hurtack	Vulcan Materials Co.	717/637-7121
Rodney Nesmith	PA DEP	717/771-4481
Michael Fetro	York County EMA	800/762-8218
		717/840-2990 (office)
		9-1-1 (after hours)

f. Flooding of Filtration Plant, Pumping Station:

   Past experiences of flooding in 1972 and 1975 have caused the borough to remove the abandoned railroad bed behind the plant, which acted as a dam flooding the plant to the point that we had to shut it down. With this correction, chance of flooding is considerably reduced. If the plant should flood, clean up would take approximately two days.

g. Contamination of Supply:

Both of our impoundments are so located that the possibility of contamination does exist both from highway accidents and farming accidents such as chemical spills. Notification of local authorities will immediately take place. Notification to DEP would be next. Depending where contamination takes place, steps will be taken to contain, if possible, for cleanup. If not possible to contain, and stream to plant is contaminated, stream would be shut off to plant, and water from Clear Lake would be used. When Clear Lake must be used to supply water to the plant, determine how long clean up will take and activate the "Water Conservation Contingency Plan".

J. Training:

Training is constantly ongoing. As problems occur, all involved learn from them. Copies of this plan will go to all departments of the Water System. As changes are made to this plan other plans will be updated. Department Supervisors will be responsible to make sure that the people in their departments are aware of what to do in an emergency.

K. Distribution Department Emergency Information:

a. Emergency Phone Numbers:

1. Equipment Suppliers:

L/B Water Service Chambersburg, PA	Main & Service Supplies Bill Everly Jr	264-8445 264-9466 (home)
HD Water Works Etters, PA	Main & Service Supplies Chad Smith	938-8693 577-1735
Ferguson Water Works New Cumberland, PA	Main & Service Supplies Sam	774-0584
Conewago Enterprises Hanover, PA	Main & Service Supplies	632-7722
PA 1 Call	Service Locates	1-800-242-1776

2. Distribution Personnel:

		Home	Cell
Frank Groft	Crew Leader	624-2166	624-9063
Jon Fowler	Crew Leader		465-9376
Sam Smith	Laborer		476-1814
Brandon Berkheimer	Laborer	521-7166	
Tim Bankert	Laborer		465-5818
Jermey Ritz	Laborer	(443)277-0158	
Zac Stiles	Laborer		578-4128
William Sherman	Meter Dept. Supervisor	259-0138	476-2715

b. Emergency Equipment:

Number	Description	Location
T-11	Ford Utility w/tools & pumps	Tool Shed
T-30	Ford Utility w/tools & pumps	Tool Shed
T-23	Int. Dump Truck (10 ton)	Pipe Yard
T-5	GMC Dump Truck (6 ton)	Pipe Yard
T-31	Chevrolet Dump Truck (10 ton)	Pipe Yard
T-6	Ford Pick Up (1/2 ton)	Tool Shed
E-12	Case Backhoe	Pipe Yard
E-26	Ford Backhoe	Pipe Yard
E-10	Air Compressor	Tool Shed
E-85	Case Backhoe	Pipe Yard
E-118	Case Backhoe	Pipe Yard
T-21	Mack Dump Truck (20 ton)	Pipe Yard

c. Emergency Repair Supply Mains & Services:

Size	Item	Location
4" thru 18"	Stainless Steel Repair Clamps	Tool Shed
¾" thru 2"	Handi-Bank Repair Clamps	Tool Shed
4" thru 12"	Bell Joint Clamps	Tool Shed
¾" thru 2"	Service Repair Materials	Tool Shed
4" thru 20"	M.J. Pipe Fittings	Pipe Yard
4' thru 20"	Ductile Iron Pipe	Pipe Yard

d. Additional Information:

1	Wall Map	Hanover Borough Office (Engineering Dept.)
1	Wall Map	Tool Shed
1	Map Note Book	Ford Pickup T-6
1	Map Note Book	Ford Escape P-12
1	Map Note Book	Tool Shed
1	Map Note Book	Ford Utility T-30
1	Map Note Book	Ford Utility T-11

L. Filtration Plant Emergency Information

a. Emergency Phone Numbers:

1. Equipment Suppliers:

MET-ED	Electric Power 24hr Emergency Service	800/545-7738
Motor Technology	Pump Motors 24 hr service	800/632/9060
Swam Electric	Emergency Contact Office Motors-Glenn Bange	717/637-3824 717/637-3821
ES2	Chlorination Equipment Peter Hutwelker	877/766-2372
PYRZ Water Supply Company Inc	Chlorination Equipment	215/256-8430
DeLaval	Pumps # 1, 2, 3 Hi-Duty	609/890-5888
ITT-AC	Pump # 4 Hi-Duty Bucks Environment Systems Corp.	215/794-8841
Fairbanks Morse	Slagle Run Pumps M & S Service Co., Inc.	610/933-5501
Cleveland Brothers Generator		800/538-1020

2. Filtration Plant Personnel:

		Home	Cell
Michael Harman	Crew Leader	632-3811	
Rickey Mummert	Maintenance	632-2457	
John Slagle	Operator	633-9749	
Doug Rummel	Operator	633-9690	
David Storm	Operator	630-0039	578-9158
Rich Brown	Operator	632-8680	
Tim Myers	Operator		965-4091

M. Filter Plant Major Equipment

a. Number 1 and 2 High Duty Pumps (18")
Name: # 1 Louis Allis Motor – Type COGX # 2 Baldor Motor Type P
DeLaval Pumps

b. Number 3 High Duty Pump (12")
Name: Louis Allis Motor – Design B Type COGX
DeLaval Pump

c. Number 4 High Duty Pump (20")
Name: Baldor Motor Type P
ITT A-C Pump

d. Number 1 and 2 Low Duty Pumps (New Plant)
Name: # 1 NIDEC Motor Type FR # 2 U.S. Electric Motor – Design B Type R
Peerless Pump

e. Number 3 Low Duty Pump (New Plant)
Name: Reliance Electric – Design B Type F
Peerless Pump

f. 3 – Low Duty Pumps (Old Plant)
Name: US Electric – Design B Type HU
Peerless Pump

g. Wash Tank Pump
Name: US Electric – Design B Type RU
Peerless

h. Generator
Name: Cleveland Brothers
MANU - Caterpillar Diesel KVA 1418 KW 1135

N. Slagle Run Equipment

a. 2 pumps US Electric – Design B Type RUE
Name: Fairbanks Morse Pump Corp.

b. 1 pump US Motor Emerson AC Vertical Motor
Name: Fairbanks Morse Pump Group

O. Drought Contingency Plan

The Borough of Hanover's (Hanover Municipal Water Department) drought contingency plan is found in Borough Ordinance Number 1907. This is an ordinance establishing guidelines for the

imposition of mandatory water use restrictions; defining certain terms; defining water use restrictions; providing for enforcement of water use restrictions; and imposing penalties.

P. The Borough of Hanover Ordinance Number 1907

SECTION I – GENERAL PROVISIONS

1.1 Purpose and Policy:

A. This ordinance sets forth uniform guidelines for imposing mandatory restrictions on water use within the service area of the Hanover Borough Water Department for uniform enforcement of said restrictions through out the service area.

B. The objectives of this ordinance are:

(1) To prevent depletion of the raw water supply during dry weather periods through the use of mandatory, enforceable water use restrictions.

(2) To provide guidelines to be used as criteria for imposing mandatory water use restrictions.

(3) To provide for enforcement of mandatory water use restrictions.

(4) To provide penalties for violations of mandatory water use restrictions.

SECTION II – SCOPE

A. The following words, terms and phrases when used in this ordinance have the meaning ascribed to them in this section except where the context clearly indicates a different meaning. Words, terms and phrases are as follows:

BOROUGH: The Borough of Hanover, York County, Pennsylvania

MUNICIPALITY: Any county, county authority, municipal authority, city, borough, township or school district.

OWNER: Any person vested with ownership, legal or equitable, sole or partial, of an improved property.

PERSON: Any individual, partnership, corporation, firm, company, association, joint stock company, trust, estate, governmental entity or any other legal entity or their legal representatives, agents or assigns. The masculine gender shall include the feminine, the singular shall include the plural where indicated by context.

STATE: The Commonwealth of Pennsylvania

USER: Any person who withdraws potable water from the water distribution system owned and operated by the Hanover Borough Water Department.

SERVICE AREA: The combined geographical area of all municipalities in which there are customers receiving water supplied by the Hanover Borough Water Department.

RAW WATER CAPACITY: The total combined gallonage of untreated water stored in the Sheppard Myers and Lawrence Baker Sheppard Reservoirs and wells and water from Slagle Run, Conewago Township and any additional sources, which may be added from time to time.
RAINFALL DEFICIT: The negative difference between the total amount of rainfall received to date in any calendar year and the amount of rainfall normally received by the same date in the same calendar year as measured at the Hanover Borough Water Filtration Plant in inches.

MANDATORY WATER RESTRICTION: Any use of water from the Hanover Water Department Distribution System, which is prohibited under the authority of this ordinance.

RAW WATER CAPACITY TREND: The projected graphic presentation of the total stored raw water capacity gallonage change based on weekly total capacity readings.

NONESSENTIAL WATER USE: Any use of water which when curtailed does not affect the health or safety of the general public.

IMPROVED PROPERTY: Any property with a water service hookup.

B. The word "shall is mandatory, and the word "may" is permissive.

SECTION III – IMPLEMENTATION:

A. If the Borough of Hanover Water Department experiences an impending raw water supply shortage condition, the Borough may request general conservation of water uses and may impose mandatory water use restrictions as deemed necessary to reduce or eliminate non-essential uses of water. Water conservation measures and or mandatory water use restrictions shall continue in effect until terminated by the Borough Council.

B. Basis of decision to impose restrictions.

(1) The decision to impose mandatory water use restrictions shall be based on the existence of two of the following conditions:

(a) The rainfall deficit in the current calendar year is equal to or greater than six (6) inches; or

(b) The amount of rainfall received for two (2) consecutive months is equal to or less than one-half (1/2) the amount normally received.

(c) The total stored raw water capacity gallonage is equal to or less than sixty five percent (65%) of the maximum storage capacity.

(d) The projected raw water capacity trend line indicates that emergency Stage III will be reached within a time period of four (4) calendar months.

(2) The existence of Subsection B(1)(a) or (b) in conjunction with Subsection B(1)(c) or (d) may constitute adequate reason to impose mandatory water use restrictions.

SECTION IV – REGULATIONS:

A. The Hanover Borough Council shall be authorized to declare an imminent shortage situation and impose mandatory water use restrictions in the service area.

B. The following water uses are declared nonessential, and any one (1) or more of such nonessential uses may be prohibited within the service area:

(1) The use of hoses, sprinklers, or other means for sprinkling or watering of shrubbery, trees, lawns, grass, plants, vines, gardens, vegetables, flowers or any other vegetation.

(2) The use of water for watering golf courses: fairways in the initial phase; tees and greens when Council deems necessary.

(3) The use of water for washing automobiles, trucks, trailers, trailer houses, or any other type of mobile equipment.

(4) The washing of streets, driveways, parking lots, service station aprons, office buildings, exteriors of homes, sidewalks, apartments, or other outdoor surfaces.

(5) The operation of any ornamental fountain or other structures making a similar use of water.

(6) The use of water for filling swimming or wading pools.

(7) The operation of any water-cooled comfort air-conditioning, which does not have water-conserving equipment; air-cooled/water cooled ice machines.

(8) The use of water from fire hydrants for construction purposes, fire department drills, or testing fire apparatus, except as deemed necessary and approved in the interest of public health or safety by the municipal health officials.

(9) The use of water to flush sewer lines or sewer manholes.

(10) The use of water for commercial farms or nurseries other than a bare minimum to preserve plants, crops or livestock.

(11) The serving of water in restaurants, clubs or eating establishments unless specifically requested by the individual customer.

SECTION V – ENFORCEMENT:

A. All Hanover Borough Water Department employees and all Hanover Borough Officials shall be charged with distributing information to the general public and reporting observed violations. The Hanover Borough Police Department shall be charged with enforcement of mandatory water use restrictions in effect within the Hanover Borough corporate limits.

B. All non-law-enforcement personnel shall report any observed violation of any mandatory water use restriction to the Hanover Borough Police Department. An officer of the Police Department shall be responsible for issuance of any applicable citations to the violator.

SECTION VI – PENALTIES:

A. First time violators shall be issued a warning citation by the applicable law enforcement agency.

B. A second violation shall be punished according to the Violation and Penalty Ordinance, Chapter 46 of the Hanover Borough Code.

C. A third violation shall result in termination of water service for a period not to exceed forty-eight (48) hours.

SECTION VII – APPEAL:

A. Any user within the service area who feels that the mandatory water use restrictions in effect impose an undue hardship upon their person or business may appeal to the Hanover Borough Manager for relief. Such appeal shall be in writing and shall clearly state all pertinent facts concerning the perceived hardship.

B. The Borough of Hanover shall render a decision in writing within forty-five (45) days of receipt of any such appeal. The Council Committee may grant exceptions to the mandatory water use restrictions on a case-by-case basis; however, the Borough's decision shall be in the best interest of all users of the water process system and shall be final.

SECTION VIII – SEVERABILITY:

In the event any provisions, section, sentence, clause or parts of this ordinance shall be held to be invalid, illegal, or unconstitutional, such invalidity, illegality or unconstitutionality shall not affect or impair any remaining provision, section, sentence, clause or part of this Ordinance, it being the intent of the borough that such remainder shall remain in full force.

SECTION IX – HEADINGS:

The headings in this Ordinance are solely for convenience and shall not affect in the legal interpretation of any provision hereof.

SECTION X – EFFECTIVE DATE:

This ordinance shall become effective the 17th day of June 1992. The Borough reserves the right to make changes from time to time as, in its opinion, may be desirable or beneficial and to amend this Ordinance in such manner and at such times, as in its opinion, may be desirable.

Q. Priorities and Procedures

The following priorities and procedures shall be established in the event that water conservation measures are necessary:

A. Voluntary Conservation Measures shall be imposed if any of the following conditions exist:

(1) A short-term emergency due to water system break down or water shortage.

(2) Raw water supplies fall to Stage I warning level.

(3) A state declared drought warning.

B. Mandatory Conservation Measures shall be imposed if any of the following conditions exist:

(1) Voluntary measures imposed under (a), (1) are not effective.

(2) A State declared water emergency due to drought.

(3) Raw water supplies fall to Stage II warning level.

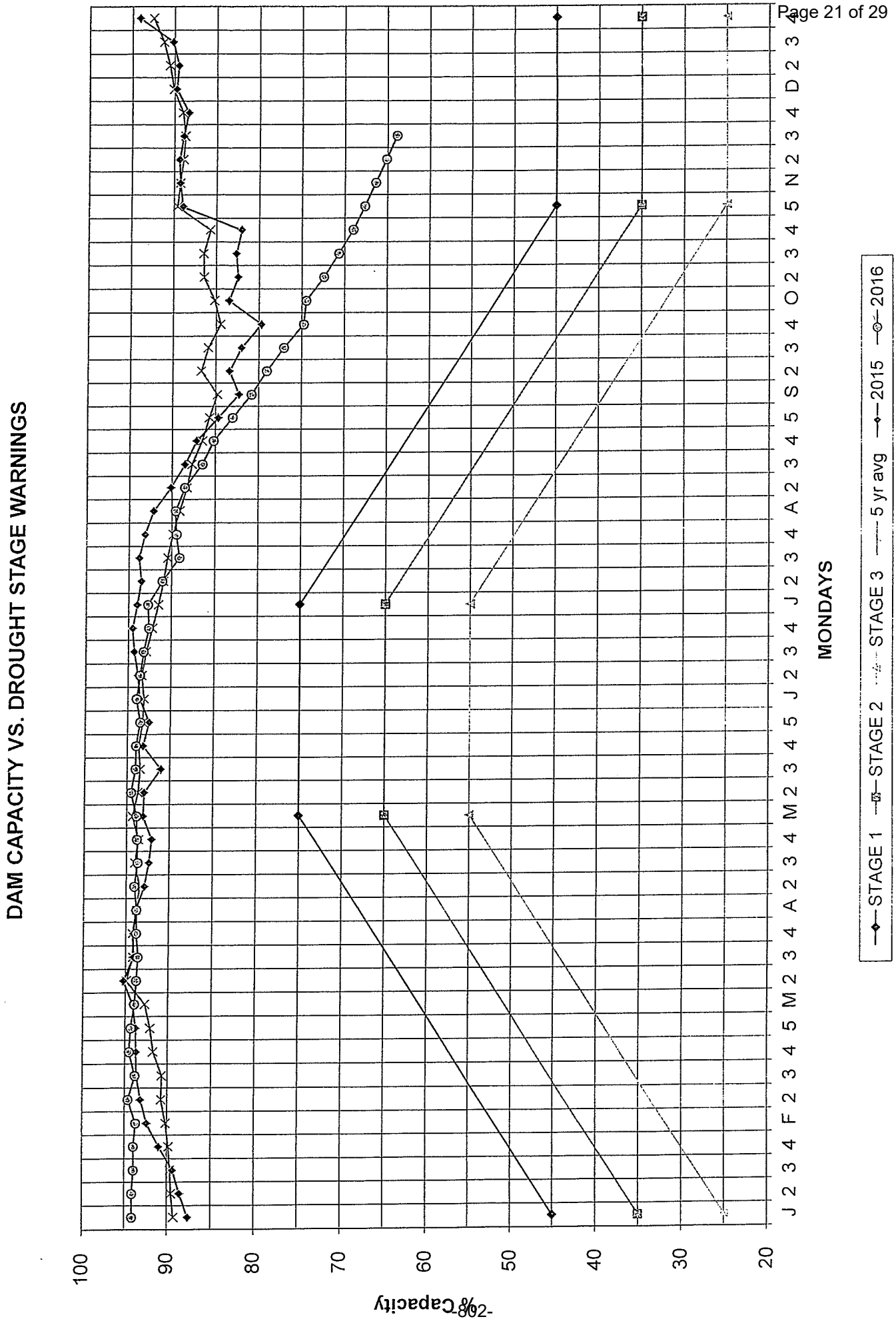
C. Water rationing (see attached plan) shall be imposed with approval of the Emergency Management Council under the following conditions:

(1) Raw water supplies fall to Stage III warning level.

(2) Mandatory measures imposed under (b), (1) are not effective.

(3) A State declared water emergency due to drought.

ATTACHMENTS


DAM CAPACITY VS. DROUGHT STAGE WARNINGS
% Capacity
100
90
80
70
60
50
40
30
20
J 2 3 4 F 2 3 4 5 M 2 3 4 A 2 3 4 M 2 3 4 5 J 2 3 4 J 2 3 4 A 2 3 4 5 S 2 3 4 O 2 3 4 5 N 2 3 4 D 2 3 4
MONDAYS
STAGE 1
STAGE 2
STAGE 3
5 yr avg
2015
2016

LOCAL WATER RATIONING PLAN
FOR THE SERVICE AREA OF
THE BOROUGH OF HANOVER/HANOVER MUNICIPAL WATER WORKS

The Commonwealth Drought Coordinator is authorized to approve a Water Rationing Plan by the provisions of 4 Pa. Code Chapter 120 issued under the Emergency Management Services Code 35 Pa. C.S. §7101 et seq.

SECTION 1. DEFINITIONS

(a) Commonwealth Drought Coordinator - An officer of the Department of Environmental Protection appointed by the Secretary to carry out the responsibilities established in the Pennsylvania Drought Contingency Plan to coordinate Commonwealth planning, preparedness and response action to a drought or water shortage emergency.

(b) Emergency Service Area - The service areas of the water supply purveyors covered by this Local Water Rationing Plan, as set forth in Section 3, Scope.

(c) Excess Use - The usage of water by a water customer in excess of the water allotment provided under the Local Water Rationing Plan for that customer, over any applicable period.

(d) Non-Residential Customer - Commercial, industrial, institutional, public and all other users with the exception of hospitals and health care facilities.

(e) Person - An individual, partnership, association, company, corporation, municipality, municipal authority, political subdivision, or an agency of Federal or State government. The term includes the officers, employees and agents of a partnership, association, company, corporation, municipality, municipal authority, political subdivision, or an agency of Federal or State government.

(f) Plan-local water rationing plan - A drought response plan for the equitable allocation of limited water supplies, submitted by a public water supply agency or the governing body of a political subdivision and approved by the Commonwealth Drought Coordinator.

(g) Political subdivision - A county, city, borough, incorporated town or township.

(h) Public Water Supply Agency, Purveyor, Water Purveyor, Water Supply Purveyor – A "community water system" as that term is defined in section 3 of the Pennsylvania Safe Drinking Water Act (35 P.S. §721.3). The owner or operator of any public water supply system including, but not limited to, any public utility, municipality, municipal authority, association or other organization which supplies water to the public; and the officers, employees and agents of any such purveyor.

(i) Residential Water Customer - Any customer who receives water service for a single or multi-family dwelling unit. The term does not include educational or other institutions, hotels, motels, or similar commercial establishments.

(j) Service Area - The geographic area serviced by an individual water supply purveyor.

(k) Service Interruption - The temporary suspension of water supply, or reduction of pressures below that required for adequate supply, to any customer, portion of a water supply system, or an entire system.

(l) Special Emergency Area - The area or areas within which the Governor has declared a state of drought and water shortage emergency.

(m) Water Allotment - The maximum quantity of water allowed for each customer over any applicable period as established pursuant to Sections 8-10 of this Plan.

(n) Water Customer - Any person who is connected to and receives water service from a water supply system.

(o) Water Company – The Borough of Hanover/Hanover Municipal Water Works

SECTION 2. PURPOSE

This Local Water Rationing Plan is intended to establish measures for essential conservation of water resources, and to provide for equitable distribution of limited water supplies, in order to balance demand and limited available supplies and to assure that sufficient water is available to preserve public health and safety within the Emergency Service Area.

SECTION 3. SCOPE

This Local Water Rationing Plan shall apply to all water uses within the service area of **The Borough of Hanover/Hanover Municipal Water Works** encompassing all or part of the following municipalities:

1, The Borough of Hanover

2, The Borough of McSherrystown

3, Penn Township

4, Conewago Township

SECTION 4. OBJECTIVE OF THE PLAN

(a) It is imperative that water customers within the Emergency Service Area achieve an immediate and further reduction in the water use in order to extend existing water supplies and, at the same time, assure that sufficient water is available to preserve the public health and sanitation, and provide fire protection service.

(b) The objective of this Local Water Rationing Plan is to effect an immediate **25** percent reduction in water usage. Should drought conditions continue, further reductions in usage may be required. If it is necessary to implement further reductions, this Plan will be modified as noted in Section 16. It is the Water Company's responsibility to continually monitor the water supply available to the water system to determine if amendments are required.

(c) The Plan provides for equitable reductions in water usage on the part of each water customer. The success of this Plan depends on the cooperation of all water customers in the emergency service area.

SECTION 5. MEASURES TO IMPLEMENT THE PLAN

Each municipality within the Emergency Service Area will develop and adopt such implementing and enforcement measures as are necessary and appropriate to assure compliance with requirements of this Local Water Rationing Plan.

SECTION 6. PROHIBITED NON-ESSENTIAL WATER USES

(a) The following water uses are declared non-essential and are prohibited within the Emergency Service Area:

(1) The use of hoses, sprinklers, or other means for sprinkling or watering of shrubbery, trees, lawns, grass, plants, vines, gardens, vegetables, flowers or any other vegetation.

(2) The use of water for watering golf courses: fairways in the initial phase; tees and greens when Council deems necessary.

(3) The use of water for washing automobiles, trucks, trailers, trailer houses, or any other type of mobile equipment at a residential property.

(4) The washing of streets, driveways, parking lots, service station aprons, office buildings, exteriors of homes, sidewalks, apartments, or other outdoor surfaces.

(5) The operation of any ornamental fountain or other structures making a similar use of water.

(6) The use of water for filling swimming or wading pools.

(7) The operation of any water-cooled comfort air-conditioning, which does not have water-conserving equipment; air-cooled/water cooled ice machines.

(8) The use of water from fire hydrants for construction purposes, fire department drills, or testing fire apparatus, except as deemed necessary and approved in the interest of public health or safety by the municipal health officials.

(9) The use of water to flush sewer lines or sewer manholes.

(10) The use of water for commercial farms or nurseries other than a bare minimum to preserve plants, crops or livestock.

(11) The serving of water in restaurants, clubs or eating establishments unless specifically requested by the individual customer.

(b) Exemptions or Variance from Non-Essential Uses of Water Restrictions.

(1) If compliance with the non-essential use of water restrictions would result in extraordinary hardship upon a water user, the water user may apply for an exemption or variance. For purposes of this section, extraordinary hardship means a permanent damage to property or other personal or economic loss which is substantially more severe than the sacrifices borne by other water users subject to the nonessential use of water restrictions.

(2) A person or business entity believing he suffers an extraordinary hardship and desiring to be wholly or partially exempt from the restrictions on the non-essential use of water shall submit a written request with full documentation supporting the need for the requested relief to the Water Company at the following address:

The Borough of Hanover
Hanover Municipal Water Works
44 Frederick Street
Hanover, Pa. 17331

(3) The application from the water user shall contain information specifying:

(i) The nature of the hardship claimed and reason for the requested exemption or variance.

(ii) The efforts taken by the applicant to conserve water and extent to which water use may be reduced by the applicant without extraordinary hardship.

(4) The Water Company shall advise the applicant of its decision regarding the application. An exemption or variance will be granted only to the extent necessary to relieve extraordinary hardship.

(5) Any person aggrieved by a decision relating to such an exemption or variance rendered by the Water Company rendering water service beyond its corporate limits may file a complaint with the Public Utility Commission in accordance with the procedures established under the Public Utility Code.

(6) Any person aggrieved by a decision relating to such an exemption or variance rendered by the Water Company not under the jurisdiction of the Public Utility Commission may file an appeal with the Commonwealth Drought Coordinator who shall render a final decision.

SECTION 7. GENERAL REQUIREMENT FOR WATER USE REDUCTIONS

Each and every water customer, regardless of whether residential, commercial, industrial, municipal, institutional or other type of user, shall achieve the water use reductions set forth in this Local Water Rationing Plan. In order to achieve the overall objectives of the Plan, the water use restrictions and limitations set forth in Sections 8-10 shall apply.

SECTION 8. WATER USE RESTRICTIONS FOR RESIDENTIAL USERS

(a) Metered Residential Water Customers and Allotments:

(1) The number of permanent residents in each dwelling unit (household) will determine the amount of water that each household will be allowed.

(2) Each dwelling unit (household) shall be allotted **40** gallons per day for each resident of the household. Households with only one permanent resident will have a daily allotment of **55** gallons per day.

(3) Residential water customers are required to provide Water Company personnel with reasonable access to read meters as necessary to implement this rationing plan. Where access is not readily available, the Water Company shall make all reasonable efforts to contact customers in order to arrange for access to read meters. In the event a water customer does not allow Water Company personnel entry to read the meter, after the Water Company has made reasonable efforts to arrange for such access, the dwelling unit (household) allotment will be reduced to **55** gallons per day.

(b) Variances and Exceptions

(1) Where the residential water allotment provided under this section would create extraordinary hardship, as in the case of special health related requirements, the water customer may apply to the Water Company for an exemption or variance from these requirements. If the Water Company finds that the allotment provided in this section would impose extraordinary hardship, the Water Company may establish a revised allotment for the particular customer. For these purposes, an "extraordinary hardship" means a permanent damage to property or economic loss which is substantially more severe than the sacrifices borne by other water users subject to this Local Water Rationing Plan.

(2) Any person aggrieved by a decision relating to such an exemption or variance rendered by the Water Company rendering water service beyond its corporate limits may file a complaint with the Public Utility Commission in accordance with the procedures established under the Public Utility Code.

(3) Any person aggrieved by a decision relating to such an exemption or variance rendered by the Water Company not under the jurisdiction of the Public Utility Commission may file an appeal with the Commonwealth Drought Coordinator who shall render a final decision.

SECTION 9. WATER USE RESTRICTIONS FOR NON-RESIDENTIAL WATER CUSTOMERS

(a) Non-residential customers include commercial, industrial, institutional, public, and all other users, with the exception of hospitals and health care facilities.

(b) Non-residential water customers shall reduce their water usage by a minimum of 25 percent of use levels for the same month of the preceding year.

(c) It is the primary responsibility of each non-residential water customer to meet its mandated water use reduction goal in whatever manner possible.

(d) The Water Company will establish a water allotment for each non-residential water customer, based upon a required **25** percent reduction of water usage from the rate of water used by the customer in the same month of the preceding year, or the last recorded use level if no meter readings record the rate of the customer's use in the same month of the preceding year.

(e) Administratively, for the purpose of calculating rationing levels for non-residential water customers, credit shall be given for water conservation efforts made prior to the effective date of water rationing. Efforts made prior shall mean the period up to and including the three (3) year period prior to the enforcement of water rationing.

(f) Each non-residential water user shall provide access to Water Company personnel for purposes of meter reading and monitoring of compliance with this Plan. The Water Company shall make all reasonable efforts to contact customers to arrange for access.

(g) (i) If the mandated 25 percent reduction in water usage cannot be obtained without imposing extraordinary hardship threatening health and safety, the non-residential customer may apply to the Water Company for a variance. For these purposes, "extraordinary hardship" means a permanent damage to property or economic loss which is substantially more severe than the sacrifices borne by other water users subject to this Local Water Rationing Plan. If the Water Company finds that the 25 percent reduction would cause extraordinary hardship or threaten health or safety, the Water Company may grant a variance and establish a revised water use reduction requirement for the particular customer.

(ii) Any person aggrieved by a decision relating to such a variance rendered by the Water Company rendering water service beyond its corporate limits may file a complaint with the Public Utility Commission in accordance with the procedures established in the Public Utility Code.

(iii) Any person aggrieved by a decision relating to such a variance rendered by the Water Company not subject to the jurisdiction of the Public Utility Commission may appeal the decision to the Commonwealth Drought Coordinator who shall render a final decision.

SECTION 10. WATER USE RESTRICTIONS FOR HOSPITALS AND HEALTH CARE FACILITIES

(a) Hospitals and health care facilities shall comply with all restrictions imposed on residential and non-residential water customers as may be applicable to each individual institution, to the extent compliance will not endanger the health of the patients or residents of the institution.

(b) Each hospital and health care facility shall survey its water usage patterns and requirements and implement such additional conservation measures as may be possible without endangering the health of patients or residents to achieve a 25 percent reduction in the institution's water usage.

SECTION 11. ENFORCEMENT OF THE PLAN

(a) The Water Company will have lead responsibility for monitoring of compliance with this Local Water Rationing Plan.

(b) The Water Company is authorized to alter meter reading schedules to assure adequate monitoring of compliance with this plan.

(c) The Water Company shall institute procedures to closely monitor supplies and current usage to determine if reductions are being attained consistent with the target figures established in the plan. The Water Company shall establish a mechanism to advise the water users of the effects of rationing.

(d) Proper law enforcement authorities and private citizens have additional enforcement responsibilities and rights as specified in Section 14 of this Local Water Rationing Plan.

SECTION 12. SERVICE INTERRUPTIONS

(a) The Water Company may implement temporary service interruptions if this action is necessary to achieve water use reductions to prevent the water supply system from depleting its on hand water supply to the point that vital service demands including, but not limited to, public health and safety, firefighting, and use of health care facilities cannot be met.

(b) The following provisions shall govern the implementation of temporary service interruptions:

(1) In order to effectuate compliance with this Plan, the Water Company is hereby authorized and required to plan and implement temporary service interruptions to all or part of its water supply system, as the Water Company may deem appropriate, when any and/or all of the following conditions are determined by the Water Company to exist, as to its water supply system:

(i) A 25 percent reduction in systemwide water usage has not been achieved, and/or

(ii) The 25 percent reduction in systemwide water usage has been achieved, but has failed to have a significant impact in extending limited water supplies, and/or

(iii) Temporary service interruptions are necessary in order to further extend limited and/or dwindling water supplies.

(2) In the event that the Water Company determines that temporary service interruptions are necessary, the Water Company shall notify its customers through the public media (newspapers, radio, telephone, and television) serving the customers of the Water Company in its service territory, at least one day prior to the temporary service interruptions, that a planned, temporary service interruption is to be imposed.

In addition, the Water Company shall notify the Commonwealth Drought Coordinator, the local coordinator of emergency management, local public health authorities, the Pennsylvania Emergency Management Agency, the Regional office of the Department of Environmental Protection, and the Pennsylvania Public Utility Commission.

Such notice shall:

(i) State the day or days when the planned, temporary service interruptions will occur;

(ii) State the time(s) when such planned, temporary service interruptions will commence, and the time(s) such interruptions will cease;

(iii) State whether the planned, temporary service interruptions are to be imposed on the entire system, or a part thereof, and, if only part(s) of the system will experience planned, temporary service interruptions, identify the geographical boundaries within which the planned, temporary service interruptions will occur; and

(iv) Advise all customers within the areas affected by planned, temporary service interruptions how to treat any water received from the system, for human consumption, during the period(s) of planned, temporary service interruptions and for such additional time as may be necessary until full pressure is restored to the system.

(3) If the Water Company imposes planned, temporary service interruptions as authorized and required by this Plan, it must provide for the continued delivery of water to health care facilities within the area(s) affected by such interruptions, by means of any adequate, alternative delivery measures that may be necessary.

(4) If the Water Company implements planned, temporary service interruptions, it must make provision, by any means possible, for the continued delivery of such water, as may be necessary, for the proper operation of sewage collection, treatment and disposal systems and facilities.

SECTION 13. EXCESS USE CHARGES

Any residential or non-residential water customer who exceeds the allotments established pursuant to this Local Water Rationing Plan will be subject to the following excess-use charge provisions:

(a) The Water Company is directed to collect an "excess-use charge" based on the amount by which a customer's use exceeds the water allotments established pursuant to the Local Water Rationing Plan, computed in accordance with the following schedule:

Excess Usage Per Month	Charge for Excess
First 2,000 gallons or portion thereof	**5** Times the actual rate charged for water
Each 1,000 gallons or portion thereof thereafter	**10** Times the actual rate charged for water

(1) Excess use charges will only be assessed against metered customers and shall be based upon actual meter readings.

(2) Excess use charges may be changed by the Water Company if needed to effect necessary reductions in water use, provided that the charges do not exceed the actual rate charged multiplied by 5 times for the first 2,000 gallons and 10 times for each 1,000 gallons thereafter. The Commonwealth Drought Coordinator need not approve such changes to an already approved Local Water Rationing Plan prior to implementation; however, 3 copies of the revised Plan must be submitted immediately to the Commonwealth Drought Coordinator.

(b) Any monies collected by the Water Company through excess use charges shall not be accounted for as income to the Water Company, but shall be placed by the Water Company in a reserve account. The disposition of funds placed in the reserve account shall be governed as follows:

(1) Funds collected by the Water Company for rendering services beyond its corporate limits shall be disposed of as directed by orders and procedures adopted by the Public Utility Commission.

(2) Funds collected by the Water Company for rendering services within its corporate limits shall be used to offset drought-related costs or expenses as directed by the Commonwealth Drought Coordinator.

(c) In addition to the excess use charge, non-compliance with the Local Water Rationing Plan will result in the following:

(1) For the first excess use, a warning of possible discontinuation shall be issued to the customer by the Water Company.

(2) For the second or subsequent excess use, the Water Company may interrupt or shut off service to the customer for a period not to exceed 48 hours, or, if the customer provides access, the Water Company may install a flow restrictor in the customer's service line for the duration of the emergency. The cost incurred by the Water Company to interrupt or shut off and reinstate service, or to install and remove a flow restrictor, shall be assessed to the water customer by the Water Company.

(3) Penalties as provided for in Section 14 of this plan.

(d) Any customer or other person aggrieved by a decision or action by the Water Company imposing an excess use charge or other remedy for non-compliance with the requirements of this Plan may proceed in accordance with the following provisions:

(1) The Water Company shall adopt procedures which provide an opportunity for the customer or aggrieved party to rebut the finding of a violation, or evidence of circumstances beyond the customer's control which resulted in the violation. The Water Company shall keep a record of evidence presented regarding disputed violations, and shall provide the customer or aggrieved party with a written notice of the Water Company's final decision and action in such cases.

(2) Any person aggrieved by the final decision or action of the Water Company rendering water service beyond its corporate limits may file a complaint with the Public Utility Commission in accordance with the procedures established under the Public Utility Code, 66 PA C.S. §101 et seq.

(3) Any person aggrieved by the final decision or action of the Water Company not subject to the Public Utility Commission may file an appeal with the Common Pleas Court in the county where the water service is provided, in accordance with the provisions and procedures of the Local Agency Law, 2 Pa. C.S. §§551- 555, 751-754.

SECTION 14. PENALTIES

Any person who violates the provisions of this Plan, who fails to carry out duties and responsibilities imposed by this Plan, or who impedes or interferes with any action undertaken or ordered pursuant to this Plan, shall be subject to the penalties provided by law under 35 Pa. C.S. §7707. Violation of any provision of this Chapter is a summary offense enforceable by law enforcement officers or private citizens in accordance with 234 Pa. Code Chapter 50 (relating to summary cases).

SECTION 15. SAVINGS CLAUSE

Nothing in this Local Water Rationing Plan shall in any way limit or affect the power or authority of any political subdivision to adopt and enforce ordinances, rules, restrictions and orders for water conservation and protection of essential water supplies, provided that such ordinances, rules, restrictions and orders do not conflict with 4 Pa. Code Chapters 118, 119, and 120 (relating to reductions of major water use in a Commonwealth drought emergency area; prohibition of nonessential water uses in a Commonwealth drought emergency area; and local water rationing plans), river basin commission orders or plans, and the requirements of this Plan.

SECTION 16. AMENDMENT OF THE PLAN

The Water Company may, at any time, submit proposed additions to or amendments of this Plan to the Commonwealth Drought Coordinator.

SECTION 17. EFFECTIVE PERIOD

This Plan shall remain in effect until terminated by action of the Commonwealth Drought Coordinator.

SECTION 18. EFFECTIVE DATE

This Plan shall take effect immediately upon approval by the Commonwealth Drought Coordinator.

Exhibit D IX-7

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO QUALITY OF SERVICE
FILING REQUIREMENTS

7. Provide a discussion of the company's policy regarding meter requirements, replacements and testing. State if the company's procedures are in compliance with 52 Pa. Code, § 65.8(b).
   a. Provide meter test records as required in 52 Pa. Code, § 65.8(c) for the 50 meters most recently removed from service.
   b. Provide a discussion of the company's policy and history of compliance with 52 Pa. Code, § 65.9 regarding adjustment of bills for meter error within the last year.

RESPONSE

The Borough complies with all guidelines for testing and replacement of meters set forth by the PUC through electronic metering inventory maintained within our KVS Enterprise Resource Planning ("ERP") system.

a. See 'Exhibit D IX-7 Attachment A' for meter testing records for the 50 meters most recently removed from service.

b. In the event of a customer concern relating to a meter reading or request for a meter test, the Counter Clerk/Billing Clerk will generate an electronic work order ("WO") in our KVS ERP system and it is provided to the Meter Department to pull the meter for testing. In compliance with PUC guidelines, a deposit is taken if the meter has been in service less than the requirements established in 52 Pa. Code, § 65.8(b). All tests are performed by Meter Department staff on an annually certified Ford Water Meter Tank Apparatus test bench (see 'Exhibit D IX-7 Attachment B' for the current tank certification) and documented on a Meter Removal and Repair Chart ("MRRC"), and results communicated to the customer by either Meter Department or Billing Clerk. In event of a meter test outside of the allowable error ranges established in Pa. Code, § 65.8(a), refund would be provided or billing would be made to the customer in accordance with Pa. Code, § 65.9.

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-1-21

Change ✓ Removal Only..... Set Only.....

Account No 510-053630-0 Folio..... Boro..... Twp. .....

Name .....

Address 215 PHILADELPHIA ST

Meter Removed

Size 1" Make SENSUS Type ECR Serial No. 44345674 ID: 09894170

Why Removed? TEST Reading 2671 Date 2-1-21

Meter Set

Size 1" Make SENSUS Type ECR Serial No. 89361152 ID: 89361152

Reading 0 Date 2-1-21

Signed JF

Remarks: .....

100.6 100.4

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-2-21

Change ✓ Removal Only..... Set Only.....

Account No. 550-781552-0 Folio..... Boro..... Twp. .....

Name .....

Address North St Apt # 17 4421001448

Meter Removed

Size 5/8 Make KENT Type ABB Serial No. 11368886

Why Removed? TEST Reading 526 Date 2-2-21

Meter Set

Size 5/8 Make SENSUS Type ECR Serial No. 89614908

Reading 0 Date 2-2-21 / 89614908

Signed .....

Remarks: 1002 101

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-2-21

Change ✓ Removal Only ..... Set Only .....

Account No. 764550-0 Folio ..... Boro ..... Twp. .....

Name .....

Address 322 Fairview Ave 4422001600

Meter Removed

Size 5/8 Make Kent Type ABB Serial No. 11368881

Why Removed? Test Reading 493 Date 2-2-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 89614847

Reading 0 Date 2-2-21 89614847

Signed Ufuss

Remarks: 100.6 97.1#

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-2-21

Change ✓ Removal Only..... Set Only.....

Account No. 510-035030-0 Folio..... Boro..... Twp. .....

Name .....

Address 875 Broadway .....

Meter Removed

Size 3/4" Make SenSus Type ECR Serial No. 32752007 ID# 04966209

Why Removed? Test Reading 1,242 Date 2-2-21

Meter Set

Size 3/4" Make Sensus Type ECR Serial No. 89615025

Reading 0 Date 2-2-21 ID# 89615025

Signed BB

Remarks: 100.6 100.3

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-2-21

Change ✓ Removal Only..... Set Only.....

Account No. 510-011770-0 Folio..... Boro..... Twp. .....

Name .....

Address 425 Broadway .....

Meter Removed

Size 3/4" Make SenSys Type ECR Serial No. 35066044 ID# 07218066

Why Removed? Test Reading 323 Date 2-2-21

Meter Set

Size 3/4" Make SenSys Type ECR Serial No. 89615030

Reading 0 Date 2-2-21 ID# 89615030

Signed BB

Remarks: 100.7 99.6

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-2-21

Change ✓ 0 Removal Only..... Set Only.....

Account No 550-76249 Folio..... Boro..... Twp. .....

Name .....

Address 419 1/2 NORTH ST

Meter Removed ID: 5232029198

Size 5/8 Make KENT Type ECR Serial No. 99415555

Why Removed? TEST Reading 329 Date 2-2-21

Meter Set ID: 89614912

Size 5/8 Make SENSUS Type ECR Serial No. 89614912

Reading 0 Date 2-2-21

Signed JF

Remarks: .....

101.1 100.5

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-3-21

Change ✓ Removal Only ..... Set Only .....

Account No. 510-022757-0 Folio ..... Boro ..... Twp. .....

Name .....

Address 831 E. Walnut St. 5672 1421

Meter Removed

Size 5/8 Make ~~Sensus~~ PMM Type ECR Serial No. 64044636

Why Removed? TEST Reading 708 Date 2-3-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 85994748

Reading 26 Date 2-3-21 90593700

Signed Rick

Remarks: .....

100 100

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-3-21

Change ✓ Removal Only ____ Set Only ____

Account No. 510 033471-0 Folio ____ Boro ____ Twp. ____

Name ____

Address 522 Maul Ave 03560561

Meter Removed

Size 5/8 Make Sensus Type ECR Serial No. 31373321

Why Removed? Test Reading 534 Date 2-3-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 89614852

Reading -0- Date 2-3-21 89614852

Signed Rick

Remarks: 101 1005

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-3-21

Change ✓ Removal Only..... Set Only.....

Account No. 540-820688-0 Folio..... Boro..... Twp. .....

Name .....

Address 59 Barley Circle

Meter Removed ID# 03695048

Size 5/8" Make SenSus Type ECR Serial No. 47170926

Why Removed? Test Reading 883 Date 2-3-21

Meter Set

Size 5/8" Make SenSus Type ECR Serial No. 89614858

Reading 0 Date 2-3-21 ID# 89614858

Signed BB

Remarks: 100.6 99.3

ROUTE BOOK	
METER INV.	
COMPUTER	

-820-

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-3-21

Change ✓ Removal Only..... Set Only.....

Account No. 550-764120-0 Folio..... Boro..... Twp. .....

Name .....

Address 226 Ridge Ave

Meter Removed

Size 5/8" Make Kent (ABB) Type ECR Serial No. 11368949 ID# 4421001708

Why Removed? Test Reading 492 Date 2-3-21

Meter Set

Size 5/8" Make SenSus Type ECR Serial No. 89614910

Reading 0 Date 2-3-21 ID# 89614910

Signed BB

Remarks: 101 99

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-4-21

Change ✓ Removal Only..... Set Only.....

Account No. 600-913010-0 Folio..... Boro..... Twp. .....

Name .....

Address 900 High Street (Utz Garage)

Meter Removed

ID# 05497186

Size 2" Make Sensus Type ECR Serial No. 18918282

Why Removed? Test Reading 48,846 Date 2-4-21

Meter Set

Size 2" Make OMNI Type ECR Serial No. 88801727

Reading 0 Date 2-4-21 ID# 88801727

Signed BB

Remarks: 100.1 99.2

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-4-21

Change ✓ Removal Only..... Set Only.....

Account No. 540-738734-0 Folio..... Boro..... Twp. .....

Name .....

Address 175 PUMA DR.

Meter Removed ID: 03704034

Size 5/8 Make SENSUS Type ECR Serial No. 47170895

Why Removed? TEST Reading 1918 Date 2-4-21

Meter Set ID: 89614848

Size 5/8 Make SENSUS Type ECR Serial No. 89614848

Reading 0 Date 2-4-21

Signed JF

Remarks: .....

100.7 98.2

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-4-21

Change ✓ -0 Removal Only..... Set Only.....

Account No. 540-738756 Folio..... Boro..... Twp. .....

Name .....

Address 116 STAFFORD DR.

Meter Removed ID: 03697337

Size 5/8 Make SENSUS Type ECR Serial No. 47170935

Why Removed? TEST Reading 839 Date 2-4-21

Meter Set ID: 89614907

Size 5/8 Make SENSUS Type ECR Serial No. 89614907

Reading 0 Date 2-4-21

Signed JF

Remarks: 100.6 99.7

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-4-21

Change ✓ Removal Only ..... Set Only .....

Account No. 540 701450-0 Folio ..... Boro ..... Twp. .....

Name .....

Address 235 JOHNATHON DR. 04329198

Meter Removed

Size 5/8 Make SENSUS Type ECR Serial No. 33753567

Why Removed? Test Reading 1082 Date 2-4-21

Meter Set

Size 5/8 Make SENSUS Type ECR Serial No. 89614850

Reading 0 Date 2-4-21 / 89614850

Signed JMS

Remarks: 100.3 98.7

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-4-21

Change ✓ Removal Only ..... Set Only .....

Account No. 530 612900 - 0 Folio ..... Boro ..... Twp. .....

Name .....

Address 409 Elm Ave. 02262092

Meter Removed

Size 5/8 Make Sensus Type ECR Serial No. 31373110

Why Removed? Jammed Reading 795 Date 2-4-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 89614853

Reading 0 Date 2-4-21 / 89614853

Signed .....

Remarks: 100.8 99.9

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-4-21

Change ✓ Removal Only..... Set Only.....

Account No. 510-256520-0 Folio..... Boro..... Twp. .....

Name .....

Address 0 N. Hanover Mall Room 100 (Now Rural King)

Meter Removed

Size 2" Make Sensus Type ECR Serial No. 48190230 ID# 04458789

Why Removed? Test Reading 41,759 Date 2-4-21

Meter Set

Size 2" Make OMNI Type ECR Serial No. 89614674

Reading 0 Date 2-4-21 ID# 89614674

Signed BB

Remarks: 100.3 99.3

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-5-21

Change ✓ Removal Only ..... Set Only .....

Account No. 510 261000-0 Folio ..... Boro ..... Twp. .....

Name .....

Address 289 GRANT DR. 04319108

Meter Removed

Size 5/8 Make SENSUS Type TR-PL Serial No. 32651965

Why Removed? Test Reading 1495 Date 2-5-21

Meter Set

Size 5/8 Make SENSUS Type TR-PL Serial No. 89126368

Reading 0 Date 2-5-21 89126368

Signed JMS

Remarks: 100.5 98.4

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-5-21

Change ✓ Removal Only..... Set Only.....

Account No. 550 781681-0 Folio..... Boro..... Twp. .....

Name .....

Address North St. Apt #57 5232028768

Meter Removed

Size 5/8 Make Kent Type HBB Serial No. 99415607

Why Removed? Test Reading 830 Date 2-5-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 89614888

Reading 0 Date 2-5-21 / 89614888

Signed .....

Remarks: 100.6 100.1

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-5-21

Change ✓ Removal Only..... Set Only.....

Account No 550 781510-0 Folio..... Boro..... Twp. .....

Name .....

Address North St Apt # 25 5232048066

Meter Removed

Size 5/8 Make Kent Type ABB Serial No. 98896054

Why Removed? Test Reading 755 Date 2-5-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 89614855

Reading 0 Date 2-5-21 / 89614855

Signed .....

Remarks: 101 100.6

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-5-21

Change ✓ Removal Only ..... Set Only .....

Account No. 520 374990 - 0 Folio ..... Boro ..... Twp. .....

Name .....

Address 144 Forry Ave, 4421001556

Meter Removed

Size 5/8 Make Kent Type ABB Serial No. 11368874

Why Removed? Test Reading 814 Date 2-5-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 89614886

Reading 0 Date 2-5-21 / 89614886

Remarks: 100.6 99.9 Signed [signature]

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-5-21

Change ✓ .0 Removal Only..... Set Only.....

550 Account No. 172590 Folio..... Boro..... Twp. .....

Name .....

Address 316 Main St. 4422002098

Meter Removed

Size 5/8 Make Kent Type ABB Serial No. 11368853

Why Removed? Test Reading 780 Date 2-5-21

Meter Set

Size 5/8 Make Sensus Type ECR Serial No. 89614854

Reading 0 Date 2-5-21 89614854

Signed T/USS

Remarks: 100.5 100.3

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-8-21

Change ✓ -D Removal Only..... Set Only.....

Account No. 550-781470 Folio..... Boro..... Twp. .....

Name .....

Address NORTH ST Apt 33

Meter Removed ID: 5232047541

Size 5/8 Make KENT Type ECR Serial No. 98896063

Why Removed? TEST Reading 730 Date 2-8-21

Meter Set ID: 89614885

Size 5/8 Make SENSUS Type ECR Serial No. 89614885

Reading 0 Date 2-8-21

Signed JF

Remarks: 101 99.9

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-8-21

Change ✓ -0 Removal Only..... Set Only.....

Account No 510-031690 Folio..... Boro..... Twp. .....

Name .....

Address 931 E. WALNUT ST

Meter Removed ID: 03098075

Size 5/8 Make SENSUS Type ECR Serial No. 36838069

Why Removed? TEST Reading 1806 Date 2-8-21

Meter Set ID: 89614884

Size 5/8 Make SENSUS Type ECR Serial No. 89614884

Reading 0 Date 2-8-21

Signed JF

Remarks: .....

101.1 99.7

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-8-21

Change ✓ -0 Removal Only..... Set Only.....

Account No 550-781640 Folio..... Boro..... Twp. .....

Name .....

Address NORTH ST Apt 49

Meter Removed

ID: 5232029265

Size 5/8 Make KENT Type ECR Serial No. 99415615

Why Removed? TEST Reading 775 Date 2-8-21

Meter Set

ID: 89614857

Size 5/8 Make SENSUS Type ECR Serial No. 89614857

Reading 0 Date 2-8-21

Signed JF

Remarks: 101 100.1

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

REMOVING AND SETTING METERS

Date 2-8-21

Change ..... Removal Only ..... Set Only .....

Account No. 520-37130-0 Folio ..... Boro ..... Twp. .....

Name .....

Address 29 Brewster Street

Meter Removed

Size 5/8" Make Kent (ABB) Type ECR Serial No. 11368947 ID# 4422001652

Why Removed? Test Reading 671 Date 2-8-21

Meter Set

Size 5/8" Make Sensus Type ECR Serial No. 89614893

Reading 0 Date 2-8-21 ID# 89614893

Signed BB

Remarks: 100.6 100.2

ROUTE BOOK	
METER INV.	
COMPUTER	

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

ATE REMOVED, AND YEAR: 11-20-20

ZE OF METER: 5/8 ECR

AME OF METER: SENSUS

JMBER OF METER: 89126251 - 89126251

MOVED BY: METER DEPT

ETER READING WHEN REMOVED: 9999

VNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

REET AND NUMBER? 1 NORTHVIEW DR

ST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

PAIRED BY: JF

TE OF REPAIR: 11-24-20

G. AFTER REPAIRED: 0

TER TEST: FAST..... MED. 101 SLOW 99.5

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 8-22-19

SIZE OF METER: 3"

NAME OF METER: Sensus ECR - Compound

NUMBER OF METER: 1291012 - 04095475

REMOVED BY: Meter Dept.

METER READING WHEN REMOVED: 11,582,000

100.5 106

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER? 22 Carlisle St.

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

Main Flange Gasket

REPAIRED BY: [signature]

DATE OF REPAIR: 12-29-20

RDG. AFTER REPAIRED: 11,582,000

METER TEST: FAST..... MED. 99.5 SLOW 100.5

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

)ATE REMOVED, AND YEAR: 2-28-20

IZE OF METER: 2"

IAME OF METER: Sensus ECR

IUMBER OF METER: 21050249-4202 1467

:EMOVED BY: M.D

IETER READING WHEN REMOVED: 9,320,700 (100 / 96)

)WNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

TREET AND NUMBER? 1019 Baltimore St.

IST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber
Main Flange Gasket
ECR Register

EPAIRED BY: Rick

ATE OF REPAIR: 11-5-20

)G. AFTER REPAIRED: -0-

ETER TEST: FAST — MED. 100 SLOW 99

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 7-30-20

SIZE OF METER: 2" TRPL

NAME OF METER: SENSUS

NUMBER OF METER: 66940357 - 74946438

REMOVED BY: METER DEPT

METER READING WHEN REMOVED: 2537 (99 / 91)

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER? 140 DART DR

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER
TRPL REGISTER
MAIN FLANGE GASKET
CHAMBER GASKET

REPAIRED BY: JF

DATE OF REPAIR: 11-23-20

RDG. AFTER REPAIRED: -0-

METER TEST: FAST — MED. 100.5 SLOW 99.5

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

ATE REMOVED, AND YEAR: 8-5-2020

ZE OF METER: 2"

AME OF METER: SenSus TRPL

JMBER OF METER: 23709113 - 74946440

EMOVED BY: Meter Dept.

ETER READING WHEN REMOVED: 18,317,800

100 98

WNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

REET AND NUMBER? Szwoyer Alley

Penn Mar

ST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

TRPL Register - ID# 74946440

Chamber

PAIRED BY: Becky

TE OF REPAIR: 10-22-2020

G. AFTER REPAIRED: 0

TER TEST: FAST ..... MED. 100 SLOW 100

-839-

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 11-26-19

SIZE OF METER: 2"

NAME OF METER: Sensus TRPL

NUMBER OF METER: 57841215-89786503

REMOVED BY: M.D.

METER READING WHEN REMOVED: 3,720,000

98 82

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER?

100 Eisenhower Dr

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

Main Flange Gasket

TRPL Register

REPAIRED BY: Rick

DATE OF REPAIR: 11-5-20

RDG. AFTER REPAIRED: -0-

METER TEST: FAST — MED. 100 SLOW 99.5

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

IOVED, AND YEAR: 9-2-20

ETER: 2"

METER: SenSus TRPL

OF METER: 32931410 - 89786502

BY: Meter Department

ADING WHEN REMOVED: 18,915,000

99 98

F PREMISES FROM WHICH METER WAS REMOVED, ALSO

ND NUMBER? Black Rock Road S.W. School

L NEW PARTS USED, BY NAME AND NUMBER:

L Register ID# 89786502

BY: Berky

EPAIR: 9-3-20

R REPAIRED: 0

ST: FAST..... MED. 99 SLOW 99

-840-

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 5-27-2020

SIZE OF METER: 1½"

NAME OF METER: SenSus

NUMBER OF METER: 42049583 - 89786496

REMOVED BY: Meter Dept.

METER READING WHEN REMOVED: 3,142,250

99 99

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER? 120 Radio Road

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

New Chamber

New TRPL Register

REPAIRED BY: Berky

DATE OF REPAIR: 9-29-2020

RDG. AFTER REPAIRED: 0

METER TEST: FAST..... MED. 100 SLOW 100

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

TE REMOVED, AND YEAR: 7-22-20

E OF METER: 1

ME OF METER: Sensus ECR

MBER OF METER: 82584488-89391242

MOVED BY: Meter Dept.

TER READING WHEN REMOVED: 0

ter was Resetting to 0 Reading 99.2 99.5

NER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

EET AND NUMBER? 870 Grant Dr.

T OF ALL NEW PARTS USED, BY NAME AND NUMBER:

ECR Register

AIRED BY: [signature]

E OF REPAIR: 7-27-20

. AFTER REPAIRED: 0

ER TEST: FAST..... MED. 99.2 SLOW 99.5

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 8-27-20

SIZE OF METER: 2"

NAME OF METER: SenSus TRPL

NUMBER OF METER: 23570972 - 74946439

REMOVED BY: Meter Dept.

METER READING WHEN REMOVED: 2,956,000

100 99

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER? 100 Kindig Ln.

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

TRPL Register ID# 74946439

REPAIRED BY: Becky

DATE OF REPAIR: 8-28-20

RDG. AFTER REPAIRED: 0

METER TEST: FAST..... MED. 100 SLOW 100

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

MOVED, AND YEAR: 6-9-20

METER: 2"

METER: Sensus TR-PL

OF METER: 48190229-71316004

D BY: Meter Dept.

EADING WHEN REMOVED: 9,826,560

100.5 96

OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

ND NUMBER? Randolph St. Apts

Building #6

LL NEW PARTS USED, BY NAME AND NUMBER:

plete Chamber

L Register

mber Gasket

Flange Gasket

BY: L. Russell

EPAIR: 6-24-20

R REPAIRED: 0

ST: FAST..... MED. 100 SLOW 96

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 8-15-19

SIZE OF METER: 3"

NAME OF METER: Sensus Compound TR-PL

NUMBER OF METER: 1352117-07680761

REMOVED BY: Meter Dept.

METER READING WHEN REMOVED: 30,066,700

100 0

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER? Tree House - Pretzels

W. Chestnut St.

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

REPAIRED BY: L. Russell

DATE OF REPAIR: 7-16-20

RDG. AFTER REPAIRED: 30,060,700

METER TEST: FAST..... MED. 99 SLOW 98.5

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 2-19-20

SIZE OF METER: 1"

NAME OF METER: Sensus ECR

NUMBER OF METER: 81871198-74809004

REMOVED BY: M.D.

METER READING WHEN REMOVED: 43,970 (98 / 97)

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO STREET AND NUMBER? 18 Brookside Ave.

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Bottom Plate

REPAIRED BY: Rick

DATE OF REPAIR: 2-20-20

RDG. AFTER REPAIRED: 44,005

METER TEST: FAST — MED. 98 SLOW 97

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 11-21-19

SIZE OF METER: 1½

NAME OF METER: SenSus TRPL

NUMBER OF METER: 71157158 - 89786493

REMOVED BY: Meter Dept.

METER READING WHEN REMOVED: 7,507,643 (99 / 99)

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO STREET AND NUMBER? Red Lobster 407 Eisenhower Drive

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

- Complete Chamber
- New Register 89786493
- Main flange Gasket
- measuring chamber gasket

REPAIRED BY: BF

DATE OF REPAIR: 2-28-20

RDG. AFTER REPAIRED: -0-

METER TEST: FAST — MED. 100 SLOW 100

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-31-20

SIZE OF METER: 5/8

NAME OF METER: Sensus ECR

NUMBER OF METER: 46465978-03328799

REMOVED BY: M.D.

METER READING WHEN REMOVED: 1,646,380

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO (98 / 96)

STREET AND NUMBER: 894 E. Walnut St.

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

Strainer

REPAIRED BY: Rick

DATE OF REPAIR: 2-17-20

RDG. AFTER REPAIRED: 1,646,440

METER TEST: FAST — MED. 100 SLOW 102

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-24-20

SIZE OF METER: 5/8

NAME OF METER: Sensus ECR

NUMBER OF METER: 46466181-03269166

REMOVED BY: M.D.

METER READING WHEN REMOVED: 751,260

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO (100 / 96)

STREET AND NUMBER: 535 Wilson Ave

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

Strainer

REPAIRED BY: Rick

DATE OF REPAIR: 2-17-20

RDG. AFTER REPAIRED: 751,320

METER TEST: FAST — MED. 100 SLOW 99

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-23-20

SIZE OF METER: 5/8

NAME OF METER: Sensus ECR

NUMBER OF METER: 47170812 - 0369 7336

REMOVED BY: M.D.

METER READING WHEN REMOVED: 2,776,430

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER: 475 High St

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

Strainer

REPAIRED BY: Rick

DATE OF REPAIR: 2-17-20

RDG. AFTER REPAIRED: 2,776,480

METER TEST: FAST — MED 100 SLOW 100

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-14-20

SIZE OF METER: 5/8

NAME OF METER: Sensus ECR

NUMBER OF METER: 47170740 - 03661856

REMOVED BY: M.D.

METER READING WHEN REMOVED: 875,730

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER: 23 Glendale St

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

Strainer

REPAIRED BY: Rick

DATE OF REPAIR: 2-17-20

RDG. AFTER REPAIRED: 875,800

METER TEST: FAST — MED 100 SLOW 100

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-24-20

SIZE OF METER: 5/8"

NAME OF METER: SENSUS ECR

NUMBER OF METER: 47170697-03661938

REMOVED BY:

METER READING WHEN REMOVED: 912,610 100.5 97

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER? 233 MEADE AVE

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

REPAIRED BY: METER DEPT

DATE OF REPAIR: 2-14-20

RDG. AFTER REPAIRED: 912,660

METER TEST: FAST ..... MED. 100 ..... SLOW 99

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-23-20

SIZE OF METER: 5/8

NAME OF METER: Sensus ECR

NUMBER OF METER: 46461121 -03333661

REMOVED BY: M.D

METER READING WHEN REMOVED: 1,415,410 100 96

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER? 139 Baltimore St.

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

Complete Chamber

Strainer

REPAIRED BY: Rick

DATE OF REPAIR: 2-17-20

RDG. AFTER REPAIRED: 1415,470

METER TEST: FAST - MED. 100 SLOW 99.5

HANOVER MUNICIPAL WATER WORKS
METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-21-20

SIZE OF METER: 5/8"

NAME OF METER: SENSUS ECR

NUMBER OF METER: 42377058 - 03380441

REMOVED BY:

METER READING WHEN REMOVED: 795,620 (100 / 97)

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER?

116 ALLEGHENY AVE

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

REPAIRED BY: METER DEPT

DATE OF REPAIR: 2-14-20

RDG. AFTER REPAIRED: 795,670

METER TEST: FAST..... MED. 100.5 SLOW.... 98

HANOVER MUNICIPAL WATER WORKS
METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-20-20

SIZE OF METER: 5/8"

NAME OF METER: SENSUS ECR

NUMBER OF METER: 47170707 - 03666053

REMOVED BY:

METER READING WHEN REMOVED: 1,184,460 (99.5 / 95.5)

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER?

355 POPLAR ST

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

REPAIRED BY: METER DEPT

DATE OF REPAIR: 2-14-20

RDG. AFTER REPAIRED: 1,184,510

METER TEST: FAST..... MED. 100 SLOW.... 99

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-27-20

SIZE OF METER: 5/8"

NAME OF METER: SENSUS ECR

NUMBER OF METER: 47170761 - 03661085

REMOVED BY:

METER READING WHEN REMOVED: 711,080

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO 100.5 99

STREET AND NUMBER?

121 MAPLE AVE

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

REPAIRED BY: METER DEPT

DATE OF REPAIR: 2-14-20

RDG. AFTER REPAIRED: 711,140

METER TEST: FAST MED. 100 SLOW 100

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 1-22-20

SIZE OF METER: 5/8"

NAME OF METER: SENSUS ECR

NUMBER OF METER: 46466184-03339195

REMOVED BY:

METER READING WHEN REMOVED: 1,844,660

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO 97 88

STREET AND NUMBER?

200 STUART AVE

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

REPAIRED BY: METER DEPT

DATE OF REPAIR: 2-14-20

RDG. AFTER REPAIRED: 1,844,720

METER TEST: FAST MED. 100 SLOW 98

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 2-11-20

SIZE OF METER: 5/8"

NAME OF METER: SENSUS ECR

NUMBER OF METER: 47170823-03721437

REMOVED BY:

METER READING WHEN REMOVED: 4,621,120

100 985

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER?

22 EICHELBERGER ST 1 FL

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

REPAIRED BY: METER DEPT

DATE OF REPAIR: 2-14-20

RDG. AFTER REPAIRED: 4,621,180

METER TEST: FAST..... MED. 100.5 SLOW 99

HANOVER MUNICIPAL WATER WORKS

METER REMOVAL AND REPAIR CHART

DATE REMOVED, AND YEAR: 2-12-20

SIZE OF METER: 5/8"

NAME OF METER: SENSUS ECR

NUMBER OF METER: 47170824-03705018

REMOVED BY:

METER READING WHEN REMOVED: 1,887,800

100.5 97.5

OWNER OF PREMISES FROM WHICH METER WAS REMOVED, ALSO

STREET AND NUMBER?

402 HEDGEROW CT

LIST OF ALL NEW PARTS USED, BY NAME AND NUMBER:

COMPLETE CHAMBER

REPAIRED BY: METER DEPT

DATE OF REPAIR: 2-14-20

RDG. AFTER REPAIRED: 1,887,860

METER TEST: FAST..... MED. 100.5 SLOW 98

Certificate of Approval for Water Meter Tank Apparatus

The water meter tank described below has been left accurate to within +/- 0.5% and has been calibrated by LAWCO Incorporated. It is approved for use in testing water meters for the period specified and subject to the conditions listed.

Period of Approval: March 17, 2020 thru March 17, 2021

This water tank is the property of: Hanover Municipal Water Works
228 High Street
Hanover, PA 17331

Location: Hanover Municipal Water Works Facility, 228 High Street, Hanover

Tank Manufacturer: Ford Tank No: 1 (Size 1) Size: 10 Gallon

This water meter tank shall not be continued in use after being damaged, disassembled, or moved where such could interfere with the accuracy of the tank.

March 17, 2020
Date

Charles E. Bohl
LAWCO Inc.

Exhibit D X-1

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

1. Provide a comparative balance sheet for the historic test year-end and the preceding year-end.

RESPONSE

See the following schedule, 'Exhibit D X-1 Attachment' for the balance sheets for the years ended 12/31/2020 and 12/31/2019.

HANOVER BOROUGH - BUREAU OF WATER

BALANCE SHEET AS OF DECEMBER 31, 2019 and 2020

	As of 12/31/2019	As of 12/31/2020
ASSETS		
Current Assets:		
Cash and Cash Equivalents		
Restricted	$ 143,854	$ 117,302
Unrestricted	7,590,303	6,642,700
Accounts Receivable	742,813	867,655
Grants Receivable		
Due from Other Funds	25,246	
Unbilled Services	449,339	439,698
Inventory	504,692	473,620
Prepaid Expenses	95,976	98,377
Total Current Assets	9,552,223	8,639,352
Cash and Cash Equivalents - Restricted	463,167	10,973,974
Net Pension Asset		
Bond Issuance Costs (Net of Accumulated Amortization)		
Capital Assets, Net	42,869,571	45,202,258
Total Assets	$ 52,884,961	$ 64,815,584
LIABILITIES AND FUND EQUITY		
Current Liabilities:		
Accounts Payable and Accrued Expenses	$ 201,471	$ 626,027
Accrued Wages	52,464	28,705
Accrued Compensated Absences	36,000	69,000
Unearned Revenue	3,110	
Accrued Interest Payable	139,934	186,231
Due to Other Funds	87,096	148,723
Consumer Deposits	143,854	117,302
Capital Lease Obligations	10,111	11,002
Bonds Payable (Net of Deferred Amounts)	445,038	848,772
Accounts Payable from Restricted Assets		10,363
Total Current Liabilities	1,119,078	2,046,125
Accrued Compensated Absences	643,053	609,349
Accrued Other Postemployment Benefits	635,240	
Net Pension Liability	(1,039,381)	649,846
Capital Lease Obligations	41,210	30,208
Consumer Deposits	463,167	345,865
Bonds Payable (Net of Current Portion)	18,878,072	28,801,594
Total Liabilities	20,740,439	32,482,987
Fund Equity:		
Invested In Capital Assets, Net of Related Debt	23,796,677	26,466,422
Restricted		
Unrestricted	7,756,394	6,959,539
Total Liabilities and Fund Equity	$ 52,293,510	$ 65,908,948

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

2. Provide a detail of other physical property, investments in affiliated companies and other investments.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

3. Provide the amounts and purpose of special cash accounts as of the historic test year-end.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

4. Describe the nature and amounts of notes receivable, accounts receivable from associated companies, and any other receivables, other than customers' accounts, greater than 15% of the total. Limit the explanation to variances greater than $10,000.

RESPONSE

None.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

5. Provide the amount of accumulated reserve for uncollectible accounts, method and rate of accrual, amounts accrued and amounts written-off in each of the last 3 years.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

6. Provide a list of prepayments and give an explanation of special prepayments.

RESPONSE

The Borough had the following prepaid expenses (totaling $98,377) accounted for in the financial statement audit for the year ending December 31, 2020, none of which are deemed special prepayments:

- January 2021 insurance payments for active and retiree health/hospitalization, prescription, vision, and life insurance - totaled $87,132

- $658 for general service agreements covering fiscal periods in 2020 to 2021.

- $10,588 for extended warranties purchased for servers at the Water Filtration Plant from January 2020 through January 2024.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

7. Break down and explain in detail any significant items, greater than 15% of the total, in the current assets account listed on the balance sheet. Limit the explanation to variances greater than $10,000.

RESPONSE

Cash and cash equivalents – Unrestricted account as of December 31, 2020 is $6,642.700 or 77% of the current assets account total of $8,639,352. See explanation of the account below.

Unrestricted cash and cash equivalents include amounts held in liquid checking and money market accounts for general use by the Water Fund. Prior to the completion of the Borough's last rate case study, unrestricted cash and cash equivalents ended at $649,529 for 2014, reflecting significant lack of financial reserves for emergency operations and any capital planning. With rate increases implemented both outside and inside the Borough in 2015, unrestricted reserves grew to just over $2million to end 2015, $4million to end 2016, and $5.6million to end 2017. The Borough began to perform more rigorous assessment of the distribution system to identify needed capital investment (on an annual basis) to "turn over" the system in its estimated life cycle (80-100 years). The Borough then embarked on an aggressive capital investment plan into the distribution network, which when implemented in the 2018 budget, reduced annual additions to unrestricted cash from over $1.5million a year to a reduction of unrestricted reserves of over $600,000 over the following two years.

During this period, the Borough also implemented a Fund Balance and Financial Reserves Policy, requiring virtually all funds to have at least 25% of current or next year (whichever higher) expenditures in unrestricted reserves to ensure (1) operations could continue in a quarter given unexpected or significant impacts out of the Borough's control, and (2) funds were available for unanticipated significant/emergency capital needs. The Borough's 2021 budget, which included continuation of a significant distribution investment plan, projected to bring ending unrestricted cash to $2.7million or approx. 27% of the 2020 expenses; well aligned with our adopted policy.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

8. Explain in detail, including the amount and purpose, the deferred asset accounts that currently operate to affect or will at a later date affect the operating account supplying:
   a. Origin of these accounts.
   b. Probable changes to this account in the near future.
   c. Amortization of these accounts currently charged to operations or to be charged in the near future.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

9. Explain the nature of accounts payable to associated companies. Provide a breakdown by category.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

10. Provide breakdown and explanation of other deferred credits as to their origin and disposition policy, for example, amortization.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

11. Provide an explanation and method of funding of any reserves, other than depreciation and bad debt appearing on historic balance sheet.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

12. Provide an analysis of unappropriated retained earnings for the historic test year and 2 preceding years.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO BALANCE SHEET
FILING REQUIREMENTS

13. Describe the purpose of any advances made by the company to its parent corporation and describe all terms and conditions associated with such advances, including an estimate of future advances or repayments that are expected to occur.

RESPONSE

Not applicable.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OTHER DATA
FILING REQUIREMENTS

1. Provide the company's monthly balance sheets and income statements for each month of the historic and future test year.

RESPONSE

The Borough Water Fund does not prepare monthly balance sheets or income statements.

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OTHER DATA
FILING REQUIREMENTS

2. Supply a copy of internal and independent audit reports of the historic test year and prior calendar year, noting any exceptions and recommendations and disposition thereof.

RESPONSE

The following schedule, 'Exhibit D XI-2 Attachment' includes the audit reports for the Water Fund for the years ended December 31, 2019 and 2020.

THE BOROUGH OF HANOVER, PENNSYLVANIA

BASIC FINANCIAL STATEMENTS AND REQUIRED AND OTHER SUPPLEMENTARY INFORMATION

FOR THE YEAR ENDED DECEMBER 31, 2019

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HAMILTON & MUSSER, P.C.

Certified Public Accountants • Consultants to Management

DAVID A. HAMILTON, CPA • BARRY E. MUSSER, CPA, CFP®
JAMES A. KRIMMEL, MBA, CPA, CFE, CFF • ROBERT D. MAST, CPA • WILLIAM P. ASHMAN, CPA

INDEPENDENT AUDITOR'S REPORT

To the Borough Council
The Borough of Hanover
Hanover, Pennsylvania

Report on the Financial Statements

We have audited the accompanying financial statements of the governmental activities, the business-type activities, the discretely presented component unit, the blended presented component unit, each major fund, and the aggregate remaining fund information of The Borough of Hanover, Pennsylvania, as of and for the year ended December 31, 2019, and the related notes to the financial statements, which collectively comprise the Borough of Hanover's basic financial statements of the Borough's primary government as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We did not audit the financial statements of the Hanover Public Library Association, Inc. Those statements were audited by other auditors whose report has been furnished to us, and our opinion, insofar as it relates to the amounts included for the discretely presented component unit, is based solely on the report of the other auditors. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

Auditor's Responsibility (Continued)

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, based on our audit and the report of other auditors, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities, the business-type activities, the blended component unit, the discretely presented component unit, each major fund, and the aggregate remaining fund information of the primary government of the Borough of Hanover, Pennsylvania, as of December 31, 2019, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, budgetary comparison information, schedule of changes in the Borough's net pension liability (asset) and related ratios - pension plans, schedules of Borough contributions and investment returns – pension plans, and schedule of changes in the Borough's total OPEB liability and related ratios on pages 4-21 and 89-102 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming opinions on the financial statements that collectively comprise the Borough of Hanover, Pennsylvania's basic financial statements. The combining schedule of Fiduciary Net Pension and combining schedule of changes in fiduciary net position on pages 103 and 104 are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The combining schedules are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has not been subjected to the auditing procedures applied in the audit of the basic financial statements and accordingly, we do not express an opinion or provide any assurance on them.

Emphasis of a Matter

As further explained in Note 24, the Borough is operating in an environment that has been economically impacted by the COVID-19 pandemic.

Hamilton & Musser, P.C.

March 30, 2020

Mechanicsburg, Pennsylvania *Certified Public Accountants*

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

INTRODUCTION

The following discussion and analysis of The Borough of Hanover's (the "Borough") financial statements provides a narrative overview and analysis of the financial activities of the Borough for the fiscal year ended December 31, 2019. Readers are encouraged to consider the information presented here in conjunction with the year-end financial statements and accompanying notes following this analysis.

The Management's Discussion and Analysis (MD&A) is an element of the reporting model adopted by the Governmental Accounting Standards Board (GASB) in their statement No. 34, *Basic Financial Stations - and Management's Discussion and Analysis - for State and Local Governments*, issued June 1999. Certain comparative information between the current year and prior year is required to be presented in this section.

FINANCIAL HIGHLIGHTS OF 2019

- The assets and deferred outflows of resources of the Borough exceeded its liabilities and deferred inflows of resources at the close of the fiscal year ended December 31, 2019 by $68,227,880 (net position). The Borough's net position value increased $4,220,629 from 2018's total of $64,007,251. The majority of the Borough's net position ($49,019,382, or 71.85%) is invested in capital assets and is not available for future spending.
- Fund balances increased in the General Fund by $681,172 from $9,624,970 to $10,306,142 in 2019.
- The Borough entered into three new capital lease obligations in 2019 relating to various heavy-duty vehicles and related equipment, totaling $589,329.
- The Borough's bond rating was confirmed as Aa3 as issued by Moody's, denoting a very strong capacity to meet financial commitments.
- The Borough had $45,615,000 in general obligation debt outstanding as of December 31, 2019. This represents a net decrease of $2,495,000 from 2019, based on principal payments made. The Non-Electoral Debt Capacity remaining is $36,411,958 and Non-Electoral Debt and Lease Rental Debt Capacity remaining is $52,998,341.

THE BOROUGH OF HANOVER, PENNSYLVANIA
MANAGEMENT'S DISCUSSION AND ANALYSIS
FOR THE YEAR ENDED DECEMBER 31, 2019
UNAUDITED

- Overall, the Borough's pension plans' funded ratio is 103.58%, which significantly outpaces the total funded ratio of all Commonwealth of Pennsylvania local government defined benefit self-insured pension plans (65.80%), based on January 1, 2019 actuarial data analyzed by the Municipal Pension Reporting Program of the Commonwealth of Pennsylvania.

OVERVIEW OF FINANCIAL STATEMENTS

This MD&A section is intended to serve as an introduction to the Borough's basic financial statements and provides an overview of the Borough's financial activities. The basic financial statements are comprised of three components: 1) government-wide financial statements; 2) fund financial statements; and 3) notes to basic financial statements. This report also contains required and other supplementary information in addition to the basic financial statements themselves.

Government-Wide Financial Statements - The government-wide financial statements are designed to provide readers with a broad overview of the Borough's finances in a manner similar to a private-sector business.

The *Statement of Net Position* presents information on all of the Borough's assets, deferred outflows of resources, liabilities, and deferred inflows of resources, with the difference reported as net position. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position of the Borough is improving or deteriorating.

The *Statement of Activities* presents information showing how the Borough's net position changed during the most recent fiscal year. All changes in net position (revenues and expenses) are reported as soon as the underlying event giving rise to the change occurs, *regardless of the timing of related cash flows*. Thus, revenues and expenses are reporting in this statement for some items that will only result in cash flows in future fiscal periods (e.g. uncollected taxes and earned, but unused, compensated absences). The focus of this statement is on the net cost of providing various activities to the citizens of the Borough.

Both the *Statement of Net Position* and the *Statement of Activities* distinguish functions of the Borough that are principally supported by taxes and intergovernmental revenues (*governmental activities*) from other functions that are intended to recover all or a significant portion of their costs through user fees and charges (business-type activities*).*

- Governmental Activities - The activities reflected in this section are general government; public safety (police, fire, and emergency management); roads; health and sanitation; cultural and recreation; and other departments and programs. These activities are primarily supported by operating grants and contributions, charges for services, real estate taxes, and departmental revenues.

- Business-Type Activities - The activities reflected in this section are water works; regional wastewater; sanitary sewer; stormwater (*through the Hanover Borough Stormwater Authority, a blended component unit*); and market house. These activities are intended to recover their cost of operation, including depreciation, primarily through user charges.

Fund Financial Statements - A *fund* is a grouping of related accounts that is used to maintain control over resources that have been segregated for specific activities or objectives. State law requires some funds be segregated, while other funds are established to control and manage resources designated for specific purposes.

The Borough has three types of funds:

- Governmental Funds - Most of the Borough's basic services are included in governmental funds, which focus on: 1) the flow of cash and other financial assets that can readily be converted into cash, and 2) the balances left at year-end that are available for spending. Consequently, the governmental funds statements provide a detailed near-term view that helps determine the financial requirements for current Borough's programs. The Borough's major governmental fund is the General Fund. The Capital Projects, Highway Liquid Fuels, Recreation, Recreation Endowment, and Library Endowment Funds are non-major governmental funds of the Borough.

  Because the focus of governmental funds is narrower than that of the government-wide financial statements, it is useful to compare the information presented for governmental funds with similar information presented for governmental activities in the government-wide financial statements. By doing so, readers may better understand the long-term impact of the Borough's near-term financing decisions. Both the governmental funds Balance Sheet and the governmental funds Statement of Revenues, Expenditures, and Changes in Fund Balances provide a reconciliation to facilitate the comparison between governmental funds and governmental activities.

The Borough adopts an annual appropriated budget for its General, Recreation, and Highway Liquid Fuels Funds. A budgetary comparison statement for the General Fund has been provided as required supplementary information for this major fund to demonstrate compliance with its budgets.

- Enterprise Funds - Used to report the same functions presented as business-type activities in the government-wide financial statements, which provide services for the Borough's other programs and activities, in more detail. The Borough reports five enterprise funds: Water, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds, which are each reported as major funds, and the Market House Fund, which is presented as non-major.

- Fiduciary Funds - The Borough is the trustee, or fiduciary, for its three separate employees' pension plans for police, fire drivers, and non-uniformed employees, collectively reported as the Borough's Pension Trust Funds, and the Fire Drivers' Post Employment Health Plan (PEHP) Fund (*discretely presented component unit*). The Borough is responsible for ensuring that the assets reported in the funds are used for the intended purposes. All of the Borough's fiduciary assets, deferred outflows of resources, liabilities, and deferred inflows of resources balances are reported in the Statement of Fiduciary Net Position. A Statement of Changes in Fiduciary Net Position is presented for the Pension Trust Funds only. All fiduciary activities are excluded from the Borough's government-wide financial statements because the Borough cannot use these assets to finance its operations.

Component Units - Component units are organizations that are legally separate, tax-exempt entities that have the following characteristics: 1) the economic resources received or held are almost entirely for the direct benefit of the Borough (known as the *primary government*), 2) the primary government has the ability to access a majority of the economic resources held by the separate organization, and 3) the assets held by the separate entity are significant to the primary government. Blended component units are component units that are so intertwined with the primary government that they are, in substance, the same as the primary government and are presented as part of the primary government. The Borough has only one blended component unit: the Hanover Borough Stormwater Authority.

The government-wide financial statements include not only the primary government, but also legally separate, discretely presented entities for which the Borough is financially accountable. Financial information for *discretely presented component units* are reported separately from the financial information presented for the primary government itself. The Borough has two discretely presented component units: the Hanover Public Library Association, and the Fire Drivers' PEHP Fund.

THE BOROUGH OF HANOVER, PENNSYLVANIA

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Notes to Basic Financial Statements and Other Information - The notes provide additional information that is essential to a full understanding of the data provided in the government-wide and fund financial statements. In addition to the basic financial statements and accompanying notes, this report also presents certain required supplementary information concerning the Borough's progress in funding its obligation to provide pension and other postemployment benefits to its employees, and combining schedules of net position and activities for the individual Pension (and Other Employee Benefit) Trust Funds of the Borough.

GOVERNMENT WIDE FINANCIAL ANALYSIS

Net Position - The following is a condensed presentation of the Borough's net position as of December 31, 2019 and 2018:

	Governmental Activities		Business-Type Activities		Totals	
	2019	2018	2019	2018	2019	2018
Assets:						
Current and Other Assets	$ 12,528,079	$ 11,658,734	$ 15,993,983	$ 15,874,030	$ 28,522,062	$ 27,532,764
Capital Assets, Net	15,592,297	15,799,257	79,969,249	79,501,831	95,561,546	95,301,088
Total Assets	28,120,376	27,457,991	95,963,232	95,375,861	124,083,608	122,833,852
Deferred Outflows of Resources	1,706,961	3,671,375	1,710,937	2,639,227	3,417,898	6,310,602
Liabilities:						
Current Liabilities	1,836,424	1,429,835	3,025,835	3,618,195	4,862,259	5,048,030
Long-Term Liabilities	8,575,811	13,766,160	39,837,390	44,522,427	48,413,201	58,288,587
Total Liabilities	10,412,235	15,195,995	42,863,225	48,140,622	53,275,460	63,336,617
Deferred Inflows of Resources	3,546,897	1,139,358	2,451,269	661,228	5,998,166	1,800,586
Net Position:						
Net Investment in Capital Assets	9,092,898	8,761,551	39,926,484	37,958,060	49,019,382	46,719,611
Restricted	582,290	574,399	7,200	7,200	589,490	581,599
Unrestricted	6,193,017	5,458,063	12,425,991	11,247,978	18,619,008	16,706,041
Total Net Position	$ 15,868,205	$ 14,794,013	$ 52,359,675	$ 49,213,238	$ 68,227,880	$ 64,007,251

As noted earlier, net position may serve as a useful indicator of a government's financial position. In the case of the Borough, assets and deferred outflows of resources exceeded liabilities and deferred inflows of resources by $68,227,880 at the close of the fiscal year.

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

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By far the largest portion of the Borough's combined net position (71.85%) reflects its investments in capital assets (e.g. land, buildings, equipment, improvements, construction in progress, and infrastructure), less any debt used to acquire those assets that are still outstanding. The Borough uses these capital assets to provide services to citizens; consequently, these assets are not available for future spending. Although the Borough's investment in its capital assets is reported net of related debt, it should be noted that the resources needed to repay this debt must be provided from other sources, since the capital assets themselves cannot be used to liquidate these liabilities.

An additional portion of the Borough's net position (0.86%) represents resources that are subject to external restrictions on how they may be used. The remaining balance of *unrestricted net position* (27.29%) may be used to meet the government's ongoing obligations to citizens and creditors. At the end of the current year, the Borough is able to report positive balances in all net position categories for both reported years.

Changes in Net Position - The following is a condensed presentation of the Borough's changes in net position for the years ended December 31, 2019 and 2018:

	Governmental Activities		Business-Type Activities		Totals	
	2019	2018	2019	2018	2019	2018
Revenues:						
Program Revenues:						
Charges for Services	$ 5,537,313	$ 5,322,025	$ 16,076,440	$ 14,512,465	$ 21,613,753	$ 19,834,490
Operating Grants and Contributions	2,148,564	2,122,316	198,283	139,259	2,346,847	2,261,575
Capital Grants and Contributions	599,020	197,346	517,112	66,413	1,116,132	263,759
General Revenues:						
Taxes:						
Property and Per Capita Taxes	5,888,623	5,728,583	-	-	5,888,623	5,728,583
Income Taxes	1,701,683	1,700,057	-	-	1,701,683	1,700,057
Business Privilege Taxes	603,251	584,811	-	-	603,251	584,811
Local Services Taxes	593,187	630,415	-	-	593,187	630,415
Interest and Investment Earnings	240,353	211,691	268,972	244,798	509,325	456,489
Loss Compensation for Capital Assets	-	217,500	-	-	-	217,500
Transfers	(14,044)	-	14,044	-	-	-
Total Revenues	17,297,950	16,714,744	17,074,851	14,962,935	34,372,801	31,677,679

Expenses:						
Governmental Activities:						
General Government	734,165	989,701	-	-	734,165	989,701
Public Safety	7,222,151	7,704,241	-	-	7,222,151	7,704,241
Health and Sanitation	4,540,747	4,511,534	-	-	4,540,747	4,511,534
Highway	1,879,407	2,387,321	-	-	1,879,407	2,387,321
Culture and Recreation	1,688,020	1,785,293	-	-	1,688,020	1,785,293
Interest on Long-Term Debt	159,268	177,727	-	-	159,268	177,727
Business-Type Activities:						
Water Services	-	-	6,077,081	6,211,980	6,077,081	6,211,980
Regional Wastewater Services	-	-	3,961,548	4,032,760	3,961,548	4,032,760
Sewer Services	-	-	2,709,322	2,969,343	2,709,322	2,969,343
Stormwater Services	-	-	1,118,301	-	1,118,301	-
Market House Services	-	-	62,162	43,265	62,162	43,265
Total Expenses	16,223,758	17,555,817	13,928,414	13,257,348	30,152,172	30,813,165
Changes in Net Position	1,074,192	(841,073)	3,146,437	1,705,587	4,220,629	864,514
Net Position - Beginning	14,794,013	15,635,086	49,213,238	47,507,651	64,007,251	63,142,737
Net Position - Ending	$ 15,868,205	$ 14,794,013	$ 52,359,675	$ 49,213,238	$ 68,227,880	$ 64,007,251

During the current fiscal year, net position for governmental activities increased $1,074,192, primarily the result of tax revenue growth in excess of depreciation on capital assets. The net position of the business-type activities increased $3,146,437, primarily related to various utility and service connection charges, currently outpacing depreciation on newer infrastructure and related improvements.

FINANCIAL ANALYSIS OF THE BOROUGH'S FUNDS

The Borough uses fund accounting to assure and demonstrate compliance with local government regulations.

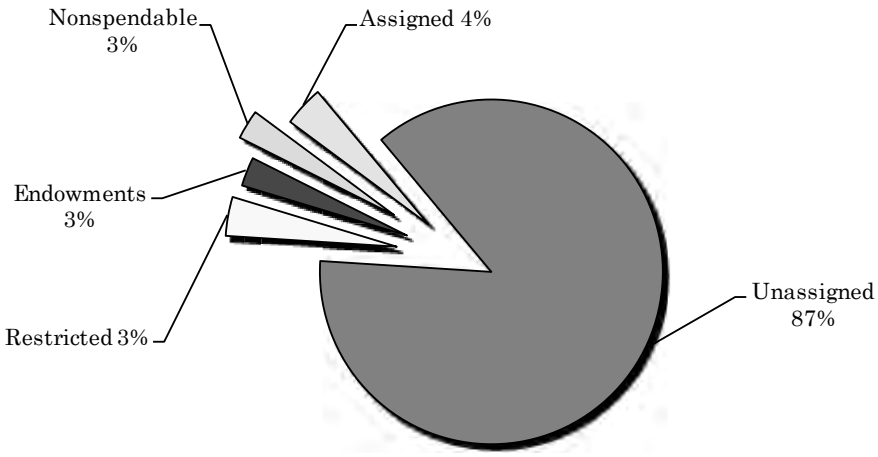
Governmental Funds - The focus of the Borough's *governmental funds* is to provide information on near-term inflows, outflows, and balances of *spendable resources*. Such information is useful in assessing the Borough's financing requirements. In particular, *unassigned fund balance* may serve as a useful measure of a government's net spendable, "available" resources at the end of the fiscal year.

At the end of the current fiscal year, the Borough's governmental funds reported combined ending fund balances of $11,018,061, of which $402,751 was externally restricted, such as by legal restrictions or intention of grantors, donors, or trustees, $302,786 was in nonspendable

form (e.g. inventory, deposits and prepaid expenses), $298,156 was held in endowment funds for recreation purposes, and $415,792 was assigned, primarily for 2020 budgetary reserve needs. The remaining $9,598,576 (87.12%) is unassigned and can be used for any lawful purpose.

The following graphic summarizes fund balances as of December 31, 2019 by relative percentage:

Governmental Fund Balances



The General Fund is the Borough's primary operating fund. It tracks services of administration, police, fire, emergency management, planning, health and sanitation, highways, library, recreation and parks, shade trees, public events, and insurance costs. At the end of the current fiscal year, unassigned fund balance of the General Fund was $9,598,576 and total fund balance was $10,306,142, reflecting a $681,172 (7.08%) increase over the prior year. As a measure of the General Fund's liquidity, it may be useful to compare the unassigned General Fund balance to General Fund expenditures. Unassigned General Fund balance represents 58.08% of total General Fund expenditures.

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The condensed changes in fund balance for the General Fund were as follows for the years ended December 31:

	2019	2018
Revenues	$ 16,750,208	$ 16,113,769
Expenses	16,525,648	16,801,343
Net Other Financing Sources (Uses)	456,612	1,226,484
Changes in Fund Balance	$ 681,172	$ 538,910

The $636,439 increase in revenues in 2019 primarily related to Federal and State capital grants received during the year as well as start of cable television franchise fee collection in late 2019. Expenses decreased $275,695 in 2019, primarily related to the $160,437 in excess State Pension Aid received (above the Borough's minimum municipal pension obligation) in 2018 paid into the relating pension funds as well as $70,875 in 2018 spending towards consulting fees for Phase 1 of the Borough's Strategic Management Planning Program (STMP) project. Net other financing sources (uses) were less significant in 2019, with capital lease proceeds recognized for two heavy-duty vehicles and related equipment ($264,249), and proceeds from dispositions of several Borough owned properties and other assets ($167,586).

THE BOROUGH OF HANOVER, PENNSYLVANIA

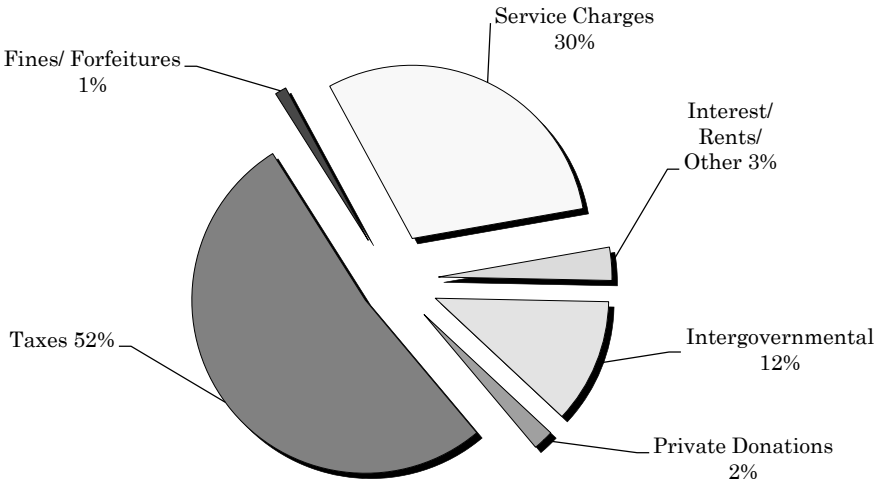
MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEAR ENDED DECEMBER 31, 2019

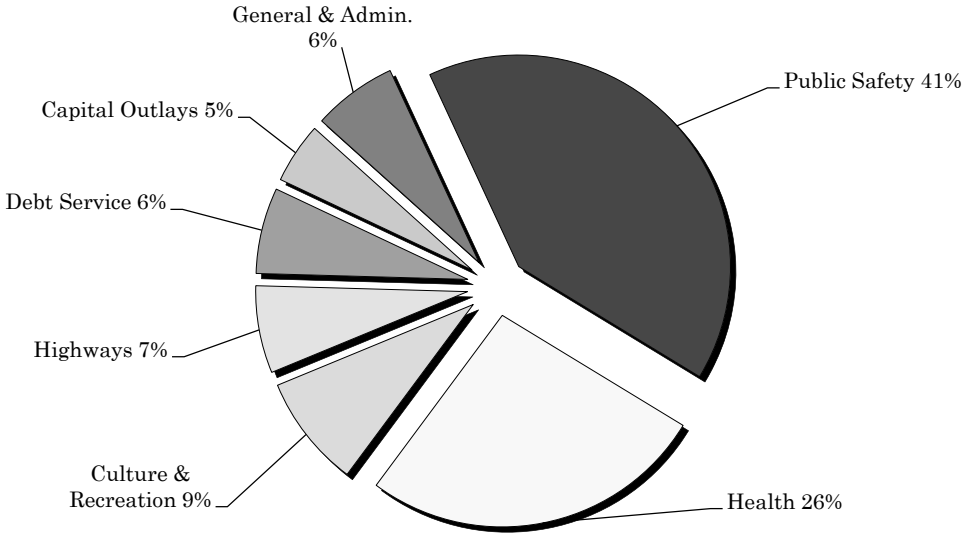
UNAUDITED

The following charts summarizes revenues and expenditures by major source for the General Fund by relative percentage for the year ended December 31, 2019:

General Fund - Revenues



General Fund - Expenditures



THE BOROUGH OF HANOVER, PENNSYLVANIA

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Enterprise Funds - The Borough's enterprise funds provide the same type of information found in the government-wide financial statements.

As of December 31, 2019, the net position of the Borough's Water Fund totaled $31,505,282; the Regional Wastewater Treatment Plant Fund totaled $12,985,895; the Sanitary Sewer Fund totaled $7,560,066; Stormwater Authority Fund totaled $106,026; and the Market House totaled $121,513. The following summarizes the significant changes to net position for the Borough's major Enterprise Funds during the current fiscal year:

- Water operating revenues increased $122,665 from 2018 results of $7,614,758 to $7,737,423, primarily related to increased industrial water consumption. Operating expenses decreased by $176,536 (from $5,515,862 to $5,339,326) in 2019, primarily related to offsetting decline in net pension expense, relating to highly favorable returns in 2019 ($315,140), and increase in depreciation on infrastructure and related capital assets ($147,294). Non-operating activities, capital contributions, and interfund transfers were relatively comparable to 2018. Total change in net position for 2019 was an increase of $2,060,380.
- Regional Wastewater operating revenues increased $75,897 from 2018 results of $2,041,550 to $2,117,447, primarily related to intergovernmental billings for shared facility costs based on their respective budgeted flow shares to the facilities. Operating expenses decreased by $114,764 (from $3,479,314 to $3,364,550) in 2019, primarily related to decline in net pension expense, relating to highly favorable returns in 2019 ($91,835). Non-operating activities, capital contributions, and interfund transfers were relatively comparable to 2018. Total change in net position for 2019 was a decrease of $202,356.
- Sewer operating revenues increased $31,616 from 2018 results of $4,769,522 to $4,801,138, primarily due to increased revenues from sewer service charges, including sanitary sewer flow exchange arrangements with Penn Township. Operating expenses decreased by $269,935 (from $2,895,494 to $2,625,559) in 2019, primarily related to decline in net pension expense, relating to highly favorable returns in 2019, and related allocations for shared staff for Stormwater Authority functions ($63,923), and in health and related insurance coverage costs, relating to surplus premium dividends received in 2019 ($170,095). Non-operating activities, capital contributions, and interfund transfers increased in 2019, primarily related to improved interest earnings and $480,654 in dedicated sewer mains, manholes, and land easement, contributed from a private community in 2019. Total change in net position for 2019 was an increase of $1,192,553.

- The total change in net position for the Stormwater Authority Fund in 2019 was an increase of $115,996. This year marked the first year of operation for the Stormwater Authority.

GENERAL FUND BUDGETARY HIGHLIGHTS

The original budget for the General Fund was amended once by the Borough Council during 2019 for reclassifications within the fund, including significant adjustments for reporting sublease revenue/expense activity with the Hanover Area Fire and Rescue Commission ($132,999), subrecipient grant coordination with the Hanover Public School District (HPSD) for stormwater improvements ($258,729), and refuse disposal fees for increased tonnage delivery ($175,000). The final budgeted change in fund balance for 2019 was a reduction of $767,164. Actual results for 2019 (GAAP Basis) were an increase to fund balance of $681,172, resulting in a positive budget-actual variance of $1,448,336.

Overall, actual operating revenues during the current fiscal year bested budget expectations by $281,911, primarily due to the following:

- Tax revenue exceeded the budgeted amounts by $222,297 for earned income, real estate transfer, and business privilege taxes in excess of budget.
- Intergovernmental revenue, primarily from State grants and State aid for pensions, actual results were under expectations by $121,847, primarily related to shift in budgeted grant activity for the West Hanover Street Park Improvements project to anticipated 2020 spending ($141,892).
- Charges for Services revenues exceeded the budgeted amount by $95,882, primarily due to increased use of the Transfer Station facilities.

Overall, expenditures were $1,077,812 less than planned, primarily due to the following:

- Public Safety expenses were less than budget by $208,662, primarily due to budgeted labor for several Police positions that went unfilled during the year and health insurance costs for Police and Fire employees lower than expected with surplus premium dividends received in 2019.
- Highway expenses were less than budget by $106,828, primarily related to amended budget for subrecipient grant coordination with the HPSD against actual spending through year-end ($258,729 budget, $137,882 actual).

- Culture and Recreation expenses were less than budget by $220,202, primarily related to less-than-anticipated spending towards downtown projects, parks and playground repairs and maintenance, and health insurance costs for Library employees lower than expected with surplus premium dividends received in 2019.
- Capital Outlay expenses were less than budget by $386,200, primarily due to shift in budgeted grant activity for the West Hanover Street Park Improvements project (see above) and budgeted amounts for allocated multipurpose wash bay proposal forgone for further facilities evaluation ($121,000).

CAPITAL ASSETS AND DEBT ADMINISTRATION

Capital Assets - The Borough's investment in capital assets, net of accumulated depreciation, totaled $95,561,546 at the end of 2019. Capital assets consist of land and improvements, infrastructure, buildings and improvements, machinery & equipment and construction in progress.

A summary of the capital assets, net of accumulated depreciation, as of December 31, 2019 and 2018 follows:

	Governmental Activities		Business-Type Activities	
	2019	2018	2019	2018
Land and Land Rights	$ 571,261	$ 571,261	$ 1,027,255	$ 891,549
Inactive Wells	-	-	-	137,044
Construction in Progress	32,865	47,732	1,459,743	1,358,068
Improvements Other Than Buildings	179,287	134,038	8,910	10,165
Machinery and Equipment	1,824,044	1,636,542	1,940,051	1,719,414
Other Buildings and Related Improvements	8,315,573	8,544,676	519,115	519,074
Plant and Infrastructure	4,669,267	4,865,008	75,014,175	74,866,517
	$ 15,592,297	$ 15,799,257	$ 79,969,249	$ 79,501,831

Significant capital investments/activity in 2019 related to the following:

- The Borough entered into three new capital lease obligations relating to various heavy-duty vehicles and related equipment, totaling $589,329.
- Dedicated sanitary sewer mains, manhole, and land easement in relation to private community assets contributed to the Borough in 2019, with estimated value of $480,654.

- Continued rehabilitation design for the Sheppard & Myers Dam ($221,533 in 2019 costs, and cumulative project costs of $922,242; *bids for construction anticipated in 2020, pending State permit approval*).
- Substantial completion of 2018-2019 Water Main Replacement project for West Hanover Street, West Middle Street, and Forney Avenue lines ($581,804 in 2019 costs, and cumulative project costs of $818,313).
- Completion of Sanitary Sewer System 2018 improvements project ($311,048 in accumulated project costs), and accumulated costs of $237,810 for 2019 improvements project, *to be completed in 2020*.

Additional information on the Borough's capital assets can be found in the notes to basic financial statements (Capital Assets note).

The Borough is committed under the following contracts for purchases and construction projects, excluding any accounts payable and accrued expenses (retainage payable) on those contracts, as of December 31, 2019:

Project	Contract Amount	Contract Amount Outstanding
General Fund		
Ejector Trailer Purchases (2)	$ 121,932	$ 121,932
Water Fund		
Water Main Lining Project Construction	$ 392,670	$ -0-
Sanitary Sewer Fund		
Sewer Main Lining Project Construction	$ 270,346	$ 63,729

Long-Term Debt - On December 31, 2019, the Borough's general obligation debt (gross) outstanding totaled $45,615,000, all related to capital purchases and projects. All debt is backed by the full faith and credit of the Borough, and all business-type debt has been certified as self-liquidating in the respective funds. This was a net decrease of $2,495,000 (5.47%) from 2018, primarily due to principal payments made. No revenue bond debt exists.

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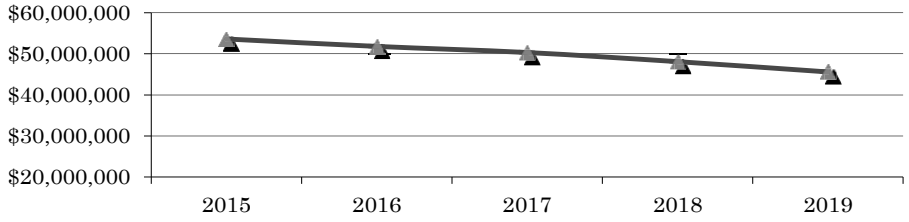
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The following represents the growth of the Borough's general obligation debt (gross) over the past five fiscal years:

Outstanding General Obligation Debt (Gross)



All bonds issued are rated Aa3 by Moody's Investors Service, denoting a very strong capacity to meet financial commitments. **The Borough of Hanover has never failed to meet any bond payment obligations.** The Borough continues to evaluate refunding opportunities for its outstanding bonds to reduce interest costs, which has resulted in significant savings for the Borough over the past several years. There were no debt limitations, restrictions, or commitments during the year ended December 31, 2019 that may affect the Borough's plans during the fiscal year ending December 31, 2020.

The following is a summary of outstanding long-term debt for the years ended December 31, 2019 and 2018:

	Governmental Activities		Business-Type Activities	
	2019	2018	2019	2018
General Obligation Bonds Payable, Net	$ 5,114,137	$ 5,692,441	$ 40,464,422	$ 42,384,085
Accrued Compensated Absences	1,705,447	1,681,579	1,160,056	1,124,039
Consumer Deposits	-	-	607,021	750,880
Capital Lease Obligations	1,538,875	1,531,212	349,571	230,035
	$ 8,358,459	$ 8,905,232	$ 42,581,070	$ 44,489,039

Additional information on the Borough's long-term debt can be found in the notes to basic financial statements (Long-Term Debt note).

THE BOROUGH OF HANOVER, PENNSYLVANIA

MANAGEMENT'S DISCUSSION AND ANALYSIS

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ECONOMIC FACTORS AND NEXT YEAR'S BUDGET AND RATES

The fiscal year 2020 budget has been constructed to leverage positive economic trends by continuing long overdue investments in infrastructure and equipment. The local economy has provided a stable fiscal environment, though growth is limited.

The Borough will continue to experience challenges meeting a balanced budget, particularly in the General Fund, as fixed expenditures continue to rise and revenues continue to flatten. The requirement to fund and improve infrastructure also provides budgetary stress. Key economic factors and trends affecting the Borough in 2020 and future years include the following items:

- General Fund - There were no changes to the Borough's tax rates for the 2020 budget as adopted. Property taxes are the single largest source of revenue for the Borough and represent 34.37% of total General Fund budgeted revenue. However, annual growth in the assessable base of the Borough has been limited to approximately 0.31% over the past five years. Collections of the current levy and agency collection on delinquent taxes have remained strong, resulting in a historical ten-year collection rate of 100.38% of the 2019 assessable base of the Borough.

- Water, Stormwater (Authority), and Sewer Fund Operations and Improvements - There were no changes to the Water, Stormwater, and Sanitary Sewer Fund charges for services in the 2020 budget as adopted. The Borough will continue to address upgrades and maintenance to the Borough's water infrastructure systems over the next several fiscal years, including upgrading water meter technology, researching validity and viability of well sources, and needed improvements to the Sheppard Myers and Kitzmillers Dams. Service charges will be reviewed to ensure adequate funding is available to support the infrastructure needs of the systems.

- Bonds - Borough staff has continued to review and implement internal policies to strengthen financial review and oversight as well as long-range planning in efforts to continuously improve the climate for bond rating increases. Future bond financing will be necessary to implement a comprehensive utilities infrastructure rehabilitation program, with initial review in early 2020 and continued planning thereafter.

- Minimum Municipal Obligation for Borough Pension Plans and Funding Progress - Pension funds budgeted for 2020 total $1,121,538 for the minimum municipal obligation to the pension plans as set forth by Conrad Siegel, Inc., the Borough's pension plan actuary. Approved changes relating to the January 1, 2019 actuarial valuation assumption for mortality rates will have a moderate impact in increasing

minimum municipal obligation costs in future years. **The Borough of Hanover has never failed to make the required minimum municipal obligation to the pension plans.** The Borough's three pension plans' funded ratios were estimated at 97.06%, 93.60%, and 108.82% for the Police, Fire Drivers', and Hanover Employees' Pension Trust Funds, respectively, as of December 31, 2019, exemplifying sound investment, management, and performance.

The above significant economic factors and trends, amongst others, were considered in preparation of the 2020 operating budgets for all funds. Based on anticipated results of operations for the Borough, projected fund balance and financial reserves for 2021, excluding restricted Consumer Deposit Agreement escrows, are $16,306,559, or 23.95% of net position as of December 31, 2019.

While the Borough's current financial position is strong, there are some indicators of future financial stress. First, a review of the strengths: The Borough's tax base value is strong compared to many other urbanized municipalities in Pennsylvania and the corresponding benefit is that the municipal tax rate is low compared with municipalities providing similar services. The Borough hosts many large value industrial and commercial properties, including big-box stores, national specialty merchants, service organizations, and manufacturing. The Borough's modified accrual fund balances exceeded the goals set in its adopted fund balance and financial reserves policy for all relating funds.

Notwithstanding these indicators of financial health, the Borough is facing challenges common to most urban municipalities in Pennsylvania. Expenditures rise due to inflation and world markets. A real estate tax base provides increased revenue three ways: increase in the tax base value due to development; increase in tax base value due to a county-wide reassessment; and/or increase in the physical tax rate. County Commissioners have expressed an unwillingness to conduct a county-wide reassessment, and pressures exist to operate without tax increases. The last reassessment was implemented in 2006. The Borough is developed to its borders; hence the rate of increase of real estate tax base value is less than 1% per year. There are other indicators of future financial distress, including tenant occupancy in excess of 46.9% (significantly higher than that of York County [25.6%], Pennsylvania [31.0%], and the United States as a whole [36.2%]), more than 50% of students on free or reduced lunch, and property blight.

Recognizing these indicators of long-term financial stress, the Borough continued to act to change the financial trajectory. The Borough has prepared its fifth internal five-year budget projection for the period 2020 through 2024, including a capital improvement program for major equipment and vehicles for the same period. The projection demonstrates, in stark manner, the decay of the Borough's financial condition if the Borough was to do nothing to

increase revenue and accommodate the natural growth in expenditures. In such a scenario, revenues stay relatively level while expenditures grow around 4% per year.

As an additional means of assessment, the Borough is currently beginning Phase II evaluation in Pennsylvania's Strategic Management Planning Program (STMP). The program is administered by the Governor's Center for Local Government Services of the Department of Community and Economic Development (DCED). Most municipalities wait until they are at the abyss of financial distress before taking advantage of a program like the STMP. Consequently, the study is typically rushed and completed with a sense of urgency. Recommendations are implemented quickly resulting in some implementations being faulty. By embarking on this exhaustive study now, the Borough will receive a thorough analysis and have ample time to evaluate and implement recommendations.

The program provides grant funding, which the Borough matches, used to hire a third-party firm to conduct an exhaustive analysis of the administration and operations of all the departments of the municipality with the goal of providing opportunities and suggestions for efficiencies, technology, alternate modes of operation, and staffing levels. The study also addresses resources and strategies to clear blight, evaluate and consolidate facilities, and more effectively enforce codes. The results of that study are under review for implementation of initiatives over the coming years.

CONTACTING THE BOROUGH'S FINANCIAL MANAGEMENT

This financial report is designed to provide our citizens, taxpayers, customers, investors and creditors with a general overview of the Borough's finances. Questions about this report or requests for additional information can be directed to The Borough of Hanover, Attn: Nan Dunford, Borough Manager at The Borough of Hanover, 44 Frederick Street, Hanover, PA 17331.

Separately issued financial statements for the Hanover Public Library Association (component unit of the Borough) can be requested at the Guthrie Memorial Library, 2 Library Place, Hanover, PA 17331.

BASIC FINANCIAL STATEMENTS

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION

DECEMBER 31, 2019

	Primary Government			Component Unit
	Governmental Activities	Business-Type Activities	Total	Hanover Public Library Association
ASSETS				
CURRENT ASSETS				
Cash and Cash Equivalents				
Unrestricted	$ 9,074,029	$ 11,427,205	$ 20,501,234	$ 90,586
Restricted	427,774	151,054	578,828	-
Certificates of Deposit	-	10,000	10,000	-
Accounts Receivable	182,433	1,417,469	1,599,902	-
Taxes Receivable, Net	768,144	-	768,144	-
Grants Receivable	371,323	35,717	407,040	-
Due from Other Governments	117,780	459,875	577,655	-
Due from Other Funds	-	12,246	12,246	-
Unbilled Services	134,032	1,169,385	1,303,417	-
Pledges Receivable	20,000	-	20,000	-
Lease Receivable	614,784	-	614,784	-
Inventory	45,756	600,731	646,487	-
Accrued Interest Receivable	-	5,807	5,807	-
Prepaid Expenses and Deposits	257,030	176,014	433,044	-
TOTAL CURRENT ASSETS	**12,013,085**	**15,465,503**	**27,478,588**	**90,586**
NON-CURRENT ASSETS				
Cash and Cash Equivalents - Restricted	416,773	463,167	879,940	152,612
Investments - Restricted	-	-	-	2,431,994
Due from Other Governments	-	65,313	65,313	-
Beneficial Interest in Assets Held by Others	98,221	-	98,221	-
Property and Equipment				
Land and Land Rights	571,261	1,027,255	1,598,516	-
Construction in Progress	32,865	1,459,743	1,492,608	-
Improvements Other than Buildings	408,335	62,168	470,503	-
Machinery and Equipment	6,744,977	4,732,228	11,477,205	-
Other Buildings and Related Improvements	12,906,045	859,863	13,765,908	-
Plant and Infrastructure	14,054,326	114,899,763	128,954,089	-
	34,717,809	123,041,020	157,758,829	-
Less: Accumulated Depreciation	19,125,512	43,071,771	62,197,283	-
Net Property and Equipment	15,592,297	79,969,249	95,561,546	-
TOTAL NON-CURRENT ASSETS	**16,107,291**	**80,497,729**	**96,605,020**	**2,584,606**
TOTAL ASSETS	**28,120,376**	**95,963,232**	**124,083,608**	**2,675,192**
DEFERRED OUTFLOWS OF RESOURCES				
Deferred Amounts from OPEB	124,297	113,268	237,565	-
Deferred Amounts from Pensions	1,547,668	826,441	2,374,109	-
Deferred Amounts on Refunding	34,996	771,228	806,224	-
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**1,706,961**	**1,710,937**	**3,417,898**	**-**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION

DECEMBER 31, 2019

	Primary Government			Component Unit
	Governmental Activities	Business-Type Activities	Total	Hanover Public Library Association
LIABILITIES				
CURRENT LIABILITIES				
Accounts Payable and Accrued Expenses	314,326	549,500	863,826	4,800
Accrued Wages	108,589	85,964	194,553	-
Accrued Compensated Absences	146,000	68,000	214,000	-
Due to Other Funds	12,246	-	12,246	-
Unearned Revenue	83,180	40,534	123,714	-
Accrued Interest Payable	40,510	290,245	330,755	-
Capital Lease Obligations	393,629	114,075	507,704	-
Bonds Payable (Net of Discounts/Premiums)	594,304	1,733,663	2,327,967	-
Payable from Restricted Assets				
Accounts Payable and Accrued Expenses	143,640	-	143,640	-
Consumer Deposits	-	143,854	143,854	-
TOTAL CURRENT LIABILITIES	**1,836,424**	**3,025,835**	**4,862,259**	**4,800**
NON-CURRENT LIABILITIES				
Accrued Compensated Absences	1,559,447	1,092,056	2,651,503	-
OPEB Liability	1,570,214	1,075,270	2,645,484	-
Net Pension Liability	(218,929)	(1,759,358)	(1,978,287)	-
Capital Lease Obligations	1,145,246	235,496	1,380,742	-
Bonds Payable (Net of Discounts/Premiums)	4,519,833	38,730,759	43,250,592	-
Payable from Restricted Assets				
Consumer Deposits	-	463,167	463,167	-
TOTAL NON-CURRENT LIABILITIES	**8,575,811**	**39,837,390**	**48,413,201**	**-**
TOTAL LIABILITIES	**10,412,235**	**42,863,225**	**53,275,460**	**4,800**
DEFERRED INFLOWS OF RESOURCES				
Deferred Amounts from Beneficial Interest	98,221	-	98,221	-
Deferred Amounts from OPEB	407,258	266,454	673,712	-
Deferred Amounts from Pensions	3,041,418	2,184,815	5,226,233	-
TOTAL DEFERRED INFLOWS OF RESOURCES	**3,546,897**	**2,451,269**	**5,998,166**	**-**
NET POSITION				
Net Investment in Capital Assets	9,092,898	39,926,484	49,019,382	-
Restricted				
Expendable	284,134	7,200	291,334	-
Nonexpendable	298,156	-	298,156	2,584,606
Unrestricted	6,193,017	12,425,991	18,619,008	85,786
TOTAL NET POSITION	**$ 15,868,205**	**$ 52,359,675**	**$ 68,227,880**	**$ 2,670,392**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF ACTIVITIES

FOR THE YEAR ENDED DECEMBER 31, 2019

Functions/Programs	Expenses	Program Revenues: Charges for Services	Program Revenues: Operating Grants and Contributions	Program Revenues: Capital Grants and Contributions	Net (Expenses) Revenues and Changes in Net Position: Primary Government: Governmental Activities	Primary Government: Business-Type Activities	Primary Government: Total	Component Unit: Hanover Public Library Association
PRIMARY GOVERNMENT								
Governmental Activities								
General Government	$ 734,165	$ 356,653	$ 40,007	$ -	$ (337,505)	$ -	$ (337,505)	$ -
Public Safety	7,222,151	312,610	555,395	17,677	(6,336,469)	-	(6,336,469)	-
Health and Sanitation	4,540,747	4,740,321	214,279	238,876	652,729	-	652,729	-
Highways	1,879,407	1,964	533,051	243,604	(1,100,788)	-	(1,100,788)	-
Culture and Recreation	1,688,020	125,765	805,832	98,863	(657,560)	-	(657,560)	-
Interest on Long-Term Debt	159,268	-	-	-	(159,268)	-	(159,268)	-
Total Governmental Activities	**16,223,758**	**5,537,313**	**2,148,564**	**599,020**	**(7,938,861)**	**-**	**(7,938,861)**	**-**
Business-Type Activities								
Water	6,077,081	7,835,100	123,512	741	-	1,882,272	1,882,272	-
Regional Wastewater	3,961,548	2,117,697	38,745	-	-	(1,805,106)	(1,805,106)	-
Sanitary Sewer	2,709,322	4,806,788	17,567	480,654	-	2,595,687	2,595,687	-
Stormwater	1,118,301	1,276,386	18,459	35,717	-	212,261	212,261	-
Market House	62,162	40,469	-	-	-	(21,693)	(21,693)	-
Total Business-Type Activities	**13,928,414**	**16,076,440**	**198,283**	**517,112**	**-**	**2,863,421**	**2,863,421**	**-**
TOTAL PRIMARY GOVERNMENT	**$ 30,152,172**	**$ 21,613,753**	**$ 2,346,847**	**$ 1,116,132**	**(7,938,861)**	**2,863,421**	**(5,075,440)**	**-**
COMPONENT UNIT								
Culture and Recreation	**$ 630,947**	**$ 245**	**$ 305,410**	**$ -**	**-**	**-**	**-**	**(325,292)**
		GENERAL REVENUES						
		Taxes						
		Property and Per Capita Taxes			5,888,623	-	5,888,623	-
		Income Taxes			1,701,683	-	1,701,683	-
		Business Privilege Taxes			603,251	-	603,251	-
		Local Services Taxes			593,187	-	593,187	-
		Interest and Investment Earnings			240,353	268,972	509,325	66,797
		Contributions to Permanent Endowments			-	-	-	450,000
		Transfers			(14,044)	14,044	-	-
		TOTAL GENERAL REVENUES			**9,013,053**	**283,016**	**9,296,069**	**516,797**
		CHANGES IN NET POSITION			**1,074,192**	**3,146,437**	**4,220,629**	**191,505**
		Net Position - Beginning of Year, as Restated			14,794,013	49,213,238	64,007,251	2,478,887
		NET POSITION - END OF YEAR			**$ 15,868,205**	**$ 52,359,675**	**$ 68,227,880**	**$ 2,670,392**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

BALANCE SHEET - GOVERNMENTAL FUNDS

DECEMBER 31, 2019

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
ASSETS AND DEFERRED OUTFLOWS OF RESOURCES			
ASSETS			
Cash and Cash Equivalents			
Unrestricted	$ 8,999,219	$ 74,810	$ 9,074,029
Restricted	63,981	780,566	844,547
Accounts Receivable	181,955	478	182,433
Taxes Receivable, Net	768,144	-	768,144
Grants Receivable	371,323	-	371,323
Unbilled Services	134,032	-	134,032
Pledges Receivable	20,000	-	20,000
Lease Receivable	614,784	-	614,784
Due from Other Governments	117,780	-	117,780
Due from Other Funds	13,000	-	13,000
Inventory	45,756	-	45,756
Prepaid Expenses and Deposits	257,030	-	257,030
Beneficial Interest in Assets Held by Others	98,221	-	98,221
TOTAL ASSETS	**11,685,225**	**855,854**	**12,541,079**
DEFERRED OUTFLOWS OF RESOURCES	**-**	**-**	**-**
TOTAL ASSETS AND DEFERRED OUTFLOWS OF RESOURCES	**$ 11,685,225**	**$ 855,854**	**$12,541,079**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

BALANCE SHEET - GOVERNMENTAL FUNDS

DECEMBER 31, 2019

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
LIABILITIES, DEFERRED INFLOWS OF RESOURCES, AND FUND BALANCES			
LIABILITIES			
Accounts Payable and Accrued Expenses	$ 314,326	$ -	$ 314,326
Accrued Wages	108,589	-	108,589
Due to Other Funds	25,246	-	25,246
Unearned Revenue	5,350	295	5,645
Payable from Restricted Assets			
Accounts Payable and Accrued Expenses	-	143,640	143,640
TOTAL LIABILITIES	**453,511**	**143,935**	**597,446**
DEFERRED INFLOWS OF RESOURCES			
Deferred Amounts from Lease Receivable	614,784	-	614,784
Deferred Amounts from Beneficial Interest	98,221	-	98,221
Deferred Amounts from Tax Revenues	212,567	-	212,567
TOTAL DEFERRED INFLOWS OF RESOURCES	**925,572**	**-**	**925,572**
FUND BALANCES			
Nonspendable			
Not in Spendable Form			
Inventory	45,756	-	45,756
Prepaid Expenses and Deposits	257,030	-	257,030
Legally/Contractually Required to be Maintained Intact			
Recreation Purposes	-	298,156	298,156
Restricted			
Capital Projects	-	118,617	118,617
Public Safety Purposes	14,192	-	14,192
Recreation Purposes	49,789	31,381	81,170
Roads and Bridges	-	188,772	188,772
Assigned			
Budgetary Reserve	340,799	-	340,799
Capital Projects	-	10,787	10,787
Recreation Purposes	-	64,206	64,206
Unassigned	9,598,576	-	9,598,576
TOTAL FUND BALANCES	**10,306,142**	**711,919**	**11,018,061**
TOTAL LIABILITIES, DEFERRED INFLOWS OF RESOURCES, AND FUND BALANCES	**$ 11,685,225**	**$ 855,854**	**$12,541,079**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

RECONCILIATION OF THE BALANCE SHEET - GOVERNMENTAL FUNDS TO THE STATEMENT OF NET POSITION

DECEMBER 31, 2019

TOTAL FUND BALANCES - GOVERNMENTAL FUNDS	**$ 11,018,061**
Amounts reported for governmental activities in the statement of net position are different because:	
Capital assets used in governmental activities are not current financial resources and, therefore, are not reported in the governmental funds.	15,592,297
Property and other tax revenues are recognized in the period for which levied, rather than when "available." A portion of the property and other tax revenues are not available and, therefore, are deferred revenue in the governmental funds.	212,567
Other long-term assets are not available to pay for current-period resources and, therefore, are deferred in the governmental funds.	572,245
Net pension liability (asset) and related deferred amounts in governmental activities are not current financial resources and, therefore, are not reported in the governmental funds.	(1,274,821)
Long-term accrued compensated absences and other postemployment benefits (OPEB) are not payable in the current period and, therefore, are reported as wages and insurance expenses in the period during which the absence and service occurs in the governmental funds.	(3,558,622)
Long-term liabilities, including capital lease obligations, bonds payable and related unamortized discounts and premiums, and accrued interest are not due and payable in the current period and, therefore, are not reported in the governmental funds.	(6,693,522)
TOTAL NET POSITION OF GOVERNMENTAL ACTIVITIES	**$ 15,868,205**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCES - GOVERNMENTAL FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
REVENUES			
Taxes	$ 8,734,647	$ -	$ 8,734,647
Licenses and Permits	126,207	-	126,207
Fines and Forfeitures	178,921	-	178,921
Interest and Rents	391,182	30,328	421,510
Intergovernmental	1,950,740	466,414	2,417,154
Charges for Services	5,046,142	4,760	5,050,902
Donations from Private Sources	322,243	8,187	330,430
Miscellaneous	126	-	126
TOTAL REVENUES	**16,750,208**	**509,689**	**17,259,897**
EXPENDITURES			
General Government	749,984	-	749,984
Public Safety	6,711,134	-	6,711,134
Health and Sanitation	4,370,247	16,477	4,386,724
Highways	1,104,318	302,382	1,406,700
Culture and Recreation	1,422,997	10,216	1,433,213
Debt Service	1,086,389	-	1,086,389
Capital Outlays	767,444	384,193	1,151,637
Miscellaneous	313,135	-	313,135
TOTAL EXPENDITURES	**16,525,648**	**713,268**	**17,238,916**
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	**224,560**	**(203,579)**	**20,981**
OTHER FINANCING SOURCES (USES)			
Proceeds from Disposal of Capital Assets	167,586	-	167,586
Interfund Transfers	24,777	(24,777)	-
Proceeds from Capital Lease Obligations	264,249	208,780	473,029
TOTAL OTHER FINANCING SOURCES (USES)	**456,612**	**184,003**	**640,615**
CHANGES IN FUND BALANCES	**681,172**	**(19,576)**	**661,596**
Fund Balances - Beginning of Year	9,624,970	731,495	10,356,465
FUND BALANCES - END OF YEAR	**$ 10,306,142**	**$ 711,919**	**$ 11,018,061**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCES - GOVERNMENTAL FUNDS TO THE STATEMENT OF ACTIVITIES

FOR THE YEAR ENDED DECEMBER 31, 2019

CHANGES IN FUND BALANCES - TOTAL GOVERNMENTAL FUNDS	**$ 661,596**
Amounts reported for governmental activities in the statement of activities are different because:	
Governmental funds report capital outlays as expenditures. However, in the statement of activities, the cost of those assets is allocated over their estimated useful lives as depreciation expense.	
Add: Capital Outlays	1,151,637
Less: Depreciation Expense	(1,229,305)
Debt proceeds provide current financial resources to governmental funds, but issuing debt and lease financing increases long-term liabilities in the statement of net position. Repayment of debt and capital lease obligations principal are expenditures in the governmental funds, but the repayment reduces long-term liabilities in the statement of net position. Other costs related to debt issuance and retirement use governmental fund resources, but recognition of expense is deferred and reported as amortization on the statement of net position.	
Amortization of Deferred Amounts on Refunding	4,379
Payments on Capital Lease Obligations	349,118
Payments on Bonds Payable	567,000
Proceeds from Capital Lease Obligations	(473,029)
Property and other tax revenues in the statement of activities that do not provide current financial resources are not reported as revenues in the governmental funds, including applicable future tax credits payable.	52,097
The net effect of various miscellaneous transactions involving capital assets (i.e. sales, interfund transfers, trade-ins) is to decrease net position.	(126,558)
In the statement of activities, certain expenses do not require the use of current financial resources and, therefore, are not reported as expenditures in the governmental funds. These expenses include the changes in:	
Net Pension Liability (Asset)	3,996,767
Amortization of Deferred Amounts from Pensions	(4,014,310)
Accrued Interest Payable	6,624
Accrued Compensated Absences	(23,868)
OPEB Liability	502,246
Amortization of Deferred Amounts from OPEB	(350,202)
CHANGES IN NET POSITION OF GOVERNMENTAL ACTIVITIES	**$ 1,074,192**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION - PROPRIETARY FUNDS

DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
ASSETS						
CURRENT ASSETS						
Cash and Cash Equivalents						
Unrestricted	$ 7,590,303	$ 304,951	$ 3,445,716	$ 46,704	$ 39,531	$ 11,427,205
Restricted	143,854	-	-	-	7,200	151,054
Certificates of Deposit	-	-	10,000	-	-	10,000
Accounts Receivable	742,813	2,283	567,233	104,863	277	1,417,469
Grants Receivable	-	-	-	35,717	-	35,717
Due from Other Governments	-	100,000	359,875	-	-	459,875
Due from Other Funds	25,246	70,497	184,126	-	-	279,869
Unbilled Services	449,339	-	577,397	142,649	-	1,169,385
Inventory	504,692	47,431	40,719	7,889	-	600,731
Accrued Interest Receivable	-	5,786	21	-	-	5,807
Prepaid Expenses	95,976	48,602	14,621	16,761	54	176,014
TOTAL CURRENT ASSETS	**9,552,223**	**579,550**	**5,199,708**	**354,583**	**47,062**	**15,733,126**
NON-CURRENT ASSETS						
Cash and Cash Equivalents - Restricted	463,167	-	-	-	-	463,167
Due from Other Governments	-	65,313	-	-	-	65,313
Property and Equipment						
Land and Land Rights	902,320	-	124,935	-	-	1,027,255
Construction in Progress	1,221,933	-	237,810	-	-	1,459,743
Improvements Other than Buildings	39,139	-	-	-	23,029	62,168
Machinery and Equipment	2,717,657	803,710	1,169,676	39,685	1,500	4,732,228
Other Buildings and Related Improvements	426,033	61,127	156,419	-	216,284	859,863
Plant and Infrastructure	54,102,396	53,595,382	7,193,286	-	8,699	114,899,763
	59,409,478	54,460,219	8,882,126	39,685	249,512	123,041,020
Less: Accumulated Depreciation	16,539,907	22,631,479	3,723,069	3,969	173,347	43,071,771
Net Property and Equipment	42,869,571	31,828,740	5,159,057	35,716	76,165	79,969,249
TOTAL NON-CURRENT ASSETS	**43,332,738**	**31,894,053**	**5,159,057**	**35,716**	**76,165**	**80,497,729**
TOTAL ASSETS	**52,884,961**	**32,473,603**	**10,358,765**	**390,299**	**123,227**	**96,230,855**
DEFERRED OUTFLOWS OF RESOURCES						
Deferred Amounts from OPEB	66,916	20,982	11,410	13,960	-	113,268
Deferred Amounts from Pensions	488,239	153,093	83,254	101,855	-	826,441
Deferred Amounts on Refunding	301,537	380,406	89,285	-	-	771,228
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**856,692**	**554,481**	**183,949**	**115,815**	**-**	**1,710,937**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION - PROPRIETARY FUNDS

DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
LIABILITIES						
CURRENT LIABILITIES						
Accounts Payable and Accrued Expenses	201,471	57,279	256,092	34,045	613	549,500
Accrued Wages	52,464	15,567	8,059	9,741	133	85,964
Accrued Compensated Absences	36,000	-	8,000	24,000	-	68,000
Unearned Revenue	3,110	37,424	-	-	-	40,534
Accrued Interest Payable	139,934	128,839	21,472	-	-	290,245
Due to Other Funds	87,096	167,527	13,000	-	-	267,623
Capital Lease Obligations	10,111	3,599	100,365	-	-	114,075
Bonds Payable (Net of Discounts/Premiums)	445,038	1,278,554	10,071	-	-	1,733,663
Payable from Restricted Assets						
Consumer Deposits	143,854	-	-	-	-	143,854
TOTAL CURRENT LIABILITIES	**1,119,078**	**1,688,789**	**417,059**	**67,786**	**746**	**3,293,458**
NON-CURRENT LIABILITIES						
Accrued Compensated Absences	643,053	235,216	108,284	104,535	968	1,092,056
OPEB Liability	635,240	199,187	108,321	132,522	-	1,075,270
Net Pension Liability	(1,039,381)	(325,910)	(177,234)	(216,833)	-	(1,759,358)
Capital Lease Obligations	41,210	14,112	180,174	-	-	235,496
Bonds Payable (Net of Discounts/Premiums)	18,878,072	17,761,728	2,090,959	-	-	38,730,759
Payable from Restricted Assets						
Consumer Deposits	463,167	-	-	-	-	463,167
TOTAL NON-CURRENT LIABILITIES	**19,621,361**	**17,884,333**	**2,310,504**	**20,224**	**968**	**39,837,390**
TOTAL LIABILITIES	**20,740,439**	**19,573,122**	**2,727,563**	**88,010**	**1,714**	**43,130,848**
DEFERRED INFLOWS OF RESOURCES						
Deferred Amounts from OPEB	157,414	49,359	26,842	32,839	-	266,454
Deferred Amounts from Pensions	1,290,729	404,723	220,094	269,269	-	2,184,815
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**1,448,143**	**454,082**	**246,936**	**302,108**	**-**	**2,451,269**
NET POSITION						
Net Investment in Capital Assets	23,796,677	13,151,153	2,866,773	35,716	76,165	39,926,484
Restricted	-	-	-	-	7,200	7,200
Unrestricted	7,756,394	(150,273)	4,701,442	80,280	38,148	12,425,991
TOTAL NET POSITION	**$ 31,553,071**	**$ 13,000,880**	**$ 7,568,215**	**$ 115,996**	**$ 121,513**	**$ 52,359,675**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND NET POSITION - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
OPERATING REVENUES						
Water, Sewer, and Stormwater Fees	$ 7,622,382	$ -	$ 4,801,138	$ 1,178,814	$ -	$ 13,602,334
Wastewater Treatment Charges	-	2,096,202	-	-	-	2,096,202
Market Stall Rents	-	-	-	-	38,038	38,038
Other Revenues	115,041	21,245	-	-	-	136,286
TOTAL OPERATING REVENUES	**7,737,423**	**2,117,447**	**4,801,138**	**1,178,814**	**38,038**	**15,872,860**
OPERATING EXPENSES						
Administrative and General	178,314	40,837	77,352	36,207	2,103	334,813
Contractual Services	125,692	197,335	94,891	185,670	-	603,588
Depreciation	1,070,991	1,382,437	276,050	3,969	11,157	2,744,604
Materials and Supplies	186,175	184,202	6,631	98,165	949	476,122
Personnel Services	2,917,433	1,024,393	490,606	767,358	19,523	5,219,313
Repairs and Maintenance	58,170	192,606	37,968	20,039	16,057	324,840
Treatment	328,187	-	1,637,594	-	-	1,965,781
Utilities	474,364	342,740	4,467	6,893	12,373	840,837
TOTAL OPERATING EXPENSES	**5,339,326**	**3,364,550**	**2,625,559**	**1,118,301**	**62,162**	**12,509,898**
OPERATING INCOME (LOSS)	**2,398,097**	**(1,247,103)**	**2,175,579**	**60,513**	**(24,124)**	**3,362,962**
NON-OPERATING REVENUES (EXPENSES)						
Gain (Loss) on Disposition of Assets	(140,727)	2,000	350	-	-	(138,377)
Interest and Rents	274,618	18,865	173,284	1,307	1,557	469,631
Non-Capital Contributions	123,512	38,745	17,567	-	-	179,824
Other Revenues	240	250	-	-	2,431	2,921
Interest Expense	(597,028)	(598,998)	(84,113)	-	-	(1,280,139)
TOTAL NON-OPERATING REVENUES (EXPENSES)	**(339,385)**	**(539,138)**	**107,088**	**1,307**	**3,988**	**(766,140)**
INCOME (LOSS) BEFORE CAPITAL CONTRIBUTIONS AND TRANSFERS	**2,058,712**	**(1,786,241)**	**2,282,667**	**61,820**	**(20,136)**	**2,596,822**
Capital Contributions	741	-	480,654	54,176	-	535,571
Interfund Transfers	927	1,583,885	(1,570,768)	-	-	14,044
CHANGES IN NET POSITION	**2,060,380**	**(202,356)**	**1,192,553**	**115,996**	**(20,136)**	**3,146,437**
Net Position - Beginning of Year	29,492,691	13,203,236	6,375,662	-	141,649	49,213,238
NET POSITION - END OF YEAR	**$ 31,553,071**	**$ 13,000,880**	**$ 7,568,215**	**$ 115,996**	**$ 121,513**	**$ 52,359,675**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CASH FLOWS - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
CASH FLOWS FROM OPERATING ACTIVITIES						
Inflows						
Cash Received from Customers	$ 7,677,897	$ 347,124	$ 4,690,962	$ 912,543	$ 38,039	$ 13,666,565
Cash Received for Interfund Services	19,132	1,449,601	63,385	18,759	-	1,550,877
	7,697,029	1,796,725	4,754,347	931,302	38,039	15,217,442
Outflows						
Cash Paid to Suppliers	1,129,504	923,608	136,069	319,763	45,167	2,554,111
Cash Paid for Interfund Services	170,212	13,797	1,497,078	17,816	3,413	1,702,316
Cash Paid to Employees	3,132,392	1,103,644	636,216	527,100	2,001	5,401,353
	4,432,108	2,041,049	2,269,363	864,679	50,581	9,657,780
NET CASH PROVIDED (USED) BY OPERATING ACTIVITIES	**3,264,921**	**(244,324)**	**2,484,984**	**66,623**	**(12,542)**	**5,559,662**
CASH FLOWS FROM NON-CAPITAL FINANCING ACTIVITIES						
Inflows						
Receipt of Non-Capital Contributions	123,512	38,745	17,567	-	-	179,824
Net Cash Received from Other Funds	-	-	110,613	-	-	110,613
	123,512	38,745	128,180	-	-	290,437
Outflows						
Net Cash Paid to Other Funds	-	110,613	-	-	-	110,613
NET CASH PROVIDED (USED) BY NON-CAPITAL FINANCING ACTIVITIES	**123,512**	**(71,868)**	**128,180**	**-**	**-**	**179,824**
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES						
Inflows						
Proceeds from Sale of Capital Assets	1,300	1,000	350	-	-	2,650
Proceeds from Long-Term Debt	-	-	116,300	-	-	116,300
Receipt of Contributed Capital and Development Charges	-	100,000	-	18,459	-	118,459
	1,300	101,000	116,650	18,459	-	237,409

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CASH FLOWS - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2019

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Outflows						
Interest Paid	582,127	1,577	615,712	-	-	1,199,416
Purchase of Capital Assets	2,614,831	76,995	524,223	39,685	-	3,255,734
Payments on Long-Term Debt	772,291	3,321	1,265,400	-	-	2,041,012
Repayment of Consumer Deposits	143,859	-	-	-	-	143,859
	4,113,108	81,893	2,405,335	39,685	-	6,640,021
NET CASH PROVIDED (USED) BY CAPITAL AND RELATED FINANCING ACTIVITIES	**(4,111,808)**	**19,107**	**(2,288,685)**	**(21,226)**	**-**	**(6,402,612)**
CASH FLOWS FROM INVESTING ACTIVITIES						
Inflows						
Miscellaneous Income Received	6,795	250	-	-	2,431	9,476
Rent Income Received	100,547	-	-	-	-	100,547
Interest Received	177,181	22,365	173,284	1,307	1,557	375,694
	284,523	22,615	173,284	1,307	3,988	485,717
NET CASH PROVIDED BY INVESTING ACTIVITIES	**284,523**	**22,615**	**173,284**	**1,307**	**3,988**	**485,717**
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	**(438,852)**	**(274,470)**	**497,763**	**46,704**	**(8,554)**	**(177,409)**
Cash and Cash Equivalents - Beginning of Year	8,636,176	579,421	2,947,953	-	55,285	12,218,835
CASH AND CASH EQUIVALENTS - END OF YEAR	**$ 8,197,324**	**$ 304,951**	**$ 3,445,716**	**$ 46,704**	**$ 46,731**	**$12,041,426**
RECONCILIATION OF CASH AND CASH EQUIVALENTS TO THE STATEMENT OF NET POSITION						
CURRENT ASSETS						
Cash and Cash Equivalents						
Unrestricted	$ 7,590,303	$ 304,951	$ 3,445,716	$ 46,704	$ 39,531	$ 11,427,205
Restricted	143,854	-	-	-	7,200	151,054
NON-CURRENT ASSETS						
Cash and Cash Equivalents - Restricted	463,167	-	-	-	-	463,167
CASH AND CASH EQUIVALENTS - END OF YEAR	**$ 8,197,324**	**$ 304,951**	**$ 3,445,716**	**$ 46,704**	**$ 46,731**	**$12,041,426**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF FIDUCIARY NET POSITION

DECEMBER 31, 2019

	Pension (and Other Employee Benefit) Trust Funds
ASSETS	
Cash and Cash Equivalents	$ 1,554,807
Contributions Receivable	47,804
Accrued Interest Receivable	87,878
Investments	55,808,455
TOTAL ASSETS	**57,498,944**
DEFERRED OUTFLOWS OF RESOURCES	-
LIABILITIES	
Pension Benefits Payable	744
TOTAL LIABILITIES	**744**
DEFERRED INFLOWS OF RESOURCES	-
NET POSITION	
Restricted for Pension Benefits	57,498,200
TOTAL NET POSITION	**$ 57,498,200**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

FOR THE YEAR ENDED DECEMBER 31, 2019

	Pension (and Other Employee Benefit) Trust Funds
ADDITIONS	
Contributions	
Employer	$ 121,485
Commonwealth	957,533
Plan Members	270,485
Total Contributions	1,349,503
Investment Earnings	
Interest Income	802,058
Dividends	439,453
	1,241,511
Less: Investment Expense	230,666
Net Investment Earnings	1,010,845
TOTAL ADDITIONS	**2,360,348**
DEDUCTIONS	
Benefits	2,241,694
Administrative Expense	30,600
TOTAL DEDUCTIONS	**2,272,294**
NET APPRECIATION IN FAIR VALUE OF INVESTMENTS	**8,783,886**
CHANGES IN NET POSITION	**8,871,940**
Net Position - Beginning of Year	48,626,260
NET POSITION - END OF YEAR	**$ 57,498,200**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 1. Summary of Significant Accounting Policies

Reporting Entity

The Borough of Hanover, Pennsylvania (the "Borough") operates under a Council-manager form of government and provides the following services as authorized by the Borough Code: Public Safety - Police and Fire, Highways and Streets, Sanitation, Public Service, Health and Social Services, Culture and Recreation, Public Improvements, Planning and Zoning, Water, Sanitary Sewer, Stormwater, Market House Rentals, and General Administrative Services.

The Borough's financial statements are prepared in accordance with accounting principles generally accepted in the United States of America (GAAP). The Governmental Accounting Standards Board (GASB) is responsible for establishing GAAP for state and local governments through its pronouncements (Statements and Interpretations).

Component Units

In evaluating how to define the Borough for financial reporting purposes, management has considered all potential component units. The basis for determining component units is the governing body's ability to exercise oversight responsibility. The most significant manifestation of this ability is financial interdependency. Other manifestations of the ability to exercise oversight responsibility include, but are not limited to, the selection of governing authority, the designation of management, the ability to significantly influence operations, and the accountability for fiscal matters. The other criterion used to evaluate potential component units for inclusion or exclusion from the reporting entity is the existence of special financing relationships, regardless of whether the Borough is able to exercise oversight responsibilities. Blended component units, although legally separate entities, are in substance, part of the Borough's operations and so data from these units are combined with data from the Borough, the primary government. Based upon the application of these criteria, the following are component units of the Borough:

Borough of Hanover Stormwater Authority ("Authority") - *Blended Component Unit* - in November 2018, Certificate of Incorporation was filed to create the Authority to manage the Borough's implementation and operation of the Municipal Separate Storm Sewer (MS4) Program, with permit currently pending State approval. The Borough Council appoints a voting majority of the Authority's Board, and guides all management functions of the entity. Separate financial statements of the Authority are not prepared.

Hanover Public Library Association (HPLA), Inc. - *Major Discretely Presented Component Unit* - the HPLA, founded in 1910, was incorporated particularly to promote and stimulate interest among members and people of Hanover and vicinity and render assistance in the building, equipping, and maintaining of the Guthrie Memorial Library, and to provide support for literacy and educational undertakings.

The HPLA's economic resources almost entirely directly benefit the Borough. The HPLA's fiscal year ended March 31, 2019 audited financial statements have been prepared in accordance with Accounting Standards Codification (ASC) 958, *Not-for-Profit Entities*, which is a basis of accounting that differs from the Borough. Financial presentations of the component unit in the Borough's government-wide financial statements and selected following disclosures are presented based on the ASC 958 guidance. Separate audited financial statements of the HPLA are available upon request at the Guthrie Memorial Library.

Fire Drivers' Post Employment Health Plan (PEHP) - *Blended (Fiduciary) Component Unit* - the Fire Drivers' PEHP, created in 2009, was established by the Borough, pursuant to Internal Revenue Code Section 501(c)(9), to provide contributions, on behalf of its eligible employees, to assist with post-employment health care needs and expenses. Separate financial statements of the Fire Drivers' PEHP are not prepared.

Joint Ventures

A joint venture is a legal entity that results from a contractual arrangement owned, operated, or governed by two or more participants as a separate and specific activity subject to joint control, in which the participants retain an ongoing financial interest or responsibility. Joint control means no single participant has the ability to unilaterally control the financial or operating policies of the joint venture. The purpose of a joint venture is to pool resources and share the costs, risks, and rewards of providing goods or services. The Borough has the following significant joint venture relationships:

Hanover Area Fire and Rescue Commission (the "Commission") - in December 2016, the Borough (through Ordinance) approved an Intergovernmental Cooperation Agreement with Penn Township for creation of the "Hanover Area Fire and Rescue" district, formally effective February 1, 2018 for an initial period of seven years. All Fire Department personal and real property of the Borough was transferred to the Commission shortly thereafter. The Commission pooled resources and funds to establish and operate a regional fire and emergency services response district under Commission control. The Commission includes appointed members from the Borough, Penn Township, volunteer fire and rescue organization, and an at-large member - no one organization appoints a majority of the members. The Commission continues to be serviced by employees of the respective municipalities' paid Fire Departments, with a joint Fire Chief and Executive Secretary, equally funded by each municipality.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

New Accounting Pronouncements Adopted

The following summarizes GASB Statements implemented by the Borough during the year ended December 31, 2019, and the relating effects on the financial statements presentation and disclosure, as applicable:

> GASB Statement No. 84, *Fiduciary Activities* - The objective of this statement is to improve guidance regarding the identification of fiduciary activities for accounting and financial reporting purposes, and how those activities should be reported. The statement establishes criteria for identifying fiduciary activities of all state and local governments, focusing on the governments control of the activity's assets, and the beneficiaries with whom a fiduciary relationship exists. The provisions of this statement are effective for periods beginning after December 15, 2018, and were implemented by the Borough as of January 1, 2019 with recognition of the Fire Drivers' PEHP fiduciary component unit noted above.

Basic Financial Statements - Government-Wide Financial Statements

The Borough's basic financial statements include both the government-wide (reporting the Borough as a whole) and fund financial statements (reporting the Borough's major funds). Both the government-wide and fund financial statements categorize primary activities as either governmental or business-type.

The Borough's general administrative, public safety, health and sanitation, highways, and culture and recreation services are classified as governmental activities. The Borough's water, regional wastewater, sanitary sewer, stormwater, and market house services are classified as business-type activities. Administrative overhead charges are made to funds and programs and are thereby included in the direct expenses of those funds and programs.

This government-wide focus is more on the sustainability of the Borough as an entity and the change in the Borough's net position resulting from the current year's activities.

In the government-wide statement of net position, both the governmental and business-type activities columns are (a) presented on a consolidated basis by column, and (b) reported on a full accrual, economic resource basis, which recognizes all long-term assets, receivables, and deferred outflows of resources as well as long-term debt and obligations and deferred inflows of resources. Fiduciary funds are not included in the government-wide financial statements. The Borough's net position is reported in three parts - net investment in capital assets; restricted net position; and unrestricted net position. The Borough first utilizes restricted resources to finance qualifying activities.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

The government-wide statement of activities reports both the gross and net cost per functional category (public safety, highways, etc.), which are otherwise being supported by general government revenues (property and income taxes, certain intergovernmental revenues, etc.). The statement of activities reduces gross expenses (including depreciation) by related program revenues and operating and capital grants and contributions. The program revenues must be directly associated with the function or business-type activity. Program revenues include revenues from licenses and permit fees, fines and forfeitures, and charges for services. Operating grants include operating-specific and discretionary (either operating or capital) grants while the capital grant column reflects capital-specific grants.

The net costs (by function or business-type activity) are normally covered by general revenues (property and income taxes, certain intergovernmental revenues, interest income, etc.) The Borough does not allocate indirect costs.

Basic Financial Statements - Fund Financial Statements

The financial transactions of the Borough are reported in individual funds in the fund financial statements. Each fund is accounted for by providing a separate set of self-balancing accounts that comprises its assets, deferred outflows of recourses, liabilities, deferred inflows of resources, fund equity, revenues, and expenditures/expenses. The various funds are reported by generic classification within the financial statements.

The Borough utilizes various criteria (percentage of the assets and deferred outflows of resources, liabilities and deferred inflows of resources, and revenues or expenditures/expenses of either fund category or the governmental and enterprise combined) for the determination of major funds.

Governmental Funds

Governmental funds are those through which most governmental functions of the Borough are financed. Governmental fund reporting focuses on the sources, uses, and balances of current financial resources. Expendable assets and deferred outflows of resources are assigned to the various governmental funds according to the purpose for which they may or must be used. Current liabilities and deferred inflows of resources are assigned to the fund from which they will be paid. The difference between governmental fund assets and deferred outflows of resources and liabilities and deferred inflows of resources is reported as fund balance. The following is a description of the Borough's major governmental fund:

General Fund - The General Fund accounts for all financial resources, except those required to be accounted for in another fund. The General Fund consists of the following internal reporting funds: General Operating and Guthrie Memorial Library Funds.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

The following is a description of the Borough's Non-Major Governmental Funds:

Capital Projects Fund - The Capital Projects Fund accounts for financial resources used for the acquisition and construction of major capital facilities that are not financed by proprietary funds. This fund includes certain road improvement and construction projects related to the Guthrie Memorial Library, and general obligation bond issuances for governmental fund purposes. Fund balance has been specifically restricted or assigned, as applicable, for these purposes.

Highway Liquid Fuels Fund - The Highway Liquid Fuels Fund accounts for legally restricted revenues derived from Commonwealth gasoline taxes. Expenditures are restricted by Commonwealth law to Borough road and bridge repairs, maintenance, and improvement programs. Fund balance has been specifically restricted for these purposes.

Recreation Fund - The Recreation Fund accounts for donations and recreation activities charges to benefit the Borough's recreation facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Hanover Recreation Board.

Recreation Endowment Fund - The Recreation Endowment Fund accounts for contributions to a permanent endowment for benefit of the Borough's recreation facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Hanover Recreation Board.

Library Endowment Fund - The Library Endowment Fund accounts for contributions restricted for benefit of the Guthrie Memorial Library facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Borough.

Proprietary Funds

The focus of proprietary fund measurement is upon determination of operating income, change in net position, financial position, and cash flows. The GAAP applicable are those similar to businesses in the private sector. Proprietary funds distinguish operating revenues and expenses from non-operating items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with the proprietary fund's principal ongoing operations. The principal operating revenues for the Borough's proprietary funds are charges for water, sewer, and wastewater treatment services and market stall rentals. Operating expenses for the Borough's proprietary funds include administrative and general costs, contractual services, depreciation on capital assets, materials and supplies, personnel services, transmission and distribution repairs and maintenance, water and sewer treatment costs, and utilities.

All revenues or expenses not meeting this definition are reported as non-operating revenues/expenses.

The Borough's proprietary funds are all classified as enterprise funds. Enterprise funds are required to be used to account for operations for which a fee is charged to external users for goods or services and the activity (a) is financed with debt that is solely secured by a pledge of the net revenues, (b) has third party requirements that the cost of providing services, including capital costs, be recovered with fees and charges, or (c) establishes fees and charges based on a pricing policy designed to recover similar costs. The following is a description of the Borough's major enterprise funds:

Water Fund - The Water Fund is used to account for the revenues generated from the charges for distribution of water to residential, commercial, industrial, and public users of the Borough.

Regional Wastewater Fund - The Regional Wastewater Fund is used to account for the revenues generated from the charges for sanitary sewer services provided for residential, commercial, industrial, and public users located outside of the Borough limits on behalf of regional municipalities participating in regional wastewater treatment plant use governed by intermunicipal agreements, and for interfund charges for sanitary sewer usage.

Sanitary Sewer Fund - The Sanitary Sewer Fund is used to account for the revenues generated from the charges for sanitary sewer services provided for the residential, commercial, industrial, and public users of the Borough.

Stormwater Authority Fund (*blended component unit*) - The Stormwater Authority Fund is used to account for the revenues generated from the charges for stormwater services provided for residential, commercial, industrial, and public users of the Borough.

The following is a description of the Borough's Non-Major Proprietary Fund:

Market House Fund - The Market House Fund is used to account for the revenues generated from vendors renting space for a farmers market.

Fiduciary Funds

Fiduciary funds are used to account for resources held by the Borough in a trustee capacity for individuals, private organizations, or other governments and therefore are not available to support the Borough's own programs. The fiduciary funds of the Borough are the Pension (and Other Employee Benefit) Trust Funds.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

For accounting measurement purposes, the Pension (and Other Employee Benefit) Trust Funds are accounted for in essentially the same manner as proprietary funds. The Pension (and Other Employee Benefit) Trust Funds account for resources of the Borough's Police, Fire Drivers' and Hanover Employees' Pension Funds Plans, and the Fire Drivers' PEHP Fund Plan.

Basis of Accounting

Basis of accounting refers to the point at which revenues or expenditures/expenses are recognized in the accounts and reported in the financial statements. It relates to the timing of the measurements made regardless of the measurement focus applied.

Accrual - Both governmental and business-type activities in the government-wide, proprietary funds, and fiduciary funds financial statements are presented on the accrual basis of accounting. Revenues are recognized when earned and expenses are recognized when incurred, regardless of the timing of related cash flows. Property and other taxes are recognized as revenues in the year for which they are levied. Grants and similar items are recognized as revenues as soon as all eligible requirements imposed by the provider have been met.

Modified Accrual - The governmental funds financial statements are presented on the modified accrual basis of accounting. Under the modified accrual basis of accounting, revenues are recorded when susceptible to accrual; i.e., both measurable and available. "Available" means collectible within the current period or within 60 days after year-end. Expenditures are generally recognized under the modified accrual basis of accounting when the related liability is incurred. The exception to this general rule is that principal and interest on general obligation long-term debt, if any, is recognized when due.

In applying the "susceptible to accrual" concept to intergovernmental revenues, the provider should recognize liabilities and expenses and the recipient should recognize receivables and revenues when the applicable eligibility requirements, including time requirements, are met.

Resources transmitted before the eligibility requirements are met should, under most circumstances, be reported as advances by the provider and as unearned revenue or a deferred inflow of resources by the recipient.

Cash and Cash Equivalents and Depository Pool

For purposes of the statement of cash flows, the Borough considers all highly liquid certificates of deposit and investments purchased with a maturity of three months or less to be cash equivalents, and the carrying amount approximates estimated fair value because of the short maturity of those instruments. The majority of the Borough's cash deposits are pooled into a

common pooled account in order to maximize investment opportunity. Each fund whose monies are deposited in the pooled account has equity therein, and interest earned on the account is allocated based upon relative equity at month-end.

Investments

Investment purchases and sales are recorded as of the trade date. Dividend income is recognized on the ex-dividend date. Other investment income is recognized when earned.

Investments are reported at fair value. Fair value is the amount reasonably expected to be received for an investment in a current sale between a willing buyer and a willing seller. Fixed income securities, real estate investment trusts (REITs), bond and mutual funds, and common and preferred stocks are valued based on published market prices and quotations from national security exchanges and securities pricing services. Money market investments that have a remaining maturity at the time of purchase of one year or less are measured at amortized cost.

Net appreciation (depreciation) is determined by calculating the change in the fair value of investments between the beginning of the year and the end of the year, less purchases of investments at cost, plus sales of investments at fair value. Investment expenses consist of external expenses directly related to investment operations, as well as the internal administrative expenses associated with the investment program.

Fair Value

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Borough categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The fair value hierarchy categorizes the inputs to valuation techniques used to measure fair value into three levels based on the extent to which inputs used in measuring fair value are observable in the market:

Level 1 - Inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2 - Inputs are those other than quoted prices within level 1 - that are observable for an asset or liability, either directly or indirectly.

Level 3 - Inputs are unobservable inputs for an asset or liability.

If the fair value of an asset or liability is measured using inputs from more than one level of the fair value hierarchy, the measurement is considered to be based on the lowest priority level input that is significant to the entire measurement.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Inventory

Inventories of materials and supplies are maintained in the General, Water, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds.

Materials and supplies maintained in the General, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds are carried in an inventory account at cost using the first-in, first-out method. Materials and supplies maintained in the Water Fund are carried in an inventory account at cost using an average costing method. All funds subsequently charge inventory to expenditures when consumed.

All other fund types expense inventoriable items when purchased.

Capital Assets

Capital assets used in governmental fund type operations are accounted for in the government-wide financial statements, rather than in governmental funds.

All capital assets are valued at historical cost or estimated historical cost if actual historical cost is not available. Donated fixed assets are valued at their estimated acquisition value on the date donated. Capital assets with a value of $5,000 or more are capitalized by the Borough except for Water Fund additions, which are capitalized if their value is $750 or greater, per National Association of Regulatory Utility Commissioners (NARUC) Accounting Instruction standards adopted by the Pennsylvania Public Utilities Commission (PUC). Effective January 1, 2018, the cost of interest incurred during the construction of capital assets is expensed as incurred for all funds.

Capital assets are depreciated using the straight-line method over the following estimated useful lives:

Improvements Other than Buildings	5-20 years
Machinery and Equipment	5-20 years
Other Buildings and Related Improvements	5-50 years
Plant and Infrastructure	20-125 years

Government-Wide Financial Statements - In the government-wide financial statements, fixed assets are accounted for as capital assets. The Borough elected to retroactively report all general infrastructure assets in a prior year, which includes roads, bridges, traffic signals, utility facilities, and storm sewers and drains. The Borough elected not to retroactively report intangible assets identified as having indefinite useful lives or being internally generated. All intangible assets identified as having indefinite useful lives acquired or being internally generated after December 31, 2009 are reported at historical cost.

Depreciation of all exhaustible fixed assets is recorded as a direct expense in the statement of activities, with accumulated depreciation reflected in the statement of net position.

Additions are recorded at cost or, if contributed property, at their estimated fair value at time of contribution. Repairs and maintenance are recorded as expenditures/expenses; renewals and betterments are capitalized. The sale or disposal of fixed assets is recorded by removing cost and accumulated depreciation from the accounts and charging the resulting gain or loss to income.

Fund Financial Statements - In the fund financial statements, fixed assets used in governmental funds operations are accounted for as capital outlay expenditures of the governmental funds upon acquisition. Fixed assets used in proprietary funds operations are accounted for in the same manner as in the government-wide financial statements.

Deferred Outflows and Inflows of Resources

In addition to assets, the statement of net position and balance sheet will sometimes report a separate section for deferred outflows of resources. This separate financial statement element represents a consumption of net position or fund balance that applies to a future period(s) and so will not be recognized as an outflow of resources (expense/expenditure) until that time. In addition to deferrals related to pensions (disclosed in respective notes below), the Borough reports deferred amounts on refunding in the statement of net position, resulting from the difference in the carrying value of the refunded debt and its reacquisition price, which is deferred and amortized over the shorter of the life of the refunded or refunding debt.

In addition to liabilities, the statement of net position and balance sheet will sometimes report a separate section for deferred inflows of resources. This separate financial statement element represents an acquisition of net position or fund balance that applies to a future period(s) and so will not be recognized as an inflow of resources (revenue) until that time. Deferrals related to pensions, beneficial interest in assets held by others, and tax revenues are disclosed in their respective notes below.

Unearned Revenue

Charges for services and other amounts collected in advance are recorded as unearned revenue as a current liability.

Interfund Activity

Sales of goods and services between funds are reported as revenues in the seller funds and as expenditures/expenses in the purchaser funds. Flows of cash or goods from one fund to another, without a requirement for repayment, are reported as interfund transfers. Interfund transfers are reported as other financing sources/uses in governmental funds, and after non-

operating revenues/expenses in proprietary funds. Interfund balances are expected to be repaid within the following calendar year.

The Borough allocates to several funds a percentage of the salaries and wages and related costs of personnel who perform general and administrative services for such funds but are paid through the General Fund. Health and life insurance costs are allocated based on the respective employees' primary fund and function.

Accrued Compensated Absences

Through various collective bargaining agreements and Codification, the Borough permits employees to accumulate and carry over various levels of vacation and sick leave, a portion of each are payable at termination. The salary-related payments representing the employer's share of Social Security and Medicare taxes have been accrued. The vested annual leave is expensed as incurred in the appropriate funds.

Accrued compensated absences are accrued when incurred in the government-wide financial statements and in the proprietary funds, with current portions recognized for anticipated or known retirements as of the reporting date. In the governmental fund financial statements, the portion of the liability which is matured and payable is included in accrued compensated absences liability and the unmatured portion is not reported.

Bond Discounts, Premiums, Deferred Amounts on Refunding, and Issuance Costs

In the government-wide and proprietary funds financial statements, bond discounts, premiums, and deferred amounts on refunding are capitalized and amortized over the terms of the respective bonds using a method that approximates the effective interest method. Unamortized bond discounts and premiums are netted against bonds payable for presentation, and unamortized deferred amounts on refunding are presented as deferred outflows of resources. Bond issuance costs, excluding amounts prepaid for bond insurance, are expensed as incurred.

In the governmental funds financial statements, bond discounts, premiums, and issuance costs are expensed in the year of the bond issuance. Bond discounts and premiums are netted against bond proceeds and reported as "Other Financing Sources." Bond issuance costs are expensed as "Debt Service."

Net Position and Fund Balances

In the government-wide, proprietary funds, and fiduciary funds financial statements, net position is classified in the following categories:

Net Investment in Capital Assets - This category groups all capital assets, including infrastructure, into one component of net position. Accumulated depreciation and the outstanding balances of debt and accounts payable and retainage payable that are attributable to the acquisition, construction, or improvement of these assets reduce this category.

Restricted Net Position - This category presents external restrictions imposed by creditors, grantors, contributors (including those who have donated to the Guthrie Memorial Library and recreation endowments, in both expendable and nonexpendable forms) or laws or regulations of other governments and restrictions imposed by law through constitutional provisions or enabling legislation.

Unrestricted Net Position - This category represents the net position of the Borough that is not restricted for any project or other purpose. However, these funds may be constrained for specific projects or purposes in the fund financial statements.

In the governmental fund financial statements, fund balances are classified in the following categories:

Nonspendable Fund Balance - This category represents amounts that are not in spendable form (such as inventory and long-term receivables) or are required to be maintained intact (such as permanent endowments).

Restricted Fund Balance - This category represents amounts constrained to specific purposes by their providers (such as grantors, bondholders, and higher levels of government), through constitutional provisions, or by enabling legislation.

Committed Fund Balance - This category represents amounts constrained to specific purposes by a government itself, using its highest level of decision-making authority; to be reported as committed, amounts cannot be used for any other purpose unless the government takes the same highest-level action to remove or change the constraint.

Assigned Fund Balance - This category represents amounts a government intends to use for a specific purpose; intent can be expressed by the governing body or by an official or body to which the governing body delegates the authority.

Unassigned Fund Balance - This category represents amounts that are available for any purpose.

The Borough has adopted a fund balance and financial reserves policy. For the classification of fund balances, the policy considers restricted or unrestricted amounts to have been spent when an expenditure is incurred for the purposes for which both restricted and unrestricted

fund balance is available. When an expense is incurred for purposes for which both restricted and unrestricted fund balances are available, restricted resources are applied first. Also, for the classification of fund balances, the Borough considers committed, assigned, or unassigned amounts to have been spent when an expenditure is incurred for purposes for which amounts in any of those unrestricted fund balance classification could be used.

For committed fund balance, the Borough's highest level of decision-making authority is the Borough Council. The formal action that is required to be taken to establish and modify or rescind a fund balance commitment is an ordinance.

For assigned fund balance, the Borough Council is authorized to assign amounts to a specific purpose. The authorization policy is a formal motion.

Budgets and Budgetary Accounting

The Borough adopts an annual operating budget for the General, Highway Liquid Fuels, Water, Regional Wastewater, Sanitary Sewer, Stormwater Authority, and Non-Major Proprietary Fund. Each budget is presented on a basis consistent with the modified accrual basis of accounting. All appropriations lapse at the end of each year and must be reappropriated.

The following procedures are followed in establishing the budgetary data reflected in the financial statements:

1. Beginning at least 30 days prior to the adoption of the budget, a proposed budget for the ensuing year shall be prepared in the manner designated by the Borough Council. This budget shall be kept on file for public inspection for a period of ten days.

2. After the ten-day period has expired, the Borough Council shall make such revisions in the budget as shall be deemed advisable.

3. Upon completion of the budget, which shall be no later than December 31st, it shall be the duty of the Borough Council to adopt an ordinance, levying the taxes referred to in this act for the fiscal year, for approval of the Mayor or passage over his/her veto.

The budget is prepared by fund and department, and is approved at the department level. The department level presented in the Budgetary Comparison Schedule, included as required supplementary information, represents the legal level of budgetary control. Once a budget is approved, it can be amended by the Borough Council with reasonable discretion. There was one budget revision approved by the Borough Council during the year ended December 31, 2019.

Estimates

Management uses estimates and assumptions in preparing financial statements in conformity with GAAP. Those estimates and assumptions affect the reported amounts of assets, deferred outflows of resources, liabilities, and deferred inflows of resources, the disclosure of contingencies, and the reported revenues and expenditures/expenses. Actual results could vary from the estimates that were used. Significant areas where estimates are made include allowance for doubtful accounts and depreciable lives.

Subsequent Events

In preparing these financial statements, the Borough has evaluated events and transactions for potential recognition or disclosure through March 30, 2020, the date the financial statements were available to be issued.

Note 2. Deposits and Investments

Primary Government

The Borough is governed by the deposit and investment limitations of Commonwealth of Pennsylvania (Commonwealth) law. Commonwealth statutes require that any depository holding public funds maintain investment securities in amounts equal to the total of all public funds on deposit. The securities may be held in the name of the depository, but must be pledged as collateral for those public funds. As of December 31, 2019, the market value of securities held by M&T Bank, the Borough's primary depository, to pledge all public funds on deposit were at 90.39% of the pooled public funds in excess of Federal Deposit Insurance Corporation (FDIC) coverage, thus in violation of the Commonwealth statutes, but no losses were incurred.

The Borough is authorized to invest in United States (U.S.) Treasury bills, obligations of the U.S. Government or Commonwealth of Pennsylvania and related agencies, repurchase agreements, and qualifying money market investments, including pooled investment funds such as the Pennsylvania Local Government Investment Trust (PLGIT). Act 10 of 2016 permitted the expansion of investments, including commercial paper, bankers' acceptances, and negotiable certificates of deposit. In addition, the Municipal Codes authorize additional investment options for pension funds as indicated in the Pennsylvania Uniform Trust Act (20 PA C.S.), including (but not limited to) common and preferred stocks, corporate bonds, REIT's, and mutual funds.

The Borough has separate investment policies for each of its three pension plans. In addition, the Borough has a formal investment policy ("operating investment policy") in relation, but not limited, to operating and reserve funds, proceeds from certain bond issues, and designated or other pledged assets under the direction of the Borough.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Deposits and Cash on Hand

The deposits held as of December 31, 2019 were as follows:

Type	Maturities	Carrying Value
Demand Deposits		$ 3,562,915
Money Market Deposits		18,368,182
Certificate of Deposit, 2.47%	10/2020	10,000
Cash on Hand		1,364
		$ 21,942,461

Reconciliation to Financial Statements	
Statement of Net Position	
Current Assets	
Cash and Cash Equivalents	
Unrestricted	$ 20,501,234
Restricted	563,456
Certificates of Deposit	10,000
Non-Current Assets	
Cash and Cash Equivalents - Restricted	867,771
	$ 21,942,461

Custodial Credit Risk - Custodial credit risk is the risk that in the event of a bank failure, the Borough's deposits may not be returned to it. The Borough's operating investment policy establishes insurance, collateral, pledging, and reporting requirements for financial institutions to limit exposure of custodial credit risk. The Borough does not have written policy for custodial credit risk in relation to its pension funds. As of December 31, 2019, deposits in financial institutions had a bank balance of $22,401,905, of which $21,898,875 was exposed to custodial credit risk and was unsecured and collateralized by securities pledged and held by the financial institutions' trust departments or agents, not in the Borough's name.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Investments

The composition of investments held as of December 31, 2019, reported at fair value, were as follows:

	Interest Maturities (in Years) (Unaudited)					
Type and Ratings*	Less than 1	1 - 5	6 - 10	More than 10	Not Applicable	Total Fair Value
Corporate Bonds - AA+ to BBB-	$ 718,463	$ 2,283,927	$ 1,236,688	$ 503,076	$ -	$ 4,742,154
Equity Securities and Equity Mutual Funds - N/A	-	-	-	-	35,371,905	35,371,905
Fixed Income Mutual Funds - AAA to B	-	1,001,235	3,173,452	-	-	4,174,687
Money Market Investments - AAAm, A+, or Not Rated	1,582,348	-	-	-	-	1,582,348
Municipal Bonds - AA2	-	-	156,158	-	-	156,158
Other Equity Investments - N/A	-	-	-	-	6,022,804	6,022,804
U.S. Agencies - Bonds - AGY	215	-	-	-	-	215
U.S. Agencies - Pools - AA+ or AGY	-	-	65,080	1,569,678	-	1,634,758
U.S. Treasury Obligations - AAA or TSY	195,179	1,993,303	937,491	579,801	-	3,705,774
	$ 2,496,205	$ 5,278,465	$ 5,568,869	$ 2,652,555	$ 41,394,709	$ 57,390,803

* Ratings are unaudited; information from Standard and Poor's (S&P). U.S. Treasury Obligations issued are explicitly guaranteed by the U.S. Government.

Reconciliation to Financial Statements	
Statement of Net Position	
Current Assets	
Cash and Cash Equivalents - Restricted	$ 15,372
Non-Current Assets	
Cash and Cash Equivalents - Restricted	12,169
Statement of Fiduciary Net Position	
Pension (and Other Employee Benefit) Trust Funds	
Cash and Cash Equivalents	1,554,807
Investments	55,808,455
	$ 57,390,803

Custodial Credit Risk - Investment custodial credit risk is the risk that the counterparty to an investment transaction will fail and the government will not recover the value of the investment or collateral securities that are in possession of an outside party. The Borough's formal investment policies require for financial institutions to purchase securities in the Borough's name, and hold by a custodian bank on the Borough's behalf to limit exposure of custodial credit risk. The Borough does not have written policy for investment custodial credit risk in relation to its pension funds. All of the Borough's

investments are held by the financial institutions' trust departments or agents, not in the Borough's name.

The institutions holding the Borough's investments are members of the Securities Investor Protection Corporation (SIPC). SIPC insures the cash and securities in each investor's account up to $500,000 against loss in the case of a failed brokerage firm or misappropriation of assets by the broker, however only up to $250,000 for cash. The Borough has over $500,000 in investments at each of the institutions, thus would be insured $500,000 at each institution by the SIPC in the event such failure or misappropriation occurs.

Interest Rate Risk - The Hanover Employees' Pension Plan's formal investment policy states that at the time of purchase, the maximum final maturity for any single issue will not exceed 100 years and the portfolio average effective duration will not exceed seven years and will be within +/- 20% of the specified performance benchmark. The Borough's operating investment policy limits maximum final maturity for operating funds for any single issue to 397 days from purchase date to maturity date, and for reserve funds for any single issue to five years from purchase date to maturity date. The Borough does not have formal investment policies that limit exposure to fair value losses arising from increasing interest rates for the Police and Fire Drivers' Pension Plans as well as the Fire Drivers' PEHP. Maturities of investments held as of December 31, 2019 are provided in the previous schedule.

Credit Risk and Concentration of Credit Risk - Investments in entities that are subject to credit risk are limited to those held by the Pension Trust and Non-Major Governmental Funds. The ratings for all investments currently held by the Pension Trust and Non-Major Governmental Funds are summarized in the previous schedule. The Borough does not have formal investment policy that limits exposure to credit and concentration of credit risk for the Fire Drivers' PEHP Fund Plan. The investment policies for the Borough's Pension Trust Funds limit its investment choices and maximum investment in any one fixed income security issuer as follows:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Prohibited Investments	None	Non-"traditional asset classes"	Non-U.S. dollar-denominated securities, and non-"traditional asset classes"
Maximum Concentration for Any Single Issue at Time of Purchase	None	None	5%, except for U.S. Treasuries, Government Agencies, Asset-Backed Securities (ABS), and Municipal Securities (limited to 5% of portfolio)

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

The Hanover Employees' Pension Plan investment policy also addresses the eligible fixed income investments permitted and their respective ratings, based on one or more nationally recognized statistical rating organizations, and portfolio limits, and all Pension Trust Fund investment policies provide asset allocation guidelines for minimum, maximum, and benchmark levels of investment holdings of the respective plans.

The Borough's operating investment policy sets various limits for the percentage of maximum allocation and maximum invested in a single issuer (excluding U.S Government Securities, certain money market funds, and Local Government Investment Pools) for various classes of security types, and further restrictions for registered money market mutual funds of Local Government Investment Pools to maximum invested of 10% of the outstanding shares of said fund or Pool.

There were no investments that exceeded 5% of plan net position for these funds as of December 31, 2019.

Restrictions

Restricted deposits and investments of governmental funds as of December 31, 2019 are comprised of the following:

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Public Safety Purposes	$ 14,192	$ -	$ 14,192
Funds Held for Future Recreation Purposes	49,789	31,381	81,170
Funds Held for Roads and Bridges	-	332,412	332,412
Non-Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Recreation Purposes	-	298,156	298,156
Funds Held for Future Capital Expansion	-	118,617	118,617
Total Restricted Deposits and Investments	$ 63,981	$ 780,566	$ 844,547

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Restricted deposits and investments of proprietary funds as of December 31, 2019 are comprised of the following:

	Water Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Capital Expansion	$ -	$ 7,200	$ 7,200
Consumer Deposit Agreement Refunds	143,854	-	143,854
Non-Current Assets			
Cash and Cash Equivalents			
Consumer Deposit Agreement Refunds	463,167	-	463,167
Total Restricted Cash and Cash Equivalents	$ 607,021	$ 7,200	$ 614,221

The Borough is required to refund the majority of consumer deposit agreements over a straight-line ten-year period following the year of receipt. A corresponding liability for consumer deposits has been recognized (see Long-Term Debt note for additional disclosure).

HPLA

Cash

The HPLA maintains its cash accounts at one financial institution, with balances insured by FDIC up to $250,000. The HPLA has no uninsured funds as of March 31, 2019.

Investments

Investments of the endowment fund by type consisted of the following as of March 31, 2019:

Type	Cost	Market Value
Cash and Cash Equivalents	$ 152,612	$ 152,612
Equities	1,560,128	1,682,392
Fixed Income Securities	757,406	749,602
	$ 2,470,146	$ 2,584,606

Investment activity for the year ended March 31, 2019 totaled $473,641, comprised of $450,000 in contributions, $43,040 in distributions, and $66,681 of investment return, net of fees of $10,417.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 3. Donor-Restricted Endowments and Related Arrangements

Primary Government

The Borough maintains donor-restricted permanent endowments with principal balances of $285,987 and $12,169 reported within the Non-Major Governmental Funds (Recreation Endowment and Library Endowment Funds, respectively) as of December 31, 2019. Financial Commissions for each fund are authorized to supervise the endowment investments and recommend to the Borough Council for authorization and spending of earnings in relation to the respective endowment purposes. Endowment funds in the Library Endowment Fund are limited to a Community Foundation investment fund.

The Borough does not have a formal policy related to spending rate or total return in relation to the respective endowment funds, but follows the provisions of the Pennsylvania Uniform Trust Act (20 PA C.S.), which defines prudent investor requirements (appropriate degree of care and "special skills" as an investor) and overall investment strategy reasonably suited to the endowments.

Net appreciation on the donor-restricted endowments that was available for authorization for expenditure by the Borough as of December 31, 2019 was $15,302 and $15,372 reported within the Non-Major Governmental Funds (Recreation Endowment and Library Endowment Funds, respectively) as cash and cash equivalents.

In addition, the Borough recognized a beneficial interest in assets held by others and a corresponding deferred inflow of resources relating to two qualifying irrevocable split-interest trust agreements meeting the Statement No. 81 criteria with a fair value as of December 31, 2019 of $98,221. The Borough's Guthrie Memorial Library also is a named beneficiary for several other revocable and perpetual, irrevocable trusts not meeting the recognition criteria in GASB Statement No. 81, and thus not recognized in the financial statements that generate annual support for the library's operations, some of which are restricted in nature.

HPLA

The State of Pennsylvania has not adopted the Uniform Prudent Management of Institutional Fund Act (UPMIFA) as of March 31, 2019. Pennsylvania's Act 141 allows nonprofits the option to elect a spending fund withdrawal rate based on a total return policy of 2% to 7% of the average fair value of the endowment assets over a period of three or more years of the actual investment income of the fund. The Association has elected to use a three-year average for the mean fair value of the fund, and will assess the spending rate annually within the allowed Act 141 range.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 4. Fair Value

Primary Government

The categorization of investments and beneficial interest in assets held by others within the fair value hierarchy are based upon the pricing transparency of the instruments and should not be perceived as the particular asset's risk. Investments classified in Level 1 of the fair value hierarchy are valued directly from a predetermined primary external pricing vendor. Beneficial interest in assets held by others classified in Level 2 is measured using the present value of future distributions projected to be received discounted at appropriate rate (income approach). Investments classified in Level 2 are subject to pricing by an alternative pricing source due to lack of information available by the primary vendor. The Borough has no investments classified in Level 3.

The Borough's fair value hierarchy of investments ($55,808,455) by type as of December 31, 2019 was as follows:

		Fair Value Measurements Using	
	Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)
Beneficial Interest in Assets Held by Others	$ 98,221	$ -	$ 98,221
Investments			
Investments by Fair Value Level			
Debt Securities			
Corporate Bonds	$ 4,742,154	$ -	$ 4,742,154
Fixed Income Mutual Funds	88,069	88,069	-
Municipal Bonds	156,158	-	156,158
U.S. Agencies - Bonds	215	-	215
U.S. Agencies - Pools	1,634,758	-	1,634,758
U.S. Treasury Obligations	3,705,774	492,542	3,213,232
Total Debt Securities	10,327,128	580,611	9,746,517
Equity Securities	20,866,249	20,866,249	-
	$ 31,193,377	$ 21,446,860	$ 9,746,517

The valuation method for investments measured at the net asset value (NAV) per share, or equivalent, as of December 31, 2019 was as follows:

Investments Measured at the Net Asset Value (NAV)	Fair Value	Redemption Frequency	Redemption Notice Period
Commingled Equity Mutual Funds	$ 20,528,460	Daily	One Day
Commingled Fixed Income Mutual Funds	4,086,618	Daily	One Day
Total Investments Measured at the NAV	$ 24,615,078		

Eight fixed income mutual funds and 30 equity mutual funds are considered to be commingled in nature and include hedge funds. The fair value of the underlying investments are used to determine NAV per share (or its equivalent) for these investments.

HPLA

ASC 820, *Fair Value Measurements*, provides a framework for measuring fair value that is similar to GASB standards summarized in Note 1.

The estimated fair values of HPLA's investments as of March 31, 2019 are as follows:

Type	Level 1	Total
Cash and Cash Equivalents	$ 152,612	$ 152,612
Equities	1,682,392	1,682,392
Fixed Income Securities	749,602	749,602
	$ 2,584,606	$ 2,584,606

Note 5. Property and Other Taxes and Tax Abatements

The Borough's ad valorem property tax is levied each year on the assessed value listed as of the prior year for all real property located in the Borough. The assessed value of the duplicate tax roll for which the 2019 tax levy was based was $989,273,316. The property tax rate for 2019 was 5.65 mills.

From the effective date of the budget, the amount stated thereon as the amount to be raised by the property tax shall constitute a determination of the amount of the tax levy in the corresponding tax year. Taxpayers receive a 2% discount if paid by the 15th day of April. For the year ended December 31, 2019, $99,777 in discounts were netted with tax revenues reported. Taxes shall be due and payable on the 15th day of June in the year for which they are levied. Taxpayers will owe an additional 10% penalty if paid after the 15th day of June. Taxes shall be overdue and in arrears on the 30th day of the following April.

Taxes are recorded in the funds as revenue by the Borough when received from the tax collectors, and accruals are recorded at year-end for taxes expected to be received within 60 days of December 31, 2019 in accordance with the modified accrual basis of accounting. Taxes are shown net of an allowance for uncollectible accounts, calculated based on the age of receivables for Per Capita Taxes. Taxes receivable and deferred tax revenue, recognized as deferred amounts from tax revenues, as of December 31, 2019 and related tax revenues for the year then ended for the General Fund, net of relating allowance for uncollectible accounts, were as follows:

	Taxes Receivable, Net	Deferred Tax Revenue	Tax Revenues
Property Taxes	$ 301,339	$ 192,756	$ 5,788,803
Income Taxes	277,083	-	1,701,683
Business Privilege Taxes	35,591	-	603,251
Local Services Taxes	130,522	-	593,187
Per Capita Taxes	93,401	89,603	47,723
Total Taxes, Gross	837,936	282,359	8,734,647
Less: Allowance for Uncollectible Taxes	69,792	69,792	-
Total Taxes, Net	$ 768,144	$ 212,567	$ 8,734,647

The Borough provides a single tax abatement program to promote improvements to certain industrial, commercial, and other business properties within designated jurisdictions of the Borough under the Pennsylvania Local Economic Revitalization Tax Assistance Act (LERTA), Act No 76 of 1977. Abatements are obtained through application by the property owner for property taxes related to improvements to deteriorated properties on a declining basis from 100% to 0% over a ten-year period, based on increased assessed value as a result of permitted improvements to the qualifying property. Revocation provisions exist with failure to satisfy any fees and costs as due to the Borough.

For the year ended December 31, 2019, several LERTA applications have been filed, but no abatements have yet occurred, pending completion and assessment of improvements.

Note 6. Due from Other Governments

In 1982, the Borough entered into an agreement with two local municipalities to jointly share the costs of constructing a regional wastewater treatment plant and related infrastructure. Under the agreement, the Borough operates the facilities, and charges the local municipalities quarterly service charges through the Regional Wastewater Fund for their allocated share of

costs based on flow usage for the entire system. Any charges received in excess of costs or deficit amounts are accounted for in subsequent budgets as an adjustment to the quarterly service charges to the participating municipalities, $204,951 of which was recognized as unearned revenue as of December 31, 2019, $37,424 of which was due from other governments. The contract also stipulates that the municipalities will share in the costs of facilities additions and upgrades as required by other authorized agencies.

Due to revised environmental compliance standards, the Borough was compelled to perform substantial improvements to the treatment plant and related infrastructure, and has recognized the local municipalities' share of these costs through December 31, 2019 as amounts due from other governments in the Regional Wastewater Fund. Beginning in 2011, one of the local municipalities agreed on repayment terms for their share of costs as follows: $395,000 due February 15, 2012, and annual payments due February 15th thereafter of $100,000 plus interest accrued on the outstanding principal balance at 4% per annum until fully repaid. Interest income recognized under the agreement totaled $6,613 for the year ended December 31, 2019, and $5,786 was accrued as of December 31, 2019.

As of December 31, 2019, $165,313 has been incurred by the Borough and is unpaid by the municipality in relation to improvements relating to the local municipality's share, and future minimum payments from the agreement based on costs incurred through December 31, 2019 is as follows for the years ending December 31:

	Regional Wastewater Fund
2020	$ 100,000
2021	65,313
	$ 165,313

In addition, the Borough has a flow exchange agreement with another municipality from 1983 for sewer treatment services charged through the Sanitary Sewer Fund, and $359,875 was due and payable from the municipality for flow exchange services through December 31, 2019.

Finally, the Borough has intergovernmental agreements for equally sharing employee costs of a joint Fire Chief and Executive Secretary that support both municipalities as part of the Commission, and $114,558 was due and payable from the municipality for said shared costs through December 31, 2019.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 7. Capital Assets

A summary of governmental activities follows:

Capital Assets	Balance 12/31/18	Increases	Decreases	Transfers	Balance 12/31/19
Non-Depreciable Assets					
Land and Land Rights	$ 571,261	$ -	$ -	$ -	$ 571,261
Construction in Progress	47,732	40,808	-	(55,675)	32,865
Total Non-Depreciable Assets	618,993	40,808	-	(55,675)	604,126
Depreciable Assets					
Improvements Other than Buildings	352,660	-	-	55,675	408,335
Machinery and Equipment	6,410,204	869,771	355,136	(179,862)	6,744,977
Other Buildings and Improvements	12,843,522	62,523	-	-	12,906,045
Plant and Infrastructure	13,874,791	179,535	-	-	14,054,326
Total Depreciable Assets	33,481,177	1,111,829	355,136	(124,187)	34,113,683
Total Capital Assets	34,100,170	1,152,637	355,136	(179,862)	34,717,809
Accumulated Depreciation					
Improvements Other than Buildings	218,622	10,426	-	-	229,048
Machinery and Equipment	4,773,662	551,977	355,136	(49,570)	4,920,933
Other Buildings and Improvements	4,298,846	291,626	-	-	4,590,472
Plant and Infrastructure	9,009,783	375,276	-	-	9,385,059
Total Accumulated Depreciation	18,300,913	1,229,305	355,136	(49,570)	19,125,512
Total Capital Assets, Net	$ 15,799,257	$ (76,668)	$ -	$ (130,292)	$ 15,592,297

Accumulated costs attributed to projects included in construction in progress as of December 31, 2019 were as follows:

Design and Extension/Rehabilitation of Storm Sewer Drainage	$ 10,709
Transfer Station Improvements and Enhancements	13,455
Parks and Playground Equipment and Facilities Upgrades	8,701
	$ 32,865

Depreciation expense, including amortization expense on assets under capital lease, was charged to governmental functions for the year ended December 31, 2019:

General Government	$ 20,557
Public Safety	90,734
Health and Sanitation	265,844
Highways	522,838
Culture and Recreation	329,332
	$ 1,229,305

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NOTES TO BASIC FINANCIAL STATEMENTS

A summary of business-type activities follows:

	Balance 12/31/18	Increases	Decreases	Transfers	Balance 12/31/19
Capital Assets					
Non-Depreciable Assets					
Land and Land Rights	$ 891,549	$ 101,895	$ -	$ 33,811	$ 1,027,255
Inactive Wells	137,044	-	137,044	-	-
Construction in Progress	1,358,068	1,249,501	-	(1,147,826)	1,459,743
Total Non-Depreciable Assets	2,386,661	1,351,396	137,044	(1,114,015)	2,486,998
Depreciable Assets					
Improvements Other than Buildings	62,168	-	-	-	62,168
Machinery and Equipment	4,237,821	410,123	95,578	179,862	4,732,228
Other Buildings and Improvements	829,587	30,276	-	-	859,863
Plant and Infrastructure	112,384,379	1,442,986	41,617	1,114,015	114,899,763
Total Depreciable Assets	117,513,955	1,883,385	137,195	1,293,877	120,554,022
Total Capital Assets	119,900,616	3,234,781	274,239	179,862	123,041,020
Accumulated Depreciation					
Improvements Other than Buildings	52,003	1,255	-	-	53,258
Machinery and Equipment	2,518,407	311,918	87,718	49,570	2,792,177
Other Buildings and Improvements	310,513	30,235	-	-	340,748
Plant and Infrastructure	37,517,862	2,401,196	33,470	-	39,885,588
Total Accumulated Depreciation	40,398,785	2,744,604	121,188	49,570	43,071,771
Total Capital Assets, Net	$ 79,501,831	$ 490,177	$ 153,051	$ 130,292	$ 79,969,249

Accumulated costs attributed to projects included in construction in progress as of December 31, 2019 were as follows:

Water Fund	
Sheppard & Myers Dam Rehabilitation	$ 922,242
Storage Building	115,697
Water Mains and Water Laterals	183,994
	$ 1,221,933
Sanitary Sewer Fund	
Sanitary Sewer System Improvements	$ 237,810

Depreciation expense, including amortization expense on assets under capital lease, was charged to business-type functions as follows for the year ended December 31, 2019:

Water Fund	$ 1,070,991
Regional Wastewater Fund	1,382,437
Sanitary Sewer Fund	276,050
Stormwater Authority Fund	3,969
Non-Major Proprietary Fund	11,157
	$ 2,744,604

Note 8. Capital Leases

The Borough is party to several lease agreements for vehicles and equipment as of December 31, 2019. The leases bear stated or implicit interest rates ranging from 1.91% to 8.80%, and each lease is secured by the capital asset under the respective lease. Vehicles and equipment under capital lease included in capital assets as of December 31, 2019 were as follows:

	Governmental Activities	Business-Type Activities
Machinery and Equipment	$ 1,409,303	$ 546,413
Less: Accumulated Depreciation	372,135	135,001
	$ 1,037,168	$ 411,412

As of December 31, 2019, future minimum payments required under the leases and the present values of minimum capital lease payments are as follows:

	Governmental Activities	Business Type Activities
2020	$ 439,082	$ 128,785
2021	428,186	128,785
2022	360,879	88,952
2023	246,348	34,817
2024	177,261	-
Total Minimum Lease Payments	1,651,756	381,339
Less: Amount Representing Interest	112,881	31,768
Present Values of Minimum Lease Payments Due Under Capital Leases Included in General Long-Term Debt	1,538,875	349,571
Less: Current Portion	393,629	114,075
Long-Term Portion	$ 1,145,246	$ 235,496

The payments above include a non-cancelable subleased fire vehicle with the Commission, excluded from the Borough's machinery and equipment listed above, with future minimum rentals to be received under the sublease and present values of minimum capital lease rentals as of December 31, 2019 as follows:

	Governmental Activities
2020	$ 132,999
2021	132,999
2022	132,999
2023	132,998
2024	132,998
Total Minimum Lease Rentals	664,993
Less: Amount Representing Interest	50,209
Present Values of Minimum Lease Rentals Due Under Capital Leases Included in General Long-Term Debt	614,784
Less: Current Portion	116,552
Long-Term Portion	$ 498,232

Note 9. Long-Term Debt

Amounts outstanding under bonds payable as of December 31, 2019 consisted of the following:

$9,770,000 2012 Series - $9,520,000 Serial and $250,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $1,255,000 to $1,380,000 through October 1, 2025 with remaining interest rates ranging from 2% to 2.125%; bonds are secured by the credit and taxing power of the Borough	$ 7,905,000
$10,000,000 2013 Series, partially refunded in 2017 - original issue of $3,170,000 Serial and $6,830,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $110,000 to $125,000 through October 1, 2022 with remaining interest rates ranging from 2% to 2.375%; all term bonds were refunded; bonds are secured by the credit and taxing power of the Borough	355,000
$3,790,000 2015 A Series - Serial Bonds; due in remaining annual principal installments ranging from $435,000 to $505,000 through October 1, 2024 with remaining interest rates of 2%; bonds are secured by the credit and taxing power of the Borough	2,400,000

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$9,100,000 2015 B Series - $3,545,000 Serial and $5,555,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $325,000 to $380,000 through October 1, 2027 with remaining interest rates ranging from 2% to 2.75%; term bonds divided into four lots with $1,200,000 paying 3% due October 1, 2030, $2,260,000 paying 3.25% due October 1, 2035, $1,010,000 paying 3.5% due October 1, 2037, and $1,085,000 paying 3.5% due October 1, 2039; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	8,355,000
$10,000,000 2015 C Series - $3,890,000 Serial and $6,110,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $25,000 to $2,025,000 through October 1, 2030 with remaining interest rates ranging from 2% to 3.45%; term bonds divided into four lots with $780,000 paying 2.625% due October 1, 2025, $1,915,000 paying 3.125% due October 1, 2028, $3,000,000 paying 3.6% due October 1, 2032, and $415,000 paying 3.5% due October 1, 2032; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	9,755,000
$6,770,000 2015 D Series - $5,270,000 Serial and $1,500,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $340,000 to $1,815,000 through October 1, 2027 with remaining interest rates ranging from 2% to 2.75%; term bonds divided into three lots with $20,000 paying 2.125% due October 1, 2022, $30,000 paying 2.5% due October 1, 2025, and $1,450,000 paying 2.95% due October 1, 2029; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	5,475,000
$4,750,000 2016 Series - $3,445,000 Serial and $1,305,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $105,000 to $125,000 through October 1, 2024 with remaining interest rates ranging from 2% to 3.5%; term bonds divided into two lots with $645,000 paying 2% due October 1, 2025 and $660,000 paying 2% due October 1, 2026; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	1,880,000
$9,580,000 2017 Series - $2,955,000 Serial and $6,625,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $45,000 to $750,000 through October 1, 2038 with remaining interest rates ranging from 2% to 3.25%; term bonds divided into two lots with $1,180,000 paying 3% due October 1, 2031 and $5,445,000 paying 3.15% due October 1, 2037; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	9,490,000
Total Bonds Payable	$ 45,615,000

As of December 31, 2019, $7,340,000 of the outstanding general obligation 2009 Series bonds are considered defeased.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Interest and related costs incurred for governmental and business-type activities for the year ended December 31, 2019 were $159,268 and $1,280,139, of which all were expensed.

The following is a summary of changes in long-term debt for the year ended December 31, 2019:

	Balance 12/31/18	Additions	Reductions	Transfers	Balance 12/31/19	Due Within One Year
Governmental Activities						
Bonds Payable						
2015 A Serial and Term Bonds	$ 2,820,000	$ -	$ 420,000	$ -	$ 2,400,000	$ 435,000
2015 C Serial and Term Bonds	200,000	-	-	-	200,000	-
2015 D Serial and Term Bonds	115,000	-	35,000	-	80,000	35,000
2016 Serial and Term Bonds	1,985,000	-	105,000	-	1,880,000	105,000
2017 Serial and Term Bonds	501,000	-	7,000	-	494,000	8,000
	5,621,000	-	567,000	-	5,054,000	583,000
Bond Discounts and Premiums	71,441	-	11,304	-	60,137	11,304
Total Bonds Payable, Net	5,692,441	-	578,304	-	5,114,137	594,304
Accrued Compensated Absences	1,681,579	23,868	-	-	1,705,447	146,000
Capital Lease Obligations	1,531,212	473,029	349,118	(116,248)	1,538,875	393,629
Total Governmental Activities Debt	$ 8,905,232	$ 496,897	$ 927,422	$ (116,248)	$ 8,358,459	$ 1,133,933
Business-Type Activities						
Bonds Payable						
2012 Serial and Term Bonds	$ 9,035,000	$ -	$ 1,130,000	$ -	$ 7,905,000	$ 1,255,000
2013 Serial and Term Bonds	475,000	-	120,000	-	355,000	120,000
2015 B Serial and Term Bonds	8,675,000	-	320,000	-	8,355,000	-
2015 C Serial and Term Bonds	9,580,000	-	25,000	-	9,555,000	25,000
2015 D Serial and Term Bonds	5,690,000	-	295,000	-	5,395,000	305,000
2016 Serial and Term Bonds	-	-	-	-	-	-
2017 Serial and Term Bonds	9,034,000	-	38,000	-	8,996,000	37,000
	42,489,000	-	1,928,000	-	40,561,000	1,742,000
Bond Discounts and Premiums	(104,915)	-	(8,337)	-	(96,578)	(8,337)
Total Bonds Payable, Net	42,384,085	-	1,919,663	-	40,464,422	1,733,663
Accrued Compensated Absences	1,124,039	36,017	-	-	1,160,056	68,000
Capital Lease Obligations	230,035	116,300	113,012	116,248	349,571	114,075
Consumer Deposits	750,880	-	143,859	-	607,021	143,854
Total Business-Type Activities Debt	$ 44,489,039	$ 152,317	$ 2,176,534	$ 116,248	$ 42,581,070	$ 2,059,592

Other long-term liabilities in governmental activities are liquidated from general revenues in the General Fund. Accrued compensated absences and capital lease obligations in business-type activities are liquidated from general revenues in the respective Water, Regional Wastewater, Sanitary Sewer, Stormwater Authority, and Non-Major Proprietary Fund. Consumer deposits are liquidated from general revenues in the Water Fund.

The principal and interest requirements to maturity of the bonds payable debt of all funds are as follows for the years ending December 31:

	Governmental Activities		Business-Type Activities	
	Principal	Interest	Principal	Interest
2020	$ 583,000	$ 105,292	$ 2,067,000	$ 1,140,601
2021	633,000	93,634	2,097,000	1,099,258
2022	653,000	79,322	2,147,000	1,057,157
2023	663,000	66,164	2,187,000	1,012,962
2024	678,000	52,752	2,232,000	967,487
2025-2029	1,844,000	74,070	11,981,000	4,002,564
2030-2034	-	-	12,405,000	2,066,962
2035-2039	-	-	5,445,000	507,955
	$ 5,054,000	$ 471,234	$ 40,561,000	$ 11,854,946

Note 10. Interfund Activity

Interfund balances between funds as of December 31, 2019 on the fund financial statements were as follows:

	Due to				
Due From	General Fund	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Total
General Fund	$ -	$ 25,246	$ -	$ -	$ 25,246
Water Fund	-	-	70,497	16,599	87,096
Regional Wastewater Fund	-	-	-	167,527	167,527
Sanitary Sewer Fund	13,000	-	-	-	13,000
Total	$ 13,000	$ 25,246	$ 70,497	$ 184,126	$ 292,869

Interfund balances result from the time lag between the dates that (1) interfund goods and services are provided or reimbursable expenditures occur, (2) transactions are recorded in the accounting system, and (3) payments between funds are made. All balances are expected to be repaid with the following year.

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NOTES TO BASIC FINANCIAL STATEMENTS

Interfund transfers for the year ended December 31, 2019 on the fund financial statements were as follows:

	Transfers from			
Transfers to	Non-Major Governmental Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Total
General Fund	$ 24,777	$ -	$ -	$ 24,777
Water Fund	-	927	-	927
Regional Wastewater Fund	-	-	1,695,425	1,695,425
Sanitary Sewer Fund	-	110,613	-	110,613
Total	$ 24,777	$ 111,540	$ 1,695,425	$ 1,831,742

Transfers are used to (1) move revenues from the fund that statute or budget requires to collect them to the fund that statute or budget requires to expend them, (2) move receipts restricted to debt service from the funds collecting the receipts to the debt service fund as debt service payments become due, (3) use unrestricted revenues collected in the General Fund to finance various programs accounted for in other funds in accordance with budgetary authorizations, and (4) transfer capital assets from the fund that paid for the assets to the fund that will utilize them within proprietary funds.

In addition, interfund transfers of capital assets, and related debt as applicable, between governmental and business-type activities, recognized on the government-wide statements, totaled $14,044.

Significant interfund transfers for the year ended December 31, 2019 include the following: the Sanitary Sewer Fund transferred $1,584,812 to the Regional Wastewater Fund to be used for debt service and reclassification of interfund debt, net of reimbursements of capital costs received from other municipalities for the shared regional wastewater treatment improvements disclosed above.

Finally, the Borough provided a temporary, short-term, non-interest-bearing operating loan of $250,000 to the Stormwater Authority during 2019, which was repaid in full prior to the promissory note requirement of satisfaction at payment intervals up to February 2020.

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NOTES TO BASIC FINANCIAL STATEMENTS

Note 11. Communication Tower Lease Agreements

The Borough has entered into communication tower lease agreements, which are expected to provide the following minimum annual rental income for the years ending December 31,

	Water Fund
2020	$ 79,634
2021	24,440
2022	17,772
2023	13,626
	$ 135,472

All lease agreements have various consecutive renewal options at the lessee's discretion.

Note 12. Defined Benefit Pension Plans

The Borough offers three single-employer defined benefit pension plans: Police Pension Plan, Fire Drivers' Pension Plan, and Hanover Employees' Pension Plan. The plans do not issue stand-alone financial reports.

A. Plan Descriptions and Funding Policies

Police Pension Plan

Plan Administration - The plan is a single-employer defined benefit plan that covers all full-time members of the police force upon employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council and the Police Pension Fund Committee, consisting of three voting members appointed by the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. A member is eligible for normal retirement after attainment of age 50 and completion of 25 years of vesting service; however, if the member continues working after their normal retirement date, their pension does not start until they actually retire. The normal retirement pension, payable monthly for the member's lifetime and continuing to the member's surviving spouse or eligible child for their respective lifetime, is equal to 50% of average monthly compensation (based on the last 36 months of employment preceding retirement), plus a service increment of $100 per month for each completed year of benefit service in excess of 25 years. Disability benefits are available to a participant disabled in the line of duty. If a participant is eligible for retirement at the time of death, a monthly death benefit is payable.

Employees retiring after January 1, 1980 are entitled to an annual cost-of-living increase equal to 6% per year or the actual cost-of-living increase based on the Consumer Price Index, whichever is smaller. A member's benefits vest upon completion of 12 years of vesting service. The vested benefit is deferred monthly pension beginning at normal retirement equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3% of their compensation per year. Member contributions are credited with interest at the rate of 3% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Police Pension Plan are financed through investment earnings.

Fire Drivers' Pension Plan

Plan Administration - The plan is a single-employer defined benefit plan that covers all full-time fire drivers on July 1st following the date of employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 with completion of 25 years of vesting service, but not later than attainment of age 62 and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.9% of average monthly compensation (highest consecutive 60 months of compensation out of the last 120 months preceding retirement) multiplied by the total number of complete years of benefit service.

Disability benefits are available to a participant who becomes totally and permanently disabled. The death benefit for a participant who has attained age 50 and has completed ten years of vesting service is a survivor pension. A monthly death benefit, payable to a surviving spouse, is also available if the participant is killed in the line of duty. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3.7% of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at

the rate of 4% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Fire Drivers' Pension Plan are financed through investment earnings.

Hanover Employees' Pension Plan

Plan Administration - The plan is a single-employer defined benefit pension plan that covers all full-time employees of the Borough, excluding uniformed police officers and fire drivers, on July 1st following the date of employment. The plan is established and administered by the Borough through a trust agent (local bank), and management of the plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 (60 for non-union hires after July 1, 2014) and completion of 25 years of vesting service, but not later than attainment of age 62 (65 for non-union hires after July 1, 2014) and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.5% (1% for non-union hires after July 1, 2014) of average monthly compensation (highest consecutive 36 months of compensation out of the last 60 months preceding retirement) multiplied by the total number of years of benefit service rounded to the nearest one-half year. The minimum monthly pension for employees with 30 or more years of vesting service is equal to 70% of average monthly compensation, less 100% of social security benefits received.

Disability benefits are available after attainment of age 45 and completion of 15 years of vesting service, following six months of permanent disability. The monthly death benefit for a participant who has attained 60 years (sum of member's age and years of vesting service) and has completed ten years of vesting service is a survivor pension. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3% of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at the rate of 4% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by

Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Hanover Employees' Pension Plan are financed through investment earnings.

Plan Membership

Membership of the plans consisted of the following as of December 31, 2019:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Inactive Plan Members or Beneficiaries Currently Receiving Benefits	20	14	65
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	1	-	3
Active Plan Members	25	17	104
Totals	46	31	172

Investment Policies, Concentrations, and Rates of Return

Disclosures regarding investment policies and concentrations of the plans' investments are located in Note 2 to the financial statements. The annual money-weighted rates of return on plans' investments, net of plans' investment expenses, were as follows for the year ended December 31, 2019: 18.76% for the Police, 20.42% for the Fire Drivers', and 20.69% for the Hanover Employees' Pension Funds' Plans. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

B. Net Pension Liability

The net pension liability was measured as of December 31, 2019, and the total pension liability was determined by rolling forward the liabilities from an actuarial valuation as of January 1, 2019. No significant events or changes in assumptions occurred between the valuation date and the fiscal year end.

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NOTES TO BASIC FINANCIAL STATEMENTS

Actuarial Assumptions - The total pension liability as determined by an actuarial valuation as of January 1, 2019, using the following actuarial assumptions, applied to all periods included in the measurement:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Actuarial Assumptions:			
Inflation Assumption	Moderate	Moderate	Moderate
Cost-of-Living Adjustments	3%	None	None
Projected Salary Increases	5%	5%	5%
Investment Rate of Return	7%, net of pension plan investment expense, including inflation	7%, net of pension plan investment expense, including inflation	7%, net of pension plan investment expense, including inflation
Disability Rates	SOA 1987 Group LTD Tables - Males, six-month elimination	SOA 1987 Group LTD Tables - Males, six-month elimination	SOA 1987 Group LTD Tables - Males, six-month elimination

Mortality rates were based on the PubS-2010 (Police and Fire Drivers') and PubG-2010 (Hanover Employees') mortality tables, projected generationally using Scale MP-2018 to reflect mortality improvement.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighing the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The target allocations and best estimates of arithmetic real rates of return for each major asset class of the pension plans are summarized in the following tables:

	Target Allocations (as of December 31, 2019)		
Asset Class	Police	Fire Drivers'	Hanover Employees'
Corporate Bonds	0%	0%	7%
Equity Securities and Equity Mutual Funds	70%	65%	65%
Fixed Income Mutual Funds	30%	32%	10%
Money Markets	0%	3%	3%
U.S. Treasuries and Agencies - Bonds and Pools	0%	0%	15%

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NOTES TO BASIC FINANCIAL STATEMENTS

	Long-Term Expected Real Rates of Return (as of December 31, 2019)		
Asset Class	Police	Fire Drivers'	Hanover Employees'
Corporate Bonds	N/A	N/A	3% - 5%
Equity Securities and Equity Mutual Funds	5% - 7%	5% - 7%	5% - 7%
Fixed Income Mutual Funds	1% - 3%	1% - 3%	1% - 3%
Money Markets	N/A	0% - 1%	0% - 1%
U.S. Treasuries and Agencies - Bonds and Pools	N/A	N/A	1% - 3%

Discount Rate - The discount rate used to measure the total pension liability for all plans was 7%. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current respective contribution rates and that Borough contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rates. Based on those assumptions, the pension plans' fiduciary net position is projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Changes in the Net Pension Liability

	Police		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balances as of December 31, 2018	$ 13,856,029	$ 11,817,070	$ 2,038,959
Service Cost	363,436	-	363,436
Interest Cost	966,806	-	966,806
Changes for Experience	(468,572)	-	(468,572)
Changes for Assumptions	373,371	-	373,371
Employer Contributions	-	545,941	(545,941)
Plan Member Contributions	-	67,525	(67,525)
Net Investment Income	-	2,243,761	(2,243,761)
Benefit Payments	(625,499)	(625,499)	-
Administrative Expense	-	(8,100)	8,100
Net Changes	609,542	2,223,628	(1,614,086)
Balances as of December 31, 2019	$ 14,465,571	$ 14,040,698	$ 424,873

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Fire Drivers'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balances as of December 31, 2018	$ 7,270,469	$ 6,255,158	$ 1,105,311
Service Cost	157,461	-	157,461
Interest Cost	524,881	-	524,881
Changes for Experience	9,699	-	9,699
Changes for Assumptions	261,458	-	261,458
Employer Contributions	-	158,627	(158,627)
Plan Member Contributions	-	47,625	(47,625)
Net Investment Income	-	1,267,942	(1,267,942)
Benefit Payments	(401,574)	(401,574)	-
Administrative Expense	-	(6,100)	6,100
Net Changes	551,925	1,066,520	(514,595)
Balances as of December 31, 2019	$ 7,822,394	$ 7,321,678	$ 500,716

Hanover Employees'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balances as of December 31, 2018	$ 31,918,045	$ 30,313,438	$ 1,604,607
Service Cost	329,117	-	329,117
Interest Cost	2,191,743	-	2,191,743
Changes of Benefit Terms	21,757	-	21,757
Changes for Experience	(1,256,261)	-	(1,256,261)
Changes for Assumptions	922,934	-	922,934
Employer Contributions	-	347,424	(347,424)
Plan Member Contributions	-	155,335	(155,335)
Net Investment Income	-	6,231,414	(6,231,414)
Benefit Payments	(1,206,451)	(1,206,451)	-
Administrative Expense	-	(16,400)	16,400
Net Changes	1,002,839	5,511,322	(4,508,483)
Balances as of December 31, 2019	$ 32,920,884	$ 35,824,760	$ (2,903,876)

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Sensitivity of the Net Pension Liability to Changes in the Discount Rate - The following presents the net pension liability of the Borough, calculated using the discount rate of 7%, as well as what the Borough's net pension liability would be if it were calculated using a discount rate that is one-percentage-point lower (6%) or one-percentage-point higher (8%) than the current rate:

	Pension Plans - Long-Term Expected Real Rates of Return		
Borough's Net Pension Liability	Police	Fire Drivers'	Hanover Employees'
One-Percent Decrease (6%)	$ 2,436,940	$ 1,382,325	$ 511,257
Current Discount Rate (7%)	$ 424,873	$ 500,716	$ (2,903,876)
One-Percent Increase (8%)	$ (1,225,602)	$ (240,025)	$ (5,779,455)

Pension Expense and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions - For the year ended December 31, 2019, the Borough recognized pension expense totaling $879,067, comprised of $562,684, $274,567, and $41,816 from the Police, Fire Drivers', and Hanover Employees' pension plans, respectively.

As of December 31, 2019, the Borough reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Changes of Assumptions		
Police	$ 595,410	$ 66,779
Fire Drivers'	375,700	-
Hanover Employees'	1,364,066	-
	2,335,176	66,779
Differences Between Expected and Actual Experience		
Police	-	746,554
Fire Drivers'	38,933	42,099
Hanover Employees'	-	1,814,712
	38,933	2,603,365
Net Difference Between Projected and Actual Earnings on Pension Plan Investments		
Police	-	404,135
Fire Drivers'	-	360,562
Hanover Employees'	-	1,791,392
	-	2,556,089
Total	$ 2,374,109	$ 5,226,233

Amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense as follows for the years ending December 31:

2020	$ 829,571
2021	796,051
2022	(68,659)
2023	1,299,059
2024	21,236
Thereafter	(25,134)
	$ 2,852,124

Note 13. Deferred Compensation Plan

The Borough, in accordance with the Borough Council's approval, offers a deferred compensation plan created in accordance with Internal Revenue Code Section 457(b). The plan is available to all Borough employees. The plan had 39 active participants as of December 31, 2019.

The plan permits employees to defer a portion of their salary until future years, which the employees are fully vested in upon contribution, with no forfeiture provision. The Borough does not contribute to the deferred compensation plan. Employees can defer the lesser of $19,000, and up to an additional $6,000 catch-up for employees age 50 or over, or 100% of their includable salaries over the plan year. Employee contributions made to the 457(b) plan for the year ended December 31, 2019 were $139,047.

All amounts of compensation deferred under the plan and all income attributable to those amounts are held in trust for the exclusive benefit of participants and their beneficiaries. The assets will not be diverted to any other purpose. The Plan Administrator, ICMA-RC, is the trustee of the investments.

Note 14. Defined Benefit Other Postemployment Benefits Plan (OPEB)

The Borough offers a single-employer, defined benefit post-employment health insurance plan that provides OPEB for the police, fire drivers, and non-uniformed (Hanover) employees of the Borough. The plan does not issue a stand-alone financial report.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

A. Plan Description and Funding Policies

Plan Administration

The plan is established and administered by the Borough through the Intergovernmental Insurance Cooperative (IIC) (a trust agent), and management of the plan is administered by the ten elected members of the Borough Council. This plan does not include the pension benefits discussed in Note 12 above. The plan is funded on a pay-as-you-go basis. There is no irrevocable trust established for the plan that meets the criteria in GASB Statement No. 75, paragraph 4, and the Borough does not have accumulated assets for the future payment of OPEB benefit payments.

Benefits Provided

The post-employment health insurance plan provides medical and hospitalization, prescription drug, dental, vision and life insurance benefits to eligible active plan members and retirees and their spouses, and is authorized by the Borough. Benefit provisions are established and amended by the Borough Council. Retirement provisions for age and service for OPEB mirror those for pension discussed in Note 12 above. The plan provides the following benefits based on employee group (collective bargaining agreements) upon retirement:

> *Police* - Health insurance coverage for five years subsequent to the retirement date of the Officer provided certification is received they are not eligible for any other employer-sponsored health insurance plan, including a plan sponsored by the Officer's spouse. Spousal coverage for the five-year period is limited to 50% of the health insurance coverage cost provided they are not eligible for any other employer-sponsored health insurance plan. The maximum Borough cost for Officer and/or spouse health insurance coverage is limited to $600 per month. Upon expiration of this paid coverage, the retiree and spouse shall be permitted to maintain health insurance coverage as a member of the plan with the entire cost paid by the retiree.
>
> *Fire Drivers and Hanover Employees* - eligible retirees and spouses shall be permitted to maintain health insurance coverage as a member of the plan with the entire cost paid by the retiree.

For all employee groups, upon attaining age 65, eligible retirees and their spouses are transitioned to a post-65 medical and prescription plan if they are eligible and wish to continue coverage. In addition, optional life insurance coverage is allowable in increments of $2,500 (up to a maximum of $7,500), elected by the retiree within 90 days of hire and continuing through retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough. Separate Borough-paid life insurance benefits for eligible employees ceases at retirement.

Contributions

The plan is unfunded, with premium payments made by the Borough, and any corresponding reimbursements from retirees and spouses, on a pay-as-you-go basis. For the year ended December 31, 2019, the Borough paid premium costs of $236,213 for retirees and their spouses, of which $217,181 was reimbursed by plan members in accordance with their respective collective bargaining agreements.

Plan Membership

Membership of the plan consisted of the following categories as of December 31, 2019:

	OPEB Plan		
	Police	Fire Drivers'	Hanover Employees'
Retirees and Beneficiaries Receiving Benefits	7	6	25
Active Plan Members	23	12	102
Totals	30	18	127

B. Total OPEB Liability

Actuarial Assumptions - The net OPEB liability was measured as of December 31, 2019, and the total OPEB liability was determined by rolling forward the liabilities from an actuarial valuation as of January 1, 2019. The following actuarial assumptions applied to all periods in the measurement, unless otherwise specified:

	OPEB Plan
Actuarial Assumptions:	
Actuarial Cost Method	Entry Age Normal Cost Method
Salary Increases/Inflation	5.0%
Municipal Bond Rate	3.64% (S&P Municipal Bond 20-Year High Grade Rate Index)
Healthcare Cost Trend Rates	5.5% per year graded down by the Society of Actuaries Long-Run Medical Cost Trend Model to an ultimate rate of 3.8% per year
Mortality	PubS-2010 Mortality Table for Police and Fire Drivers, and PubG-2010 Mortality Table for Nonuniformed Employees

The following changes in actuarial assumption have been made since the prior measurement date: discount rate changed from 3.16% to 3.64%, and the mortality table was updated from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers, and to the PubG-2010 Mortality Table for Nonuniformed Employees.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Discount Rate - The discount rate used to measure the total OPEB liability was 3.64% for the plan, relating to the S&P Municipal Bond 20-Year High Grade Rate Index as of January 1, 2019. No assets have been accumulated in an irrevocable trust, so the municipal rate has been applied to all periods.

Changes in the Total OPEB Liability

Balances as of December 31, 2018	$ 3,376,710
Service Cost	152,618
Interest Cost	108,558
Changes of Benefit Terms	(10,531)
Changes for Experience	(692,487)
Changes for Assumptions	(115,968)
Benefit Payments (Estimated)	(173,416)
Net Changes	(731,226)
Balances as of December 31, 2019	$ 2,645,484

Sensitivity of the Total OPEB Liability to Changes in the Discount Rate - The following presents the total OPEB liability of the Borough, calculated using the discount rate of 3.64%, as well as what the Borough's total OPEB liability would be if it were calculated using a discount rate that is one-percentage-point lower (2.64%) or one-percentage-point higher (4.64%) than the current rate:

	Borough's Total OPEB Liability
One-Percent Decrease (2.64%)	$ 2,861,561
Current Discount Rate (3.64%)	$ 2,645,484
One-Percent Increase (4.64%)	$ 2,450,906

Sensitivity of the Total OPEB Liability to Changes in the Healthcare Cost Trend Rate - The following presents the total OPEB liability of the Borough, calculated using the healthcare cost trend rate of 5.5% decreasing to 3.8%, as well as what the Borough's total OPEB liability would be if it were calculated using a healthcare cost trend rate that is one-percentage-point lower (4.5% decreasing to 2.8%) or one-percentage-point higher (6.5% decreasing to 4.8%) than the current rate:

	Borough's Total OPEB Liability
One-Percent Decrease (4.5% decreasing to 2.8%)	$ 2,413,026
Current Healthcare Cost Trend Rate (5.5% decreasing to 3.8%)	$ 2,645,484
One-Percent Increase (6.5% decreasing to 4.8%)	$ 2,919,131

OPEB Expense and Deferred Outflows of Resources Related to OPEB - For the year ended December 31, 2019, the Borough recognized OPEB expense totaling $133,106. As of December 31, 2019, the Borough reported deferred outflows of resources related to OPEB from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Changes of Assumptions	$ 86,018	$ 96,640
Changes for Experience	-	577,072
Benefit Payments Subsequent to the Measurement Date	151,547	-
	$ 237,565	$ 673,712

Deferred outflows of $151,547 for benefit payments subsequent to the measurement date will be recognized as a reduction of the total OPEB liability in the year ended December 31, 2020. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows for the years ending December 31:

2020	$ 117,539
2021	117,539
2022	117,539
2023	117,539
2024	117,538
	$ 587,694

Note 15. Defined Contribution Other Postemployment Benefits Plan

The Borough, in accordance with the Borough Council's approval, offers a defined contribution post-employment health plan (PEHP) created in accordance with Internal Revenue Code Section 501(c)(9). The PEHP is funded through a voluntary employees' beneficiary association (VEBA) to provide post-retirement reimbursement of qualifying medical care expenses and health care insurance premiums. The plan requires mandatory participation by all active members of the Hanover Professional Firefighters Local 2045 bargaining unit, and is not available to any other employees of the Borough. The plan had 15 active participants as of December 31, 2019.

The plan requires annual contributions by the Borough for each active participant ($700 for 2019), and active participants employed before January 1, 2009 receive an additional Borough contribution ($30 of pay up to a maximum of $780 annually) in lieu of receiving Emergency Medical Technician/ Automated External Defibrillator (EMT/AED) pay. In addition, up to five

days of accumulated sick leave is annually deposited per active participant at their current pay rate for those having been employed by the Borough for at least ten years, and up to 60 days of accumulated sick leave (less those previously deposited) are contributed upon retirement. Employee salary deferrals are not permitted to the plan. Borough contributions of $27,026 were accrued for the 501(c)(9) plan for the year ended December 31, 2019.

All amounts of compensation deferred under the plans and all income attributable to those amounts are held in trust for the exclusive benefit of participants and their beneficiaries. The assets will not be diverted to any other purpose. The Plan Administrator, Nationwide Retirement Solutions, is the trustee of the investments.

Note 16. Concentration of Credit Risk

The Borough receives real estate and per capita taxes from residents within the Borough limits. The Borough uses a tax collector to collect all current real estate and per capita taxes. The Borough may lien any property associated with the real estate tax assessment, therefore an allowance for uncollectible real estate taxes is not considered necessary. The Borough also provides water, sewer, and garbage service to customers within the Hanover area, and grants credit to its residents for these services. This area is located in York and Adams Counties, which are in south central Pennsylvania. The Borough may lien any property receiving service for uncollected bills, therefore an allowance for uncollectible services is not considered necessary.

Note 17. Risk Management

The Borough is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. The Borough purchases commercial insurance coverage for these types of losses, including workers' compensation. Settled claims resulting from these risks have not exceeded commercial insurance coverage in any of the past three fiscal years, and there have been no significant reductions in insurance coverage.

In 2018, the Borough began participation in the Intergovernmental Insurance Cooperative (IIC) through a perpetual-duration agreement, continuing until terminated pursuant to terms and conditions as defined therein. The IIC is a public entity risk pool established by certain units of local governments in Pennsylvania to provide health and welfare plan benefits directly to eligible employees, their families, and dependents of the participating municipal members. The IIC receives, processes, and pays such claims as may occur within the benefit program of each municipal member. Management consists of a Board of Directors compromised of seven appointed representatives from the municipal membership. The

Borough does not exercise any control over the activities of the IIC beyond its representation on the Board of Directors.

Under the trust plan, the Borough pays reasonable and customary healthcare expenses, including premiums for reinsurance, as there is an overall plan loss limitation, which is recalculated annually. The plan coverage is retrospectively rated, with final premium determination after loss experience is known. The Borough is responsible for its share of cross recovery of all municipal members as a net reduction in return of any premiums paid in excess of actual claims costs on an annual basis, and is subject to supplemental assessments by municipal members if deemed necessary by the IIC. For the year ended December 31, 2018, the Borough paid premiums of $3,607,824, and received $477,130 for premiums paid in excess of actual claims cost for 2018 following dividend declaration in 2019.

The Borough also pays unemployment costs on a claims-made basis. Total unemployment expense for the year ended December 31, 2019 was $1,066.

Note 18. Environmental Concerns

The Borough has underground storage tanks for fuel, and performs necessary testing in the surrounding land areas as necessary for leaks and potential contamination, and operates a wastewater facility. In addition, the Borough, as part of the closure plan for the Black Rock Landfill, performs well tests and water analysis in the landfill and surrounding areas. If a leak or contamination occurs, the Borough could become liable for the cost to remediate. In 2018, the Borough executed a budget modification with a third-party engineering firm for additional off-site migration control activities due to testing results, including recovery well installation, and requests by the Pennsylvania Department of Environmental Protection (DEP), which were completed in 2019 and in continued monitoring and reporting. Total costs for the additional equipment, testing, and regular monitoring were $119,868 for the year ended December 31, 2019, and are not expected to have a material effect on the Borough's financial position after giving effect to the provision for clean-up costs noted above.

Note 19. Contingencies and Commitments

The Borough participates in a number of federal, state, and county programs that are fully or partially funded by grants received from other governmental units. Expenditures financed by grants are subject to audit by or for the appropriate grantor government. If expenditures are disallowed due to noncompliance with grant program regulations, the Borough may be required to reimburse the grantor government. The Borough believes that disallowed expenditures, if any, based on subsequent audits will not have a material effect on any of the individual governmental funds or the overall financial position of the Borough.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

The Borough is subject to real estate tax assessment appeals on an ongoing basis. If tax appeals are successful, the result is a loss of tax revenue to the Borough. It is anticipated that any material loss of tax revenue on individual tax appeals will be offset with additional revenues from other properties or other sources of revenue and would not create a financial hardship to the Borough.

The Borough is involved with various lawsuits in the normal course of operations. In most cases, management cannot predict the outcome of the lawsuits or estimate the amount of any loss that may result. Management believes that losses resulting from these matters, if any, would be substantially covered under the Borough's professional liability insurance policy and would not have a material effect on the financial position of the Borough.

The Borough is committed under an Intergovernmental Cooperation Agreement related to the implementation of the York County Regional Chesapeake Bay Pollutant Reduction Plan, a County-based consortium to address stormwater discharges and implement pollution reduction plans. The agreement term is through December 31, 2023, with annual contribution to the consortium of $102,490.

As disclosed in Note 1, the Borough also is committed under an Intergovernmental Cooperation Agreement for operating and capital program costs for operation of the Commission for an initial period of seven years. The Commissions budget is funded equally from the Borough and Penn Township in quarterly allotments. Gross allotments paid to the Commission for the year ended December 31, 2019 totaled $682,070. In addition, various reimbursements for shared costs between the Borough and Commission occurred during the year ended December 31, 2019, decreasing total net costs for the Commission to $636,105. Any difference between allotments made and actual Commission costs are retained by the Commission and considered in relation to future budget needs. The agreement stipulates no return or refund of such excess. As of December 31, 2019, the Commission held cash and investments totaling $310,948 (unaudited), each equally funded by the Borough and Penn Township. The Commission has cash-basis audited financial statements available upon request.

In addition, the Borough is committed under the following significant contracts for purchases and construction projects outstanding, excluding any accounts payable and accrued expenses (retainage payable) on those contracts, as of December 31, 2019:

Project	Contract Amount	Contract Amount Outstanding
General Fund		
Ejector Trailer Purchases (2)	$ 121,932	$ 121,932
Water Fund		
Water Main Lining Project Construction	$ 392,670	$ -0-
Sanitary Sewer Fund		
Sewer Main Lining Project Construction	$ 270,346	$ 63,729

Note 20. Operating Leases

The Borough leases several office machines for various departments, which are accounted for as operating leases with terms extending over the next several years. Renewal options are available for several of the leases. Future minimum payments required under the non-cancelable operating leases are as follows for the years ending December 31,

2020	$ 14,378
2021	11,968
2022	11,878
2023	2,980
	$ 41,204

Total operating lease expenditures for the year ended December 31, 2019 were $37,830.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 21. Reconciliation of Operating Income (Loss) to Net Cash Provided (Used) by Operating Activities

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Operating Income (Loss)	$ 2,398,097	$ (1,247,103)	$ 2,175,579	$ 60,513	$ (24,124)	$ 3,362,962
Adjustments to Reconcile Operating Income (Loss) to Net Cash Provided by Operating Activities						
Depreciation	1,070,991	1,382,437	276,050	3,969	11,157	2,744,604
(Increase) Decrease in Accounts Receivable	(33,056)	60	21,448	(104,863)	1	(116,410)
Due from Other Governments	-	-	(10,492)	-	-	(10,492)
Due from Other Funds	(25,246)	(70,497)	199,555	-	-	103,812
Unbilled Services	(7,338)	24,185	(57,747)	(142,649)	-	(183,549)
Inventory	13,334	7,657	(481)	(7,889)	-	12,621
Prepaid Expenses	(24,573)	(19,528)	5,643	(16,761)	150	(55,069)
Increase (Decrease) in Accounts Payable and Accrued Expenses	(24,671)	32,186	21,039	34,045	172	62,771
Accrued Wages	10,667	995	(1,389)	9,741	36	20,050
Accrued Compensated Absences	1,707	(19,321)	(74,970)	128,535	66	36,017
Due to Other Funds	87,096	(216,154)	-	-	-	(129,058)
Unearned Revenue	-	(58,316)	-	-	-	(58,316)
Total OPEB Liability	(204,172)	(73,987)	(83,343)	132,522	-	(228,980)
Net Deferred Amounts from OPEB	113,621	35,995	20,672	18,879	-	189,167
Net Pension Liability	(1,599,592)	(519,324)	(304,648)	(216,833)	-	(2,640,397)
Net Deferred Amounts from Pensions	1,488,056	496,391	298,068	167,414	-	2,449,929
Net Cash Provided (Used) by Operating Activities	$ 3,264,921	$ (244,324)	$ 2,484,984	$ 66,623	$ (12,542)	$ 5,559,662

The Borough had the following significant non-cash capital, financing, and investing activities for the year ended December 31, 2019:

Debt Financing - The Sanitary Sewer Fund recognized an interfund transfer of $1,695,425 to subsidize the Regional Wastewater Fund's debt service payments made.

Contributed Assets and Inventory - The Water Fund recognized $741 for perpetual easements received on a property for utilities access, and the Sanitary Sewer Fund received $480,654 for perpetual easements and sewer main/related apparatus infrastructure received related to a development within the Borough.

Note 22. New Governmental Accounting Standards Board Pronouncements

The GASB has issued several pronouncements prior to the year ended December 31, 2019 and through the date the financial statements were available to be issued that have effective dates that may impact future financial presentations:

GASB Statement No. 87, *Leases* - The objective of this statement is to increase usefulness of governments' financial statements by requiring a single model for lease accounting, both capital and operating (previously not recognized as assets and liabilities) leases, based on the payment provisions of the contract and the foundational principle that leases are financings of the right to use an underlying asset. The provisions of this statement are effective for periods beginning after December 15, 2019. The implementation of this statement is expected to have significant effect on the financial statements of the Borough in the year of implementation; however, the effects of said implementation are not yet quantifiable.

GASB Statement No. 91, *Conduit Debt Obligations* - The objective of this statement is to provide a single method of reporting conduit debt obligations by issuers and eliminate diversity in practice associated with (1) commitments extended by issuers, (2) arrangements associated with conduit debt obligations, and (3) related note disclosures. The provisions of this statement are effective for periods beginning after December 15, 2020. The implementation of this statement is not expected to have significant effect on the financial statements of the Borough in the year of implementation.

GASB Statement No. 92, *Omnibus 2020* - The objective of this statement is to improve consistency of authoritative literature by addressing practice issues that have been identified during implementation and application of certain GASB Statements. The provisions of this statement are predominately effective for periods beginning after June 15, 2020. The implementation of this statement is not expected to have significant effect on the financial statements of the Borough in the year of implementation.

THE BOROUGH OF HANOVER, PENNSYLVANIA

NOTES TO BASIC FINANCIAL STATEMENTS

Note 23. Prior Period Adjustment - HPLA

HPLA

During the year ended March 31, 2019, the HPLA reached an agreement with and paid the Borough $97,834, representing partial disbursement of a prior fully-accrued estate distribution ($146,725 as accrued as of March 31, 2018). The beginning net position of the HPLA was adjusted to reflect the reduced payable as of March 31, 2018 by $48,891 for a total of $2,220,448.

Note 24. Subsequent Events

Primary Government

In January 2020, the Borough issued $8,495,000 of refunding bonds to advance refund $8,355,000 of the 2015 Series B bonds to provide resources to purchase U.S. government securities that were placed in an irrevocable trust to generate resources for all future debt service payments. As a result, the refunded bonds are considered to be defeased and the liabilities have been removed. The 2015 Series B bonds are set for call April 2020, at which time all refunded bonds are to be called and redeemed with accumulated trust resources. The current refunding reduced total debt service payments over the next 20 years by $506,735. This resulted in an economic gain (difference between the present values of the debt service payments on the old and new debt) of $407,666.

In February 2020, the Borough approved capital lease financing totaling $158,560 for the acquisition of a dump truck with a plow. The terms of the lease are for five years, with first annual installment due at closing, at 1.95% stated interest rate and secured by the relating capital asset.

Subsequent to December 31, 2019, the Borough has been operating in an environment that has been economically impacted by the COVID-19 pandemic. The full impact of the pandemic on the Borough is not known as of the release of these financial statements; however, management continues to monitor the current conditions and their potential impact on the financial statements.

REQUIRED SUPPLEMENTARY INFORMATION

Schedule "1"

THE BOROUGH OF HANOVER, PENNSYLVANIA

BUDGETARY COMPARISON SCHEDULE - GENERAL FUND

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

	Budgeted Amounts			
	Original Budget	Final Budget	Actual	Variance
REVENUES				
Taxes	$ 8,512,350	$ 8,512,350	$ 8,734,647	$ 222,297
Licenses and Permits	61,650	85,650	126,207	40,557
Fines and Forfeitures	179,450	179,450	178,921	(529)
Interest and Rents	343,950	343,950	391,182	47,232
Intergovernmental	1,813,858	2,072,587	1,950,740	(121,847)
Charges for Services	4,795,010	4,950,260	5,046,142	95,882
Donations from Private Sources	324,050	324,050	322,243	(1,807)
Miscellaneous	-	-	126	126
TOTAL REVENUES	**16,030,318**	**16,468,297**	**16,750,208**	**281,911**
EXPENDITURES				
General Government	837,534	837,534	749,984	87,550
Public Safety	6,756,797	6,919,796	6,711,134	208,662
Health and Sanitation	4,150,521	4,358,021	4,370,247	(12,226)
Highways	952,417	1,211,146	1,104,318	106,828
Culture and Recreation	1,643,199	1,643,199	1,422,997	220,202
Debt Service	1,082,768	1,082,768	1,086,389	(3,621)
Capital Outlays	1,211,894	1,153,644	767,444	386,200
Miscellaneous	397,352	397,352	313,135	84,217
TOTAL EXPENDITURES	**17,032,482**	**17,603,460**	**16,525,648**	**1,077,812**
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	**(1,002,164)**	**(1,135,163)**	**224,560**	**1,359,723**
OTHER FINANCING SOURCES				
Proceeds from Disposal of Capital Assets	-	132,999	167,586	34,587
Interfund Transfers	-	-	24,777	24,777
Proceeds from Capital Lease Obligations	235,000	235,000	264,249	29,249
TOTAL OTHER FINANCING SOURCES	**235,000**	**367,999**	**456,612**	**88,613**
CHANGES IN FUND BALANCE	**(767,164)**	**(767,164)**	**681,172**	**1,448,336**
Fund Balance - Beginning of Year	9,624,970	9,624,970	9,624,970	-
FUND BALANCE - END OF YEAR	**$ 8,857,806**	**$ 8,857,806**	**$ 10,306,142**	**$ 1,448,336**

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2019			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 363,436	$ 157,461	$ 329,117	$ 850,014
Interest	966,806	524,881	2,191,743	3,683,430
Changes of Benefit Terms	-	-	21,757	21,757
Changes for Experience	(468,572)	9,699	(1,256,261)	(1,715,134)
Changes of Assumptions	373,371	261,458	922,934	1,557,763
Benefit Payments, Including Refunds of Plan Member Contributions	(625,499)	(401,574)	(1,206,451)	(2,233,524)
NET CHANGES IN TOTAL PENSION LIABILITY	**609,542**	**551,925**	**1,002,839**	**2,164,306**
Total Pension Liability - Beginning of Year	13,856,029	7,270,469	31,918,045	53,044,543
TOTAL PENSION LIABILITY - END OF YEAR (A)	**14,465,571**	**7,822,394**	**32,920,884**	**55,208,849**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	545,941	158,627	347,424	1,051,992
Contributions - Plan Members	67,525	47,625	155,335	270,485
Net Investment Income	2,243,761	1,267,942	6,231,414	9,743,117
Benefit Payments, Including Refunds of Plan Member Contributions	(625,499)	(401,574)	(1,206,451)	(2,233,524)
Administrative Expense	(8,100)	(6,100)	(16,400)	(30,600)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**2,223,628**	**1,066,520**	**5,511,322**	**8,801,470**
Plan Fiduciary Net Position - Beginning of Year	11,817,070	6,255,158	30,313,438	48,385,666
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**14,040,698**	**7,321,678**	**35,824,760**	**57,187,136**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 424,873**	**$ 500,716**	**$ (2,903,876)**	**$ (1,978,287)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	97.06%	93.60%	108.82%	103.58%
COVERED-EMPLOYEE PAYROLL	$ 2,242,984	$ 1,287,145	$ 5,660,980	$ 9,191,109
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	18.94%	38.90%	(51.30%)	(21.52%)

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2018			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 393,942	$ 136,679	$ 358,409	$ 889,030
Interest	926,381	488,774	2,122,719	3,537,874
Changes of Benefit Terms	-	210,301	-	210,301
Changes in Experience	-	-	-	-
Changes of Assumptions	-	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(608,734)	(401,574)	(1,058,472)	(2,068,780)
NET CHANGES IN TOTAL PENSION LIABILITY	**711,589**	**434,180**	**1,422,656**	**2,568,425**
Total Pension Liability - Beginning of Year	13,144,440	6,836,289	30,495,389	50,476,118
TOTAL PENSION LIABILITY - END OF YEAR (A)	**13,856,029**	**7,270,469**	**31,918,045**	**53,044,543**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	564,507	42,787	249,949	857,243
Contributions - Plan Members	64,231	43,009	150,915	258,155
Net Investment Income	(830,854)	(420,640)	(1,976,195)	(3,227,689)
Benefit Payments, Including Refunds of Plan Member Contributions	(608,734)	(401,574)	(1,058,472)	(2,068,780)
Administrative Expense	(4,600)	(4,000)	(6,600)	(15,200)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**(815,450)**	**(740,418)**	**(2,640,403)**	**(4,196,271)**
Plan Fiduciary Net Position - Beginning of Year	12,632,520	6,995,576	32,953,841	52,581,937
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**11,817,070**	**6,255,158**	**30,313,438**	**48,385,666**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 2,038,959**	**$ 1,015,311**	**$ 1,604,607**	**$ 4,658,877**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	85.28%	86.04%	94.97%	91.22%
COVERED-EMPLOYEE PAYROLL	$ 1,978,380	$ 1,208,992	$ 5,614,113	$ 8,801,485
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	103.06%	83.98%	28.58%	52.93%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2017			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 375,183	$ 122,036	$ 341,342	$ 838,561
Interest	877,558	459,512	2,026,083	3,363,153
Changes of Benefit Terms	-	-	-	-
Changes in Experience	(529,608)	48,992	(1,148,834)	(1,629,450)
Changes of Assumptions	440,603	242,550	1,189,911	1,873,064
Benefit Payments, Including Refunds of Plan Member Contributions	(539,320)	(375,372)	(949,487)	(1,864,179)
NET CHANGES IN TOTAL PENSION LIABILITY	**624,416**	**497,718**	**1,459,015**	**2,581,149**
Total Pension Liability - Beginning of Year	12,520,024	6,338,571	29,036,374	47,894,969
TOTAL PENSION LIABILITY - END OF YEAR (A)	**13,144,440**	**6,836,289**	**30,495,389**	**50,476,118**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	399,759	46,440	268,797	714,996
Contributions - Plan Members	64,049	41,439	151,420	256,908
Net Investment Income	1,557,534	1,061,777	4,891,289	7,510,600
Benefit Payments, Including Refunds of Plan Member Contributions	(539,320)	(375,372)	(949,487)	(1,864,179)
Administrative Expense	(6,200)	(6,100)	(10,500)	(22,800)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**1,475,822**	**768,184**	**4,351,519**	**6,595,525**
Plan Fiduciary Net Position - Beginning of Year	11,156,698	6,227,392	28,602,322	45,986,412
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**12,632,520**	**6,995,576**	**32,953,841**	**52,581,937**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 511,920**	**$ (159,287)**	**$ (2,458,452)**	**$ (2,105,819)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	96.11%	102.33%	108.06%	104.17%
COVERED-EMPLOYEE PAYROLL	$ 2,107,504	$ 1,081,258	$ 5,507,764	$ 8,696,526
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	24.29%	(14.73%)	(44.64%)	(24.21%)

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2016			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 316,342	$ 109,094	$ 528,544	$ 953,980
Interest	837,000	426,339	1,928,172	3,191,511
Changes of Benefit Terms	-	-	-	-
Changes in Experience	-	-	-	-
Changes of Assumptions	-	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(548,229)	(356,656)	(874,219)	(1,779,104)
NET CHANGES IN TOTAL PENSION LIABILITY	**605,113**	**178,777**	**1,582,497**	**2,366,387**
Total Pension Liability - Beginning of Year	11,914,911	6,159,794	27,453,877	45,528,582
TOTAL PENSION LIABILITY - END OF YEAR (A)	**12,520,024**	**6,338,571**	**29,036,374**	**47,894,969**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	419,625	37,805	263,766	721,196
Contributions - Plan Members	62,334	39,220	156,153	257,707
Net Investment Income	675,893	303,972	1,308,135	2,288,000
Benefit Payments, Including Refunds of Plan Member Contributions	(548,229)	(356,656)	(874,219)	(1,779,104)
Administrative Expense	(4,900)	(3,800)	(7,600)	(16,300)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**604,723**	**20,541**	**846,235**	**1,471,499**
Plan Fiduciary Net Position - Beginning of Year	10,551,975	6,206,851	27,756,087	44,514,913
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**11,156,698**	**6,227,392**	**28,602,322**	**45,986,412**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 1,363,326**	**$ 111,179**	**$ 434,052**	**$ 1,908,557**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	89.11%	98.25%	98.51%	96.02%
COVERED-EMPLOYEE PAYROLL	$ 2,077,787	$ 1,080,471	$ 5,462,803	$ 8,621,061
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	65.61%	10.29%	7.95%	22.14%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2015			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 301,278	$ 103,899	$ 503,375	$ 908,552
Interest	797,720	414,642	1,822,241	3,034,603
Changes of Benefit Terms	-	-	-	-
Changes in Experience	(27,836)	(112,264)	(1,160,455)	(1,300,555)
Changes of Assumptions	(133,554)	-	-	(133,554)
Benefit Payments, Including Refunds of Plan Member Contributions	(557,605)	(356,611)	(800,748)	(1,714,964)
NET CHANGES IN TOTAL PENSION LIABILITY	**380,003**	**49,666**	**364,413**	**794,082**
Total Pension Liability - Beginning of Year	11,534,908	6,110,128	27,089,464	44,734,500
TOTAL PENSION LIABILITY - END OF YEAR (A)	**11,914,911**	**6,159,794**	**27,453,877**	**45,528,582**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	478,308	64,277	423,936	966,521
Contributions - Plan Members	64,012	36,883	157,438	258,333
Net Investment Income	(446,203)	(25,197)	(91,891)	(563,291)
Benefit Payments, Including Refunds of Plan Member Contributions	(557,605)	(356,611)	(800,748)	(1,714,964)
Administrative Expense	(7,600)	(6,500)	(10,600)	(24,700)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**(469,088)**	**(287,148)**	**(321,865)**	**(1,078,101)**
Plan Fiduciary Net Position - Beginning of Year	11,021,063	6,493,999	28,077,952	45,593,014
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**10,551,975**	**6,206,851**	**27,756,087**	**44,514,913**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 1,362,936**	**$ (47,057)**	**$ (302,210)**	**$ 1,013,669**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	88.56%	100.76%	101.10%	97.77%
COVERED-EMPLOYEE PAYROLL	$ 2,160,409	$ 1,020,433	$ 5,586,454	$ 8,767,296
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	63.09%	(4.61%)	(5.41%)	11.56%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2014			
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Total Pension Trust Funds
TOTAL PENSION LIABILITY				
Service Cost	$ 264,674	$ 92,224	$ 551,759	$ 908,657
Interest	773,726	410,195	1,795,624	2,979,545
Changes of Benefit Terms	-	-	-	-
Changes in Experience	-	-	-	-
Changes of Assumptions	-	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(584,107)	(319,985)	(715,865)	(1,619,957)
NET CHANGES IN TOTAL PENSION LIABILITY	**454,293**	**182,434**	**1,631,518**	**2,268,245**
Total Pension Liability - Beginning of Year	11,080,615	5,927,694	25,457,946	42,466,255
TOTAL PENSION LIABILITY - END OF YEAR (A)	**11,534,908**	**6,110,128**	**27,089,464**	**44,734,500**
PLAN FIDUCIARY NET POSITION				
Contributions - Employer	478,718	66,988	448,010	993,716
Contributions - Plan Members	61,406	37,484	160,897	259,787
Net Investment Income	781,847	155,116	722,392	1,659,355
Benefit Payments, Including Refunds of Plan Member Contributions	(584,107)	(319,985)	(715,865)	(1,619,957)
Administrative Expense	(2,700)	(1,800)	(7,900)	(12,400)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**735,164**	**(62,197)**	**607,534**	**1,280,501**
Plan Fiduciary Net Position - Beginning of Year	10,285,899	6,556,196	27,470,418	44,312,513
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**11,021,063**	**6,493,999**	**28,077,952**	**45,593,014**
BOROUGH'S NET PENSION LIABILITY (A-B)	**$ 513,845**	**$ (383,871)**	**$ (988,488)**	**$ (858,514)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	95.55%	106.28%	103.65%	101.92%
COVERED-EMPLOYEE PAYROLL	$ 1,902,925	$ 962,980	$ 5,239,612	$ 8,105,517
BOROUGH'S NET PENSION LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	27.00%	(39.86%)	(18.87%)	(10.59%)

NOTES TO SCHEDULE:

This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 68.

Schedule "3"

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

SCHEDULE OF BOROUGH CONTRIBUTIONS

Police Pension Plan	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially Determined Contribution	$ 545,941	$ 404,070	$ 398,330	$ 398,325	$ 478,308	$ 478,718	$ 380,559	$ 348,397	$ 342,788	$ 224,850
Contribution in Relation to the Actuarially Determined Contribution	545,941	564,507	399,759	419,625	478,308	478,718	380,559	348,397	342,788	224,850
Contribution Deficiency (Excess)	$ -	$ (160,437)	$ (1,429)	$ (21,300)	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 2,242,984	$ 1,978,380	$ 2,107,504	$ 2,077,787	$ 2,160,409	$ 1,902,925	$ 1,713,930	$ 1,782,147	$ 1,405,946	$ 1,507,503
Contribution as a Percentage of Covered-Employee Payroll	24.34%	28.53%	18.97%	20.20%	22.14%	25.16%	22.20%	19.55%	24.38%	14.92%

Fire Drivers' Pension Plan	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially Determined Contribution	$ 158,627	$ 42,787	$ 46,440	$ 37,805	$ 64,277	$ 66,988	$ 203,763	$ 187,994	$ 188,128	$ 150,422
Contribution in Relation to the Actuarially Determined Contribution	158,627	42,787	46,440	37,805	64,277	66,988	203,763	187,994	188,128	150,422
Contribution Deficiency (Excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 1,287,145	$ 1,208,992	$ 1,081,258	$ 1,080,471	$ 1,020,433	$ 962,980	$ 913,768	$ 967,608	$ 983,929	$ 1,035,282
Contribution as a Percentage of Covered-Employee Payroll	12.32%	3.54%	4.29%	3.50%	6.30%	6.96%	22.30%	19.43%	19.12%	14.53%

Schedule "3"

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

Hanover Employees' Pension Plan	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially Determined Contribution	$ 347,424	$ 249,949	$ 268,797	$ 263,766	$ 423,936	$ 448,010	$ 574,943	$ 482,645	$ 458,651	$ 460,768
Contribution in Relation to the Actuarially Determined Contribution	347,424	249,949	268,797	263,766	423,936	448,010	574,943	482,645	458,651	460,768
Contribution Deficiency (Excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 5,660,980	$ 5,614,113	$ 5,507,764	$ 5,462,803	$ 5,586,454	$ 5,239,612	$ 5,294,038	$ 5,364,775	$ 4,982,663	$ 5,082,520
Contribution as a Percentage of Covered-Employee Payroll	6.14%	4.45%	4.88%	4.83%	7.59%	8.55%	10.86%	9.00%	9.20%	9.07%

NOTES TO SCHEDULE:

Valuation Date - Actuarially determined contribution rates are calculated as of January 1, two to four years prior to the end of the fiscal year in which the contributions are reported. The total pension liability is based on a roll forward from this date.

Actuarial Assumptions:

Actuarial Cost Method	Entry age normal
Asset Valuation Method	Market value as determined by the trustee
Inflation Assumption	3%
Projected Salary Increases	5%
Investment Rate of Return	7%, net of pension plan investment expense, including inflation

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Amortization Method	Level dollar closed	Level dollar closed	Level dollar closed
Remaining Amortization Period	11 years	13 years	11 years
Mortality	Based on PubS-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)	Based on PubS-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)	Based on PubG-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)
Retirement Age	Active members at age 53 and completion of 25 years of service or age on valuation date, if greater; vested former members at normal retirement age, or age of valuation date, if greater	Normal retirement age, or age of valuation date, if greater	Normal retirement age, or age of valuation date, if greater

Changes in Benefits Terms - In 2014, benefits for non-union, non-uniformed employees in the Hanover Employees' Pension Plan hired on or after July 1, 2014 changed:

1) Normal retirement date is attained at age 60 and completion of 25 years of vesting service (previously age 55), or attainment of age 65 and completion of 10 years of vesting service (previously age 62).

2) Normal retirement pension is 1% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year (previously 1.5%).

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF BOROUGH CONTRIBUTIONS - PENSION PLANS
LAST 10 FISCAL YEARS

UNAUDITED

In 2018, the Fire Drivers' Pension Plan pension benefit increased from 1.75% to 1.9% of average monthly compensation.

In 2019, through unionization, benefits for certain prior non-union members hired after July 1, 2014 of the Hanover Employees' Pension Plan changed :

1) Normal retirement date is attained at age 55 and completion of 25 years of vesting service (previously age 60), or attainment of age 62 and completion of 10 years of vesting service (previously age 65).
2) Normal retirement pension is 1.5% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year (previously 1%).

Change in Assumptions - In 2015, the cost-of-living increase assumption for the Police Pension Plan was revised from 4% to 3% per year to reflect recent history of cost-of-living increases.

In 2017, the mortality assumptions for all pension plans were revised from the RP-2000 Mortality Tables for Males and Females for expectation of retired life mortality to the IRS 2017 Static Combined Table for Small Plans.

In 2019, the mortality assumptions for all pension plans were revised from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers' Pension Plans, and the PubG-2010 Mortality Table for Hanover Employees' Pension Plan.

Exhibit D XI-2 Attachment
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THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULES OF INVESTMENT RETURNS - PENSION PLANS
LAST 10 FISCAL YEARS*

UNAUDITED

	2019			2018			2017		
	Pension Plans			Pension Plans			Pension Plans		
	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'
Average Money-Weighted Rate of Return, Net of Investment Expense	18.76%	20.42%	20.69 %	(6.55)%	(6.14)%	(6.04)%	13.87%	17.37%	17.20%

	2016			2015			2014		
	Pension Plans			Pension Plans			Pension Plans		
	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'	Police	Fire Drivers'	Hanover Employees'
Average Money-Weighted Rate of Return, Net of Investment Expense	6.36%	4.99%	4.74%	(4.02)%	(0.39)%	(0.33%)	6.41%	2.40%	2.38%

NOTES TO SCHEDULE:

* This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 68.

Schedule "5"

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S TOTAL OPEB LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2019	2018
TOTAL OPEB LIABILITY		
Service Cost	$ 152,618	$ 133,310
Interest	108,558	118,997
Changes of Benefit Terms	(10,531)	-
Changes for Experience	(692,487)	-
Changes of Assumptions	(115,968)	120,426
Benefit Payments (Estimated)	(173,416)	(153,071)
NET CHANGES IN TOTAL OPEB LIABILITY	**(731,226)**	**219,662**
Total OPEB Liability - Beginning of Year	3,376,710	3,157,048
TOTAL OPEB LIABILITY - END OF YEAR	**2,645,484**	**3,376,710**
COVERED-EMPLOYEE PAYROLL	8,587,152	8,621,059
BOROUGH'S TOTAL OPEB LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	30.81%	39.17%

NOTES TO SCHEDULE:

The total OPEB liability amount presented for each fiscal year was determined as of the fiscal year-end. No assets have been accumulated in a trust that meets the criteria in GASB Statement No. 75, paragrap 4, to pay related benefits. This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 75.

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S TOTAL OPEB LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

Valuation Date - Actuarially determined contribution rates are calculated as of January 1, two to four years prior to the end of the fiscal year in which the contributions are reported. The total OPEB Liabilit is based on a roll forward from this date.

Actuarial Assumptions:

Actuarial Cost Method	Entry Age Normal Cost Method
Salary Increase/Inflation	5.0%
Municipal Bond Rate	3.64% (S&P Municipal Bond 20-Year High Grade Rate Index)
Healthcare Cost Trend Rates	5.5% per year graded down by the Society of Actuaries Long-Run Medical Cost Trend Model to an ultimate rate of 3.8% per year
Mortality	PubS-2010 Mortality Table for Police and Fire Drivers, and PubG-2010 Mortality Table for Nonuniformed Employees

Change in Benefit Terms - After January 1, 2015, new Fire Driver employees are not eligible to purchase health insurance through the Borough after retirement. After January 1, 2019, new Water Department and Nonuniformed White Collar employees are not eligible to purchase health insurance through the Borough after retirement.

Change in Assumptions - In 2019, the discount rate changed from 3.16% to 3.64%. The mortality table was updated from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers, and to the PubG-2010 Mortality Table for Non-uniformed Employees.

OTHER SUPPLEMENTARY INFORMATION

THE BOROUGH OF HANOVER, PENNSYLVANIA

COMBINING SCHEDULE OF FIDUCIARY NET POSITION

DECEMBER 31, 2019

UNAUDITED

	Pension (and Other Employee Benefit) Trust Funds				
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Component Unit - Fire Drivers' PEHP Fund	Total Pension (and Other Employee Benefit) Trust Funds
ASSETS					
Cash and Cash Equivalents	$ 608,568	$ 182,925	$ 744,010	$ 19,304	$ 1,554,807
Contributions Receivable	5,392	3,422	11,964	27,026	47,804
Accrued Interest Receivable	36,290	1,985	49,603	-	87,878
Investments	13,390,448	7,133,346	35,019,927	264,734	55,808,455
TOTAL ASSETS	**14,040,698**	**7,321,678**	**35,825,504**	**311,064**	**57,498,944**
DEFERRED OUTFLOWS OF RESOURCES	-	-	-	-	-
LIABILITIES					
Pension Benefits Payable	-	-	744	-	744
LIABILITIES	-	-	**744**	-	**744**
DEFERRED INFLOWS OF RESOURCES	-	-	-	-	-
NET POSITION					
Restricted for Pension Benefits	14,040,698	7,321,678	35,824,760	311,064	57,498,200
TOTAL NET POSITION	**$ 14,040,698**	**$ 7,321,678**	**$ 35,824,760**	**$ 311,064**	**$ 57,498,200**

THE BOROUGH OF HANOVER, PENNSYLVANIA

COMBINING SCHEDULE OF CHANGES IN FIDUCIARY NET POSITION

FOR THE YEAR ENDED DECEMBER 31, 2019

UNAUDITED

	Pension (and Other Employee Benefit) Trust Funds				
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Component Unit - Fire Drivers' PEHP Fund	Total Pension (and Other Employee Benefit) Trust Funds
ADDITIONS					
Contributions					
Employer	$ -	$ -	$ 94,459	$ 27,026	$ 121,485
Commonwealth	545,941	158,627	252,965	-	957,533
Plan Members	67,525	47,625	155,335	-	270,485
Total Contributions	613,466	206,252	502,759	27,026	1,349,503
Investment Earnings					
Interest Income	108,927	112,448	580,683	-	802,058
Dividends	243,452	35,123	160,484	394	439,453
	352,379	147,571	741,167	394	1,241,511
Less: Investment Expense	78,265	34,149	117,652	600	230,666
Net Investment Earnings	274,114	113,422	623,515	(206)	1,010,845
TOTAL ADDITIONS	**887,580**	**319,674**	**1,126,274**	**26,820**	**2,360,348**
DEDUCTIONS					
Benefits	625,499	401,574	1,206,451	8,170	2,241,694
Administrative Expense	8,100	6,100	16,400	-	30,600
TOTAL DEDUCTIONS	**633,599**	**407,674**	**1,222,851**	**8,170**	**2,272,294**
NET APPRECIATION IN FAIR VALUE OF INVESTMENTS	**1,969,647**	**1,154,520**	**5,607,899**	**51,820**	**8,783,886**
CHANGES IN NET POSITION	**2,223,628**	**1,066,520**	**5,511,322**	**70,470**	**8,871,940**
Net Position - Beginning of Year	11,817,070	6,255,158	30,313,438	240,594	48,626,260
NET POSITION - END OF YEAR	**$ 14,040,698**	**$ 7,321,678**	**$ 35,824,760**	**$ 311,064**	**$ 57,498,200**

THE BOROUGH OF HANOVER, PENNSYLVANIA

BASIC FINANCIAL STATEMENTS AND REQUIRED AND OTHER SUPPLEMENTARY INFORMATION

FOR THE YEAR ENDED DECEMBER 31, 2020

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HAMILTON & MUSSER, PC
Certified Public Accountants • Consultants to Management
DAVID A. HAMILTON, CPA • BARRY E. MUSSER, CPA, CFP® (1959 - 2020)
JAMES A. KRIMMEL, MBA, CPA, CFE, CFF • ROBERT D. MAST, CPA • WILLIAM P. ASHMAN, CPA

INDEPENDENT AUDITOR'S REPORT

To the Borough Council
The Borough of Hanover
Hanover, Pennsylvania

Opinions

We have audited the accompanying financial statements of the governmental activities, the business-type activities, the discretely presented component unit, the blended presented component unit, each major fund, and the aggregate remaining fund information of The Borough of Hanover, Pennsylvania, as of and for the year ended December 31, 2020, and the related notes to the financial statements, which collectively comprise the Borough of Hanover's basic financial statements of the Borough's primary government as listed in the table of contents.

In our opinion, based on our audit and the report of other auditors, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities, the business-type activities, the blended presented component unit, the discretely presented component unit, each major fund, and the aggregate remaining fund information of the primary government of the Borough of Hanover, Pennsylvania, as of December 31, 2020, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of The Borough of Hanover and to meet our other ethical responsibilities in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Emphasis of a Matter

As further explained in Note 23, the Borough is operating in an environment that has been economically impacted by the COVID-19 pandemic.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about The Borough of Hanover's ability to continue as a going concern within one year after the date that the financial statements are available to be issued.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with generally accepted auditing standards will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements, including omissions, are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with generally accepted auditing standards, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of Borough's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about Borough's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control related matters that we identified during the audit.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, budgetary comparison information, schedule of changes in the Borough's net pension liability (asset) and related ratios - pension plans, schedules of Borough contributions and investment returns – pension plans, and schedule of changes in the Borough's total OPEB liability and related ratios on pages 4-20 and 89-99 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming opinions on the financial statements that collectively comprise the Borough of Hanover, Pennsylvania's basic financial statements. The combining schedule of fiduciary net pension and combining schedule of changes in fiduciary net position on pages 100 and 101 are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The combining schedules are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has not been subjected to the auditing procedures applied in the audit of the basic financial statements and accordingly, we do not express an opinion or provide any assurance on them.

Hamilton & Musser, P.C.

March 30, 2021

Mechanicsburg, Pennsylvania *Certified Public Accountants*

INTRODUCTION

The following discussion and analysis of The Borough of Hanover's (the "Borough") financial statements provides a narrative overview and analysis of the financial activities of the Borough for the fiscal year ended December 31, 2020. Readers are encouraged to consider the information presented here in conjunction with the year-end financial statements and accompanying notes following this analysis.

The Management's Discussion and Analysis (MD&A) is an element of the reporting model adopted by the Governmental Accounting Standards Board (GASB) in their statement No. 34, *Basic Financial Stations - and Management's Discussion and Analysis - for State and Local Governments*, issued June 1999. Certain comparative information between the current year and prior year is required to be presented in this section.

FINANCIAL HIGHLIGHTS OF 2020

- The assets and deferred outflows of resources of the Borough exceeded its liabilities and deferred inflows of resources at the close of the fiscal year ended December 31, 2020 by $73,243,201 (net position). The Borough's net position value increased $5,015,321 from 2019's total of $68,227,880. The majority of the Borough's net position ($51,994,621, or 70.99%) is invested in capital assets and is not available for future spending.
- Fund balances increased in the General Fund by $581,196 from $10,306,142 to $10,887,338 in 2020.
- The Borough entered into two new capital lease obligations in 2020 relating to various heavy-duty vehicles and related equipment, totaling $390,039.
- The Borough's bond rating was confirmed as Aa3 as issued by Moody's, denoting a very strong capacity to meet financial commitments.
- The Borough had $51,685,000 in general obligation debt outstanding as of December 31, 2020. This represents a net increase of $6,070,000 from 2019, based on issuance of new Water Fund debt of $9,440,000 for forthcoming dam rehabilitation projects and slightly offset with principal payments made. The Non-Electoral Debt Capacity remaining is $35,358,558 and Non-Electoral Debt and Lease Rental Debt Capacity remaining is $51,286,381.

- Overall, the Borough's pension plans' funded ratio is 110.93%, which significantly outpaces the total funded ratio of all Commonwealth of Pennsylvania local government defined benefit self-insured pension plans (65.80%), based on January 1, 2019 actuarial data analyzed by the Municipal Pension Reporting Program of the Commonwealth of Pennsylvania.

OVERVIEW OF FINANCIAL STATEMENTS

This MD&A section is intended to serve as an introduction to the Borough's basic financial statements and provides an overview of the Borough's financial activities. The basic financial statements are comprised of three components: 1) government-wide financial statements; 2) fund financial statements; and 3) notes to basic financial statements. This report also contains required and other supplementary information in addition to the basic financial statements themselves.

Government-Wide Financial Statements - The government-wide financial statements are designed to provide readers with a broad overview of the Borough's finances in a manner similar to a private-sector business.

The *Statement of Net Position* presents information on all of the Borough's assets, deferred outflows of resources, liabilities, and deferred inflows of resources, with the difference reported as net position. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position of the Borough is improving or deteriorating.

The *Statement of Activities* presents information showing how the Borough's net position changed during the most recent fiscal year. All changes in net position (revenues and expenses) are reported as soon as the underlying event giving rise to the change occurs, *regardless of the timing of related cash flows*. Thus, revenues and expenses are reporting in this statement for some items that will only result in cash flows in future fiscal periods (e.g., uncollected taxes and earned, but unused, compensated absences). The focus of this statement is on the net cost of providing various activities to the citizens of the Borough.

Both the *Statement of Net Position* and the *Statement of Activities* distinguish functions of the Borough that are principally supported by taxes and intergovernmental revenues (*governmental activities*) from other functions that are intended to recover all or a significant portion of their costs through user fees and charges (business-type activities*)*.

- Governmental Activities - The activities reflected in this section are general government; public safety (police, fire, and emergency management); roads; health and sanitation; cultural and recreation; and other departments and programs. These activities are primarily supported by operating grants and contributions, charges for services, real estate taxes, and departmental revenues.

- Business-Type Activities - The activities reflected in this section are water; regional wastewater; sanitary sewer; stormwater (*through the Hanover Borough Stormwater Authority, a blended component unit*); and market house. These activities are intended to recover their cost of operation, including depreciation, primarily through user charges.

Fund Financial Statements **-** A *fund* is a grouping of related accounts that is used to maintain control over resources that have been segregated for specific activities or objectives. State law requires some funds be segregated, while other funds are established to control and manage resources designated for specific purposes.

The Borough has three types of funds:

- Governmental Funds - Most of the Borough's basic services are included in governmental funds, which focus on 1) the flow of cash and other financial assets that can readily be converted into cash, and 2) the balances left at year-end that are available for spending. Consequently, the governmental funds statements provide a detailed near-term view that helps determine the financial requirements for current Borough's programs. The Borough's major governmental fund is the General Fund. The Capital Projects, Highway Liquid Fuels, Recreation, Recreation Endowment, and Library Endowment Funds are non-major governmental funds of the Borough.

  Because the focus of governmental funds is narrower than that of the government-wide financial statements, it is useful to compare the information presented for governmental funds with similar information presented for governmental activities in the government-wide financial statements. By doing so, readers may better understand the long-term impact of the Borough's near-term financing decisions. Both the governmental funds Balance Sheet and the governmental funds Statement of Revenues, Expenditures, and Changes in Fund Balances provide a reconciliation to facilitate the comparison between governmental funds and governmental activities.

The Borough adopts an annual appropriated budget for its General, Recreation, and Highway Liquid Fuels Funds. A budgetary comparison statement for the General Fund has been provided as required supplementary information for this major fund to demonstrate compliance with its budgets.

- Enterprise Funds - Used to report the same functions presented as business-type activities in the government-wide financial statements, which provide services for the Borough's other programs and activities, in more detail. The Borough reports five enterprise funds: Water, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds, which are each reported as major funds, and the Market House Fund, which is presented as non-major.

- Fiduciary Funds - The Borough is the trustee, or fiduciary, for its three separate employees' pension plans for police, fire drivers, and non-uniformed employees, collectively reported as the Borough's Pension Trust Funds, and the Fire Drivers' Post Employment Health Plan (PEHP) Fund (*discretely presented component unit*). The Borough is responsible for ensuring that the assets reported in the funds are used for the intended purposes. All the Borough's fiduciary assets, deferred outflows of resources, liabilities, and deferred inflows of resources balances are reported in the Statement of Fiduciary Net Position. A Statement of Changes in Fiduciary Net Position is presented for the Pension Trust Funds only. All fiduciary activities are excluded from the Borough's government-wide financial statements because the Borough cannot use these assets to finance its operations.

Component Units - Component units are organizations that are legally separate, tax-exempt entities that have the following characteristics: 1) the economic resources received or held are almost entirely for the direct benefit of the Borough (known as the *primary government*), 2) the primary government has the ability to access a majority of the economic resources held by the separate organization, and 3) the assets held by the separate entity are significant to the primary government. Blended component units are component units that are so intertwined with the primary government that they are, in substance, the same as the primary government and are presented as part of the primary government. The Borough has only one blended component unit: the Hanover Borough Stormwater Authority.

The government-wide financial statements include not only the primary government, but also legally separate, discretely presented entities for which the Borough is financially accountable. Financial information for *discretely presented component units* are reported separately from the financial information presented for the primary government itself. The Borough has two discretely presented component units: the Hanover Public Library Association, and the Fire Drivers' PEHP Fund.

Notes to Basic Financial Statements and Other Information - The notes provide additional information that is essential to a full understanding of the data provided in the government-wide and fund financial statements. In addition to the basic financial statements and accompanying notes, this report also presents certain required supplementary information concerning the Borough's progress in funding its obligation to provide pension and other postemployment benefits to its employees, and combining schedules of net position and activities for the individual Pension (and Other Employee Benefit) Trust Funds of the Borough.

GOVERNMENT WIDE FINANCIAL ANALYSIS

Net Position - The following is a condensed presentation of the Borough's net position as of December 31, 2020 and 2019:

	Governmental Activities		Business-Type Activities		Totals	
	2020	2019	2020	2019	2020	2019
Assets:						
Current and Other Assets	$ 15,801,973	$ 12,528,079	$ 29,681,897	$ 15,993,983	$ 45,483,870	$ 28,522,062
Capital Assets, Net	14,947,621	15,592,297	81,473,048	79,969,249	96,420,669	95,561,546
Total Assets	30,749,594	28,120,376	111,154,945	95,963,232	141,904,539	124,083,608
Deferred Outflows of Resources	1,427,851	1,706,961	1,538,540	1,710,937	2,966,391	3,417,898
Liabilities:						
Current Liabilities	1,709,457	1,836,424	4,030,002	3,025,835	5,739,459	4,862,259
Long-Term Liabilities	8,135,391	8,575,811	50,307,029	39,837,390	58,442,420	48,413,201
Total Liabilities	9,844,848	10,412,235	54,337,031	42,863,225	64,181,879	53,275,460
Deferred Inflows of Resources	4,485,252	3,546,897	2,960,598	2,451,269	7,445,850	5,998,166
Net Position:						
Net Investment in Capital Assets	9,269,310	9,092,898	42,725,311	39,926,484	51,994,621	49,019,382
Restricted	701,081	582,290	1,369	7,200	702,450	589,490
Unrestricted	7,876,954	6,193,017	12,669,176	12,425,991	20,546,130	18,619,008
Total Net Position	$ 17,847,345	$ 15,868,205	$ 55,395,856	$ 52,359,675	$ 73,243,201	$ 68,227,880

As noted earlier, net position may serve as a useful indicator of a government's financial position. In the case of the Borough, assets and deferred outflows of resources exceeded liabilities and deferred inflows of resources by $73,243,201 at the close of the fiscal year.

By far the largest portion of the Borough's combined net position (70.99%) reflects its investments in capital assets (e.g., land, buildings, equipment, improvements, construction in progress, and infrastructure), less any debt used to acquire those assets that are still outstanding. The Borough uses these capital assets to provide services to citizens; consequently, these assets are not available for future spending. Although the Borough's investment in its capital assets is reported net of related debt, it should be noted that the resources needed to repay this debt must be provided from other sources, since the capital assets themselves cannot be used to liquidate these liabilities.

An additional portion of the Borough's net position (0.96%) represents resources that are subject to external restrictions on how they may be used. The remaining balance of *unrestricted net position* (28.05%) may be used to meet the government's ongoing obligations to citizens and creditors. At the end of the current year, the Borough can report positive balances in all net position categories for both reported years.

Changes in Net Position - The following is a condensed presentation of the Borough's changes in net position for the years ended December 31, 2020 and 2019:

	Governmental Activities		Business-Type Activities		Totals	
	2020	2019	2020	2019	2020	2019
Revenues:						
Program Revenues:						
Charges for Services	$ 5,598,609	$ 5,537,313	$ 16,511,055	$ 16,076,440	$ 22,109,664	$ 21,613,753
Operating Grants and Contributions	2,158,816	2,148,564	213,019	198,283	2,371,835	2,346,847
Capital Grants and Contributions	468,529	599,020	-	517,112	468,529	1,116,132
General Revenues:						
Taxes:						
Property and Per Capita Taxes	5,952,564	5,888,623	-	-	5,952,564	5,888,623
Income Taxes	1,627,460	1,701,683	-	-	1,627,460	1,701,683
Business Privilege Taxes	568,536	603,251	-	-	568,536	603,251
Local Services Taxes	483,919	593,187	-	-	483,919	593,187
Interest and Investment Earnings	96,446	240,353	134,841	268,972	231.287	509,325
Transfers	(33,249)	(14,044)	33,249	14,044	-	-
Total Revenues	16,921,630	17,297,950	16,892,164	17,074,851	33,813,794	34,372,801

	Governmental Activities		Business-Type Activities		Totals	
	2020	2019	2020	2019	2020	2019
Expenses:						
Governmental Activities:						
General Government	788,587	734,165	-	-	788,587	734,165
Public Safety	6,415,788	7,222,151	-	-	6,415,788	7,222,151
Health and Sanitation	4,285,394	4,540,747	-	-	4,285,394	4,540,747
Highway	1,920,982	1,879,407	-	-	1,920,982	1,879,407
Culture and Recreation	1,383,510	1,688,020	-	-	1,383,510	1,688,020
Interest on Long-Term Debt	148,229	159,268	-	-	148,229	159,268
Business-Type Activities:						
Water Services	-	-	6,453,412	6,077,081	6,453,412	6,077,081
Regional Wastewater Services	-	-	3,869,328	3,961,548	3,869,328	3,961,548
Sewer Services	-	-	2,557,295	2,709,322	2,557,295	2,709,322
Stormwater Services	-	-	915,715	1,118,301	915,715	1,118,301
Market House Services	-	-	60,233	62,162	60,233	62,162
Total Expenses	14,942,490	16,223,758	13,855,983	13,928,414	28,798,473	30,152,172
Changes in Net Position	1,979,140	1,074,192	3,036,181	3,146,437	5,015,321	4,220,629
Net Position - Beginning	15,868,205	14,794,013	52,359,675	49,213,238	68,227,880	64,007,251
Net Position - Ending	$ 17,847,345	$ 15,868,205	$ 55,395,856	$ 52,359,675	$ 73,243,201	$ 68,227,880

During the current fiscal year, net position for governmental activities increased $1,979,140, primarily the result of expense reductions for health insurance premium dividends received, positive pension trends reducing net pension expense, and COVID-19 impacts to operations at several Borough facilities. The net position of the business-type activities increased $3,036,181, primarily related to various utility and service connection charges currently outpacing depreciation on newer infrastructure and related improvements.

FINANCIAL ANALYSIS OF THE BOROUGH'S FUNDS

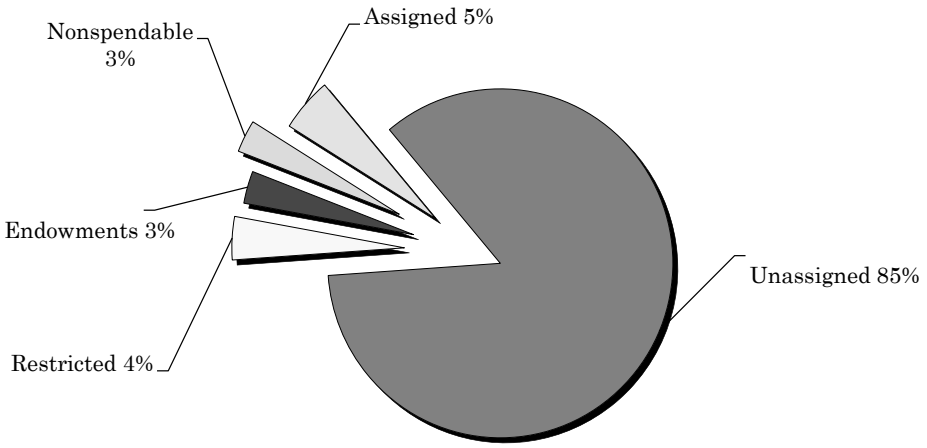
The Borough uses fund accounting to assure and demonstrate compliance with local government regulations.

Governmental Funds - The focus of the Borough's *governmental funds* is to provide information on near-term inflows, outflows, and balances of *spendable resources*. Such information is useful in assessing the Borough's financing requirements. In particular, *unassigned fund balance* may serve as a useful measure of a government's net spendable, "available" resources at the end of the fiscal year.

At the end of the current fiscal year, the Borough's governmental funds reported combined ending fund balances of $11,686,814, of which $484,138 was externally restricted, such as by legal restrictions or intention of grantors, donors, or trustees, $329,889 was in nonspendable form (e.g., inventory, deposits, and prepaid expenses), $298,156 was held in endowment funds for recreation purposes, and $550,484 was assigned, primarily for 2021 budgetary reserve needs. The remaining $10,024,147 (85.77%) is unassigned and can be used for any lawful purpose.

The following graphic summarizes fund balances as of December 31, 2020 by relative percentage:

Governmental Fund Balances



The General Fund is the Borough's primary operating fund. It tracks services of administration, police, fire, emergency management, planning, health and sanitation, highways, library, recreation and parks, shade trees, public events, and insurance costs. At the end of the current fiscal year, unassigned fund balance of the General Fund was $10,024,147 and total fund balance was $10,887,338, reflecting a $581,196 (5.64%) increase over the prior year. As a measure of the General Fund's liquidity, it may be useful to compare the unassigned General Fund balance to General Fund expenditures. Unassigned General Fund balance represents 61.99% of total General Fund expenditures.

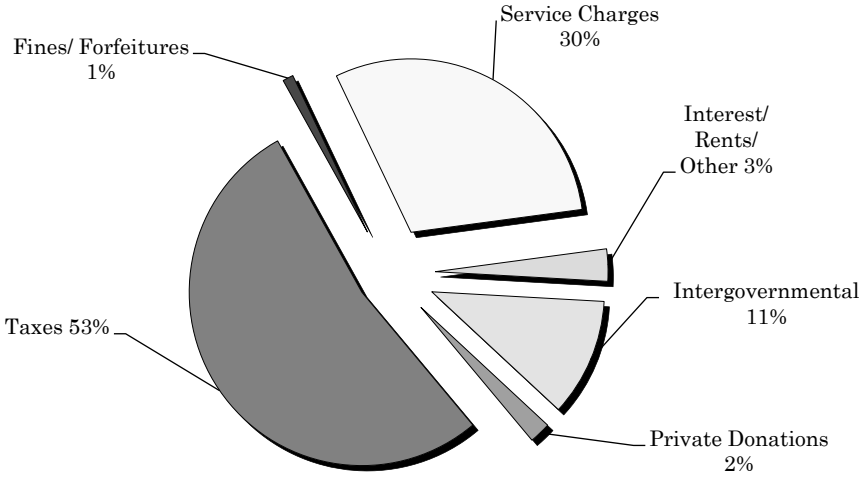
The condensed changes in fund balance for the General Fund were as follows for the years ended December 31:

	2020	2019
Revenues	$ 16,424,437	$ 16,750,208
Expenses	16,170,380	16,525,648
Net Other Financing Sources (Uses)	327,139	456,612
Changes in Fund Balance	$ 581,196	$ 681,172

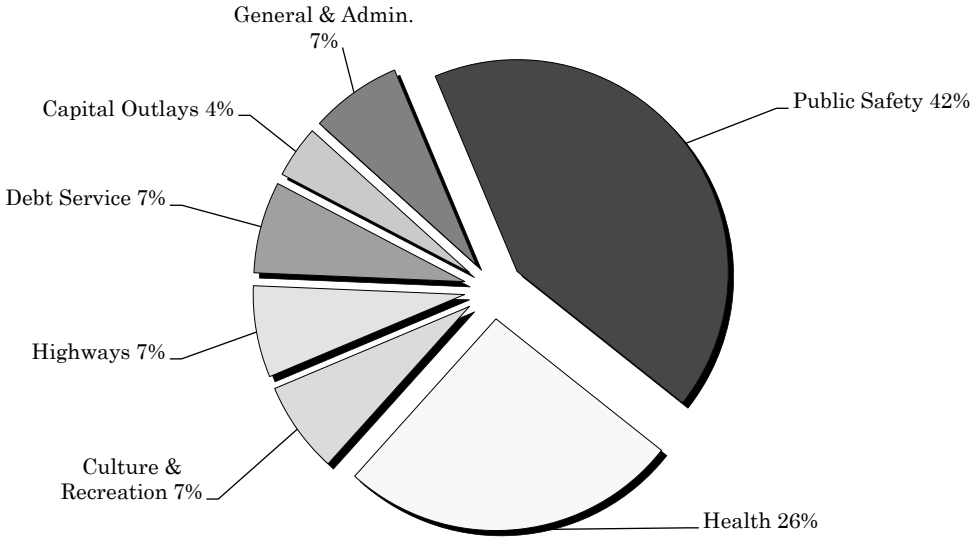
The $325,771 decrease in revenues in 2020 primarily related to reduction in interest earnings due to decline in rate environment, and Federal and State capital grant program activity in 2020. Expenses decreased $355,268 in 2020, primarily related to reductions in operating and capital costs relative to the Guthrie Memorial Library for partial closure in 2020 and then modified operations later in the year due to COVID-19. Net other financing sources (uses) were less significant in 2020, which were primarily for several bond refunding transactions for interest rate savings.

The following charts summarizes revenues and expenditures by major source for the General Fund by relative percentage for the year ended December 31, 2020:

General Fund - Revenues



General Fund - Expenditures



Enterprise Funds - The Borough's enterprise funds provide the same type of information found in the government-wide financial statements.

As of December 31, 2020, the net position of the Borough's Water Fund totaled $33,425,961; the Regional Wastewater Treatment Plant Fund totaled $12,827,327; the Sanitary Sewer Fund totaled $8,570,883; Stormwater Authority totaled $462,181; and the Market House totaled $109,504. The following summarizes the significant changes to net position for the Borough's major Enterprise Funds during the current fiscal year:

- Water operating revenues increased $245,910 from 2019 results of $7,737,423 to $7,983,333, primarily related to increased residential growth and industrial water consumption. Operating expenses increased by $141,653 (from $5,339,326 to $5,480,979) in 2020, primarily related to the increase in sewer surcharges assessed to the Water Filtration Plant for flow concentration. Non-operating activities, capital contributions, and interfund transfers increased in 2020, primarily related to bond issuance costs expensed for several refunding transactions in 2020. Total change in net position for 2020 was an increase of $1,872,890.
- Regional Wastewater operating revenues decreased $41,649 from 2019 results of $2,117,447 to $2,075,798, primarily related to intergovernmental billings for shared facility costs based on their respective budgeted flow shares to the facilities. Operating expenses decreased by $204,938 (from $3,364,550 to $3,159,612) in 2020, primarily

related to decline in net pension expense, relating to highly favorable returns in 2020. Non-operating activities, capital contributions, and interfund transfers were relatively comparable to 2020. Total change in net position for 2020 was a decrease of $173,553.

- Sanitary Sewer operating revenues increased $155,820 from 2019 results of $4,801,138 to $4,956,958, primarily due to increased revenues from sewer service charges, specifically sanitary sewer flow exchange arrangements with Penn Township. Operating expenses decreased by $148,055 (from $2,625,559 to $2,477,504) in 2020, primarily related to reduction in wastewater treatment charges from the Regional Wastewater Treatment Plant. Non-operating activities, capital contributions, and interfund transfers decreased in 2020, primarily related $480,654 in dedicated sewer mains, manholes, and land easement, contributed from a private community in 2019. Total change in net position for 2020 was an increase of $1,002,668.
- Stormwater Authority operating revenues increased $46,626 from 2019 results of $1,178,814 to $1,225,440, primarily related to 2019 being a partial implementation year of the billing program. Operating expenses decreased by $202,586 (from $1,118,301 to $915,715) in 2020, primarily related to decline in net pension expense, relating to highly favorable returns in 2020. Non-operating activities, capital contributions, and interfund transfers were relatively comparable to 2020. Total change in net position for 2020 was an increase of $346,185.

GENERAL FUND BUDGETARY HIGHLIGHTS

The original budget for the General Fund was not amended by the Borough Council during 2020. Overall, actual operating revenues during the current fiscal year fell short of budget expectations by $11,318, primarily due to COVID-19 impacts with penalty abatement and interested earnings.

Overall, expenditures were $904,173 less than planned, primarily due to the following:

- Public Safety expenses were less than budget by $157,288, primarily due to budgeted labor for several Police positions that went unfilled during the year and health insurance costs for Police and Fire employees lower than expected with surplus premium dividends received in 2020.
- Highway expenses were less than budget by $147,313, primarily related health insurance costs for Public Works employees lower than expected with surplus premium dividends received in 2020 and shift in labor for COVID-19 support services for facilities.

- Culture and Recreation expenses were less than budget by $382,654, primarily related to reductions in operating costs relative to the Guthrie Memorial Library for partial closure in 2020 and then modified operations later in the year due to COVID-19 and cancellation of the 2020 Chili Cook-Off event due to COVID-19.
- Capital Outlay expenses were less than budget by $164,830, primarily due to shift in budgeted grant activity for the West Hanover Street Park Improvements project to 2021 due to COVID-19.

CAPITAL ASSETS AND DEBT ADMINISTRATION

Capital Assets - The Borough's investment in capital assets, net of accumulated depreciation, totaled $96,420,669 at the end of 2020. Capital assets consist of land and improvements, infrastructure, buildings and improvements, machinery and equipment, and construction in progress.

A summary of the capital assets, net of accumulated depreciation, as of December 31, 2020 and 2019 follows:

	Governmental Activities		Business-Type Activities	
	2020	2019	2020	2019
Land and Land Rights	$ 629,136	$ 571,261	$ 1,027,255	$ 1,027,255
Construction in Progress	46,310	32,865	4,258,264	1,459,743
Improvements Other Than Buildings	166,078	179,287	7,654	8,910
Machinery and Equipment	1,720,675	1,824,044	2,240,035	1,940,051
Other Buildings and Related Improvements	8,049,564	8,315,573	641,744	519,115
Plant and Infrastructure	4,335,858	4,669,267	73,298,096	75,014,175
	$ 14,947,621	$ 15,592,297	$ 81,473,048	$ 79,969,249

Significant capital investments/activity in 2020 related to the following:

- The Borough entered into two new capital lease obligations relating to various heavy-duty vehicles and related equipment, totaling $390,039.
- Continued rehabilitation design for the Sheppard & Myers Dam ($20,935 in 2020 costs, and cumulative project costs of $943,177; *bids for construction anticipated in early 2021, pending State permit approval*).
- Over $2,750,000 in capital investment for water main cleaning and lining and replacement projects under 2020 improvement contacts, *to be completed in 2021.*

- Completion of Sanitary Sewer System 2019 improvements project ($340,775 in accumulated project costs), and accumulated costs of $330,606 for 2020 improvements project, *to be completed in 2021.*

Additional information on the Borough's capital assets can be found in the notes to basic financial statements (Capital Assets note).

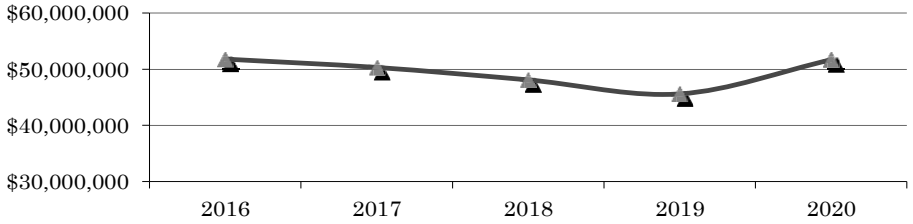
The Borough is committed under the following contracts for purchases and construction projects, excluding any accounts payable and accrued expenses (retainage payable) on those contracts, as of December 31, 2020:

Project	Contract Amount	Contract Amount Outstanding
Water Fund		
Water Main Lining Projects		
Construction	$ 1,423,491	$ 114,778
Water Main Replacement Projects		
Construction	$ 1,617,183	$ 529,670
Sheppard-Myers Dam Rehabilitation		
Engineering	$ 898,430	$ 898,430
Sanitary Sewer Fund		
Sewer Main Lining Project		
Construction	$ 305,699	$ 4,767
Stormwater Authority Fund		
Watershed Assessment Project		
Engineering	$ 24,840	$ 24,840

Long-Term Debt - On December 31, 2020, the Borough's general obligation debt (gross) outstanding totaled $51,685,000, all related to capital purchases and projects. All debt is backed by the full faith and credit of the Borough, and virtually all business-type debt has been certified as self-liquidating in the respective funds. This was a net increase of $6,070,000 (13.3%) from 2019, primarily due to issuance of $9,440,000 in Water Fund debt for forthcoming dam rehabilitation projects. No revenue bond debt exists.

The following represents the growth of the Borough's general obligation debt (gross) over the past five fiscal years:

Outstanding General Obligation Debt (Gross)



All bonds issued are rated Aa3 by Moody's Investors Service, denoting a very strong capacity to meet financial commitments. **The Borough of Hanover has never failed to meet any bond payment obligations.** The Borough continues to evaluate refunding opportunities for its outstanding bonds to reduce interest costs, which has resulted in significant savings for the Borough over the past several years. There were no debt limitations, restrictions, or commitments during the year ended December 31, 2020 that may affect the Borough's plans during the fiscal year ending December 31, 2021.

The following is a summary of outstanding long-term debt for the years ended December 31, 2020 and 2019:

	Governmental Activities		Business-Type Activities	
	2020	2019	2020	2019
General Obligation Bonds Payable, Net	$ 4,523,149	$ 5,114,137	$ 49,735,262	$ 40,464,422
Accrued Compensated Absences	1,726,655	1,705,447	1,177,321	1,160,056
Consumer Deposits	-	-	463,167	607,021
Capital Lease Obligations	1,263,674	1,538,875	418,596	349,571
	$ 7,513,478	$ 8,358,459	$ 51,794,346	$ 42,581,070

Additional information on the Borough's long-term debt can be found in the notes to basic financial statements (Long-Term Debt note).

ECONOMIC FACTORS AND NEXT YEAR'S BUDGET AND RATES

The calendar year 2021 budget leverages positive economic trends by continuing long overdue investments in infrastructure and equipment. The local economy provides a stable fiscal environment, though growth is limited.

The Borough continues to experience challenges meeting a balanced budget, particularly in the General Fund, as fixed expenditures continue to rise, and revenues continue to flatten. The requirement to fund and improve infrastructure also provides budgetary stress. Key economic factors and trends affecting the Borough in 2021 and future years include the following:

- General Fund - There were no changes to the Borough's tax rates for the 2021 budget as adopted. Property taxes are the single largest source of revenue for the Borough and represent 34.6% of total General Fund budgeted revenue. However, annual growth in the assessable base of the Borough has been limited to approximately 0.4% over the past five cumulative years. Collections of the current tax levy and collection of delinquent taxes remained strong, resulting in a ten-year collection rate of 100.24% of the 2020 assessable base of the Borough.

- Water, Stormwater (Authority), and Sanitary Sewer Fund Operations and Improvements - There were no changes to the Water and Sanitary Sewer Funds and Stormwater Authority charges for services in the 2021 budget, though an increase in water service charges will be evaluated in 2021. The Borough will continue to address upgrades and maintenance to the Borough's water infrastructure over the next several years, including upgrading water meter technology, researching new well sources, and improving the Sheppard Myers and Kitzmillers Impounding Dams.

- Bonds - Borough staff continues to implement internal finance policies and create long-range plans to improve the climate for bond rating increases. The Borough issued bond debt in 2021 to fund the first stage of a comprehensive utilities infrastructure rehabilitation focused on improvements to the Sheppard Myers and Kitzmillers Impounding Dams.

- Minimum Municipal Obligation for Borough Pension Plans and Funding Progress - Pension funds budgeted for 2021 total $1,486,313 for the minimum municipal obligation to the pension plans as set forth by Conrad Siegel, Inc., the Borough's pension plan actuary, representing significant increases for modified mortality tables during 2019. **The Borough of Hanover has never failed to make the required minimum municipal obligation to the pension plans.** The Borough's three

pension plans' funded ratios were estimated at 103.86%, 100.04%, and 116.65% for the Police, Fire Drivers', and Hanover Employees' Pension Trust Funds, respectively, as of December 31, 2020, exemplifying sound investment, management, and performance.

The above significant economic factors and trends were considered in preparation of the 2021 operating budgets for all funds. Based on anticipated results of operations for the Borough, projected fund balance and financial reserves for 2021, excluding restricted Consumer Deposit Agreement escrows, are estimated at $16,573,729, or 22.63% of net position as of December 31, 2020.

While the Borough's current financial position is strong, there are some indicators of future financial stress. First, a review of the strengths: The Borough's tax base value is strong compared to many other urbanized municipalities in Pennsylvania and the corresponding benefit is that the municipal tax rate is low compared with municipalities providing similar services. The Borough hosts many large value industrial and commercial properties, including big-box stores, national specialty merchants, service organizations, and manufacturing. The Borough's modified accrual fund balances exceeded the goals set in its adopted fund balance and financial reserves policy for all relating funds.

Notwithstanding these indicators of financial health, the Borough faces challenges common to most urban municipalities in Pennsylvania. Expenditures rise due to inflation and world markets. A real estate tax base provides increased revenue three ways: increase in the tax base value due to development; increase in tax base value due to a county-wide reassessment; and/or increase in the actual tax rate. The York County Commissioners have not conducted a county-wide reassessment since 2006, and Borough Council has not increased local taxes since 2015. The Borough is developed to its borders; hence the rate of increase of real estate tax base value is less than 1% per year. There are other indicators of future financial distress, including tenant occupancy in excess of 46.5% (significantly higher than that of York County [25.3%], Pennsylvania [31.0%], and the United States as a whole [36.2%]). More than 50% of students receive a free or reduced lunch, and some neighborhoods are blighted.

Recognizing these indicators of long-term financial stress, the Borough continues to act to change the financial trajectory. The Borough prepared its fifth five-year budget projection for the period 2021 through 2025, including a capital improvement program for major equipment and vehicles for the same period. The projection demonstrates, in stark manner, the decay of the Borough's financial condition if the Borough does nothing to increase revenue and reduce the natural growth in expenditures - absent action, revenues stay relatively level while expenditures will grow around 2.7% per year.

The Borough is beginning Phase II evaluation in Pennsylvania's Strategic Management Planning Program (STMP). The program is administered by the Governor's Center for Local Government Services of the Department of Community and Economic Development (DCED). Most municipalities wait until they are at the abyss of financial distress before taking advantage of a program like the STMP. Consequently, the study is typically rushed and completed with a sense of urgency. Recommendations are implemented quickly resulting in some implementations being faulty. By embarking on this exhaustive study now, the Borough will receive a thorough analysis and have ample time to evaluate and implement recommendations.

STMP will provide grants, matched by the Borough, to hire a third-party firm to conduct an exhaustive analysis of the administration and operations of all the departments of the municipality with the goal of providing opportunities and suggestions for efficiencies, technology, alternate modes of operation, and staffing levels. The study also addresses resources and strategies to clear blight, evaluate and consolidate facilities, and more effectively enforce codes. The results of that study are under review for implementation of initiatives over the coming years.

CONTACTING THE BOROUGH'S FINANCIAL MANAGEMENT

This financial report is designed to provide our citizens, taxpayers, customers, investors and creditors with a general overview of the Borough's finances. Questions about this report or requests for additional information can be directed to The Borough of Hanover, Attn: Nan Dunford, Borough Manager at The Borough of Hanover, 44 Frederick Street, Hanover, PA 17331.

Separately issued financial statements for the Hanover Public Library Association (component unit of the Borough) can be requested at the Guthrie Memorial Library, 2 Library Place, Hanover, PA 17331.

BASIC FINANCIAL STATEMENTS

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION

DECEMBER 31, 2020

	Primary Government			Component Unit
	Governmental Activities	Business-Type Activities	Total	Hanover Public Library Association
ASSETS				
CURRENT ASSETS				
Cash and Cash Equivalents				
Unrestricted	$ 9,769,493	$ 11,249,751	$ 21,019,244	$ 95,465
Restricted	411,223	123,805	535,028	-
Accounts Receivable	293,935	1,476,419	1,770,354	-
Taxes Receivable, Net	593,651	-	593,651	-
Grants Receivable	380,036	-	380,036	-
Due from Other Governments	122,675	515,980	638,655	-
Unbilled Services	120,024	1,098,464	1,218,488	-
Pledges Receivable	10,000	-	10,000	-
Lease Receivable	498,232	-	498,232	-
Inventory	53,676	585,124	638,800	-
Prepaid Expenses and Deposits	276,213	173,756	449,969	-
TOTAL CURRENT ASSETS	**12,529,158**	**15,223,299**	**27,752,457**	**95,465**
NON-CURRENT ASSETS				
Cash and Cash Equivalents - Restricted	379,369	10,973,974	11,353,343	259,980
Investments - Restricted	-	-	-	2,435,484
Beneficial Interest in Assets Held by Others	95,043	-	95,043	-
Net Pension Asset	2,798,403	3,484,624	6,283,027	-
Property and Equipment				
Land and Land Rights	629,136	1,027,255	1,656,391	-
Construction in Progress	46,310	4,258,264	4,304,574	-
Improvements Other than Buildings	408,335	62,168	470,503	-
Machinery and Equipment	6,913,798	5,365,839	12,279,637	-
Other Buildings and Improvements	12,843,997	1,015,352	13,859,349	-
Plant and Infrastructure	14,095,455	115,581,801	129,677,256	-
	34,937,031	127,310,679	162,247,710	-
Less: Accumulated Depreciation	19,989,410	45,837,631	65,827,041	-
Net Property and Equipment	14,947,621	81,473,048	96,420,669	-
TOTAL NON-CURRENT ASSETS	**18,220,436**	**95,931,646**	**114,152,082**	**2,695,464**
TOTAL ASSETS	**30,749,594**	**111,154,945**	**141,904,539**	**2,790,929**
DEFERRED OUTFLOWS OF RESOURCES				
Deferred Amounts from OPEB	170,897	141,446	312,343	-
Deferred Amounts from Pensions	1,229,655	608,719	1,838,374	-
Deferred Amounts on Refunding	27,299	788,375	815,674	-
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**1,427,851**	**1,538,540**	**2,966,391**	**-**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION

DECEMBER 31, 2020

	Primary Government			Component Unit
	Governmental Activities	Business-Type Activities	Total	Hanover Public Library Association
LIABILITIES				
CURRENT LIABILITIES				
Accounts Payable and Accrued Expenses	408,731	965,266	1,373,997	9,600
Accrued Wages	99,618	50,846	150,464	-
Accrued Compensated Absences	-	103,000	103,000	-
Unearned Revenue	89,057	80,757	169,814	-
Accrued Interest Payable	37,449	330,432	367,881	-
Capital Lease Obligations	419,360	162,743	582,103	-
Bonds Payable (Net of Discounts/Premiums)	646,944	2,204,159	2,851,103	-
Payable from Restricted Assets				
Accounts Payable and Accrued Expenses	8,298	15,497	23,795	-
Consumer Deposits	-	117,302	117,302	-
TOTAL CURRENT LIABILITIES	**1,709,457**	**4,030,002**	**5,739,459**	**9,600**
NON-CURRENT LIABILITIES				
Accrued Compensated Absences	1,726,655	1,074,321	2,800,976	-
OPEB Liability	1,688,217	1,099,887	2,788,104	-
Capital Lease Obligations	844,314	255,853	1,100,167	-
Bonds Payable (Net of Discounts/Premiums)	3,876,205	47,531,103	51,407,308	-
Payable from Restricted Assets				
Consumer Deposits	-	345,865	345,865	-
TOTAL NON-CURRENT LIABILITIES	**8,135,391**	**50,307,029**	**58,442,420**	**-**
TOTAL LIABILITIES	**9,844,848**	**54,337,031**	**64,181,879**	**9,600**
DEFERRED INFLOWS OF RESOURCES				
Deferred Amounts from Beneficial Interest	95,043	-	95,043	-
Deferred Amounts from OPEB	326,898	212,071	538,969	-
Deferred Amounts from Pensions	4,063,311	2,748,527	6,811,838	-
TOTAL DEFERRED INFLOWS OF RESOURCES	**4,485,252**	**2,960,598**	**7,445,850**	**-**
NET POSITION				
Net Investment in Capital Assets	9,269,310	42,725,311	51,994,621	-
Restricted				
Expendable	402,925	1,369	404,294	-
Nonexpendable	298,156	-	298,156	2,695,464
Unrestricted	7,876,954	12,669,176	20,546,130	85,865
TOTAL NET POSITION	**$ 17,847,345**	**$ 55,395,856**	**$ 73,243,201**	**$ 2,781,329**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF ACTIVITIES

FOR THE YEAR ENDED DECEMBER 31, 2020

Functions/Programs	Expenses	Program Revenues: Charges for Services	Program Revenues: Operating Grants and Contributions	Program Revenues: Capital Grants and Contributions	Net (Expenses) Revenues and Changes in Net Position: Primary Government: Governmental Activities	Primary Government: Business-Type Activities	Primary Government: Total	Component Unit: Hanover Public Library Association
PRIMARY GOVERNMENT								
Governmental Activities								
General Government	$ 788,587	$ 543,273	$ 43,276	$ -	$ (202,038)	$ -	$ (202,038)	$ -
Public Safety	6,415,788	284,090	660,037	20,224	(5,451,437)	-	(5,451,437)	-
Health and Sanitation	4,285,394	4,740,697	177,841	54,791	687,935	-	687,935	-
Highways	1,920,982	10,410	566,205	321,131	(1,023,236)	-	(1,023,236)	-
Culture and Recreation	1,383,510	20,139	711,457	72,383	(579,531)	-	(579,531)	-
Interest on Long-Term Debt	148,229	-	-	-	(148,229)	-	(148,229)	-
Total Governmental Activities	**14,942,490**	**5,598,609**	**2,158,816**	**468,529**	**(6,716,536)**	**-**	**(6,716,536)**	**-**
Business-Type Activities								
Water	6,453,412	8,080,258	124,790	-	-	1,751,636	1,751,636	-
Regional Wastewater	3,869,328	2,076,098	41,047	-	-	(1,752,183)	(1,752,183)	-
Sanitary Sewer	2,557,295	4,960,850	20,843	-	-	2,424,398	2,424,398	-
Stormwater	915,715	1,347,586	25,339	-	-	457,210	457,210	-
Market House	60,233	46,263	1,000	-	-	(12,970)	(12,970)	-
Total Business-Type Activities	**13,855,983**	**16,511,055**	**213,019**	**-**	**-**	**2,868,091**	**2,868,091**	**-**
TOTAL PRIMARY GOVERNMENT	**$ 28,798,473**	**$ 22,109,664**	**$ 2,371,835**	**$ 468,529**	**(6,716,536)**	**2,868,091**	**(3,848,445)**	**-**
COMPONENT UNIT								
Culture and Recreation	**$ 497,315**	**$ -**	**$ 443,818**	**$ -**	**-**	**-**	**-**	**(53,497)**
		GENERAL REVENUES						
		Taxes						
		Property and Per Capita Taxes			5,952,564	-	5,952,564	-
		Income Taxes			1,627,460	-	1,627,460	-
		Business Privilege Taxes			568,536	-	568,536	-
		Local Services Taxes			483,919	-	483,919	-
		Interest and Investment Earnings			96,446	134,841	231,287	(235,566)
		Contributions to Permanent Endowments			-	-	-	400,000
		Transfers			(33,249)	33,249	-	-
		TOTAL GENERAL REVENUES			**8,695,676**	**168,090**	**8,863,766**	**164,434**
		CHANGES IN NET POSITION			**1,979,140**	**3,036,181**	**5,015,321**	**110,937**
		Net Position - Beginning of Year			15,868,205	52,359,675	68,227,880	2,670,392
		NET POSITION - END OF YEAR			**$ 17,847,345**	**$ 55,395,856**	**$ 73,243,201**	**$ 2,781,329**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

BALANCE SHEET - GOVERNMENTAL FUNDS

DECEMBER 31, 2020

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
ASSETS AND DEFERRED OUTFLOWS OF RESOURCES			
ASSETS			
Cash and Cash Equivalents			
Unrestricted	$ 9,684,724	$ 84,769	$ 9,769,493
Restricted	62,873	727,719	790,592
Accounts Receivable	293,457	478	293,935
Taxes Receivable, Net	593,651	-	593,651
Grants Receivable	380,036	-	380,036
Unbilled Services	120,024	-	120,024
Pledges Receivable	10,000	-	10,000
Lease Receivable	498,232	-	498,232
Due from Other Governments	122,675	-	122,675
Inventory	53,676	-	53,676
Prepaid Expenses and Deposits	276,213	-	276,213
Beneficial Interest in Assets Held by Others	95,043	-	95,043
TOTAL ASSETS	**12,190,604**	**812,966**	**13,003,570**
DEFERRED OUTFLOWS OF RESOURCES	**-**	**-**	**-**
TOTAL ASSETS AND DEFERRED OUTFLOWS OF RESOURCES	**$ 12,190,604**	**$ 812,966**	**$ 13,003,570**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

BALANCE SHEET - GOVERNMENTAL FUNDS

DECEMBER 31, 2020

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
LIABILITIES, DEFERRED INFLOWS OF RESOURCES, AND FUND BALANCES			
LIABILITIES			
Accounts Payable and Accrued Expenses	$ 403,834	$ 4,897	$ 408,731
Accrued Wages	99,618	-	99,618
Unearned Revenue	11,227	295	11,522
Payable from Restricted Assets			
Accounts Payable and Accrued Expenses	-	8,298	8,298
TOTAL LIABILITIES	**514,679**	**13,490**	**528,169**
DEFERRED INFLOWS OF RESOURCES			
Deferred Amounts from Lease Receivable	498,232	-	498,232
Deferred Amounts from Beneficial Interest	95,043	-	95,043
Deferred Amounts from Tax Revenues	195,312	-	195,312
TOTAL DEFERRED INFLOWS OF RESOURCES	**788,587**	**-**	**788,587**
FUND BALANCES			
Nonspendable			
Not in Spendable Form			
Inventory	53,676	-	53,676
Prepaid Expenses and Deposits	276,213	-	276,213
Legally/Contractually Required to be Maintained Intact			
Recreation Purposes	-	298,156	298,156
Restricted			
Capital Projects	-	81,213	81,213
Public Safety Purposes	16,222	-	16,222
Recreation Purposes	46,651	36,302	82,953
Roads and Bridges	-	303,750	303,750
Assigned			
Budgetary Reserve	470,429	-	470,429
Capital Projects	-	6,808	6,808
Recreation Purposes	-	73,247	73,247
Unassigned	10,024,147	-	10,024,147
TOTAL FUND BALANCES	**10,887,338**	**799,476**	**11,686,814**
TOTAL LIABILITIES, DEFERRED INFLOWS OF RESOURCES, AND FUND BALANCES	**$ 12,190,604**	**$ 812,966**	**$ 13,003,570**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

RECONCILIATION OF THE BALANCE SHEET - GOVERNMENTAL FUNDS TO THE STATEMENT OF NET POSITION

DECEMBER 31, 2020

TOTAL FUND BALANCES - GOVERNMENTAL FUNDS	**$ 11,686,814**
Amounts reported for governmental activities in the statement of net position are different because:	
Capital assets used in governmental activities are not current financial resources and, therefore, are not reported in the governmental funds.	14,947,621
Property and other tax revenues are recognized in the period for which levied, rather than when "available." A portion of the property and other tax revenues are not available and, therefore, are deferred revenue in the governmental funds.	195,312
Other long-term assets are not available to pay for current-period resources and, therefore, are deferred in the governmental funds.	447,996
Net pension liability (asset) and related deferred amounts in governmental activities are not current financial resources and, therefore, are not reported in the governmental funds.	(35,253)
Long-term accrued compensated absences and other postemployment benefits (OPEB) are not payable in the current period and, therefore, are reported as wages and insurance expenses in the period during which the absence and service occurs in the governmental funds.	(3,570,873)
Long-term liabilities, including capital lease obligations, bonds payable and related unamortized discounts and premiums, and accrued interest are not due and payable in the current period and, therefore, are not reported in the governmental funds.	(5,824,272)
TOTAL NET POSITION OF GOVERNMENTAL ACTIVITIES	**$ 17,847,345**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCES - GOVERNMENTAL FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2020

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
REVENUES			
Taxes	$ 8,649,734	$ -	$ 8,649,734
Licenses and Permits	255,073	-	255,073
Fines and Forfeitures	171,992	-	171,992
Interest and Rents	288,796	15,852	304,648
Intergovernmental	1,836,782	453,949	2,290,731
Charges for Services	4,944,657	270	4,944,927
Donations from Private Sources	258,988	2,380	261,368
Miscellaneous	18,415	-	18,415
TOTAL REVENUES	**16,424,437**	**472,451**	**16,896,888**
EXPENDITURES			
General Government	799,138	-	799,138
Public Safety	6,757,396	-	6,757,396
Health and Sanitation	4,239,097	9,195	4,248,292
Highways	1,153,466	298,493	1,451,959
Culture and Recreation	1,122,338	198	1,122,536
Debt Service	1,136,296	43,903	1,180,199
Capital Outlays	587,960	33,105	621,065
Miscellaneous	374,689	-	374,689
TOTAL EXPENDITURES	**16,170,380**	**384,894**	**16,555,274**
EXCESS OF REVENUES OVER EXPENDITURES	**254,057**	**87,557**	**341,614**
OTHER FINANCING SOURCES (USES)			
Proceeds from Disposal of Capital Assets	156,722	-	156,722
Proceeds from Capital Lease Obligations	158,560	-	158,560
Proceeds from Refunding Bonds	291,857	-	291,857
Payment to Refunded Bond Escrow Agent	(280,000)	-	(280,000)
TOTAL OTHER FINANCING SOURCES (USES)	**327,139**	**-**	**327,139**
CHANGES IN FUND BALANCES	**581,196**	**87,557**	**668,753**
Fund Balances - Beginning of Year	10,306,142	711,919	11,018,061
FUND BALANCES - END OF YEAR	**$ 10,887,338**	**$ 799,476**	**$ 11,686,814**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCES - GOVERNMENTAL FUNDS TO THE STATEMENT OF ACTIVITIES

FOR THE YEAR ENDED DECEMBER 31, 2020

CHANGES IN FUND BALANCES - TOTAL GOVERNMENTAL FUNDS	**$ 668,753**
Amounts reported for governmental activities in the statement of activities are different because:	
Governmental funds report capital outlays as expenditures. However, in the statement of activities, the cost of those assets is allocated over their estimated useful lives as depreciation expense.	
Add: Capital Outlays	621,065
Less: Depreciation Expense	(1,242,019)
Debt proceeds provide current financial resources to governmental funds, but issuing debt and lease financing increases long-term liabilities in the statement of net position. Repayment of debt and capital lease obligations principal are expenditures in the governmental funds, but the repayment reduces long-term liabilities in the statement of net position. Other costs related to debt issuance and retirement use governmental fund resources, but recognition of expense is deferred and reported as amortization on the statement of net position.	
Amortization of Deferred Amounts on Refunding	7,148
Payments on Capital Lease Obligations	433,761
Payments on Bonds Payable	588,000
Payment to Refunded Bond Escrow Agent	280,000
Proceeds from Capital Lease Obligations	(158,560)
Proceeds from Refunding Bonds	(291,857)
Property and other tax revenues in the statement of activities that do not provide current financial resources are not reported as revenues in the governmental funds, including applicable future tax credits payable.	(17,255)
Capital asset contributions are revenues in the statement of activities that do not provide current financial resources and are not reported as revenues in the governmental funds.	75,246
The net effect of various miscellaneous transactions involving capital assets (i.e. sales, interfund transfers, trade-ins) is to decrease net position.	(215,520)
In the statement of activities, certain expenses do not require the use of current financial resources and, therefore, are not reported as expenditures in the governmental funds. These expenses include the changes in:	
Net Pension Liability (Asset)	2,579,474
Amortization of Deferred Amounts from Pensions	(1,339,906)
Accrued Interest Payable	3,061
Accrued Compensated Absences	(21,208)
OPEB Liability	(118,003)
Amortization of Deferred Amounts from OPEB	126,960
CHANGES IN NET POSITION OF GOVERNMENTAL ACTIVITIES	**$ 1,979,140**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION - PROPRIETARY FUNDS

DECEMBER 31, 2020

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority	Non-Major Proprietary Fund	Total Proprietary Funds
ASSETS						
CURRENT ASSETS						
Cash and Cash Equivalents						
Unrestricted	$ 6,642,700	$ 516,962	$ 3,792,289	$ 252,224	$ 45,576	$ 11,249,751
Restricted	117,302	-	-	-	6,503	123,805
Accounts Receivable	867,655	3,604	492,082	112,857	221	1,476,419
Due from Other Governments	-	-	515,980	-	-	515,980
Due from Other Funds	-	129,844	359,706	-	-	489,550
Unbilled Services	439,698	-	519,065	139,701	-	1,098,464
Inventory	473,620	52,139	43,420	15,945	-	585,124
Prepaid Expenses and Deposits	98,377	41,559	14,774	18,904	142	173,756
TOTAL CURRENT ASSETS	**8,639,352**	**744,108**	**5,737,316**	**539,631**	**52,442**	**15,712,849**
NON-CURRENT ASSETS						
Cash and Cash Equivalents - Restricted	10,973,974	-	-	-	-	10,973,974
Net Pension Asset	2,063,014	644,020	380,301	397,289	-	3,484,624
Property and Equipment						
Land and Land Rights	902,320	-	124,935	-	-	1,027,255
Construction in Progress	3,899,774	-	338,031	20,459	-	4,258,264
Improvements Other than Buildings	39,139	-	-	-	23,029	62,168
Machinery and Equipment	2,989,226	921,926	1,413,502	39,685	1,500	5,365,839
Other Buildings and Improvements	581,522	61,127	156,419	-	216,284	1,015,352
Plant and Infrastructure	54,437,814	53,595,382	7,539,906	-	8,699	115,581,801
	62,849,795	54,578,435	9,572,793	60,144	249,512	127,310,679
Less: Accumulated Depreciation	17,647,537	24,020,546	3,973,140	11,906	184,502	45,837,631
Net Property and Equipment	45,202,258	30,557,889	5,599,653	48,238	65,010	81,473,048
TOTAL NON-CURRENT ASSETS	**58,239,246**	**31,201,909**	**5,979,954**	**445,527**	**65,010**	**95,931,646**
TOTAL ASSETS	**66,878,598**	**31,946,017**	**11,717,270**	**985,158**	**117,452**	**111,644,495**
DEFERRED OUTFLOWS OF RESOURCES						
Deferred Amounts from OPEB	83,634	26,178	14,727	16,907	-	141,446
Deferred Amounts from Pensions	359,060	112,949	57,628	79,082	-	608,719
Deferred Amounts on Refunding	337,994	367,253	83,128	-	-	788,375
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**780,688**	**506,380**	**155,483**	**95,989**	**-**	**1,538,540**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF NET POSITION - PROPRIETARY FUNDS

DECEMBER 31, 2020

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority	Non-Major Proprietary Fund	Total Proprietary Funds
LIABILITIES						
CURRENT LIABILITIES						
Accounts Payable and Accrued Expenses	626,027	53,204	279,366	5,960	709	965,266
Accrued Wages	28,705	10,168	5,398	6,371	204	50,846
Accrued Compensated Absences	69,000	-	16,000	18,000	-	103,000
Unearned Revenue	-	79,848	-	-	909	80,757
Accrued Interest Payable	186,231	124,175	20,026	-	-	330,432
Due to Other Funds	148,723	337,114	-	3,713	-	489,550
Capital Lease Obligations	11,002	3,901	147,840	-	-	162,743
Bonds Payable (Net of Discounts/Premiums)	848,772	1,348,316	7,071	-	-	2,204,159
Payable from Restricted Assets						
Accounts Payable and Accrued Expenses	10,363	-	-	-	5,134	15,497
Consumer Deposits	117,302	-	-	-	-	117,302
TOTAL CURRENT LIABILITIES	**2,046,125**	**1,956,726**	**475,701**	**34,044**	**6,956**	**4,519,552**
NON-CURRENT LIABILITIES						
Accrued Compensated Absences	609,349	260,793	108,744	94,443	992	1,074,321
OPEB Liability	649,846	203,726	111,218	135,097	-	1,099,887
Capital Lease Obligations	30,208	10,211	215,434	-	-	255,853
Bonds Payable (Net of Discounts/Premiums)	28,801,594	16,645,621	2,083,888	-	-	47,531,103
Payable from Restricted Assets						
Consumer Deposits	345,865	-	-	-	-	345,865
TOTAL NON-CURRENT LIABILITIES	**30,436,862**	**17,120,351**	**2,519,284**	**229,540**	**992**	**50,307,029**
TOTAL LIABILITIES	**32,482,987**	**19,077,077**	**2,994,985**	**263,584**	**7,948**	**54,826,581**
DEFERRED INFLOWS OF RESOURCES						
Deferred Amounts from OPEB	125,148	39,331	20,441	27,151	-	212,071
Deferred Amounts from Pensions	1,625,190	508,662	286,444	328,231	-	2,748,527
TOTAL DEFERRED OUTFLOWS OF RESOURCES	**1,750,338**	**547,993**	**306,885**	**355,382**	**-**	**2,960,598**
NET POSITION						
Net Investment in Capital Assets	26,466,422	12,917,093	3,228,548	48,238	65,010	42,725,311
Restricted	-	-	-	-	1,369	1,369
Unrestricted	6,959,539	(89,766)	5,342,335	413,943	43,125	12,669,176
TOTAL NET POSITION	**$ 33,425,961**	**$ 12,827,327**	**$ 8,570,883**	**$ 462,181**	**$ 109,504**	**$ 55,395,856**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF REVENUES, EXPENSES, AND CHANGES IN FUND NET POSITION - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2020

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority	Non-Major Proprietary Fund	Total Proprietary Funds
OPERATING REVENUES						
Water, Sewer, and Stormwater Fees	$ 7,859,683	$ -	$ 4,956,958	$ 1,225,440	$ -	$ 14,042,081
Wastewater Treatment Charges	-	2,004,461	-	-	-	2,004,461
Market Stall Rents	-	-	-	-	43,814	43,814
Other Revenues	123,650	71,337	-	-	-	194,987
TOTAL OPERATING REVENUES	**7,983,333**	**2,075,798**	**4,956,958**	**1,225,440**	**43,814**	**16,285,343**
OPERATING EXPENSES						
Administrative and General	189,965	47,045	81,275	33,931	2,187	354,403
Contractual Services	196,732	168,833	64,869	149,103	-	579,537
Depreciation	1,111,967	1,397,328	268,016	7,937	11,155	2,796,403
Materials and Supplies	158,501	186,881	1,810	75,228	1,213	423,633
Personnel Services	2,773,464	906,636	559,342	547,364	18,720	4,805,526
Repairs and Maintenance	81,774	157,897	68,223	47,018	13,096	368,008
Treatment	330,035	-	1,429,342	-	-	1,759,377
Utilities	638,541	294,992	4,627	6,755	13,862	958,777
TOTAL OPERATING EXPENSES	**5,480,979**	**3,159,612**	**2,477,504**	**867,336**	**60,233**	**12,045,664**
OPERATING INCOME (LOSS)	**2,502,354**	**(1,083,814)**	**2,479,454**	**358,104**	**(16,419)**	**4,239,679**
NON-OPERATING REVENUES (EXPENSES)						
Gain (Loss) on Disposition of Assets	(3,648)	-	-	-	-	(3,648)
Interest and Rents	195,399	4,283	156,509	412	961	357,564
Non-Capital Contributions	124,790	41,047	20,843	-	-	186,680
Other Revenues	240	300	-	-	2,449	2,989
Interest Expense	(968,785)	(709,716)	(79,791)	(48,379)	-	(1,806,671)
TOTAL NON-OPERATING REVENUES (EXPENSES)	**(652,004)**	**(664,086)**	**97,561**	**(47,967)**	**3,410**	**(1,263,086)**
INCOME (LOSS) BEFORE CAPITAL CONTRIBUTIONS AND TRANSFERS	**1,850,350**	**(1,747,900)**	**2,577,015**	**310,137**	**(13,009)**	**2,976,593**
Capital Contributions	-	-	-	25,339	1,000	26,339
Interfund Transfers	22,540	1,574,347	(1,574,347)	10,709	-	33,249
CHANGES IN NET POSITION	**1,872,890**	**(173,553)**	**1,002,668**	**346,185**	**(12,009)**	**3,036,181**
Net Position - Beginning of Year	31,553,071	13,000,880	7,568,215	115,996	121,513	52,359,675
NET POSITION - END OF YEAR	**$ 33,425,961**	**$ 12,827,327**	**$ 8,570,883**	**$ 462,181**	**$ 109,504**	**$ 55,395,856**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CASH FLOWS - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2020

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority	Non-Major Proprietary Fund	Total Proprietary Funds
CASH FLOWS FROM OPERATING ACTIVITIES						
Inflows						
Cash Received from Customers	$ 7,851,707	$ 430,121	$ 4,864,041	$ 1,197,737	$ 44,779	$ 14,388,385
Cash Received for Interfund Services	16,425	1,797,020	70,295	22,657	-	1,906,397
	7,868,132	2,227,141	4,934,336	1,220,394	44,779	16,294,782
Outflows						
Cash Paid to Suppliers	1,147,266	846,512	206,793	328,507	41,601	2,570,679
Cash Paid for Interfund Services	365,726	10,876	1,673,124	18,099	5,282	2,073,107
Cash Paid to Employees	3,367,052	1,071,170	671,455	671,607	2,092	5,783,376
	4,880,044	1,928,558	2,551,372	1,018,213	48,975	10,427,162
NET CASH PROVIDED (USED) BY OPERATING ACTIVITIES	**2,988,088**	**298,583**	**2,382,964**	**202,181**	**(4,196)**	**5,867,620**
CASH FLOWS FROM NON-CAPITAL FINANCING ACTIVITIES						
Inflows						
Receipt of Non-Capital Contributions	124,790	41,047	20,843	-	-	186,680
Net Cash Received from Other Funds	-	-	171,926	-	-	171,926
	124,790	41,047	192,769	-	-	358,606
Outflows						
Net Cash Paid to Other Funds	-	171,926	-	-	-	171,926
NET CASH PROVIDED (USED) BY NON-CAPITAL FINANCING ACTIVITIES	**124,790**	**(130,879)**	**192,769**	**-**	**-**	**186,680**
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES						
Inflows						
Proceeds from Sale of Capital Assets	1,530	-	-	-	-	1,530
Proceeds from Long-Term Debt	21,560,000	16,095,000	231,479	-	-	37,886,479
Receipt of Contributed Capital and Development Charges	-	165,313	-	61,056	1,000	227,369
	21,561,530	16,260,313	231,479	61,056	1,000	38,115,378

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CASH FLOWS - PROPRIETARY FUNDS

FOR THE YEAR ENDED DECEMBER 31, 2020

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority	Non-Major Proprietary Fund	Total Proprietary Funds
Outflows						
Interest Paid	929,842	408,552	446,424	48,379	-	1,833,197
Purchase of Capital Assets	2,991,441	126,477	647,001	9,750	(5,134)	3,769,535
Payments on Long-Term Debt	11,271,958	15,691,346	1,533,744	-	-	28,497,048
Repayment of Consumer Deposits	143,854	-	-	-	-	143,854
	15,337,095	16,226,375	2,627,169	58,129	(5,134)	34,243,634
NET CASH PROVIDED (USED) BY CAPITAL AND RELATED FINANCING ACTIVITIES	**6,224,435**	**33,938**	**(2,395,690)**	**2,927**	**6,134**	**3,871,744**
CASH FLOWS FROM INVESTING ACTIVITIES						
Inflows						
Proceeds from Maturity of Certificates of Deposit	-	-	10,000	-	-	10,000
Miscellaneous Income Received	7,050	300	-	-	2,449	9,799
Rent Income Received	93,575	-	-	-	-	93,575
Interest Received	98,714	10,069	156,530	412	961	266,686
	199,339	10,369	166,530	412	3,410	380,060
NET CASH PROVIDED BY INVESTING ACTIVITIES	**199,339**	**10,369**	**166,530**	**412**	**3,410**	**380,060**
NET INCREASE IN CASH AND CASH EQUIVALENTS	**9,536,652**	**212,011**	**346,573**	**205,520**	**5,348**	**10,306,104**
Cash and Cash Equivalents - Beginning of Year	8,197,324	304,951	3,445,716	46,704	46,731	12,041,426
CASH AND CASH EQUIVALENTS - END OF YEAR	**$ 17,733,976**	**$ 516,962**	**$ 3,792,289**	**$ 252,224**	**$ 52,079**	**$ 22,347,530**
RECONCILIATION OF CASH AND CASH EQUIVALENTS TO THE STATEMENT OF NET POSITION						
CURRENT ASSETS						
Cash and Cash Equivalents						
Unrestricted	$ 6,642,700	$ 516,962	$ 3,792,289	$ 252,224	$ 45,576	$ 11,249,751
Restricted	117,302	-	-	-	6,503	123,805
NON-CURRENT ASSETS						
Cash and Cash Equivalents - Restricted	10,973,974	-	-	-	-	10,973,974
CASH AND CASH EQUIVALENTS - END OF YEAR	**$ 17,733,976**	**$ 516,962**	**$ 3,792,289**	**$ 252,224**	**$ 52,079**	**$ 22,347,530**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF FIDUCIARY NET POSITION

DECEMBER 31, 2020

	Pension (and Other Employee Benefit) Trust Funds
ASSETS	
Cash and Cash Equivalents	$ 1,970,065
Contributions and Pension Benefits Receivable	55,074
Accrued Interest Receivable	72,284
Investments	62,070,704
TOTAL ASSETS	**64,168,127**
DEFERRED OUTFLOWS OF RESOURCES	-
LIABILITIES	-
DEFERRED INFLOWS OF RESOURCES	-
NET POSITION	
Restricted for Pension Benefits	64,168,127
TOTAL NET POSITION	**$ 64,168,127**

See Accompanying Notes

THE BOROUGH OF HANOVER, PENNSYLVANIA

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

FOR THE YEAR ENDED DECEMBER 31, 2020

	Pension (and Other Employee Benefit) Trust Funds
ADDITIONS	
Contributions	
Employer	$ 203,565
Commonwealth	945,476
Plan Members	277,527
Total Contributions	1,426,568
Investment Earnings	
Interest Income	625,485
Dividends	352,299
	977,784
Less: Investment Expense	251,519
Net Investment Earnings	726,265
TOTAL ADDITIONS	**2,152,833**
DEDUCTIONS	
Benefits	2,441,983
Administrative Expense	15,000
TOTAL DEDUCTIONS	**2,456,983**
NET APPRECIATION IN FAIR VALUE OF INVESTMENTS	**6,974,077**
CHANGES IN NET POSITION	**6,669,927**
Net Position - Beginning of Year	57,498,200
NET POSITION - END OF YEAR	**$ 64,168,127**

See Accompanying Notes

Note 1. Summary of Significant Accounting Policies

Reporting Entity

The Borough of Hanover, Pennsylvania (the "Borough") operates under a Council-manager form of government and provides the following services as authorized by the Borough Code: Public Safety - Police and Fire, Highways and Streets, Sanitation, Public Service, Health and Social Services, Culture and Recreation, Public Improvements, Planning and Zoning, Water, Sanitary Sewer, Stormwater, Market House Rentals, and General Administrative Services.

The Borough's financial statements are prepared in accordance with accounting principles generally accepted in the United States of America (GAAP). The Governmental Accounting Standards Board (GASB) is responsible for establishing GAAP for state and local governments through its pronouncements (Statements and Interpretations).

Component Units

In evaluating how to define the Borough for financial reporting purposes, management has considered all potential component units. The basis for determining component units is the governing body's ability to exercise oversight responsibility. The most significant manifestation of this ability is financial interdependency. Other manifestations of the ability to exercise oversight responsibility include, but are not limited to, the selection of governing authority, the designation of management, the ability to significantly influence operations, and the accountability for fiscal matters. The other criterion used to evaluate potential component units for inclusion or exclusion from the reporting entity is the existence of special financing relationships, regardless of whether the Borough is able to exercise oversight responsibilities. Blended component units, although legally separate entities, are in substance, part of the Borough's operations and so data from these units are combined with data from the Borough, the primary government. Based upon the application of these criteria, the following are component units of the Borough:

Borough of Hanover Stormwater Authority ("Authority") - *Blended Component Unit* - in November 2018, Certificate of Incorporation was filed to create the Authority to manage the Borough's implementation and operation of the Municipal Separate Storm Sewer (MS4) Program, with permit currently pending State approval. The Borough Council appoints a voting majority of the Authority's Board, and guides all management functions of the entity. Separate financial statements of the Authority are not prepared.

Hanover Public Library Association (HPLA), Inc. - *Major Discretely Presented Component Unit* - the HPLA, founded in 1910, was incorporated particularly to promote and stimulate interest among members and people of Hanover and vicinity and render assistance in the building, equipping, and maintaining of the Guthrie Memorial Library, and to provide support for literacy and educational undertakings.

The HPLA's economic resources almost entirely directly benefit the Borough. The HPLA's fiscal year ended March 31, 2020 audited financial statements have been prepared in accordance with Accounting Standards Codification (ASC) 958, *Not-for-Profit Entities*, which is a basis of accounting that differs from the Borough. Financial presentations of the component unit in the Borough's government-wide financial statements and selected following disclosures are presented based on the ASC 958 guidance. Separate audited financial statements of the HPLA are available upon request at the Guthrie Memorial Library.

Fire Drivers' Post Employment Health Plan (PEHP) - *Blended (Fiduciary) Component Unit* - the Fire Drivers' PEHP, created in 2009, was established by the Borough, pursuant to Internal Revenue Code Section 501(c)(9), to provide contributions, on behalf of its eligible employees, to assist with post-employment health care needs and expenses. Separate financial statements of the Fire Drivers' PEHP are not prepared.

Joint Ventures

A joint venture is a legal entity that results from a contractual arrangement owned, operated, or governed by two or more participants as a separate and specific activity subject to joint control, in which the participants retain an ongoing financial interest or responsibility. Joint control means no single participant has the ability to unilaterally control the financial or operating policies of the joint venture. The purpose of a joint venture is to pool resources and share the costs, risks, and rewards of providing goods or services. The Borough has the following significant joint venture relationships:

Hanover Area Fire and Rescue Commission (the "Commission") - in December 2016, the Borough (through Ordinance) approved an Intergovernmental Cooperation Agreement with Penn Township for creation of the "Hanover Area Fire and Rescue" district, formally effective February 1, 2018 for an initial period of seven years. All Fire Department personal and real property of the Borough was transferred to the Commission shortly thereafter. The Commission pooled resources and funds to establish and operate a regional fire and emergency services response district under Commission control. The Commission includes appointed members from the Borough, Penn Township, volunteer fire and rescue organization, and an at-large member - no one organization appoints a majority of the members. The Commission continues to be serviced by employees of the respective municipalities' paid Fire Departments, with a joint Fire Chief and Executive Secretary, equally funded by each municipality.

New Accounting Pronouncements Adopted

The following summarizes GASB Statements implemented by the Borough during the year ended December 31, 2020, and the relating effects on the financial statements presentation and disclosure, as applicable:

GASB Statement No. 91, *Conduit Debt Obligations* - The objective of this statement is to provide a single method of reporting conduit debt obligations by issuers and eliminate diversity in practice associated with (1) commitments extended by issuers, (2) arrangements associated with conduit debt obligations, and (3) related note disclosures. The provisions of this statement are effective for periods beginning after December 15, 2020 and were early implemented by the Borough as of January 1, 2020 with minimal effect on financial statement presentation or disclosure.

GASB Statement No. 92, *Omnibus 2020* - The objective of this statement is to improve consistency of authoritative literature by addressing practice issues that have been identified during implementation and application of certain GASB Statements. The provisions of this statement are predominately effective for periods beginning after June 15, 2020 and were early implemented by the Borough as of January 1, 2020 with minimal effect on financial statement presentation or disclosure.

GASB Statement No. 93, *Replacement of Interbank Offered Rates* - The objective of this statement is to address accounting, presentation, and disclosure implications that result from the replacement of an interbank offered rate (IBOR), most notably, the London Interbank Offered Rate (LIBOR). The provisions of this statement are predominately effective for periods beginning after June 15, 2020 and were early implemented by the Borough as of January 1, 2020 with minimal effect on financial statement presentation or disclosure.

GASB Statement No. 94, *Public-Private and Public-Public Partnerships and Availability Payment Arrangements* - The objective of this statement is to improve financial reporting by addressing issues related to public-private and public-public partnership arrangements (PPPs) and availability payment arrangements (APAs). As used in the statement, a PPP is an arrangement in which a government (the transferor) contracts with an operator (a governmental or nongovernmental entity) to provide public services by conveying control of the right to operate or use a nonfinancial asset, such as infrastructure or other capital asset (the underlying PPP asset), for a period of time in an exchange or exchange-like transaction, and an APA is an arrangement in which a government compensates an operator for services that may include designing, constructing, financing, maintaining, or operating an underlying nonfinancial asset for a period of time in an exchange or exchange-like transaction. The provisions of this statement are effective for periods beginning after June 15, 2022 and were early

implemented by the Borough as of January 1, 2020 with minimal effect on financial statement presentation or disclosure.

GASB Statement No. 95, *Postponement of the Effective Dates of Certain Authoritative Guidance* - The objective of this statement is to provide temporary relief to government and other stakeholders in light of the COVID-19 pandemic, postponing the implementation date for several recent statements. The provisions of this statement were effective immediately and were implemented by the Borough as of January 1, 2020 with minimal effect on financial statement presentation or disclosure.

GASB Statement No. 97, *Certain Component Unit Criteria, and Accounting and Financial Reporting for Internal Revenue Code Section 457 Deferred Compensation Plans—an amendment of GASB Statements No. 14 and No. 84, and a supersession of GASB Statement No. 32* - The primary objectives of this statement are to (1) increase consistency and comparability related to the reporting of fiduciary component units in circumstances in which a potential component unit does not have a governing board and the primary government performs the duties that a governing board typically would perform; (2) mitigate costs associated with the reporting of certain defined contribution pension plans, defined contribution other postemployment benefit (OPEB) plans, and employee benefit plans other than pension plans or OPEB plans (other employee benefit plans) as fiduciary component units in fiduciary fund financial statements; and (3) enhance the relevance, consistency, and comparability of the accounting and financial reporting for Internal Revenue Code (IRC) Section 457 deferred compensation plans (Section 457 plans) that meet the definition of a pension plan and for benefits provided through those plans. The provisions of this statement are predominately effective for periods beginning after June 15, 2021 and were early implemented by the Borough as of January 1, 2020 with minimal effect on financial statement presentation or disclosure.

Basic Financial Statements - Government-Wide Financial Statements

The Borough's basic financial statements include both the government-wide (reporting the Borough as a whole) and fund financial statements (reporting the Borough's major and non-major funds). Both the government-wide and fund financial statements categorize primary activities as either governmental or business-type.

The Borough's general administrative, public safety, health and sanitation, highways, and culture and recreation services are classified as governmental activities. The Borough's water, regional wastewater, sanitary sewer, stormwater, and market house services are classified as business-type activities. Administrative overhead charges are made to funds and programs and are thereby included in the direct expenses of those funds and programs.

This government-wide focus is more on the sustainability of the Borough as an entity and the change in the Borough's net position resulting from the current year's activities.

In the government-wide statement of net position, both the governmental and business-type activities columns are (a) presented on a consolidated basis by column, and (b) reported on a full accrual, economic resource basis, which recognizes all long-term assets, receivables, and deferred outflows of resources as well as long-term debt and obligations and deferred inflows of resources. Fiduciary funds are not included in the government-wide financial statements. The Borough's net position is reported in three parts - net investment in capital assets; restricted net position; and unrestricted net position. The Borough first utilizes restricted resources to finance qualifying activities.

The government-wide statement of activities reports both the gross and net cost per functional category (public safety, highways, etc.), which are otherwise being supported by general government revenues (property and income taxes, certain intergovernmental revenues, etc.). The statement of activities reduces gross expenses (including depreciation) by related program revenues and operating and capital grants and contributions. The program revenues must be directly associated with the function or business-type activity. Program revenues include revenues from licenses and permit fees, fines and forfeitures, and charges for services. Operating grants include operating-specific and discretionary (either operating or capital) grants while the capital grant column reflects capital-specific grants.

The net costs (by function or business-type activity) are normally covered by general revenues (property and income taxes, certain intergovernmental revenues, interest income, etc.) The Borough does not allocate indirect costs.

Basic Financial Statements - Fund Financial Statements

The financial transactions of the Borough are reported in individual funds in the fund financial statements. Each fund is accounted for by providing a separate set of self-balancing accounts that comprises its assets, deferred outflows of recourses, liabilities, deferred inflows of resources, fund equity, revenues, and expenditures/expenses. The various funds are reported by generic classification within the financial statements.

The Borough utilizes various criteria (percentage of the assets and deferred outflows of resources, liabilities and deferred inflows of resources, and revenues or expenditures/expenses of either fund category or the governmental and enterprise combined) for the determination of major funds.

Governmental Funds

Governmental funds are those through which most governmental functions of the Borough are financed. Governmental fund reporting focuses on the sources, uses, and balances of

current financial resources. Expendable assets and deferred outflows of resources are assigned to the various governmental funds according to the purpose for which they may or must be used. Current liabilities and deferred inflows of resources are assigned to the fund from which they will be paid. The difference between governmental fund assets and deferred outflows of resources and liabilities and deferred inflows of resources is reported as fund balance. The following is a description of the Borough's major governmental fund:

General Fund - The General Fund accounts for all financial resources, except those required to be accounted for in another fund. The General Fund consists of the following internal reporting funds: General Operating and Guthrie Memorial Library Funds.

The following is a description of the Borough's Non-Major Governmental Funds:

Capital Projects Fund - The Capital Projects Fund accounts for financial resources used for the acquisition and construction of major capital facilities that are not financed by proprietary funds. This fund includes certain road improvement and construction projects related to the Transfer Station, and general obligation bond issuances for governmental fund purposes. Fund balance has been specifically restricted or assigned, as applicable, for these purposes.

Highway Liquid Fuels Fund - The Highway Liquid Fuels Fund accounts for legally restricted revenues derived from Commonwealth gasoline taxes. Expenditures are restricted by Commonwealth law to Borough road and bridge repairs, maintenance, and improvement programs. Fund balance has been specifically restricted for these purposes.

Recreation Fund - The Recreation Fund accounts for donations and recreation activities charges to benefit the Borough's recreation facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Hanover Recreation Board.

Recreation Endowment Fund - The Recreation Endowment Fund accounts for contributions to a permanent endowment for benefit of the Borough's recreation facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Hanover Recreation Board.

Library Endowment Fund - The Library Endowment Fund accounts for contributions restricted for benefit of the Guthrie Memorial Library facilities and operations, and related earnings are held until they are authorized for expenditure or transfer by the Borough.

Proprietary Funds

The focus of proprietary fund measurement is upon determination of operating income, change in net position, financial position, and cash flows. The GAAP applicable are those similar to businesses in the private sector. Proprietary funds distinguish operating revenues and expenses from non-operating items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with the proprietary fund's principal ongoing operations. The principal operating revenues for the Borough's proprietary funds are charges for water, sewer, and wastewater treatment services and market stall rentals. Operating expenses for the Borough's proprietary funds include administrative and general costs, contractual services, depreciation on capital assets, materials and supplies, personnel services, transmission and distribution repairs and maintenance, water and sewer treatment costs, and utilities. All revenues or expenses not meeting this definition are reported as non-operating revenues/expenses.

The Borough's proprietary funds are all classified as enterprise funds. Enterprise funds are required to be used to account for operations for which a fee is charged to external users for goods or services and the activity (a) is financed with debt that is solely secured by a pledge of the net revenues, (b) has third party requirements that the cost of providing services, including capital costs, be recovered with fees and charges, or (c) establishes fees and charges based on a pricing policy designed to recover similar costs. The following is a description of the Borough's major enterprise funds:

Water Fund - The Water Fund is used to account for the revenues generated from the charges for distribution of water to residential, commercial, industrial, and public users of the Borough.

Regional Wastewater Fund - The Regional Wastewater Fund is used to account for the revenues generated from the charges for sanitary sewer services provided for residential, commercial, industrial, and public users located outside of the Borough limits on behalf of regional municipalities participating in regional wastewater treatment plant use governed by intermunicipal agreements, and for interfund charges for sanitary sewer usage.

Sanitary Sewer Fund - The Sanitary Sewer Fund is used to account for the revenues generated from the charges for sanitary sewer services provided for the residential, commercial, industrial, and public users of the Borough.

Stormwater Authority Fund (*blended component unit*) - The Stormwater Authority Fund is used to account for the revenues generated from the charges for stormwater services provided for residential, commercial, industrial, and public users of the Borough.

The following is a description of the Borough's Non-Major Proprietary Fund:

Market House Fund - The Market House Fund is used to account for the revenues generated from vendors renting space for a farmers market.

Fiduciary Funds

Fiduciary funds are used to account for resources held by the Borough in a trustee capacity for individuals, private organizations, or other governments and therefore are not available to support the Borough's own programs. The fiduciary funds of the Borough are the Pension (and Other Employee Benefit) Trust Funds.

For accounting measurement purposes, the Pension (and Other Employee Benefit) Trust Funds are accounted for in essentially the same manner as proprietary funds. The Pension (and Other Employee Benefit) Trust Funds account for resources of the Borough's Police, Fire Drivers' and Hanover Employees' Pension Funds Plans, and the Fire Drivers' PEHP Fund Plan.

Basis of Accounting

Basis of accounting refers to the point at which revenues or expenditures/expenses are recognized in the accounts and reported in the financial statements. It relates to the timing of the measurements made regardless of the measurement focus applied.

Accrual - Both governmental and business-type activities in the government-wide, proprietary funds, and fiduciary funds financial statements are presented on the accrual basis of accounting. Revenues are recognized when earned and expenses are recognized when incurred, regardless of the timing of related cash flows. Property and other taxes are recognized as revenues in the year for which they are levied. Grants and similar items are recognized as revenues as soon as all eligible requirements imposed by the provider have been met.

Modified Accrual - The governmental funds financial statements are presented on the modified accrual basis of accounting. Under the modified accrual basis of accounting, revenues are recorded when susceptible to accrual; i.e., both measurable and available. "Available" means collectible within the current period or within 60 days after year-end. Expenditures are generally recognized under the modified accrual basis of accounting

when the related liability is incurred. The exception to this general rule is that principal and interest on general obligation long-term debt, if any, is recognized when due.

In applying the "susceptible to accrual" concept to intergovernmental revenues, the provider should recognize liabilities and expenses and the recipient should recognize receivables and revenues when the applicable eligibility requirements, including time requirements, are met.

Resources transmitted before the eligibility requirements are met should, under most circumstances, be reported as advances by the provider and as unearned revenue or a deferred inflow of resources by the recipient.

Cash and Cash Equivalents and Depository Pool

For purposes of the statement of cash flows, the Borough considers all highly liquid certificates of deposit and investments purchased with a maturity of three months or less to be cash equivalents, and the carrying amount approximates estimated fair value because of the short maturity of those instruments. The majority of the Borough's cash deposits are pooled into a common pooled account in order to maximize investment opportunity. Each fund whose monies are deposited in the pooled account has equity therein, and interest earned on the account is allocated based upon relative equity at month-end.

Investments

Investment purchases and sales are recorded as of the trade date. Dividend income is recognized on the ex-dividend date. Other investment income is recognized when earned.

Investments are reported at fair value. Fair value is the amount reasonably expected to be received for an investment in a current sale between a willing buyer and a willing seller. Fixed income securities, real estate investment trusts (REITs), bond and mutual funds, and common and preferred stocks are valued based on published market prices and quotations from national security exchanges and securities pricing services. Money market investments that have a remaining maturity at the time of purchase of one year or less are measured at amortized cost.

Net appreciation (depreciation) is determined by calculating the change in the fair value of investments between the beginning of the year and the end of the year, less purchases of investments at cost, plus sales of investments at fair value. Investment expenses consist of external expenses directly related to investment operations, as well as the internal administrative expenses associated with the investment program.

Fair Value

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Borough categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The fair value hierarchy categorizes the inputs to valuation techniques used to measure fair value into three levels based on the extent to which inputs used in measuring fair value are observable in the market:

Level 1 - Inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2 - Inputs are those other than quoted prices within level 1 - that are observable for an asset or liability, either directly or indirectly.

Level 3 - Inputs are unobservable inputs for an asset or liability.

If the fair value of an asset or liability is measured using inputs from more than one level of the fair value hierarchy, the measurement is considered to be based on the lowest priority level input that is significant to the entire measurement.

Inventory

Inventories of materials and supplies are maintained in the General, Water, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds.

Materials and supplies maintained in the General, Regional Wastewater, Stormwater Authority, and Sanitary Sewer Funds are carried in an inventory account at cost using the first-in, first-out method. Materials and supplies maintained in the Water Fund are carried in an inventory account at cost using an average costing method. All funds subsequently charge inventory to expenditures when consumed.

All other fund types expense inventoriable items when purchased.

Capital Assets

Capital assets used in governmental fund type operations are accounted for in the government-wide financial statements, rather than in governmental funds.

All capital assets are valued at historical cost or estimated historical cost if actual historical cost is not available. Donated capital assets are valued at their estimated acquisition value on the date donated. Capital assets with a value of $5,000 or more are capitalized by the Borough except for Water Fund additions, which are capitalized if their value is $750 or greater, per National Association of Regulatory Utility Commissioners (NARUC) Accounting

Instruction standards adopted by the Pennsylvania Public Utilities Commission (PUC). Effective January 1, 2018, the cost of interest incurred during the construction of capital assets is expensed as incurred for all funds.

Capital assets are depreciated using the straight-line method over the following estimated useful lives:

Improvements Other than Buildings	5-20 years
Machinery and Equipment	5-20 years
Other Buildings and Improvements	5-50 years
Plant and Infrastructure	20-125 years

Government-Wide Financial Statements - In the government-wide financial statements, capital assets are accounted for as capital assets. The Borough elected to retroactively report all general infrastructure assets in a prior year, which includes roads, bridges, traffic signals, utility facilities, and storm sewers and drains. The Borough elected not to retroactively report intangible assets identified as having indefinite useful lives or being internally generated. All intangible assets identified as having indefinite useful lives acquired or being internally generated after December 31, 2009 are reported at historical cost. Depreciation of all exhaustible capital assets is recorded as a direct expense in the statement of activities, with accumulated depreciation reflected in the statement of net position.

Additions are recorded at cost or, if contributed property, at their estimated fair value at time of contribution. Repairs and maintenance are recorded as expenditures/expenses; renewals and betterments are capitalized. The sale or disposal of capital assets is recorded by removing cost and accumulated depreciation from the accounts and charging the resulting gain or loss to income.

Fund Financial Statements - In the fund financial statements, capital assets used in governmental funds operations are accounted for as capital outlay expenditures of the governmental funds upon acquisition. Capital assets used in proprietary funds operations are accounted for in the same manner as in the government-wide financial statements.

Deferred Outflows and Inflows of Resources

In addition to assets, the statement of net position and balance sheet will sometimes report a separate section for deferred outflows of resources. This separate financial statement element represents a consumption of net position or fund balance that applies to a future period(s) and so will not be recognized as an outflow of resources (expense/expenditure) until that time. In addition to deferrals related to pensions (disclosed in respective notes below), the Borough reports deferred amounts on refunding in the statement of net position, resulting from the

difference in the carrying value of the refunded debt and its reacquisition price, which is deferred and amortized over the shorter of the life of the refunded or refunding debt.

In addition to liabilities, the statement of net position and balance sheet will sometimes report a separate section for deferred inflows of resources. This separate financial statement element represents an acquisition of net position or fund balance that applies to a future period(s) and so will not be recognized as an inflow of resources (revenue) until that time. Deferrals related to pensions, beneficial interest in assets held by others, and tax revenues are disclosed in their respective notes below.

Unearned Revenue

Charges for services and other amounts collected in advance are recorded as unearned revenue as a current liability.

Interfund Activity

Sales of goods and services between funds are reported as revenues in the seller funds and as expenditures/expenses in the purchaser funds. Flows of cash or goods from one fund to another, without a requirement for repayment, are reported as interfund transfers. Interfund transfers are reported as other financing sources/uses in governmental funds, and after non-operating revenues/expenses in proprietary funds. Interfund balances are expected to be repaid within the following calendar year.

The Borough allocates to several funds a percentage of the salaries and wages and related costs of personnel who perform general and administrative services for such funds but are paid through the General Fund. Health and life insurance costs are allocated based on the respective employees' primary fund and function.

Accrued Compensated Absences

Through various collective bargaining agreements and Codification, the Borough permits employees to accumulate and carry over various levels of vacation and sick leave, a portion of each are payable at termination. The salary-related payments representing the employer's share of Social Security and Medicare taxes have been accrued. The vested annual leave is expensed as incurred in the appropriate funds.

Accrued compensated absences are accrued when incurred in the government-wide financial statements and in the proprietary funds, with current portions recognized for anticipated or known retirements as of the reporting date. In the governmental fund financial statements, the portion of the liability which is matured and payable is included in accrued compensated absences liability and the unmatured portion is not reported.

Bond Discounts, Premiums, Deferred Amounts on Refunding, and Issuance Costs

In the government-wide and proprietary funds financial statements, bond discounts, premiums, and deferred amounts on refunding are capitalized and amortized over the terms of the respective bonds using a method that approximates the effective interest method. Unamortized bond discounts and premiums are netted against bonds payable for presentation, and unamortized deferred amounts on refunding are presented as deferred outflows of resources. Bond issuance costs, excluding amounts prepaid for bond insurance, are expensed as incurred.

In the governmental funds financial statements, bond discounts, premiums, and issuance costs are expensed in the year of the bond issuance. Bond discounts and premiums are netted against bond proceeds and reported as "Other Financing Sources." Bond issuance costs are expensed as "Debt Service."

Net Position and Fund Balances

In the government-wide, proprietary funds, and fiduciary funds financial statements, net position is classified in the following categories:

Net Investment in Capital Assets - This category groups all capital assets, including infrastructure, into one component of net position. Accumulated depreciation and the outstanding balances of debt and accounts payable and retainage payable that are attributable to the acquisition, construction, or improvement of these assets reduce this category.

Restricted Net Position - This category presents external restrictions imposed by creditors, grantors, contributors (including those who have donated to the Guthrie Memorial Library and recreation endowments, in both expendable and nonexpendable forms) or laws or regulations of other governments and restrictions imposed by law through constitutional provisions or enabling legislation.

Unrestricted Net Position - This category represents the net position of the Borough that is not restricted for any project or other purpose. However, these funds may be constrained for specific projects or purposes in the fund financial statements.

In the governmental fund financial statements, fund balances are classified in the following categories:

Nonspendable Fund Balance - This category represents amounts that are not in spendable form (such as inventory and long-term receivables) or are required to be maintained intact (such as permanent endowments).

Restricted Fund Balance - This category represents amounts constrained to specific purposes by their providers (such as grantors, bondholders, and higher levels of government), through constitutional provisions, or by enabling legislation.

Committed Fund Balance - This category represents amounts constrained to specific purposes by a government itself, using its highest level of decision-making authority; to be reported as committed, amounts cannot be used for any other purpose unless the government takes the same highest-level action to remove or change the constraint.

Assigned Fund Balance - This category represents amounts a government intends to use for a specific purpose; intent can be expressed by the governing body or by an official or body to which the governing body delegates the authority.

Unassigned Fund Balance - This category represents amounts that are available for any purpose.

The Borough has adopted a fund balance and financial reserves policy. For the classification of fund balances, the policy considers restricted or unrestricted amounts to have been spent when an expenditure is incurred for the purposes for which both restricted and unrestricted fund balance is available. When an expense is incurred for purposes for which both restricted and unrestricted fund balances are available, restricted resources are applied first. Also, for the classification of fund balances, the Borough considers committed, assigned, or unassigned amounts to have been spent when an expenditure is incurred for purposes for which amounts in any of those unrestricted fund balance classification could be used.

For committed fund balance, the Borough's highest level of decision-making authority is the Borough Council. The formal action that is required to be taken to establish and modify or rescind a fund balance commitment is an ordinance.

For assigned fund balance, the Borough Council is authorized to assign amounts to a specific purpose. The authorization policy is a formal motion.

Budgets and Budgetary Accounting

The Borough adopts an annual operating budget for the General, Highway Liquid Fuels, Water, Regional Wastewater, Sanitary Sewer, Stormwater Authority, and Non-Major Proprietary Fund. Each budget is presented on a basis consistent with the modified accrual basis of accounting. All appropriations lapse at the end of each year and must be reappropriated.

The following procedures are followed in establishing the budgetary data reflected in the financial statements:

1. Beginning at least 30 days prior to the adoption of the budget, a proposed budget for the ensuing year shall be prepared in the manner designated by the Borough Council. This budget shall be kept on file for public inspection for a period of ten days.

2. After the ten-day period has expired, the Borough Council shall make such revisions in the budget as shall be deemed advisable.

3. Upon completion of the budget, which shall be no later than December 31st, it shall be the duty of the Borough Council to adopt an ordinance, levying the taxes referred to in this act for the fiscal year, for approval of the Mayor or passage over his/her veto.

The budget is prepared by fund and department and is approved at the department level. The department level presented in the Budgetary Comparison Schedule, included as required supplementary information, represents the legal level of budgetary control. Once a budget is approved, it can be amended by the Borough Council with reasonable discretion. There were no budget revisions approved by the Borough Council during the year ended December 31, 2020.

Estimates

Management uses estimates and assumptions in preparing financial statements in conformity with GAAP. Those estimates and assumptions affect the reported amounts of assets, deferred outflows of resources, liabilities, and deferred inflows of resources, the disclosure of contingencies, and the reported revenues and expenditures/expenses. Actual results could vary from the estimates that were used. Significant areas where estimates are made include allowance for doubtful accounts and depreciable lives.

Subsequent Events

In preparing these financial statements, the Borough has evaluated events and transactions for potential recognition or disclosure through March 30, 2021, the date the financial statements were available to be issued.

Note 2. Deposits and Investments

Primary Government

The Borough is governed by the deposit and investment limitations of Commonwealth of Pennsylvania (Commonwealth) law. Commonwealth statutes require that any depository holding public funds maintain investment securities in amounts equal to the total of all public funds on deposit. The securities may be held in the name of the depository but must be pledged as collateral for those public funds.

The Borough is authorized to invest in United States (U.S.) Treasury bills, obligations of the U.S. Government or Commonwealth of Pennsylvania and related agencies, repurchase agreements, and qualifying money market investments, including pooled investment funds such as the Pennsylvania Local Government Investment Trust (PLGIT). Act 10 of 2016 permitted the expansion of investments, including commercial paper, bankers' acceptances, and negotiable certificates of deposit. In addition, the Municipal Codes authorize additional investment options for pension funds as indicated in the Pennsylvania Uniform Trust Act (20 PA C.S.), including (but not limited to) common and preferred stocks, corporate bonds, REIT's, and mutual funds.

The Borough has separate investment policies for each of its three pension plans. In addition, the Borough has a formal investment policy ("operating investment policy") in relation, but not limited, to operating and reserve funds, proceeds from certain bond issues, and designated or other pledged assets under the direction of the Borough.

Deposits and Cash on Hand

The deposits held as of December 31, 2020 were as follows:

Type	Maturities	Carrying Value
Demand Deposits		$ 2,574,629
Money Market Deposits		30,302,162
Cash on Hand		1,565
		$ 32,878,356

Reconciliation to Financial Statements	
Statement of Net Position	
Current Assets	
Cash and Cash Equivalents	
Unrestricted	$ 21,019,818
Restricted	517,364
Non-Current Assets	
Cash and Cash Equivalents - Restricted	11,341,174
	$ 32,878,356

Custodial Credit Risk - Custodial credit risk is the risk that in the event of a bank failure, the Borough's deposits may not be returned to it. The Borough's operating investment policy establishes insurance, collateral, pledging, and reporting requirements for financial institutions to limit exposure of custodial credit risk. The Borough does not have written policy for custodial credit risk in relation to its pension funds. As of December 31, 2020, Borough and Stormwater Authority deposits in financial institutions had bank balances of $33,413,033 and $252,158, respectively, of which $32,802,150 and $-0-, respectively was exposed to custodial credit risk and was unsecured and collateralized by securities pledged and held by the financial institutions' trust departments or agents, not in the Borough's or Stormwater Authority's name, respectively.

Investments

The composition of investments held as of December 31, 2020, reported at fair value, were as follows:

	Interest Maturities (in Years) (Unaudited)					
Type and Ratings*	Less than 1	1 - 5	6 - 10	More than 10	Not Applicable	Total Fair Value
Corporate Bonds - AA+ to BBB-	$ 210,757	$ 2,287,087	$ 1,735,226	$ 822,755	$ -	$ 5,055,825
Equity Securities and Equity Mutual Funds - N/A	-	-	-	-	39,158,784	39,158,784
Fixed Income Mutual Funds - AAA to B	-	1,271,737	3,760,800	-	-	5,032,537
Money Market Investments - AAAm, A+, or Not Rated	1,999,898	-	-	-	-	1,999,898
Municipal Bonds - AA1 or AA2	-	-	277,625	284,253	-	561,878
Other Equity Investments - N/A	-	-	-	-	7,475,501	7,475,501
U.S. Agencies - Pools - AA+ or AGY	-	160,085	55,994	1,619,267	-	1,835,346
U.S. Treasury Obligations - AAA or TSY	-	1,607,121	754,089	589,623	-	2,950,833
	$ 2,210,655	$ 5,326,030	$ 6,583,734	$ 3,315,898	$ 46,634,285	$ 64,070,602

* Ratings are unaudited; information from Standard and Poor's (S&P). U.S. Treasury Obligations issued are explicitly guaranteed by the U.S. Government.

Reconciliation to Financial Statements		
Statement of Net Position		
Current Assets		
Cash and Cash Equivalents - Restricted	$	17,664
Non-Current Assets		
Cash and Cash Equivalents - Restricted		12,169
Statement of Fiduciary Net Position		
Pension (and Other Employee Benefit) Trust Funds		
Cash and Cash Equivalents		1,970,065
Investments		62,070,704
		$ 64,070,602

Custodial Credit Risk - Investment custodial credit risk is the risk that the counterparty to an investment transaction will fail and the government will not recover the value of the investment or collateral securities that are in possession of an outside party. The Borough's formal investment policies require for financial institutions to purchase securities in the Borough's name, and hold by a custodian bank on the Borough's behalf to limit exposure of custodial credit risk. The Borough does not have written policy for investment custodial credit risk in relation to its pension funds. All of the Borough's investments are held by the financial institutions' trust departments or agents, not in the Borough's name.

The institutions holding the Borough's investments are members of the Securities Investor Protection Corporation (SIPC). SIPC insures the cash and securities in each investor's account up to $500,000 against loss in the case of a failed brokerage firm or misappropriation of assets by the broker, however only up to $250,000 for cash. The Borough has over $500,000 in investments at each of the institutions, thus would be insured $500,000 at each institution by the SIPC in the event such failure or misappropriation occurs.

Interest Rate Risk - The Hanover Employees' Pension Plan's formal investment policy states that at the time of purchase, the maximum final maturity for any single issue will not exceed 100 years and the portfolio average effective duration will not exceed seven years and will be within +/- 20% of the specified performance benchmark. The Borough's operating investment policy limits maximum final maturity for operating funds for any single issue to 397 days from purchase date to maturity date, and for reserve funds for any single issue to five years from purchase date to maturity date. The Borough does not have formal investment policies that limit exposure to fair value losses arising from increasing interest rates for the Police and Fire Drivers' Pension Plans as well as the Fire Drivers'

PEHP. Maturities of investments held as of December 31, 2020 are provided in the previous schedule.

Credit Risk and Concentration of Credit Risk - Investments in entities that are subject to credit risk are limited to those held by the Pension Trust and Non-Major Governmental Funds. The ratings for all investments currently held by the Pension Trust and Non-Major Governmental Funds are summarized in the previous schedule. The Borough does not have formal investment policy that limits exposure to credit and concentration of credit risk for the Fire Drivers' PEHP Fund Plan. The investment policies for the Borough's Pension Trust Funds limit its investment choices and maximum investment in any one fixed income security issuer as follows:

		Pension Plans	
	Police	Fire Drivers'	Hanover Employees'
Prohibited Investments	None	Non-"traditional asset classes"	Non-U.S. dollar-denominated securities, and non-"traditional asset classes"
Maximum Concentrations	None	None	5%, with select investments limited to 5% of portfolio

The Hanover Employees' Pension Plan investment policy also addresses the eligible fixed income investments permitted and their respective ratings, based on one or more nationally recognized statistical rating organizations, and portfolio limits, and all Pension Trust Fund investment policies provide asset allocation guidelines for minimum, maximum, and benchmark levels of investment holdings of the respective plans.

The Borough's operating investment policy sets various limits for the percentage of maximum allocation and maximum invested in a single issuer (excluding U.S. Government Securities, certain money market funds, and Local Government Investment Pools) for various classes of security types, and further restrictions for registered money market mutual funds of Local Government Investment Pools to maximum invested of 10% of the outstanding shares of said fund or Pool.

There were no investments that exceeded 5% of plan net position for these funds as of December 31, 2020.

Restrictions

Restricted deposits and investments of governmental funds as of December 31, 2020 are comprised of the following:

	General Fund	Non-Major Governmental Funds	Total Governmental Funds
Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Public Safety Purposes	$ 16,222	$ -	$ 16,222
Funds Held for Future Recreation Purposes	46,651	36,302	82,953
Funds Held for Roads and Bridges	-	312,048	312,048
Non-Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Recreation Purposes	-	298,156	298,156
Funds Held for Future Capital Expansion	-	81,213	81,213
Total Restricted Deposits and Investments	$ 62,873	$ 727,719	$ 790,592

Restricted deposits and investments of proprietary funds as of December 31, 2020 are comprised of the following:

	Water Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Capital Expansion	$ -	$ 6,503	$ 6,503
Consumer Deposit Agreement Refunds	117,302	-	117,302
Non-Current Assets			
Cash and Cash Equivalents			
Funds Held for Future Capital Expansion	10,628,109	-	10,628,109
Consumer Deposit Agreement Refunds	345,865	-	345,865
Total Restricted Cash and Cash Equivalents	$ 11,091,276	$ 6,503	$ 11,097,779

The Borough is required to refund the majority of consumer deposit agreements over a straight-line ten-year period following the year of receipt. A corresponding liability for consumer deposits has been recognized (see Long-Term Debt note for additional disclosure).

HPLA

Cash

The HPLA maintains its cash accounts at one financial institution, with balances insured by FDIC up to $250,000. The HPLA has no uninsured funds as of March 31, 2020.

Investments

Investments of the endowment fund by type consisted of the following as of March 31, 2020:

Type	Cost	Market Value
Cash and Cash Equivalents	$ 259,980	$ 259,980
Equities	1,907,606	1,713,972
Fixed Income Securities	716,177	721,512
	$ 2,883,763	$ 2,695,464

Investment activity for the year ended March 31, 2020 totaled $110,858, comprised of $400,000 in contributions, $53,001 in distributions, and $(223,632) of investment return, net of fees of $12,509.

Note 3. Donor-Restricted Endowments and Related Arrangements

Primary Government

The Borough maintains donor-restricted permanent endowments with principal balances of $285,987 and $12,169 reported within the Non-Major Governmental Funds (Recreation Endowment and Library Endowment Funds, respectively) as of December 31, 2020. Financial Commissions for each fund are authorized to supervise the endowment investments and recommend to the Borough Council for authorization and spending of earnings in relation to the respective endowment purposes. Endowment funds in the Library Endowment Fund are limited to a Community Foundation investment fund.

The Borough does not have a formal policy related to spending rate or total return in relation to the respective endowment funds, but follows the provisions of the Pennsylvania Uniform Trust Act (20 PA C.S.), which defines prudent investor requirements (appropriate degree of care and "special skills" as an investor) and overall investment strategy reasonably suited to the endowments.

Net appreciation on the donor-restricted endowments that was available for authorization for expenditure by the Borough as of December 31, 2020 was $17,931 and $17,664 reported within the Non-Major Governmental Funds (Recreation Endowment and Library Endowment Funds, respectively) as cash and cash equivalents.

In addition, the Borough recognized a beneficial interest in assets held by others and a corresponding deferred inflow of resources relating to two qualifying irrevocable split-interest trust agreements meeting the Statement No. 81 criteria with a fair value as of December 31, 2020 of $95,043. The Borough's Guthrie Memorial Library also is a named beneficiary for several other revocable and perpetual, irrevocable trusts not meeting the recognition criteria in GASB Statement No. 81, and thus not recognized in the financial statements that generate annual support for the library's operations, some of which are restricted in nature.

HPLA

The Commonwealth of Pennsylvania has not adopted the Uniform Prudent Management of Institutional Fund Act (UPMIFA) as of March 31, 2020. Pennsylvania's Act 141 allows nonprofits the option to elect a spending fund withdrawal rate based on a total return policy of 2% to 7% of the average fair value of the endowment assets over a period of three or more years of the actual investment income of the fund. The Association has elected to use a three-year average for the mean fair value of the fund and will assess the spending rate annually within the allowed Act 141 range.

Note 4. Fair Value

Primary Government

The categorization of investments and beneficial interest in assets held by others within the fair value hierarchy are based upon the pricing transparency of the instruments and should not be perceived as the particular asset's risk. The hierarchy is based on the valuation inputs used to measure the fair value of assets. Level 1 inputs are quoted prices in an active market for identical assets; Level 2 inputs are significant other observable inputs or quoted prices in markets that are not active; and Level 3 inputs are significant unobservable inputs.

The Borough's fair value hierarchy of investments ($62,070,704) by type, valued based on recurring measurements using matrix pricing, as of December 31, 2020 was as follows:

		Fair Value Measurements Using		
	Fair Value	Level 1	Level 2	Level 3
Beneficial Interest in Assets Held by Others	$ 95,043	$ -	$ 95,043	$ -

		Fair Value Measurements Using		
	Fair Value	Level 1	Level 2	Level 3
Investments				
Investments by Fair Value Level				
Debt Securities				
Corporate Bonds	$ 5,055,825	$ -	$ 5,005,825	$ 50,000
Fixed Income Mutual Funds	582,037	582,037	-	-
Municipal Bonds	561,878	-	561,878	-
U.S. Agencies - Pools	1,835,346	-	1,835,346	-
U.S. Treasury Obligations	2,950,833	159,539	2,791,294	-
Total Debt Securities	10,985,919	741,576	10,194,343	50,000
Equity Securities	22,546,069	22,546,069	-	-
	$ 33,531,988	$ 23,287,645	$ 10,194,343	$ 50,000

The valuation method for investments measured at the net asset value (NAV) per share, or equivalent, as of December 31, 2020 was as follows:

Investments Measured at the Net Asset Value (NAV)	Fair Value	Redemption Frequency	Redemption Notice Period
Commingled Equity Mutual Funds	$ 24,088,216	Daily	Trade Date, Plus One to Two Days
Commingled Fixed Income Mutual Funds	4,450,500	Daily	Trade Date, Plus One Day
Total Investments Measured at the NAV	$ 28,538,716		

Thirty-four (34) fixed income mutual funds and eight equity mutual funds are considered to be commingled in nature and include hedge funds. The fair value of the underlying investments is used to determine NAV per share (or its equivalent) for these investments.

HPLA

ASC 820, *Fair Value Measurements*, provides a framework for measuring fair value that is similar to GASB standards summarized in Note 1.

The estimated fair values of HPLA's investments as of March 31, 2020 are as follows:

Type	Level 1	Total
Cash and Cash Equivalents	$ 259,980	$ 259,980
Equities	1,713,972	1,713,972
Fixed Income Securities	721,512	721,512
	$ 2,695,464	$ 2,695,464

Note 5. Property and Other Taxes and Tax Abatements

The Borough's ad valorem property tax is levied each year on the assessed value listed as of the prior year for all real property located in the Borough. The assessed value of the duplicate tax roll for which the 2020 tax levy was based was $990,471,816. The property tax rate for 2019 was 5.65 mills.

From the effective date of the budget, the amount stated thereon as the amount to be raised by the property tax shall constitute a determination of the amount of the tax levy in the corresponding tax year. Taxpayers receive a 2% discount if paid by the 15th day of April. For the year ended December 31, 2020, $95,543 in discounts were netted with tax revenues reported. Taxes shall be due and payable on the 15th day of June in the year for which they are levied. Taxpayers will owe an additional 10% penalty if paid after the 15th day of June, extended through December 31st for 2020 due to the COVID-19 pandemic. Taxes shall be overdue and in arrears on the 30th day of the following April.

Taxes are recorded in the funds as revenue by the Borough when received from the tax collectors, and accruals are recorded at year-end for taxes expected to be received within 60 days of December 31, 2020 in accordance with the modified accrual basis of accounting. Taxes are shown net of an allowance for uncollectible accounts, calculated based on the age of receivables for Per Capita Taxes. Taxes receivable and deferred tax revenue, recognized as deferred amounts from tax revenues, as of December 31, 2020 and related tax revenues for the year then ended for the General Fund, net of relating allowance for uncollectible accounts, were as follows:

	Taxes Receivable, Net	Deferred Tax Revenue	Tax Revenues
Property Taxes	$ 297,742	$ 174,524	$ 5,921,168
Income Taxes	197,832	-	1,627,460
Business Privilege Taxes	23,611	-	568,536
Local Services Taxes	51,863	-	483,919
Per Capita Taxes	63,603	61,788	48,651
Total Taxes, Gross	634,651	236,312	8,649,734
Less: Allowance for Uncollectible Taxes	41,000	41,000	-
Total Taxes, Net	$ 593,651	$ 195,312	$ 8,649,734

The Borough provides a single tax abatement program to promote improvements to certain industrial, commercial, and other business properties within designated jurisdictions of the Borough under the Pennsylvania Local Economic Revitalization Tax Assistance Act (LERTA), Act No 76 of 1977. Abatements are obtained through application by the property owner for

property taxes related to improvements to deteriorated properties on a declining basis from 100% to 0% over a ten-year period, based on increased assessed value as a result of permitted improvements to the qualifying property. Revocation provisions exist with failure to satisfy any fees and costs as due to the Borough.

For the year ended December 31, 2020, several LERTA applications have been filed, but no abatements have yet occurred, pending completion and assessment of improvements.

Note 6. Due from Other Governments

In 1982, the Borough entered into an agreement with two local municipalities to jointly share the costs of constructing a regional wastewater treatment plant and related infrastructure. Under the agreement, the Borough operates the facilities, and charges the local municipalities quarterly service charges through the Regional Wastewater Fund for their allocated share of costs based on flow usage for the entire system. Any charges received in excess of costs or deficit amounts are accounted for in subsequent budgets as an adjustment to the quarterly service charges to the participating municipalities, $416,962 of which was recognized as unearned revenue as of December 31, 2020, $79,848 of which was due from other governments. The contract also stipulates that the municipalities will share in the costs of facilities additions and upgrades as required by other authorized agencies.

Due to revised environmental compliance standards, the Borough was compelled to perform substantial improvements to the treatment plant and related infrastructure and has recognized the local municipalities' share of these costs as amounts due from other governments in the Regional Wastewater Fund. Beginning in 2011, one of the local municipalities agreed on repayment terms for their share of costs as follows: $395,000 due February 15, 2012, and annual payments due February 15th thereafter of $100,000 plus interest accrued on the outstanding principal balance at 4% per annum until fully repaid, which occurred in 2020. Interest income recognized under the agreement totaled $827 for the year ended December 31, 2020.

In addition, the Borough has a flow exchange agreement with another municipality from 1983 for sewer treatment services charged through the Sanitary Sewer Fund, and $515,980 was due and payable from the municipality for flow exchange services through December 31, 2020.

Finally, the Borough has intergovernmental agreements for equally sharing employee costs of a joint Fire Chief and Executive Secretary that support both municipalities as part of the Commission, and $122,675 was due and payable from the municipality for said shared costs through December 31, 2020.

Note 7. Capital Assets

A summary of governmental activities follows:

Capital Assets	Balance 12/31/19	Increases	Decreases	Transfers	Balance 12/31/20
Non-Depreciable Assets					
Land and Land Rights	$ 571,261	$ 99,375	$ 41,500	$ -	$ 629,136
Construction in Progress	32,865	24,154	-	(10,709)	46,310
Total Non-Depreciable Assets	604,126	123,529	-	(10,709)	675,446
Depreciable Assets					
Improvements Other than Buildings	408,335	-	-	-	408,335
Machinery and Equipment	6,744,977	514,382	245,019	(100,542)	6,913,798
Other Buildings and Improvements	12,906,045	32,862	94,910	-	12,843,997
Plant and Infrastructure	14,054,326	41,129	-	-	14,095,455
Total Depreciable Assets	34,113,683	588,373	339,929	(100,542)	34,261,585
Total Capital Assets	34,717,809	711,902	381,429	(111,251)	34,937,031
Accumulated Depreciation					
Improvements Other than Buildings	229,048	13,209	-	-	242,257
Machinery and Equipment	4,920,933	566,993	216,801	(78,002)	5,193,123
Other Buildings and Improvements	4,590,472	287,279	83,318	-	4,794,433
Plant and Infrastructure	9,385,059	374,538	-	-	9,759,597
Total Accumulated Depreciation	19,125,512	1,242,019	300,119	(78,002)	19,989,410
Total Capital Assets, Net	$ 15,592,297	$ (530,117)	$ 81,310	$ (33,249)	$ 14,947,621

Accumulated costs attributed to projects included in construction in progress as of December 31, 2020 were as follows:

Transfer Station Improvements and Enhancements	$ 21,548
Electric Vehicle Charging Station	10,427
Parks and Playground Equipment and Facilities Upgrades	14,335
	$ 46,310

Depreciation expense, including amortization expense on assets under capital lease, was charged to governmental functions for the year ended December 31, 2020:

General Government	$ 22,059
Public Safety	91,348
Health and Sanitation	252,375
Highways	554,668
Culture and Recreation	321,569
	$ 1,242,019

A summary of business-type activities follows:

	Balance 12/31/19	Increases	Decreases	Transfers	Balance 12/31/20
Capital Assets					
Non-Depreciable Assets					
Land and Land Rights	$ 1,027,255	$ -	$ -	$ -	$ 1,027,255
Construction in Progress	1,459,743	3,326,516	-	(527,995)	4,258,264
Total Non-Depreciable Assets	2,486,998	3,326,516	-	(527,995)	5,285,519
Depreciable Assets					
Improvements Other than Buildings	62,168	-	-	-	62,168
Machinery and Equipment	4,732,228	599,908	66,688	100,391	5,365,839
Other Buildings and Improvements	859,863	33,700	-	121,789	1,015,352
Plant and Infrastructure	114,899,763	317,286	52,315	417,067	115,581,801
Total Depreciable Assets	120,554,022	950,894	119,003	639,247	122,025,160
Total Capital Assets	123,041,020	4,277,410	119,003	111,252	127,310,679
Accumulated Depreciation					
Improvements Other than Buildings	53,258	1,256	-	-	54,514
Machinery and Equipment	2,792,177	322,358	66,688	77,957	3,125,804
Other Buildings and Improvements	340,748	32,860	-	-	373,608
Plant and Infrastructure	39,885,588	2,439,929	41,225	(587)	42,283,705
Total Accumulated Depreciation	43,071,771	2,796,403	107,913	77,370	45,837,631
Total Capital Assets, Net	$ 79,969,249	$ 1,481,007	$ 11,090	$ 33,882	$ 81,473,048

Accumulated costs attributed to projects included in construction in progress as of December 31, 2020 were as follows:

Water Fund	
Sheppard & Myers Dam Rehabilitation	$ 943,177
Storage Buildings	17,325
Bulk Water Station Software	13,960
Water Mains and Water Laterals	2,925,312
	$ 3,899,774
Sanitary Sewer Fund	
Sanitary Sewer System Improvements	$ 338,031
Stormwater Authority Fund	
Stormwater System Improvements	$ 20,459

Depreciation expense, including amortization expense on assets under capital lease, was charged to business-type functions as follows for the year ended December 31, 2020:

Water Fund	$ 1,111,967
Regional Wastewater Fund	1,397,328
Sanitary Sewer Fund	268,016
Stormwater Authority Fund	7,937
Non-Major Proprietary Fund	11,155
	$ 2,796,403

Note 8. Capital Leases

The Borough is party to several lease agreements for vehicles and equipment as of December 31, 2020. The leases bear stated or implicit interest rates ranging from 1.91% to 8.80%, and each lease is secured by the capital asset under the respective lease. Vehicles and equipment under capital lease included in capital assets as of December 31, 2020 were as follows:

	Governmental Activities	Business-Type Activities
Machinery and Equipment	$ 1,531,921	$ 777,892
Less: Accumulated Depreciation	550,208	235,737
	$ 981,713	$ 542,155

As of December 31, 2020, future minimum payments required under the leases and the present values of minimum capital lease payments are as follows:

	Governmental Activities	Business Type Activities
2021	$ 453,791	$ 176,168
2022	393,828	136,312
2023	279,296	82,155
2024	210,209	47,314
Total Minimum Lease Payments	1,337,124	441,949
Less: Amount Representing Interest	73,450	23,353
Present Values of Minimum Lease Payments Due Under Capital Leases Included in General Long-Term Debt	1,263,674	418,596
Less: Current Portion	419,360	162,743
Long-Term Portion	$ 844,314	$ 255,853

The payments above include a non-cancelable subleased fire vehicle with the Commission, excluded from the Borough's machinery and equipment listed above, and a non-cancelable subleased street sweeper between the Sanitary Sewer Fund (lessor) and the Stormwater Authority (lessee) with future minimum rentals to be received under the sublease and present values of minimum capital lease rentals as of December 31, 2020 as follows:

	Governmental Activities	Business-Type Activities
2021	$ 132,999	$ 47,383
2022	132,999	47,360
2023	132,998	47,338
2024	132,998	47,314
Total Minimum Lease Rentals	531,994	189,395
Less: Amount Representing Interest	33,762	6,295
Present Values of Minimum Lease Rentals Due Under Capital Leases Included in General Long-Term Debt	498,232	183,100
Less: Current Portion	119,670	44,259
Long-Term Portion	$ 378,562	$ 138,841

Note 9. Long-Term Debt

Amounts outstanding under bonds payable as of December 31, 2020 consisted of the following:

$9,770,000 2012 Series - $9,520,000 Serial and $250,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $545,000 to $1,195,000 through October 1, 2022 with remaining interest rates of 2%; bonds are secured by the credit and taxing power of the Borough	$ 1,740,000
$10,000,000 2013 Series, partially refunded in 2017 - original issue of $3,170,000 Serial and $6,830,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $110,000 to $125,000 through October 1, 2022 with remaining interest rates ranging from 2.125% to 2.375%; all term bonds were refunded; bonds are secured by the credit and taxing power of the Borough	235,000
$3,790,000 2015 A Series - Serial Bonds; due in remaining annual principal installments ranging from $475,000 to $505,000 through October 1, 2024 with remaining interest rates of 2%; bonds are secured by the credit and taxing power of the Borough	1,965,000

$4,750,000 2016 Series - $3,445,000 Serial and $1,305,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $110,000 to $125,000 through October 1, 2024 with remaining interest rates ranging from 2% to 3.5%; term bonds divided into two lots with $645,000 paying 2% due October 1, 2025 and $660,000 paying 2% due October 1, 2026; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	1,775,000
$9,580,000 2017 Series - $2,955,000 Serial and $6,625,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $45,000 to $750,000 through October 1, 2038 with remaining interest rates ranging from 2% to 3.25%; term bonds divided into two lots with $1,180,000 paying 3% due October 1, 2031 and $5,445,000 paying 3.15% due October 1, 2037; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	9,445,000
$8,495,000 2020 Series - $3,730,000 Serial and $4,765,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $325,000 to $420,000 through October 1, 2029 with remaining interest rates ranging from 2% to 4%; term bonds divided into three lots with $2,240,000 paying 2.5% due October 1, 2034, $970,000 paying 2.5% due October 1, 2036, and $1,555,000 paying 2.625% due October 1, 2039; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	8,145,000
$9,445,000 2020 A Series - Serial Bonds; due in remaining annual principal installments ranging from $10,000 to $1,970,000 through October 1, 2032 with remaining interest rates ranging from 2% to 4%; bonds are secured by the credit and taxing power of the Borough	9,400,000
$4,475,000 2020 B Series - $3,815,000 Serial and $660,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $1,215,000 to $1,310,000 through October 1, 2025 with remaining interest rates of 4%; single term bonds lot with $660,000 paying 4% due October 1, 2022; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	4,455,000
$5,480,000 2020 C Series - $2,175,000 Serial and $3,305,000 Term Bonds; serial bonds due in remaining annual principal installment of $1,780,000 paying 2% interest due October 1, 2027; term bonds divided into three lots with $40,000 paying 2% due October 1, 2023, $1,850,000 paying 2% due October 1, 2026, and $1,415,000 paying 2% due October 1, 2029; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	5,085,000

$9,440,000 2020 D Series - $3,970,000 Serial and $5,470,000 Term Bonds; serial bonds due in remaining annual principal installments ranging from $245,000 to $490,000 through October 1, 2040 with remaining interest rates from 3% to 4%; term bonds divided into five lots with $705,000 paying 4% due October 1, 2032, $1,155,000 paying 4% due October 1, 2035, $855,000 paying 4% due October 1, 2037, $1,040,000 paying 4% due October 1, 2042, and $1,715,000 paying 4% due October 1, 2045; all term bonds are subject to mandatory redemption in prescribed amounts before the maturity dates; bonds are secured by the credit and taxing power of the Borough	9,440,000
Total Bonds Payable	$ 51,685,000

In January 2020, the Borough issued $8,495,000 in refunding bonds, titled 2020 Series bonds, to currently refund $8,355,000 of the outstanding 2015 B Series bonds to achieve economic savings. The current refunding reduced total debt service payments over the next 29 years by $506,735. This resulted in an economic gain of $407,666.

In July 2020, the Borough issued $9,445,000 in refunding bonds, titled 2020 A Series bonds, to currently refund $9,755,000 of the outstanding 2015 C Series bonds to achieve economic savings. The current refunding reduced total debt service payments over the next 12 years by $762,219. This resulted in an economic gain of $682,275.

In July 2020, the Borough issued $4,475,000 in refunding bonds, titled 2020 B Series bonds, to currently refund $4,910,000 of the outstanding 2012 Series bonds to achieve economic savings. The current refunding reduced total debt service payments over the next five years by $164,983. This resulted in an economic gain of $158,442.

In July 2020, the Borough issued $5,480,000 in refunding bonds, titled 2020 C Series bonds, to currently refund $5,475,000 of the outstanding 2015 D Series bonds to achieve economic savings. The current refunding reduced total debt service payments over the next nine years by $345,384. This resulted in an economic gain of $320,724.

Interest and related costs incurred for governmental and business-type activities for the year ended December 31, 2020 were $148,229 and $1,806,671, of which all were expensed.

The following is a summary of changes in long-term debt for the year ended December 31, 2020:

	Balance 12/31/19	Additions	Reductions	Balance 12/31/20	Due Within One Year
Governmental Activities					
Bonds Payable					
2015 A Serial and Term Bonds	$ 2,400,000	$ -	$ 435,000	$ 1,965,000	$ 475,000
2015 C Serial and Term Bonds	200,000	-	200,000	-	-
2015 D Serial and Term Bonds	80,000	-	80,000	-	-
2016 Serial and Term Bonds	1,880,000	-	105,000	1,775,000	110,000
2017 Serial and Term Bonds	494,000	-	8,000	486,000	8,000
2020 A Serial Bonds	-	190,000	-	190,000	40,000
2020 C Serial and Term Bonds	-	85,000	40,000	45,000	-
	5,054,000	275,000	868,000	4,461,000	633,000
Bond Discounts and Premiums	60,137	16,857	14,845	62,149	13,944
Total Bonds Payable, Net	5,114,137	291,857	882,845	4,523,149	646,944
Accrued Compensated Absences	1,705,447	21,208	-	1,726,655	-
Capital Lease Obligations	1,538,875	158,560	433,761	1,263,674	419,360
Total Governmental Activities Debt	$ 8,358,459	$ 471,625	$ 1,316,606	$ 7,513,478	$ 1,066,304
Business-Type Activities					
Bonds Payable					
2012 Serial and Term Bonds	$ 7,905,000	$ -	$ 6,165,000	$ 1,740,000	$ 1,195,000
2013 Serial and Term Bonds	355,000	-	120,000	235,000	125,000
2015 B Serial and Term Bonds	8,355,000	-	8,355,000	-	-
2015 C Serial and Term Bonds	9,555,000	-	9,555,000	-	-
2015 D Serial and Term Bonds	5,395,000	-	5,395,000	-	-
2017 Serial and Term Bonds	8,996,000	-	37,000	8,959,000	37,000
2020 Serial and Term Bonds	-	8,495,000	350,000	8,145,000	325,000
2020 A Serial and Term Bonds	-	9,255,000	45,000	9,210,000	305,000
2020 B Serial and Term Bonds	-	4,475,000	20,000	4,455,000	5,000
2020 C Serial and Term Bonds	-	5,395,000	355,000	5,040,000	5,000
2020 D Serial and Term Bonds	-	9,440,000	-	9,440,000	-
	40,561,000	37,060,000	30,397,000	47,224,000	1,997,000
Bond Discounts and Premiums	(96,578)	2,657,406	49,566	2,511,262	207,159
Total Bonds Payable, Net	40,464,422	39,717,406	30,446,566	49,735,262	2,204,159
Accrued Compensated Absences	1,160,056	17,265	-	1,177,321	103,000
Capital Lease Obligations	349,571	231,479	162,454	418,596	162,743
Consumer Deposits	607,021	-	143,854	463,167	117,302
Total Business-Type Activities Debt	$ 42,581,070	$ 39,966,150	$ 30,752,874	$ 51,794,346	$ 2,587,204

Other long-term liabilities in governmental activities are liquidated from general revenues in the General Fund. Accrued compensated absences and capital lease obligations in business-type activities are liquidated from general revenues in the respective Water, Regional

Wastewater, Sanitary Sewer, Stormwater Authority, and Non-Major Proprietary Fund. Consumer deposits are liquidated from general revenues in the Water Fund.

The principal and interest requirements to maturity of the bonds payable debt of all funds are as follows for the years ending December 31:

	Governmental Activities		Business-Type Activities	
	Principal	Interest	Principal	Interest
2021	$ 633,000	$ 94,664	$ 1,997,000	$ 1,386,138
2022	648,000	80,352	2,257,000	1,421,892
2023	663,000	67,044	2,312,000	1,350,990
2024	678,000	53,382	2,407,000	1,265,398
2025	688,000	39,024	2,497,000	1,172,960
2026-2030	1,151,000	34,856	13,764,000	4,769,164
2031-2035	-	-	12,740,000	2,702,794
2036-2040	-	-	6,495,000	1,106,484
2041-2045	-	-	2,755,000	339,000
	$ 4,461,000	$ 369,322	$ 47,224,000	$ 15,484,820

Note 10. Interfund Activity

Interfund balances between funds as of December 31, 2020 on the fund financial statements were as follows:

	Due to		
Due From	Regional Wastewater Fund	Sanitary Sewer Fund	Total
Water Fund	$ 129,844	$ 18,879	$ 148,723
Regional Wastewater Fund	-	337,114	337,114
Stormwater Authority	-	3,713	3,713
Total	$ 129,844	$ 359,706	$ 489,550

Interfund balances result from the time lag between the dates that (1) interfund goods and services are provided or reimbursable expenditures occur, (2) transactions are recorded in the accounting system, and (3) payments between funds are made. All balances are expected to be repaid with the following year.

Interfund transfers for the year ended December 31, 2020 on the fund financial statements were as follows:

	Transfers from		
Transfers to	Regional Wastewater Fund	Sanitary Sewer Fund	Total
Regional Wastewater Fund	$ -	$ 1,746,273	$ 1,746,273
Sanitary Sewer Fund	171,926	-	171,926
Total	$ 171,926	$ 1,746,273	$ 1,918,199

Transfers are used to (1) move revenues from the fund that statute or budget requires to collect them to the fund that statute or budget requires to expend them, (2) move receipts restricted to debt service from the funds collecting the receipts to the debt service fund as debt service payments become due, (3) use unrestricted revenues collected in the General Fund to finance various programs accounted for in other funds in accordance with budgetary authorizations, and (4) transfer capital assets from the fund that paid for the assets to the fund that will utilize them within proprietary funds.

In addition, interfund transfers of capital assets, and related debt as applicable, between governmental and business-type activities, recognized on the government-wide statements, totaled $33,249.

Significant interfund transfers for the year ended December 31, 2020 include the following: The Sanitary Sewer Fund transferred $1,574,347 to the Regional Wastewater Fund to be used for debt service and reclassification of interfund debt, net of reimbursements of capital costs received from other municipalities for the shared regional wastewater treatment improvements disclosed above.

Note 11. Communication Tower Lease Agreements

The Borough has entered into communication tower lease agreements, which are expected to provide the following minimum annual rental income for the years ending December 31:

	Water Fund
2021	$ 63,992
2022	57,324
2023	53,178
2024	39,552
2025	20,096
	$ 234,142

All lease agreements have various consecutive renewal options at the lessee's discretion.

Note 12. Defined Benefit Pension Plans

The Borough offers three single-employer defined benefit pension plans: Police Pension Plan, Fire Drivers' Pension Plan, and Hanover Employees' Pension Plan. The plans do not issue stand-alone financial reports.

A. Plan Descriptions and Funding Policies

Police Pension Plan

Plan Administration - The Plan is a single-employer defined benefit plan that covers all full-time members of the police force upon employment. The Plan is established and administered by the Borough through a trust agent (local bank), and management of the Plan is administered by the ten elected members of the Borough Council and the Police Pension Fund Committee, consisting of three voting members appointed by the Borough Council.

Benefits Provided - The Plan provides monthly retirement benefits as well as death and disability benefits. A member is eligible for normal retirement after attainment of age 50 and completion of 25 years of vesting service; however, if the member continues working after their normal retirement date, their pension does not start until they actually retire. The normal retirement pension, payable monthly for the member's lifetime and continuing to the member's surviving spouse or eligible child for their respective lifetime, is equal to 50% of average monthly compensation (based on the last 36 months of employment preceding retirement), plus a service increment of $100 per month for each completed year of benefit service in excess of 25 years. Disability benefits are available to a participant disabled in the line of duty. If a participant is eligible for retirement at the time of death, a monthly death benefit is payable.

Employees retiring after January 1, 1980 are entitled to an annual cost-of-living increase equal to 6% per year or the actual cost-of-living increase based on the Consumer Price Index, whichever is smaller. A member's benefits vest upon completion of 12 years of vesting service. The vested benefit is deferred monthly pension beginning at normal retirement equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3% of their compensation per year. Member contributions are credited with interest at the rate of 3% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Police Pension Plan are financed through investment earnings.

Fire Drivers' Pension Plan

Plan Administration - The Plan is a single-employer defined benefit plan that covers all full-time fire drivers on July 1st following the date of employment. The Plan is established and administered by the Borough through a trust agent (local bank), and management of the Plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The Plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 with completion of 25 years of vesting service, but not later than attainment of age 62 and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.9% of average monthly compensation (highest consecutive 60 months of compensation out of the last 120 months preceding retirement) multiplied by the total number of complete years of benefit service.

Disability benefits are available to a participant who becomes totally and permanently disabled. The death benefit for a participant who has attained age 50 and has completed ten years of vesting service is a survivor pension. A monthly death benefit, payable to a surviving spouse, is also available if the participant is killed in the line of duty. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3.7% of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at the rate of 4% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Fire Drivers' Pension Plan are financed through investment earnings.

Hanover Employees' Pension Plan

Plan Administration - The Plan is a single-employer defined benefit pension plan that covers all full-time employees of the Borough, excluding uniformed police officers and fire drivers, on July 1st following the date of employment. The Plan is established and administered by the Borough through a trust agent (local bank), and management of the Plan is administered by the ten elected members of the Borough Council.

Benefits Provided - The Plan provides monthly retirement benefits as well as death and disability benefits. The normal retirement date is the first day of the month following attainment of age 55 (60 for non-union hires after July 1, 2014) and completion of 25 years of vesting service, but not later than attainment of age 62 (65 for non-union hires after July 1, 2014) and completion of ten years of vesting service, if earlier. The normal retirement pension, payable monthly for life with payments ceasing upon death, is equal to 1.5% (1% for non-union hires after July 1, 2014) of average monthly compensation (highest consecutive 36 months of compensation out of the last 60 months preceding retirement) multiplied by the total number of years of benefit service rounded to the nearest one-half year. The minimum monthly pension for employees with 30 or more years of vesting service is equal to 70% of average monthly compensation, less 100% of social security benefits received.

Disability benefits are available after attainment of age 45 and completion of 15 years of vesting service, following six months of permanent disability. The monthly death benefit for a participant who has attained 60 years (sum of member's age and years of vesting service) and has completed ten years of vesting service is a survivor pension. A member's benefits vest upon completion of ten years of vesting service. The vested benefit is a deferred monthly pension beginning at the normal retirement date equal to the benefit accrued to the date of termination.

Contributions - Plan members, pursuant to Borough Ordinance and plan agreement, are required to contribute 3% of their annual covered salary up to attainment of age 62 and completion of ten years of vesting service. Member contributions are credited with interest at the rate of 4% per year. The Commonwealth is required, by Act 205 (Municipal Pension Plan

Funding Standard and Recovery Act), to contribute at an actuarially determined rate. The Borough is responsible for contributing funds after accounting for the Commonwealth contribution in order to meet the minimum municipal obligation for each year as required by Act 205. The contribution requirements of the plan members and the Commonwealth may be amended by the Borough and Commonwealth legislature, respectively. Administrative costs of the Hanover Employees' Pension Plan are financed through investment earnings.

Plan Membership

Membership of the Plans consisted of the following as of December 31, 2020:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Inactive Plan Members or Beneficiaries Currently Receiving Benefits	22	14	69
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	0	0	1
Active Plan Members	24	17	106
Totals	46	31	176

Investment Policies, Concentrations, and Rates of Return

Disclosures regarding investment policies and concentrations of the Plans' investments are in Note 2 to the financial statements. The annual money-weighted rates of return on Plans' investments, net of Plans' investment expenses, were as follows for the year ended December 31, 2020: 12.32% for the Police, 13.77% for the Fire Drivers', and 9.98% for the Hanover Employees' Pension Funds' Plans. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

B. Net Pension Liability (Asset)

The net pension liability (asset) was measured as of December 31, 2020, and the total pension liability was determined by rolling forward the liabilities from an actuarial valuation as of January 1, 2019. No significant events or changes in assumptions occurred between the valuation date and the fiscal year end.

Actuarial Assumptions - The total pension liability as determined by an actuarial valuation as of January 1, 2019, using the following actuarial assumptions, applied to all periods included in the measurement:

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Actuarial Assumptions:			
Inflation Assumption	Moderate	Moderate	Moderate
Cost-of-Living Adjustments	3%	None	None
Projected Salary Increases	5%	5%	5%
Investment Rate of Return	7%, net of pension plan investment expense, including inflation	7%, net of pension plan investment expense, including inflation	7%, net of pension plan investment expense, including inflation
Disability Rates	SOA 1987 Group LTD Tables - Males, six-month elimination	SOA 1987 Group LTD Tables - Males, six-month elimination	SOA 1987 Group LTD Tables - Males, six-month elimination

Mortality rates were based on the PubS-2010 (Police and Fire Drivers') and PubG-2010 (Hanover Employees') mortality tables, projected generationally using Scale MP-2018 to reflect mortality improvement.

The long-term expected rate of return on the pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighing the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The target allocations and best estimates of arithmetic real rates of return for each major asset class of the pension plans are summarized in the following tables:

	Target Allocations (as of December 31, 2019)		
Asset Class	Police	Fire Drivers'	Hanover Employees'
Corporate Bonds	0%	0%	7%
Equity Securities and Equity Mutual Funds	70%	65%	65%
Fixed Income Mutual Funds	30%	32%	10%
Money Markets	0%	3%	3%
U.S. Treasuries and Agencies - Bonds and Pools	0%	0%	15%

Asset Class	Long-Term Expected Real Rates of Return (as of December 31, 2019) Police	Fire Drivers'	Hanover Employees'
Corporate Bonds	N/A	N/A	3% - 5%
Equity Securities and Equity Mutual Funds	5% - 7%	5% - 7%	5% - 7%
Fixed Income Mutual Funds	1% - 3%	1% - 3%	1% - 3%
Money Markets	N/A	0% - 1%	0% - 1%
U.S. Treasuries and Agencies - Bonds and Pools	N/A	N/A	1% - 3%

Discount Rate - The discount rate used to measure the total pension liability for all Plans was 7%. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current respective contribution rates and that Borough contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rates. Based on those assumptions, the pension plans' fiduciary net position is projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on the pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Changes in the Net Pension Liability (Asset)

	Police		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability (Asset)
Balances as of December 31, 2019	$ 14,465,571	$ 14,040,698	$ 424,873
Service Cost	381,608	-	381,608
Interest Cost	1,015,321	-	1,015,321
Employer Contributions	-	595,878	(595,878)
Plan Member Contributions	-	65,342	(65,342)
Net Investment Income	-	1,750,636	(1,750,636)
Benefit Payments	(685,174)	(685,174)	-
Administrative Expense	-	(4,500)	4,500
Net Changes	711,755	1,722,182	(1,010,427)
Balances as of December 31, 2020	$ 15,177,326	$ 15,762,880	$ (585,554)

Fire Drivers'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability (Asset)
Balances as of December 31, 2019	$ 7,822,394	$ 7,321,678	$ 500,716
Service Cost	165,334	-	165,334
Interest Cost	545,086	-	545,086
Employer Contributions	-	165,976	(165,976)
Plan Member Contributions	-	49,680	(49,680)
Net Investment Income	-	1,002,157	(1,002,157)
Benefit Payments	(401,574)	(401,574)	-
Administrative Expense	-	(3,500)	3,500
Net Changes	308,846	812,739	(503,893)
Balances as of December 31, 2020	$ 8,131,240	$ 8,134,417	$ (3,177)

Hanover Employees'

	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability (Asset)
Balances as of December 31, 2019	$ 32,920,884	$ 35,824,760	$ (2,903,876)
Service Cost	345,573	-	345,573
Interest Cost	2,281,438	-	2,281,438
Changes of Benefit Terms	-	-	-
Employer Contributions	-	359,784	(359,784)
Plan Member Contributions	-	162,505	(162,505)
Net Investment Income	-	4,902,142	(4,902,142)
Benefit Payments	(1,348,982)	(1,348,982)	-
Administrative Expense	-	(7,000)	7,000
Net Changes	1,278,029	4,068,449	(2,790,420)
Balances as of December 31, 2020	$ 34,198,913	$ 39,893,209	$ (5,694,296)

Sensitivity of the Net Pension Liability (Asset) to Changes in the Discount Rate - The following presents the net pension liability (asset) of the Borough, calculated using the discount rate of 7%, as well as what the Borough's net pension liability (asset) would be if it were calculated using a discount rate that is one-percentage-point lower (6%) or one-percentage-point higher (8%) than the current rate:

	Pension Plans - Long-Term Expected Real Rates of Return		
Borough's Net Pension Liability (Asset)	Police	Fire Drivers'	Hanover Employees'
One-Percent Decrease (6%)	$ 1,520,624	$ 897,170	$ (2,296,124)
Current Discount Rate (7%)	$ (585,554)	$ (3,177)	$ (5,694,296)
One-Percent Increase (8%)	$ (2,313,697)	$ (759,801)	$ (8,554,107)

Pension Expense and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions - For the year ended December 31, 2020, the Borough recognized pension expense totaling $(1,061,762), comprised of $75,457, $29,536, and $(1,166,755) from the Police, Fire Drivers', and Hanover Employees' pension plans, respectively.

As of December 31, 2020, the Borough reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Changes of Assumptions		
Police	$ 486,996	$ 53,424
Fire Drivers'	308,030	-
Hanover Employees'	1,011,925	-
	1,806,951	53,424
Differences Between Expected and Actual Experience		
Police	-	610,630
Fire Drivers'	31,423	28,066
Hanover Employees'	-	1,220,453
	31,423	1,859,149
Net Difference Between Projected and Actual Earnings on Pension Plan Investments		
Police	-	935,006
Fire Drivers'	-	666,868
Hanover Employees'	-	3,297,391
	-	4,899,265
Total	$ 1,838,374	$ 6,811,838

Amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense as follows for the years ending December 31:

2021	$ 1,533,780
2022	669,070
2023	2,036,788
2024	758,960
2025	(25,134)
	$ 4,973,464

Note 13. Deferred Compensation Plan

The Borough, in accordance with the Borough Council's approval, offers a deferred compensation plan created in accordance with Internal Revenue Code Section 457(b). The Plan is available to all Borough employees. The Plan had 43 active participants as of December 31, 2020.

The Plan permits employees to defer a portion of their salary until future years, which the employees are fully vested in upon contribution, with no forfeiture provision. The Borough does not contribute to the deferred compensation plan. Employees can defer the lesser of $19,500, and up to an additional $6,500 catch-up for employees age 50 or over, or 100% of their includable salaries over the plan year. Employee contributions made to the 457(b) Plan for the year ended December 31, 2020 were $163,626.

All amounts of compensation deferred under the Plan and all income attributable to those amounts are held in trust for the exclusive benefit of participants and their beneficiaries. The assets will not be diverted to any other purpose. The Plan Administrator, ICMA-RC, is the trustee of the investments.

Note 14. Defined Benefit Other Postemployment Benefits Plan (OPEB)

The Borough offers a single-employer, defined benefit post-employment health insurance plan that provides OPEB for the police, fire drivers, and non-uniformed (Hanover) employees of the Borough. The Plan does not issue a stand-alone financial report.

A. Plan Description and Funding Policies

Plan Administration

The Plan is established and administered by the Borough through the Intergovernmental Insurance Cooperative (IIC) (a trust agent), and management of the Plan is administered by the ten elected members of the Borough Council. This Plan does not include the pension benefits discussed in Note 12 above. The Plan is funded on a pay-as-you-go basis. There is no irrevocable trust established for the Plan that meets the criteria in GASB Statement No. 75, paragraph 4, and the Borough does not have accumulated assets for the future payment of OPEB benefit payments.

Benefits Provided

The post-employment health insurance plan provides medical and hospitalization, prescription drug, dental, vision and life insurance benefits to eligible active plan members and retirees and their spouses and is authorized by the Borough. Benefit provisions are established and amended by the Borough Council. Retirement provisions for age and service for OPEB mirror those for pension discussed in Note 12 above. The Plan provides the following benefits based on employee group (collective bargaining agreements) upon retirement:

> *Police* - Health insurance coverage for five years subsequent to the retirement date of the Officer provided certification is received they are not eligible for any other employer-sponsored health insurance plan, including a Plan sponsored by the Officer's spouse. Spousal coverage for the five-year period is limited to 50% of the health insurance coverage cost provided they are not eligible for any other employer-sponsored health insurance plan. The maximum Borough cost for Officer and/or spouse health insurance coverage is limited to $600 per month. Upon expiration of this paid coverage, the retiree and spouse shall be permitted to maintain health insurance coverage as a member of the Plan with the entire cost paid by the retiree.
>
> *Fire Drivers and Hanover Employees* - eligible retirees and spouses shall be permitted to maintain health insurance coverage as a member of the Plan with the entire cost paid by the retiree.

For all employee groups, upon attaining age 65, eligible retirees and their spouses are transitioned to a post-65 medical and prescription plan if they are eligible and wish to continue coverage. In addition, optional life insurance coverage is allowable in increments of $2,500 (up to a maximum of $7,500), elected by the retiree within 90 days of hire and continuing through retirement at the sole expense of the retiree at the group life insurance rate in effect under the group life insurance policy of the Borough. Separate Borough-paid life insurance benefits for eligible employees ceases at retirement.

Contributions

The Plan is unfunded, with premium payments made by the Borough, and any corresponding reimbursements from retirees and spouses, on a pay-as-you-go basis. For the year ended December 31, 2020 the Borough paid premium costs of $287,475 for retirees and their spouses, of which $248,247 was reimbursed by plan members in accordance with their respective collective bargaining agreements.

Plan Membership

Membership of the Plan consisted of the following categories as of December 31, 2020:

	OPEB Plan		
	Police	Fire Drivers'	Hanover Employees'
Retirees and Beneficiaries Receiving Benefits	7	6	25
Active Plan Members	23	12	102
Totals	30	18	127

B. Total OPEB Liability

Actuarial Assumptions - The net OPEB liability was measured as of December 31, 2020, and the total OPEB liability was determined by rolling forward the liabilities from an actuarial valuation as of January 1, 2019. The following actuarial assumptions applied to all periods in the measurement, unless otherwise specified:

	OPEB Plan
Actuarial Assumptions:	
Actuarial Cost Method	Entry Age Normal Cost Method
Salary Increases/Inflation	5.0%
Municipal Bond Rate	3.26% (S&P Municipal Bond 20-Year High Grade Rate Index)
Healthcare Cost Trend Rates	5.5% per year graded down by the Society of Actuaries Long-Run Medical Cost Trend Model
Mortality	PubS-2010 Mortality Table for Police and Fire Drivers, and PubG-2010 Mortality Table for Nonuniformed Employees

Discount Rate - The discount rate used to measure the total OPEB liability was 3.26% for the Plan, relating to the S&P Municipal Bond 20-Year High Grade Rate Index as of January 1, 2020. No assets have been accumulated in an irrevocable trust, so the municipal rate has been applied to all periods.

Changes in the Total OPEB Liability

Balances as of December 31, 2019	$ 2,645,484
Service Cost	104,345
Interest Cost	97,105
Changes of Benefit Terms	-
Changes for Experience	-
Changes for Assumptions	92,717
Benefit Payments (Estimated)	(151,547)
Net Changes	142,620
Balances as of December 31, 2020	$ 2,788,104

Sensitivity of the Total OPEB Liability to Changes in the Discount Rate - The following presents the total OPEB liability of the Borough, calculated using the discount rate of 3.26%, as well as what the Borough's total OPEB liability would be if it were calculated using a discount rate that is one-percentage-point lower (2.26%) or one-percentage-point higher (4.26%) than the current rate:

	Borough's Total OPEB Liability
One-Percent Decrease (2.26%)	$ 2,582,069
Current Discount Rate (3.26%)	$ 2,788,104
One-Percent Increase (4.26%)	$ 3,016,951

Sensitivity of the Total OPEB Liability to Changes in the Healthcare Cost Trend Rate - The following presents the total OPEB liability of the Borough, calculated using the current healthcare cost trend rate of 5.5%, as well as what the Borough's total OPEB liability would be if it were calculated using a healthcare cost trend rate that is one-percentage-point lower (4.5%) or one-percentage-point higher (6.5%) than the current rate:

	Borough's Total OPEB Liability
One-Percent Decrease (4.5% decreasing to 2.8%)	$ 2,515,584
Current Healthcare Cost Trend Rate (5.5% decreasing to 4%)	$ 2,788,104
One-Percent Increase (6.5% decreasing to 4.8%)	$ 3,111,074

OPEB Expense and Deferred Outflows of Resources Related to OPEB - For the year ended December 31, 2020, the Borough recognized OPEB expense totaling $99,364. As of December 31, 2020, the Borough reported deferred outflows of resources related to OPEB from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Changes of Assumptions	$ 146,078	$ 77,312
Changes for Experience	-	461,657
Benefit Payments Subsequent to the Measurement Date	166,265	-
	$ 312,343	$ 538,969

Deferred outflows of $166,265 for benefit payments subsequent to the measurement date will be recognized as a reduction of the total OPEB liability in the year ended December 31, 2021. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows for the years ending December 31:

2021	$ 102,086
2022	102,086
2023	102,086
2024	102,085
2025	(15,452)
	$ 392,891

Note 15. Defined Contribution Other Postemployment Benefits Plan

The Borough, in accordance with the Borough Council's approval, offers a defined contribution post-employment health plan (PEHP) created in accordance with Internal Revenue Code Section 501(c)(9). The PEHP is funded through a voluntary employees' beneficiary association (VEBA) to provide post-retirement reimbursement of qualifying medical care expenses and health care insurance premiums. The Plan requires mandatory participation by all active members of the Hanover Professional Firefighters Local 2045 bargaining unit and is not available to any other employees of the Borough. The Plan had 15 active participants as of December 31, 2020.

The Plan requires annual contributions by the Borough for each active participant ($700 for 2020), and active participants employed before January 1, 2009 receive an additional Borough contribution ($30 of pay up to a maximum of $780 annually) in lieu of receiving Emergency Medical Technician/ Automated External Defibrillator (EMT/AED) pay. In addition, up to five

days of accumulated sick leave is annually deposited per active participant at their current pay rate for those having been employed by the Borough for at least ten years, and up to 60 days of accumulated sick leave (less those previously deposited) are contributed upon retirement. Employee salary deferrals are not permitted to the Plan. Borough contributions of $27,403 were accrued for the 501(c)(9) Plan for the year ended December 31, 2020.

All amounts of compensation deferred under the Plans and all income attributable to those amounts are held in trust for the exclusive benefit of participants and their beneficiaries. The assets will not be diverted to any other purpose. The Plan Administrator, Nationwide Retirement Solutions, is the trustee of the investments.

Note 16. Concentration of Credit Risk

The Borough receives real estate and per capita taxes from residents within the Borough limits. The Borough uses a tax collector to collect all current real estate and per capita taxes. The Borough may lien any property associated with the real estate tax assessment, therefore an allowance for uncollectible real estate taxes is not considered necessary. The Borough also provides water, sewer, and garbage service to customers within the Hanover area, and grants credit to its residents for these services. This area is located in York and Adams Counties, which are in south central Pennsylvania. The Borough may lien any property receiving service for uncollected bills, therefore an allowance for uncollectible services is not considered necessary.

Note 17. Risk Management

The Borough is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. The Borough purchases commercial insurance coverage for these types of losses, including workers' compensation. Settled claims resulting from these risks have not exceeded commercial insurance coverage in any of the past three fiscal years, and there have been no significant reductions in insurance coverage. Insurance recoveries totaling $97,984 were received for two loss incidents in 2020 at the Regional Wastewater Treatment Plant for equipment replacement and facility restoration.

In 2018, the Borough began participation in the Intergovernmental Insurance Cooperative (IIC) through a perpetual-duration agreement, continuing until terminated pursuant to terms and conditions as defined therein. The IIC is a public entity risk pool established by certain units of local governments in Pennsylvania to provide health and welfare plan benefits directly to eligible employees, their families, and dependents of the participating municipal members. The IIC receives, processes, and pays such claims as may occur within the benefit program of each municipal member. Management consists of a Board of Directors

compromised of seven appointed representatives from the municipal membership. The Borough does not exercise any control over the activities of the IIC beyond its representation on the Board of Directors.

Under the Trust Plan, the Borough pays reasonable and customary healthcare expenses, including premiums for reinsurance, as there is an overall plan loss limitation, which is recalculated annually. The Plan's coverage is retrospectively rated, with final premium determination after loss experience is known. The Borough is responsible for its share of cross recovery of all municipal members as a net reduction in return of any premiums paid in excess of actual claims costs on an annual basis and is subject to supplemental assessments by municipal members if deemed necessary by the IIC. For the year ended December 31, 2020, the Borough paid premiums of $3,938,771, and received $267,675 for premiums paid in excess of actual claims cost for 2019 following dividend declaration in 2020.

The Borough also pays unemployment costs on a claims-made basis. Total unemployment expense for the year ended December 31, 2020 was $8,716.

Note 18. Environmental Concerns

The Borough has underground storage tanks for fuel and performs necessary testing in the surrounding land areas as necessary for leaks and potential contamination and operates a wastewater facility. In addition, the Borough, as part of the closure plan for the Black Rock Landfill, performs well tests and water analysis in the landfill and surrounding areas. If a leak or contamination occurs, the Borough could become liable for the cost to remediate. In 2018, the Borough executed a budget modification with a third-party engineering firm for additional off-site migration control activities due to testing results, including recovery well installation, and requests by the Pennsylvania Department of Environmental Protection (DEP), which were completed in 2020 and in continued monitoring and reporting. Total costs for the additional equipment, testing, and regular monitoring were $57,054 for the year ended December 31, 2020 and are not expected to have a material effect on the Borough's financial position after giving effect to the provision for clean-up costs noted above.

Note 19. Contingencies and Commitments

The Borough participates in several federal, state, and county programs that are fully or partially funded by grants received from other governmental units. Expenditures financed by grants are subject to audit by or for the appropriate grantor government. If expenditures are disallowed due to noncompliance with grant program regulations, the Borough may be required to reimburse the grantor government. The Borough believes that disallowed expenditures, if any, based on subsequent audits will not have a material effect on any of the individual governmental funds or the overall financial position of the Borough.

The Borough is subject to real estate tax assessment appeals on an ongoing basis. If tax appeals are successful, the result is a loss of tax revenue to the Borough. It is anticipated that any material loss of tax revenue on individual tax appeals will be offset with additional revenues from other properties or other sources of revenue and would not create a financial hardship to the Borough.

The Borough is involved with various lawsuits in the normal course of operations. In most cases, management cannot predict the outcome of the lawsuits or estimate the amount of any loss that may result. Management believes that losses resulting from these matters, if any, would be substantially covered under the Borough's professional liability insurance policy and would not have a material effect on the financial position of the Borough.

The Borough is committed under an Intergovernmental Cooperation Agreement related to the implementation of the York County Regional Chesapeake Bay Pollutant Reduction Plan, a County-based consortium to address stormwater discharges and implement pollution reduction plans. The agreement term is through December 31, 2023, with annual contribution to the consortium of $102,490.

As disclosed in Note 1, the Borough also is committed under an Intergovernmental Cooperation Agreement for operating and capital program costs for operation of the Commission for an initial period of seven years. The Commission's budget is funded equally from the Borough and Penn Township in quarterly allotments. Gross allotments paid to the Commission for the year ended December 31, 2020 totaled $625,709. In addition, various reimbursements for shared costs between the Borough and Commission occurred during the year ended December 31, 2020, decreasing total net costs for the Commission to $574,208. Any difference between allotments made and actual Commission costs are retained by the Commission and considered in relation to future budget needs. The agreement stipulates no return or refund of such excess. As of December 31, 2020, the Commission held cash and investments totaling $262,564 (unaudited), each equally funded by the Borough and Penn Township. The Commission has cash-basis audited financial statements available upon request.

In addition, the Borough is committed under the following significant contracts for purchases and construction projects outstanding, excluding any accounts payable and accrued expenses (retainage payable) on those contracts, as of December 31, 2020:

Project	Contract Amount	Contract Amount Outstanding
Water Fund		
Water Main Lining Projects		
Construction	$ 1,423,491	$ 114,778
Water Main Replacement Projects		
Construction	$ 1,617,183	$ 529,670
Sheppard-Myers Dam Rehabilitation		
Engineering	$ 898,430	$ 898,430
Sanitary Sewer Fund		
Sewer Main Lining Project		
Construction	$ 305,699	$ 4,767
Stormwater Authority Fund		
Watershed Assessment Project		
Engineering	$ 24,840	$ 24,840

Note 20. Operating Leases

The Borough leases several office machines for various departments, which are accounted for as operating leases with terms extending over the next several years. Renewal options are available for several of the leases. Future minimum payments required under the non-cancelable operating leases are as follows for the years ending December 31:

2021	$ 35,625
2022	35,535
2023	23,103
2024	2,449
2025	816
	$ 97,528

Total operating lease expenditures for the year ended December 31, 2020 were $18,268.

Note 21. Reconciliation of Operating Income (Loss) to Net Cash Provided (Used) by Operating Activities

	Water Fund	Regional Wastewater Fund	Sanitary Sewer Fund	Stormwater Authority Fund	Non-Major Proprietary Fund	Total Proprietary Funds
Operating Income (Loss)	$ 2,502,354	$ (1,083,814)	$ 2,479,454	$ 309,725	$ (16,419)	$ 4,191,300
Adjustments to Reconcile Operating Income (Loss) to Net Cash Provided (Used) by Operating Activities						
Depreciation	1,111,967	1,397,328	268,016	7,937	11,155	2,796,403
(Increase) Decrease in Accounts Receivable	(124,842)	(1,321)	75,151	(7,994)	56	(58,950)
Due from Other Governments	-	-	(156,105)	-	-	(156,105)
Due from Other Funds	25,246	(59,347)	(175,580)	-	-	(209,681)
Unbilled Services	9,641	-	58,332	2,948	-	70,921
Inventory	31,072	(4,708)	(2,701)	(8,056)	-	15,607
Prepaid Expenses	(2,401)	7,043	(153)	(2,143)	(88)	2,258
Net Pension Asset	(1,023,633)	(318,110)	(203,067)	(180,456)	-	(1,725,266)
Increase (Decrease) in Accounts Payable and Accrued Expenses	(7,742)	(4,075)	(51,337)	(28,085)	96	(91,143)
Accrued Wages	(23,759)	(5,399)	(2,661)	(3,370)	71	(35,118)
Accrued Compensated Absences	(704)	25,577	8,460	(16,092)	24	17,265
Due to Other Funds	61,627	169,587	-	3,713	-	234,927
Unearned Revenue	-	42,424	-	-	909	43,333
Total OPEB Liability	14,606	4,539	2,897	2,575	-	24,617
Net Deferred Amounts from OPEB	(48,984)	(15,224)	(9,718)	(8,635)	-	(82,561)
Net Deferred Amounts from Pensions	463,640	144,083	91,976	81,735	-	781,434
Net Cash Provided (Used) by Operating Activities	$ 2,988,088	$ 298,583	$ 2,382,964	$ 153,802	$ (4,196)	$ 5,819,241

The Borough had the following significant non-cash capital, financing, and investing activities for the year ended December 31, 2020:

Debt Financing - The Sanitary Sewer Fund recognized an interfund transfer of $1,746,273 to subsidize the Regional Wastewater Fund's debt service payments made.

Note 22. New Governmental Accounting Standards Board Pronouncements

The GASB has issued several pronouncements prior to the year ended December 31, 2020 and through the date the financial statements were available to be issued that have effective dates that may impact future financial presentations:

GASB Statement No. 87, *Leases* - The objective of this statement is to increase usefulness of governments' financial statements by requiring a single model for lease accounting, both capital and operating (previously not recognized as assets and liabilities) leases, based on the payment provisions of the contract and the foundational principle that leases are financings of the right to use an underlying asset. The provisions of this statement are effective for periods beginning after June 15, 2021, based on 18-month extension provided by GASB Statement No. 95 (see Note 1). The implementation of this statement is expected to have significant effect on the financial statements of the Borough in the year of implementation; however, the effects of said implementation are not yet quantifiable.

GASB Statement No. 96, *Subscription-Based Information Technology Agreements* - The objective of this statement is to provide guidance on the accounting and financial reporting for subscription-based information technology arrangements (SBITAs), representing a contract that conveys control of the right to use another party's information technology (IT) software to a government for a period of time in an exchange or exchange-like transaction. The provisions of this statement are effective for periods beginning after June 15, 2022. The implementation of this statement is expected to have moderate effect on the financial statements of the Borough in the year of implementation; however, the effects of said implementation are not yet quantifiable.

Note 23. Subsequent Events

Primary Government

In January and February 2021, the Borough authorized contracts with an engineering firm and a legal firm, respectively, for support services relative to a proposed Pennsylvania Public Utilities Commission (PUC) water rate case filing, with estimated maximum costs of $244,000 and $175,000, respectively.

In March 2021, the Borough authorized the lease purchase agreement for a $239,968 tandem axle rear load refuse truck for five years with interest at 1.45% per annum and a contract with a sewer main rehabilitation company for Sanitary Sewer lining project work totaling $336,112.

The Borough has continued operating in an environment that has been economically impacted by the COVID-19 pandemic. The full impact of the pandemic on the Borough is not known as of the release of these financial statements; however, management continues to monitor the current conditions and their potential impact on the financial statements.

REQUIRED SUPPLEMENTARY INFORMATION

Schedule "1"

THE BOROUGH OF HANOVER, PENNSYLVANIA

BUDGETARY COMPARISON SCHEDULE - GENERAL FUND

FOR THE YEAR ENDED DECEMBER 31, 2020

UNAUDITED

	Original and Final Budget	Actual	Variance
REVENUES			
Taxes	$ 8,699,200	$ 8,649,734	$ (49,466)
Licenses and Permits	207,100	255,073	47,973
Fines and Forfeitures	162,750	171,992	9,242
Interest and Rents	376,118	288,796	(87,322)
Intergovernmental	1,789,697	1,836,782	47,085
Charges for Services	4,872,650	4,944,657	72,007
Donations from Private Sources	328,240	258,988	(69,252)
Miscellaneous	-	18,415	18,415
TOTAL REVENUES	**16,435,755**	**16,424,437**	**(11,318)**
EXPENDITURES			
General Government	832,724	799,138	33,586
Public Safety	6,914,684	6,757,396	157,288
Health and Sanitation	4,263,349	4,239,097	24,252
Highways	1,300,779	1,153,466	147,313
Culture and Recreation	1,504,992	1,122,338	382,654
Debt Service	1,120,769	1,136,296	(15,527)
Capital Outlays	752,790	587,960	164,830
Miscellaneous	384,466	374,689	9,777
TOTAL EXPENDITURES	**17,074,553**	**16,170,380**	**904,173**
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	**(638,798)**	**254,057**	**892,855**
OTHER FINANCING SOURCES (USES)			
Proceeds from Disposal of Capital Assets	132,999	156,722	23,723
Proceeds from Capital Lease Obligations	165,000	158,560	(6,440)
Proceeds from Refunding Bonds	-	291,857	291,857
Refunded Debt Service - Principal	-	(280,000)	(280,000)
TOTAL OTHER FINANCING SOURCES (USES)	**297,999**	**327,139**	**29,140**
CHANGES IN FUND BALANCE	**(340,799)**	**581,196**	**921,995**
Fund Balance - Beginning of Year	10,306,142	10,306,142	-
FUND BALANCE - END OF YEAR	**$ 9,965,343**	**$ 10,887,338**	**$ 921,995**

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY (ASSET) AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

Police Pension Plan	2020	2019	2018	2017	2016	2015	2014
TOTAL PENSION LIABILITY							
Service Cost	$ 381,608	$ 363,436	$ 393,942	$ 375,183	$ 316,342	$ 301,278	$ 264,674
Interest	1,015,321	966,806	926,381	877,558	837,000	797,720	773,726
Changes of Benefit Terms	-	-	-	-	-	-	-
Changes for Experience	-	(468,572)	-	(529,608)	-	(27,836)	-
Changes of Assumptions	-	373,371	-	440,603	-	(133,554)	-
Benefit Payments, Including Refunds of Plan Member Contributions	(685,174)	(625,499)	(608,734)	(539,320)	(548,229)	(557,605)	(584,107)
NET CHANGES IN TOTAL PENSION LIABILITY	**711,755**	**609,542**	**711,589**	**624,416**	**605,113**	**380,003**	**454,293**
Total Pension Liability - Beginning of Year	14,465,571	13,856,029	13,144,440	12,520,024	11,914,911	11,534,908	11,080,615
TOTAL PENSION LIABILITY - END OF YEAR (A)	**15,177,326**	**14,465,571**	**13,856,029**	**13,144,440**	**12,520,024**	**11,914,911**	**11,534,908**
PLAN FIDUCIARY NET POSITION							
Contributions - Employer	595,878	545,941	564,507	399,759	419,625	478,308	478,718
Contributions - Plan Members	65,342	67,525	64,231	64,049	62,334	64,012	61,406
Net Investment Income	1,750,636	2,243,761	(830,854)	1,557,534	675,893	(446,203)	781,847
Benefit Payments, Including Refunds of Plan Member Contributions	(685,174)	(625,499)	(608,734)	(539,320)	(548,229)	(557,605)	(584,107)
Administrative Expense	(4,500)	(8,100)	(4,600)	(6,200)	(4,900)	(7,600)	(2,700)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**1,722,182**	**2,223,628**	**(815,450)**	**1,475,822**	**604,723**	**(469,088)**	**735,164**
Plan Fiduciary Net Position - Beginning of Year	14,040,698	11,817,070	12,632,520	11,156,698	10,551,975	11,021,063	10,285,899
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**15,762,880**	**14,040,698**	**11,817,070**	**12,632,520**	**11,156,698**	**10,551,975**	**11,021,063**
BOROUGH'S NET PENSION LIABILITY (ASSET) (A-B)	**$ (585,554)**	**$ 424,873**	**$ 2,038,959**	**$ 511,920**	**$ 1,363,326**	**$ 1,362,936**	**$ 513,845**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	103.86%	97.06%	85.28%	96.11%	89.11%	88.56%	95.55%
COVERED-EMPLOYEE PAYROLL	$ 2,138,745	$ 2,242,984	$ 1,978,380	$ 2,107,504	$ 2,077,787	$ 2,160,409	$ 1,902,925
BOROUGH'S NET PENSION LIABILITY (ASSET) AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	(27.38%)	18.94%	103.06%	24.29%	65.61%	63.09%	27.00%

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY (ASSET) AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

Fire Drivers' Pension Plan	2020	2019	2018	2017	2016	2015	2014
TOTAL PENSION LIABILITY							
Service Cost	$ 165,334	$ 157,461	$ 136,679	$ 122,036	$ 109,094	$ 103,899	$ 92,224
Interest	545,086	524,881	488,774	459,512	426,339	414,642	410,195
Changes of Benefit Terms	-	-	210,301	-	-	-	-
Changes in Experience	-	9,699	-	48,992	-	(112,264)	-
Changes of Assumptions	-	261,458	-	242,550	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(401,574)	(401,574)	(401,574)	(375,372)	(356,656)	(356,611)	(319,985)
NET CHANGES IN TOTAL PENSION LIABILITY	**308,846**	**551,925**	**434,180**	**497,718**	**178,777**	**49,666**	**182,434**
Total Pension Liability - Beginning of Year	7,822,394	7,270,469	6,836,289	6,338,571	6,159,794	6,110,128	5,927,694
TOTAL PENSION LIABILITY - END OF YEAR (A)	**8,131,240**	**7,822,394**	**7,270,469**	**6,836,289**	**6,338,571**	**6,159,794**	**6,110,128**
PLAN FIDUCIARY NET POSITION							
Contributions - Employer	165,976	158,627	42,787	46,440	37,805	64,277	66,988
Contributions - Plan Members	49,680	47,625	43,009	41,439	39,220	36,883	37,484
Net Investment Income	1,002,157	1,267,942	(420,640)	1,061,777	303,972	(25,197)	155,116
Benefit Payments, Including Refunds of Plan Member Contributions	(401,574)	(401,574)	(401,574)	(375,372)	(356,656)	(356,611)	(319,985)
Administrative Expense	(3,500)	(6,100)	(4,000)	(6,100)	(3,800)	(6,500)	(1,800)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**812,739**	**1,066,520**	**(740,418)**	**768,184**	**20,541**	**(287,148)**	**(62,197)**
Plan Fiduciary Net Position - Beginning of Year	7,321,678	6,255,158	6,995,576	6,227,392	6,206,851	6,493,999	6,556,196
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**8,134,417**	**7,321,678**	**6,255,158**	**6,995,576**	**6,227,392**	**6,206,851**	**6,493,999**
BOROUGH'S NET PENSION LIABILITY (ASSET) (A-B)	**$ (3,177)**	**$ 500,716**	**$ 1,015,311**	**$ (159,287)**	**$ 111,179**	**$ (47,057)**	**$ (383,871)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	100.04%	93.60%	86.04%	102.33%	98.25%	100.76%	106.28%
COVERED-EMPLOYEE PAYROLL	$ 1,342,704	$ 1,287,145	$ 1,208,992	$ 1,081,258	$ 1,080,471	$ 1,020,433	$ 962,980
BOROUGH'S NET PENSION LIABILITY (ASSET) AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	(0.24%)	38.90%	83.98%	(14.73%)	10.29%	(4.61%)	(39.86%)

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S NET PENSION LIABILITY (ASSET) AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

Hanover Employees' Pension Plan	2020	2019	2018	2017	2016	2015	2014
TOTAL PENSION LIABILITY							
Service Cost	$ 345,573	$ 329,117	$ 358,409	$ 341,342	$ 528,544	$ 503,375	$ 551,759
Interest	2,281,438	2,191,743	2,122,719	2,026,083	1,928,172	1,822,241	1,795,624
Changes of Benefit Terms	-	21,757	-	-	-	-	-
Changes in Experience	-	(1,256,261)	-	(1,148,834)	-	(1,160,455)	-
Changes of Assumptions	-	922,934	-	1,189,911	-	-	-
Benefit Payments, Including Refunds of Plan Member Contributions	(1,348,982)	(1,206,451)	(1,058,472)	(949,487)	(874,219)	(800,748)	(715,865)
NET CHANGES IN TOTAL PENSION LIABILITY	**1,278,029**	**1,002,839**	**1,422,656**	**1,459,015**	**1,582,497**	**364,413**	**1,631,518**
Total Pension Liability - Beginning of Year	32,920,884	31,918,045	30,495,389	29,036,374	27,453,877	27,089,464	25,457,946
TOTAL PENSION LIABILITY - END OF YEAR (A)	**34,198,913**	**32,920,884**	**31,918,045**	**30,495,389**	**29,036,374**	**27,453,877**	**27,089,464**
PLAN FIDUCIARY NET POSITION							
Contributions - Employer	359,784	347,424	249,949	268,797	263,766	423,936	448,010
Contributions - Plan Members	162,505	155,335	150,915	151,420	156,153	157,438	160,897
Net Investment Income	4,902,142	6,231,414	(1,976,195)	4,891,289	1,308,135	(91,891)	722,392
Benefit Payments, Including Refunds of Plan Member Contributions	(1,348,982)	(1,206,451)	(1,058,472)	(949,487)	(874,219)	(800,748)	(715,865)
Administrative Expense	(7,000)	(16,400)	(6,600)	(10,500)	(7,600)	(10,600)	(7,900)
NET CHANGES IN PLAN FIDUCIARY NET POSITION	**4,068,449**	**5,511,322**	**(2,640,403)**	**4,351,519**	**846,235**	**(321,865)**	**607,534**
Plan Fiduciary Net Position - Beginning of Year	35,824,760	30,313,438	32,953,841	28,602,322	27,756,087	28,077,952	27,470,418
PLAN FIDUCIARY NET POSITION - END OF YEAR (B)	**39,893,209**	**35,824,760**	**30,313,438**	**32,953,841**	**28,602,322**	**27,756,087**	**28,077,952**
BOROUGH'S NET PENSION LIABILITY (ASSET) (A-B)	**$ (5,694,296)**	**$ (2,903,876)**	**$ 1,604,607**	**$ (2,458,452)**	**$ 434,052**	**$ (302,210)**	**$ (988,488)**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY	116.65%	108.82%	94.97%	108.06%	98.51%	101.10%	103.65%
COVERED-EMPLOYEE PAYROLL	$ 6,150,125	$ 5,660,980	$ 5,614,113	$ 5,507,764	$ 5,462,803	$ 5,586,454	$ 5,239,612
BOROUGH'S NET PENSION LIABILITY (ASSET) AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	(92.59%)	(51.30%)	28.58%	(44.64%)	7.95%	(5.41%)	(18.87%)

NOTES TO SCHEDULE:

This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 68.

SCHEDULE OF BOROUGH CONTRIBUTIONS

Police Pension Plan	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Actuarially Determined Contribution	$ 595,778	$ 545,941	$ 404,070	$ 398,330	$ 398,325	$ 478,308	$ 478,718	$ 380,559	$ 348,397	$ 342,788
Contribution in Relation to the Actuarially Determined Contribution	595,878	545,941	564,507	399,759	419,625	478,308	478,718	380,559	348,397	342,788
Contribution Deficiency (Excess)	$ (100)	$ -	$ (160,437)	$ (1,429)	$ (21,300)	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 2,138,745	$ 2,242,984	$ 1,978,380	$ 2,107,504	$ 2,077,787	$ 2,160,409	$ 1,902,925	$ 1,713,930	$ 1,782,147	$ 1,405,946
Contribution as a Percentage of Covered-Employee Payroll	27.86%	24.34%	28.53%	18.97%	20.20%	22.14%	25.16%	22.20%	19.55%	24.38%

Fire Drivers' Pension Plan	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Actuarially Determined Contribution	$ 165,976	$ 158,627	$ 42,787	$ 46,440	$ 37,805	$ 64,277	$ 66,988	$ 203,763	$ 187,994	$ 188,128
Contribution in Relation to the Actuarially Determined Contribution	165,976	158,627	42,787	46,440	37,805	64,277	66,988	203,763	187,994	188,128
Contribution Deficiency (Excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 1,342,704	$ 1,287,145	$ 1,208,992	$ 1,081,258	$ 1,080,471	$ 1,020,433	$ 962,980	$ 913,768	$ 967,608	$ 983,929
Contribution as a Percentage of Covered-Employee Payroll	12.36%	12.32%	3.54%	4.29%	3.50%	6.30%	6.96%	22.30%	19.43%	19.12%

Hanover Employees' Pension Plan	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Actuarially Determined Contribution	$ 359,784	$ 347,424	$ 249,949	$ 268,797	$ 263,766	$ 423,936	$ 448,010	$ 574,943	$ 482,645	$ 458,651
Contribution in Relation to the Actuarially Determined Contribution	359,784	347,424	249,949	268,797	263,766	423,936	448,010	574,943	482,645	458,651
Contribution Deficiency (Excess)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Covered-Employee Payroll	$ 6,150,125	$ 5,660,980	$ 5,614,113	$ 5,507,764	$ 5,462,803	$ 5,586,454	$ 5,239,612	$ 5,294,038	$ 5,364,775	$ 4,982,663
Contribution as a Percentage of Covered-Employee Payroll	5.85%	6.14%	4.45%	4.88%	4.83%	7.59%	8.55%	10.86%	9.00%	9.20%

NOTES TO SCHEDULE:

Valuation Date - Actuarially determined contribution rates are calculated as of January 1, two to four years prior to the end of the fiscal year in which the contributions are reported. The total pension liability is based on a roll forward from this date.

Actuarial Assumptions:

Actuarial Cost Method	Entry age normal
Asset Valuation Method	Market value as determined by the trustee
Inflation Assumption	3%
Projected Salary Increases	5%
Investment Rate of Return	7%, net of pension plan investment expense, including inflation

	Pension Plans		
	Police	Fire Drivers'	Hanover Employees'
Amortization Method	Level dollar closed	Level dollar closed	Level dollar closed
Remaining Amortization Period	11 years	13 years	11 years
Mortality	Based on PubS-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)	Based on PubS-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)	Based on PubG-2010 Mortality Table, including rates for disables retirees and contingent survivors (incorporated into the table are rates projected generationally using Scale MP-2018 to reflect mortality improvements)
Retirement Age	Active members at age 53 and completion of 25 years of service or age on valuation date, if greater; vested former members at normal retirement age, or age of valuation date, if greater	Normal retirement age, or age of valuation date, if greater	Normal retirement age, or age of valuation date, if greater

Changes in Benefits Terms - In 2014, benefits for non-union, non-uniformed employees in the Hanover Employees' Pension Plan hired on or after July 1, 2014 changed:

1) Normal retirement date is attained at age 60 and completion of 25 years of vesting service (previously age 55), or attainment of age 65 and completion of 10 years of vesting service (previously age 62).

2) Normal retirement pension is 1% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year (previously 1.5%).

In 2018, the Fire Drivers' Pension Plan pension benefit increased from 1.75% to 1.9% of average monthly compensation.

In 2019, through unionization, benefits for certain prior non-union members hired after July 1, 2014 of the Hanover Employees' Pension Plan changed:

1) Normal retirement date is attained at age 55 and completion of 25 years of vesting service (previously age 60), or attainment of age 62 and completion of 10 years of vesting service (previously age 65).
2) Normal retirement pension is 1.5% of average monthly compensation multiplied by the total number of years of benefit service rounded to the nearest one-half year (previously 1%).

Change in Assumptions - In 2015, the cost-of-living increase assumption for the Police Pension Plan was revised from 4% to 3% per year to reflect recent history of cost-of-living increases.

In 2017, the mortality assumptions for all pension plans were revised from the RP-2000 Mortality Tables for Males and Females for expectation of retired life mortality to the IRS 2017 Static Combined Table for Small Plans.

In 2019, the mortality assumptions for all pension plans were revised from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers' Pension Plans, and the PubG-2010 Mortality Table for Hanover Employees' Pension Plan.

Police Pension Plan	2020	2019	2018	2017	2016	2015	2014
Average Money-Weighted Rate of Return, Net of Investment Expense	12.32%	18.76%	(6.55)%	13.87%	6.36%	(4.02)%	6.41%

Fire Drivers' Pension Plan	2020	2019	2018	2017	2016	2015	2014
Average Money-Weighted Rate of Return, Net of Investment Expense	13.77%	20.42%	(6.14)%	17.37%	4.99%	(0.39)%	2.40%

Hanover Employees' Pension Plan	2020	2019	2018	2017	2016	2015	2014
Average Money-Weighted Rate of Return, Net of Investment Expense	13.79%	20.69%	(6.04)%	17.20%	4.74%	(0.33)%	2.38%

NOTES TO SCHEDULE:

* This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 68.

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S TOTAL OPEB LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

	2020	2019	2018
TOTAL OPEB LIABILITY			
Service Cost	$ 104,345	$ 152,618	$ 133,310
Interest	97,105	108,558	118,997
Changes of Benefit Terms	-	(10,531)	-
Changes for Experience	-	(692,487)	-
Changes of Assumptions	92,717	(115,968)	120,426
Benefit Payments (Estimated)	(151,547)	(173,416)	(153,071)
NET CHANGES IN TOTAL OPEB LIABILITY	**142,620**	**(731,226)**	**219,662**
Total OPEB Liability - Beginning of Year	2,645,484	3,376,710	3,157,048
TOTAL OPEB LIABILITY - END OF YEAR	**2,788,104**	**2,645,484**	**3,376,710**
COVERED-EMPLOYEE PAYROLL	8,587,152	8,587,152	8,621,059
BOROUGH'S TOTAL OPEB LIABILITY AS A PERCENTAGE OF COVERED-EMPLOYEE PAYROLL	32.47%	30.81%	39.17%

NOTES TO SCHEDULE:

The total OPEB liability amount presented for each fiscal year was determined as of the fiscal year-end. No assets have been accumulated in a trust that meets the criteria in GASB Statement No. 75, paragraph 4, to pay related benefits. This schedule will eventually cover the ten most-recent fiscal years; however, this is the information available since the implementation year of GASB 75.

THE BOROUGH OF HANOVER, PENNSYLVANIA

SCHEDULE OF CHANGES IN THE BOROUGH'S TOTAL OPEB LIABILITY AND RELATED RATIOS

LAST 10 FISCAL YEARS

UNAUDITED

Valuation Date - Actuarially determined contribution rates are calculated as of January 1, two to four years prior to the end of the fiscal year in which the contributions are reported. The total OPEB Liability is based on a roll forward from this date.

Actuarial Assumptions:

Actuarial Cost Method	Entry Age Normal Cost Method
Salary Increase/Inflation	5.0%
Municipal Bond Rate	3.26% (S&P Municipal Bond 20-Year High Grade Rate Index)
Healthcare Cost Trend Rates	5.5% per year graded down by the Society of Actuaries Long-Run Medical Cost Trend Model to an ultimate rate of 3.8% per year
Mortality	PubS-2010 Mortality Table for Police and Fire Drivers, and PubG-2010 Mortality Table for Nonuniformed Employees

Change in Benefit Terms - After January 1, 2015, new Fire Driver employees are not eligible to purchase health insurance through the Borough after retirement. After January 1, 2019, new Water Department and Nonuniformed White Collar employees are not eligible to purchase health insurance through the Borough after retirement.

Change in Assumptions - In 2020, the discount rate changed from 3.64% to 3.26%.

In 2019, the discount rate changed from 3.16% to 3.64%. The mortality table was updated from the IRS 2017 Static Combined Table for Small Plans to the PubS-2010 Mortality Table for Police and Fire Drivers, and to the PubG-2010 Mortality Table for Non-uniformed Employees.

OTHER SUPPLEMENTARY INFORMATION

THE BOROUGH OF HANOVER, PENNSYLVANIA

COMBINING SCHEDULE OF FIDUCIARY NET POSITION

DECEMBER 31, 2020

UNAUDITED

	Pension (and Other Employee Benefit) Trust Funds				
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Component Unit - Fire Drivers' PEHP Fund	Total Pension (and Other Employee Benefit) Trust Funds
ASSETS					
Cash and Cash Equivalents	$ 538,526	$ 286,216	$ 1,123,023	$ 22,300	$ 1,970,065
Contributions and Pension Benefits Receivable	8,308	3,654	15,709	27,403	55,074
Accrued Interest Receivable	24,697	1,051	46,536	-	72,284
Investments	15,191,349	7,843,496	38,707,941	327,918	62,070,704
TOTAL ASSETS	**15,762,880**	**8,134,417**	**39,893,209**	**377,621**	**64,168,127**
DEFERRED OUTFLOWS OF RESOURCES	-	-	-	-	-
LIABILITIES	-	-	-	-	-
DEFERRED INFLOWS OF RESOURCES	-	-	-	-	-
NET POSITION					
Restricted for Pension Benefits	15,762,880	8,134,417	39,893,209	377,621	64,168,127
TOTAL NET POSITION	**$ 15,762,880**	**$ 8,134,417**	**$ 39,893,209**	**$ 377,621**	**$ 64,168,127**

THE BOROUGH OF HANOVER, PENNSYLVANIA

COMBINING SCHEDULE OF CHANGES IN FIDUCIARY NET POSITION

FOR THE YEAR ENDED DECEMBER 31, 2020

UNAUDITED

	Pension (and Other Employee Benefit) Trust Funds				
	Police Pension Fund	Fire Drivers' Pension Fund	Hanover Employees' Pension Fund	Component Unit - Fire Drivers' PEHP Fund	Total Pension (and Other Employee Benefit) Trust Funds
ADDITIONS					
Contributions					
Employer	$ -	$ -	$ 176,162	$ 27,403	$ 203,565
Commonwealth	595,878	165,976	183,622	-	945,476
Plan Members	65,342	49,680	162,505	-	277,527
Total Contributions	661,220	215,656	522,289	27,403	1,426,568
Investment Earnings					
Interest Income	84,876	83,065	457,544	-	625,485
Dividends	204,673	23,931	123,695	-	352,299
	289,549	106,996	581,239	-	977,784
Less: Investment Expense	82,746	36,070	130,728	1,975	251,519
Net Investment Earnings	206,803	70,926	450,511	(1,975)	726,265
TOTAL ADDITIONS	**868,023**	**286,582**	**972,800**	**25,428**	**2,152,833**
DEDUCTIONS					
Benefits	685,174	401,574	1,348,982	6,253	2,441,983
Administrative Expense	4,500	3,500	7,000	-	15,000
TOTAL DEDUCTIONS	**689,674**	**405,074**	**1,355,982**	**6,253**	**2,456,983**
NET APPRECIATION IN FAIR VALUE OF INVESTMENTS	**1,543,833**	**931,231**	**4,451,631**	**47,382**	**6,974,077**
CHANGES IN NET POSITION	**1,722,182**	**812,739**	**4,068,449**	**66,557**	**6,669,927**
Net Position - Beginning of Year	14,040,698	7,321,678	35,824,760	311,064	57,498,200
NET POSITION - END OF YEAR	**$ 15,762,880**	**$ 8,134,417**	**$ 39,893,209**	**$ 377,621**	**$ 64,168,127**

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OTHER DATA
FILING REQUIREMENTS

3. Provide all monthly or quarterly, or both, budget variance reports to management, or the board of directors, or both, submitted during the past year. Please provide the most recent detailed budget variance report which the company compiled, and update as additional reports are issued.

RESPONSE

See the following schedule, 'Exhibit D XI-3 Attachment'.

THE BOROUGH OF HANOVER

Revenue / Expense Control Report

Fiscal Year: 2020 Period From: 1 To: 12

Account No.	Description	Original Budget	YTD Budget Adjustments	YTD Adjusted Budget	YTD Actual Rev / Exp	YTD Available Balance	Percent Rev/Exp Balance
Fund 06	**WATER REVENUE FUND**						
Type R	**Revenue**						
Org 355	**STATE SHARED REVENUE**						
Dept 006	**.**						
Prog							
06.006.38320.000511	STATE - MUNICIPAL PENSION AID	124,789.00	0.00	124,789.00	(124,790.00)	(1.00)	(100.00)
Total Prog		**(124,789.00)**	**0.00**	**(124,789.00)**	**(124,790.00)**	**1.00**	**100.00**
Total Dept 006	**.**	**(124,789.00)**	**0.00**	**(124,789.00)**	**(124,790.00)**	**1.00**	**100.00**
Total Org 355	**STATE SHARED REVENUE**	**(124,789.00)**	**0.00**	**(124,789.00)**	**(124,790.00)**	**1.00**	**100.00**
Org 378	**WATER SYSTEM (REVENUES)**						
Dept 006	**.**						
Prog							
06.006.37811.000300	METERED REVENUE - DOMESTIC	4,172,500.00	0.00	4,172,500.00	(4,369,578.04)	(197,078.04)	(104.72)
06.006.37812.000301	METERED REVENUE - COMMERCIAL	835,000.00	0.00	835,000.00	(763,760.95)	71,239.05	(91.47)
06.006.37813.000302	METERED REVENUE - INDUSTRIAL	1,750,000.00	0.00	1,750,000.00	(2,087,766.66)	(337,766.66)	(119.30)
06.006.37814.000304	METERED REVENUE - PUBLIC	125,000.00	0.00	125,000.00	(138,847.54)	(13,847.54)	(111.08)
06.006.37816.000315	METERED REVENUE - PENALTIES	21,000.00	0.00	21,000.00	(19,867.39)	1,132.61	(94.61)
06.006.37830.000310	UNMETERED REVENUE - SALE OF WATER	40,000.00	0.00	40,000.00	(41,964.19)	(1,964.19)	(104.91)
06.006.37840.000309	UNMETERED REVENUE - PRIVATE FIRE PROTECTION	293,500.00	0.00	293,500.00	(299,597.52)	(6,097.52)	(102.08)
06.006.37850.000311	UNMETERED REVENUE - PUBLIC FIRE PROTECTION	125,000.00	0.00	125,000.00	(131,771.61)	(6,771.61)	(105.42)
06.006.38000.000314	MISCELLANEOUS	17,500.00	0.00	17,500.00	(9,755.57)	7,744.43	(55.75)
Total Prog		**(7,379,500.00)**	**0.00**	**(7,379,500.00)**	**(7,862,909.47)**	**483,409.47**	**106.55**
Total Dept 006	**.**	**(7,379,500.00)**	**0.00**	**(7,379,500.00)**	**(7,862,909.47)**	**483,409.47**	**106.55**
Total Org 378	**WATER SYSTEM (REVENUES)**	**(7,379,500.00)**	**0.00**	**(7,379,500.00)**	**(7,862,909.47)**	**483,409.47**	**106.55**
Org 383	**NON-OPERATION REVENUE**						
Dept 006	**.**						
Prog							

THE BOROUGH OF HANOVER

Revenue / Expense Control Report

Fiscal Year: 2020 Period From: 1 To: 12

Account No.	Description	Original Budget	YTD Budget Adjustments	YTD Adjusted Budget	YTD Actual Rev / Exp	YTD Available Balance	Percent Rev/Exp Balance
Fund 06	**WATER REVENUE FUND**						
Type R	**Revenue**						
Org 383	**NON-OPERATION REVENUE**						
Dept 006	**.**						
Prog							
06.006.34280.000501	RENTS - TERRACE AVE (AT&T) CELL TOWER	18,144.00	0.00	18,144.00	(18,122.97)	21.03	(99.88)
06.006.34285.000501	RENTS - RAILROAD ST (VERIZON) CELL TOWER	8,448.00	0.00	8,448.00	(7,740.48)	707.52	(91.63)
06.006.34290.000501	RENTS - TERRACE AVE (SHENTEL) CELL TOWER	18,660.00	0.00	18,660.00	(18,662.40)	(2.40)	(100.01)
06.006.34292.000501	RENTS - FILTER PLANT (TOWER CO) CELL TOWER	16,734.00	0.00	16,734.00	(15,316.40)	1,417.60	(91.53)
06.006.34297.000501	RENTS - OXFORD AVE (AT&T) CELL TOWER	18,432.00	0.00	18,432.00	(18,182.40)	249.60	(98.65)
06.006.34298.000501	RENTS - OXFORD AVE (SHENTEL) CELL TOWER	18,660.00	0.00	18,660.00	(18,662.40)	(2.40)	(100.01)
06.006.38313.000500	MISC - MERCHANDISING & JOBBING REVENUES	115,000.00	0.00	115,000.00	(122,105.77)	(7,105.77)	(106.18)
06.006.38314.000504	INTEREST	145,000.00	0.00	145,000.00	(65,617.83)	79,382.17	(45.25)
06.006.38315.000511	MISC - JOYCE BARDIN RESTITUTION	240.00	0.00	240.00	(200.00)	40.00	(83.33)
06.006.38318.000511	MISC - TIMBER/HAY SALES	0.00	0.00	0.00	(6,810.00)	(6,810.00)	0.00
06.006.38327.000511	MISC - RETIREES INSURANCE REIMBURSEMENTS	52,000.00	0.00	52,000.00	(44,293.89)	7,706.11	(85.18)
Total Prog		**(411,318.00)**	**0.00**	**(411,318.00)**	**(335,714.54)**	**(75,603.46)**	**81.62**
Total Dept 006	**.**	**(411,318.00)**	**0.00**	**(411,318.00)**	**(335,714.54)**	**(75,603.46)**	**81.62**
Total Org 383	**NON-OPERATION REVENUE**	**(411,318.00)**	**0.00**	**(411,318.00)**	**(335,714.54)**	**(75,603.46)**	**81.62**
Total Type R	**Revenue**	**(7,915,607.00)**	**0.00**	**(7,915,607.00)**	**(8,323,414.01)**	**407,807.01**	**105.15**

THE BOROUGH OF HANOVER

Revenue / Expense Control Report

Fiscal Year: 2020 Period From: 1 To: 12

Account No.	Description	Original Budget	YTD Budget Adjustments	YTD Adjusted Budget	YTD Actual Rev / Exp	YTD Available Balance	Percent Rev/Exp Balance
Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.448.00350.001401.0001	LABOR - DAMS & WELLS	238,500.00	0.00	238,500.00	254,489.21	(15,989.21)	106.70
06.448.00351.002006.0001	UTILITIES - GASOLINE & DIESEL - DAMS & WELLS	4,000.00	0.00	4,000.00	1,845.14	2,154.86	46.13
06.448.00351.002007.0001	MATERIALS & SUPPLIES - DAMS & WELLS	15,000.00	0.00	15,000.00	10,751.95	4,248.05	71.68
06.448.00351.002007.0004	MATERIALS & SUPPLIES - RAW WATER INTAKES	5,000.00	0.00	5,000.00	4,004.08	995.92	80.08
06.448.00351.003002.0001	UTILITIES - GARBAGE - DAMS & WELLS	2,500.00	0.00	2,500.00	1,589.12	910.88	63.56
06.448.00351.003004.0001	UTILITIES - TELEPHONE - DAMS & WELLS	750.00	0.00	750.00	297.43	452.57	39.66
06.448.00351.003004.0003	UTILITIES - TELEPHONE - RAW WATER INTAKES	800.00	0.00	800.00	0.00	800.00	0.00
06.448.00351.003005.0002	UTILITIES - ELECTRIC - DAMS & WELLS	2,750.00	0.00	2,750.00	2,395.70	354.30	87.12
06.448.00351.003005.0003	UTILITIES - ELECTRIC - RAW WATER INTAKES	30,000.00	0.00	30,000.00	8,780.94	21,219.06	29.27
06.448.00351.003042.0003	UTILITIES - STORMWATER USER FEES - SLAGLE RUN P.S.	90.00	0.00	90.00	79.19	10.81	87.99
06.448.00351.003042.0013	UTILITIES - STORMWATER USER FEES - DAMS & WELLS	1,400.00	0.00	1,400.00	1,325.02	74.98	94.64
06.448.00353.001420.0001	LABOR - REPAIRS & MAINT. - DAMS & WELLS (FLEET)	500.00	0.00	500.00	2,060.81	(1,560.81)	412.16
06.448.00353.001420.0004	LABOR - REPAIRS & MAINT. - RAW WATER INTAKES (RWWT)	1,500.00	0.00	1,500.00	840.20	659.80	56.01
06.448.00353.001431.0006	LABOR - REPAIRS & MAINT. - CARETAKERS HOUSES	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00
06.448.00353.002007.0001	REPAIRS & MAINT. - DAMS & WELLS	10,000.00	0.00	10,000.00	5,373.62	4,626.38	53.74
06.448.00353.002020.0004	REPAIRS & MAINT. - RAW WATER INTAKES	15,000.00	0.00	15,000.00	10,782.59	4,217.41	71.88
06.448.00353.002020.0006	REPAIRS & MAINT. - M&E - CARETAKERS HOUSES	11,500.00	0.00	11,500.00	11,445.35	54.65	99.52
06.448.00354.001401	LABOR - WATER FILTER PLANT	295,750.00	0.00	295,750.00	301,775.94	(6,025.94)	102.04
06.448.00355.002005	MATERIALS & SUPPLIES - WATER TESTING - PLANT	30,000.00	0.00	30,000.00	23,593.52	6,406.48	78.65
06.448.00355.002007.0008	MATERIALS & SUPPLIES - PLANT	20,000.00	0.00	20,000.00	21,556.22	(1,556.22)	107.78
06.448.00355.002008.0008	UTILITIES - GAS (HEAT) - PLANT	14,000.00	0.00	14,000.00	5,989.45	8,010.55	42.78
06.448.00355.002018.0008	UTILITIES - DIESEL FUEL (GENERATOR) - PLANT	4,000.00	0.00	4,000.00	0.00	4,000.00	0.00
06.448.00355.002040.0008	MATERIALS & SUPPLIES -	225,000.00	0.00	225,000.00	219,866.69	5,133.31	97.72

THE BOROUGH OF HANOVER

Revenue / Expense Control Report

Fiscal Year: 2020 Period From: 1 To: 12

Account No.	Description	Original Budget	YTD Budget Adjustments	YTD Adjusted Budget	YTD Actual Rev / Exp	YTD Available Balance	Percent Rev/Exp Balance
Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.448.00355.002040.0008	CHEMICALS - PLANT						
06.448.00355.003002.0008	UTILITIES - GARBAGE - PLANT	2,100.00	0.00	2,100.00	1,234.45	865.55	58.78
06.448.00355.003004.0008	UTILITIES - TELEPHONE - PLANT	1,500.00	0.00	1,500.00	1,161.18	338.82	77.41
06.448.00355.003005.0008	UTILITIES - ELECTRIC - PLANT	58,500.00	0.00	58,500.00	52,977.52	5,522.48	90.56
06.448.00355.003009	UTILITIES - SEWER - PLANT	125,000.00	0.00	125,000.00	174,783.79	(49,783.79)	139.83
06.448.00355.003042.0008	UTILITIES - STORMWATER USER FEES - PLANT	1,000.00	0.00	1,000.00	950.28	49.72	95.03
06.448.00355.003043.0008	PROF. SERVICES - COMMUNITY WATER SYSTEM FEES-PLANT	25,000.00	0.00	25,000.00	25,000.00	0.00	100.00
06.448.00355.003045.0008	UTILITIES - CABLE & INTERNET - PLANT	800.00	0.00	800.00	770.73	29.27	96.34
06.448.00356.001430.0008	LABOR - REPAIRS & MAINT. - PLANT	37,750.00	0.00	37,750.00	48,413.02	(10,663.02)	128.25
06.448.00356.002020.0008	REPAIRS & MAINT. - PLANT	19,000.00	0.00	19,000.00	16,962.77	2,037.23	89.28
06.448.00362.001401	LABOR - PUMPING STATION (P.S.)	280,000.00	0.00	280,000.00	286,098.26	(6,098.26)	102.18
06.448.00365.002007.0010	MATERIALS & SUPPLIES - PUMPING STATION (P.S.)	12,000.00	0.00	12,000.00	10,915.43	1,084.57	90.96
06.448.00365.002008.0010	UTILITIES - GAS (HEAT) - P.S.	14,000.00	0.00	14,000.00	5,989.43	8,010.57	42.78
06.448.00365.002018.0010	UTILITIES - DIESEL FUEL (GENERATOR) - P.S.	4,000.00	0.00	4,000.00	0.00	4,000.00	0.00
06.448.00365.003002.0010	UTILITIES - GARBAGE - P.S.	2,100.00	0.00	2,100.00	1,234.45	865.55	58.78
06.448.00365.003004.0010	UTILITIES - TELEPHONE - P.S.	1,500.00	0.00	1,500.00	1,249.38	250.62	83.29
06.448.00365.003042.0010	UTILITIES - STORMWATER USER FEES - P.S.	1,000.00	0.00	1,000.00	950.28	49.72	95.03
06.448.00365.003045.0010	UTILITIES - CABLE & INTERNET - P.S.	800.00	0.00	800.00	770.73	29.27	96.34
06.448.00366.003005.0010	UTILITIES - ELECTRIC - P.S.	180,000.00	0.00	180,000.00	173,179.32	6,820.68	96.21
06.448.00367.001430.0010	LABOR - REPAIRS & MAINT. - P.S.	37,750.00	0.00	37,750.00	48,507.01	(10,757.01)	128.50
06.448.00367.002030.0010	REPAIRS & MAINT. - P.S.	20,000.00	0.00	20,000.00	26,255.26	(6,255.26)	131.28
06.448.00368.001401.0035	LABOR - DISTRIBUTION/FLUSHING	110,000.00	0.00	110,000.00	219,597.21	(109,597.21)	199.63
06.448.00369.001401	LABOR - METER DEPT. (BUCKET)	115,000.00	0.00	115,000.00	118,258.65	(3,258.65)	102.83
06.448.00371.002007	MATERIALS & SUPPLIES - STREET DEPT.	25,000.00	0.00	25,000.00	20,295.34	4,704.66	81.18
06.448.00371.003003	MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - STREET DEPT.	2,250.00	0.00	2,250.00	2,223.94	26.06	98.84

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Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.448.00371.003004.0020	PROF. SERVICES - LOCATES - STREET DEPT.	2,000.00	0.00	2,000.00	1,429.04	570.96	71.45
06.448.00372.003003	MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - METER DEPT.	1,250.00	0.00	1,250.00	1,144.00	106.00	91.52
06.448.00373.003004.0036	UTILITIES - CELL PHONE - SCADA SYSTEM COMMUNICATIONS	7,500.00	0.00	7,500.00	7,513.72	(13.72)	100.18
06.448.00373.003005.0032	UTILITIES - ELECTRIC - TANKS	2,000.00	0.00	2,000.00	1,398.78	601.22	69.94
06.448.00373.003008.0036	UTILITIES - GAS (HEAT) - PARRS - P.S.	400.00	0.00	400.00	306.99	93.01	76.75
06.448.00374.002007	MATERIALS & SUPPLIES - GRATUITOUS SERVICES - DISTRIB. DEPT.	500.00	0.00	500.00	0.00	500.00	0.00
06.448.00376.001420	LABOR - REPAIRS & MAINT. - DISTRIBUTION MAINS	125,000.00	0.00	125,000.00	153,073.16	(28,073.16)	122.46
06.448.00376.002020	MATERIALS & SUPPLIES - DISTRIBUTION MAINS	50,000.00	0.00	50,000.00	43,438.94	6,561.06	86.88
06.448.00377.001420	LABOR - SERVICE LINES	68,500.00	0.00	68,500.00	86,265.87	(17,765.87)	125.94
06.448.00377.001420.0025	LABOR - WATER HAULING STATION	500.00	0.00	500.00	0.00	500.00	0.00
06.448.00377.002020	MATERIALS & SUPPLIES - SERVICE LINES	20,000.00	0.00	20,000.00	15,430.12	4,569.88	77.15
06.448.00377.002020.0025	MATERIALS & SUPPLIES - WATER HAULING STATION	245.00	0.00	245.00	1,126.25	(881.25)	459.69
06.448.00378.001420	LABOR - TANKS & RESERVOIRS	15,000.00	0.00	15,000.00	8,622.32	6,377.68	57.48
06.448.00378.002020	MATERIALS & SUPPLIES - TANKS & RESERVOIRS	8,000.00	0.00	8,000.00	748.41	7,251.59	9.36
06.448.00378.707113	REPAIRS & MAINT. - TANKS & RESERVOIRS	70,000.00	0.00	70,000.00	56,750.00	13,250.00	81.07
06.448.00379.001420	LABOR - METER MAINTENANCE	132,500.00	0.00	132,500.00	109,005.04	23,494.96	82.27
06.448.00379.002020	MATERIALS & SUPPLIES - METER DEPT.	20,000.00	0.00	20,000.00	9,342.88	10,657.12	46.71
06.448.00379.300619	UTILITIES - WATER & SEWER - TANGER BLDG. - METER DEPT.	4,250.00	0.00	4,250.00	3,942.21	307.79	92.76
06.448.00380.001420	LABOR - FIRE HYDRANTS	12,500.00	0.00	12,500.00	10,771.91	1,728.09	86.18
06.448.00380.002020	MATERIALS & SUPPLIES - FIRE HYDRANTS	5,500.00	0.00	5,500.00	5,034.91	465.09	91.54
06.448.00382.130115	LABOR - BOROUGH MANAGER	44,000.00	0.00	44,000.00	43,749.94	250.06	99.43
06.448.00383.140115	LABOR - ADMINISTRATIVE STAFF (EXEC./OFFICE)	386,500.00	0.00	386,500.00	370,176.66	16,323.34	95.78
06.448.00386.200700	DUES, TRAINING, PERMITS, &	10,000.00	0.00	10,000.00	2,706.00	7,294.00	27.06

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Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.448.00386.200700	MEMBERSHIPS						
06.448.00387.002700	PROF. SERVICES - COMPUTER & SUPPORT SERVICES/SUBSCRIPTIONS	6,500.00	0.00	6,500.00	10,781.01	(4,281.01)	165.86
06.448.00387.200715	MATERIALS & SUPPLIES - OFFICE & RENTAL EXPENSES	4,500.00	0.00	4,500.00	6,134.10	(1,634.10)	136.31
06.448.00387.300415	UTILITIES - TELEPHONE - OFFICE	1,350.00	0.00	1,350.00	928.36	421.64	68.77
06.448.00387.301215	RENTS - OFFICE RENT (GENERAL FUND)	93,199.00	0.00	93,199.00	93,199.00	0.00	100.00
06.448.00387.301315	ADVERTISING	3,000.00	0.00	3,000.00	1,572.44	1,427.56	52.41
06.448.00387.301415	MATERIALS & SUPPLIES - POSTAGE - OFFICE	37,500.00	0.00	37,500.00	35,619.52	1,880.48	94.99
06.448.00387.301515	RENTS - EQUIPMENT RENTAL - OFFICE	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00
06.448.00387.301615	PROF. SERVICES - ACCOUNTING & AUDITING - OFFICE	12,100.00	0.00	12,100.00	10,195.00	1,905.00	84.26
06.448.00387.301715	PROF. SERVICES - ENGINEERING SERVICES - RATE CASE	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00
06.448.00388.140116	LABOR - PIPE YARD - DISTRIB. MAINS	5,500.00	0.00	5,500.00	8,062.87	(2,562.87)	146.60
06.448.00388.140117	LABOR - SHED - DISTRIB. MAINS	20,000.00	0.00	20,000.00	21,435.70	(1,435.70)	107.18
06.448.00388.140118	LABOR - PUBLIC WORKS MECHANICS	43,000.00	0.00	43,000.00	54,276.17	(11,276.17)	126.22
06.448.00388.200618	UTILITIES - GASOLINE & OIL	25,000.00	0.00	25,000.00	12,985.10	12,014.90	51.94
06.448.00388.200716	MATERIALS & SUPPLIES - PIPE YARD	500.00	0.00	500.00	0.00	500.00	0.00
06.448.00388.200720	MATERIALS & SUPPLIES - OTHER BUILDINGS & STORAGE	2,500.00	0.00	2,500.00	1,667.13	832.87	66.69
06.448.00388.201819	UTILITIES - DIESEL FUEL	15,000.00	0.00	15,000.00	6,455.90	8,544.10	43.04
06.448.00388.202018	REPAIRS & MAINT. - VEHICLES	17,500.00	0.00	17,500.00	14,116.99	3,383.01	80.67
06.448.00388.202019	REPAIRS & MAINT. - EQUIPMENT	25,000.00	0.00	25,000.00	29,963.16	(4,963.16)	119.85
06.448.00388.203618	REPAIRS & MAINT. - OTHER BUILDINGS & STORAGE	3,000.00	0.00	3,000.00	4,040.92	(1,040.92)	134.70
06.448.00388.300419	UTILITIES - TELEPHONE - TANGER BUILDING	1,650.00	0.00	1,650.00	1,424.70	225.30	86.35
06.448.00388.300518	UTILITIES - ELECTRIC - TOOL SHED - TANGER BUILDING	7,500.00	0.00	7,500.00	4,447.60	3,052.40	59.30
06.448.00388.300619	UTILITIES - WATER, SEWER &	2,500.00	0.00	2,500.00	1,759.49	740.51	70.38

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Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.448.00388.300619	STORMWATER - TOOL SHED - TANGER BUILDING						
06.448.00388.300818	UTILITIES - GAS (HEAT) - TANGER BUILDING	5,500.00	0.00	5,500.00	3,090.43	2,409.57	56.19
06.448.00388.300819	UTILITIES - GARBAGE - TANGER	3,500.00	0.00	3,500.00	3,980.71	(480.71)	113.73
06.448.00388.304018	UTILITIES - CABLE & INTERNET - TANGER BUILDING	1,250.00	0.00	1,250.00	1,036.80	213.20	82.94
06.448.00388.304417	UTILITIES - CELL PHONES	1,000.00	0.00	1,000.00	639.05	360.95	63.91
06.448.00390.404600	TAXES - CELL TOWER & WATERSHED PROPERTY TAXES	4,500.00	0.00	4,500.00	3,325.28	1,174.72	73.90
06.448.00392.304702	PROF. SERVICES - LEGAL SERVICES - RATE CASE	175,000.00	0.00	175,000.00	0.00	175,000.00	0.00
06.448.00392.304703	PROF. SERVICES - LEGAL SERVICES - LABOR NEG./STLMTS.	0.00	0.00	0.00	8,097.31	(8,097.31)	0.00
06.448.00392.304704	PROF. SERVICES - LEGAL SERVICES	8,000.00	0.00	8,000.00	45,262.00	(37,262.00)	565.78
06.448.00396.304921	BENEFITS/TAXES - HEALTH & HOSPITALIZATION INSURANCE	875,000.00	0.00	875,000.00	938,598.08	(63,598.08)	107.27
06.448.00396.304922	BENEFITS/TAXES - WORKMANS COMPENSATION	63,500.00	0.00	63,500.00	50,752.05	12,747.95	79.92
06.448.00396.304923	FIRE & LIABILITY INSURANCE	40,000.00	0.00	40,000.00	36,730.32	3,269.68	91.83
06.448.00396.304924	BENEFITS/TAXES - LIFE INSURANCE	5,700.00	0.00	5,700.00	5,964.16	(264.16)	104.63
06.448.00396.304927	BENEFITS/TAXES - RETIREE HEALTH & LIFE INSURANCE	47,000.00	0.00	47,000.00	52,487.66	(5,487.66)	111.68
06.448.00397.305028	BENEFITS/TAXES - PENSION	124,789.00	0.00	124,789.00	124,790.00	(1.00)	100.00
06.448.00401.140100	LABOR - REPAIRS & MAINT. - FACILITIES (PW)	13,500.00	0.00	13,500.00	14,598.02	(1,098.02)	108.13
06.448.00550.140100	LABOR - MERCHANDISING & JOBBING	37,500.00	0.00	37,500.00	17,611.74	19,888.26	46.96
06.448.00550.200700	MATERIALS & SUPPLIES - MERCHANDISING & JOBBING	50,000.00	0.00	50,000.00	37,432.69	12,567.31	74.87
Total Prog 1	**OPERATIONS & MAINTENANCE**	**4,974,773.00**	**0.00**	**4,974,773.00**	**4,722,059.21**	**252,713.79**	**94.92**
Prog 2	**CAPITAL OUTLAY**						
06.448.00134.308100	PROF. SERVICES - ENGINEERING SERVICES - PRELIM. CHARGES	85,000.00	0.00	85,000.00	92,957.20	(7,957.20)	109.36

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Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 2	**CAPITAL OUTLAY**						
06.448.00208.140172	LABOR - CAPITAL OUTLAY - LBS PARKING LOT	4,000.00	0.00	4,000.00	0.00	4,000.00	0.00
06.448.00208.142202	LABOR - CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS	7,000.00	0.00	7,000.00	0.00	7,000.00	0.00
06.448.00208.701030	CAPITAL OUTLAY - S&M DAM (MATS. & PROF. SVC)	0.00	0.00	0.00	6,644.92	(6,644.92)	0.00
06.448.00208.701040	CAPITAL OUTLAY - LBS PARKING LOT	10,000.00	0.00	10,000.00	0.00	10,000.00	0.00
06.448.00208.704301	CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS	12,000.00	0.00	12,000.00	6,092.33	5,907.67	50.77
06.448.00208.705640	CAPITAL OUTLAY - CARETAKER HOUSE #1 (N. STORMES) IMPROV.	4,000.00	0.00	4,000.00	0.00	4,000.00	0.00
06.448.00248.146600	LABOR - CAPITAL OUTLAY - NEW DISTRIBUTION MAINS	157,600.00	0.00	157,600.00	35,817.20	121,782.80	22.73
06.448.00248.146616	LABOR - CAPITAL OUTLAY - PARK HEIGHTS BLVD	0.00	0.00	0.00	2,006.19	(2,006.19)	0.00
06.448.00248.146617	LABOR - CAPITAL OUTLAY - BECK MILL RD	0.00	0.00	0.00	846.56	(846.56)	0.00
06.448.00248.146618	LABOR - CAPITAL OUTLAY - E GRANGER ST	0.00	0.00	0.00	15,234.78	(15,234.78)	0.00
06.448.00248.146619	LABOR - CAPITAL OUTLAY - MT ROYAL AVE	0.00	0.00	0.00	17,373.89	(17,373.89)	0.00
06.448.00248.146646	LABOR - CAPITAL OUTLAY - YORK STREET	0.00	0.00	0.00	9,596.12	(9,596.12)	0.00
06.448.00248.146657	LABOR - CAPITAL OUTLAY - A-STREET MAIN	6,000.00	0.00	6,000.00	0.00	6,000.00	0.00
06.448.00248.606615	CAPITAL OUTLAY - BROADWAY	0.00	0.00	0.00	576,263.17	(576,263.17)	0.00
06.448.00248.606616	CAPITAL OUTLAY - PARK HEIGHTS BLVD	0.00	0.00	0.00	484,466.80	(484,466.80)	0.00
06.448.00248.606617	CAPITAL OUTLAY - BECK MILL RD	0.00	0.00	0.00	79,576.94	(79,576.94)	0.00
06.448.00248.606618	CAPITAL OUTLAY - EAST GRANGER STREET	0.00	0.00	0.00	14,104.32	(14,104.32)	0.00
06.448.00248.606619	CAPITAL OUTLAY - MOUNT ROYAL AVENUE	0.00	0.00	0.00	16,901.20	(16,901.20)	0.00
06.448.00248.606625	CAPITAL OUTLAY - NEW DISTRIBUTION MAINS	2,098,915.00	0.00	2,098,915.00	30,820.44	2,068,094.56	1.47
06.448.00248.606626	CAPITAL OUTLAY - LOCUST ST-SPRING AVE NEW MAIN	36,780.00	0.00	36,780.00	0.00	36,780.00	0.00
06.448.00248.606646	CAPITAL OUTLAY -YORK STREET	0.00	0.00	0.00	19,058.87	(19,058.87)	0.00
06.448.00248.606657	CAPITAL OUTLAY - A-STREET	5,000.00	0.00	5,000.00	0.00	5,000.00	0.00

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Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 2	**CAPITAL OUTLAY**						
06.448.00248.606657	MAIN						
06.448.00249.146700	LABOR - CAPITAL OUTLAY - NEW SERVICE LATERALS	7,500.00	0.00	7,500.00	5,865.46	1,634.54	78.21
06.448.00249.606700	CAPITAL OUTLAY - NEW SERVICE LATERALS	7,500.00	0.00	7,500.00	1,389.92	6,110.08	18.53
06.448.00250.146400	LABOR - CAPITAL OUTLAY - METERS & EQUIPMENT	13,500.00	0.00	13,500.00	9,309.71	4,190.29	68.96
06.448.00250.706400	CAPITAL OUTLAY - METERS & EQUIPMENT	150,000.00	0.00	150,000.00	168,464.22	(18,464.22)	112.31
06.448.00259.706015	CAPITAL OUTLAY - EQUIPMENT - PLANT	20,000.00	0.00	20,000.00	13,960.00	6,040.00	69.80
06.448.00259.706018	CAPITAL OUTLAY - VEHICLES - DISTRIB. DEPT.	60,000.00	0.00	60,000.00	0.00	60,000.00	0.00
06.448.00259.706019	CAPITAL OUTLAY - EQUIPMENT - DISTRIB. DEPT.	189,500.00	0.00	189,500.00	154,639.21	34,860.79	81.60
06.448.00259.706021	CAPITAL OUTLAY - BUILDINGS & FACILITIES - PLANT	34,500.00	0.00	34,500.00	22,919.65	11,580.35	66.43
06.448.00259.706022	CAPITAL OUTLAY - BUILDINGS & FACILITIES - DISTRIB. DEPT	70,000.00	0.00	70,000.00	17,325.00	52,675.00	24.75
06.448.00376.141903	LABOR - CAPITAL OUTLAY - CLEANING & LINING	132,010.00	0.00	132,010.00	0.00	132,010.00	0.00
06.448.00376.141908	LABOR - CAPITAL OUTLAY - PLEASANT ST CLEANING & LINING	0.00	0.00	0.00	7,507.77	(7,507.77)	0.00
06.448.00376.141911	LABOR - CAPITAL OUTLAY - JOHN ST CLEANING & LINING	0.00	0.00	0.00	7,950.02	(7,950.02)	0.00
06.448.00376.141912	LABOR - CAPITAL OUTLAY - YORK ST CLEANING & LINING	0.00	0.00	0.00	21,311.01	(21,311.01)	0.00
06.448.00376.141913	LABOR - CAPITAL OUTLAY - E MIDDLE ST CLEANING & LINING	0.00	0.00	0.00	9,917.14	(9,917.14)	0.00
06.448.00376.141914	LABOR - CAPITAL OUTLAY - BAER AVE CLEANING & LINING	0.00	0.00	0.00	8,085.34	(8,085.34)	0.00
06.448.00376.141915	LABOR - CAPITAL OUTLAY - WIRT AVE CLEANING & LINING	0.00	0.00	0.00	10,337.97	(10,337.97)	0.00
06.448.00376.141916	LABOR - CAPITAL OUTLAY - FOOTER ST CLEANING & LINING	0.00	0.00	0.00	4,200.28	(4,200.28)	0.00
06.448.00376.201908	CAPITAL OUTLAY - PLEASANT ST CLEANING & LINING (MATS. & PROF. SVC)	215,250.00	0.00	215,250.00	177,395.29	37,854.71	82.41
06.448.00376.201911	CAPITAL OUTLAY - JOHN ST CLEANING & LINING (MATS & PROF SVC)	0.00	0.00	0.00	149,249.88	(149,249.88)	0.00

THE BOROUGH OF HANOVER
Revenue / Expense Control Report

Fiscal Year: 2020 Period From: 1 To: 12

Account No.	Description	Original Budget	YTD Budget Adjustments	YTD Adjusted Budget	YTD Actual Rev / Exp	YTD Available Balance	Percent Rev/Exp Balance
Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 448	**WATER SYSTEM**						
Dept 448	**WATER SYSTEM**						
Prog 2	**CAPITAL OUTLAY**						
06.448.00376.201912	CAPITAL OUTLAY - YORK ST CLEANING & LINING	0.00	0.00	0.00	333,862.40	(333,862.40)	0.00
06.448.00376.201913	CAPITAL OUTLAY - E MIDDLE ST CLEANING & LINING	0.00	0.00	0.00	189,892.86	(189,892.86)	0.00
06.448.00376.201914	CAPITAL OUTLAY - BAER AVE CLEANING & LINING	0.00	0.00	0.00	163,427.94	(163,427.94)	0.00
06.448.00376.201915	CAPITAL OUTLAY - WIRT AVE CLEANING & LINING	0.00	0.00	0.00	233,818.52	(233,818.52)	0.00
06.448.00376.201916	CAPITAL OUTLAY - FOOTER ST CLEANING & LINING	0.00	0.00	0.00	70,789.43	(70,789.43)	0.00
06.448.00376.301903	CAPITAL OUTLAY - PROF.SERVICES - CLEANING & LINING	1,944,836.00	0.00	1,944,836.00	0.00	1,944,836.00	0.00
Total Prog 2	**CAPITAL OUTLAY**	**5,270,891.00**	**0.00**	**5,270,891.00**	**3,189,379.95**	**2,081,511.05**	**60.51**
Total Dept 448	**WATER SYSTEM**	**10,245,664.00**	**0.00**	**10,245,664.00**	**7,911,439.16**	**2,334,224.84**	**77.22**
Dept 486	**INSURANCE PREMIUMS & SOCIAL SECURITY**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.486.01500.001610	BENEFITS/TAXES - SOCIAL SECURITY	179,750.00	0.00	179,750.00	176,726.30	3,023.70	98.32
Total Prog 1	**OPERATIONS & MAINTENANCE**	**179,750.00**	**0.00**	**179,750.00**	**176,726.30**	**3,023.70**	**98.32**
Total Dept 486	**INSURANCE PREMIUMS & SOCIAL SECURITY**	**179,750.00**	**0.00**	**179,750.00**	**176,726.30**	**3,023.70**	**98.32**
Total Org 448	**WATER SYSTEM**	**10,425,414.00**	**0.00**	**10,425,414.00**	**8,088,165.46**	**2,337,248.54**	**77.58**
Org 470	**DEBT SERVICE**						
Dept 448	**WATER SYSTEM**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.448.00608.504210	DEBT - FEES - G.O.B. SERIES (ALL)	2,500.00	0.00	2,500.00	5,325.00	(2,825.00)	213.00
06.448.04710.505238	DEBT - PRINCIPAL - G.O.B. 2020D SERIES	500,000.00	0.00	500,000.00	0.00	500,000.00	0.00
06.448.04710.505245	DEBT - PRINCIPAL - G.O.B. 2013 SERIES	120,000.00	0.00	120,000.00	120,000.00	0.00	100.00
06.448.04710.505246	DEBT - PRINCIPAL - G.O.B. 2020	325,000.00	0.00	325,000.00	350,000.00	(25,000.00)	107.69

THE BOROUGH OF HANOVER

Revenue / Expense Control Report

Fiscal Year: 2020 Period From: 1 To: 12

Account No.	Description	Original Budget	YTD Budget Adjustments	YTD Adjusted Budget	YTD Actual Rev / Exp	YTD Available Balance	Percent Rev/Exp Balance
Fund 06	**WATER REVENUE FUND**						
Type E	**Expense**						
Org 470	**DEBT SERVICE**						
Dept 448	**WATER SYSTEM**						
Prog 1	**OPERATIONS & MAINTENANCE**						
06.448.04710.505246	(2015B) SERIES						
06.448.04710.505247	DEBT - PRINCIPAL - G.O.B. 2020A SERIES (REFI. 2010/2015C)	10,000.00	0.00	10,000.00	0.00	10,000.00	0.00
06.448.04710.505248	DEBT - PRINCIPAL - G.O.B. 2020C SERIES (REFI. 2010/2015D)	290,000.00	0.00	290,000.00	300,000.00	(10,000.00)	103.45
06.448.04710.505249	DEBT - PRINCIPAL - G.O.B. 2017 SERIES (REFI.2013)	27,000.00	0.00	27,000.00	27,000.00	0.00	100.00
06.448.04710.505257	DEBT - PRINCIPAL - LEASES (ENTERPRISE)	10,115.00	0.00	10,115.00	10,110.23	4.77	99.95
06.448.04720.505345	DEBT - INTEREST - G.O.B. 2013 SERIES	7,669.00	0.00	7,669.00	7,668.76	0.24	100.00
06.448.04720.505346	DEBT - INTEREST - G.O.B. 2020 (2015B) SERIES	246,132.00	0.00	246,132.00	290,224.52	(44,092.52)	117.91
06.448.04720.505347	DEBT - INTEREST - G.O.B. 2020A SERIES (REFI. 2010/2015C)	76,022.00	0.00	76,022.00	95,199.84	(19,177.84)	125.23
06.448.04720.505348	DEBT - INTEREST - G.O.B. 2020C SERIES (REFI. 2010/2015D)	24,663.00	0.00	24,663.00	28,162.08	(3,499.08)	114.19
06.448.04720.505349	DEBT - INTEREST - G.O.B. 2017 SERIES (REFI.2013)	205,444.00	0.00	205,444.00	205,444.50	(0.50)	100.00
06.448.04720.505357	DEBT - INTEREST - LEASES (ENTERPRISE)	3,970.00	0.00	3,970.00	3,965.65	4.35	99.89
Total Prog 1	**OPERATIONS & MAINTENANCE**	**1,848,515.00**	**0.00**	**1,848,515.00**	**1,443,100.58**	**405,414.42**	**78.07**
Total Dept 448	**WATER SYSTEM**	**1,848,515.00**	**0.00**	**1,848,515.00**	**1,443,100.58**	**405,414.42**	**78.07**
Total Org 470	**DEBT SERVICE**	**1,848,515.00**	**0.00**	**1,848,515.00**	**1,443,100.58**	**405,414.42**	**78.07**
Total Type E	**Expense**	**12,273,929.00**	**0.00**	**12,273,929.00**	**9,531,266.04**	**2,742,662.96**	**77.65**
Total Fund 06	**WATER REVENUE FUND**	**4,358,322.00**	**0.00**	**4,358,322.00**	**1,207,852.03**	**3,150,469.97**	**27.71**

Exhibit D XI-4

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OTHER DATA
FILING REQUIREMENTS

4. Provide a copy of the company's most recent operating and capital budgets.

RESPONSE

See the following schedule, 'Exhibit D XI-4 Attachment'.

THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type R	**Revenue**			
Dept 006	**.**			
06.006.34280.000501 RENTS - TERRACE AVE (AT&T) CELL TOWER		18,144.00	18,144.00	18,816.00
06.006.34285.000501 RENTS - RAILROAD ST (VERIZON) CELL TOWER		8,448.00	8,448.00	8,728.00
06.006.34290.000501 RENTS - TERRACE AVE (SHENTEL) CELL TOWER		18,660.00	18,660.00	22,392.00
06.006.34292.000501 RENTS - FILTER PLANT (TOWER CO) CELL TOWER		16,734.00	16,734.00	17,241.00
06.006.34297.000501 RENTS - OXFORD AVE (AT&T) CELL TOWER		18,432.00	18,432.00	20,736.00
06.006.34298.000501 RENTS - OXFORD AVE (SHENTEL) CELL TOWER		18,660.00	18,660.00	22,081.00
06.006.35970 CONTRIBUTED CAPITAL		0.00	0.00	111,500.00
06.006.37811.000300 METERED REVENUE - DOMESTIC		4,172,500.00	4,172,500.00	4,280,000.00
06.006.37812.000301 METERED REVENUE - COMMERCIAL		835,000.00	835,000.00	825,000.00
06.006.37813.000302 METERED REVENUE - INDUSTRIAL		1,750,000.00	1,750,000.00	1,900,000.00
06.006.37814.000304 METERED REVENUE - PUBLIC		125,000.00	125,000.00	130,000.00
06.006.37816.000315 METERED REVENUE - PENALTIES		21,000.00	21,000.00	21,000.00
06.006.37830.000310 UNMETERED REVENUE - SALE OF WATER		40,000.00	40,000.00	40,000.00
06.006.37840.000309 UNMETERED REVENUE - PRIVATE FIRE PROTECTION		293,500.00	293,500.00	300,000.00
06.006.37850.000311 UNMETERED REVENUE - PUBLIC FIRE PROTECTION		125,000.00	125,000.00	130,000.00
06.006.38000.000314				

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Exhibit D X1-4 Attachment
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THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type R	**Revenue**			
Dept 006	**.**			
06.006.38000.000314 MISCELLANEOUS		17,500.00	17,500.00	17,500.00
06.006.38313.000500 MISC - MERCHANDISING & JOBBING REVENUES		115,000.00	115,000.00	112,500.00
06.006.38314.000504 INTEREST		145,000.00	145,000.00	70,000.00
06.006.38315.000511 MISC - JOYCE BARDIN RESTITUTION		240.00	240.00	240.00
06.006.38318.000511 MISC - TIMBER/HAY SALES		0.00	0.00	26,500.00
06.006.38320.000511 STATE - MUNICIPAL PENSION AID		124,789.00	124,789.00	0.00
06.006.38327.000511 MISC - RETIREES INSURANCE REIMBURSEMENTS		52,000.00	52,000.00	52,650.00
Total Dept 006				
.		**(7,915,607.00)**	**(7,915,607.00)**	**(8,126,884.00)**
Total Type R				
Revenue		**(7,915,607.00)**	**(7,915,607.00)**	**(8,126,884.00)**

Exhibit D X1-4 Attachment
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THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description	Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06 **WATER REVENUE FUND**			
Type E **Expense**			
Dept 448 **WATER SYSTEM**			
06.448.00134.308100 PROF. SERVICES - ENGINEERING SERVICES - PRELIM. CHARGES	85,000.00	85,000.00	85,000.00
06.448.00208.140172 LABOR - CAPITAL OUTLAY - LBS PARKING LOT	4,000.00	4,000.00	0.00
06.448.00208.142202 LABOR - CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS	7,000.00	7,000.00	0.00
06.448.00208.701040 CAPITAL OUTLAY - LBS PARKING LOT	10,000.00	10,000.00	0.00
06.448.00208.704301 CAPITAL OUTLAY - LBS & S&M MAINT. SHEDS	12,000.00	12,000.00	30,000.00
06.448.00208.705640 CAPITAL OUTLAY - CARETAKER HOUSE #1 (N. STORMES) IMPROV.	4,000.00	4,000.00	4,000.00
06.448.00248.146600 LABOR - CAPITAL OUTLAY - NEW DISTRIBUTION MAINS	157,600.00	157,600.00	118,500.00
06.448.00248.146614 LABOR - CAPITAL OUTLAY - E HANOVER ST	0.00	0.00	2,000.00
06.448.00248.146646 LABOR - CAPITAL OUTLAY - YORK STREET	0.00	0.00	55,000.00
06.448.00248.146657 LABOR - CAPITAL OUTLAY - A-STREET MAIN	6,000.00	6,000.00	0.00
06.448.00248.606613 CAPITAL OUTLAY - THIRD ST	0.00	0.00	306,450.00
06.448.00248.606614 CAPITAL OUTLAY - E HANOVER ST	0.00	0.00	350,000.00
06.448.00248.606615 CAPITAL OUTLAY - BROADWAY	0.00	0.00	118,800.00
06.448.00248.606625 CAPITAL OUTLAY - NEW DISTRIBUTION MAINS	2,098,915.00	2,098,915.00	598,500.00
06.448.00248.606626 CAPITAL OUTLAY - LOCUST ST-SPRING AVE NEW MAIN	36,780.00	36,780.00	36,780.00

THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 448	**WATER SYSTEM**			
06.448.00248.606646 CAPITAL OUTLAY -YORK STREET		0.00	0.00	160,000.00
06.448.00248.606657 CAPITAL OUTLAY - A-STREET MAIN		5,000.00	5,000.00	0.00
06.448.00249.146700 LABOR - CAPITAL OUTLAY - NEW SERVICE LATERALS		7,500.00	7,500.00	5,000.00
06.448.00249.606700 CAPITAL OUTLAY - NEW SERVICE LATERALS		7,500.00	7,500.00	7,500.00
06.448.00250.146400 LABOR - CAPITAL OUTLAY - METERS & EQUIPMENT		13,500.00	13,500.00	12,000.00
06.448.00250.706400 CAPITAL OUTLAY - METERS & EQUIPMENT		150,000.00	150,000.00	150,000.00
06.448.00259.706014 CAPITAL OUTLAY - VEHICLES - PLANT		0.00	0.00	29,500.00
06.448.00259.706015 CAPITAL OUTLAY - EQUIPMENT - PLANT		20,000.00	20,000.00	13,000.00
06.448.00259.706018 CAPITAL OUTLAY - VEHICLES - DISTRIB. DEPT.		60,000.00	60,000.00	103,000.00
06.448.00259.706019 CAPITAL OUTLAY - EQUIPMENT - DISTRIB. DEPT.		189,500.00	189,500.00	0.00
06.448.00259.706021 CAPITAL OUTLAY - BUILDINGS & FACILITIES - PLANT		34,500.00	34,500.00	59,000.00
06.448.00259.706022 CAPITAL OUTLAY - BUILDINGS & FACILITIES - DISTRIB. DEPT		70,000.00	70,000.00	34,697.00
06.448.00350.001401.0001 LABOR - DAMS & WELLS		238,500.00	238,500.00	283,500.00
06.448.00351.002006.0001 UTILITIES - GASOLINE & DIESEL - DAMS & WELLS		4,000.00	4,000.00	3,000.00
06.448.00351.002007.0001 MATERIALS & SUPPLIES - DAMS & WELLS		15,000.00	15,000.00	12,500.00
06.448.00351.002007.0004				

EXHIBIT D

THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 448	**WATER SYSTEM**			
06.448.00351.002007.0004 MATERIALS & SUPPLIES - RAW WATER INTAKES		5,000.00	5,000.00	3,000.00
06.448.00351.003002.0001 UTILITIES - GARBAGE - DAMS & WELLS		2,500.00	2,500.00	1,600.00
06.448.00351.003004.0001 UTILITIES - TELEPHONE - DAMS & WELLS		750.00	750.00	500.00
06.448.00351.003004.0003 UTILITIES - TELEPHONE - RAW WATER INTAKES		800.00	800.00	0.00
06.448.00351.003005.0002 UTILITIES - ELECTRIC - DAMS & WELLS		2,750.00	2,750.00	2,750.00
06.448.00351.003005.0003 UTILITIES - ELECTRIC - RAW WATER INTAKES		30,000.00	30,000.00	20,000.00
06.448.00351.003042.0003 UTILITIES - STORMWATER USER FEES - SLAGLE RUN P.S.		90.00	90.00	90.00
06.448.00351.003042.0013 UTILITIES - STORMWATER USER FEES - DAMS & WELLS		1,400.00	1,400.00	1,375.00
06.448.00353.001420.0001 LABOR - REPAIRS & MAINT. - DAMS & WELLS (FLEET)		500.00	500.00	500.00
06.448.00353.001420.0004 LABOR - REPAIRS & MAINT. - RAW WATER INTAKES (RWWT)		1,500.00	1,500.00	1,500.00
06.448.00353.001431.0006 LABOR - REPAIRS & MAINT. - CARETAKERS HOUSES		1,000.00	1,000.00	0.00
06.448.00353.002007.0001 REPAIRS & MAINT. - DAMS & WELLS		10,000.00	10,000.00	9,000.00
06.448.00353.002020.0004 REPAIRS & MAINT. - RAW WATER INTAKES		15,000.00	15,000.00	4,000.00
06.448.00353.002020.0006 REPAIRS & MAINT. - M&E - CARETAKERS HOUSES		11,500.00	11,500.00	3,000.00
06.448.00353.002021.0001 REPAIRS & MAINT. - FORESTRY MANAGEMENT		0.00	0.00	26,500.00

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THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description	Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06 **WATER REVENUE FUND**			
Type E **Expense**			
Dept 448 **WATER SYSTEM**			
06.448.00354.001401 LABOR - WATER FILTER PLANT	295,750.00	295,750.00	306,000.00
06.448.00355.002005 MATERIALS & SUPPLIES - WATER TESTING - PLANT	30,000.00	30,000.00	24,000.00
06.448.00355.002007.0008 MATERIALS & SUPPLIES - PLANT	20,000.00	20,000.00	22,000.00
06.448.00355.002008.0008 UTILITIES - GAS (HEAT) - PLANT	14,000.00	14,000.00	9,000.00
06.448.00355.002018.0008 UTILITIES - DIESEL FUEL (GENERATOR) - PLANT	4,000.00	4,000.00	500.00
06.448.00355.002040.0008 MATERIALS & SUPPLIES - CHEMICALS - PLANT	225,000.00	225,000.00	240,000.00
06.448.00355.003002.0008 UTILITIES - GARBAGE - PLANT	2,100.00	2,100.00	1,500.00
06.448.00355.003004.0008 UTILITIES - TELEPHONE - PLANT	1,500.00	1,500.00	1,300.00
06.448.00355.003005.0008 UTILITIES - ELECTRIC - PLANT	58,500.00	58,500.00	55,000.00
06.448.00355.003009 UTILITIES - SEWER - PLANT	125,000.00	125,000.00	170,000.00
06.448.00355.003042.0008 UTILITIES - STORMWATER USER FEES - PLANT	1,000.00	1,000.00	1,000.00
06.448.00355.003043.0008 PROF. SERVICES - COMMUNITY WATER SYSTEM FEES-PLANT	25,000.00	25,000.00	25,000.00
06.448.00355.003045.0008 UTILITIES - CABLE & INTERNET - PLANT	800.00	800.00	800.00
06.448.00356.001430.0008 LABOR - REPAIRS & MAINT. - PLANT	37,750.00	37,750.00	35,250.00
06.448.00356.002020.0008 REPAIRS & MAINT. - PLANT	19,000.00	19,000.00	25,000.00
06.448.00362.001401 LABOR - PUMPING STATION (P.S.)	280,000.00	280,000.00	288,000.00
06.448.00365.002007.0010 MATERIALS & SUPPLIES - PUMPING	12,000.00	12,000.00	12,000.00

Exhibit D X1-4 Attachment
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THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 448	**WATER SYSTEM**			
06.448.00365.002008.0010 UTILITIES - GAS (HEAT) - P.S.		14,000.00	14,000.00	9,000.00
06.448.00365.002018.0010 UTILITIES - DIESEL FUEL (GENERATOR) - P.S.		4,000.00	4,000.00	500.00
06.448.00365.003002.0010 UTILITIES - GARBAGE - P.S.		2,100.00	2,100.00	1,500.00
06.448.00365.003004.0010 UTILITIES - TELEPHONE - P.S.		1,500.00	1,500.00	1,300.00
06.448.00365.003042.0010 UTILITIES - STORMWATER USER FEES - P.S.		1,000.00	1,000.00	1,000.00
06.448.00365.003045.0010 UTILITIES - CABLE & INTERNET - P.S.		800.00	800.00	800.00
06.448.00366.003005.0010 UTILITIES - ELECTRIC - P.S.		180,000.00	180,000.00	175,000.00
06.448.00367.001430.0010 LABOR - REPAIRS & MAINT. - P.S.		37,750.00	37,750.00	35,250.00
06.448.00367.002030.0010 REPAIRS & MAINT. - P.S.		20,000.00	20,000.00	27,000.00
06.448.00368.001401.0035 LABOR - DISTRIBUTION/FLUSHING		110,000.00	110,000.00	115,000.00
06.448.00369.001401 LABOR - METER DEPT. (BUCKET)		115,000.00	115,000.00	103,500.00
06.448.00371.002007 MATERIALS & SUPPLIES - STREET DEPT.		25,000.00	25,000.00	20,000.00
06.448.00371.003003 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - STREET DEPT.		2,250.00	2,250.00	2,250.00
06.448.00371.003004.0020 PROF. SERVICES - LOCATES - STREET DEPT.		2,000.00	2,000.00	1,500.00
06.448.00372.003003 MATERIALS & SUPPLIES - UNIFORM CLEANING & REPAIRS - METER DEPT.		1,250.00	1,250.00	1,250.00
06.448.00373.003004.0036 UTILITIES - CELL PHONE - SCADA SYSTEM COMMUNICATIONS		7,500.00	7,500.00	7,500.00
06.448.00373.003005.0032				

THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 448	**WATER SYSTEM**			
06.448.00373.003005.0032 UTILITIES - ELECTRIC - TANKS		2,000.00	2,000.00	1,500.00
06.448.00373.003008.0036 UTILITIES - GAS (HEAT) - PARRS - P.S.		400.00	400.00	300.00
06.448.00374.002007 MATERIALS & SUPPLIES - GRATUITOUS SERVICES - DISTRIB. DEPT.		500.00	500.00	500.00
06.448.00376.001420 LABOR - REPAIRS & MAINT. - DISTRIBUTION MAINS		125,000.00	125,000.00	115,000.00
06.448.00376.002020 MATERIALS & SUPPLIES - DISTRIBUTION MAINS		50,000.00	50,000.00	50,000.00
06.448.00376.141903 LABOR - CAPITAL OUTLAY - CLEANING & LINING		132,010.00	132,010.00	82,500.00
06.448.00376.201908 CAPITAL OUTLAY - PLEASANT ST CLEANING & LINING (MATS. & PROF. SVC)		215,250.00	215,250.00	0.00
06.448.00376.301903 CAPITAL OUTLAY - PROF.SERVICES - CLEANING & LINING		1,944,836.00	1,944,836.00	2,052,500.00
06.448.00377.001420 LABOR - SERVICE LINES		68,500.00	68,500.00	82,000.00
06.448.00377.001420.0025 LABOR - WATER HAULING STATION		500.00	500.00	0.00
06.448.00377.002020 MATERIALS & SUPPLIES - SERVICE LINES		20,000.00	20,000.00	20,000.00
06.448.00377.002020.0025 MATERIALS & SUPPLIES - WATER HAULING STATION		245.00	245.00	650.00
06.448.00378.001420 LABOR - TANKS & RESERVOIRS		15,000.00	15,000.00	12,500.00
06.448.00378.002020 MATERIALS & SUPPLIES - TANKS & RESERVOIRS		8,000.00	8,000.00	8,000.00
06.448.00378.707113 REPAIRS & MAINT. - TANKS & RESERVOIRS		70,000.00	70,000.00	0.00

THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description	Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06 **WATER REVENUE FUND**			
Type E **Expense**			
Dept 448 **WATER SYSTEM**			
06.448.00379.001420 LABOR - METER MAINTENANCE	132,500.00	132,500.00	147,500.00
06.448.00379.002020 MATERIALS & SUPPLIES - METER DEPT.	20,000.00	20,000.00	6,500.00
06.448.00379.300619 UTILITIES - WATER & SEWER - TANGER BLDG. - METER DEPT.	4,250.00	4,250.00	4,000.00
06.448.00380.001420 LABOR - FIRE HYDRANTS	12,500.00	12,500.00	13,000.00
06.448.00380.002020 MATERIALS & SUPPLIES - FIRE HYDRANTS	5,500.00	5,500.00	5,000.00
06.448.00382.130115 LABOR - BOROUGH MANAGER	44,000.00	44,000.00	44,900.00
06.448.00383.140115 LABOR - ADMINISTRATIVE STAFF (EXEC./OFFICE)	386,500.00	386,500.00	369,000.00
06.448.00386.200700 DUES, TRAINING, PERMITS, & MEMBERSHIPS	10,000.00	10,000.00	6,500.00
06.448.00387.002700 PROF. SERVICES - COMPUTER & SUPPORT SERVICES/SUBSCRIPTIONS	6,500.00	6,500.00	12,500.00
06.448.00387.200715 MATERIALS & SUPPLIES - OFFICE & RENTAL EXPENSES	4,500.00	4,500.00	6,000.00
06.448.00387.300415 UTILITIES - TELEPHONE - OFFICE	1,350.00	1,350.00	1,350.00
06.448.00387.301215 RENTS - OFFICE RENT (GENERAL FUND)	93,199.00	93,199.00	105,424.00
06.448.00387.301315 ADVERTISING	3,000.00	3,000.00	2,000.00
06.448.00387.301415 MATERIALS & SUPPLIES - POSTAGE - OFFICE	37,500.00	37,500.00	40,500.00
06.448.00387.301515 RENTS - EQUIPMENT RENTAL - OFFICE	1,000.00	1,000.00	0.00
06.448.00387.301615 PROF. SERVICES - ACCOUNTING & AUDITING - OFFICE	12,100.00	12,100.00	9,500.00

Exhibit D X1-4 Attachment
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THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 448	**WATER SYSTEM**			
06.448.00387.301715 PROF. SERVICES - ENGINEERING SERVICES - RATE CASE		200,000.00	200,000.00	175,000.00
06.448.00388.140116 LABOR - PIPE YARD - DISTRIB. MAINS		5,500.00	5,500.00	6,000.00
06.448.00388.140117 LABOR - SHED - DISTRIB. MAINS		20,000.00	20,000.00	18,500.00
06.448.00388.140118 LABOR - PUBLIC WORKS MECHANICS		43,000.00	43,000.00	50,000.00
06.448.00388.200618 UTILITIES - GASOLINE & OIL		25,000.00	25,000.00	20,000.00
06.448.00388.200716 MATERIALS & SUPPLIES - PIPE YARD		500.00	500.00	0.00
06.448.00388.200720 MATERIALS & SUPPLIES - OTHER BUILDINGS & STORAGE		2,500.00	2,500.00	2,500.00
06.448.00388.201819 UTILITIES - DIESEL FUEL		15,000.00	15,000.00	10,500.00
06.448.00388.202018 REPAIRS & MAINT. - VEHICLES		17,500.00	17,500.00	17,500.00
06.448.00388.202019 REPAIRS & MAINT. - EQUIPMENT		25,000.00	25,000.00	19,000.00
06.448.00388.203618 REPAIRS & MAINT. - OTHER BUILDINGS & STORAGE		3,000.00	3,000.00	3,000.00
06.448.00388.300419 UTILITIES - TELEPHONE - TANGER BUILDING		1,650.00	1,650.00	1,650.00
06.448.00388.300518 UTILITIES - ELECTRIC - TOOL SHED - TANGER BUILDING		7,500.00	7,500.00	5,000.00
06.448.00388.300619 UTILITIES - WATER, SEWER & STORMWATER - TOOL SHED - TANGER BUILDING		2,500.00	2,500.00	1,750.00
06.448.00388.300818 UTILITIES - GAS (HEAT) - TANGER BUILDING		5,500.00	5,500.00	4,500.00
06.448.00388.300819 UTILITIES - GARBAGE - TANGER		3,500.00	3,500.00	4,500.00

Exhibit D X1-4 Attachment
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THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 448	**WATER SYSTEM**			
06.448.00388.304018 UTILITIES - CABLE & INTERNET - TANGER BUILDING		1,250.00	1,250.00	1,250.00
06.448.00388.304417 UTILITIES - CELL PHONES		1,000.00	1,000.00	800.00
06.448.00390.404600 TAXES - CELL TOWER & WATERSHED PROPERTY TAXES		4,500.00	4,500.00	4,000.00
06.448.00392.304702 PROF. SERVICES - LEGAL SERVICES - RATE CASE		175,000.00	175,000.00	150,000.00
06.448.00392.304704 PROF. SERVICES - LEGAL SERVICES		8,000.00	8,000.00	8,000.00
06.448.00396.304921 BENEFITS/TAXES - HEALTH & HOSPITALIZATION INSURANCE		875,000.00	875,000.00	950,750.00
06.448.00396.304922 BENEFITS/TAXES - WORKMANS COMPENSATION		63,500.00	63,500.00	52,250.00
06.448.00396.304923 FIRE & LIABILITY INSURANCE		40,000.00	40,000.00	38,000.00
06.448.00396.304924 BENEFITS/TAXES - LIFE INSURANCE		5,700.00	5,700.00	5,675.00
06.448.00396.304927 BENEFITS/TAXES - RETIREE HEALTH & LIFE INSURANCE		47,000.00	47,000.00	50,000.00
06.448.00397.305028 BENEFITS/TAXES - PENSION		124,789.00	124,789.00	167,570.00
06.448.00401.140100 LABOR - REPAIRS & MAINT. - FACILITIES (PW)		13,500.00	13,500.00	12,000.00
06.448.00550.140100 LABOR - MERCHANDISING & JOBBING		37,500.00	37,500.00	35,000.00
06.448.00550.200700 MATERIALS & SUPPLIES - MERCHANDISING & JOBBING		50,000.00	50,000.00	50,000.00
06.448.00608.504210 DEBT - FEES - G.O.B. SERIES (ALL)		2,500.00	2,500.00	3,050.00
06.448.04710.505238 DEBT - PRINCIPAL - G.O.B. 2020D SERIES		500,000.00	500,000.00	565,000.00

THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 448	**WATER SYSTEM**			
06.448.04710.505245 DEBT - PRINCIPAL - G.O.B. 2013 SERIES		120,000.00	120,000.00	125,000.00
06.448.04710.505246 DEBT - PRINCIPAL - G.O.B. 2020 (2015B) SERIES		325,000.00	325,000.00	325,000.00
06.448.04710.505247 DEBT - PRINCIPAL - G.O.B. 2020A SERIES (REFI. 2010/2015C)		10,000.00	10,000.00	290,000.00
06.448.04710.505248 DEBT - PRINCIPAL - G.O.B. 2020C SERIES (REFI. 2010/2015D)		290,000.00	290,000.00	0.00
06.448.04710.505249 DEBT - PRINCIPAL - G.O.B. 2017 SERIES (REFI.2013)		27,000.00	27,000.00	30,000.00
06.448.04710.505257 DEBT - PRINCIPAL - LEASES (ENTERPRISE)		10,115.00	10,115.00	11,005.00
06.448.04720.505345 DEBT - INTEREST - G.O.B. 2013 SERIES		7,669.00	7,669.00	5,269.00
06.448.04720.505346 DEBT - INTEREST - G.O.B. 2020 (2015B) SERIES		246,132.00	246,132.00	220,944.00
06.448.04720.505347 DEBT - INTEREST - G.O.B. 2020A SERIES (REFI. 2010/2015C)		76,022.00	76,022.00	83,050.00
06.448.04720.505348 DEBT - INTEREST - G.O.B. 2020C SERIES (REFI. 2010/2015D)		24,663.00	24,663.00	14,000.00
06.448.04720.505349 DEBT - INTEREST - G.O.B. 2017 SERIES (REFI.2013)		205,444.00	205,444.00	204,904.00
06.448.04720.505357 DEBT - INTEREST - LEASES (ENTERPRISE)		3,970.00	3,970.00	3,075.00
Total Dept 448 **WATER SYSTEM**		**12,094,179.00**	**12,094,179.00**	**11,314,358.00**
Dept 486	**INSURANCE PREMIUMS & SOCIAL SECURITY**			
06.486.01500.001610				

EXHIBIT D X1-4

THE BOROUGH OF HANOVER

Annual Orig-Adj Budget (Cw)

Fiscal Year: 2021 Period From: 1 To: 12

Account Description		Original 2020 Budget	Adjusted 2020 Budget	2021 ADOPTED Stage
Fund 06	**WATER REVENUE FUND**			
Type E	**Expense**			
Dept 486	**INSURANCE PREMIUMS & SOCIAL SECURITY**			
06.486.01500.001610 BENEFITS/TAXES - SOCIAL SECURITY		179,750.00	179,750.00	179,350.00
Total Dept 486 **INSURANCE PREMIUMS & SOCIAL SECURITY**		**179,750.00**	**179,750.00**	**179,350.00**
Total Type E **Expense**		**12,273,929.00**	**12,273,929.00**	**11,493,708.00**
Total Fund 06 **WATER REVENUE FUND**		**4,358,322.00**	**4,358,322.00**	**3,366,824.00**

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OTHER DATA
FILING REQUIREMENTS

5. Provide a schedule that shows the percentage of unaccounted for water for the test year and 2 prior years. Describe how this amount was determined and explain any steps taken to reduce unaccounted for water. Provide a similar analysis of infiltration for wastewater utilities.

RESPONSE

See the following schedule, 'Exhibit D XI-5 Attachment' showing unaccounted for water for the years 2018, 2019 and 2020. The Borough has leak detection plan established to identify and repair leaks throughout the system.

For the Year Ended December 31, 2018

Borough of Hanover

500. WATER DELIVERED INTO SYSTEM DURING YEAR

Every estimated value shall be supported by such detailed information as will permit a ready identification, analysis, & verification of all relevant facts. The Company shall be prepared to furnish to the Commission this detailed information.

Line No.	Description (a)	(Gallons) (b)	(gal. Per day) (c)
1	**Water Delivered for Distribution & Sale:**		
2	Water Obtained from Company Sources	1,613,160,000	4,419,616
3	Water Obtained from Other Independent Utilities		
4	**Total Water Delivered**	**1,613,160,000**	4,419,616
5	**Metered Sales:**		
6	Residential	413,621,000	1,133,208
7	Commercial	64,582,000	176,937
8	Industrial	380,510,000	1,042,493
9	Public	20,402,000	55,896
10	Other Water Utilities	N/A	N/A
11	Private Fire Protection		
12	Public Fire Protection		
13	Other Metered Service Identify: Within City Limits Customers	475,893,000	1,303,816
14	**Total Metered Sales**	1,355,008,000	3,712,351
15	**Unmetered Sales:**	N/A	N/A
16	Residential		
17	Commercial		
18	Industrial		
19	Private Fire Protection		
20	Public Fire Protection		
21	Other Unmetered Service Identify _____		
21	**Total Unmetered Sales**		
22	**Total Gallons Delivered**	1,355,008,000	3,712,351
23	**Non-Revenue Usage Allowances:**		
24	**Authorized Unmetered Usage:**		
25	Main Flushing	9,320,625	25,536
26	Blow-off Use	1,104,000	3,025
27	Others: Fire Sevices, Hydrant flushing, Cement lining & Street sweepers	20,377,474	55,829
28	Unauthorized Use	4,032,900	11,049
29	Unavoidable Leakage _____ gpd/mile of main		
30	Adjustments:		
31	Located & Repaired Breaks in Mains & Services	1,433,998	3,929
32	Others: Identify _New Main Installs & New Developments___		
33	**Total Allowances & Adjustments**	36,268,997	99,367
34	**Unaccounted-for-Water**	**221,883,003**	
35	**Percentage of Unaccounted-for-Water**	**13.8%**	

For the Year Ended December 31, 2019

Borough of Hanover

500. WATER DELIVERED INTO SYSTEM DURING YEAR

Every estimated value shall be supported by such detailed information as will permit a ready identification, analysis, & verification of all relevant facts. The Company shall be prepared to furnish to the Commission this detailed information.

Line No.	Description (a)	(Gallons) (b)	(gal. Per day) (c)
1	**Water Delivered for Distribution & Sale:**		
2	Water Obtained from Company Sources	1,741,283,000	4,770,638
3	Water Obtained from Other Independent Utilities		
4	**Total Water Delivered**	**1,741,283,000**	4,770,638
5	**Metered Sales:**		
6	Residential	410,648,000	1,125,063
7	Commercial	66,270,000	181,562
8	Industrial	460,702,000	1,262,197
9	Public	26,241,000	71,893
10	Other Water Utilities	N/A	N/A
11	Private Fire Protection		
12	Public Fire Protection		
13	Other Metered Service Identify: Within City Limits Customers	452,543,000	1,239,844
14	**Total Metered Sales**	1,416,404,000	3,880,559
15	**Unmetered Sales:**	N/A	N/A
16	Residential		
17	Commercial		
18	Industrial		
19	Private Fire Protection		
20	Public Fire Protection		
21	Other Unmetered Service Identify _____		
21	**Total Unmetered Sales**		
22	**Total Gallons Delivered**	1,416,404,000	3,880,559
23	**Non-Revenue Usage Allowances:**		
24	**Authorized Unmetered Usage:**		
25	Main Flushing	11,506,700	31,525
26	Blow-off Use	5,371,192	14,716
27	Others: Cement lining & Street sweepers	480,636	1,317
28	Unauthorized Use	4,353,208	11,927
29	Unavoidable Leakage _____ gpd/mile of main		
30	Adjustments:		
31	Located & Repaired Breaks in Mains & Services	5,507,202	15,088
32	Others: New main installs & New developments	10,396,300	28,483
33	**Total Allowances & Adjustments**	37,615,238	103,055
34	**Unaccounted-for-Water**	**287,263,763**	
35	**Percentage of Unaccounted-for-Water**	**16.5%**	

For the Year Ended December 31, 2020

Borough of Hanover

500. WATER DELIVERED INTO SYSTEM DURING YEAR

Every estimated value shall be supported by such detailed information as will permit a ready identification, analysis, & verification of all relevant facts. The Company shall be prepared to furnish to the Commission this detailed information.

Line No.	Description (a)	(Gallons) (b)	(gal. Per day) (c)
1	**Water Delivered for Distribution & Sale:**		
2	Water Obtained from Company Sources	1,846,226,000	5,058,153
3	Water Obtained from Other Independent Utilities		
4	**Total Water Delivered**	**1,846,226,000**	5,058,153
5	**Metered Sales:**		
6	Residential	439,370,000	1,203,753
7	Commercial	62,987,000	172,567
8	Industrial	488,713,000	1,338,940
9	Public	23,666,000	64,838
10	Other Water Utilities	N/A	NA
11	Private Fire Protection		
12	Public Fire Protection		
13	Other Metered Service Identify: Within City Limits Customers	464,846,000	1,273,551
14	**Total Metered Sales**	1,479,582,000	4,053,649
15	**Unmetered Sales:**	N/A	N/A
16	Residential		
17	Commercial		
18	Industrial		
19	Private Fire Protection		
20	Public Fire Protection		
21	Other Unmetered Service Identify _____		
21	**Total Unmetered Sales**		
22	**Total Gallons Delivered**	1,479,582,000	4,053,649
23	**Non-Revenue Usage Allowances:**		
24	**Authorized Unmetered Usage:**		
25	Main Flushing	11,050,950	30,277
26	Blow-off Use	192,900	528
27	Others: Fire Sevices (York St. fire), Cement lining, Main cleaning, & street sweepers	534,326	1,464
28	Unauthorized Use	4,615,565	12,645
29	Unavoidable Leakage _____ gpd/mile of main		
30	Adjustments:		
31	Located & Repaired Breaks in Mains & Services	5,483,775	15,024
32	Others: Identify _New Main Installs	193,325	530
33	**Total Allowances & Adjustments**	22,070,841	60,468
34	**Unaccounted-for-Water**	**344,573,159**	
35	**Percentage of Unaccounted-for-Water**	**18.7%**	

BOROUGH OF HANOVER
WATER UTILITIES

RESPONSES TO OTHER DATA
FILING REQUIREMENTS

6. Provide a corporate history (include the dates of original incorporation, subsequent mergers, or acquisitions, or both). Indicate all counties and cities and other governmental subdivisions to which service is provided, including service areas outside the state, and the total population in the area served.

RESPONSE

Please refer to Borough of Hanover Statement No. 1.

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
HANOVER, PENNSYLVANIA

REBUTTAL TESTIMONY

OF

GREGORY R. HERBERT, ANALYST

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

REVENUE,
REVENUE REQUIREMENTS, COST OF SERVICE
AND DEMAND STUDY

OCTOBER 2021

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS
DOCKET NO. R-2021-03026116

REBUTTAL TESTIMONY OF GREGORY R. HERBERT

Q. State your name and business address.

A. My name is Gregory R. Herbert. My business address is 207 Senate Avenue, Camp Hill, PA.

Q. By whom are you employed?

A. I am employed by Gannett Fleming Valuation and Rate Consultants, LLC.

Q. Are you the same Gregory R. Herbert that submitted direct testimony in this proceeding?

A. Yes. On June 30, 2021, I submitted direct testimony, Borough of Hanover Statement No. 2, which supported the Borough of Hanover's (the Borough) pro forma revenue and expense claims for the historic test year ended December 31, 2020, the future test year ended December 31, 2021, and the fully forecasted future test year ending December 31, 2022, and the statement of income for the Borough of Hanover - Hanover Municipal Water Works ("Borough"). I also sponsored Exhibits GRH-1, and GRH-2.

Q. What is the purpose of your rebuttal testimony in this proceeding?

A. I will address the adjustments and recommendations that were made to the revenue requirement and cash working capital by I&E Witness Zachari Walker, and OCA Witness Stacy Sherwood. I will be sponsoring Exhibit GRH-1R as part of my rebuttal testimony.

Q. Please describe how the recommended adjustments attributable to outside-Borough customers were determined by Ms. Sherwood and Mr. Walker.

A. Mr. Walker and Ms. Sherwood rely on the outside-Borough allocations presented in Exhibit CEH-1 developed by Ms. Constance E. Heppenstall to calculate their recommended adjustments attributable to the jurisdictional customers. My rebuttal testimony will only discuss Mr. Walker's and Ms. Sherwood's recommended expense and cash working capital adjustments in terms of dollar amounts allocated to the outside-Borough customers.

REVENUE REQUIREMENT - PRO FORMA OPERATION AND MAINTENANCE EXPENSES

RATE CASE EXPENSE

Q. In direct testimony, Mr. Walker normalized rate case expense over 47 months and Ms. Sherwood normalized rate case expense over 4 years while the Borough normalized rate case expense over three years. Do you maintain that rate case expense should be normalized over three years?

A. Yes, I do. Mr. Walker and Ms. Sherwood make similar rate case expense adjustments as they calculated the average duration between the Borough's prior three rate cases and determined the current rate case expense should be normalized over a 47-month period. Mr. Walker uses the 47-month amortization period for a total adjustment of $33,007, and Ms. Sherwood rounded up to a 4-year period for a total adjustment of $35,258 to the jurisdictional customers. The Borough's prior three rate cases were filed in 2009, 2012 and 2014, which illustrates the Borough filed rate cases on a two and a half-year pattern over the years 2009 through 2014. The normalization of rate case expense over several years is appropriate as the expense for a rate case is only incurred during the period of the

actual rate case but the benefits of increased rates last more than one year. A three-year normalization period is reasonable as it acknowledges that rate case expense should be spread over a period of years, but also does not penalize the Borough for delaying a rate case due to costs, requirements from the previous case, and limited resources. Therefore, the Borough maintains that the rate case expense should be normalized over a three-year period.

LEGAL EXPENSE – PA PUC LEGAL FEES

Q. On page 6 of her direct testimony, Ms. Sherwood recommends the amortization of the PA PUC Legal Fees costs using the same time period she recommends for the rate case expense. Do you agree with this adjustment to the PA PUC Legal Fees Expense?

A. I do not agree with the amortization period of four years that Ms. Sherwood recommends for the PA PUC Fees expense, but I do agree with Ms. Sherwood's reasoning to amortize the PA PUC Legal Fees over the same time period as the rate case expense. The Borough maintains a three-year period to recover rate case expense is reasonable. Thus, a three-year amortization period is reasonable to recover the PA PUC Legal Fees, and I reject the recommended expense adjustment made by Ms. Sherwood.

SOURCE OF SUPPLY – MISCELLANEOUS OPERATING EXPENSE AND MAINTENANCE EXPENSE

Q. On pages 6 through 8, Ms. Sherwood recommends adjustments to Source of Supply – Miscellaneous Operating and Miscellaneous Maintenance expenses. Please describe the adjustments made by Ms. Sherwood.

A. Ms. Sherwood identifies a non-recurring expense of $2,213 for a transmitter replacement for Slagle Run Flow in the miscellaneous operating expense account, and she recommends amortizing the expense over a four-year period. The adjustment reduces the outside-Borough miscellaneous operating expense claim by $1,104.

Ms. Sherwood identifies a non-recurring expense of $10,780 for a roof replacement completed on the garage and home of the caretaker who oversees the daily water release and property maintenance of the Borough's dam. Ms. Sherwood recommends amortizing the expense over a 25-year period, which reduces the miscellaneous maintenance expense claim attributable to jurisdictional customers by $6,881.

Q. Do you agree with the Ms. Sherwood's adjustments to miscellaneous operating and miscellaneous maintenance expenses?

A. No, I do not. The transmitter replacement and roof replacement were necessary for the Borough to maintain and operate its source of supply operations safely. I reject Ms. Sherwood's adjustments, as the Borough experiences similar repairs every year to operate aging plant and infrastructure and meet all regulatory requirements.

POWER AND PUMPING – SUPPLIES AND EQUIPMENT EXPENSE

Q. Please describe the adjustment made by Ms. Sherwood to the Power and Pumping - Supplies and Equipment expense account.

A. Ms. Sherwood discusses in her testimony that the Borough's supplies and equipment expense accounts vary annually and recommends averaging the historic three years of expenses booked in 2018, 2019 and 2020 (HTY). On Schedule SLS-

7 she calculates the three-year normalization periods for the supplies and equipment expense accounts and determines an adjustment of $4,566 attributed to the jurisdictional customers.

Q. Do you agree with Ms. Sherwood's adjustment to the Power and Pumping - Supplies and Equipment expense account?

A. No, I do not. From 2018 through 2020, the costs of power and pumping – supplies and equipment have only increased from year to year instead of varying up and down from year to year. Therefore, I reject the expense adjustment Ms. Sherwood recommends to the supplies and equipment expense as this expense is only increasing.

PROFESSIONAL SERVICES – ENGINEERING SERVICES EXPENSE

Q. On pages 9 through 11, Ms. Sherwood recommends adjustments to Engineering Services expense account. Please describe the adjustments made by Ms. Sherwood.

A. Based on a Borough response to interrogatory, OCA-IV-19, Ms. Sherwood identifies a dozen non-recurring engineering services costs incurred by the Borough totaling $44,650, during the historic test year. Ms. Sherwood recommends amortizing these expenses over a four-year period. Additionally, Ms. Sherwood eliminates an engineering services expense which incurred at the end of 2019 and adjusts the jurisdictional claim by $3,866.

Q. Do you agree with Ms. Sherwood's adjustments to miscellaneous operating and miscellaneous maintenance expenses?

A. I do agree with the adjustment to remove the engineering services expense that

occurred in 2019 and have reflected it in Exhibit GRH-1-R. However, I do not agree with the amortization of the dozen engineering expenses Ms. Sherwood identified as non-recurring or one-time expenses. The engineering services provided by Forest Management and Gannett Fleming are necessary for the improvement, development and maintenance of the Borough water system. Gannett Fleming has historically provided services to the Borough, continues to provide services, and the Borough expects the same level of services to be provided in the future. Therefore, I reject the adjustment to amortize these expenses over a four-year period.

BANK FEES EXPENSE

Q. Please describe Ms. Sherwood adjustment to the Bank Fees expense accounts.

A. In her testimony, Ms. Sherwood identified $3,440 related to bond issuance costs and explains the expense is irregular and infrequent and recommends amortizing these expenses over a period of four years. Ms. Sherwood determines an adjustment of $1,715 allocated to the jurisdictional customers.

Q. Do you agree with Ms. Sherwood's adjustment to the Bank Fees expense account?

A. Yes, I agree with Ms. Sherwood that the bond issuance expenses are infrequent, and the expense should amortized as Ms. Sherwood recommends. The adjustment to Bank Fees expense is reflected in Exhibit GRH-1-R.

GENERAL OFFICE – COMPUTER SUPPORT EXPENSE

Q. Do you agree with the Ms. Sherwood's adjustments to General Office – Computer Support expense account?

A. No, I do not. Ms. Sherwood identifies non-recurring or one-time expenses in the historic test year and recommends amortizing these expenses over a period of four years. The adjustment reduces the expense claim by $1,698 that is allocated to the outside-Borough customers. Ms. Sherwood explains that if the non-recurring expenses are removed in the historic test year (HTY) 2020, the expense in this account for 2020 matches the expense levels booked in 2019 and 2018. However, the expense account total in 2019 was actually $3,079 higher than the HTY total expense. Therefore, the HTY expense total is reasonable to project for the FTY and FPFTY, and I reject the recommended Computer Support expense adjustment made by Ms. Sherwood.

SEWER BILL EXPENSE

Q. In his direct testimony, Mr. Walker makes an adjustment to the sewer bill expense based on a historic three-year average (2018 through 2020) of the expense amounts. Do you agree with the adjustment to the sewer bill expense?

A. No, I do not agree with Mr. Walker's adjustment to the sewer bill expense. Mr. Walker reduces the sewer bill expense attributed to the jurisdictional customers by $75,097 ($222,022 minus $146,925). His recommendation is based on the average historical three years (2018 – 2020) expense amounts of sewer bills and applies an average consumer price index inflation factor over the three-year average. The Borough has experienced higher concentrations of total solids since second quarter of 2019 and continues to experience higher concentrations and expects the sewer bill expense to maintain or increase from the 2020 historic test year amounts due to

the application of surcharges. Therefore, I reject Mr. Walker's recommendation to adjust the sewer bill expense.

RATE BASE

Cash Working Capital

Q. Please address Mr. Walker's and Ms. Sherwood's cash working capital adjustment.

A. Mr. Walker and Ms. Sherwood both agree to the "rule of thumb" methodology to calculate Cash Working Capital (CWC). However, Mr. Walker does not agree to the "rule of thumb" method for a revenue increase over $1 million without the Commission granting formal waiver for the Borough from completing a lead/lag study. In addition, Mr. Walker does not agree with including taxes other than income from the CWC calculation as he argues taxes are non-cash items and taxes are collected prior to payments being made and should be removed from the "rule of thumb" calculation. In addition, Mr. Walker adjusts his CWC claim for his recommended operation and maintenance adjustments. As a result, Mr. Walker recommends a total allowance for CWC of $409,091 which is a total reduction to Cash Working Capital of $26,910 to the jurisdictional customers. Ms. Sherwood makes an adjustment to CWC due to her recommended operation and maintenance adjustments in her CWC calculation for a total allowance of $437,418 or a reduction of $9,486 to the outside-Borough customers.

Q. Do you agree with Mr. Walker's and Ms. Sherwood's adjustments?

A. I would agree that the operating expenses included in the calculation of cash working capital should reflect any changes to those expenses ultimately allowed in this case.

In as much as I disagree with most of Mr. Walker's and Ms. Sherwood's operation and maintenance expense adjustments, I disagree with their CWC adjustments.

Furthermore, I disagree with Mr. Walker for excluding taxes other than income from the CWC calculation, as these are cash expense items for the Water Department. As a note, the Borough did not complete a lead lag study for this filing due to the time and expense of performing the study. This procedure is in line with prior Borough filings. Additionally, Ms. Sherwood mistakenly shows on Schedule SLS-11 the Borough's outside-Borough allocated proforma operation and expense total to be $3,575,231 instead of the filed amount of $3,464,160, and the Borough's Cash Working Capital claim to be $446,901 instead of the filed amount of $436,001. Therefore, I calculate her total adjustment to Cash Working Capital for the outside-Borough customers to be a reduction of $12,467.

Cash working capital has been adjusted based on the adjustments to operation and maintenance expenses described in rebuttal testimony and reflected in Exhibit GRH-1-R. The Borough's updated jurisdictional CWC claim is $435,320.

PROPOSED REVENUE

OTHER OPERATING - LATE PAYMENT REVENUE

Q. Please address Mr. Sakaya's proposed revenue adjustments.

A. During discovery, Mr. Sakaya identified an error with revenue adjustment R-9 in Exhibit GRH-1 and recommends the Borough to make the adjustment in rebuttal testimony. I agree with Mr. Sakaya's recommendation and have reflected the adjustment of $12,344 in Exhibit GRH-1-R. Additionally, Mr. Sakaya states the Borough recorded approximately $14,809 of outside-Borough late payment revenue

in the historic test year, under present rates, and did not adjust the amount for the proposed rate increase. Mr. Sakaya states that late payment revenue will increase with a proposed rate increase and recommends these revenues should be adjusted to reflect the overall 28.9% rate increase. I agree with Mr. Sakaya's adjustment to late payment revenues. Thus, the adjustment to late payment revenue under proposed rates is reflected in Exhibit GRH-1-R.

SUMMARY

Q. Please summarize the City's rebuttal position.

A. See Exhibit GRH-1-R for the summary of the City's rebuttal position for revenue requirements and income statement based on the changes discussed in this testimony. Based on the Borough's recommended adjustments to revenue requirement, the Borough's requested rate for the outside City customers is 6.27%, which is the same level that the Borough can support of 6.27%.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

Exhibit GRH-1-R

BOROUGH OF HANOVER - MUNICIPAL WATER WORKS
OUTSIDE BOROUGH - SUMMARY OF POSITION REBUTTAL

Description	Borough Filed	Adjustments	Borough Rebuttal
Operating Revenue Deductions:			
Operation and Maintenance			
Filed Expenses	$ 3,464,160		3,464,160
Adj. Professional Services - Engineering Services		$ (3,773)	(3,773)
Adj. Bank Fees		$ (1,674)	(1,674)
Total Expenses Including Adjustments			3,458,714
Taxes Other Than Income	111,071	-	111,071
Depreciation	1,386,991	-	1,386,991
Total Operating			
Revenue Deductions	4,962,222	(5,447)	4,956,775
Net Operating Available for Return	2,260,092	(43)	2,260,050
Total Operating Revenue (Under Proposed Rates)	7,222,314		7,222,314
Adj. to Late Payment Fees	-	4,280	4,280
Adj. to Proposed Revenues		12,344	12,344
Total Revenue Including Adjustments			7,238,939
Less Present Revenue	5,659,214		5,659,214
Less Present Revenue Including Revenue Adjustments	5,659,214	-	5,659,214
Allowable Increase	**1,563,100**		**1,563,100**
Percentage Increase	27.62%		27.62%
Original Cost of Measure	$ 36,029,944	$ (681)	$ 36,029,263
Rate of Return	6.27%		6.27%

VERIFICATION

I, Gregory R. Herbert, hereby state that the facts set forth in my Rebuttal Testimony, Borough of Hanover Statement No. 2-R, and related Exhibit GRH-1-R, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Gregory R. Herbert

Dated: October 20, 2021

Statement No. 3
Docket No. R-2021-3026116
Witness: C.E. Heppenstall

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
HANOVER, PENNSYLVANIA

DIRECT TESTIMONY

OF

CONSTANCE E. HEPPENSTALL

GANNETT FLEMING
VALUATION AND RATE CONSULTANTS, LLC

COST OF SERVICE ALLOCATION AND RATE DESIGN

June 29, 2021

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: HANOVER MUNICIPAL WATER WORKS
DOCKET NO. R-2021-3026116

DIRECT TESTIMONY OF CONSTANCE E. HEPPENSTALL

1. Q. State your name and business address.

A. My name is Constance E. Heppenstall. My business address is 1010 Adams Avenue, Audubon, Pennsylvania.

2. Q. By whom are you employed?

A. I am employed by Gannett Fleming Valuation and Rate Consultants, LLC .

3. Q. Please state your position with Gannett Fleming Valuation and Rate Consultants, LLC, and briefly describe your general duties and responsibilities.

A. My title is Senior Project Manager. My duties and responsibilities include the preparation of accounting and financial data for revenue requirement and cash working capital claims, the allocation of cost of service to customer classifications, and the design of customer rates in support of public utility rate filings.

4. Q. Have you presented testimony in rate proceedings before a regulatory agency?

A. Yes. I have testified before the Pennsylvania Public Utility Commission, the Arizona Corporation Commission, the Kentucky Public Service Commission, the Virginia State Corporate Commission, the Missouri Public Service Commission, the Hawaii Public Service Commission, the West Virginia Public Service Commission, the Indiana Utility Regulatory Commission and the

California Public Utility Commission concerning revenue requirements, cost of service allocation and rate design. A list of cases in which I have testified is attached to my testimony.

5. Q. What is your educational background?

A. I have a Bachelor of Arts in Economics from the University of Virginia, Charlottesville, Virginia and a Master of Science in Industrial Administration from the Tepper School of Business at Carnegie-Mellon University, Pittsburgh, Pennsylvania.

6. Q. Would you please describe your professional affiliations?

A. I am a member of the American Water Works Association, the National Association of Water Companies, and the Pennsylvania Municipal Authorities Association.

7. Q. Briefly describe your work experience.

A. I joined the Gannett Fleming Valuation and Rate Consultants, LLC of Gannett Fleming, Inc. in August 2006, as a Rate Analyst and was promoted to my current position in 2012. Prior to my employment at Gannett Fleming, Inc., I was a Vice President of PriMuni, LLP where I developed financial analyses to test proprietary software in order to ensure its pricing accuracy in accordance with securities industry's conventions. From 1987 to 2001, I was employed by Commonwealth Securities and Investments, Inc. as a public finance professional where I created and implemented financial models for public finance clients to create debt structures to meet clients' needs. From 1986 to 1987, I was a public finance associate with Mellon Capital Markets.

8. Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to explain and support Hanover Municipal Water Works' (Borough) cost of service allocation study and the proposed rate design based on the fully projected future test year ending December 31, 2022.

9. Q. Have you prepared exhibits which present and support the Borough's claims in this proceeding?

A. Yes. Exhibit CEH-1 presents the Borough's cost of service allocation study and the proposed rate design for the twelve months ended December 31, 2022, and the associated data required under 52 Pa. Code 53.53 of the Pennsylvania Public Utility Commission Tariff Regulations.

10. Q. Please explain the contents of Exhibit CEH-1.

A. Exhibit CEH-1, titled "Cost of Service Allocation Study for the Fully Projected Test Year Ended December 31, 2022," is the report on the cost of service study prepared for the Borough. It sets forth the results of the study based on the estimated conditions during the twelve months ended December 31, 2022. The information in the exhibit includes a description of the methods used in the study, the allocation of cost of service, and the factors on which the allocations were based.

11. Q. What is the purpose of the cost of service allocation study?

A. The purpose of the study is to allocate the total cost of service to the several customer classifications served both inside and outside the Borough. The study provides a basis for determining the extent to which the revenues to be derived from each service area and customer classification are aligned with

the cost of serving that classification.

12. Q. What method of cost allocation was used in the study?

A. The Base-Extra Capacity Method, as described in the 2017 edition and prior editions of the Water Rates Manual published by the American Water Works Association, was used to allocate the costs.

13. Q. Why did you use that method?

A. The base-extra capacity method is a recognized method which allocates the cost of providing water service to customer classifications in proportion to the classification's use of commodity, facilities and services. It is generally accepted as a sound method for cost allocation and has been accepted by this Commission.

14. Q. Is this method described in Exhibit CEH-1?

A. Yes. It is described on pages 2 and 3 of the exhibit.

15. Q. Please outline the procedure which you followed in the cost allocation study.

A. The allocation of costs to customer classifications is presented in Schedule D, of Exhibit CEH-1. The items of cost, which include operating expenses, depreciation expenses, and income available for return, are identified in column 1 of Schedule D. The cost of each item, shown in column 3, is allocated to the several customer classifications based on the allocation factor referenced in column 2. The development of the allocation factors is presented in Schedule E.

Referring to some of the larger cost items, purchased electric power and treatment chemicals, were allocated to customer classifications on the basis

of average daily consumption, because they tend to vary with the amount of water consumed. Source of supply and water treatment costs were allocated partly on the basis of average consumption and partly on the basis of maximum day extra demand (i.e., the difference between maximum day and average day demand), inasmuch as the function of the associated facilities is generally to meet maximum day requirements.

Transmission mains and pumping stations are allocated on the basis of average consumption, maximum day extra demand and fire protection demands. Costs associated with distribution mains and storage facilities were allocated partly on the basis of average consumption, partly on the basis of maximum hour extra demand, and partly on the demand for fire protection service because these facilities are designed to meet maximum hour and fire demand requirements.

Fire demand costs were allocated between public and private fire services in proportion to the relative potential demands on the system by hydrants and fire services for each classification. The basis for the allocation of fire demand costs between public and private fire service is presented in Schedule F.

Certain facilities serving only the outside-Borough service area such as booster pumping stations were allocated to customer classifications for outside-Borough only.

Costs associated with meters and services were allocated in proportion to the 5/8-inch meter equivalents and 3/4-inch service equivalents serving each classification. Capital costs associated with fire hydrants were allocated between the inside-Borough and outside-Borough service areas on the basis

of the number of hydrants in each area. Costs for meter reading, billing, customer accounting and collection were allocated on the number of meter readings and number of bills for each classification.

Administrative and general costs were allocated on the basis of the allocated direct costs excluding those costs requiring little administrative and general expense. Annual depreciation accruals were allocated on the basis of the function of the facilities represented by the depreciation expense for each depreciable plant account. Income available for return was allocated based on the results of allocating the original cost measure of value.

16. Q. What were the sources of the total cost of service data set forth in the third column of Schedule D?

A. The operating and maintenance expenses, depreciation expense and income available for return were based on data presented in Exhibit No. GRH-1, for submission to the Pennsylvania Public Utility Commission in support of the Company's Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3.

The total operating expense in the amount of $5,210,095 presented in Schedule D on page 11 of Exhibit No. CEH-1 is the pro forma amount shown in Exhibit GRH-1 of the supporting data filed with the tariff.

The depreciation expense of $2,062,625 by plant account, shown on page 12 of Exhibit CEH-1, was developed from the detail presented in Exhibit JJS-3, "Depreciation Study – Calculated Annual Depreciation Accruals Related to Utility Plant at December 31, 2022". The total amount also is the pro forma amount shown in Exhibit GRH-1 of the supporting data filed with the tariff.

The original cost less depreciation data shown on page 34 of Exhibit CEH-

1 were calculated from data presented in Exhibit JJS-3.

17. Q. Refer to Schedule C, pages 15 and 19 of Exhibit CEH-1, and explain how you determined the maximum day and maximum hour factors entered in column 3.

A. The maximum day and maximum hour factors were based on judgment considering the system maximum day ratio, observations of the service areas, billing records, field studies conducted by our firm for other Pennsylvania water utilities and generally accepted maximum day and hour ratios.

18. Q. Please explain the allocation of public fire costs.

A. The Borough's existing public fire hydrant rate recovers approximately 65% of the outside Borough cost of public fire service which exceeds the 25% required by Section 1328 of the Public Utility Code. Therefore, no increase to the public fire hydrant rate is proposed. The portion of public fire hydrant costs left unrecovered has been reallocated to customer classes, excluding private fire, using 5/8-inch meter equivalents.

19. Q. Why did you use 5/8-inch meter equivalents to reallocate the unrecovered public fire costs?

A. Allocating public fire cost of service based on 5/8-inch meter equivalents is consistent with the recovery of such fixed costs and also recognizes that customers with larger-sized meters tend to have higher property values.

20. Q. Have you used this method to reallocate unrecovered public fire costs in other Pennsylvania water rates cases?

A. Yes, I have. In my testimony for the Pennsylvania-American Water Company, I reallocated the unrecovered public fire costs in the same manner, using 5/8-

inch meter equivalents.

21. Q. What do the results of the cost allocation study show?

A. Schedule A in Exhibit CEH-1 sets forth the results of the cost allocation study compared to revenues under present and proposed rates. The allocated cost of service for outside-Borough customers of $7,222,314 ($6,969,562 + $252,752 other revenues) supports the proposed revenue for outside-Borough customers of $7,222,314.

PROPOSED RATES

22. Q. Please explain the proposed rate design.

A. The proposed rate design for outside-Borough customers maintains a monthly or quarterly customer charge by meter size plus a single block consumption charge for each classification. A comparison of present and proposed outside-Borough rates is set forth on page 40 of Exhibit CEH-1.

Customer charges were not increased inasmuch as the existing customer charges are sufficient to recover the customer costs. Private fire line rates were increased to recover the allocated cost of private fire service. As stated earlier in my testimony, public fire hydrant rates were not increased at this time.

23. Q. What is the increase for an average outside-Borough residential customer?

A. For an average residential customer with a 5/8-inch meter and usage of 11,000 per quarter, the bill would increase by $19.37 per quarter, from $68.94 to $88.32 or 28.1%. See Exhibit CEH-1, page 41.

24. Q. What is the effect of the proposed outside-Borough rates on commercial and industrial customers?

A. The bill for an average commercial customer with a 5/8-inch meter and 37,000 gallons of usage per quarter would increase from $154.02 to $204.11 or 32.5%. An average industrial customer with a 2-inch meter and 332,000 gallons of usage per month would increase from $1,366.66 to $1,701.98 or 24.5%. See Exhibit CEH-1, pages 42 and 43.

25. Q. What is the effect of the proposed rates for the large industrial customer?

A. The proposed rates for the large industrial average monthly bill with four meters and usage of 32,959,000 gallons per month would increase from $106,705.27 to $146,922 or 37.8%.

26. Q. Does this conclude your direct testimony?

A. Yes, it does.

CONSTANCE E. HEPPENSTALL – LIST OF CASES TESTIFIED

	Year	Jurisdiction	Docket No.	Client/Utility	Subject
1.	2010	AZ CC	W-01303A-09-0343 and SW-01303A-09-0343	Arizona American Water Company	Rate Consolidation
2.	2010	Pa PUC	R-2010-2179103	City of Lancaster – Bureau of Water	Revenue Requirements
3.	2012	Pa PUC	R-2012-2311725	Hanover Borough	Cost of Service/Revenue Requirements
4.	2012	Pa PUC	R-2012-2310366	City of Lancaster – Sewer Fund	Revenue Requirements
5.	2013	Pa PUC	R-2013-2350509	City of DuBois – Bureau of Water	Revenue Requirements
6.	2013	Pa PUC	R-2013-2390244	City of Bethlehem – Bureau of Water	Revenue Requirements
7.	2014	Pa PUC	R-2014-2418872	City of Lancaster – Bureau of Water	Revenue Requirements
8.	2014	Pa PUC	R-2014-2428304	Hanover Borough	Revenue and Revenue Reqrmnts
9.	2015	KY PSC	Case No.2015-000143	Northern Kentucky Water District	Cost of Service
10.	2016	Pa PUC	R-2016-2554150	City of DuBois – Bureau of Water	Cost of Service/Revenue Requirements
11.	2016	AZ CC	WS-01303A-16-0145	EPCOR Water Arizona, Inc.	Cost of Service/Rate Design
12.	2017	MO PSC	WR-2017-0285	Missouri-American Water Company	Cost of Service/Rate Design
13.	2017	MO PSC	SR-2017-0286	Missouri-American Water Company	Cost of Service/Rate Design
14.	2017	VA SCC	PUR-2017-00082	Aqua Virginia, Inc	Cost of Service
15.	2017	AZ CC	WS-01303A-17-0257	EPCOR Water Arizona, Inc	Cost of Service/Rate Design
16.	2017	HI PUC	2017-0446	Hana Water Systems, LLC – North	Cost of Service/Rate Design
17.	2017	HI PUC	2017-0447	Hana Water Systems, LLC – South	Cost of Service/Rate Design
18.	2018	PA PUC	2018-200208	SUEZ Water Pennsylvania	Revenue Requirements
19.	2018	KY PSC	2018-00208	Water Service Corp of KY	Cost of Service/Rate Design
20.	2018	WV PSC	18-0573-W-42t	West Virginia American Water Co.	Cost of Service
21.	2018	IN IRC	50208	Indiana American Water Company	Cost of Service/Demand Study
22.	2018	KY PSC	2018-00291	Northern Kentucky Water District	Cost of Service/Rate Design
23.	2018	KY PSC	2018-0358	Kentucky American Water	Cost of Service/Rate Design
24.	2019	PA PUC	2019-3006904	Newtown Artesian Water Co.	Revenue Reqmts./Rate Design
25.	2019	PA PUC	2019-3010955	City of Lancaster – Sewer Fund	Rev. Reqmts./Cost of Service/Rates
26.	2020	PA PUC	2020-3017206	Philadelphia Gas Works	Cost of Service
27.	2020	PA PUC	2020-3019369	Pennsylvania American Water Co.	Cost of Service/Rate Design
28.	2020	PA PUC	2020-3019371	Pennsylvania American Water Co.	Cost of Service/Rate Design
29.	2020	PA PUC	2020-3020256	City of Bethlehem	Rev. Reqmts./Cost of Service/Rates
30.	2020	CA PUC	A2101003	San Jose Water Company	Rate Design
31.	2020	VA SCC	PUR-2020-00106	Aqua Virginia, Inc.	Cost of Service

VERIFICATION

I, Constance E. Heppenstall, hereby state that the facts set forth in my Direct Testimony, Borough of Hanover Statement No. 3, and related Exhibit CEH-1, filed with the Public Utility Commission on June 29, 2021, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Constance E. Heppenstall

Dated: June 29, 2021

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

Hanover, Pennsylvania

COST OF SERVICE ALLOCATION STUDY

FOR THE FULLY PROJECTED FUTURE TEST YEAR ENDED

DECEMBER 31, 2022

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania

Gannett Fleming

Excellence Delivered ***As Promised***

June 29, 2021

Borough of Hanover – Hanover Municipal Water Works
44 Frederick Street
Hanover, PA 17331

Attention: Mr. Samuel Miller, Director of Finance/Treasurer

Pursuant to your request, we have conducted a cost of service allocation study based on the revenue requirements estimated for the fully projected future test year ended December 31, 2022.

The attached report presents the results of the allocation study, as well as supporting schedules which set forth the detailed cost allocation calculations. Schedule A presents a comparison of the cost of service by customer classification with the pro forma revenues produced by each classification under present and proposed rates.

Respectfully submitted,

GANNETT FLEMING VALUATION
AND RATE CONSULTANTS, LLC

CONSTANCE E. HEPPENSTALL
Senior Project Manager, Rate Studies

GREGORY R. HERBERT
Rate Analyst

CEH:mle

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PART I. INTRODUCTION

BOROUGH OF HANOVER – HANOVER MUNICIPAL WATER WORKS

COST OF SERVICE ALLOCATION STUDY
FOR THE TEST YEAR ENDED DECEMBER 31, 2022

PART I. INTRODUCTION

PLAN OF REPORT

The report sets forth the results of the cost of service allocation studies based on the estimated revenue requirements as of December 31, 2022, for the Borough of Hanover – Hanover Municipal Water Works (Hanover or Borough). Part I, Introduction, contains statements with respect to the basis of the study, the procedures employed, and a summary of the results of the study. Part II, Cost of Service by Customer Classification, presents detailed schedules of the allocation of costs to specific customer classifications, as well as the bases for the allocations. Schedule A in Part II summarizes the cost allocation and the revenues produced under present and proposed rates.

BASIS OF STUDY

The purpose of the cost allocation study was to determine the relative cost of service responsibilities of the several customer classifications for Inside-Borough and Outside-Borough service areas based on considerations of quantity of water consumed, variability of rate of consumption, and costs associated with customer metering, billing and accounting. The allocation studies incorporated generally-accepted principles and procedures for allocating the several categories of cost to customer classifications in proportion to each classification's use of facilities, commodities and services required in providing water service.

ALLOCATION PROCEDURES

The allocation studies were based on the Base-Extra Capacity Method for allocating costs to customer classifications. The method is described in the 2017 edition and prior editions of the Water Rates Manual published by the American Water Works Association. The four basic categories of cost responsibility are base, extra capacity, customer, and fire protection costs. The following discussion presents a brief description of these costs and the manner in which they were allocated.

Base Costs are costs that tend to vary with the quantity of water used, plus costs associated with supplying, treating, pumping, and distributing water to customers under average load conditions, without the elements necessary to meet peak demands. Base costs were allocated to customer classifications on the basis of average daily usage.

Extra Capacity Costs are costs associated with meeting usage requirements in excess of the average. They include operating and capital costs for additional plant and system capacity beyond that required for average use. The extra capacity costs in this study are subdivided into costs necessary to meet maximum day extra demand and costs to meet maximum hour extra demand. The extra capacity costs were allocated to customer classifications on the bases of each classification's maximum day and hour usage in excess of average usage.

Customer Costs are costs associated with serving customers regardless of their usage or demand characteristics. Customer costs include the operating and capital costs related to meters and services, meter reading costs, and billing and collecting costs. The customer costs were allocated on the bases of the capital cost of meters and services, and the number of customers.

Fire Protection Costs are costs associated with providing the facilities to meet the potential peak demand of fire protection service. Fire Protection costs are subdivided into costs to meet Public Fire Protection and Private Fire Protection demands. The extra capacity costs assigned to fire protection service were allocated to Public and Private Fire Protection on the basis of the total relative demands of the hydrants and fire service lines, sized to provide fire protection.

RESULTS OF STUDY

The results of the cost of service allocation study are set forth in Part II. The data summarized in Schedule A, Comparison of Cost of Service with Revenues Under Present and Proposed Rates for the Test Year Ended December 31, 2022, constitute the principal results of the cost allocation studies and subsequent rate designs.

The cost of service by customer classification shown in column 2 of Schedule A is developed in Schedule D, Projected Cost of Service for the Twelve Months Ended December 31, 2022, Allocated to Customer Classifications. The allocation of the total cost of service to the several customer classifications for Outside-Borough service areas was performed by applying the allocation factors referenced in column 2 of Schedule D to the cost of service set forth in column 3. The bases for the allocation factors are presented in Schedule E.

Schedule F presents the basis for allocating demand related costs of fire service to private and public fire protection classifications.

PART II. COST OF SERVICE BY CUSTOMER CLASSIFICATION

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

COMPARISON OF COST OF SERVICE WITH REVENUES UNDER PRESENT AND PROPOSED RATES
FOR THE TEST YEAR ENDED DECEMBER 31, 2022

Customer Classification	Cost of Service			Revenues, Present Rates		Revenue Proposed Rates		Proposed Increase	
	Amount	Percent	Outside Perc.	Amount	Percent	Amount	Percent	Amount	Percent Increase
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inside the Borough									
Residential	$ 1,643,610	17.2%							
Commercial/Public	446,205	4.7%							
Industrial	421,493	4.4%							
Private Fire	90,152	0.9%							
Public Fire Service	-	0.0%							
Total Inside the Borough	2,601,459	27.2%							
Outside the Borough									
Residential	3,722,009	38.9%	53.5%	2,936,274	54.4%	3,724,262	53.5%	787,988	26.8%
Commercial/Public	581,923	6.1%	8.3%	461,670	8.5%	580,515	8.3%	118,845	25.7%
Industrial	495,349	5.2%	7.1%	400,183	7.4%	495,136	7.1%	94,952	23.7%
Large Industrial	1,759,361	18.4%	25.2%	1,275,662	23.6%	1,756,452	25.2%	480,790	37.7%
Private Fire	279,148	2.9%	4.0%	200,901	3.7%	281,426	4.0%	80,526	40.1%
Public Fire Service	131,772	1.4%	1.9%	131,772	2.4%	131,771	1.9%	(0)	0.0%
Total Outside the Borough	6,969,562	72.9%	100.0%	5,406,462	100.0%	6,969,562	100.0%	1,563,100	28.9%
Total Sales - Outside	$ 6,969,562		100.0%	$ 5,406,462	100.0%	$ 6,969,562	100.0%	$ 1,563,100	28.9%
Other Revenues									
Outside the Borough	252,752			252,752		252,752		-	
Total Outside Borough	$ 7,222,314			$ 5,659,214		$ 7,222,314		$ 1,563,100	27.6%

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

DEVELOPMENT OF RATE OF RETURN BY CUSTOMER CLASSIFICATION
UNDER PRESENT RATES

ITEM	COST OF SERVICE	OUTSIDE - BOROUGH					
		RESIDENTIAL	COMMERCIAL	INDUSTRIAL	LARGE INDUSTRIAL	PRIVATE FIRE	PUBLIC FIRE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. REVENUES FROM SALES	5,406,462	2,936,274	461,670	400,183	1,275,662	200,901	131,772
2. OTHER REVENUES	252,752	134,738	20,808	17,542	61,840	10,276	7,549
3. TOTAL OPERATING REVENUES	5,659,214	3,071,012	482,478	417,725	1,337,502	211,176	139,321
4. LESS: OPERATING EXPENSES (INCLUDES REALLOCATION OF FIRE)	4,962,222	2,691,728	410,737	342,329	1,198,936	178,453	140,039
5. RETURN	696,992	379,284	71,740	75,397	138,566	32,723	(717)
6. ORIGINAL COSTS MEASURE OF VALUE	36,029,944	17,656,673	2,929,403	2,668,058	9,912,704	1,769,247	1,093,858
7. RATE OF RETURN, PERCENT	1.93	2.15	2.45	2.83	1.40	1.85	(0.07)
8. RELATIVE RATE OF RETURN	1.00	1.11	1.27	1.46	0.72	0.96	(0.03)

CALCULATION OF RETURN BY CLASS AFTER REALLOCATE PUBLIC FIRE

1. REVENUES FROM SALES	5,406,462	3,045,552	477,324	406,047	1,276,637	200,901
2. OTHER REVENUES	252,752	140,998	21,705	17,878	61,896	10,276
3. TOTAL OPERATING REVENUES	5,659,214	3,186,551	499,029	423,925	1,338,533	211,176
4. LESS: OPERATING EXPENSES (INCLUDES REALLOCATION OF FIRE)	4,962,222	2,807,862	427,374	348,560	1,199,972	178,453
5. RETURN	696,992	378,689	71,655	75,365	138,561	32,723
6. ORIGINAL COSTS MEASURE OF VALUE	36,029,944	18,563,809	3,059,353	2,716,735	9,920,799	1,769,247
7. RATE OF RETURN, PERCENT	1.93	2.04	2.34	2.77	1.40	1.85
8. RELATIVE RATE OF RETURN	1.00	1.05	1.21	1.43	0.72	0.96

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

DEVELOPMENT OF RATE OF RETURN BY CUSTOMER CLASSIFICATION
UNDER PROPOSED RATES

ITEM	COST OF SERVICE	OUTSIDE - BOROUGH					
		RESIDENTIAL	COMMERCIAL	INDUSTRIAL	LARGE INDUSTRIAL	PRIVATE FIRE	PUBLIC FIRE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. REVENUES FROM SALES	6,969,562	3,724,262	580,515	495,136	1,756,452	281,426	131,771
2. OTHER REVENUES	252,752	134,738	20,808	17,542	61,840	10,276	7,549
3. TOTAL OPERATING REVENUES	7,222,314	3,859,000	601,322	512,678	1,818,292	291,702	139,321
4. LESS: OPERATING EXPENSES (INCLUDES REALLOCATION OF FIRE)	4,962,222	2,691,728	410,737	342,329	1,198,936	178,453	140,039
5. RETURN	2,260,092	1,167,272	190,585	170,349	619,356	113,248	(718)
6. ORIGINAL COSTS MEASURE OF VALUE	36,029,944	17,656,673	2,929,403	2,668,058	9,912,704	1,769,247	1,093,858
7. RATE OF RETURN, PERCENT	6.27	6.61	6.51	6.38	6.25	6.40	(0.07)
8. RELATIVE RATE OF RETURN	1.00	1.05	1.04	1.02	1.00	1.02	(0.01)
CALCULATION OF RETURN BY CLASS AFTER REALLOCATE PUBLIC FIRE							
1. REVENUES FROM SALES	6,969,562	3,833,540	596,169	500,999	1,757,427	281,426	
2. OTHER REVENUES	252,752	140,998	21,705	17,878	61,896	10,276	
3. TOTAL OPERATING REVENUES	7,222,314	3,974,539	617,874	518,877	1,819,323	291,702	
4. LESS: OPERATING EXPENSES (INCLUDES REALLOCATION OF FIRE)	4,962,222	2,807,862	427,374	348,560	1,199,972	178,453	
5. RETURN	2,260,092	1,166,677	190,500	170,317	619,350	113,248	
6. ORIGINAL COSTS MEASURE OF VALUE	36,029,944	18,563,809	3,059,353	2,716,735	9,920,799	1,769,247	
7. RATE OF RETURN, PERCENT	6.27	6.28	6.23	6.27	6.24	6.40	
8. RELATIVE RATE OF RETURN	1.00	1.00	0.99	1.00	1.00	1.02	

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022
ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE- BOROUGH RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	OUTSIDE - BOROUGH RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
OPERATION AND MAINTENANCE EXPENSES													
Source of Supply													
Operating Expense:													
Labor	2	$ 197,640	38,935	12,096	13,776	158	119	67,237	11,661	11,265	41,900	316	178
Gas and Diesel	2	1,860	366	114	130	1	1	633	110	106	394	3	2
Miscellaneous Operating Expenses	2	18,047	3,555	1,104	1,258	14	11	6,140	1,065	1,029	3,826	29	16
Power	1	11,177	1,937	685	861	13	10	3,342	661	704	2,919	28	17
Total Operation Expense		228,723	44,794	13,999	16,024	187	141	77,351	13,496	13,104	49,039	376	213
Maintenance Expense:													
Labor	2	3,048	600	187	212	2	2	1,037	180	174	646	5	3
Miscellaneous Maintenance Expenses	2	27,602	5,438	1,689	1,924	22	17	9,390	1,628	1,573	5,852	44	25
Total Maintenance Expense		30,649	6,038	1,876	2,136	25	18	10,427	1,808	1,747	6,498	49	28
Total Source of Supply		259,373	50,832	15,875	18,160	212	159	87,778	15,304	14,851	55,537	425	240
Water Treatment													
Operating Expense:													
Labor	2	256,422	50,515	15,693	17,873	205	154	87,235	15,129	14,616	54,361	410	231
Lab - Water Testing	2	23,594	4,648	1,444	1,644	19	14	8,027	1,392	1,345	5,002	38	21
Diesel Fuel	1	-	0	0	0	0	0	0	0	0	0	0	0
Chemicals	1	257,420	44,611	15,780	19,821	309	232	76,969	15,214	16,217	67,238	644	386
Power	1	52,978	9,181	3,248	4,079	64	48	15,840	3,131	3,338	13,838	132	79
Sewer Bill	1	323,506	56,064	19,831	24,910	388	291	96,728	19,119	20,381	84,500	809	485
Stormwater Bill	1	950	165	58	73	1	1	284	56	60	248	2	1
Miscellaneous	2	55,691	10,971	3,408	3,882	45	33	18,946	3,286	3,174	11,807	89	50
Total Operating Expense		970,561	176,154	59,462	72,283	1,030	773	304,029	57,327	59,131	236,994	2,124	1,254
Maintenance Expense													
Labor	2	50,864	10,020	3,113	3,545	41	31	17,304	3,001	2,899	10,783	81	46
Miscellaneous Maintenance Expenses	2	16,963	3,342	1,038	1,182	14	10	5,771	1,001	967	3,596	27	15
Total Maintenance Expense		67,827	13,362	4,151	4,728	54	41	23,075	4,002	3,866	14,379	109	61
Total Water Treatment		1,038,388	189,516	63,613	77,010	1,085	813	327,103	61,328	62,997	251,373	2,233	1,315

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022
ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE- BOROUGH RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	OUTSIDE - BOROUGH RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
Power and Pumping													
Operating Expense													
Labor	3	300,582	53,684	16,652	18,967	5,982	4,238	92,609	16,081	15,540	57,682	11,873	7,274
Supplies and Expenses	3	21,038	3,757	1,165	1,327	419	297	6,482	1,126	1,088	4,037	831	509
Power	1	173,179	30,012	10,616	13,335	208	156	51,781	10,235	10,910	45,234	433	260
Total Operating Expense		494,799	87,453	28,434	33,629	6,608	4,691	150,872	27,442	27,538	106,953	13,137	8,043
Maintenance Expense													
Pump Station - Labor	3	50,963	9,102	2,823	3,216	1,014	719	15,702	2,727	2,635	9,780	2,013	1,233
Supplies and Equipment	3	26,255	4,689	1,455	1,657	522	370	8,089	1,405	1,357	5,038	1,037	635
Misc Maintenance Expense	3	-	0	0	0	0	0	0	0	0	0	0	0
Total Maintenance Expense		77,218	13,791	4,278	4,872	1,537	1,089	23,791	4,131	3,992	14,818	3,050	1,869
Total Power and Pumping		572,017	101,244	32,711	38,501	8,145	5,779	174,662	31,573	31,530	121,771	16,187	9,912
Transmission and Distribution													
Operating Expense													
Labor	10	293,694	70,751	16,065	7,871	6,784	7,607	121,560	14,890	7,078	13,040	14,185	13,862
Meter - Labor	8	124,245	37,100	9,592	3,777	0	0	61,191	8,759	3,280	547	0	0
Streets Dept.	10	20,694	4,985	1,132	555	478	536	8,565	1,049	499	919	1,000	977
Streets Dept. - Misc Exp	10	3,653	880	200	98	84	95	1,512	185	88	162	176	172
Meter Dept.	8	1,144	342	88	35	0	0	563	81	30	5	0	0
Other Distribution Expense	10	9,219	2,221	504	247	213	239	3,816	467	222	409	445	435
Gratuitous Services	10	-	0	0	0	0	0	0	0	0	0	0	0
Total Operating Expense		452,650	116,278	27,581	12,582	7,560	8,476	197,207	25,432	11,197	15,082	15,807	15,447
Maintenance Expense													
Transmission Mains - Labor	3	-	0	0	0	0	0	0	0	0	0	0	0
Transmission Mains - Supplies	3	-	0	0	0	0	0	0	0	0	0	0	0
Labor - Cleaning mains	3	-	0	0	0	0	0	0	0	0	0	0	0
Distribution Mains - Labor	6	135,121	19,260	5,376	4,898	8,109	5,744	36,785	5,697	4,422	16,219	17,705	10,907
Distribution Mains - Supplies	6	58,327	8,314	2,320	2,114	3,500	2,480	15,879	2,459	1,909	7,001	7,642	4,708
Distribution Mains - Contract Cleaning	6	-	0	0	0	0	0	0	0	0	0	0	0
Service Lines - Labor	9	90,633	29,465	3,462	372	1,468	0	50,528	2,592	517	45	2,184	0
Service Lines	9	19,506	6,341	745	80	316	0	10,875	558	111	10	470	0
Tanks and Reservoirs - Labor	5	9,059	1,849	525	494	118	85	3,200	505	404	1,502	233	145
Tanks and Reservoirs	5	748	153	43	41	10	7	264	42	33	124	19	12
Tanks and Reservoirs - Tank Painting	5	-	0	0	0	0	0	0	0	0	0	0	0
Meters -Labor	8	114,523	34,197	8,841	3,482	0	0	56,403	8,074	3,023	504	0	0
Meters	8	13,285	3,967	1,026	404	0	0	6,543	937	351	58	0	0
Hydrants - Labor	7	11,317	0	0	0	0	4,153	0	0	0	0	0	7,164
Hydrants	7	7,400	0	0	0	0	2,716	0	0	0	0	0	4,684
Total Maintenance Expense		459,919	103,545	22,338	11,884	13,521	15,185	180,477	20,862	10,770	25,463	28,253	27,620
Total Transmission and Distribution		912,569	219,823	49,919	24,467	21,081	23,662	377,685	46,295	21,967	40,545	44,060	43,067

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022
ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE- BOROUGH RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	OUTSIDE - BOROUGH RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
Administrative and General Expenses													
Wages and Salaries - Professional Staff	13	45,965	10,117	2,565	2,119	680	657	17,393	2,413	1,783	5,663	1,393	1,181
Wages - General Office	13	297,833	65,553	16,619	13,730	4,408	4,259	112,700	15,636	11,556	36,693	9,024	7,654
Wages - Billing and Collecting	11	74,735	24,924	2,638	336	852	7	42,180	1,943	456	0	1,383	15
Office Supplies	13	-	0	0	0	0	0	0	0	0	0	0	0
Misc Office Exp	13	2,706	596	151	125	40	39	1,024	142	105	333	82	70
General Office - Data Processing Maint.	13	-	0	0	0	0	0	0	0	0	0	0	0
General Office - Computer Support	11	10,679	3,562	377	48	122	1	6,027	278	65	0	198	2
General Office - Misc	13	8,635	1,901	482	398	128	123	3,267	453	335	1,064	262	222
General Office - Rent	13	93,199	20,513	5,201	4,296	1,379	1,333	35,267	4,893	3,616	11,482	2,824	2,395
General Office - Postage	11	35,620	11,879	1,257	160	406	4	20,104	926	217	0	659	7
General Office - Auditors	13	10,448	2,300	583	482	155	149	3,954	549	405	1,287	317	269
Rate Case Expense	18	141,033	0	0	0	0	0	74,145	11,610	9,963	35,601	5,647	4,068
General Property Expense - Labor	13	88,016	19,372	4,911	4,058	1,303	1,259	33,305	4,621	3,415	10,844	2,667	2,262
General Property Expense - Vehicle	13	14,117	3,107	788	651	209	202	5,342	741	548	1,739	428	363
General Property Expense - Misc	13	73,891	16,263	4,123	3,406	1,094	1,057	27,960	3,879	2,867	9,103	2,239	1,899
Legal Expenses	13	10,854	2,389	606	500	161	155	4,107	570	421	1,337	329	279
Legal Expenses - PA PUC Legal Fees	13A	14,437	0	0	0	0	0	8,418	1,169	863	2,740	674	572
Insurance - Health	14	1,007,795	223,428	56,940	46,359	14,613	13,605	383,668	53,514	39,002	122,346	29,831	24,489
Insurance - Workman's Comp	14	52,250	11,584	2,952	2,404	758	705	19,892	2,774	2,022	6,343	1,547	1,270
Insurance - Fire and Liability	14	38,000	8,425	2,147	1,748	551	513	14,467	2,018	1,471	4,613	1,125	923
Insurance -Life	14	5,675	1,258	321	261	82	77	2,160	301	220	689	168	138
Insurance -Prescriptions	14	-	0	0	0	0	0	0	0	0	0	0	0
Retirees Hospitalization and Health	14	48,210	10,688	2,724	2,218	699	651	18,354	2,560	1,866	5,853	1,427	1,172
Employee Pension	14	167,570	37,150	9,468	7,708	2,430	2,262	63,794	8,898	6,485	20,343	4,960	4,072
Unemployment Compensation	14	-	0	0	0	0	0	0	0	0	0	0	0
Professional Services - Engineering Services	13	105,690	23,262	5,898	4,872	1,564	1,511	39,993	5,549	4,101	13,021	3,202	2,716
General Prop. Labor Exp	13	15,337	3,376	856	707	227	219	5,804	805	595	1,890	465	394
Bank Fees	13	5,325	1,172	297	245	79	76	2,015	280	207	656	161	137
Total Administrative and General Expenses		2,368,020	502,819	121,903	96,832	31,938	28,865	945,339	126,522	92,584	293,641	71,009	56,569
Other Operating Expense													
Merchandising and Jobbing - Labor	13	18,503	4,073	1,032	853	274	265	7,002	971	718	2,280	561	476
Merchandising and Jobbing - Misc	13	41,225	9,074	2,300	1,900	610	590	15,600	2,164	1,600	5,079	1,249	1,059
Other Non-operating Expense	13	-	0	0	0	0	0	0	0	0	0	0	0
Total Other Operating Expense		59,728	13,146	3,333	2,753	884	854	22,601	3,136	2,317	7,359	1,810	1,535
Total Operation and Maintenance		5,210,095	1,077,380	287,354	257,723	63,345	60,133	1,935,169	284,158	226,247	770,225	135,724	112,638

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2022
ALLOCATED TO RESIDENTIAL, COMMERCIAL AND PUBLIC, INDUSTRIAL, AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE- BOROUGH RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	OUTSIDE - BOROUGH RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
Depreciation Expense													
Collecting and Impounding Reservoirs - Imp	1	331,302	57,415	20,309	25,510	398	298	99,059	19,580	20,872	86,536	828	497
Springs and Wells	2	11,035	2,174	675	769	9	7	3,754	651	629	2,339	18	10
Collecting and Impounding Reservoirs - Coll	1	36,203	6,274	2,219	2,788	43	33	10,825	2,140	2,281	9,456	91	54
Aqueducts and Supply Mains	2	287,581	56,653	17,600	20,044	230	173	97,835	16,967	16,392	60,967	460	259
Sedimentation Basins	2	19,760	3,893	1,209	1,377	16	12	6,722	1,166	1,126	4,189	32	18
Filters	2	230,193	45,348	14,088	16,044	184	138	78,312	13,581	13,121	48,801	368	207
Clear Water Basin & Clearwell	2	25,178	4,960	1,541	1,755	20	15	8,566	1,486	1,435	5,338	40	23
Chemical Treatment Plant	2	411,660	81,097	25,194	28,693	329	247	140,047	24,288	23,465	87,272	659	370
Parr's Hill Chlorination Facility	2A	5,106	0	0	0	0	0	2,604	450	432	1,601	12	7
Laboratory Equipment	2	1,019	201	62	71	1	1	347	60	58	216	2	1
Structures and Improvements - Pumping	3	13,687	2,444	758	864	272	193	4,217	732	708	2,627	541	331
Parr's Hill Booster Station	3A	24,142	0	0	0	0	0	11,156	1,927	1,854	6,851	1,458	896
Kidd Lane Pump Station	3A	368	0	0	0	0	0	170	29	28	104	22	14
Slagle Run Pump Station	3	1,646	294	91	104	33	23	507	88	85	316	65	40
Pumps and Pumping Equipment	3	70,356	12,566	3,898	4,439	1,400	992	21,677	3,764	3,637	13,501	2,779	1,703
Electrical Equipment	3	75,451	13,476	4,180	4,761	1,501	1,064	23,246	4,037	3,901	14,479	2,980	1,826
Other Pump Station Equipment	3	699	125	39	44	14	10	215	37	36	134	28	17
Transmission Mains	3	35,658	6,369	1,975	2,250	710	503	10,986	1,908	1,844	6,843	1,408	863
Distribution Reservoirs and Standpipes	5	35,161	7,176	2,036	1,916	457	331	12,422	1,958	1,568	5,830	904	563
Distribution Mains	6	136,474	19,452	5,430	4,947	8,190	5,802	37,154	5,754	4,466	16,381	17,882	11,016
Services	9	32,364	10,522	1,236	133	524	0	18,043	926	184	16	780	0
Meters	8	81,809	24,428	6,316	2,487	0	0	40,291	5,768	2,160	360	0	0
Hydrants	7	450	0	0	0	0	165	0	0	0	0	0	285
Structures and Improvements - General	13	12,475	2,746	696	575	185	178	4,721	655	484	1,537	378	321
General Office Equipment	13	3,509	772	196	162	52	50	1,328	184	136	432	106	90
Other General Equipment	13	179,339	39,473	10,007	8,268	2,654	2,565	67,862	9,415	6,958	22,095	5,434	4,609
Depreciation Expense		2,062,625	397,857	119,755	128,002	17,223	12,798	702,065	117,550	107,861	398,221	37,274	24,019
Taxes Other Than Income - Social Security	14	3,325	737	188	153	48	45	1,266	177	129	404	98	81
Taxes Other Than Income - Payment in Lieu	15	161,837	30,069	8,998	9,597	2,492	1,764	53,228	8,853	8,092	30,086	5,357	3,301
Utility Operating Income Available for Return - Inside	16A	218,172	124,140	37,089	39,424	10,254	7,265	0	0	0	0	0	0
Utility Operating Income Available for Return - Outside	16B	2,260,092	0	0	0	0	0	1,107,445	183,746	167,473	621,751	110,971	68,707
TOTAL COST OF SERVICE		9,916,147	1,630,183	453,384	434,898	93,362	82,005	3,799,173	594,483	509,802	1,820,687	289,424	208,745
LESS: OTHER WATER REVENUES													
PENALTIES	17	19,867	3,077	850	809	169	153	7,786	1,220	1,047	3,737	592	427
RENTS	17	96,927	15,014	4,148	3,945	824	746	37,986	5,951	5,108	18,232	2,888	2,084
MISCELLANEOUS REVENUE	17	16,566	2,566	709	674	141	128	6,492	1,017	873	3,116	494	356
RETIREES REIMBURSEMENT	14	46,151	10,232	2,608	2,123	669	623	17,570	2,451	1,786	5,603	1,366	1,121
UNMETERED SALES	17	41,964	6,500	1,796	1,708	357	323	16,446	2,577	2,212	7,893	1,251	902
MERCHANDISING AND JOBBING	17	123,650	19,153	5,292	5,033	1,051	952	48,459	7,592	6,516	23,259	3,685	2,658
TOTAL OTHER WATER REVENUES		345,125	56,543	15,404	14,291	3,210	2,925	134,738	20,808	17,542	61,840	10,276	7,549
REALLOCATION OF PUBLIC FIRE - OUTSIDE	19							57,574	8,248	3,089	514	-	(69,424)
REALLOCATION OF PUBLIC FIRE - INSIDE	20		69,970	8,224	886	-	(79,080)						
TOTAL COST OF SERVICE RELATED TO SALES OF WATER		9,571,021	1,643,610	446,205	421,493	90,152	0	3,722,009	581,923	495,349	1,759,361	279,148	131,772

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS

FACTOR 1. ALLOCATION OF COSTS WHICH VARY WITH THE AMOUNT OF WATER CONSUMED.

Factors are based on the pro forma test year average daily consumption for each customer classification.

Customer Classification	Average Daily Consumption, 1000 Gallons	Allocation Factor	Factor 1A Allocation Factor for Outside-Borough
(1)	(2)	(3)	(4)
Inside - Borough			
Residential	719	0.1733	
Commercial/Public	255	0.0613	
Industrial	320	0.0770	
Private Fire Protection	5	0.0012	
Public Fire Protection	4	0.0009	
Outside - Borough			
Residential	1,241	0.2990	0.4356
Commercial/Public	245	0.0591	0.0862
Industrial	261	0.0630	0.0918
Large Industrial	1,084	0.2612	0.3806
Private Fire Protection	10	0.0025	0.0036
Public Fire Protection	6	0.0015	0.0022
Total	4,149	1.0000	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS

FACTOR 2. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM DAY EXTRA CAPACITY FUNCTIONS.

Factors are based on the weighting of the factors for average daily consumption (Factor 1) and the factors derived from maximum day extra capacity demand for each customer classification, as follows:

	Average Daily Consumption		Maximum Day Extra Capacity		
Customer Classification	Allocation Factor 1	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)x	(4)	(5)=(4)x	(6)=(3)+(5)
		0.6250		0.3750	
Inside - Borough					
Residential	0.1733	0.1082	0.2369	0.0888	0.1970
Commercial/Public	0.0613	0.0383	0.0610	0.0229	0.0612
Industrial	0.0770	0.0481	0.0575	0.0216	0.0697
Private Fire Protection	0.0012	0.0008			0.0008
Public Fire Protection	0.0009	0.0006			0.0006
Outside - Borough					
Residential	0.2990	0.1869	0.4089	0.1533	0.3402
Commercial/Public	0.0591	0.0369	0.0588	0.0221	0.0590
Industrial	0.0630	0.0394	0.0470	0.0176	0.0570
Large Industrial	0.2612	0.1633	0.1299	0.0487	0.2120
Private Fire Protection	0.0025	0.0016			0.0016
Public Fire Protection	0.0015	0.0009			0.0009
Total	1.0000	0.6250	1.0000	0.3750	1.0000

The derivation of the maximum day extra capacity factors in column 4 and the basis for the column 3 and column 5 weightings are presented on the following page.

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS

FACTOR 2A. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM DAY EXTRA CAPACITY FUNCTIONS FOR OUTSIDE BOROUGH CUSTOMERS ONLY

Factors are based on the weighting of the factors for average daily consumption (Factor 1) and the factors derived from maximum day extra capacity demand for each customer classification, as follows:

	Average Daily Consumption		Maximum Day Extra Capacity		
Customer Classification	Allocation Factor 1A	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)x 0.6250	(4)	(5)=(4)x 0.3750	(6)=(3)+(5)
Outside - Borough					
Residential	0.4356	0.2721	0.6344	0.2379	0.5100
Commercial/Public	0.0862	0.0539	0.0912	0.0342	0.0881
Industrial	0.0918	0.0574	0.0729	0.0273	0.0847
Large Industrial	0.3806	0.2379	0.2015	0.0756	0.3135
Private Fire Protection	0.0036	0.0023			0.0023
Public Fire Protection	0.0022	0.0014			0.0014
Total	1.0000	0.6250	1.0000	0.3750	1.0000

The derivation of the maximum day extra capacity factors in column 4 and the basis for the column 3 and column 5 weightings are presented on the following page.

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 2 AND 2A. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM DAY EXTRA CAPACITY FUNCTIONS, cont.

Customer Classification	Average Daily Consumption, 1000 Gallons	Maximum Day Extra Capacity Factor*	Maximum Day Extra Capacity Rate of Flow, 1000 Gallons Per Day	Factor 2 Allocation Factor	Factor 2A Allocation Factor for Outside-Borough
(1)	(2)	(3)	(4)=(2)x(3)	(5)	(6)
Inside - Borough					
Residential	719	1.10	790.6	0.2369	
Commercial	255	0.80	203.6	0.0610	
Industrial	320	0.60	192.0	0.0575	
Outside - Borough					
Residential	1,241	1.10	1,364.8	0.4089	0.6344
Commercial	245	0.80	196.2	0.0588	0.0912
Industrial	261	0.60	156.8	0.0470	0.0729
Large Industrial	1,084	0.40	433.4	0.1299	0.2015
Total	4,124.1		3,337.4	1.0000	1.0000

The weighting of the factors is based on the maximum day ratio of 1.25, based on a review of historic maximum day ratios.

	Maximum Day Ratio	Weight
Average Day	1.00	0.6250
Maximum Day Extra Capacity	0.60	0.3750
Total	1.60	1.0000

* Ratio of maximum day to average day minus 1.0.

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 3. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE, MAXIMUM DAY EXTRA CAPACITY AND FIRE PROTECTION FUNCTIONS.

Factors are based on the weighting of the average daily consumption, the maximum day extra capacity demand, and the fire protection demand for each customer classification.

	Average Daily Consumption			Max Day Extra Capacity		Fire Protection		
Customer Classification	1000 Gals.	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)	(4)=(3)x 0.5660	(5)	(6)=(5)x 0.3397	(7)	(8)=(7)x 0.0943	(9)=(4)+ (6)+(8)
Inside - Borough								
Residential	719	0.1733	0.0981	0.2369	0.0805			0.1786
Commercial/Public	255	0.0613	0.0347	0.0610	0.0207			0.0554
Industrial	320	0.0770	0.0436	0.0575	0.0195			0.0631
Private Fire Protection	5	0.0012	0.0007			0.2038	0.0192	0.0199
Public Fire Protection	4	0.0009	0.0005			0.1441	0.0136	0.0141
Outside - Borough								
Residential	1,241	0.2990	0.1692	0.4089	0.1389			0.3081
Commercial/Public	245	0.0591	0.0335	0.0588	0.0200			0.0535
Industrial	261	0.0630	0.0357	0.0470	0.0160			0.0517
Large Industrial	1,084	0.2612	0.1478	0.1299	0.0441			0.1919
Private Fire Protection	10	0.0025	0.0014			0.4036	0.0381	0.0395
Public Fire Protection	6	0.0015	0.0008			0.2485	0.0234	0.0242
	4,149	1.0000	0.5660	1.0000	0.3397	1.0000	0.0943	1.0000

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BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 3A. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE, MAXIMUM DAY EXTRA CAPACITY AND FIRE PROTECTION FUNCTIONS FOR OUTSIDE-BOROUGH CUSTOMERS ONLY

Factors are based on the weighting of the average daily consumption, the maximum day extra capacity demand, and the fire protection demand for each customer classification.

	Average Daily Consumption			Max Day Extra Capacity		Fire Protection		
Customer Classification	1000 Gals.	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)	(4)=(3)x 0.5660	(5)	(6)=(5)x 0.3397	(7)	(8)=(7)x 0.0943	(9)=(4)+ (6)+(8)
Outside - Borough								
Residential	1,241	0.4356	0.2466	0.6344	0.2155			0.4621
Commercial/Public	245	0.0862	0.0488	0.0912	0.0310			0.0798
Industrial	261	0.0918	0.0520	0.0729	0.0248			0.0768
Large Industrial	1,084	0.3806	0.2154	0.2015	0.0684			0.2838
Private Fire Protection	10	0.0036	0.0020			0.6189	0.0584	0.0604
Public Fire Protection	6	0.0022	0.0012			0.3811	0.0359	0.0371
	2,847	1.0000	0.5660	1.0000	0.3397	1.0000	0.0943	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 3 AND 3A. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM DAY EXTRA CAPACITY AND FIRE PROTECTION FUNCTIONS, cont.

The weighting of the factors is based on the potential demand of general and fire protection service. The bases for the potential demand of general service are a maximum day to average day ratio of 1.6 and the average daily send-out during the test year ending 12/31/20 of 5.04 mgd. The system demand for the fire protection is 3,500 gpm for 4 hours.

	Ratio	Rate of Flow, (GPD)	Weight
Average Hour	1.00	5,044,333	0.5660
Maximum Hour Extra Capacity	0.60	3,026,600	0.3397
Subtotal	1.60	8,070,933	0.9057
Fire Protection		840,000	0.0943
Total		8,910,933	1.0000

The public and private fire protection allocation factors in column 7 on the previous page are based on relative potential demands. (See Schedule D).

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 4. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM HOUR EXTRA CAPACITY FUNCTIONS.

Factors are based on the weighting of the average hourly consumption, the maximum hour extra capacity demand, and the fire protection demand for each customer classification.

Customer Classification	Average Hourly Consumption 1000 Gals.	Allocation Factor	Weighted Factor	Max Hour Extra Capacity Allocation Factor	Weighted Factor	Fire Protection Allocation Factor	Weighted Factor	Allocation Factor	Allocation Factor by Service Area
(1)	(2)	(3)	(4)=(3)x 0.3126	(5)	(6)=(5)x 0.3751	(7)	(8)=(7)x 0.3124	(9)=(4) +(6)+(8)	
Inside - Borough									
Residential	29.9	0.1730	0.0540	0.2621	0.0982			0.1522	0.4439
Commercial/Public	10.6	0.0613	0.0192	0.0620	0.0233			0.0425	0.1239
Industrial	13.3	0.0770	0.0241	0.0389	0.0146			0.0387	0.1129
Private Fire Protection	0.2	0.0012	0.0004			0.2038	0.0637	0.0641	0.1869
Public Fire Protection	0.2	0.0012	0.0004			0.1441	0.0450	0.0454	0.1324
									1.0000
Outside - Borough									
Residential	51.7	0.2992	0.0935	0.4532	0.1700			0.2635	0.4010
Commercial/Public	10.2	0.0590	0.0184	0.0596	0.0224			0.0408	0.0621
Industrial	10.9	0.0631	0.0197	0.0319	0.0120			0.0317	0.0482
Large Industrial	45.1	0.2610	0.0816	0.0923	0.0346			0.1162	0.1768
Private Fire Protection	0.4	0.0023	0.0007			0.4036	0.1261	0.1268	0.1930
Public Fire Protection	0.3	0.0017	0.0005			0.2485	0.0776	0.0781	0.1189
									1.0000
	172.8	1.0000	0.3125	1.0000	0.3751	1.0000	0.3124	1.0000	

The maximum hour extra capacity factors in column 5 are determined on the following page.

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 4. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM HOUR EXTRA CAPACITY FUNCTIONS, cont.

The weighting of the factors is based on the potential demand of general and fire protection service. The bases for the potential demand of general service are a maximum hour to average hour ratio of 2.00 and the average daily send-out during the test year ending 12/31/20 of 5.04 mgd. The system demand for the fire protection is 3,500 gpm.

	Ratio	Rate of Flow, (GPM)	Weight
Average Hour	1.00	3,503	0.3126
Maximum Hour Extra Capacity	1.20	4,204	0.3751
Subtotal	2.20	7,707	0.6877
Fire Protection		3,500	0.3124
Total		11,207	1.0001

Customer Classification	Average Hourly Consumption 1000 Gals	Maximum Hour Extra Capacity Factor	Rate, 1000 gal/hr	Allocation Factor
(1)	(2)	(3)	(4)=(2)x(3)	(5)
Inside - Borough				
Residential	29.9	3.0	89.7	0.2621
Commercial/Public	10.6	2.0	21.2	0.0620
Industrial	13.3	1.0	13.3	0.0389
Outside - Borough				
Residential	51.7	3.0	155.1	0.4532
Commercial/Public	10.2	2.0	20.4	0.0596
Industrial	10.9	1.0	10.9	0.0319
Large Industrial	45.1	0.7	31.6	0.0923
Total	171.7		342.2	1.0000

The public and private fire protection allocation factors in column 7 on the previous page are based on relative potential demands. (See Schedule D).

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 5. ALLOCATION OF COSTS ASSOCIATED WITH STORAGE FACILITIES.

Factors are based on the weighting of the average hourly consumption, the maximum hour extra capacity demand, and the fire protection demand for each customer classification.

Customer Classification	Average Hourly Consumption 1000 Gals.	Allocation Factor	Weighted Factor	Maximum Hour Extra Capacity Allocation Factor	Weighted Factor	Fire Protection Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)	(4)=(3)x 0.4695	(5)	(6)=(5)x 0.4695	(7)	(8)=(7)x 0.0610	(9)=(4) +(6)+(8)
Inside - Borough								
Residential	29.9	0.1730	0.0811	0.2621	0.1230			0.2041
Commercial/Public	10.6	0.0613	0.0288	0.0620	0.0291			0.0579
Industrial	13.3	0.0770	0.0362	0.0389	0.0183			0.0545
Private Fire Protection	0.2	0.0012	0.0006			0.2038	0.0124	0.0130
Public Fire Protection	0.2	0.0012	0.0006			0.1441	0.0088	0.0094
Outside -Borough								
Residential	51.7	0.2992	0.1405	0.4532	0.2128			0.3533
Commercial/Public	10.2	0.0590	0.0277	0.0596	0.0280			0.0557
Industrial	10.9	0.0631	0.0296	0.0319	0.0150			0.0446
Large Industrial	45.1	0.2610	0.1225	0.0923	0.0433			0.1658
Private Fire Protection	0.4	0.0023	0.0011			0.4036	0.0246	0.0257
Public Fire Protection	0.3	0.0017	0.0008			0.2485	0.0152	0.0160
Total	172.8	1.0000	0.4695	1.0000	0.4695	1.0000	0.0610	1.0000

The weighting of the factors is based on the ratio of the capacity required for a 3-hour demand of fire flow, as related to total storage capacity. The calculation is shown on the following page.

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 5. ALLOCATION OF COSTS ASSOCIATED WITH STORAGE FACILITIES.

The weighting of the factors is based on the ratio of the capacity required for a 4-hour demand of fire flow, as related to total storage capacity.

Fire Protection Weight =	3,500 GPM X 60 Min. X 4 Hours / 13,770,000 Gallons			=	0.0610
General Service Weight =	1.0000	-	0.0610	=	0.9390

The weighting of the average hourly consumption and maximum hour extra demand for general service is based on the maximum hour ratio, as follows.

	Maximum Hour Ratio	Percent	Weight
Average Hour	1.00	50.00	0.4695
Extra Capacity Maximum Hour	1.00	50.00	0.4695
Total	2.00	100.00	0.9390

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 6. ALLOCATION OF COSTS ASSOCIATED WITH DISTRIBUTION MAINS.

Factors are based on the weighting of the maximum hour consumption, Factor 4, and length of distribution mains attributable to inside and outside customers

Customer Classification	Allocation Factor 4 By Area	Inside Weighted Factor	Outside Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)x 0.3211	(4)=(2)x 0.6789	(5)=(3)+(4)
Inside - Borough				
Residential	0.4439	0.1425		0.1425
Commercial/Public	0.1239	0.0398		0.0398
Industrial	0.1129	0.0363		0.0363
Private Fire Protection	0.1869	0.0600		0.0600
Public Fire Protection	0.1324	0.0425		0.0425
Outside - Borough				
Residential	0.4010		0.2722	0.2722
Commercial/Public	0.0621		0.0422	0.0422
Industrial	0.0482		0.0327	0.0327
Large Industrial	0.1768		0.1200	0.1200
Private Fire Protection	0.1930		0.1310	0.1310
Public Fire Protection	0.1189		0.0807	0.0807
Total	2.0000	0.3211	0.6789	1.0000

The weighting of the factors is based on the length of distribution mains as follows:

	Length of Mains (Feet)	Weight
10-inch and Under		
Inside	280,991	0.3211
Outside	594,124	0.6789
Total	875,115	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 7. ALLOCATION OF COSTS ASSOCIATED WITH FIRE HYDRANTS.

Fire hydrant costs are assigned directly to public fire protection, in each service area based on the number of hydrants.

Customer Classification	Number of Hydrants	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Public Fire Protection	276	0.3670
Outside - Borough		
Public Fire Protection	476	0.6330
Total	752	1.0000

FACTOR 8. ALLOCATION OF COSTS ASSOCIATED WITH METERS.

Factors are based on the relative size of meters by size and customer classification, as developed on the following pages and summarized below.

Customer Classification	5/8" Equivalents	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Residential	7,101	0.2986
Commercial/Public	1,835	0.0772
Industrial	722	0.0304
Outside - Borough		
Residential	11,709	0.4925
Commercial/Public	1,677	0.0705
Industrial	628	0.0264
Large Industrial	105	0.0044
Total	23,777	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

BASIS FOR ALLOCATING METER COSTS TO CUSTOMER CLASSIFICATIONS

INSIDE - BOROUGH

		Residential		Commercial/Public		Industrial		Total	
Meter Size	5/8" Equivalent	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting
(1)	(2)	(3)	(4)=(2)x(3)	(5)	(6)=(2)x(5)	(7)	(8)=(2)x(7)	(9)	(10)=(2)x(9)
5/8"x3/4"	1.00	5,964	5,964	383	383	5	5	6,351	6,352
3/4"	1.50	43	65	63	95	5	7	111	167
1"	2.50	314	786	97	241	4	10	415	1,037
1-1/2"	5.00	14	70	50	248	7	35	71	353
2"	8.00	16	126	59	468	10	80	84	674
3"	15.00	1	15	15	225	6	89	22	329
4"	25.00	3	75	5	125	2	50	10	250
6"	50.00	0	0	1	50	9	446	10	496
8"	80.00	0	0	0	0	0	0	0	0
Total		6,355	7,101	671	1,835	47	722	7,073	9,658

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

BASIS FOR ALLOCATING METER COSTS TO CUSTOMER CLASSIFICATIONS

OUTSIDE - BOROUGH

		Residential		Commercial/Public		Industrial		Large Industrial		Total	
Meter Size	5/8" Equiv.	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting
(1)	(2)	(3)	(4)=(2)x(3)	(5)	(6)=(2)x(5)	(7)	(8)=(2)x(7)	(9)	(10)=(2)x(9)	(11)	(12)=(2)x(11)
5/8"x3/4"	1.00	10,429	10,429	229	229	13	13	0	0	10,671	10,671
3/4"	1.50	101	152	25	37	0	0	0	0	126	189
1"	2.50	385	961	109	273	7	18	0	0	501	1,252
1-1/2"	5.00	5	24	41	203	12	60	1	5	58	292
2"	8.00	6	48	56	450	23	187	0	0	86	685
3"	15.00	3	45	14	210	9	135	0	0	26	390
4"	25.00	2	50	7	175	9	215	2	50	20	490
6"	50.00	0	0	2	100	0	0	1	50	3	150
8"	80.00	0	0	0	0	0	0	0	0	0	0
Total		10,930	11,709	482	1,677	73	628	4	105	11,489	14,119

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 9. ALLOCATION OF COSTS ASSOCIATED WITH SERVICES.

Factors are based on the relative size of services by size and customer classification, as developed on the following pages and summarized below.

Customer Classification	3/4" Equivalents	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Residential	6,392	0.3251
Commercial/Public	751	0.0382
Industrial	81	0.0041
Fire Protection	318	0.0162
Outside - Borough		
Residential	10,965	0.5575
Commercial/Public	563	0.0286
Industrial	113	0.0057
Large Industrial	10	0.0005
Private Fire Protection	474	0.0241
Total	19,667	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

BASIS FOR ALLOCATING SERVICE COSTS TO CUSTOMER CLASSIFICATIONS

INSIDE - BOROUGH

		Residential		Commercial/Public		Industrial		Fire Protection		Total	
Service Size	3/4" Equivalent	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting
(1)	(2)	(3)	(4)=(2)x(3)	(5)	(6)=(2)x(5)	(7)	(8)=(2)x(7)	(9)	(10)=(2)x(9)	(11)	(12)=(2)x(9)
3/4"	1.00	6,007	6,007	446	446	9	9	0	0	6,462	6,462
1"	1.06	314	333	97	102	4	4	0	0	415	439
1-1/2"	1.28	14	18	50	63	7	9	0	0	71	90
2"	1.50	16	24	59	88	10	15	0	0	84	127
3"	2.37	1	2	15	36	6	14	0	0	22	52
4"	2.50	3	8	5	13	2	5	25	63	35	89
6"	2.79	0	0	1	3	9	25	54	151	64	179
8"	3.11	0	0	0	0	0	0	28	87	28	87
10"	4.12	0	0	0	0	0	0	3	12	3	12
12"	4.65	0	0	0	0	0	0	1	5	1	5
Total		6,355	6,392	671	751	47	81	111	318	7,184	7,542

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

BASIS FOR ALLOCATING SERVICE COSTS TO CUSTOMER CLASSIFICATIONS

OUTSIDE - BOROUGH

		Residential		Commercial/Public		Industrial		Large Industrial		Fire Protection		Total	
Service Size	3/4" Equiv.	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting
(1)	(2)	(3)	(4)=(2)x(3)	(5)	(6)=(2)x(5)	(7)	(8)=(2)x(7)	(9)	(10)=(2)x(9)	(11)	(12)=(2)x(11)	(13)	(14)=(2)x(13)
3/4"	1.00	10,530	10,530	254	254	13	13	0	0	0	0	10,796	10,797
1"	1.06	385	408	109	116	7	7	0	0	0	0	501	531
1-1/2"	1.28	5	6	41	52	12	15	1	1	0	0	57	74
2"	1.50	6	9	56	84	23	36	0	1	0	0	86	130
3"	2.37	3	7	14	33	9	21	0	0	0	0	26	61
4"	2.50	2	5	7	18	9	21	2	5	0	0	18	49
6"	2.79	0	0	2	6	0	0	1	3	6	17	8	26
8"	3.11	0	0	0	0	0	0	0	0	17	53	17	53
10"	4.12	0	0	0	0	0	0	0	0	62	255	62	255
12"	4.65	0	0	0	0	0	0	0	0	32	149	32	149
Total		10,930	10,965	482	563	73	113	4	10	117	474	11,602	12,125

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 10. ALLOCATION OF TRANSMISSION AND DISTRIBUTION SUPERVISION AND ENGINEERING AND OTHER DEPARTMENTAL EXPENSES.

Factors are based on transmission and distribution expenses other than those being allocated, as follows:

Customer Classification	Transmission and Distribution Expenses	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Residential	$140,986	0.2409
Commercial/Public	32,018	0.0547
Industrial	15,696	0.0268
Private Fire Protection	13,521	0.0231
Public Fire Protection	15,185	0.0259
Outside - Borough		
Residential	242,231	0.4139
Commercial/Public	29,702	0.0507
Industrial	14,080	0.0241
Large Industrial	26,015	0.0444
Private Fire Protection	28,253	0.0483
Public Fire Protection	27,620	0.0472
Total	$585,309	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 11. ALLOCATION OF BILLING AND COLLECTING COSTS.

Factors are based on the pro forma number of bills.

Customer Classification	Pro Forma Number of Bills	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Residential	25,082	0.3335
Commercial/Public	2,658	0.0353
Industrial	339	0.0045
Private Fire Protection	860	0.0114
Public Fire Protection	4	0.0001
Outside - Borough		
Residential	42,464	0.5644
Commercial/Public	1,955	0.0260
Industrial	456	0.0061
Large Industrial	-	0.0000
Private Fire Protection	1,388	0.0185
Public Fire Protection	12	0.0002
Total	75,218	1.0000

FACTOR 12. ALLOCATION OF METER READING COSTS.

Factors are based on the pro forma number of meter readings by customer classification as follows:

Customer Classification	Pro Forma Number of Readings	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Residential	25,082	0.3438
Commercial/Public	2,658	0.0364
Industrial	339	0.0046
Outside - Borough		
Residential	42,464	0.5821
Commercial/Public	1,955	0.0268
Industrial	456	0.0063
Large Industrial	0	0.0000
Total	72,954	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 13. ALLOCATION OF ADMINISTRATIVE AND GENERAL EXPENSES.

Factors are based on the allocation of all other operation and maintenance expenses excluding power and fuel purchased, chemicals and sewer bill.

Customer Classification	Operation & Maintenance Expenses	Factor 13 Allocation Factor	Factor 13A Allocation Factor
(1)	(2)	(3)	(3)
Inside - Borough			
Residential	$456,414	0.2201	
Commercial/Public	115,855	0.0558	
Industrial	95,629	0.0461	
Private Fire Protection	30,798	0.0148	
Public Fire Protection	29,688	0.0143	
Outside - Borough			
Residential	784,853	0.3784	0.5831
Commercial/Public	109,010	0.0525	0.0810
Industrial	80,468	0.0388	0.0598
Large Industrial	255,497	0.1232	0.1898
Private Fire Protection	62,901	0.0303	0.0467
Public Fire Protection	53,329	0.0257	0.0396
Total	$2,074,441	1.0000	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 14. ALLOCATION OF LABOR RELATED TAXES AND BENEFITS.

Factors are based on the allocation of operation and maintenance direct labor expense to customer classifications.

Customer Classification	Direct Labor Expense	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Residential	$ 482,892	0.2217
Commercial/Public	123,046	0.0565
Industrial	100,285	0.0460
Private Fire Protection	31,625	0.0145
Public Fire Protection	29,518	0.0135
Outside - Borough		
Residential	829,175	0.3807
Commercial/Public	115,685	0.0531
Industrial	84,376	0.0387
Large Industrial	264,377	0.1214
Private Fire Protection	64,498	0.0296
Public Fire Protection	53,025	0.0243
Total	$ 2,178,500	1.0000

FACTOR 15. ALLOCATION OF OTHER RATE BASE ELEMENTS.

Factors are based on the allocation of the original cost less depreciation other than those items being allocated, as follows:

Customer Classification	Original Cost Less Depreciation	Allocation Factor
(1)	(2)	(3)
Inside - Borough		
Residential	$ 9,828,362	0.1858
Commercial/Public	2,942,277	0.0556
Industrial	3,136,665	0.0593
Private Fire Protection	813,149	0.0154
Public Fire Protection	574,536	0.0109
Outside - Borough		
Residential	17,402,423	0.3289
Commercial/Public	2,894,128	0.0547
Industrial	2,641,988	0.0500
Large Industrial	9,829,925	0.1859
Private Fire Protection	1,748,889	0.0331
Public Fire Protection	1,076,590	0.0204
Total	$ 52,888,933	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 16. ALLOCATION OF INCOME AVAILABLE FOR RETURN.

The factors are based on the allocation of the original cost measure of value rate base as shown on the following page and summarized below

Customer Classification	Original Cost Measure of Value	Allocation Factor	Factor 16A and B Allocation Factor
(1)	(2)	(3)	(3)
Inside - Borough			Factor 16 A
Residential	$ 9,976,249	0.1863	0.5690
Commercial/Public	2,979,769	0.0556	0.1700
Industrial	3,167,640	0.0591	0.1807
Private Fire Protection	823,094	0.0154	0.0470
Public Fire Protection	584,144	0.0109	0.0333
			1.0000
Outside - Borough			Factor 16 B
Residential	17,656,673	0.3297	0.4900
Commercial/Public	2,929,403	0.0547	0.0813
Industrial	2,668,058	0.0498	0.0741
Large Industrial	9,912,704	0.1851	0.2751
Private Fire Protection	1,769,247	0.0330	0.0491
Public Fire Protection	1,093,858	0.0204	0.0304
Total	$ 53,560,840	1.0000	1.0000

FACTOR 17 AND 17A. ALLOCATION OF OTHER WATER REVENUES.

The factors are based on the allocation of the total cost of service, excluding those items being allocated.

Customer Classification	Inside - Borough Total Cost of Service	Factor 17 Allocation Factor	Factor 17A Allocation by Area
(1)	(2)	(3)	(3)
Inside - Borough			
Residential	$1,492,897	0.1549	0.6082
Commercial/Public	412,962	0.0428	0.1682
Industrial	392,721	0.0407	0.1600
Private Fire Protection	82,224	0.0085	0.0335
Public Fire Protection	73,886	0.0077	0.0301
			1.0000
Outside - Borough			
Residential	3,776,572	0.3919	0.5259
Commercial/Public	591,347	0.0614	0.0823
Industrial	507,484	0.0527	0.0706
Large Industrial	1,813,329	0.1881	0.2524
Private Fire Protection	287,614	0.0298	0.0400
Public Fire Protection	207,210	0.0215	0.0288
			1.0000
Total	$9,638,247	1.0000	

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

PROJECTED COST OF SERVICE FOR THE TWELVE MONTHS ENDING DECEMBER 31, 2021
ALLOCATED TO RESIDENTIAL, COMMERCIAL & PUBLIC, INDUSTRIAL AND FIRE SERVICE CUSTOMER CLASSIFICATIONS

ACCOUNT (1)	FACTOR REF (2)	COST OF SERVICE (3)	INSIDE- BOROUGH RESIDENTIAL (4)	COMMERCIAL & PUBLIC (5)	INDUSTRIAL (6)	PRIVATE FIRE (7)	PUBLIC FIRE (8)	OUTSIDE - BOROUGH RESIDENTIAL (9)	COMMERCIAL & PUBLIC (10)	INDUSTRIAL (11)	LARGE INDUSTRIAL (12)	PRIVATE FIRE (13)	PUBLIC FIRE (14)
205-207 Land	1	726,829	125,959	44,555	55,966	872	654	217,322	42,956	45,790	189,848	1,817	1,090
212 Land	1	7,307	1,266	448	563	9	7	2,185	432	460	1,909	18	11
234 Land	1	96,020	16,640	5,886	7,394	115	86	28,710	5,675	6,049	25,080	240	144
234 Land - Slagle Run	1	12,113	2,099	742	933	15	11	3,622	716	763	3,164	30	18
245 Rights of Way	5	33,113	6,758	1,917	1,805	430	311	11,699	1,844	1,477	5,490	851	530
246 Real Estate - Booster	4	-	0	0	0	0	0	0	0	0	0	0	0
247 Land - Parr's Hill	5	2,455	501	142	134	32	23	867	137	109	407	63	39
247 Land - New Storate W.T.	5	9,310	1,900	539	507	121	88	3,289	519	415	1,544	239	149
208 Collecting and Impounding Reservoirs - Imp	1	7,960,048	1,379,476	487,951	612,924	9,552	7,164	2,380,054	470,439	501,483	2,079,165	19,900	11,940
210 Springs and Wells	2	267,241	52,646	16,355	18,627	214	160	90,915	15,767	15,233	56,655	428	241
212.2 Collecting and Impounding Reservoirs - Coll	1	411,865	71,376	25,247	31,714	494	371	123,148	24,341	25,947	107,579	1,030	618
214 Aqueducts and Supply Mains	2	6,164,902	1,214,486	377,292	429,694	4,932	3,699	2,097,300	363,729	351,399	1,306,959	9,864	5,548
217 Sedimentation Basins	2	352,389	69,421	21,566	24,562	282	211	119,883	20,791	20,086	74,706	564	317
219 Filters	2	4,381,240	863,104	268,132	305,372	3,505	2,629	1,490,498	258,493	249,731	928,823	7,010	3,943
220 Clear Water Basin & Clearwell	2	363,141	71,539	22,224	25,311	291	218	123,541	21,425	20,699	76,986	581	327
223 Chemical Treatment Plant	2	8,097,775	1,595,262	495,584	564,415	6,478	4,859	2,754,863	477,769	461,573	1,716,728	12,956	7,288
223 Parr's Hill Chlorination Facility	2A	5,106	0	0	0	0	0	2,604	450	432	1,601	12	7
224 Laboratory Equipment	2	14,138	2,785	865	985	11	8	4,810	834	806	2,997	23	13
236 Structures and Improvements - Pumping	3	60,893	10,875	3,373	3,842	1,212	859	18,761	3,258	3,148	11,685	2,405	1,474
236 Parr's Hill Booster Station	3A	499,850	0	0	0	0	0	230,981	39,888	38,388	141,857	30,191	18,544
236 Kidd Lane Pump Station	3A	6,263	0	0	0	0	0	2,894	500	481	1,777	378	232
236 Slagle Run Pump Station	3	34,394	6,143	1,905	2,170	684	485	10,597	1,840	1,778	6,600	1,359	832
237 Pumps and Pumping Equipment	3	2,293,389	409,599	127,054	144,713	45,638	32,337	706,593	122,696	118,568	440,101	90,589	55,500
242 Electrical Equipment	3	3,187,278	569,248	176,575	201,117	63,427	44,941	982,000	170,519	164,782	611,639	125,897	77,132
243 Other Pump Station Equipment	3	7,371	1,316	408	465	147	104	2,271	394	381	1,414	291	178
246 Transmission Mains	3	2,348,641	419,467	130,115	148,199	46,738	33,116	723,616	125,652	121,425	450,704	92,771	56,837
247 Distribution Reservoirs and Standpipes	5	1,339,078	273,306	77,533	72,980	17,408	12,587	473,096	74,587	59,723	222,019	34,414	21,425
248 Distribution Mains	6	9,371,944	1,335,842	372,856	339,753	562,444	398,435	2,551,408	395,118	306,678	1,124,910	1,227,984	756,515
249 Services	9	1,267,213	411,971	48,408	5,196	20,529	0	706,471	36,242	7,223	634	30,540	0
250 Meters	8	1,692,479	505,374	130,659	51,451	0	0	833,546	119,320	44,681	7,447	0	0
251 Hydrants	7	12,358	0	0	0	0	4,535	0	0	0	0	0	7,823
257 Structures and Improvements - General	13	498,264	109,668	27,803	22,970	7,374	7,125	188,543	26,159	19,333	61,386	15,097	12,805
258 General Office Equipment	13	8,722	1,920	487	402	129	125	3,300	458	338	1,075	264	224
259 Other General Equipment	13	1,355,804	298,412	75,654	62,503	20,066	19,388	513,036	71,180	52,605	167,035	41,081	34,844
Total Utility Plant In Service		52,888,933	9,828,362	2,942,277	3,136,665	813,149	574,536	17,402,423	2,894,128	2,641,988	9,829,925	1,748,889	1,076,590
Cash Working Capital	13	671,907	147,887	37,492	30,975	9,944	9,608	254,250	35,275	26,070	82,779	20,359	17,268
Total Rate Base		53,560,840	9,976,249	2,979,769	3,167,640	823,094	584,144	17,656,673	2,929,403	2,668,058	9,912,704	1,769,247	1,093,858

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 18. ALLOCATION OF REGULATORY COMMISSION EXPENSES

The factors are based on the allocation of the total outside - Borough cost of service, excluding those items being allocated.

Customer Classification	Outside - Borough Total Cost of Service	Allocation Factor
(1)	(2)	(3)
Outside - Borough		
Residential	$3,702,427	0.5257
Commercial/Public	579,737	0.0823
Industrial	497,521	0.0706
Large Industrial	1,777,728	0.2524
Private Fire Protection	281,967	0.0400
Public Fire Protection	203,142	0.0288
Total	$7,042,523	1.0000

FACTOR 19. REALLOCATION OF PUBLIC FIRE COSTS - OUTSIDE BOROUGH

Factors are based on the relative size of meters by size and customer classification, as developed in Factor 9 for Outside Borough customers

Customer Classification	5/8" Equivalents	Allocation Factor
(1)	(2)	(3)
Outside - Borough		
Residential	11,709	0.8293
Commercial/Public	1,677	0.1188
Industrial	628	0.0445
Large Industrial	105	0.0074
Total	14,119	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 20. REALLOCATION OF PUBLIC FIRE COSTS - INSIDE BOROUGH

Factors are based on the relative size of meters by size and customer classification, as developed in Factor 9 for Inside Borough customers

Customer Classification	5/8" Equivalents	Allocation Factor
(1)	(2)	(3)
Outside - Borough		
Residential	6,392	0.8848
Commercial/Public	751	0.1040
Industrial	81	0.0112
Total	7,224	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

BASIS FOR ALLOCATION OF DEMAND-RELATED COSTS OF FIRE SERVICE TO PRIVATE AND PUBLIC FIRE PROTECTION

Description	Restrictive Diameter(s) Squared	Number of Units	Relative Demand	Percent of Total Fire Protection	Percent of Service Area Fire Protection
(1)	(2)	(3)	(4)	(5)	
INSIDE BOROUGH					
Private Fire Protection					
4" Hydrants 2-2 1/2",1-4 1/2"	16.00	104	1,664		
4 -Inch Fire Line	16.00	25	400		
6 -Inch Fire Line	36.00	54	1,944		
8 -Inch Fire Line	64.00	28	1,792		
10 -Inch Fire Line	100.00	3	300		
12 -Inch Fire Line	144.00	1	144		
Total Private Fire Protection		215	6,244	0.2038	0.5857
Public Fire Protection					
Service Nozzles					
4" Hydrants 2-2 1/2",1-4 1/2"	16.00	276	4,416		
Total Public Fire Protection		276	4,416	0.1441	0.4143
Total Inside Borough Fire Protection		491	10,660	0.3479	1.0000

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

BASIS FOR ALLOCATION OF DEMAND-RELATED COSTS OF FIRE SERVICE TO PRIVATE AND PUBLIC FIRE PROTECTION

Description	Restrictive Diameter(s) Squared	Number of Units	Relative Demand	Percent of Total Fire Protection	Percent of Service Area Fire Protection
(1)	(2)	(3)	(4)	(5)	
OUTSIDE BOROUGH					
Private Fire Protection					
4" Hydrants 2-2 1/2",1-4 1/2"	16.00	16	256		
4 -Inch Fire Line	16.00	0	0		
6 -Inch Fire Line	36.00	6	216		
8 -Inch Fire Line	64.00	17	1,088		
10 -Inch Fire Line	100.00	62	6,200		
12 -Inch Fire Line	144.00	32	4,608		
Total Private Fire Protection		133	12,368	0.4036	0.6189
Public Fire Protection Service Nozzles					
4" Hydrants 2-2 1/2",1-4 1/2"	16.00	476	7,616		
Total Public Fire Protection		476	7,616	0.2485	0.3811
Total Outside Borough Fire Protection		609	19,984	0.6521	1.0000
Total Fire Protection		1,100	30,644	1.0000	

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS

SUMMARY OF AVERAGE DAILY AND MAXIMUM DAILY SENDOUT FOR 2007-2020

Year	Average Daily Send-out	Maximum Daily Sendout MGD	Maximum Daily Sendout Ratio to Average
2007	5.59	7.03	1.26
2008	5.46	6.42	1.18
2009	5.09	6.37	1.25
2010	5.14	6.26	1.22
2011	5.20	6.29	1.21
2012	5.17	6.28	1.21
2013	4.94	6.15	1.24
2014	4.70	6.16	1.31
2015	4.70	7.44	1.58
2016	4.62	6.18	1.34
2017	4.57	7.53	1.65
2018	4.42	7.11	1.61
2019	4.77	6.70	1.40
2020	5.04	7.01	1.39

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE-BOROUGH
RATE COMPARISON

	Present	Proposed	Increase
Quarterly Customer Charge			
5/8	$ 26.55	$ 26.55	0.0%
3/4	36.72	36.72	0.0%
1	57.09	57.09	0.0%
1 1/2	108.12	108.12	0.0%
2	169.14	169.14	0.0%
3	362.64	362.64	0.0%
4	617.25	617.25	0.0%
6	1,279.26	1,279.26	0.0%
8	1,839.45	1,839.45	0.0%
Consumption Charge per 1000 Gallons			
Residential	$ 3.8540	$ 5.6153	45.7%
Commercial/Public	3.4450	4.7989	39.3%
Industrial	3.6070	4.6170	28.0%
Large Industrial	3.2110	4.4312	38.0%

Private Fire - Quarterly Charge

	Present	Proposed	Increase
Hydrant	$ 122.04	$ 170.85	40.0%
4	42.03	58.83	40.0%
6	122.04	170.85	40.0%
8	261.87	366.63	40.0%
10	467.73	654.81	40.0%
12	597.27	836.19	40.0%

Public Fire - Quarterly Charge

	Present	Proposed	Increase
Hydrant	$69.39	$69.39	0.0%

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE-BOROUGH
BILL COMPARISON
RESIDENTIAL 5/8" QUARTERLY

Quarterly Usage 1,000 Gals.	Present Rates	Proposed Rates	Dollar Increase	Percentage Increase
0	$ 26.55	$ 26.55	$ -	0.00%
1	$ 30.40	$ 32.17	$ 1.76	5.79%
2	$ 34.26	$ 37.78	$ 3.52	10.28%
3	$ 38.11	$ 43.40	$ 5.28	13.86%
4	$ 41.97	$ 49.01	$ 7.05	16.79%
5	$ 45.82	$ 54.63	$ 8.81	19.22%
6	$ 49.67	$ 60.24	$ 10.57	21.27%
7	$ 53.53	$ 65.86	$ 12.33	23.03%
8	$ 57.38	$ 71.47	$ 14.09	24.56%
9	$ 61.24	$ 77.09	$ 15.85	25.89%
10	$ 65.09	$ 82.70	$ 17.61	27.06%
11	$ 68.94	$ 88.32	$ 19.37	28.10%
12	$ 72.80	$ 93.93	$ 21.14	29.03%
13	$ 76.65	$ 99.55	$ 22.90	29.87%
14	$ 80.51	$ 105.16	$ 24.66	30.63%
15	$ 84.36	$ 110.78	$ 26.42	31.32%
16	$ 88.21	$ 116.39	$ 28.18	31.95%
17	$ 92.07	$ 122.01	$ 29.94	32.52%
18	$ 95.92	$ 127.63	$ 31.70	33.05%
19	$ 99.78	$ 133.24	$ 33.46	33.54%
20	$ 103.63	$ 138.86	$ 35.23	33.99%
25	$ 122.90	$ 166.93	$ 44.03	35.83%
30	$ 142.17	$ 195.01	$ 52.84	37.17%
35	$ 161.44	$ 223.09	$ 61.65	38.18%
39	$ 176.86	$ 245.55	$ 68.69	38.84%
40	$ 180.71	$ 251.16	$ 70.45	38.99%
45	$ 199.98	$ 279.24	$ 79.26	39.63%
50	$ 219.25	$ 307.32	$ 88.07	40.17%
60	$ 257.79	$ 363.47	$ 105.68	40.99%
70	$ 296.33	$ 419.62	$ 123.29	41.61%
80	$ 334.87	$ 475.77	$ 140.90	42.08%
90	$ 373.41	$ 531.93	$ 158.52	42.45%
100	$ 411.95	$ 588.08	$ 176.13	42.76%

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE-BOROUGH
BILL COMPARISON
COMMERCIAL 5/8" QUARTERLY

Quarterly Usage 1,000 Gals.	Present Rates	Proposed Rates	Dollar Increase	Percentage Increase
0	$ 26.55	$ 26.55	$ -	0.00%
1	$ 30.00	$ 31.35	$ 1.35	4.51%
2	$ 33.44	$ 36.15	$ 2.71	8.10%
3	$ 36.89	$ 40.95	$ 4.06	11.01%
4	$ 40.33	$ 45.75	$ 5.42	13.43%
5	$ 43.78	$ 50.54	$ 6.77	15.46%
6	$ 47.22	$ 55.34	$ 8.12	17.20%
7	$ 50.67	$ 60.14	$ 9.48	18.71%
8	$ 54.11	$ 64.94	$ 10.83	20.02%
9	$ 57.56	$ 69.74	$ 12.19	21.17%
10	$ 61.00	$ 74.54	$ 13.54	22.20%
11	$ 64.45	$ 79.34	$ 14.89	23.11%
12	$ 67.89	$ 84.14	$ 16.25	23.93%
13	$ 71.34	$ 88.94	$ 17.60	24.67%
14	$ 74.78	$ 93.73	$ 18.95	25.35%
15	$ 78.23	$ 98.53	$ 20.31	25.96%
16	$ 81.67	$ 103.33	$ 21.66	26.52%
17	$ 85.12	$ 108.13	$ 23.02	27.04%
18	$ 88.56	$ 112.93	$ 24.37	27.52%
19	$ 92.01	$ 117.73	$ 25.72	27.96%
20	$ 95.45	$ 122.53	$ 27.08	28.37%
25	$ 112.68	$ 146.52	$ 33.85	30.04%
30	$ 129.90	$ 170.52	$ 40.62	31.27%
35	$ 147.13	$ 194.51	$ 47.39	32.21%
37	$ 154.02	$ 204.11	$ 50.09	32.53%
39	$ 160.91	$ 213.71	$ 52.80	32.82%
40	$ 164.35	$ 218.51	$ 54.16	32.95%
42	$ 171.24	$ 228.10	$ 56.86	33.21%
45	$ 181.58	$ 242.50	$ 60.93	33.55%
50	$ 198.80	$ 266.50	$ 67.70	34.05%
60	$ 233.25	$ 314.48	$ 81.23	34.83%
70	$ 267.70	$ 362.47	$ 94.77	35.40%
80	$ 302.15	$ 410.46	$ 108.31	35.85%
90	$ 336.60	$ 458.45	$ 121.85	36.20%
100	$ 371.05	$ 506.44	$ 135.39	36.49%

BOROUGH OF HANOVER - HANOVER MUNICIPAL WATER WORKS
OUTSIDE-BOROUGH
BILL COMPARISON
INDUSTRIAL 2" QUARTERLY

Quarterly Usage 1,000 Gals.	Present Rates	Proposed Rates	Dollar Increase	Percentage Increase
0	$ 169.14	$ 169.14	$ -	0.00%
1	$ 172.75	$ 173.76	$ 1.01	0.58%
2	$ 176.35	$ 178.37	$ 2.02	1.15%
3	$ 179.96	$ 182.99	$ 3.03	1.68%
4	$ 183.57	$ 187.61	$ 4.04	2.20%
5	$ 187.18	$ 192.23	$ 5.05	2.70%
6	$ 190.78	$ 196.84	$ 6.06	3.18%
7	$ 194.39	$ 201.46	$ 7.07	3.64%
8	$ 198.00	$ 206.08	$ 8.08	4.08%
9	$ 201.60	$ 210.69	$ 9.09	4.51%
10	$ 205.21	$ 215.31	$ 10.10	4.92%
20	$ 241.28	$ 261.48	$ 20.20	8.37%
30	$ 277.35	$ 307.65	$ 30.30	10.92%
40	$ 313.42	$ 353.82	$ 40.40	12.89%
50	$ 349.49	$ 399.99	$ 50.50	14.45%
60	$ 385.56	$ 446.16	$ 60.60	15.72%
70	$ 421.63	$ 492.33	$ 70.70	16.77%
80	$ 457.70	$ 538.50	$ 80.80	17.65%
90	$ 493.77	$ 584.67	$ 90.90	18.41%
100	$ 529.84	$ 630.84	$ 101.00	19.06%
125	$ 620.02	$ 746.27	$ 126.25	20.36%
150	$ 710.19	$ 861.69	$ 151.50	21.33%
200	$ 890.54	$ 1,092.54	$ 202.00	22.68%
225	$ 980.72	$ 1,207.97	$ 227.25	23.17%
250	$ 1,070.89	$ 1,323.39	$ 252.50	23.58%
269	$ 1,139.42	$ 1,411.11	$ 271.69	23.84%
275	$ 1,161.07	$ 1,438.82	$ 277.75	23.92%
300	$ 1,251.24	$ 1,554.24	$ 303.00	24.22%
332	$ 1,366.66	$ 1,701.98	$ 335.32	24.54%
350	$ 1,431.59	$ 1,785.09	$ 353.50	24.69%
400	$ 1,611.94	$ 2,015.94	$ 404.00	25.06%
500	$ 1,972.64	$ 2,477.64	$ 505.00	25.60%
600	$ 2,333.34	$ 2,939.34	$ 606.00	25.97%

Statement No. 3-R
Docket No. R-2021-3026116
Witness: C.E. Heppenstall

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
HANOVER, PENNSYLVANIA

REBUTTAL TESTIMONY

OF

CONSTANCE E. HEPPENSTALL

GANNETT FLEMING
VALUATION AND RATE CONSULTANTS, LLC

COST OF SERVICE ALLOCATION AND RATE DESIGN

October 2021

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: HANOVER MUNICIPAL WATER WORKS
DOCKET NO. R-2021-3026116

REBUTTAL TESTIMONY OF CONSTANCE E. HEPPENSTALL

1. Q. State your name and business address.

A. My name is Constance E. Heppenstall. My business address is 1010 Adams Avenue, Audubon, Pennsylvania.

2. Q. Are you the same Constance E. Heppenstall who provided direct testimony in this proceeding as Statement 3 and sponsored Exhibit CEH-1?

A. Yes, I am.

3. Q. What is the purpose of your rebuttal testimony in this proceeding?

A. The purpose of my testimony is to rebut the direct testimony of OCA Witness Jerome D. Mierzwa regarding the Borough's cost of service study presented as Exhibit CEH-1.

4. Q. Please discuss Mr. Mierzwa's position.

A. Mr. Mierzwa generally agrees with the cost of service study presented by the Borough. However, he recommends allocating the operation and maintenance costs related to source of supply and water treatment based on average demands, rather than the Borough's allocation based on average and maximum day demands.

5. Q. Do you agree?

A. No, I do not. Inasmuch as the source of supply and water treatment plant are designed to supply water to meet maximum day demands, the operation and maintenance of those facilities should be allocated in the same manner, based

on cost causation. In addition, a treatment plant or source of supply asset sized for average day demands would be much smaller than one designed to meet maximum day demands and larger facilities would have a larger operation and maintenance expenses associated with it. Therefore, I disagree with Mr. Mierzwa's recommendations.

6. Q. What is the cost of service result of Mr. Mierzwa's recommend change?

A. The result shifts more costs to outside Borough customers, and away from the residential class and toward the other non-residential classes, mainly the Large Industrial class, resulting in a revised increase to this class of 42.7%, larger than the Borough recommended increase of 37.9%. I recommend rejecting Mr. Mierzwa's cost of service and revenue allocation changes.

RATE STRUCTURE AND SCALE BACK

7. Q. Please explain the parties' positions regard rate structure and the scale back of the increase, if the Pennsylvania Public Utility Commission approves a revenue requirement lower than the one requested by the Borough.

A. Both I&E Witness Sakaya and OSBA Witness Brian Kalcic agree with the Borough's rate structure under proposed rates, as proposed rates move revenues toward a relative rate of return of 1.00. Both witnesses recommend a scale back of the increase for each customer class. Mr. Mierzwa recommends the revenue allocation based on his revised cost of service. He does not discuss the issue of scale back. I agree with the recommendations of both Mr. Sakaya and Mr. Kalcic regarding rate design and scale back. As stated previously, I do not recommend Mr. Mierzwa's revenue allocation.

8. Q. Does this conclude your direct testimony?

A. Yes, it does.

VERIFICATION

I, Constance E. Heppenstall, hereby state that the facts set forth in my Rebuttal Testimony, Borough of Hanover Statement No. 3-R, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Constance E. Heppenstall

Dated: October 20, 2021

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DIRECT TESTIMONY OF
JOHN J. SPANOS

ON BEHALF OF
BOROUGH OF HANOVER/HANOVER MUNICIPAL WATER WORKS
DOCKET NO. R-2021-3026116

DEPRECIATION

June 2021

Borough of Hanover Statement No. 4

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

RE: THE BOROUGH OF HANOVER

DIRECT TESTIMONY OF JOHN J. SPANOS

Q. Please state your name and address.

A. John J. Spanos. My business address is 207 Senate Avenue, Camp Hill, Pennsylvania.

Q. With what firm are you associated?

A. I am associated with the firm of Gannett Fleming Valuation and Rate Consultants, LLC.

Q. How long have you been associated with Gannett Fleming?

A. I have been associated with the firm since June 1986.

Q. What is your position in the firm?

A. I am President.

Q. What is your educational background?

A. I have Bachelor of Science degrees in Industrial Management and Mathematics from Carnegie-Mellon University and a Master of Business Administration from York College of Pennsylvania.

Q. Are you a member of any professional societies?

A. Yes. I am a member of the Society of Depreciation Professionals and the American Gas Association/Edison Electric Institute Industry Accounting Committee.

Q. Have you taken the certification examination for depreciation professionals?

A. Yes. I passed the certification examination of the Society of Depreciation Professionals in September 1997, and was recertified in August 2003, January 2008, January 2013 and February 2018.

Q. Will you outline your experience in the field of depreciation?

I have over 35 years of depreciation experience which includes expert testimony in over 370 cases before approximately 41 regulatory commissions, including this Commission. These cases have included depreciation studies in the electric, gas, water, wastewater and pipeline industries. In addition to cases where I have submitted testimony, I have also supervised over 700 other depreciation or valuation assignments. Please refer to Appendix A for my qualifications statement, which includes further information with respect to my work history, case experience, and leadership in the Society of Depreciation Professionals.

Q. What is the purpose of your testimony?

A. I was asked by the Borough of Hanover to prepare depreciation studies with regard to plant in service as of December 31, 2020, December 31, 2021 and December 31, 2022.

Q. Have you prepared exhibits presenting the results of your studies?

A. Yes. Exhibit Nos. JJS-1, JJS-2 and JJS-3 present the results of the depreciation studies. Exhibit No. JJS-1 presents the results of the depreciation study as of December 31, 2020 (2020 Study), Exhibit JJS-2 presents a description of the methods used and the results of the depreciation study as of December 31, 2021 (2021 Study). Exhibit JJS-3 presents the results of the depreciation study as of December 31, 2022 (2022 Study).

Q. Please summarize the contents of the 2020 Study.

A. The contents of the 2020 Study includes a summary table and detailed tabulations of the results of the depreciation calculations related to utility plant in service as of December 31, 2020. Table 1, pages I-3 and I-4, presents a summary of the results of the depreciation calculations by depreciable group related to the original cost of Water Plant in Service. The table shows the estimated survivor curve, original cost, book reserve, future book accruals, composite remaining life and the calculated annual accrual rate and amount. The detailed depreciation calculations by account are presented in the section beginning on page II-2.

Q. Please describe the 2021 Study.

A. The 2021 Study titled, "2021 Depreciation Study – Calculated Annual Depreciation Accruals Related to Water Plant in Service as of December 31, 2021", includes the results of the depreciation study as related to the estimated original cost as of December 31, 2021. The report also includes explanatory text and the detailed depreciation calculations.

Q. Please describe the 2022 Study.

A. The 2022 Study titled, "2022 Depreciation Study – Calculated Annual Depreciation Accruals Related to Water Plant in Service as of December 31, 2022", includes the results of the depreciation study as related to the estimated original cost as of December 31, 2022. Table 1, pages I-3 and I-4, presents the summary of the results of the depreciation calculations by depreciable group related to estimated original cost as of December 31, 2022. Table 2, page I-5, and Table 3, page I-6, set forth the development of the book reserve and estimated annual accruals for the period ended December 31, 2022.

Q. What was the purpose of your depreciation study?

A. The purpose of the depreciation study was to estimate the annual depreciation accruals related to water plant in service for ratemaking purposes and, using Commission-approved procedures, to determine the Borough of Hanover's book reserve and depreciation accrual rates as of December 31, 2022.

Q. Is the Borough's claim for annual depreciation in the current proceeding based on the same methods of depreciation as were used in its most recent water rate proceeding at Docket No. R-2014-2428304?

A. Yes, it is. For most plant accounts, the current claim for annual depreciation is based on the straight line remaining life method of depreciation. For Accounts 258 and 259, the claim is based on the straight line remaining life method of amortization. These accounts have a large number of units, but small asset values representing less than 3 percent of the depreciable plant. The assets represent items located in office buildings, service centers, garages and warehouses. Given the difficulty in maintaining accounting records for these numerous assets and high cost for periodic inventories, retirements are recorded when a vintage is fully amortized, rather than as the units are removed from service. All units are retired when the age of the vintage reaches the amortization period. The annual amortization is based on amortization accounting, which distributes the unrecovered cost of fixed capital assets over the remaining amortization period selected for each account.

Q. What group procedure is being used in this proceeding for depreciable accounts?

A. The equal life group procedure is used in the current proceeding for all depreciable accounts and installation years. The equal life group procedure also was used in the same manner in the Borough's last rate proceeding.

Q. How was the book reserve used in the calculation of annual depreciation?

A. The total book reserve was allocated by account to each vintage within the account to determine original cost less accrued depreciation by vintage. The total annual accrual is the sum of the results of dividing the original costs less accrued depreciation by the vintage composite remaining lives.

Q. How was the book reserve as of December 31, 2021 estimated?

A. The book reserve as of December 31, 2021, by account, was projected by adding estimated accruals and subtracting estimated retirements from the book reserve as of December 31, 2020. Annual accruals were estimated using the annual accruals calculated as of December 31, 2020. For the purpose of calculating the annual accruals, the projected book reserve by account was allocated to vintages based on calculated accrued depreciation as of December 31, 2021.

Q. How was the book reserve as of December 31, 2022 estimated?

A. The book reserve as of December 31, 2022, by account, was projected by adding estimated accruals and subtracting estimated retirements from the book reserve as December 31, 2021. Annual accruals were estimated using annual accrual rates calculated as part of the 2021 Study in this proceeding. The projected book reserve by account was allocated to vintages for the purpose of the annual accrual calculation based on calculated accrued depreciation as of December 31, 2022.

Q. Has a service life study of the Borough of Hanover's water utility property been performed?

A. Yes. Service life studies have been performed in 2009, 2012, 2014 and updated in 2020 as part of this case. These service life studies are the basis for the service lives I used to calculate annual accruals.

Q. Briefly outline the procedure used in performing the service life study.

A. The service life study consisted of assembling and compiling historical data from the records related to the water utility plant of the Borough of Hanover; statistically analyzing such data to obtain historical trends of survivor characteristics; obtaining supplementary information from management and operating personnel concerning Borough practices and plans as they relate to plant operations; and interpreting the above data to form judgments of service life characteristics.

Iowa type survivor curves were used to describe the estimated survivor characteristics of the mass property groups. Individual service lives were used for major individual units of plant, such as reservoirs and buildings housing treatment plants, pump stations, offices and shops. The life span concept was recognized by coordinating the lives of associated plant installed in subsequent years with the probable retirement date defined by the life estimated for the major unit.

Q. What statistical data were employed in the historical analyses performed for the purpose of estimating service life characteristics?

A. The data consisted of the entries made to record retirements and other transactions related to the water plant during the period 1932-2020. These

entries were classified by depreciable group, type of transaction, the year in which the transaction took place, and the year in which the plant was installed. Types of transactions included in the data were plant additions, retirements, transfers, and balances.

Q. What was the source of these data?

A. They were assembled from Borough records related to its water plant in service.

Q. Were the methods used in the service life study the same as those used in other depreciation studies for water utility plant presented before this Commission?

A. Yes. The methods are the same ones that have been presented previously for other water companies before the Pennsylvania Public Utility Commission, and that have been accepted by the Commission in its past orders concerning water utilities.

Q. What approach did you use to estimate the lives of significant structures such as treatment plants and service centers?

A. I used the life span technique to estimate the lives of significant structures. In this technique, the survivor characteristics of the structures are described by the use of interim survivor curves and estimated probable retirement dates. The interim survivor curve describes the rate of retirement related to the replacement of elements of the structure such as plumbing, heating, doors, windows, roofs, etc. that occur during the life of the facility. The probable retirement date provides the rate of final retirement for each year of installation for the structures by truncating the interim survivor curve for each installation

year at its attained age at the date of probable retirement. The use of interim survivor curves truncated at the date of probable retirement provides a consistent method for estimating the lives of the several years of installation inasmuch as concurrent retirement of all years of installation will occur when the structure is retired.

Q. Has your firm used this approach in other proceedings before this Commission?

A. Yes, we have used the life span technique on many occasions before the Commission.

Q. What are the bases for the probable retirement years that you have estimated for each structure?

A. The bases for the estimates of probable retirement years are life spans for each structure that are based on judgment, and incorporate consideration of the age, use, size, nature of construction, management outlook and typical life spans experienced and used by other water utilities for similar structures. Most of the life spans result in probable retirement dates that are many years in the future. As a result, the retirement of these structures is not yet subject to specific management plans. Such plans would be premature. At the appropriate time, detailed studies of the economics of rehabilitation and continued use or retirement of the structure will be performed and the results incorporated in the estimation of the structure's life span.

Q. Are the factors considered in your estimates of service life presented in Exhibit No. JJS-2?

A. Yes. A discussion of the factors considered in the estimation of service lives is presented by account on pages III-2 through III-6 of Exhibit No. JJS-2.

Q. Please outline the contents of Exhibit No. JJS-2.

A. Exhibit No. JJS-2 is presented in seven parts. Part I, Methods Used in Study, includes an introduction and the basis of the study. Part II, Estimation of Survivor Curves, includes a description of Iowa Curves and the formulation of the retirement rate method. Part III, Service Life Analyses, describes the considerations used in the service life analyses. Part IV, Calculation of Annual and Accrued Depreciation, describes the procedures used in the calculation of group depreciation. Part V, Results of Study, presents summaries by depreciable group of annual depreciation accrual rates and amounts. Part VI, Service Life Statistics, and Part VII, Detailed Depreciation Calculations, present the graphs and tables related to the service life study and the detailed tabulations of annual depreciation, respectively.

Table 1, pages V-4 and V-5, presents the estimated survivor curve, the original cost as of December 31, 2021, and the book reserve and calculated annual depreciation for each account or subaccount of Water Plant in Service. Table 2, page V-6, presents the bringforward to December 31, 2021 of the book reserve as of December 31, 2020. Table 3, page V-7, presents the calculation of depreciation accruals for the twelve months ended December 31, 2021.

The section beginning on page VI-2 presents the results of the retirement rate analyses prepared as the historical bases for the service life estimates. The tabulations on pages VII-2 through VII-36 present the

calculation of annual depreciation by vintage by account for each depreciable group of utility plant.

Q. Please outline the contents of Exhibit No. JJS-1.

A. Exhibit No. JJS-1 includes a description of the results, a summary of the depreciation calculations, and the detailed depreciation calculations as of December 31, 2020. The descriptions and explanations presented in Exhibit No. JJS-2 are also applicable to the depreciation calculations presented in Exhibit No. JJS-1. The graphs and tables related to service life presented in Exhibit JJS-2, also support the service life estimates used in Exhibit JJS-1, inasmuch as the estimates are the same for both test years. The summary tables and detailed depreciation calculations as of December 31, 2020, are organized and presented in the same manner as those as of December 31, 2021.

Q. Please outline the contents of Exhibit No. JJS-3.

A. Exhibit No. JJS-3 includes a description of the results, a summary of the depreciation calculations, the development of the book reserve and the detailed depreciation calculations as of December 31, 2022. The descriptions and explanations presented in Exhibit No. JJS-2 are also applicable to the depreciation calculations presented in Exhibit No. JJS-3. The graphs and tables related to service life presented in Exhibit JJS-2, also support the service life estimates used in Exhibit JJS-3, inasmuch as the estimates are the same for both test years. The summary tables and detailed depreciation calculations as of December 31, 2022, are organized and presented in the same manner as those at December 31, 2021.

Q. Please use an example to illustrate the manner in which the study is presented in Exhibit No. JJS-1, JJS-2 and JJS-3.

A. I will use Account 248, Distribution Mains, as my example, inasmuch as it is the largest depreciable group and represents 18 percent of the original cost of depreciable water plant as of December 31, 2021.

The retirement rate method was used to analyze the survivor characteristics of this group. The life table for the 1932-2020 experience band is presented on pages VI-61 through VI-63 of Exhibit No. JJS-2. The life table, or original survivor curve, is plotted along with the estimated smooth survivor curve, the 100-R4, on page VI-60.

The calculation of the annual depreciation related to the original cost as of December 31, 2021 of water plant is presented on pages VII-22 through VII-24 of Exhibit No. JJS-2. The calculation is based on the 100-R4 survivor curve, the attained age, and the allocated book reserve. The tabulations set forth the installation year, the original cost, calculated accrued depreciation, allocated book reserve, future accruals, remaining life and annual accrual. The totals are brought forward to Table 1 on page V-4 in Exhibit No. JJS-2.

Q. Does this complete your testimony at this time?

A. Yes, it does.

Appendix A

JOHN SPANOS

DEPRECIATION EXPERIENCE

Q. Please state your name.

A. My name is John J. Spanos.

Q. What is your educational background?

A. I have Bachelor of Science degrees in Industrial Management and Mathematics from Carnegie-Mellon University and a Master of Business Administration from York College.

Q. Do you belong to any professional societies?

A. Yes. I am a member and past President of the Society of Depreciation Professionals and a member of the American Gas Association/Edison Electric Institute Industry Accounting Committee.

Q. Do you hold any special certification as a depreciation expert?

A. Yes. The Society of Depreciation Professionals has established national standards for depreciation professionals. The Society administers an examination to become certified in this field. I passed the certification exam in September 1997 and was recertified in August 2003, February 2008, January 2013 and February 2018.

Q. Please outline your experience in the field of depreciation.

A. In June 1986, I was employed by Gannett Fleming Valuation and Rate Consultants, Inc. as a Depreciation Analyst. During the period from June 1986 through December 1995, I helped prepare numerous depreciation and original cost studies for utility companies in various industries. I helped perform depreciation studies for the following telephone companies: United Telephone of Pennsylvania, United Telephone of New Jersey, and Anchorage Telephone Utility. I helped perform depreciation studies for the following

companies in the railroad industry: Union Pacific Railroad, Burlington Northern Railroad, and Wisconsin Central Transportation Corporation.

I helped perform depreciation studies for the following organizations in the electric utility industry: Chugach Electric Association, The Cincinnati Gas and Electric Company (CG&E), The Union Light, Heat and Power Company (ULH&P), Northwest Territories Power Corporation, and the City of Calgary - Electric System.

I helped perform depreciation studies for the following pipeline companies: TransCanada Pipelines Limited, Trans Mountain Pipe Line Company Ltd., Interprovincial Pipe Line Inc., Nova Gas Transmission Limited and Lakehead Pipeline Company.

I helped perform depreciation studies for the following gas utility companies: Columbia Gas of Pennsylvania, Columbia Gas of Maryland, The Peoples Natural Gas Company, T. W. Phillips Gas & Oil Company, CG&E, ULH&P, Lawrenceburg Gas Company and Penn Fuel Gas, Inc.

I helped perform depreciation studies for the following water utility companies: Indiana-American Water Company, Consumers Pennsylvania Water Company and The York Water Company; and depreciation and original cost studies for Philadelphia Suburban Water Company and Pennsylvania-American Water Company.

In each of the above studies, I assembled and analyzed historical and simulated data, performed field reviews, developed preliminary estimates of service life and net salvage, calculated annual depreciation, and prepared reports for submission to state public utility commissions or federal regulatory agencies. I performed these studies under the general direction of William M. Stout, P.E.

In January 1996, I was assigned to the position of Supervisor of Depreciation Studies. In July 1999, I was promoted to the position of Manager, Depreciation and

Valuation Studies. In December 2000, I was promoted to the position as Vice-President of Gannett Fleming Valuation and Rate Consultants, Inc., in April 2012, I was promoted to the position as Senior Vice President of the Valuation and Rate Division of Gannett Fleming Inc. (now doing business as Gannett Fleming Valuation and Rate Consultants, LLC) and in January of 2019, I was promoted to my present position of President of Gannett Fleming Valuation and Rate Consultants, LLC. In my current position I am responsible for conducting all depreciation, valuation and original cost studies, including the preparation of final exhibits and responses to data requests for submission to the appropriate regulatory bodies.

Since January 1996, I have conducted depreciation studies similar to those previously listed including assignments for Pennsylvania-American Water Company; Aqua Pennsylvania; Kentucky-American Water Company; Virginia-American Water Company; Indiana-American Water Company; Iowa-American Water Company; New Jersey-American Water Company; Hampton Water Works Company; Omaha Public Power District; Enbridge Pipe Line Company; Inc.; Columbia Gas of Virginia, Inc.; Virginia Natural Gas Company National Fuel Gas Distribution Corporation - New York and Pennsylvania Divisions; The City of Bethlehem - Bureau of Water; The City of Coatesville Authority; The City of Lancaster - Bureau of Water; Peoples Energy Corporation; The York Water Company; Public Service Company of Colorado; Enbridge Pipelines; Enbridge Gas Distribution, Inc.; Reliant Energy-HLP; Massachusetts-American Water Company; St. Louis County Water Company; Missouri-American Water Company; Chugach Electric Association; Alliant Energy; Oklahoma Gas & Electric Company; Nevada Power Company; Dominion Virginia Power; NUI-Virginia Gas Companies; Pacific Gas & Electric Company; PSI Energy; NUI - Elizabethtown Gas Company; Cinergy Corporation – CG&E; Cinergy Corporation – ULH&P; Columbia Gas of Kentucky; South Carolina Electric & Gas Company; Idaho Power Company; El Paso

Electric Company; Aqua North Carolina; Aqua Ohio; Aqua Texas, Inc.; Aqua Illinois, Inc.; Ameren Missouri; Central Hudson Gas & Electric; Centennial Pipeline Company; CenterPoint Energy-Arkansas; CenterPoint Energy – Oklahoma; CenterPoint Energy – Entex; CenterPoint Energy - Louisiana; NSTAR – Boston Edison Company; Westar Energy, Inc.; United Water Pennsylvania; PPL Electric Utilities; PPL Gas Utilities; Wisconsin Power & Light Company; TransAlaska Pipeline; Avista Corporation; Northwest Natural Gas; Allegheny Energy Supply, Inc.; Public Service Company of North Carolina; South Jersey Gas Company; Duquesne Light Company; MidAmerican Energy Company; Laclede Gas; Duke Energy Company; E.ON U.S. Services Inc.; Elkton Gas Services; Anchorage Water and Wastewater Utility; Kansas City Power and Light; Duke Energy North Carolina; Duke Energy South Carolina; Monongahela Power Company; Potomac Edison Company; Duke Energy Ohio Gas; Duke Energy Kentucky; Duke Energy Indiana; Duke Energy Progress; Northern Indiana Public Service Company; Tennessee-American Water Company; Columbia Gas of Maryland; Maryland-American Water Company; Bonneville Power Administration; NSTAR Electric and Gas Company; EPCOR Distribution, Inc.; B. C. Gas Utility, Ltd; Entergy Arkansas; Entergy Texas; Entergy Mississippi; Entergy Louisiana; Entergy Gulf States Louisiana; the Borough of Hanover; Louisville Gas and Electric Company; Kentucky Utilities Company; Madison Gas and Electric; Central Maine Power; PEPCO; PacifiCorp; Minnesota Energy Resource Group; Jersey Central Power & Light Company; Cheyenne Light, Fuel and Power Company; United Water Arkansas; Central Vermont Public Service Corporation; Green Mountain Power; Portland General Electric Company; Atlantic City Electric; Nicor Gas Company; Black Hills Power; Black Hills Colorado Gas; Black Hills Kansas Gas; Black Hills Service Company; Black Hills Utility Holdings; Public Service Company of Oklahoma; City of

Dubois; Peoples Gas Light and Coke Company; North Shore Gas Company; Connecticut Light and Power; New York State Electric and Gas Corporation; Rochester Gas and Electric Corporation; Greater Missouri Operations; Tennessee Valley Authority; Omaha Public Power District; Indianapolis Power & Light Company; Vermont Gas Systems, Inc.; Metropolitan Edison; Pennsylvania Electric; West Penn Power; Pennsylvania Power; PHI Service Company - Delmarva Power and Light; Atmos Energy Corporation; Citizens Energy Group; PSE&G Company; Berkshire Gas Company; Alabama Gas Corporation; Mid-Atlantic Interstate Transmission, LLC; SUEZ Water; WEC Energy Group; Rocky Mountain Natural Gas, LLC; Illinois-American Water Company; Northern Illinois Gas Company; Public Service of New Hampshire and Newtown Artesian Water Company.

My additional duties include determining final life and salvage estimates, conducting field reviews, presenting recommended depreciation rates to management for its consideration and supporting such rates before regulatory bodies.

Q. Have you submitted testimony to any state utility commission on the subject of utility plant depreciation?

A. Yes. I have submitted testimony to the Pennsylvania Public Utility Commission; the Commonwealth of Kentucky Public Service Commission; the Public Utilities Commission of Ohio; the Nevada Public Utility Commission; the Public Utilities Board of New Jersey; the Missouri Public Service Commission; the Massachusetts Department of Telecommunications and Energy; the Alberta Energy & Utility Board; the Idaho Public Utility Commission; the Louisiana Public Service Commission; the State Corporation Commission of Kansas; the Oklahoma Corporate Commission; the Public Service Commission of South Carolina; Railroad Commission of Texas – Gas Services Division; the New York Public Service Commission; Illinois Commerce Commission; the Indiana

Utility Regulatory Commission; the California Public Utilities Commission; the Federal Energy Regulatory Commission ("FERC"); the Arkansas Public Service Commission; the Public Utility Commission of Texas; Maryland Public Service Commission; Washington Utilities and Transportation Commission; The Tennessee Regulatory Commission; the Regulatory Commission of Alaska; Minnesota Public Utility Commission; Utah Public Service Commission; District of Columbia Public Service Commission; the Mississippi Public Service Commission; Delaware Public Service Commission; Virginia State Corporation Commission; Colorado Public Utility Commission; Oregon Public Utility Commission; South Dakota Public Utilities Commission; Wisconsin Public Service Commission; Wyoming Public Service Commission; the Public Service Commission of West Virginia; Maine Public Utility Commission; Iowa Utility Board; Connecticut Public Utilities Regulatory Authority; New Mexico Public Regulation Commission; Commonwealth of Massachusetts Department of Public Utilities; Rhode Island Public Utilities Commission and the North Carolina Utilities Commission.

Q. Have you had any additional education relating to utility plant depreciation?

A. Yes. I have completed the following courses conducted by Depreciation Programs, Inc.: "Techniques of Life Analysis," "Techniques of Salvage and Depreciation Analysis," "Forecasting Life and Salvage," "Modeling and Life Analysis Using Simulation," and "Managing a Depreciation Study." I have also completed the "Introduction to Public Utility Accounting" program conducted by the American Gas Association.

Q. Does this conclude your qualification statement?

A. Yes.

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY

	Year	Jurisdiction	Docket No.	Client Utility	Subject
01.	1998	PA PUC	R-00984375	City of Bethlehem – Bureau of Water	Original Cost and Depreciation
02.	1998	PA PUC	R-00984567	City of Lancaster	Original Cost and Depreciation
03.	1999	PA PUC	R-00994605	The York Water Company	Depreciation
04.	2000	D.T.&E.	DTE 00-105	Massachusetts-American Water Company	Depreciation
05.	2001	PA PUC	R-00016114	City of Lancaster	Original Cost and Depreciation
06.	2001	PA PUC	R-00017236	The York Water Company	Depreciation
07.	2001	PA PUC	R-00016339	Pennsylvania-American Water Company	Depreciation
08.	2001	OH PUC	01-1228-GA-AIR	Cinergy Corp – Cincinnati Gas & Elect Company	Depreciation
09.	2001	KY PSC	2001-092	Cinergy Corp – Union Light, Heat & Power Co.	Depreciation
10.	2002	PA PUC	R-00016750	Philadelphia Suburban Water Company	Depreciation
11.	2002	KY PSC	2002-00145	Columbia Gas of Kentucky	Depreciation
12.	2002	NJ BPU	GF02040245	NUI Corporation/Elizabethtown Gas Company	Depreciation
13.	2002	ID PUC	IPC-E-03-7	Idaho Power Company	Depreciation
14.	2003	PA PUC	R-0027975	The York Water Company	Depreciation
15.	2003	IN URC	R-0027975	Cinergy Corp – PSI Energy, Inc.	Depreciation
16.	2003	PA PUC	R-00038304	Pennsylvania-American Water Company	Depreciation
17.	2003	MO PSC	WR-2003-0500	Missouri-American Water Company	Depreciation
18.	2003	FERC	ER03-1274-000	NSTAR-Boston Edison Company	Depreciation
19.	2003	NJ BPU	BPU 03080683	South Jersey Gas Company	Depreciation
20.	2003	NV PUC	03-10001	Nevada Power Company	Depreciation
21.	2003	LA PSC	U-27676	CenterPoint Energy – Arkla	Depreciation
22.	2003	PA PUC	R-00038805	Pennsylvania Suburban Water Company	Depreciation
23.	2004	AB En/Util Bd	1306821	EPCOR Distribution, Inc.	Depreciation
24.	2004	PA PUC	R-00038168	National Fuel Gas Distribution Corp (PA)	Depreciation
25.	2004	PA PUC	R-00049255	PPL Electric Utilities	Depreciation
26.	2004	PA PUC	R-00049165	The York Water Company	Depreciation
27.	2004	OK Corp Cm	PUC 200400187	CenterPoint Energy – Arkla	Depreciation
28.	2004	OH PUC	04-680-El-AIR	Cinergy Corp. – Cincinnati Gas and Electric Company	Depreciation
29.	2004	RR Com of TX	GUD#	CenterPoint Energy – Entex Gas Services Div.	Depreciation
30.	2004	NY PUC	04-G-1047	National Fuel Gas Distribution Gas (NY)	Depreciation
31.	2004	AR PSC	04-121-U	CenterPoint Energy – Arkla	Depreciation
32.	2005	IL CC	05-ICC-06	North Shore Gas Company	Depreciation
33.	2005	IL CC	05-ICC-06	Peoples Gas Light and Coke Company	Depreciation
34.	2005	KY PSC	2005-00042	Union Light Heat & Power	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
35.	2005	IL CC	05-0308	MidAmerican Energy Company	Depreciation
36.	2005	MO PSC	GF-2005	Laclede Gas Company	Depreciation
37.	2005	KS CC	05-WSEE-981-RTS	Westar Energy	Depreciation
38.	2005	RR Com of TX	GUD #	CenterPoint Energy – Entex Gas Services Div.	Depreciation
39.	2005	US District Court	Cause No. 1:99-CV-1693-LJM/VSS	Cinergy Corporation	Accounting
40.	2005	OK CC	PUD 200500151	Oklahoma Gas and Electric Company	Depreciation
41.	2005	MA Dept Tele-com & Ergy	DTE 05-85	NSTAR	Depreciation
42.	2005	NY PUC	05-E-934/05-G-0935	Central Hudson Gas & Electric Company	Depreciation
43.	2005	AK Reg Com	U-04-102	Chugach Electric Association	Depreciation
44.	2005	CA PUC	A05-12-002	Pacific Gas & Electric	Depreciation
45.	2006	PA PUC	R-00051030	Aqua Pennsylvania, Inc.	Depreciation
46.	2006	PA PUC	R-00051178	T.W. Phillips Gas and Oil Company	Depreciation
47.	2006	NC Util Cm.	G-5, Sub522	Pub. Service Company of North Carolina	Depreciation
48.	2006	PA PUC	R-00051167	City of Lancaster	Depreciation
49.	2006	PA PUC	R00061346	Duquesne Light Company	Depreciation
50.	2006	PA PUC	R-00061322	The York Water Company	Depreciation
51.	2006	PA PUC	R-00051298	PPL GAS Utilities	Depreciation
52.	2006	PUC of TX	32093	CenterPoint Energy – Houston Electric	Depreciation
53.	2006	KY PSC	2006-00172	Duke Energy Kentucky	Depreciation
54.	2006	SC PSC		SCANA	Accounting
55.	2006	AK Reg Com	U-06-6	Municipal Light and Power	Depreciation
56.	2006	DE PSC	06-284	Delmarva Power and Light	Depreciation
57.	2006	IN URC	IURC43081	Indiana American Water Company	Depreciation
58.	2006	AK Reg Com	U-06-134	Chugach Electric Association	Depreciation
59.	2006	MO PSC	WR-2007-0216	Missouri American Water Company	Depreciation
60.	2006	FERC	IS05-82-002, et al	TransAlaska Pipeline	Depreciation
61.	2006	PA PUC	R-00061493	National Fuel Gas Distribution Corp. (PA)	Depreciation
62.	2007	NC Util Com.	E-7 SUB 828	Duke Energy Carolinas, LLC	Depreciation
63.	2007	OH PSC	08-709-EL-AIR	Duke Energy Ohio Gas	Depreciation
64.	2007	PA PUC	R-00072155	PPL Electric Utilities Corporation	Depreciation
65.	2007	KY PSC	2007-00143	Kentucky American Water Company	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
66.	2007	PA PUC	R-00072229	Pennsylvania American Water Company	Depreciation
67.	2007	KY PSC	2007-0008	NiSource – Columbia Gas of Kentucky	Depreciation
68.	2007	NY PSC	07-G-0141	National Fuel Gas Distribution Corp (NY)	Depreciation
69.	2008	AK PSC	U-08-004	Anchorage Water & Wastewater Utility	Depreciation
70.	2008	TN Reg Auth	08-00039	Tennessee-American Water Company	Depreciation
71.	2008	DE PSC	08-96	Artesian Water Company	Depreciation
72.	2008	PA PUC	R-2008-2023067	The York Water Company	Depreciation
73.	2008	KS CC	08-WSEE1-RTS	Westar Energy	Depreciation
74.	2008	IN URC	43526	Northern Indiana Public Service Company	Depreciation
75.	2008	IN URC	43501	Duke Energy Indiana	Depreciation
76.	2008	MD PSC	9159	NiSource – Columbia Gas of Maryland	Depreciation
77.	2008	KY PSC	2008-000251	Kentucky Utilities	Depreciation
78.	2008	KY PSC	2008-000252	Louisville Gas & Electric	Depreciation
79.	2008	PA PUC	2008-20322689	Pennsylvania American Water Co. - Wastewater	Depreciation
80.	2008	NY PSC	08-E887/08-00888	Central Hudson	Depreciation
81.	2008	WV TC	VE-080416/VG-8080417	Avista Corporation	Depreciation
82.	2008	IL CC	ICC-09-166	Peoples Gas, Light and Coke Company	Depreciation
83.	2009	IL CC	ICC-09-167	North Shore Gas Company	Depreciation
84.	2009	DC PSC	1076	Potomac Electric Power Company	Depreciation
85.	2009	KY PSC	2009-00141	NiSource – Columbia Gas of Kentucky	Depreciation
86.	2009	FERC	ER08-1056-002	Entergy Services	Depreciation
87.	2009	PA PUC	R-2009-2097323	Pennsylvania American Water Company	Depreciation
88.	2009	NC Util Cm	E-7, Sub 090	Duke Energy Carolinas, LLC	Depreciation
89.	2009	KY PSC	2009-00202	Duke Energy Kentucky	Depreciation
90.	2009	VA St. CC	PUE-2009-00059	Aqua Virginia, Inc.	Depreciation
91.	2009	PA PUC	2009-2132019	Aqua Pennsylvania, Inc.	Depreciation
92.	2009	MS PSC	Docket No. 2011-UA-183	Entergy Mississippi	Depreciation
93.	2009	AK PSC	09-08-U	Entergy Arkansas	Depreciation
94.	2009	TX PUC	37744	Entergy Texas	Depreciation
95.	2009	TX PUC	37690	El Paso Electric Company	Depreciation
96.	2009	PA PUC	R-2009-2106908	The Borough of Hanover	Depreciation
97.	2009	KS CC	10-KCPE-415-RTS	Kansas City Power & Light	Depreciation
98.	2009	PA PUC	R-2009-	United Water Pennsylvania	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
99.	2009	OH PUC		Aqua Ohio Water Company	Depreciation
100.	2009	WI PSC	3270-DU-103	Madison Gas & Electric Company	Depreciation
101.	2009	MO PSC	WR-2010	Missouri American Water Company	Depreciation
102.	2009	AK Reg Cm	U-09-097	Chugach Electric Association	Depreciation
103.	2010	IN URC	43969	Northern Indiana Public Service Company	Depreciation
104.	2010	WI PSC	6690-DU-104	Wisconsin Public Service Corp.	Depreciation
105.	2010	PA PUC	R-2010-2161694	PPL Electric Utilities Corp.	Depreciation
106.	2010	KY PSC	2010-00036	Kentucky American Water Company	Depreciation
107.	2010	PA PUC	R-2009-2149262	Columbia Gas of Pennsylvania	Depreciation
108.	2010	MO PSC	GR-2010-0171	Laclede Gas Company	Depreciation
109.	2010	SC PSC	2009-489-E	South Carolina Electric & Gas Company	Depreciation
110.	2010	NJ BD OF PU	ER09080664	Atlantic City Electric	Depreciation
111.	2010	VA St. CC	PUE-2010-00001	Virginia American Water Company	Depreciation
112.	2010	PA PUC	R-2010-2157140	The York Water Company	Depreciation
113.	2010	MO PSC	ER-2010-0356	Greater Missouri Operations Company	Depreciation
114.	2010	MO PSC	ER-2010-0355	Kansas City Power and Light	Depreciation
115.	2010	PA PUC	R-2010-2167797	T.W. Phillips Gas and Oil Company	Depreciation
116.	2010	PSC SC	2009-489-E	SCANA – Electric	Depreciation
117.	2010	PA PUC	R-2010-22010702	Peoples Natural Gas, LLC	Depreciation
118.	2010	AK PSC	10-067-U	Oklahoma Gas and Electric Company	Depreciation
119.	2010	IN URC	Cause No. 43894	Northern Indiana Public Serv. Company - NIFL	Depreciation
120.	2010	IN URC	Cause No. 43894	Northern Indiana Public Serv. Co. - Kokomo	Depreciation
121.	2010	PA PUC	R-2010-2166212	Pennsylvania American Water Co. - WW	Depreciation
122.	2010	NC Util Cn.	W-218,SUB310	Aqua North Carolina, Inc.	Depreciation
123.	2011	OH PUC	11-4161-WS-AIR	Ohio American Water Company	Depreciation
124.	2011	MS PSC	EC-123-0082-00	Entergy Mississippi	Depreciation
125.	2011	CO PUC	11AL-387E	Black Hills Colorado	Depreciation
126.	2011	PA PUC	R-2010-2215623	Columbia Gas of Pennsylvania	Depreciation
127.	2011	PA PUC	R-2010-2179103	City of Lancaster – Bureau of Water	Depreciation
128.	2011	IN URC	43114 IGCC 4S	Duke Energy Indiana	Depreciation
129.	2011	FERC	IS11-146-000	Enbridge Pipelines (Southern Lights)	Depreciation
130.	2011	IL CC	11-0217	MidAmerican Energy Corporation	Depreciation
131.	2011	OK CC	201100087	Oklahoma Gas & Electric Company	Depreciation
132.	2011	PA PUC	2011-2232243	Pennsylvania American Water Company	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
133.	2011	FERC	RP11-___-000	Carolina Gas Transmission	Depreciation
134.	2012	WA UTC	UE-120436/UG-120437	Avista Corporation	Depreciation
135.	2012	AK Reg Cm	U-12-009	Chugach Electric Association	Depreciation
136.	2012	MA PUC	DPU 12-25	Columbia Gas of Massachusetts	Depreciation
137.	2012	TX PUC	40094	El Paso Electric Company	Depreciation
138.	2012	ID PUC	IPC-E-12	Idaho Power Company	Depreciation
139.	2012	PA PUC	R-2012-2290597	PPL Electric Utilities	Depreciation
140.	2012	PA PUC	R-2012-2311725	Borough of Hanover – Bureau of Water	Depreciation
141.	2012	KY PSC	2012-00222	Louisville Gas and Electric Company	Depreciation
142.	2012	KY PSC	2012-00221	Kentucky Utilities Company	Depreciation
143.	2012	PA PUC	R-2012-2285985	Peoples Natural Gas Company	Depreciation
144.	2012	DC PSC	Case 1087	Potomac Electric Power Company	Depreciation
145.	2012	OH PSC	12-1682-EL-AIR	Duke Energy Ohio (Electric)	Depreciation
146.	2012	OH PSC	12-1685-GA-AIR	Duke Energy Ohio (Gas)	Depreciation
147.	2012	PA PUC	R-2012-2310366	City of Lancaster – Sewer Fund	Depreciation
148.	2012	PA PUC	R-2012-2321748	Columbia Gas of Pennsylvania	Depreciation
149.	2012	FERC	ER-12-2681-000	ITC Holdings	Depreciation
150.	2012	MO PSC	ER-2012-0174	Kansas City Power and Light	Depreciation
151.	2012	MO PSC	ER-2012-0175	KCPL Greater Missouri Operations Company	Depreciation
152.	2012	MO PSC	GO-2012-0363	Laclede Gas Company	Depreciation
153.	2012	MN PUC	G007,001/D-12-533	Integrys – MN Energy Resource Group	Depreciation
154.	2012	TX PUC	SOAH 582-14-1051/ TECQ 2013-2007-UCR	Aqua Texas	Depreciation
155.	2012	PA PUC	2012-2336379	York Water Company	Depreciation
156.	2013	NJ BPU	ER12121071	PHI Service Company– Atlantic City Electric	Depreciation
157.	2013	KY PSC	2013-00167	Columbia Gas of Kentucky	Depreciation
158.	2013	VA St CC	2013-00020	Virginia Electric and Power Company	Depreciation
159.	2013	IA Util Bd	2013-0004	MidAmerican Energy Corporation	Depreciation
160.	2013	PA PUC	2013-2355276	Pennsylvania American Water Company	Depreciation
161.	2013	NY PSC	13-E-0030, 13-G-0031, 13-S-0032	Consolidated Edison of New York	Depreciation
162.	2013	PA PUC	2013-2355886	Peoples TWP LLC	Depreciation
163.	2013	TN Reg Auth	12-0504	Tennessee American Water	Depreciation
164.	2013	ME PUC	2013-168	Central Maine Power Company	Depreciation
165.	2013	DC PSC	Case 1103	PHI Service Company – PEPCO	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
166.	2013	WY PSC	2003-ER-13	Cheyenne Light, Fuel and Power Company	Depreciation
167.	2013	FERC	ER13-2428-0000	Kentucky Utilities	Depreciation
168.	2013	FERC	ER13- -0000	MidAmerican Energy Company	Depreciation
169.	2013	FERC	ER13-2410-0000	PPL Utilities	Depreciation
170.	2013	PA PUC	R-2013-2372129	Duquesne Light Company	Depreciation
171.	2013	NJ BPU	ER12111052	Jersey Central Power and Light Company	Depreciation
172.	2013	PA PUC	R-2013-2390244	Bethlehem, City of – Bureau of Water	Depreciation
173.	2013	OK CC	UM 1679	Oklahoma, Public Service Company of	Depreciation
174.	2013	IL CC	13-0500	Nicor Gas Company	Depreciation
175.	2013	WY PSC	20000-427-EA-13	PacifiCorp	Depreciation
176.	2013	UT PSC	13-035-02	PacifiCorp	Depreciation
177.	2013	OR PUC	UM 1647	PacifiCorp	Depreciation
178.	2013	PA PUC	2013-2350509	Dubois, City of	Depreciation
179.	2014	IL CC	14-0224	North Shore Gas Company	Depreciation
180.	2014	FERC	ER14- -0000	Duquesne Light Company	Depreciation
181.	2014	SD PUC	EL14-026	Black Hills Power Company	Depreciation
182.	2014	WY PSC	20002-91-ER-14	Black Hills Power Company	Depreciation
183.	2014	PA PUC	2014-2428304	Borough of Hanover – Municipal Water Works	Depreciation
184.	2014	PA PUC	2014-2406274	Columbia Gas of Pennsylvania	Depreciation
185.	2014	IL CC	14-0225	Peoples Gas Light and Coke Company	Depreciation
186.	2014	MO PSC	ER-2014-0258	Ameren Missouri	Depreciation
187.	2014	KS CC	14-BHCG-502-RTS	Black Hills Service Company	Depreciation
188.	2014	KS CC	14-BHCG-502-RTS	Black Hills Utility Holdings	Depreciation
189.	2014	KS CC	14-BHCG-502-RTS	Black Hills Kansas Gas	Depreciation
190.	2014	PA PUC	2014-2418872	Lancaster, City of – Bureau of Water	Depreciation
191.	2014	WV PSC	14-0701-E-D	First Energy – MonPower/PotomacEdison	Depreciation
192	2014	VA St CC	PUC-2014-00045	Aqua Virginia	Depreciation
193.	2014	VA St CC	PUE-2013	Virginia American Water Company	Depreciation
194.	2014	OK CC	PUD201400229	Oklahoma Gas and Electric Company	Depreciation
195.	2014	OR PUC	UM1679	Portland General Electric	Depreciation
196.	2014	IN URC	Cause No. 44576	Indianapolis Power & Light	Depreciation
197.	2014	MA DPU	DPU. 14-150	NSTAR Gas	Depreciation
198.	2014	CT PURA	14-05-06	Connecticut Light and Power	Depreciation
199.	2014	MO PSC	ER-2014-0370	Kansas City Power & Light	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
200.	2014	KY PSC	2014-00371	Kentucky Utilities Company	Depreciation
201.	2014	KY PSC	2014-00372	Louisville Gas and Electric Company	Depreciation
202.	2015	PA PUC	R-2015-2462723	United Water Pennsylvania Inc.	Depreciation
203.	2015	PA PUC	R-2015-2468056	NiSource - Columbia Gas of Pennsylvania	Depreciation
204.	2015	NY PSC	15-E-0283/15-G-0284	New York State Electric and Gas Corporation	Depreciation
205.	2015	NY PSC	15-E-0285/15-G-0286	Rochester Gas and Electric Corporation	Depreciation
206.	2015	MO PSC	WR-2015-0301/SR-2015-0302	Missouri American Water Company	Depreciation
207.	2015	OK CC	PUD 201500208	Oklahoma, Public Service Company of	Depreciation
208.	2015	WV PSC	15-0676-W-42T	West Virginia American Water Company	Depreciation
209.	2015	PA PUC	2015-2469275	PPL Electric Utilities	Depreciation
210.	2015	IN URC	Cause No. 44688	Northern Indiana Public Service Company	Depreciation
211.	2015	OH PSC	14-1929-EL-RDR	First Energy-Ohio Edison/Cleveland Electric/ Toledo Edison	Depreciation
212.	2015	NM PRC	15-00127-UT	El Paso Electric	Depreciation
213.	2015	TX PUC	PUC-44941; SOAH 473-15-5257	El Paso Electric	Depreciation
214.	2015	WI PSC	3270-DU-104	Madison Gas and Electric Company	Depreciation
215.	2015	OK CC	PUD 201500273	Oklahoma Gas and Electric	Depreciation
216.	2015	KY PSC	Doc. No. 2015-00418	Kentucky American Water Company	Depreciation
217.	2015	NC UC	Doc. No. G-5, Sub 565	Public Service Company of North Carolina	Depreciation
218.	2016	WA UTC	Docket UE-17	Puget Sound Energy	Depreciation
219.	2016	NY PSC	Case No. 16-W-0130	SUEZ Water New York, Inc.	Depreciation
220.	2016	MO PSC	ER-2016-0156	KCPL – Greater Missouri	Depreciation
221.	2016	WI PSC		Wisconsin Public Service Corporation	Depreciation
222.	2016	KY PSC	Case No. 2016-00026	Kentucky Utilities Company	Depreciation
223.	2016	KY PSC	Case No. 2016-00027	Louisville Gas and Electric Company	Depreciation
224.	2016	OH PUC	Case No. 16-0907-WW-AIR	Aqua Ohio	Depreciation
225.	2016	MD PSC	Case 9417	NiSource - Columbia Gas of Maryland	Depreciation
226.	2016	KY PSC	2016-00162	Columbia Gas of Kentucky	Depreciation
227.	2016	DE PSC	16-0649	Delmarva Power and Light Company – Electric	Depreciation
228.	2016	DE PSC	16-0650	Delmarva Power and Light Company – Gas	Depreciation
229.	2016	NY PSC	Case 16-G-0257	National Fuel Gas Distribution Corp – NY Div	Depreciation
230.	2016	PA PUC	R-2016-2537349	Metropolitan Edison Company	Depreciation
231.	2016	PA PUC	R-2016-2537352	Pennsylvania Electric Company	Depreciation
232.	2016	PA PUC	R-2016-2537355	Pennsylvania Power Company	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
233.	2016	PA PUC	R-2016-2537359	West Penn Power Company	Depreciation
234.	2016	PA PUC	R-2016-2529660	NiSource - Columbia Gas of PA	Depreciation
235.	2016	KY PSC	Case No. 2016-00063	Kentucky Utilities / Louisville Gas & Electric Co	Depreciation
236.	2016	MO PSC	ER-2016-0285	KCPL Missouri	Depreciation
237.	2016	AR PSC	16-052-U	Oklahoma Gas & Electric Co	Depreciation
238.	2016	PSCW	6680-DU-104	Wisconsin Power and Light	Depreciation
239.	2016	ID PUC	IPC-E-16-23	Idaho Power Company	Depreciation
240.	2016	OR PUC	UM1801	Idaho Power Company	Depreciation
241.	2016	ILL CC	16-	MidAmerican Energy Company	Depreciation
242.	2016	KY PSC	Case No. 2016-00370	Kentucky Utilities Company	Depreciation
243.	2016	KY PSC	Case No. 2016-00371	Louisville Gas and Electric Company	Depreciation
244.	2016	IN URC	Cause No. 45029	Indianapolis Power & Light	Depreciation
245.	2016	AL RC	U-16-081	Chugach Electric Association	Depreciation
246.	2017	MA DPU	D.P.U. 17-05	NSTAR Electric Company and Western Massachusetts Electric Company	Depreciation
247.	2017	TX PUC	PUC-26831, SOAH 973-17-2686	El Paso Electric Company	Depreciation
248.	2017	WA UTC	UE-17033 and UG-170034	Puget Sound Energy	Depreciation
249.	2017	OH PUC	Case No. 17-0032-EL-AIR	Duke Energy Ohio	Depreciation
250.	2017	VA SCC	Case No. PUE-2016-00413	Virginia Natural Gas, Inc.	Depreciation
251.	2017	OK CC	Case No. PUD201700151	Public Service Company of Oklahoma	Depreciation
252.	2017	MD PSC	Case No. 9447	Columbia Gas of Maryland	Depreciation
253.	2017	NC UC	Docket No. E-2, Sub 1142	Duke Energy Progress	Depreciation
254.	2017	VA SCC	Case No. PUR-2017-00090	Dominion Virginia Electric and Power Company	Depreciation
255.	2017	FERC	ER17-1162	MidAmerican Energy Company	Depreciation
256.	2017	PA PUC	R-2017-2595853	Pennsylvania American Water Company	Depreciation
257.	2017	OR PUC	UM1809	Portland General Electric	Depreciation
258.	2017	FERC	ER17-217-000	Jersey Central Power & Light	Depreciation
259.	2017	FERC	ER17-211-000	Mid-Atlantic Interstate Transmission, LLC	Depreciation
260.	2017	MN PUC	Docket No. G007/D-17-442	Minnesota Energy Resources Corporation	Depreciation
261.	2017	IL CC	Docket No. 17-0124	Northern Illinois Gas Company	Depreciation
262.	2017	OR PUC	UM1808	Northwest Natural Gas Company	Depreciation
263.	2017	NY PSC	Case No. 17-W-0528	SUEZ Water Owego-Nichols	Depreciation
264.	2017	MO PSC	GR-2017-0215	Laclede Gas Company	Depreciation
265.	2017	MO PSC	GR-2017-0216	Missouri Gas Energy	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
266.	2017	ILL CC	Docket No. 17-0337	Illinois-American Water Company	Depreciation
267.	2017	FERC	Docket No. ER18-22-000	PPL Electric Utilities Corporation	Depreciation
268.	2017	IN URC	Cause No. 44988	Northern Indiana Public Service Company	Depreciation
269.	2017	NJ BPU	BPU Docket No. WR17090985	New Jersey American Water Company, Inc.	Depreciation
270.	2017	RI PUC	Docket No. 4800	SUEZ Water Rhode Island	Depreciation
271.	2017	OK CC	Cause No. PUD 201700496	Oklahoma Gas and Electric Company	Depreciation
272.	2017	NJ BPU	ER18010029 & GR18010030	Public Service Electric and Gas Company	Depreciation
273.	2017	NC Util Com.	Docket No. E-7, SUB 1146	Duke Energy Carolinas, LLC	Depreciation
274.	2017	KY PSC	Case No. 2017-00321	Duke Energy Kentucky, Inc.	Depreciation
275.	2017	MA DPU	D.P.U. 18-40	Berkshire Gas Company	Depreciation
276.	2018	IN IURC	Cause No. 44992	Indiana-American Water Company, Inc.	Depreciation
277.	2018	IN IURC	Cause No. 45029	Indianapolis Power and Light	Depreciation
278.	2018	NC Util Com.	Docket No. W-218, Sub 497	Aqua North Carolina, Inc.	Depreciation
279.	2018	PA PUC	Docket No. R-2018-2647577	NiSource - Columbia Gas of Pennsylvania, Inc.	Depreciation
280.	2018	OR PUC	Docket UM 1933	Avista Corporation	Depreciation
281.	2018	WA UTC	Docket No. UE-108167	Avista Corporation	Depreciation
282.	2018	ID PUC	AVU-E-18-03, AVU-G-18-02	Avista Corporation	Depreciation
283.	2018	IN URC	Cause No. 45039	Citizens Energy Group	Depreciation
284.	2018	FERC	Docket No. ER18-	Duke Energy Progress	Depreciation
285.	2018	PA PUC	Docket No. R-2018-3000124	Duquesne Light Company	Depreciation
286.	2018	MD PSC	Case No. 948	NiSource - Columbia Gas of Maryland	Depreciation
287.	2018	MA DPU	D.P.U. 18-45	NiSource - Columbia Gas of Massachusetts	Depreciation
288.	2018	OH PUC	Case No. 18-0299-GA-ALT	Vectren Energy Delivery of Ohio	Depreciation
289.	2018	PA PUC	Docket No. R-2018-3000834	SUEZ Water Pennsylvania Inc.	Depreciation
290.	2018	MD PSC	Case No. 9847	Maryland-American Water Company	Depreciation
291.	2018	PA PUC	Docket No. R-2018-3000019	The York Water Company	Depreciation
292.	2018	FERC	ER-18-2231-000	Duke Energy Carolinas, LLC	Depreciation
293.	2018	KY PSC	Case No. 2018-00261	Duke Energy Kentucky, Inc.	Depreciation
294.	2018	NJ BPU	BPU Docket No. WR18050593	SUEZ Water New Jersey	Depreciation
295.	2018	WA UTC	Docket No. UE-180778	PacifiCorp	Depreciation
296.	2018	UT PSC	Docket No. 18-035-36	PacifiCorp	Depreciation
297.	2018	OR PUC	Docket No. UM-1968	PacifiCorp	Depreciation
298.	2018	ID PUC	Case No. PAC-E-18-08	PacifiCorp	Depreciation
299.	2018	WY PSC	20000-539-EA-18	PacifiCorp	Depreciation
300.	2018	PA PUC	Docket No. R-2018-3003068	Aqua Pennsylvania, Inc.	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
301.	2018	IL CC	Docket No. 18-1467	Aqua Illinois, Inc.	Depreciation
302.	2018	KY PSC	Case No. 2018-00294	Louisville Gas & Electric Company	Depreciation
303.	2018	KY PSC	Case No. 2018-00295	Kentucky Utilities Company	Depreciation
304.	2018	IN URC	Cause No. 45159	Northern Indiana Public Service Company	Depreciation
305.	2018	VA SCC	Case No. PUR-2019-00175	Virginia American Water Company	Depreciation
306.	2019	PA PUC	Docket No. R-2018-3006818	Peoples Natural Gas Company, LLC	Depreciation
307.	2019	OK CC	Cause No. PUD201800140	Oklahoma Gas and Electric Company	Depreciation
308.	2019	MD PSC	Case No. 9490	FirstEnergy – Potomac Edison	Depreciation
309.	2019	SC PSC	Docket No. 2018-318-E	Duke Energy Progress	Depreciation
310.	2019	SC PSC	Docket No. 2018-319-E	Duke Energy Carolinas	Depreciation
311.	2019	DE PSC	DE 19-057	Public Service of New Hampshire	Depreciation
312.	2019	NY PSC	Case No. 19-W-0168 & 19-W-0269	SUEZ Water New York	Depreciation
313.	2019	PA PUC	Docket No. R-2019-3006904	Newtown Artesian Water Company	Depreciation
314.	2019	MO PSC	ER-2019-0335	Ameren Missouri	Depreciation
315.	2019	MO PSC	EC-2019-0200	KCP&L Greater Missouri Operations Company	Depreciation
316.	2019	MN DOC	G011/D-19-377	Minnesota Energy Resource Corp.	Depreciation
317.	2019	NY PSC	Case 19-E-0378 & 19-G-0379	New York State Electric and Gas Corporation	Depreciation
318.	2019	NY PSC	Case 19-E-0380 & 19-G-0381	Rochester Gas and Electric Corporation	Depreciation
319.	2019	WA UTC	Docket UE-190529 / UG-190530	Puget Sound Energy	Depreciation
320.	2019	PA PUC	Docket No. R-2019-3010955	City of Lancaster	Depreciation
321.	2019	IURC	Cause No. 45253	Duke Energy Indiana	Depreciation
322.	2019	KY PSC	Case No. 2019-00271	Duke Energy Kentucky, Inc.	Depreciation
323.	2019	OH PUC	Case No. 18-1720-GA-AIR	Northeast Ohio Natural Gas Corp	Depreciation
324.	2019	NC Util. Com.	Docket No. E-2, Sub 1219	Duke Energy Carolinas	Depreciation
325.	2019	FERC	Docket No. ER20-277-000	Jersey Central Power & Light Company	Depreciation
326.	2019	MA DPU	D.P.U. 19-120	NSTAR Gas Company	Depreciation
327.	2019	SC PSC	Docket No. 2019-290-WS	Blue Granite Water Company	Depreciation
328.	2019	NC Util. Com.	Docket No. E-2, Sub 1219	Duke Energy Progress	Depreciation
329.	2019	MD PSC	Case No. 9609	NiSource Columbia Gas of Maryland, Inc.	Depreciation
330.	2020	NJ BPU	Docket No. ER20020146	Jersey Central Power & Light Company	Depreciation
331.	2020	PA PUC	Docket No. R-2020-3018835	NiSource - Columbia Gas of Pennsylvania, Inc.	Depreciation
332.	2020	PA PUC	Docket No. R-2020-3019369	Pennsylvania-American Water Company	Depreciation
333.	2020	PA PUC	Docket No. R-2020-3019371	Pennsylvania-American Water Company	Depreciation
334.	2020	MO PSC	GO-2018-0309, GO-2018-0310	Spire Missouri, Inc.	Depreciation
335.	2020	NM PRC	Case No. 20-00104-UT	El Paso Electric Company	Depreciation
336.	2020	MD PSC	Case No. 9644	Columbia Gas of Maryland, Inc.	Depreciation
337.	2020	MO PSC	GO-2018-0309, GO-2018-0310	Spire Missouri, Inc.	Depreciation
338.	2020	VA St CC	Case No. PUR-2020-00095	Virginia Natural Gas Company	Depreciation

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY, cont.

	Year	Jurisdiction	Docket No.	Client Utility	Subject
339.	2020	SC PSC	Docket No. 2020-125-E	Dominion Energy South Carolina, Inc.	Depreciation
340.	2020	WV PSC	Case No. 20-0745-G-D	Hope Gas, Inc. d/b/a Dominion Energy West Virginia	Depreciation
341.	2020	VA St CC	Case No. PUR-2020-00106	Aqua Virginia, Inc.	Depreciation
342.	2020	PA PUC	Docket No. R-2020-3020256	City of Bethlehem – Bureau of Water	Depreciation
343.	2020	NE PSC	Docket No. NG-109	Black Hills Nebraska	Depreciation
344.	2020	NY PSC	Case No. 20-E-0428 & 20-G-0429	Central Hudson Gas & Electric Corporation	Depreciation
345.	2020	FERC	ER20-598	Duke Energy Indiana	Depreciation
346.	2020	FERC	ER20-855	Northern Indiana Public Service Company	Depreciation
347.	2020	OR PSC	UE 374	Pacificorp	Depreciation
348.	2020	MD PSC	Case No. 9490 Phase II	Potomac Edison – Maryland	Depreciation
349.	2020	IN URC	Case No. 45447	Southern Indiana Gas and Electric Company	Depreciation
350.	2020	IN URC	IURC Cause No. 45468	Indiana Gas Company, Inc. d/b/a Vectren Energy	Depreciation
351.	2020	KY PSC	Case No. 2020-00349	Kentucky Utilities Company	Depreciation
352.	2020	KY PSC	Case No. 2020-00350	Louisville Gas and Electric Company	Depreciation
353.	2020	FERC	Docket No. ER21- 000	South FirstEnergy Operating Companies	Depreciation
354.	2020	OH PUC	Case Nos 20-1651-EL-AIR, 20-1652-EL-AAM & 20-1653-EL-ATA	Dayton Power and Light Company	Depreciation
355.	2020	OR PSC	UE 388	Northwest Natural Gas Company	Depreciation
356.	2020	MO PSC	Case no. GR-2021-0241	Ameren Missouri Gas	Depreciation
357.	2021	KY PSC	Case No. 2021-00103	East Kentucky Power Cooperative	Depreciation
358.	2021	MPUC	Docket No. 2021-00024	Bangor Natural Gas	Depreciation
359.	2021	PA PUC	Docket No. R-2021-3024296	Columbia Gas of Pennsylvania, Inc.	Depreciation
360.	2021	NC Util. Com.	Doc. No. G-5, Sub 632	Public Service of North Carolina	Depreciation
361.	2021	MO PSC	ER-2021-0240	Ameren Missouri	Depreciation
362.	2021	PA PUC	Docket No. R-2021-3024750	Duquesne Light Company	Depreciation
363.	2021	KS PSC	21-BHCG-418-RTS	Black Hills Kansas Gas	Depreciation
364.	2021	KY PSC	Case No. 2021-00190	Duke Energy Kentucky	Depreciation
365.	2021	OR PSC	Docket UM 2152	Portland General Electric	Depreciation
366.	2021	ILL CC	Docket No. 20-0810	North Shore Gas Company	Depreciation
367.	2021	FERC	ER21-1939-000	Duke Energy Progress	Depreciation
368.	2021	FERC	ER21-1940-000	Duke Energy Carolina	Depreciation
369.	2021	KY PSC	Case No. 2021-00183	NiSource Columbia Gas of Kentucky	Depreciation
370.	2021	MD PSC	Case No. 9664	NiSource Columbia Gas of Maryland	Depreciation
371.	2021	OH PUC	Case No. 21-0596-ST-AIR	Aqua Ohio	Depreciation

VERIFICATION

I, John J. Spanos, hereby state that the facts set forth in my Direct Testimony, Borough of Hanover Statement No. 4, and related Exhibits JJS-1, JJS-2 and JJS-3, filed with the Public Utility Commission on June 29, 2021, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

John J. Spanos

Dated: June 29, 2021

Exhibit No. JJS-1
Witness: John J. Spanos
Doc. No. R-2021-3026116

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

2020 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2020

Prepared by:

Gannett Fleming

*Excellence Delivered **As Promised***

Exhibit No. JJS-1
Witness: John J. Spanos
Doc. No. R-2021-3026116

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

Hanover, Pennsylvania

2020 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2020

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania

Gannett Fleming

Excellence Delivered ***As Promised***

June 24, 2021

The Borough of Hanover
Hanover Municipal Water Works
44 Frederick Street
Hanover, PA 17331

Attention Mr. Samuel Miller
Borough Manager

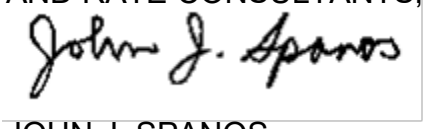
Ladies and Gentlemen:

Pursuant to your request, we have determined the annual depreciation accruals applicable to water plant as of December 31, 2020. Summaries of the original cost, book reserve and annual accruals are presented in Tables 1 and 2 beginning on page I-3.

A description of the methods and procedures upon which the study was based is set forth in a companion report "2022 Depreciation Study - Calculated Annual Depreciation Accruals Related to Water Plant as of December 31, 2021."

Respectfully submitted,

GANNETT FLEMING VALUATION
AND RATE CONSULTANTS, LLC



JOHN J. SPANOS
President

JJS:mle

068281.100

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PART II. DETAILED DEPRECIATION CALCULATIONS II-1

PART I. RESULTS OF STUDY

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
DEPRECIATION STUDY

PART I. RESULTS OF STUDY

SUMMARY OF RESULTS

The results of the depreciation study are summarized in Table 1, which sets forth the calculated annual depreciation related to Water Plant in Service as of December 31, 2020. The calculated annual depreciation rates by account are based on the survivor curve and probable retirement date, where applicable.

DETAILED TABULATIONS OF DEPRECIATION CALCULATIONS

The supporting data for the depreciation calculations are presented in account sequence in the section beginning on page II-2. The original cost, calculated accrued depreciation, allocated book reserve, future accruals, remaining life and annual accrual are shown for each vintage of each account or subaccount.

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2020

	DEPRECIABLE GROUP	PROBABLE RETIREMENT DATE	SURVIVOR CURVE	ORIGINAL COST AS OF DECEMBER 31, 2020	BOOK DEPRECIATION RESERVE	FUTURE ACCRUALS	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(7)/(4)	(9)=(6)/(7)
	DEPRECIABLE PLANT								
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING								
	SHEPPARD AND MYERS RESERVOIR	06-2044	125-R2.5 *	745,649.36	474,941	270,708	12,145	1.63	22.3
	L. B. SHEPPARD (LONG ARM) RESERVOIR	06-2067	125-R2.5 *	3,321,101.38	1,389,296	1,931,805	46,170	1.39	41.8
	DREDGING	06-2064	125-R2.5 *	648,584.23	284,254	364,330	9,015	1.39	40.4
	TOTAL ACCOUNT 208			4,715,334.97	2,148,491	2,566,843	67,330	1.43	38.1
210	SPRINGS AND WELLS		45-R4	458,864.60	169,369	289,496	11,158	2.43	25.9
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING								
	CLEAR LAKE	06-2034	125-R2.5 *	256,410.04	143,236	113,174	8,526	3.33	13.3
	KITZMILLER DAM	06-2034	125-R2.5 *	78,938.03	42,242	36,696	2,759	3.50	13.3
	TOTAL ACCOUNT 212.2			335,348.07	185,478	149,870	11,285	3.37	13.3
214	AQUEDUCTS AND SUPPLY MAINS	06-2044	100-S2.5 *	7,458,783.87	1,350,337	6,108,447	260,737	3.50	23.4
217	SEDIMENTATION BASINS	06-2042	80-S1.5 *	867,305.33	475,020	392,285	19,975	2.30	19.6
219	FILTERS	06-2042	70-R3 *	6,004,078.69	1,160,525	4,843,554	231,605	3.86	20.9
220	CLEAR WATER BASIN AND CLEARWELL	06-2037	65-R4 *	513,883.54	100,331	413,553	25,207	4.91	16.4
223	CHEMICAL TREATMENT PLANT								
	CHEMICAL BUILDING	06-2037	75-R4 *	2,456,399.85	584,209	1,872,191	114,256	4.65	16.4
	CHEMICAL TREATMENT EQUIPMENT		35-L2.5	9,366,570.78	2,442,766	6,923,805	304,455	3.25	22.7
	PARR'S HILL CHLORINATION FACILITY	06-2023	40-S3 *	132,857.59	116,115	16,743	7,784	5.86	2.2
	TOTAL ACCOUNT 223			11,955,828.22	3,143,090	8,812,739	426,495	3.57	20.7
224	LABORATORY EQUIPMENT		30-S0	31,393.37	14,951	16,442	1,197	3.81	13.7
236	STRUCTURES AND IMPROVEMENTS - PUMPING								
	PUMPING STRUCTURES	06-2027	75-R3 *	409,984.58	321,419	88,566	13,885	3.39	6.4
	PARR'S HILL BOOSTER STATION	06-2044	75-R3 *	878,309.43	329,976	548,333	24,327	2.77	22.5
	KIDD LANE PUMP STATION	06-2040	75-R3 *	13,552.02	6,549	7,003	371	2.74	18.9
	SLAGLE RUN PUMP STATION	06-2044	75-R3 *	59,937.83	22,230	37,708	1,658	2.77	22.7
	TOTAL ACCOUNT 236			1,361,783.86	680,174	681,610	40,241	2.96	16.9
237	PUMPS AND PUMPING EQUIPMENT		50-R2.5	2,185,021.15	596,529	1,588,492	50,092	2.29	31.7
242	ELECTRICAL EQUIPMENT		55-R3	1,011,720.04	204,965	806,755	21,026	2.08	38.4
243	OTHER PUMP STATION EQUIPMENT		35-S2.5	24,664.08	15,771	8,893	781	3.17	11.4
246	TRANSMISSION MAINS		100-R3	2,266,822.16	767,571	1,499,251	25,239	1.11	59.4
247	DISTRIBUTION RESERVOIRS AND STANDPIPES		60-R3	1,893,213.11	482,193	1,411,020	36,233	1.91	38.9
248	DISTRIBUTION MAINS		100-R4	11,098,204.66	2,985,231	8,112,973	120,520	1.09	67.3
249	SERVICES		70-S2.5	2,029,453.07	722,286	1,307,167	32,494	1.60	40.2
250	METERS		38-S4	2,059,470.56	981,069	1,078,402	63,721	3.09	16.9
251	HYDRANTS		70-R3	29,253.72	15,969	13,285	468	1.60	28.4
257	STRUCTURES AND IMPROVEMENTS - GENERAL		60-R3	668,964.22	145,480	523,484	12,675	1.89	41.3

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

TABLE 1. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2020

	DEPRECIABLE GROUP	PROBABLE RETIREMENT DATE	SURVIVOR CURVE	ORIGINAL COST AS OF DECEMBER 31, 2020	BOOK DEPRECIATION RESERVE	FUTURE ACCRUALS	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(7)/(4)	(9)=(6)/(7)
258	GENERAL OFFICE EQUIPMENT								
	OFFICE FURNITURE		20-SQ	26,517.87	24,402	2,116	731	2.76	2.9
	OFFICE EQUIPMENT		15-SQ	46,111.16	41,532	4,579	533	1.16	8.6
	COMPUTER EQUIPMENT		5-SQ	41,981.25	31,951	10,030	3,032	7.22	3.3
	TOTAL ACCOUNT 258			114,610.28	97,885	16,725	4,296	3.75	3.9
259	OTHER GENERAL EQUIPMENT								
	CARS		9-L3	197,151.85	106,512	90,640	22,081	11.20	4.1
	TRUCKS		15-L3	702,490.22	260,243	442,247	52,425	7.46	8.4
	TOOLS, SHOP AND GARAGE EQUIPMENT		20-SQ	1,182,189.61	622,695	559,495	47,473	4.02	11.8
	COMMUNICATION EQUIPMENT		10-SQ	639,698.57	215,372	424,327	60,352	9.43	7.0
	TOTAL ACCOUNT 259			2,721,530.25	1,204,822	1,516,709	182,331	6.70	8.3
	TOTAL DEPRECIABLE PLANT			**59,805,531.82**	**17,647,537**	**42,157,995**	**1,645,106**	**2.75**	**25.6**
	NONDEPRECIABLE PLANT								
205	LAND			18,026.03					
206	LAND			11,174.98					
207	LAND			2,689.89					
207.02	LAND			429,396.00					
207.03	LAND			74,314.20					
207.04	LAND			69,848.51					
207.05	LAND			36,800.00					
207.06	LAND			59,663.56					
207.1	TREES			24,916.00					
212.1	LAND			7,307.00					
234	LAND			96,020.25					
234.1	LAND - SLAGLE RUN			12,112.50					
245	RIGHTS OF WAY			23,410.67					
245.01	RIGHTS OF WAY			9,701.88					
247.1	LAND - PARR'S HILL			2,455.00					
247.12	LAND - NEW STORAGE W. TANK			9,310.05					
	TOTAL NONDEPRECIABLE PLANT			**887,146.52**					
	TOTAL WATER PLANT IN SERVICE			**60,692,678.34**	**17,647,537**	**42,157,995**	**1,645,106**		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

PART II. DETAILED DEPRECIATION CALCULATIONS

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SHEPPARD AND MYERS RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1932	26.00	21	20	6	21.38	
1933	128.00	103	96	32	21.20	2
1934	174,786.00	140,598	131,113	43,673	21.03	2,077
1935	6,494.00	5,219	4,867	1,627	20.88	78
1936	27.00	21	20	7	21.88	
1937	1,058.00	839	782	276	21.77	13
1939	170.00	134	125	45	21.59	2
1940	1,269.00	1,001	933	336	21.54	16
1941	495.00	390	364	131	21.52	6
1942	152.00	119	111	41	21.50	2
1943	508.00	398	371	137	21.50	6
1946	823.00	638	595	228	21.65	11
1948	163.00	125	117	46	21.84	2
1951	1,425.00	1,080	1,007	418	22.24	19
1952	1,752.00	1,320	1,231	521	22.41	23
1953	796.00	602	561	235	21.79	11
1958	5,560.00	4,100	3,823	1,737	22.25	78
1960	247.00	181	169	78	22.15	4
1961	240.00	174	162	78	22.47	3
1962	2,880.00	2,089	1,948	932	22.15	42
1963	54.00	39	36	18	22.50	1
1964	370,969.00	266,207	248,248	122,721	22.24	5,518
1965	2,521.00	1,791	1,670	851	22.62	38
1966	80.00	57	53	27	22.42	1
1969	2,784.57	1,936	1,805	979	22.58	43
1970	1,279.00	885	825	454	22.50	20
1986	2,677.00	1,607	1,499	1,178	22.97	51
1988	19,760.00	11,560	10,780	8,980	23.06	389
1989	235.00	136	127	108	22.85	5
1991	28,617.00	16,123	15,035	13,582	22.86	594
1993	3,479.00	1,894	1,766	1,713	23.01	74
1994	10,151.97	5,434	5,067	5,085	23.00	221
1995	14,545.53	7,641	7,126	7,420	23.04	322
1996	8,894.06	4,598	4,288	4,606	22.89	201
1997	1,743.00	881	822	921	23.01	40
1999	7,444.74	3,602	3,359	4,086	22.94	178
2000	271.68	128	119	152	22.98	7
2001	12,776.08	5,854	5,459	7,317	23.06	317
2003	2,325.00	1,005	937	1,388	22.99	60

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SHEPPARD AND MYERS RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
2004	3,768.28	1,573	1,467	2,301	23.03	100
2005	2,250.00	903	842	1,408	23.11	61
2008	7,094.68	2,492	2,324	4,771	23.09	207
2009	32,816.63	10,908	10,172	22,645	23.10	980
2010	3,892.61	1,218	1,136	2,757	23.06	120
2012	6,220.53	1,676	1,563	4,658	23.05	202
	745,649.36	509,300	474,941	270,708		12,145
L.B SHEPPARD (LONG ARM) RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2067						
NET SALVAGE PERCENT.. 0						
1964	64,266.00	37,403	34,880	29,386	40.58	724
1967	2,313,857.22	1,312,188	1,223,664	1,090,193	40.84	26,694
1968	334.00	188	175	159	40.95	4
1969	43,505.43	24,198	22,566	20,940	41.09	510
1971	9,358.00	5,095	4,751	4,607	41.41	111
1972	879.00	473	441	438	41.59	11
1973	1,216.00	647	603	613	41.79	15
1977	291.00	148	138	153	41.97	4
1987	26,445.00	11,604	10,821	15,624	42.84	365
1992	50,259.00	19,913	18,570	31,689	43.44	729
1993	1,136.00	441	411	725	43.42	17
1994	659.70	250	233	427	43.43	10
1995	369.49	137	128	242	43.46	6
1996	40,372.61	14,542	13,561	26,812	43.52	616
1997	23,861.53	8,356	7,792	16,069	43.61	368
1999	6,129.16	2,016	1,880	4,249	43.86	97
2000	4,039.81	1,292	1,205	2,835	43.60	65
2002	11,723.32	3,470	3,236	8,487	44.00	193
2004	3,208.36	879	820	2,389	43.74	55
2005	4,696.28	1,223	1,140	3,556	44.02	81
2006	642.40	159	148	494	43.98	11
2007	2,383.91	560	522	1,862	43.97	42
2008	1,078.14	238	222	856	44.00	19
2009	468.46	97	90	378	44.06	9
2010	309.04	59	55	254	44.14	6

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
L.B SHEPPARD (LONG ARM) RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2067						
NET SALVAGE PERCENT.. 0						
2012	4,065.67	657	613	3,453	44.13	78
2015	3,957.64	440	410	3,547	44.00	81
2017	545,342.53	40,464	37,734	507,608	43.67	11,624
2018	15,438.67	837	781	14,658	43.59	336
2019	8,239.17	277	258	7,981	43.14	185
2020	132,568.84	1,551	1,446	131,122	42.24	3,104
	3,321,101.38	1,489,802	1,389,296	1,931,805		46,170
DREDGING						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2064						
NET SALVAGE PERCENT.. 0						
1984	525,160.00	249,188	232,377	292,783	40.42	7,244
1985	111,998.00	52,482	48,941	63,057	40.26	1,566
2002	7,894.00	2,439	2,274	5,620	41.38	136
2009	2,300.51	500	466	1,834	41.41	44
2012	1,231.72	209	195	1,037	41.50	25
	648,584.23	304,818	284,254	364,330		9,015
	4,715,334.97	2,303,920	2,148,491	2,566,843		67,330

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 38.1 1.43

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 210.00 SPRINGS AND WELLS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 45-R4						
NET SALVAGE PERCENT.. 0						
1984	8,812.00	6,787	6,329	2,483	10.89	228
1989	3,744.00	2,583	2,409	1,335	14.16	94
2002	152,428.64	65,422	61,008	91,421	24.60	3,716
2003	104,392.26	42,383	39,524	64,868	25.60	2,534
2004	2,861.65	1,100	1,026	1,836	26.42	69
2005	1,160.76	419	391	770	27.42	28
2006	185,465.29	62,928	58,682	126,783	28.24	4,489
	458,864.60	181,622	169,369	289,496		11,158

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 25.9 2.43

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CLEAR LAKE						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2034						
NET SALVAGE PERCENT.. 0						
1934	66,356.13	57,969	54,058	12,298	12.51	983
1935	27.00	24	22	5	12.54	
1936	111.00	97	90	21	12.58	2
1939	210.20	182	170	40	12.84	3
1947	411.68	351	327	84	12.71	7
1966	40.05	32	30	10	13.07	1
1967	489.60	393	366	123	13.17	9
1994	9,737.33	6,477	6,040	3,697	13.34	277
1997	9,547.41	6,080	5,670	3,878	13.40	289
1998	28,292.08	17,762	16,564	11,728	13.34	879
2001	12,698.00	7,527	7,019	5,679	13.39	424
2002	13,991.19	8,127	7,579	6,412	13.35	480
2006	9,844.00	5,125	4,779	5,065	13.35	379
2011	104,654.37	43,452	40,521	64,134	13.38	4,793
	256,410.04	153,598	143,236	113,174		8,526
KITZMILLER DAM						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2034						
NET SALVAGE PERCENT.. 0						
1934	9,740.87	8,510	7,936	1,805	12.51	144
1960	742.53	611	570	173	13.03	13
1963	1.00	1	1			
1965	6,773.38	5,488	5,118	1,656	12.99	127
1966	4,132.50	3,333	3,108	1,024	13.07	78
1969	565.92	449	419	147	13.44	11
1996	3,727.84	2,411	2,248	1,480	13.38	111
1999	4,773.81	2,945	2,746	2,027	13.34	152
2000	1,322.00	800	746	576	13.40	43
2010	47,158.18	20,750	19,350	27,808	13.37	2,080
	78,938.03	45,298	42,242	36,696		2,759
	335,348.07	198,896	185,478	149,870		11,285

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 13.3 3.37

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 214.00 AQUEDUCTS AND SUPPLY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 100-S2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1934	44,756.40	37,166	34,659	10,097	17.67	571
1963	2,820.00	2,059	1,920	900	21.24	42
1991	395,355.00	221,596	206,646	188,709	23.13	8,159
1992	364,271.00	201,405	187,818	176,453	23.05	7,655
1993	203,339.00	110,718	103,249	100,090	23.01	4,350
1994	26,958.94	14,431	13,457	13,502	23.00	587
1995	23,171.07	12,172	11,351	11,820	23.04	513
2004	36,938.40	15,300	14,268	22,670	23.34	971
2005	104,657.61	41,696	38,883	65,775	23.41	2,810
2012	1,847,567.06	491,453	458,298	1,389,269	23.45	59,244
2013	135,237.13	32,754	30,544	104,693	23.46	4,463
2017	805,719.42	104,582	97,527	708,192	23.46	30,187
2018	391,821.86	37,693	35,150	356,672	23.48	15,190
2019	1,556,518.40	93,391	87,090	1,469,428	23.50	62,529
2020	1,519,652.58	31,609	29,477	1,490,176	23.48	63,466
	7,458,783.87	1,448,025	1,350,337	6,108,447		260,737

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 23.4 3.50

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 217.00 SEDIMENTATION BASINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 80-S1.5						
PROBABLE RETIREMENT YEAR.. 6-2042						
NET SALVAGE PERCENT.. 0						
1932	39,440.00	34,206	31,898	7,542	13.54	557
1933	178.00	153	143	35	14.54	2
1934	3,011.00	2,579	2,405	606	14.51	42
1937	58.00	49	46	12	14.54	1
1938	3.00	3	3			
1939	178.00	151	141	37	14.65	3
1940	2,638.00	2,230	2,080	558	14.74	38
1941	619.00	522	487	132	14.84	9
1942	28.00	24	22	6	14.95	
1943	114.00	95	89	25	15.09	2
1944	176.00	147	137	39	15.25	3
1945	18.00	15	14	4	15.41	
1947	100.00	82	76	24	15.79	2
1948	39,983.00	32,754	30,544	9,439	16.00	590
1949	745.00	607	566	179	16.22	11
1950	104.00	84	78	26	16.45	2
1954	24.00	19	18	6	16.83	
1963	19,101.00	14,608	13,622	5,479	17.68	310
1964	41,074.00	31,331	29,217	11,857	17.57	675
1967	170,465.00	127,678	119,064	51,401	17.93	2,867
1993	396,166.00	228,786	213,352	182,814	20.12	9,086
1994	3,889.55	2,216	2,066	1,824	20.01	91
2009	61,652.90	21,837	20,364	41,289	20.97	1,969
2018	87,539.88	9,209	8,588	78,952	21.25	3,715
	867,305.33	509,385	475,020	392,285		19,975

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 19.6 2.30

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 219.00 FILTERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 70-R3						
PROBABLE RETIREMENT YEAR.. 6-2042						
NET SALVAGE PERCENT.. 0						
1948	27,019.00	23,312	21,739	5,280	11.53	458
1956	2,779.00	2,294	2,139	640	13.62	47
1957	80.00	66	62	18	14.02	1
1964	73,710.00	57,472	53,595	20,115	15.96	1,260
1967	120,289.00	92,021	85,813	34,476	16.43	2,098
1972	47,343.00	34,674	32,335	15,008	17.72	847
1981	4,058.00	2,741	2,556	1,502	18.98	79
1986	250,542.00	159,896	149,109	101,433	19.56	5,186
1987	148,086.00	93,265	86,973	61,113	19.69	3,104
1989	44,840.00	27,541	25,683	19,157	19.78	969
1992	6,264.00	3,678	3,430	2,834	20.04	141
2002	2,583.34	1,219	1,137	1,446	20.71	70
2006	6,285.70	2,580	2,406	3,880	20.83	186
2016	2,644,003.14	465,345	433,951	2,210,052	21.07	104,891
2018	2,626,196.51	278,377	259,597	2,366,600	21.08	112,268
	6,004,078.69	1,244,481	1,160,525	4,843,554		231,605

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 20.9 3.86

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 220.00 CLEAR WATER BASIN AND CLEARWELL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 65-R4						
PROBABLE RETIREMENT YEAR.. 6-2037						
NET SALVAGE PERCENT.. 0						
1967	2,282.00	1,856	1,731	551	12.29	45
1968	919.00	738	688	231	12.86	18
1984	53,364.00	37,590	35,054	18,310	15.32	1,195
2004	5,061.99	2,539	2,368	2,694	16.39	164
2013	686.74	215	200	487	16.48	30
2016	132,200.16	28,370	26,456	105,744	16.47	6,420
2018	262,619.65	34,613	32,278	230,342	16.47	13,986
2020	56,750.00	1,668	1,556	55,194	16.48	3,349
	513,883.54	107,589	100,331	413,553		25,207

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 16.4 4.91

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CHEMICAL BUILDING						
INTERIM SURVIVOR CURVE.. IOWA 75-R4						
PROBABLE RETIREMENT YEAR.. 6-2037						
NET SALVAGE PERCENT.. 0						
1948	66,301.60	58,160	54,236	12,065	10.15	1,189
1960	294.00	240	224	70	13.57	5
1961	694.00	566	528	166	13.49	12
1964	5,992.00	4,807	4,483	1,509	13.92	108
1971	621.00	476	444	177	15.02	12
1972	13,685.95	10,420	9,717	3,969	15.20	261
1973	23,033.93	17,506	16,325	6,709	15.00	447
1974	467.40	352	328	139	15.23	9
1975	689.53	515	480	209	15.48	14
1980	4,688.59	3,380	3,152	1,537	15.68	98
1988	43,213.00	28,931	26,979	16,234	16.04	1,012
1990	15,337.00	10,010	9,335	6,002	16.23	370
1994	1,101.20	683	637	464	16.24	29
1995	5,010.58	3,053	2,847	2,164	16.34	132
1997	752.03	444	414	338	16.34	21
2000	4,035.75	2,242	2,091	1,945	16.40	119
2003	3,158.29	1,630	1,520	1,638	16.40	100
2004	6,122.35	3,071	2,864	3,259	16.39	199
2005	9,438.00	4,579	4,270	5,168	16.45	314
2007	9,150.00	4,126	3,848	5,302	16.44	323
2008	10,999.85	4,743	4,423	6,577	16.49	399
2011	8,642.10	3,161	2,948	5,694	16.47	346
2012	40,883.00	13,933	12,993	27,890	16.44	1,696
2016	1,983,002.36	425,552	396,843	1,586,160	16.47	96,306
2018	176,166.69	23,219	21,653	154,514	16.47	9,382
2020	22,919.65	674	629	22,291	16.48	1,353
	2,456,399.85	626,473	584,209	1,872,191		114,256
CHEMICAL TREATMENT EQUIPMENT						
SURVIVOR CURVE.. IOWA 35-L2.5						
NET SALVAGE PERCENT.. 0						
1959	968.80	882	822	146	6.07	24
1964	1,170.00	1,044	974	196	6.79	29
1965	278.00	247	230	48	7.00	7
1966	55.96	49	46	10	7.23	1
1967	414,724.79	363,880	339,332	75,393	7.48	10,079
1969	4,514.00	3,929	3,664	850	7.67	111

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CHEMICAL TREATMENT EQUIPMENT						
SURVIVOR CURVE.. IOWA 35-L2.5						
NET SALVAGE PERCENT.. 0						
1970	12,055.00	10,411	9,709	2,346	7.98	294
1971	567.10	488	455	112	7.97	14
1972	3,700.89	3,159	2,946	755	8.32	91
1973	5,351.66	4,550	4,243	1,109	8.37	132
1976	7,798.00	6,489	6,051	1,747	8.97	195
1977	3,707.00	3,064	2,857	850	9.13	93
1978	3,915.00	3,211	2,994	921	9.32	99
1980	2,050.41	1,653	1,541	509	9.75	52
1982	3,165.34	2,510	2,341	825	10.04	82
1983	27,180.78	21,405	19,961	7,220	10.12	713
1984	393,321.75	307,224	286,498	106,824	10.23	10,442
1985	35,328.00	27,464	25,611	9,717	10.16	956
1986	764,301.00	588,053	548,381	215,920	10.34	20,882
1987	345,605.00	263,973	246,165	99,440	10.36	9,598
1989	18,878.00	14,094	13,143	5,735	10.69	536
1991	29,566.75	21,542	20,089	9,478	10.99	862
1993	138,721.00	98,048	91,433	47,288	11.41	4,144
1994	10,687.15	7,420	6,919	3,768	11.67	323
1996	30,797.27	20,597	19,207	11,590	12.13	955
1998	15,771.09	10,007	9,332	6,439	12.96	497
1999	9,464.76	5,840	5,446	4,019	13.34	301
2001	21,298.04	12,293	11,464	9,834	14.28	689
2003	1,890.44	1,006	938	952	15.39	62
2004	1,573.04	799	745	828	15.97	52
2006	4,450.00	2,026	1,889	2,561	17.35	148
2007	1,537.12	660	615	922	17.95	51
2008	3,866.02	1,551	1,446	2,420	18.65	130
2009	12,437.45	4,619	4,307	8,130	19.46	418
2010	1,296.00	444	414	882	20.17	44
2011	3,227.95	1,009	941	2,287	20.89	109
2012	3,959.54	1,114	1,039	2,921	21.71	135
2016	3,044,562.19	464,600	433,257	2,611,305	25.00	104,452
2017	3,492.00	416	388	3,104	25.91	120
2018	3,940,262.91	335,710	313,062	3,627,201	26.83	135,192
2019	39,073.58	2,004	1,869	37,205	27.74	1,341
	9,366,570.78	2,619,484	2,442,766	6,923,805		304,455

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
PARR'S HILL CHLORINATION FACILITY						
INTERIM SURVIVOR CURVE.. IOWA 40-S3						
PROBABLE RETIREMENT YEAR.. 6-2023						
NET SALVAGE PERCENT.. 0						
1971	27,882.50	26,776	24,970	2,913	2.05	1,421
1972	5,090.16	4,888	4,558	532	2.01	265
1973	21,633.41	20,757	19,357	2,277	2.00	1,138
1974	48,768.60	46,715	43,564	5,205	2.04	2,551
1983	24,524.92	23,083	21,526	2,999	2.34	1,282
2018	3,492.00	1,746	1,628	1,864	2.50	746
2019	1,466.00	550	513	953	2.50	381
	132,857.59	124,515	116,115	16,743		7,784
	11,955,828.22	3,370,472	3,143,090	8,812,739		426,495

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 20.7 3.57

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 224.00 LABORATORY EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 30-S0						
NET SALVAGE PERCENT.. 0						
1971	1,134.00	1,055	984	150	3.69	41
1972	3,728.40	3,436	3,204	524	4.13	127
1984	6,532.60	5,318	4,959	1,574	8.34	189
1994	941.65	651	607	335	11.82	28
1995	1,905.00	1,292	1,205	700	12.09	58
1997	1,370.75	889	829	542	12.73	43
2000	367.98	221	206	162	13.63	12
2001	2,220.00	1,294	1,207	1,013	13.95	73
2017	7,115.00	1,148	1,070	6,045	18.19	332
2018	6,077.99	729	680	5,398	18.33	294
	31,393.37	16,033	14,951	16,442		1,197

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 13.7 3.81

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
PUMPING STRUCTURES						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2027						
NET SALVAGE PERCENT.. 0						
1932	5,249.00	4,971	4,636	613	4.95	124
1934	203.00	191	178	25	5.25	5
1937	746.00	704	657	89	4.99	18
1947	333.00	308	287	46	5.87	8
1948	24,114.00	22,378	20,868	3,246	5.62	578
1949	32.00	30	28	4	6.02	1
1961	248.00	224	209	39	6.29	6
1964	1,232.00	1,114	1,039	193	6.00	32
1965	6.00	5	5	1	6.23	
1966	13.00	12	11	2	6.11	
1967	4,853.68	4,336	4,043	810	6.38	127
1968	382.04	341	318	64	6.32	10
1981	945.00	814	759	186	6.37	29
1984	106,689.00	90,728	84,607	22,082	6.42	3,440
1985	69,348.00	58,835	54,866	14,482	6.34	2,284
1986	1,862.00	1,567	1,461	401	6.48	62
1989	4,414.00	3,671	3,423	991	6.38	155
1990	8,605.00	7,113	6,633	1,972	6.40	308
1991	17,275.00	14,167	13,211	4,064	6.47	628
1992	157,755.00	128,586	119,911	37,844	6.47	5,849
1994	5,679.86	4,576	4,267	1,413	6.39	221
	409,984.58	344,671	321,419	88,566		13,885
PARR'S HILL BOOSTER STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1967	21,210.24	15,660	14,604	6,607	18.96	348
1984	235.00	148	138	97	21.31	5
1993	185,882.00	103,257	96,291	89,591	22.00	4,072
1994	227,749.69	124,329	115,941	111,808	22.04	5,073
1995	40,719.62	21,805	20,334	20,386	22.12	922
2014	400,140.24	88,191	82,241	317,899	23.00	13,822
2015	2,372.64	458	427	1,946	22.99	85
	878,309.43	353,848	329,976	548,333		24,327

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
KIDD LANE PUMP STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2040						
NET SALVAGE PERCENT.. 0						
2000	11,107.89	5,784	5,394	5,714	18.87	303
2001	2,444.13	1,239	1,155	1,289	18.96	68
	13,552.02	7,023	6,549	7,003		371
SLAGLE RUN PUMP STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
2004	54,562.09	22,960	21,411	33,151	22.71	1,460
2016	5,375.74	878	819	4,557	23.05	198
	59,937.83	23,838	22,230	37,708		1,658
	1,361,783.86	729,380	680,174	681,610		40,241
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..					16.9	2.96

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 237.00 PUMPS AND PUMPING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R2.5						
NET SALVAGE PERCENT.. 0						
1963	1.00	1	1			
1964	5,134.00	4,467	4,166	968	8.44	115
1967	34,797.21	29,414	27,430	7,367	9.79	753
1969	78.00	65	61	17	10.23	2
1975	2,899.00	2,255	2,103	796	12.98	61
1976	23,909.36	18,405	17,163	6,746	13.31	507
1981	438.00	313	292	146	15.75	9
1982	322.00	226	211	111	16.45	7
1983	2,032.00	1,402	1,307	725	16.85	43
1984	6,736.00	4,548	4,241	2,495	17.56	142
1989	4,413.00	2,683	2,502	1,911	20.31	94
1990	9,782.00	5,788	5,398	4,384	21.05	208
1991	14,202.00	8,212	7,658	6,544	21.52	304
1992	137,003.00	76,913	71,724	65,279	22.26	2,933
1993	103,100.00	56,416	52,610	50,490	22.75	2,219
1994	189,595.29	100,486	93,707	95,888	23.50	4,080
1995	47,109.19	24,266	22,629	24,480	24.00	1,020
1999	4,248.73	1,900	1,772	2,477	26.58	93
2000	35,827.87	15,349	14,313	21,515	27.35	787
2001	1,888.26	777	725	1,163	27.90	42
2003	4,262.37	1,596	1,488	2,774	29.23	95
2005	116,646.37	39,240	36,593	80,053	30.58	2,618
2006	168,485.76	53,511	49,901	118,585	31.16	3,806
2009	1,591.91	410	382	1,210	33.14	37
2011	916.73	198	185	732	34.56	21
2013	352.28	61	57	295	35.60	8
2014	1,238,039.39	188,306	175,601	1,062,438	36.24	29,317
2015	2,372.64	308	287	2,086	36.87	57
2017	24,882.79	2,115	1,973	22,910	37.65	608
2020	3,955.00	53	49	3,906	36.68	106
	2,185,021.15	639,684	596,529	1,588,492		50,092

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 31.7 2.29

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 242.00 ELECTRICAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R3						
NET SALVAGE PERCENT.. 0						
1932	2,201.00	2,182	2,035	166	0.79	166
1935	50.00	49	46	4	1.46	3
1941	639.00	615	574	65	3.14	21
1943	37.00	35	33	4	3.80	1
1948	3,251.00	3,040	2,835	416	5.02	83
1949	93.00	86	80	13	5.42	2
1958	263.00	235	219	44	7.43	6
1963	367.00	317	296	71	9.17	8
1964	6,112.00	5,215	4,863	1,249	9.72	128
1965	1,340.00	1,130	1,054	286	10.29	28
1966	384.00	322	300	84	10.44	8
1967	39,096.10	32,418	30,231	8,865	11.02	804
1969	476.00	387	361	115	11.79	10
1970	125.00	100	93	32	12.39	3
1973	568.00	440	410	158	13.85	11
1974	1,573.00	1,200	1,119	454	14.48	31
1984	9,206.00	5,914	5,515	3,691	20.32	182
1985	22,565.00	14,180	13,223	9,342	20.99	445
1992	1,651.00	870	811	840	25.56	33
2002	87,795.35	31,677	29,540	58,255	32.78	1,777
2004	215,497.55	69,692	64,990	150,508	34.52	4,360
2016	426,143.78	39,717	37,038	389,106	43.81	8,882
2018	189,146.26	9,873	9,207	179,939	45.35	3,968
2019	3,140.00	99	92	3,048	45.90	66
	1,011,720.04	219,793	204,965	806,755		21,026

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 38.4 2.08

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 243.00 OTHER PUMP STATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-S2.5						
NET SALVAGE PERCENT.. 0						
1993	7,254.00	5,306	4,948	2,306	10.09	229
1994	2,528.00	1,809	1,687	841	10.54	80
1995	13,912.60	9,721	9,065	4,848	11.00	441
2018	969.48	76	71	898	29.24	31
	24,664.08	16,912	15,771	8,893		781

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 11.4 3.17

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 246.00 TRANSMISSION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R3						
NET SALVAGE PERCENT.. 0						
1932	48,195.00	37,958	35,397	12,798	23.87	536
1964	101,129.00	57,138	53,283	47,846	43.50	1,100
1967	591,994.00	319,914	298,332	293,662	45.50	6,454
1989	307,744.00	104,695	97,632	210,112	61.09	3,439
1990	265,580.00	87,482	81,580	184,000	62.09	2,963
1991	234,906.00	74,841	69,792	165,114	63.09	2,617
1992	9,410.00	2,896	2,701	6,709	64.09	105
1993	133,347.00	39,977	37,280	96,067	64.24	1,495
1994	184,577.03	53,306	49,710	134,867	65.25	2,067
1995	4,601.40	1,279	1,193	3,408	66.24	51
2004	25,862.38	4,738	4,418	21,444	73.59	291
2005	55,800.81	9,687	9,033	46,768	73.79	634
2009	182,956.85	23,784	22,180	160,777	76.99	2,088
2011	6,439.32	692	645	5,794	78.99	73
2012	20,596.58	1,996	1,861	18,736	79.22	237
2018	93,682.79	2,717	2,534	91,149	83.71	1,089
	2,266,822.16	823,100	767,571	1,499,251		25,239

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 59.4 1.11

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 247.00 DISTRIBUTION RESERVOIRS AND STANDPIPES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R3						
NET SALVAGE PERCENT.. 0						
1932	13,405.00	12,930	12,058	1,347	3.25	414
1933	346.00	333	311	35	3.41	10
1934	32,040.00	30,765	28,689	3,351	3.59	933
1935	1,049.00	1,005	937	112	3.79	30
1942	182.00	170	159	23	5.53	4
1964	42,268.70	34,390	32,070	10,199	12.94	788
1967	253,591.00	200,793	187,247	66,344	14.07	4,715
1968	1,863.00	1,457	1,359	504	14.62	34
1969	4,209.00	3,251	3,032	1,177	15.17	78
1971	1,427.00	1,074	1,002	425	16.29	26
1972	200.00	148	138	62	16.86	4
1981	113.00	72	67	46	22.23	2
1982	1,194.00	749	698	496	22.85	22
1983	421.00	259	242	179	23.48	8
1984	10,424.89	6,278	5,854	4,571	24.11	190
1987	5,994.00	3,353	3,127	2,867	26.38	109
1989	8,379.26	4,461	4,160	4,219	27.67	152
1990	39,779.40	20,626	19,234	20,545	28.32	725
1991	1,766.00	891	831	935	28.98	32
1995	7,023.00	3,116	2,906	4,117	31.97	129
1996	1,725.43	740	690	1,035	32.64	32
1998	3,410.40	1,358	1,266	2,144	34.00	63
2002	5,166.35	1,720	1,604	3,562	37.06	96
2003	1,573.97	496	463	1,111	38.06	29
2006	33,073.85	8,778	8,186	24,888	40.14	620
2007	32,230.59	7,961	7,424	24,807	41.15	603
2014	1,390,357.27	169,902	158,439	1,231,918	46.69	26,385
	1,893,213.11	517,076	482,193	1,411,020		36,233

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 38.9 1.91

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
1932	271,620.03	221,153	206,233	65,387	20.20	3,237
1933	554.00	451	421	133	20.02	7
1934	10,661.00	8,576	7,997	2,664	21.03	127
1935	6,747.00	5,365	5,003	1,744	22.02	79
1936	16,051.29	12,750	11,890	4,161	21.88	190
1937	2,795.00	2,194	2,046	749	22.88	33
1938	4,542.00	3,522	3,284	1,258	23.88	53
1939	73,116.50	56,607	52,788	20,328	23.77	855
1940	9,354.75	7,155	6,672	2,683	24.76	108
1941	14,903.28	11,255	10,496	4,407	25.77	171
1942	139.00	105	98	41	25.67	2
1944	13.00	10	9	4	27.67	
1945	303.00	222	207	96	27.59	3
1946	14,117.00	10,201	9,513	4,604	28.60	161
1947	3,880.00	2,766	2,579	1,301	29.59	44
1948	20,232.00	14,375	13,405	6,827	29.54	231
1949	22,823.17	15,992	14,913	7,910	30.54	259
1950	21,503.00	14,856	13,854	7,649	31.54	243
1951	21,520.00	14,806	13,807	7,713	31.52	245
1952	17,887.00	12,131	11,313	6,574	32.51	202
1953	14,306.00	9,559	8,914	5,392	33.52	161
1954	32,213.61	21,209	19,778	12,436	34.51	360
1955	30,686.23	20,099	18,743	11,943	34.50	346
1956	28,914.00	18,650	17,392	11,522	35.50	325
1957	31,342.00	19,902	18,559	12,783	36.50	350
1958	32,920.81	20,576	19,188	13,733	37.50	366
1959	15,547.00	9,658	9,006	6,541	37.50	174
1960	11,198.00	6,842	6,380	4,818	38.51	125
1961	29,803.00	17,912	16,704	13,099	39.50	332
1962	13,745.00	8,121	7,573	6,172	40.51	152
1963	85,596.00	50,202	46,815	38,781	40.54	957
1964	22,741.00	13,106	12,222	10,519	41.54	253
1965	34,813.38	19,708	18,378	16,435	42.54	386
1966	32,790.00	18,228	16,998	15,792	43.54	363
1967	75,490.53	41,195	38,416	37,075	44.54	832
1968	31,096.00	16,817	15,683	15,413	44.58	346
1969	185,578.00	98,431	91,791	93,787	45.59	2,057
1970	61,595.00	32,042	29,880	31,715	46.58	681
1971	76,798.00	39,152	36,511	40,287	47.59	847
1972	20,088.00	10,036	9,359	10,729	48.58	221
1973	35,916.00	17,570	16,385	19,531	49.59	394

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
1974	31,922.00	15,437	14,396	17,526	49.65	353
1975	59,387.00	28,102	26,206	33,181	50.65	655
1976	80,502.71	37,257	34,744	45,759	51.65	886
1977	14,818.00	6,704	6,252	8,566	52.65	163
1978	51,115.12	22,593	21,069	30,046	53.65	560
1979	311,086.00	134,265	125,207	185,879	54.65	3,401
1980	288,262.00	121,416	113,225	175,037	55.65	3,145
1981	223,093.00	91,647	85,464	137,629	56.65	2,429
1982	122,807.00	49,639	46,290	76,517	56.74	1,349
1983	116,282.00	45,792	42,703	73,579	57.73	1,275
1984	103,541.00	39,677	37,000	66,541	58.74	1,133
1985	225,568.00	84,092	78,419	147,149	59.73	2,464
1986	155,327.00	56,259	52,464	102,863	60.74	1,693
1987	412,829.00	145,233	135,435	277,394	61.73	4,494
1988	346,814.00	118,333	110,350	236,464	62.74	3,769
1989	259,866.52	85,964	80,165	179,702	63.73	2,820
1990	252,654.00	80,900	75,442	177,212	64.74	2,737
1991	366,347.95	113,495	105,838	260,510	65.73	3,963
1992	277,003.00	82,879	77,288	199,715	66.74	2,992
1993	474,476.00	137,029	127,785	346,691	67.73	5,119
1994	425,292.85	118,316	110,334	314,959	68.74	4,582
1995	107,146.88	28,962	27,008	80,139	68.84	1,164
1996	94,124.83	24,444	22,795	71,330	69.84	1,021
1997	160,942.01	40,091	37,386	123,556	70.84	1,744
1998	86,575.89	20,648	19,255	67,321	71.84	937
1999	220,604.36	50,276	46,884	173,720	72.84	2,385
2000	229,337.22	49,835	46,473	182,864	73.84	2,476
2001	515,084.22	106,468	99,286	415,798	74.84	5,556
2002	69,925.62	13,712	12,787	57,139	75.84	753
2003	50,940.67	9,449	8,812	42,129	76.84	548
2004	325,968.84	57,012	53,166	272,803	77.84	3,505
2005	67,074.44	11,020	10,277	56,797	78.84	720
2006	55,692.85	8,560	7,983	47,710	79.84	598
2007	457,330.86	65,444	61,029	396,302	80.84	4,902
2008	105,281.15	13,950	13,009	92,272	81.84	1,127
2009	135,108.82	16,470	15,359	119,750	82.84	1,446
2010	214,724.86	23,899	22,287	192,438	83.84	2,295
2011	74,491.11	7,501	6,995	67,496	84.84	796
2012	139,186.95	12,541	11,695	127,492	85.84	1,485
2013	286,962.12	22,813	21,274	265,688	86.84	3,060
2014	426,457.79	29,383	27,400	399,058	87.84	4,543

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
2015	113,203.20	6,600	6,155	107,048	88.84	1,205
2016	632,135.75	30,153	28,118	604,018	89.84	6,723
2017	325,679.49	12,083	11,268	314,411	90.84	3,461
2018	11,072.30	293	273	10,799	91.84	118
2019	18,464.76	294	274	18,191	92.84	196
2020	139,753.94	755	704	139,050	92.95	1,496
	11,098,204.66	3,201,192	2,985,231	8,112,973		120,520

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 67.3 1.09

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
1932	41,538.58	37,497	34,967	6,572	9.54	689
1933	508.00	458	427	81	9.59	8
1934	786.00	707	659	127	9.65	13
1935	819.37	736	686	133	9.73	14
1936	2,486.05	2,206	2,057	429	10.74	40
1937	142.00	126	117	25	10.84	2
1938	1,579.00	1,394	1,300	279	10.95	25
1939	1,650.23	1,453	1,355	295	11.09	27
1940	3,302.98	2,898	2,703	600	11.25	53
1941	1,860.00	1,627	1,517	343	11.41	30
1942	441.00	384	358	83	11.59	7
1943	215.00	187	174	41	11.79	3
1944	1,431.00	1,226	1,143	288	12.79	23
1945	514.60	439	409	106	12.99	8
1946	3,160.58	2,684	2,503	658	13.22	50
1947	4,322.22	3,653	3,407	915	13.46	68
1948	6,070.78	5,106	4,762	1,309	13.71	95
1949	7,628.08	6,382	5,951	1,677	13.97	120
1950	8,034.66	6,684	6,233	1,802	14.25	126
1951	6,875.11	5,686	5,302	1,573	14.54	108
1952	8,015.88	6,589	6,145	1,871	14.83	126
1953	9,891.19	8,079	7,534	2,357	15.14	156
1954	6,605.35	5,359	4,997	1,608	15.47	104
1955	11,513.00	9,275	8,649	2,864	15.80	181
1956	6,676.09	5,340	4,980	1,696	16.15	105
1957	8,442.62	6,702	6,250	2,193	16.50	133
1958	12,853.99	10,123	9,440	3,414	16.87	202
1959	8,106.96	6,332	5,905	2,202	17.24	128
1960	10,079.00	7,805	7,278	2,801	17.62	159
1961	9,875.00	7,580	7,069	2,806	18.02	156
1962	7,295.00	5,548	5,174	2,121	18.42	115
1963	10,485.07	7,897	7,364	3,121	18.84	166
1964	4,534.27	3,382	3,154	1,380	19.26	72
1965	7,590.00	5,603	5,225	2,365	19.68	120
1966	7,347.43	5,366	5,004	2,343	20.13	116
1967	5,633.00	4,068	3,794	1,839	20.58	89
1968	10,125.00	7,177	6,693	3,432	21.57	159
1969	5,517.00	3,864	3,603	1,914	22.03	87
1970	9,993.00	6,913	6,447	3,546	22.50	158
1971	5,406.62	3,693	3,444	1,963	22.96	85
1972	10,034.02	6,765	6,309	3,725	23.44	159

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
1973	8,043.25	5,349	4,988	3,055	23.93	128
1974	12,633.53	8,283	7,724	4,910	24.43	201
1975	10,882.00	7,031	6,557	4,325	24.92	174
1976	6,513.96	4,145	3,865	2,649	25.43	104
1977	5,991.24	3,727	3,476	2,515	26.43	95
1978	4,103.00	2,511	2,342	1,761	26.94	65
1979	9,084.00	5,467	5,098	3,986	27.46	145
1980	5,850.00	3,459	3,226	2,624	27.99	94
1981	21,105.20	12,254	11,427	9,678	28.53	339
1982	16,741.00	9,475	8,836	7,905	29.52	268
1983	21,058.00	11,687	10,899	10,159	30.07	338
1984	27,883.00	15,163	14,140	13,743	30.62	449
1985	37,811.17	20,002	18,653	19,158	31.61	606
1986	35,129.00	18,179	16,953	18,176	32.17	565
1987	60,047.00	30,372	28,323	31,724	32.73	969
1988	52,172.11	25,606	23,879	28,293	33.72	839
1989	57,938.00	27,741	25,869	32,069	34.29	935
1990	54,708.00	25,363	23,652	31,056	35.29	880
1991	31,226.00	14,095	13,144	18,082	35.86	504
1992	69,993.00	30,517	28,458	41,535	36.86	1,127
1993	134,915.00	57,137	53,282	81,633	37.44	2,180
1994	66,392.33	27,095	25,267	41,125	38.44	1,070
1995	29,867.18	11,729	10,938	18,929	39.44	480
1996	26,863.74	10,203	9,515	17,349	40.01	434
1997	22,513.36	8,199	7,646	14,867	41.02	362
1998	20,473.57	7,141	6,659	13,815	42.01	329
1999	36,849.68	12,359	11,525	25,325	42.60	594
2000	29,438.54	9,414	8,779	20,660	43.60	474
2001	75,179.03	22,869	21,326	53,853	44.60	1,207
2002	47,456.11	13,696	12,772	34,684	45.60	761
2003	8,668.25	2,382	2,221	6,447	46.19	140
2004	50,670.75	13,124	12,239	38,432	47.20	814
2005	32,938.21	8,017	7,476	25,462	48.19	528
2006	25,644.93	5,837	5,443	20,202	49.20	411
2007	123,286.21	26,137	24,374	98,912	50.19	1,971
2008	42,750.31	8,388	7,822	34,928	51.20	682
2009	30,383.87	5,487	5,117	25,267	52.19	484
2010	9,699.51	1,609	1,500	8,200	52.79	155
2011	22,585.18	3,390	3,161	19,424	53.79	361
2012	12,301.43	1,652	1,541	10,760	54.79	196
2013	35,294.72	4,182	3,900	31,395	55.79	563

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
2014	96,354.59	9,896	9,229	87,126	56.79	1,534
2015	21,002.75	1,825	1,702	19,301	57.79	334
2016	39,130.06	2,782	2,594	36,536	58.79	621
2017	14,581.07	806	752	13,829	59.79	231
2018	12,579.03	497	463	12,116	60.79	199
2019	135,004.58	3,200	2,984	132,021	61.79	2,137
2020	8,331.89	66	62	8,270	62.79	132
	2,029,453.07	774,538	722,286	1,307,167		32,494

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 40.2 1.60

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-S4						
NET SALVAGE PERCENT.. 0						
1970	6,882.93	6,604	6,158	725	2.13	340
1971	7,951.00	7,596	7,084	867	2.31	375
1972	8,305.00	7,895	7,362	943	2.52	374
1973	13,229.84	12,568	11,720	1,510	2.50	604
1974	9,609.58	9,071	8,459	1,151	2.76	417
1975	16,592.24	15,552	14,503	2,089	3.04	687
1976	21,558.00	20,146	18,787	2,771	3.12	888
1977	18,187.00	16,852	15,715	2,472	3.45	717
1978	18,237.00	16,818	15,683	2,554	3.59	711
1979	15,268.00	13,940	13,000	2,268	3.95	574
1980	21,206.00	19,238	17,940	3,266	4.14	789
1981	40,851.00	36,627	34,156	6,695	4.56	1,468
1982	46,004.80	40,917	38,157	7,848	4.79	1,638
1983	55,202.00	48,440	45,172	10,030	5.24	1,914
1984	58,327.00	50,669	47,251	11,076	5.52	2,007
1985	66,271.00	56,701	52,876	13,395	5.99	2,236
1986	50,054.00	42,306	39,452	10,602	6.32	1,678
1987	54,325.00	45,133	42,088	12,237	6.82	1,794
1988	68,843.67	56,163	52,374	16,470	7.34	2,244
1989	52,022.73	41,623	38,815	13,208	7.87	1,678
1990	82,695.67	64,817	60,444	22,252	8.41	2,646
1991	69,366.00	53,204	49,615	19,751	8.96	2,204
1992	67,553.00	50,442	47,039	20,514	9.67	2,121
1993	59,189.42	42,972	40,073	19,116	10.38	1,842
1994	28,033.70	19,761	18,428	9,606	11.09	866
1995	29,595.09	20,148	18,789	10,806	11.96	904
1996	20,260.18	13,303	12,406	7,854	12.81	613
1997	30,765.47	19,450	18,138	12,627	13.67	924
1998	27,294.53	16,581	15,462	11,833	14.54	814
1999	16,881.66	9,835	9,171	7,711	15.40	501
2000	15,230.43	8,462	7,891	7,339	16.40	448
2001	29,985.17	15,844	14,775	15,210	17.40	874
2002	22,174.74	11,158	10,405	11,770	18.26	645
2003	32,884.62	15,653	14,597	18,288	19.26	950
2004	53,402.59	23,967	22,350	31,053	20.26	1,533
2005	11,772.08	4,963	4,628	7,144	21.26	336
2006	28,855.87	11,381	10,613	18,243	22.26	820
2007	42,508.48	15,609	14,556	27,952	23.26	1,202
2008	9,189.72	3,125	2,914	6,276	24.26	259
2009	13,052.60	4,083	3,808	9,245	25.26	366
2010	21,959.84	6,272	5,849	16,111	26.26	614

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-S4						
NET SALVAGE PERCENT.. 0						
2011	23,260.20	6,010	5,605	17,655	27.26	648
2012	21,330.49	4,932	4,599	16,731	28.26	592
2013	32,235.65	6,576	6,132	26,104	29.26	892
2014	40,705.44	7,197	6,712	33,993	30.26	1,123
2015	22,454.35	3,359	3,132	19,322	31.26	618
2016	40,082.56	4,906	4,575	35,508	32.26	1,101
2017	64,283.94	6,120	5,707	58,577	33.26	1,761
2018	129,404.74	8,800	8,207	121,198	34.26	3,538
2019	141,389.30	5,769	5,380	136,009	35.26	3,857
2020	182,745.24	2,485	2,317	180,428	36.26	4,976
	2,059,470.56	1,052,043	981,069	1,078,402		63,721

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 16.9 3.09

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 251.00 HYDRANTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R3						
NET SALVAGE PERCENT.. 0						
1932	2,006.00	1,864	1,738	268	6.74	40
1942	58.00	51	48	10	10.00	1
1950	133.00	113	105	28	12.83	2
1951	133.00	112	104	29	13.14	2
1952	162.00	135	126	36	13.47	3
1958	1,222.00	970	905	317	16.24	20
1959	352.00	275	256	96	17.24	6
1962	247.00	188	175	72	18.42	4
1963	1,637.00	1,224	1,142	495	19.42	25
1964	732.00	542	505	227	19.83	11
1965	537.00	393	367	170	20.26	8
1966	1,003.00	727	678	325	20.69	16
1967	1,916.00	1,363	1,271	645	21.68	30
1968	199.00	140	131	68	22.13	3
1969	657.00	457	426	231	22.58	10
1970	1,953.00	1,341	1,251	702	23.03	30
1982	5,205.00	2,886	2,691	2,514	30.94	81
1985	566.00	293	273	293	32.99	9
1987	701.00	345	322	379	34.53	11
1994	8,024.67	3,211	2,994	5,031	39.72	127
2003	1,810.05	494	461	1,349	46.60	29
	29,253.72	17,124	15,969	13,285		468

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 28.4 1.60

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 257.00 STRUCTURES AND IMPROVEMENTS - GENERAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R3						
NET SALVAGE PERCENT.. 0						
1932	3,355.00	3,236	3,018	337	3.25	104
1939	408.00	386	360	48	4.71	10
1940	5,289.00	4,981	4,645	644	4.97	130
1941	206.00	193	180	26	5.25	5
1943	16.00	15	14	2	5.83	
1945	614.00	566	528	86	6.47	13
1951	1,425.00	1,278	1,192	233	8.02	29
1958	37.00	32	30	7	9.96	1
1959	740.00	633	590	150	10.45	14
1960	89.00	75	70	19	10.93	2
1970	55.00	42	39	16	15.72	1
1979	16,587.00	11,014	10,271	6,316	21.00	301
1980	875.00	570	532	343	21.61	16
1981	4,761.00	3,047	2,841	1,920	22.23	86
1982	6,599.00	4,142	3,863	2,736	22.85	120
1983	28,805.00	17,715	16,520	12,285	23.48	523
1984	10,783.00	6,494	6,056	4,727	24.11	196
1997	5,179.69	2,142	1,997	3,183	33.32	96
1998	12,014.64	4,784	4,461	7,554	34.00	222
1999	157.50	60	56	102	34.99	3
2000	388.74	142	132	257	35.68	7
2001	312.72	109	102	211	36.37	6
2002	106,811.62	35,568	33,168	73,644	37.06	1,987
2005	533.53	151	141	393	39.45	10
2008	30,660.73	7,052	6,576	24,085	41.85	576
2009	27,380.79	5,827	5,434	21,947	42.55	516
2011	16,091.53	2,843	2,651	13,441	44.26	304
2014	154,954.00	18,935	17,657	137,297	46.69	2,941
2015	220,699.73	22,953	21,405	199,295	47.41	4,204
2016	9,975.00	853	795	9,180	48.13	191
2017	820.00	55	51	769	48.86	16
2018	2,340.00	112	105	2,235	49.58	45
	668,964.22	156,005	145,480	523,484		12,675

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 41.3 1.89

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 258.00 GENERAL OFFICE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
OFFICE FURNITURE						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1984	8,916.00	8,916	8,916			
1986	3,770.00	3,770	3,770			
1988	3,468.00	3,468	3,468			
1990	2,161.00	2,161	2,161			
1992	1,033.00	1,033	1,033			
1994	5,871.88	5,872	5,872			
1996	123.74	124	124			
2001	227.92	222	254-	482	0.50	482
2006	574.11	416	476-	1,050	5.50	191
2010	172.26	90	103-	275	9.50	29
2011	199.96	95	109-	309	10.50	29
	26,517.87	26,167	24,402	2,116		731
OFFICE EQUIPMENT						
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
1982	2,999.35	2,999	2,999			
1983	10,735.00	10,735	10,735			
1985	6,058.00	6,058	6,058			
1987	2,024.00	2,024	2,024			
1989	6,621.00	6,621	6,621			
1991	2,118.00	2,118	2,118			
1993	2,483.00	2,483	2,483			
1994	6,005.28	6,005	6,005			
1995	965.10	965	965			
1997	356.00	356	356			
2000	3,059.67	3,060	3,060			
2012	315.96	179	304-	620	6.50	95
2014	975.00	422	718-	1,693	8.50	199
2015	1,395.80	512	871-	2,266	9.50	239
	46,111.16	44,537	41,532	4,579		533

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 258.00 GENERAL OFFICE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
COMPUTER EQUIPMENT						
SURVIVOR CURVE.. 5-SQUARE						
NET SALVAGE PERCENT.. 0						
1998	3,724.44	3,724	3,724			
2005	5,624.00	5,624	5,624			
2008	2,040.00	2,040	2,040			
2009	3,673.47	3,673	3,673			
2012	550.80	551	551			
2015	15,005.80	15,006	15,006			
2017	587.94	412	151	437	1.50	291
2019	10,774.80	3,232	1,182	9,593	3.50	2,741
	41,981.25	34,262	31,951	10,030		3,032
	114,610.28	104,966	97,885	16,725		4,296

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 3.9 3.75

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CARS						
SURVIVOR CURVE.. IOWA 9-L3						
NET SALVAGE PERCENT.. 0						
1994	10,939.04	10,939	10,939			
1998	4,750.39	4,750	4,750			
2000	13,667.83	13,646	12,579	1,089	0.03	1,089
2001	12,085.57	11,948	11,014	1,072	0.22	1,072
2013	20,472.00	15,323	14,125	6,347	2.52	2,519
2017	135,237.02	57,611	53,106	82,132	4.72	17,401
	197,151.85	114,217	106,512	90,640		22,081
TRUCKS						
SURVIVOR CURVE.. IOWA 15-L3						
NET SALVAGE PERCENT.. 0						
1992	3,996.75	3,816	3,559	438	1.35	324
1994	18,280.75	17,149	15,992	2,289	1.75	1,308
1996	708.60	651	607	102	2.17	47
1998	5,896.37	5,280	4,924	973	2.63	370
2000	3,680.52	3,206	2,990	691	3.03	228
2001	2,835.96	2,433	2,269	567	3.23	176
2006	22,010.76	17,331	16,162	5,849	3.92	1,492
2007	84,311.09	64,877	60,500	23,811	4.04	5,894
2008	29,498.26	22,050	20,562	8,936	4.22	2,118
2009	21,239.98	15,291	14,259	6,981	4.47	1,562
2010	21,588.89	14,758	13,762	7,827	4.86	1,610
2011	23,965.47	15,345	14,310	9,656	5.34	1,808
2013	31,225.00	16,627	15,505	15,720	6.58	2,389
2015	24,211.95	9,774	9,115	15,097	8.12	1,859
2017	76,657.33	20,100	18,744	57,913	9.85	5,879
2018	221,681.33	41,720	38,905	182,776	10.78	16,955
2019	59,393.21	6,723	6,269	53,124	11.75	4,521
2020	51,308.00	1,939	1,808	49,500	12.74	3,885
	702,490.22	279,070	260,243	442,247		52,425
TOOLS, SHOP AND GARAGE EQUIPMENT						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1988	17,205.41	17,205	17,205			
1990	42,119.89	42,120	42,120			

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
TOOLS, SHOP AND GARAGE EQUIPMENT						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1991	26,383.00	26,383	26,383			
1992	31,567.20	31,567	31,567			
1993	42,487.20	42,487	42,487			
1994	45,712.89	45,713	45,713			
1995	24,849.46	24,849	24,849			
1996	23,889.61	23,890	23,890			
1997	26,597.06	26,597	26,597			
1998	36,216.12	36,216	36,216			
1999	26,192.74	26,193	26,193			
2000	55,123.50	55,124	55,124			
2001	20,931.92	20,409	16,996	3,936	0.50	3,936
2003	3,088.37	2,702	2,250	838	2.50	335
2004	11,159.86	9,207	7,667	3,492	3.50	998
2005	8,983.99	6,963	5,799	3,185	4.50	708
2006	18,762.73	13,603	11,328	7,434	5.50	1,352
2007	106,287.70	71,744	59,747	46,541	6.50	7,160
2008	38,624.28	24,140	20,103	18,521	7.50	2,469
2009	12,391.57	7,125	5,934	6,458	8.50	760
2010	14,578.59	7,654	6,374	8,204	9.50	864
2011	130,748.16	62,105	51,720	79,028	10.50	7,526
2012	3,555.50	1,511	1,258	2,297	11.50	200
2013	4,759.20	1,785	1,487	3,273	12.50	262
2014	5,997.20	1,949	1,623	4,374	13.50	324
2015	29,790.15	8,192	6,822	22,968	14.50	1,584
2016	5,238.25	1,179	982	4,256	15.50	275
2017	4,104.19	718	598	3,506	16.50	212
2018	177,401.06	22,175	18,467	158,934	17.50	9,082
2019	31,045.60	2,328	1,939	29,107	18.50	1,573
2020	156,397.21	3,910	3,256	153,141	19.50	7,853
	1,182,189.61	667,743	622,695	559,495		47,473
COMMUNICATION EQUIPMENT						
SURVIVOR CURVE.. 10-SQUARE						
NET SALVAGE PERCENT.. 0						
1993	4,243.80	4,244	4,244			
1994	14,220.76	14,221	14,221			
1996	11,091.92	11,092	11,092			
1997	6,802.11	6,802	6,802			

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2020

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
COMMUNICATION EQUIPMENT						
SURVIVOR CURVE.. 10-SQUARE						
NET SALVAGE PERCENT.. 0						
1998	5,316.80	5,317	5,317			
1999	5,831.94	5,832	5,832			
2001	3,021.39	3,021	3,021			
2004	1,305.00	1,305	1,305			
2006	6,124.27	6,124	6,124			
2007	1,836.00	1,836	1,836			
2013	1,239.00	929	844	395	2.50	158
2016	132,200.16	59,490	54,074	78,126	5.50	14,205
2018	437,699.42	109,425	99,464	338,236	7.50	45,098
2019	8,766.00	1,315	1,195	7,571	8.50	891
	639,698.57	230,953	215,372	424,327		60,352
	2,721,530.25	1,291,983	1,204,822	1,516,709		182,331

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 8.3 6.70

Exhibit No. JJS-2
Witness: John J. Spanos
Doc. No. R-2021-3026116

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

2021 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2021

Prepared by:

Gannett Fleming

*Excellence Delivered **As Promised***

Exhibit No. JJS-2
Witness: John J. Spanos
Doc. No. R-2021-3026116

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

Hanover, Pennsylvania

2021 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2021

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania

Gannett Fleming

Excellence Delivered ***As Promised***

June 24, 2021

The Borough of Hanover
Hanover Municipal Water Works
44 Frederick Street
Hanover, PA 17331

Attention Mr. Samuel Miller
Borough Manager

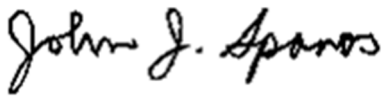
Ladies and Gentlemen:

Pursuant to your request, we have determined the annual depreciation accruals applicable to water plant as of December 31, 2021. The results of our study are presented in this report titled "2021 Depreciation Study - Calculated Annual Depreciation Accruals Related to Water Plant as of December 31, 2021". The results of our study as of December 31, 2020 are presented in our report titled "2020 Depreciation Study - Calculated Annual Depreciation Accruals Related to Water Plant as of December 31, 2020". The same methods, procedures and estimates are used in both studies.

The attached report sets forth a description of the methods and procedures upon which the study was based, the estimates of survivor curves and the calculated annual depreciation as of December 31, 2021.

Respectfully submitted,

GANNETT FLEMING VALUATION
AND RATE CONSULTANTS, LLC



JOHN J. SPANOS
President

JJS:mle

068281.100

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PART I. METHODS USED IN STUDY

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

DEPRECIATION STUDY

PART I. METHODS USED IN STUDY

INTRODUCTION OF REPORT

The report presents the methods used in and the results of the depreciation study conducted for The Borough of Hanover related to the original cost of utility plant in service as of December 31, 2021. Part I, Introduction, contains statements with respect to the basis of the study and the development of original cost. Part II, Estimation of Survivor Curves, presents descriptions of the considerations and methods used in the service life study. Part III, Service Life Analysis, presents the informed judgment of the average service life analysis. Part IV, Calculation of Annual and Accrued Depreciation, describes the procedures used in the calculation of group depreciation. Part V, Results of Study, presents summaries by depreciable group of annual depreciation accrual rates and amounts, as well as composite remaining lives. Part VI, Service Life Statistics presents the graphical presentation of service life estimates, and Part VII, Detailed Depreciation Calculations presents the detailed tabulations of annual depreciation.

BASIS OF THE STUDY

The purpose of the depreciation study was to determine the annual depreciation accruals applicable to the cost of water plant in service as of December 31, 2021. For most accounts, the straight line remaining life method using attained ages, the book depreciation reserve and estimated survivor curves, was the basis for the calculation of

annual depreciation. For certain accounts, the annual and accrued amortization amounts were based on the age of the property and the selected amortization period.

The survivor curve estimates were based on judgment which incorporated (1) analyses of historical data related to the property; (2) consideration of the character, use and location of the property; (3) probable future events and management plans; and (4) a general knowledge of waterworks property lives. The use of Iowa type survivor curves is a generally-accepted method of estimating average service life when the actual lives of individual property units are dispersed. When the majority of the units within a property group were expected to experience a common retirement date, the life span procedure was used. Interim survivor curves were used with life span groups to represent retirements expected to occur before the estimated final retirement date for the group.

PART II. ESTIMATION OF SURVIVOR CURVES

PART II. ESTIMATION OF SURVIVOR CURVES

The calculation of annual depreciation based on the straight line method requires the estimation of survivor curves and the selection of group depreciation procedures. The estimation of survivor curves is discussed below and the development of net salvage is discussed in later sections of this report.

SURVIVOR CURVES

The use of an average service life for a property group implies that the various units in the group have different lives. Thus, the average life may be obtained by determining the separate lives of each of the units, or by constructing a survivor curve by plotting the number of units which survive at successive ages.

The survivor curve graphically depicts the amount of property existing at each age throughout the life of an original group. From the survivor curve, the average life of the group, the remaining life expectancy, the probable life, and the frequency curve can be calculated. In Figure 1, a typical smooth survivor curve and the derived curves are illustrated. The average life is obtained by calculating the area under the survivor curve, from age zero to the maximum age, and dividing this area by the ordinate at age zero. The remaining life expectancy at any age can be calculated by obtaining the area under the curve, from the observation age to the maximum age, and dividing this area by the percent surviving at the observation age. For example, in Figure 1, the remaining life at age 30 is equal to the crosshatched area under the survivor curve divided by 29.5 percent surviving at age 30. The probable life at any age is developed by adding the age and remaining life. If the probable life of the property is calculated for each year of age, the probable life curve shown in the chart can be developed. The frequency curve presents the number of units retired in each age interval. It is derived by obtaining the differences between the amount of property surviving at the beginning and at the end of each interval.

This study has incorporated the use of Iowa curves developed from a retirement rate analysis of historical retirement history. A discussion of the concepts of survivor curves and of the development of survivor curves using the retirement rate method is presented below.

Iowa Type Curves

The range of survivor characteristics usually experienced by utility and industrial properties is encompassed by a system of generalized survivor curves known as the Iowa type curves. There are four families in the Iowa system, labeled in accordance with the location of the modes of the retirements (or the portion of the frequency curve with the highest level of retirements) in relationship to the average life and the relative height of the modes. The left moded curves, presented in Figure 2, are those in which the greatest frequency of retirement occurs to the left of, or prior to, average service life. The symmetrical moded curves, presented in Figure 3, are those in which the greatest frequency of retirement occurs at average service life. The right moded curves, presented in Figure 4, are those in which the greatest frequency occurs to the right of, or after, average service life. The origin moded curves, presented in Figure 5, are those in which the greatest frequency of retirement occurs at the origin, or immediately after age zero. The letter designation of each family of curves (L, S, R or O) represents the location of the mode of the associated frequency curve with respect to the average service life. The numbers represent the relative heights of the modes of the frequency curves within each family. A higher number designates a higher mode curve.

The Iowa curves were developed at the Iowa State College Engineering Experiment Station through an extensive process of observation and classification of the ages at which industrial property had been retired. A report of the study which resulted in the classification of property survivor characteristics into 18 type curves, which constitute three of the four families, was published in 1935 in the form of the Experiment Station's Bulletin 125.

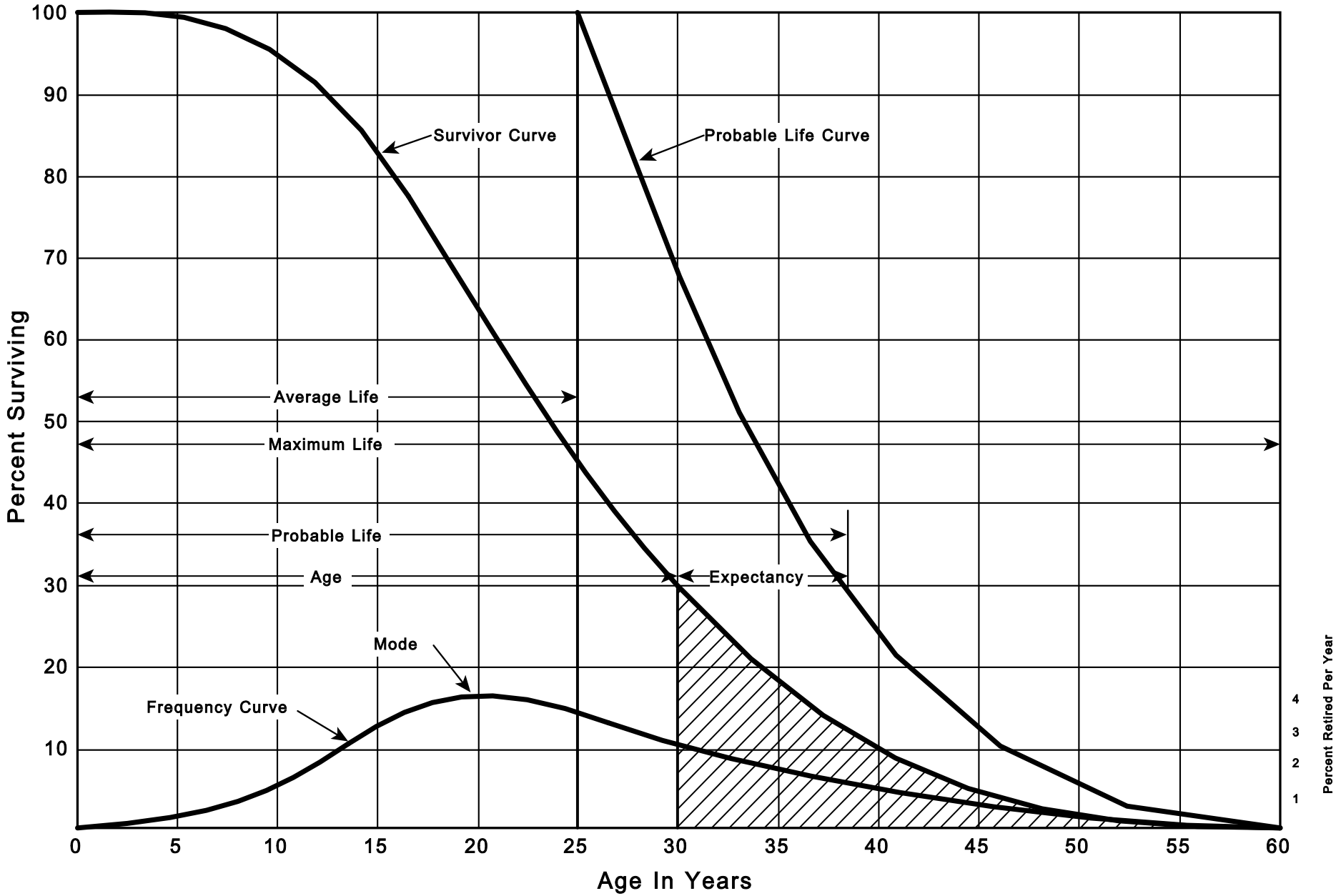


Figure 1. A Typical Survivor Curve and Derived Curves

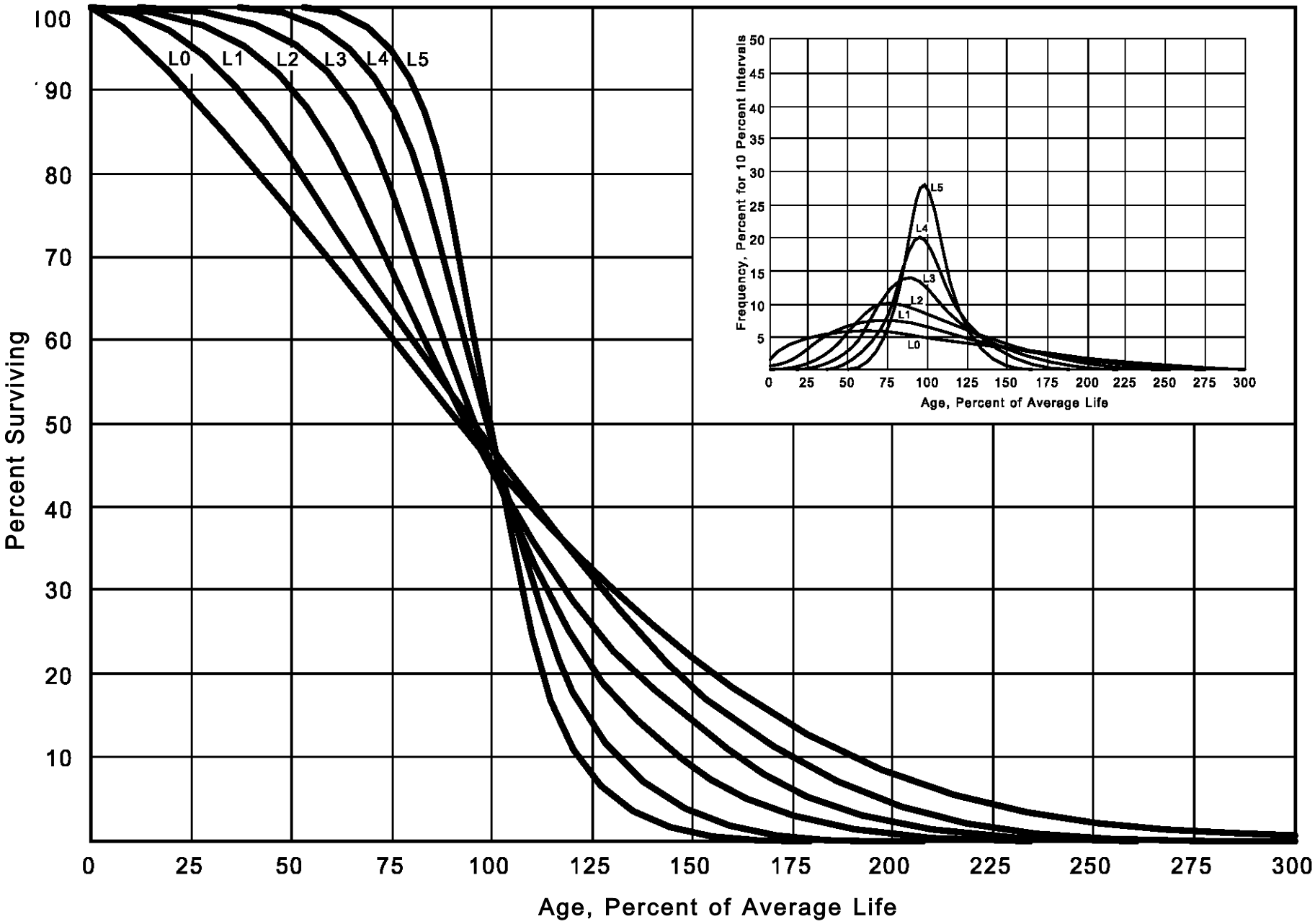


Figure 2. Left Modal or "L" Iowa Type Survivor Curves

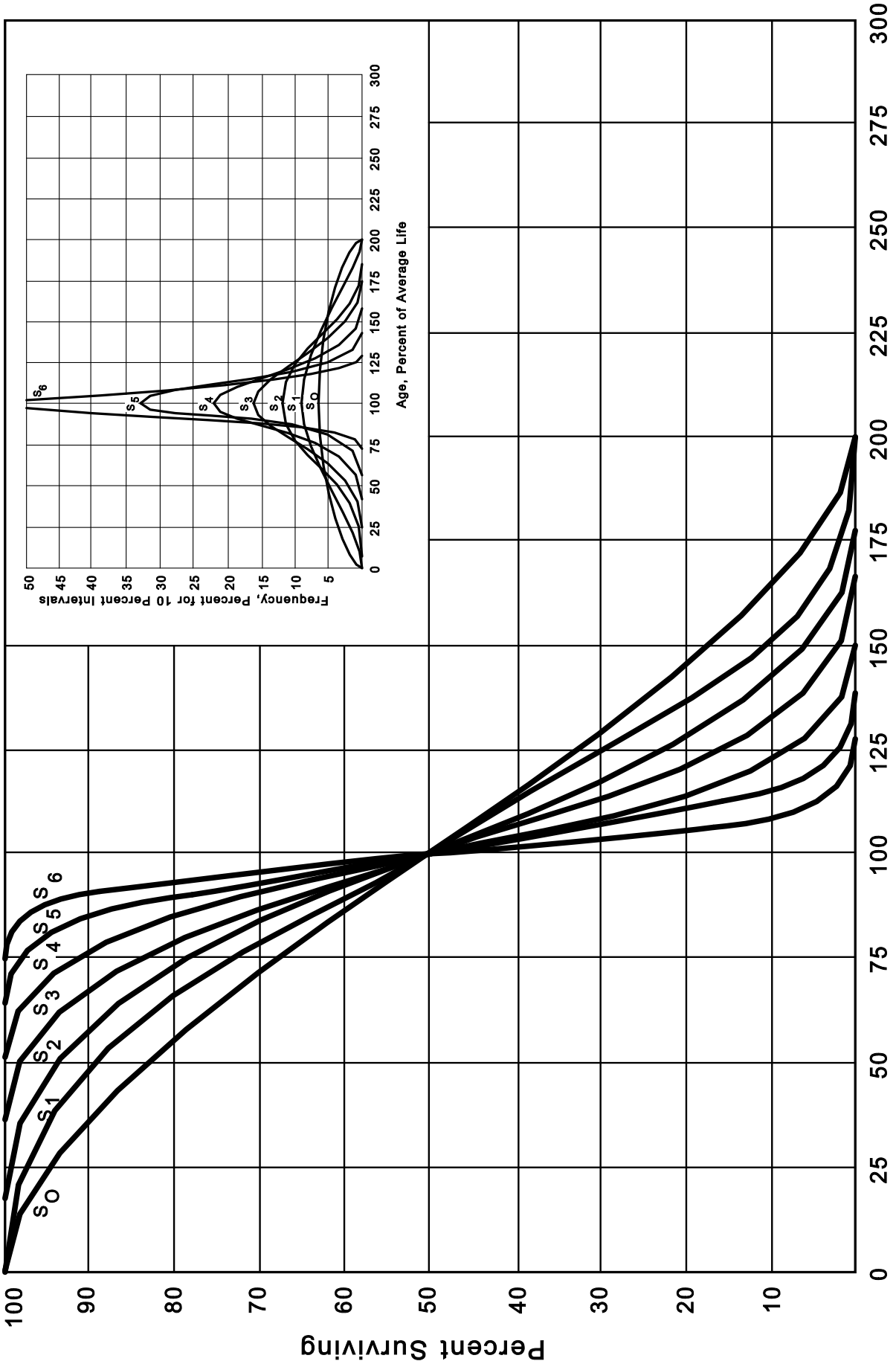


Figure 3. Symmetrical or "S" Iowa Type Survivor Curves

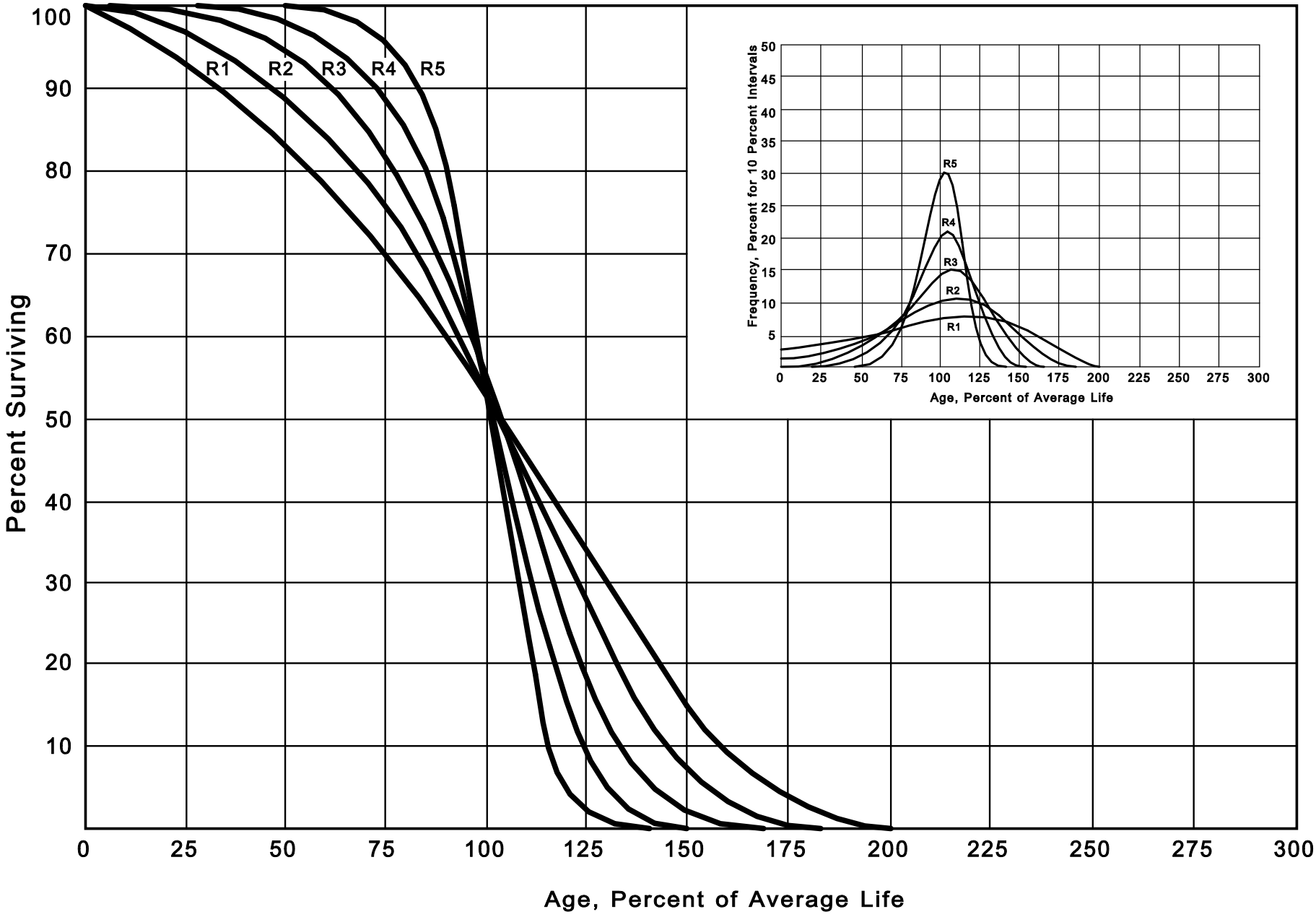


Figure 4. Right Modal or "R" Iowa Type Survivor Curves

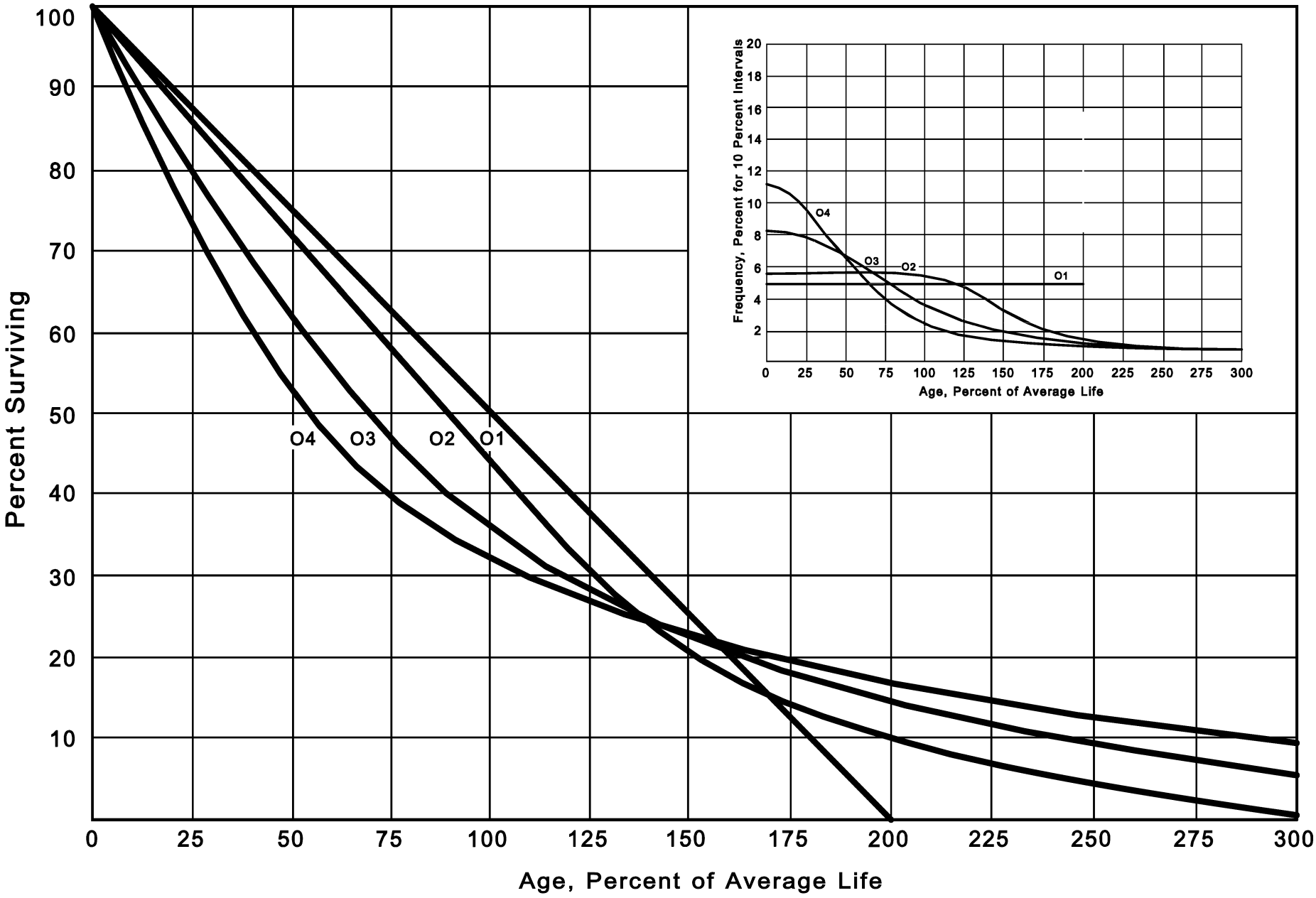


Figure 5. Origin Modal or "O" Iowa Type Survivor Curves

These curve types have also been presented in subsequent Experiment Station bulletins and in the text, "Engineering Valuation and Depreciation."[1] In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student submitted a thesis presenting his development of the fourth family consisting of the four O type survivor curves.

Retirement Rate Method of Analysis

The retirement rate method is an actuarial method of deriving survivor curves using the average rates at which property of each age group is retired. The method relates to property groups for which aged accounting experience is available and is the method used to develop the original stub survivor curves in this study. The method (also known as the annual rate method) is illustrated through the use of an example in the following text, and is also explained in several publications, including "Statistical Analyses of Industrial Property Retirements,"[2] "Engineering Valuation and Depreciation,"[3] and "Depreciation Systems."[4]

The average rate of retirement used in the calculation of the percent surviving for the survivor curve (life table) requires two sets of data: first, the property retired during a period of observation, identified by the property's age at retirement; and second, the property exposed to retirement at the beginning of the age intervals during the same period. The period of observation is referred to as the experience band, and the band of years which represent the installation dates of the property exposed to retirement during the experience band is referred to as the placement band. An example of the calculations used in the development of a life table follows. The example includes schedules of annual aged property transactions, a schedule of plant exposed to retirement, a life table and illustrations of smoothing the stub survivor curve.

[1]Marston, Anson, Robley Winfrey and Jean C. Hempstead. Engineering Valuation and Depreciation, 2nd Edition. New York, McGraw-Hill Book Company. 1953.

[2]Winfrey, Robley, Statistical Analyses of Industrial Property Retirements. Iowa State College, Engineering Experiment Station, Bulletin 125. 1935.

[3]Marston, Anson, Robley Winfrey, and Jean C. Hempstead, Supra Note 1.

[4]Wolf, Frank K. and W. Chester Fitch. Depreciation Systems. Iowa State University Press. 1994.

Schedules of Annual Transactions in Plant Records

A hypothetical property group is used to illustrate the retirement rate method. This property group is observed for the experience band 2011-2020 during which there were placements (or installations) during the years 2006-2020. In order to illustrate the summation of the aged data by age interval, the data were compiled in the manner presented in Schedules 1 and 2 on pages II-11 and II-12. In Schedule 1, year placed and the year of retirement are shown. The age interval during which a retirement occurred is determined from this information. In the example which follows, $10,000 of the dollars invested in 2006 were retired in 2011. The $10,000 retirement occurred during the age interval between 4½ and 5½ years on the basis that approximately one-half of the amount of property was installed prior to and subsequent to July 1 of each year. That is, on the average, property installed during a year is placed in service at the midpoint of the year for the purpose of the analysis. All retirements also are stated as occurring at the midpoint of a one-year age interval of time, except the first age interval which encompasses only one-half year.

The total retirements occurring in each age interval in a band are determined by summing the amounts for each transaction year-installation year combination for that age interval. For example, the total of $143,000 retired for age interval 4½-5½ is the sum of the retirements entered on Schedule 1 immediately above the stair step line drawn on the table beginning with the 2011 retirements of 2006 installations and ending with the 2020 retirements of the 2015 installations. Thus, the total amount of 143 for age interval 4½-5½ equals the sum of:

10 + 12 + 13 + 11 + 13 + 13 + 15 + 17 + 19 + 20.

SCHEDULE 1. RETIREMENTS FOR EACH YEAR 2011-2020
SUMMARIZED BY AGE INTERVAL

Experience Band 2011-2020

Placement Band 2006-2020

Year Placed	Retirements, Thousands of Dollars During Year										Total During Age Interval	Age Interval
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2006	10	11	12	13	14	16	23	24	25	26	26	13½-14½
2007	11	12	13	15	16	18	20	21	22	19	44	12½-13½
2008	11	12	13	14	16	17	19	21	22	18	64	11½-12½
2009	8	9	10	11	11	13	14	15	16	17	83	10½-11½
2010	9	10	11	12	13	14	16	17	19	20	93	9½-10½
2011	4	9	10	11	12	13	14	15	16	20	105	8½-9½
2012		5	11	12	13	14	15	16	18	20	113	7½-8½
2013			6	12	13	15	16	17	19	19	124	6½-7½
2014				6	13	15	16	17	19	19	131	5½-6½
2015					7	14	16	17	19	20	143	4½-5½
2016						8	18	20	22	23	146	3½-4½
2017							9	20	22	25	150	2½-3½
2018								11	23	25	151	1½-2½
2019									11	24	153	½-1½
2020										13	80	0-½
Total	53	68	86	106	128	157	196	231	273	308	1,606	

SCHEDULE 2. OTHER TRANSACTIONS FOR EACH YEAR 2011-2020
SUMMARIZED BY AGE INTERVAL

Experience Band 2011-2020 Placement Band 2006-2020

Year Placed	Acquisitions, Transfers and Sales, Thousands of Dollars During Year										Total During Age Interval	Age Interval
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2006	-	-	-	-	-	-	60[a]	-	-	-	-	13½-14½
2007	-	-	-	-	-	-	-	-	-	-	-	12½-13½
2008	-	-	-	-	-	-	-	-	-	-	-	11½-12½
2009	-	-	-	-	-	-	-	(5)[b]	-	-	60	10½-11½
2010	-	-	-	-	-	-	-	6[a]	-	-	-	9½-10½
2011	-	-	-	-	-	-	-	-	-	-	(5)	8½-9½
2012		-	-	-	-	-	-	-	-	-	6	7½-8½
2013			-	-	-	-	-	-	-	-	-	6½-7½
2014				-	-	-	-	(12)[b]	-	-	-	5½-6½
2015					-	-	-	-	22[a]	-	-	4½-5½
2016						-	-	(19)[b]	-	-	10	3½-4½
2017							-	-	-	-	-	2½-3½
2018								-	-	(102)[c]	(121)	1½-2½
2019									-	-	-	½-1½
2020											-	0-½
Total	-	-	-	-	-	-	60	(30)	22	(102)	(50)	

[a] Transfer Affecting Exposures at Beginning of Year
[b] Transfer Affecting Exposures at End of Year
[c] Sale with Continued Use
Parentheses Denote Credit Amount.

In Schedule 2, other transactions which affect the group are recorded in a similar manner. The entries illustrated include transfers and sales. The entries which are credits to the plant account are shown in parentheses. The items recorded on this schedule are not totaled with the retirements, but are used in developing the exposures at the beginning of each age interval.

Schedule of Plant Exposed to Retirement

The development of the amount of plant exposed to retirement at the beginning of each age interval is illustrated in Schedule 3 on page II-14. The surviving plant at the beginning of each year from 2011 through 2020 is recorded by year in the portion of the table headed "Annual Survivors at the Beginning of the Year." The last amount entered in each column is the amount of new plant added to the group during the year. The amounts entered in Schedule 3 for each successive year following the beginning balance or addition are obtained by adding or subtracting the net entries shown on Schedules 1 and 2. For the purpose of determining the plant exposed to retirement, transfers-in are considered as being exposed to retirement in this group at the beginning of the year in which they occurred, and the sales and transfers-out are considered to be removed from the plant exposed to retirement at the beginning of the following year. Thus, the amounts of plant shown at the beginning of each year are the amounts of plant from each placement year considered to be exposed to retirement at the beginning of each successive transaction year. For example, the exposures for the installation year 2020 are calculated in the following manner:

Exposures at age 0	= amount of addition	= $750,000
Exposures at age ½	= $750,000 - $ 8,000	= $742,000
Exposures at age 1½	= $742,000 - $18,000	= $724,000
Exposures at age 2½	= $724,000 - $20,000 - $19,000	= $685,000
Exposures at age 3½	= $685,000 - $22,000	= $663,000

SCHEDULE 3. PLANT EXPOSED TO RETIREMENT
JANUARY 1 OF EACH YEAR 2011-2020
SUMMARIZED BY AGE INTERVAL

Experience Band 2011-2020

Placement Band 2006-2020

Year Placed	Exposures, Thousands of Dollars Annual Survivors at the Beginning of the Year 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total at Beginning of Age Interval	Age Interval
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2006	255	245	234	222	209	195	239	216	192	167	167	13½-14½
2007	279	268	256	243	228	212	194	174	153	131	323	12½-13½
2008	307	296	284	271	257	241	224	205	184	162	531	11½-12½
2009	338	330	321	311	300	289	276	262	242	226	823	10½-11½
2010	376	367	357	346	334	321	307	297	280	261	1,097	9½-10½
2011	420[a]	416	407	397	386	374	361	347	332	316	1,503	8½-9½
2012		460[a]	455	444	432	419	405	390	374	356	1,952	7½-8½
2013			510[a]	504	492	479	464	448	431	412	2,463	6½-7½
2014				580[a]	574	561	546	530	501	482	3,057	5½-6½
2015					660[a]	653	639	623	628	609	3,789	4½-5½
2016						750[a]	742	724	685	663	4,332	3½-4½
2017							850[a]	841	821	799	4,955	2½-3½
2018								960[a]	949	926	5,719	1½-2½
2019									1,080[a]	1,069	6,579	½-1½
2020										1,220[a]	7,490	0-½
Total	1,975	2,382	2,824	3,318	3,872	4,494	5,247	6,017	6,852	7,799	44,780	

[a]Additions during the year

For the entire experience band 2011-2020, the total exposures at the beginning of an age interval are obtained by summing diagonally in a manner similar to the summing of the retirements during an age interval (Schedule 1). For example, the figure of 3,789, shown as the total exposures at the beginning of age interval 4½-5½, is obtained by summing:

255 + 268 + 284 + 311 + 334 + 374 + 405 + 448 + 501 + 609.

Original Life Table

The original life table, illustrated in Schedule 4 on page II-16**,** is developed from the totals shown on the schedules of retirements and exposures, Schedules 1 and 3, respectively. The exposures at the beginning of the age interval are obtained from the corresponding age interval of the exposure schedule, and the retirements during the age interval are obtained from the corresponding age interval of the retirement schedule. The retirement ratio is the result of dividing the retirements during the age interval by the exposures at the beginning of the age interval. The percent surviving at the beginning of each age interval is derived from survivor ratios, each of which equals one minus the retirement ratio. The percent surviving is developed by starting with 100% at age zero and successively multiplying the percent surviving at the beginning of each interval by the survivor ratio, i.e., one minus the retirement ratio for that age interval. The calculations necessary to determine the percent surviving at age 5½ are as follows:

Percent surviving at age 4½	=	88.15				
Exposures at age 4½	=	3,789,000				
Retirements from age 4½ to 5½	=	143,000				
Retirement Ratio	=	143,000	÷	3,789,000	=	0.0377
Survivor Ratio	=	1.000	-	0.0377	=	0.9623
Percent surviving at age 5½	=	(88.15)	x	(0.9623)	=	84.83

The totals of the exposures and retirements (columns 2 and 3) are shown for the purpose of checking with the respective totals in Schedules 1 and 3. The ratio of the total retirements to the total exposures, other than for each age interval, is meaningless.

SCHEDULE 4. ORIGINAL LIFE TABLE
CALCULATED BY THE RETIREMENT RATE METHOD

Experience Band 2011-2020 Placement Band 2006-2020

(Exposure and Retirement Amounts are in Thousands of Dollars)

Age at Beginning of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retirement Ratio	Survivor Ratio	Percent Surviving at Beginning of Age Interval
(1)	(2)	(3)	(4)	(5)	(6)
0.0	7,490	80	0.0107	0.9893	100.00
0.5	6,579	153	0.0233	0.9767	98.93
1.5	5,719	151	0.0264	0.9736	96.62
2.5	4,955	150	0.0303	0.9697	94.07
3.5	4,332	146	0.0337	0.9663	91.22
4.5	3,789	143	0.0377	0.9623	88.15
5.5	3,057	131	0.0429	0.9571	84.83
6.5	2,463	124	0.0503	0.9497	81.19
7.5	1,952	113	0.0579	0.9421	77.11
8.5	1,503	105	0.0699	0.9301	72.65
9.5	1,097	93	0.0848	0.9152	67.57
10.5	823	83	0.1009	0.8991	61.84
11.5	531	64	0.1205	0.8795	55.60
12.5	323	44	0.1362	0.8638	48.90
13.5	167	26	0.1557	0.8443	42.24
14.5					35.66
Total	44,780	1,606			

Column 2 from Schedule 3, Column 12, Plant Exposed to Retirement.
Column 3 from Schedule 1, Column 12, Retirements for Each Year.
Column 4 = Column 3 Divided by Column 2.
Column 5 = 1.0000 Minus Column 4.
Column 6 = Column 5 Multiplied by Column 6 as of the Preceding Age Interval.

The original survivor curve is plotted from the original life table (column 6, Schedule 4). When the curve terminates at a percent surviving greater than zero, it is called a stub survivor curve. Survivor curves developed from retirement rate studies generally are stub curves.

Smoothing the Original Survivor Curve

The smoothing of the original survivor curve eliminates any irregularities and serves as the basis for the preliminary extrapolation to zero percent surviving of the original stub curve. Even if the original survivor curve is complete from 100% to zero percent, it is desirable to eliminate any irregularities, as there is still an extrapolation for the vintages which have not yet lived to the age at which the curve reaches zero percent. In this study, the smoothing of the original curve with established type curves was used to eliminate irregularities in the original curve.

The Iowa type curves are used in this study to smooth those original stub curves which are expressed as percents surviving at ages in years. Each original survivor curve was compared to the Iowa curves using visual and mathematical matching in order to determine the better fitting smooth curves. In Figures 6, 7, and 8, the original curve developed in Schedule 4 is compared with the L, S, and R Iowa type curves which most nearly fit the original survivor curve. In Figure 6, the L1 curve with an average life between 12 and 13 years appears to be the best fit. In Figure 7, the S0 type curve with a 12-year average life appears to be the best fit and appears to be better than the L1 fitting. In Figure 8, the R1 type curve with a 12-year average life appears to be the best fit and appears to be better than either the L1 or the S0.

In Figure 9, the three fittings, 12-L1, 12-S0 and 12-R1 are drawn for comparison purposes. It is probable that the 12-R1 Iowa curve would be selected as the most representative of the plotted survivor characteristics of the group.

FIGURE 6. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

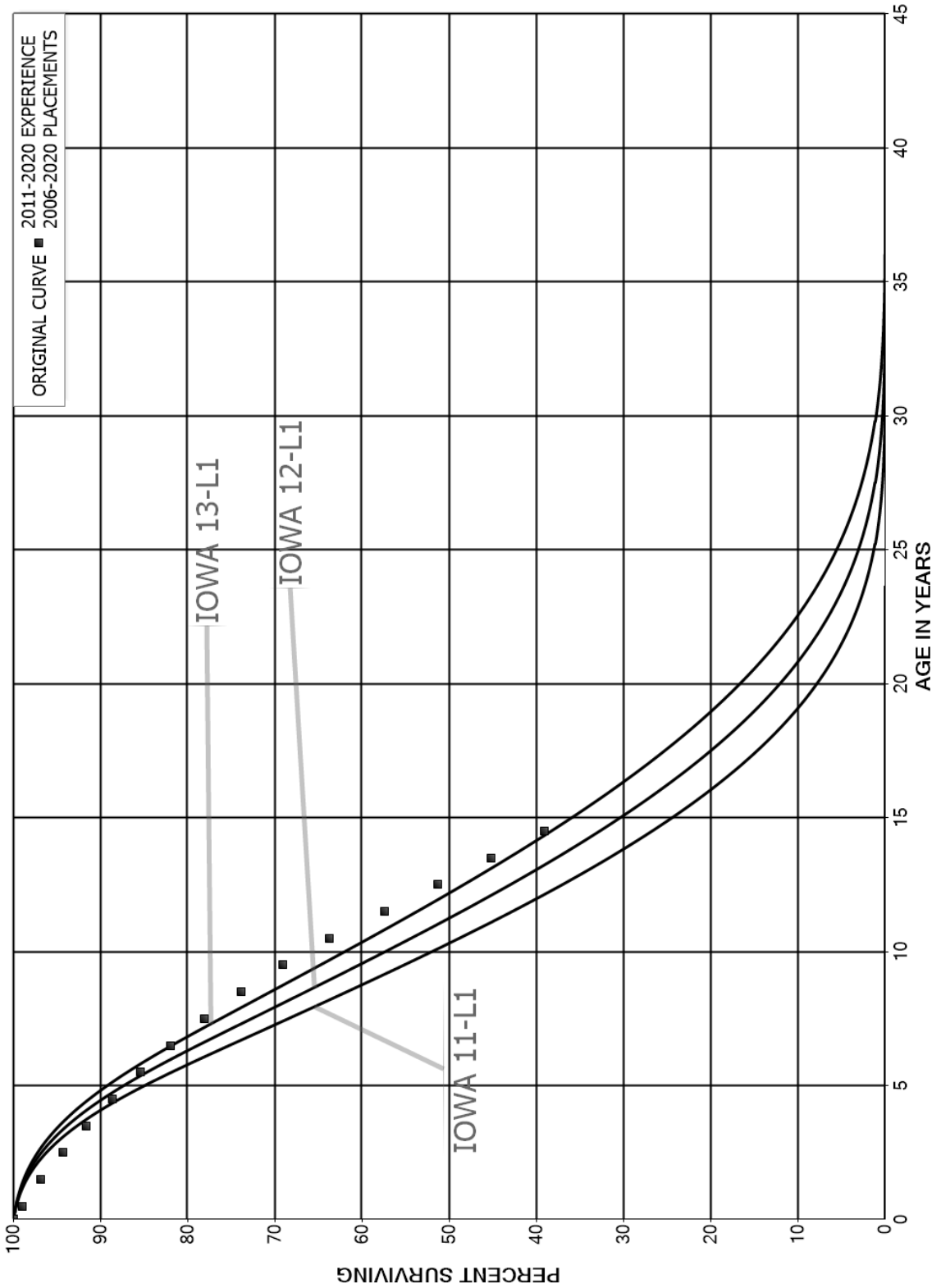


FIGURE 7. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN S0 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

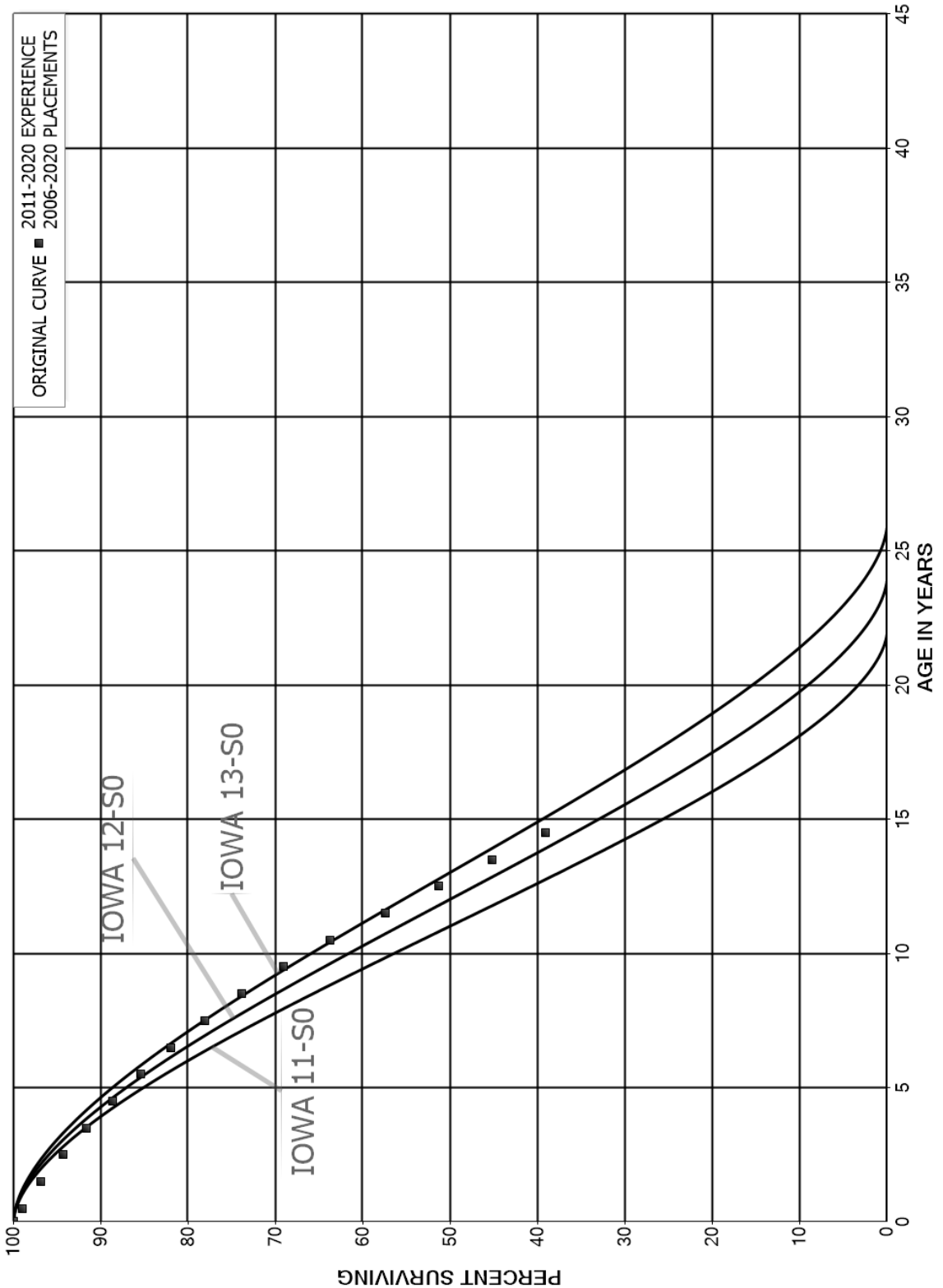


FIGURE 8. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

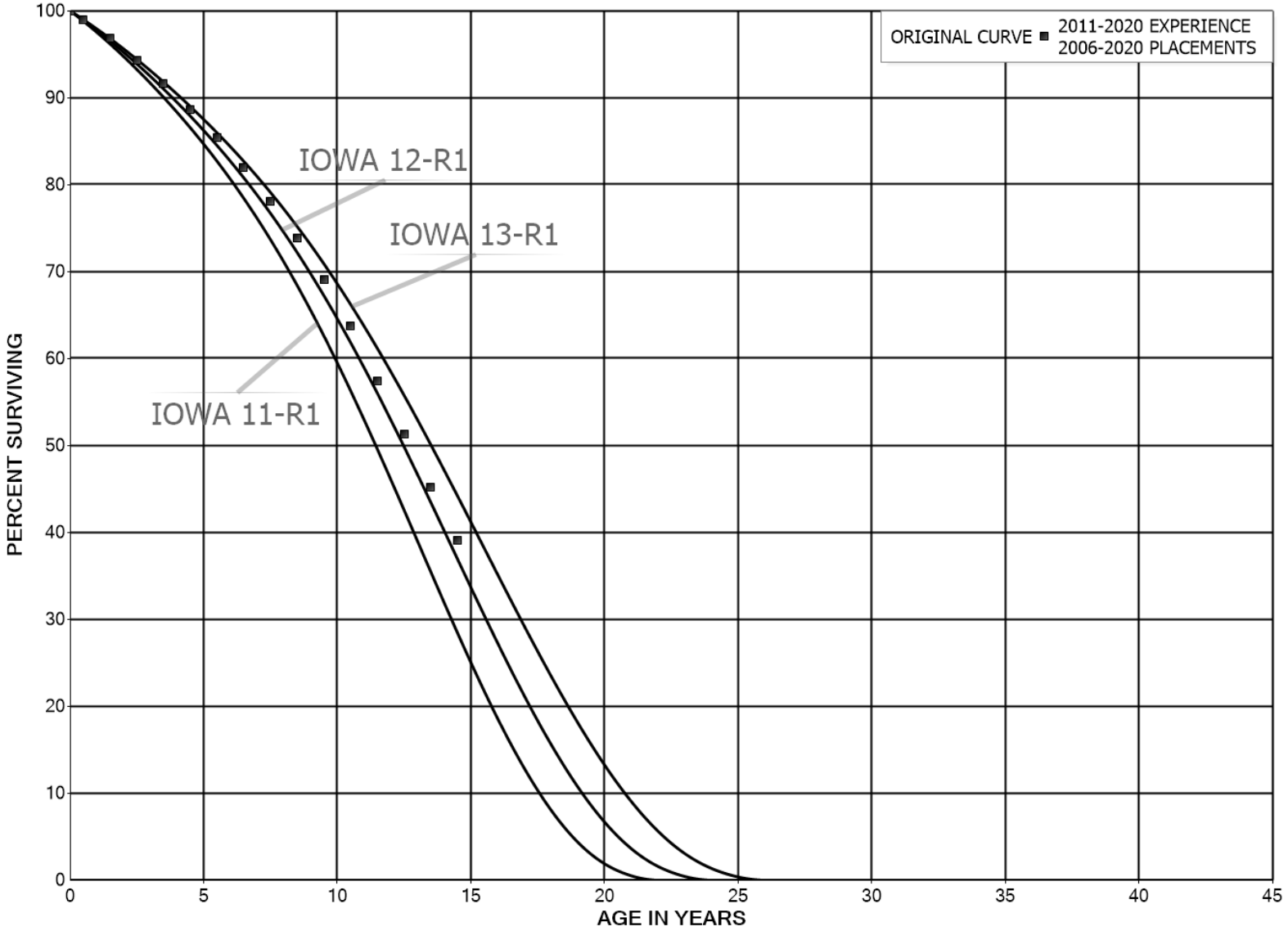
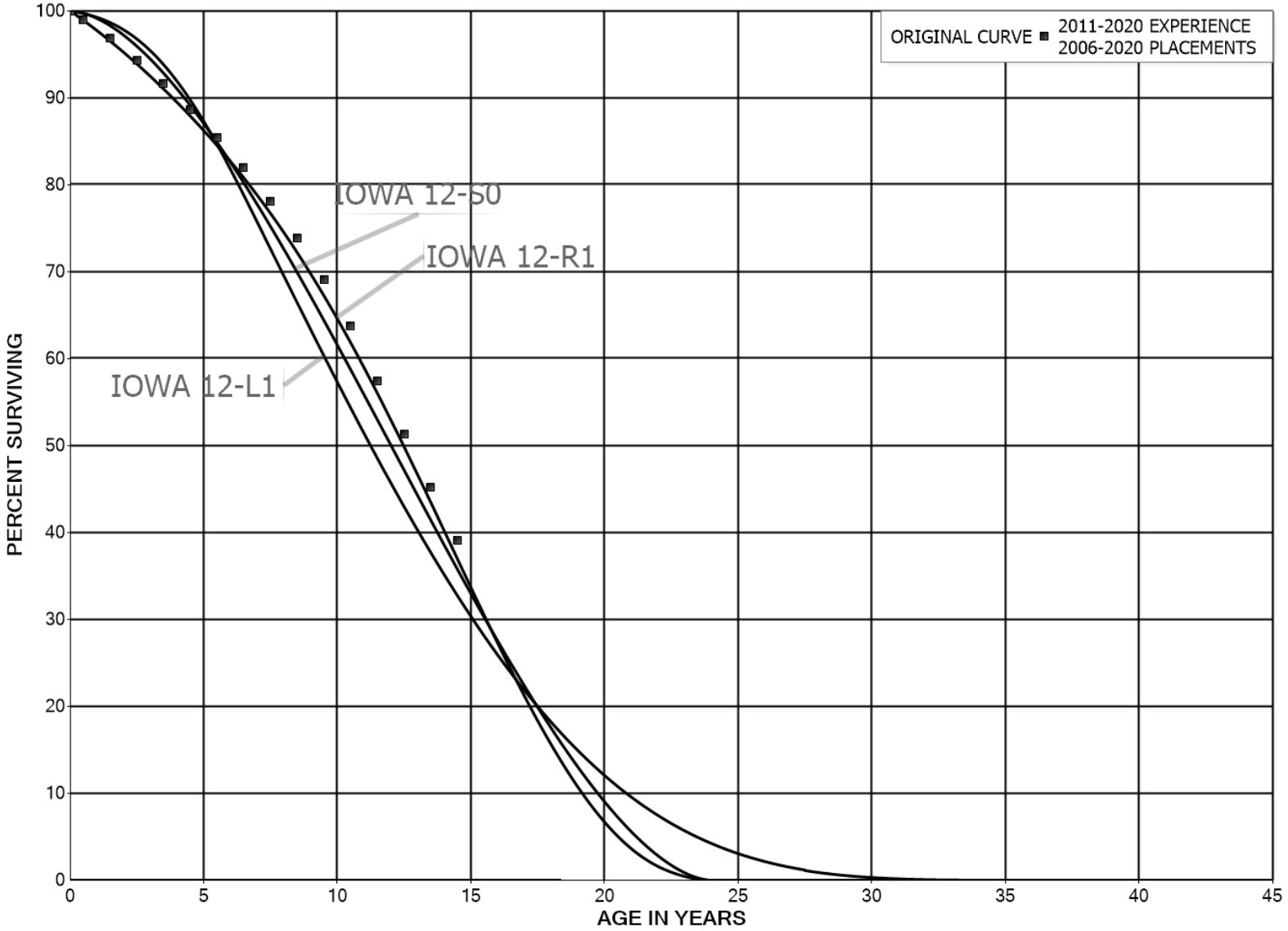


FIGURE 9. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1, S0 AND R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES



PART III. SERVICE LIFE ANALYSIS

PART III. SERVICE LIFE ANALYSIS

Statistical Analyses of Data

The method of life analysis used in the study consisted of compiling the past history of the depreciable accounts or groups, analyzing historical trends through the use of recognized techniques, and forecasting the trend of survivors for each depreciable group based on an interpretation of past trends and future plans. The estimates of average service life and dispersion result from consideration of both the historical and forecasted trends.

The aged data analyzed for the purpose of estimating survivor curves were compiled from the property records of the Company. These data included plant additions, retirements, sales, transfers, and adjustments recorded through 2020.

The actuarial retirement rate method was used for the analysis of the retirement activity related to the depreciable properties of this company. The method is explained in several recognized published texts, including "Statistical Analyses of Industrial Property Retirements"[5] and "Engineering Valuation and Depreciation."[6]

Each retirement rate analysis resulted in a life table which, when plotted, formed an original survivor curve. Each original survivor curve as plotted from the life table represents the average survivor pattern experienced by the several vintage groups during the experience band studied. Inasmuch as this survivor pattern does not necessarily describe the life characteristics of the property group, interpretation of these

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[5] Winfrey, Robley. Statistical Analyses of Industrial Property Retirements. Iowa State College, Engineering Experiment Station, Bulletin 125. 1935.

[6] Anson Marston, Robley Winfrey, and Jean C. Hempstead. Engineering Valuation and Depreciation, 2nd Edition. New York, McGraw-Hill Book Company. 1953.

original curves is required in order to use them as a valid consideration in the process of service life estimation. Standard type curves, generally the Iowa type curves, were used to aid these interpretations.

Field Trips

In order to be familiar with the operation of the Company and observe representative portions of the plant, a field trip was conducted. A general understanding of the function of the plant and information with respect to the reasons for past retirements and the expected future causes of retirements are obtained during these field trips. Such knowledge and information were incorporated in the interpretation and extrapolation of the statistical analyses. The following is a list of the locations visited during the field trips:

June 22, 2021
- Parr's Hill Reservoir
- Parr's Hill Booster Station
- Terrace Avenue Standpipe
- McSherrystown Standpipe
- Slagles Run Pump Station
- Sheppard-Myers Reservoir
- Lawrence Baker Sheppard Dam
- Kitzmiller Dam
- Clear Lake
- Hanover Water Treatment Plant

July 23, 2009
- Parr's Hill Reservoir
- Parr's Hill Booster Station
- Sheppard-Myers Dam
- Lawrence Baker Sheppard Dam
- Hanover Filter Plant
- Slagles Run Pump Station
- Terrace Avenue Standpipe
- McSherrystown Standpipe

Judgments

The survivor curve estimates were based on judgment which considered factors including statistical analyses of retirements, Company policies and outlook as determined during discussions with management, and survivor curve estimates from previous studies of the Company, as well as other water companies. For depreciable groups which consist of numerous similar items of property, the distribution of the lives of the units in the group was judged on the basis of an average survival pattern for the entire group. The judgments for a life span group were made by estimating the life of the major facility in the group and assigning lives to the related items of property which terminate at the probable retirement date of the major facility.

The life span estimates for structures and equipment in Accounts 208, 212.2, 214, 217, 219, 220, 223 and 236 were based on the type of construction, attained age and specific plans of management. The following tabulation sets forth the estimated life span for each life span group.

Life Span Group	Life Span
Account 208.00, Collecting and Impounding Reservoirs - Impounding	
Large Reservoirs	100,110
Dredging	80
Account 212.20, Collecting and Impounding Reservoirs - Collecting	
Clear Lake	100
Kitzmiller Dam	100
Account 214.00, Aqueducts and Supply Mains	
Large	110
Account 217.00, Sedimentation Basins	
Basins	75,110

Account 219.00, Filters	
Filters	56,75
Account 220.00, Clear Water Basin and Clearwell	
Clearwell	70
Account 223.00, Chemical Treatment Plant	
Chemical Building	65,89
Parr's Hill Chlorination Facility	52
Account 236.00, Structures and Improvements - Pumping	
Pumping Structures	43,79
Parr's Hill Booster Station	50
Kidd Lane Pump Station	40
Slagles Run Pump Station	40

The life span estimates for several groups were based primarily on the attained age. The age of these groups is approximately equal to or greater than the estimate typically made for the property group. For each of the above accounts, the expectation is that there will be retirements prior to the final retirement of the plant. Interim survivor curves were estimated for the plant based on prior studies and judgment. The interim survivor curves are as follows:

Account		Interim Survivor Group
208.00	Collecting and Impounding Reservoirs - Impounding	125-R2.5
212.20	Collecting and Impounding Reservoirs - Collecting	125-R2.5
214.00	Aqueducts and Supply Mains	100-S2.5
217.00	Sedimentation Basins	80-S1.5
219.00	Filters	70-R3
220.00	Clear Water Basin and Clearwell	65-R4
223.10	Chemical Treatment Plant - Building	75-R4
223.30	Chemical Treatment Plant - Parr's Hill Chlorination Facility	40-S3
236.00	Structures and Improvements - Pumping	75R3

The average survivor curves estimated for depreciable groups with numerous similar items were based on statistical analyses, Company policies, and previous estimates made for this and other companies. For the remaining mass plant accounts and subaccounts for which survivor curves were estimated, the combined statistical analysis and informed judgment resulted in good indications of the survivor patterns experienced. The estimates below were the resulting survivor curves for the following accounts:

	Property Group	Survivor Curve
210.00	Springs and Wells	45-R4
223.20	Chemical Treatment Plant - Equipment	35-L2.5
224.00	Laboratory Equipment	30-S0
237.00	Pumps and Pumping Equipment	50-R2.5
242.00	Electrical Equipment	55-R3
243.00	Other Pump Station Equipment	35-S2.5
246.00	Transmission Mains	100-R3
247.00	Distribution Reservoirs and Standpipes	60-R3
248.00	Distribution Mains	100-R4
249.00	Services	70-S2.5
250.00	Meters	38-S4
251.00	Hydrants	70-R3
257.00	Structures and Improvements - General	60-R3
259.00	Other General Equipment	
	Cars	9-L3
	Trucks	15-L3

The amortization periods selected for general plant Accounts 258.00 and 259.00 are discussed in the section, “Amortization of General Plant Accounts.”

PART IV. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

PART IV. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

CALCULATION OF DEPRECIATION

The annual depreciation accruals as of December 31, 2021, are based on the straight line remaining life method and the equal life group procedure. For the purpose of calculating the remaining life accruals as of December 31, 2021, the book reserve is allocated among vintages in proportion to the calculated accrued depreciation as of December 31, 2021.

Group Depreciation Procedures

A group procedure for depreciation is appropriate when considering more than a single item of property. Normally, the items within a group do not have identical service lives, but have lives that are dispersed over a range of time.

In the average service life procedure, the rate of annual depreciation is based on the average life or average remaining life of the group, and this rate is applied to the surviving balances of the group's cost. A characteristic of this procedure is that the cost of plant retired prior to average life is not fully recouped at the time of retirement, whereas the cost of plant retired subsequent to average life is more than fully recouped. Over the entire life cycle, the portion of cost not recouped prior to average life is balanced by the cost recouped subsequent to average life.

In the equal life group procedure, the property group is subdivided according to service life. That is, each equal life group includes that portion of the property which experiences the life of that specific group. The relative size of each equal life group is determined from the property's life dispersion curve. This procedure eliminates the need to base depreciation on average lives, inasmuch as each group is equivalent to a

unit having a single life. The full costs of short-lived units are accrued during their lives, leaving no deferral of accruals required to be added to the annual costs associated with long-lived units. The calculated depreciation for the property group is the summation of the calculated depreciation based on the service life of each equal life group.

Remaining Life Annual Accruals

For the purpose of calculating remaining life accrual rates as of December 31, 2021, the estimated book depreciation reserve for each plant account is allocated among vintages in proportion to the calculated accrued depreciation for the account. Explanations of remaining life accruals and calculated accrued depreciation based on the equal life group procedure follow. The detailed calculations are set forth in the Results of Study section of the report.

Equal Life Group Procedure

In the equal life group procedure, the remaining life annual accrual for each vintage is determined by dividing future book accruals (original cost less book reserve) by the composite remaining life for the surviving original cost of that vintage. The composite remaining life is derived by compositing the individual equal life group remaining lives in accordance with the following equation:

$$\text{Composite Remaining Life} = \frac{\sum\left(\frac{\text{Book Cost}}{\text{Life}} \times \text{Remaining Life}\right)}{\sum \frac{\text{Book Cost}}{\text{Life}}}.$$

The book costs and lives of the several equal life groups which are summed in the foregoing equation are defined by the estimated survivor curve.

Inasmuch as book cost divided by life equals the whole life annual accrual, the foregoing equation reduces to the following form:

$$Composite\ Remaining\ Life\ =\ \frac{\sum Whole\ Life\ Future\ Accruals}{\sum Whole\ Life\ Annual\ Accruals}$$

or

$$Composite\ Remaining\ Life\ =\ \frac{\sum Book\ Cost\ -\ Calc.\ Reserve}{\sum Whole\ Life\ Annual\ Accrual}.$$

The annual accrual rate for each account is equal to the sum of the remaining life annual accruals for all vintages divided by the account's total original cost. The account's "composite remaining life" is calculated by dividing the sum of the future book accruals for all vintages by the sum of the remaining life annual accruals for all vintages.

The calculated accrued depreciation in the equal life group procedure also represents that portion of depreciable cost which will not be allocated to expense through future accruals. However, the calculation is based at the equal life group level rather than the vintage group level, and does not require the use of averages. The equal life group accrued depreciation ratio is calculated as follows:

$$Ratio\ =\ 1\ -\ \frac{Remaining\ Life.}{Service\ Life}$$

Inasmuch as service life minus remaining life equals age, when averages are not employed, the foregoing equation reduces to:

$$Ratio\ =\ \frac{Age}{Service\ Life}.$$

AMORTIZATION OF GENERAL PLANT ACCOUNTS

In order to use a more efficient and cost effective accounting process for most equipment recorded in general plant Accounts 258.00 and 259.00; amounts capitalized in these accounts are amortized rather than depreciated. Amortization as defined in the Uniform System of Accounts is the gradual extinguishment of an amount in an account by distributing such amount over a fixed period, over the life of the asset or liability to which it applies, or over the period during which it is anticipated the benefit will be realized.

The primary reasons for the amortization of certain general plant accounts is that the effort required to unitize additions, periodically inventory equipment and determine amounts to be retired for equipment recorded in these accounts is disproportionate to the original cost of the equipment when compared to other water plant accounts.

Accounting for such equipment using an amortization concept consists of capitalization of amounts to these accounts based on the same criteria as used previously under depreciation accounting, amortization of the asset over a fixed period, retirement of the equipment at the end of the amortization period and recognition of any net salvage related to disposition of equipment in these accounts as a gain or loss. For equipment in these accounts that was placed in service prior to implementation of amortization accounting, the net book value by vintage amortized over the remaining amortization period specified for each account and the original cost will be retired at the end of this period.

The amortization periods selected for each account or subaccount are based on a review of the existing depreciation rates for the accounts, typical service lives used for

each type of equipment and a consideration of the period during which it is anticipated that most of the benefit of the equipment will be realized. The amortization periods are as follows:

Account Number	Description	Amortization Period, Years
258.00	General Office Equipment	
	Office Furniture	20
	Office Equipment	15
	Computer Equipment	5
259.00	Other General Equipment	
	Tools, Shop and Garage Equipment	20
	Communication Equipment	10

PART V. RESULTS OF STUDY

PART V. RESULTS OF STUDY

DESCRIPTION OF SUMMARY TABULATIONS

The results of the depreciation study are summarized in Table 1 which sets forth the calculated annual depreciation and the book reserve related to Water Plant in Service. Table 2 presents the bringforward to December 31, 2021, of the book depreciation reserve as of December 31, 2020. Table 3 sets forth the calculation of estimated depreciation accruals for the twelve months ended December 31, 2021.

DESCRIPTION OF DETAILED TABULATIONS

Supporting statistical data for the estimates of average service lives and survivor curves and the annual depreciation calculations, are presented in two sections.

The section beginning on page VI-2 sets forth, for each depreciable group analyzed by the retirement rate method, a chart depicting the original and estimated survivor curves followed by a tabular presentation of the original life table plotted on the chart. The supporting data for the original cost depreciation calculations are presented in the section beginning on page VII-2.

In the first section, the survivor curves estimated for the depreciable groups are shown as dark smooth curves on the charts. Each smooth survivor curve is denoted by a numeral followed by the type curve designation. The numeral used is the average life derived from the entire curve from 100 percent to zero percent surviving. In cases where only a segment of the estimated curve is used in the depreciation calculation, the numeral used for identification purposes is not a designation of the average life of the group. The titles of the charts indicate the group, the symbol used to plot the points of the original life table, and the experience and placement bands of the life tables which

were plotted. The experience band indicates the range of years for which the retirements were used to develop the stub survivor curve. The placements indicate, for the related experience band, the range of years of installations which appear in the experience.

The tables of the calculated annual depreciation related to original cost are presented in account sequence in the second section and indicate the estimated average survivor curves used in the calculations. The tables set forth, for each installation year, the original cost, calculated accrued depreciation, allocated book reserve, remaining life expectancy, and the calculated annual accrual.

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TABLE 1. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2021

	DEPRECIABLE GROUP	PROBABLE RETIREMENT DATE	SURVIVOR CURVE	ORIGINAL COST AS OF DECEMBER 31, 2021	BOOK DEPRECIATION RESERVE	FUTURE ACCRUALS	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(7)/(4)	(9)=(6)/(7)
	DEPRECIABLE PLANT								
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING								
	SHEPPARD AND MYERS RESERVOIR	06-2044	125-R2.5 *	2,611,649.36	468,303	2,143,346	98,952	3.79	21.7
	L. B. SHEPPARD (LONG ARM) RESERVOIR	06-2067	125-R2.5 *	3,321,101.38	1,435,459	1,885,642	45,397	1.37	41.5
	DREDGING	06-2064	125-R2.5 *	648,584.23	293,269	355,315	8,992	1.39	39.5
	TOTAL ACCOUNT 208			6,581,334.97	2,197,031	4,384,303	153,341	2.33	28.6
210	SPRINGS AND WELLS		45-R4	458,864.60	180,519	278,346	11,090	2.42	25.1
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING								
	CLEAR LAKE	06-2034	125-R2.5 *	256,410.04	151,774	104,636	8,496	3.31	12.3
	KITZMILLER DAM	06-2034	125-R2.5 *	171,938.03	39,632	132,306	10,747	6.25	12.3
	TOTAL ACCOUNT 212.2			428,348.07	191,406	236,942	19,243	4.49	12.3
214	AQUEDUCTS AND SUPPLY MAINS	06-2044	100-S2.5 *	7,899,743.87	1,610,111	6,289,633	280,390	3.55	22.4
217	SEDIMENTATION BASINS	06-2042	80-S1.5 *	867,305.33	494,968	372,337	19,908	2.30	18.7
219	FILTERS	06-2042	70-R3 *	6,004,078.69	1,392,282	4,611,797	230,778	3.84	20.0
220	CLEAR WATER BASIN AND CLEARWELL	06-2037	65-R4 *	513,883.54	125,563	388,321	25,197	4.90	15.4
223	CHEMICAL TREATMENT PLANT								
	CHEMICAL BUILDING	06-2037	75-R4 *	2,480,659.85	697,716	1,782,944	115,824	4.67	15.4
	CHEMICAL TREATMENT EQUIPMENT		35-L2.5	9,457,557.78	2,743,868	6,713,690	301,422	3.19	22.3
	PARR'S HILL CHLORINATION FACILITY	06-2023	40-S3 *	138,917.59	123,758	15,160	11,015	7.93	1.4
	TOTAL ACCOUNT 223			12,077,135.22	3,565,342	8,511,794	428,261	3.55	19.9
224	LABORATORY EQUIPMENT		30-S0	31,393.37	16,147	15,246	1,107	3.53	13.8
236	STRUCTURES AND IMPROVEMENTS - PUMPING								
	PUMPING STRUCTURES	06-2027	75-R3 *	409,984.58	335,317	74,668	13,784	3.36	5.4
	PARR'S HILL BOOSTER STATION	06-2044	75-R3 *	878,309.43	354,305	524,004	24,153	2.75	21.7
	KIDD LANE PUMP STATION	06-2040	75-R3 *	13,552.02	6,920	6,632	368	2.72	18.0
	SLAGLE RUN PUMP STATION	06-2044	75-R3 *	59,937.83	23,890	36,048	1,657	2.76	21.8
	TOTAL ACCOUNT 236			1,361,783.86	720,432	641,352	39,962	2.93	16.0
237	PUMPS AND PUMPING EQUIPMENT		50-R2.5	2,628,291.15	628,311	1,999,980	62,175	2.37	32.2
242	ELECTRICAL EQUIPMENT		55-R3	2,341,525.04	169,849	2,171,676	52,333	2.23	41.5
243	OTHER PUMP STATION EQUIPMENT		35-S2.5	24,664.08	16,553	8,111	740	3.00	11.0
246	TRANSMISSION MAINS		100-R3	2,928,250.16	782,904	2,145,346	33,177	1.13	64.7
247	DISTRIBUTION RESERVOIRS AND STANDPIPES		60-R3	1,893,213.11	518,353	1,374,860	35,871	1.89	38.3
248	DISTRIBUTION MAINS		100-R4	12,200,594.66	3,089,709	9,110,886	132,480	1.09	68.8
249	SERVICES		70-S2.5	2,040,073.07	752,962	1,287,111	32,437	1.59	39.7
250	METERS		38-S4	2,378,970.56	1,014,143	1,364,828	71,842	3.02	19.0
251	HYDRANTS		70-R3	29,253.72	16,437	12,817	459	1.57	27.9
257	STRUCTURES AND IMPROVEMENTS - GENERAL		60-R3	668,964.22	158,123	510,841	12,569	1.88	40.6

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TABLE 1. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2021

	DEPRECIABLE GROUP	PROBABLE RETIREMENT DATE	SURVIVOR CURVE	ORIGINAL COST AS OF DECEMBER 31, 2021	BOOK DEPRECIATION RESERVE	FUTURE ACCRUALS	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(7)/(4)	(9)=(6)/(7)
258	GENERAL OFFICE EQUIPMENT								
	OFFICE FURNITURE		20-SQ	26,517.87	25,134	1,384	251	0.95	5.5
	OFFICE EQUIPMENT		15-SQ	46,111.16	42,067	4,044	533	1.16	7.6
	COMPUTER EQUIPMENT		5-SQ	41,981.25	34,982	6,999	2,918	6.95	2.4
	TOTAL ACCOUNT 258			114,610.28	102,183	12,427	3,702	3.23	3.4
259	OTHER GENERAL EQUIPMENT								
	CARS		9-L3	200,762.81	117,856	82,907	20,463	10.19	4.1
	TRUCKS		15-L3	747,415.22	308,324	439,091	52,320	7.00	8.4
	TOOLS, SHOP AND GARAGE EQUIPMENT		20-SQ	1,254,214.61	663,667	590,548	47,566	3.79	12.4
	COMMUNICATION EQUIPMENT		10-SQ	639,698.57	275,696	364,003	60,344	9.43	6.0
	TOTAL ACCOUNT 259			2,842,091.21	1,365,543	1,476,549	180,693	6.36	8.2
	TOTAL DEPRECIABLE PLANT			**66,314,372.78**	**19,108,871**	**47,205,503**	**1,827,755**	**2.76**	**25.8**
	NONDEPRECIABLE PLANT								
205	LAND			18,026.03					
206	LAND			11,174.98					
207	LAND			2,689.89					
207.02	LAND			429,396.00					
207.03	LAND			74,314.20					
207.04	LAND			69,848.51					
207.05	LAND			36,800.00					
207.06	LAND			59,663.56					
207.1	TREES			24,916.00					
212.1	LAND			7,307.00					
234	LAND			96,020.25					
234.1	LAND - SLAGLE RUN			12,112.50					
245	RIGHTS OF WAY			23,410.67					
245.01	RIGHTS OF WAY			9,701.88					
247.1	LAND - PARR'S HILL			2,455.00					
247.12	LAND - NEW STORAGE W. TANK			9,310.05					
	TOTAL NONDEPRECIABLE PLANT			**887,146.52**					
	TOTAL WATER PLANT IN SERVICE			**67,201,519.30**	**19,108,871**	**47,205,503**	**1,827,755**		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

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TABLE 2. BRINGFORWARD OF THE BOOK RESERVE FROM DECEMBER 31, 2020 TO DECEMBER 31, 2021

	DEPRECIABLE GROUP	BOOK RESERVE DECEMBER 31, 2020		ANNUAL ACCRUALS		RETIREMENTS		BOOK RESERVE DECEMBER 31, 2021
	(1)	(2)	+	(3)	-	(4)	=	(5)
DEPRECIABLE PLANT								
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING							
	SHEPPARD AND MYERS RESERVOIR	474,941		27,362		34,000		468,303
	L. B. SHEPPARD (LONG ARM) RESERVOIR	1,389,296		46,163				1,435,459
	DREDGING	284,254		9,015				293,269
	TOTAL ACCOUNT 208	2,148,491		82,540		34,000		2,197,031
210	SPRINGS AND WELLS	169,369		11,150				180,519
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING							
	CLEAR LAKE	143,236		8,538				151,774
	KITZMILLER DAM	42,242		4,390		7,000		39,632
	TOTAL ACCOUNT 212.2	185,478		12,928		7,000		191,406
214	AQUEDUCTS AND SUPPLY MAINS	1,350,337		268,774		9,000		1,610,111
217	SEDIMENTATION BASINS	475,020		19,948				494,968
219	FILTERS	1,160,525		231,757				1,392,282
220	CLEAR WATER BASIN & CLEARWELL	100,331		25,232				125,563
223	CHEMICAL TREATMENT PLANT							
	CHEMICAL BUILDING	584,209		114,787		1,280		697,716
	CHEMICAL TREATMENT EQUIPMENT	2,442,766		305,892		4,790		2,743,868
	PARR'S HILL CHLORINATION FACILITY	116,115		7,963		320		123,758
	TOTAL ACCOUNT 223	3,143,090		428,642		6,390		3,565,342
224	LABORATORY EQUIPMENT	14,951		1,196				16,147
236	STRUCTURES AND IMPROVEMENTS - PUMPING							
	PUMPING STRUCTURES	321,419		13,898				335,317
	PARR'S HILL BOOSTER STATION	329,976		24,329				354,305
	KIDD LANE PUMP STATION	6,549		371				6,920
	SLAGLE RUN PUMP STATION	22,230		1,660				23,890
	TOTAL ACCOUNT 236	680,174		40,258		0		720,432
237	PUMPS AND PUMPING EQUIPMENT	596,529		55,112		23,330		628,311
242	ELECTRICAL EQUIPMENT	204,965		34,874		69,990		169,849
243	OTHER PUMP STATION EQUIPMENT	15,771		782				16,553
246	TRANSMISSION MAINS	767,571		28,833		13,500		782,904
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	482,193		36,160				518,353
248	DISTRIBUTION MAINS	2,985,231		126,978		22,500		3,089,709
249	SERVICES	722,286		32,556		1,880		752,962
250	METERS	981,069		68,574		35,500		1,014,143
251	HYDRANTS	15,969		468				16,437
257	STRUCTURES AND IMPROVEMENTS - GENERAL	145,480		12,643				158,123
258	GENERAL OFFICE EQUIPMENT							
	OFFICE FURNITURE	24,402		732				25,134
	OFFICE EQUIPMENT	41,532		535				42,067
	COMPUTER EQUIPMENT	31,951		3,031				34,982
	TOTAL ACCOUNT 258	97,885		4,298		0		102,183
259	OTHER GENERAL EQUIPMENT							
	CARS	106,512		22,283		10,939		117,856
	TRUCKS	260,243		54,081		6,000		308,324
	TOOLS, SHOP AND GARAGE EQUIPMENT	622,695		48,972		8,000		663,667
	COMMUNICATION EQUIPMENT	215,372		60,324				275,696
	TOTAL ACCOUNT 259	1,204,822		185,660		24,939		1,365,543
TOTAL DEPRECIABLE PLANT		**17,647,537**		**1,709,363**		**248,029**		**19,108,872**

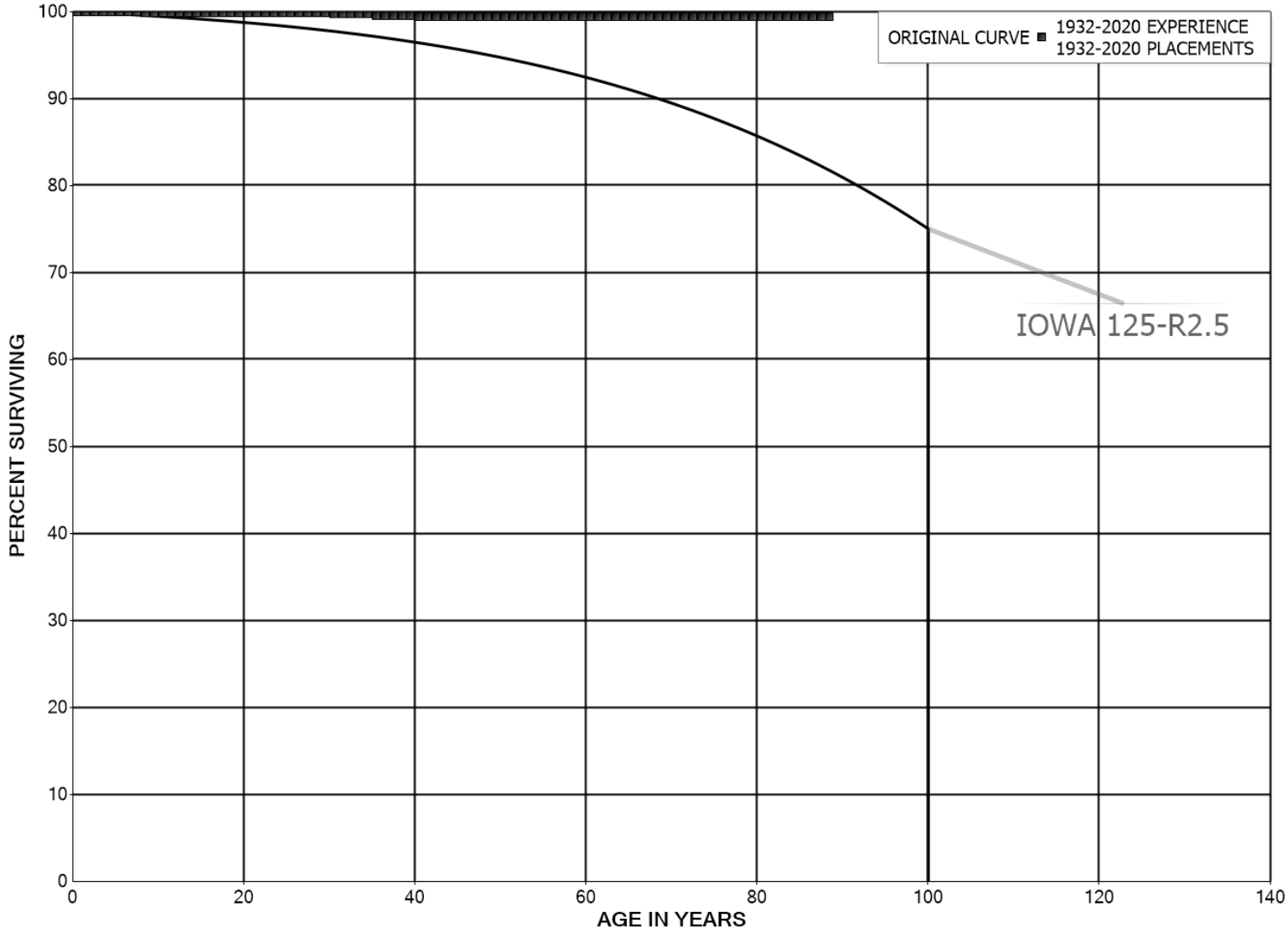
BOROUGH OF HANOVER
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TABLE 3. CALCULATION OF DEPRECIATION ACCRUALS FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021

	DEPRECIABLE GROUP	ORIGINAL COST AT DECEMBER 31, 2020	ORIGINAL COST AT DECEMBER 31, 2021	COMPOSITE ACCRUAL RATE	ANNUAL ACCRUAL AMOUNT
	(1)	(2)	(3)	(4)	(5)
DEPRECIABLE PLANT					
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING				
	SHEPPARD AND MYERS RESERVOIR	745,649.36	2,611,649.36	1.63	27,362
	L. B. SHEPPARD (LONG ARM) RESERVOIR	3,321,101.38	3,321,101.38	1.39	46,163
	DREDGING	648,584.23	648,584.23	1.39	9,015
	TOTAL ACCOUNT 208	4,715,334.97	6,581,334.97	1.43	82,540
210	SPRINGS AND WELLS	458,864.60	458,864.60	2.43	11,150
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING				
	CLEAR LAKE	256,410.04	256,410.04	3.33	8,538
	KITZMILLER DAM	78,938.03	171,938.03	3.50	4,390
	TOTAL ACCOUNT 212.2	335,348.07	428,348.07	3.37	12,928
214	AQUEDUCTS AND SUPPLY MAINS	7,458,783.87	7,899,743.87	3.50	268,774
217	SEDIMENTATION BASINS	867,305.33	867,305.33	2.30	19,948
219	FILTERS	6,004,078.69	6,004,078.69	3.86	231,757
220	CLEAR WATER BASIN & CLEARWELL	513,883.54	513,883.54	4.91	25,232
223	CHEMICAL TREATMENT PLANT				
	CHEMICAL BUILDING	2,456,399.85	2,480,659.85	4.65	114,787
	CHEMICAL TREATMENT EQUIPMENT	9,366,570.78	9,457,557.78	3.25	305,892
	PARR'S HILL CHLORINATION FACILITY	132,857.59	138,917.59	5.86	7,963
	TOTAL ACCOUNT 223	11,955,828.22	12,077,135.22	3.57	428,642
224	LABORATORY EQUIPMENT	31,393.37	31,393.37	3.81	1,196
236	STRUCTURES AND IMPROVEMENTS - PUMPING				
	PUMPING STRUCTURES	409,984.58	409,984.58	3.39	13,898
	PARR'S HILL BOOSTER STATION	878,309.43	878,309.43	2.77	24,329
	KIDD LANE PUMP STATION	13,552.02	13,552.02	2.74	371
	SLAGLE RUN PUMP STATION	59,937.83	59,937.83	2.77	1,660
	TOTAL ACCOUNT 236	1,361,783.86	1,361,783.86	2.96	40,258
237	PUMPS AND PUMPING EQUIPMENT	2,185,021.15	2,628,291.15	2.29	55,112
242	ELECTRICAL EQUIPMENT	1,011,720.04	2,341,525.04	2.08	34,874
243	OTHER PUMP STATION EQUIPMENT	24,664.08	24,664.08	3.17	782
246	TRANSMISSION MAINS	2,266,822.16	2,928,250.16	1.11	28,833
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	1,893,213.11	1,893,213.11	1.91	36,160
248	DISTRIBUTION MAINS	11,098,204.66	12,200,594.66	1.09	126,978
249	SERVICES	2,029,453.07	2,040,073.07	1.60	32,556
250	METERS	2,059,470.56	2,378,970.56	3.09	68,574
251	HYDRANTS	29,253.72	29,253.72	1.60	468
257	STRUCTURES AND IMPROVEMENTS - GENERAL	668,964.22	668,964.22	1.89	12,643
258	GENERAL OFFICE EQUIPMENT				
	OFFICE FURNITURE	26,517.87	26,517.87	2.76	732
	OFFICE EQUIPMENT	46,111.16	46,111.16	1.16	535
	COMPUTER EQUIPMENT	41,981.25	41,981.25	7.22	3,031
	TOTAL ACCOUNT 258	114,610.28	114,610.28	3.75	4,298
259	OTHER GENERAL EQUIPMENT				
	CARS	197,151.85	200,762.81	11.20	22,283
	TRUCKS	702,490.22	747,415.22	7.46	54,081
	TOOLS, SHOP AND GARAGE EQUIPMENT	1,182,189.61	1,254,214.61	4.02	48,972
	COMMUNICATION EQUIPMENT	639,698.57	639,698.57	9.43	60,324
	TOTAL ACCOUNT 259	2,721,530.25	2,842,091.21	6.70	185,660
TOTAL DEPRECIABLE PLANT		**59,805,531.82**	**66,314,372.78**	2.75	**1,709,363**

PART VI. SERVICE LIFE STATISTICS

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ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING
ORIGINAL AND SMOOTH SURVIVOR CURVES



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ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	4,180,017		0.0000	1.0000	100.00
0.5	4,102,960		0.0000	1.0000	100.00
1.5	4,094,721		0.0000	1.0000	100.00
2.5	4,079,282		0.0000	1.0000	100.00
3.5	3,533,940	1,334	0.0004	0.9996	100.00
4.5	3,532,606	682	0.0002	0.9998	99.96
5.5	3,527,966		0.0000	1.0000	99.94
6.5	3,527,966		0.0000	1.0000	99.94
7.5	3,527,966	2,515	0.0007	0.9993	99.94
8.5	3,620,858	2,300	0.0006	0.9994	99.87
9.5	3,618,558		0.0000	1.0000	99.81
10.5	3,614,356		0.0000	1.0000	99.81
11.5	3,578,771		0.0000	1.0000	99.81
12.5	3,570,598		0.0000	1.0000	99.81
13.5	3,568,214		0.0000	1.0000	99.81
14.5	3,567,572		0.0000	1.0000	99.81
15.5	3,560,625		0.0000	1.0000	99.81
16.5	3,553,649		0.0000	1.0000	99.81
17.5	3,551,324		0.0000	1.0000	99.81
18.5	3,531,706		0.0000	1.0000	99.81
19.5	3,518,930		0.0000	1.0000	99.81
20.5	3,514,619	119	0.0000	1.0000	99.81
21.5	3,500,926	73	0.0000	1.0000	99.80
22.5	3,500,853	70	0.0000	1.0000	99.80
23.5	3,475,178	246	0.0001	0.9999	99.80
24.5	3,425,666		0.0000	1.0000	99.79
25.5	3,410,751		0.0000	1.0000	99.79
26.5	3,399,939		0.0000	1.0000	99.79
27.5	3,395,324	220	0.0001	0.9999	99.79
28.5	3,738,742		0.0000	1.0000	99.79
29.5	3,710,125	481	0.0001	0.9999	99.79
30.5	3,709,644		0.0000	1.0000	99.77
31.5	3,709,409	99	0.0000	1.0000	99.77
32.5	3,689,550		0.0000	1.0000	99.77
33.5	3,663,105		0.0000	1.0000	99.77
34.5	3,660,428	8,518	0.0023	0.9977	99.77
35.5	3,539,912		0.0000	1.0000	99.54
36.5	3,014,752	220	0.0001	0.9999	99.54
37.5	3,014,532	189	0.0001	0.9999	99.53
38.5	3,014,343	41	0.0000	1.0000	99.53

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	3,014,302	3,909	0.0013	0.9987	99.52
40.5	3,010,393		0.0000	1.0000	99.40
41.5	3,010,393		0.0000	1.0000	99.40
42.5	3,010,393		0.0000	1.0000	99.40
43.5	3,010,102		0.0000	1.0000	99.40
44.5	3,010,102		0.0000	1.0000	99.40
45.5	3,010,102		0.0000	1.0000	99.40
46.5	3,010,102		0.0000	1.0000	99.40
47.5	3,008,886		0.0000	1.0000	99.40
48.5	3,008,007		0.0000	1.0000	99.40
49.5	2,998,649		0.0000	1.0000	99.40
50.5	2,997,370		0.0000	1.0000	99.40
51.5	2,951,080		0.0000	1.0000	99.40
52.5	2,950,746		0.0000	1.0000	99.40
53.5	636,889		0.0000	1.0000	99.40
54.5	636,809		0.0000	1.0000	99.40
55.5	634,288		0.0000	1.0000	99.40
56.5	199,053		0.0000	1.0000	99.40
57.5	198,999		0.0000	1.0000	99.40
58.5	196,119		0.0000	1.0000	99.40
59.5	195,879		0.0000	1.0000	99.40
60.5	195,632		0.0000	1.0000	99.40
61.5	195,632		0.0000	1.0000	99.40
62.5	190,072		0.0000	1.0000	99.40
63.5	190,072		0.0000	1.0000	99.40
64.5	190,072		0.0000	1.0000	99.40
65.5	190,072		0.0000	1.0000	99.40
66.5	190,072		0.0000	1.0000	99.40
67.5	189,276		0.0000	1.0000	99.40
68.5	187,524		0.0000	1.0000	99.40
69.5	186,099		0.0000	1.0000	99.40
70.5	186,099		0.0000	1.0000	99.40
71.5	186,099		0.0000	1.0000	99.40
72.5	185,936		0.0000	1.0000	99.40
73.5	185,936		0.0000	1.0000	99.40
74.5	185,113		0.0000	1.0000	99.40
75.5	185,113		0.0000	1.0000	99.40
76.5	185,113		0.0000	1.0000	99.40
77.5	184,605		0.0000	1.0000	99.40
78.5	184,453		0.0000	1.0000	99.40

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

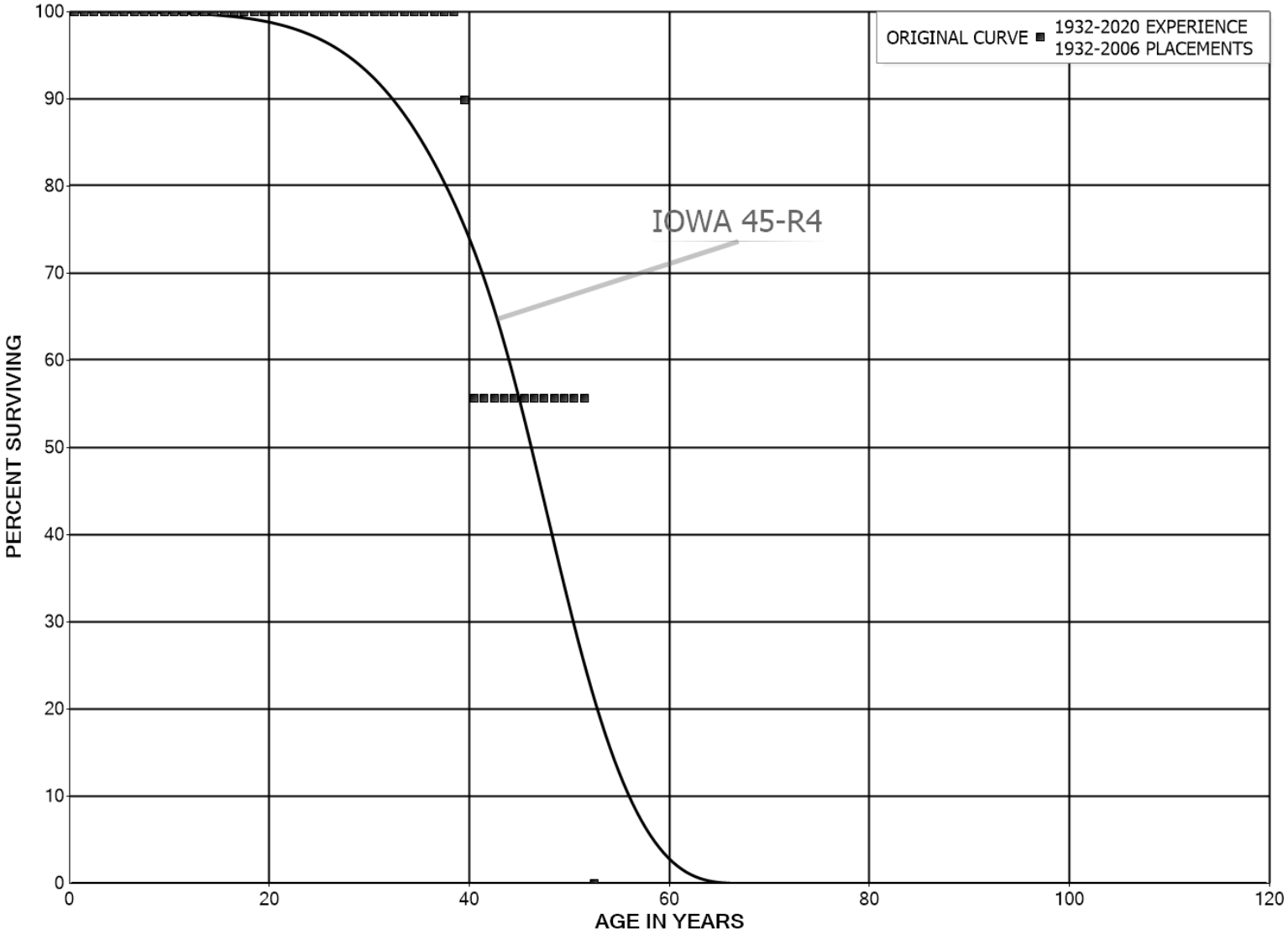
ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	183,958		0.0000	1.0000	99.40
80.5	182,689		0.0000	1.0000	99.40
81.5	182,519		0.0000	1.0000	99.40
82.5	182,519		0.0000	1.0000	99.40
83.5	181,461		0.0000	1.0000	99.40
84.5	181,434		0.0000	1.0000	99.40
85.5	174,940		0.0000	1.0000	99.40
86.5	154		0.0000	1.0000	99.40
87.5	26		0.0000	1.0000	99.40
88.5					99.40

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 210.00 SPRINGS AND WELLS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 210.00 SPRINGS AND WELLS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2006 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	465,385		0.0000	1.0000	100.00
0.5	459,406		0.0000	1.0000	100.00
1.5	459,406		0.0000	1.0000	100.00
2.5	459,406		0.0000	1.0000	100.00
3.5	459,406		0.0000	1.0000	100.00
4.5	459,406		0.0000	1.0000	100.00
5.5	459,406		0.0000	1.0000	100.00
6.5	459,406		0.0000	1.0000	100.00
7.5	459,406		0.0000	1.0000	100.00
8.5	460,162		0.0000	1.0000	100.00
9.5	460,162		0.0000	1.0000	100.00
10.5	460,162		0.0000	1.0000	100.00
11.5	460,162		0.0000	1.0000	100.00
12.5	460,162		0.0000	1.0000	100.00
13.5	460,162		0.0000	1.0000	100.00
14.5	274,696		0.0000	1.0000	100.00
15.5	273,536		0.0000	1.0000	100.00
16.5	270,674		0.0000	1.0000	100.00
17.5	166,282		0.0000	1.0000	100.00
18.5	13,853		0.0000	1.0000	100.00
19.5	13,853		0.0000	1.0000	100.00
20.5	13,853		0.0000	1.0000	100.00
21.5	13,853		0.0000	1.0000	100.00
22.5	13,853		0.0000	1.0000	100.00
23.5	13,853		0.0000	1.0000	100.00
24.5	13,853		0.0000	1.0000	100.00
25.5	13,853		0.0000	1.0000	100.00
26.5	13,853		0.0000	1.0000	100.00
27.5	13,853		0.0000	1.0000	100.00
28.5	13,853		0.0000	1.0000	100.00
29.5	13,853		0.0000	1.0000	100.00
30.5	13,853		0.0000	1.0000	100.00
31.5	10,109		0.0000	1.0000	100.00
32.5	10,109		0.0000	1.0000	100.00
33.5	10,109		0.0000	1.0000	100.00
34.5	10,109		0.0000	1.0000	100.00
35.5	10,109		0.0000	1.0000	100.00
36.5	1,297		0.0000	1.0000	100.00
37.5	1,297		0.0000	1.0000	100.00
38.5	1,297	132	0.1018	0.8982	100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

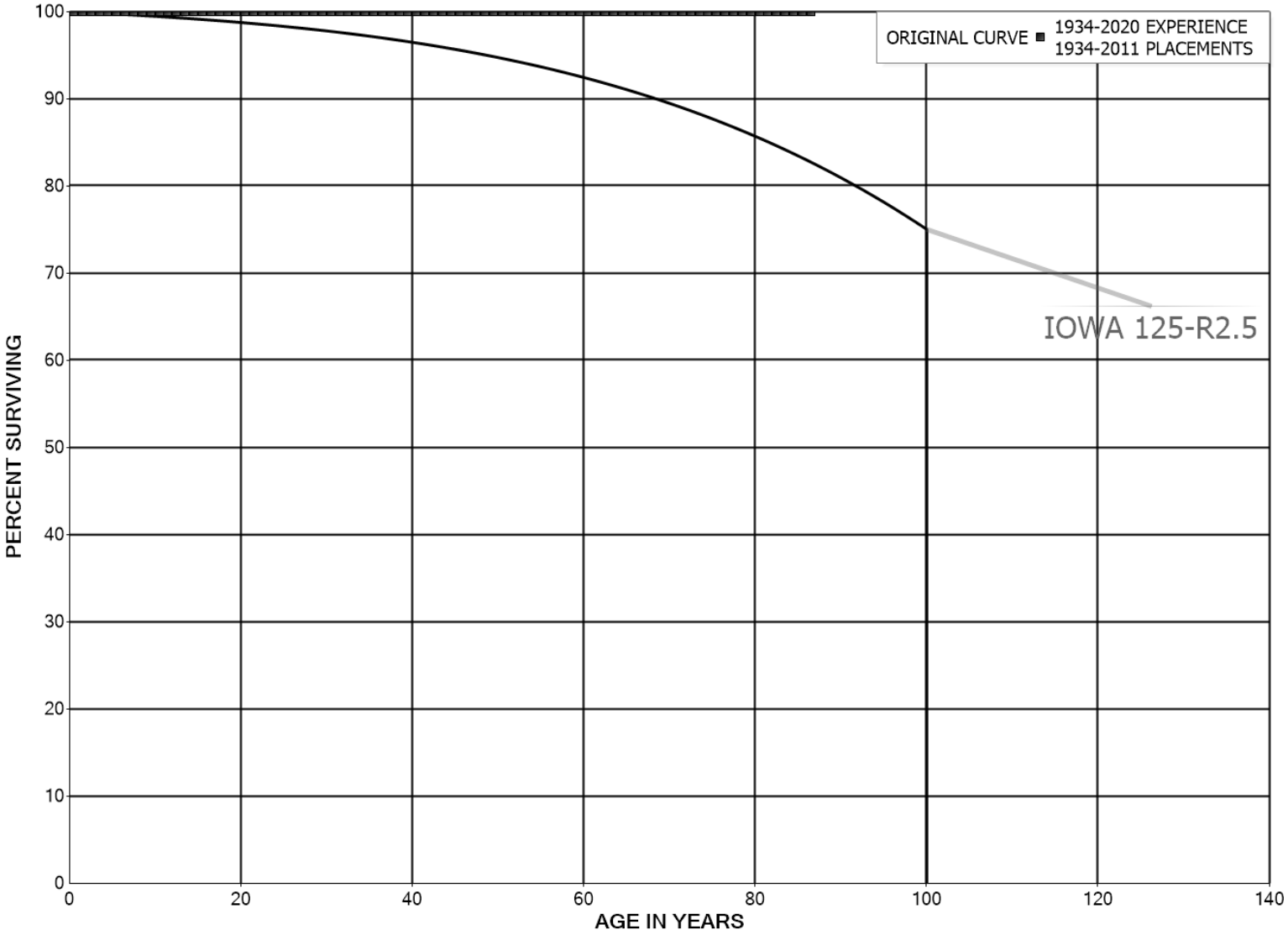
ACCOUNT 210.00 SPRINGS AND WELLS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2006 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	1,165	443	0.3803	0.6197	89.82
40.5	722		0.0000	1.0000	55.67
41.5	722		0.0000	1.0000	55.67
42.5	722		0.0000	1.0000	55.67
43.5	722		0.0000	1.0000	55.67
44.5	722		0.0000	1.0000	55.67
45.5	722		0.0000	1.0000	55.67
46.5	722		0.0000	1.0000	55.67
47.5	722		0.0000	1.0000	55.67
48.5	722		0.0000	1.0000	55.67
49.5	722		0.0000	1.0000	55.67
50.5	722		0.0000	1.0000	55.67
51.5	722	722	1.0000		55.67
52.5					

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1934-2011 EXPERIENCE BAND 1934-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	377,126		0.0000	1.0000	100.00
0.5	331,216		0.0000	1.0000	100.00
1.5	335,348		0.0000	1.0000	100.00
2.5	335,348		0.0000	1.0000	100.00
3.5	335,348		0.0000	1.0000	100.00
4.5	335,348		0.0000	1.0000	100.00
5.5	335,348		0.0000	1.0000	100.00
6.5	335,348		0.0000	1.0000	100.00
7.5	335,348		0.0000	1.0000	100.00
8.5	335,348		0.0000	1.0000	100.00
9.5	230,694		0.0000	1.0000	100.00
10.5	183,536		0.0000	1.0000	100.00
11.5	183,536		0.0000	1.0000	100.00
12.5	183,536		0.0000	1.0000	100.00
13.5	183,536		0.0000	1.0000	100.00
14.5	173,692		0.0000	1.0000	100.00
15.5	173,692		0.0000	1.0000	100.00
16.5	173,692		0.0000	1.0000	100.00
17.5	173,692		0.0000	1.0000	100.00
18.5	159,700		0.0000	1.0000	100.00
19.5	147,002		0.0000	1.0000	100.00
20.5	145,680		0.0000	1.0000	100.00
21.5	140,907		0.0000	1.0000	100.00
22.5	112,614		0.0000	1.0000	100.00
23.5	103,067		0.0000	1.0000	100.00
24.5	99,339		0.0000	1.0000	100.00
25.5	99,339		0.0000	1.0000	100.00
26.5	89,602		0.0000	1.0000	100.00
27.5	89,602		0.0000	1.0000	100.00
28.5	89,602		0.0000	1.0000	100.00
29.5	89,602		0.0000	1.0000	100.00
30.5	89,602		0.0000	1.0000	100.00
31.5	89,602		0.0000	1.0000	100.00
32.5	89,602		0.0000	1.0000	100.00
33.5	89,602		0.0000	1.0000	100.00
34.5	89,602		0.0000	1.0000	100.00
35.5	89,602		0.0000	1.0000	100.00
36.5	89,602		0.0000	1.0000	100.00
37.5	89,602		0.0000	1.0000	100.00
38.5	89,602		0.0000	1.0000	100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1934-2011 EXPERIENCE BAND 1934-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	89,602		0.0000	1.0000	100.00
40.5	89,602		0.0000	1.0000	100.00
41.5	89,602		0.0000	1.0000	100.00
42.5	89,602		0.0000	1.0000	100.00
43.5	89,602		0.0000	1.0000	100.00
44.5	89,602		0.0000	1.0000	100.00
45.5	89,602		0.0000	1.0000	100.00
46.5	89,602		0.0000	1.0000	100.00
47.5	89,602		0.0000	1.0000	100.00
48.5	89,602		0.0000	1.0000	100.00
49.5	89,602		0.0000	1.0000	100.00
50.5	89,602		0.0000	1.0000	100.00
51.5	89,036		0.0000	1.0000	100.00
52.5	89,036		0.0000	1.0000	100.00
53.5	88,546		0.0000	1.0000	100.00
54.5	84,374		0.0000	1.0000	100.00
55.5	77,600		0.0000	1.0000	100.00
56.5	77,600		0.0000	1.0000	100.00
57.5	77,599		0.0000	1.0000	100.00
58.5	77,599		0.0000	1.0000	100.00
59.5	77,599		0.0000	1.0000	100.00
60.5	76,857		0.0000	1.0000	100.00
61.5	76,857		0.0000	1.0000	100.00
62.5	76,857		0.0000	1.0000	100.00
63.5	76,857		0.0000	1.0000	100.00
64.5	76,857		0.0000	1.0000	100.00
65.5	76,857		0.0000	1.0000	100.00
66.5	76,857		0.0000	1.0000	100.00
67.5	76,857		0.0000	1.0000	100.00
68.5	76,857		0.0000	1.0000	100.00
69.5	76,857		0.0000	1.0000	100.00
70.5	76,857		0.0000	1.0000	100.00
71.5	76,857		0.0000	1.0000	100.00
72.5	76,857		0.0000	1.0000	100.00
73.5	76,445		0.0000	1.0000	100.00
74.5	76,445		0.0000	1.0000	100.00
75.5	76,445		0.0000	1.0000	100.00
76.5	76,445		0.0000	1.0000	100.00
77.5	76,445		0.0000	1.0000	100.00
78.5	76,445		0.0000	1.0000	100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

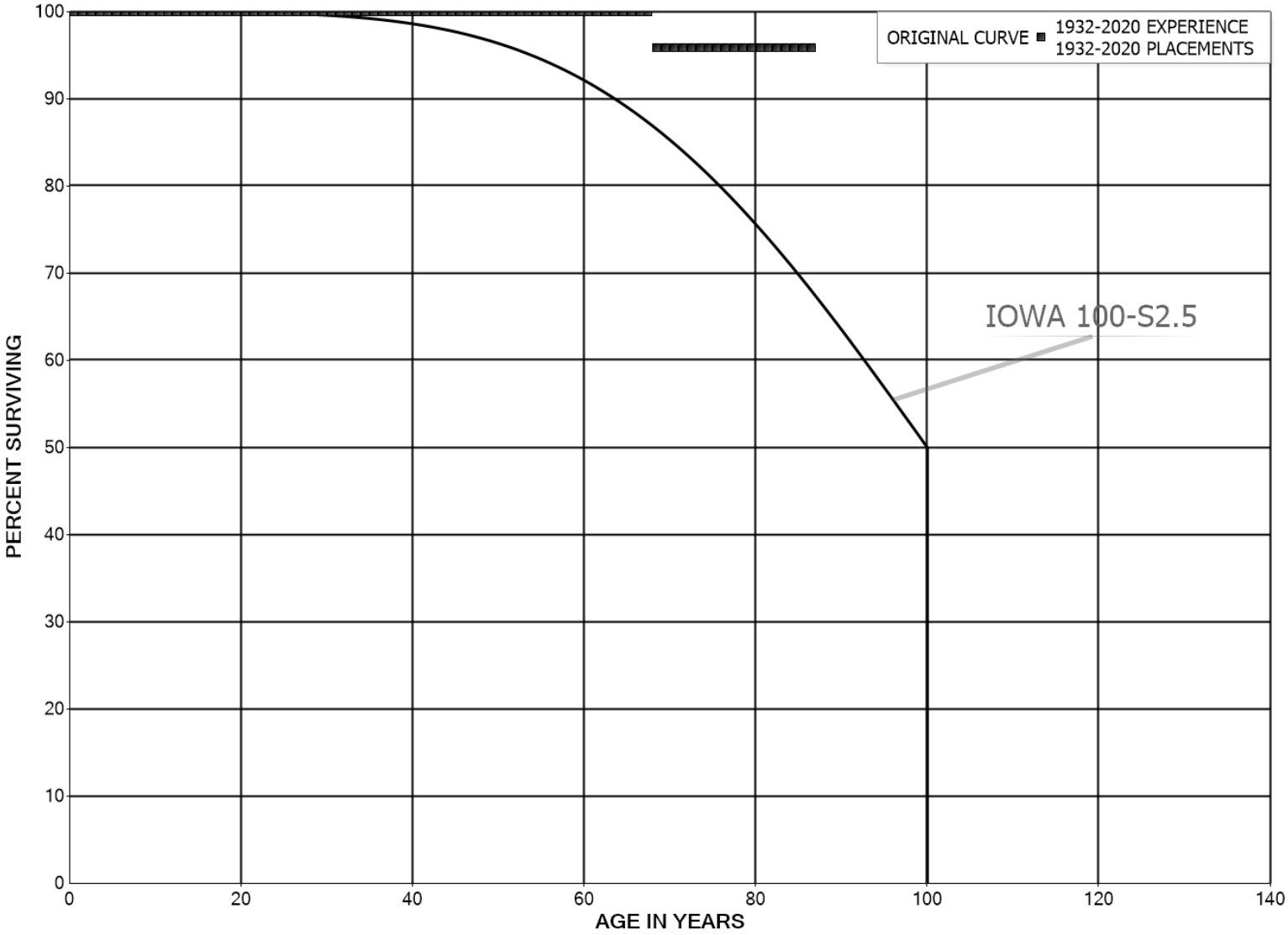
ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1934-2011 EXPERIENCE BAND 1934-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	76,445		0.0000	1.0000	100.00
80.5	76,445		0.0000	1.0000	100.00
81.5	76,235		0.0000	1.0000	100.00
82.5	76,235		0.0000	1.0000	100.00
83.5	76,235		0.0000	1.0000	100.00
84.5	76,124		0.0000	1.0000	100.00
85.5	76,097		0.0000	1.0000	100.00
86.5					100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 214.00 AQUEDUCTS AND SUPPLY MAINS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 214.00 AQUEDUCTS AND SUPPLY MAINS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	7,464,734		0.0000	1.0000	100.00
0.5	5,982,808		0.0000	1.0000	100.00
1.5	4,384,563		0.0000	1.0000	100.00
2.5	3,992,742		0.0000	1.0000	100.00
3.5	3,187,022		0.0000	1.0000	100.00
4.5	3,187,022		0.0000	1.0000	100.00
5.5	3,187,022		0.0000	1.0000	100.00
6.5	3,187,022		0.0000	1.0000	100.00
7.5	3,051,785		0.0000	1.0000	100.00
8.5	1,204,218		0.0000	1.0000	100.00
9.5	1,204,218		0.0000	1.0000	100.00
10.5	1,204,218		0.0000	1.0000	100.00
11.5	1,204,218		0.0000	1.0000	100.00
12.5	1,204,218		0.0000	1.0000	100.00
13.5	1,204,218		0.0000	1.0000	100.00
14.5	1,204,218		0.0000	1.0000	100.00
15.5	1,099,560		0.0000	1.0000	100.00
16.5	1,062,622		0.0000	1.0000	100.00
17.5	1,062,622		0.0000	1.0000	100.00
18.5	1,062,622		0.0000	1.0000	100.00
19.5	1,062,622		0.0000	1.0000	100.00
20.5	1,062,622		0.0000	1.0000	100.00
21.5	1,062,622		0.0000	1.0000	100.00
22.5	1,062,622		0.0000	1.0000	100.00
23.5	1,062,622		0.0000	1.0000	100.00
24.5	1,062,622		0.0000	1.0000	100.00
25.5	1,039,451		0.0000	1.0000	100.00
26.5	1,012,492		0.0000	1.0000	100.00
27.5	809,153		0.0000	1.0000	100.00
28.5	444,882		0.0000	1.0000	100.00
29.5	49,527		0.0000	1.0000	100.00
30.5	49,527		0.0000	1.0000	100.00
31.5	49,527		0.0000	1.0000	100.00
32.5	49,527		0.0000	1.0000	100.00
33.5	49,527		0.0000	1.0000	100.00
34.5	49,527		0.0000	1.0000	100.00
35.5	49,527		0.0000	1.0000	100.00
36.5	49,527		0.0000	1.0000	100.00
37.5	49,527		0.0000	1.0000	100.00
38.5	49,527		0.0000	1.0000	100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 214.00 AQUEDUCTS AND SUPPLY MAINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	49,527		0.0000	1.0000	100.00
40.5	49,527		0.0000	1.0000	100.00
41.5	49,527		0.0000	1.0000	100.00
42.5	49,527		0.0000	1.0000	100.00
43.5	49,527		0.0000	1.0000	100.00
44.5	49,527		0.0000	1.0000	100.00
45.5	49,527		0.0000	1.0000	100.00
46.5	49,527		0.0000	1.0000	100.00
47.5	49,527		0.0000	1.0000	100.00
48.5	49,527		0.0000	1.0000	100.00
49.5	49,527		0.0000	1.0000	100.00
50.5	49,527		0.0000	1.0000	100.00
51.5	49,527		0.0000	1.0000	100.00
52.5	49,527		0.0000	1.0000	100.00
53.5	49,527		0.0000	1.0000	100.00
54.5	49,527		0.0000	1.0000	100.00
55.5	49,527		0.0000	1.0000	100.00
56.5	49,527		0.0000	1.0000	100.00
57.5	46,707		0.0000	1.0000	100.00
58.5	46,707		0.0000	1.0000	100.00
59.5	46,707		0.0000	1.0000	100.00
60.5	46,707		0.0000	1.0000	100.00
61.5	46,707		0.0000	1.0000	100.00
62.5	46,707		0.0000	1.0000	100.00
63.5	46,707		0.0000	1.0000	100.00
64.5	46,707		0.0000	1.0000	100.00
65.5	46,707		0.0000	1.0000	100.00
66.5	46,707		0.0000	1.0000	100.00
67.5	46,707	1,951	0.0418	0.9582	100.00
68.5	44,756		0.0000	1.0000	95.82
69.5	44,756		0.0000	1.0000	95.82
70.5	44,756		0.0000	1.0000	95.82
71.5	44,756		0.0000	1.0000	95.82
72.5	44,756		0.0000	1.0000	95.82
73.5	44,756		0.0000	1.0000	95.82
74.5	44,756		0.0000	1.0000	95.82
75.5	44,756		0.0000	1.0000	95.82
76.5	44,756		0.0000	1.0000	95.82
77.5	44,756		0.0000	1.0000	95.82
78.5	44,756		0.0000	1.0000	95.82

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

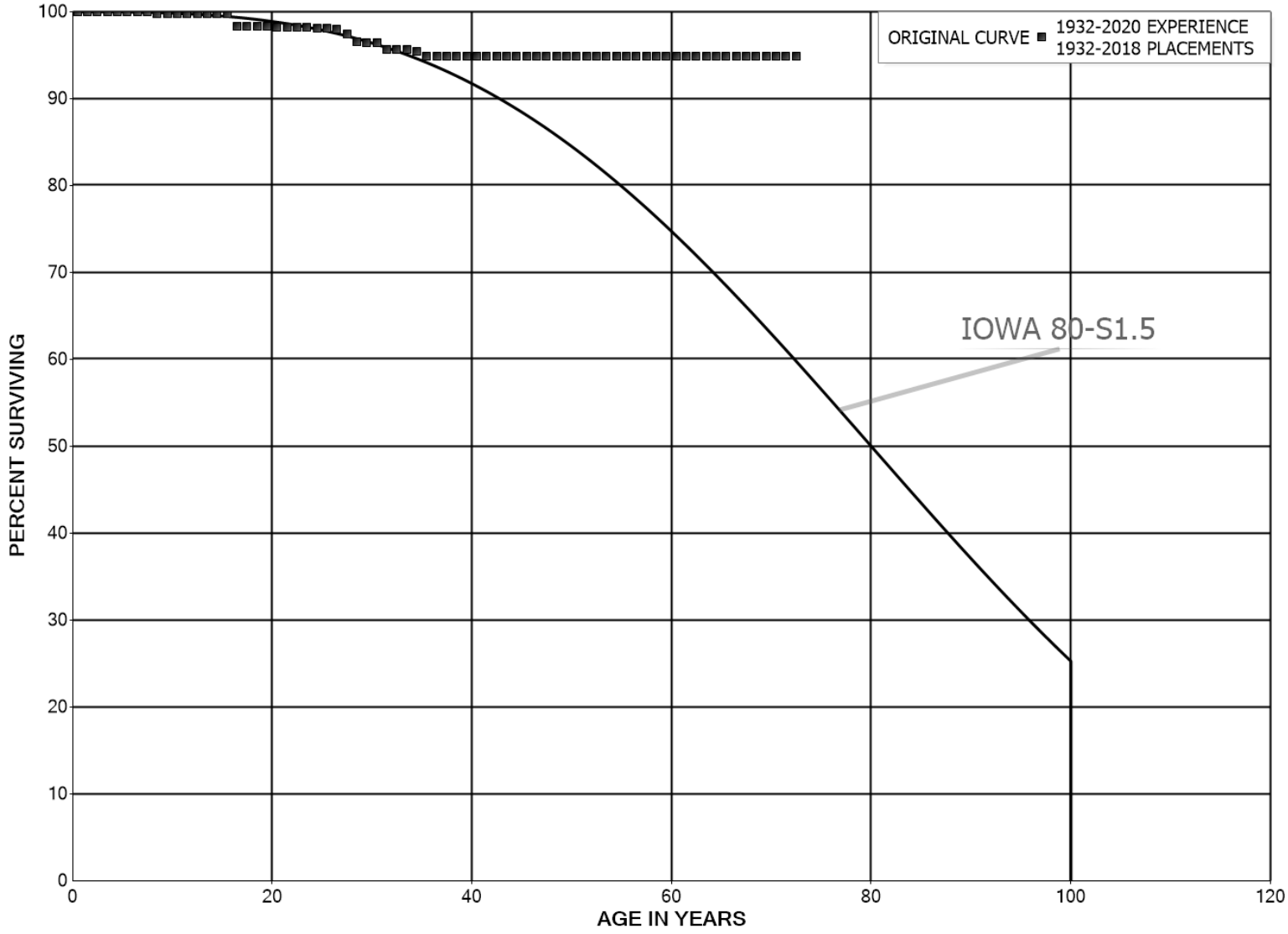
ACCOUNT 214.00 AQUEDUCTS AND SUPPLY MAINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	44,756		0.0000	1.0000	95.82
80.5	44,756		0.0000	1.0000	95.82
81.5	44,756		0.0000	1.0000	95.82
82.5	44,756		0.0000	1.0000	95.82
83.5	44,756		0.0000	1.0000	95.82
84.5	44,756		0.0000	1.0000	95.82
85.5	44,756		0.0000	1.0000	95.82
86.5					95.82

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 217.00 SEDIMENTATION BASINS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 217.00 SEDIMENTATION BASINS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	853,788		0.0000	1.0000	100.00
0.5	853,035		0.0000	1.0000	100.00
1.5	853,035		0.0000	1.0000	100.00
2.5	765,495		0.0000	1.0000	100.00
3.5	765,495		0.0000	1.0000	100.00
4.5	765,495		0.0000	1.0000	100.00
5.5	765,495		0.0000	1.0000	100.00
6.5	765,495		0.0000	1.0000	100.00
7.5	765,495	2,278	0.0030	0.9970	100.00
8.5	763,217		0.0000	1.0000	99.70
9.5	763,217		0.0000	1.0000	99.70
10.5	763,217		0.0000	1.0000	99.70
11.5	701,565		0.0000	1.0000	99.70
12.5	701,565		0.0000	1.0000	99.70
13.5	701,565		0.0000	1.0000	99.70
14.5	701,565		0.0000	1.0000	99.70
15.5	701,565	9,863	0.0141	0.9859	99.70
16.5	691,702		0.0000	1.0000	98.30
17.5	691,702		0.0000	1.0000	98.30
18.5	691,702		0.0000	1.0000	98.30
19.5	691,702	1,075	0.0016	0.9984	98.30
20.5	690,627	127	0.0002	0.9998	98.15
21.5	690,500		0.0000	1.0000	98.13
22.5	690,500	35	0.0001	0.9999	98.13
23.5	690,465	509	0.0007	0.9993	98.12
24.5	689,956	69	0.0001	0.9999	98.05
25.5	689,887	588	0.0009	0.9991	98.04
26.5	685,409	3,899	0.0057	0.9943	97.96
27.5	285,344	2,732	0.0096	0.9904	97.40
28.5	323,686	344	0.0011	0.9989	96.47
29.5	323,342	79	0.0002	0.9998	96.37
30.5	323,263	2,557	0.0079	0.9921	96.34
31.5	320,706		0.0000	1.0000	95.58
32.5	320,706		0.0000	1.0000	95.58
33.5	320,706	550	0.0017	0.9983	95.58
34.5	320,156	2,099	0.0066	0.9934	95.42
35.5	318,057		0.0000	1.0000	94.79
36.5	318,057		0.0000	1.0000	94.79
37.5	318,057		0.0000	1.0000	94.79
38.5	318,057		0.0000	1.0000	94.79

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 217.00 SEDIMENTATION BASINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	318,057		0.0000	1.0000	94.79
40.5	318,057		0.0000	1.0000	94.79
41.5	318,057		0.0000	1.0000	94.79
42.5	318,057		0.0000	1.0000	94.79
43.5	318,057		0.0000	1.0000	94.79
44.5	318,057		0.0000	1.0000	94.79
45.5	318,057		0.0000	1.0000	94.79
46.5	318,057		0.0000	1.0000	94.79
47.5	318,057		0.0000	1.0000	94.79
48.5	318,057		0.0000	1.0000	94.79
49.5	318,057		0.0000	1.0000	94.79
50.5	318,057		0.0000	1.0000	94.79
51.5	318,057		0.0000	1.0000	94.79
52.5	318,057		0.0000	1.0000	94.79
53.5	147,592		0.0000	1.0000	94.79
54.5	147,592		0.0000	1.0000	94.79
55.5	147,592		0.0000	1.0000	94.79
56.5	106,518		0.0000	1.0000	94.79
57.5	87,417		0.0000	1.0000	94.79
58.5	87,417		0.0000	1.0000	94.79
59.5	87,417		0.0000	1.0000	94.79
60.5	87,417		0.0000	1.0000	94.79
61.5	87,417		0.0000	1.0000	94.79
62.5	87,417		0.0000	1.0000	94.79
63.5	87,417		0.0000	1.0000	94.79
64.5	87,417		0.0000	1.0000	94.79
65.5	87,417		0.0000	1.0000	94.79
66.5	87,393		0.0000	1.0000	94.79
67.5	87,393		0.0000	1.0000	94.79
68.5	87,393		0.0000	1.0000	94.79
69.5	87,393		0.0000	1.0000	94.79
70.5	87,289		0.0000	1.0000	94.79
71.5	86,544		0.0000	1.0000	94.79
72.5	46,561		0.0000	1.0000	94.79
73.5	46,461		0.0000	1.0000	94.79
74.5	46,461		0.0000	1.0000	94.79
75.5	46,443		0.0000	1.0000	94.79
76.5	46,267		0.0000	1.0000	94.79
77.5	46,153		0.0000	1.0000	94.79
78.5	46,125		0.0000	1.0000	94.79

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

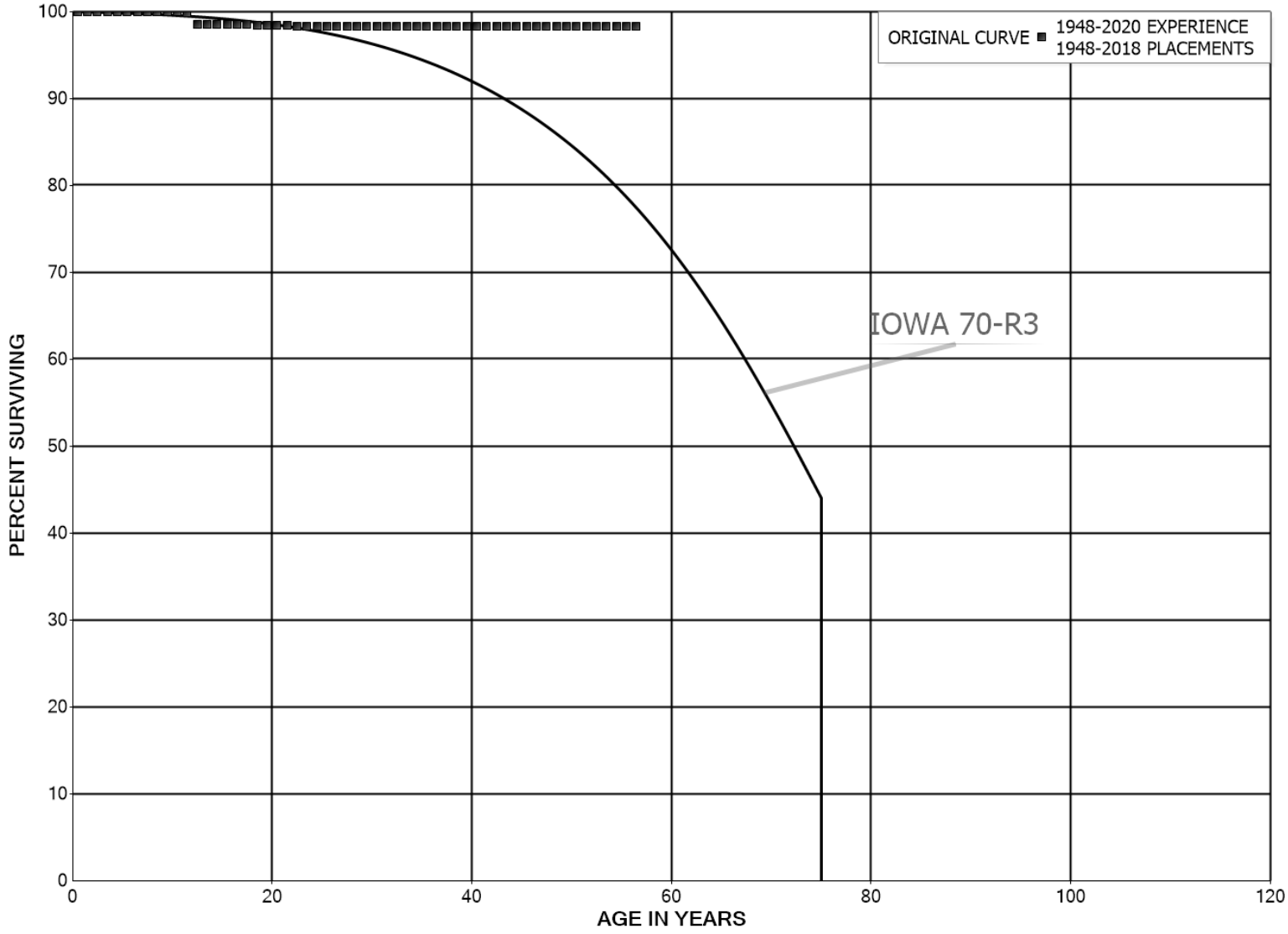
ACCOUNT 217.00 SEDIMENTATION BASINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	45,506		0.0000	1.0000	94.79
80.5	42,868		0.0000	1.0000	94.79
81.5	42,690		0.0000	1.0000	94.79
82.5	42,687		0.0000	1.0000	94.79
83.5	42,629		0.0000	1.0000	94.79
84.5	42,629		0.0000	1.0000	94.79
85.5	42,629		0.0000	1.0000	94.79
86.5	39,618		0.0000	1.0000	94.79
87.5	39,440		0.0000	1.0000	94.79
88.5					94.79

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 219.00 FILTERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 219.00 FILTERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1948-2018 EXPERIENCE BAND 1948-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	5,941,956		0.0000	1.0000	100.00
0.5	5,941,956		0.0000	1.0000	100.00
1.5	5,941,956		0.0000	1.0000	100.00
2.5	3,315,759		0.0000	1.0000	100.00
3.5	3,315,759		0.0000	1.0000	100.00
4.5	671,756		0.0000	1.0000	100.00
5.5	671,756		0.0000	1.0000	100.00
6.5	671,756		0.0000	1.0000	100.00
7.5	671,756		0.0000	1.0000	100.00
8.5	671,756	521	0.0008	0.9992	100.00
9.5	671,235		0.0000	1.0000	99.92
10.5	671,235	330	0.0005	0.9995	99.92
11.5	670,905	9,331	0.0139	0.9861	99.87
12.5	661,574		0.0000	1.0000	98.48
13.5	661,574		0.0000	1.0000	98.48
14.5	655,288		0.0000	1.0000	98.48
15.5	655,288		0.0000	1.0000	98.48
16.5	655,288		0.0000	1.0000	98.48
17.5	655,288	897	0.0014	0.9986	98.48
18.5	651,808		0.0000	1.0000	98.35
19.5	651,808		0.0000	1.0000	98.35
20.5	651,808		0.0000	1.0000	98.35
21.5	651,808	508	0.0008	0.9992	98.35
22.5	651,300		0.0000	1.0000	98.27
23.5	651,300		0.0000	1.0000	98.27
24.5	651,300		0.0000	1.0000	98.27
25.5	651,300		0.0000	1.0000	98.27
26.5	651,300		0.0000	1.0000	98.27
27.5	651,300		0.0000	1.0000	98.27
28.5	718,746		0.0000	1.0000	98.27
29.5	718,746		0.0000	1.0000	98.27
30.5	718,746		0.0000	1.0000	98.27
31.5	673,906		0.0000	1.0000	98.27
32.5	673,906		0.0000	1.0000	98.27
33.5	525,820		0.0000	1.0000	98.27
34.5	275,278		0.0000	1.0000	98.27
35.5	275,278		0.0000	1.0000	98.27
36.5	275,278		0.0000	1.0000	98.27
37.5	275,278		0.0000	1.0000	98.27
38.5	275,278		0.0000	1.0000	98.27

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

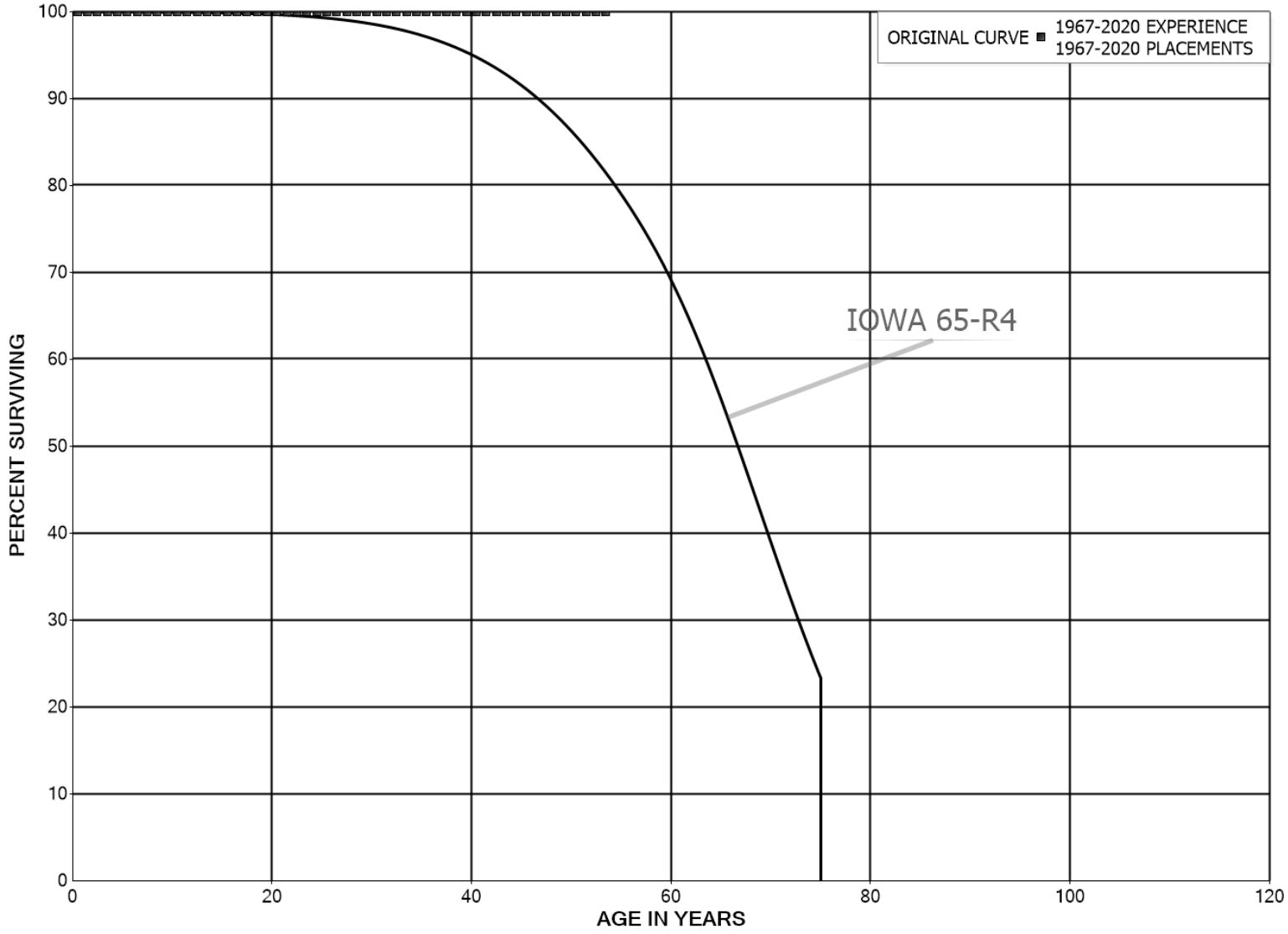
ACCOUNT 219.00 FILTERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1948-2018 EXPERIENCE BAND 1948-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	271,220		0.0000	1.0000	98.27
40.5	271,220		0.0000	1.0000	98.27
41.5	271,220		0.0000	1.0000	98.27
42.5	271,220		0.0000	1.0000	98.27
43.5	271,220		0.0000	1.0000	98.27
44.5	271,220		0.0000	1.0000	98.27
45.5	271,220		0.0000	1.0000	98.27
46.5	271,220		0.0000	1.0000	98.27
47.5	271,220		0.0000	1.0000	98.27
48.5	223,877		0.0000	1.0000	98.27
49.5	223,877		0.0000	1.0000	98.27
50.5	223,877		0.0000	1.0000	98.27
51.5	223,877		0.0000	1.0000	98.27
52.5	223,877		0.0000	1.0000	98.27
53.5	103,588		0.0000	1.0000	98.27
54.5	103,588		0.0000	1.0000	98.27
55.5	103,588		0.0000	1.0000	98.27
56.5	29,878		0.0000	1.0000	98.27
57.5	29,878		0.0000	1.0000	98.27
58.5	29,878		0.0000	1.0000	98.27
59.5	29,878		0.0000	1.0000	98.27
60.5	29,878		0.0000	1.0000	98.27
61.5	29,878		0.0000	1.0000	98.27
62.5	29,878		0.0000	1.0000	98.27
63.5	29,798		0.0000	1.0000	98.27
64.5	27,019		0.0000	1.0000	98.27
65.5	27,019		0.0000	1.0000	98.27
66.5	27,019		0.0000	1.0000	98.27
67.5	27,019		0.0000	1.0000	98.27
68.5	27,019		0.0000	1.0000	98.27
69.5	27,019		0.0000	1.0000	98.27
70.5	27,019		0.0000	1.0000	98.27
71.5	27,019		0.0000	1.0000	98.27
72.5					98.27

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 220.00 CLEAR WATER BASIN AND CLEARWELL
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 220.00 CLEAR WATER BASIN AND CLEARWELL

ORIGINAL LIFE TABLE

PLACEMENT BAND 1967-2020 EXPERIENCE BAND 1967-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	514,266		0.0000	1.0000	100.00
0.5	457,134		0.0000	1.0000	100.00
1.5	457,134		0.0000	1.0000	100.00
2.5	194,514		0.0000	1.0000	100.00
3.5	194,514		0.0000	1.0000	100.00
4.5	62,314		0.0000	1.0000	100.00
5.5	62,314		0.0000	1.0000	100.00
6.5	62,314		0.0000	1.0000	100.00
7.5	61,627		0.0000	1.0000	100.00
8.5	61,627		0.0000	1.0000	100.00
9.5	61,627		0.0000	1.0000	100.00
10.5	61,627		0.0000	1.0000	100.00
11.5	61,627		0.0000	1.0000	100.00
12.5	61,627		0.0000	1.0000	100.00
13.5	61,627		0.0000	1.0000	100.00
14.5	61,627		0.0000	1.0000	100.00
15.5	61,627		0.0000	1.0000	100.00
16.5	56,565		0.0000	1.0000	100.00
17.5	56,565		0.0000	1.0000	100.00
18.5	56,565		0.0000	1.0000	100.00
19.5	56,565		0.0000	1.0000	100.00
20.5	56,565		0.0000	1.0000	100.00
21.5	56,565		0.0000	1.0000	100.00
22.5	56,565		0.0000	1.0000	100.00
23.5	56,565		0.0000	1.0000	100.00
24.5	56,565		0.0000	1.0000	100.00
25.5	56,565		0.0000	1.0000	100.00
26.5	56,565		0.0000	1.0000	100.00
27.5	56,565		0.0000	1.0000	100.00
28.5	56,565		0.0000	1.0000	100.00
29.5	56,565		0.0000	1.0000	100.00
30.5	56,565		0.0000	1.0000	100.00
31.5	56,565		0.0000	1.0000	100.00
32.5	56,565		0.0000	1.0000	100.00
33.5	56,565		0.0000	1.0000	100.00
34.5	56,565		0.0000	1.0000	100.00
35.5	56,565		0.0000	1.0000	100.00
36.5	3,201		0.0000	1.0000	100.00
37.5	3,201		0.0000	1.0000	100.00
38.5	3,201		0.0000	1.0000	100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

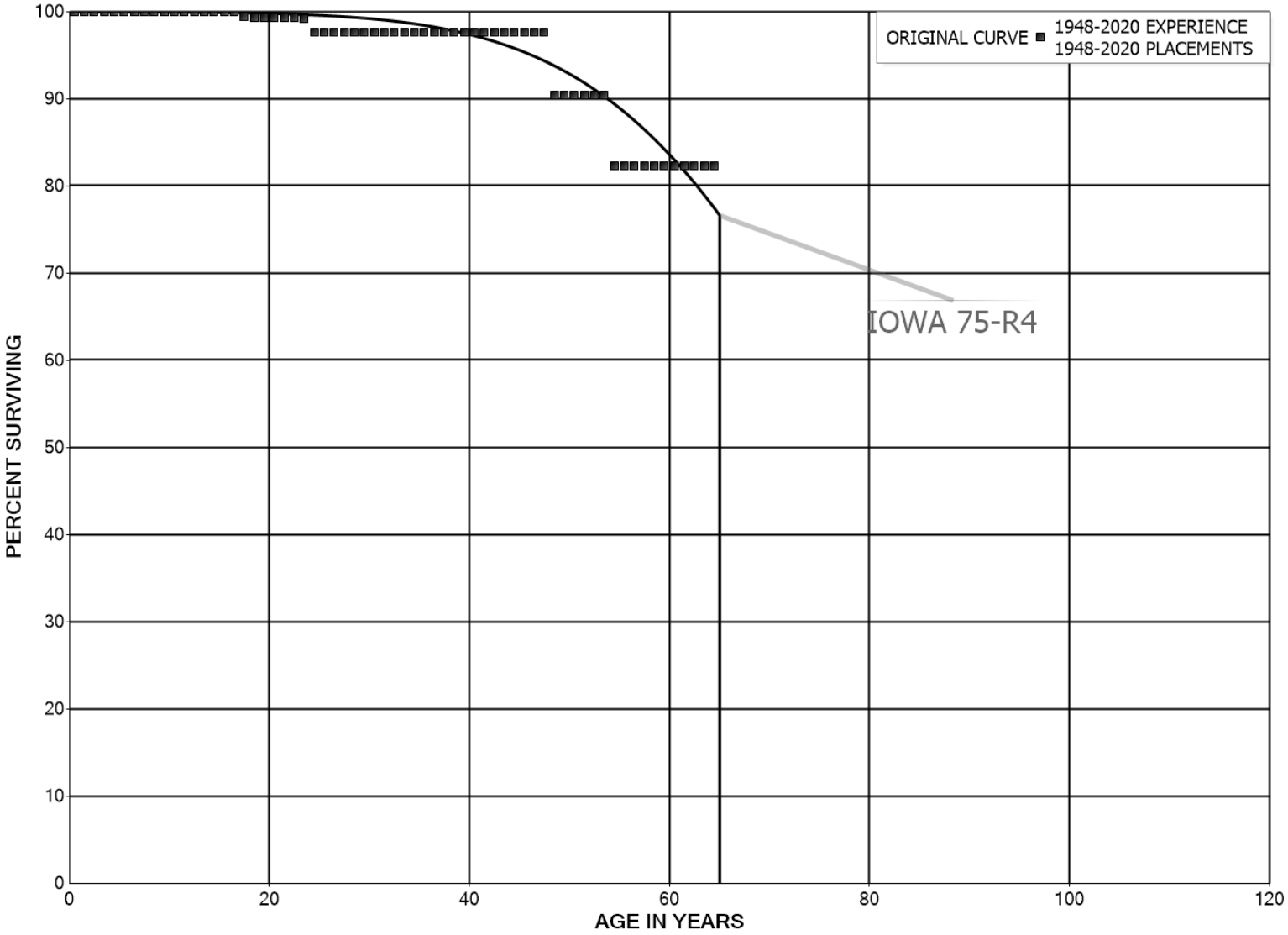
ACCOUNT 220.00 CLEAR WATER BASIN AND CLEARWELL

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1967-2020 EXPERIENCE BAND 1967-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	3,201		0.0000	1.0000	100.00
40.5	3,201		0.0000	1.0000	100.00
41.5	3,201		0.0000	1.0000	100.00
42.5	3,201		0.0000	1.0000	100.00
43.5	3,201		0.0000	1.0000	100.00
44.5	3,201		0.0000	1.0000	100.00
45.5	3,201		0.0000	1.0000	100.00
46.5	3,201		0.0000	1.0000	100.00
47.5	3,201		0.0000	1.0000	100.00
48.5	3,201		0.0000	1.0000	100.00
49.5	3,201		0.0000	1.0000	100.00
50.5	3,201		0.0000	1.0000	100.00
51.5	3,201		0.0000	1.0000	100.00
52.5	2,282		0.0000	1.0000	100.00
53.5					100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - CHEMICAL BUILDING
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - CHEMICAL BUILDING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1948-2020 EXPERIENCE BAND 1948-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,470,031		0.0000	1.0000	100.00
0.5	2,447,112		0.0000	1.0000	100.00
1.5	2,447,112		0.0000	1.0000	100.00
2.5	2,270,945		0.0000	1.0000	100.00
3.5	2,270,945		0.0000	1.0000	100.00
4.5	287,943		0.0000	1.0000	100.00
5.5	287,943		0.0000	1.0000	100.00
6.5	287,943		0.0000	1.0000	100.00
7.5	287,943		0.0000	1.0000	100.00
8.5	247,060		0.0000	1.0000	100.00
9.5	238,417		0.0000	1.0000	100.00
10.5	238,417		0.0000	1.0000	100.00
11.5	238,417		0.0000	1.0000	100.00
12.5	227,418		0.0000	1.0000	100.00
13.5	218,268		0.0000	1.0000	100.00
14.5	218,268		0.0000	1.0000	100.00
15.5	208,830		0.0000	1.0000	100.00
16.5	202,707	1,321	0.0065	0.9935	100.00
17.5	198,228	170	0.0009	0.9991	99.35
18.5	198,058		0.0000	1.0000	99.26
19.5	198,058		0.0000	1.0000	99.26
20.5	194,022		0.0000	1.0000	99.26
21.5	194,022		0.0000	1.0000	99.26
22.5	194,022	115	0.0006	0.9994	99.26
23.5	193,155	3,192	0.0165	0.9835	99.20
24.5	189,963		0.0000	1.0000	97.56
25.5	184,953		0.0000	1.0000	97.56
26.5	183,851		0.0000	1.0000	97.56
27.5	183,851		0.0000	1.0000	97.56
28.5	189,771		0.0000	1.0000	97.56
29.5	189,771		0.0000	1.0000	97.56
30.5	174,434		0.0000	1.0000	97.56
31.5	174,434		0.0000	1.0000	97.56
32.5	131,221		0.0000	1.0000	97.56
33.5	131,221		0.0000	1.0000	97.56
34.5	131,221		0.0000	1.0000	97.56
35.5	131,221		0.0000	1.0000	97.56
36.5	131,221		0.0000	1.0000	97.56
37.5	131,221		0.0000	1.0000	97.56
38.5	131,221		0.0000	1.0000	97.56

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

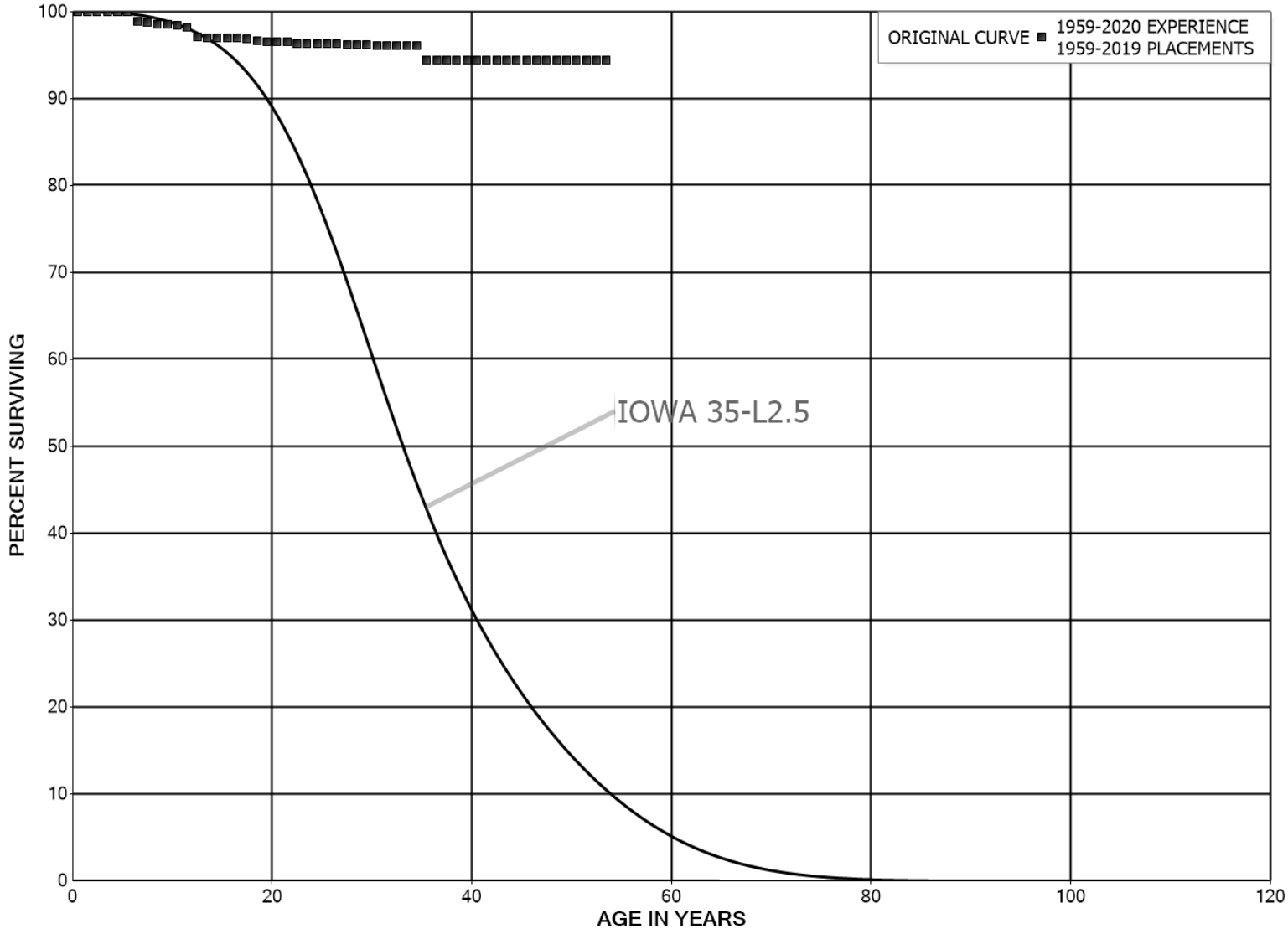
ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - CHEMICAL BUILDING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1948-2020 EXPERIENCE BAND 1948-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	131,221		0.0000	1.0000	97.56
40.5	126,533		0.0000	1.0000	97.56
41.5	126,533		0.0000	1.0000	97.56
42.5	126,533		0.0000	1.0000	97.56
43.5	126,533		0.0000	1.0000	97.56
44.5	126,533		0.0000	1.0000	97.56
45.5	125,843		0.0000	1.0000	97.56
46.5	125,376		0.0000	1.0000	97.56
47.5	102,342	7,500	0.0733	0.9267	97.56
48.5	81,156		0.0000	1.0000	90.41
49.5	80,535		0.0000	1.0000	90.41
50.5	80,535		0.0000	1.0000	90.41
51.5	80,535		0.0000	1.0000	90.41
52.5	80,535		0.0000	1.0000	90.41
53.5	80,535	7,253	0.0901	0.9099	90.41
54.5	73,282		0.0000	1.0000	82.27
55.5	73,282		0.0000	1.0000	82.27
56.5	67,290		0.0000	1.0000	82.27
57.5	67,290		0.0000	1.0000	82.27
58.5	67,290		0.0000	1.0000	82.27
59.5	66,596		0.0000	1.0000	82.27
60.5	66,302		0.0000	1.0000	82.27
61.5	66,302		0.0000	1.0000	82.27
62.5	66,302		0.0000	1.0000	82.27
63.5	66,302		0.0000	1.0000	82.27
64.5	66,302		0.0000	1.0000	82.27
65.5	66,302		0.0000	1.0000	82.27
66.5	66,302		0.0000	1.0000	82.27
67.5	66,302		0.0000	1.0000	82.27
68.5	66,302		0.0000	1.0000	82.27
69.5	66,302		0.0000	1.0000	82.27
70.5	66,302		0.0000	1.0000	82.27
71.5	66,302		0.0000	1.0000	82.27
72.5					82.27

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - CHEMICAL TREATMENT EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - CHEMICAL TREATMENT EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1959-2019 EXPERIENCE BAND 1959-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	9,134,349		0.0000	1.0000	100.00
0.5	9,137,475		0.0000	1.0000	100.00
1.5	9,098,402		0.0000	1.0000	100.00
2.5	5,158,139		0.0000	1.0000	100.00
3.5	5,154,647		0.0000	1.0000	100.00
4.5	2,110,085		0.0000	1.0000	100.00
5.5	2,110,085	24,417	0.0116	0.9884	100.00
6.5	2,085,668	1,835	0.0009	0.9991	98.84
7.5	2,083,833	5,172	0.0025	0.9975	98.76
8.5	2,408,778		0.0000	1.0000	98.51
9.5	2,405,550	2,295	0.0010	0.9990	98.51
10.5	2,401,958	7,199	0.0030	0.9970	98.42
11.5	2,382,322	24,929	0.0105	0.9895	98.12
12.5	2,353,527	3,325	0.0014	0.9986	97.10
13.5	2,348,665		0.0000	1.0000	96.96
14.5	2,344,215	302	0.0001	0.9999	96.96
15.5	2,343,913		0.0000	1.0000	96.95
16.5	2,342,340	3,596	0.0015	0.9985	96.95
17.5	2,336,854	5,338	0.0023	0.9977	96.80
18.5	2,331,515	1,258	0.0005	0.9995	96.58
19.5	2,308,959		0.0000	1.0000	96.52
20.5	2,308,959		0.0000	1.0000	96.52
21.5	2,299,494	5,729	0.0025	0.9975	96.52
22.5	2,277,994		0.0000	1.0000	96.28
23.5	2,277,994		0.0000	1.0000	96.28
24.5	2,247,197	803	0.0004	0.9996	96.28
25.5	2,246,394		0.0000	1.0000	96.25
26.5	2,235,706	996	0.0004	0.9996	96.25
27.5	2,095,990		0.0000	1.0000	96.21
28.5	2,097,160		0.0000	1.0000	96.21
29.5	2,067,593	2,032	0.0010	0.9990	96.21
30.5	2,065,561		0.0000	1.0000	96.11
31.5	2,046,683		0.0000	1.0000	96.11
32.5	2,046,683		0.0000	1.0000	96.11
33.5	1,701,078		0.0000	1.0000	96.11
34.5	936,777	16,924	0.0181	0.9819	96.11
35.5	884,524		0.0000	1.0000	94.37
36.5	491,203		0.0000	1.0000	94.37
37.5	464,022		0.0000	1.0000	94.37
38.5	460,857		0.0000	1.0000	94.37

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

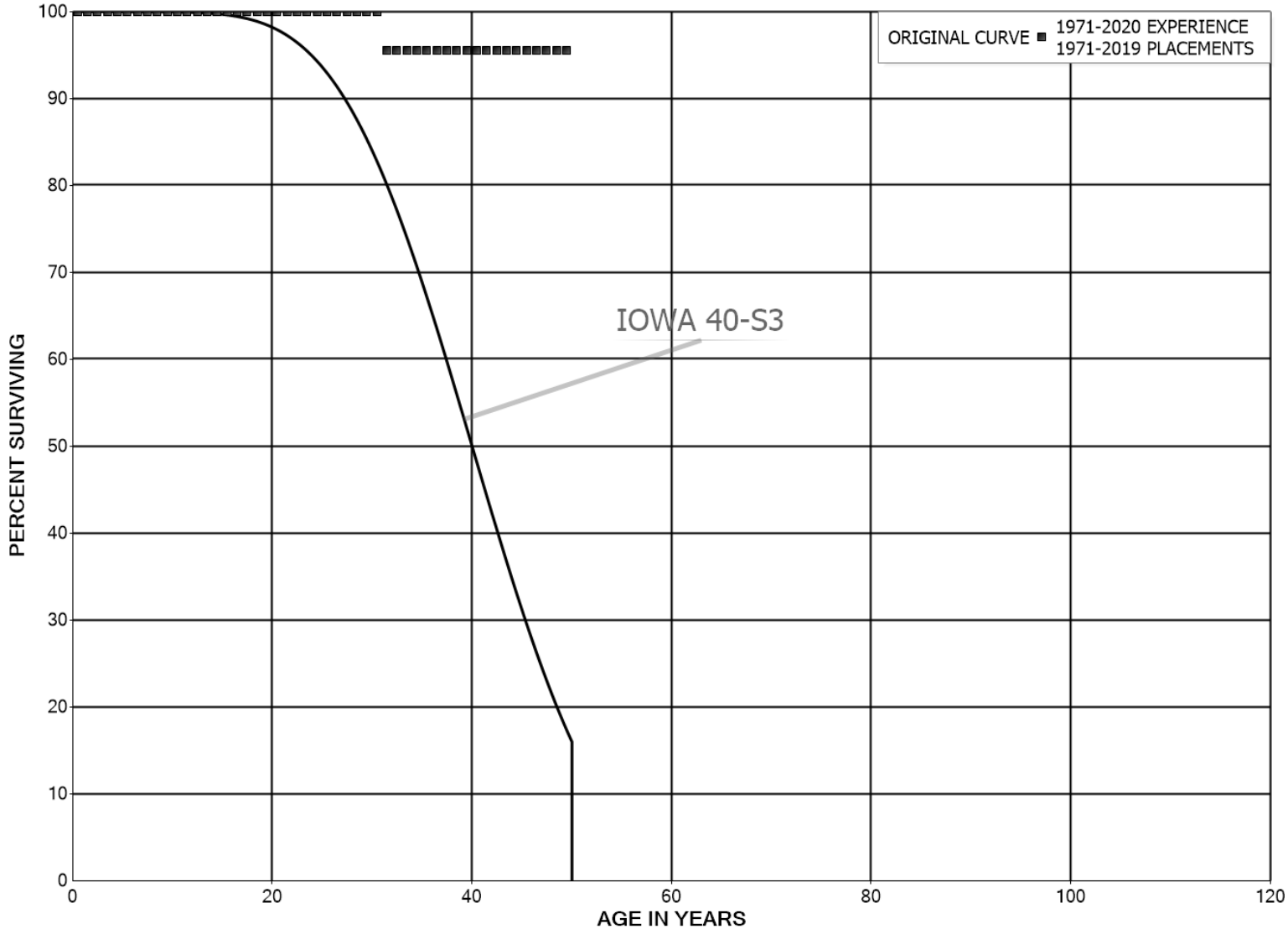
ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - CHEMICAL TREATMENT EQUIPMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1959-2019 EXPERIENCE BAND 1959-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	460,857		0.0000	1.0000	94.37
40.5	458,806		0.0000	1.0000	94.37
41.5	458,806		0.0000	1.0000	94.37
42.5	454,891		0.0000	1.0000	94.37
43.5	451,184		0.0000	1.0000	94.37
44.5	443,386		0.0000	1.0000	94.37
45.5	443,386		0.0000	1.0000	94.37
46.5	443,386		0.0000	1.0000	94.37
47.5	438,035		0.0000	1.0000	94.37
48.5	434,334		0.0000	1.0000	94.37
49.5	433,767		0.0000	1.0000	94.37
50.5	421,712		0.0000	1.0000	94.37
51.5	417,198		0.0000	1.0000	94.37
52.5	417,198		0.0000	1.0000	94.37
53.5	2,473		0.0000	1.0000	94.37
54.5	2,417		0.0000	1.0000	94.37
55.5	2,139		0.0000	1.0000	94.37
56.5	969		0.0000	1.0000	94.37
57.5	969		0.0000	1.0000	94.37
58.5	969		0.0000	1.0000	94.37
59.5	969		0.0000	1.0000	94.37
60.5	969		0.0000	1.0000	94.37
61.5					94.37

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - PARR'S HILL CHLORINATION FACILITY
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - PARR'S HILL CHLORINATION FACILITY

ORIGINAL LIFE TABLE

PLACEMENT BAND 1971-2019 EXPERIENCE BAND 1971-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	135,178		0.0000	1.0000	100.00
0.5	138,902		0.0000	1.0000	100.00
1.5	137,436		0.0000	1.0000	100.00
2.5	133,944		0.0000	1.0000	100.00
3.5	133,944		0.0000	1.0000	100.00
4.5	133,944		0.0000	1.0000	100.00
5.5	133,944		0.0000	1.0000	100.00
6.5	133,944		0.0000	1.0000	100.00
7.5	133,944		0.0000	1.0000	100.00
8.5	133,944		0.0000	1.0000	100.00
9.5	133,944		0.0000	1.0000	100.00
10.5	133,944		0.0000	1.0000	100.00
11.5	133,944		0.0000	1.0000	100.00
12.5	133,944		0.0000	1.0000	100.00
13.5	133,944		0.0000	1.0000	100.00
14.5	133,944		0.0000	1.0000	100.00
15.5	133,944		0.0000	1.0000	100.00
16.5	133,944		0.0000	1.0000	100.00
17.5	133,944		0.0000	1.0000	100.00
18.5	133,944		0.0000	1.0000	100.00
19.5	133,944		0.0000	1.0000	100.00
20.5	133,944		0.0000	1.0000	100.00
21.5	133,944		0.0000	1.0000	100.00
22.5	133,944		0.0000	1.0000	100.00
23.5	133,944		0.0000	1.0000	100.00
24.5	133,944		0.0000	1.0000	100.00
25.5	133,944		0.0000	1.0000	100.00
26.5	133,944		0.0000	1.0000	100.00
27.5	133,944		0.0000	1.0000	100.00
28.5	133,944		0.0000	1.0000	100.00
29.5	133,944		0.0000	1.0000	100.00
30.5	133,944	6,044	0.0451	0.9549	100.00
31.5	127,900		0.0000	1.0000	95.49
32.5	127,900		0.0000	1.0000	95.49
33.5	127,900		0.0000	1.0000	95.49
34.5	127,900		0.0000	1.0000	95.49
35.5	127,900		0.0000	1.0000	95.49
36.5	127,900		0.0000	1.0000	95.49
37.5	103,375		0.0000	1.0000	95.49
38.5	103,375		0.0000	1.0000	95.49

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

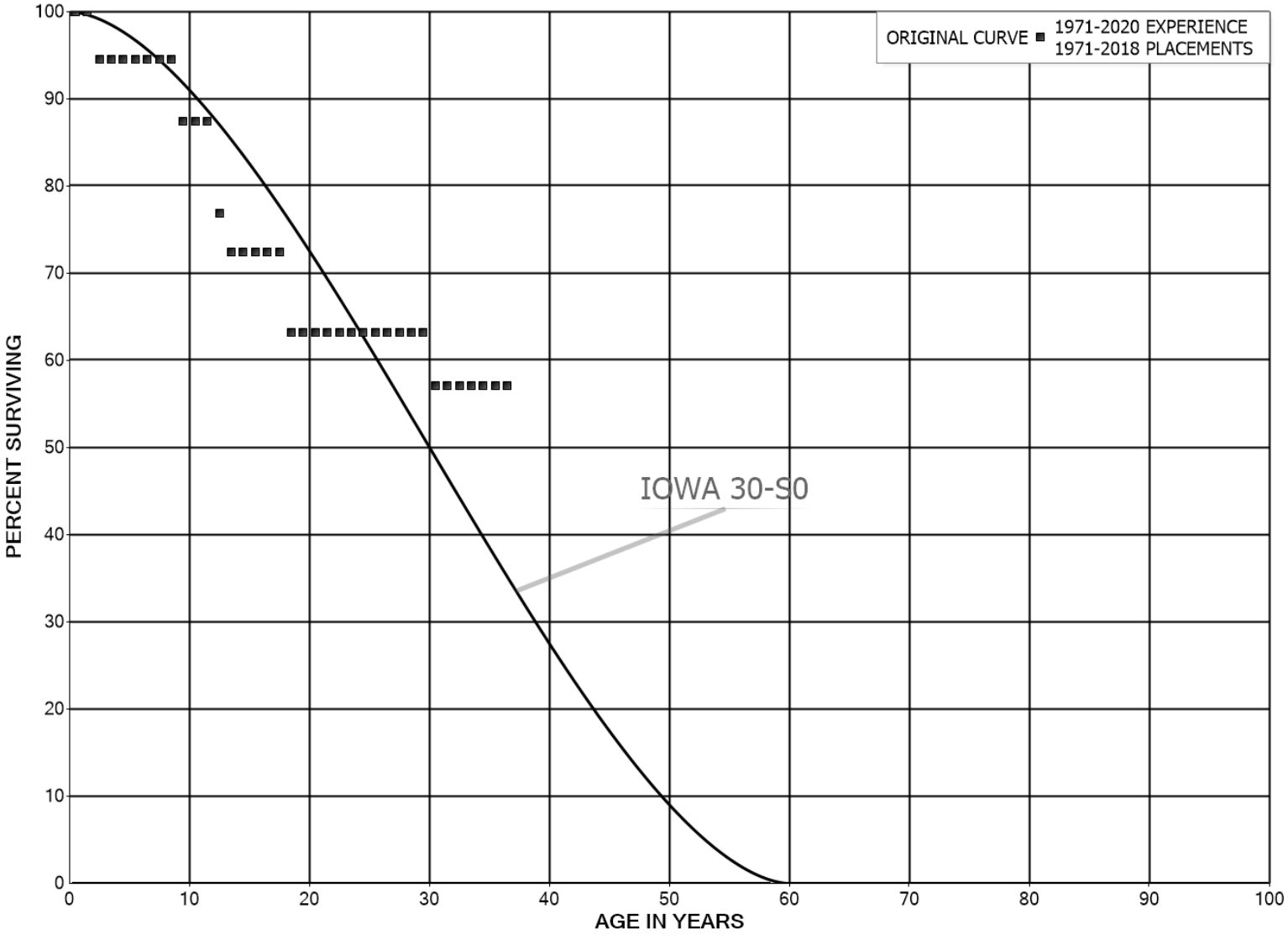
ACCOUNT 223.00 CHEMICAL TREATMENT PLANT - PARR'S HILL CHLORINATION FACILITY

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1971-2019 EXPERIENCE BAND 1971-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	103,375		0.0000	1.0000	95.49
40.5	103,375		0.0000	1.0000	95.49
41.5	103,375		0.0000	1.0000	95.49
42.5	103,375		0.0000	1.0000	95.49
43.5	103,375		0.0000	1.0000	95.49
44.5	103,375		0.0000	1.0000	95.49
45.5	103,375		0.0000	1.0000	95.49
46.5	54,606		0.0000	1.0000	95.49
47.5	32,973		0.0000	1.0000	95.49
48.5	27,883		0.0000	1.0000	95.49
49.5					95.49

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 224.00 LABORATORY EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 224.00 LABORATORY EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1971-2018 EXPERIENCE BAND 1971-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	44,707		0.0000	1.0000	100.00
0.5	44,707		0.0000	1.0000	100.00
1.5	44,707	2,455	0.0549	0.9451	100.00
2.5	36,174		0.0000	1.0000	94.51
3.5	29,059		0.0000	1.0000	94.51
4.5	29,059		0.0000	1.0000	94.51
5.5	29,059		0.0000	1.0000	94.51
6.5	29,059		0.0000	1.0000	94.51
7.5	29,059		0.0000	1.0000	94.51
8.5	29,059	2,183	0.0751	0.9249	94.51
9.5	26,876		0.0000	1.0000	87.41
10.5	26,876		0.0000	1.0000	87.41
11.5	26,876	3,266	0.1215	0.8785	87.41
12.5	23,610	1,358	0.0575	0.9425	76.79
13.5	22,252		0.0000	1.0000	72.37
14.5	22,252		0.0000	1.0000	72.37
15.5	22,252		0.0000	1.0000	72.37
16.5	22,252		0.0000	1.0000	72.37
17.5	22,252	2,836	0.1275	0.8725	72.37
18.5	19,416		0.0000	1.0000	63.15
19.5	17,196		0.0000	1.0000	63.15
20.5	16,828		0.0000	1.0000	63.15
21.5	16,828		0.0000	1.0000	63.15
22.5	16,828		0.0000	1.0000	63.15
23.5	15,457		0.0000	1.0000	63.15
24.5	15,457		0.0000	1.0000	63.15
25.5	13,552		0.0000	1.0000	63.15
26.5	12,611		0.0000	1.0000	63.15
27.5	12,611		0.0000	1.0000	63.15
28.5	12,611		0.0000	1.0000	63.15
29.5	12,611	1,216	0.0964	0.9036	63.15
30.5	11,395		0.0000	1.0000	57.06
31.5	11,395		0.0000	1.0000	57.06
32.5	11,395		0.0000	1.0000	57.06
33.5	11,395		0.0000	1.0000	57.06
34.5	11,395		0.0000	1.0000	57.06
35.5	11,395		0.0000	1.0000	57.06
36.5	4,862		0.0000	1.0000	57.06
37.5	4,862		0.0000	1.0000	57.06
38.5	4,862		0.0000	1.0000	57.06

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

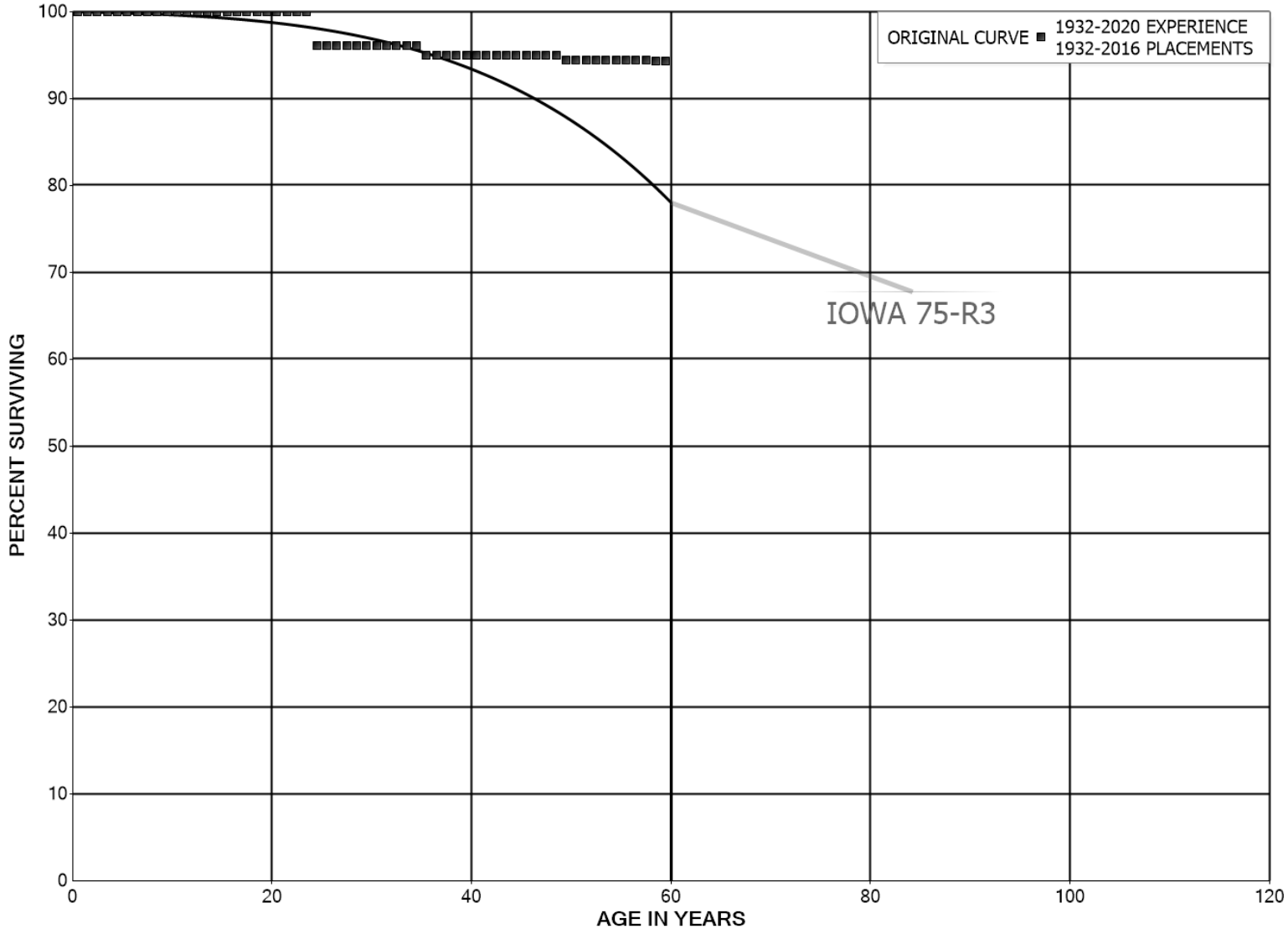
ACCOUNT 224.00 LABORATORY EQUIPMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1971-2018 EXPERIENCE BAND 1971-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	4,862		0.0000	1.0000	57.06
40.5	4,862		0.0000	1.0000	57.06
41.5	4,862		0.0000	1.0000	57.06
42.5	4,862		0.0000	1.0000	57.06
43.5	4,862		0.0000	1.0000	57.06
44.5	4,862		0.0000	1.0000	57.06
45.5	4,862		0.0000	1.0000	57.06
46.5	4,862		0.0000	1.0000	57.06
47.5	4,862		0.0000	1.0000	57.06
48.5	1,134		0.0000	1.0000	57.06
49.5					57.06

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2016 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	1,313,788		0.0000	1.0000	100.00
0.5	1,364,270		0.0000	1.0000	100.00
1.5	1,364,270		0.0000	1.0000	100.00
2.5	1,364,270		0.0000	1.0000	100.00
3.5	1,364,270		0.0000	1.0000	100.00
4.5	1,358,894		0.0000	1.0000	100.00
5.5	1,356,522		0.0000	1.0000	100.00
6.5	956,381		0.0000	1.0000	100.00
7.5	956,381		0.0000	1.0000	100.00
8.5	994,798		0.0000	1.0000	100.00
9.5	994,798		0.0000	1.0000	100.00
10.5	994,798		0.0000	1.0000	100.00
11.5	994,798		0.0000	1.0000	100.00
12.5	994,798		0.0000	1.0000	100.00
13.5	994,798		0.0000	1.0000	100.00
14.5	994,798		0.0000	1.0000	100.00
15.5	994,798		0.0000	1.0000	100.00
16.5	940,236		0.0000	1.0000	100.00
17.5	940,236		0.0000	1.0000	100.00
18.5	940,236		0.0000	1.0000	100.00
19.5	937,792		0.0000	1.0000	100.00
20.5	926,684		0.0000	1.0000	100.00
21.5	926,684		0.0000	1.0000	100.00
22.5	926,684		0.0000	1.0000	100.00
23.5	926,684	36,856	0.0398	0.9602	100.00
24.5	889,828		0.0000	1.0000	96.02
25.5	849,109		0.0000	1.0000	96.02
26.5	615,679		0.0000	1.0000	96.02
27.5	429,797		0.0000	1.0000	96.02
28.5	273,274		0.0000	1.0000	96.02
29.5	255,999		0.0000	1.0000	96.02
30.5	247,394		0.0000	1.0000	96.02
31.5	242,980		0.0000	1.0000	96.02
32.5	242,980		0.0000	1.0000	96.02
33.5	242,980		0.0000	1.0000	96.02
34.5	241,118	2,627	0.0109	0.9891	96.02
35.5	169,143		0.0000	1.0000	94.98
36.5	62,219		0.0000	1.0000	94.98
37.5	62,219		0.0000	1.0000	94.98
38.5	62,219		0.0000	1.0000	94.98

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2016 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	61,274		0.0000	1.0000	94.98
40.5	61,274		0.0000	1.0000	94.98
41.5	61,274		0.0000	1.0000	94.98
42.5	61,274		0.0000	1.0000	94.98
43.5	61,274		0.0000	1.0000	94.98
44.5	61,274		0.0000	1.0000	94.98
45.5	61,274		0.0000	1.0000	94.98
46.5	61,274		0.0000	1.0000	94.98
47.5	61,274		0.0000	1.0000	94.98
48.5	61,274	363	0.0059	0.9941	94.98
49.5	60,911		0.0000	1.0000	94.41
50.5	60,911		0.0000	1.0000	94.41
51.5	60,911	7	0.0001	0.9999	94.41
52.5	60,522		0.0000	1.0000	94.40
53.5	34,458		0.0000	1.0000	94.40
54.5	34,445		0.0000	1.0000	94.40
55.5	34,439		0.0000	1.0000	94.40
56.5	33,207		0.0000	1.0000	94.40
57.5	33,207	35	0.0011	0.9989	94.40
58.5	33,172		0.0000	1.0000	94.30
59.5	32,924	10	0.0003	0.9997	94.30
60.5	32,914		0.0000	1.0000	94.27
61.5	32,914		0.0000	1.0000	94.27
62.5	32,914		0.0000	1.0000	94.27
63.5	32,914		0.0000	1.0000	94.27
64.5	32,914		0.0000	1.0000	94.27
65.5	32,914		0.0000	1.0000	94.27
66.5	32,914	2,237	0.0680	0.9320	94.27
67.5	30,677		0.0000	1.0000	87.87
68.5	30,677		0.0000	1.0000	87.87
69.5	30,677		0.0000	1.0000	87.87
70.5	30,677		0.0000	1.0000	87.87
71.5	30,645		0.0000	1.0000	87.87
72.5	6,531		0.0000	1.0000	87.87
73.5	6,198		0.0000	1.0000	87.87
74.5	6,198		0.0000	1.0000	87.87
75.5	6,198		0.0000	1.0000	87.87
76.5	6,198		0.0000	1.0000	87.87
77.5	6,198		0.0000	1.0000	87.87
78.5	6,198		0.0000	1.0000	87.87

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

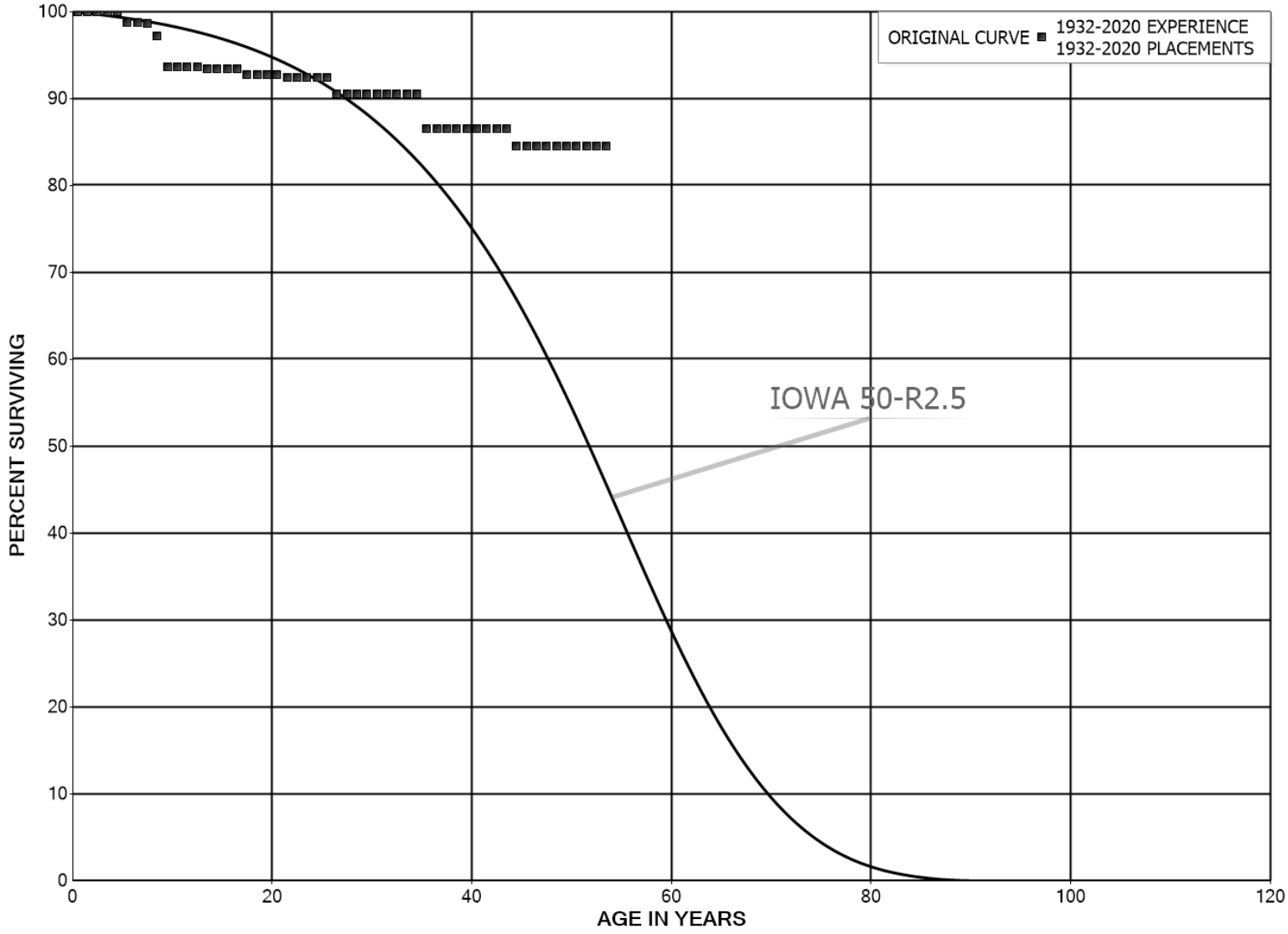
ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2016 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	6,198		0.0000	1.0000	87.87
80.5	6,198		0.0000	1.0000	87.87
81.5	6,198		0.0000	1.0000	87.87
82.5	6,198		0.0000	1.0000	87.87
83.5	5,452		0.0000	1.0000	87.87
84.5	5,452		0.0000	1.0000	87.87
85.5	5,452		0.0000	1.0000	87.87
86.5	5,249		0.0000	1.0000	87.87
87.5	5,249		0.0000	1.0000	87.87
88.5					87.87

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 237.00 PUMPS AND PUMPING EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 237.00 PUMPS AND PUMPING EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,274,761		0.0000	1.0000	100.00
0.5	2,287,174		0.0000	1.0000	100.00
1.5	2,287,174		0.0000	1.0000	100.00
2.5	2,287,174		0.0000	1.0000	100.00
3.5	2,262,291		0.0000	1.0000	100.00
4.5	2,262,291	27,770	0.0123	0.9877	100.00
5.5	2,232,148	446	0.0002	0.9998	98.77
6.5	993,662	933	0.0009	0.9991	98.75
7.5	992,377	15,199	0.0153	0.9847	98.66
8.5	977,178	35,580	0.0364	0.9636	97.15
9.5	940,681		0.0000	1.0000	93.61
10.5	940,681		0.0000	1.0000	93.61
11.5	939,089	360	0.0004	0.9996	93.61
12.5	938,730	2,299	0.0024	0.9976	93.58
13.5	936,431		0.0000	1.0000	93.35
14.5	767,945		0.0000	1.0000	93.35
15.5	651,299		0.0000	1.0000	93.35
16.5	651,299	4,094	0.0063	0.9937	93.35
17.5	642,942	440	0.0007	0.9993	92.76
18.5	642,502		0.0000	1.0000	92.70
19.5	640,614		0.0000	1.0000	92.70
20.5	604,786	1,931	0.0032	0.9968	92.70
21.5	598,606		0.0000	1.0000	92.40
22.5	598,606		0.0000	1.0000	92.40
23.5	598,606		0.0000	1.0000	92.40
24.5	598,606		0.0000	1.0000	92.40
25.5	551,497	11,156	0.0202	0.9798	92.40
26.5	350,746	84	0.0002	0.9998	90.53
27.5	247,562		0.0000	1.0000	90.51
28.5	115,693		0.0000	1.0000	90.51
29.5	101,491		0.0000	1.0000	90.51
30.5	91,709		0.0000	1.0000	90.51
31.5	87,296		0.0000	1.0000	90.51
32.5	87,296		0.0000	1.0000	90.51
33.5	87,296	35	0.0004	0.9996	90.51
34.5	87,261	3,800	0.0436	0.9564	90.47
35.5	83,461		0.0000	1.0000	86.53
36.5	76,725		0.0000	1.0000	86.53
37.5	74,693		0.0000	1.0000	86.53
38.5	74,371		0.0000	1.0000	86.53

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

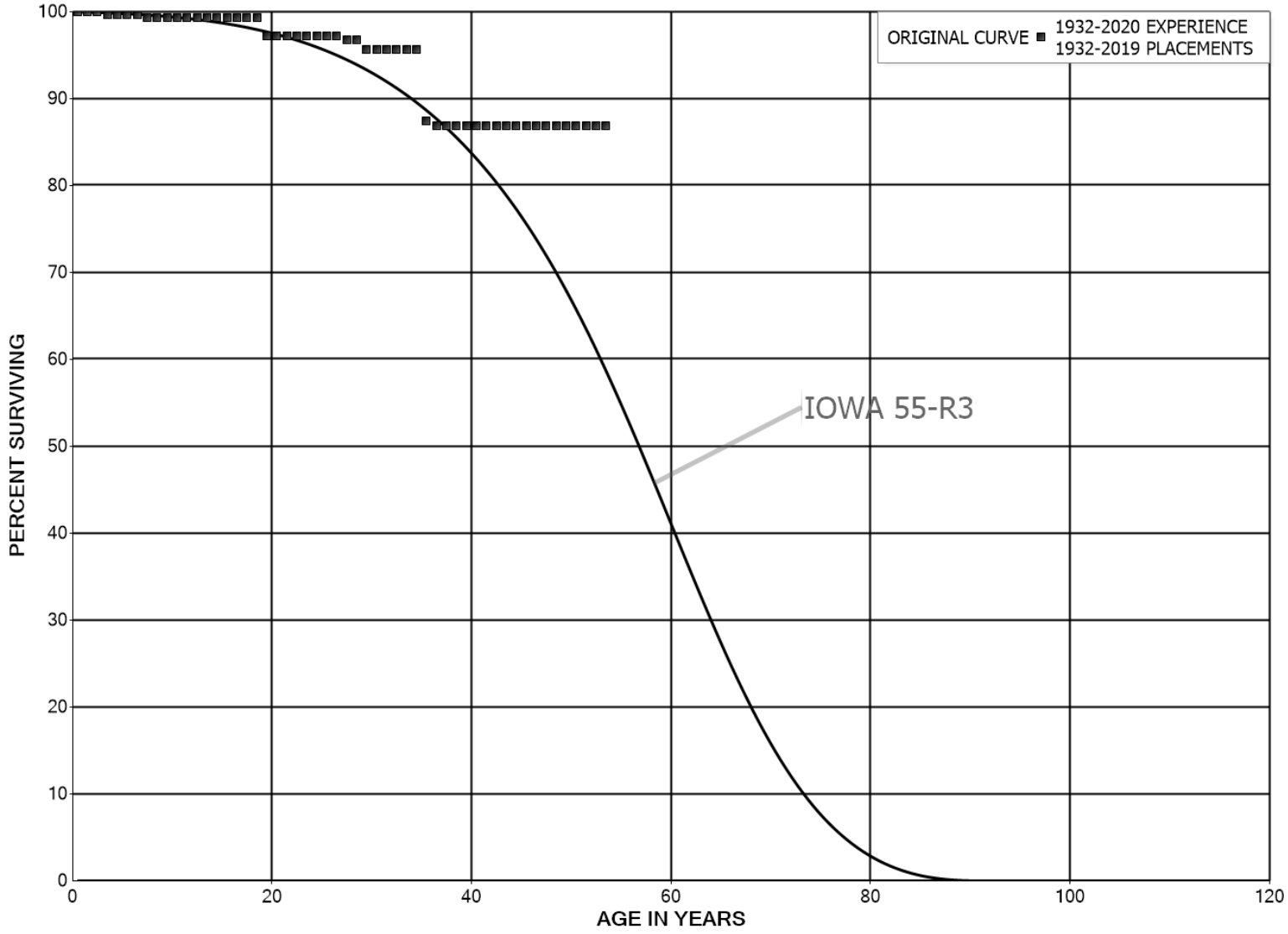
ACCOUNT 237.00 PUMPS AND PUMPING EQUIPMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	73,933		0.0000	1.0000	86.53
40.5	73,933		0.0000	1.0000	86.53
41.5	73,933		0.0000	1.0000	86.53
42.5	73,933		0.0000	1.0000	86.53
43.5	73,933	1,745	0.0236	0.9764	86.53
44.5	48,279		0.0000	1.0000	84.49
45.5	45,380		0.0000	1.0000	84.49
46.5	45,380		0.0000	1.0000	84.49
47.5	45,380		0.0000	1.0000	84.49
48.5	45,380		0.0000	1.0000	84.49
49.5	45,380		0.0000	1.0000	84.49
50.5	45,380		0.0000	1.0000	84.49
51.5	45,302		0.0000	1.0000	84.49
52.5	45,302		0.0000	1.0000	84.49
53.5	10,505		0.0000	1.0000	84.49
54.5	10,505		0.0000	1.0000	84.49
55.5	10,505		0.0000	1.0000	84.49
56.5	5,371		0.0000	1.0000	84.49
57.5	5,370		0.0000	1.0000	84.49
58.5	5,370		0.0000	1.0000	84.49
59.5	5,370		0.0000	1.0000	84.49
60.5					84.49

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 242.00 ELECTRICAL EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 242.00 ELECTRICAL EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2019 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	1,013,439		0.0000	1.0000	100.00
0.5	1,022,601		0.0000	1.0000	100.00
1.5	1,019,461		0.0000	1.0000	100.00
2.5	830,315	3,215	0.0039	0.9961	100.00
3.5	827,100		0.0000	1.0000	99.61
4.5	400,956		0.0000	1.0000	99.61
5.5	400,956		0.0000	1.0000	99.61
6.5	400,956	1,215	0.0030	0.9970	99.61
7.5	399,741		0.0000	1.0000	99.31
8.5	399,741		0.0000	1.0000	99.31
9.5	399,741		0.0000	1.0000	99.31
10.5	399,741		0.0000	1.0000	99.31
11.5	399,741		0.0000	1.0000	99.31
12.5	399,741		0.0000	1.0000	99.31
13.5	399,741		0.0000	1.0000	99.31
14.5	399,741		0.0000	1.0000	99.31
15.5	399,741		0.0000	1.0000	99.31
16.5	184,243		0.0000	1.0000	99.31
17.5	184,243		0.0000	1.0000	99.31
18.5	96,448	2,064	0.0214	0.9786	99.31
19.5	94,384		0.0000	1.0000	97.19
20.5	94,384		0.0000	1.0000	97.19
21.5	94,384		0.0000	1.0000	97.19
22.5	94,384		0.0000	1.0000	97.19
23.5	94,384		0.0000	1.0000	97.19
24.5	94,384		0.0000	1.0000	97.19
25.5	94,384		0.0000	1.0000	97.19
26.5	94,384	400	0.0042	0.9958	97.19
27.5	93,984		0.0000	1.0000	96.77
28.5	98,261	1,200	0.0122	0.9878	96.77
29.5	97,061		0.0000	1.0000	95.59
30.5	97,061		0.0000	1.0000	95.59
31.5	97,061		0.0000	1.0000	95.59
32.5	97,061		0.0000	1.0000	95.59
33.5	97,061		0.0000	1.0000	95.59
34.5	97,061	8,289	0.0854	0.9146	95.59
35.5	66,207	426	0.0064	0.9936	87.43
36.5	56,575		0.0000	1.0000	86.87
37.5	56,575		0.0000	1.0000	86.87
38.5	56,575		0.0000	1.0000	86.87

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 242.00 ELECTRICAL EQUIPMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2019 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	56,575		0.0000	1.0000	86.87
40.5	56,575		0.0000	1.0000	86.87
41.5	56,575		0.0000	1.0000	86.87
42.5	56,575		0.0000	1.0000	86.87
43.5	56,575		0.0000	1.0000	86.87
44.5	56,575		0.0000	1.0000	86.87
45.5	56,575		0.0000	1.0000	86.87
46.5	55,002		0.0000	1.0000	86.87
47.5	54,434		0.0000	1.0000	86.87
48.5	54,434		0.0000	1.0000	86.87
49.5	54,434		0.0000	1.0000	86.87
50.5	54,309		0.0000	1.0000	86.87
51.5	53,833		0.0000	1.0000	86.87
52.5	53,833		0.0000	1.0000	86.87
53.5	14,737		0.0000	1.0000	86.87
54.5	14,353		0.0000	1.0000	86.87
55.5	13,013		0.0000	1.0000	86.87
56.5	6,901		0.0000	1.0000	86.87
57.5	6,534		0.0000	1.0000	86.87
58.5	6,534		0.0000	1.0000	86.87
59.5	6,534		0.0000	1.0000	86.87
60.5	6,534		0.0000	1.0000	86.87
61.5	6,534		0.0000	1.0000	86.87
62.5	6,271		0.0000	1.0000	86.87
63.5	6,271		0.0000	1.0000	86.87
64.5	6,271		0.0000	1.0000	86.87
65.5	6,271		0.0000	1.0000	86.87
66.5	6,271		0.0000	1.0000	86.87
67.5	6,271		0.0000	1.0000	86.87
68.5	6,271		0.0000	1.0000	86.87
69.5	6,271		0.0000	1.0000	86.87
70.5	6,271		0.0000	1.0000	86.87
71.5	6,178		0.0000	1.0000	86.87
72.5	2,927		0.0000	1.0000	86.87
73.5	2,927		0.0000	1.0000	86.87
74.5	2,927		0.0000	1.0000	86.87
75.5	2,927		0.0000	1.0000	86.87
76.5	2,927		0.0000	1.0000	86.87
77.5	2,890		0.0000	1.0000	86.87
78.5	2,890		0.0000	1.0000	86.87

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

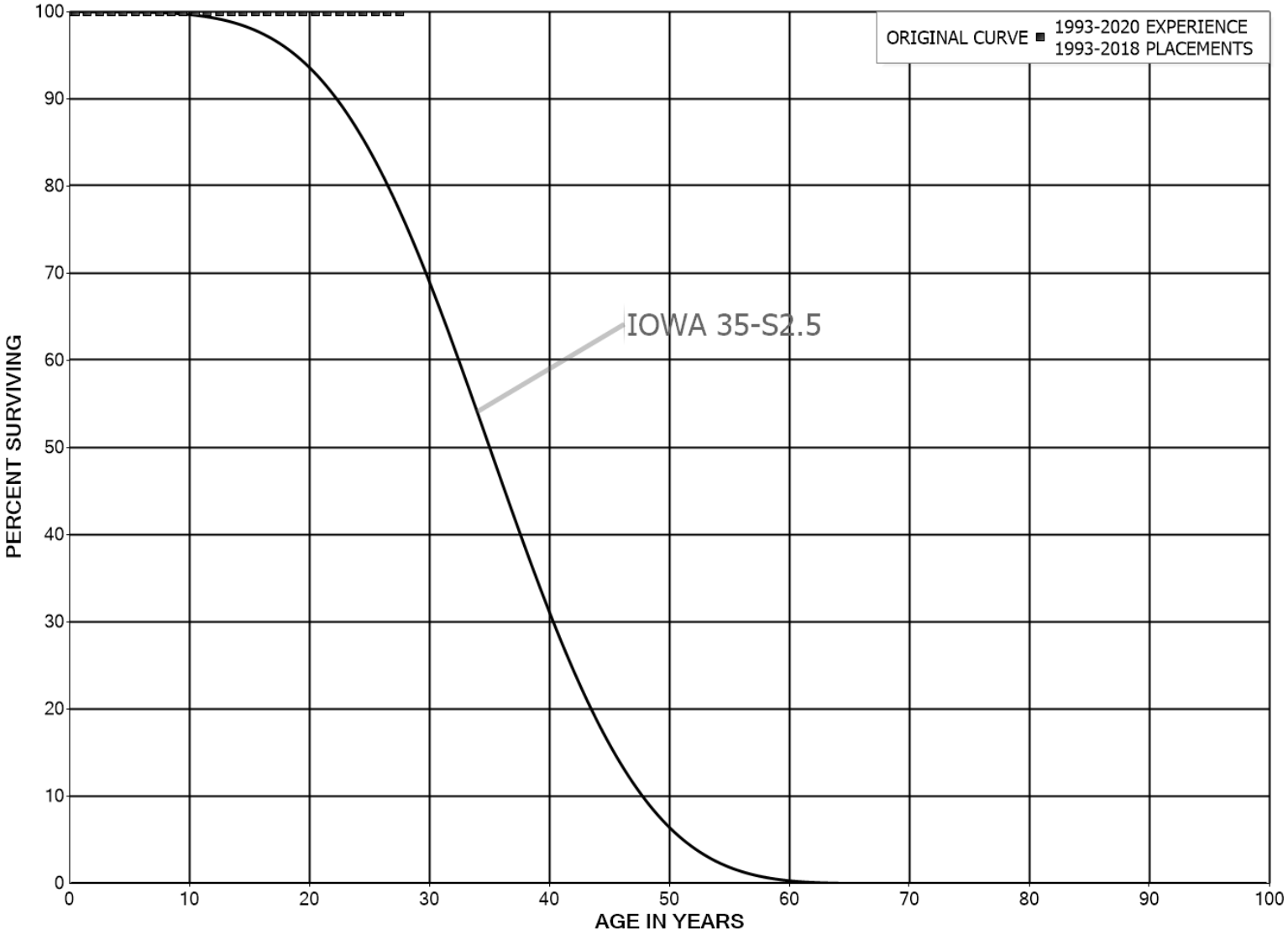
ACCOUNT 242.00 ELECTRICAL EQUIPMENT

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2019 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	2,251		0.0000	1.0000	86.87
80.5	2,251		0.0000	1.0000	86.87
81.5	2,251		0.0000	1.0000	86.87
82.5	2,251		0.0000	1.0000	86.87
83.5	2,251		0.0000	1.0000	86.87
84.5	2,251		0.0000	1.0000	86.87
85.5	2,201		0.0000	1.0000	86.87
86.5	2,201		0.0000	1.0000	86.87
87.5	2,201		0.0000	1.0000	86.87
88.5					86.87

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 243.00 OTHER PUMP STATION EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

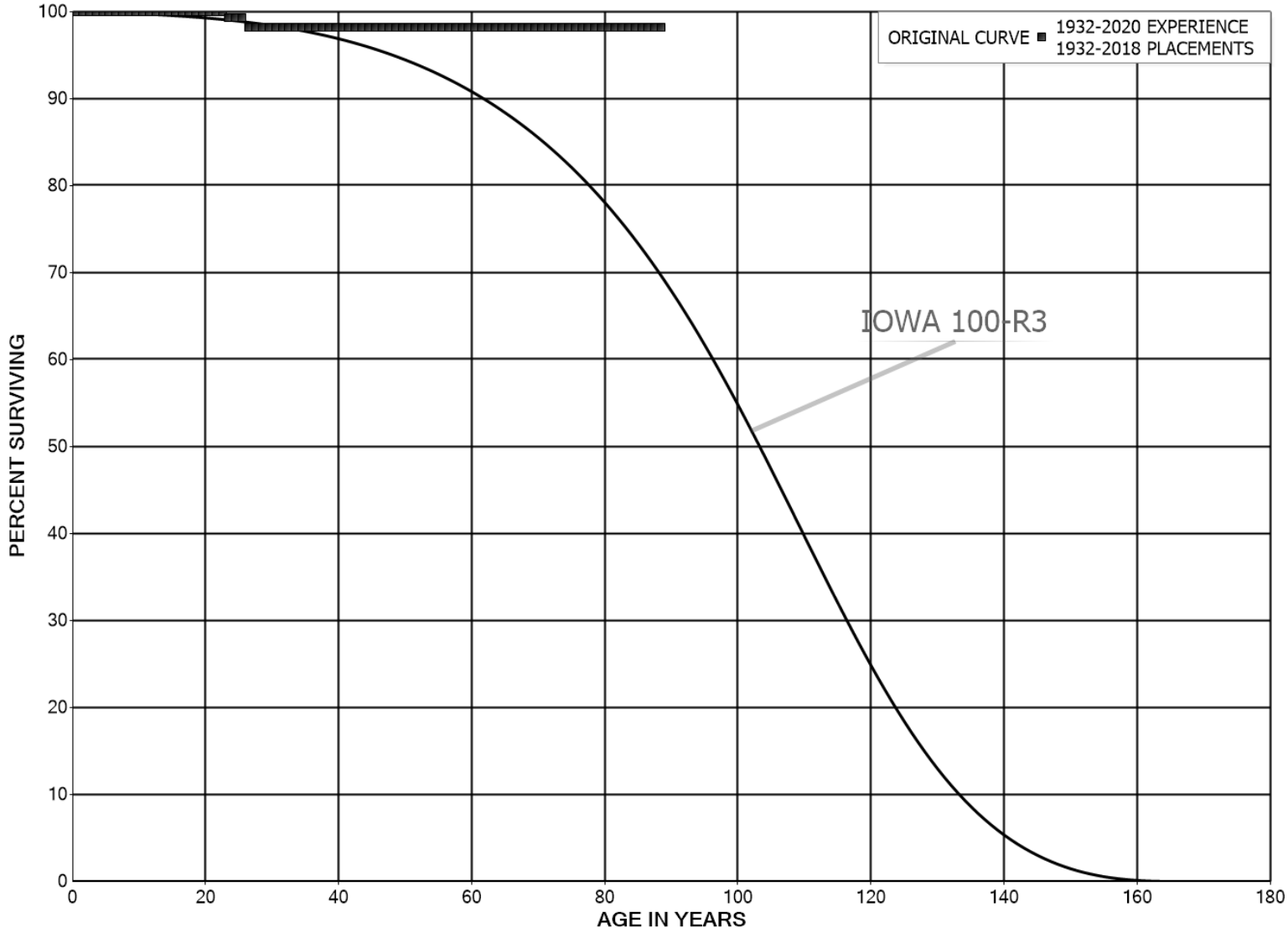
ACCOUNT 243.00 OTHER PUMP STATION EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 1993-2018 EXPERIENCE BAND 1993-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	24,664		0.0000	1.0000	100.00
0.5	24,664		0.0000	1.0000	100.00
1.5	24,664		0.0000	1.0000	100.00
2.5	23,695		0.0000	1.0000	100.00
3.5	23,695		0.0000	1.0000	100.00
4.5	23,695		0.0000	1.0000	100.00
5.5	23,695		0.0000	1.0000	100.00
6.5	23,695		0.0000	1.0000	100.00
7.5	23,695		0.0000	1.0000	100.00
8.5	23,695		0.0000	1.0000	100.00
9.5	23,695		0.0000	1.0000	100.00
10.5	23,695		0.0000	1.0000	100.00
11.5	23,695		0.0000	1.0000	100.00
12.5	23,695		0.0000	1.0000	100.00
13.5	23,695		0.0000	1.0000	100.00
14.5	23,695		0.0000	1.0000	100.00
15.5	23,695		0.0000	1.0000	100.00
16.5	23,695		0.0000	1.0000	100.00
17.5	23,695		0.0000	1.0000	100.00
18.5	23,695		0.0000	1.0000	100.00
19.5	23,695		0.0000	1.0000	100.00
20.5	23,695		0.0000	1.0000	100.00
21.5	23,695		0.0000	1.0000	100.00
22.5	23,695		0.0000	1.0000	100.00
23.5	23,695		0.0000	1.0000	100.00
24.5	23,695		0.0000	1.0000	100.00
25.5	9,782		0.0000	1.0000	100.00
26.5	7,254		0.0000	1.0000	100.00
27.5					100.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 246.00 TRANSMISSION MAINS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 246.00 TRANSMISSION MAINS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,185,887		0.0000	1.0000	100.00
0.5	2,198,092		0.0000	1.0000	100.00
1.5	2,198,092		0.0000	1.0000	100.00
2.5	2,104,409		0.0000	1.0000	100.00
3.5	2,104,409		0.0000	1.0000	100.00
4.5	2,104,409		0.0000	1.0000	100.00
5.5	2,104,409		0.0000	1.0000	100.00
6.5	2,104,409		0.0000	1.0000	100.00
7.5	2,104,409		0.0000	1.0000	100.00
8.5	2,083,813		0.0000	1.0000	100.00
9.5	2,077,373		0.0000	1.0000	100.00
10.5	2,077,373		0.0000	1.0000	100.00
11.5	1,894,417		0.0000	1.0000	100.00
12.5	1,894,417		0.0000	1.0000	100.00
13.5	1,894,417		0.0000	1.0000	100.00
14.5	1,894,417		0.0000	1.0000	100.00
15.5	1,838,616		0.0000	1.0000	100.00
16.5	1,812,753		0.0000	1.0000	100.00
17.5	1,812,753		0.0000	1.0000	100.00
18.5	1,812,753		0.0000	1.0000	100.00
19.5	1,812,753		0.0000	1.0000	100.00
20.5	1,812,753		0.0000	1.0000	100.00
21.5	1,812,753		0.0000	1.0000	100.00
22.5	1,812,753	12,840	0.0071	0.9929	100.00
23.5	1,799,913		0.0000	1.0000	99.29
24.5	1,799,913		0.0000	1.0000	99.29
25.5	1,795,312	19,513	0.0109	0.9891	99.29
26.5	1,591,222		0.0000	1.0000	98.21
27.5	1,457,875		0.0000	1.0000	98.21
28.5	1,549,594		0.0000	1.0000	98.21
29.5	1,314,688		0.0000	1.0000	98.21
30.5	1,049,108		0.0000	1.0000	98.21
31.5	741,364	46	0.0001	0.9999	98.21
32.5	741,318		0.0000	1.0000	98.21
33.5	741,318		0.0000	1.0000	98.21
34.5	741,318		0.0000	1.0000	98.21
35.5	741,318		0.0000	1.0000	98.21
36.5	741,318		0.0000	1.0000	98.21
37.5	741,318		0.0000	1.0000	98.21
38.5	741,318		0.0000	1.0000	98.21

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 246.00 TRANSMISSION MAINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	741,318		0.0000	1.0000	98.21
40.5	741,318		0.0000	1.0000	98.21
41.5	741,318		0.0000	1.0000	98.21
42.5	741,318		0.0000	1.0000	98.21
43.5	741,318		0.0000	1.0000	98.21
44.5	741,318		0.0000	1.0000	98.21
45.5	741,318		0.0000	1.0000	98.21
46.5	741,318		0.0000	1.0000	98.21
47.5	741,318		0.0000	1.0000	98.21
48.5	741,318		0.0000	1.0000	98.21
49.5	741,318		0.0000	1.0000	98.21
50.5	741,318		0.0000	1.0000	98.21
51.5	741,318		0.0000	1.0000	98.21
52.5	741,318		0.0000	1.0000	98.21
53.5	149,324		0.0000	1.0000	98.21
54.5	149,324		0.0000	1.0000	98.21
55.5	149,324		0.0000	1.0000	98.21
56.5	48,195		0.0000	1.0000	98.21
57.5	48,195		0.0000	1.0000	98.21
58.5	48,195		0.0000	1.0000	98.21
59.5	48,195		0.0000	1.0000	98.21
60.5	48,195		0.0000	1.0000	98.21
61.5	48,195		0.0000	1.0000	98.21
62.5	48,195		0.0000	1.0000	98.21
63.5	48,195		0.0000	1.0000	98.21
64.5	48,195		0.0000	1.0000	98.21
65.5	48,195		0.0000	1.0000	98.21
66.5	48,195		0.0000	1.0000	98.21
67.5	48,195		0.0000	1.0000	98.21
68.5	48,195		0.0000	1.0000	98.21
69.5	48,195		0.0000	1.0000	98.21
70.5	48,195		0.0000	1.0000	98.21
71.5	48,195		0.0000	1.0000	98.21
72.5	48,195		0.0000	1.0000	98.21
73.5	48,195		0.0000	1.0000	98.21
74.5	48,195		0.0000	1.0000	98.21
75.5	48,195		0.0000	1.0000	98.21
76.5	48,195		0.0000	1.0000	98.21
77.5	48,195		0.0000	1.0000	98.21
78.5	48,195		0.0000	1.0000	98.21

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

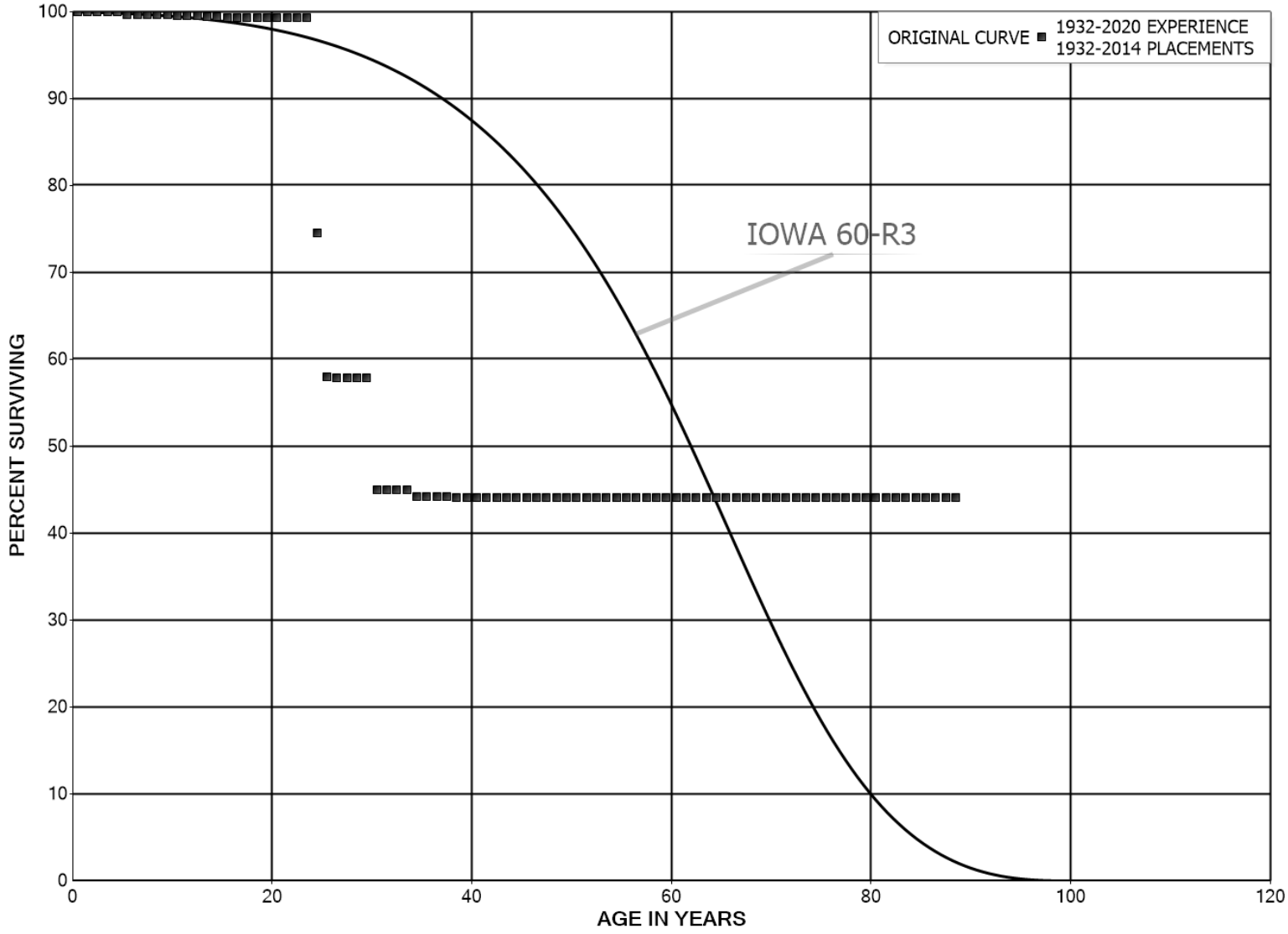
ACCOUNT 246.00 TRANSMISSION MAINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	48,195		0.0000	1.0000	98.21
80.5	48,195		0.0000	1.0000	98.21
81.5	48,195		0.0000	1.0000	98.21
82.5	48,195		0.0000	1.0000	98.21
83.5	48,195		0.0000	1.0000	98.21
84.5	48,195		0.0000	1.0000	98.21
85.5	48,195		0.0000	1.0000	98.21
86.5	48,195		0.0000	1.0000	98.21
87.5	48,195		0.0000	1.0000	98.21
88.5					98.21

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 247.00 DISTRIBUTION RESERVOIRS AND STANDPIPES
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 247.00 DISTRIBUTION RESERVOIRS AND STANDPIPES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2014 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,263,252		0.0000	1.0000	100.00
0.5	2,276,488		0.0000	1.0000	100.00
1.5	2,276,488		0.0000	1.0000	100.00
2.5	2,276,488		0.0000	1.0000	100.00
3.5	2,276,488		0.0000	1.0000	100.00
4.5	2,276,488	8,670	0.0038	0.9962	100.00
5.5	2,267,818		0.0000	1.0000	99.62
6.5	877,461		0.0000	1.0000	99.62
7.5	877,461		0.0000	1.0000	99.62
8.5	959,514		0.0000	1.0000	99.62
9.5	959,514	1,163	0.0012	0.9988	99.62
10.5	958,351		0.0000	1.0000	99.50
11.5	958,351	100	0.0001	0.9999	99.50
12.5	958,251	1,239	0.0013	0.9987	99.49
13.5	924,781		0.0000	1.0000	99.36
14.5	891,707	767	0.0009	0.9991	99.36
15.5	890,940		0.0000	1.0000	99.27
16.5	890,940		0.0000	1.0000	99.27
17.5	889,366		0.0000	1.0000	99.27
18.5	884,200		0.0000	1.0000	99.27
19.5	884,200		0.0000	1.0000	99.27
20.5	884,200		0.0000	1.0000	99.27
21.5	884,200		0.0000	1.0000	99.27
22.5	880,789		0.0000	1.0000	99.27
23.5	880,789	219,777	0.2495	0.7505	99.27
24.5	659,287	146,518	0.2222	0.7778	74.50
25.5	505,747	736	0.0015	0.9985	57.95
26.5	505,011		0.0000	1.0000	57.86
27.5	505,011		0.0000	1.0000	57.86
28.5	548,058		0.0000	1.0000	57.86
29.5	546,292	122,098	0.2235	0.7765	57.86
30.5	384,414		0.0000	1.0000	44.93
31.5	376,035		0.0000	1.0000	44.93
32.5	376,035		0.0000	1.0000	44.93
33.5	370,041	6,529	0.0176	0.9824	44.93
34.5	363,512		0.0000	1.0000	44.14
35.5	363,512		0.0000	1.0000	44.14
36.5	353,087		0.0000	1.0000	44.14
37.5	352,666	778	0.0022	0.9978	44.14
38.5	350,694		0.0000	1.0000	44.04

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 247.00 DISTRIBUTION RESERVOIRS AND STANDPIPES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2014 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	350,581		0.0000	1.0000	44.04
40.5	350,581		0.0000	1.0000	44.04
41.5	350,581		0.0000	1.0000	44.04
42.5	350,581		0.0000	1.0000	44.04
43.5	350,581		0.0000	1.0000	44.04
44.5	350,581		0.0000	1.0000	44.04
45.5	350,581		0.0000	1.0000	44.04
46.5	350,581		0.0000	1.0000	44.04
47.5	350,581		0.0000	1.0000	44.04
48.5	350,381		0.0000	1.0000	44.04
49.5	348,954		0.0000	1.0000	44.04
50.5	348,954		0.0000	1.0000	44.04
51.5	344,745		0.0000	1.0000	44.04
52.5	342,882		0.0000	1.0000	44.04
53.5	89,291		0.0000	1.0000	44.04
54.5	89,291		0.0000	1.0000	44.04
55.5	89,291		0.0000	1.0000	44.04
56.5	47,022		0.0000	1.0000	44.04
57.5	47,022		0.0000	1.0000	44.04
58.5	47,022		0.0000	1.0000	44.04
59.5	47,022		0.0000	1.0000	44.04
60.5	47,022		0.0000	1.0000	44.04
61.5	47,022		0.0000	1.0000	44.04
62.5	47,022		0.0000	1.0000	44.04
63.5	47,022		0.0000	1.0000	44.04
64.5	47,022		0.0000	1.0000	44.04
65.5	47,022		0.0000	1.0000	44.04
66.5	47,022		0.0000	1.0000	44.04
67.5	47,022		0.0000	1.0000	44.04
68.5	47,022		0.0000	1.0000	44.04
69.5	47,022		0.0000	1.0000	44.04
70.5	47,022		0.0000	1.0000	44.04
71.5	47,022		0.0000	1.0000	44.04
72.5	47,022		0.0000	1.0000	44.04
73.5	47,022		0.0000	1.0000	44.04
74.5	47,022		0.0000	1.0000	44.04
75.5	47,022		0.0000	1.0000	44.04
76.5	47,022		0.0000	1.0000	44.04
77.5	47,022		0.0000	1.0000	44.04
78.5	46,840		0.0000	1.0000	44.04

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

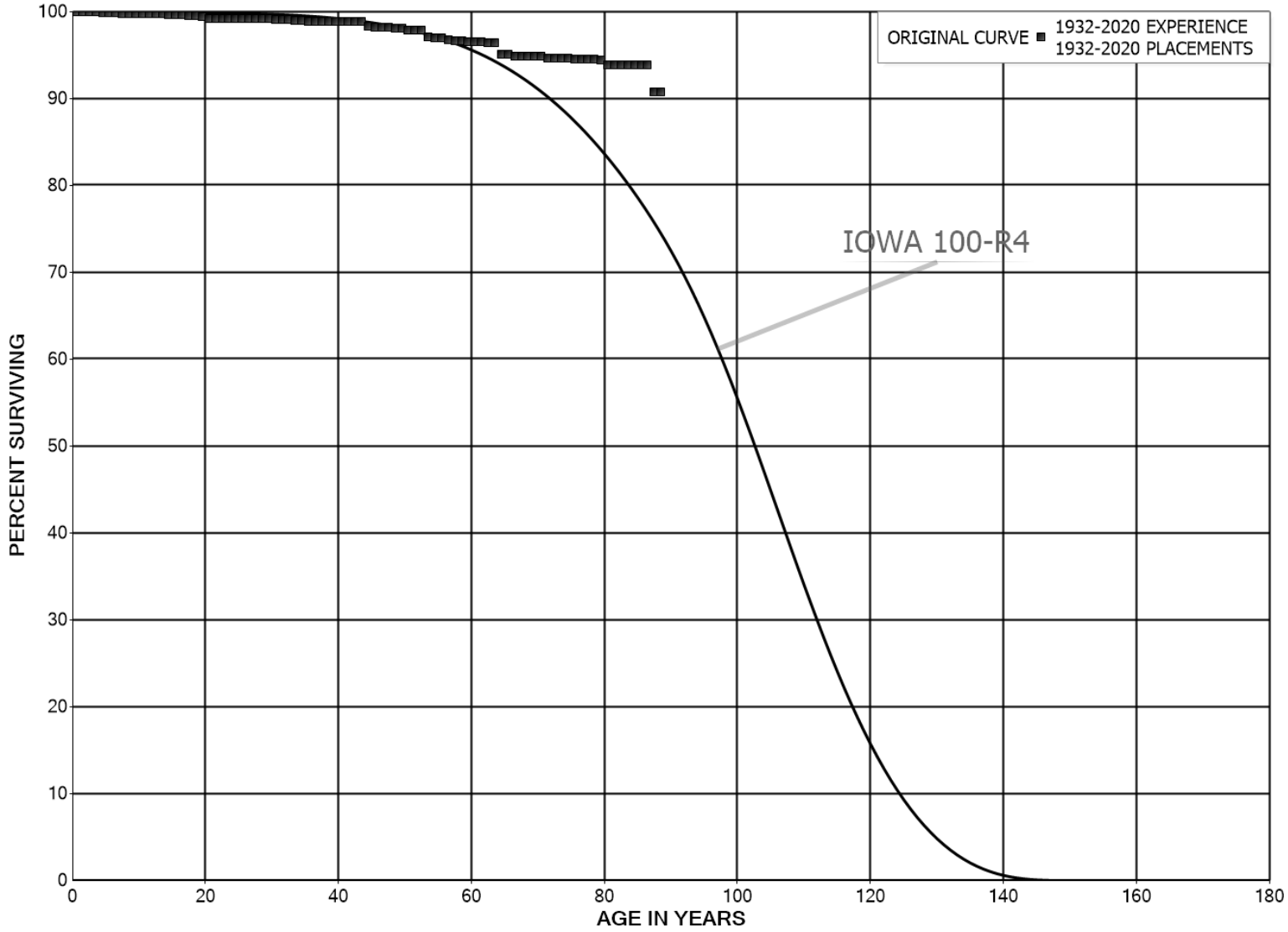
ACCOUNT 247.00 DISTRIBUTION RESERVOIRS AND STANDPIPES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2014 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	46,840		0.0000	1.0000	44.04
80.5	46,840		0.0000	1.0000	44.04
81.5	46,840		0.0000	1.0000	44.04
82.5	46,840		0.0000	1.0000	44.04
83.5	46,840		0.0000	1.0000	44.04
84.5	46,840		0.0000	1.0000	44.04
85.5	45,791		0.0000	1.0000	44.04
86.5	13,751		0.0000	1.0000	44.04
87.5	13,405		0.0000	1.0000	44.04
88.5					44.04

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 248.00 DISTRIBUTION MAINS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	11,267,288	1,062	0.0001	0.9999	100.00
0.5	11,091,870	155	0.0000	1.0000	99.99
1.5	11,073,250	1,464	0.0001	0.9999	99.99
2.5	11,060,714	2,250	0.0002	0.9998	99.98
3.5	10,732,784	12,267	0.0011	0.9989	99.96
4.5	10,088,382		0.0000	1.0000	99.84
5.5	9,975,178	3,815	0.0004	0.9996	99.84
6.5	9,544,906	4,577	0.0005	0.9995	99.80
7.5	9,253,366	3,709	0.0004	0.9996	99.76
8.5	9,110,470	3,332	0.0004	0.9996	99.72
9.5	9,032,647		0.0000	1.0000	99.68
10.5	8,817,923		0.0000	1.0000	99.68
11.5	8,682,814	22	0.0000	1.0000	99.68
12.5	8,577,511		0.0000	1.0000	99.68
13.5	8,120,180	3,321	0.0004	0.9996	99.68
14.5	8,061,166	3,817	0.0005	0.9995	99.64
15.5	7,990,274		0.0000	1.0000	99.59
16.5	7,664,306	5,047	0.0007	0.9993	99.59
17.5	7,608,318		0.0000	1.0000	99.53
18.5	7,538,392	7,613	0.0010	0.9990	99.53
19.5	7,015,695	16,009	0.0023	0.9977	99.42
20.5	6,770,349	326	0.0000	1.0000	99.20
21.5	6,549,419	504	0.0001	0.9999	99.19
22.5	6,462,339	1,366	0.0002	0.9998	99.19
23.5	6,300,031		0.0000	1.0000	99.16
24.5	6,205,906	1,186	0.0002	0.9998	99.16
25.5	6,097,573	658	0.0001	0.9999	99.15
26.5	5,671,622	43	0.0000	1.0000	99.13
27.5	5,197,103		0.0000	1.0000	99.13
28.5	4,923,175		0.0000	1.0000	99.13
29.5	4,556,828	654	0.0001	0.9999	99.13
30.5	4,303,520	541	0.0001	0.9999	99.12
31.5	4,043,112	630	0.0002	0.9998	99.11
32.5	3,695,668	3,798	0.0010	0.9990	99.09
33.5	3,279,041	2,314	0.0007	0.9993	98.99
34.5	3,121,400	2,121	0.0007	0.9993	98.92
35.5	2,893,711		0.0000	1.0000	98.85
36.5	2,790,170	112	0.0000	1.0000	98.85
37.5	2,673,776	441	0.0002	0.9998	98.85
38.5	2,550,528		0.0000	1.0000	98.83

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	2,327,435		0.0000	1.0000	98.83
40.5	2,039,173		0.0000	1.0000	98.83
41.5	1,728,087	507	0.0003	0.9997	98.83
42.5	1,676,465		0.0000	1.0000	98.80
43.5	1,661,647	9,482	0.0057	0.9943	98.80
44.5	1,571,662	528	0.0003	0.9997	98.24
45.5	1,511,747	470	0.0003	0.9997	98.21
46.5	1,479,355	249	0.0002	0.9998	98.18
47.5	1,443,190	891	0.0006	0.9994	98.16
48.5	1,422,211		0.0000	1.0000	98.10
49.5	1,345,413	3,819	0.0028	0.9972	98.10
50.5	1,279,999		0.0000	1.0000	97.82
51.5	1,094,421	158	0.0001	0.9999	97.82
52.5	1,063,167	8,286	0.0078	0.9922	97.81
53.5	979,390	1,390	0.0014	0.9986	97.04
54.5	945,210		0.0000	1.0000	96.91
55.5	910,397	1,574	0.0017	0.9983	96.91
56.5	886,082	652	0.0007	0.9993	96.74
57.5	799,834	578	0.0007	0.9993	96.67
58.5	785,512	722	0.0009	0.9991	96.60
59.5	754,986		0.0000	1.0000	96.51
60.5	743,788	75	0.0001	0.9999	96.51
61.5	728,166	801	0.0011	0.9989	96.50
62.5	694,445		0.0000	1.0000	96.39
63.5	663,103	8,958	0.0135	0.9865	96.39
64.5	625,231		0.0000	1.0000	95.09
65.5	594,544	1,284	0.0022	0.9978	95.09
66.5	561,046		0.0000	1.0000	94.89
67.5	546,740		0.0000	1.0000	94.89
68.5	528,853		0.0000	1.0000	94.89
69.5	507,333		0.0000	1.0000	94.89
70.5	485,830	1,119	0.0023	0.9977	94.89
71.5	461,888		0.0000	1.0000	94.67
72.5	441,656		0.0000	1.0000	94.67
73.5	437,776		0.0000	1.0000	94.67
74.5	423,659	510	0.0012	0.9988	94.67
75.5	422,847		0.0000	1.0000	94.55
76.5	422,834		0.0000	1.0000	94.55
77.5	422,834		0.0000	1.0000	94.55
78.5	422,695	878	0.0021	0.9979	94.55

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

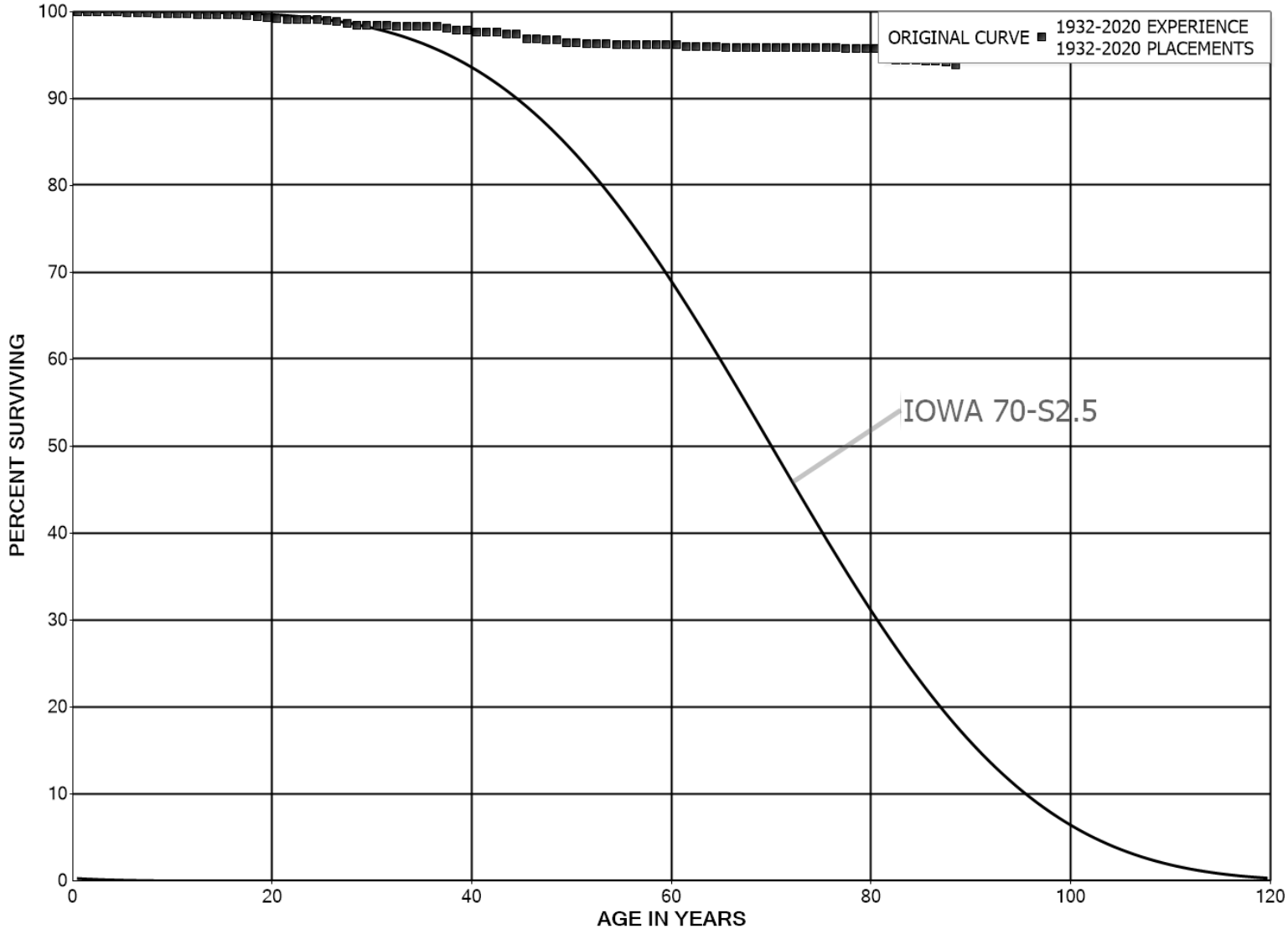
ACCOUNT 248.00 DISTRIBUTION MAINS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	406,913	2,279	0.0056	0.9944	94.36
80.5	395,280		0.0000	1.0000	93.83
81.5	322,163		0.0000	1.0000	93.83
82.5	317,621		0.0000	1.0000	93.83
83.5	314,826		0.0000	1.0000	93.83
84.5	298,775		0.0000	1.0000	93.83
85.5	292,028		0.0000	1.0000	93.83
86.5	281,367	9,193	0.0327	0.9673	93.83
87.5	271,620		0.0000	1.0000	90.76
88.5					90.76

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 249.00 SERVICES
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,058,694	1,959	0.0010	0.9990	100.00
0.5	2,048,403		0.0000	1.0000	99.90
1.5	1,913,398		0.0000	1.0000	99.90
2.5	1,900,819		0.0000	1.0000	99.90
3.5	1,886,238	75	0.0000	1.0000	99.90
4.5	1,847,033	816	0.0004	0.9996	99.90
5.5	1,825,215		0.0000	1.0000	99.86
6.5	1,728,860		0.0000	1.0000	99.86
7.5	1,693,565	3,066	0.0018	0.9982	99.86
8.5	1,678,198		0.0000	1.0000	99.68
9.5	1,655,613		0.0000	1.0000	99.68
10.5	1,645,913		0.0000	1.0000	99.68
11.5	1,615,529	704	0.0004	0.9996	99.68
12.5	1,572,075		0.0000	1.0000	99.63
13.5	1,448,789		0.0000	1.0000	99.63
14.5	1,423,144		0.0000	1.0000	99.63
15.5	1,390,206		0.0000	1.0000	99.63
16.5	1,339,535	1,495	0.0011	0.9989	99.63
17.5	1,329,372	1,692	0.0013	0.9987	99.52
18.5	1,280,223	954	0.0007	0.9993	99.39
19.5	1,204,090	1,116	0.0009	0.9991	99.32
20.5	1,173,536	1,831	0.0016	0.9984	99.23
21.5	1,134,855	71	0.0001	0.9999	99.07
22.5	1,114,311	168	0.0002	0.9998	99.07
23.5	1,091,629		0.0000	1.0000	99.05
24.5	1,064,766	1,298	0.0012	0.9988	99.05
25.5	1,033,600	586	0.0006	0.9994	98.93
26.5	966,622	2,776	0.0029	0.9971	98.88
27.5	828,931	1,713	0.0021	0.9979	98.59
28.5	757,225	41	0.0001	0.9999	98.39
29.5	725,958		0.0000	1.0000	98.38
30.5	671,250		0.0000	1.0000	98.38
31.5	613,312	571	0.0009	0.9991	98.38
32.5	560,569		0.0000	1.0000	98.29
33.5	500,522		0.0000	1.0000	98.29
34.5	465,393	169	0.0004	0.9996	98.29
35.5	427,413		0.0000	1.0000	98.26
36.5	399,530	656	0.0016	0.9984	98.26
37.5	377,817	789	0.0021	0.9979	98.09
38.5	360,286	90	0.0003	0.9997	97.89

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	339,091	697	0.0021	0.9979	97.86
40.5	332,544		0.0000	1.0000	97.66
41.5	323,460		0.0000	1.0000	97.66
42.5	319,357	749	0.0023	0.9977	97.66
43.5	312,616		0.0000	1.0000	97.43
44.5	306,102	1,763	0.0058	0.9942	97.43
45.5	293,458	34	0.0001	0.9999	96.87
46.5	280,790	336	0.0012	0.9988	96.86
47.5	272,410		0.0000	1.0000	96.75
48.5	262,376	1,071	0.0041	0.9959	96.75
49.5	255,899		0.0000	1.0000	96.35
50.5	245,906	106	0.0004	0.9996	96.35
51.5	240,283		0.0000	1.0000	96.31
52.5	230,158	66	0.0003	0.9997	96.31
53.5	224,459	155	0.0007	0.9993	96.28
54.5	216,956	60	0.0003	0.9997	96.22
55.5	209,305		0.0000	1.0000	96.19
56.5	204,771		0.0000	1.0000	96.19
57.5	194,286		0.0000	1.0000	96.19
58.5	186,991	27	0.0001	0.9999	96.19
59.5	177,089	98	0.0006	0.9994	96.17
60.5	166,912	254	0.0015	0.9985	96.12
61.5	158,550	19	0.0001	0.9999	95.97
62.5	145,677	36	0.0002	0.9998	95.96
63.5	137,199	56	0.0004	0.9996	95.94
64.5	130,467	22	0.0002	0.9998	95.90
65.5	118,932	24	0.0002	0.9998	95.88
66.5	112,303		0.0000	1.0000	95.87
67.5	102,411	14	0.0001	0.9999	95.87
68.5	94,381		0.0000	1.0000	95.85
69.5	87,506	13	0.0002	0.9998	95.85
70.5	79,458		0.0000	1.0000	95.84
71.5	71,830		0.0000	1.0000	95.84
72.5	65,759	11	0.0002	0.9998	95.84
73.5	61,426	26	0.0004	0.9996	95.82
74.5	58,240		0.0000	1.0000	95.78
75.5	57,725		0.0000	1.0000	95.78
76.5	56,294	25	0.0004	0.9996	95.78
77.5	56,054	25	0.0004	0.9996	95.74
78.5	55,589		0.0000	1.0000	95.70

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

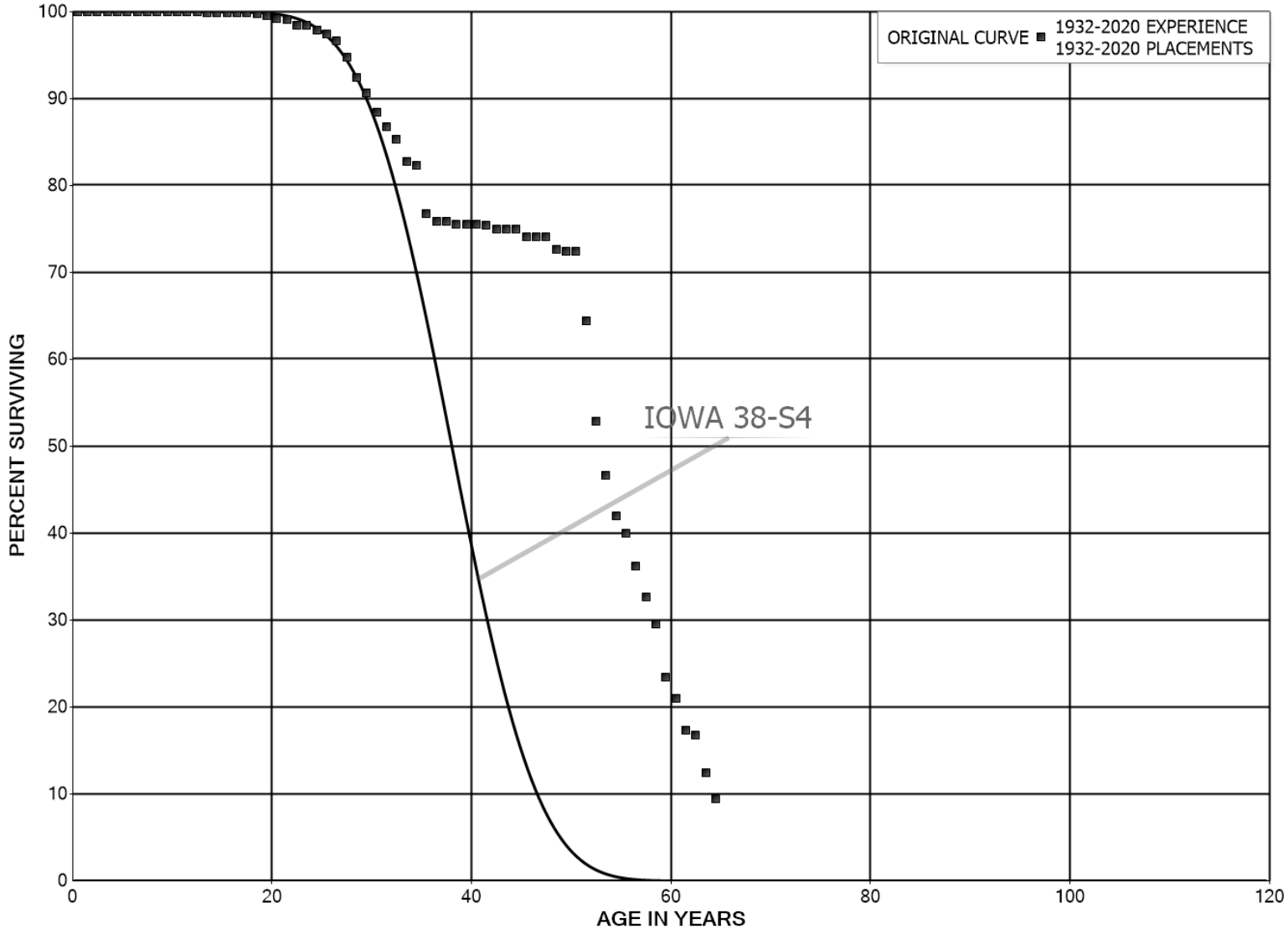
ACCOUNT 249.00 SERVICES

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	53,729		0.0000	1.0000	95.70
80.5	50,426		0.0000	1.0000	95.70
81.5	48,775	655	0.0134	0.9866	95.70
82.5	46,542		0.0000	1.0000	94.41
83.5	46,400		0.0000	1.0000	94.41
84.5	43,914	58	0.0013	0.9987	94.41
85.5	43,037		0.0000	1.0000	94.29
86.5	42,251	32	0.0007	0.9993	94.29
87.5	41,711	173	0.0041	0.9959	94.22
88.5					93.83

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 250.00 METERS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,380,263		0.0000	1.0000	100.00
0.5	2,197,518		0.0000	1.0000	100.00
1.5	2,056,128		0.0000	1.0000	100.00
2.5	1,926,724		0.0000	1.0000	100.00
3.5	1,862,440	72	0.0000	1.0000	100.00
4.5	1,822,285		0.0000	1.0000	100.00
5.5	1,799,831		0.0000	1.0000	100.00
6.5	1,759,125		0.0000	1.0000	100.00
7.5	1,727,992	1,664	0.0010	0.9990	100.00
8.5	1,704,998		0.0000	1.0000	99.90
9.5	1,681,738		0.0000	1.0000	99.90
10.5	1,659,778		0.0000	1.0000	99.90
11.5	1,646,725		0.0000	1.0000	99.90
12.5	1,637,536	511	0.0003	0.9997	99.90
13.5	1,594,516		0.0000	1.0000	99.87
14.5	1,565,660		0.0000	1.0000	99.87
15.5	1,553,888	117	0.0001	0.9999	99.87
16.5	1,500,369		0.0000	1.0000	99.86
17.5	1,467,484	2,153	0.0015	0.9985	99.86
18.5	1,443,157	3,177	0.0022	0.9978	99.71
19.5	1,409,994	4,497	0.0032	0.9968	99.50
20.5	1,390,267	2,016	0.0015	0.9985	99.18
21.5	1,371,369	8,564	0.0062	0.9938	99.03
22.5	1,335,510	935	0.0007	0.9993	98.42
23.5	1,303,809	7,164	0.0055	0.9945	98.35
24.5	1,276,385	5,948	0.0047	0.9953	97.81
25.5	1,240,842	9,330	0.0075	0.9925	97.35
26.5	1,203,479	24,050	0.0200	0.9800	96.62
27.5	1,120,239	27,772	0.0248	0.9752	94.69
28.5	1,024,915	18,549	0.0181	0.9819	92.34
29.5	936,999	23,904	0.0255	0.9745	90.67
30.5	830,400	14,925	0.0180	0.9820	88.36
31.5	763,452	12,993	0.0170	0.9830	86.77
32.5	681,615	20,621	0.0303	0.9697	85.29
33.5	606,669	3,291	0.0054	0.9946	82.71
34.5	553,324	37,061	0.0670	0.9330	82.26
35.5	449,992	5,306	0.0118	0.9882	76.75
36.5	386,359		0.0000	1.0000	75.85
37.5	331,157	1,292	0.0039	0.9961	75.85
38.5	283,860		0.0000	1.0000	75.55

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	243,009		0.0000	1.0000	75.55
40.5	221,803	374	0.0017	0.9983	75.55
41.5	206,161	1,246	0.0060	0.9940	75.42
42.5	186,678		0.0000	1.0000	74.97
43.5	168,491		0.0000	1.0000	74.97
44.5	146,933	1,788	0.0122	0.9878	74.97
45.5	128,553	49	0.0004	0.9996	74.06
46.5	118,894		0.0000	1.0000	74.03
47.5	105,664	2,054	0.0194	0.9806	74.03
48.5	95,305	286	0.0030	0.9970	72.59
49.5	87,068		0.0000	1.0000	72.37
50.5	80,185	8,821	0.1100	0.8900	72.37
51.5	71,364	12,835	0.1799	0.8201	64.41
52.5	58,528	6,845	0.1170	0.8830	52.82
53.5	51,683	5,228	0.1012	0.8988	46.65
54.5	46,455	2,135	0.0460	0.9540	41.93
55.5	44,320	4,273	0.0964	0.9036	40.00
56.5	40,047	3,897	0.0973	0.9027	36.14
57.5	36,150	3,517	0.0973	0.9027	32.63
58.5	32,633	6,742	0.2066	0.7934	29.45
59.5	25,892	2,642	0.1020	0.8980	23.37
60.5	23,250	4,129	0.1776	0.8224	20.98
61.5	19,121	646	0.0338	0.9662	17.26
62.5	18,475	4,762	0.2578	0.7422	16.67
63.5	13,713	3,260	0.2377	0.7623	12.38
64.5	10,453	969	0.0927	0.9073	9.43
65.5	9,484	318	0.0335	0.9665	8.56
66.5	9,166	1,105	0.1206	0.8794	8.27
67.5	8,061	719	0.0892	0.9108	7.28
68.5	7,342	547	0.0745	0.9255	6.63
69.5	6,795	376	0.0553	0.9447	6.13
70.5	6,419	995	0.1550	0.8450	5.79
71.5	5,424	356	0.0656	0.9344	4.90
72.5	5,068	112	0.0221	0.9779	4.57
73.5	4,956	179	0.0361	0.9639	4.47
74.5	4,777	253	0.0530	0.9470	4.31
75.5	4,524	13	0.0029	0.9971	4.08
76.5	4,511	52	0.0115	0.9885	4.07
77.5	4,459	108	0.0242	0.9758	4.02
78.5	4,351	163	0.0375	0.9625	3.93

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

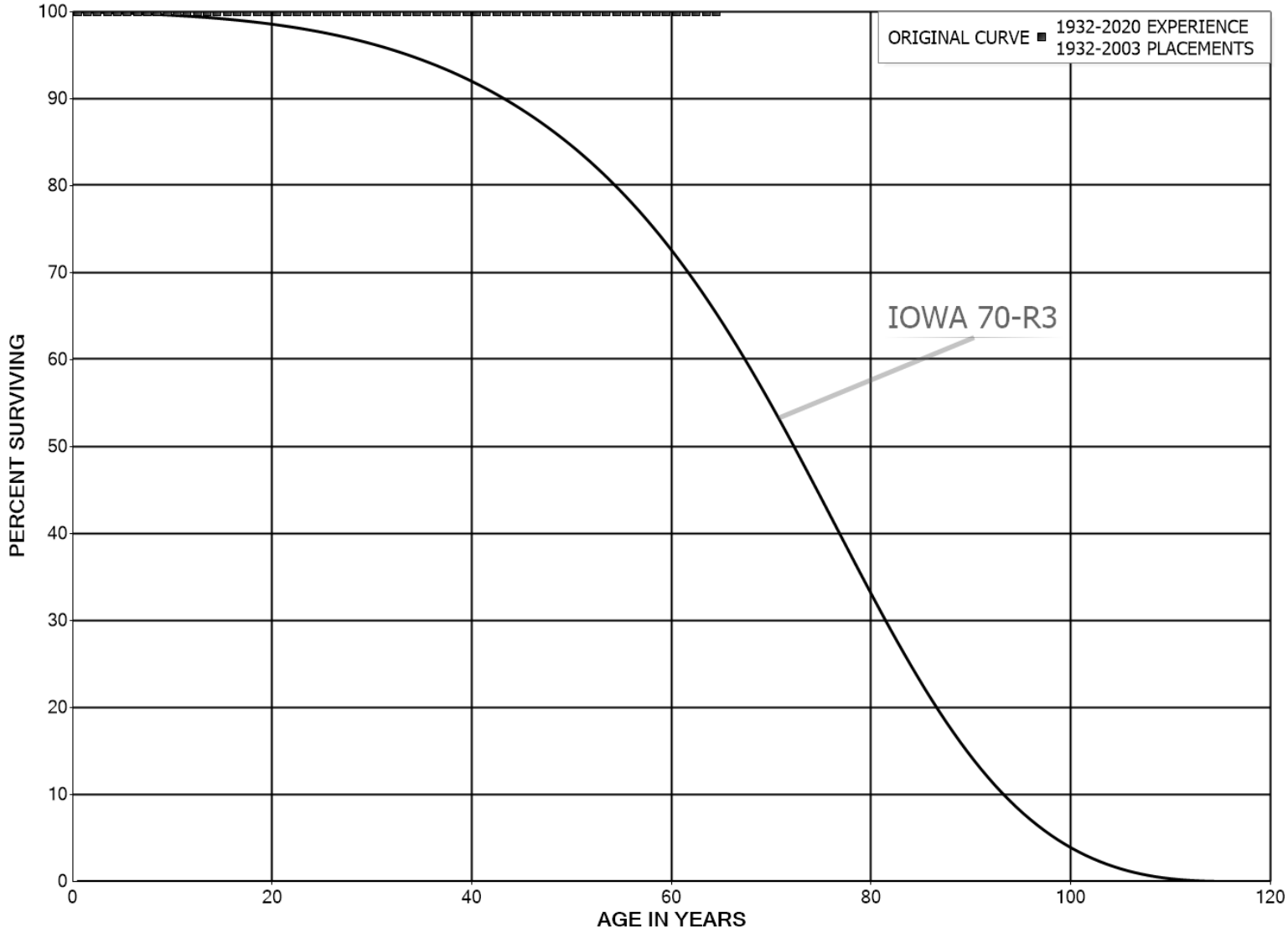
ACCOUNT 250.00 METERS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2020 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	4,188	566	0.1351	0.8649	3.78
80.5	3,622	48	0.0133	0.9867	3.27
81.5	3,574	78	0.0218	0.9782	3.23
82.5	3,496	237	0.0678	0.9322	3.16
83.5	3,259	315	0.0967	0.9033	2.94
84.5	2,944	151	0.0513	0.9487	2.66
85.5	2,793	879	0.3146	0.6854	2.52
86.5	1,914	1,914	1.0000		1.73
87.5					

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 251.00 HYDRANTS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 251.00 HYDRANTS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2003 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	29,010		0.0000	1.0000	100.00
0.5	29,074		0.0000	1.0000	100.00
1.5	29,074		0.0000	1.0000	100.00
2.5	29,074		0.0000	1.0000	100.00
3.5	29,074		0.0000	1.0000	100.00
4.5	29,074		0.0000	1.0000	100.00
5.5	29,074		0.0000	1.0000	100.00
6.5	29,074		0.0000	1.0000	100.00
7.5	29,074		0.0000	1.0000	100.00
8.5	29,074		0.0000	1.0000	100.00
9.5	29,074	15	0.0005	0.9995	100.00
10.5	29,059		0.0000	1.0000	99.95
11.5	29,059		0.0000	1.0000	99.95
12.5	29,059		0.0000	1.0000	99.95
13.5	29,059		0.0000	1.0000	99.95
14.5	29,059		0.0000	1.0000	99.95
15.5	29,059		0.0000	1.0000	99.95
16.5	29,059		0.0000	1.0000	99.95
17.5	27,249		0.0000	1.0000	99.95
18.5	27,249		0.0000	1.0000	99.95
19.5	27,249		0.0000	1.0000	99.95
20.5	27,249		0.0000	1.0000	99.95
21.5	27,249		0.0000	1.0000	99.95
22.5	27,249		0.0000	1.0000	99.95
23.5	27,249		0.0000	1.0000	99.95
24.5	27,249		0.0000	1.0000	99.95
25.5	27,249		0.0000	1.0000	99.95
26.5	19,224		0.0000	1.0000	99.95
27.5	19,224		0.0000	1.0000	99.95
28.5	19,419		0.0000	1.0000	99.95
29.5	19,419		0.0000	1.0000	99.95
30.5	19,419		0.0000	1.0000	99.95
31.5	19,419		0.0000	1.0000	99.95
32.5	19,419		0.0000	1.0000	99.95
33.5	18,718		0.0000	1.0000	99.95
34.5	18,718		0.0000	1.0000	99.95
35.5	18,152		0.0000	1.0000	99.95
36.5	18,152		0.0000	1.0000	99.95
37.5	18,152		0.0000	1.0000	99.95
38.5	12,947		0.0000	1.0000	99.95

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 251.00 HYDRANTS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2003 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	12,947		0.0000	1.0000	99.95
40.5	12,947		0.0000	1.0000	99.95
41.5	12,947		0.0000	1.0000	99.95
42.5	12,947		0.0000	1.0000	99.95
43.5	12,947		0.0000	1.0000	99.95
44.5	12,947		0.0000	1.0000	99.95
45.5	12,947		0.0000	1.0000	99.95
46.5	12,947		0.0000	1.0000	99.95
47.5	12,947		0.0000	1.0000	99.95
48.5	12,947		0.0000	1.0000	99.95
49.5	12,947		0.0000	1.0000	99.95
50.5	10,994		0.0000	1.0000	99.95
51.5	10,337		0.0000	1.0000	99.95
52.5	10,138		0.0000	1.0000	99.95
53.5	8,222		0.0000	1.0000	99.95
54.5	7,219		0.0000	1.0000	99.95
55.5	6,682		0.0000	1.0000	99.95
56.5	5,950		0.0000	1.0000	99.95
57.5	4,313		0.0000	1.0000	99.95
58.5	4,066		0.0000	1.0000	99.95
59.5	4,066		0.0000	1.0000	99.95
60.5	4,066		0.0000	1.0000	99.95
61.5	3,714		0.0000	1.0000	99.95
62.5	2,492		0.0000	1.0000	99.95
63.5	2,492		0.0000	1.0000	99.95
64.5	2,492		0.0000	1.0000	99.95
65.5	2,492		0.0000	1.0000	99.95
66.5	2,492		0.0000	1.0000	99.95
67.5	2,492		0.0000	1.0000	99.95
68.5	2,330		0.0000	1.0000	99.95
69.5	2,197		0.0000	1.0000	99.95
70.5	2,064		0.0000	1.0000	99.95
71.5	2,064		0.0000	1.0000	99.95
72.5	2,064		0.0000	1.0000	99.95
73.5	2,064		0.0000	1.0000	99.95
74.5	2,064		0.0000	1.0000	99.95
75.5	2,064		0.0000	1.0000	99.95
76.5	2,064		0.0000	1.0000	99.95
77.5	2,064		0.0000	1.0000	99.95
78.5	2,006		0.0000	1.0000	99.95

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

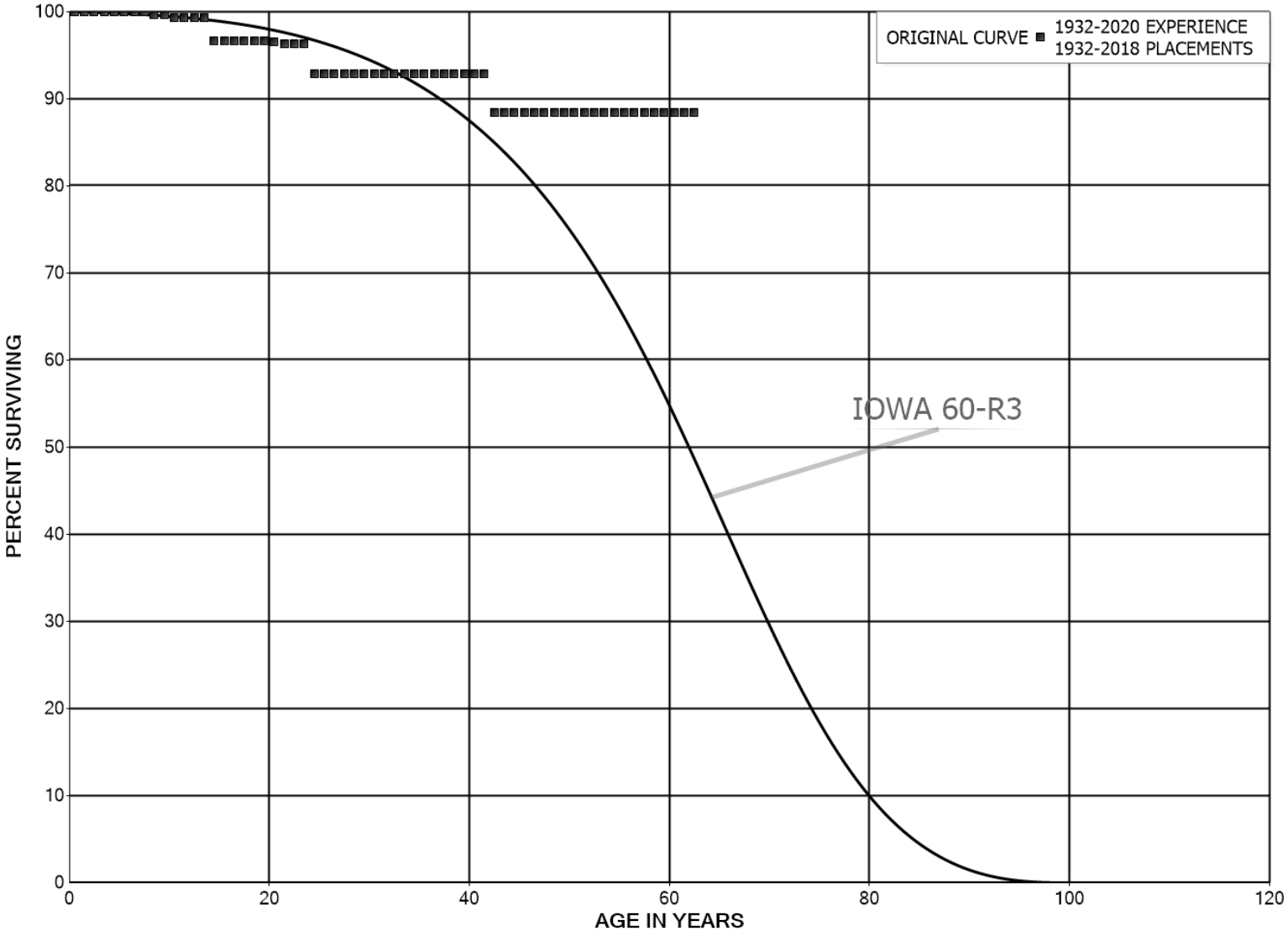
ACCOUNT 251.00 HYDRANTS

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2003 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	2,006		0.0000	1.0000	99.95
80.5	2,006		0.0000	1.0000	99.95
81.5	2,006		0.0000	1.0000	99.95
82.5	2,006		0.0000	1.0000	99.95
83.5	2,006		0.0000	1.0000	99.95
84.5	2,006		0.0000	1.0000	99.95
85.5	2,006		0.0000	1.0000	99.95
86.5	2,006		0.0000	1.0000	99.95
87.5	2,006		0.0000	1.0000	99.95
88.5					99.95

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 257.00 STRUCTURES AND IMPROVEMENTS - GENERAL
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 257.00 STRUCTURES AND IMPROVEMENTS - GENERAL

ORIGINAL LIFE TABLE

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	627,859		0.0000	1.0000	100.00
0.5	679,723		0.0000	1.0000	100.00
1.5	679,723		0.0000	1.0000	100.00
2.5	677,383		0.0000	1.0000	100.00
3.5	676,563		0.0000	1.0000	100.00
4.5	666,588		0.0000	1.0000	100.00
5.5	445,888		0.0000	1.0000	100.00
6.5	290,934		0.0000	1.0000	100.00
7.5	292,045	1,111	0.0038	0.9962	100.00
8.5	290,934		0.0000	1.0000	99.62
9.5	274,843	796	0.0029	0.9971	99.62
10.5	274,047		0.0000	1.0000	99.33
11.5	246,666		0.0000	1.0000	99.33
12.5	216,005		0.0000	1.0000	99.33
13.5	216,005	5,890	0.0273	0.9727	99.33
14.5	210,115		0.0000	1.0000	96.62
15.5	209,582		0.0000	1.0000	96.62
16.5	209,582	100	0.0005	0.9995	96.62
17.5	209,482		0.0000	1.0000	96.58
18.5	102,670		0.0000	1.0000	96.58
19.5	102,358	72	0.0007	0.9993	96.58
20.5	101,897	186	0.0018	0.9982	96.51
21.5	101,553		0.0000	1.0000	96.33
22.5	89,539	62	0.0007	0.9993	96.33
23.5	84,297	2,981	0.0354	0.9646	96.27
24.5	81,316		0.0000	1.0000	92.86
25.5	81,316		0.0000	1.0000	92.86
26.5	81,316		0.0000	1.0000	92.86
27.5	81,316	62	0.0008	0.9992	92.86
28.5	81,254		0.0000	1.0000	92.79
29.5	81,254		0.0000	1.0000	92.79
30.5	81,254		0.0000	1.0000	92.79
31.5	81,254		0.0000	1.0000	92.79
32.5	81,254		0.0000	1.0000	92.79
33.5	81,254		0.0000	1.0000	92.79
34.5	81,254		0.0000	1.0000	92.79
35.5	81,254		0.0000	1.0000	92.79
36.5	70,471		0.0000	1.0000	92.79
37.5	41,666		0.0000	1.0000	92.79
38.5	35,067		0.0000	1.0000	92.79

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 257.00 STRUCTURES AND IMPROVEMENTS - GENERAL

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
39.5	30,306		0.0000	1.0000	92.79
40.5	29,431		0.0000	1.0000	92.79
41.5	12,844	610	0.0475	0.9525	92.79
42.5	12,234		0.0000	1.0000	88.38
43.5	12,234		0.0000	1.0000	88.38
44.5	12,234		0.0000	1.0000	88.38
45.5	12,234		0.0000	1.0000	88.38
46.5	12,234		0.0000	1.0000	88.38
47.5	12,234		0.0000	1.0000	88.38
48.5	12,234		0.0000	1.0000	88.38
49.5	12,234		0.0000	1.0000	88.38
50.5	12,179		0.0000	1.0000	88.38
51.5	12,179		0.0000	1.0000	88.38
52.5	12,179		0.0000	1.0000	88.38
53.5	12,179		0.0000	1.0000	88.38
54.5	12,179		0.0000	1.0000	88.38
55.5	12,179		0.0000	1.0000	88.38
56.5	12,179		0.0000	1.0000	88.38
57.5	12,179		0.0000	1.0000	88.38
58.5	12,179		0.0000	1.0000	88.38
59.5	12,179		0.0000	1.0000	88.38
60.5	12,090		0.0000	1.0000	88.38
61.5	11,350		0.0000	1.0000	88.38
62.5	11,313		0.0000	1.0000	88.38
63.5	11,313		0.0000	1.0000	88.38
64.5	11,313		0.0000	1.0000	88.38
65.5	11,313		0.0000	1.0000	88.38
66.5	11,313		0.0000	1.0000	88.38
67.5	11,313		0.0000	1.0000	88.38
68.5	11,313		0.0000	1.0000	88.38
69.5	9,888		0.0000	1.0000	88.38
70.5	9,888		0.0000	1.0000	88.38
71.5	9,888		0.0000	1.0000	88.38
72.5	9,888		0.0000	1.0000	88.38
73.5	9,888		0.0000	1.0000	88.38
74.5	9,888		0.0000	1.0000	88.38
75.5	9,274		0.0000	1.0000	88.38
76.5	9,274		0.0000	1.0000	88.38
77.5	9,258		0.0000	1.0000	88.38
78.5	9,258		0.0000	1.0000	88.38

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

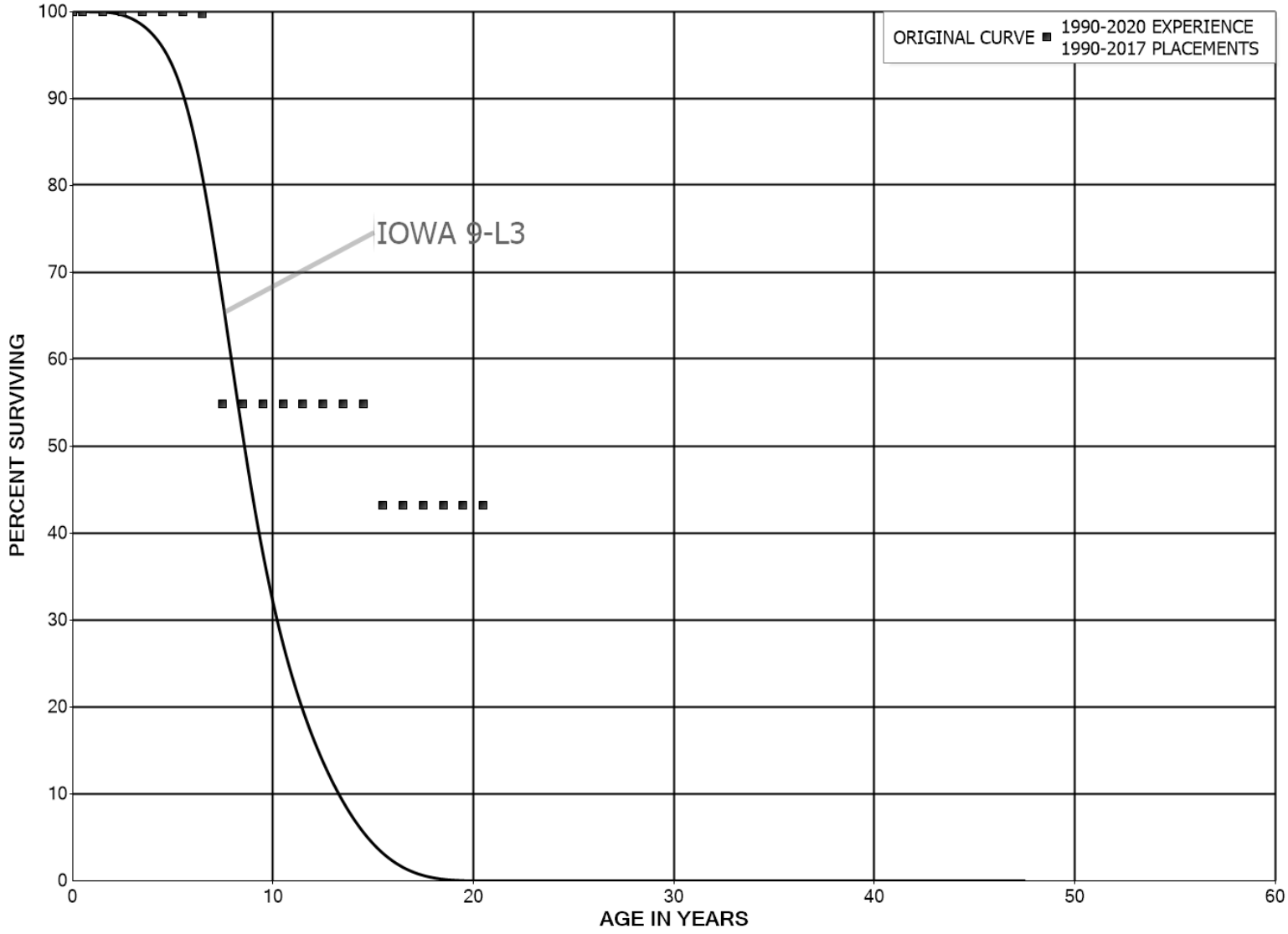
ACCOUNT 257.00 STRUCTURES AND IMPROVEMENTS - GENERAL

ORIGINAL LIFE TABLE, CONT.

PLACEMENT BAND 1932-2018 EXPERIENCE BAND 1932-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
79.5	9,052		0.0000	1.0000	88.38
80.5	3,763		0.0000	1.0000	88.38
81.5	3,355		0.0000	1.0000	88.38
82.5	3,355		0.0000	1.0000	88.38
83.5	3,355		0.0000	1.0000	88.38
84.5	3,355		0.0000	1.0000	88.38
85.5	3,355		0.0000	1.0000	88.38
86.5	3,355		0.0000	1.0000	88.38
87.5	3,355		0.0000	1.0000	88.38
88.5					88.38

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 259.00 OTHER GENERAL EQUIPMENT - CARS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

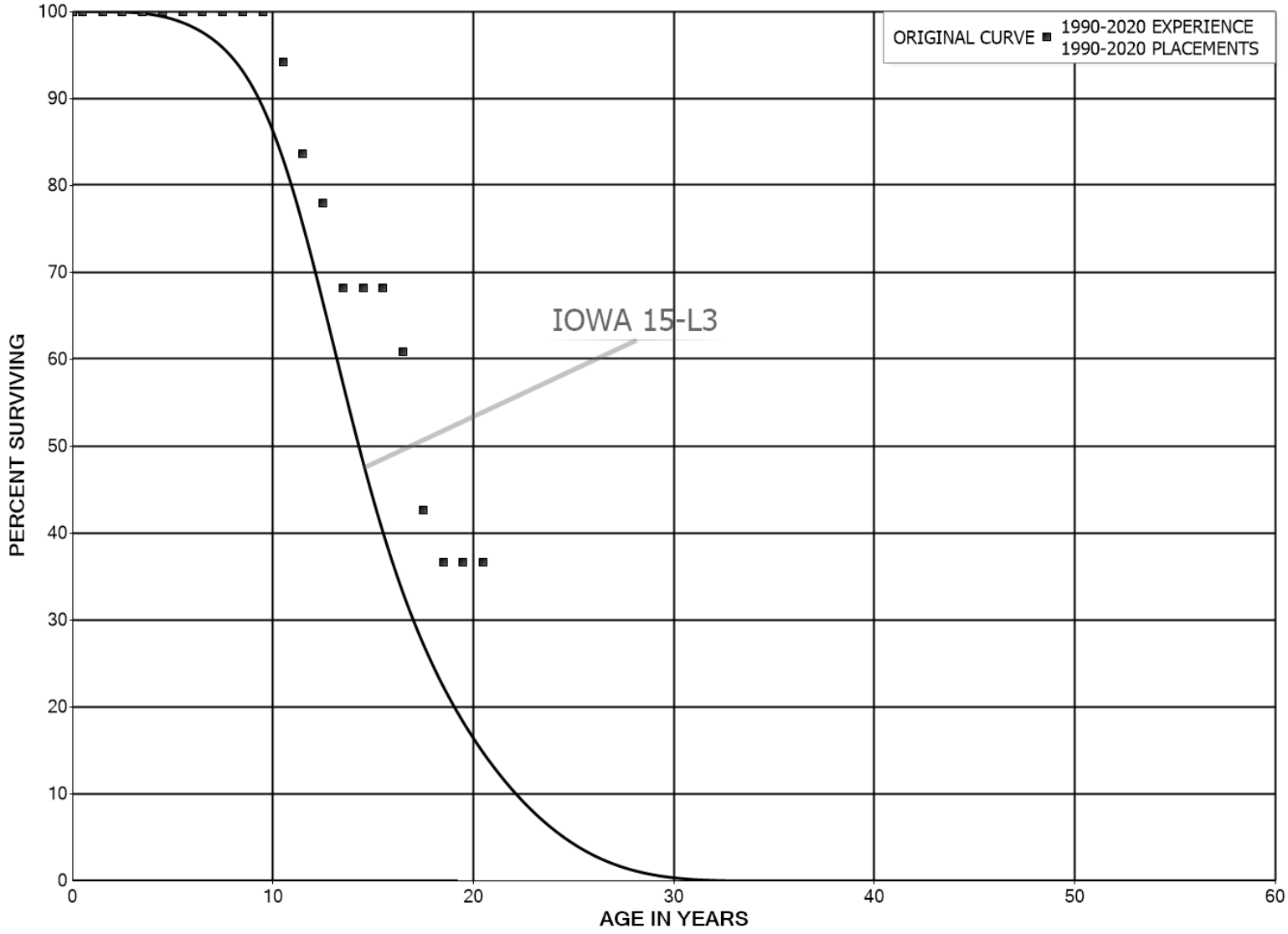
ACCOUNT 259.00 OTHER GENERAL EQUIPMENT - CARS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1990-2017 EXPERIENCE BAND 1990-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	170,505		0.0000	1.0000	100.00
0.5	170,505		0.0000	1.0000	100.00
1.5	170,505		0.0000	1.0000	100.00
2.5	170,505		0.0000	1.0000	100.00
3.5	102,887		0.0000	1.0000	100.00
4.5	102,887		0.0000	1.0000	100.00
5.5	130,694	372	0.0028	0.9972	100.00
6.5	73,115	32,923	0.4503	0.5497	99.72
7.5	52,643		0.0000	1.0000	54.81
8.5	52,643		0.0000	1.0000	54.81
9.5	52,643		0.0000	1.0000	54.81
10.5	52,643		0.0000	1.0000	54.81
11.5	52,643		0.0000	1.0000	54.81
12.5	52,643		0.0000	1.0000	54.81
13.5	52,643		0.0000	1.0000	54.81
14.5	52,643	11,200	0.2128	0.7872	54.81
15.5	41,443		0.0000	1.0000	43.15
16.5	41,443		0.0000	1.0000	43.15
17.5	41,443		0.0000	1.0000	43.15
18.5	41,443		0.0000	1.0000	43.15
19.5	29,357		0.0000	1.0000	43.15
20.5	15,689		0.0000	1.0000	43.15
21.5	15,689		0.0000	1.0000	43.15
22.5	10,939		0.0000	1.0000	43.15
23.5	10,939		0.0000	1.0000	43.15
24.5	10,939		0.0000	1.0000	43.15
25.5	10,939		0.0000	1.0000	43.15
26.5					43.15

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
ACCOUNT 259.00 OTHER GENERAL EQUIPMENT - TRUCKS
ORIGINAL AND SMOOTH SURVIVOR CURVES



THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT - TRUCKS

ORIGINAL LIFE TABLE

PLACEMENT BAND 1990-2020 EXPERIENCE BAND 1990-2020

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	932,673		0.0000	1.0000	100.00
0.5	881,365		0.0000	1.0000	100.00
1.5	821,972		0.0000	1.0000	100.00
2.5	600,291		0.0000	1.0000	100.00
3.5	523,633		0.0000	1.0000	100.00
4.5	523,633		0.0000	1.0000	100.00
5.5	499,421		0.0000	1.0000	100.00
6.5	499,421		0.0000	1.0000	100.00
7.5	468,196		0.0000	1.0000	100.00
8.5	451,919		0.0000	1.0000	100.00
9.5	427,954	25,085	0.0586	0.9414	100.00
10.5	381,280	42,830	0.1123	0.8877	94.14
11.5	317,210	21,459	0.0676	0.9324	83.56
12.5	280,751	34,998	0.1247	0.8753	77.91
13.5	161,442		0.0000	1.0000	68.20
14.5	139,431		0.0000	1.0000	68.20
15.5	139,431	15,137	0.1086	0.8914	68.20
16.5	124,294	37,100	0.2985	0.7015	60.79
17.5	87,194	12,271	0.1407	0.8593	42.65
18.5	74,923		0.0000	1.0000	36.65
19.5	72,087		0.0000	1.0000	36.65
20.5	38,415		0.0000	1.0000	36.65
21.5	38,415		0.0000	1.0000	36.65
22.5	32,518		0.0000	1.0000	36.65
23.5	32,518		0.0000	1.0000	36.65
24.5	31,810		0.0000	1.0000	36.65
25.5	31,810		0.0000	1.0000	36.65
26.5	13,529	9,532	0.7046	0.2954	36.65
27.5	3,997		0.0000	1.0000	10.83
28.5					10.83

PART VII. DETAILED DEPRECIATION CALCULATIONS

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SHEPPARD AND MYERS RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1932	24.79	20	17	7	20.40	
1933	122.16	99	86	36	20.20	2
1934	166,816.14	135,755	117,993	48,823	20.02	2,439
1935	6,197.89	4,986	4,334	1,864	21.03	89
1936	25.77	21	18	8	20.88	
1937	1,009.76	811	705	305	20.76	15
1939	162.25	130	113	49	20.60	2
1940	1,211.14	967	840	371	20.54	18
1941	472.43	377	328	145	20.51	7
1942	145.07	115	100	45	20.50	2
1943	484.84	384	334	151	20.51	7
1946	785.47	617	536	249	20.65	12
1948	155.57	121	105	50	20.84	2
1951	1,360.02	1,045	908	452	21.25	21
1952	1,672.11	1,278	1,111	561	21.41	26
1953	759.70	578	502	257	21.59	12
1958	5,306.48	3,976	3,456	1,851	21.25	87
1960	235.74	175	152	84	21.14	4
1961	229.06	169	147	82	21.47	4
1962	2,748.68	2,028	1,763	986	21.15	47
1963	51.54	38	33	19	21.50	1
1964	354,053.61	258,530	224,704	129,350	21.24	6,090
1965	2,406.05	1,740	1,512	894	21.62	41
1966	76.35	55	48	29	21.42	1
1969	2,657.60	1,884	1,637	1,020	21.57	47
1970	1,220.68	861	748	472	21.49	22
1986	2,554.93	1,578	1,372	1,183	21.97	54
1988	18,858.99	11,372	9,884	8,975	22.06	407
1989	224.28	134	116	108	21.85	5
1991	27,312.13	15,912	13,830	13,482	21.85	617
1993	3,320.37	1,874	1,629	1,692	22.01	77
1994	9,689.06	5,382	4,678	5,011	22.00	228
1995	13,882.29	7,578	6,586	7,296	22.04	331
1996	8,488.51	4,546	3,951	4,537	22.12	205
1997	1,663.52	876	761	902	22.01	41
1999	7,105.28	3,581	3,112	3,993	22.14	180
2000	259.29	128	111	148	22.17	7
2001	12,193.52	5,875	5,106	7,087	22.05	321
2003	2,218.99	1,010	878	1,341	22.15	61

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SHEPPARD AND MYERS RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
2004	3,596.45	1,593	1,385	2,212	22.02	100
2005	2,147.40	918	798	1,350	22.11	61
2008	6,771.18	2,569	2,233	4,538	22.09	205
2009	31,320.26	11,313	9,833	21,487	22.10	972
2010	3,715.12	1,269	1,103	2,612	22.17	118
2012	5,936.89	1,782	1,549	4,388	22.15	198
2021	1,900,000.00	42,750	37,157	1,862,843	21.72	85,766
	2,611,649.36	538,800	468,303	2,143,346		98,952
L.B SHEPPARD (LONG ARM) RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2067						
NET SALVAGE PERCENT.. 0						
1964	64,266.00	37,692	35,603	28,663	40.54	707
1967	2,313,857.22	1,323,989	1,250,612	1,063,245	40.74	26,098
1968	334.00	189	179	155	40.84	4
1969	43,505.43	24,441	23,086	20,419	40.95	499
1971	9,358.00	5,151	4,866	4,492	41.25	109
1972	879.00	483	456	423	40.59	10
1973	1,216.00	661	624	592	40.79	15
1977	291.00	150	142	149	41.71	4
1987	26,445.00	11,861	11,204	15,241	42.42	359
1992	50,259.00	20,606	19,464	30,795	42.45	725
1993	1,136.00	456	431	705	42.43	17
1994	659.70	259	245	415	42.43	10
1995	369.49	142	134	235	42.47	6
1996	40,372.61	15,132	14,293	26,079	42.53	613
1997	23,861.53	8,709	8,226	15,635	42.62	367
1999	6,129.16	2,110	1,993	4,136	42.86	97
2000	4,039.81	1,346	1,271	2,768	43.02	64
2002	11,723.32	3,658	3,455	8,268	43.00	192
2004	3,208.36	927	876	2,333	43.10	54
2005	4,696.28	1,302	1,230	3,466	43.02	81
2006	642.40	170	161	482	42.98	11
2007	2,383.91	601	568	1,816	42.97	42
2008	1,078.14	258	244	834	42.99	19
2009	468.46	105	99	369	43.06	9

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
L.B SHEPPARD (LONG ARM) RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2067						
NET SALVAGE PERCENT.. 0						
2010	309.04	65	61	248	43.15	6
2012	4,065.67	734	693	3,372	43.13	78
2015	3,957.64	520	491	3,466	43.00	81
2017	545,342.53	51,808	48,937	496,406	42.89	11,574
2018	15,438.67	1,167	1,102	14,336	42.80	335
2019	8,239.17	455	430	7,809	42.75	183
2020	132,568.84	4,534	4,283	128,286	42.36	3,028
	3,321,101.38	1,519,681	1,435,459	1,885,642		45,397
DREDGING						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2064						
NET SALVAGE PERCENT.. 0						
1984	525,160.00	256,016	239,939	285,221	39.42	7,235
1985	111,998.00	53,557	50,194	61,804	39.83	1,552
2002	7,894.00	2,570	2,409	5,485	40.38	136
2009	2,300.51	543	509	1,792	40.41	44
2012	1,231.72	234	219	1,012	40.50	25
	648,584.23	312,920	293,269	355,315		8,992
	6,581,334.97	2,371,401	2,197,031	4,384,303		153,341

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 28.6 2.33

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 210.00 SPRINGS AND WELLS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 45-R4						
NET SALVAGE PERCENT.. 0						
1984	8,812.00	6,907	6,507	2,305	10.34	223
1989	3,744.00	2,640	2,487	1,257	13.59	92
2002	152,428.64	68,654	64,682	87,747	23.79	3,688
2003	104,392.26	44,805	42,213	62,179	24.60	2,528
2004	2,861.65	1,162	1,095	1,767	25.60	69
2005	1,160.76	446	420	741	26.42	28
2006	185,465.29	66,990	63,115	122,350	27.42	4,462
	458,864.60	191,604	180,519	278,346		11,090

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 25.1 2.42

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CLEAR LAKE						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2034						
NET SALVAGE PERCENT.. 0						
1934	66,356.13	58,646	55,226	11,130	11.50	968
1935	27.00	24	23	4	11.54	
1936	111.00	98	92	19	11.59	2
1939	210.20	184	173	37	11.84	3
1947	411.68	353	332	79	12.45	6
1966	40.05	33	31	9	12.07	1
1967	489.60	400	377	113	12.17	9
1994	9,737.33	6,721	6,329	3,408	12.34	276
1997	9,547.41	6,339	5,969	3,578	12.40	289
1998	28,292.08	18,548	17,466	10,826	12.34	877
2001	12,698.00	7,913	7,452	5,246	12.39	423
2002	13,991.19	8,540	8,042	5,949	12.45	478
2006	9,844.00	5,462	5,144	4,700	12.43	378
2011	104,654.37	47,911	45,117	59,537	12.44	4,786
	256,410.04	161,172	151,774	104,636		8,496
KITZMILLER DAM						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2034						
NET SALVAGE PERCENT.. 0						
1934	8,877.07	7,846	6,560	2,317	11.50	201
1960	676.68	566	473	203	12.03	17
1963	0.91	1	1			
1965	6,172.74	5,057	4,228	1,945	12.47	156
1966	3,766.04	3,093	2,586	1,180	12.07	98
1969	515.74	417	349	167	12.44	13
1996	3,397.27	2,287	1,912	1,485	12.38	120
1999	4,350.48	2,810	2,349	2,001	12.34	162
2000	1,204.77	764	639	566	12.40	46
2010	42,976.33	20,659	17,273	25,703	12.42	2,069
2021	100,000.00	3,900	3,261	96,739	12.30	7,865
	171,938.03	47,400	39,632	132,306		10,747
	428,348.07	208,572	191,406	236,942		19,243

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 12.3 4.49

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 214.00 AQUEDUCTS AND SUPPLY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 100-S2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1934	44,702.39	37,550	35,303	9,399	16.67	564
1963	2,816.60	2,093	1,968	849	20.24	42
1991	394,877.95	228,832	215,136	179,742	22.13	8,122
1992	363,831.46	208,221	195,759	168,072	22.05	7,622
1993	203,093.64	114,606	107,747	95,347	22.01	4,332
1994	26,926.41	14,885	13,994	12,932	22.25	581
1995	23,143.11	12,571	11,819	11,324	22.28	508
2004	36,893.83	16,204	15,234	21,660	22.34	970
2005	104,531.33	44,321	41,668	62,863	22.41	2,805
2012	1,845,337.73	548,803	515,956	1,329,382	22.45	59,215
2013	135,073.95	37,091	34,871	100,203	22.46	4,461
2017	804,747.21	134,393	126,350	678,397	22.45	30,218
2018	391,349.08	52,754	49,597	341,752	22.47	15,209
2019	1,554,640.26	155,464	146,159	1,408,481	22.50	62,599
2020	1,517,818.92	95,015	89,328	1,428,491	22.48	63,545
2021	449,960.00	9,809	9,222	440,738	22.49	19,597
	7,899,743.87	1,712,612	1,610,111	6,289,633		280,390

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 22.4 3.55

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 217.00 SEDIMENTATION BASINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 80-S1.5						
PROBABLE RETIREMENT YEAR.. 6-2042						
NET SALVAGE PERCENT.. 0						
1932	39,440.00	34,242	32,169	7,271	13.59	535
1933	178.00	154	145	33	13.54	2
1934	3,011.00	2,608	2,450	561	13.52	41
1937	58.00	49	46	12	14.51	1
1938	3.00	3	3			
1939	178.00	151	142	36	14.58	2
1940	2,638.00	2,236	2,101	537	14.65	37
1941	619.00	523	491	128	14.74	9
1942	28.00	24	23	5	14.84	
1943	114.00	96	90	24	14.95	2
1944	176.00	147	138	38	15.09	3
1945	18.00	15	14	4	15.25	
1947	100.00	83	78	22	15.59	1
1948	39,983.00	33,210	31,199	8,784	14.99	586
1949	745.00	616	579	166	15.22	11
1950	104.00	86	81	23	15.46	1
1954	24.00	19	18	6	15.83	
1963	19,101.00	14,861	13,961	5,140	16.69	308
1964	41,074.00	31,648	29,732	11,342	17.13	662
1967	170,465.00	130,065	122,189	48,276	16.93	2,852
1993	396,166.00	237,105	222,748	173,418	19.12	9,070
1994	3,889.55	2,289	2,150	1,740	19.23	90
2009	61,652.90	23,736	22,299	39,354	19.97	1,971
2018	87,539.88	12,903	12,122	75,418	20.25	3,724
	867,305.33	526,869	494,968	372,337		19,908

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 18.7 2.30

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 219.00 FILTERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 70-R3						
PROBABLE RETIREMENT YEAR.. 6-2042						
NET SALVAGE PERCENT.. 0						
1948	27,019.00	23,631	22,407	4,612	10.54	438
1956	2,779.00	2,312	2,192	587	13.24	44
1957	80.00	66	63	17	13.62	1
1964	73,710.00	58,489	55,460	18,250	14.96	1,220
1967	120,289.00	93,092	88,271	32,018	15.92	2,011
1972	47,343.00	35,384	33,551	13,792	16.73	824
1981	4,058.00	2,811	2,665	1,393	17.98	77
1986	250,542.00	164,556	156,034	94,508	18.55	5,095
1987	148,086.00	96,049	91,075	57,011	18.69	3,050
1989	44,840.00	28,272	26,808	18,032	19.05	947
1992	6,264.00	3,807	3,610	2,654	19.04	139
2002	2,583.34	1,284	1,218	1,365	19.72	69
2006	6,285.70	2,757	2,614	3,672	19.84	185
2016	2,644,003.14	567,139	537,767	2,106,236	20.14	104,580
2018	2,626,196.51	388,677	368,547	2,257,650	20.14	112,098
	6,004,078.69	1,468,326	1,392,282	4,611,797		230,778

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 20.0 3.84

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 220.00 CLEAR WATER BASIN AND CLEARWELL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 65-R4						
PROBABLE RETIREMENT YEAR.. 6-2037						
NET SALVAGE PERCENT.. 0						
1967	2,282.00	1,878	1,782	500	11.72	43
1968	919.00	752	714	205	11.86	17
1984	53,364.00	38,625	36,651	16,713	14.31	1,168
2004	5,061.99	2,693	2,555	2,507	15.39	163
2013	686.74	243	231	456	15.48	29
2016	132,200.16	34,689	32,917	99,283	15.46	6,422
2018	262,619.65	48,427	45,952	216,668	15.48	13,997
2020	56,750.00	5,017	4,761	51,989	15.48	3,358
	513,883.54	132,324	125,563	388,321		25,197

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.4 4.90

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CHEMICAL BUILDING						
INTERIM SURVIVOR CURVE.. IOWA 75-R4						
PROBABLE RETIREMENT YEAR.. 6-2037						
NET SALVAGE PERCENT.. 0						
1948	66,267.02	58,448	55,262	11,005	9.83	1,120
1960	293.85	244	231	63	12.58	5
1961	693.64	571	540	154	13.03	12
1964	5,988.88	4,856	4,591	1,398	13.42	104
1971	620.68	486	460	161	14.01	11
1972	13,678.82	10,631	10,051	3,627	14.19	256
1973	23,021.93	17,755	16,787	6,235	14.39	433
1974	467.16	359	339	128	14.23	9
1975	689.17	526	497	192	14.48	13
1980	4,686.15	3,462	3,273	1,413	14.68	96
1988	43,190.48	29,806	28,181	15,009	15.04	998
1990	15,329.01	10,333	9,770	5,559	15.23	365
1994	1,100.63	708	669	431	15.24	28
1995	5,007.97	3,172	2,999	2,009	15.34	131
1997	751.64	462	437	315	15.34	21
2000	4,033.65	2,350	2,222	1,812	15.40	118
2003	3,156.64	1,723	1,629	1,528	15.40	99
2004	6,119.16	3,255	3,078	3,042	15.39	198
2005	9,433.08	4,871	4,605	4,828	15.45	312
2007	9,145.23	4,429	4,188	4,958	15.44	321
2008	10,994.12	5,121	4,842	6,152	15.48	397
2011	8,637.60	3,491	3,301	5,337	15.48	345
2012	40,861.70	15,527	14,681	26,181	15.50	1,689
2016	1,981,969.04	520,069	491,716	1,490,253	15.46	96,394
2018	176,074.89	32,468	30,698	145,377	15.48	9,391
2020	22,907.71	2,025	1,915	20,993	15.48	1,356
2021	25,540.00	799	755	24,785	15.47	1,602
	2,480,659.85	737,947	697,716	1,782,944		115,824
CHEMICAL TREATMENT EQUIPMENT						
SURVIVOR CURVE.. IOWA 35-L2.5						
NET SALVAGE PERCENT.. 0						
1959	968.32	884	845	124	5.99	21
1964	1,169.40	1,049	1,002	167	6.60	25
1965	277.86	248	237	41	6.79	6
1966	55.93	50	48	8	7.00	1
1967	414,512.70	365,973	349,650	64,863	7.23	8,971

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CHEMICAL TREATMENT EQUIPMENT						
SURVIVOR CURVE.. IOWA 35-L2.5						
NET SALVAGE PERCENT.. 0						
1969	4,511.69	3,956	3,780	732	7.38	99
1970	12,048.84	10,487	10,019	2,030	7.67	265
1971	566.81	489	467	100	7.98	13
1972	3,699.00	3,186	3,044	655	7.97	82
1973	5,348.92	4,566	4,362	987	8.32	119
1976	7,794.01	6,525	6,234	1,560	8.85	176
1977	3,705.10	3,083	2,945	760	8.97	85
1978	3,913.00	3,234	3,090	823	9.13	90
1980	2,049.36	1,667	1,593	457	9.52	48
1982	3,163.72	2,537	2,424	740	9.76	76
1983	27,166.88	21,546	20,585	6,582	10.04	656
1984	393,120.61	309,582	295,774	97,347	10.12	9,619
1985	35,309.93	27,581	26,351	8,959	10.23	876
1986	763,910.14	593,864	567,376	196,534	10.16	19,344
1987	345,428.26	265,773	253,919	91,509	10.34	8,850
1989	18,868.35	14,227	13,592	5,276	10.60	498
1991	29,551.63	21,812	20,839	8,713	10.82	805
1993	138,650.06	99,578	95,137	43,513	11.18	3,892
1994	10,681.68	7,550	7,213	3,468	11.41	304
1996	30,781.52	21,036	20,098	10,684	11.81	905
1998	15,763.02	10,262	9,804	5,959	12.60	473
1999	9,459.92	6,002	5,734	3,726	12.96	288
2001	21,287.15	12,700	12,134	9,154	13.86	660
2003	1,889.47	1,049	1,002	887	14.83	60
2004	1,572.24	836	799	774	15.39	50
2006	4,447.72	2,144	2,048	2,399	16.66	144
2007	1,536.33	699	668	869	17.35	50
2008	3,864.04	1,659	1,585	2,279	17.95	127
2009	12,431.09	4,987	4,765	7,667	18.65	411
2010	1,295.34	481	460	836	19.46	43
2011	3,226.30	1,104	1,055	2,172	20.17	108
2012	3,957.52	1,237	1,182	2,776	20.89	133
2016	3,043,005.22	564,173	539,009	2,503,996	24.17	103,599
2017	3,490.21	533	509	2,981	25.00	119
2018	3,938,247.89	468,651	447,748	3,490,500	25.91	134,716
2019	39,053.60	3,327	3,179	35,875	26.83	1,337
2021	95,777.00	1,638	1,565	94,212	28.74	3,278
	9,457,557.78	2,871,965	2,743,868	6,713,690		301,422

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
PARR'S HILL CHLORINATION FACILITY						
INTERIM SURVIVOR CURVE.. IOWA 40-S3						
PROBABLE RETIREMENT YEAR.. 6-2023						
NET SALVAGE PERCENT.. 0						
1971	27,815.34	27,109	25,994	1,821	1.32	1,380
1972	5,077.90	4,952	4,748	330	1.26	262
1973	21,581.30	21,037	20,172	1,409	1.25	1,127
1974	48,651.14	47,376	45,428	3,224	1.28	2,519
1983	24,465.85	23,644	22,672	1,794	1.34	1,339
2018	3,483.59	2,439	2,339	1,145	1.50	763
2019	1,462.47	914	876	586	1.50	391
2021	6,380.00	1,595	1,529	4,851	1.50	3,234
	138,917.59	129,066	123,758	15,160		11,015
	12,077,135.22	3,738,978	3,565,342	8,511,794		428,261

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 19.9 3.55

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 224.00 LABORATORY EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 30-S0						
NET SALVAGE PERCENT.. 0						
1971	1,134.00	1,059	1,019	115	3.56	32
1972	3,728.40	3,470	3,340	388	3.69	105
1984	6,532.60	5,389	5,188	1,345	7.95	169
1994	941.65	666	641	301	11.41	26
1995	1,905.00	1,317	1,268	637	11.82	54
1997	1,370.75	910	876	495	12.40	40
2000	367.98	227	219	149	13.34	11
2001	2,220.00	1,333	1,283	937	13.63	69
2017	7,115.00	1,422	1,369	5,746	18.02	319
2018	6,077.99	981	944	5,134	18.19	282
	31,393.37	16,774	16,147	15,246		1,107

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 13.8 3.53

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
PUMPING STRUCTURES						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2027						
NET SALVAGE PERCENT.. 0						
1932	5,249.00	4,980	4,709	540	4.84	112
1934	203.00	194	183	20	4.24	5
1937	746.00	706	668	78	4.79	16
1947	333.00	313	296	37	4.87	8
1948	24,114.00	22,508	21,281	2,833	5.24	541
1949	32.00	30	28	4	5.02	1
1961	248.00	228	216	32	5.29	6
1964	1,232.00	1,126	1,065	167	5.40	31
1965	6.00	5	5	1	5.23	
1966	13.00	12	11	2	5.48	
1967	4,853.68	4,418	4,177	676	5.38	126
1968	382.04	347	328	54	5.32	10
1981	945.00	834	789	156	5.37	29
1984	106,689.00	93,225	88,144	18,545	5.42	3,422
1985	69,348.00	60,499	57,202	12,146	5.34	2,275
1986	1,862.00	1,613	1,525	337	5.48	61
1989	4,414.00	3,787	3,581	833	5.38	155
1990	8,605.00	7,345	6,945	1,660	5.40	307
1991	17,275.00	14,647	13,849	3,426	5.47	626
1992	157,755.00	133,098	125,844	31,911	5.47	5,834
1994	5,679.86	4,732	4,474	1,206	5.50	219
	409,984.58	354,647	335,317	74,668		13,784
PARR'S HILL BOOSTER STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1967	21,210.24	15,952	15,051	6,159	17.96	343
1984	235.00	152	143	92	20.30	5
1993	185,882.00	106,473	100,461	85,421	21.25	4,020
1994	227,749.69	128,405	121,154	106,595	21.28	5,009
1995	40,719.62	22,551	21,278	19,442	21.35	911
2014	400,140.24	101,436	95,708	304,432	22.09	13,781
2015	2,372.64	540	510	1,863	22.07	84
	878,309.43	375,509	354,305	524,004		24,153

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
KIDD LANE PUMP STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2040						
NET SALVAGE PERCENT.. 0						
2000	11,107.89	6,043	5,693	5,415	18.02	300
2001	2,444.13	1,303	1,227	1,217	17.96	68
	13,552.02	7,346	6,920	6,632		368
SLAGLE RUN PUMP STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
2004	54,562.09	24,346	22,882	31,681	21.72	1,459
2016	5,375.74	1,073	1,008	4,367	22.05	198
	59,937.83	25,419	23,890	36,048		1,657
	1,361,783.86	762,921	720,432	641,352		39,962

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 16.0 2.93

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 237.00 PUMPS AND PUMPING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R2.5						
NET SALVAGE PERCENT.. 0						
1963	0.98	1	1			
1964	5,079.18	4,439	4,092	987	8.29	119
1967	34,425.67	29,455	27,153	7,273	9.20	791
1969	77.17	65	60	17	10.00	2
1975	2,868.05	2,267	2,090	778	12.32	63
1976	23,654.07	18,403	16,965	6,689	12.98	515
1981	433.32	314	289	144	15.36	9
1982	318.56	228	210	109	15.75	7
1983	2,010.30	1,409	1,299	711	16.45	43
1984	6,664.08	4,598	4,239	2,425	16.85	144
1989	4,365.88	2,710	2,498	1,868	19.85	94
1990	9,677.56	5,884	5,424	4,254	20.31	209
1991	14,050.36	8,314	7,664	6,386	21.05	303
1992	135,540.19	78,369	72,245	63,295	21.52	2,941
1993	101,999.18	57,262	52,787	49,212	22.26	2,211
1994	187,570.94	102,639	94,618	92,953	22.75	4,086
1995	46,606.19	24,701	22,771	23,835	23.50	1,014
1999	4,203.37	1,948	1,796	2,407	26.04	92
2000	35,445.33	15,851	14,612	20,833	26.58	784
2001	1,868.10	800	737	1,131	27.35	41
2003	4,216.86	1,654	1,525	2,692	28.67	94
2005	115,400.91	40,944	37,744	77,657	30.01	2,588
2006	166,686.80	56,073	51,691	114,996	30.58	3,760
2009	1,574.91	437	403	1,172	32.55	36
2011	906.94	215	198	709	33.75	21
2013	348.52	68	63	286	35.17	8
2014	1,224,820.54	213,119	196,465	1,028,356	35.60	28,886
2015	2,347.31	357	329	2,018	36.24	56
2017	24,617.11	2,649	2,442	22,175	37.34	594
2020	3,912.77	149	137	3,776	37.87	100
2021	466,600.00	6,252	5,764	460,836	36.68	12,564
	2,628,291.15	681,574	628,311	1,999,980		62,175

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 32.2 2.37

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 242.00 ELECTRICAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R3						
NET SALVAGE PERCENT.. 0						
1932	2,048.71	2,035	1,457	592	0.59	592
1935	46.54	46	33	14	1.22	11
1941	594.79	575	412	183	2.83	65
1943	34.44	33	24	10	3.47	3
1948	3,026.10	2,847	2,038	988	4.62	214
1949	86.57	81	58	29	5.02	6
1958	244.81	219	157	88	7.42	12
1963	341.61	296	212	130	9.07	14
1964	5,689.18	4,907	3,512	2,177	9.17	237
1965	1,247.30	1,064	762	485	9.72	50
1966	357.44	302	216	141	10.29	14
1967	36,391.46	30,543	21,862	14,529	10.44	1,392
1969	443.07	365	261	182	11.20	16
1970	116.35	95	68	48	11.79	4
1973	528.71	415	297	232	13.23	18
1974	1,464.18	1,134	812	652	13.85	47
1984	8,569.14	5,623	4,025	4,544	19.65	231
1985	21,003.97	13,493	9,658	11,346	20.32	558
1992	1,536.79	834	597	940	24.85	38
2002	81,721.74	30,915	22,128	59,594	32.05	1,859
2004	200,589.60	68,441	48,988	151,602	33.78	4,488
2016	396,663.49	44,942	32,168	364,495	43.04	8,469
2018	176,061.27	12,817	9,174	166,887	44.58	3,744
2019	2,922.78	153	110	2,813	45.35	62
2021	1,399,795.00	15,118	10,820	1,388,975	46.01	30,189
	2,341,525.04	237,293	169,849	2,171,676		52,333

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 41.5 2.23

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 243.00 OTHER PUMP STATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-S2.5						
NET SALVAGE PERCENT.. 0						
1993	7,254.00	5,417	5,175	2,079	9.67	215
1994	2,528.00	1,849	1,766	762	10.09	76
1995	13,912.60	9,954	9,510	4,403	10.54	418
2018	969.48	107	102	867	28.25	31
	24,664.08	17,327	16,553	8,111		740

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 11.0 3.00

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 246.00 TRANSMISSION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R3						
NET SALVAGE PERCENT.. 0						
1932	47,907.95	37,732	34,998	12,910	24.14	535
1964	100,526.73	57,803	53,615	46,912	42.50	1,104
1967	588,468.40	323,893	300,423	288,045	44.51	6,471
1989	305,911.24	106,396	98,686	207,225	60.95	3,400
1990	263,998.35	89,812	83,304	180,694	61.09	2,958
1991	233,507.02	76,917	71,344	162,163	62.09	2,612
1992	9,353.96	2,980	2,764	6,590	63.09	104
1993	132,552.86	40,800	37,844	94,709	64.09	1,478
1994	183,477.79	55,007	51,021	132,457	64.24	2,062
1995	4,574.00	1,321	1,225	3,349	65.25	51
2004	25,708.36	4,993	4,631	21,077	72.59	290
2005	55,468.49	10,162	9,426	46,042	73.59	626
2009	181,867.26	25,461	23,616	158,251	76.79	2,061
2011	6,400.97	759	704	5,697	78.00	73
2012	20,473.92	2,199	2,040	18,434	78.99	233
2018	93,124.86	3,781	3,507	89,618	82.71	1,084
2021	674,928.00	4,050	3,756	671,172	83.53	8,035
	2,928,250.16	844,066	782,904	2,145,346		33,177

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 64.7 1.13

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 247.00 DISTRIBUTION RESERVOIRS AND STANDPIPES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R3						
NET SALVAGE PERCENT.. 0						
1932	13,405.00	12,957	12,245	1,160	3.09	375
1933	346.00	334	316	30	3.25	9
1934	32,040.00	30,838	29,143	2,897	3.41	850
1935	1,049.00	1,007	952	97	3.59	27
1942	182.00	171	162	20	5.25	4
1964	42,268.70	34,753	32,842	9,427	12.43	758
1967	253,591.00	203,177	192,008	61,583	13.52	4,555
1968	1,863.00	1,475	1,394	469	14.07	33
1969	4,209.00	3,292	3,111	1,098	14.62	75
1971	1,427.00	1,088	1,028	399	15.72	25
1972	200.00	150	142	58	16.29	4
1981	113.00	74	70	43	21.61	2
1982	1,194.00	764	722	472	22.23	21
1983	421.00	264	249	172	22.85	8
1984	10,424.89	6,411	6,059	4,366	23.48	186
1987	5,994.00	3,433	3,244	2,750	25.74	107
1989	8,379.26	4,575	4,323	4,056	27.02	150
1990	39,779.40	21,179	20,015	19,764	27.67	714
1991	1,766.00	916	866	900	28.32	32
1995	7,023.00	3,219	3,042	3,981	31.31	127
1996	1,725.43	766	724	1,001	31.97	31
1998	3,410.40	1,411	1,333	2,077	33.32	62
2002	5,166.35	1,803	1,704	3,462	36.37	95
2003	1,573.97	524	495	1,079	37.06	29
2006	33,073.85	9,330	8,817	24,257	39.45	615
2007	32,230.59	8,554	8,084	24,147	40.14	602
2014	1,390,357.27	196,040	185,263	1,205,094	45.69	26,375
	1,893,213.11	548,505	518,353	1,374,860		35,871

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 38.3 1.89

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
1932	271,069.29	223,198	208,113	62,956	19.20	3,279
1933	552.88	450	420	133	20.20	7
1934	10,639.39	8,658	8,073	2,566	20.02	128
1935	6,733.32	5,416	5,050	1,683	21.03	80
1936	16,018.75	12,738	11,877	4,142	22.02	188
1937	2,789.33	2,216	2,066	723	21.88	33
1938	4,532.79	3,558	3,318	1,215	22.88	53
1939	72,968.27	56,587	52,763	20,205	23.88	846
1940	9,335.78	7,228	6,740	2,596	23.77	109
1941	14,873.07	11,375	10,606	4,267	24.76	172
1942	138.72	105	98	41	25.77	2
1944	12.97	10	9	4	26.67	
1945	302.39	222	207	95	27.67	3
1946	14,088.38	10,318	9,621	4,467	27.59	162
1947	3,872.13	2,798	2,609	1,263	28.60	44
1948	20,190.98	14,396	13,423	6,768	29.59	229
1949	22,776.90	16,183	15,089	7,688	29.54	260
1950	21,459.41	15,037	14,021	7,438	30.54	244
1951	21,476.37	14,838	13,835	7,641	31.54	242
1952	17,850.74	12,281	11,451	6,400	31.52	203
1953	14,277.00	9,683	9,029	5,248	32.51	161
1954	32,148.30	21,481	20,029	12,119	33.52	362
1955	30,624.02	20,163	18,800	11,824	34.51	343
1956	28,855.38	18,900	17,623	11,232	34.50	326
1957	31,278.46	20,175	18,811	12,467	35.50	351
1958	32,854.07	20,862	19,452	13,402	36.50	367
1959	15,515.48	9,697	9,042	6,473	37.50	173
1960	11,175.30	6,942	6,473	4,702	37.50	125
1961	29,742.58	18,173	16,945	12,798	38.51	332
1962	13,717.13	8,244	7,687	6,030	39.50	153
1963	85,422.47	50,468	47,057	38,365	40.51	947
1964	22,694.90	13,311	12,411	10,284	40.54	254
1965	34,742.80	20,022	18,669	16,074	41.54	387
1966	32,723.52	18,525	17,273	15,451	42.54	363
1967	75,337.48	41,880	39,050	36,287	43.54	833
1968	31,032.96	16,935	15,790	15,243	44.54	342
1969	185,201.77	100,157	93,388	91,814	44.58	2,060
1970	61,470.13	32,604	30,400	31,070	45.59	682
1971	76,642.30	39,869	37,175	39,467	46.58	847
1972	20,047.27	10,220	9,529	10,518	47.59	221
1973	35,843.19	17,907	16,697	19,146	48.58	394

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
1974	31,857.28	15,585	14,532	17,325	49.59	349
1975	59,266.60	28,661	26,724	32,543	49.65	655
1976	80,339.50	38,017	35,448	44,892	50.65	886
1977	14,787.96	6,844	6,381	8,407	51.65	163
1978	51,011.49	23,078	21,518	29,493	52.65	560
1979	310,455.32	137,221	127,947	182,508	53.65	3,402
1980	287,677.59	124,162	115,771	171,907	54.65	3,146
1981	222,640.71	93,776	87,438	135,203	55.65	2,430
1982	122,558.03	50,347	46,944	75,614	56.65	1,335
1983	116,046.26	46,906	43,736	72,310	56.74	1,274
1984	103,331.09	40,692	37,942	65,389	57.73	1,133
1985	225,110.69	86,262	80,432	144,679	58.74	2,463
1986	155,012.10	57,789	53,883	101,129	59.73	1,693
1987	411,992.05	149,224	139,139	272,853	60.74	4,492
1988	346,110.88	121,762	113,533	232,578	61.73	3,768
1989	259,339.68	88,487	82,507	176,833	62.74	2,819
1990	252,141.78	83,409	77,772	174,370	63.73	2,736
1991	365,605.23	117,067	109,155	256,450	64.74	3,961
1992	276,441.42	85,642	79,854	196,587	65.73	2,991
1993	473,514.07	141,675	132,100	341,414	66.74	5,116
1994	424,430.63	122,576	114,292	310,139	67.73	4,579
1995	106,929.66	29,748	27,738	79,192	68.74	1,152
1996	93,934.01	25,390	23,674	70,260	68.84	1,021
1997	160,615.72	41,712	38,893	121,723	69.84	1,743
1998	86,400.37	21,522	20,067	66,333	70.84	936
1999	220,157.12	52,507	48,958	171,199	71.84	2,383
2000	228,872.27	52,160	48,635	180,237	72.84	2,474
2001	514,039.96	111,701	104,152	409,888	73.84	5,551
2002	69,783.86	14,424	13,449	56,335	74.84	753
2003	50,837.40	9,969	9,295	41,542	75.84	548
2004	325,307.99	60,345	56,267	269,041	76.84	3,501
2005	66,938.46	11,708	10,917	56,021	77.84	720
2006	55,579.94	9,132	8,515	47,065	78.84	597
2007	456,403.69	70,149	65,408	390,996	79.84	4,897
2008	105,067.71	15,035	14,019	91,049	80.84	1,126
2009	134,834.91	17,866	16,659	118,176	81.84	1,444
2010	214,289.54	26,122	24,356	189,934	82.84	2,293
2011	74,340.09	8,274	7,715	66,625	83.84	795
2012	138,904.77	13,988	13,043	125,862	84.84	1,484
2013	286,380.35	25,803	24,059	262,321	85.84	3,056
2014	425,593.21	33,835	31,548	394,045	86.84	4,538

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
2015	112,973.70	7,784	7,258	105,716	87.84	1,204
2016	630,854.19	36,779	34,293	596,561	88.84	6,715
2017	325,019.22	15,503	14,455	310,564	89.84	3,457
2018	11,049.85	410	382	10,668	90.84	117
2019	18,427.33	488	455	17,972	91.84	196
2020	139,470.61	2,218	2,068	137,403	92.84	1,480
2021	1,124,890.00	6,074	5,664	1,119,226	92.95	12,041
	12,200,594.66	3,313,658	3,089,709	9,110,886		132,480

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 68.8 1.09

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
1932	41,500.17	37,516	35,270	6,230	9.50	656
1933	507.53	458	431	77	9.54	8
1934	785.27	708	666	119	9.59	12
1935	818.61	736	692	127	9.65	13
1936	2,483.75	2,230	2,096	388	9.73	40
1937	141.87	126	118	24	10.74	2
1938	1,577.54	1,396	1,312	266	10.84	25
1939	1,648.70	1,455	1,368	281	10.95	26
1940	3,299.92	2,905	2,731	569	11.09	51
1941	1,858.28	1,630	1,532	326	11.25	29
1942	440.59	385	362	79	11.41	7
1943	214.80	187	176	39	11.59	3
1944	1,429.67	1,241	1,167	263	11.79	22
1945	514.12	440	414	100	12.79	8
1946	3,157.65	2,694	2,533	625	12.99	48
1947	4,318.22	3,667	3,447	871	13.22	66
1948	6,065.16	5,126	4,819	1,246	13.46	93
1949	7,621.01	6,409	6,025	1,596	13.71	116
1950	8,027.22	6,716	6,314	1,713	13.97	123
1951	6,868.74	5,714	5,372	1,497	14.25	105
1952	8,008.45	6,623	6,226	1,782	14.54	123
1953	9,882.03	8,123	7,637	2,245	14.83	151
1954	6,599.23	5,390	5,067	1,532	15.14	101
1955	11,502.33	9,332	8,773	2,729	15.47	176
1956	6,669.91	5,373	5,051	1,619	15.80	102
1957	8,434.80	6,746	6,342	2,093	16.15	130
1958	12,842.08	10,194	9,584	3,258	16.50	197
1959	8,099.45	6,378	5,996	2,103	16.87	125
1960	10,069.66	7,864	7,393	2,677	17.24	155
1961	9,865.85	7,640	7,183	2,683	17.62	152
1962	7,288.24	5,594	5,259	2,029	18.02	113
1963	10,475.36	7,967	7,490	2,985	18.42	162
1964	4,530.07	3,412	3,208	1,322	18.84	70
1965	7,582.97	5,655	5,316	2,267	19.26	118
1966	7,340.62	5,419	5,094	2,247	19.68	114
1967	5,627.78	4,110	3,864	1,764	20.13	88
1968	10,115.62	7,306	6,869	3,247	20.58	158
1969	5,511.89	3,907	3,673	1,839	21.57	85
1970	9,983.74	6,993	6,574	3,410	22.03	155
1971	5,401.61	3,737	3,513	1,889	22.50	84
1972	10,024.72	6,848	6,438	3,587	22.96	156

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
1973	8,035.80	5,418	5,094	2,942	23.44	126
1974	12,621.83	8,394	7,891	4,731	23.93	198
1975	10,871.92	7,128	6,701	4,171	24.43	171
1976	6,507.93	4,205	3,953	2,555	24.92	103
1977	5,985.69	3,809	3,581	2,405	25.43	95
1978	4,099.20	2,550	2,397	1,702	26.43	64
1979	9,075.58	5,554	5,221	3,855	26.94	143
1980	5,844.58	3,517	3,306	2,539	27.46	92
1981	21,085.65	12,468	11,721	9,365	27.99	335
1982	16,725.49	9,711	9,130	7,595	28.53	266
1983	21,038.49	11,908	11,195	9,843	29.52	333
1984	27,857.17	15,461	14,535	13,322	30.07	443
1985	37,776.14	20,543	19,313	18,463	30.62	603
1986	35,096.46	18,566	17,454	17,642	31.61	558
1987	59,991.37	31,046	29,187	30,804	32.17	958
1988	52,123.78	26,364	24,785	27,339	32.73	835
1989	57,884.33	28,410	26,709	31,175	33.72	925
1990	54,657.32	26,170	24,603	30,054	34.29	876
1991	31,197.07	14,463	13,597	17,600	35.29	499
1992	69,928.16	31,566	29,676	40,252	35.86	1,122
1993	134,790.02	58,768	55,249	79,541	36.86	2,158
1994	66,330.83	28,091	26,409	39,922	37.44	1,066
1995	29,839.51	12,178	11,449	18,391	38.44	478
1996	26,838.85	10,540	9,909	16,930	39.44	429
1997	22,492.50	8,543	8,031	14,462	40.01	361
1998	20,454.60	7,450	7,004	13,451	41.02	328
1999	36,815.54	12,841	12,072	24,744	42.01	589
2000	29,411.27	9,865	9,274	20,137	42.60	473
2001	75,109.39	24,020	22,582	52,527	43.60	1,205
2002	47,412.15	14,423	13,559	33,853	44.60	759
2003	8,660.22	2,499	2,349	6,311	45.60	138
2004	50,623.81	13,911	13,078	37,546	46.19	813
2005	32,907.70	8,523	8,013	24,895	47.20	527
2006	25,621.17	6,236	5,863	19,758	48.19	410
2007	123,172.00	28,034	26,355	96,817	49.20	1,968
2008	42,710.71	9,055	8,513	34,198	50.19	681
2009	30,355.72	5,956	5,599	24,757	51.20	484
2010	9,690.52	1,750	1,645	8,046	52.19	154
2011	22,564.26	3,743	3,519	19,045	52.79	361
2012	12,290.03	1,845	1,735	10,555	53.79	196
2013	35,262.02	4,736	4,452	30,810	54.79	562

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
2014	96,265.33	11,407	10,724	85,541	55.79	1,533
2015	20,983.29	2,155	2,026	18,957	56.79	334
2016	39,093.81	3,397	3,194	35,900	57.79	621
2017	14,567.56	1,036	974	13,594	58.79	231
2018	12,567.38	695	653	11,914	59.79	199
2019	134,879.52	5,328	5,010	129,870	60.79	2,136
2020	8,324.17	197	185	8,139	61.79	132
2021	12,500.00	99	93	12,407	62.79	198
	2,040,073.07	800,922	752,962	1,287,111		32,437

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 39.7 1.59

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-S4						
NET SALVAGE PERCENT.. 0						
1970	6,764.28	6,514	6,116	648	1.98	327
1971	7,813.95	7,497	7,039	775	2.13	364
1972	8,161.84	7,798	7,322	840	2.31	364
1973	13,001.79	12,360	11,605	1,397	2.52	554
1974	9,443.94	8,972	8,424	1,020	2.50	408
1975	16,306.23	15,393	14,453	1,853	2.76	671
1976	21,186.40	19,858	18,645	2,541	3.04	836
1977	17,873.50	16,703	15,683	2,190	3.12	702
1978	17,922.64	16,607	15,593	2,330	3.45	675
1979	15,004.82	13,837	12,992	2,013	3.59	561
1980	20,840.46	19,027	17,865	2,975	3.95	753
1981	40,146.83	36,421	34,197	5,950	4.14	1,437
1982	45,211.80	40,537	38,061	7,151	4.56	1,568
1983	54,250.46	48,250	45,303	8,947	4.79	1,868
1984	57,321.59	50,300	47,228	10,094	5.24	1,926
1985	65,128.66	56,577	53,121	12,008	5.52	2,175
1986	49,191.20	42,088	39,517	9,674	5.99	1,615
1987	53,388.58	45,124	42,368	11,021	6.32	1,744
1988	67,656.98	56,209	52,776	14,881	6.82	2,182
1989	51,125.99	41,709	39,162	11,964	7.34	1,630
1990	81,270.21	65,024	61,053	20,217	7.87	2,569
1991	68,170.31	53,432	50,168	18,002	8.41	2,141
1992	66,388.56	50,920	47,810	18,579	8.96	2,074
1993	58,169.15	43,435	40,782	17,387	9.67	1,798
1994	27,550.47	20,002	18,780	8,770	10.38	845
1995	29,084.95	20,502	19,250	9,835	11.09	887
1996	19,910.95	13,555	12,727	7,184	11.96	601
1997	30,235.15	19,852	18,640	11,595	12.81	905
1998	26,824.04	16,958	15,922	10,902	13.67	798
1999	16,590.66	10,079	9,463	7,128	14.54	490
2000	14,967.90	8,720	8,187	6,781	15.40	440
2001	29,468.30	16,373	15,373	14,095	16.40	859
2002	21,792.50	11,515	10,812	10,980	17.40	631
2003	32,317.77	16,262	15,269	17,049	18.26	934
2004	52,482.07	24,981	23,455	29,027	19.26	1,507
2005	11,569.16	5,192	4,875	6,694	20.26	330
2006	28,358.47	11,956	11,226	17,132	21.26	806
2007	41,775.74	16,476	15,470	26,306	22.26	1,182
2008	9,031.31	3,316	3,113	5,918	23.26	254
2009	12,827.61	4,361	4,095	8,733	24.26	360
2010	21,581.31	6,751	6,339	15,242	25.26	603

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-S4						
NET SALVAGE PERCENT.. 0						
2011	22,859.25	6,529	6,130	16,729	26.26	637
2012	20,962.81	5,417	5,086	15,877	27.26	582
2013	31,679.99	7,324	6,877	24,803	28.26	878
2014	40,003.78	8,161	7,663	32,341	29.26	1,105
2015	22,067.29	3,901	3,663	18,404	30.26	608
2016	39,391.64	5,893	5,533	33,859	31.26	1,083
2017	63,175.85	7,733	7,261	55,915	32.26	1,733
2018	127,174.13	12,107	11,367	115,807	33.26	3,482
2019	138,952.11	9,449	8,872	130,080	34.26	3,797
2020	179,595.18	7,327	6,879	172,716	35.26	4,898
2021	355,000.00	4,828	4,533	350,467	36.26	9,665
	2,378,970.56	1,080,112	1,014,143	1,364,828		71,842

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 19.0 3.02

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 251.00 HYDRANTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R3						
NET SALVAGE PERCENT.. 0						
1932	2,006.00	1,867	1,759	247	6.65	37
1942	58.00	52	49	9	9.79	1
1950	133.00	113	106	27	12.54	2
1951	133.00	113	106	27	12.83	2
1952	162.00	136	128	34	13.14	3
1958	1,222.00	978	921	301	15.87	19
1959	352.00	279	263	89	16.24	5
1962	247.00	190	179	68	18.02	4
1963	1,637.00	1,245	1,173	464	18.42	25
1964	732.00	547	515	217	19.42	11
1965	537.00	397	374	163	19.83	8
1966	1,003.00	735	692	311	20.26	15
1967	1,916.00	1,389	1,308	608	20.69	29
1968	199.00	142	134	65	21.68	3
1969	657.00	462	435	222	22.13	10
1970	1,953.00	1,358	1,279	674	22.58	30
1982	5,205.00	2,940	2,770	2,435	30.43	80
1985	566.00	300	283	283	32.47	9
1987	701.00	353	333	368	33.99	11
1994	8,024.67	3,332	3,138	4,887	38.73	126
2003	1,810.05	522	492	1,318	45.60	29
	29,253.72	17,450	16,437	12,817		459

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 27.9 1.57

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 257.00 STRUCTURES AND IMPROVEMENTS - GENERAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R3						
NET SALVAGE PERCENT.. 0						
1932	3,355.00	3,243	3,064	291	3.09	94
1939	408.00	387	366	42	4.45	9
1940	5,289.00	5,000	4,725	564	4.71	120
1941	206.00	194	183	23	4.97	5
1943	16.00	15	14	2	5.53	
1945	614.00	568	537	77	6.15	13
1951	1,425.00	1,286	1,215	210	7.62	28
1958	37.00	32	30	7	10.03	1
1959	740.00	638	603	137	9.96	14
1960	89.00	76	72	17	10.45	2
1970	55.00	42	40	15	15.17	1
1979	16,587.00	11,209	10,592	5,995	20.39	294
1980	875.00	581	549	326	21.00	16
1981	4,761.00	3,104	2,933	1,828	21.61	85
1982	6,599.00	4,223	3,990	2,609	22.23	117
1983	28,805.00	18,078	17,083	11,722	22.85	513
1984	10,783.00	6,632	6,267	4,516	23.48	192
1997	5,179.69	2,221	2,099	3,081	32.64	94
1998	12,014.64	4,969	4,695	7,320	33.32	220
1999	157.50	63	60	98	34.00	3
2000	388.74	148	140	249	34.99	7
2001	312.72	114	108	205	35.68	6
2002	106,811.62	37,277	35,224	71,588	36.37	1,968
2005	533.53	159	150	384	38.75	10
2008	30,660.73	7,573	7,156	23,505	41.15	571
2009	27,380.79	6,298	5,951	21,430	41.85	512
2011	16,091.53	3,125	2,953	13,139	43.56	302
2014	154,954.00	21,849	20,646	134,308	45.69	2,940
2015	220,699.73	26,970	25,485	195,215	46.69	4,181
2016	9,975.00	1,037	980	8,995	47.41	190
2017	820.00	70	66	754	48.13	16
2018	2,340.00	156	147	2,193	48.86	45
	668,964.22	167,337	158,123	510,841		12,569

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 40.6 1.88

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 258.00 GENERAL OFFICE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
OFFICE FURNITURE						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1984	8,916.00	8,916	8,916			
1986	3,770.00	3,770	3,770			
1988	3,468.00	3,468	3,468			
1990	2,161.00	2,161	2,161			
1992	1,033.00	1,033	1,033			
1994	5,871.88	5,872	5,872			
1996	123.74	124	124			
2001	227.92	228	228			
2006	574.11	445	300-	874	4.50	194
2010	172.26	99	67-	239	8.50	28
2011	199.96	105	71-	271	9.50	29
	26,517.87	26,221	25,134	1,384		251
OFFICE EQUIPMENT						
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
1982	2,999.35	2,999	2,999			
1983	10,735.00	10,735	10,735			
1985	6,058.00	6,058	6,058			
1987	2,024.00	2,024	2,024			
1989	6,621.00	6,621	6,621			
1991	2,118.00	2,118	2,118			
1993	2,483.00	2,483	2,483			
1994	6,005.28	6,005	6,005			
1995	965.10	965	965			
1997	356.00	356	356			
2000	3,059.67	3,060	3,060			
2012	315.96	200	210-	526	5.50	96
2014	975.00	488	512-	1,487	7.50	198
2015	1,395.80	605	635-	2,031	8.50	239
	46,111.16	44,717	42,067	4,044		533

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 258.00 GENERAL OFFICE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
COMPUTER EQUIPMENT						
SURVIVOR CURVE.. 5-SQUARE						
NET SALVAGE PERCENT.. 0						
1998	3,724.44	3,724	3,724			
2005	5,624.00	5,624	5,624			
2008	2,040.00	2,040	2,040			
2009	3,673.47	3,673	3,673			
2012	550.80	551	551			
2015	15,005.80	15,006	15,006			
2017	587.94	529	390	198	0.50	198
2019	10,774.80	5,387	3,973	6,801	2.50	2,720
	41,981.25	36,534	34,982	6,999		2,918
	114,610.28	107,472	102,183	12,427		3,702

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 3.4 3.23

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CARS						
SURVIVOR CURVE.. IOWA 9-L3						
NET SALVAGE PERCENT.. 0						
1998	4,750.39	4,750	4,750			
2000	13,667.83	13,548	13,382	286	0.19	286
2001	12,085.57	12,066	11,918	167	0.03	167
2013	20,472.00	16,044	15,848	4,624	2.35	1,968
2017	135,237.02	71,933	71,052	64,185	3.96	16,208
2021	14,550.00	917	906	13,644	7.44	1,834
	200,762.81	119,258	117,856	82,907		20,463
TRUCKS						
SURVIVOR CURVE.. IOWA 15-L3						
NET SALVAGE PERCENT.. 0						
1994	16,277.50	15,399	15,113	1,165	1.57	742
1996	708.60	658	646	63	1.97	32
1998	5,896.37	5,349	5,250	647	2.41	268
2000	3,680.52	3,252	3,192	489	2.83	173
2001	2,835.96	2,471	2,425	411	3.03	136
2006	22,010.76	17,672	17,344	4,667	3.81	1,225
2007	84,311.09	66,387	65,154	19,157	3.92	4,887
2008	29,498.26	22,699	22,277	7,221	4.04	1,787
2009	21,239.98	15,877	15,582	5,658	4.22	1,341
2010	21,588.89	15,542	15,253	6,336	4.47	1,417
2011	23,965.47	16,383	16,079	7,887	4.86	1,623
2013	31,225.00	18,420	18,078	13,147	5.91	2,225
2015	24,211.95	11,380	11,169	13,043	7.33	1,779
2017	76,657.33	25,634	25,158	51,499	8.96	5,748
2018	221,681.33	58,125	57,045	164,636	9.85	16,714
2019	59,393.21	11,178	10,970	48,423	10.78	4,492
2020	51,308.00	5,808	5,700	45,608	11.75	3,882
2021	50,925.00	1,925	1,889	49,036	12.74	3,849
	747,415.22	314,159	308,324	439,091		52,320
TOOLS, SHOP AND GARAGE EQUIPMENT						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1988	17,205.41	17,205	17,205			
1990	42,119.89	42,120	42,120			

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
TOOLS, SHOP AND GARAGE EQUIPMENT						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1991	26,383.00	26,383	26,383			
1992	23,567.20	23,567	23,567			
1993	42,487.20	42,487	42,487			
1994	45,712.89	45,713	45,713			
1995	24,849.46	24,849	24,849			
1996	23,889.61	23,890	23,890			
1997	26,597.06	26,597	26,597			
1998	36,216.12	36,216	36,216			
1999	26,192.74	26,193	26,193			
2000	55,123.50	55,124	55,124			
2001	20,931.92	20,932	20,932			
2003	3,088.37	2,857	2,494	594	1.50	396
2004	11,159.86	9,765	8,524	2,636	2.50	1,054
2005	8,983.99	7,412	6,470	2,514	3.50	718
2006	18,762.73	14,541	12,693	6,070	4.50	1,349
2007	106,287.70	77,059	67,265	39,023	5.50	7,095
2008	38,624.28	26,071	22,757	15,867	6.50	2,441
2009	12,391.57	7,745	6,761	5,631	7.50	751
2010	14,578.59	8,383	7,318	7,261	8.50	854
2011	130,748.16	68,643	59,919	70,830	9.50	7,456
2012	3,555.50	1,689	1,474	2,081	10.50	198
2013	4,759.20	2,023	1,766	2,993	11.50	260
2014	5,997.20	2,249	1,963	4,034	12.50	323
2015	29,790.15	9,682	8,451	21,339	13.50	1,581
2016	5,238.25	1,441	1,258	3,980	14.50	274
2017	4,104.19	923	806	3,299	15.50	213
2018	177,401.06	31,045	27,099	150,302	16.50	9,109
2019	31,045.60	3,881	3,388	27,658	17.50	1,580
2020	156,397.21	11,730	10,239	146,158	18.50	7,900
2021	80,025.00	2,001	1,747	78,278	19.50	4,014
	1,254,214.61	700,416	663,667	590,548		47,566
COMMUNICATION EQUIPMENT						
SURVIVOR CURVE.. 10-SQUARE						
NET SALVAGE PERCENT.. 0						
1993	4,243.80	4,244	4,244			
1994	14,220.76	14,221	14,221			
1996	11,091.92	11,092	11,092			

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2021

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUTURE BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
COMMUNICATION EQUIPMENT						
SURVIVOR CURVE.. 10-SQUARE						
NET SALVAGE PERCENT.. 0						
1997	6,802.11	6,802	6,802			
1998	5,316.80	5,317	5,317			
1999	5,831.94	5,832	5,832			
2001	3,021.39	3,021	3,021			
2004	1,305.00	1,305	1,305			
2006	6,124.27	6,124	6,124			
2007	1,836.00	1,836	1,836			
2013	1,239.00	1,053	992	247	1.50	165
2016	132,200.16	72,710	68,506	63,694	4.50	14,154
2018	437,699.42	153,195	144,338	293,361	6.50	45,132
2019	8,766.00	2,192	2,065	6,701	7.50	893
	639,698.57	288,944	275,696	364,003		60,344
	2,842,091.21	1,422,777	1,365,543	1,476,549		180,693

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 8.2 6.36

Exhibit No. JJS-3
Witness: John J. Spanos
Doc. No. R-2021-3026116

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

2022 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2022

Prepared by:

Gannett Fleming

Excellence Delivered ***As Promised***

Exhibit No. JJS-3
Witness: John J. Spanos
Doc. No. R-2021-3026116

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

Hanover, Pennsylvania

2022 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2022

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania

Gannett Fleming

Excellence Delivered ***As Promised***

June 24, 2021

The Borough of Hanover
Hanover Municipal Water Works
44 Frederick Street
Hanover, PA 17331

Attention Mr. Samuel Miller
Borough Manager

Ladies and Gentlemen:

Pursuant to your request, we have determined the annual depreciation accruals applicable to water plant as of December 31, 2022. Summaries of the original cost, book reserve and annual accruals are presented in Tables 1 through 3 beginning on page I-3.

A description of the methods and procedures upon which the study was based is set forth in a companion report "2021 Depreciation Study - Calculated Annual Depreciation Accruals Related to Water Plant as of December 31, 2021." The same methods, procedures and estimates are used in both studies.

Respectfully submitted,

GANNETT FLEMING VALUATION
AND RATE CONSULTANTS, LLC

John J. Spanos

JOHN J. SPANOS
President

JJS:mle

068765.100

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PART II. DETAILED DEPRECIATION CALCULATIONS II-1

PART I. RESULTS OF STUDY

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
DEPRECIATION STUDY

PART I. RESULTS OF STUDY

SUMMARY OF RESULTS

The results of the depreciation study are summarized in Table 1, which sets forth the calculated annual depreciation and the ratemaking book depreciation reserve related to Water Plant in Service as of December 31, 2022. The calculated annual depreciation rates by account are based on the survivor curve and probable retirement date, where applicable. Table 2 presents the bringforward to December 31, 2022 of the book depreciation reserve as of December 31, 2021. Table 3 sets forth the calculation of estimated depreciation accruals for the fifteen months ended December 31, 2022.

DETAILED TABULATIONS OF DEPRECIATION CALCULATIONS

The supporting data for the depreciation calculations are presented in account sequence in the section beginning on page II-2. The original cost, calculated accrued depreciation, allocated book reserve, future accruals, remaining life and annual accrual are shown for each vintage of each account or subaccount.

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TABLE 1. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2022

	DEPRECIABLE GROUP	PROBABLE RETIREMENT DATE	SURVIVOR CURVE	ORIGINAL COST AS OF DECEMBER 31, 2022	BOOK DEPRECIATION RESERVE	FUTURE ACCRUALS	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(7)/(4)	(9)=(6)/(7)
	DEPRECIABLE PLANT								
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING								
	SHEPPARD AND MYERS RESERVOIR	06-2044	125-R2.5 *	6,345,649.36	572,044	5,773,605	277,036	4.37	20.8
	L. B. SHEPPARD (LONG ARM) RESERVOIR	06-2067	125-R2.5 *	3,321,101.38	1,480,958	1,840,143	45,275	1.36	40.6
	DREDGING	06-2064	125-R2.5 *	648,584.23	302,284	346,300	8,991	1.39	38.5
	TOTAL ACCOUNT 208			10,315,334.97	2,355,286	7,960,048	331,302	3.21	24.0
210	SPRINGS AND WELLS		45-R4	458,864.60	191,624	267,241	11,035	2.40	24.2
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING								
	CLEAR LAKE	06-2034	125-R2.5 *	256,410.04	160,261	96,149	8,402	3.28	11.4
	KITZMILLER DAM	06-2034	125-R2.5 *	358,938.03	43,222	315,716	27,801	7.75	11.4
	TOTAL ACCOUNT 212.2			615,348.07	203,483	411,865	36,203	5.88	11.4
214	AQUEDUCTS AND SUPPLY MAINS	06-2044	100-S2.5 *	8,055,039.87	1,890,138	6,164,902	287,581	3.57	21.4
217	SEDIMENTATION BASINS	06-2042	80-S1.5 *	867,305.33	514,916	352,389	19,760	2.28	17.8
219	FILTERS	06-2042	70-R3 *	6,004,078.69	1,622,839	4,381,240	230,193	3.83	19.0
220	CLEAR WATER BASIN AND CLEARWELL	06-2037	65-R4 *	513,883.54	150,743	363,141	25,178	4.90	14.4
223	CHEMICAL TREATMENT PLANT								
	CHEMICAL BUILDING	06-2037	75-R4 *	2,484,459.85	813,452	1,671,008	116,016	4.67	14.4
	CHEMICAL TREATMENT EQUIPMENT		35-L2.5	9,471,807.78	3,045,041	6,426,767	295,644	3.12	21.7
	PARR'S HILL CHLORINATION FACILITY	06-2023	40-S3 *	139,867.59	134,762	5,106	5,106	3.65	1.0
	TOTAL ACCOUNT 223			12,096,135.22	3,993,255	8,102,881	416,766	3.45	19.4
224	LABORATORY EQUIPMENT		30-S0	31,393.37	17,255	14,138	1,019	3.25	13.9
236	STRUCTURES AND IMPROVEMENTS - PUMPING								
	PUMPING STRUCTURES	06-2027	75-R3 *	409,984.58	349,092	60,893	13,687	3.34	4.4
	PARR'S HILL BOOSTER STATION	06-2044	75-R3 *	878,309.43	378,459	499,850	24,142	2.75	20.7
	KIDD LANE PUMP STATION	06-2040	75-R3 *	13,552.02	7,289	6,263	368	2.72	17.0
	SLAGLE RUN PUMP STATION	06-2044	75-R3 *	59,937.83	25,544	34,394	1,646	2.75	20.9
	TOTAL ACCOUNT 236			1,361,783.86	760,384	601,400	39,843	2.93	15.1
237	PUMPS AND PUMPING EQUIPMENT		50-R2.5	2,970,050.15	676,661	2,293,389	70,356	2.37	32.6
242	ELECTRICAL EQUIPMENT		55-R3	3,366,815.04	179,537	3,187,278	75,451	2.24	42.2
243	OTHER PUMP STATION EQUIPMENT		35-S2.5	24,664.08	17,293	7,371	699	2.83	10.5
246	TRANSMISSION MAINS		100-R3	3,161,190.16	812,549	2,348,641	35,658	1.13	65.9
247	DISTRIBUTION RESERVOIRS AND STANDPIPES		60-R3	1,893,213.11	554,135	1,339,078	35,161	1.86	38.1
248	DISTRIBUTION MAINS		100-R4	12,588,824.66	3,216,881	9,371,944	136,474	1.08	68.7
249	SERVICES		70-S2.5	2,050,808.07	783,595	1,267,213	32,364	1.58	39.2
250	METERS		38-S4	2,743,470.56	1,050,992	1,692,479	81,809	2.98	20.7
251	HYDRANTS		70-R3	29,253.72	16,896	12,358	450	1.54	27.5
257	STRUCTURES AND IMPROVEMENTS - GENERAL		60-R3	668,964.22	170,700	498,264	12,475	1.86	39.9

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TABLE 1. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WATER PLANT AS OF DECEMBER 31, 2022

	DEPRECIABLE GROUP	PROBABLE RETIREMENT DATE	SURVIVOR CURVE	ORIGINAL COST AS OF DECEMBER 31, 2022	BOOK DEPRECIATION RESERVE	FUTURE ACCRUALS	CALCULATED ANNUAL ACCRUAL AMOUNT	CALCULATED ANNUAL ACCRUAL RATE	COMPOSITE REMAINING LIFE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)=(7)/(4)	(9)=(6)/(7)
258	GENERAL OFFICE EQUIPMENT								
	OFFICE FURNITURE		20-SQ	26,517.87	25,386	1,132	254	0.96	4.5
	OFFICE EQUIPMENT		15-SQ	46,111.16	42,602	3,509	534	1.16	6.6
	COMPUTER EQUIPMENT		5-SQ	41,981.25	37,900	4,081	2,721	6.48	1.5
	TOTAL ACCOUNT 258			114,610.28	105,888	8,722	3,509	3.06	2.5
259	OTHER GENERAL EQUIPMENT								
	CARS		9-L3	211,387.42	134,105	77,282	19,648	9.29	3.9
	TRUCKS		15-L3	765,940.22	358,291	407,649	50,562	6.60	8.1
	TOOLS, SHOP AND GARAGE EQUIPMENT		20-SQ	1,276,314.61	709,121	567,194	48,843	3.83	11.6
	COMMUNICATION EQUIPMENT		10-SQ	639,698.57	336,020	303,679	60,286	9.42	5.0
	TOTAL ACCOUNT 259			2,893,340.82	1,537,537	1,355,804	179,339	6.20	7.6
	TOTAL DEPRECIABLE PLANT			**72,824,372.39**	**20,822,587**	**52,001,786**	**2,062,625**	**2.83**	**25.2**
	NONDEPRECIABLE PLANT								
205	LAND			18,026.03					
206	LAND			11,174.98					
207	LAND			2,689.89					
207.02	LAND			429,396.00					
207.03	LAND			74,314.20					
207.04	LAND			69,848.51					
207.05	LAND			36,800.00					
207.06	LAND			59,663.56					
207.1	TREES			24,916.00					
212.1	LAND			7,307.00					
234	LAND			96,020.25					
234.1	LAND - SLAGLE RUN			12,112.50					
245	RIGHTS OF WAY			23,410.67					
245.01	RIGHTS OF WAY			9,701.88					
247.1	LAND - PARR'S HILL			2,455.00					
247.12	LAND - NEW STORAGE W. TANK			9,310.05					
	TOTAL NONDEPRECIABLE PLANT			**887,146.52**					
	TOTAL WATER PLANT IN SERVICE			**73,711,518.91**	**20,822,587**	**52,001,786**	**2,062,625**		

* LIFE SPAN PROCEDURE WAS USED. CURVE SHOWN IS INTERIM SURVIVOR CURVE.

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TABLE 2. BRINGFORWARD OF THE BOOK RESERVE FROM DECEMBER 31, 2021 TO DECEMBER 31, 2022

	DEPRECIABLE GROUP	BOOK RESERVE DECEMBER 31, 2021	+	ANNUAL ACCRUALS	-	RETIREMENTS	=	BOOK RESERVE DECEMBER 31, 2022
	(1)	(2)		(3)		(4)		(5)
DEPRECIABLE PLANT								
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING							
	SHEPPARD AND MYERS RESERVOIR	468,303		169,741		66,000		572,044
	L. B. SHEPPARD (LONG ARM) RESERVOIR	1,435,459		45,499				1,480,958
	DREDGING	293,269		9,015				302,284
	TOTAL ACCOUNT 208	2,197,031		224,255		66,000		2,355,286
210	SPRINGS AND WELLS	180,519		11,105				191,624
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING							
	CLEAR LAKE	151,774		8,487				160,261
	KITZMILLER DAM	39,632		16,590		13,000		43,222
	TOTAL ACCOUNT 212.2	191,406		25,077		13,000		203,483
214	AQUEDUCTS AND SUPPLY MAINS	1,610,111		283,197		3,170		1,890,138
217	SEDIMENTATION BASINS	494,968		19,948				514,916
219	FILTERS	1,392,282		230,557				1,622,839
220	CLEAR WATER BASIN & CLEARWELL	125,563		25,180				150,743
223	CHEMICAL TREATMENT PLANT							
	CHEMICAL BUILDING	697,716		115,936		200		813,452
	CHEMICAL TREATMENT EQUIPMENT	2,743,868		301,923		750		3,045,041
	PARR'S HILL CHLORINATION FACILITY	123,758		11,054		50		134,762
	TOTAL ACCOUNT 223	3,565,342		428,913		1,000		3,993,255
224	LABORATORY EQUIPMENT	16,147		1,108				17,255
236	STRUCTURES AND IMPROVEMENTS - PUMPING							
	PUMPING STRUCTURES	335,317		13,775				349,092
	PARR'S HILL BOOSTER STATION	354,305		24,154				378,459
	KIDD LANE PUMP STATION	6,920		369				7,289
	SLAGLE RUN PUMP STATION	23,890		1,654				25,544
	TOTAL ACCOUNT 236	720,432		39,952		0		760,384
237	PUMPS AND PUMPING EQUIPMENT	628,311		66,340		17,990		676,661
242	ELECTRICAL EQUIPMENT	169,849		63,648		53,960		179,537
243	OTHER PUMP STATION EQUIPMENT	16,553		740				17,293
246	TRANSMISSION MAINS	782,904		34,405		4,760		812,549
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	518,353		35,782				554,135
248	DISTRIBUTION MAINS	3,089,709		135,102		7,930		3,216,881
249	SERVICES	752,962		32,523		1,890		783,595
250	METERS	1,014,143		77,349		40,500		1,050,992
251	HYDRANTS	16,437		459				16,896
257	STRUCTURES AND IMPROVEMENTS - GENERAL	158,123		12,577				170,700
258	GENERAL OFFICE EQUIPMENT							
	OFFICE FURNITURE	25,134		252				25,386
	OFFICE EQUIPMENT	42,067		535				42,602
	COMPUTER EQUIPMENT	34,982		2,918				37,900
	TOTAL ACCOUNT 258	102,183		3,705		0		105,888
259	OTHER GENERAL EQUIPMENT							
	CARS	117,856		20,999		4,750		134,105
	TRUCKS	308,324		52,967		3,000		358,291
	TOOLS, SHOP AND GARAGE EQUIPMENT	663,667		47,954		2,500		709,121
	COMMUNICATION EQUIPMENT	275,696		60,324				336,020
	TOTAL ACCOUNT 259	1,365,543		182,244		10,250		1,537,537
TOTAL DEPRECIABLE PLANT		**19,108,872**		**1,934,166**		**220,450**		**20,822,587**

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TABLE 3. CALCULATION OF DEPRECIATION ACCRUALS FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2022

	DEPRECIABLE GROUP	ORIGINAL COST AT DECEMBER 31, 2021	ORIGINAL COST AT DECEMBER 31, 2022	COMPOSITE ACCRUAL RATE	ANNUAL ACCRUAL AMOUNT
	(1)	(2)	(3)	(4)	(5)
DEPRECIABLE PLANT					
208	COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING				
	SHEPPARD AND MYERS RESERVOIR	2,611,649.36	6,345,649.36	3.79	169,741
	L. B. SHEPPARD (LONG ARM) RESERVOIR	3,321,101.38	3,321,101.38	1.37	45,499
	DREDGING	648,584.23	648,584.23	1.39	9,015
	TOTAL ACCOUNT 208	6,581,334.97	10,315,334.97	2.33	224,255
210	SPRINGS AND WELLS	458,864.60	458,864.60	2.42	11,105
212.2	COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING				
	CLEAR LAKE	256,410.04	256,410.04	3.31	8,487
	KITZMILLER DAM	171,938.03	358,938.03	6.25	16,590
	TOTAL ACCOUNT 212.2	428,348.07	615,348.07	4.49	25,077
214	AQUEDUCTS AND SUPPLY MAINS	7,899,743.87	8,055,039.87	3.55	283,197
217	SEDIMENTATION BASINS	867,305.33	867,305.33	2.30	19,948
219	FILTERS	6,004,078.69	6,004,078.69	3.84	230,557
220	CLEAR WATER BASIN & CLEARWELL	513,883.54	513,883.54	4.90	25,180
223	CHEMICAL TREATMENT PLANT				
	CHEMICAL BUILDING	2,480,659.85	2,484,459.85	4.67	115,936
	CHEMICAL TREATMENT EQUIPMENT	9,457,557.78	9,471,807.78	3.19	301,923
	PARR'S HILL CHLORINATION FACILITY	138,917.59	139,867.59	7.93	11,054
	TOTAL ACCOUNT 223	12,077,135.22	12,096,135.22	3.55	428,913
224	LABORATORY EQUIPMENT	31,393.37	31,393.37	3.53	1,108
236	STRUCTURES AND IMPROVEMENTS - PUMPING				
	PUMPING STRUCTURES	409,984.58	409,984.58	3.36	13,775
	PARR'S HILL BOOSTER STATION	878,309.43	878,309.43	2.75	24,154
	KIDD LANE PUMP STATION	13,552.02	13,552.02	2.72	369
	SLAGLE RUN PUMP STATION	59,937.83	59,937.83	2.76	1,654
	TOTAL ACCOUNT 236	1,361,783.86	1,361,783.86	2.93	39,952
237	PUMPS AND PUMPING EQUIPMENT	2,628,291.15	2,970,050.15	2.37	66,340
242	ELECTRICAL EQUIPMENT	2,341,525.04	3,366,815.04	2.23	63,648
243	OTHER PUMP STATION EQUIPMENT	24,664.08	24,664.08	3.00	740
246	TRANSMISSION MAINS	2,928,250.16	3,161,190.16	1.13	34,405
247	DISTRIBUTION RESERVOIRS AND STANDPIPES	1,893,213.11	1,893,213.11	1.89	35,782
248	DISTRIBUTION MAINS	12,200,594.66	12,588,824.66	1.09	135,102
249	SERVICES	2,040,073.07	2,050,808.07	1.59	32,523
250	METERS	2,378,970.56	2,743,470.56	3.02	77,349
251	HYDRANTS	29,253.72	29,253.72	1.57	459
257	STRUCTURES AND IMPROVEMENTS - GENERAL	668,964.22	668,964.22	1.88	12,577
258	GENERAL OFFICE EQUIPMENT				
	OFFICE FURNITURE	26,517.87	26,517.87	0.95	252
	OFFICE EQUIPMENT	46,111.16	46,111.16	1.16	535
	COMPUTER EQUIPMENT	41,981.25	41,981.25	6.95	2,918
	TOTAL ACCOUNT 258	114,610.28	114,610.28	3.23	3,705
259	OTHER GENERAL EQUIPMENT				
	CARS	200,762.81	211,387.42	10.19	20,999
	TRUCKS	747,415.22	765,940.22	7.00	52,967
	TOOLS, SHOP AND GARAGE EQUIPMENT	1,254,214.61	1,276,314.61	3.79	47,954
	COMMUNICATION EQUIPMENT	639,698.57	639,698.57	9.43	60,324
	TOTAL ACCOUNT 259	2,842,091.21	2,893,340.82	6.36	182,244
TOTAL DEPRECIABLE PLANT		**66,314,372.78**	**72,824,372.39**	2.76	**1,934,166**

PART II. DETAILED DEPRECIATION CALCULATIONS

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SHEPPARD AND MYERS RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1932	24.20	20	16	8	19.38	
1933	119.07	98	80	39	19.20	2
1934	162,600.46	133,820	108,759	53,842	19.03	2,829
1935	6,041.26	4,916	3,995	2,046	20.02	102
1936	25.12	20	16	9	19.88	
1937	984.24	799	649	335	19.77	17
1939	158.15	128	104	54	19.59	3
1940	1,180.53	954	775	405	19.54	21
1941	460.49	372	302	158	19.52	8
1942	141.40	114	93	49	19.50	3
1943	472.59	379	308	165	19.50	8
1946	765.62	609	495	271	19.65	14
1948	151.64	120	98	54	19.84	3
1951	1,325.65	1,033	840	486	20.24	24
1952	1,629.85	1,264	1,027	603	20.41	30
1953	740.50	571	464	276	20.59	13
1958	5,172.38	3,937	3,200	1,973	20.25	97
1960	229.78	172	140	90	20.83	4
1961	223.27	168	137	87	20.47	4
1962	2,679.22	1,994	1,621	1,059	20.80	51
1963	50.24	37	30	20	20.50	1
1964	345,106.18	254,378	206,739	138,367	20.87	6,630
1965	2,345.25	1,726	1,403	942	20.62	46
1966	74.42	55	45	30	20.42	1
1969	2,590.44	1,871	1,521	1,070	20.58	52
1970	1,189.83	856	696	494	20.50	24
1986	2,490.36	1,582	1,286	1,205	20.97	57
1988	18,382.40	11,415	9,277	9,105	21.06	432
1989	218.61	134	109	110	21.15	5
1991	26,621.91	15,933	12,949	13,673	21.13	647
1993	3,236.46	1,890	1,536	1,700	21.01	81
1994	9,444.20	5,437	4,419	5,025	21.00	239
1995	13,531.47	7,666	6,230	7,301	21.04	347
1996	8,273.99	4,604	3,742	4,532	21.12	215
1997	1,621.48	889	723	899	21.01	43
1999	6,925.72	3,646	2,963	3,963	21.14	187
2000	252.74	130	106	147	21.17	7
2001	11,885.37	6,004	4,880	7,006	21.06	333
2003	2,162.91	1,038	844	1,319	21.15	62

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HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SHEPPARD AND MYERS RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
2004	3,505.56	1,634	1,328	2,178	21.18	103
2005	2,093.13	949	771	1,322	21.11	63
2008	6,600.06	2,680	2,178	4,422	21.21	208
2009	30,528.75	11,912	9,681	20,848	21.10	988
2010	3,621.23	1,344	1,092	2,529	21.17	119
2012	5,786.86	1,920	1,560	4,226	21.15	200
2021	1,851,984.37	123,342	100,243	1,751,741	21.02	83,337
2022	3,800,000.00	89,300	72,576	3,727,424	20.78	179,376
	6,345,649.36	703,860	572,044	5,773,605		277,036
L.B SHEPPARD (LONG ARM) RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2067						
NET SALVAGE PERCENT.. 0						
1964	64,266.00	38,348	36,344	27,922	39.54	706
1967	2,313,857.22	1,348,516	1,278,054	1,035,804	39.73	26,071
1968	334.00	193	183	151	39.84	4
1969	43,505.43	24,903	23,602	19,904	39.96	498
1971	9,358.00	5,254	4,979	4,379	40.24	109
1972	879.00	488	463	416	40.41	10
1973	1,216.00	668	633	583	40.59	14
1977	291.00	154	146	145	40.71	4
1987	26,445.00	12,204	11,566	14,879	41.42	359
1992	50,259.00	21,310	20,197	30,062	41.44	725
1993	1,136.00	473	448	688	41.42	17
1994	659.70	267	253	407	41.92	10
1995	369.49	146	138	231	41.94	6
1996	40,372.61	15,620	14,804	25,569	41.99	609
1997	23,861.53	9,005	8,534	15,327	42.07	364
1999	6,129.16	2,204	2,089	4,040	41.86	97
2000	4,039.81	1,409	1,335	2,704	42.01	64
2002	11,723.32	3,845	3,644	8,079	42.00	192
2004	3,208.36	979	928	2,281	42.11	54
2005	4,696.28	1,381	1,309	3,387	42.02	81
2006	642.40	180	171	472	42.32	11
2007	2,383.91	639	606	1,778	42.30	42
2008	1,078.14	275	261	818	42.32	19

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 208.00 COLLECTING AND IMPOUNDING RESERVOIRS - IMPOUNDING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
L.B SHEPPARD (LONG ARM) RESERVOIR						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2067						
NET SALVAGE PERCENT.. 0						
2009	468.46	113	107	361	42.37	9
2010	309.04	71	67	242	42.14	6
2012	4,065.67	807	765	3,301	42.41	78
2015	3,957.64	597	566	3,392	42.25	80
2017	545,342.53	62,987	59,696	485,647	42.12	11,530
2018	15,438.67	1,487	1,409	14,029	42.23	332
2019	8,239.17	634	601	7,638	41.95	182
2020	132,568.84	7,450	7,061	125,508	41.95	2,992
	3,321,101.38	1,562,607	1,480,958	1,840,143		45,275
DREDGING						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2064						
NET SALVAGE PERCENT.. 0						
1984	525,160.00	262,843	247,210	277,950	38.42	7,235
1985	111,998.00	55,013	51,741	60,257	38.84	1,551
2002	7,894.00	2,703	2,542	5,352	39.38	136
2009	2,300.51	584	549	1,751	39.69	44
2012	1,231.72	257	242	990	39.75	25
	648,584.23	321,400	302,284	346,300		8,991
	10,315,334.97	2,587,867	2,355,286	7,960,048		331,302
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..					24.0	3.21

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 210.00 SPRINGS AND WELLS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 45-R4						
NET SALVAGE PERCENT.. 0						
1984	8,812.00	7,057	6,706	2,106	9.58	220
1989	3,744.00	2,709	2,574	1,170	12.80	91
2002	152,428.64	71,870	68,298	84,131	22.98	3,661
2003	104,392.26	47,018	44,681	59,711	23.79	2,510
2004	2,861.65	1,228	1,167	1,695	24.60	69
2005	1,160.76	471	448	713	25.60	28
2006	185,465.29	71,293	67,750	117,715	26.42	4,456
	458,864.60	201,646	191,624	267,241		11,035
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..					24.2	2.40

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CLEAR LAKE						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2034						
NET SALVAGE PERCENT.. 0						
1934	66,356.13	58,725	55,943	10,413	11.50	905
1935	27.00	24	23	4	11.50	
1936	111.00	99	94	17	10.58	2
1939	210.20	186	177	33	10.84	3
1947	411.68	357	340	72	11.46	6
1966	40.05	33	31	9	11.07	1
1967	489.60	408	389	101	11.17	9
1994	9,737.33	6,966	6,636	3,101	11.34	273
1997	9,547.41	6,597	6,285	3,263	11.40	286
1998	28,292.08	19,270	18,357	9,935	11.47	866
2001	12,698.00	8,299	7,906	4,792	11.39	421
2002	13,991.19	8,977	8,552	5,439	11.45	475
2006	9,844.00	5,815	5,540	4,304	11.43	377
2011	104,654.37	52,474	49,988	54,666	11.44	4,778
	256,410.04	168,230	160,261	96,149		8,402
KITZMILLER DAM						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2034						
NET SALVAGE PERCENT.. 0						
1934	8,205.87	7,262	5,108	3,098	11.50	269
1960	625.52	532	374	251	11.03	23
1963	0.84	1	1			
1965	5,706.03	4,758	3,346	2,360	11.46	206
1966	3,481.29	2,911	2,047	1,434	11.07	130
1969	476.75	393	276	200	11.44	17
1996	3,140.41	2,197	1,545	1,595	11.38	140
1999	4,021.55	2,703	1,901	2,120	11.47	185
2000	1,113.68	739	520	594	11.40	52

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 212.20 COLLECTING AND IMPOUNDING RESERVOIRS - COLLECTING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
KITZMILLER DAM						
INTERIM SURVIVOR CURVE.. IOWA 125-R2.5						
PROBABLE RETIREMENT YEAR.. 6-2034						
NET SALVAGE PERCENT.. 0						
2010	39,726.95	20,757	14,599	25,128	11.42	2,200
2021	92,439.14	10,760	7,568	84,871	11.39	7,451
2022	200,000.00	8,440	5,936	194,064	11.33	17,128
	358,938.03	61,453	43,222	315,716		27,801
	615,348.07	229,683	203,483	411,865		36,203

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 11.4 5.88

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 214.00 AQUEDUCTS AND SUPPLY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 100-S2.5						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1934	44,684.45	37,571	35,680	9,004	16.76	537
1963	2,815.47	2,127	2,020	795	19.24	41
1991	394,719.49	236,240	224,351	170,368	21.13	8,063
1992	363,685.46	215,193	204,363	159,322	21.05	7,569
1993	203,012.14	118,579	112,611	90,401	21.01	4,303
1994	26,915.61	15,417	14,641	12,275	21.25	578
1995	23,133.82	13,043	12,387	10,747	21.28	505
2004	36,879.03	17,127	16,265	20,614	21.34	966
2005	104,489.38	46,999	44,634	59,855	21.41	2,796
2012	1,844,597.24	606,135	575,629	1,268,968	21.45	59,159
2013	135,019.75	41,424	39,339	95,681	21.46	4,459
2017	804,424.28	164,103	155,844	648,580	21.46	30,223
2018	391,192.04	67,754	64,344	326,848	21.48	15,216
2019	1,554,016.42	217,562	206,612	1,347,404	21.50	62,670
2020	1,517,209.85	158,093	150,137	1,367,073	21.48	63,644
2021	449,779.44	29,326	27,850	421,929	21.49	19,634
2022	158,466.00	3,613	3,431	155,035	21.48	7,218
	8,055,039.87	1,990,306	1,890,138	6,164,902		287,581

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 21.4 3.57

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 217.00 SEDIMENTATION BASINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 80-S1.5						
PROBABLE RETIREMENT YEAR.. 6-2042						
NET SALVAGE PERCENT.. 0						
1932	39,440.00	34,620	32,798	6,642	12.60	527
1933	178.00	155	147	31	13.59	2
1934	3,011.00	2,611	2,474	537	13.54	40
1937	58.00	50	47	11	13.50	1
1938	3.00	3	3			
1939	178.00	153	145	33	13.59	2
1940	2,638.00	2,263	2,144	494	13.65	36
1941	619.00	530	502	117	13.73	9
1942	28.00	24	23	5	13.84	
1943	114.00	97	92	22	13.96	2
1944	176.00	149	141	35	14.09	2
1945	18.00	15	14	4	14.24	
1947	100.00	84	80	20	14.59	1
1948	39,983.00	33,362	31,607	8,376	14.79	566
1949	745.00	619	586	159	14.99	11
1950	104.00	86	81	23	15.22	2
1954	24.00	20	19	5	15.53	
1963	19,101.00	15,002	14,213	4,888	16.26	301
1964	41,074.00	32,198	30,504	10,570	16.13	655
1967	170,465.00	131,497	124,578	45,887	16.45	2,789
1993	396,166.00	245,425	232,510	163,656	18.12	9,032
1994	3,889.55	2,372	2,247	1,643	18.23	90
2009	61,652.90	25,635	24,286	37,367	18.97	1,970
2018	87,539.88	16,545	15,675	71,865	19.31	3,722
	867,305.33	543,515	514,916	352,389		19,760

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 17.8 2.28

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 219.00 FILTERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 70-R3						
PROBABLE RETIREMENT YEAR.. 6-2042						
NET SALVAGE PERCENT.. 0						
1948	27,019.00	23,752	22,786	4,233	10.25	413
1956	2,779.00	2,347	2,252	527	12.24	43
1957	80.00	67	64	16	12.62	1
1964	73,710.00	59,071	56,669	17,041	14.50	1,175
1967	120,289.00	94,800	90,945	29,344	14.92	1,967
1972	47,343.00	35,862	34,404	12,939	16.17	800
1981	4,058.00	2,863	2,747	1,311	17.32	76
1986	250,542.00	168,264	161,421	89,121	17.85	4,993
1987	148,086.00	98,299	94,302	53,784	17.98	2,991
1989	44,840.00	29,142	27,957	16,883	18.05	935
1992	6,264.00	3,916	3,757	2,507	18.28	137
2002	2,583.34	1,351	1,296	1,287	18.71	69
2006	6,285.70	2,925	2,806	3,480	18.96	184
2016	2,644,003.14	670,255	642,999	2,001,004	19.14	104,546
2018	2,626,196.51	498,715	478,434	2,147,763	19.20	111,863
	6,004,078.69	1,691,629	1,622,839	4,381,240		230,193

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 19.0 3.83

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 220.00 CLEAR WATER BASIN AND CLEARWELL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
INTERIM SURVIVOR CURVE.. IOWA 65-R4						
PROBABLE RETIREMENT YEAR.. 6-2037						
NET SALVAGE PERCENT.. 0						
1967	2,282.00	1,900	1,826	456	11.17	41
1968	919.00	761	731	188	11.29	17
1984	53,364.00	39,447	37,910	15,454	13.58	1,138
2004	5,061.99	2,847	2,736	2,326	14.39	162
2013	686.74	272	261	426	14.48	29
2016	132,200.16	40,982	39,385	92,815	14.47	6,414
2018	262,619.65	62,293	59,866	202,754	14.47	14,012
2020	56,750.00	8,354	8,028	48,722	14.48	3,365
	513,883.54	156,856	150,743	363,141		25,178

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 14.4 4.90

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CHEMICAL BUILDING						
INTERIM SURVIVOR CURVE.. IOWA 75-R4						
PROBABLE RETIREMENT YEAR.. 6-2037						
NET SALVAGE PERCENT.. 0						
1948	66,261.69	59,238	56,632	9,630	8.83	1,091
1960	293.83	246	235	59	12.13	5
1961	693.58	580	554	139	12.03	12
1964	5,988.40	4,939	4,722	1,267	12.43	102
1971	620.63	495	473	147	13.02	11
1972	13,677.72	10,844	10,367	3,311	13.20	251
1973	23,020.07	18,117	17,320	5,700	13.40	425
1974	467.12	365	349	118	13.61	9
1975	689.11	537	513	176	13.48	13
1980	4,685.77	3,545	3,389	1,297	13.68	95
1988	43,187.00	30,693	29,343	13,844	14.04	986
1990	15,327.77	10,660	10,191	5,137	14.23	361
1994	1,100.54	734	702	399	14.24	28
1995	5,007.57	3,291	3,146	1,861	14.34	130
1997	751.58	481	460	292	14.34	20
2000	4,033.32	2,460	2,352	1,682	14.40	117
2003	3,156.39	1,816	1,736	1,420	14.40	99
2004	6,118.67	3,441	3,290	2,829	14.39	197
2005	9,432.32	5,167	4,940	4,493	14.45	311
2007	9,144.49	4,734	4,526	4,619	14.44	320
2008	10,993.23	5,499	5,257	5,736	14.49	396
2011	8,636.90	3,824	3,656	4,981	14.47	344
2012	40,858.41	17,161	16,406	24,452	14.50	1,686
2016	1,981,809.25	614,361	587,329	1,394,480	14.47	96,370
2018	176,060.69	41,762	39,924	136,136	14.47	9,408
2020	22,905.86	3,372	3,224	19,682	14.48	1,359
2021	25,537.94	2,395	2,290	23,248	14.50	1,603
2022	4,000.00	134	128	3,872	14.49	267
	2,484,459.85	850,891	813,452	1,671,008		116,016
CHEMICAL TREATMENT EQUIPMENT						
SURVIVOR CURVE.. IOWA 35-L2.5						
NET SALVAGE PERCENT.. 0						
1959	968.24	892	870	98	5.46	18
1964	1,169.31	1,053	1,027	142	6.44	22
1965	277.84	249	243	35	6.60	5
1966	55.93	50	49	7	6.79	1

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CHEMICAL TREATMENT EQUIPMENT						
SURVIVOR CURVE.. IOWA 35-L2.5						
NET SALVAGE PERCENT.. 0						
1967	414,479.83	368,058	358,943	55,536	7.00	7,934
1969	4,511.33	3,958	3,860	651	7.48	87
1970	12,047.88	10,564	10,302	1,745	7.38	236
1971	566.77	493	481	86	7.67	11
1972	3,698.71	3,194	3,115	584	7.98	73
1973	5,348.50	4,607	4,493	856	7.97	107
1976	7,793.39	6,559	6,397	1,397	8.75	160
1977	3,704.81	3,102	3,025	680	8.85	77
1978	3,912.69	3,256	3,175	737	8.97	82
1980	2,049.20	1,681	1,639	410	9.32	44
1982	3,163.47	2,550	2,487	677	9.75	69
1983	27,164.73	21,781	21,242	5,923	9.76	607
1984	393,089.43	311,759	304,039	89,051	10.04	8,870
1985	35,307.13	27,804	27,115	8,192	10.12	809
1986	763,849.56	596,643	581,868	181,982	10.23	17,789
1987	345,400.87	268,515	261,866	83,535	10.16	8,222
1989	18,866.85	14,411	14,054	4,813	10.36	465
1991	29,549.29	22,061	21,515	8,035	10.69	752
1993	138,639.06	101,012	98,511	40,129	10.99	3,651
1994	10,680.83	7,671	7,481	3,200	11.18	286
1996	30,779.08	21,370	20,841	9,938	11.67	852
1998	15,761.77	10,541	10,280	5,482	12.13	452
1999	9,459.17	6,158	6,006	3,454	12.60	274
2001	21,285.46	13,133	12,808	8,478	13.34	636
2003	1,889.32	1,091	1,064	825	14.28	58
2004	1,572.12	873	851	721	14.83	49
2006	4,447.37	2,260	2,204	2,243	15.97	140
2007	1,536.21	740	722	815	16.66	49
2008	3,863.73	1,759	1,715	2,148	17.35	124
2009	12,430.10	5,336	5,204	7,226	17.95	403
2010	1,295.24	520	507	788	18.65	42
2011	3,226.04	1,198	1,168	2,058	19.46	106
2012	3,957.21	1,355	1,321	2,636	20.17	131
2016	3,042,763.90	662,714	646,303	2,396,461	23.35	102,632
2017	3,489.93	647	631	2,859	24.17	118
2018	3,937,935.58	600,929	586,048	3,351,888	25.00	134,076

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 223.00 CHEMICAL TREATMENT PLANT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CHEMICAL TREATMENT EQUIPMENT						
SURVIVOR CURVE.. IOWA 35-L2.5						
NET SALVAGE PERCENT.. 0						
2019	39,050.50	4,647	4,532	34,519	25.91	1,332
2021	95,769.40	4,913	4,791	90,978	27.74	3,280
2022	15,000.00	256	250	14,750	28.74	513
	9,471,807.78	3,122,363	3,045,041	6,426,767		295,644
PARR'S HILL CHLORINATION FACILITY						
INTERIM SURVIVOR CURVE.. IOWA 40-S3						
PROBABLE RETIREMENT YEAR.. 6-2023						
NET SALVAGE PERCENT.. 0						
1971	27,805.34	27,494	27,276	530	0.58	530
1972	5,076.07	5,024	4,984	92	0.52	92
1973	21,573.53	21,358	21,188	385	0.50	385
1974	48,633.63	48,118	47,736	898	0.52	898
1983	24,457.04	24,151	23,959	498	0.50	498
2018	3,482.34	3,134	3,109	373	0.50	373
2019	1,461.94	1,279	1,269	193	0.50	193
2021	6,377.70	4,783	4,745	1,633	0.50	1,633
2022	1,000.00	500	496	504	0.50	504
	139,867.59	135,841	134,762	5,106		5,106
	12,096,135.22	4,109,095	3,993,255	8,102,881		416,766
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..					19.4	3.45

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 224.00 LABORATORY EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 30-S0						
NET SALVAGE PERCENT.. 0						
1971	1,134.00	1,069	1,057	77	3.15	24
1972	3,728.40	3,483	3,443	285	3.56	80
1984	6,532.60	5,457	5,394	1,139	7.59	150
1994	941.65	679	671	271	11.03	25
1995	1,905.00	1,346	1,330	575	11.41	50
1997	1,370.75	930	919	452	12.09	37
2000	367.98	233	230	138	13.09	11
2001	2,220.00	1,370	1,355	865	13.34	65
2017	7,115.00	1,675	1,656	5,459	17.86	306
2018	6,077.99	1,214	1,200	4,878	18.02	271
	31,393.37	17,456	17,255	14,138		1,019

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 13.9 3.25

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
PUMPING STRUCTURES						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2027						
NET SALVAGE PERCENT.. 0						
1932	5,249.00	5,035	4,821	428	3.84	111
1934	203.00	194	186	17	4.09	4
1937	746.00	714	684	62	3.79	16
1947	333.00	317	304	29	3.87	7
1948	24,114.00	22,817	21,848	2,266	4.24	534
1949	32.00	30	29	3	4.02	1
1961	248.00	232	222	26	4.29	6
1964	1,232.00	1,146	1,097	135	4.39	31
1965	6.00	6	6			
1966	13.00	12	11	2	4.48	
1967	4,853.68	4,498	4,307	547	4.38	125
1968	382.04	354	339	43	4.32	10
1981	945.00	855	819	126	4.37	29
1984	106,689.00	95,700	91,636	15,053	4.42	3,406
1985	69,348.00	61,893	59,265	10,083	4.52	2,231
1986	1,862.00	1,658	1,588	274	4.48	61
1989	4,414.00	3,889	3,724	690	4.52	153
1990	8,605.00	7,579	7,257	1,348	4.40	306
1991	17,275.00	15,128	14,486	2,789	4.47	624
1992	157,755.00	137,610	131,767	25,988	4.47	5,814
1994	5,679.86	4,905	4,697	983	4.50	218
	409,984.58	364,572	349,092	60,893		13,687
PARR'S HILL BOOSTER STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
1967	21,210.24	16,128	15,315	5,895	17.49	337
1984	235.00	156	148	87	19.64	4
1993	185,882.00	110,228	104,671	81,211	20.25	4,010
1994	227,749.69	133,051	126,343	101,406	20.28	5,000
1995	40,719.62	23,406	22,226	18,494	20.34	909
2014	400,140.24	114,960	109,164	290,976	21.09	13,797
2015	2,372.64	623	592	1,781	21.07	85
	878,309.43	398,552	378,459	499,850		24,142

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 236.00 STRUCTURES AND IMPROVEMENTS - PUMPING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
KIDD LANE PUMP STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2040						
NET SALVAGE PERCENT.. 0						
2000	11,107.89	6,323	5,994	5,114	17.03	300
2001	2,444.13	1,366	1,295	1,149	16.96	68
	13,552.02	7,689	7,289	6,263		368
SLAGLE RUN PUMP STATION						
INTERIM SURVIVOR CURVE.. IOWA 75-R3						
PROBABLE RETIREMENT YEAR.. 6-2044						
NET SALVAGE PERCENT.. 0						
2004	54,562.09	25,639	24,343	30,219	20.87	1,448
2016	5,375.74	1,265	1,201	4,175	21.12	198
	59,937.83	26,904	25,544	34,394		1,646
	1,361,783.86	797,717	760,384	601,400		39,843

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.1 2.93

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 237.00 PUMPS AND PUMPING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R2.5						
NET SALVAGE PERCENT.. 0						
1963	0.97	1	1			
1964	5,044.43	4,426	4,086	958	8.17	117
1967	34,190.03	29,410	27,149	7,041	9.02	781
1969	76.64	65	60	17	9.79	2
1975	2,848.42	2,273	2,098	750	12.02	62
1976	23,492.16	18,571	17,143	6,349	12.32	515
1981	430.35	318	294	136	14.68	9
1982	316.38	229	211	105	15.36	7
1983	1,996.54	1,428	1,318	679	15.75	43
1984	6,618.47	4,638	4,281	2,337	16.45	142
1989	4,336.00	2,760	2,548	1,788	19.13	93
1990	9,611.32	5,967	5,508	4,103	19.85	207
1991	13,954.19	8,484	7,832	6,122	20.31	301
1992	134,612.45	79,650	73,525	61,087	21.05	2,902
1993	101,301.02	58,572	54,068	47,233	21.52	2,195
1994	186,287.06	104,582	96,540	89,747	22.26	4,032
1995	46,287.18	25,328	23,380	22,907	22.75	1,007
1999	4,174.60	2,011	1,856	2,319	25.28	92
2000	35,202.72	16,316	15,061	20,142	26.04	774
2001	1,855.31	830	766	1,089	26.58	41
2003	4,188.00	1,723	1,591	2,597	27.90	93
2005	114,611.02	42,922	39,622	74,989	29.23	2,565
2006	165,545.87	58,736	54,220	111,326	30.01	3,710
2009	1,564.13	465	429	1,135	31.95	36
2011	900.73	232	214	687	33.14	21
2013	346.13	75	69	277	34.56	8
2014	1,216,436.95	236,719	218,517	997,920	35.17	28,374
2015	2,331.24	406	375	1,956	35.60	55
2017	24,448.61	3,173	2,929	21,520	36.87	584
2020	3,885.99	240	222	3,664	37.98	96
2021	463,406.24	17,656	16,298	447,108	37.87	11,806
2022	359,749.00	4,821	4,450	355,299	36.68	9,686
	2,970,050.15	733,027	676,661	2,293,389		70,356

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 32.6 2.37

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 242.00 ELECTRICAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R3						
NET SALVAGE PERCENT.. 0						
1932	2,001.47	1,992	1,237	764	0.41	764
1935	45.47	45	45			
1941	581.08	564	350	231	2.54	91
1943	33.65	32	20	14	3.14	4
1948	2,956.36	2,797	1,737	1,219	4.24	288
1949	84.58	80	50	35	4.62	8
1958	239.17	216	134	105	6.93	15
1963	333.74	292	181	153	8.53	18
1964	5,558.07	4,812	2,988	2,570	9.07	283
1965	1,218.56	1,051	653	566	9.17	62
1966	349.20	298	185	164	9.72	17
1967	35,552.83	29,992	18,625	16,928	10.29	1,645
1969	432.86	359	223	210	11.02	19
1970	113.67	94	58	56	11.20	5
1973	516.53	412	256	261	12.61	21
1974	1,430.44	1,124	698	732	13.23	55
1984	8,371.67	5,608	3,483	4,889	18.97	258
1985	20,519.94	13,465	8,362	12,158	19.65	619
1992	1,501.37	838	520	981	24.14	41
2002	79,838.48	31,584	19,613	60,225	31.32	1,923
2004	195,967.05	70,705	43,907	152,060	32.78	4,639
2016	387,522.46	51,618	32,054	355,468	42.28	8,407
2018	172,003.97	16,031	9,955	162,049	43.81	3,699
2019	2,855.43	208	129	2,726	44.58	61
2021	1,367,536.99	43,214	26,836	1,340,701	45.90	29,209
2022	1,079,250.00	11,656	7,238	1,072,012	46.01	23,300
	3,366,815.04	289,087	179,537	3,187,278		75,451

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 42.2 2.24

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 243.00 OTHER PUMP STATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-S2.5						
NET SALVAGE PERCENT.. 0						
1993	7,254.00	5,521	5,387	1,867	9.26	202
1994	2,528.00	1,888	1,842	686	9.67	71
1995	13,912.60	10,177	9,930	3,983	10.09	395
2018	969.48	137	134	835	27.24	31
	24,664.08	17,723	17,293	7,371		699

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.5 2.83

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 246.00 TRANSMISSION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R3						
NET SALVAGE PERCENT.. 0						
1932	47,830.09	38,092	35,530	12,300	23.14	532
1964	100,363.32	58,713	54,764	45,599	41.50	1,099
1967	587,511.82	326,069	304,138	283,374	44.50	6,368
1989	305,413.97	109,460	102,098	203,316	59.96	3,391
1990	263,569.21	91,669	85,504	178,065	60.95	2,921
1991	233,127.44	79,310	73,976	159,151	61.09	2,605
1992	9,338.75	3,076	2,869	6,470	62.09	104
1993	132,337.39	42,163	39,327	93,010	63.09	1,474
1994	183,179.54	56,383	52,591	130,589	64.09	2,038
1995	4,566.56	1,369	1,277	3,290	64.24	51
2004	25,666.57	5,272	4,917	20,750	71.59	290
2005	55,378.32	10,754	10,031	45,347	72.59	625
2009	181,571.63	27,454	25,607	155,965	75.79	2,058
2011	6,390.56	831	775	5,616	76.99	73
2012	20,440.64	2,424	2,261	18,180	78.00	233
2018	92,973.48	4,816	4,492	88,481	82.45	1,073
2021	673,830.87	11,859	11,062	662,769	83.97	7,893
2022	237,700.00	1,426	1,330	236,370	83.53	2,830
	3,161,190.16	871,140	812,549	2,348,641		35,658

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 65.9 1.13

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 247.00 DISTRIBUTION RESERVOIRS AND STANDPIPES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R3						
NET SALVAGE PERCENT.. 0						
1932	13,405.00	12,981	12,460	945	2.95	320
1933	346.00	334	321	25	3.09	8
1934	32,040.00	30,906	29,666	2,374	3.25	730
1935	1,049.00	1,010	969	80	3.41	23
1942	182.00	171	164	18	4.97	4
1964	42,268.70	35,113	33,704	8,565	11.92	719
1967	253,591.00	204,090	195,903	57,688	13.46	4,286
1968	1,863.00	1,493	1,433	430	13.52	32
1969	4,209.00	3,333	3,199	1,010	14.07	72
1971	1,427.00	1,102	1,058	369	15.17	24
1972	200.00	153	147	53	15.72	3
1981	113.00	75	72	41	21.00	2
1982	1,194.00	778	747	447	21.61	21
1983	421.00	269	258	163	22.23	7
1984	10,424.89	6,543	6,281	4,144	22.85	181
1987	5,994.00	3,532	3,390	2,604	24.74	105
1989	8,379.26	4,687	4,499	3,880	26.38	147
1990	39,779.40	21,720	20,849	18,930	27.02	701
1991	1,766.00	940	902	864	27.67	31
1995	7,023.00	3,342	3,208	3,815	30.30	126
1996	1,725.43	791	759	966	31.31	31
1998	3,410.40	1,462	1,403	2,007	32.64	61
2002	5,166.35	1,885	1,809	3,357	35.68	94
2003	1,573.97	549	527	1,047	36.37	29
2006	33,073.85	9,876	9,480	23,594	38.75	609
2007	32,230.59	9,092	8,727	23,504	39.45	596
2014	1,390,357.27	221,067	212,200	1,178,157	44.97	26,199
	1,893,213.11	577,294	554,135	1,339,078		35,161

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 38.1 1.86

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
1932	270,893.14	225,546	211,027	59,866	18.20	3,289
1933	552.52	455	426	127	19.20	7
1934	10,632.47	8,657	8,100	2,532	20.20	125
1935	6,728.94	5,476	5,123	1,606	20.02	80
1936	16,008.34	12,877	12,048	3,960	21.03	188
1937	2,787.52	2,217	2,074	714	22.02	32
1938	4,529.84	3,598	3,366	1,164	21.88	53
1939	72,920.84	57,236	53,552	19,369	22.88	847
1940	9,329.71	7,235	6,769	2,561	23.88	107
1941	14,863.40	11,507	10,766	4,097	23.77	172
1942	138.63	106	99	40	24.76	2
1944	12.96	10	9	4	25.67	
1945	302.19	225	211	91	26.67	3
1946	14,079.22	10,340	9,674	4,405	27.67	159
1947	3,869.61	2,834	2,652	1,218	27.59	44
1948	20,177.86	14,581	13,642	6,536	28.60	229
1949	22,762.10	16,229	15,184	7,578	29.59	256
1950	21,445.46	15,237	14,256	7,189	29.54	243
1951	21,462.41	15,039	14,071	7,391	30.54	242
1952	17,839.14	12,325	11,532	6,307	31.54	200
1953	14,267.72	9,816	9,184	5,084	31.52	161
1954	32,127.40	21,789	20,386	11,741	32.51	361
1955	30,604.12	20,450	19,134	11,470	33.52	342
1956	28,836.62	18,986	17,764	11,073	34.51	321
1957	31,258.13	20,474	19,156	12,102	34.50	351
1958	32,832.72	21,177	19,814	13,019	35.50	367
1959	15,505.40	9,846	9,212	6,293	36.50	172
1960	11,168.04	6,980	6,531	4,637	37.50	124
1961	29,723.25	18,464	17,275	12,448	37.50	332
1962	13,708.21	8,376	7,837	5,871	38.51	152
1963	85,366.95	51,306	48,003	37,364	39.50	946
1964	22,680.15	13,399	12,536	10,144	40.51	250
1965	34,720.22	20,363	19,052	15,668	40.54	386
1966	32,702.25	18,846	17,633	15,069	41.54	363
1967	75,288.51	42,621	39,877	35,412	42.54	832
1968	31,012.79	17,240	16,130	14,883	43.54	342
1969	185,081.39	100,999	94,497	90,584	44.54	2,034
1970	61,430.18	33,221	31,083	30,347	44.58	681
1971	76,592.48	40,625	38,010	38,582	45.59	846
1972	20,034.24	10,422	9,751	10,283	46.58	221
1973	35,819.89	18,261	17,086	18,734	47.59	394

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
1974	31,836.57	15,906	14,882	16,955	48.58	349
1975	59,228.08	28,974	27,109	32,119	49.59	648
1976	80,287.28	38,827	36,328	43,959	49.65	885
1977	14,778.35	6,993	6,543	8,235	50.65	163
1978	50,978.33	23,593	22,074	28,904	51.65	560
1979	310,253.53	140,359	131,324	178,930	52.65	3,398
1980	287,490.61	127,071	118,891	168,600	53.65	3,143
1981	222,496.00	96,029	89,847	132,649	54.65	2,427
1982	122,478.37	51,588	48,267	74,211	55.65	1,334
1983	115,970.83	47,641	44,574	71,397	56.65	1,260
1984	103,263.93	41,739	39,052	64,212	56.74	1,132
1985	224,964.38	88,591	82,888	142,076	57.73	2,461
1986	154,911.35	59,362	55,541	99,370	58.74	1,692
1987	411,724.27	153,491	143,611	268,113	59.73	4,489
1988	345,885.92	125,280	117,215	228,671	60.74	3,765
1989	259,171.12	91,176	85,307	173,864	61.73	2,817
1990	251,977.90	85,975	80,441	171,537	62.74	2,734
1991	365,367.60	120,864	113,084	252,284	63.73	3,959
1992	276,261.74	88,459	82,765	193,497	64.74	2,989
1993	473,206.30	146,599	137,162	336,044	65.73	5,112
1994	424,154.76	126,907	118,738	305,417	66.74	4,576
1995	106,860.16	30,861	28,874	77,986	67.73	1,151
1996	93,872.96	26,115	24,434	69,439	68.74	1,010
1997	160,511.32	43,386	40,593	119,918	68.84	1,742
1998	86,344.21	22,424	20,981	65,363	69.84	936
1999	220,014.02	54,805	51,277	168,737	70.84	2,382
2000	228,723.51	54,551	51,039	177,685	71.84	2,473
2001	513,705.85	117,074	109,538	404,168	72.84	5,549
2002	69,738.50	15,154	14,178	55,560	73.84	752
2003	50,804.36	10,501	9,825	40,979	74.84	548
2004	325,096.55	63,751	59,647	265,450	75.84	3,500
2005	66,894.95	12,409	11,610	55,285	76.84	719
2006	55,543.81	9,715	9,090	46,454	77.84	597
2007	456,107.04	74,938	70,114	385,993	78.84	4,896
2008	104,999.42	16,138	15,099	89,900	79.84	1,126
2009	134,747.27	19,282	18,041	116,706	80.84	1,444
2010	214,150.26	28,375	26,548	187,602	81.84	2,292
2011	74,291.77	9,056	8,473	65,819	82.84	795
2012	138,814.49	15,450	14,455	124,359	83.84	1,483
2013	286,194.21	28,820	26,965	259,229	84.84	3,056
2014	425,316.59	38,321	35,854	389,463	85.84	4,537

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 248.00 DISTRIBUTION MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 100-R4						
NET SALVAGE PERCENT.. 0						
2015	112,900.27	8,976	8,398	104,502	86.84	1,203
2016	630,444.15	43,438	40,642	589,802	87.84	6,715
2017	324,807.97	18,936	17,717	307,091	88.84	3,457
2018	11,042.67	527	493	10,550	89.84	117
2019	18,415.35	683	639	17,776	90.84	196
2020	139,379.96	3,694	3,456	135,924	91.84	1,480
2021	1,124,158.86	17,874	16,725	1,107,434	92.84	11,928
2022	396,160.00	2,139	2,001	394,159	92.95	4,241
	12,588,824.66	3,438,208	3,216,881	9,371,944		136,474

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 68.7 1.08

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
1932	41,461.72	37,523	35,548	5,914	9.50	623
1933	507.06	458	434	73	9.50	8
1934	784.54	708	671	114	9.54	12
1935	817.85	737	698	120	9.59	13
1936	2,481.45	2,232	2,115	366	9.65	38
1937	141.74	127	120	22	9.73	2
1938	1,576.08	1,398	1,324	252	10.74	23
1939	1,647.17	1,458	1,381	266	10.84	25
1940	3,296.86	2,910	2,757	540	10.95	49
1941	1,856.56	1,634	1,548	309	11.09	28
1942	440.18	386	366	74	11.25	7
1943	214.60	188	178	37	11.41	3
1944	1,428.35	1,245	1,179	249	11.59	21
1945	513.64	446	423	91	11.79	8
1946	3,154.72	2,703	2,561	594	12.79	46
1947	4,314.22	3,681	3,487	827	12.99	64
1948	6,059.54	5,146	4,875	1,185	13.22	90
1949	7,613.95	6,435	6,096	1,518	13.46	113
1950	8,019.78	6,745	6,390	1,630	13.71	119
1951	6,862.38	5,741	5,439	1,423	13.97	102
1952	8,001.03	6,656	6,306	1,695	14.25	119
1953	9,872.87	8,165	7,735	2,138	14.54	147
1954	6,593.12	5,420	5,135	1,458	14.83	98
1955	11,491.67	9,386	8,892	2,600	15.14	172
1956	6,663.73	5,406	5,121	1,543	15.47	100
1957	8,426.99	6,789	6,432	1,995	15.80	126
1958	12,830.18	10,262	9,722	3,108	16.15	192
1959	8,091.95	6,423	6,085	2,007	16.50	122
1960	10,060.33	7,923	7,506	2,554	16.87	151
1961	9,856.71	7,698	7,293	2,564	17.24	149
1962	7,281.49	5,639	5,342	1,939	17.62	110
1963	10,465.66	8,033	7,610	2,856	18.02	158
1964	4,525.87	3,442	3,261	1,265	18.42	69
1965	7,575.94	5,706	5,406	2,170	18.84	115
1966	7,333.82	5,470	5,182	2,152	19.26	112
1967	5,622.57	4,151	3,932	1,691	19.68	86
1968	10,106.25	7,381	6,992	3,114	20.13	155
1969	5,506.78	3,977	3,768	1,739	20.58	84
1970	9,974.49	7,070	6,698	3,276	21.57	152
1971	5,396.61	3,780	3,581	1,816	22.03	82
1972	10,015.43	6,929	6,564	3,451	22.50	153

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
1973	8,028.36	5,484	5,195	2,833	22.96	123
1974	12,610.14	8,502	8,054	4,556	23.44	194
1975	10,861.85	7,223	6,843	4,019	23.93	168
1976	6,501.90	4,263	4,039	2,463	24.43	101
1977	5,980.14	3,864	3,661	2,319	24.92	93
1978	4,095.40	2,606	2,469	1,626	25.43	64
1979	9,067.17	5,640	5,343	3,724	26.43	141
1980	5,839.17	3,574	3,386	2,453	26.94	91
1981	21,066.12	12,678	12,011	9,055	27.46	330
1982	16,709.99	9,881	9,361	7,349	27.99	263
1983	21,019.00	12,204	11,562	9,457	28.53	331
1984	27,831.36	15,753	14,924	12,907	29.52	437
1985	37,741.14	20,946	19,843	17,898	30.07	595
1986	35,063.95	19,068	18,064	17,000	30.62	555
1987	59,935.79	31,706	30,037	29,899	31.61	946
1988	52,075.49	26,949	25,530	26,545	32.17	825
1989	57,830.70	29,251	27,711	30,120	32.73	920
1990	54,606.68	26,801	25,390	29,217	33.72	866
1991	31,168.17	14,923	14,137	17,031	34.29	497
1992	69,863.38	32,389	30,684	39,179	35.29	1,110
1993	134,665.15	60,788	57,588	77,077	35.86	2,149
1994	66,269.38	28,893	27,372	38,897	36.86	1,055
1995	29,811.87	12,625	11,960	17,852	37.44	477
1996	26,813.99	10,943	10,367	16,447	38.44	428
1997	22,471.66	8,825	8,360	14,112	39.44	358
1998	20,435.65	7,761	7,352	13,084	40.01	327
1999	36,781.43	13,396	12,691	24,090	41.02	587
2000	29,384.02	10,249	9,710	19,674	42.01	468
2001	75,039.81	25,168	23,843	51,197	42.60	1,202
2002	47,368.23	15,148	14,351	33,017	43.60	757
2003	8,652.20	2,632	2,493	6,159	44.60	138
2004	50,576.91	14,596	13,828	36,749	45.60	806
2005	32,877.21	9,035	8,559	24,318	46.19	526
2006	25,597.43	6,630	6,281	19,316	47.20	409
2007	123,057.89	29,952	28,375	94,683	48.19	1,965
2008	42,671.14	9,712	9,201	33,470	49.20	680
2009	30,327.60	6,429	6,091	24,237	50.19	483
2010	9,681.54	1,900	1,800	7,882	51.20	154
2011	22,543.36	4,071	3,857	18,686	52.19	358
2012	12,278.64	2,037	1,930	10,349	52.79	196
2013	35,229.35	5,288	5,010	30,219	53.79	562

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 249.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2.5						
NET SALVAGE PERCENT.. 0						
2014	96,176.15	12,916	12,236	83,940	54.79	1,532
2015	20,963.85	2,484	2,353	18,611	55.79	334
2016	39,057.59	4,011	3,800	35,258	56.79	621
2017	14,554.06	1,265	1,198	13,356	57.79	231
2018	12,555.74	893	846	11,710	58.79	199
2019	134,754.56	7,452	7,059	127,696	59.79	2,136
2020	8,316.46	329	312	8,004	60.79	132
2021	12,488.42	296	280	12,208	61.79	198
2022	12,625.00	100	95	12,530	62.79	200
	2,050,808.07	827,136	783,595	1,267,213		32,364

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 39.2 1.58

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-S4						
NET SALVAGE PERCENT.. 0						
1970	6,649.12	6,423	6,047	602	1.85	325
1971	7,680.92	7,397	6,964	717	1.98	362
1972	8,022.89	7,698	7,247	776	2.13	364
1973	12,780.45	12,210	11,495	1,285	2.31	556
1974	9,283.16	8,825	8,308	975	2.52	387
1975	16,028.63	15,227	14,335	1,694	2.50	678
1976	20,825.72	19,659	18,507	2,319	2.76	840
1977	17,569.22	16,468	15,503	2,066	3.04	680
1978	17,617.52	16,464	15,500	2,118	3.12	679
1979	14,749.38	13,667	12,866	1,883	3.45	546
1980	20,485.67	18,892	17,785	2,701	3.59	752
1981	39,463.36	36,030	33,920	5,543	3.95	1,403
1982	44,442.11	40,318	37,956	6,486	4.14	1,567
1983	53,326.89	47,813	45,012	8,315	4.56	1,823
1984	56,345.74	50,114	47,179	9,167	4.79	1,914
1985	64,019.90	56,177	52,887	11,133	5.24	2,125
1986	48,353.76	42,005	39,545	8,809	5.52	1,596
1987	52,479.68	44,902	42,272	10,208	5.99	1,704
1988	66,505.18	56,210	52,918	13,587	6.32	2,150
1989	50,255.61	41,752	39,306	10,950	6.82	1,606
1990	79,886.65	65,172	61,355	18,532	7.34	2,525
1991	67,009.77	53,615	50,475	16,535	7.87	2,101
1992	65,258.35	51,149	48,153	17,105	8.41	2,034
1993	57,178.87	43,856	41,287	15,892	8.96	1,774
1994	27,081.45	20,222	19,037	8,044	9.67	832
1995	28,589.80	20,756	19,540	9,050	10.38	872
1996	19,571.98	13,796	12,988	6,584	11.09	594
1997	29,720.42	20,234	19,049	10,671	11.96	892
1998	26,367.38	17,313	16,299	10,068	12.81	786
1999	16,308.22	10,310	9,706	6,602	13.67	483
2000	14,713.08	8,938	8,414	6,299	14.54	433
2001	28,966.63	16,876	15,888	13,079	15.40	849
2002	21,421.50	11,902	11,205	10,216	16.40	623
2003	31,767.59	16,786	15,803	15,965	17.40	918
2004	51,588.61	25,959	24,438	27,151	18.26	1,487
2005	11,372.20	5,413	5,096	6,276	19.26	326
2006	27,875.69	12,511	11,778	16,098	20.26	795
2007	41,064.54	17,313	16,299	24,766	21.26	1,165
2008	8,877.56	3,501	3,296	5,582	22.26	251
2009	12,609.23	4,630	4,359	8,250	23.26	355
2010	21,213.91	7,213	6,790	14,424	24.26	595

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 250.00 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-S4						
NET SALVAGE PERCENT.. 0						
2011	22,470.09	7,029	6,617	15,853	25.26	628
2012	20,605.94	5,885	5,540	15,066	26.26	574
2013	31,140.66	8,047	7,576	23,565	27.26	864
2014	39,322.75	9,091	8,559	30,764	28.26	1,089
2015	21,691.61	4,425	4,166	17,526	29.26	599
2016	38,721.03	6,846	6,445	32,276	30.26	1,067
2017	62,100.33	9,290	8,746	53,354	31.26	1,707
2018	125,009.10	15,301	14,405	110,604	32.26	3,429
2019	136,586.57	13,003	12,241	124,346	33.26	3,739
2020	176,537.72	12,005	11,302	165,236	34.26	4,823
2021	348,956.42	14,237	13,403	335,553	35.26	9,517
2022	405,000.00	5,508	5,185	399,815	36.26	11,026
	2,743,470.56	1,116,383	1,050,992	1,692,479		81,809

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 20.7 2.98

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 251.00 HYDRANTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R3						
NET SALVAGE PERCENT.. 0						
1932	2,006.00	1,870	1,782	224	6.58	34
1942	58.00	52	50	8	9.59	1
1950	133.00	114	109	24	12.25	2
1951	133.00	113	108	25	12.54	2
1952	162.00	137	131	31	12.83	2
1958	1,222.00	985	939	283	15.50	18
1959	352.00	282	269	83	15.87	5
1962	247.00	191	182	65	17.62	4
1963	1,637.00	1,257	1,198	439	18.02	24
1964	732.00	557	531	201	18.42	11
1965	537.00	401	382	155	19.42	8
1966	1,003.00	742	707	296	19.83	15
1967	1,916.00	1,404	1,338	578	20.26	29
1968	199.00	144	137	62	20.69	3
1969	657.00	468	446	211	21.68	10
1970	1,953.00	1,374	1,309	644	22.13	29
1982	5,205.00	2,993	2,851	2,354	29.92	79
1985	566.00	306	292	274	31.94	9
1987	701.00	363	346	355	32.99	11
1994	8,024.67	3,431	3,268	4,757	38.17	125
2003	1,810.05	547	521	1,289	45.02	29
	29,253.72	17,731	16,896	12,358		450

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 27.5 1.54

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 257.00 STRUCTURES AND IMPROVEMENTS - GENERAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R3						
NET SALVAGE PERCENT.. 0						
1932	3,355.00	3,249	3,104	251	2.95	85
1939	408.00	388	371	37	4.22	9
1940	5,289.00	5,018	4,794	495	4.45	111
1941	206.00	195	186	20	4.71	4
1943	16.00	15	14	2	5.25	
1945	614.00	571	545	69	5.83	12
1951	1,425.00	1,294	1,236	189	7.24	26
1958	37.00	32	31	6	9.57	1
1959	740.00	639	610	130	10.03	13
1960	89.00	77	74	15	9.96	2
1970	55.00	43	41	14	14.62	1
1979	16,587.00	11,400	10,890	5,697	19.79	288
1980	875.00	591	565	310	20.39	15
1981	4,761.00	3,161	3,020	1,741	21.00	83
1982	6,599.00	4,303	4,110	2,489	21.61	115
1983	28,805.00	18,432	17,607	11,198	22.23	504
1984	10,783.00	6,767	6,464	4,319	22.85	189
1997	5,179.69	2,298	2,195	2,985	31.97	93
1998	12,014.64	5,152	4,922	7,093	32.64	217
1999	157.50	65	62	96	33.32	3
2000	388.74	155	148	241	34.00	7
2001	312.72	119	114	199	34.99	6
2002	106,811.62	38,976	37,233	69,579	35.68	1,950
2005	533.53	168	160	374	38.06	10
2008	30,660.73	8,137	7,773	22,888	40.14	570
2009	27,380.79	6,763	6,460	20,921	41.15	508
2011	16,091.53	3,424	3,271	12,821	42.55	301
2014	154,954.00	24,638	23,536	131,418	44.97	2,922
2015	220,699.73	31,119	29,727	190,973	45.69	4,180
2016	9,975.00	1,219	1,165	8,810	46.69	189
2017	820.00	85	81	739	47.41	16
2018	2,340.00	200	191	2,149	48.13	45
	668,964.22	178,693	170,700	498,264		12,475

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 39.9 1.86

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 258.00 GENERAL OFFICE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
OFFICE FURNITURE						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1984	8,916.00	8,916	8,916			
1986	3,770.00	3,770	3,770			
1988	3,468.00	3,468	3,468			
1990	2,161.00	2,161	2,161			
1992	1,033.00	1,033	1,033			
1994	5,871.88	5,872	5,872			
1996	123.74	124	124			
2001	227.92	228	228			
2006	574.11	474	126-	700	3.50	200
2010	172.26	108	29-	201	7.50	27
2011	199.96	115	31-	231	8.50	27
	26,517.87	26,269	25,386	1,132		254
OFFICE EQUIPMENT						
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
1982	2,999.35	2,999	2,999			
1983	10,735.00	10,735	10,735			
1985	6,058.00	6,058	6,058			
1987	2,024.00	2,024	2,024			
1989	6,621.00	6,621	6,621			
1991	2,118.00	2,118	2,118			
1993	2,483.00	2,483	2,483			
1994	6,005.28	6,005	6,005			
1995	965.10	965	965			
1997	356.00	356	356			
2000	3,059.67	3,060	3,060			
2012	315.96	221	123-	439	4.50	98
2014	975.00	553	309-	1,284	6.50	198
2015	1,395.80	698	390-	1,786	7.50	238
	46,111.16	44,896	42,602	3,509		534

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 258.00 GENERAL OFFICE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
COMPUTER EQUIPMENT						
SURVIVOR CURVE.. 5-SQUARE						
NET SALVAGE PERCENT.. 0						
1998	3,724.44	3,724	3,724			
2005	5,624.00	5,624	5,624			
2008	2,040.00	2,040	2,040			
2009	3,673.47	3,673	3,673			
2012	550.80	551	551			
2015	15,005.80	15,006	15,006			
2017	587.94	588	588			
2019	10,774.80	7,542	6,694	4,081	1.50	2,721
	41,981.25	38,748	37,900	4,081		2,721
	114,610.28	109,913	105,888	8,722		3,509

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 2.5 3.06

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
CARS						
SURVIVOR CURVE.. IOWA 9-L3						
NET SALVAGE PERCENT.. 0						
2000	13,667.83	13,668	13,668			
2001	12,085.57	11,979	12,086			
2013	20,472.00	16,570	17,160	3,312	2.24	1,479
2017	135,237.02	84,347	87,350	47,887	3.32	14,424
2021	14,550.00	2,741	2,839	11,711	6.46	1,813
2022	15,375.00	969	1,003	14,372	7.44	1,932
	211,387.42	130,274	134,105	77,282		19,648
TRUCKS						
SURVIVOR CURVE.. IOWA 15-L3						
NET SALVAGE PERCENT.. 0						
1994	13,277.50	12,677	12,870	408	1.35	302
1996	708.60	665	675	33	1.75	19
1998	5,896.37	5,418	5,500	396	2.17	182
2000	3,680.52	3,296	3,346	334	2.63	127
2001	2,835.96	2,506	2,544	292	2.83	103
2006	22,010.76	17,941	18,214	3,797	3.74	1,015
2007	84,311.09	67,693	68,721	15,590	3.81	4,092
2008	29,498.26	23,227	23,580	5,918	3.92	1,510
2009	21,239.98	16,344	16,592	4,648	4.04	1,150
2010	21,588.89	16,138	16,383	5,206	4.22	1,234
2011	23,965.47	17,253	17,515	6,450	4.47	1,443
2013	31,225.00	19,993	20,297	10,928	5.34	2,046
2015	24,211.95	12,893	13,089	11,123	6.58	1,690
2017	76,657.33	30,947	31,417	45,240	8.12	5,571
2018	221,681.33	74,130	75,256	146,425	8.96	16,342
2019	59,393.21	15,573	15,810	43,584	9.85	4,425
2020	51,308.00	9,656	9,803	41,505	10.78	3,850
2021	50,925.00	5,765	5,853	45,072	11.75	3,836
2022	21,525.00	814	826	20,699	12.74	1,625
	765,940.22	352,929	358,291	407,649		50,562

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
TOOLS, SHOP AND GARAGE EQUIPMENT						
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1988	17,205.41	17,205	17,205			
1990	42,119.89	42,120	42,120			
1991	26,383.00	26,383	26,383			
1992	21,067.20	21,067	21,067			
1993	42,487.20	42,487	42,487			
1994	45,712.89	45,713	45,713			
1995	24,849.46	24,849	24,849			
1996	23,889.61	23,890	23,890			
1997	26,597.06	26,597	26,597			
1998	36,216.12	36,216	36,216			
1999	26,192.74	26,193	26,193			
2000	55,123.50	55,124	55,124			
2001	20,931.92	20,932	20,932			
2003	3,088.37	3,011	2,725	364	0.50	364
2004	11,159.86	10,323	9,342	1,818	1.50	1,212
2005	8,983.99	7,861	7,114	1,870	2.50	748
2006	18,762.73	15,479	14,007	4,755	3.50	1,359
2007	106,287.70	82,373	74,541	31,746	4.50	7,055
2008	38,624.28	28,003	25,341	13,284	5.50	2,415
2009	12,391.57	8,364	7,569	4,823	6.50	742
2010	14,578.59	9,112	8,246	6,333	7.50	844
2011	130,748.16	75,180	68,032	62,716	8.50	7,378
2012	3,555.50	1,867	1,689	1,866	9.50	196
2013	4,759.20	2,261	2,046	2,713	10.50	258
2014	5,997.20	2,549	2,307	3,691	11.50	321
2015	29,790.15	11,171	10,109	19,681	12.50	1,574
2016	5,238.25	1,702	1,540	3,698	13.50	274
2017	4,104.19	1,129	1,022	3,083	14.50	213
2018	177,401.06	39,915	36,120	141,281	15.50	9,115
2019	31,045.60	5,433	4,916	26,129	16.50	1,584
2020	156,397.21	19,550	17,691	138,706	17.50	7,926
2021	80,025.00	6,002	5,431	74,594	18.50	4,032
2022	24,600.00	615	557	24,043	19.50	1,233
	1,276,314.61	740,676	709,121	567,194		48,843

THE BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS

ACCOUNT 259.00 OTHER GENERAL EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2022

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
COMMUNICATION EQUIPMENT						
SURVIVOR CURVE.. 10-SQUARE						
NET SALVAGE PERCENT.. 0						
1993	4,243.80	4,244	4,244			
1994	14,220.76	14,221	14,221			
1996	11,091.92	11,092	11,092			
1997	6,802.11	6,802	6,802			
1998	5,316.80	5,317	5,317			
1999	5,831.94	5,832	5,832			
2001	3,021.39	3,021	3,021			
2004	1,305.00	1,305	1,305			
2006	6,124.27	6,124	6,124			
2007	1,836.00	1,836	1,836			
2013	1,239.00	1,177	1,132	107	0.50	107
2016	132,200.16	85,930	82,664	49,536	3.50	14,153
2018	437,699.42	196,965	189,478	248,221	5.50	45,131
2019	8,766.00	3,068	2,951	5,815	6.50	895
	639,698.57	346,934	336,020	303,679		60,286
	2,893,340.82	1,570,813	1,537,537	1,355,804		179,339

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 7.6 6.20

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
HANOVER, PENNSYLVANIA

RATE OF RETURN

DIRECT TESTIMONY
OF
HAROLD WALKER, III

JUNE 2021

Prepared by:
GANNETT FLEMING
VALUATION AND RATE CONSULTANTS, LLC



Valley Forge, Pennsylvania

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APPENDIX A A-1

OVERALL RATE OF RETURN TERMS, ABBREVIATIONS AND ACRONYMS

Terms, Abbreviations and Acronyms	Defined
Borough of Hanover	The Borough in its entirety
CAPM	Capital Asset Pricing Model
Commission	Pennsylvania Public Utility Commission
Comparable Companies	Water Group Followed by Analysts
Comparable Group	Water Group Followed by Analysts
Cost of Capital	Investor-required cost rate
DCF	Discounted Cash Flow
EPA	U.S. Environmental Protection Agency
EPS	Earnings per share
Financial Risk	Leverage
GICS	Global Industry Classification Standard
GO	General Obligation Bonds
IOU	Investor Owned Utilities
Leverage	Fixed cost capital
Long-term U.S. Treasury Securities	Base Risk-Free Rate
M/B	Market-to-Book Ratios
Moody's	Moody's Investors Service
NARUC	National Association of Regulatory Utility Commissioners
Non-Systematic Risk	Company-Specific Risk
Outside Customers	Customers who are located outside of the Borough of Hanover
ROE	Return on Equity
RP	Risk Premium
S&P	Standard & Poor's
SIC	Standard Industrial Classification
Systematic Risk	Non-Diversifiable Risk
Water Fund	Hanover Municipal Water Works
Water Group	Water Group Followed by Analysts

INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Harold Walker, III. My business mailing address is 1010 Adams Avenue, Audubon, Pennsylvania 19403.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Gannett Fleming Valuation and Rate Consultants, LLC as Manager, Financial Studies.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND EMPLOYMENT EXPERIENCE?

A. My educational background, business experience and qualifications are provided in Appendix A.

SCOPE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to recommend an appropriate overall rate of return that Hanover Municipal Water Works ("Water Fund") should be afforded an opportunity to earn on its water utility service rate base. My testimony is supported by Exhibit HW-1, which is composed of 21 Schedules. It should be noted, for the purposes of my testimony, my reference to Borough of Hanover refers to the Borough of Hanover in its entirety; while my reference to Water Fund refers to that portion of the Borough of Hanover's services that are accounted for as the Water Enterprise Fund.

SUMMARY OF RECOMMENDATION

Q. WHAT IS YOUR RECOMMENDED COST OF EQUITY?

A. My recommendation is that Water Fund be permitted an overall rate of return of 6.86% based upon an imputed capital structure at December 31, 2022, including a 10.45% cost of common equity. My alternative recommended cost of common equity, should the Commission decide to adjust my primary recommendation of 10.45% to reflect the income tax status of the investors of Water Fund, is 9.30% and an overall fair rate of return recommendation would be 6.27%. My recommended cost of common equity reflects Water Fund's unique risk characteristics.

Q. HOW DID YOU DETERMINE YOUR RECOMMENDED COMMON EQUITY COST RATE?

A. I used several models to help me in formulating my recommended common equity cost rate including Discounted Cash Flow ("DCF"), Capital Asset Pricing Model ("CAPM") and Risk Premium ("RP").

Q. IS IT IMPORTANT TO USE MORE THAN ONE MARKET MODEL?

A. Yes. It is necessary to estimate common equity cost rates using a number of different models. At any given time, a particular model may understate or overstate the cost of equity. While any single investor may rely solely upon one model, different investors rely on different models and many investors use multiple models. Therefore, because the price of common stock reflects a number of valuation models, it is appropriate to estimate the market-required common equity cost rate by applying a broad range of analytical models.

Q. PLEASE SUMMARIZE YOUR COMMON EQUITY COST RATE RECOMMENDATION.

A. There is no market data concerning Water Fund's shares of common stock because Water Fund shares of common stock are not publicly traded. Accordingly, due to the lack of market data concerning the Water Fund's equity, I used a comparable group of publicly traded companies to estimate the common equity cost rate. Based upon the results of my entire analysis, I conclude Water Fund's current common equity cost rate is at least 10.45%. The current range of common equity cost for Water Fund is 10.35% (DCF), 10.15% (CAPM), and 10.85% (RP). Value Line Investment Survey ("Value Line") is relied upon by many investors and is the only investment advisory service of which I am aware that projects earned return on equity. As a check on the reasonableness of my common equity cost rate recommendation, I reviewed Value Line's projected returns on common equity for comparable utilities. Value Line's projected earned returns on common equity for my comparable utilities range from 9.0% to 15.0%. The range of the projected returns suggests that my recommendation that Water Fund be permitted an opportunity to earn 10.45% is reasonable, if not conservative. If the Commission adjusts for the maximum level of personal income taxes of the Water Fund equity investor, the current common equity cost rate is 9.30%.

PRINCIPLES OF RATE REGULATION AND FAIR RATE OF RETURN

Q. WHAT ARE THE PRINCIPLES GUIDING FAIR RATES OF RETURN IN THE CONTEXT OF RATE REGULATION?

A. In a capitalistic or free market system, competition determines the price for all goods and services. Utilities are permitted to operate as monopolies or near monopolies as a tradeoff for a ceiling on the price of service because: (1) the services provided by utilities are considered necessities by society; and (2) capital-intensive and long-lived facilities are necessary to provide utility service. Generally, utilities are required to serve all customers in their service territory at reasonable rates determined by regulators. As a result, regulators act as a substitute for a competitive-free market system when they authorize prices for utility service.

Although utilities operate in varying degrees as regulated monopolies, they must compete with governmental bodies, non-regulated industries, and other utilities for labor, materials, and capital. Capital is provided by investors who seek the highest return commensurate with the perceived level of risk; the greater the perceived risk, the higher the required return rate. In order for utilities to attract the capital required to provide service, a fair rate of return should equal an investor-required, market-determined rate of return.

Q. WHAT CONSTITUTES A FAIR RATE OF RETURN?

A. Two noted Supreme Court cases define the benchmarks of a fair rate of return. In *Bluefield*[1], a fair rate of return is defined as: (1) equal to the return on investments in other business undertakings with the same level of risks (the comparable earnings standard);

[1]Bluefield Water Works & Improvement Company v. P.S.C. of West Virginia, 262 U.S. 679 (1923).

(2) sufficient to assure confidence in the financial soundness of a utility (the financial integrity standard); (3) adequate to permit a public utility to maintain and support its credit, enabling the utility to raise or attract additional capital necessary to provide reliable service (the capital attraction standard). The second case, *Hope*[2], determined a fair rate of return to be based upon guidelines found in *Bluefield* as well as stating that: (1) allowed revenues must cover capital costs including service on debt and dividends on stock; and (2) the Commission was not bound to use any single formula or combination of formulae in determining rates. Utilities are not entitled to a guaranteed return. However, the regulatory-determined price for service must allow the utility a fair opportunity to recover all costs associated with providing the service, including a fair rate of return.

INVESTMENT RISK

Q. PREVIOUSLY, YOU REFERRED TO RISK. PLEASE DEFINE THE TERM RISK.

A. Risk is the uncertainty associated with a particular action; the greater the uncertainty of a particular outcome, the greater the risk. Investors who invest in risky assets expose themselves to investment risk particular to that investment. Investment risk is the sum of business risk and financial risk. Business risk is the risk inherent in the operations of a business. Assuming that a Company is financed with 100% common equity, business risk includes all operating factors that affect the probability of receiving expected future income such as: sales volatility, management actions, availability of product substitutes, technological obsolescence, regulation, raw materials, labor, size and growth of the market

[2]Federal Power Commission v. Hope Natural Gas Company, 320 U.S. 591 (1944).

served, diversity of the customer base, economic activity of the area served, and other similar factors.

Q. WHAT IS FINANCIAL RISK?

A. Financial risk reflects the manner in which an enterprise is financed. Financial risk arises from the use of fixed cost capital (leverage) such as debt and/or preferred stock, because of the contractual obligations associated with the use of such capital. Because the fixed contractual obligations must be serviced before earnings are available for common stockholders, the introduction of leverage increases the potential volatility of the earnings available for common shareholders and therefore increases common shareholder risks.

Although financial risk and business risk are separate and distinct, they are interrelated. In order for a company to maintain a given level of investment risk, business risk and financial risk should complement one another to the extent possible. For example, two firms may have similar investment risks while having different levels of business risk, if the business risk differences are compensated for by using more or less leverage (financial risk) thereby resulting in similar investment risk.

DESCRIPTION OF THE HANOVER MUNICIPAL WATER WORKS

Q. PLEASE GIVE A BRIEF DESCRIPTION OF THE HANOVER MUNICIPAL WATER WORKS.

A. Water Fund provides water services to about 18,000 customers who are primarily located in the Borough of Hanover and outlying municipalities in York County and Adams County. The Water Fund's service area includes the Borough of Hanover, and four communities that are located outside the Borough of Hanover ("Outside Customers"). The Outside Customers include Penn Township and Heidelberg Township, York County; and

Conewago Township and McSherrystown Borough, Adams County. In total, the entire population that is provided water service by the Water Fund is approximately 40,000 people. The majority of Hanover's water customers, 61%, have their water rates regulated by the Pennsylvania Public Utility Commission.

THE INDUSTRY

Q. PLEASE GIVE A BRIEF OVERVIEW OF THE INDUSTRY IN WHICH THE COMPANY OPERATES.

A. Water Fund operates in the water supply industry. The water supply industry has a Standard Industrial Classification ("SIC") code of 4941, has water utilities, and includes establishments primarily engaged in distributing water for sale for residential, commercial, and industrial uses. Government controlled establishments such as municipalities, public service districts and other local governmental entities dominate the industry. Private companies or investor owned utilities ("IOU") are active in the construction and improvement of water supply facilities and infrastructure. There are currently 11,283 U.S. Businesses with a SIC code of 4941.

A comparative industry to the water supply industry is the wastewater supply industry. The wastewater utility industry has a Standard Industrial Classification ("SIC") code of 4952 (Sewerage Systems), has sewer utilities, and includes establishments primarily engaged in the collection and disposal of wastes conducted through a sewer system, including such treatment processes as may be provided. There are currently 2,104 U.S. Businesses with a SIC code of 4952.

The water supply industry is the most fragmented of the major utility industries with more than 53,000 community water systems in the U.S. (83% of which serve less than

3,300 customers). The nation's water systems range in size from large municipally owned systems, such as the New York City water system that serves approximately 9 million people, to small systems, where a few customers share a common well.

According to the U.S. Environmental Protection Agency's ("EPA") most recent survey of publicly-owned wastewater treatment facilities in 2008, there are approximately 15,000 such facilities in the nation, serving approximately 74% of the U.S. population. Eighty percent of domestic wastewater systems are government owned rather than IOUs. Currently, there are no wastewater utility companies that have actively traded stock.[3]

An estimated 14% of all water supplies are managed or owned by IOUs. IOUs consist of companies with common stock that is either actively traded or inactively traded, as well as companies that are closely held, or not publicly traded. Currently, there are only about nine investor owned water utility companies with publicly traded stock in the U.S.

The water utility industry's and wastewater utility industry's increased compliance with state and federal water purity levels and large infrastructure replacements are driving consolidation of the wastewater utility and water utility industries. Because many wastewater utility and water utility operations do not have the means to finance the significant capital expenditures needed to comply with these requirements, many have been selling their operations to larger, financially stronger operations.

The larger IOUs have been following an aggressive acquisition program to expand their operations by acquiring smaller wastewater and water systems. Generally, they enter a new market by acquiring one or several wastewater or water utilities. After their initial entry into a new market, the larger investor-owned water utility companies continually seek

[3]Many of the publicly traded water utility stocks also own some wastewater utilities but there are no publicly traded utility stocks which are comprised solely of wastewater utilities.

to expand their market share and services through the acquisition of wastewater and water utility businesses and operations that can be integrated with their existing operations. Such acquisitions may allow a company to expand market share and increase asset utilization by eliminating duplicate management, administrative, and operational functions. Acquisitions of small, independent utilities can often add earning assets without necessarily incurring the costs associated with the SDWA if such acquisitions are contiguous to the potential purchaser.

In summary, the result of increased capital spending, to meet the SDWA and CWA requirements[4] and replace the aging infrastructure of many systems, has moved the wastewater and water industries toward consolidation. Moreover, Federal and State regulations and controls concerning water quality are still in the process of being developed and it is not possible to predict the scope or the enforceability of regulations or standards which may be established in the future, or the cost and effect of existing and potential regulations and legislation upon the Water Fund. However, as a smaller size water system, the Water Fund faces the cost of compliance with less financial resources when compared to larger IOU water utilities.

[4]The SDWA, or Safe Drinking Water Act, is the principal federal law in the United States intended to ensure safe drinking water for the public. Pursuant to the act, the EPA is required to set standards for drinking water quality and oversee all states, localities, and water suppliers who implement these standards. The CWA, or Clean Water Act, is the primary federal law in the United States governing water pollution. The CWA's objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands.

COMPARABLE GROUP

Q. HOW DO YOU ESTIMATE THE COST OF COMMON EQUITY FOR WATER FUND?

A. The Water Fund's fund equity is not traded. Accordingly, I employed a comparable group of utility companies with actively traded stock, to determine a market-required cost rate of common equity capital for the Water Fund. Since no companies are perfectly identical to the Water Fund, it is reasonable to determine the market-required cost rate for a comparable group of utility companies and adjust, to the extent necessary, for investment risk differences between the Water Fund and the comparable group.

Q. HOW DID YOU SELECT THE COMPARABLE GROUP USED TO DETERMINE THE COST OF COMMON EQUITY FOR WATER FUND?

A. I selected a comparable group of water utilities to determine the cost of common equity for Water Fund considering security analysts' coverage. Unlike the other utility industries, only a portion of the IOU water companies with publicly traded stock in the U.S. are followed by security analysts. Coverage by security analysts is important when determining a market required cost of common equity. Accordingly, security analysts' coverage was considered when selecting my comparable group. I selected my water utility comparable group, Water Group Followed by Analysts ("Water Group"), based upon a general criteria that includes: (1) all U.S. water utilities that are covered by several security analysts as measured by the existence of several sources of published projected five-year growth rates in earnings per share ("EPS"); (2) with a Standard Industrial Classification (SIC) of 4941 (i.e., Water Supply Facilities and Infrastructure); (3) with a North American Industry Classification System (NAICS) of 221310 (i.e., Water Supply and Irrigation

Systems); (4) are not the announced subject of an acquisition; (5) currently pay a common dividend and have not reduced their common dividend within the past four years; (6) have market value of common stock, the product of multiplying the closing stock price by the number of common shares outstanding, greater than $200.0 million; and (7) have a total enterprise, the sum of market value, preferred stock and total debt, greater than $450.0 million.

It should be noted that the Water Group is also referred to as the Comparable Group and/or the Comparable Companies.[5] The names of the utilities that comprise the Comparable Group and their bond or credit ratings are listed in Table 1.

Bond and Credit Ratings for
The Water Group Followed by Analysts

	S&P Credit Rating
Water Group Followed by Analysts	
American States Water Co	A+
American Water Works Co Inc	A
California Water Service Gp *	A+
Essential Utilities, Inc.	A
Middlesex Water Co	A
SJW Corp	A-
York Water Co	A-
Average	A

* - The A+ bond rating is that for California Water Service, Inc.

Table 1

[5]All of the Comparable Companies also provide some wastewater service.

Q. WHY DID YOU INCLUDE NOT BEING THE SUBJECT OF AN ACQUISITION AS A CRITERIA FOR THE WATER GROUP?

A. To begin with, there are only about nine investor owned water utility companies with publicly traded stock in the U.S., and some of these companies are very small. As stated previously, the IOU water industry receives only limited exposure on Wall Street.

Additionally, the merger activity in the water industry can result in abnormal or "tainted" stock prices in terms of a DCF analysis because premiums are typically paid in corporate acquisitions. That is, when a tender offer is made for the purchase of all the outstanding stock of a company, the amount of that offer usually exceeds the price at which the stock was previously traded in the market. These large premiums are often reflected in the prices of other water utilities that are not currently the announced subject of an acquisition.[6]

CAPITAL STRUCTURE

Q. WHAT IS REQUIRED TO DEVELOP AN OVERALL RATE OF RETURN?

A. The first step in developing an overall rate of return is the selection of capital structure ratios to be employed. Next, the cost rate for each capital component is determined. The overall rate of return is the product of weighting each capital component by its respective capital cost rate. This procedure results in Water Fund's overall rate of return being weighted proportionately to the amount of capital and cost of capital of each type of capital.

[6]Multiple publications mention these impacts including Research Magazine – April 2010, Barron's – March 2001, Utility Business – June 2002, and Value Line Investment Survey – April 2013.

Q. DOES WATER FUND DIRECTLY RAISE OR ISSUE ITS OWN DEBT CAPITAL?

A. No, the Water Fund does not raise its own capital; rather it is essentially a "subsidiary" of the Borough of Hanover, although not a separate legal entity. Most government entities such as the Borough of Hanover do not have subsidiaries, rather, they have departments. The Hanover Municipal Water Works is a department but a separate accounting entity from the Borough of Hanover, accounted for as an Enterprise Fund. As a department of the Borough of Hanover, the Water Fund has no managerial control over its capital structure and is not able to obtain its debt financing in the open market.

Q. WHAT CAPITAL STRUCTURE RATIOS ARE APPROPRIATE TO BE USED TO DEVELOP WATER FUND'S OVERALL RATE OF RETURN?

A. Consistent with 66 PA. C.S. Section 1301(b), I believe it is necessary to evaluate the Water Fund's current cost of capital based upon an imputed capital structure at December 31, 2022, consisting of 48% long term debt and 52% equity, representing the current water industry practice and is consistent with the Comparison Group's capital structure ratios.

Q. HOW DOES YOUR RECOMMENDED CAPITAL STRUCTURE COMPARE WITH RATIOS EMPLOYED BY OTHER INVESTOR-OWNED COMPANIES?

A. The capital structure I recommend for Water Fund reflects a common equity ratio of 52.0% which falls within the range of the ratios employed by other investor-owned water companies as shown on pages 1 and 2 of Schedule 2. A comparison of my recommendation for Water Fund's capital structure ratios to those recently employed and forecasted to be employed by the Comparison Group is shown in Table 2.

Comparison of Capital Structure Ratios

	Water Fund	Water Group	
	At 12/31/2022	At 9/30/2020	Projected 2024
Debt	48.0	50.8	43.0
Preferred Stock	0.0	0.0	0.0
Common Equity	52.0	49.2	57.0
	100.0	100.0	100.0

Table 2

Water Fund's rate making capital structure ratios are reasonable based upon the above information and are consistent with 66 PA. C.S. Section 1301(b).

EMBEDDED COST RATE

Q. YOU TESTIFIED THAT WATER FUND DOES NOT DIRECTLY RAISE OR ISSUE ITS OWN DEBT CAPITAL. WHAT TYPE OF MUNICIPAL DEBT CAPITAL IS ASSUMED OR RAISED FOR WATER FUND?

A. The Borough of Hanover issues general obligation municipal bonds including those financing the Water Fund's rate base. The bonds used to fund the construction of the water system, are guaranteed by the full faith and credit and taxing authority of the Borough of Hanover; hence, they are a general obligation of the Borough of Hanover only.

Municipal bonds are roughly divided into two classes: general obligation ("GO") and revenue bonds. The difference between GO and revenue bonds is the specific security that is pledged to repay the debt. GO bonds are secured by the full faith and credit of the issuer, meaning that the borrower is committing to raise taxes or other revenues sufficient to cover the amount owed. By comparison, revenue bonds are backed or secured solely

by the income received by the revenue-producing enterprise (e.g., a water system) being financed by the revenue bonds. Therefore, unlike GO bonds, revenue bonds are not backed by the full faith and credit of the issuing entity. All other things being equal, GO bonds are less risky or a more secure investment than revenue bonds since revenue bonds lack the full faith and credit of the issuing entity.

Hence, since the cost of borrowing increases as the risk of nonpayment increases, GO bonds command (i.e., allow the Borough of Hanover to borrow at) lower interest rates than revenue bonds. Moreover, the Borough of Hanover's GO bonds are tax-exempt to the investor, lowering their cost of borrowing further, including the portion of the Borough of Hanover's GO bonds that are allocated to the Water Fund. Accordingly, Water Fund's Outside Customers benefit from the taxing powers of the Borough of Hanover securing lower borrowing costs of GO bonds, and also benefit further from the tax-exemption of the interest paid on the Borough of Hanover's GO bonds, lowering their borrowing costs further, despite not being taxpayers since they are located beyond its corporate limits.

Q. WHAT EMBEDDED COST RATES DO YOU RECOMMEND BE USED TO CALCULATE THE WATER FUND'S OVERALL RATE OF RETURN?

A. I recommend using the Water Fund's estimated embedded debt cost rate of 2.98% at December 31, 2022. The determination of the embedded debt cost rate is shown on Schedule 3.

Q. HOW DID YOU DETERMINE WATER FUND'S EMBEDDED COST RATES?

A. The determination of an embedded cost rate is a relatively simple arithmetic exercise because a company has contracted for this capital for a specific period of time and at a specific cost, including issuance expenses and coupon rate. The embedded cost rate is

determined by employing a cost rate to maturity calculation, using as inputs, the coupon rate, net proceeds ratio, and term in years. Once the cost rate to maturity, or effective cost rate, is determined for each issue, it is weighted according to the amount of capital outstanding for each series to determine the weighted composite cost or the embedded cost.

FINANCIAL ANALYSIS

Q. HAVE YOU REVIEWED HISTORICAL FINANCIAL INFORMATION OF THE WATER GROUP AS PART OF YOUR ANALYSIS?

A. Yes. On page 1 of Schedule 4, I developed a five-year analysis, ending in 2019, detailing various financial ratios for Water Group. Schedule 5 reveals the results of operations for a large broad-based group of utilities known as the Standard & Poor's ("S&P") Utilities for the five years ending 2019. This information is useful in determining relative risk differences between different types of utilities.

Comparing the Comparable Group and the S&P Utilities' coverage of fixed charges and the various cash flow coverage proves that the Comparable Group has experienced a higher level of coverage than the S&P Utilities.

Q. WHAT DO YOU CONCLUDE FROM THE COMPARISON OF ALL THE INFORMATION SHOWN ON SCHEDULES 4 THROUGH 5?

A. Taken together, these comparisons show that Comparable Groups is exposed to risk that is similar in nature but lesser in degree compared with the S&P Utilities. This is evident when one considers the size of the Water Group as compared to the S&P Utilities along with the various financial ratios.

Q. WHAT INFORMATION IS SHOWN ON SCHEDULE 6?

A. Schedule 6 lists the names, issuer credit ratings, common stock rankings, betas and market values of the companies contained in the Comparable Group and the S&P Utilities. As is evident from the information shown on Table 3, the Comparable Group and the S&P Utilities are similar to each other in risk.

	S&P Issuer Credit Rating	S&P Quality Ranking	Value Line Beta	Recent Market Value (Mill $)	Market Quartile Name
Water Group	A	Above Average (A-)	0.79	2,695.414	Low-Cap
S&P Utilities	BBB+	Average (B+)	0.89	21,478.663	Large-Cap

Table 3

The Water Group's average issuer credit ratings and common stock rankings are higher than the S&P Utilities. The average beta of the Comparable Group, 0.79, is less than the average beta of the S&P Utilities, 0.89. Beta is a measure of volatility or market risk; the higher the beta, the higher the market risk. The market values provide an indication of the relative size of each group. As a generalization, the smaller the average sizes of a group, the greater the risk.

Page 2 of Schedule 6 shows the Comparable Companies have experienced a higher return on equity ("ROE") when compared to the S&P Utilities. Further, the Comparable Companies' dividend payout ratio is lower than S&P Utilities. S&P, a predominant bond rating agency, considers profit to be a fundamental determinant of credit protection. S&P states that a firm's profit level:

> Whether generated by the regulated or deregulated side of the business, profitability is critical for utilities because of the need to fund investment-generating capacity, maintain access to external debt and equity capital, and make acquisitions. Profit potential and stability is a critical determinant of credit protection. A company that generates higher operating margins and

> returns on capital also has a greater ability to fund growth internally, attract capital externally, and withstand business adversity. Earnings power ultimately attests to the value of the company's assets, as well. In fact, a company's profit performance offers a litmus test of its fundamental health and competitive position.
>
> Accordingly, the conclusions about profitability should confirm the assessment of business risk, including the degree of advantage provided by the regulatory environment.[7]

Q. WHAT INFORMATION IS SHOWN ON SCHEDULE 7?

A. Schedule 7 reveals the capital intensity and capital recovery for Water Fund, the Comparable Companies, and the S&P Utilities. Based upon the 2019 capital intensity ratio of plant to revenues, Water Fund ($7.68) is more capital intensive as compared to the Water Group ($6.71) and more than the S&P Utilities ($4.65). From a purely financial point of view, based on current accounting practices, the rate of capital recovery or depreciation rate is an indication of risk because it represents cash flow and the return of an investment. Water Fund's average rate of capital recovery is lower than the Comparable Group's, suggesting more risk.

The return on equity and depreciation expense provides the margin for coverage of construction expenditures. For a utility company, depreciation expense is the single largest generator of cash flow. From a financial analyst's point of view, cash flow is the life blood of a utility company. Without it, a utility cannot access capital markets, it cannot construct plant, and therefore, it cannot provide service to its customers.

[7]Standard & Poor's Ratings Services, *Criteria, Utilities: Key Credit Factors: Business And Financial Risks In The Investor-Owned Utilities Industry*, Nov. 26, 2008, pgs. 8-9.

RISK ANALYSIS

Q. PLEASE EXPLAIN THE INFORMATION SHOWN ON SCHEDULE 8.

A. Schedule 8 details the size difference between Water Fund and the Comparable Group. Company size is an indicator of business risk and is summarized in Table 4.

Number of Times Larger Than the Water Fund	
	Water Group
Capitalization	86.5x
Revenues	132.5x
Number of Customers	53.3x

Table 4

As shown in Table 4, Water Fund is smaller than the Water Group. The size of a company affects risk. A smaller company requires the employment of proportionately less financial leverage (*i.e.,* debt and preferred capital) than a larger company to balance out investment risk. If investment risk is not balanced out, then a higher cost of capital is required.

Q. WHY IS SIZE SIGNIFICANT TO YOUR ANALYSIS?

A. The size of a company can be likened to ships on the ocean, since a large ship has a much better chance of weathering a storm than a small ship. The loss of a large customer will impact a small company much more than a large company because a large customer of a small company usually accounts for a larger percentage of the small company's sales.

Moreover, a larger company is likely to have a more diverse geographic operation than a smaller company, which enables it to sustain earnings fluctuations caused by abnormal weather in one portion of its service territory. A larger company operating in

more than one regulatory jurisdiction enjoys "regulatory diversification" which makes it less susceptible to adverse regulatory developments or eminent domain claims in any single jurisdiction. Further, a larger company with a more diverse customer base is less susceptible to downturns associated with regional economic conditions than a small company. For example, on average, the average company in the Water Group provides water/sewer service in multiple states for about 958,000 customers. The average population of the communities served by the average company in the Water Group is about 3.6 million people. These wide-ranging operations provide the Water Group substantial geographic, economic, regulatory, weather and customer diversification. The Water Fund provides water service to about 18,000 total customers and to only about 11,000 Outside Customers. The concentration of Water Fund's business in south central Pennsylvania makes it very susceptible to any adverse development in local regulatory, economic, demographic, competitive and weather conditions.

Further, S&P, a major credit rating agency, recognizes the importance that diversification and size play in credit ratings. S&P believes some of the critical factors include: regional and cross-border market diversification (mitigates economic, demographic, and political risk concentration); customer diversification; and regulatory regime diversification.[8]

The size of a company can be a barrier to fluid access to capital markets (*i.e.,* liquidity risk). Investors require compensation for the lack of marketability and liquidity

[8]Standard & Poor's, Corporate Ratings Criteria, Utilities: Key Credit Factors: Business and Financial Risks in The Investor-Owned Utilities Industry, Nov. 26, 2008.

of their investments. If no compensation is provided, then investors, or at least sophisticated investors, shy away.

Q. IS THE IMPACT OF SIZE COMMONLY RECOGNIZED?

A. Yes, the National Association of Regulatory Utility Commissioners ("NARUC"), as well as most reputable financial texts, recognizes that size affects relative business risk. Liquidity risk and the existence of the small firm effect relating to business risk of small firms are well-documented in financial literature.[9] Investors' expectations reflect the highly-publicized existence of the small firm effect. For example, many mutual funds classify their investment strategy as small capitalization in an attempt to profit from the existence of the small firm effect.

As previously discussed, S&P recognizes that size plays a role in credit ratings.

> Standard & Poor's has no minimum size criterion for any given rating level. However, size turns out to be significantly correlated to ratings. The reason: size often provides a measure of diversification, and/or affects competitive position. . . . Small companies are, almost by definition, more concentrated in terms of product, number of customers, or geography. In effect, they lack some elements of diversification that can benefit larger companies. To the extent that markets and regional economies change, a broader scope of business affords protection. This consideration is balanced against the performance and prospects of a given business. . . . In addition, lack of financial flexibility is usually an important negative factor in the case of very small companies. Adverse developments that would simply be a setback for companies with greater resources could spell the end for companies with limited access to funds.[10]

As shown on Schedule 9, size plays a role in the composition of investors, and hence liquidity. In 2020, about 121% of the Water Group's shares traded while the larger

[9]Banz, Rolf, W. "The Relationship Between Return and Market Value of Common Stocks," Journal of Financial Economics, 9:3-18 1981. For subsequent studies see Fama and French, etc.
[10]*Standard & Poor's*, Corporate Ratings Criteria 2006; pg. 22.

companies comprising the S&P Utilities had a much higher trading volume of 179%. Insiders[11] hold more than seven times more, as a percent to total, of the Water Group's shares than the S&P Utilities. Currently, only about 70% of the Water Group shares are held by institutions[12] while the larger companies comprising the S&P Utilities had much higher institutional holdings of 80%. Due to small size and less interest by financial institutions, fewer security analysts follow the Comparable Group, and none follow Water Fund.

The lack of trading activity may affect the cost of equity estimates for small entities such as Water Fund and the Water Group. When stock prices do not change because of inactive trading activity, estimates of dividend yield for use in a dividend cash flow model and beta estimates for use in the capital asset pricing model are affected. In a stock market that is generally up, the beta estimates for the Comparable Companies may be understated due to thin trading.

Q. DO WATER FUND AND THE COMPARABLE COMPANIES HAVE SIMILAR OPERATING RISKS?

A. Yes. From an operations standpoint, Water Fund and the Comparable Companies have similar risks and are indistinguishable. Both are required to meet Clean Water Act and Safe Drinking Water Act requirements and are also required to provide safe and reliable services to their customers and comply with Commission regulations. Further, municipal and non-municipal utilities have similar investment risks as is evident by the fact that their

[11]An insider is a director or an officer who has a policy-making role or a person who is directly or indirectly the beneficial owner of more than 10% of a certain company's stock.

[12]Institutional holders are those investment managers having a fair market value of equity assets under management of $100 million or more. Certain banks, insurance companies, investment advisers, investment companies, foundations and pension funds are included in this category.

bonds are often rated similarly. However, the Water Fund is unique when compared with a traditional municipal authority or municipally owned water or sewer utility because the Water Fund is not able to increase rates for service at the discretion of municipal officials. Rather, rates for Outside Customers fall under the jurisdiction of the Pennsylvania Public Utility Commission. Accordingly, the Water Fund must comply with the same regulatory requirements for increasing rates as non-municipals require. The Water Fund experiences attrition and regulatory lag similar to a non-municipal utility but lacks the benefits that income taxes provide a non-municipal utility, for two reasons.

First, deferred income taxes provide non-municipal utilities a cash flow advantage that the Water Fund does not enjoy. Second, current income taxes included in the Comparable Companies' revenue requirement provide a margin or cushion against an unanticipated drop in sales or increase in operating expenses. The Water Fund does not have this margin of protection. Thus, the Water Fund faces much higher risk than non-municipal utilities.

Q. IS THERE ANY SINGLE MEASURE THAT BEST SHOWS INVESTMENT RISK FROM A COMMON STOCKHOLDER'S PERSPECTIVE?

A. No. However, from a creditor's viewpoint, the best measure of investment risk is debt rating. The debt rating process generally provides a good measure of investment risk for common stockholders because the factors considered in the debt rating process are usually relevant factors that a common stock investor would consider in assessing the risk of an investment. Credit rating agencies, such as S&P, assess the risk of an investment into two

categories based on: fundamental business analysis; and financial analysis.[13] The business risk analysis includes assessing: Country risk; industry risk; competitive position; and profitability/peer group comparisons. The financial risk analysis includes assessing: accounting; financial governance and policies/risk tolerance; cash flow adequacy; capital structure/asset protection; and liquidity/short-term factors.

Q. WHAT IS THE BOND RATING OF WATER FUND AND THE COMPARABLE GROUP?

A. Page 1 of Schedule 10 shows the average bond/credit rating for the Comparable Group. The Comparable Group has an A credit profile. The Water Fund does not have bonds rated; however, the Borough of Hanover, which provides the debt financing, has an Aa3 bond rating by Moody's Investors Service ("Moody's"). The major bond rating/credit rating agencies append modifiers, such as +, - for S&P and 1, 2, and 3 for Moody's to each generic rating classification. For example, an "A" credit profile is comprised of three subsets such as A+, A, A- for S&P or A1, A2 or A3 for Moody's. The modifier of either "+" or "1" indicates that the obligation ranks in the higher end of its generic rating category; the modifier "2" indicates a mid-range ranking; and the modifier of "-" or "3" indicates a ranking in the lower end of that generic rating category.

S&P and Moody's publish financial benchmark criteria necessary to obtain a bond rating for different types of utilities. As a generalization, the higher the perceived business risk, the more stringent the financial criteria so the sum of the two, business risk and financial criteria, remains the same.

[13] *Standard & Poor's*, Corporate Ratings Criteria, General: Criteria Methodology: Business Risk/Financial Risk Matrix Expanded, May 27, 2009 and *Standard & Poor's*, Criteria Corporates General: Corporate Methodology, November 19, 2013.

Q. WHAT ARE SOME FINANCIAL BENCHMARKS APPLIED BY CREDIT RATING AGENCIES FOR RATING PUBLIC UTILITY DEBT?

A. Page 2 of Schedule 10 summarizes the application of credit rating agencies measures of financial risk for the Comparable Group and the Water Fund. S&P describes their range of financial benchmarks as

> Risk-adjusted ratio guidelines depict the role that financial ratios play in Standard & Poor's rating process, since financial ratios are viewed in the context of a firm's business risk. A company with a stronger competitive position, more favorable business prospects, and more predictable cash flows can afford to undertake added financial risk while maintaining the same credit rating. The guidelines displayed in the matrices make explicit the linkage between financial ratios and levels of business risk.[14]

Credit rating agencies' measures of financial risk are broader than the traditional measure of financial risk, leverage. Besides reviewing amounts of leverage employed, credit rating agencies also focus on earnings protection and cash flow adequacy. For a municipal bond, the most important measure of financial risk is debt service coverage and other measures of cash flow adequacy.

As is evident from the information shown on page 2 of Schedule 10, for the three years ending in 2019, the Water Fund's debt service coverage and cash flow adequacy ratios were similar but below the Comparable Companies. Comparing the Water Fund and the Water Group's measures of debt service coverage and cash flow adequacy prove that the Water Group has experienced a higher level of cash flow adequacy than the Water Fund; verifying that the Water Fund is a higher investment risk than the Water Group. Prospectively, based upon the Water Fund's construction program, the Water Fund's ratios

[14]Standard & Poor's Corporate Rating Criteria, 2000.

are likely to be strained. Based solely upon Water Fund's historical ratios, it is my opinion that Water Fund's credit profile is lower than the Comparable Companies.

Further, based solely upon Water Fund's size, it is my opinion that Water Fund's credit profile is lower than the Comparable Groups'. Based on Water Fund's small size, it is highly likely that Water Fund's credit profile is below A (e.g., BBB, etc.). An analysis of corporate credit ratings, shown on page 3 of Schedule 10, indicates that there is a 91% (100%-0%-1%-8%=91%) chance that Water Fund's credit profile falls below A based on their small size alone. As S&P has stated, size is significantly correlated to credit ratings.

An analysis of corporate credit ratings, summarized on page 3 of Schedule 10, found The Berkshire Gas Company ("Berkshire") to be the smallest utility with a credit rating. Berkshire's credit rating is only A- despite having a capitalization comprised of about $184 million and a common equity ratio in excess of 67%. According to this analysis of corporate credit ratings, the smallest water utility is The York Water Company ("York"). York's credit rating is only A- notwithstanding having a capitalization of about $270 million and a common equity ratio of more than 53%.

Information reported by Moody's, shown on page 5 of Schedule 10, also documents the relationship between bond rating and size as both the median O&M (operating and maintenance expense) and median revenue increased with bond rating. For example, the median revenue of water and sewer utilities with a Baa bond rating was $5.9 million, the median revenue of water and sewer utilities with an A bond rating was $13.0 million, and the median revenue of water and sewer utilities water with an Aa bond rating was $16.0 million. Similar size metric information reported by Fitch Ratings (page 5 of Schedule 10) also documents the relationship between bond rating and size as both the median

population and median number of customers served increased with bond rating. For instance, according to Fitch, the median number of sewer customers of utilities with an A bond rating was 20,437, the median number of sewer customers of utilities with an AA bond rating was 54,757, and the median number of sewer customers of utilities with a AAA bond rating was 86,744.

Q. WHAT DEBT SERVICE COVERAGE HAVE THE COMPARABLE COMPANIES EXPERIENCED?

A. As shown on page 4 of Schedule 10, the Comparable Group has an average debt service coverage of 2.8-times and the average has ranged from 1.8-times to 3.2-times. In order to compete with the Comparable Group for capital, in the future, it will be necessary for the Water Fund to achieve higher returns on equity, and increased cash flow just to maintain a similar credit quality.

S&P has stated:

> ... low authorized returns may affect the industry's ability to attract necessary capital to develop new water supplies and upgrade the quality of existing supplies . . . Traditional ratemaking policy has not provided sufficient credit support during the construction cycle of the electric industry over the past 15 years. To avoid a repeat in the water industry, regulators must be aware of the increased challenges the industry faces.[15] (Emphasis added)

Investors will not provide the equity capital necessary for increasing the amount of common equity in a capital structure unless the regulatory authority allows an adequate rate of return on the equity.[16]

[15] Standard & Poor's CreditWeek, May 25, 1992.

[16] National Association of Regulatory Utility Commissioners, loc. cit.

Q. WHAT INFORMATION IS SHOWN ON PAGE 5 OF SCHEDULE 10?

A. Page 5 of Schedule 10 summarizes the finding of a recent report from Moody's concerning debt service coverage levels for municipal water and sewer utility.[17] The Moody's report compiled data for public water and sewer bond issuers and found that the median Baa rated government utility had annual debt service coverage of 2.0-times while public water and sewer bond issuers with Aaa bond ratings had median debt service coverage level of 3.4-times.

Q. WHAT INFORMATION IS SHOWN ON PAGE 6 OF SCHEDULE 10?

A. Page 6 of Schedule 10 shows the debt service coverage levels for water and sewer Pennsylvania municipal authorities reported for the years 2013 to 2018. The information shown reflects debt service for over 300 water and sewer Pennsylvania municipal authorities in each year, including about 200 water and about 100 sewer municipal authorities. Most of the Pennsylvania municipal authorities included in page 6 of Schedule 10 are not regulated by the PUC. The median debt service coverage over the period 2013 to 2017 ranged from: 2.0-times to 2.6-times for all water municipal authorities; and 2.6-times to 4.0-times for all sewer municipal authorities. Based upon the information shown, absent rate regulation, water and sewer Pennsylvania municipal authorities have rates that produced median debt service coverage of 2.4-times to 3.3-times, respectively.

Q. WHAT DEBT SERVICE COVERAGE LEVEL HAS THE WATER FUND EXPERIENCED?

A. For a municipal utility, the revenue requirement should include the potential impact of a revenue bond financing which requires revenue sufficient to achieve debt service coverage.

[17] Moody's Investors Service, "Water and Sewer Utilities – US: Medians - Solid Financial Performance, Ability to Increase Rates Underpin Stability", 5/19/20.

Page 7 of Schedule 10 shows that the Water Fund revenues in 2017 through 2019 provided debt service coverage of 0.5-times to 2.8-times and averaged 2.0-times. The Water Fund's average 2.0-times debt service is equal to the 2.0-times debt service reported by Moody's for both A and Baa rated government utilities' bonds (page 5 of Schedule 10) and far below the 2.4-times to 3.3-times average median debt service coverage level achieved by water and sewer Pennsylvania municipal authorities (page 6 of Schedule 10).

I believe the Water Fund recent levels of debt service coverage should be viewed with understanding that the Water Fund's prospective debt service requirement over the next five years (2022-2026) will average at least 40% to 60% higher than their most recent obligation, thus demonstrating the need for additional revenues in order to maintain their existing credit quality.

Q. WHAT DO YOU CONCLUDE FROM THE VARIOUS MEASURES OF INVESTMENT RISK INFORMATION YOU HAVE TESTIFIED TO?

A. A summary of my conclusions regarding the risk analyses discussed previously is shown in Table 5. Overall, the information summarized in Table 5 indicates that Water Fund has higher investment risk than the Water Group.

Summary of Risk Analyses

		Municipal Water Works	Water Group Followed by Analysts
1.	Business Risk:		
2.	Country Risk	Similar Risk Level	
3.	Industry Risk	Similar Risk Level	
4.	Competitive Position	Similar Risk Level	
5.	Profitability/Peer Group Comparisons	Higher Risk Level	
6.	Capitalization Ratios & Financial Risk (Leverage)*	Similar Risk Level	
7.	Debt Cost Rate*		Higher Risk Level
8.	Relative Size:		
9.	Regulatory Diversification	Higher Risk Level	
10.	Economic Diversification	Higher Risk Level	
11.	Demographic Diversification	Higher Risk Level	
12.	Diversification of Weather Conditions	Higher Risk Level	
13.	Customer Concentration of Revenues	Higher Risk Level	
14.	Capital Intensity	Higher Risk Level	
15.	Capital Recovery	Higher Risk Level	
16.	Lower Liquidity:		
17.	Institutional Holdings	Higher Risk Level	
18.	Insider Holdings	Higher Risk Level	
19.	Percentage of Shares Traded	Higher Risk Level	
20.	Required To Meet Clean Water Acts and Safe Drinking Water Act	Similar Risk Level	
21.	Same Regulatory Requirements For Increasing Rates As Non-Municipals	Similar Risk Level	
22.	Experiences Regulatory Lag and Attrition Similar To A Non-Municipal Utility	Similar Risk Level	
23.	Lacks The Benefits That Income Taxes Provide in the Revenue Requirement	Higher Risk Level	
24.	Deferred Income Taxes Provide Non-Municipal Utilities A Cash Flow Advantage	Higher Risk Level	
25.	Current Income Taxes Included In The Revenue Requirement Provide A Margin Or Cushion Against An Unanticipated Drop In Sales Or Increase In Operating Expenses	Higher Risk Level	
26.	Does Not Issue, And Possibly Can Not Issue Bonds Due To Their Size, Bonds To Finance Their Rate Base Additions.	Higher Risk Level	
27.	Debt Service Coverage	Higher Risk Level	
28.	Credit Market Financial Risk Metrics	Higher Risk Level	
29.	Cash Flow Adequacy	Higher Risk Level	
30.	Credit Rating / Credit Profile	Higher Risk Level	

* - Based on recommended capital structure for rate making purposes.

Comment: The terms "Similar Level " indicates same amount of risk and the terms "Higher Level " indicates greater risk.

Table 5

CAPITAL COST RATES

Q. WHAT INFORMATION IS SHOWN ON SCHEDULE 11?

A. Schedule 11 reviews long-term and short-term interest rate trends. Long-term and short-term interest rate trends are reviewed to ascertain the "sub-flooring" or "basement" upon which the Comparable Companies' common equity market capitalization rate is built. Based upon the settled yields implied in the Treasury Bond future contracts and the long-term and recent trends in spreads between long-term government bonds and A-rated public utility bonds available to me at the time Schedule 11 was prepared, I conclude that the market believes that if the Comparable Companies issued new long-term bonds near term, they would be priced to yield about 3.5% based upon a credit profile of "A." Further, it is reasonable to conclude the market anticipates that long-term government bonds will be priced to yield about 2.4%, near term.

Since October 2008, the Federal Reserve has been monetizing US Treasury debt to artificially suppress interest rates through expansionary money policies. The Federal Reserve, with effectively unlimited money at its disposal, intervenes at any time it wishes, in whatever volume it wishes, to make sure that Treasury bond and bill prices and yields are exactly what the Federal Reserve wants them to be. The US Treasury bond market, and mortgage market, has become an artificial market with no connection to objective risk and interest rates.

In August 2011, the Federal Reserve began "Operation Twist." Under "Operation Twist," the Federal Reserve began buying $400 billion of long-dated or long-term US Treasury debt, financed by selling short-term US Treasury debt with three years to go or less. The goal of "Operation Twist" was to try to drive long-term rates lower, which the

Federal Reserve thought would help the mortgage market. This process has created an artificial demand for the US Treasury debt themselves, and easily drives interest rates artificially lower and deceives investors into believing US Treasury debt are safe with wide demand. This has resulted in the entire capital system being impacted by the Federal Reserve's distortion of the price of risk.

> In the real world of economics, the borrower pays an interest rate to a lender, who makes money (interest) by taking on the risk of lending and deferring gratification. The lender is willing to not spend his money now. In a free market economy, interest rates are essentially a price put on money, and they reflect the time preference of people. Higher interest rates reflect a high demand for borrowing and lower savings. But the higher rates automatically correct this situation by encouraging savings and discouraging borrowing. Lower interest rates will work the opposite way. When the government/central bank tampers with interest rates, savings and lending are distorted, and resources are misallocated. This is evident in looking back on the housing bubble. The artificially low interest rates signaled that there was a high amount of savings. But it was a false signal. There was also a signal for people to borrow more. Again, it was a false signal. As these false signals were revealed, the housing boom turned into a bust.[18]

Q. HAVE YOU CONSIDERED THE IMPACT OF COVID-19 ON THE CAPITAL MARKETS IN YOUR ANALYSIS?

A. Yes. On March 11, 2020 the World Health Organization ("WHO") declared a quickly spreading coronavirus infection a pandemic ("COVID-19"). Labeling a disease as a pandemic indicates its spread over a wide geographic area and affecting a high proportion of the population.

The United States Environmental Protection Agency ("EPA") is providing information on drinking water and wastewater to provide clarity to the public regarding

[18]Pike, Geoffrey "The Threat of Negative Interest Rates," Wealth Daily, May 30, 2014, http://www.wealthdaily.com/articles/the-threat-of-negative-interest-rates/5185, (6/03/2014)

COVID-19. According to EPA, the COVID-19 virus has not been detected in drinking-water supplies. Based on current evidence, the risk to water supplies is low.[19] EPA has also stated that wastewater treatment plants treat the COVID-19: "wastewater treatment plants treat viruses and other pathogens. Coronavirus, which causes COVID-19, is a type of virus that is particularly susceptible to disinfection. Standard treatment and disinfectant processes at wastewater treatment plants are expected to be effective."[20] EPA sent a "letter to Governors in all 50 states, territories, tribes and Washington, DC, requesting that water and wastewater workers, as well as the manufacturers and suppliers who provide vital services and materials to the water sector, are considered essential workers and businesses by state authorities when enacting restrictions to curb the spread of COVID-19."[21]

In response to COVID-19 the Federal Reserve has provided monetary and fiscal stimulus to increase liquidity in the form of new fiscal stimulus programs and rate cuts. "For context, new fiscal stimulus and total fiscal deficits in the US are roughly double the levels seen in 2008-2009, and the US fiscal deficit we project for 2020 of 15%-18% is only matched by deficits seen at the height of WWII in 1942-1943."[22] The combined result of these actions by the Federal Reserve and investors' flight to quality have resulted in artificial and historically low risk-free rates as measured by the 30-year treasury bond yield. Public utility bond yields have not fluctuated (decreased) nearly to the degree which yields of 30-year treasury bonds have as is evident by the widening of the yield spread or default spread shown on page 5 of Schedule 17 from pre-COVID-19 levels.

19 https://www.epa.gov/coronavirus, 5/27/20.
20 https://www.epa.gov/coronavirus/do-wastewater-treatment-plants-treat-covid-19 ,7/31/20.
21 https://www.epa.gov/coronavirus/coronavirus-and-drinking-water-and-wastewater, 5/27/20
22 https://www.jpmorgan.com/jpmpdf/1320748588999.pdf, 5/29/20.

When there is a crisis in the markets, such as a financial meltdown, market participants usually sell off and move their money to a safer place; fleeing from illiquid, low quality investments to liquid, high quality investments. This flight to quality reflects a collapse of confidence in the financial system and is most evident in short-term interest rates. Prospectively the capital markets will be affected by the upcoming unprecedented large Treasury financings. Investors provide capital based upon risk and return opportunities and investors will not provide common equity capital when higher risk-adjusted returns are available.

Q. ARE THERE OTHER INDICATIONS THAT FORECASTERS BELIEVE CAPITAL COSTS RATES MAY INCREASE SUBSTANTIALLY FROM THEIR CURRENT LEVELS?

A. Yes, consensus forecasts show that interest rates are expected to increase substantially in the next few years. Table 6 shows the forecasted increase in interest rates published in the December 1, 2020 Blue Chip Consensus Forecasts for the period 2021 to 2023. As shown in Table 6, consensus forecasts show interest rates are expected to increase about 85 basis points from current levels. If interest rates were to increase as predicted, investors will not provide common equity capital when higher risk-adjusted returns are available.

Blue Chip Financial Forecasts Long-Range Survey 3/1/21

	Latest Qtr 3/1/21	Consensus Forecasts (12/1/20 Forecasts)		
	4Q 2020	2022	2023	2024
Interest Rates				
Prime Rate	3.25	3.28	3.48	3.85
3-mo. Treasury Bills	0.09	0.18	0.40	0.82
10 Year Notes	0.86	1.30	1.65	2.03
30 Year Notes	1.62	2.07	2.44	2.81
Aaa Corporate Bond Yield	2.58	2.79	3.22	3.64
Baa Corporate Bond Yield	3.14	3.89	4.30	4.67

Table 6

COMMON EQUITY COST RATE ESTIMATE

Q. WHAT IS THE BEST METHOD OF ESTIMATING COMMON EQUITY COST RATES?

A. There is no single method (model) suitable for estimating the cost rate for common equity. While a single investor may rely solely upon one model in evaluating investment opportunities, other investors rely on different models. Most sophisticated investors who use an equity valuation model rely on many models in evaluating their common equity investment alternatives. Therefore, the average price of an equity security reflects the results of the application of many equity models used by investors in determining their investment decisions.

The application of any single model to estimate common equity cost rates is not appropriate because the security price for which the equity cost rate is being estimated reflects the application of many models used in the valuation of the investment. That is,

the price of any security reflects the collective application of many models. Accordingly, if only one model is used to estimate common equity cost rates, that cost rate will most likely be different from the collective market's cost rates because the collective valuation in the market reflects more than one method.

Noted financial texts, investor organizations and professional societies all endorse the use of more than one valuation method. "We endorse the dividend discount model, particularly when used for establishing companies with consistent earnings power and when used along with other valuation models. It is our view that, in any case, an investor should employ more than one model."[23]

The American Association of Individual Investors state, "No one area of investment is suitable for all investors and no single method of evaluating investment opportunities has been proven successful all of the time."[24]

In their study guide, the National Society of Rate of Return Analysts states, "No cost of equity model or other concept is recommended or emphasized, nor is any procedure for employing any model recommended . . . it remains important to recognize that alternative methods exist and have merit in cost of capital estimation. To this end, analysts should be knowledgeable of a broad spectrum of cost of capital techniques and issues."[25]

Several different models should be employed to measure accurately the market-required cost of equity reflected in the price of stock. Therefore, I used three recognized

[23]Sidney Cottle, Roger F. Murray and Frank E. Block, Graham and Dodd's Securities Analysis 5th Edition, McGraw-Hill, Inc., 1988, p. 568 (emphasis added).
[24]Editorial Policy, AAII Journal, American Association of Individual Investors, Volume 18, No. 1, January 1996, p. 1.
[25]David C. Parcell, The Cost of Capital - A Practitioners Guide, National Society of Rate of Return Analysts, 1995 Edition.

methods: the DCF shown on Schedule 12, the CAPM shown on Schedule 17, and the RP shown on Schedule 18.

DISCOUNTED CASH FLOW

Q. PLEASE EXPLAIN THE DISCOUNTED CASH FLOW MODEL.

A. The DCF is based upon the assumption that the price of a share of stock is equal to a future stream of cash flows to which the holder is entitled. The stream of cash flows is discounted at the investor-required cost rate (cost of capital).

Although the traditional DCF assumes a stream of cash flow into perpetuity, a termination, or sale price can be calculated at any point in time. Therefore, the return rate to the stockholder consists of cash flow (earnings or dividends) received and the change in the price of a share of stock. The cost of equity is defined as:

> ...the minimum rate of return that must be earned on equity finance and investments to keep the value of existing common equity unchanged. This return rate is the rate of return that investors expect to receive on the Company's common stock . . . the dividend yield plus the capital gains yield . . . [26]

Q. PLEASE EXPLAIN HOW YOU CALCULATED YOUR DIVIDEND YIELD IN THE DCF SHOWN ON SCHEDULE 12.

A. As shown on page 1 of Schedule 12, I used the average dividend yield of 1.8% for the Water Group. The individual dividend yields are shown on page 2 of Schedule 12 and are based upon the most recent months' yield, February 2021, and the twelve-month average yield, ending February 2021. The second input to a market DCF calculation is the determination of an appropriate share price growth rate.

[26] J. Fred Weston and Eugene F. Brigham, Essentials of Managerial Finance, 3rd ed. (The Dryden Press), 1974, p. 504 (emphasis added).

Q. WHAT SOURCES OF GROWTH RATES DID YOU REVIEW?

A. I reviewed both historical and projected growth rates. Schedule 13 shows the array of projected growth rates for the Comparable Companies that are published. Specific historical growth rates are shown for informational purposes because I believe the meaningful historical growth rates are already considered when analysts arrive at their projected growth rates. Nonetheless, some investors may still rely on historical growth rates.

Q. PLEASE EXPLAIN THE SOURCES OF THE PROJECTED GROWTH RATES SHOWN ON SCHEDULE 13.

A. I relied upon four sources for projected growth rates, First Call, S&P, Zacks Investment Research and Value Line.[27]

Q. DID YOU REVIEW ANY OTHER GROWTH RATES BESIDES THOSE SHOWN ON SCHEDULE 13?

A. Yes. I reviewed EPS growth rates reflecting changes in return rates on book common equity (ROE) over time. I summarized recent ROEs on page 1 of Schedule 14 and compared those to the Water Group's higher levels projected to be achieved by Value Line, as shown on page 2 of Schedule 14. ROEs increase when EPS grows at much higher/faster rates than book value.

I also reviewed industry specific average projected growth rates that are published by Zacks for the industries in which the Comparable Companies operate. According to

[27]With the exception of Value Line, the earnings growth rate projections are consensus estimates five-year EPS estimates. These consensus estimates are compiled from more than 1,700 financial analysts and brokerage firms nationwide. It should be noted that none of the consensus forecasts provides projected DPS estimates. Value Line publishes projected Cash flow, EPS and DPS five-year growth projections as well.

Zacks, the Water Group's industry is projected to have EPS growth rates that average 10.1% over the next five years.

Q. WHAT DO YOU CONCLUDE FROM THE GROWTH RATES YOU HAVE REVIEWED?

A. Table 7 summarizes some of the various growth rates reviewed.

Summary of Growth Rates	Water Group
Projected 5 Year Growth in EPS	7.1
Actual 5 Year Growth in EPS	6.8
Projected 5 Year Growth in DPS	7.1
Projected 5 Year Growth in EPS for the industry	10.5

Table 7

Academic studies suggest that growth rate conclusions should be tested for reasonableness against long-term interest rate levels. Further, the minimum growth rate must at least exceed expected inflation levels. Otherwise, investors would experience decreases in the purchasing power of their investment. Finally, the combined result of adding the growth rate to the market value dividend yield must provide a sufficient margin over yields of public utility debt.

Q. WHAT METHOD DID YOU USE TO ARRIVE AT YOUR GROWTH RATE CONCLUSION?

A. No single method is necessarily the correct method of estimating share value growth. It is reasonable to assume that investors anticipate that the Water Group's current ROE will expand to higher levels. The published historical earnings growth rates for the Water Group averages 6.8%. Because there is not necessarily any single means of estimating

share value growth, I considered all of this information in determining a growth rate conclusion for the Comparable Companies.

Moreover, while some rate of return practitioners would advocate that mathematical precision should be followed when selecting a growth rate, the fact is that investors do not behave in the same manner when establishing the market price for a stock. Rather, investors consider both company-specific variables and overall market sentiment such as inflation rates, interest rates and economic conditions when formulating their capital gains expectations. This is especially true when one considers the relatively meaningless negative growth rates. That is, use of a negative growth rate in a DCF implies that investors invest with the expectation of losing money.

The range of growth rates previously summarized supports the reasonableness of an expected 7.1% growth rate for the Water Group based primarily on the projected five-year growth rates and considering the Water Group's industry projected EPS growth rates of 10.5%. Like the projected growth rates, this investor-expected growth rate of 7.1% is based on a survey of projected and historical growth rates published by established entities, including First Call, S&P, Zacks Investment Research and Value Line. Use of information from these unbiased professional organizations provides an objective estimation of investor's expectations of growth. Based on the aforesaid, all growth rates for the Comparison Companies have been considered and have been given weight in determining a 7.1% growth rate for the Water Group.

Q. WHAT IS YOUR MARKET VALUE DCF ESTIMATE FOR THE COMPARABLE COMPANIES?

A. The market value DCF cost rate estimate for the Water Group is 9.0%, as detailed on page 1 of Schedule 12.

Q. ARE THERE OTHER CONSIDERATIONS IN REVIEWING A MARKET VALUE CAPITALIZATION DCF COST RATE ESTIMATE?

A. Yes. It should be noted that although I recommend specific dividend yields for the Comparable Group, I recommend that less weight be given to the resultant market value DCF cost rate due to the market's current market capitalization ratios and the impact that the market-to-book ratio has on the DCF results. The Comparable Companies' current market-to-book ratios of 326% and low dividend yields are being affected by the aforementioned policy of the Federal Reserve that has resulted in the mispricing of capital due to artificial interest rates, not DCF fundamentals.

Although the DCF cost for common equity appears to be based upon mathematical precision, the derived result does not reflect the reality of the marketplace since the model proceeds from unconnected assumptions. The traditional DCF derived cost rate for common equity will continuously understate or overstate investors' return requirements as long as stock prices continually sell above or below book value. A traditional DCF model implicitly assumes that stock price will be driven to book value over time. However, such a proposition is not rational when viewed in the context of an investor purchasing stock above book value. It is <u>not</u> rational to assume that an investor would expect share price to <u>decrease</u> 69% (100%÷326%=31%-100%=69%) in value to equal book value.

Utility stocks do not trade in a vacuum. Utility stock prices, whether they are above or below book value, reflect worldwide market sentiment and are not reflective of only one element.

Q. WHAT DO YOU MEAN BY YOUR STATEMENT THAT UTILITY STOCKS ARE NOT TRADED IN A VACUUM?

A. Utility stocks cannot be viewed solely by themselves. They must be viewed in the context of the market environment. Table 8 summarizes recent market-to-book ratios ("M/B") for well-known measures of market value reported in the March 29, 2021 issue of Barron's and the Water Group's average M/B as shown on page 1 of Schedule 14.

	M/B Ratios(%)
Dow Jones Industrials	494
Dow Jones Transportation	431
Dow Jones Utilities	233
S&P 500	435
S&P Industrials	586
Vs.	
Water Group	326

Table 8

Utility stock investors view their investment decisions compared with other investment alternatives, including those of the various market measures shown in Table 8.

Q. HOW DOES A TRADITIONAL DCF IMPLICITLY ASSUME THAT MARKET PRICE WILL EQUAL BOOK VALUE?

A. Under traditional DCF theory, price will equal book value (M/B=1.00) only when a company is earning its cost of capital. Traditional DCF theory maintains that a company is under-earning its cost of capital when the market price is below book value (M/B<1.00),

while a company over-earning its cost of capital will have a market price above its book value (M/B>1.00). If this were true, it would imply that the capitalistic free market is not efficient because the overwhelming majority of stocks would currently be earning more than their cost of capital. Table 8 shows that most stocks sell at an M/B that is greater than 1.0.

Q. PLEASE EXPLAIN WHY SUCH A PHENOMENON WOULD SHOW THAT THE CAPITALISTIC FREE-MARKET IS NOT EFFICIENT.

A. Historically, the S&P Industrials, which represented approximately 400 companies, sold at an M/B as low as 1.0 only one time out of the 53-year period 1947-1999. Based upon the traditional DCF assumption, which suggests that companies with M/Bs greater than 1.0 earn more than their cost of capital, this data would suggest that the S&P Industrial companies have earned more than their cost of capital while competing in a competitive environment over the 53-year period. In a competitive market, new companies would continually enter the market up to the point that the earnings rate was at least equal to their cost of capital.

During this period, the S&P Industrials sold at an average M/B of 223.7% while experiencing a ROE of 15.7% over a period in which interest rates averaged 7.2%. It is important to note that the average ROE of 15.7% is relative to a common equity ratio of more than 60% for the S&P Industrials over many years.

Q. WHAT IS THE SIGNIFICANCE OF INDUSTRIAL COMPANIES' M/B AND THE COST OF CAPITAL FOR A WATER UTILITY?

A. As stated previously, utility stocks do not trade in a vacuum. They must compete for capital with other firms including industrial stocks. Over time, there has been a

relationship between M/Bs of industrial stocks and utility stocks. Although industrial stocks have sold at a higher multiple of book value than utility stocks, both have tracked in similar directions. Because utility and industrial stock prices relative to book values move in similar directions, it is irrational to conclude that stock prices that are different from book value, either higher or lower, suggest that a firm is over-or under-earning its cost of capital when competitive free-markets exist.

Q. DOES THE MARKET VALUE DCF PROVIDE A REASONABLE ESTIMATE OF THE WATER GROUP'S COMMON EQUITY COST RATE?

A. No, the DCF only provides a reasonable estimate of the Comparable Group's common equity cost rate when their market price and book value are similar (M/B=100%).[28] A DCF will overstate a common equity cost rate when M/Bs are below 100% and understate when they are above 100%. Since the Comparable Group's current M/Bs average 324%, the DCF understates their common equity cost rate. Schedule 15 provides a numerical illustration of the impact of M/Bs on investors' market returns and DCF returns. The reason that DCF understates or overstates investors' return requirements depending upon M/B levels is because a DCF-derived equity cost rate is applied to a book value rate base while investors' returns are measured relative to stock price levels. Based upon this, I recommend that less weight be given to the market value DCF cost rate unless the increased financial risk, resulting from applying a market value cost rate to a book value, is accounted for.

[28]Roger A Morin, Regulatory Finance - Utilities' Cost of Capital, Public Utility Reports, Inc., 1994, pp. 236-237.

Q. HOW DO YOU RESOLVE THE FINANCIAL RISK DIFFERENCE BETWEEN MARKET VALUE COST RATES AND BOOK VALUE COST RATES?

A. The basic proposition of financial theory regarding the economic value of a company is based on market value. That is, a company's value is based on its **market value** weighted average cost of capital.[29] The American Society of Appraisers, ASA Business Valuation Standards, 2009, and the National Association of Certified Valuation Analysts, Professional Standards, 2007, use the same definition:

> Weighted Average Cost of Capital (WACC). The cost of capital (discount rate) determined by the weighted average, **at market values**, of the cost of all financing sources in the business enterprise's capital structure. (Emphasis added)

Accordingly, the market value derived cost rate reflects the financial risk or leverage associated with **capitalization ratios based on market value**, not book value.

As shown on page 1 of Schedule 16, for the Water Group there is a large difference in leverage as a result of the average $4,426 million difference in market value common equity and book value common equity. This difference in market values and book values results in debt/equity ratios based on market value of 26.0%/74.0% (debt/equity) verses 51.0%/49.0% (debt/equity) based on book value as shown on page 1 of Schedule 16. The larger the difference between market values and book values the less reliable the models' results are because **the models provide an estimate of the cost of capital of market value**, not book value.

[29]For other examples, see http://www.investinganswers.com/financial-dictionary/financial-statement-analysis/weighted-average-cost-capital-wacc-2905. Also see http://www.wallstreetmojo.com/weighted-average-cost-capital-wacc/ , or http://accountingexplained.com/misc/corporate-finance/wacc .

Financial theory concludes capital structure and firm value are related. Since capital structure and firm value are related, an adjustment is required when a cost of common equity model is based on market value and if its results are then applied to book value. As explained previously, the market value derived cost rate reflects the financial risk or leverage associated with **capitalization ratios based on market value**, not book value. The authors Brealey, Myers and Allen provide a similar definition of the cost of capital being based on market capitalization, not book value,

> The values of debt and equity add up to overall firm value (D + E = V) and firm value V equals asset value. **These figures are all market values, not book (accounting) values**. The market value of equity is often much larger than the book value, so the market debt ratio D/V is often much lower than a debt ratio computed from the book balance sheet.[30]

The work of Modigliani and Miller concludes that the market value of any firm is independent of its capital structure and this is precisely the reason why an adjustment is appropriate. The only way for the market value of a firm to remain independent of its capital structure is if the capital cost rates change to offset changes in the capital structure. If the capital cost rates do not change to offset changes in the capital structure, then the value of the firm will change. Clearly an adjustment is required when a cost of common equity model is based on **market value** and if its results are then applied to **book value** because the capital structure is changed from **market value** capitalization to **book value** capitalization.

Differences in the amount of leverage employed can be quantified based upon the Comparable Group's leveraged beta being "unleveraged" through the application of the "Hamada Formula". The details of the model are shown on page 2 of Schedule 16. For

[30]Brealey, Myers and Allen, Principles of Corporate Finance, 10th edition, page 216 (emphasis added).

example, the inputs to the formula for the Water Group market value capitalization consist of their leveraged beta of 0.79, debt ratio of 25.7%, preferred stock ratio of 0.0%, common equity ratio of 74.3% and combined tax rate of 28.00%. The group's unleveraged beta is determined to be 0.63 through the use of the following Hamada formula:

$$Bl = Bu\ (1 + (1 - t)\ D/E + P/E)$$

where:

Bl = observed, leveraged beta

Bu = calculated, unleveraged beta

t = income tax rate

D = debt ratio

P = preferred stock ratio

E = common equity ratio

Applying the unleveraged beta of 0.63 along with the Water Group's book value capitalization ratios of 50.8% long-term debt, 0.0% preferred stock and 49.2% common equity and combined tax rate of 28.00% results in a leveraged beta of 1.10 applicable to the group's book value capitalization. Based upon the Water Group's risk premium of 6.0% and the difference between Water Group's market value leveraged beta, their book value leveraged beta of 0.31 (1.10 - 0.79) indicates that the Water Group's common equity cost rate must be increased by 1.86 (0.31 x 6.0 = 1.86) in recognition of their book value's exposure to more financial risk.

Q. IS THERE ANOTHER WAY TO REFLECT THE FINANCIAL RISK DIFFERENCE THAT EXISTS AS A RESULT OF MARKET CAPITALIZATION

RATIOS BEING SIGNIFICANTLY DIFFERENT FROM BOOK VALUE CAPITALIZATION RATIOS?

A. Yes, generally speaking. Although it is possible to know the direction of a financial risk adjustment on common equity cost rate, a specific quantification of financial risk differences is very difficult. Although the end result of a financial risk adjustment is very subjective and specific quantification very difficult, the direction of the adjustment is clearly known. However, hypothetically, if the Comparable Group's debt were rated based on market value debt ratios, they would command an Aaa rating. The Comparison Group currently has bonds rated A based upon their book value debt ratios. The yield spread on a bond rated Aaa versus A rated bonds averages 43 basis points or 0.43% as shown on page 3 of Schedule 16.

The end result of the application of the Hamada Model and the bond yield spread indicates that the Water Group market value common equity cost rate equity cost rate should be adjusted upward by at least 1.1% (1.8% hamada est. + 0.4% yield spread = 2.2% ÷ 2 = 1.1%) since it is going to be applied to a book value.

Accounting for the increased amount of leverage between market value derived DCF cost rates and book value cost rates indicates a book value DCF cost rate of 10.10% for the Water Group (9.0% + 1.1% = 10.10%).

CAPITAL ASSET PRICING MODEL

Q. PLEASE BRIEFLY DESCRIBE THE THEORY OF THE CAPITAL ASSET PRICING MODEL.

A. The CAPM is based upon the assumption that investors hold diversified portfolios and that the market only recognizes or rewards non-diversifiable (or systematic) risk when

determining the price of a security because company-specific risk (or non-systematic) is removed through diversification. Further, investors are assumed to require additional or higher returns for assuming additional or higher risk. This assumption is captured by using a beta that provides an incremental cost of additional risk above the base risk-free rate available to investors. The beta of a security reflects the market risk or systematic risk of the security relative to the market. The beta for the market is always equal to 1.00; therefore, a company whose stock has a beta greater than 1.00 is considered riskier than the market, and a company with a beta less than 1.00 is considered less risky than the market. The base risk-free rate is assumed to be a U.S. Government treasury security because they are assumed to be free of default risk.

Q. WHAT RISK-FREE RATE AND BETA HAVE YOU USED IN YOUR CAPM CALCULATION?

A. The risk-free rate used in CAPM should have approximately the same maturity as the life of the asset for which the cost rate is being determined. Because utility assets are long-lived, a long-term Treasury Bond yield serves as an appropriate proxy. Previously, I estimated an appropriate risk-free rate of 2.4% based upon the recent and forward long-term Treasury yields. I used the average beta of 0.79 for the Water Group as shown on page 1 of Schedule 17. However, as stated previously, the Comparable Group's betas are understated due to their small size which affects their stock price changes.

Q. AFTER DEVELOPING AN APPROPRIATE BETA AND RISK-FREE RATE, WHAT ELSE IS NECESSARY TO CALCULATE A CAPM DERIVED COST RATE?

A. A market premium is necessary to determine a traditional CAPM derived cost rate. The market return rate is the return expected for the entire market. The market premium is then multiplied by the company specific beta to capture the incremental cost of additional risk (market premium) above the base risk-free rate (long-term treasury securities) to develop a risk adjusted market premium. For example, if you conclude that the expected return on the market as a whole is 15% and further assume that the risk-free rate is 8%, then the market premium is shown to be 7% (15% - 8% = 7%).

Further, assume there are two companies, one of which is considered less risky than the market, and therefore has a beta of less than 1.00 or 0.80. The second company has a beta that is greater than 1.00 or 1.20, and is therefore considered riskier than the market. By multiplying the hypothetical 7.0% market premium by the respective betas of 0.80 and 1.20, risk adjusted market premiums of 5.6% (7.0% x 0.80) and 8.4% (7.0% x 1.20) are shown for the company considered less risky than the market and for the company considered riskier than the market, respectively.

Adding the assumed risk-free rate of 8% to the risk adjusted market premiums results in the CAPM derived cost rates of 13.6% (5.6% + 8.0%) for the less risky company and 16.4% (8.4% + 8.0%) for the company considered of greater risk than the market. In fact, the result of this hypothetical CAPM calculation shows that: (1) the least risky company, with the beta of 0.80, has a cost rate of 13.6%; (2) the market, with the beta of

1.00, has a cost rate of 15.0%; and (3) that the higher risk company, with a beta of 1.20, has a cost rate of 16.4%.

Q. HOW DID YOU DEVELOP A MARKET PREMIUM FOR YOUR CAPM?

A. The average projected market premium of 6.3% is developed on page 2 of Schedule 17. It is based upon Value Line's average projected total market return for the next three to five years of 8.7% less the risk-free rate of 2.4%. I also reviewed market premiums derived from Ibbotson Associates' most recent publication concerning asset returns that show a market premium of 6.9%. The Ibbotson Associates' market premium may be on the low side reflective of the higher interest rate environment found during their study (*i.e.,* 5.0%). The Value Line market premium reflects the Federal Reserve's current artificial interest rate levels while the Ibbotson Associates' market premiums reflect a higher interest rate environment than what exists today.

Q. HOW DID YOU ADJUST FOR THE IMPACT THAT SIZE HAS ON THE COMPARABLE GROUP'S BETA?

A. The adjustment is reflected in the CAPM size premium. The CAPM size premium is developed on page 4 of Schedule 17. The size premium reflects the risks associated with the Comparable Group's small size and its impact on the determination of their beta. This adjustment is necessary because beta (systematic risk) does not capture or reflect the Comparable Group's small size. I reduced the size premium by the ratio of the Comparison Group's beta to their respective market quartile's beta.

Q. WHAT IS THE COVID-19 DEFAULT ADJUSTMENT?

A. As explained previously, the combined result of these actions by the Federal Reserve and investors' flight to quality have resulted in artificial and historically low risk-free rates as

measured by the 30-year treasury bond yield. Public utility bond yields have not fluctuated (decreased) nearly to the degree which yields of 30-year treasury bonds have as is evident by the widening of the yield spread or default spread shown on page 5 of Schedule 17 from pre-COVID-19 levels. The COVID-19 default adjustment normalizes the default spread between treasury bond yields and public utility bond yields to account for current artificial interest rates.

Q. WHAT IS THE COMPARISON GROUP'S MARKET COST OF EQUITY BASED UPON YOUR CAPM CALCULATION?

A. The CAPM based on Ibbotson Associates' historical market returns shows a market cost rate of 8.9% for the Water Group. The CAPM based on Value Line's projected market returns shows an 8.4% for the Water Group, as shown on page 1 of Schedule 17. The Comparable Group's average market value CAPM of 8.8% is based 75% on the results of the historical market returns and 25% on the projected market returns. Adjusting the market value CAPM based upon the end result of the application of the Hamada Model and the bond yield spread to account for the difference in leverage between market value capitalization ratios and book value ratios discussed previously indicates a cost rate of 9.90% for the Water Group applicable to book value (8.8% + 1.1% = 9.9%).

RISK PREMIUM

Q. WHAT IS A RISK PREMIUM?

A. A risk premium is the common equity investors' required premium over the long-term debt cost rate for the same company, in recognition of the added risk to which the common stockholder is exposed versus long-term debtholders. Long-term debtholders have a stated contract concerning the receipt of dividend and principal repayment whereas

common stock investors do not. Further, long-term debtholders have the first claim on assets in case of bankruptcy. A risk premium recognizes the higher risk to which a common stock investor is exposed. The risk premium-derived cost rate for common equity is the simplest form of deriving the cost rate for common equity because it is nothing more than a premium above the prospective level of long-term corporate debt.

Q. WHAT IS THE APPROPRIATE ESTIMATED FUTURE LONG-TERM BORROWING RATE FOR THE COMPARABLE COMPANIES?

A. The estimated near term long-term borrowing rate for the Comparable Companies is 3.5% based upon their credit profile that supports an A bond rating.

Q. WHAT IS THE APPROPRIATE RISK PREMIUM TO BE ADDED TO THE FUTURE LONG-TERM BORROWING RATE?

A. To determine a common equity cost rate, it is necessary to estimate a risk premium to be added to the Comparable Group's prospective long-term debt rate. Investors may rely upon published projected premiums; they also rely upon their experiences of investing in ultimately determining a probabilistic forecasted risk premium.

Projections of total market returns are shown on page 2 of Schedule 18. A projected risk premium for the market can be derived by subtracting the debt cost rate from the projected market return as shown on page 2 of Schedule 18. However, the derived risk premium for the market is not directly applicable to the Comparable Companies because they are less risky than the market. The use of 85% of the market's risk is a conservative estimation of their level of risk as compared to the market.

The midpoint of the risk premium range is 5.1% and the average for the most recent quarter is 5.0% as shown on page 2 of Schedule 18. Based on this, a reasonable estimate of a longer-term projected risk premium is 5.0%.

Q. HOW DO INVESTORS' EXPERIENCES AFFECT THEIR DETERMINATION OF A RISK PREMIUM?

A. Returns on various assets are studied to determine a probabilistic risk premium. The most noted asset return studies and resultant risk premium studies are those performed by Ibbotson Associates. However, Ibbotson Associates has not performed asset return studies concerning public utility common stocks. Based upon Ibbotson Associates' methodology of computing asset returns, I calculated annual returns for the S&P utilities and bonds for the period 1928-2019. The resultant annual returns were then compared to determine a recent risk premium from a recent 20-year period, 2000-2019 and subsequent periods that were each increased by ten years until the entire study period was reviewed (pages 3 and 4 of Schedule 18).

A long-term analysis of rates of return is necessary because it assumes that investors' expectations are, on average, equal to realized long-run rates of return and resultant risk premium. Observing a single year's risk premium, either high or low, may not be consistent with investors' requirements. Further, studies show a mean reversion in risk premiums. In other words, over time, risk premiums revert to a longer-term average premium. Moreover, since the expected rate of return is defined as "the rate of return expected to be realized from an investment; the mean value of the probability distribution of possible results,"[31] a long-term analysis of annual returns is appropriate.

[31]Eugene F. Brigham, Fundamentals of Financial Management, Fifth Edition, The Dryden Press, 1989, p. 106.

Q. WHAT DO YOU CONCLUDE FROM THE INFORMATION SHOWN ON PAGES 3 AND 4 OF SCHEDULE 18?

A. The average of the absolute range of the S&P Utilities' appropriate average risk premium (i.e., bonds rated AAA to A) was 3.7% during the seven periods studied, as calculated from page 3 of Schedule 18. The credit adjusted longer term risk premiums (i.e., bonds rated A), 1928-2019, averages 4.3%. The appropriate average (i.e., bonds rated AAA to A) longer term risk premiums, 1928-2019, have an absolute range of 4.3% to 5.3%, and averages 4.7%.

The aforementioned premiums are based on total returns for bonds; and reflect their price risk. A bond's price risk is not related to its credit quality and is eliminated when a bond is held to maturity from time of purchase. Using the income returns, page 4 of Schedule 18, for bonds eliminates price risk and better measures an investor's required return based on credit quality. The appropriate average risk premium (i.e., bonds rated AAA to A) based on income returns was 5.2% during the seven periods studied. The credit adjusted longer term risk premiums (i.e., bonds rated A), 1928-2019, averages 4.9%. The appropriate average (i.e., bonds rated AAA to A) longer term risk premiums, 1928-2019, have an absolute range of 4.9% to 5.2%, and averages 5.1%.

Q. WHAT INFORMATION IS SHOWN ON PAGE 5 OF SCHEDULE 18?

A. Page 5 of Schedule 18 proves and measures the negative relationship between interest rate levels and the resulting risk premium. That is, risk premiums are generally higher when interest rates are low and risk premiums are generally lower when interest rates are high. This was proven by sorting the 92-year period, 1928 to 2019, annual returns based on interest rate level from lowest interest rate to highest interest rate and distributing the

results into two equal groups, a 46-year low interest rate environment group and a 46-year high interest rate environment group.

During the period 1928-2019, the 46 years with the lowest interest rates had an average interest rate of 2.9% and reflected a range of interest rates from 2.0% to 4.1%. This period resembles the current interest rate environment of 1.4% discussed previously regarding the CAPM's risk free rate. The risk premium based on total returns during this low interest rate environment produced the appropriate average (i.e., bonds rated AAA to A) longer term risk premium of 6.6% and a credit adjusted longer term risk premium (i.e., bonds rated A) of 5.8%. The annual income return based risk premium during this low interest rate environment produced the appropriate average (i.e., bonds rated AAA to A) longer term risk premium of 7.5% and a credit adjusted longer term risk premium (i.e., bonds rated A) of 7.2%.

However, during the period 1928-2019, the 46 years with the highest interest rates had an average interest rate of 7.2% and reflected a range of interest rates from 4.1% to 13.5%. This period is far different from the current interest rate environment of 1.4%. The risk premium based on total returns during the highest interest rate environment produced an average longer term risk premium of 2.8% over bonds rated AAA to A and a credit adjusted longer term risk premium (i.e., bonds rated A) of only 2.8%. The annual income return based risk premium during the highest interest rate environment produced an average longer term risk premium of 2.8% over bonds rated AAA to A and a credit adjusted longer term risk premium (i.e., bonds rated A) of only 2.6%.

Over time, risk premiums are mean reverting. They constantly move toward a long-term average reflecting a long-term level of interest rates. That is, an above-average

risk premium will decrease toward a long-term average while a below-average risk premium will increase toward a long-term average. In any single year, of course, investor-required rates of return may not be realized and in certain instances, a single year's risk premiums may be negative. Negative risk premiums are not indicative of investors' expectations and violate the basic premise of finance concerning risk and return. Negative risk premiums usually occur only in the stock market's down years (*i.e.,* the years in which the stock markets' return was negative).

When interest rate levels are not considered the credit adjusted longer term risk premium (i.e., bonds rated A), 1928-2019, averages 4.9%, discussed previously regarding page 4 of Schedule 18. However, the annual income return based risk premium during the low interest rate environment produced a credit adjusted longer term risk premium (i.e., bonds rated A) of 7.2%. Since this period resembles the current interest rate environment of 2.4%, a reasonable estimate of investors risk premium based on historical returns is based on a 50% weighting on the results of the entire 1928-2019 historical market returns and a 50% weighting on the results of the low interest rate environment to produce a 6.0% historical risk premium.

Adding the risk premium of 6.0% for the Comparable Group to the prospective cost of newly issued long-term debt of 3.5% results in a market value risk premium derived cost rate for common equity of 9.50% as reflected on page 1 of Schedule 18. Adjusting the market value risk premium based upon the end result of the application of the Hamada Model and the bond yield spread to account for the difference in leverage between market value capitalization and book value ratios discussed previously indicates a cost rate of 10.60% applicable to book value (9.50% + 1.1% = 10.60%).

SUMMARY OF COMMON EQUITY COST RATE

Q. WHAT IS YOUR COMPARABLE GROUP'S COMMON EQUITY COST RATE?

A. Based upon the results of the models employed, the Water Group's common equity cost rate is in the range of 9.90% to 10.60% as reflected on Schedule 19. Based upon this data, the common equity cost rate for the Water Group is at least 10.20%. My recommendation is based upon the Water Group's 10.20% common equity cost rate.

Q. DO YOU RECOMMEND A COST OF COMMON EQUITY OF 10.20% FOR WATER FUND?

A. No. Based upon the financial analysis and risk analysis, I conclude that Water Fund is exposed to greater investment risk than the Comparable Group. This is evidenced by Water Fund's small size, visibly lower credit rating and the other factors summarized in Table 5 discussed previously.

Q. HOW DO YOU REFLECT THE INVESTMENT RISK DIFFERENCE BETWEEN WATER FUND AND THE COMPARABLE GROUP?

A. The direction of the investment risk adjustment on common equity cost rates is clearly known. A specific quantification of risk differences is based on Water Fund's implied maximum A- to a BBB+ credit profile, if not lower. The difference in bond rating between Water Fund and the Comparable Companies suggests a minimum 25-basis point difference in long-term debt cost rates based upon the yield spread of A and BBB rated public utility debt since an A- to a BBB+ credit rating falls between the A and BBB ratings.

A 25-basis point spread between Water Fund and the Water Group is a conservative estimate of the risk differential. Adding the 0.25% risk adjustment to the various results of the three models employed for the Water Group shows a current range of common equity

cost applicable to book value for Water Fund of 10.35% (DCF), 10.15% (CAPM), and 10.85% (RP) as shown in Table 9.

Summary of the Water Fund's Equity Cost Rates	
DCF	10.35
CAPM	10.15
RP	10.85

Table 9

Q. WHAT IS YOUR COMMON EQUITY COST RATE RECOMMENDATION FOR WATER FUND?

A. As discussed above and as shown in Schedule 19, I recommend a 10.45% common equity cost rate for Water Fund. My alternative recommended cost of common equity, should the Commission decide to adjust my primary recommendation of 10.45% to reflect the maximum income tax status of the investors of the Water Fund, is 9.30%.

Q. HOW DO YOU IMPUTE PERSONAL INCOME TAXES IN A RECOMMENDATION?

A. In past cases the Commission has relied upon bond yield spreads between public utility and GO bonds. The difference in bond yield spreads between public utility and GO bonds produces an estimate of income tax rates of bond investors as shown on Schedule 20. This comparison requires credit quality of each type of bond used be matched (i.e., A vs. A, and Baa vs. Baa) otherwise credit quality differences are measured.

As shown on Schedule 20, the credit quality of each type of bond has been matched. The appropriate yield comparison is based on bonds rated A bonds rated Baa to match the credit rating of the Water Fund. As shown on Schedule 20, the yield spreads between public utility and GO bonds shows the maximum income tax adjustment is 11%.

Applying the 11% income tax adjustment to my 10.45% recommended cost of common equity produces a 9.30% for the Water Fund.

Q. HAVE YOU CHECKED THE REASONABLENESS OF YOUR RECOMMENDED COMMON EQUITY RATE FOR WATER FUND?

A. Yes. Page 2 of Schedule 14 reflects the average projected earned return on average book common equity for the companies in the Comparable Group for the period 2023-2025, which is shown to range from 9.0% to 15.0%. Given the large degree to which regulatory lag and attrition impacts water utilities earning, the range of the comparable utilities' projected earned returns suggests that my recommendation that Water Fund be permitted an opportunity to earn 10.45% is reasonable, if not conservative.

OVERALL RATE OF RETURN RECOMMENDATION

Q. WHAT IS YOUR OVERALL FAIR RATE OF RETURN RECOMMENDATION FOR THE WATER FUND?

A. Based upon the recommended capital structure and my estimate of the Water Fund's common equity cost rate, I recommend an overall fair rate of return of 6.86%. The details of my recommendation are shown on Schedule 1. It should be noted, should the Commission decide to adjust my primary 6.86% recommended cost of common equity to reflect the income tax status of the investors of the Water Fund, my overall fair rate of return recommendation would be 6.27%, as shown on Schedule 21.

Q. HAVE YOU TESTED THE REASONABLENESS OF YOUR OVERALL FAIR RATE OF RETURN RECOMMENDATION?

A. Yes. If my recommended overall rate of return is actually earned, it will give Water Fund ratios that will allow Water Fund to present a financial profile that will enable it to attract capital necessary to provide safe and reliable water service, at reasonable terms.

Q. DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

APPENDIX A

Professional Qualifications
of
Harold Walker, III
Manager, Financial Studies
Gannett Fleming Valuation and Rate Consultants, LLC.

EDUCATION

Mr. Walker graduated from Pennsylvania State University in 1984 with a Bachelor of Science Degree in Finance. His studies concentrated on securities analysis and portfolio management with an emphasis on economics and quantitative business analysis. He has also completed the regulation and the rate-making process courses presented by the College of Business Administration and Economics Center for Public Utilities at New Mexico State University. Additionally, he has attended programs presented by The Institute of Chartered Financial Analysts (CFA).

Mr. Walker was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the Society of Utility and Regulatory Financial Analysts. This designation is based upon education, experience and the successful completion of a comprehensive examination. He is also a member of the Society of Utility and Regulatory Financial Analysts (SURFA) and has attended numerous financial forums sponsored by the Society. The SURFA forums are recognized by the Association for Investment Management and Research (AIMR) and the National Association of State Boards of Accountancy for continuing education credits.

Mr. Walker is also a licensed Municipal Advisor Representative (Series 50) by Municipal Securities Rulemaking Board (MSRB) and Financial Industry Regulatory Authority (FINRA).

BUSINESS EXPERIENCE

Prior to joining Gannett Fleming Valuation and Rate Consultants, LLC., Mr. Walker was employed by AUS Consultants - Utility Services. He held various positions during his eleven years with AUS, concluding his employment there as a Vice President. His duties included providing and supervising financial and economic studies on behalf of investor owned and municipally owned water, wastewater, electric, natural gas distribution and transmission, oil pipeline and telephone utilities as well as resource recovery companies.

In 1996, Mr. Walker joined Gannett Fleming Valuation and Rate Consultants, LLC. In his capacity as Manager, Financial Studies and for the past twenty years, he has continuously studied rates of return requirements for regulated firms. In this regard, he supervised the preparation of rate of return studies in connection with his testimony and in the past, for other individuals. He also assisted and/or developed dividend policy studies, nuclear prudence studies, calculated fixed charge rates for avoided costs involving cogeneration projects, financial decision studies for capital budgeting purposes and developed financial models for determining future capital requirements and the effect of those requirements on investors and ratepayers, valued utility property and common stock for acquisition and divestiture, and assisted in the private placement of fixed capital securities for public utilities.

Head, Gannett Fleming GASB 34 Task Force responsible for developing Governmental Accounting Standards Board (GASB) 34 services, and educating Gannett Fleming personnel and Gannett Fleming clients on GASB 34 and how it may affect them. The GASB 34 related services include inventory of assets, valuation of assets, salvage estimation, annual depreciation rate determination, estimation of depreciation reserve, asset service life determination, asset condition assessment, condition assessment documentation, maintenance estimate for asset preservation, establishment of condition level index, geographic information system (GIS) and data management services, management discussion and analysis (MD&A) reporting, required supplemental information (RSI) reporting, auditor interface, and GASB 34 compliance review.

Mr. Walker was also the Publisher of C.A. Turner Utility Reports from 1988 to 1996. C.A. Turner Utility Reports is a financial publication which provides financial data and related ratios and forecasts covering the utility industry. From 1993 to 1994, he became a contributing author for the Fortnightly, a utility trade journal. His column was the Financial News column and focused mainly on the natural gas industry.

In 2004, Mr. Walker was elected to serve on the Board of Directors of SURFA. Previously, he served as an ex-officio directors as an advisor to SURFA's existing President. In 2000, Mr. Walker was elected President of SURFA for the 2001-2002 term. Prior to that, he was elected to serve on the Board of Directors of SURFA during the period 1997-1998 and 1999-2000. Currently, he also serves on the Pennsylvania Municipal Authorities Association, Electric Deregulation Committee.

EXPERT TESTIMONY

Mr. Walker has submitted testimony or been deposed on various topics before regulatory commissions and courts in 25 states including: Arizona, California, Colorado, Connecticut, Delaware, Hawaii, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, Nevada, New Jersey, New York, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, and West Virginia. His testimonies covered various subjects including: fair market value, the taking of natural resources, benchmarking, appropriate capital structure and fixed capital cost rates, depreciation, fair rate of return, purchased water adjustments, synchronization of interest charges for income tax purposes, valuation, cash working capital, lead-lag studies, financial analyses of investment alternatives, and fair value.

The following tabulation provides a listing of the electric power, natural gas distribution, telephone, wastewater, and water service utility cases in which he has been involved as a witness. Additionally, he has been involved in a number of rate proceedings involving small public utilities which were resolved by Option Orders and therefore, are not listed below.

Client	Docket No.
Alpena Power Company	U-10020
Armstrong Telephone Company - Northern Division	92-0884-T-42T
Armstrong Telephone Company - Northern Division	95-0571-T-42T
Artesian Water Company, Inc.	90 10
Artesian Water Company, Inc.	06 158
Aqua Illinois Consolidated Water Divisions and Consolidated Sewer Divisions	11-0436
Aqua Illinois Hawthorn Woods Wastewater Division	07 0620/07 0621/08 0067
Aqua Illinois Hawthorn Woods Water Division	07 0620/07 0621/08 0067
Aqua Illinois Kankakee Water Division	10-0194
Aqua Illinois Kankakee Water Division	14-0419
Aqua Illinois Vermilion Division	07 0620/07 0621/08 0067
Aqua Illinois Willowbrook Wastewater Division	07 0620/07 0621/08 0067
Aqua Illinois Willowbrook Water Division	07 0620/07 0621/08 0067
Aqua Pennsylvania Wastewater Inc	A-2016-2580061
Aqua Pennsylvania Wastewater Inc	A-2017-2605434
Aqua Pennsylvania Wastewater Inc	A-2018-3001582
Aqua Pennsylvania Wastewater Inc	A-2019-3008491
Aqua Pennsylvania Wastewater Inc	A-2019-3009052
Aqua Pennsylvania Wastewater Inc	A-2019-3015173
Aqua Pennsylvania Wastewater Inc	A-2021-3024267
Aqua Virginia - Alpha Water Corporation	Pue-2009-00059
Aqua Virginia - Blue Ridge Utility Company, Inc.	Pue-2009-00059
Aqua Virginia - Caroline Utilities, Inc. (Wastewater)	Pue-2009-00059
Aqua Virginia - Caroline Utilities, Inc. (Water)	Pue-2009-00059
Aqua Virginia - Earlysville Forest Water Company	Pue-2009-00059
Aqua Virginia - Heritage Homes of Virginia	Pue-2009-00059

Aqua Virginia - Indian River Water Company	Pue-2009-00059
Aqua Virginia - James River Service Corp.	Pue-2009-00059
Aqua Virginia - Lake Holiday Utilities, Inc. (Wastewater)	Pue-2009-00059
Aqua Virginia - Lake Holiday Utilities, Inc. (Water)	Pue-2009-00059
Aqua Virginia - Lake Monticello Services Co. (Wastewater)	Pue-2009-00059
Aqua Virginia - Lake Monticello Services Co. (Water)	Pue-2009-00059
Aqua Virginia - Lake Shawnee	Pue-2009-00059
Aqua Virginia - Land'or Utility Company (Wastewater)	Pue-2009-00059
Aqua Virginia - Land'or Utility Company (Water)	Pue-2009-00059
Aqua Virginia - Mountainview Water Company, Inc.	Pue-2009-00059
Aqua Virginia - Powhatan Water Works, Inc.	Pue-2009-00059
Aqua Virginia - Rainbow Forest Water Corporation	Pue-2009-00059
Aqua Virginia - Shawnee Land	Pue-2009-00059
Aqua Virginia - Sydnor Water Corporation	Pue-2009-00059
Aqua Virginia - Water Distributors, Inc.	Pue-2009-00059
Berkshire Gas Company	18-40
Borough of Hanover	R-2009-2106908
Borough of Hanover	R-2012-2311725
Borough of Hanover	R-2014-242830
Borough of Royersford	A-2020-3019634
Chaparral City Water Company	W 02113a 04 0616
California-American Water Company	CIVCV156413
Connecticut-American Water Company	99-08-32
Connecticut Water Company	06 07 08
Citizens Utilities Company Colorado Gas Division	-
Citizens Utilities Company Vermont Electric Division	5426
Citizens Utilities Home Water Company	R 901664
Citizens Utilities Water Company of Pennsylvania	R 901663
City of Bethlehem - Bureau of Water	R-00984375
City of Bethlehem - Bureau of Water	R 00072492
City of Bethlehem - Bureau of Water	R-2013-2390244

City of Bethlehem - Bureau of Water	R-2020-3020256
City of Dubois – Bureau of Water	R-2013-2350509
City of Dubois – Bureau of Water	R-2016-2554150
City of Lancaster Sewer Fund	R-00005109
City of Lancaster Sewer Fund	R-00049862
City of Lancaster Sewer Fund	R-2012-2310366
City of Lancaster Sewer Fund	R-2019-3010955
City of Lancaster Sewer Fund	R-2019-3010955
City of Lancaster Water Fund	R-00984567
City of Lancaster Water Fund	R-00016114
City of Lancaster Water Fund	R 00051167
City of Lancaster Water Fund	R-2010-2179103
City of Lancaster Water Fund	R-2014-2418872
Coastland Corporation	15-cvs-216
Consumers Pennsylvania Water Company Roaring Creek Division	R-00973869
Consumers Pennsylvania Water Company Shenango Valley Division	R-00973972
Country Knolls Water Works, Inc.	90 W 0458
East Resources, Inc. - West Virginia Utility	06 0445 G 42T
Elizabethtown Water Company	WR06030257
Forest Park, Inc.	19-W-0168 & 19-W-0269
Hampton Water Works Company	DW 99-057
Hidden Valley Utility Services, LP	R-2018-3001306
Hidden Valley Utility Services, LP	R-2018-3001307
Illinois American Water Company	16-0093
Indian Rock Water Company	R-911971
Indiana Natural Gas Corporation	38891
Jamaica Water Supply Company	-
Kane Borough Authority	A-2019-3014248
Kentucky American Water Company, Inc.	2007 00134
Middlesex Water Company	WR 89030266J
Millcreek Township Water Authority	55 198 Y 00021 11
Missouri-American Water Company	WR 2000-281
Missouri-American Water Company	SR 2000-282
Mount Holly Water Company	WR06030257
Nevada Power Company d/b/a NV Energy	20-06003

New Jersey American Water Company	WR 89080702J
New Jersey American Water Company	WR 90090950J
New Jersey American Water Company	WR 03070511
New Jersey American Water Company	WR-06030257
New Jersey American Water Company	WR08010020
New Jersey American Water Company	WR10040260
New Jersey American Water Company	WR11070460
New Jersey American Water Company	WR15010035
New Jersey American Water Company	WR17090985
New Jersey American Water Company	WR19121516
New Jersey Natural Gas Company	GR19030420
Newtown Artesian Water Company	R-911977
Newtown Artesian Water Company	R-00943157
Newtown Artesian Water Company	R-2009-2117550
Newtown Artesian Water Company	R-2011-2230259
Newtown Artesian Water Company	R-2017-2624240
Newtown Artesian Water Company	R-2019-3006904
North Maine Utilities	14-0396
Northern Indiana Fuel & Light Company	38770
Oklahoma Natural Gas Company	PUD-940000477
Palmetto Utilities, Inc.	2020-281-S
Palmetto Wastewater Reclamation, LLC	2018-82-S
Pennichuck Water Works, Inc.	DW 04 048
Pennichuck Water Works, Inc.	DW 06 073
Pennichuck Water Works, Inc.	DW 08 073
Pennsylvania Gas & Water Company (Gas)	R-891261
Pennsylvania Gas & Water Co. (Water)	R 901726
Pennsylvania Gas & Water Co. (Water)	R-911966
Pennsylvania Gas & Water Co. (Water)	R-22404
Pennsylvania Gas & Water Co. (Water)	R-00922482
Pennsylvania Gas & Water Co. (Water)	R-00932667
Philadelphia Gas Works	R-2020-3017206
Public Service Company of North Carolina, Inc.	G-5, Sub 565
Public Service Electric and Gas Company	ER181010029
Public Service Electric and Gas Company	GR18010030
Presque Isle Harbor Water Company	U-9702
Sierra Pacific Power Company d/b/a NV Energy	19-06002

St. Louis County Water Company	WR-2000-844
Suez Water Delaware, Inc.	19-0615
Suez Water Idaho, Inc.	SUZ-W-20-02
Suez Water New Jersey, Inc.	WR18050593
Suez Water New Jersey, Inc.	WR20110729
Suez Water Owego-Nichols, Inc.	17-W-0528
Suez Water Pennsylvania, Inc.	R-2018-3000834
Suez Water Pennsylvania, Inc.	A-2018-3003519
Suez Water Pennsylvania, Inc.	A-2018-3003517
Suez Water Rhode Island, Inc.	Docket No. 4800
Suez Water Owego-Nichols, Inc.	19-W-0168 & 19-W-0269
Suez Water New York, Inc.	19-W-0168 & 19-W-0269
Suez Westchester, Inc.	19-W-0168 & 19-W-0269
Town of North East Water Fund	9190
Township of Exeter	A-2018-3004933
United Water New Rochelle	W-95-W-1168
United Water Toms River	WR-95050219
Upper Pottsgrove Township	A-2020-3021460
Valley Township (water)	A-2020-3019859
Valley Township (wastewater)	A-2020-3020178
Valley Water Systems, Inc.	06 10 07
Virginia American Water Company	PUR-2018-00175
West Virginia-American Water Company	15-0676-W-42T
West Virginia-American Water Company	15-0675-S-42T
Wilmington Suburban Water Corporation	94-149
York Water Company	R-901813
York Water Company	R-922168
York Water Company	R-943053
York Water Company	R-963619
York Water Company	R-994605
York Water Company	R-00016236
Young Brothers, LLC	2019-0117

VERIFICATION

I, Harold Walker, III, hereby state that the facts set forth in my Direct Testimony, Borough of Hanover Statement No. 5, and related Exhibit HW-1, filed with the Public Utility Commission on June 29, 2021, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Harold Walker, III

Dated: June 29, 2021

Docket No. R-2021-3026116
Witness: H. Walker, III
Exhibit HW-1

HANOVER MUNICIPAL WATER WORKS
HANOVER, PENNSYLVANIA

RATE OF RETURN

EXHIBIT

TO ACCOMPANY THE

DIRECT TESTIMONY

MARCH 2021

Prepared by:
GANNETT FLEMING
VALUATION AND RATE CONSULTANTS, LLC



Valley Forge, Pennsylvania

Hanover Municipal Water Works
Recommended Fair Rate of Return
Recommended Rate Making Ratios at December 31, 2022

	Recommended Ratios(1)	Cost Rates(2)	Weighted Cost
Debt	48.0	2.98	1.43
Fund Equity	52.0	10.45	5.43
Overall	100.0		6.86

Notes: (1) As explained in the testimony.
(2) The debt cost rate is based on the weighted cost rate to maturity for all issues.

Capital Structure Ratios for
The Water Group Followed by Analysts
At 9/30/2020 and Estimated for 2024

	9/30/2020	Est.(1) 2024
Water Group Followed by Analysts		
Long-term Debt	50.8 %	43.0 %
Preferred Stock	0.0	0.0
Common Equity	49.2	57.0
Total	100.0 %	100.0 %

Notes: (1) Project by Value Line for the period 2023 to 2025.

Source of Information: Value Line Investment Survey, 1/08/21, and S&P Capital IQ

Capital Structure Ratios for
The Water Group Followed by Analysts
At 9/30/2020 and Estimated for 2024

	Actual at 9/30/20		
	Long-term Debt	Preferred Stock	Common Equity
Water Group Followed by Analysts			
American States Water Co	46.2	0.0	53.8
American Water Works Co Inc	59.9	0.0	40.1
California Water Service Gp	47.5	0.0	52.5
Essential Utilities, Inc.	53.9	0.0	46.1
Middlesex Water Co	41.9	0.4	57.7
SJW Corp	60.2	0.0	39.8
York Water Co	45.8	0.0	54.2
Average	50.8	0.0	49.2

	Estimated at 2024		
	Long-term Debt	Preferred Stock	Common Equity
Water Group Followed by Analysts			
American States Water Co	49.5	-1.0	51.5
American Water Works Co Inc	59.0	0.0	41.0
California Water Service Gp	39.0	0.0	61.0
Essential Utilities, Inc.	40.5	0.0	59.5
Middlesex Water Co	38.5	0.5	61.0
SJW Corp	39.0	0.0	61.0
York Water Co	36.0	0.0	64.0
Average	43.0	0.0	57.0

Source of Information: Value Line Investment Survey, 1/08/21, and S&P Capital IQ

Hanover Municipal Water Works
Borough of Hanover
General Obligations Bonds
Attributable to the Water Works
Effective Cost of Debt

	Outstanding	Cost Rate (1)	Annual Cost	Effective Cost
At 12/31/20				
General Obligation Bonds, Series of 2013	$235,000	3.78%	$8,883	
General Obligation Bonds, Series of 2017	6,869,000	3.18%	218,434	
General Obligation Bonds, Series of 2020	8,145,000	3.04%	247,608	
General Obligation Bonds, Series A of 2020	2,650,000	2.80%	74,200	
General Obligation Bonds, Series C of 2020	700,000	2.24%	15,680	
General Obligation Bonds, Series D of 2020	9,440,000	2.88%	271,872	
Total	$28,039,000		$836,677	2.98%
At 12/31/21				
General Obligation Bonds, Series of 2013	$110,000	3.78%	$4,158	
General Obligation Bonds, Series of 2017	6,839,000	3.18%	217,480	
General Obligation Bonds, Series of 2020	7,820,000	3.04%	237,728	
General Obligation Bonds, Series A of 2020	2,360,000	2.80%	66,080	
General Obligation Bonds, Series C of 2020	700,000	2.24%	15,680	
General Obligation Bonds, Series D of 2020	9,440,000	2.88%	271,872	
Total	$27,269,000		$812,998	2.98%
At 12/31/22				
General Obligation Bonds, Series of 2017	$6,794,000	3.18%	$216,049	
General Obligation Bonds, Series of 2020	7,480,000	3.04%	227,392	
General Obligation Bonds, Series A of 2020	2,065,000	2.80%	57,820	
General Obligation Bonds, Series C of 2020	700,000	2.24%	15,680	
General Obligation Bonds, Series D of 2020	9,195,000	2.88%	264,816	
Total	$26,234,000		$781,757	2.98%

Note: (1) The debt cost rate is based on the effective cost rate to maturity for each issue.

Water Group Followed by Analysts
Five Year Analysis
2015 - 2019 (1)

Ln #		2019	2018	2017	2016	2015	Average Ann. Chg(%)	
				(Millions of $)				
	Investor Provided Capital($)							
1	Permanent Capital	3,934.479	3,230.128	2,836.135	2,677.151	2,530.244	11.9	
2	Short-Term Debt	162.140	171.857	188.340	154.493	106.277		
3	Total Capital	4,096.619	3,401.985	3,024.475	2,831.644	2,636.521	11.8	
4	Total Revenue($)	899.254	856.759	835.976	812.504	785.487	3.5	
5	Construction($)	414.853	386.422	357.285	320.360	274.975	10.9	
							Five Year Average	Average Central Values(9)
6	Effective Income Tax Rate(%)	13.4	14.4	32.2	32.0	31.5	24.7	31.5
	Book Capitalization Ratios(%)							
7	Long-Term Debt	49.4	46.2	45.6	46.2	46.3	46.7	46.2
8	Preferred Stock	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9	Common Equity	50.6	53.7	54.3	53.7	53.6	53.2	53.7
	Total	100.0	100.0	100.0	100.0	100.0		
10	Total Debt	50.9	48.5	49.0	48.5	47.5	48.9	48.5
11	Preferred Stock	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12	Common Equity	49.0	51.4	50.9	51.4	52.4	51.0	51.4
	Total	100.0	100.0	100.0	100.0	100.0		
	Rates on Average Capital(2)(%)							
13	Total Debt	4.4	5.1	4.9	5.1	5.2	5.0	5.1
14	Long-Term Debt	3.9	4.5	5.1	5.1	5.3	4.8	5.1
15	Preferred Stock	5.8	5.9	5.9	5.9	5.9	5.9	5.9
	Coverage - Including AFC(3)(x)							
16	PreTax Interest	3.6	3.7	4.8	4.7	4.4	4.2	4.4
17	PreTax Interest + Pref. Div	3.6	3.6	4.8	4.6	4.4	4.2	4.4
18	PostTax Interest + Pref. Div	3.3	3.3	3.6	3.5	3.3	3.4	3.3
	Coverage - Excluding AFC(3)(x)							
19	PreTax Interest	3.5	3.6	4.7	4.6	4.4	4.2	4.4
20	PreTax Interest + Pref. Div	3.5	3.6	4.7	4.6	4.3	4.1	4.3
21	PostTax Interest + Pref. Div	3.2	3.2	3.5	3.4	3.2	3.3	3.2
22	GCF / Interest Coverage(4)(x)	5.1	5.0	6.1	5.8	6.2	5.6	5.8
23	Coverage of Common Dividends(5)(x)	3.0	3.2	4.0	3.9	4.0	3.6	3.9
24	Construction / Avg. Tot. Capital(%)	12.8	13.6	14.4	13.4	10.8	13.0	13.4
25	NCF / Construction(6)(%)	46.7	49.2	62.0	66.2	90.4	62.9	62.0
26	AFC / Income for Common Stock	6.5	3.6	3.7	2.8	2.2	3.8	3.6
27	GCF / Avg. Tot. Debt(7)(%)	17.7	19.3	23.9	23.9	25.8	22.1	23.9
28	GCF / Permanent Capital(8)(%)	8.3	9.1	11.9	11.4	12.1	10.6	11.4

See page 2 of this Schedule for notes.

Water Group Followed by Analysts
Five Year Analysis
2015-2019

Notes:

(1) Average of the achieved results for each individual company based upon the financials as originally reported.

(2) Computed by relating total debt interest, long-term debt interest and preferred dividend expense to average of beginning and ending balance of the respective capital outstanding.

(3) The coverage calculations, both including and excluding AFC, represent the number of times available earnings cover the various fixed charges.

(4) GCF or gross cash flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less AFC), plus interest charges, divided by interest charges.

(5) GCF (see note 4) less all preferred dividends which cover common dividends.

(6) The percent of GCF (see note 4) less all cash dividends which cover gross construction expenditures.

(7) GCF (see note 4) as a percentage of Permanent Capital (long-term debt, current maturities and preferred, preference and common equity).

(8) GCF (see note 4) as a percentage of average total debt.

(9) Average of the second, third and fourth quintile values.

Source of Information: Standard & Poor's and Annual Reports

S&P Utilities
Five Year Analysis
2015 - 2019 (1)

Ln #		2019	2018	2017	2016	2015	Average Ann. Chg(%)	
				(Millions of $)				
	Investor Provided Capital($)							
1	Permanent Capital	51,186.799	45,049.028	42,898.567	40,656.671	35,858.814	9.4	
2	Short-Term Debt	1,626.323	2,223.236	1,461.341	1,349.417	1,276.707		
3	Total Capital	52,813.123	47,272.264	44,359.908	42,006.088	37,135.521	9.3	
4	Total Revenue($)	14,806.863	14,513.493	14,075.305	13,371.010	13,421.140	2.5	
5	Construction($)	6,259.336	5,465.970	5,017.795	4,948.510	4,358.889	9.6	
							Five Year Average	Average Central Values(9)
6	Effective Income Tax Rate(%)	15.8	29.8	20.0	27.2	33.6	25.3	27.2
	Book Capitalization Ratios(%)							
7	Long-Term Debt	56.1	55.8	57.2	56.6	54.7	56.1	56.1
8	Preferred Stock	0.9	0.5	0.0	0.0	0.0	0.3	0.6
9	Common Equity	43.1	43.6	42.8	43.4	45.3	43.6	43.4
	Total	100.0	100.0	100.0	100.0	100.0		
10	Total Debt	57.5	58.0	58.8	58.2	56.2	57.7	58.0
11	Preferred Stock	0.8	0.5	0.0	0.0	0.0	0.3	0.4
12	Common Equity	41.6	41.5	41.2	41.8	43.8	42.0	41.6
	Total	100.0	100.0	100.0	100.0	100.0		
	Rates on Average Capital(2)(%)							
13	Total Debt	4.4	4.2	4.1	4.2	4.2	4.2	4.2
14	Long-Term Debt	NA	NA	NA	NA	NA	NA	0.0
15	Preferred Stock	6.4	5.3	NA	NA	NA	5.8	0.0
	Coverage - Including AFC(3)(x)							
16	PreTax Interest	3.1	3.2	3.3	3.2	3.7	3.3	3.2
17	PreTax Interest + Pref. Div	3.1	3.2	3.3	3.2	3.7	3.3	3.2
18	PostTax Interest + Pref. Div	2.8	2.9	2.8	2.5	2.8	2.8	2.8
	Coverage - Excluding AFC(3)(x)							
19	PreTax Interest	3.0	3.2	3.2	3.1	3.6	3.2	3.2
20	PreTax Interest + Pref. Div	3.0	3.2	3.2	3.1	3.6	3.2	3.2
21	PostTax Interest + Pref. Div	2.8	2.8	2.7	2.4	2.7	2.7	2.7
22	GCF / Interest Coverage(4)(x)	5.0	5.3	5.2	5.2	5.8	5.3	5.2
23	Coverage of Common Dividends(5)(x)	4.1	3.9	3.2	3.3	3.9	3.7	3.9
24	Construction / Avg. Tot. Capital(%)	12.6	12.6	12.4	13.2	12.8	12.7	12.6
25	NCF / Construction(6)(%)	67.7	61.4	53.3	50.4	60.1	58.6	60.1
26	AFC / Income for Common Stock	4.6	3.4	4.5	(2.9)	3.4	2.6	3.4
27	GCF / Avg. Tot. Debt(7)(%)	17.0	17.6	17.3	16.9	19.7	17.7	17.3
28	GCF / Permanent Capital(8)(%)	9.5	10.1	9.8	9.1	10.6	9.8	9.8

See page 2 of this Schedule for notes.

S&P Public Utilities
Five Year Analysis
2015-2019

Notes:

(1) Market value weighted achieved results for each individual company based upon the financials as originally reported.

(2) Computed by relating total debt interest, long-term debt interest and preferred dividend expense to average of beginning and ending balance of the respective capital outstanding.

(3) The coverage calculations, both including and excluding AFC, represent the number of times available earnings cover the various fixed charges.

(4) GCF or gross cash flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less AFC), plus interest charges, divided by interest charges.

(5) GCF (see note 4) less all preferred dividends which cover common dividends.

(6) The percent of GCF (see note 4) less all cash dividends which cover gross construction expenditures.

(7) GCF (see note 4) as a percentage of Permanent Capital (long-term debt, current maturities and preferred, preference and common equity).

(8) GCF (see note 4) as a percentage of average total debt.

(9) Average of the second, third and fourth quintile values.

Source of Information: Standard & Poor's, Moody's and Annual Reports

Risk Measures for the Common Stock of
The Water Group Followed by Analysts and the S&P Utilities

	Recent S&P Issuer Credit Rating	Stock Exchange	Recent S&P Quality Ranking	Value Line Beta	Recent Market Value (Mill $)	Market Quartile	Market Quartile Name
Water Group Followed by Analysts							
American States Water Co	A+	NYSE	High (A)	0.65	2,695.414	3	Low-Cap
American Water Works Co Inc	A	NYSE	Above Average (A-)	0.85	25,742.602	1	Large-Cap
California Water Service Gp	A+	NYSE	Above Average (A-)	0.65	2,766.623	3	Low-Cap
Essential Utilities, Inc.	A	NYSE	High (A)	0.95	10,316.129	2	Mid-Cap
Middlesex Water Co	A	NasdaqGS	High (A)	0.75	1,199.981	3	Low-Cap
SJW Corp	A-	NYSE	Average (B+)	0.85	1,789.928	3	Low-Cap
York Water Co	A-	NasdaqGS	High (A)	0.80	543.009	4	Mico-Cap
Average	A		Above Average (A-)	0.79	2,695.414	3	Low-Cap
S&P Public Utilities							
AES Corporation (The)	BBB-	NYSE	Lower (B-)	1.05	17,675.145	1	Large-Cap
Alliant Energy Corporation	A-	NasdaqGS	High (A)	0.80	11,534.509	2	Mid-Cap
Ameren Corporation	BBB+	NYSE	Above Average (A-)	0.80	17,803.263	1	Large-Cap
American Electric Power Company, Inc	A-	NasdaqGS	Above Average (A-)	0.75	37,170.824	1	Large-Cap
American Water Works Company, Inc.	A	NYSE	Above Average (A-)	0.85	25,742.602	1	Large-Cap
Atmos Energy Corporation	A-	NYSE	High (A)	0.80	10,843.676	2	Mid-Cap
CenterPoint Energy, Inc.	BBB+	NYSE	Below Average (B)	1.15	10,722.714	2	Mid-Cap
CMS Energy Corporation	BBB+	NYSE	High (A)	0.80	15,634.058	1	Large-Cap
Consolidated Edison, Inc.	A-	NYSE	Average (B+)	0.75	22,479.818	1	Large-Cap
Dominion Energy, Inc.	BBB+	NYSE	Average (B+)	0.80	55,041.881	1	Large-Cap
DTE Energy Company	BBB+	NYSE	High (A)	0.90	22,811.038	1	Large-Cap
Duke Energy Corporation	BBB+	NYSE	Average (B+)	0.85	65,789.916	1	Large-Cap
Edison International	BBB	NYSE	Below Average (B)	0.90	20,477.507	1	Large-Cap
Entergy Corporation	BBB+	NYSE	Below Average (B)	0.95	17,403.668	1	Large-Cap
Evergy, Inc.	A-	NYSE	Above Average (A-)	1.05	12,171.057	2	Mid-Cap
Eversource Energy	A-	NYSE	High (A)	0.90	27,261.908	1	Large-Cap
Exelon Corporation	BBB+	NasdaqGS	Below Average (B)	0.90	37,686.639	1	Large-Cap
FirstEnergy Corp.	BB	NYSE	Below Average (B)	0.85	18,002.148	1	Large-Cap
NextEra Energy, Inc.	A-	NYSE	Above Average (A-)	0.85	144,011.592	1	Large-Cap
NiSource Inc.	BBB+	NYSE	Below Average (B)	0.85	8,464.170	2	Mid-Cap
NRG Energy, Inc.	BB+	NYSE	Below Average (B)	1.25	8,916.503	2	Mid-Cap
Pinnacle West Capital Corporation	A-	NYSE	High (A)	0.85	7,880.524	2	Mid-Cap
PPL Corporation	A-	NYSE	Average (B+)	1.05	20,139.712	1	Large-Cap
Public Service Enterprise Group Incorp	BBB+	NYSE	Above Average (A-)	0.90	27,229.797	1	Large-Cap
Sempra Energy	BBB+	NYSE	Average (B+)	0.95	35,094.548	1	Large-Cap
Southern Co (The)	A-	NYSE	Average (B+)	0.90	59,930.900	1	Large-Cap
WEC Energy Group, Inc.	A-	NYSE	High (A)	0.80	25,436.641	1	Large-Cap
Xcel Energy Inc.	A-	NasdaqGS	High (A)	0.75	31,500.845	1	Large-Cap
Average	BBB+		Average (B+)	0.89	21,478.663	1	Large-Cap

Comparative Ratios
For the Water Group Followed by Analysts,
S&P Utilities, and S&P 500
For the Years 2015-2019(1)

	2019	2018	2017	2016	2015	Five Year Average
Return on Common Equity(2)						
Water Group Followed by Analysts	9.5	10.1	11.4	10.9	10.4	10.5
S&P Utilities	9.8	10.2	10.3	9.1	9.3	9.7
S&P 500	15.8	15.9	14.0	12.6	12.1	14.1
Market/Book Multiple(3)						
Water Group Followed by Analysts	3.4	3.1	3.1	2.8	2.3	2.9
S&P Utilities	2.6	1.8	2.2	2.0	1.9	2.1
S&P 500	3.2	3.2	3.1	2.7	2.7	2.8
Earnings/Price Ratio(4)						
Water Group Followed by Analysts	2.7	3.3	3.7	4.0	4.6	3.7
S&P Utilities	5.3	5.2	4.8	4.4	4.0	4.7
S&P 500	4.9	5.1	4.5	4.6	4.4	4.7
Dividend Payout Ratio(5)						
Water Group Followed by Analysts	73.2	60.5	54.7	56.2	57.5	60.4
S&P Utilities	77.1	58.7	84.1	55.4	55.0	66.1
S&P 500	41.9	40.4	43.8	47.6	48.7	44.5
Dividend Yield(6)						
Water Group Followed by Analysts	1.8	2.0	1.9	2.1	2.6	2.1
S&P Utilities	3.4	3.7	3.5	3.6	3.7	3.6
S&P 500	2.1	2.0	2.0	2.2	2.2	2.1

See next page for Notes.

Comparative Ratios For
The Water Group Followed by Analysts,
The S&P Utilities, and the S&P 500
For the Years 2015-2019 (1)

Notes:

(1) The average of achieved results for the companies in each group. The information for the S&P Public Utilities is market weighted. The information for the S&P 500 is based upon per share information adjusted to price index level.

(2) Rate of Return on Average Book Common Equity - income available for common equity divided by average beginning and ending year's balance of book common equity.

(3) Market/Book Ratio - average of yearly high-low market price divided by the average of beginning and ending year's book value per share.

(4) Earnings/Price Ratio - reported earnings per share yearly divided by the average of yearly high-low market price.

(5) Dividend Payout Ratio is computed by dividing the yearly reported dividends paid by the yearly income available for common equity.

(6) Dividend Yield - yearly dividend per share divided by the average yearly high-low market price.

Source of Information: Standard & Poor's and Annual Reports

Capital Intensity and Capital Recovery
Hanover Municipal Water Works
The Water Group Followed by Analysts, and S&P Utilities
For the Year 2019

	Capital Intensity	Rate of Capital Recovery	Capital Recovery Years
Hanover Municipal Water Works	$7.68	1.80%	55.5
Water Group Followed by Analysts	$6.71	2.07%	49.0
S&P Utilities	$4.65	3.21%	32.8

Relative Size of
Hanover Municipal Water Works
Hanover Municipal Water Works - Total Outside City
Hanover Municipal Water Works - Total Inside City
Versus the Water Group Followed by Analysts
For the Year 2020

	Hanover Municipal Water Works	Water Group Followed by Analysts	Water Group Followed by Analysts Vs. Hanover Municipal Water Works
Hanover Municipal Water Works			
Total Capitalization (000's)	$54,000	$4,669,000	86.5 x
Total Operating Revenues (000's)	$7,851	$1,040,000	132.5 x
Number of Customers	17,979	958,331	53.3 x
Hanover Municipal Water Works - Total Outside City			
Total Capitalization (000's)*	$34,822	$4,669,000	134.1 x
Total Operating Revenues (000's)	$5,336	$1,040,000	194.9 x
Number of Customers	10,969	958,331	87.4 x
Hanover Municipal Water Works - Total Inside City			
Total Capitalization (000's)*	$19,178	$4,669,000	243.5 x
Total Operating Revenues (000's)	$2,516	$1,040,000	413.4 x
Number of Customers	7,010	958,331	136.7 x

* Capitalization is assumumed to be equal to approximate rate base apportioned based on revenues and customers.

Institutional Holdings, Insider Holdings and Percentage of Shares Traded Annually for
The Water Group Followed by Analysts, and the S&P Utilities

	Water Group Followed by Analysts	S&P Public Utilities
Percentage of common shares held by insiders (1)	2.3%	0.3%
Percentage of common shares held by institutions (2)	70%	80%
Percentage of Common Shares Traded in 2019	115%	163%
Percentage of Common Shares Traded in 2020	121%	179%
Average Number of Months For All Common Shares to Turnover (3)	11.5	7.4

Notes: (1) An insider is a director or an officer who has a policy-making role or a person who is directly or indirectly the beneficial owner of more than 10% of a certain company's stock. An insider may be either an individual or a corporation. Insiders are required to disclose their purchase/sale transactions to the SEC in which a change in beneficial ownership has occurred. The filings must be submitted before the end of the second business day following the day on which the transaction had been executed.

(2) Institutional holders are those investment managers having a fair market value of equity assets under management of $100 million or more. Certain banks, insurance companies, investment advisers, investment companies, foundations and pension funds are included in this category.

(3) Based on average turnover (shares traded) over the past five years.

Bond and Credit Ratings for
Borough of Hanover and
The Water Group Followed by Analysts

	S&P Credit Rating
Borough of Hanover	Aa3 *
Water Group Followed by Analysts	
American States Water Co	A+
American Water Works Co Inc	A
California Water Service Gp **	A+
Essential Utilities, Inc.	A
Middlesex Water Co	A
SJW Corp	A-
York Water Co	A-
Average	A

* - Aa3 rating shown is a Moody's rating. Equivalent to a S&P rating of AA-.

** - The A+ bond rating is that for California Water Service, Inc.

Comparison of Credit Market Financial Risk Metrics
For Hanover Municipal Water Works
And the Water Group Followed by Analysts
2017 - 2019 (1)

	Hanover Municipal Water Works			Comparable Group		
	2019	2018	2017	2019	2018	2017
Debt Service Coverage	2.7	2.8	0.5	1.8	3.0	2.5
Pre-Tax Interest Coverage - Including AFC(2)(x)	4.5	4.0	4.8	3.7	4.8	4.7
Post-Tax Interest Coverage - Including AFC(2)(x)	4.5	4.0	4.8	3.3	3.6	3.5
GCF / Interest Coverage(3)(x)	6.4	5.5	6.2	5.0	6.0	5.8
GCF / Tot. Debt(4)(%)	16.2	13.3	15.5	18.3	23.2	22.8
GCF / Construction(5)(%)	119.7	91.5	47.0	75.4	86.1	94.1

Notes: (1) Average of the achieved results for each individual company based upon the financials as originally reported.
(2) Represents the number of times available earnings, including AFC, cover all interest charges.
(3) GCF or gross cash flow (sum of net income, depreciation, amortization, net deferred income taxes and investment tax credits, less AFC), plus interest charges, divided by interest charges.
(4) GCF (see note 3) as a percentage of total debt.
(5) The percent of GCF (see note 3) which cover gross construction expenditures.

Source: 2017-19 Annual Reports
S&P Capital IQ

Distribution of Bond and Credit Ratings for
All Companies Contained in S&P's *Capital IQ* Database (1)

Number of Companies In Each Grouping	S&P Bond and Credit Ratings				Range of Reported Permanent Capital By Groupings (Million $)		
	Average	Median	Maximum	Minimum	Smallest	Average	Largest
100	B+	B	AA-	CCC-	89.900	557.803	863.000
100	BB-	B+	AA-	CCC+	864.300	1,081.171	1,328.300
100	BB	BB-	AA-	CCC-	1,330.100	1,604.661	1,834.000
100	BB	BB	AA	B-	1,844.000	2,132.794	2,459.100
100	BB+	BB	AAA	CCC+	2,471.400	2,848.239	3,336.900
100	BB+	BB+	AA-	CCC	3,353.800	3,717.831	4,148.100
100	BB+	BB+	AA	CCC+	4,149.000	4,726.693	5,288.800
100	BBB-	BBB-	A+	B-	5,324.516	6,017.743	6,945.500
100	BBB-	BBB	AA+	CCC-	6,946.800	7,901.141	8,997.300
100	BBB-	BBB	AA-	CCC+	9,002.600	10,658.452	11,963.600
100	BBB	BBB+	AA-	B-	12,001.000	14,861.876	17,813.000
100	BBB	BBB+	AA+	CCC-	17,868.000	22,210.057	27,528.000
100	BBB+	BBB+	AA+	B-	28,288.100	36,902.301	53,505.000
94	A-	A-	AAA	BB-	54,191.000	108,651.962	362,224.000
Total 1,394							

Number of Companies In Each Grouping	Range of Reported Permanent Capital By Groupings (Million $)			Distribution of S&P Bond and Credit Ratings By Size Grouping							
	Smallest	Average	Largest	AAA	AA	A	BBB	BB	B	CCC	CC
100	89.900	557.803	863.000	0%	1%	8%	2%	12%	65%	12%	0%
100	864.300	1,081.171	1,328.300	0%	1%	4%	6%	33%	51%	5%	0%
100	1,330.100	1,604.661	1,834.000	0%	1%	7%	16%	35%	37%	4%	0%
100	1,844.000	2,132.794	2,459.100	0%	1%	4%	20%	51%	24%	0%	0%
100	2,471.400	2,848.239	3,336.900	1%	2%	7%	26%	34%	26%	4%	0%
100	3,353.800	3,717.831	4,148.100	0%	1%	15%	34%	37%	10%	3%	0%
100	4,149.000	4,726.693	5,288.800	0%	1%	13%	33%	33%	18%	2%	0%
100	5,324.516	6,017.743	6,945.500	0%	0%	14%	38%	32%	16%	0%	0%
100	6,946.800	7,901.141	8,997.300	0%	2%	19%	47%	20%	10%	2%	0%
100	9,002.600	10,658.452	11,963.600	0%	2%	19%	47%	26%	5%	1%	0%
100	12,001.000	14,861.876	17,813.000	0%	1%	35%	44%	15%	5%	0%	0%
100	17,868.000	22,210.057	27,528.000	0%	5%	33%	42%	14%	5%	1%	0%
100	28,288.100	36,902.301	53,505.000	0%	5%	37%	41%	9%	8%	0%	0%
94	54,191.000	108,651.962	362,224.000	2%	18%	37%	31%	12%	0%	0%	0%
1,394											

Note: (1) Includes all non-financial public and private companies located in the US that are contained in S&P's *Capital IQ* Database that have a S&P bond or credit ratings of CC or higher and reported permanent capital for the year 2020 (as of 5/28/21). Companies were sorted based on amount of reported permanent capital and then separated into groups of 100 companies from smallest to largest.

Debt Service Coverage Levels for the
The Water Group Followed by Analysts

Debt Service Coverage - As Reported

Water Group Followed by Analysts	2019	2018	2017	2016	2015	Average
American States Water Co	2.2	5.4	2.4	5.4	5.8	4.2
American Water Works Co Inc	1.8	1.7	1.0	2.6	2.7	2.0
California Water Service Gp	0.4	3.4	3.0	3.6	3.8	2.8
Essential Utilities, Inc.	0.4	0.5	1.0	1.0	0.9	0.8
Middlesex Water Co	4.0	4.0	3.7	3.7	3.3	3.7
SJW Corp	3.7	4.9	5.2	3.1	4.5	4.3
York Water Co	0.3	0.8	1.1	4.4	1.4	1.6
Average	1.8	3.0	2.5	3.4	3.2	2.8

Municipal Water and Sewer Utility
Median Debt Service Levels for 2018 and 2017 and
Median Size and Credits for 2018 and 2017

Moody's 2018 Water and Sewer Medians Debt Service Coverage

	Aaa	Aa	A	Baa
Annual Debt Service Coverage	3.4	2.4	2.0	2.0

Fitch's 2017 Water and Sewer Medians Debt Service Coverage

	AAA	AA	A	All Credits
3-Year Historical Average Coverage of Annual Debt Service	2.8	2.2	1.5	2.2
Current Year's Coverage of Annual Debt Service	2.6	2.3	1.6	2.3
Minimum Coverage Projected Next 5-Years	2.4	1.8	1.3	1.7
Maximum Annual Debt Service Coverage	2.3	1.8	1.4	1.9

SIZE & CREDIT: Moody's 2018 Water and Sewer Medians: System Size (O&M, $000) and Total Revenues ($000)

	Aaa	Aa	A	Baa
System Size (O&M, $000)	87,835	24,509	7,600	4,040
Total Revenues ($000)	156,109	16,082	13,006	5,978

SIZE & CREDIT: Fitch's 2017 Water and Sewer Medians: Population and Number of Customers

	AAA	AA	A	All Credits
Population	330,421	188,100	69,117	188,100
Total Water Customers	90,783	51,844	12,975	51,168
Total Sewer Customers	86,744	54,757	20,437	56,711

Source of Information: Moody's Investors Service, "Water and Sewer Utilities – US: Medians - Solid Financial Performance, Ability to Increase Rates Underpin Stability", 5/19/20.
Fitch, Inc., Fitch Ratings Ltd. "2017 Water and Sewer Medians", 12/16/16,

Debt Service Coverage Levels for
Pennsylvania Water and Sewer Municipal Authorities *
For the Years 2013 to 2018

		2018	2017	2016	2015	2014	2013	Summary 2014-2018	Summary 2013-2017
Water Municipal Authorities									
Number of Municipal Authorities Reporting		11	175	197	212	212	224	807	1,020
Percentiles:	20%	1.8	1.6	1.5	1.4	1.4	1.3	1.4	1.4
	40%	3.4	2.2	2.0	2.0	1.9	1.7	2.0	1.9
	50%	3.8	2.6	2.4	2.4	2.3	2.0	2.4	2.4
	60%	4.1	3.2	3.0	3.1	3.0	2.6	3.1	2.9
	80%	11.9	5.4	4.9	6.6	5.4	5.4	5.4	5.4
Sewer Municipal Authorities									
Number of Municipal Authorities Reporting		5	84	92	94	108	107	383	485
Percentiles:	20%	0.7	1.4	1.9	1.5	1.0	1.3	1.4	1.4
	40%	1.5	2.8	3.3	2.8	2.2	2.3	2.6	2.5
	50%	2.0	3.5	4.0	3.4	2.6	3.1	3.3	3.3
	60%	4.3	4.3	5.3	4.5	3.5	4.0	4.5	4.3
	80%	20.5	9.6	10.4	8.2	7.3	6.6	8.9	8.1

* Includes all reported operating water/sewer municipal authorities with debt service payments that were greater than 2.99% of outstanding debt.

Source of Information: Statistics for Municipal Authorities in Pennsylvania, 2013 - 2018

Hanover Municipal Water Works
Debt Service Coverage Levels

	2019	2018	2017
Income (Loss)	$2,058,712	$1,749,915	$2,344,245
Interest paid	582,127	590,800	618,469
Depreciation & Amort	1,070,991	923,697	866,210
Total Source	$3,711,830	$3,264,412	$3,828,924
Principal	$772,291	$583,427	$7,276,285
Interest paid	582,127	590,800	618,469
Total Use	$1,354,418	$1,174,227	$7,894,754
Debt Service Coverage	2.7	2.8	0.5

Hanover Municipal Water Works - Existing Debt Service Requirements

2021	1,594,118
2022	1,919,512
2023	1,911,200
2024	1,914,998
2025	1,914,300
2026	1,928,998
2027	1,929,106
2028	1,921,014
2029	1,924,564
2030	1,921,338

Interest Rate Trends for
Investor-Owned Public Utility Bonds
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

	Years	Aaa Rated	Aa Rated	A Rated	Baa Rated
	2015	NA	4.00	4.12	5.03
	2016	NA	3.73	3.93	4.68
	2017	NA	3.82	4.00	4.38
	2018	NA	4.09	4.25	4.67
	2019	NA	3.61	3.77	4.19
	Average	NA	3.85	4.01	4.59
Jan	2020	NA	3.12	3.29	3.60
Feb	2020	NA	2.96	3.11	3.42
Mar	2020	NA	3.30	3.50	3.96
Apr	2020	NA	2.93	3.19	3.82
May	2020	NA	2.89	3.14	3.63
Jun	2020	NA	2.80	3.07	3.44
Jul	2020	NA	2.46	2.74	3.09
Aug	2020	NA	2.49	2.73	3.06
Sep	2020	NA	2.62	2.84	3.17
Oct	2020	NA	2.72	2.95	3.27
Nov	2020	NA	2.63	2.85	3.17
Dec	2020	NA	2.57	2.77	3.05
Avg	2020	NA	2.79	3.02	3.39
Jan	2021	NA	2.73	2.91	3.18
Feb	2021	NA	2.93	3.09	3.37

Source of Information: MERGENT BOND RECORD

Credit Risk Spreads of
Investor-Owned Public Utility Bonds
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

	Years	Aa Over Aaa	A Over Aa	Baa Over A	Baa Over Aaa
	2015	NA	0.12	0.91	NA
	2016	NA	0.20	0.74	NA
	2017	NA	0.18	0.38	NA
	2018	NA	0.16	0.42	NA
	2019	NA	0.16	0.42	NA
Average		NA	0.16	0.58	NA
Jan	2020	NA	0.17	0.31	NA
Feb	2020	NA	0.15	0.31	NA
Mar	2020	NA	0.20	0.46	NA
Apr	2020	NA	0.26	0.63	NA
May	2020	NA	0.25	0.49	NA
Jun	2020	NA	0.27	0.37	NA
Jul	2020	NA	0.28	0.35	NA
Aug	2020	NA	0.24	0.33	NA
Sep	2020	NA	0.22	0.33	NA
Oct	2020	NA	0.23	0.32	NA
Nov	2020	NA	0.22	0.32	NA
Dec	2020	NA	0.20	0.28	NA
Avg	2020	NA	0.23	0.37	NA
Jan	2021	NA	0.18	0.27	NA
Feb	2021	NA	0.16	0.28	NA

Source of Information: MERGENT BOND RECORD

Interest Rate Trends
Of Long-Term Treasury Constant
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

Years		10-Year T-Bond	20-Year T-Bond	30-Year T-Bond	Long-term T-Bond Yield
2015		2.14	2.55	2.84	2.51
2016		1.84	2.23	2.60	2.22
2017		2.33	2.65	2.90	2.63
2018		2.91	3.02	3.11	3.01
2019		2.14	2.40	2.58	2.40
Average		2.27	2.57	2.81	2.55
Jan	2020	1.76	2.07	2.22	2.15
Feb	2020	1.50	1.81	1.97	1.89
Mar	2020	0.87	1.26	1.46	1.36
Apr	2020	0.66	1.06	1.27	1.17
May	2020	0.67	1.12	1.38	1.25
Jun	2020	0.73	1.27	1.49	1.38
Jul	2020	0.62	1.09	1.31	1.20
Aug	2020	0.65	1.14	1.36	1.25
Sep	2020	0.68	1.21	1.42	1.32
Oct	2020	0.79	1.34	1.57	1.46
Nov	2020	0.87	1.40	1.62	1.51
Dec	2020	0.93	1.47	1.67	1.57
Avg	2020	0.89	1.35	1.56	1.46
Jan	2021	1.08	1.63	1.82	1.73
Feb	2021	1.26	1.88	2.04	1.96

Source of Information: Federal Reserve Bulletin

Spread in Average Long-Term Bond Yields
Versus Public Utility Bond Yields
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

Spread in Average Long-Term T-Bond Yields Versus Public Utility Bonds:

	Years	Aaa Rated	Aa Rated	A Rated	Baa Rated
	2015	NA	1.49	1.61	2.52
	2016	NA	1.51	1.71	2.45
	2017	NA	1.19	1.37	1.75
	2018	NA	1.08	1.24	1.66
	2019	NA	1.21	1.37	1.79
Average		NA	1.30	1.46	2.03
Jan	2020	NA	0.98	1.15	1.46
Feb	2020	NA	1.07	1.22	1.53
Mar	2020	NA	1.94	2.14	2.60
Apr	2020	NA	1.77	2.03	2.66
May	2020	NA	1.64	1.89	2.38
Jun	2020	NA	1.42	1.69	2.06
Jul	2020	NA	1.26	1.54	1.89
Aug	2020	NA	1.24	1.48	1.81
Sep	2020	NA	1.31	1.53	1.86
Oct	2020	NA	1.27	1.50	1.82
Nov	2020	NA	1.12	1.34	1.66
Dec	2020	NA	1.00	1.20	1.48
Avg	2020	NA	1.34	1.56	1.93
Jan	2021	NA	1.01	1.19	1.46
Feb	2021	NA	0.97	1.13	1.41

Comment: Derived from the information on pages 1 and 3 of this Schedule.

Interest Rate Trends for
Municipal Bonds
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

	Years	Aaa Rated	Aa Rated	A Rated	Baa Rated
	2015	3.22	3.49	3.80	4.20
	2016	2.76	3.01	3.31	3.61
	2017	3.05	3.29	3.62	3.95
	2018	3.28	3.49	3.78	4.12
	2019	2.73	2.93	3.13	3.44
	Average	3.01	3.24	3.53	3.87
Jan	2020	2.35	2.55	2.72	3.00
Feb	2020	2.02	2.22	2.38	2.66
Mar	2020	2.33	2.52	2.68	3.13
Apr	2020	2.58	2.78	2.99	3.78
May	2020	2.25	2.46	2.72	3.66
Jun	2020	2.01	2.22	2.50	3.58
Jul	2020	1.86	2.07	2.33	3.38
Aug	2020	1.62	1.83	2.05	3.58
Sep	2020	1.81	2.02	2.24	3.10
Oct	2020	1.91	2.12	2.34	3.26
Nov	2020	1.92	2.13	2.35	3.31
Dec	2020	1.62	1.79	2.01	3.23
Avg	2020	2.02	2.23	2.44	2.72
Jan	2021	1.70	1.87	2.08	2.68
Feb	2021	1.57	1.74	1.93	2.44

Source of Information: MERGENT BOND RECORD

Credit Risk Spreads of
Municipal Bonds
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

	Years	Aa Over Aaa	A Over Aa	Baa Over A	Baa Over Aaa
	2015	0.27	0.32	0.40	0.98
	2016	0.25	0.31	0.30	0.86
	2017	0.23	0.33	0.34	0.90
	2018	0.21	0.29	0.34	0.84
	2019	0.20	0.20	0.31	0.71
	Average	0.23	0.29	0.34	0.86
Jan	2020	0.20	0.17	0.28	0.65
Feb	2020	0.20	0.16	0.28	0.64
Mar	2020	0.19	0.16	0.45	0.80
Apr	2020	0.20	0.21	0.79	1.20
May	2020	0.21	0.26	0.94	1.41
Jun	2020	0.21	0.28	1.08	1.57
Jul	2020	0.21	0.26	1.05	1.52
Aug	2020	0.21	0.22	1.53	1.96
Sep	2020	0.21	0.22	0.86	1.29
Oct	2020	0.21	0.22	0.92	1.35
Nov	2020	0.21	0.22	0.96	1.39
Dec	2020	0.17	0.22	1.22	1.61
Avg	2020	0.21	0.21	0.28	0.70
Jan	2021	0.17	0.21	0.60	0.98
Feb	2021	0.17	0.19	0.51	0.87

Source of Information: MERGENT BOND RECORD

Spread in Average Long-Term Bond Yields
Versus Municipal Bond Yields
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

		Spread in Average Long-Term T-Bond Yields Versus Municipal Bonds:			
	Years	Aaa Rated	Aa Rated	A Rated	Baa Rated
	2015	(0.71)	(0.98)	(1.29)	(1.69)
	2016	(0.53)	(0.78)	(1.09)	(1.39)
	2017	(0.43)	(0.66)	(0.99)	(1.32)
	2018	(0.27)	(0.48)	(0.77)	(1.11)
	2019	(0.33)	(0.53)	(0.73)	(1.04)
Average		(0.45)	(0.69)	(0.97)	(1.31)
Jan	2020	(0.21)	(0.41)	(0.58)	(0.86)
Feb	2020	(0.13)	(0.33)	(0.49)	(0.77)
Mar	2020	(0.97)	(1.16)	(1.32)	(1.77)
Apr	2020	(1.42)	(1.62)	(1.83)	(2.62)
May	2020	(1.00)	(1.21)	(1.47)	(2.41)
Jun	2020	(0.63)	(0.84)	(1.12)	(2.20)
Jul	2020	(0.66)	(0.87)	(1.13)	(2.18)
Aug	2020	(0.37)	(0.58)	(0.80)	(2.33)
Sep	2020	(0.50)	(0.71)	(0.93)	(1.79)
Oct	2020	(0.46)	(0.67)	(0.89)	(1.81)
Nov	2020	(0.41)	(0.62)	(0.84)	(1.80)
Dec	2020	(0.05)	(0.22)	(0.44)	(1.66)
Avg	2020	(0.57)	(0.78)	(0.99)	(1.27)
Jan	2021	0.03	(0.15)	(0.36)	(0.96)
Feb	2021	0.39	0.22	0.03	(0.48)

Interest Rate Trends for
Federal Funds Rate and Prime Rate
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

	Years	Fed Funds Rate	Prime Rate
	2015	0.13	3.26
	2016	0.40	3.51
	2017	1.00	4.10
	2018	1.83	4.90
	2019	2.16	5.28
Average		1.10	4.21
Jan	2020	1.55	4.75
Feb	2020	1.58	4.75
Mar	2020	0.65	3.78
Apr	2020	0.05	3.25
May	2020	0.05	3.25
Jun	2020	0.08	3.25
Jul	2020	0.09	3.25
Aug	2020	0.10	3.25
Sep	2020	0.09	3.25
Oct	2020	0.09	3.25
Nov	2020	0.09	3.25
Dec	2020	0.09	3.25
Avg	2020	0.38	3.54
Jan	2021	0.09	3.25
Feb	2021	0.08	3.25

Source of Information: Federal Reserve Bulletin

Blue Chip Financial Forecasts - March 1, 2021

	First Quarter 2021	Second Quarter 2021	Third Quarter 2021	Fourth Quarter 2021	First Quarter 2022	Five Quarter Average
Prime Rate						
Top Ten Average	3.3 %	3.3 %	3.3 %	3.3 %	3.3 %	3.3 %
Group Average	3.3	3.3	3.3	3.3	3.3	3.3
Bottom Ten Average	3.2	3.2	3.2	3.2	3.2	3.2
Three-Month Treasury Bills						
Top Ten Average	0.1	0.1	0.1	0.2	0.2	0.2
Group Average	0.1	0.1	0.1	0.1	0.1	0.1
Bottom Ten Average	0.0	0.1	0.1	0.1	0.1	0.1
Ten Year Treasury Notes						
Top Ten Average	1.3	1.5	1.6	1.8	1.9	1.6
Group Average	1.2	1.3	1.4	1.5	1.6	1.4
Bottom Ten Average	1.1	1.2	1.2	1.2	1.2	1.2
Thirty Year Treasury Bonds						
Top Ten Average	2.1	2.3	2.4	2.6	2.7	2.4
Group Average	2.0	2.1	2.2	2.3	2.4	2.2
Bottom Ten Average	1.8	1.9	2.0	2.0	2.0	1.9
Aaa-Rated Corporate Bonds						
Top Ten Average	2.8	3.0	3.1	3.2	3.3	3.1
Group Average	2.6	2.8	2.9	3.0	3.0	2.8
Bottom Ten Average	2.4	2.5	2.6	2.7	2.8	2.6
Baa-Rated Corporate Bonds						
Top Ten Average	5.1	5.1	5.1	5.1	5.1	5.1
Group Average	3.5	3.7	3.8	3.9	4.0	3.8
Bottom Ten Average	4.6	4.6	4.6	4.6	4.6	4.6

Derived Public Utility Bond Yield Forecasts Based on Aaa and Baa Corporate Yields

Aa-Rated Public Utility Bonds						
Top Ten Average	3.7	3.8	3.9	3.9	3.9	3.8
Group Average	2.8	3.0	3.1	3.2	3.3	3.1
Bottom Ten Average	3.3	3.3	3.4	3.4	3.4	3.4
A-Rated Public Utility Bonds						
Top Ten Average	3.9	4.0	4.1	4.1	4.2	4.1
Group Average	3.0	3.2	3.3	3.4	3.5	3.3
Bottom Ten Average	3.5	3.6	3.6	3.6	3.7	3.6
Baa-Rated Public Utility Bonds						
Top Ten Average	4.3	4.4	4.5	4.5	4.5	4.4
Group Average	3.4	3.6	3.7	3.8	3.9	3.7
Bottom Ten Average	3.9	3.9	4.0	4.0	4.0	4.0

Settled Yields on Treasury Bond
Future Contracts
Traded on the Chicago Board of Trade
at the Close of March 30, 2021

Delivery Date	Treasury Bonds (CBOT)	
Jun-21	3.151	%
Sep-21	3.208	
Dec-21	3.208	
Average	3.189	%

Source of Information: Chicago Board of Trade

Market Value Discounted Cash Flow for
The Water Group Followed by Analysts

	Water Group Followed by Analysts
Dividend Yield(1)	1.8 %
Growth in Dividends(2)	0.1
Adjusted Dividend Yield	1.9
Stock Appreciation(3)	7.1
Market Value DCF Cost Rate	9.0 %

Notes: (1) Developed on page 2 of this Schedule.
(2) Equal to one-half the assumed growth in value.
(3) As explained in the direct testimony, the growth in value is supported by the information shown on Schedules 13 and 14.

Market Value Dividend Yield for
the Water Group Followed by Analysts
For the Twelve Months Ended February 2021

	Recent Dividend Yields(1)	Longer Term Dividend Yields(2)	Average Yields
Water Group Followed by Analysts			
American States Water Co	1.7 %	1.7 %	
American Water Works Co Inc	1.4	1.6	
California Water Service Gp	1.6	1.8	
Essential Utilities, Inc.	2.2	2.3	
Middlesex Water Co	1.4	1.6	
SJW Corp	2.0	2.1	
York Water Co	1.7	1.6	
Average	1.7 %	1.8 %	1.8 %

Notes: (1) Average of the high and the low dividend yield for the month of February 2021.
(2) Average of the high and the low dividend yield for each of the twelve months ended February 2021.

Source of Information: S&P Capital IQ

Development of Long Term Projected Growth in Value
Based Upon Growth Over The Next Five Years
For the Water Group Followed by Analysts

	A	B	C	D	E	F	G	H
	Analysts' Projected Growth in EPS				Other Projected Growth			
	First Call EPS Growth	S&P EPS Growth	ZACK's EPS Growth	Value Line EPS Growth	Value Line DPS Growth	Value Line Cash Flow Growth	Average EPS Growth	Average All Growth
Water Group Followed by Analysts								
American States Water Co	4.6 %	6.0 %	4.9 %	6.5 %	9.5 %	7.0 %	5.5 %	6.4 %
American Water Works Co Inc	8.6	8.5	8.1	8.5	8.5	6.5	8.4	8.1
California Water Service Gp	10.8	9.0	NA	8.0	5.5	3.0	9.3	7.3
Essential Utilities, Inc.	6.4	7.0	6.3	7.0	7.5	5.5	6.7	6.6
Middlesex Water Co	2.7	NA	NA	7.0	5.5	5.5	4.9	5.2
SJW Corp	5.5	6.0	14.0	10.5	7.0	4.5	9.0	7.9
York Water Co	4.9	NA	NA	7.0	6.0	7.0	6.0	6.2
Average	6.2 %	7.3 %	8.3 %	7.8 %	7.1 %	5.6 %	7.1 %	6.8 %

	Historical 5-Year Growth in EPS			
	First Call EPS Growth	ZACK's EPS Growth	Value Line EPS Growth	Average EPS Growth
Water Group Followed by Analysts				
American States Water Co	5.5 %	7.8 %	5.0 %	6.1 %
American Water Works Co Inc	8.7	8.1	6.5	7.8
California Water Service Gp	21.1	13.7	4.5	13.1
Essential Utilities, Inc.	3.9	4.6	1.5	3.3
Middlesex Water Co	13.5	11.8	12.0	12.4
SJW Corp	-5.8	-0.4	4.5	-0.6
York Water Co	4.2	6.5	6.0	5.6
Average	7.3 %	7.4 %	5.7 %	6.8 %

Source of Information: Value Line Investment Survey, 1/08/21; S&P Capital IQ 3/25/21;
FirstCall 3/25/21; and
Zacks Investment Research 3/25/21

Recent Payout Ratios,
ROEs, P-E Multiples, Market/Book Multiples, and Market Value
For the Water Group Followed by Analysts

	Current Dividend Payout	Current Return on Equity	PE Mult	Market to Book Mult	Current Market Value (Mill $)
Water Group Followed by Analysts					
American States Water Co	56	13.4	32.6	4.25	2,695.414
American Water Works Co Inc	57	10.4	38.8	3.95	25,742.602
California Water Service Gp	44	11.3	29.0	3.08	2,766.623
Essential Utilities, Inc.	95	5.5	41.7	2.23	10,316.129
Middlesex Water Co	47	12.1	31.4	3.51	1,199.981
SJW Corp	84	4.7	41.8	1.96	1,789.928
York Water Co	58	11.9	33.3	3.84	543.009
Average	63	9.9	35.5	3.26	6,436.241

Source of Information: S&P Capital IQ

Value Line Projected ROE Based on Year-End and Average,
Dividend Payout Ratio, and Common Equity Ratio for
The Water Group Followed by Analysts for 2023 - 2025

Water Group Followed by Analysts	Value Line Projected ROE	Projected Average ROE (1)	Value Line Projected Dividend Payout	Value Line Projected Common Equity Ratio
American States Water Co	14.0 %	14.4 %	63.8 %	51.5 %
American Water Works Co Inc	11.5	11.9	59.2	41.0
California Water Service Gp	11.0	11.3	48.8	61.0
Essential Utilities, Inc.	9.0	9.6	74.3	59.5
Middlesex Water Co	15.0	15.0	47.2	61.0
SJW Corp	9.5	9.8	45.5	61.0
York Water Co	13.0	13.2	59.4	64.0
Average	11.9 %	12.2 %	56.9 %	57.0 %

Notes: (1) Value Line ROE, which is a year-end ROE, is converted to average ROE by the factor derived from the following formula: 2((1+g)/(2+g)), where "g" is the rate of growth in common equity.

Source of Information: Value Line Investment Survey, 1/08/21

Illustration of the
Effect of Market-To-Book Ratio on Market Return

Ln #		Situation 1	Situation 2	Situation 3
1	M/B Ratio	50%	100%	200%
2	Market Purchase Price	$25.00	$50.00	$100.00
3	Book Value	$50.00	$50.00	$50.00
4	DCF Return	10.0%	10.0%	10.0%
5	DCF Dollar Return	$5.00	$5.00	$5.00
6	Dividend Yield	5.0%	5.0%	5.0%
7	DPS	$1.25	$2.50	$5.00
8	Dollar Growth in Value	$3.75	$2.50	$0.00
9	Market Sale Price	$28.75	$52.50	$100.00
10	Total Market Return	20.0%	10.0%	5.0%

"The simple numerical illustration....demonstrates the impact of market-to-book ratios on the DCF market return....The DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to the book value rate base of $50 to produce $5.00 of earnings. Of the $5.00 of earnings, the full $5.00 are required for dividends to produce a dividend yield of 5.0% on a stock price of $100.00, and no dollars are available for growth. The investor's return is therefore only 5% versus his required return of 10%. A DCF cost rate of 10%, which implies $10.00 of earnings, translates to only $5.00 of earnings on book value, or a 5% return.....Therefore, the DCF cost rate understates the investor's required return when stock prices are well above book, as is the case presently."

The above illustration is taken from Roger A Morin, Regulatory Finance - Utilities' Cost of Capital, Public Utility Reports, Inc., 1994, pp. 236-237.

Differences in Book Value and Market Values for the
Water Group Followed by Analysts

	Recent Book Value Capitalization Ratios (9/30/20)	Recent Market Value Capitalization Ratios	Average Book Value of Common Equity (Millions)	Average Market Value of Common Equity (Millions)	Difference in Market Value and Book Value Common Equity
Water Group Followed by Analysts:					
Long Term Debt	50.8 %	25.7 %			
Preferred Stock	0.0	0.0			
Common Equity	49.2	74.3	$2,009.766	$6,436.241	$4,426.475
Total	100.0 %	100.0 %			

Financial Risk Adjustment Using the "Hamada Model"

Water Group Followed by Analysts

Market Value @ (9/30/20)

Line No.	DEBT (D)	PREF (P)	CE (E)	TAX (t)	BETA (Bl)
2 .	25.7%	0.0%	74.3%	28.000%	0.79

3 . Bl = Bu (1+(1-t)D/E+P/E)

4 .	1-t =	0.7200	
5 .	D/E =	0.3459	
6 .	P/E =	0.0000	
7 .	Bl =	Bu *	1.2490
8 .	Bu =	0.63	

Water Group Followed by Analysts

Book Value @ (9/30/20)

	DEBT (D)	PREF (P)	CE (E)	TAX (t)
11 .	50.80%	0.00%	49.20%	28.000%

12 . Bl = Bu (1+(1-t)D/E+P/E)

13 .	1-t =	0.7200	
14 .	D/E =	1.0325	
15 .	P/E =	0.0000	
16 .	Bl =	Bu *	1.7434
17 .	Bl =	1.10	

Cost Adjustment Based on Risk Premium

18 .	Barometer Group's Beta		0.79
19 .	Beta difference	=	0.31
20 .	Risk premium	=	6.0
21 .	Risk adjustment	=	1.86

Default Spread for
Aaa Rated Corporate Bonds and A Rated Investor-Owned Public Utility Bonds
Yearly for 2015-2019, Monthly for the Years 2020 and 2021

Years	Corporate Aaa Rated	Public Utility A Rated	A Over Aaa
2015	3.89	4.12	0.23
2016	3.67	3.93	0.27
2017	3.74	4.00	0.25
2018	3.93	4.25	0.32
2019	3.39	3.77	0.38
Average	3.72	4.01	0.29
Jan 2020	2.94	3.29	0.35
Feb 2020	2.78	3.11	0.33
Mar 2020	3.02	3.50	0.48
Apr 2020	2.43	3.19	0.76
May 2020	2.50	3.14	0.64
Jun 2020	2.44	3.07	0.63
Jul 2020	2.14	2.74	0.60
Aug 2020	2.55	2.73	0.18
Sep 2020	2.31	2.84	0.53
Oct 2020	2.35	2.95	0.60
Nov 2020	2.30	2.85	0.55
Dec 2020	2.26	2.77	0.51
Avg 2020	2.50	3.02	0.52
Jan 2021	2.45	2.91	0.46
Feb 2021	2.70	3.09	0.39

Source of Information: MERGENT BOND RECORD

Market Value CAPM for
The Water Group Followed by Analysts

	Water Group Followed by Analysts
Estimation Based Upon Historical Information	
Market Premium(1)	6.9 %
x Beta(2)	0.79
Risk Adjusted Market Premium	5.5
Size Adjustment Premium(2)	0.9
Plus Risk Free Rate(1)	2.4
COVID-19 Default Adjustment(3)	0.09
Market Value CAPM Cost Rate	8.9 %
Estimation Based Upon Projected Information	
Market Premium(1)	6.3 %
x Beta(2)	0.79
Risk Adjusted Market Premium	5.0
Size Adjustment Premium(2)	0.9
Plus Risk Free Rate(1)	2.4
COVID-19 Default Adjustment(3)	0.09
Market Value CAPM Cost Rate	8.4 %

Market Value CAPM is: 8.8%

Notes: (1) Developed on page 2 of this Schedule.
(2) Developed on page 4 of this Schedule.
(3) Developed on page 5 of this Schedule.

Development of Market Premiums for Use in a CAPM Model

A	B	C	D	E	F	G	H
Value Line Summary & Index Month End Edition	Forecasted Market Dividend Yield	Stock Price Appreciation Next 3-5 Years	Annual Price Appreciation(1)	Annual Total Return(1)	Midpoint Market Return(2)	Average Market Return(3)	CAPM Projected Market Return(6)
December-20	2.0 %	35 %	7.8 %	9.8 %			
January-21	1.9	25	5.7	7.6			
February-21	1.9	30	6.8	8.7			
					8.7 %	8.7 %	8.7 %
						Less Risk Free Rate(4)	2.4
						Estimated Market Premium Based Upon Projected Information (1)	6.3 %
						Estimated Market Premium Based Upon Historical Information (5)	6.9 %

See next page of this Schedule for Notes.

CAPM
The Water Group Followed by Analysts

Notes: (1) A projected market premium is based upon the projected market return rate derived from the Value Line Summary and Index for the various dates shown. For example, Value Line projects (Feb-21) that the market will appreciate in price 30% over the next three to five years. Using a four-year midpoint estimate, Value Line's appreciation potential equates to 6.8% annually ([1.30]^.25). Additionally, Value Line estimates the market will have a dividend yield of 1.9%. Combining the market dividend yield of 1.9% with the market appreciation results in a projected market return rate of 8.7% (6.8% + 1.9%).

(2) Mid point of the month-end total market returns in Column E.

(3) Average total market return in Column E.

(4) As discussed in the direct testimony, the risk-free rate is 2.4%.

(5) The historical market premium is based upon studies conducted by Ibbotson Associates concerning asset returns. Ibbotson Associates' asset return studies are the most noted asset return rate studies available today. The results are widely disseminated throughout the investment public. Ibbotson Associates' long-term common stock total market return is 11.88% which, when reduced by the long-term historic risk-free rate of 4.97% results in a market premium of 6.9% (11.88% - 4.97%).

Recent Market Values and
Beta Adjusted Ibbotson Associates Size Premiums For
The Water Group Followed by Analysts

	1	2	3	4	5	6	7	8
	Recent Market Value (Mill $)	Market Quartile Name	Market Quartile	Quartile Size Premium	Quartile Beta	Value Line Beta	Beta Ratio	Beta Adjusted Quartile Size Premium
Water Group Followed by Analysts								
American States Water Co	$2,695.414	Low-Cap	3	1.60	1.22	0.65	53%	0.8
American Water Works Co Inc	25,742.602	Large-Cap	1	0.00	1.00	0.85	85%	0.0
California Water Service Gp	2,766.623	Low-Cap	3	1.60	1.22	0.65	53%	0.8
Essential Utilities, Inc.	10,316.129	Mid-Cap	2	0.89	1.12	0.95	85%	0.8
Middlesex Water Co	1,199.981	Low-Cap	3	1.60	1.22	0.75	61%	1.0
SJW Corp	1,789.928	Low-Cap	3	1.60	1.22	0.85	70%	1.1
York Water Co	543.009	Mico-Cap	4	3.40	1.35	0.80	59%	2.0
Average		Low-Cap	3	1.60	1.22	0.79	67%	0.9

Source of Information: 2019 SBBI Yearbook, Stocks, Bonds, Bills, and Inflation, and Value Line

COVID-19 Default Adjustment
Pre and Post COVID-19
A Rated Investor-Owned Public Utility Bonds and 30-Year Treasury Bonds

Years	A Rated	30-Year T-Bond	Credit Spread
Pre COVID-19 Yields			
Jan 2019	4.35	3.04	1.31
Feb 2019	4.25	3.02	1.23
Mar 2019	4.16	2.98	1.18
Apr 2019	4.08	2.94	1.14
May 2019	3.98	2.82	1.16
Jun 2019	3.82	2.57	1.25
Jul 2019	3.69	2.57	1.12
Aug 2019	3.29	2.12	1.17
Sep 2019	3.37	2.16	1.21
Oct 2019	3.39	2.19	1.20
Nov 2019	3.43	2.28	1.15
Dec 2019	3.40	2.30	1.10
Jan 2020	3.29	2.22	1.07
Feb 2020	3.11	1.97	1.14
Average Credit Spread (Pre COVID-19)			1.17
Recent Post COVID-19 Yields			
Dec 2020	2.77	1.67	1.10
Jan 2021	2.91	1.82	1.09
Feb 2021	3.09	2.04	1.05
Average Credit Spread (Post COVID-19)			1.08

Average Credit Spread (Pre COVID-19)	1.17
Average Credit Spread (Post COVID-19)	1.08
COVID-19 Default Adjustment	0.09

Market Value Risk Premium
For the Water Group Followed by Analysts

	Water Group Followed by Analysts	
Prospective Public Utility Bond Yields(1)	3.5	%
Estimated Risk Premium(2)	6.0	
Market Value Risk Premium Indicated Cost Rate	9.5	%

Notes: (1) Based upon the current and prospective long-term debt cost rates, it is reasonable to expect that if the comparable group (i.e., Water Group) issued new long-term bonds, it would both be priced to yield about 3.5% based upon credit profiles of A for the Water Group.

(2) A 6% risk premium is concluded for the Group after reviewing the tabulation of risk spreads shown on pages 2, 3, 4 and 5 of this Schedule.

Development of the Projected Risk Premium

A	B	C	D	E	F	G	H	I
Value Line Summary & Index Month End Edition	Forecasted Market Dividend Yield	Stock Price Appreciation Next 3-5 Years	Annual Price Appreciation	Forecasted Annual Total Return	Less: Yield of Moody's A Rated Industrial Bonds	Forecasted Equity Premium	Estimated Risk Adjustment	Forecasted Risk Premium
December-20	2.0 %	35 %	7.8 %	9.8 %	2.66 %	7.1 %	85 %	6.1 %
January-21	1.9	25	5.7	7.6	2.77	4.8	85	4.1
February-21	1.9	30	6.8	8.7	2.97	5.7	85	4.9
		Midpoint of data		8.7		6.0		5.1 %
		Quarter's Average		8.7		5.9		5.0 %

Annual Total Returns and Risk Premiums of
S&P Public Utility Stocks and Bonds
for the Years 2000-2019, 1990-2019, 1980-2019, 1970-2019,1960-2019, 1950-2019 and 1928-2019

Periods	Public Utility Stock	L-Term T-Bonds	Public Utility Bonds AAA	AAA & AA	AA	A	BBB
			Annual Total Returns				
			Average Annual Rates of Return				
2000 to 2019	0.1224	0.0805	0.0905	0.0912	0.0916	0.0924	0.0976
1990 to 2019	0.1156	0.0857	0.0971	0.0930	0.0935	0.0921	0.0977
1980 to 2019	0.1419	0.1007	0.1200	0.1068	0.1079	0.1078	0.1145
1970 to 2019	0.1305	0.0894	0.1004	0.0971	0.0982	0.0990	0.1052
1960 to 2019	0.1207	0.0765	0.0790	0.0825	0.0832	0.0840	0.0896
1950 to 2019	0.1241	0.0644	0.0638	0.0708	0.0714	0.0723	0.0779
1928 to 2019	0.1120	0.0580	0.0594	0.0661	0.0671	0.0693	0.0761
			Average Risk Premiums				
2000 to 2019		0.0419	0.0319	0.0313	0.0309	0.0300	0.0249
1990 to 2019		0.0299	0.0185	0.0227	0.0221	0.0236	0.0179
1980 to 2019		0.0412	0.0219	0.0351	0.0340	0.0342	0.0274
1970 to 2019		0.0443	0.0418	0.0382	0.0375	0.0367	0.0311
1960 to 2019		0.0443	0.0418	0.0382	0.0375	0.0367	0.0311
1950 to 2019		0.0597	0.0604	0.0534	0.0527	0.0519	0.0463
1928 to 2019		0.0540	0.0526	0.0459	0.0449	0.0428	0.0359

Annual Total Returns, Annual Income Returns and Risk Premiums of
S&P Public Utility Stocks and Bonds
for the Years 2000-2019, 1990-2019, 1980-2019, 1970-2019,1960-2019, 1950-2019 and 1928-2019

Periods	Annual Total Returns Public Utility Stock	Annual Income Returns					
		L-Term T-Bonds	Public Utility Bonds				
			AAA	AAA & AA	AA	A	BBB
Average Rates of Return							
2000 to 2019	0.1224	0.0398	0.0769	0.0533	0.0534	0.0551	0.0600
1990 to 2019	0.1156	0.0501	0.0782	0.0622	0.0623	0.0640	0.0682
1980 to 2019	0.1419	0.0641	0.0953	0.0759	0.0763	0.0786	0.0831
1970 to 2019	0.1305	0.0664	0.0916	0.0776	0.0782	0.0806	0.0850
1960 to 2019	0.1207	0.0630	0.0818	0.0732	0.0737	0.0759	0.0799
1950 to 2019	0.1241	0.0583	0.0725	0.0675	0.0680	0.0701	0.0740
1928 to 2019	0.1120	0.0508	0.0609	0.0597	0.0604	0.0629	0.0677
Average Risk Premiums							
2000 to 2019		0.0826	0.0456	0.0691	0.0691	0.0674	0.0625
1990 to 2019		0.0655	0.0374	0.0535	0.0533	0.0516	0.0474
1980 to 2019		0.0778	0.0467	0.0661	0.0656	0.0634	0.0589
1970 to 2019		0.0578	0.0390	0.0476	0.0470	0.0449	0.0408
1960 to 2019		0.0578	0.0390	0.0476	0.0470	0.0449	0.0408
1950 to 2019		0.0659	0.0517	0.0566	0.0561	0.0540	0.0502
1928 to 2019		0.0613	0.0511	0.0524	0.0517	0.0491	0.0443

Annual Total Returns, Annual Income Returns and Risk Premiums of
S&P Public Utility Stocks and Bonds
For the 46 Years of the Lowest Interest Rate Environment and the 46 Years of the Highest Interest Rate Environment
For The Years 1928-2019

Current Interest Rate Environment: 2.4%

Periods	Public Utility Stock	L-Term T-Bonds	Public Utility Bonds AAA	AAA & AA	AA	A	BBB
Annual Total Returns							
Low Interest Rate Environment:							
46 Years of the Lowest Interest Rates, Ranging from 2.0% to 4.1% with an Average Rate of 2.9%							
Average Rates of Return	0.1126	0.0313	0.0349	0.0484	0.0496	0.0547	0.0662
Average Risk Premiums		0.0814	0.0777	0.0642	0.0630	0.0579	0.0464
High Interest Rate Environment:							
46 Years of the Highest Interest Rates, Ranging from 4.1% to 13.5% with an Average Rate of 7.2%							
Average Risk Premiums	0.1114	0.0847	0.0814	0.0838	0.0847	0.0838	0.0860
Average Risk Premiums		0.0267	0.0300	0.0276	0.0268	0.0276	0.0254
Annual Income Returns							
Low Interest Rate Environment:							
46 Years of the Lowest Interest Rates, Ranging from 2.0% to 4.1% with an Average Rate of 2.9%							
Average Rates of Return	0.1126	0.0293	0.0343	0.0371	0.0378	0.0407	0.0465
Average Risk Premiums		0.0833	0.0783	0.0755	0.0749	0.0720	0.0661
High Interest Rate Environment:							
46 Years of the Highest Interest Rates, Ranging from 4.1% to 13.5% with an Average Rate of 7.2%							
Average Risk Premiums	0.1114	0.0723	0.0847	0.0822	0.0830	0.0852	0.0889
Average Risk Premiums		0.0392	0.0267	0.0292	0.0285	0.0262	0.0225

Annual Total Returns of
S&P Public Utility Stocks and Bonds
for the Years 1928-2019

	Annual Total Returns						
			Public Utility Bonds				
Years	Public Utility Stocks	L-Term T-Bonds	AAA	AAA & AA	AA	A	BBB
1928	0.5431	-0.0030	0.0370	0.0388	0.0406	0.0372	0.0392
1929	0.1376	0.0410	0.0209	0.0193	0.0178	0.0163	-0.0076
1930	-0.2149	0.0509	0.0917	0.0892	0.0869	0.0820	0.0378
1931	-0.3193	-0.0782	0.0058	-0.0059	-0.0171	-0.0608	-0.1089
1932	-0.0724	0.1736	0.1073	0.1037	0.1003	0.0685	0.0570
1933	-0.2170	0.0090	0.0142	-0.0145	-0.0401	-0.0686	-0.0601
1934	-0.1743	0.0962	0.1712	0.2000	0.2272	0.3264	0.4593
1935	0.6914	0.0610	0.1053	0.1243	0.1427	0.1760	0.2885
1936	0.2357	0.0691	0.0783	0.0916	0.1046	0.1079	0.1078
1937	-0.3337	-0.0091	0.0290	0.0323	0.0357	0.0272	-0.0626
1938	0.1020	0.0662	0.0720	0.0773	0.0825	0.0884	0.1505
1939	0.1538	0.0692	0.0435	0.0473	0.0510	0.0851	0.0923
1940	-0.1643	0.0910	0.0480	0.0506	0.0532	0.0949	0.1359
1941	-0.3050	0.0234	0.0255	0.0291	0.0327	0.0428	0.0681
1942	0.1079	-0.0735	0.0261	0.0287	0.0313	0.0314	0.0590
1943	0.4750	0.0228	0.0312	0.0346	0.0380	0.0405	0.0564
1944	0.1879	0.0268	0.0343	0.0353	0.0362	0.0303	0.0459
1945	0.5665	0.1075	0.0298	0.0349	0.0383	0.0683	0.0805
1946	-0.0130	-0.0006	0.0233	0.0238	0.0242	0.0267	0.0377
1947	-0.1236	-0.0165	-0.0139	-0.0187	-0.0234	-0.0213	-0.0105
1948	0.0451	0.0202	0.0287	0.0317	0.0347	0.0225	0.0073
1949	0.3074	0.0760	0.0718	0.0746	0.0773	0.0892	0.0757
1950	0.0152	-0.0034	0.0126	0.0131	0.0135	0.0107	0.0233
1951	0.2075	-0.0541	-0.0393	-0.0393	-0.0393	-0.0468	-0.0268
1952	0.1947	0.0101	0.0373	0.0390	0.0407	0.0442	0.0399
1953	0.0918	0.0062	0.0078	0.0063	0.0048	0.0107	0.0037
1954	0.2269	0.0676	0.0668	0.0701	0.0733	0.0745	0.0909
1955	0.1357	-0.0264	-0.0107	-0.0127	-0.0147	-0.0100	0.0146
1956	0.0416	-0.0484	-0.0703	-0.0703	-0.0703	-0.0714	-0.0816
1957	0.0541	0.0472	0.0246	0.0229	0.0213	0.0054	-0.0131
1958	0.3827	-0.0439	-0.0081	-0.0032	0.0017	0.0123	0.0339
1959	0.0958	-0.0320	-0.0231	-0.0234	-0.0237	-0.0120	-0.0102
1960	0.1680	0.1106	0.0764	0.0735	0.0705	0.0791	0.0994
1961	0.3646	0.0135	0.0432	0.0448	0.0464	0.0502	0.0442
1962	-0.0519	0.0650	0.0831	0.0829	0.0828	0.0852	0.0891
1963	0.1261	-0.0022	0.0171	0.0202	0.0232	0.0294	0.0329
1964	0.1685	0.0439	0.0394	0.0391	0.0387	0.0409	0.0396
1965	0.0489	-0.0064	-0.0010	-0.0014	-0.0018	-0.0044	0.0050
1966	-0.0504	0.0085	-0.0501	-0.0509	-0.0518	-0.0602	-0.0990
1967	-0.0216	-0.0650	-0.0525	-0.0539	-0.0553	-0.0592	-0.0271
1968	0.1419	0.0149	0.0268	0.0224	0.0181	0.0286	0.0243
1969	-0.1769	-0.0640	-0.0792	-0.0839	-0.0885	-0.0960	-0.0892
1970	0.1494	0.1537	0.0970	0.0978	0.0987	0.0952	0.0761
1971	0.0050	0.0999	0.1168	0.1241	0.1313	0.1510	0.1681
1972	0.1464	0.0661	0.0912	0.0980	0.1047	0.1103	0.1387
1973	-0.2106	-0.0893	0.0158	0.0138	0.0118	0.0156	0.0150
1974	-0.2135	0.0092	-0.0315	-0.0360	-0.0405	-0.0683	-0.1033
1975	0.4364	0.0465	0.0915	0.0863	0.0813	0.0872	0.0940
1976	0.3245	0.1955	0.1976	0.2017	0.2058	0.2475	0.2806
1977	0.1076	0.0074	0.0459	0.0545	0.0629	0.0683	0.0903
1978	-0.0174	-0.0189	-0.0083	-0.0055	-0.0027	-0.0026	0.0000
1979	0.1221	-0.0289	-0.0424	-0.0509	-0.0590	-0.0655	-0.0823
1980	0.1275	-0.0804	-0.0782	-0.0778	-0.0773	-0.0702	-0.0649
1981	0.1464	0.0472	0.0616	0.0674	0.0730	0.0416	0.0674
1982	0.2292	0.4323	0.3294	0.3750	0.3942	0.3708	0.3808
1983	0.2372	-0.0049	0.0721	0.0691	0.0763	0.1406	0.1347
1984	0.2219	0.1611	0.1770	0.1796	0.1768	0.1783	0.2075
1985	0.3232	0.3143	0.3473	0.3276	0.3259	0.3143	0.3098
1986	0.3575	0.3692	0.2994	0.2720	0.2698	0.2835	0.2933
1987	-0.0544	-0.1013	-0.1132	-0.0637	-0.0566	-0.0435	-0.0505
1988	0.1849	0.1026	0.2027	0.1615	0.1594	0.1643	0.1919
1989	0.4351	0.2176	0.1770	0.1743	0.1715	0.1692	0.1781
1990	0.0069	0.0482	0.0685	0.0689	0.0722	0.0738	0.0728
1991	0.0931	0.1472	0.1813	0.1647	0.1624	0.1715	0.1878
1992	0.1183	0.1093	0.1264	0.1312	0.1324	0.1355	0.1315
1993	0.1661	0.2162	0.1926	0.2126	0.2190	0.1429	0.1590
1994	-0.0825	-0.1075	-0.0802	-0.0656	-0.0657	0.0065	-0.0351
1995	0.3772	0.3268	0.2860	0.3074	0.3089	0.2164	0.2442
1996	0.0550	0.0020	0.0279	0.0211	0.0214	0.0279	0.0415
1997	0.1959	0.1454	0.1181	0.1157	0.1169	0.1238	0.1496
1998	0.1896	0.1786	0.1431	0.0365	0.0289	0.1074	0.0981
1999	-0.0998	-0.1062	-0.0792	-0.0275	-0.0237	-0.0921	-0.0684
2000	0.5475	0.1922	0.1076	0.1150	0.1146	0.1101	0.1196
2001	-0.2877	0.0596	0.0734	0.0788	0.0873	0.0780	0.0534
2002	-0.2934	0.1362		0.1851	0.1851	0.2461	0.1746
2003	0.2509	0.0488		0.1678	0.1678	0.1529	0.2329
2004	0.2763	0.0861		0.1162	0.1162	0.0782	0.0919
2005	0.2151	0.0520		0.0869	0.0869	0.0732	0.0541
2006	0.2323	0.0421		0.0486	0.0486	0.0596	0.0759
2007	0.1434	0.0814		0.0043	0.0043	0.0143	0.0042
2008	-0.3160	0.2953		0.0733	0.0733	0.0132	-0.1109
2009	0.1801	-0.1460		0.1159	0.1159	0.1662	0.3279
2010	0.0795	0.0755		0.0809	0.0809	0.0871	0.0893
2011	0.2051	0.3271		0.2701	0.2701	0.2505	0.2019
2012	0.1272	0.0622		0.0801	0.0801	0.0955	0.1287
2013	0.1363	-0.1592		-0.0850	-0.0850	-0.0758	-0.0494
2014	0.3017	0.2419		0.1577	0.1577	0.1872	0.1333
2015	-0.0629	0.0115		-0.0031	-0.0031	-0.0227	-0.0682
2016	0.1834	-0.0224		0.0443	0.0443	0.0512	0.1625
2017	0.1966	0.0714		0.1224	0.1224	0.1211	0.1505
2018	0.0644	-0.0579		-0.0566	-0.0566	-0.0477	-0.0680
2019	0.2690	0.2127		0.2209	0.2209	0.2098	0.2471

Annual Total Returns of S&P Public Utility Stocks
And Annual Income Returns of Bonds
for the Years 1928-2019

	Annual Total Returns	Income Returns					
			Public Utility Bonds				
Years	Public Utility Stocks	L-Term T-Bonds	AAA	AAA & AA	AA	A	BBB
1928	0.5431	0.0329	0.0451	0.0460	0.0470	0.0499	0.0541
1929	0.1376	0.0361	0.0468	0.0479	0.0490	0.0522	0.0578
1930	-0.2149	0.0332	0.0458	0.0470	0.0482	0.0514	0.0591
1931	-0.3193	0.0338	0.0434	0.0449	0.0463	0.0511	0.0635
1932	-0.0724	0.0350	0.0474	0.0504	0.0535	0.0640	0.0815
1933	-0.2170	0.0315	0.0436	0.0468	0.0499	0.0604	0.0833
1934	-0.1743	0.0306	0.0402	0.0436	0.0471	0.0559	0.0713
1935	0.6914	0.0278	0.0351	0.0376	0.0402	0.0466	0.0544
1936	0.2357	0.0273	0.0324	0.0343	0.0362	0.0415	0.0465
1937	-0.3337	0.0275	0.0320	0.0334	0.0347	0.0395	0.0486
1938	0.1020	0.0263	0.0303	0.0316	0.0329	0.0392	0.0510
1939	0.1538	0.0239	0.0286	0.0296	0.0305	0.0360	0.0448
1940	-0.1643	0.0224	0.0277	0.0285	0.0293	0.0331	0.0410
1941	-0.3050	0.0197	0.0269	0.0276	0.0283	0.0304	0.0366
1942	0.1079	0.0239	0.0272	0.0279	0.0287	0.0305	0.0358
1943	0.4750	0.0246	0.0264	0.0269	0.0273	0.0296	0.0338
1944	0.1879	0.0248	0.0265	0.0268	0.0272	0.0294	0.0333
1945	0.5665	0.0229	0.0256	0.0261	0.0266	0.0285	0.0318
1946	-0.0130	0.0208	0.0250	0.0254	0.0257	0.0268	0.0293
1947	-0.1236	0.0215	0.0257	0.0261	0.0264	0.0273	0.0297
1948	0.0451	0.0240	0.0282	0.0287	0.0292	0.0301	0.0327
1949	0.3074	0.0223	0.0270	0.0274	0.0277	0.0291	0.0324
1950	0.0152	0.0216	0.0262	0.0264	0.0267	0.0276	0.0312
1951	0.2075	0.0244	0.0285	0.0288	0.0291	0.0307	0.0334
1952	0.1947	0.0265	0.0300	0.0303	0.0305	0.0324	0.0351
1953	0.0918	0.0300	0.0325	0.0328	0.0331	0.0347	0.0371
1954	0.2269	0.0266	0.0296	0.0298	0.0301	0.0317	0.0348
1955	0.1357	0.0287	0.0307	0.0309	0.0311	0.0324	0.0341
1956	0.0416	0.0310	0.0335	0.0337	0.0340	0.0357	0.0374
1957	0.0541	0.0355	0.0397	0.0400	0.0403	0.0428	0.0452
1958	0.3827	0.0344	0.0384	0.0386	0.0389	0.0414	0.0447
1959	0.0958	0.0409	0.0445	0.0448	0.0451	0.0470	0.0494
1960	0.1680	0.0409	0.0450	0.0453	0.0455	0.0473	0.0489
1961	0.3646	0.0391	0.0442	0.0445	0.0449	0.0462	0.0476
1962	-0.0519	0.0401	0.0434	0.0437	0.0439	0.0450	0.0466
1963	0.1261	0.0403	0.0427	0.0429	0.0431	0.0437	0.0456
1964	0.1685	0.0419	0.0441	0.0442	0.0443	0.0450	0.0466
1965	0.0489	0.0424	0.0448	0.0450	0.0451	0.0458	0.0475
1966	-0.0504	0.0475	0.0513	0.0515	0.0518	0.0531	0.0552
1967	-0.0216	0.0494	0.0553	0.0556	0.0559	0.0576	0.0605
1968	0.1419	0.0543	0.0621	0.0627	0.0633	0.0651	0.0684
1969	-0.1769	0.0624	0.0706	0.0716	0.0725	0.0743	0.0778
1970	0.1494	0.0692	0.0822	0.0833	0.0844	0.0870	0.0913
1971	0.0050	0.0614	0.0766	0.0777	0.0789	0.0825	0.0868
1972	0.1464	0.0601	0.0744	0.0751	0.0758	0.0778	0.0815
1973	-0.2106	0.0701	0.0762	0.0767	0.0773	0.0789	0.0812
1974	-0.2135	0.0800	0.0849	0.0861	0.0873	0.0899	0.0929
1975	0.4364	0.0817	0.0894	0.0912	0.0929	0.0978	0.1057
1976	0.3245	0.0794	0.0864	0.0880	0.0895	0.0928	0.0987
1977	0.1076	0.0765	0.0814	0.0829	0.0845	0.0859	0.0896
1978	-0.0174	0.0840	0.0877	0.0888	0.0900	0.0917	0.0947
1979	0.1221	0.0921	0.0962	0.0978	0.0995	0.1017	0.1064
1980	0.1275	0.1115	0.1182	0.1211	0.1241	0.1271	0.1352
1981	0.1464	0.1349	0.1427	0.1458	0.1489	0.1529	0.1616
1982	0.2292	0.1309	0.1439	0.1448	0.1464	0.1532	0.1610
1983	0.2372	0.1115	0.1247	0.1229	0.1237	0.1298	0.1350
1984	0.2219	0.1247	0.1297	0.1339	0.1341	0.1374	0.1434
1985	0.3232	0.1104	0.1187	0.1179	0.1189	0.1228	0.1270
1986	0.3575	0.0802	0.0908	0.0930	0.0940	0.0973	0.1015
1987	-0.0544	0.0843	0.0934	0.0946	0.0953	0.0985	0.1027
1988	0.1849	0.0897	0.1013	0.1009	0.1014	0.1040	0.1083
1989	0.4351	0.0854	0.0938	0.0949	0.0955	0.0980	0.1001
1990	0.0069	0.0858	0.0943	0.0959	0.0964	0.0985	0.1009
1991	0.0931	0.0818	0.0891	0.0915	0.0921	0.0943	0.0961
1992	0.1183	0.0769	0.0822	0.0860	0.0869	0.0887	0.0897
1993	0.1661	0.0671	0.0737	0.0776	0.0780	0.0805	0.0816
1994	-0.0825	0.0730	0.0794	0.0799	0.0802	0.0826	0.0868
1995	0.3772	0.0708	0.0781	0.0774	0.0776	0.0813	0.0857
1996	0.0550	0.0672	0.0745	0.0742	0.0745	0.0762	0.0805
1997	0.1959	0.0670	0.0746	0.0743	0.0746	0.0747	0.0782
1998	0.1896	0.0572	0.0682	0.0674	0.0677	0.0687	0.0710
1999	-0.0998	0.0592	0.0710	0.0740	0.0748	0.0743	0.0766
2000	0.5475	0.0607	0.0790	0.0817	0.0821	0.0830	0.0839
2001	-0.2877	0.0557	0.0747	0.0777	0.0780	0.0787	0.0810
2002	-0.2934	0.0542		0.0730	0.0730	0.0754	0.0818
2003	0.2509	0.0496		0.0646	0.0646	0.0623	0.0673
2004	0.2763	0.0505		0.0608	0.0608	0.0617	0.0641
2005	0.2151	0.0465		0.0546	0.0546	0.0566	0.0592
2006	0.2323	0.0499		0.0583	0.0583	0.0607	0.0632
2007	0.1434	0.0493		0.0591	0.0591	0.0605	0.0629
2008	-0.3160	0.0448		0.0619	0.0619	0.0650	0.0711
2009	0.1801	0.0401		0.0579	0.0579	0.0610	0.0721
2010	0.0795	0.0405		0.0525	0.0525	0.0548	0.0598
2011	0.2051	0.0375		0.0489	0.0489	0.0514	0.0565
2012	0.1272	0.0256		0.0385	0.0385	0.0416	0.0490
2013	0.1363	0.0302		0.0417	0.0417	0.0441	0.0492
2014	0.3017	0.0316		0.0424	0.0424	0.0435	0.0485
2015	-0.0629	0.0254		0.0397	0.0397	0.0408	0.0496
2016	0.1834	0.0221		0.0373	0.0373	0.0394	0.0474
2017	0.1966	0.0267		0.0386	0.0386	0.0404	0.0443
2018	0.0644	0.0307		0.0404	0.0404	0.0420	0.0460
2019	0.2690	0.0248		0.0369	0.0369	0.0385	0.0429

Hanover Municipal Water Works
Common Equity Cost Rate Summary

	Water Group Followed by Analysts		
	DCF(1)	CAPM(2)	RP(3)
Common Equity Cost Rate Range	10.10 %	9.90 %	10.60 %
Investment Risk Adjustments (4)	0.25	0.25	0.25
Hanover Municipal Water Works Adjusted Common Equity Cost Rate Range:	10.35	10.15	10.85
Hanover Municipal Water Works Recommended Common Equity Cost Rate (5)		10.45 %	
LESS : Personal Income Tax Adjustment (4)		1.15	
Recommendation after personal income taxes for Hanover Municipal Water Works		9.30 %	
Check of Reasonableness of Common Equity Cost Rate (6)		9.0 % to 15.0 %	

Notes: (1) From Schedule 12 and explained in the Direct Testimony.
(2) From Schedule 17 and explained in the Direct Testimony.
(3) From Schedule 18 and explained in the Direct Testimony.
(4) As explained in the Direct Testimony.
(5) As explained in the Direct Testimony, the recommendation is only applicable to a rate making common equity ratio of 52%. (~52.00%)
(6) See page 2 of Schedule 14.

Analysis of Tax Adjustment Factor
Based on Yield of G.O. Municipal Bonds and Investor-Owned Public Utility Bonds

	1	2	3	4	5	6	7
		G.O. Municipal Bonds			Investor-Owned Public Utility Bonds		Calculated Tax Factor Municipal A/Baa Over Public Utility A/Baa [Ratio is converted to a tax factor by subtracting the ratio from 100%]
Years	A Rated	Baa Rated	Average A/Baa	A Rated	Baa Rated	Average A/Baa	
Mar 2020	2.68	3.13	2.91	3.50	3.96	3.73	22%
Apr 2020	2.99	3.78	3.39	3.19	3.82	3.51	3%
May 2020	2.72	3.66	3.19	3.14	3.63	3.39	6%
Jun 2020	2.50	3.58	3.04	3.07	3.44	3.26	7%
Jul 2020	2.33	3.38	2.86	2.74	3.09	2.92	2%
Aug 2020	2.05	3.58	2.82	2.73	3.06	2.90	3%
Sep 2020	2.24	3.10	2.67	2.84	3.17	3.01	11%
Oct 2020	2.34	3.26	2.80	2.95	3.27	3.11	10%
Nov 2020	2.35	3.31	2.83	2.85	3.17	3.01	6%
Dec 2020	2.01	3.23	2.62	2.77	3.05	2.91	10%
Jan 2021	2.08	2.68	2.38	2.91	3.18	3.05	22%
Feb 2021	1.93	2.44	2.19	3.09	3.37	3.23	32%
						Average	0.11

Hanover Municipal Water Works
Recommended Fair Rate of Return and Summary of Alternative Overall Rates of Return
With Tax Adjustment
Recommended Rate Making Ratios at December 31, 2022

	Recommended Ratios	Cost Rates(1)	Recommended Weighted Cost	11% Tax Adjusted Equity Cost Rate (2)	Tax-Adjusted Weighted Cost
Debt	48.0	2.98	1.43	--	1.43
Fund Equity	52.0	10.45	5.43	9.30	4.84
Overall	100.0		6.86		6.27

Notes: (1) Debt cost is from Schedule 3 and equity cost rates are from Schedule 19.
(2) See Schedule 20.

Borough of Hanover Statement No. 5-R
Witness: H. Walker, III
Docket No. R-2021-3026116

BOROUGH OF HANOVER
HANOVER MUNICIPAL WATER WORKS
HANOVER, PENNSYLVANIA

RATE OF RETURN

REBUTTAL TESTIMONY
OF
HAROLD WALKER, III

OCTOBER 2021

Prepared by:
GANNETT FLEMING
VALUATION AND RATE CONSULTANTS, LLC

Valley Forge, Pennsylvania

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INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A. My name is Harold Walker, III. I am employed by Gannett Fleming Valuation and Rate Consultants, LLC as Manager, Financial Studies. My business address is 1010 Adams Avenue, Audubon, Pennsylvania 19403.

Q. ARE YOU THE SAME HAROLD WALKER WHO PREVIOUSLY SUBMITTED TESTIMONY IN THIS PROCEEDING?

A. Yes.

SCOPE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The Borough of Hanover - Hanover Municipal Water Works ("Water Fund") asked me to respond to and comment on the direct testimony submitted by Bureau of Investigation and Enforcement ("I&E") witness Christopher Keller and the direct testimony submitted by Office of Consumer Advocate ("OCA") witness David J. Garrett. It should be noted, for the purposes of my testimony, my reference to Borough of Hanover refers to the Borough of Hanover in its entirety; while my reference to Water Fund refers to that portion of the Borough of Hanover's services that are accounted for as the Water Enterprise Fund.

SUMMARY

Q. PLEASE SUMMARIZE YOUR COMMENTS ON I&E'S AND OCA'S TESTIMONIES.

A. I respectfully disagree with I&E's proposed return on equity ("ROE") of 8.91% and OCA's proposed ROE of 8.40% for the Water Fund. These aforementioned opportunity ROEs are before each witness's recommended tax adjustments. I also disagree with I&E's proposed overall rate of return ("ROR") of 5.59% and OCA's proposed ROR of 5.64% for Water Fund and their proposed tax adjusted overall rate of return ("TAROR") of 4.48% and 5.18%, respectively, after each witness's recommended tax adjustments.

Specifically, the Pennsylvania Public Utility Commission ("Commission" or "PUC") should not accept I&E's and OCA's proposals because:

- I&E's recommended capital structure is not support by law, financial theory, and/or regulatory practice for utilities;
- I&E's and OCA's recommended returns on equity and related overall rates of return do not afford the Water Fund the opportunity to earn a fair rate of return;
- I&E's recommended tax adjustment is calculated incorrectly, and is influenced by forces other than income taxes due to the period chosen to analyze; and
- I&E's and OCA's proposals show a lack of understanding of the precepts of a fair rate of return, including the comparable earnings standard, capital attraction standard, and the financial integrity standard.

Finally, my testimony examines and refutes I&E's and OCA's alleged criticisms of my recommendations. As I describe later in this testimony, these claims are baseless and should be rejected.

Based upon the results of my entire analysis contained in my direct and rebuttal testimonies, my recommendation is that Water Fund be permitted an overall rate of return of 6.86% based upon an imputed capital structure at December 31, 2022, including a

10.45% cost of common equity. My alternative recommended cost of common equity, should the Commission decide to adjust my primary recommendation of 10.45% to reflect the income tax status of the investors of Water Fund, is 9.30% and an overall fair rate of return recommendation would be 6.27%. My recommended cost of common equity reflects Water Fund's unique risk characteristics.

As a check on the reasonableness of my common equity cost rate recommendation, I reviewed Value Line's projected returns on common equity for comparable utilities. Value Line's projected earned returns on common equity for my comparable utilities range from 9.0% to 15.0%. The range of the projected returns suggests that my recommendation that Water Fund be permitted an opportunity to earn 10.45% is reasonable, if not conservative.

A FAIR RATE OF RETURN

Q. DO THE RECOMMENDATIONS OF I&E AND OCA PROVIDE THE WATER FUND A FAIR RATE OF RETURN?

A. No. In *Bluefield*[1], a fair rate of return is defined as: (1) equal to the return on investments in other business undertakings with the same level of risks (the comparable earnings standard); (2) sufficient to assure confidence in the financial soundness of a utility (the financial integrity standard); (3) will maintain and support its credit, enabling the utility to raise or attract additional capital necessary to provide reliable service (the capital attraction standard).

1 *Bluefield Water Works & Improvement Company v. P.S.C. of West Virginia*, 262 U.S. 679 (1923).

Mr. Keller's and Mr. Garrett's entire rate of return recommendations are flawed and do not produce a fair rate of return for the Water Fund. Throughout this rebuttal testimony I highlight the numerous flaws contained in their testimonies. Mr. Keller's and Mr. Garrett's proposals show a lack of understanding of the precepts of a fair rate of return, including the comparable earnings standard, capital attraction standard, and the financial integrity standard. Mr. Keller's testimony is couched with innuendos that the Borough's ownership of the Water Fund reduces the risk of providing water service to outside customers. I do not recall the Commission ever suggesting that a multi-state investor-owned utility should be afforded something less than a fair rate of return because they are owned by large holding company or that their rates in Pennsylvania should be subsidized by non-jurisdictional rate payers. Yet that is what Mr. Keller recommends for the Water Fund.

Mr. Keller's and Mr. Garrett's testimonies violate the precepts of a fair rate of return, including the comparable earnings standard, the capital attraction standard, and the financial integrity standard. Mr. Keller's and Mr. Garrett's recommendations violate all three aforementioned fair rate of return precepts as demonstrated by their own testimonies. The Water Fund is entitled to a return that will enable it to attract additional capital, not only subsidized, below-market cost GO Bond capital raised, and then assigned, by the Borough of Hanover. The credit that enables GO bonds to be issued is the taxing powers of the issuing entity and the tax paying ability of the entity's taxpayers. A fair rate of return for the Water Fund is the credit that should enable the Water Fund to attract capital regardless of the Borough's ability to levy taxes. The risk of providing service to outside customers is not mitigated simply because the Borough can tax non-jurisdictional taxpayers

or because the Borough can change rates for inside the Borough customers. Risk does not change with ownership, and the price or cost of bearing risk is what it is. I&E's and OCA's recommendations offer no incentive to investors to invest in municipal water assets when higher returns are available from less risky investments. Investors will not provide capital and should not be forced to provide capital when higher risk-adjusted returns are available.

CAPITAL STRUCTURE

Q. WHAT CAPITAL STRUCTURE RATIOS DOES I&E RECOMMEND BEING USED TO DEVELOP THE WATER FUND'S OVERALL RATE OF RETURN?

A. Mr. Keller recommends a hypothetical capital structure consisting of 56% long-term debt and 44% equity. According to Mr. Keller, his recommended "44% equity ratio more closely resembles the low end of the range of equity ratios of the average capital structures in my proxy group which is 43.67%" (at page 12). Although Mr. Keller's "recommendation is designed to comply with Title 66, Section 1301(b)," his recommendation fails to do so.

According to Title 66, Section 1301(b), "the commission shall employ an imputed capital structure of comparable public utilities providing water or wastewater service" (underline added). However, Mr. Keller recommends only a single utility's capital structure ratio, American Water Works, since he relied only on the low end of his comparison group's range. Specifically, his recommendation is based on American Water Works' five-year average (2016-2020) common equity of 43.67%, as shown on I&E Exhibit No. 2 Schedule 2. The fully projected future test year for these proceedings is 12/31/22, not average 2016 – 2020 utilized by Mr. Keller.

Additionally, regarding relying solely on American Water Works' capital structure, American Water Works is the largest and most geographically diverse U.S. publicly traded water and wastewater utility company. American Water Works employs more than 7,000 professionals who provide regulated and market-based drinking water, wastewater, and other related services to 15 million people in 46 states. Conversely, the Water Fund provides water service to about 18,000 total customers and to only about 11,000 Outside Customers. The concentration of Water Fund's business in south central Pennsylvania makes it very susceptible to any adverse development in local regulatory, economic, demographic, competitive and weather conditions. The risks associated with Water Fund's concentrated service area are discussed on pages 19-21 of my direct testimony (Borough of Hanover Statement No. 5).

In addition to the enormous size difference between American Water Works and the Water Fund, Mr. Keller contradicts his use of data from only one company when he explains why information from only one company is less reliable and should not be used,

> A proxy group is typically utilized since the use of **data exclusively from one company may be less reliable**. The **lower reliability occurs because the data for one company** may be subject to events that can cause short-term anomalies in the marketplace. The **rate of return on common equity for a single company could become distorted** in these circumstances and would therefore not be representative of similarly situated companies. Therefore, a proxy group has the effect of smoothing out potential anomalies associated with a single company.[2] (Emphasis added)

Generally speaking, size of Mr. Keller's comparable group companies is inversely related to the percentage of equity used to finance their assets because company size is an indicator of business risk. The amount of investor provided capital of the companies

2 I&E Statement No. 2 at 7.

which comprise Mr. Keller's comparable group ranged from $266.8 million to $15,868.0 million (see I&E Exhibit No. 2, Schedule 2) in 2020 as shown in Table 1.

Mr. Keller's Proxy Group's Capitalization Sorted Largest to Smallest

Mr. Keller's Proxy Group	2020 Investor Provided Capital	2020 Common Equity Ratio	Average Capitalization	**Average Common Equity Ratio**
American Water Works	15,868.000	40.67%		
Essential Utilties	10,247.263	45.71%		
SJW Group	2,204.740	41.60%	9,440.001	**42.66%**
California Water Service Group	1,716.312	53.68%		
American States Water Co	1,225.857	52.34%	1,471.085	**53.01%**
Middlesex Water Co	626.578	55.25%		
York Water Company	266.825	53.69%	446.702	**54.47%**

Source: I&E Exhibit No. 2, Schedule 2

Table 1

The three largest companies in Mr. Keller's comparable group, or those companies with more than $2,000 million (i.e., $2 billion) of investor provided capital had common equity ratios which range from 40.7% to 45.7%, the two mid-sized companies, or those companies with more than more than $1,000 million and less than $2,000 million of investor provided capital had common equity ratios which range from 52.3% to 53.7%, while the two smallest companies in Mr. Keller's comparable group had common equity ratios ranging from 53.7% to 55.3%. The two smallest companies in Mr. Keller's comparable group have $266.8 million to $626.5 million of investor provided capital.

In fact, no company in Mr. Keller's comparable group with less than $2,000 million (i.e., $2 billion) of investor provided capital had common equity ratios below 52.3%. Even the four smallest companies (less than $2,000 million) in Mr. Keller's comparable group are much larger than the Water Fund, since they have about 18-times more investor

provided capital (average $958.9 million) than Water Fund's $54.0 million investor provided capital and 28-times more investor provided capital than Water Fund's Outside Customer related capital ($34.8 million).

Finally, I note that the five-year average (2016-2020) capital structure ratios for Mr. Keller's comparison group shown on I&E Exhibit No. 2 Schedule 2 consists of 47% debt and 53% equity is almost identical to my recommended capital structure of 48% debt and 52% equity. Based on the aforesaid, I believe the Commission should not accept Mr. Keller's recommendation.

Q. WHAT CAPITAL STRUCTURE RATIOS DOES OCA RECOMMEND BEING USED TO DEVELOP THE WATER FUND'S OVERALL RATE OF RETURN?

A. Mr. Garrett recommends a 2020 capital structure consisting of 51% debt and 49% equity based upon the 2020 average debt ratio for his comparison group.[3] Schedule 2 of Exhibit HW-1 reveals Mr. Garrett's comparison group's capital structure is projected to be 43% debt and 57% equity during 2023-2025. The fully projected future test year for these proceedings is 12/31/22, not 2020 utilized by Mr. Garrett.

Further, Table 2 shows the 2021 and 2022 debt ratios for Mr. Garrett's comparison companies taken from Mr. Garrett's cited source of information (Value Line Investment Survey, 7/9/21).

3 "My analysis of the 2020 capital structures of the proxy group shows that the average debt ratio of the proxy group is 51%. . . I recommend that the Commission impute a capital structure consisting of 51% debt and 49% equity, which is reflective of the capital structures of the proxy group."

Company	2020 Debt Ratio	2021 Debt Ratio	2022 Debt Ratio
American States Water Co	47%	46%	49%
American Water Works Co Inc	59%	59%	62%
California Water Service Gp	46%	45%	44%
Essential Utilities, Inc.	54%	54%	56%
Middlesex Water Co	44%	43%	42%
SJW Corp	58%	54%	51%
York Water Co	46%	45%	43%
Average	51%	49%	49%

Source: OCA Statement 2 Exhibit DJG-14 and 2021 & 2022 Debt Ratios from 7/9/21 Value Line Investment Survey

Table 2

As shown, Mr. Garrett's comparison companies will have a debt ratio of 49% in 2021 and 2022, which produces a capital structure consisting of 49% debt and 51% equity. A capital structure consisting of 49% debt and 51% equity is consistent with the 12/31/22 fully projected future test year for these proceedings and is nearly identical to my recommended capital structure of 48% debt and 52% equity. Based on the aforesaid, I believe the Commission should not accept Mr. Garrett's recommendation. As explained in my direct testimony (page 13, Borough of Hanover Statement No. 5), consistent with 66 PA. C.S. Section 1301(b), I believe it is necessary to evaluate the Water Fund's current cost of capital based upon an imputed capital structure, consisting of 48% long term debt and 52% equity, representing the water industry practice, is consistent with the Comparison Group's capital structure ratios and aligns with the 12/31/22 fully projected future test year for these proceedings.

EMBEDDED COST RATE

Q. WHAT EMBEDDED COST RATES DO YOU RECOMMEND BE USED TO CALCULATE THE WATER FUND'S OVERALL RATE OF RETURN?

A. Consistent with my recommended capital structure ratios, I recommend using Water Fund's embedded debt cost rate of 2.98% at December 31, 2022.

Q. WHAT EMBEDDED COST RATE DO I&E AND OCA RECOMMEND BEING USED TO DEVELOP WATER FUND'S OVERALL RATE OF RETURN?

A. Both Mr. Keller and Mr. Garrett accept the Water Fund's 2.98% embedded long-term debt cost rate.

COMPARABLE GROUPS

Q. WHAT COMPANIES DID I&E AND OCA USE TO ESTIMATE THE COST OF COMMON EQUITY FOR WATER FUND?

A. I&E's and OCA's use the same comparison group that I used. Note that the phrases "proxy group," "comparison group," and "comparison companies" are used interchangeably, and to refer to the same group of seven water utility companies utilized by Mr. Keller, Mr. Garrett, and me.

Q. DO YOU HAVE ANY OTHER COMMENTS REGARDING I&E AND OCA PROXY GROUPS?

A. Yes. In addition to using a comparison group or proxy group to estimate the cost of equity, proxy groups are used as a benchmark to satisfy the long-established guideline of providing

a utility the opportunity to earn a return equal to that of similar risk enterprises. However, neither Mr. Keller nor Mr. Garrett presented any evidence regarding the similarity, or dissimilarity, of risk between their comparison companies and Water Fund. A risk analysis of Water Fund and the comparison companies was discussed in my direct testimony in sections "Financial Analysis" and "Risk Analysis." A risk analysis of the Water Fund and the comparison companies is essential in determining a fair rate of return because risk and return counterbalance one another. That is, the greater the risk, the higher the required return. Accordingly, I do not believe the Commission can or should rely upon either Mr. Keller's or Mr. Garrett's recommendations.

RISK FACTORS

Q. BESIDES THE AFOREMENTIONED REQUIRED RISK COMPARISON BETWEEN THE WATER FUND AND THE PROXY GROUP, WHICH NEITHER MR. KELLER NOR MR. GARRETT PRESENTED, IS THERE OTHER EVIDENCE CONCERNING RISK THAT THEY FAILED TO CONSIDER?

A. Yes, water utilities face increased risks which Mr. Keller and Mr. Garrett did not considered. For example, Moody's credit rating agency stated the current federal income tax law is "credit negative" for utilities:

> Tax reform is credit negative for sector, but impact varies by company . . . The wide-ranging tax legislation passed by the US Congress on December 20, 2017 cut the statutory corporate tax rate to 21% from 35%. The legislation was broadly credit positive for corporate cash flows but for regulated investor-owned utilities, which include electric, gas and water utilities, the effect was the opposite. . . The legislation is credit negative for investor-owned utilities. A lower tax rate will reduce the difference between the amount that utilities collect from rate payers to cover taxes and their payments to tax authorities, reducing cash flow. . . Tax reform is neutral for earnings but negative for cash flow. Utilities collect revenue based on book

> tax but cash tax is much lower. A lower tax rate lowers revenue, while loss of bonus depreciation increases cash tax. . . Cash flow to debt ratio could decline by 150-250 basis points. We estimate that regulated utilities could experience a decline in the ratio of cash flow from operations pre-working capital to debt (CFO pre-WC/debt) of 150 bps to 250 bps, assuming no corrective action is taken.[4]

Similarly, regarding the current federal income tax law another credit rating agency, Standard & Poor's, has also recently stated:

> One of the not-so-apparent implications of the tax reform legislation is that utility credit metrics will likely experience some strain due to the lower customer rates, revenues and cash flows resulting from the corporate tax rate reduction. Utilities can offset the pressure to their credit metrics in several ways. One approach is to reduce capital expenditures, which, while not increasing earnings or cash flow or rates, would conserve funds and counteract the strain on credit metrics. . . Another approach is that utilities can petition regulators for an increase in their authorized equity returns as a means of offsetting the negative credit ramifications of the new tax law.[5]

Additionally, inflation has started gaining momentum and is pushing capital cost rates higher as reported by Steven Vannelli, CFA in Economy, Markets:

> Fed funds futures for 2022 and 2023 have broken out to new highs, likely on the back of **rising inflation expectations**. As things stand now, the market is looking for three hikes by the end of 2023, with the **effective fed funds moving from 8bps today to 85bps**. Just today the New York Fed released its monthly inflation expectation survey, and it climbed to new highs. Tomorrow we get September CPI readings and expectations are that it remains around the current level of 5.3%. The US CPI is pretty well correlated with China's PPI which appears to be continuing higher. Given this relationship it is hard to see US inflation dropping until it does in China. And here the news is somewhat disconcerting. With thermal coal prices making new highs, odds are this continues to create upward pressure on China's PPI and in turn, the US CPI.[6] (Emphasis added)

4 Moody's Investor Services, *Regulated Utilities - US: Tax Reform is Credit Negative for Sector, But Impact Varies by Company*, January 24, 2018, Page 1.
5 Standard & Poor's, *Financial Focus: Average Utility Equity Ratio Rises Slightly, Possibly from Tax Reform Fallout*, June 20, 2018, Page 1.
6 Steven Vannelli, "Is Inflation Starting to Impact Equity Returns?," Knowledge Leaders Capital, October 12, 2021, Page 1. https://www.knowledgeleaderscapital.com/2021/10/12/is-inflation-starting-to-impact-equity-returns/ (10/12/21)

Q. IS WATER FUND SIMILAR IN SIZE TO MR. KELLER'S OR MR. GARRETT'S PROXY GROUP?

A. No. My testimony details the large size difference between Water Fund and the Comparable Group. Company size is an indicator of business risk and was discussed in my direct testimony (pages 19-22). The finance literature supports the fact that, as the size of a firm decreases, its risk and, hence, its required return increases.

> When scholars have tried to explain actual security returns, several anomalies (i.e., deviations from what is considered normal) have become evident. One is a *small-firm*, or *size*, *effect*. It has been found that common stocks of firms with small market capitalizations (price per share times the number of shares outstanding) provide higher returns than common stocks of firms with high capitalizations, holding other things constant.[7]

Further, since size is a recognized and meaningful element of risk, it is appropriate to reflect that risk in a company's cost of equity.

> Recent studies have provided strong evidence that the degree of risk and corresponding cost of capital increase with decreasing size of company. The studies show that this addition to the equity risk premium is over and above the amount that would be warranted just as a result from a company's systematic risk.[8]

> Two independent sets of empirical studies provide strong support for the proposition that cost of capital tends to increase with decreasing size. Users of cost of capital data should make themselves aware of updates of these and possibly other similar studies in order to incorporate the latest current size effect data in cost of capital estimates, whether using build-up models, CAPM, or other cost of capital models.[9]

7 James C. Van Horne, John M. Wachowicz. Fundamentals of Financial Management, 13th ed. (Pearson Education Limited), 2008, at 114.
8 Shannon P. Pratt. Cost of Capital: Estimation and Applications, (Wiley), 1998, at 64.
9 *Id*. at 95.

Dr. Thomas Zepp presented research on water utilities that support a small firm effect in the utility industry.[10] Moreover, Professor Brigham has indicated that smaller firms have higher capital costs than otherwise similar but larger firms.[11] Standard & Poor's, a credit rating agency, documents that relationship between size and credit rating,

> Company size and diversification often plays [a] role. While we have no minimum size criterion for any given rating level, company size tends to be significantly correlated to rating levels. This is because larger companies often benefit from economies of scale and/or diversification, translating into a stronger competitive position. Small companies are, almost by definition, -more concentrated in terms of product, number of customers, and geography. To the extent that markets and regional economies change, a broader scope of business affords protection.[12] (Underline added.)
>
> While we have no minimum size criterion for any given rating level, size and ratings do end up being correlated, given that size often provides a measure of diversification, and/or affects competitive positioning.[13] (Underline added.)

Further, since size is a recognized and meaningful element of risk, it is appropriate to reflect that risk in a company's cost of equity. Credit rating agencies recognize that size impacts credit rating. The authors Brealey, Myers and Allen discuss the "firm size" and the size premium.[14] Additional support for the use of the size premium for utilities is also found in a 1995 article by M. Annin.[15] Because firm size plays a role in the pricing of securities in the unregulated financial markets, it is necessary to reflect this fact when determining capital cost rates for utilities. Otherwise, a smaller utility is at a competitive disadvantage in the money market when competing for capital.

10 *See* Zepp (2002), "Utility Stocks and the Size Effect: Revisited", Economics and Finance Quarterly, 43, 578-582.
11 *See* Fundamentals of Financial Management, 5th Edition, page 623.
12 *Standard & Poor's*, Corporate Ratings Criteria 2008; pg. 22.
13 *Id.* at 23.
14 Brealey, Myers and Allen, Principles of Corporate Finance, 10th edition, page 198.
15 See Annin (1995), "Equity and the Small Stock Effect", Public Utilities Fortnightly, October 15, 1995, at 42-43.

Q. ON PAGE 16 OF MR. GARRETT'S TESTIMONY HE REFERENCED TWO 2016 ARTICLES PUBLISHED IN PUBLIC UTILITIES FORTNIGHTLY, ONE BY STEVE HUNTOON AND ONE BY LEONARD HYMAN AND WILLIAM TILLES. SIMILARLY, ON PAGE 17 MR. GARRETT REFERENCED A 2017 WHITE PAPER BY CHARLES GRIFFEY. MR. GARRETT REFERENCED THESE ARTICLES TO SUPPORT HIS OPINION THAT INVESTORS' EXPECTATION OF RETURNS ARE LOWER TODAY. DO YOU HAVE ANY COMMENTS CONCERNING THE REFERENCED ARTICLES?

A. Yes. On Exhibit DJG-13, Mr. Garrett shows the annual return for the market as measured by the S&P 500. To date, since the 2016 Steve Huntoon article and since the 2016 Hyman and Tilles article were published, the market (S&P 500) has provided investors an average annual return of 15.7%. Further, to date, since the 2017 Charles Griffey white paper was published, the market (S&P 500) has provided investors an average annual return of 16.7%.

Therefore, the market has provided a total return of about 15.7% to 16.7% during the period Mr. Garrett stated that there has been a decline in investor expectations of returns. Clearly, investors' return requirements are higher than what Mr. Garrett advocates. Based on the aforesaid, I conclude that investors in the market have not relied upon the cited studies/articles used by Mr. Garrett since the projected market returns cited in the studies/articles are considerably below the returns earned from investing.

Q. ON PAGE 46 OF HIS TESTIMONY, I&E WITNESS KELLER STATES, "WHILE IT IS TRUE THAT FOR OUTSIDE CUSTOMERS, THE WATER FUND MUST

OBTAIN THE APPROVAL OF THE COMMISSION BEFORE CHANGING RATES, FOR INSIDE CUSTOMERS THE WATER FUND DOES NOT NEED THE APPROVAL OF THE COMMISSION AND MAY CHANGE INSIDE RATES AT THE DISCRETION OF MUNICIPAL OFFICIALS. THEREFORE, THE WATER FUND HAS MORE FLEXIBILITY IN ITS DETERMINATION OF TOTAL SYSTEM REVENUE THAN THE COMPARABLE GROUP." IS THIS OPINION RELEVANT TO THIS CASE AND TO A FAIR RATE OF RETURN?

A. No. I believe this statement impeaches I&E's recommendation. The risk of providing service to Inside Customers is irrelevant to the current proceeding since the PUC only has jurisdiction over the rates of service for Outside Customers. Therefore, the PUC should only be interested in the risk of providing service to Outside Customers. I&E's testimony advocates for cross subsidization by suggesting that the Water Fund should be afforded something less than a fair rate of return because their Outside Customers' rates can be subsidized by non-jurisdictional (Inside Customers) rate payers.

Q. ON PAGE 20 OF HIS DIRECT TESTIMONY, OCA WITNESS GARRET STATES, "I HAVE USED FINANCIAL MODELS TO CLOSELY ESTIMATE THE BOROUGH'S COST OF EQUITY, AND THESE FINANCIAL MODELS ACCOUNT FOR RISK." DO YOU AGREE WITH MR. GARRETT?

A. No. The financial models used by Mr. Garrett reflect inputs relative to his comparison companies not the Water Fund. The financial models used by Mr. Garrett do not reflect the Water Fund smaller size, lower cash flow, lower credit profile, lower debt service coverage and the other risk determinants summarized on Table 5 of page 30 of my direct testimony.

Q. ON PAGE 15 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER DISCUSSES UNSYSTEMATIC RISK AND SYSTEMATIC RISK, WHILE OCA WITNESS GARRETT DISCUSSES UNSYSTEMATIC RISK AND SYSTEMATIC RISK ON PAGES 22 TO 25 OF HIS DIRECT TESTIMONY. DO YOU AGREE WITH I&E'S OR OCA'S TESTIMONIES REGARDING UNSYSTEMATIC RISK AND SYSTEMATIC RISK?

A. No. I believe Mr. Keller's and Mr. Garrett's testimonies are misleading or vague in these areas because systematic risk (non-diversifiable) is the only risk germane under CAPM and portfolio theory. The CAPM is based upon the assumption that investors hold diversified portfolios and that the market only recognizes or rewards systematic risk (non-diversifiable) when determining the price of a security because unsystematic risk (company-specific) is removed through diversification. However, both systematic risk (non-diversifiable) and unsystematic risk (company-specific) are relevant under DCF, risk premium, comparable earnings, credit analyses, bond ratings, etc. and both are precepts of a fair rate of return and must be considered. Mr. Keller's and Mr. Garrett's testimonies suggest company-specific risk is irrelevant because unsystematic risk is removed through diversification. A real-life example involving Enron Corporation proves the fallacies of assuming company-specific risk is irrelevant.

> The story of Enron Corporation depicts a company that reached dramatic heights only to face a dizzying fall. The fated company's collapse **affected thousands of employees** and **shook Wall Street to its core**. **At Enron's peak**, its **shares were worth $90.75;** just **prior to declaring bankruptcy** on Dec. 2, 2001, **they were trading at $0.26**

> When the recession hit in 2000, Enron had significant exposure to the most volatile parts of the market. **As a result, many trusting investors and creditors found themselves on the losing end of a vanishing market cap.**
>
> At the time, Enron's collapse was the biggest corporate bankruptcy to ever hit the financial world (since then, the failures of WorldCom, Lehman Brothers, and Washington Mutual have surpassed it). The Enron scandal drew attention to accounting and corporate fraud as its **shareholders lost $74 billion in the four years** leading up to its bankruptcy, and its **employees lost billions in pension benefits**.[16] (Emphasis added)

Enron Corporation's story proves company-specific risk is pertinent. Equity investors and bond holders can lose capital, as did every investor who held Enron Corporation stock during their collapse regardless if their portfolio was diversified or not. Mr. Garrett contradicts his own testimony regarding the sole importance of systematic risk (non-diversifiable) on page 9 of his testimony when he cites the U.S. Supreme Court first addressing the meaning of a fair rate of return for public utilities in *Wilcox v. Consolidated Gas Co. of New York* even as he stated, "the court found that '**the amount of risk in the business is a most important factor**'[17] in determining the appropriate allowed rate of return." (Emphasis added)

I&E'S AND OCA'S RECOMMENDED COST OF EQUITY

Q. WHAT MARKET VALUE DCF ESTIMATE DO I&E'S AND OCA'S WITNESSES RECOMMEND FOR WATER FUND?

16 Excerpts taken from Troy Segal, "Enron Scandal: The Fall of a Wall Street Darling," Investopedia (2021), https://www.investopedia.com/updates/enron-scandal-summary/ (10/12/21).

17 *Wilcox v. Consolidated Gas Co. of New York*, 212 U.S. 19 (1909).

A. Mr. Keller recommends a market value DCF of 8.91% and Mr. Garrett recommends a market value DCF of 8.4% for his proxy group which I believe are below the zone of reasonableness.

Q. WHY DO YOU BELIEVE I&E WITNESS KELLER'S MARKET VALUE DCF IS BELOW THE ZONE OF REASONABLENESS?

A. Mr. Keller's recommended market value DCF of 8.91% is significantly impacted by one company's result, Middlesex Water Company ("Middlesex"). Mr. Keller's recommended market value DCF for Middlesex is just 4.76%. A 4.76% cost of equity for a water utility is clearly below the zone of reasonableness. Since Mr. Keller's recommended cost of equity is based entirely on the result of his market value DCF, it is imperative that his recommended market value DCF be precise and not heavily impacted by the results of just one company, Middlesex. Had Mr. Keller's recommended cost of equity been based on multiple common equity models instead of just his DCF, his inclusion of the results for Middlesex would not be significant.[18]

Table 3 shows the results of Mr. Keller's recommended market value DCF both including and excluding Middlesex, as well as his results for Middlesex. As shown on Table 3, Mr. Keller's recommended market value DCF for Middlesex of 4.76% is **47% below his overall recommended market value DCF** result of 8.91%. Further, his overall market value DCF excluding Middlesex, 9.60%, is more than **2-times higher** than his recommended market value DCF for Middlesex.

18 See pages 35-36 of my direct testimony for the reasons and support for the use of multiple models.

Mr. Keller's Recommended Market Value DCF

	Adjusted Dividend Yield (1)	Growth Rate (2)	Expected Return on Equity (3=1+2)
I&E's Current Recommendation	1.76%	7.15%	8.91%
Middlesex Water Co	1.16%	3.60%	4.76%
Results Excluding Middlesex	1.85%	7.74%	9.60%

Source: I&E Exhibit No. 2, Schedules 4 - 6.

Table 3

Mr. Keller has presented no evidence which supports a conclusion that Middlesex's cost of equity is only 50% that of his other proxy group companies. Mr. Keller's recommended market value **DCF for Middlesex**, of 4.76%, **is 416-basis points below** his **overall** recommended market value **DCF** result, of 8.91%, and **is 484-basis points below his** overall recommended market value **DCF for his other proxy group companies**, of 9.60%.

In other recent testimonies for a water and a wastewater utility Mr. Keller adjusted the results of his DCF to eliminate a company's growth to reduce his growth rate conclusion from 9.09% to 7.33%.[19] Mr. Keller used the same proxy group in these other recent testimonies for a water and a wastewater utility that he used in this proceeding. I believe consistency and the magnitude of Mr. Keller's inclusion of Middlesex's results on his overall recommendation supports a similar approach in these proceedings.

19 See I&E Statement No. 2, at pages 20-21, and I&E Exhibit No. 2 Schedule 5 in Docket No. R-2021-3025207 filed sometime after June 2021. Also see I&E Statement No. 2, at page 25, and I&E Exhibit No. 2, Schedule 9 in Docket No. R-2021-3025206 filed sometime after June 2021.

Q. WHY DO YOU BELIEVE OCA WITNESS GARRETT'S MARKET VALUE DCF IS BELOW THE ZONE OF REASONABLENESS?

A. Mr. Garrett's market value DCF of 8.4% reflects two inputs or factors that I believe are flawed: yield measurement period; and measure of growth. Both Mr. Keller and I averaged a spot or current day's measure of yield along with a 12-month or 52-week measure of yield while Mr. Garrett only used a recent 30-day measure of yield. Mr. Keller justified his yield measurement technique as follows, "[A]a representative dividend yield must be calculated over a time frame that avoids the problems of both short-term anomalies and stale data series. For my DCF analysis, the dividend yield calculation places equal emphasis on the most recent spot and the 52-week average dividend yields." (Keller at page 23). I agree with Mr. Keller's rationale, and I believe it is consistent with past Commission practice. The reasons why Mr. Garrett's 30-day measure of yield is not appropriate is because it allows for undue impact of irregularities that may arise from using a short measurement period. Further, there is a significant length of time from the beginning of the preparation of a rate filing, the filing of the application and when testimony is due which justifies the use of a longer, 12-month measurement period.[20]

The measure of growth used in Mr. Garrett's DCF is based on the nominal growth in the value of the economic output ("GDP") for the overall national economy as measured by the **nominal GDP growth** and **historical growth in earnings per share** of his comparison companies, while Mr. Keller used **published projected growth in earnings per share** of his comparison companies.[21]

20 "It is arguably ill-advised to use a single stock price in a model that is ultimately used to set rates for several years, especially if a stock is experiencing some volatility." (Garrett at pages 29-30)

21 Mr. Keller and I used similar measures of growth based on analysts' forecasts of earnings for the comparison companies.

The growth in the value of GDP for the overall national economy does not provide a reasonable measure for the growth of the comparison companies. For example, Mr. Garrett's projected nominal growth in GDP is a 30-year (2021-2051) projection. Over the past 30 years (1990-2020), nominal GDP increased by 258% while the comparison companies' revenues increased 520%, or 101% (520% ÷ 258%) more than GDP. A similar significant difference in growth between GDP and the comparison companies' revenues will continue to occur prospectively because of water utility industry fundamentals. At a minimum, the investor-owned water industry will continue to grow faster than the overall economy for the next several decades, if not for the next century.

The comparison companies' growth strategy focuses on the acquisition of water and wastewater companies and operations which expands their market share. Government controlled establishments such as municipalities, public service districts and other local governmental entities dominate the water and wastewater industry. Currently, government-controlled establishments manage or own about 86% of all water supplies and 80% of all domestic wastewater systems. The percentage of all water supplies that are managed or owned by larger investor-owned utilities ("IOU"), and the percentage of wastewater systems managed or owned by larger IOUs, will increase over time as the cost of infrastructure replacement and regulatory compliance becomes prohibitive for Government-controlled establishments and small IOUs. Clearly, there are ample new growth opportunities available for IOUs to grow faster than the national economy through acquisition of Government controlled water/wastewater establishments and small IOUs.

The water utility industry's and wastewater utility industry's increased compliance with state and federal water purity levels and large infrastructure replacements are driving

consolidation of the wastewater utility and water utility industries. Because many wastewater utility and water utility operations do not have the means to finance the significant capital expenditures needed to comply with these requirements, many have been selling their operations to larger, financially stronger operations.

The larger IOUs have been following an aggressive acquisition program to expand their operations by acquiring smaller wastewater and water systems. Generally, they enter a new market by acquiring one or several wastewater or water utilities. After their initial entry into a new market, the larger investor-owned water utility companies continually seek to expand their market share and services through the acquisition of wastewater and water utility businesses and operations that can be integrated with their existing operations. Such acquisitions may allow a company to expand market share and increase asset utilization by eliminating duplicate management, administrative, and operational functions. Acquisitions of small, independent utilities can often add earning assets without necessarily incurring the costs associated with the SDWA or CWA if such acquisitions are contiguous to the potential purchaser.[22]

Mr. Garrett's use of historical growth in earnings per share is not appropriate, nor do I believe use of historical growth in earnings per share is consistent with past Commission practice.[23] Use of historical growth in earnings per share as a measure of

22 The SDWA, or Safe Drinking Water Act, is the principal federal law in the United States intended to ensure safe drinking water for the public. Pursuant to the act, the EPA is required to set standards for drinking water quality and oversee all states, localities, and water suppliers who implement these standards. The CWA, or Clean Water Act, is the primary federal law in the United States governing water pollution. The CWA's objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands.

23 Note that the 6.8% "Projected Growth Rates" identified in Figure 7 on page 36 of OCA Statement 2 is labeled incorrectly. The 6.8% is based on "Historical Growth Rates," and is correctly identified as such in Exhibit DJG-5.

investors' expectations may not reflect future growth potential, reflects past business cycles and has likely already been factored into analysts' forecast of earnings growth.[24]

Q. DO YOU HAVE ANY OTHER COMMENTS REGARDING OCA'S DCF MODEL?

A. Yes. I believe Mr. Garrett improperly relied upon a 30-year GDP growth rate and historical growth in earnings per share. He subjectively ignored the investor influencing growth rates of security analysts and instead, calculated his DCF based on GDP growth and historical growth in earnings per share. GDP growth measures growth in national economy, not water utility stock price.

Published projected EPS growth rates are used primarily by investors. Further, academic studies[25] verify the superiority of analysts' EPS growth forecasts over derived growth rates in predicting stock prices. Mr. Garrett developed an unrealistically low DCF using a low GDP growth estimate and historical growth in earnings per share. The market-required cost of equity represents what the market will pay for a stock based on investors' expectations of expected future growth. Investors' expectations of expected future growth are not based upon Mr. Garrett's unique growth rate, they are based on investors' expectations of expected future growth. For this reason, analysts' projections of future growth prospects for water utilities are required because analysts' forecasts are relied upon by investors when they price utility stocks.

24 Also see *Pennsylvania Public Utility Commission, 5 et. al v. PECO Energy Company – Gas Division*, at Docket R-2020-3018929 (Order Entered June 22, 2021), p. 160.

25 Gordon, David, A., Gordon, Myron, J., and Gould, Lawrence, I.A Choice Among Methods of Estimating Share Yield, The Journal of Portfolio Management, 50-55, Spring 1989.

Value Line's projected earned returns on common equity for Mr. Garrett's proxy group range from 9.0% to 15.0% while Mr. Garrett's DCF recommendation is 8.4%. Therefore, adopting Mr. Garrett's recommended 8.4% DCF would place the Water Fund at a competitive disadvantage in the competition to attract capital.

Q. IS THERE A DIFFERENCE BETWEEN EARNED RETURNS, OR "ACCOUNTING ROEs" AND THE ROE TO BE DETERMINED IN THIS CASE?

A. No, not really. I agree there is a distinction between a market return and an accounting return. The ROE that the Commission will determine in this case will become Water Fund's accounting ROE benchmark by which under-earning and over-earning will be measured. If Mr. Garrett's proxy group is earning an accounting return of 9.0% to 15.0% while Water Fund earns only 8.4%, it places Water Fund at a competitive disadvantage in the competition to attract capital.

Q. DO CURRENT MARKET CONDITIONS IMPACT I&E'S AND OCA'S COST OF EQUITY METHODOLOGIES MORE SO CURRENTLY THAN IN PREVIOUS PERIODS?

A. Yes. The basic proposition of financial theory regarding the economic value of a company is based on market value. That is, a company's value is based on its **market value** weighted average cost of capital.[26] The American Society of Appraisers, ASA Business

26 Other examples, see http://www.investinganswers.com/financial-dictionary/financial-statement-analysis/weighted-average-cost-capital-wacc-2905. Also see http://www.wallstreetmojo.com/weighted-average-cost-capital-wacc/ , or http://accountingexplained.com/misc/corporate-finance/wacc .

Valuation Standards, 2009, and the National Association of Certified Valuation Analysts, Professional Standards, 2007, use the same definition:

> Weighted Average Cost of Capital (WACC). The cost of capital (discount rate) determined by the weighted average, **at market values**, of the cost of all financing sources in the business enterprise's capital structure. (Emphasis added)

Accordingly, the market value derived cost rate reflects the financial risk or leverage associated with **capitalization ratios based on market value**, not book value.

As shown in Table 4, there is a large difference in the market capitalization ratios and the book capitalization for I&E's and OCA's proxy groups. This difference in market values and book values results in debt/equity ratios based on **market value of 26%/74%** (debt/equity) verses 51%/49% (debt/equity) based on book value for I&E's and OCA's proxy group as shown on Table 4.

Difference in Book Values and Market Values
Capitalization Ratios

	Recent Book Value Capitalization Ratios (9/30/20)	**Recent Market Value Capitalization Ratios**
Debt	50.8	**25.7**
Preferred Stock	0.0	**0.0**
Common Equity	49.2	**74.3**
	100.0	**100.0**

Source: Exhibit HW-1, Schedule 16, page 1.

Table 4

The larger the difference between market values and book values the less reliable the models' results are because **the models provide an estimate of the cost of capital of market value**, not book value.

Financial theory concludes capital structure and firm value are related. Since capital structure and firm value are related, a leverage adjustment (Hamada adjustment) is required when a cost of common equity model is based on market value and if its results are then applied to book value. As explained previously, the market value derived cost rate reflects the financial risk or leverage associated with **capitalization ratios based on market value**, not book value. The authors Brealey, Myers and Allen provide a similar definition of the cost of capital being based on market capitalization, not book value,

> The values of debt and equity add up to overall firm value (D + E = V) and firm value V equals asset value. **These figures are all market values, not book (accounting) values**. The market value of equity is often much larger than the book value, so the market debt ratio D/V is often much lower than a debt ratio computed from the book balance sheet.[27] (Emphasis added)

The work of Modigliani and Miller concludes that the market value of any firm is independent of its capital structure, and this is precisely the reason why the leverage adjustment (Hamada adjustment) is appropriate. The only way for the market value of a firm to remain independent of its capital structure is if the capital cost rates change to offset changes in the capital structure. If the capital cost rates do not change to offset changes in the capital structure, then the value of the firm will change. Clearly a leverage adjustment (Hamada adjustment) is required when a cost of common equity model is based on **market value** and if its results are then applied to **book value** because the capital structure is changed from **market value** capitalization to **book value** capitalization.

27 Brealey, Myers and Allen, Principles of Corporate Finance, 10th edition, page 216.

Referring to Table 4, I&E's and OCA's proxy groups' cost of capital is based on debt/equity ratios based on **market value of 26%/74%** (debt/equity). Therefore, I&E's and OCA's market value equity cost rates reflect a 74% equity ratio. That is not just my opinion, but it is a corner stone of financial theory. I&E's and OCA's market value DCF cost rates of 8.91% and 8.4%, respectively, reflect a 74% equity ratio and yet they recommend their 8.91% and 8.4% cost of equity be applied to their proxy group's 2020 approximate 49% equity ratio based on book value. Even if their 8.91% and 8.4% cost of equity were appropriate for a 74% equity ratio, it cannot simultaneously be appropriate for a 49% equity ratio without violation of Modigliani and Miller's precept.

Q. ON PAGE 38 OF HIS DIRECT TESTIMONY, MR. GARRETT PRESENTS THE HAMADA FORMULA AND ALSO STATES, "MR. WALKER'S APPLICATION OF THE HAMADA FORMULA IS INCORRECT." IS MR. GARRETT CORRECT?

A. No. The Hamada formula presented by Mr. Garrett is incorrect according to his own cited source of information, Dr. Damodaran.[28] Specifically, the Hamada formula presented by Mr. Garrett incorrectly states "D = book value of debt" and "E = book value of equity" while his cited source of information, Dr. Damodaran, states the "D" and the "E" are based on **market value, not book value** used by Mr. Garrett (see Figure 1). Further, Dr. Damodaran's presentation of the Hamada formula is consistent with the formula I used. Had Mr. Garrett used the correct Hamada formula **based on market value**, he would have produced the same results shown in my direct testimony (pages 46-47).

28 Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* 197 (3rd ed., John Wiley & Sons, Inc. 2012).

Figure 1

Copy from Dr. Damodaran's 2012 Textbook

Degree of Financial Leverage

Other things remaining equal, an increase in financial leverage will increase the beta of the equity in a firm. Intuitively, we would expect that the fixed interest payments on debt result in increasing income in good times and decreasing income in bad times. Higher leverage increases the variance in net income and makes equity investment in the firm riskier. If all the firm's risk is borne by the stockholders (i.e., the beta of debt is zero),[7] and debt has a tax benefit to the firm, then,

$\beta_L = \beta_u[1 + (1 - t)(D/E)]$

where β_L = Levered beta for equity in the firm

β_u = Unlevered beta of the firm (i.e., the beta of the firm without any debt)

t = Marginal tax rate

D/E = Debt-to-equity ratio (market value)

[7] This formula was originally developed by Hamada in 1972. There are two common modifications. One is to ignore the tax effects and compute the levered beta as:

$\beta_L = \beta_u(1 + D/E)$

If debt has market risk (i.e., its beta is greater than zero), the original formula can be modified to take this into account. If the beta of debt is β_D, the beta of equity can be written as:

$\beta_L = \beta_u[1 + (1 - t)(D/E)] - \beta_D(1 - t)D/E$

Q. WHAT MARKET VALUE CAPM ESTIMATE DOES I&E WITNESS KELLER AND OCA WITNESS GARRETT RECOMMEND FOR THE WATER FUND?

A. Mr. Keller recommends a market value CAPM of 9.89%. Mr. Garrett recommends a market value CAPM of 6.8% which I believe is below the zone of reasonableness.

Q. WHY IS THERE SUCH A LARGE DIFFERENCE BETWEEN THE MARKET VALUE CAPM ESTIMATES OF I&E AND OCA?

A. The 307-basis point difference between Mr. Keller's market value CAPM of 9.89% and Mr. Garrett's market value CAPM of 6.8% is a result of Mr. Garrett's reliance on unique

market premium projections which have substantially underestimated market performance and investors' returns. Mr. Garrett's proxy group projected accounting return of 9.0% to 15.0% is **218-basis points to 818-basis points higher** than his recommended market value CAPM of 6.8% and highlights the inadequacy of Mr. Garrett's recommendation.

Q. DO YOU AGREE WITH I&E WITNESS KELLER'S CAPM METHODOLOGY?

A. No. The two areas of disagreement I have with Mr. Keller's CAPM relate to his risk-free rate and the market risk premium. Mr. Keller's risk-free rate is based on the 10-year Treasury note. However, financial theory indicates the term matching of the risk-free rate should be based on the life of the asset, not the time horizon of the investor. In this case, water assets have a much longer life than the 10 years that results from using 10-year notes. Besides matching the life of the asset, another mistake of using 10-year Treasury notes is that they are more sensitive to monetary policy activities taken by the Federal Open Market Committee, whereas the 30-year Treasury bonds are more of an indication of investor sentiment of their required returns. Additionally, Mr. Keller's analysis significantly understates the risk-free rate of return because he incorrectly gives the same weight to the yield on 10-year Treasury notes for the first **five quarters** (4Q 2021 through 4Q 2022) as he does for the entire **five-year period** 2023 through 2027. Had Mr. Keller given proper weighting to the projected periods represented (i.e., 25 total quarters) his risk-free rate would be 2.68%, not 1.98%.

The other area of disagreement I have with Mr. Keller's CAPM is he did not reflect the required CAPM size premium. The size premium reflects the risks associated with Mr. Keller's proxy group's small size and its impact on the determination of their beta.

This adjustment is necessary because beta (systematic risk) does not capture or reflect the proxy group's small size. According to Brealey, Myers, and Allen, "the relationship among stock returns and firm size and book-to-market ratio has been well documented."[29] Brealey, Myers, and Allen also state, on page 202, that "between 1926 and 2008 the difference between the annual returns on small and large capitalization stocks averaged 3.6%" which should be included in Mr. Keller's CAPM and similarly included in Mr. Garrett's CAPM.

Additionally, on pages 19 and 20, Mr. Keller references two articles which concluded that the CAPM understated the return for small companies and for companies with betas below 1.0. Most water utilities are considered small companies relative publicly traded stocks, and all have betas below 1.0. My CAPM reflects these factors. However, Mr. Keller's CAPM does not reflect the findings of the two studies he cited on pages 19 and 20. Accordingly, Mr. Keller's CAPM cost rate is understated and should not be relied upon.

Investors prefer liquidity to lack of liquidity. Accordingly, a share in a business is worth more if it is easily marketable or, conversely, worth less if it is not. Privately held water utilities such as Water Fund are worth less than publicly traded water utilities. Further, publicly traded water utilities are not as marketable as the large companies which comprise the S&P 500. The size premium used in the CAPM accounts for some of these differences.

29 Brealey, Myers and Allen, Principles of Corporate Finance, 10th edition, page 198.

Q. DO YOU HAVE ANY MORE COMMENTS REGARDING THE ARTICLES THAT MR. KELLER REFERENCED ON PAGES 19 AND 20 OF HIS DIRECT TESTIMONY CONCERNING THE CAPM?

A. Yes. The articles support the widely held point that the return for small companies, such as Water Fund, should include a premium for the additional risk associated with their small size. Investors' expectations reflect the highly publicized existence of the small firm effect. For example, many mutual funds classify their investment strategy as small capitalization to profit from the existence of the small firm effect. Because firm size plays a role in the pricing of securities in the unregulated financial markets, it is necessary to reflect this fact when determining capital cost rates for utilities. Otherwise, a small utility is at a competitive disadvantage in the money market when competing for capital.

Q. DO YOU HAVE ANY MORE COMMENTS REGARDING MR. KELLER'S MARKET VALUE CAPM OF 9.89%?

A. Yes. Mr. Keller's recommended cost of equity is based on the results of his market value DCF of 8.91%. Mr. Keller states on page 16 that he "recommend[s] using the results of the CAPM as a comparison to the DCF results." Mr. Keller's market value CAPM, of 9.89%, is **108-basis points higher** than his recommended market value DCF, of 8.91%. This comparison proves Mr. Keller's recommended market value DCF is unreliable, due in part to his inclusion of the meaningless indicated 4.76% market value DCF cost rate for Middlesex discussed previously.

Q. DO YOU AGREE WITH OCA WITNESS GARRET'S CAPM METHODOLOGY?

A. No. Mr. Garrett's CAPM reflects market premiums he gathered from four articles published and updated multiple times since at least 2015. During this period the projections made in his sourced articles and sourced authors have substantially underestimated the actual market premium earned from investing. This can be proven from the information shown on Mr. Garrett's Exhibit DJG-13 by subtracting the risk-free rate (column 5) from the actual market return (column 4) to produce the annual market premium for each year from 2015 to date. Table 5 proves the average annual market premiums have been substantially higher than the projected 4.8% to 5.0% premium from his sourced authors shown on DJG-10 which Mr. Garrett incorporated in his CAPM.

Beginning Year	Average Market Premium Through 2020
2015	11.2%
2016	13.6%
2017	14.7%
2018	13.2%
2019	23.2%
2020	17.1%

Table 5

Table 5 proves investors' return requirements are higher than what Mr. Garrett advocates. Based on the aforesaid, I conclude that investors in the market have not relied upon the cited authors used by Mr. Garrett since the projected market premiums of the cited authors are considerably below the returns earned from investing.

The last area of disagreement I have with Mr. Garrett's CAPM is he did not reflect the required CAPM size premium. The size premium reflects the risks associated with Mr. Garrett's proxy group's small size and its impact on the determination of their beta. This adjustment is necessary because beta (systematic risk) does not capture or reflect the proxy group's small size. According to Brealey, Myers, and Allen, "the relationship among stock returns and firm size and book-to-market ratio has been well documented."[30] Brealey, Myers, and Allen also state, on page 202, that "between 1926 and 2008 the difference between the annual returns on small and large capitalization stocks averaged 3.6%" which should be included in Mr. Garrett's CAPM.

Q. DO YOU HAVE ANY OTHER COMMENTS REGARDING THE MARKET VALUE CAPM ESTIMATES OF I&E AND OCA?

A. Yes. The market value derived CAPM cost rate reflects the financial risk or leverage associated with **capitalization ratios based on market value**, not book value. As explained previously, there is a large difference in the market capitalization ratios and the book capitalization for I&E's and OCA's proxy groups. This difference in market values and book values results in debt/equity ratios based on **market value of 26%/74%** (debt/equity) versus the roughly 51%/49% (debt/equity) based on the 2020 book value for I&E's and OCA's proxy groups. The larger the difference between market values and book values the less reliable the models' results are because **the models provide an estimate of the cost of capital of market value**, not book value.

30 Brealey, Myers and Allen, Principles of Corporate Finance, 10th edition, page 198.

Q. WHAT COMMON EQUITY COST RATES DO I&E AND OCA RECOMMEND FOR WATER FUND?

A. Mr. Keller recommends a common equity cost rate of 8.91% for Water Fund. Mr. Garrett recommends a common equity cost rate of 8.40% for Water Fund.

Q. DO YOU HAVE ANY COMMENTS REGARDING I&E WITNESS KELLER'S RECOMMENDED COMMON EQUITY COST RATE OF 8.91%?

A. Yes. Mr. Keller's recommendation of 8.91% is based entirely on the results of his DCF model. The average projected earned return on average book common equity for the companies in the Comparable Group (direct testimony Schedule 14) is shown to range from 9.0% to 15.0%. If the Comparable Group is earning an accounting return of 9.0% to 15.0% while Water Fund is earning only 8.91%, it places Water Fund at a competitive disadvantage in the competition to attract capital.

Additionally, as noted previously, sometime after June 2021 Mr. Keller filed other testimonies concerning both a water and a wastewater utility. In both recent testimonies Mr. Keller recommends a 9.24% cost of equity derived from the same proxy group used in these proceedings.[31]

Q. DO YOU HAVE ANY COMMENTS REGARDING OCA WITNESS GARRETT'S RECOMMENDED COMMON EQUITY COST RATE OF 8.4% FOR WATER FUND?

31 See I&E Statement No. 2 in Docket No. R-2021-3025207 and see I&E Statement No. 2 in Docket No. R-2021-3025206.

A. Yes. Mr. Garrett's recommendation of 8.4% for Water Fund is based on his recommended DCF model of 8.4%. The forecasted earned return on book common equity for the companies in Mr. Garrett's proxy group, of 9.0% to 15.0%, is **60-basis points to 660-basis points higher** than Mr. Garrett's recommended 8.4% for the Water Fund. Therefore, adopting Mr. Garrett's recommended 8.4% would place the Water Fund at a competitive disadvantage in the competition to attract capital and will not provide the Water Fund a fair rate of return.

INVESTMENT RISK ADJUSTMENT

Q. WHAT INVESTMENT RISK ADJUSTMENT DOES I&E AND OCA RECOMMEND FOR THE WATER FUND?

A. Mr. Keller and Mr. Garrett did not make an investment risk adjustment. Since Mr. Keller and Mr. Garrett did not conduct any risk analyses of the Water Fund and their proxy groups, they have not presented any evidence regarding the similarity, or dissimilarity, of risk between the proxy group and the Water Fund. Risk analyses of the Water Fund and the comparison companies are essential to satisfy the long-established guideline of providing a utility the opportunity to earn a return equal to that of similar risk enterprises.

A risk analysis of Water Fund and the comparison companies was discussed in my direct testimony in sections "Financial Analysis" and "Risk Analysis." Based upon my financial analysis and risk analysis presented in my direct testimony, I concluded that Water Fund is exposed to greater investment risk than the comparison companies. This conclusion is substantiated by Water Fund's small size, lack of service area diversification, higher capital intensity, lower debt service coverage, lower cash flow adequacy, visibly

lower credit profile and the other factors summarized in Table 5 on page 30 of my direct testimony. I quantified these documented risk differences based on Water Fund's implied maximum A- to a BBB+ credit profile and the comparison companies' A credit profile. The difference in bond rating between Water Fund and the comparison companies suggests a minimum 25-basis point difference in long-term debt cost rates. My conclusion is based upon a portion of the yield spread of A and BBB rated public utility debt since the Water Fund's A- to BBB+ credit rating falls between the A and BBB ratings. Accordingly, a 25-basis point risk adjustment is supported by the evidence presented.

RECOMMENDED INCOME TAX ADJUSTMENTS

Q. PLEASE SUMMARIZE THE RECOMMENDED INCOME TAX ADJUSTMENTS PRESENTED BY MR. KELLER AND MR. GARRETT.

A. Mr. Keller recommends a tax adjustment factor of 28.31% and Mr. Garrett recommends a 11% tax adjustment factor. In my Direct Testimony, I recommended a maximum tax adjustment factor of 11%. Therefore, Mr. Keller's recommended tax adjustment factor is almost **three times greater** than the tax adjustment factor recommended by Mr. Garrett and me.

Mr. Keller's tax adjustment factor reflects a 12-month period, which inadvertently captures COVID-19's volatile impact on bond yields. I note that I&E has traditionally used a multi-year period for this measure in other municipal cases. Further, I note the Commission adopted a 2-year measurement period for the tax adjustment in the two most

recent rate cases which I am aware where the tax adjustment factor was fully litigated.[32] I should also point out that in these two most recent rate cases the tax adjustment factor was determined to be 20% (Lancaster) and 18.22% (DuBois), both occurring during periods when income tax rates were **higher** than they current are. This comparison alone brings into question the reasonableness of Mr. Keller's recommended 28.31% tax adjustment factor.

Q. CAN YOU PLEASE EXPLAIN WHAT YOU MEAN WHEN YOU STATED MR. KELLER'S TAX ADJUSTMENT FACTOR INADVERTENTLY CAPTURES COVID-19'S VOLATILE IMPACT ON BOND YIELDS?

A. Yes. The months included in Mr. Keller's 12-month bond yield comparison only include data after the beginning of the COVID-19 related pandemic. As explained in my direct testimony (page 32-34 and 51-52), in response to COVID-19 the Federal Reserve has provided monetary and fiscal stimulus to increase liquidity in the form of new fiscal stimulus programs and rate cuts. The combined result of these actions by the Federal Reserve and investors' flight to quality have resulted in artificial low rates and historically low rates on government bond yields. Public utility bond yields have not fluctuated (decreased) nearly to the degree that government bond yields have. Mr. Keller's 12-month measurement period only includes yield volatility which resulted from the market's uncertainty due to COVID-19. For example, I&E's Schedule 11 shows the implied tax rate initially ranging from 21% to 18%, then jumping from 18% to a range of 27% to 29%

32 City of Lancaster - Bureau of Water, Docket No. R-2010-2179103 and City of DuBois - Bureau of Water Docket No. R-2016-2554150.

before peaking at 38% (February 2021). After peaking at 38%, the implied tax rate has fallen every month during the following six-month period of Mr. Keller's observations. If the difference between municipal bond yields and public utility bond yields were only due to the income tax effect, or primarily due to the income tax effect, the difference in the bond yields should be similar on a monthly basis and across the period analyzed since income tax rates have been constant. The results of Mr. Keller's analysis suggest there are multiple factors at play which influence the difference in bond yields, and the income tax effect is only one such factor.

To further prove Mr. Keller's tax adjustment factor reflects COVID-19's impact, I applied Mr. Keller's methodology back to the beginning of 2016 as shown in Figure 2. Figure 2 depicts both a pre-COVID-19 period, the COVID-19 period, and shows the impact of the only change in income tax rates during this entire period (Tax Cuts and Jobs Act of 2017).

Figure 2

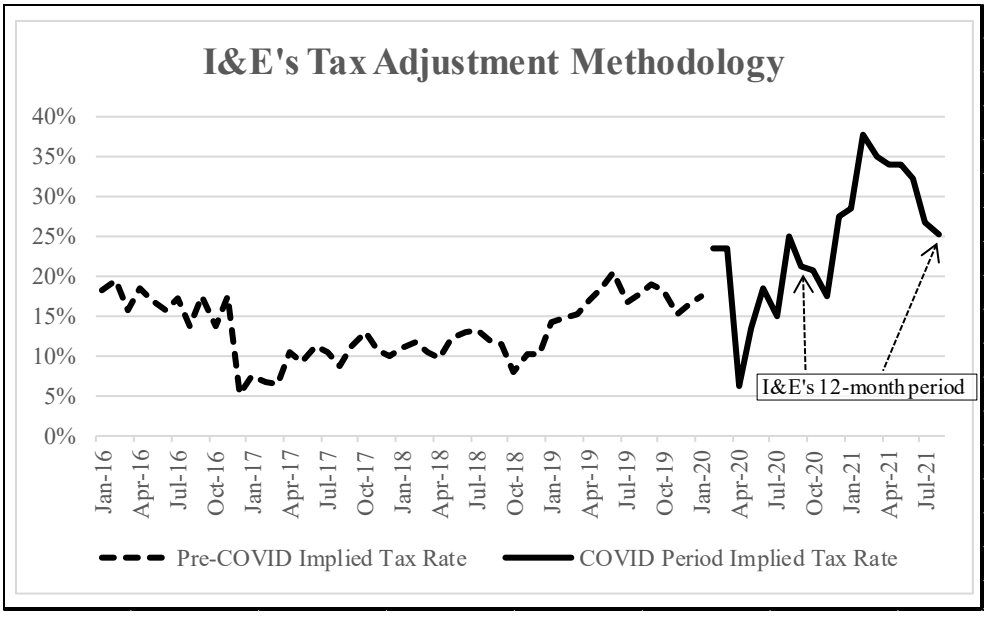


Figure 2 proves COVID-19 has had a dramatic impact on Mr. Keller's tax adjustment factor methodology and confirms there are multiple factors at play influencing the difference in bond yields, and the income tax effect is only one such factor.

Q. IS THE APPROACH USED BY I&E WITNESS KELLER TO DETERMINE THE TAX ADJUSTMENT SIMILAR TO THE METHODOLOGY THAT OCA WITNESS GARRETT AND YOU USED?

A. No. Although we measured the tax adjustment by comparing Moody's Municipal General Obligation bond yields to Moody's Public Utility bonds yields on a monthly basis, we measured different credit qualities, and different time periods. Mr. Keller's tax adjustment factor methodology only measured the A rated credit quality of his proxy group and not the Water Fund's credit quality. Mr. Garret and I both measured the tax adjustment by incorporating the Water Fund's A- to a BBB+ credit rating. The appropriate yield comparison should be based on both bonds rated A and bonds rated Baa to match the credit rating of the Water Fund. Doing so results in measuring income tax effect related to the Water Fund's A- to a BBB+ credit rating.

OVERALL RATE OF RETURN RECOMMENDATION

Q. WHAT IS YOUR OVERALL FAIR RATE OF RETURN RECOMMENDATION FOR THE WATER FUND?

A. Based upon the recommended capital structure and my estimate of Water Fund's common equity cost rate, I recommend an overall fair rate of return of 6.86%. Should the Commission decide to adjust my primary recommendation to reflect the income tax status

of the investors of the Water Fund, my overall fair rate of return recommendation would be 6.27%.

Q. WHAT OVERALL RATE OF RETURN RECOMMENDATION DO I&E WITNESS KELLER AND OCA WITNESS GARRETT RECOMMEND FOR THE WATER FUND?

A. Mr. Keller recommends an overall rate of return of 5.59% (no tax adjustment) and 4.48% after his recommended tax adjustment. Mr. Garrett recommends an overall rate of return of 5.64% (no tax adjustment) and 5.18% after his recommended tax adjustment. Based on Water Fund's small size, lack of service area diversification, higher capital intensity, lower debt service coverage, lower cash flow adequacy, visibly lower credit profile, higher risk (summarized in Table 5 on page 30 of my direct testimony), and my full-scale company specific cost of capital study, I believe Mr. Keller's and Mr. Garrett's recommended overall rates of return should not be adopted.

RESPONSE TO I&E'S CRITICISM OF MR. WALKER'S TESTIMONY

Q. ON PAGES 31 TO 38 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER DISCUSSES USING A LEVERAGE ADJUSTMENT. IS A LEVERAGE ADJUSTMENT JUSTIFIED?

A. Yes. I explain the reason a leverage adjustment should be used in my direct testimony. Further, I previously explained that capital structure and firm value are related. Since capital structure and firm value are related, a leverage adjustment is required when a **cost of common equity model is based on market value** and if its **results are then applied**

to book value in order to be consistent with financial theory. I should also point out that Mr. Keller incorrectly refers to the adjustment as a market-to-book ratio adjustment which it is not. The adjustment accounts for capitalization differences between **market value** capitalization ratios and **book value** capitalization ratios. A market-to-book ratio is a stock price metric and is not part of the adjustment contrary to Mr. Keller's testimony.

Mr. Keller correctly points out that an adjustment for the increased amount of leverage between market value derived cost rates and book value cost rates was not used in the 2008 Aqua Pennsylvania, Inc. decision.[33] However, I believe the Commission did not use the adjustment because they had derived a 10.78% DCF cost rate without the adjustment.[34] As such, the Commission mentioned that such an adjustment was part of their informed opinion, "an adjustment is not precedential but discretionary with the Commission."

Similarly, Mr. Keller properly points out that an adjustment was not used in the 2018 UGI decision.[35] However, I believe the Commission did not use the adjustment because they had derived a 9.85% cost rate without the adjustment.

An adjustment for the increased amount of leverage between market value derived cost rates and book value cost rates was utilized and adopted by the ALJ and the Commission in the 2005 Lancaster Sewer case,

> The City has proposed a market-to-book adjustment of .65%, as calculated by Mr. Walker. I acknowledge that this adjustment has been accepted by

33 See Aqua Pennsylvania, Inc., Order Docket R-00072711

34 The Order states, "In the cases cited by Aqua in support of its leverage adjustment, it is obvious that the DCF results in those cases were not as high as the unadjusted DCF result we have in this proceeding, since the final cost of equity in those cases was no higher than 10.6% with the leverage adjustment. The unadjusted DCF results presented by the Parties in this case are generally higher than the DCF recommendations from the earlier cases cited by Aqua".

35 See UGI Utilities - Electric Division, Order Docket No. R-2017-2640058

> the Commission in three major base rate cases in the past 18 months. See, PPL 2004, supra; Aqua PA, supra; PAWC 2004, supra; see also, PAWC 2002, supra; Pa. P.U.C. v. Philadelphia Suburban Water Co., 219 PUR 4th 272 (2002). Moreover, the market-to-book adjustment was upheld by the Commonwealth Court in Popowsky v Pa. P.U.C., 868 A.2d 606 (Pa. Commw. 2004). Therefore, I accept a .65% market-to-book adjustment to my recommended DCF result, for a cost of equity of 10.75%, modified by a 18% tax savings adjustment, for a cost of equity of 8.82% (10.75% x .82 tax savings = 8.815% rounded to 8.82%. (ALJ's recommended decision, City of Lancaster – Water Fund, docket R-00049862, 6/23/05)

Recently, I recommended a similar adjustment for the increased amount of leverage between market value derived cost rates and book value cost rates in the City of Bethlehem Water Department case. The Commission's Order in this case states,

> The ALJ noted the Settlement did not agree to a specific rate of return. However, if a rate of return must be calculated, the ALJ found the City's proposed rate of return to be reasonable and in the public interest. R.D. at 51.[36]
>
> While we adopt the Settlement, we also agree with the ALJ's rationale and recommendation on this issue, which was provided as a contingency recommendation should the Commission choose not to approve the Settlement, without modification. **We expressly agree with the ALJ's findings, favoring the City's application of traditional ROE models and its analysis of current market conditions.** We conclude that the ALJ's alternative recommendation is supported by substantial evidence.[37] (Emphasis added)

36 *Pennsylvania Public Utility Commission, et. al v. City of Bethlehem – Water Department*, at Docket R-2020-3020256 (Order Entered April 15, 2021), p. 84.
37 *Id*. at 85.

Table 6 compares Mr. Keller's recommended ROE in the current case to the Commission's authorized ROE in the five cases cited by Mr. Keller as not using a leverage adjustment (pages 35 and 36). This comparison shows if the Commission adopts Mr. Keller's recommended DCF of 8.91% then a leverage adjustment is warranted based upon the precedent espoused in the 2008 Aqua Pennsylvania, Inc. decision.

Order Date & Utility	Docket No.	Authorized ROE	I&E's Recommended ROE in the Current Case	I&E's ROE Less Authorized ROE
2008 Aqua Pennsylvania	R-00072711	10.78%	8.91%	-1.87%
2011 Lancaster – Bureau of Water	R-2010-2179103	10.00%	8.91%	-1.09%
2018 UGI Utilities – Electric	R-2017-2640058	9.85%	8.91%	-0.94%
2021 Columbia Gas	R-2020-3018835	9.86%	8.91%	-0.95%
2021 PECO – Gas	R-2020-3018929	10.24%	8.91%	-1.33%

Table 6

Q. AT THE BOTTOM OF PAGE 33 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER HAS A CALCULATION OF THE IMPACT OF 110 ADDITIONAL BASIS POINTS TO THE WATER FUND'S COST OF EQUITY FOR OUTSIDE CUSTOMERS. IS MR. KELLER'S CALCULATION CORRECT?

A. No. Mr. Keller's calculation is incorrect by about 30% since he did not account for his tax adjustment factor (28.31%).

Q. ON PAGES 37 AND 38 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER CLAIMS, "THE EFFICIENT MARKET HYPOTHESIS DICTATES THAT THE PRICE OF A SECURITY FULLY REFLECTS AVAILABLE INFORMATION AND SO THE DIFFERENCE BETWEEN THE MARKET VALUE AND THE

BOOK VALUE IS ALREADY REFLECTED IN THE PRICE AND NO LEVERAGE ADJUSTMENT IS NEEDED. MR. WALKER'S LEVERAGE ADJUSTMENT ASSUMES THAT THE DIFFERENCE BETWEEN MARKET AND BOOK VALUES IS NOT REFLECTED IN THE PRICE OF A STOCK AND THAT INVESTORS DEPEND UPON MARKET VALUE CAPITAL STRUCTURES FOR INVESTMENT DECISIONS. THE AVAILABILITY OF BOOK VALUE CAPITAL STRUCTURES AND MARKET-TO-BOOK RATIOS DEMONSTRATES THAT MR. WALKER'S ASSUMPTIONS ARE NOT VALID." IS MR. KELLER CORRECT?

A. No. As explained previously, the basic proposition of financial theory regarding the economic value of a company is based on market value. That is, a company's value is based on its **market value** weighted average cost of capital.[38] Accordingly, the market value derived cost rate reflects the financial risk or leverage associated with **capitalization ratios based on market value**, not book value. Therefore, since the models employed by Mr. Keller are based on market values, and provide market value cost rates, Mr. Keller's cost rates cannot be simultaneously applied to book value without recognizing the leverage difference between **market value** and **book value** without violating multiple basic propositions of financial theory.

Q. ON PAGE 38 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER TAKES ISSUE WITH YOUR OBSERVATION OF YIELD SPREAD TO ADJUST THE

38 See footnotes 25 and 26 for authoritative sources/references on the market value weighted average cost of capital.

COST RATE OF COMMON EQUITY. ARE MR. KELLER'S CRITICISMS VALID?

A. No, the measure I used incorporated simplifying assumptions to estimate unmeasurable variables. Simplifying assumptions are common in economics and finance. Further, it is also common in economics and finance to use known and measurable variables to estimate unmeasurable variables. Unmeasurable variables are items which we know exist but lack specific quantifiable data to measure. For example, Mr. Keller used bond yield differences between Moody's Municipal General Obligation bond yields and Moody's Public Utility bond yields as his absolute measure of tax rates. Clearly, the difference between Moody's Municipal General Obligation bond yields and Moody's Public Utility bond yields reflects a multitude of different variables in addition to just the tax rates in Pennsylvania such as collateral or credit, duration, varying state and local tax rates, public trust of government/public utilities, call provisions, business cycle, impact of COVID-19, etc.

Q. ON PAGE 40 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER TAKES ISSUE WITH YOUR CAPITAL INTENSITY CALCULATION AND STATES, "WHILE MR. WALKER USED SALES, AND PLANT, PROPERTY, AND EQUIPMENT (PP&E) AS THE FACTORS, HE IS USING PP&E UNADJUSTED FOR DEPRECIATION. IF MR. WALKER WERE TO PERFORM THE SAME CALCULATION USING NET PP&E, HIS CAPITAL INTENSITY RATIO WOULD BE SIGNIFICANTLY LOWER." IS MR. KELLER CORRECT?

A. Yes. If you change a formula or its inputs you will get a different result. Mr. Keller is correct that the ratio will be lower if net plant, property, and equipment were used **but the result still proves the Water Fund is higher risk** than the comparison companies. Based upon the 2019 capital intensity ratio of net plant to revenues, Water Fund ($5.54) is more capital intensive as compared to the Water Group ($5.05) and more than the S&P Utilities ($3.41). In other words, the Water Fund must invest $5.54 in net plant to produce a dollar of revenue or about 110% more than the amount of capital required for the Water Group just to produce the same level of revenue.

Q. ON PAGE 41 OF HIS DIRECT TESTIMONY I&E WITNESS KELLER STATES, "SINCE MUNICIPAL PROVIDERS IN PENNSYLVANIA ARE ONLY REGULATED OUTSIDE THEIR BORDERS, INSIDE PLANT IS NOT SUBJECT TO THE USED AND USEFUL STANDARD, A STANDARD THAT CONSTRAINS IOUS FROM OVERSIZING PLANT. THE WRF REPORT ALSO NOTED THAT MUNICIPALITIES CAN BE PRESSURED FROM ELECTED OFFICIALS TO BUILD PLANT THAT MIGHT NOT MEET THE COST-BENEFIT TEST, AND THEREFORE MAY BE OVERSIZED." ARE MR. KELLER'S STATEMENTS APPLICABLE TO THE WATER FUND?

A. No. All Water Fund plant is allocated between jurisdictional and non-jurisdictional customers. The allocation of Water Fund plant between jurisdictional and non-jurisdictional customers is subject to Commission oversite and approval. Since the Commission applies a used and useful standard to all utility plant under their jurisdiction and all Water Fund plant is allocated between jurisdictional and non-jurisdictional

customers, it follows that all Water Fund jurisdictional and non-jurisdictional plant has been subject to a used and useful standard. Further, it is naïve to claim "municipalities can be pressured from elected officials to build plant that might not meet the cost-benefit test" since elected officials are voted on by both taxpayers and Inside Customer rate payers, who have vested interests in the "cost-benefit" of every project.

Q. ON PAGE 42 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER CLAIMS THAT YOU ADDED "90 BASIS POINTS TO" YOUR "CAPM RESULTS TO ACCOUNT FOR THE WATER FUND'S SMALL SIZE." IS MR. KELLER CORRECT?

A. No, I did not add 90-basis points to the CAPM result to account for the Water Fund's small size. The CAPM does not reflect or incorporate the Water Fund's small size. The size premium used in the CAPM only considers the risks associated with the proxy group's size relative to the market and its impact on the determination of the proxy group's beta. Since the Water Fund is much smaller than the proxy group, the Water Fund's size has not been accounted for in the results of the CAPM.

Q. ON PAGES 43 AND 44 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER DISCUSSES ANNIE WONG'S ARTICLE AND CONCLUDES, "WHILE THIS ARTICLE IS OLDER, ITS ASSERTION IS STILL VALID. ABSENT ANY CREDIBLE UP-TO-DATE ARTICLE TO REFUTE DR. WONG'S FINDINGS, MR. WALKER'S SIZE ADJUSTMENT TO HIS CAPM RESULTS SHOULD BE

REJECTED." DO YOU HAVE A RESPONSE TO MR. KELLER'S TESTIMONY?

A. Yes. The 2002 article by Dr. Zepp (see footnote 10) referenced earlier in this testimony specifically addresses and disproves Annie Wong's findings. The article that Mr. Keller refers to on page 20 of his testimony refutes Annie Wong's findings. The cited textbooks referenced in footnotes 7, 8, 9, 11, 14, and 15 of this testimony disprove Annie Wong's findings and all postdate Annie Wong's article.

Q. ON PAGE 47 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER STATES, "MR. WALKER TESTIFIED THAT THE WATER FUND WAS RISKIER BECAUSE IT LACKS THE INCOME TAX BENEFITS, WHICH MR. WALKER DESCRIBED AS THE ABILITY OF THE UTILITY TO CLAIM DEFERRED TAXES. WHAT MR. WALKER IGNORED IS THAT THE WATER FUND IS NOT SUBJECT TO INCOME TAXES. IT HAS NO NEED TO DEFER TAXES BECAUSE IT DOES NOT HAVE ANY INCOME TAXES TO DEFER. THE PROXY GROUP COMPANIES MAY BENEFIT FROM THEIR ABILITY TO DEFER TAXES, BUT THE WATER FUND IS IN A FAR BETTER POSITION BY NOT BEING SUBJECT TO INCOME TAXES IN THE FIRST PLACE." IS MR. KELLER CORRECT?

A. No. Mr. Keller conflates and combines income taxes and deferred taxes, two separate and distinct items. Income taxes are an income statement item, included as part of the determination of the proxy group's revenue requirement, which add a level of protection for investors because they provide a margin and reduce earnings variability against a

decrease in sales. This level of protection or margin is the basis for measuring interest coverage on a pre-tax basis. Several other financial metrics used to assess risk are also measured on a pre-tax basis for this reason.

Deferred taxes are a cash flow statement item. Deferred taxes increase cash flow, which in turn enhances an entity's ability to internally finance construction and assists in the cash coverage of debt, interest, dividends, etc. Since the Water Fund has neither income taxes nor deferred taxes but the proxy group does, this results in the Water Fund being riskier than the proxy group based on the absence of income taxes and deferred taxes.

Q. ON PAGE 48 OF HIS DIRECT TESTIMONY, I&E WITNESS KELLER DISCUSSES THE BOND RATING METHODOLOGY AND STATES, "SIZE IS ONLY ONE FACTOR UPON WHICH A CORPORATION IS RATED." DO YOU AGREE WITH MR. KELLER?

A. Yes. Size is a factor upon which a corporation's bonds are rated. Accordingly, the large size difference between the Water Fund and the proxy group should be considered when evaluating the Water Fund's risk profile.

RESPONSE TO OCA'S CRITICISM OF MR. WALKER'S TESTIMONY

Q. ON PAGES 38 AND 39 OF HIS DIRECT TESTIMONY, OCA WITNESS GARRETT STATES, USING THE COMPANY'S PROPOSED CAPITAL STRUCTURE AND A TAX RATE OF 28% (THE SAME USED BY MR. WALKER), I CALCULATE AN UNLEVERED BETA OF 0.47. WHEN THAT BETA IS RELEVERED TO MY PROPOSED DEBT RATIO OF 51%, I

CALCULATE A COST OF EQUITY OF 7.1%, WHICH IS CLOSE TO MY CAPM RESULT OF 6.8%." IS MR. GARRETT CORRECT?

A. No. I previously explained that the Hamada formula presented by Mr. Garrett is incorrect according to his own cited source of information, Dr. Damodaran. If Mr. Garrett used the correct formula shown in Dr. Damodaran's textbook he would have calculated a cost of equity of 8.8%, not 7.1%. Obviously, a calculated a cost of equity of 8.8% disproves Mr. Garrett's CAPM result of 6.8%.

Q. DO YOU HAVE ANY COMMENTS REGARDING PAGE 42 OF MR. GARRETT'S DIRECT TESTIMONY WHERE HE DISCUSSES THE DEVELOPMENT OF HIS RECOMMENDED 1.91% RISK-FREE RATE?

A. Yes. Mr. Garrett relied upon the Congressional Budget Office's Budget Outlook ("CBOB") in determining the GDP growth rate used in his DCF (pages 35-36). In that same cited CBOB publication, on page 43, the risk-free rate is projected to average 3.5% over the 2021–2051 period and to reach 4.9% in 2051. Consistency and impartiality suggest that Mr. Garrett's recommended risk-free rate should be 3.5%, not 1.91%.

Q. ON PAGES 51 AND 52 OF HIS DIRECT TESTIMONY, OCA WITNESS GARRETT OPINES THAT THE USE OF "FORWARD-LOOKING PROJECTION" OF RISK-FREE RATES FOR USE IN A CAPM IS "UPWARDLY BIASED." DO YOU AGREE?

A. No. Both Mr. Keller and I use "forward-looking projection" of risk-free rates in our models and such use is consistent with Commission precedent. Conversely, I do not

believe the Commission has accepted Mr. Garrett's approach of using only a spot 30-day average to determine the risk-free rate. To date, in the 26 days following the end of Mr. Garrett's 30-day average period, Mr. Garrett's risk-free rate has **increased 25-basis points**. Further, as discussed previously, Mr. Garrett's cited CBOB publication projects the risk-free rate to average 3.5% over the 2021–2051 period, or **159-basis point higher** than Mr. Garrett's selected risk-free rate.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes, it does. However, I reserve the right to supplement my testimony as additional issues arise during this proceeding.

VERIFICATION

I, Harold Walker, III, hereby state that the facts set forth in my Rebuttal Testimony, Borough of Hanover Statement No. 5-R, at Docket No. R-2021-3026116, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Harold Walker, III

Dated: October 20, 2021

Supplement No. 32
to
Water-Pa. P.U.C. No. 3

BOROUGH OF HANOVER

HANOVER MUNICIPAL WATER WORKS

RATES, RULES AND REGULATIONS

GOVERNING THE DISTRIBUTION OF WATER

IN

THE TOWNSHIP OF PENN IN YORK COUNTY

AND

THE TOWNSHIP OF HEIDELBERG IN YORK COUNTY

AND

THE TOWNSHIP OF CONEWAGO IN ADAMS COUNTY

AND

THE BOROUGH OF McSHERRYSTOWN IN ADAMS COUNTY

PENNSYLVANIA

ISSUED: June 29, 2021 **EFFECTIVE: August 28, 2021**

BY: Nan Dunford, Borough Manager (C)
Borough of Hanover
Hanover Municipal Water Works
44 Frederick Street
Hanover, Pennsylvania 17331

NOTICE

THIS SUPPLEMENT MAKES INCREASES TO EXISTING RATES
(see Page No. 2)

LIST OF CHANGES MADE BY THIS SUPPLEMENT

This supplement makes increases to existing rates, except for Public Fire Protection, resulting in an increase in revenue of $1,563,100 for outside Borough customers or by 27.6%.

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List of Changes Made by This Supplement	2 Seventeenth Revised (C)
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Schedule of Meter Rates	4 Fourteenth Revised (C)
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Schedule of Fire Service Rates	6 Fourteenth Revised (C)
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Rules and Regulations:	
1. Definitions	8 – 9a Original
2. Filing, Posting and Effect	9b Original
3. Application for Service	9b-10 Original
4. Connections to Water Supply System	10 Original
5. Regulation of Supply	11 Original
6. Interruption, Discontinuance or Termination of Service	12 Third Revised 12a First Revised
7. Bills and penalties	12a-13a First Revised
8. Metered Service	14 Third Revised
9. Meter Installations	15 Third Revised
10. Fire Service	15 Third Revised
11. Extension of Mains	15 Third Revised
11. Extension of Mains	16-18 Original
11. Extension of Mains	19 First Revised
13-16. Water Conservation Contingency Plan	20-22 Original

(C) Indicates Change

Borough of Hanover Exhibit 1

SCHEDULE OF METER RATES

Application:

This schedule is applicable to all metered customers located outside the corporate limits of the Borough of Hanover.

Base Charges:

Size of Meter	Per Quarter
5/8″	$ 26.55
3/4″	36.72
1″	57.09
1-1/2″	108.12
2″	169.14
3″	362.64
4″	617.25
6″	1,279.26
8″	1,839.45

Consumption Charge

All consumption -

	Residential	Commercial/Public	Industrial	Large Industrial
Rate per 1,000 gallons	$5.6153 (I)	$4.7989 (I)	$4.6170(I)	$4.4312(I)

NOTE: A customer who wishes to have service discontinued temporarily shall give at least seven (7) days written notice to the Water Works, specifying the date on which service is to be discontinued temporarily. In the absence of proper notice, the customer shall be responsible for all service rendered until the time that the Water Works shall receive the specified written notice. The customer shall not turn water on or off at any curb stop, or disconnect or remove the meter, or permit its disconnection or removal, without the prior written consent of the Water Works. For services that are temporarily disconnected, the base charge will apply for the period of temporary disconnection.

(I) Indicates Increase

SCHEDULE OF FIRE SERVICE RATES

PRIVATE AND PUBLIC FIRE SERVICE

Standard Fire Hydrants:	Per Month	Per Quarter
For a standard private fire hydrant	$56.95 (I)	$170.85 (I)
For a standard public fire hydrant	$ 23.13	$ 69.39
Fire Sprinkler Service and Fire Hose Connections:		
For a Four (4) inch connection to the street main:	$19.61 (I)	$58.83 (I)
For a six (6) inch connection to the street main:	$56.95 (I)	$170.85 (I)
For an eight (8) inch connection to the street main:	$122.21 (I)	$366.63 (I)
For a ten (10) inch connection to the street main:	$218.27 (I)	$654.81 (I)
For a twelve (12) inch connection to the street main:	$278.73 (I)	$836.19 (I)

(I) Indicates Increase

June 29, 2021

NOTICE OF PROPOSED RATE CHANGES

TO OUR CUSTOMERS:

The Borough of Hanover is filing a request with the Pennsylvania Public Utility Commission (PUC) to increase your water rates as of August 28, 2021. This notice describes the Borough rate request, the PUC's role, and what actions you can take.

The Borough of Hanover has requested an overall rate increase of $1,563,100 per year. If the Borough's entire request is approved, the total bill for a residential customer using 11,000 gallons per quarter with a 5/8-inch meter would increase from $68.94 to $88.32 per quarter, or by 28.1%.

The total bill for a commercial customer using 37,000 gallons per quarter with a 5/8-inch meter would increase from $154.02 to $204.11 per quarter, or by 32.5%.

Rates for an industrial customer using 332,000 gallons per quarter with a 2-inch meter would increase from $1,366.66 to $1,701.98 per quarter, or by 24.5%.

To find out your customer class or how the requested increase may affect your water bill, contact the Borough of Hanover at (717) 637-3877. The rates requested by the Borough may be found in Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3. You may examine the material filed with the PUC which explains the requested increase and the reasons for it. A copy of this material is kept at the Borough of Hanover's office. Upon request, the Borough will send you the Statement of Reasons for Supplement No. 32 to Tariff Water-Pa. P.U.C. No. 3, explaining why the rate increase has been requested.

The state agency which approves rates for public utilities is the PUC. The PUC will examine the requested rate increase and can prevent existing rates from changing until it investigates and/or holds hearings on the request. The Borough must prove that the requested rates are reasonable. After examining the evidence, the PUC may grant all, some, or none of the request or may reduce existing rates.

The PUC may change the amount of the rate increase or decrease requested by the utility for each customer class. As a result, the rate charged to you may be different than the rate requested by the Borough and shown above.

There are three (3) ways to challenge the Borough's request to change its rates:

1. You can file a formal complaint. If you want a hearing before a judge, you must file a formal complaint. By filing a formal complaint, you assure yourself the opportunity to take part in hearings about the rate increase request. All complaints should be filed with the PUC before August 28, 2021. If no formal complaints are filed, the Commission may grant all, some, or none of the requests without holding a hearing before a judge.

2. You can send us a letter telling why you object to the requested rate increase. Sometimes there is information in the letters that makes us aware of problems with the Borough's service or management. This information can be helpful when we investigate the rate request.

   Send your letter or request for a formal complaint form to the Pennsylvania Public Utility Commission, P.O. Box 3265, Harrisburg, PA 17105-3265.

3. You can be a witness at a public input hearing. Public input hearings are held if the Commission opens an investigation of the Borough's rate increase request and if there is a large number of customers interested in the case. At these hearings, you have the opportunity present your views in person to the PUC judge hearing the case and the Borough representatives. All testimony given "under oath" becomes part of the official rate case record. These hearings are held in the service area of the Borough.

For more information, call the PUC at 1-800-692-7380. You may leave your name and address so you can be notified of any hearings that may be scheduled in this case.

BOROUGH OF HANOVER