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October 10, 2025

Via Electronic Filing
Matthew L. Homsher, Secretary
Pennsylvania Public Utility Commission
400 North Street
Harrisburg, PA 17120

Re: Petition of The Pittsburgh Water and Sewer Authority for Approval of its Lead Service Line Replacement Program; Docket No. P-2024-3046468

Dear Secretary Homsher:

On August 25, 2025, The Pittsburgh Water and Sewer Authority's ("Pittsburgh Water") filed its Amended Long-Term Infrastructure Improvement Plan ("LTIIP"), Lead Service Line Replacement Plan and pro forma tariff supplement, pursuant to the Pennsylvania Public Utility Commission's Order entered July 24, 2025 in the above-referenced proceeding.

Pittsburgh Water has since identified a clerical error in the amended LTIIP and is now filing a corrected Table of Contents (page 4), revised pages 22-23 and corrected cover page for Appendix C to the Amended LTIIP. This correction is necessary to be consistent with Paragraph 26 of the Joint Petition for Settlement, as approved by the Commission in its July 24, 2025 Order. The correction also clarifies that Appendix C incorporates Pittsburgh Water's LSLR Plan by reference.

Additionally, at the request of Commission Staff, Pittsburgh Water is filing a redline version of the Revised LTIIP (as corrected) and Appendix B.

Copies to be served in accordance with the attached Certificate of Service.

Sincerely,

Sarah C. Stoner

Sarah C. Stoner
Enclosure

cc: Cert. of Service (w/enc.)

CERTIFICATE OF SERVICE

I hereby certify that this day I served a copy of Pittsburgh Water's *corrected* amended LTIIP upon the persons listed below in the manner indicated in accordance with the requirements of 52 Pa. Code Section 1.54.

Via Email Only

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Sarah C. Stoner, Esq.

Dated: October 10, 2025

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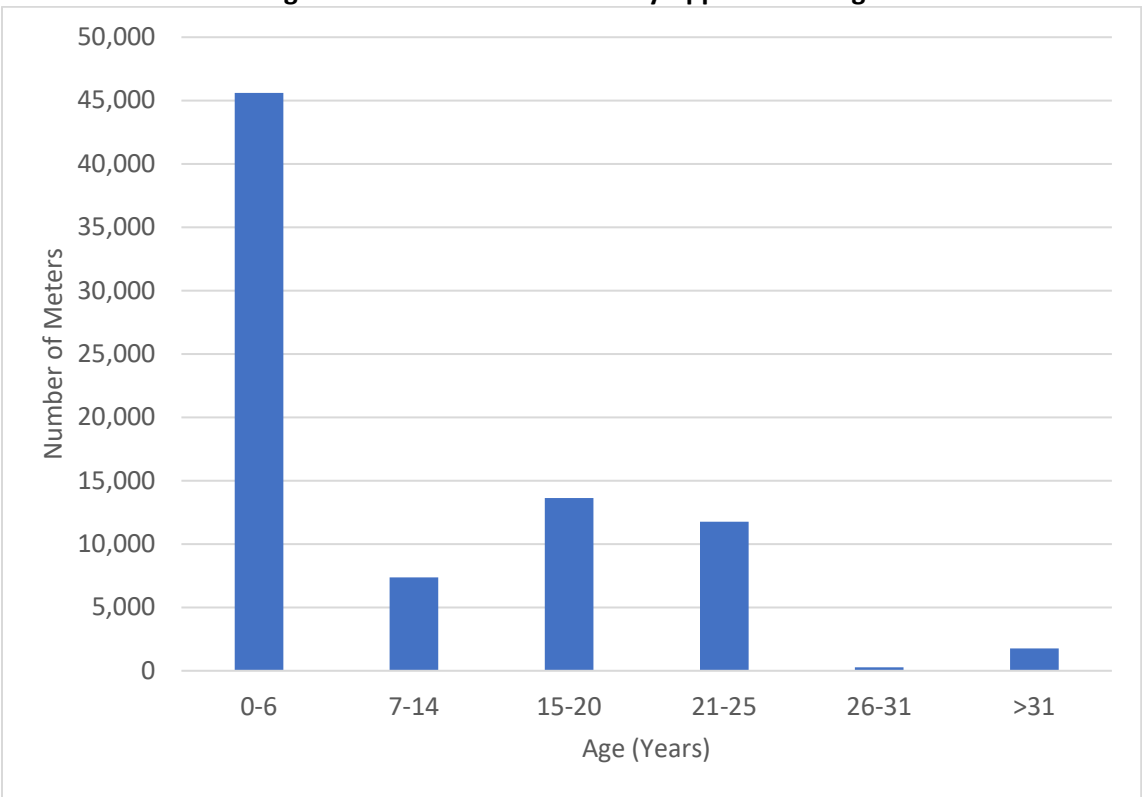
Figure 2-4: Number of Meters by Approximate Age



There are approximately 7,539 public fire hydrants in the system.

2.2 Lead Service Line Replacement Program

During the June 30 and December 31, 2016, and December 31, 2017 rounds of compliance sampling of water in the Authority's distribution system, the lead action level of 15 ppb as enumerated in 25 Pa. Code § 109.1101 was exceeded. The Authority's Lead Service Line Replacement (LSLR) Program was developed to address the requirements of the aforementioned code, an April 25, 2016 Pennsylvania Department of Environment (PADEP) Administrative Order, and a November 17, 2017 PADEP COA. The Authority was also directed to optimize corrosion control measures in the system to mitigate the release of lead in drinking water.

The LSLR Program has undergone significant review by the Commission as part of the compliance plan process and is set forth in Appendix C of PWSA's current LTIIP. The initial version of Appendix C was revised with the filing of PWSA's Amended LTIIP on April 27, 2020 pursuant to the Commission's March 26, 2020 Final Order addressing Stage 1 Compliance Plan issues. Following the March 26, 2020 Final Order, the Commission continued to review PWSA's proposed LSLR Program and directed additional revisions in its February 2, 2021 Order regarding the Stage 1 Compliance Plan issues. Accordingly, on April 1, 2021, PWSA filed an updated amended Appendix C pursuant to the directives of the February 2, 2021 Order. Subsequently, PWSA established a Lead Service Line Replacement Program Plan pursuant to the PUC's LSLR regulations. Pittsburgh Water filed its current Lead Service Line Replacement Program Plan on August 25, 2025, pursuant to the PUC's July 24, 2025 Order in PWSA's LSLR Program proceeding at Docket No. P-2024-3046468, and corrections to this Amended LTIIP were subsequently filed in October 2025.

Part VI of PWSA's Water Tariff incorporates PWSA's Lead Service Line Remediation program. These tariff provisions have been revised consistent with the PUC's July 24, 2025 Order at Docket No. P-2024-3046468. PWSA's LSLR Plan is no longer included in Appendix C herein, consistent with the settlement as approved by the PUC's July 24, 2025 Order at Docket No. P-2024-3046468. However, PWSA's current LSLR Plan is incorporated herein by reference.

2.2.1 Lead Service Line Replacement Program Plan

PWSA's current goal is to complete the replacement of all residential lead service lines in its system by the end of 2027 and to remove and replace all lead service lines, whether PWSA-owned or customer-owned, within its water distribution system as required by the PUC's regulations at 52 Pa. Code § 65.53, the applicable Environmental Protection Agency regulations, and in accordance with the Lead Service Line Replacement Program Plan ("LSLR") approved at Docket Number P-2024-3046468. As discussed further herein, PWSA will use funding from the Commission approved Distribution System Infrastructure Improvement Charge ("DSIC") to recover the costs of replacing lead service lines. Lead service lines not replaced using DSIC funds will be funded by revenue bonds or external funding, such as PENNVEST low-interest loans and grants.

PWSA has maintained a comprehensive lead section of its website since 2018. The website (https://www.pgh2o.com/your-water/lead-information) includes the following:

- A GIS-based webmap showing project locations and service line materials for all customer locations in our water service area. Customers can search on any address in our water system and learn what information we have regarding their service line materials. The information on the webmap is updated on a monthly basis with information PWSA is developing concerning the service line material inventory.
- General information about the use of orthophosphate for corrosion control at PWSA.
- Information about lead in general and specifically lead service lines, including Frequently Asked Questions.
- Links to PWSA's customer request lead sampling program to order a test kit and how to get a free filter if your lead results are elevated (> 10.0 ppb).
- Sample results from PWSA Customer Request Program and LCR Compliance Testing Program. These results are updated every six months for the customer request program, and within 60 days of the completion of each compliance sampling event.
- Details and descriptions of the PWSA Line Replacement Reimbursement Program that provides an income-based reimbursement for customers electing to proactively replace their own private LSL.
- Information and resources on health risks associated with lead and lead service lines.
- Meeting minutes of the CLRAC, which meets quarterly.

2.2.2 Inventory of Lead Service Lines

A comprehensive discussion of PWSA's service line inventory is discussed in Section 2 of PWSA's LSLR Program Plan. As discussed therein, PWSA started developing a service line inventory in 2016. Its inventory efforts have evolved and continue to evolve since then to conform to changing regulations, guidance and developing technology. PWSA submitted an updated service line inventory to PADEP on October 16, 2024 pursuant to the requirements of 40 C.F.R. § 141.80.

APPENDIX C

(Removed)

PITTSBURGH WATER & SEWER AUTHORITY

5-YEAR
LONG-TERM INFRASTRUCTURE
IMPROVEMENT PLAN
Combined Water and Wastewater
For the Period of
January 1, 2023 through December 31, 2027

October 6, 2022

As revised August 25, 2025, pursuant to 52 Pa. Code §§ 65.51-65.52 and consistent with the LSLR Plan Filed at Docket No. P-2024-3046468

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LIST OF ACRONYMS & ABBREVIATIONS

AACE	Association for the Advancement of Cost Engineering
AAOP	Annual Asset Optimization Plan
ACHD	Allegheny County Health Department
ACO	Administrative Consent Order
AL	Lead & Copper Rule Action Limit
ALCOSAN	Allegheny County Sanitary Authority
Authority	The Pittsburgh Water and Sewer Authority (also, PWSA)
BBP	Blood Borne Pathogens
BMP	Best Management Practice
BODR	Basis Of Design Report
CCTV	Closed Circuit Television
Ch.	Chapter
CIP	Capital Improvement Plan; also, Capital Improvement Program
CIPP	Cured-in-place Pipe
City	The City of Pittsburgh
CMI	Compliance Management International
CMMS	Computer Monitoring Maintenance System
CMP	Corrugated Metal Pipe
CoF	Consequence of Failure
COA	Consent Order and Agreement
Commission	Public Utilities Commission
CSO	Combined Sewer Overflow
DOMI	Department Of Mobility and Infrastructure of the City of Pittsburgh
DSIC	Distribution System Improvement Charge
EOC	Equal Opportunity Contract
FIO	Final Implementation Order
FY	Fiscal Year
GI	Green Infrastructure
GIS	Geographic Information System

LIST OF ACRONYMS & ABBREVIATIONS

gpm	Gallons Per Minute
HDP	High Density Polyethylene
IDIQ	Indefinite Delivery/Indefinite Quantity
JSA	Job Safety Analysis
LF	Linear Feet
LOS	Level Of Service
LSL	Lead Service Lines
LSLR	Lead Service Line Replacement
LTIIP	Long Term Infrastructure Improvement Plan
MBE	Minority owned Business Enterprise
MOU	Memorandum of Understanding
MGD	Million Gallons per Day
mg/L	Milligrams per Liter
NASSCO	National Association of Sewer Service Companies
NMCs	Nine Minimum Control Measures
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety & Health Act
P3	Public Private Partnership
PA (or Pa)	Pennsylvania
PACP	Pipeline Assessment Certification Program
PADEP	Pennsylvania Department of Environmental Protection
PAYGO	Pay As You Go
PAWC	Pennsylvania American Water Company
PCCP	Pre-stressed Concrete Cylinder Pipe
PennDOT	Pennsylvania Department of Transportation
PENNVEST	Pennsylvania Infrastructure Investment Authority
PMP	Project Management Policies
PPA	PWSA Project Audit
ppb	Parts Per Billion
PPE	Personal Protective Equipment

LIST OF ACRONYMS & ABBREVIATIONS

psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
PWS	Public Water Suppliers
PWSA	Pittsburgh Water & Sewer Authority (also, Authority)
RCP	Reinforced Concrete Pipe
RFP	Request For Proposal
ROW	Right Of Way
SDWMR	Small Diameter Water Main Replacement
SIP	Safety Improvement Plan
SME	Subject Material Expert
SOW	Scope of Work
SRS	Source Reduction Study
SSO	Sanitary Sewer Overflow
TDH	Total Dynamic Head
TIO	Tentative Implementation Order
TM	Technical Design Memorandum
USEPA	United States Environmental Protection Agency
VCP	Vitrified Clay Pipe
WBE	Women-owned Business Enterprise
WIFIA	Water Infrastructure Finance and Innovation Act of 2014
WWTF	Wastewater Treatment Facility

1 INTRODUCTION

1.1 Regulatory Background

1.1.1 Overview

On December 21, 2017, Pennsylvania Governor Wolf signed Act 65 of 2017 (Act 65) into law amending the Pennsylvania (PA or Pa) Public Utility Code which, among other things, added a new Chapter 32 (Sections 3201 – 3209) addressing the Public Utility Commission's (Commission) jurisdiction over the provision of utility water, wastewater, and stormwater service by entities created by Pennsylvania cities of the second class under the Municipality Authorities Act. As the City of Pittsburgh (City) is the only city of the second class in the Commonwealth, the Commission now has jurisdiction over the Pittsburgh Water and Sewer Authority (Authority). The Authority is the first municipal authority to be regulated by the Commission. Act 65 directed the Authority to file a long-term infrastructure improvement plan (LTIIP) with its Compliance Plan. 66 Pa. C.S. § 3204(a). Pursuant to 66 Pa. C. S 1352(a) of the Public Utility Code, a Commission approved LTIIP is necessary to permit water and wastewater utilities to establish a distribution system improvement charge ("DSIC") to recover reasonable and prudent costs incurred to repair, improve, or replace certain eligible distribution property that is part of the utility's distribution system.

On September 28, 2018, PWSA filed its combined LTIIP along with its proposed Compliance Plan.[1] PWSA's LTIIP was included in the litigation of Stage 1 of PWSA's Compliance Plan and the Commission approved a Partial Settlement of Stage 1 issues which included amendments to the initially filed LTIIP on March 26, 2020.[2] As directed by the Commission, the Authority filed an Amended LTIIP on April 27, 2020 which the Commission ultimately approved by Orders entered on August 27, 2020 at Docket Nos. P-2018-3005037 (water) and P-2018-3005039 (wastewater).

PWSA did not include a request for approval of a DSIC in its initial rate case filed in July 2018 prior to the filing of its LTIIP but did seek approval for a DSIC in its second rate case filed on March 6, 2020. The Commission approved a full settlement of the second rate case by order entered December 3, 2020 and, with its tariffs effective January 14, 2021, PWSA began assessing a 5% DSIC to water and wastewater customers. Subsequently, PWSA has filed all required DSIC and LTIIP reports.

On February 25, 2022, PWSA filed its first required Annual Asset Optimization Plan (AAOP) for its water and wastewater operations pursuant to 52 Pa. Code § 121.6. By Secretarial Letters dated May 27, 2022, the Commission rejected PWSA's AAOP based, *inter alia*, on its conclusions that there was an extreme variance in actual versus proposed LTIIP expenditures and changes in DSIC-eligible property replacement

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1 In its Final Implementation Order, the Commission accorded PWSA the discretion to file a unified LTIIP so long as it segregated discrete services and operations as they exist at the time of the filing. *Implementation of Chapter 32 of the Public Utility Code Regarding Pittsburgh Water and Sewer Authority*, Docket Nos. M-2018-2640802 (water) and M-2018-2640803 (wastewater), Final Implementation Order entered March 15, 2018 at 43 (*"Final Implementation Order*").

2 *Implementation of Chapter 32 of the Public Utility Code Regarding Pittsburgh Water and Sewer Authority – Stage 1*, Docket Nos. M-2018-2640802 (water) and M-2018-2640803 (wastewater), Opinion and Order entered March 26, 2020 ("*March 2020 Stage 1 Order*")

making it impossible for staff to determine the efficacy of PWSA's LTIIP.[3] Thus, PWSA was directed to either file a petition for modification of its LTIIP or file a new LTIIP that supersedes and replaces the

remaining term of the existing LTIIP.

In response, PWSA has elected to file this second combined LTIIP to cover the period of time from January 1, 2023 through December 31, 2027 to supersede the currently approved LTIIPs. PWSA's LTIIP, documents a multiyear investment program which is limited to the eligible projects which may be funded through revenue collected from customers through the DISC. Note that PWSA has other capital investment needs for the water supply system and wastewater collection system that are not LTIIP eligible.

LTIIP requirements are identified in 52 Pa Code §121.3 as follows:

1. Identification of types and age of eligible property owned and operated by the utility;
2. An initial schedule for planned repair and replacement of eligible property;
3. A general description of location of eligible property;
4. A reasonable estimate of quantity of eligible property to be improved or repaired;
5. Projected annual expenditures and means to finance the expenditures;
6. A description of the manner by which infrastructure replacements will be accelerated and how repair, improvement or replacement will ensure and maintain adequate, efficient, safe, reliable and reasonable service to customers;
7. A workforce management and training program designed to ensure that the utility will have access to a qualified workforce to perform work in a cost-effective, safe and reliable manner; and
8. A description of the utility's outreach and coordination activities with other utilities, Department of Transportation and local governments regarding the planned maintenance/construction projects and roadways that may be impacted by the LTIIP.

To the extent Item #5 contemplates identification of the specific financing source to be used for specific expenditures, PWSA has not included such level of detail here because PWSA will utilize funds available from a number of available funding resources based on which one provides the most value for ratepayers. These funding sources include ratepayer revenue received through base rates and the Commission-approved DSIC, revenue bonds, a capital line of credit, pay-as-you-go (PAYGO) funding, and PennVest low interest loans and grants. The timing of funding sources beyond ratepayer revenue, such as revenue bonds and PennVest loans and grants is unknown and, therefore, PWSA relies on flexibility to determine the best funding source to use for a particular expenditure when it is incurred.

LTIIP "Eligible property" is defined in the code as property that is part of a distribution system and eligible for repair, improvement and replacement as defined in 66 PA C.S. § 1351, as follows:

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[3] *See* Secretarial Letters dated May 27, 2022 at Docket Nos. M-2022-3031146 (water) and M-2022-3031147 (wastewater).

"(3) For water utilities, eligible property shall include:

(i) Utility service lines, meters and hydrants installed as in-kind replacements for customers.

(ii) Mains and valves installed as replacements for existing facilities that have worn out, are in

deteriorated condition or are required to be upgraded to meet under 52 PA Code Ch. 65 (relating to water service).

(iii) Main extensions installed to eliminate dead ends and to implement solutions to regional water supply problems that present a significant health and safety concern for customers currently receiving service from the water utility.

(iv) Main cleaning and relining projects.

(v) Unreimbursed costs related to highway relocation projects where a water utility must relocate its facilities.

(vi) Other related capitalized costs."

And,

"(4) For wastewater utilities, eligible property shall include:

(i) Collection sewers, collecting mains and service laterals, including sewer taps, curb stops and lateral cleanouts installed as in-kind replacements for customers.

(ii) Collection mains and valves for gravity and pressure systems and related facilities such as manholes, grinder pumps, air and vacuum release chambers, cleanouts, main line flow meters, valve vaults and lift stations installed as replacements or upgrades for existing facilities that have worn out, are in deteriorated condition or are required to be upgraded by law, regulation or order.

(iii) Collection main extensions installed to implement solutions to wastewater problems that present a significant health and safety concern for customers currently receiving service from the wastewater utility.

(iv) Collection main rehabilitation including inflow and infiltration projects.

(v) Unreimbursed costs related to highway relocation projects where a wastewater utility must relocate its facilities.

(vi) Other related capitalized costs."

In general, "vertical" assets such as treatment plants, storage facilities, pump stations, etc. are not considered eligible property under the DSIC program. For the purposes of this LTIIP, the term "sewers" refers to the sewers under the responsibility of the Authority which include separate sanitary sewers and "combined sewers" which convey sanitary sewage and precipitation diverted to the sewer system.

1.1.2 PUC LTIIP Requirements

Further guidance regarding PWSA's LTIIP was provided by the PUC in its initial implementation orders when PWSA first became subjected to the Commission's jurisdiction. Specifically, in its Tentative Implementation Order,[4] the Commission requested that PWSA provide the following information in its LTIIP:

- Details on how the Authority intends to replace or upgrade targeted eligible property, how aging infrastructure replacement will be accelerated, and how that activity will improve reliability and safety;
- Any metrics that the Authority uses to trace and evaluate the effectiveness of

infrastructure improvements, e.g., lost or unaccounted for water, main breaks, or non-revenue water;

- Detail on how the programs and property eligible for LTIIP consideration were determined and targeted, e.g., a risk-based approach, age, material type, lost or unaccounted for water, non-revenue water, regulatory directive, or audit findings.
- A schedule for eligible property repair and replacement by class and category for each year the LTIIP will remain in effect;
- A projection of annual capital expenses to ensure that the LTIIP is cost-effective;
- A description of its workforce management and training program; and,
- A description of any outreach and coordination with other utilities, Pennsylvania Department of Transportation (PennDOT), and local governments on planned maintenance or construction projects.

In addition to the LTIIP, the TIO states that the Commission will request that the Authority provide it with an Annual Asset Optimization Plan (AAOP) which will include expenditure information for completed LTIIP work for the reporting year and the projected year. Pursuant to PUC Regulations, PWSA's AAOP will be filed annually with the Commission 60 days after the 12 months of its LTIIP has expired.

This combined LTIIP reflects asset and project data for water system distribution services and sewer services separately. For the purpose of this LTIIP, the two major categories of infrastructure projects addressed are Water and Sewer.

1.2 Pittsburgh Water and Sewer Authority History and System Overview

The Authority was formed by the City to oversee a significant capital improvement program focused on the City of Pittsburgh water treatment and distribution systems to meet various requirements mandated by Federal and State regulations pertaining to safe drinking water. The Authority was formed under the provisions of the Pennsylvania Municipality Authorities Act, 53 Pa. C.S.A. §5601 et. seq. The Authority's Articles of Incorporation were originally filed on February 17, 1984, with the Department of State of the Commonwealth of Pennsylvania. Pursuant to a Lease and Management Agreement dated March 29, 1984, between the Authority and the City, the water and sewer system was leased to the

[4] *Implementation of Chapter 32 of the Public Utility Code Regarding Pittsburgh Water and Sewer Authority*, Docket Nos. M-2018-2640802 (water) and M-2018-2640803 (wastewater), Tentative Implementation Order entered January 18, 2018 at 19-22 (*"TIO"*).

Authority. Under the Lease and Management Agreement, the Authority was authorized to operate and maintain the water and sewer systems, construct all necessary improvements, establish and collect rates and charges for its service, and finance its operations and improvements through revenue collections and sale of bonds and notes payable solely from the Authority's revenues. The Authority appointed and designated the City as the Authority's agent to manage, operate, and maintain the water and sewer systems for the term of the lease, subject to the general supervision, direction, and the control of the Authority. The City provided the services necessary to operate the water and sewer systems to the Authority with the Authority reimbursing the City for all expenses actually incurred and expended by the City.

The Capital Lease Agreement and Cooperation Agreement, each between the Authority and City, as authorized in Resolution No. 47 of 1995, terminated the aforementioned Lease and Management Agreement. The Cooperation Agreement provided that the City render certain services to the Authority as set forth in the agreement and provided the basis of payment for such services to be rendered by the City. As of January 1, 1995, all positions in the City Water Department and certain positions in the Water and Sewer Division of the Department of Engineering and Construction were eliminated from the City's budget and similar positions were created and filled by the Authority. The Authority absorbed the existing City water department staff at that time and became the sole operator of the sewer system in 1999.

In 2008, tan Amendment to the Articles of Incorporation was filed as adopted by the City and the Authority, which extended its term of existence to 2045 in order to ensure that its term covers the duration of certain bond obligations. Again, in 2020, an amendment to the Article of Incorporation was filed with the Department of State which, as adopted by the City and the Authority, further extended its term of existence to March 19, 2070.

Under the terms of the Capital Lease Agreement, the Authority will own the water and sewer systems on September 1, 2025 upon payment of $1.00. In the future, the Authority plans to negotiate a Memorandum of Agreement (MOA) for management of stormwater system assets in the City.

1.2.1 Water System Overview

The Authority, through its water supply and distribution system, provides water service to more than 300,000 people throughout the City and surrounding areas (see Figure 1-1: Water System Overview in Appendix A), which is estimated to swell to over 500,000 persons including the business workforce during working hours. The system consists of a 100 million gallons per day (MGD) rapid sand type water treatment plant, one 20.8 MGD microfiltration water treatment plant, approximately 962 miles of mains, 26,388 valves (isolation and hydrant), and 7,539 fire hydrants (not including private hydrants), one raw water pump station located along the Allegheny River, two finished water pump stations, eight distribution pump stations, three covered finished water reservoirs, one uncovered source water reservoir, and ten distribution storage tanks/reservoirs. The total storage capacity of the reservoirs and the tanks is approximately 455 million gallons when fully operational. The useable storage capacity within the reservoir and tank system provides adequate volume and pressure and is sufficient to provide storage equivalent to approximately two days of normal water usage, at 65 to about 70 mgd. The average and maximum day filtered water production is shown in Table 1-1.

Table 1-1: Average and Maximum -Filter Water Production (Million Gallons per Day)

Year	Average	Maximum
2018	70.4	91.2
2019	70.4	86.2
2020	66.7	81.3
2021	67.2	83.8

Source: PWSA Environmental Compliance Department

The sole source of water for the water system is the Allegheny River. The Pennsylvania Department of Environmental Resources, now the Department of Environmental Protection (PADEP), issued a 50-year Water Allocation Permit to the Authority in March 1989, which allows for water withdrawal of up to 100 MGD from the river. The PADEP has advised the Authority that the permitted allocation would be re-evaluated in the future if the Authority's demand increases as a result of growth within the City or

through the sale of water to surrounding municipalities.

The Authority's water system currently has over 80,000 service line connections from residential, commercial, industrial, and public customers for potable water and water for fire protection within the geographic boundaries of the City.

In addition to providing water to the City of Pittsburgh, the Authority also owns and operates the water system for the City of Millvale and provides bulk water to the towns of Reserve and Fox Chapel. In addition, through interconnections with other systems, the Authority provides water for supply and/or emergency use to several adjacent municipalities: Blawnox, portions of the Pennsylvania American Water Company (PAWC) system, and intermittent provisions to a number of other neighboring communities.

The PAWC supplies water to approximately 27,000 customers in the southern and western sections of the City (the Authority provides sewer conveyance to these customers).

Two additional small areas, one in the eastern part and the other in the western end of the City, are served by the Wilkinsburg-Penn Joint Water Authority and the West View Water Authority, respectively. In each of these areas, the distribution system elements (waterlines, valves, hydrants, etc.) are owned and maintained by the respective independent water purveyor.

In April 2016, the Authority received an Administrative Order from PADEP for violations under the Pennsylvania Safe Drinking Water Act and regulations related to a modification of corrosion control treatment chemical in 2014. The Authority reinstituted the original corrosion control chemical in early 2016 and is fully cooperating with PADEP and the components of the Order. The Authority began a corrosion control study in 2017 to further improve lead and copper corrosion control, which ultimately became a regulatory mandate documented in a November 2017 Amended Consent Order (ACO). The study recommended an Orthophosphate treatment system which was installed and became operational in April 2019. The lead abatement issue is discussed in more detail in Section 2 of this LTIIP.

1.2.2 Sewer System Overview

The Authority's sewer collection system is comprised of a network of approximately 1,237 miles of sanitary, storm, overflow, and combined sewers (see Figure 1-2: Sewer System Overview in Appendix A). The system includes 29,797 manholes (which includes flow dividers and diversion chambers), 24,896 inlets (which includes catch basins and storm inlets), 35 solely owned combined sewer overflow (CSO) outfalls, 203 storm sewer outfalls, four wastewater pump stations, and ancillary facilities. Approximately 72% of the sewer system is combined sewers, designed so that during wet weather events, a portion of the collected stormwater and diluted wastewater that exceeds the Allegheny County Sanitary Authority (ALCOSAN) conveyance and treatment capacity is discharged into natural watercourses through 100 active CSO diversion chambers. Approximately 23% of the sewer system consists of separate sewers that are dedicated separate sanitary and storm sewer pipelines. The Authority's combined sewer system conveys wastewater collected from 24 neighboring suburban municipalities and sewage generated within the City boundaries to the ALCOSAN interceptors. These conveyance pipes are located along the rivers and tributaries which deliver the flow to ALCOSAN's wastewater treatment facility (WWTF) for treatment prior to discharge into the Ohio River. The ALCOSAN WWTF is operating under the National Pollutant Discharge Elimination System (NPDES) under Permit No. 0025984. In total, the ALCOSAN WWTF receives wastewater flows from 83 municipalities and authorities.

The 24 neighboring municipalities' sewer system connections were established pursuant to agreements with the City to convey their wastewater to the ALCOSAN WWTF. Many of these municipal agreements date back to the early 20th Century and do not provide for cost sharing of sewer system maintenance and reconstruction. Neither the City of Pittsburgh nor the PWSA have imposed any of these agreements' conditions relative to payments for sewer system maintenance, reconstruction, or repair.

The sewer system has adequate capacity to convey dry weather wastewater flows; however, during wet weather events, the PWSA sewerage conveyance system often exceeds its capacity and the capacity of the ALCOSAN conveyance system, which results in overflows, bypassing, and flooding.

In 1994, the United States Environmental Protection Agency (USEPA) adopted regulations regarding overflows from combined sewer outfalls during events that result in the discharge of untreated sanitary sewage into receiving waters. The USEPA regulations require owners of any sewer system having CSOs to acquire NPDES discharge permits for each overflow site. In January 1997, the owners of these systems were required to implement the USEPA's "Nine Minimum Control Measures" (NMCs). The NMCs define the basic steps for maintaining the combined sewer system in proper operational order and identifying potential areas requiring updates and repairs.

During dry weather conditions, the ALCOSAN interceptor system is designed to convey all wastewater flows from the City and surrounding municipalities to the ALCOSAN WWTF. ALCOSAN's interceptor system includes shallow-cut pipes, deep tunnels, and diversion structures. During wet weather conditions, the flow diversion structures, which are maintained by ALCOSAN, the Authority, and other municipalities, limit or "regulate" the amount of combined sewage that enters trunk sewers and ALCOSAN's interceptor system. In addition, there are regulator points in the sanitary sewer system that relieve or overflow untreated sewage (Sanitary Sewer Overflows or SSOs) to the nearest water body.

Administrative Consent Orders (ACOs) and Consent Order and Agreements (COAs) were issued in early 2004 to the City of Pittsburgh and the other 82 communities tributary to ALCOSAN. The Orders directed compliance with the Pennsylvania Clean Streams Law of 1937 and the Federal Clean Water Act, to eliminate SSOs, and fulfill the Pennsylvania and USEPA CSO Policy obligations. The ACOs were issued to separate sewer communities by the Allegheny County Health Department (ACHD) and the COAs were issued to combined sewer communities by the PADEP. The initial COA among the Authority, the City of Pittsburgh, PADEP, and the ACHD was entered into on January 29, 2004, and later amended in July 2007. The original Orders required communities to complete the following activities:

- Assess and map the sewer collection system
- Clean and televise the sewer collection system
- Make critical repairs
- Conduct flow monitoring
- Develop a long-term wet weather control plan in conjunction with ALCOSAN

The 2004 Consent Order has expired but the PWSA began negotiations in 2021 for a new Consent Decree with the PADEP, the USEPA and the U.S. Department of Justice (DOJ) to require the PWSA to continue to address these issues. Negotiations are underway and will continue in 2023.

The Authority recognizes the importance of and continues to embrace partnerships with neighboring municipalities and other key stakeholders to strategically address reduction of CSO, SSO, surface

flooding, and basement sewage backups. Since CSO and SSO are hydraulically connected across the regional service area and storm inflows to the combined system are influenced beyond the City boundaries, partnerships with ALCOSAN during the implementation of their wet weather improvements program, with the connected municipalities, and with organizations such as the Watersheds of South Pittsburgh, will continue to create opportunities for significant source reduction and leverage capital investments to implement multi-problem focused solutions.

The majority of the Authority's sewers are combined. By virtue of these combined sewers and the broader mission of stormwater management within the Authority's service area, the Authority has been engaged in stormwater management since its formation in 1984. Historically, stormwater management services have been shared with the City of Pittsburgh because of the interconnected network of separate stormwater conveyances, combined sewers, street-related infrastructure like curbs and gutters, inlets, and natural channels.

Effective January 22, 2022, the Commission approved imposition of a new Stormwater fee to customers to recover some of the costs associated with stormwater management.[5] As a newly introduced fee, the fee was not designed to fully recover all costs related to stormwater. Rather, the rates for wastewater conveyance and the DSIC are designed to recover a significantly greater amount of the costs of stormwater. Despite all of this, drainage and infrastructure problems are numerous, with surface flooding and sewer system basement backups the most visible and vexing issues. The Authority is developing a plan to address these most significant stormwater issues, focused on these primary goals:

1. Evaluate, design, build and maintain projects that keep as much stormwater out of the sewer system as possible, so the existing infrastructure can carry flows most effectively and reduce sewer system basement backups and surface flooding.

[5] The Stormwater fee was approved as part of PWSA's rate case at Docket No. R-2021-3024779.

2. Review and modify existing local regulations and ordinances to establish development controls and mechanisms for dealing with these stormwater related problems.

1.3 The 2023-2027 Capital Improvement Plan

The Authority's overall 5-year Capital Improvement Plan (CIP) from 2023-2027 includes significant investments in the water, sewer, and stormwater systems to address aging infrastructure, improvements necessary to meet regulatory requirements, and improve infrastructure reliability and performance. These improvements go well beyond the defined "LTIIP" eligible project types defined earlier, but include essential water system improvements that mitigate primary risks of water system failure.

Water system renewal priorities within the CIP include improvements to the Aspinwall Water Treatment Plant, replacement or rehabilitation of the two major finished water pumping stations, upgrades of storage facilities; replacement of critical water transmission mains; continuation of the lead service line replacement program; and continuation of the small, intermediate, and large diameter water main replacement programs with an overall 5-year budget of approximately $1.2 billion.

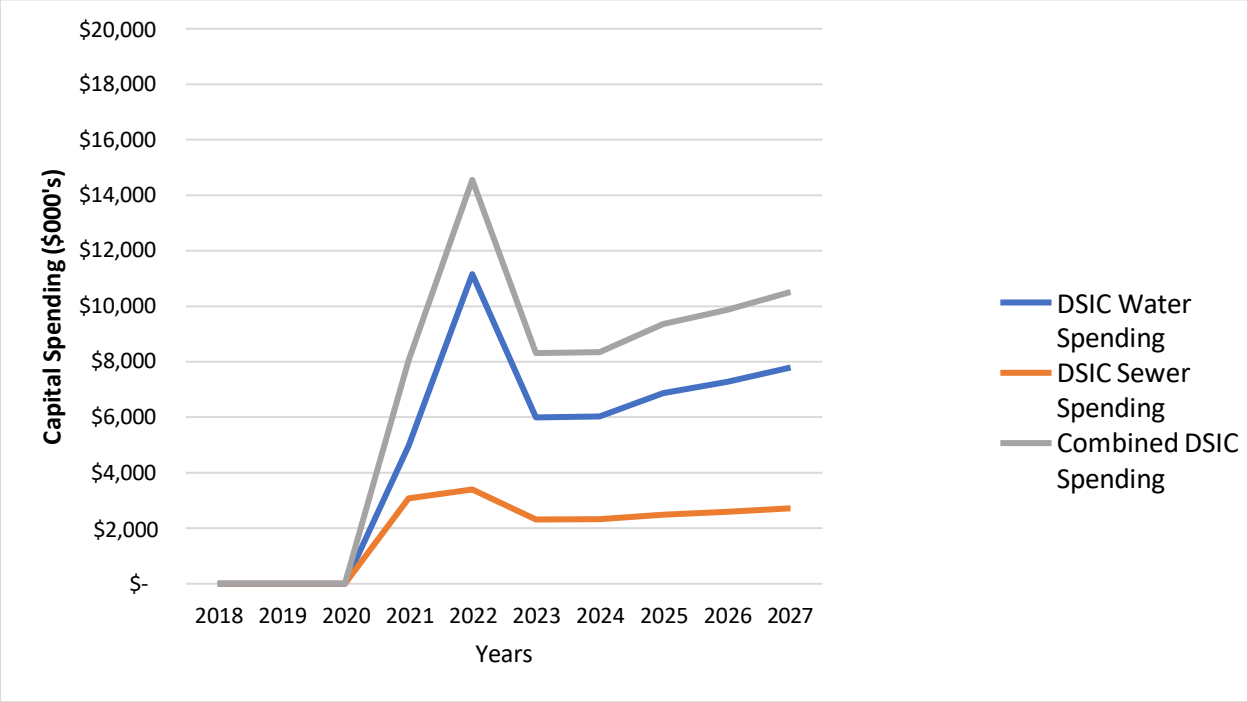
The wastewater system renewal priorities include relocation of sewers under structures to reduce failure (including consequential damages), risk of service disruption and improve performance; projects to remove stormwater inflows and groundwater infiltration from the existing sanitary sewer system;

and general sewer rehabilitation of the sewer system to improve the structural condition of the assets. The 5-year budget for these areas is approximately $210 million.

The CIP also includes stormwater system priorities as well. The highlights include stormwater projects such as the 4-Mile Run Stormwater Infrastructure Improvements Project; separated stormwater sewer upgrades including water quality management systems to reduce siltation and errant sewer connections; and stormwater water detention projects to help mitigate peak stormwater flow impacts on the combined sewer systems, to reduce CSO and SSO's. These stormwater impacts primarily include basement sewage backups and localized street flooding. Approximately $134 million has been allocated to address priority issues.

Figure 1-3 shows the historical levels of capital spending, dating back to 2021 for all projects and for eligible properties only, not including stormwater projects.

Figure 1-3 PWSA Capital Spending History for Eligible Property



1.4 Origination of this LTIIP

This LTIIP is organized to address two of the three categories of services and infrastructure systems provided and maintained by the Authority: water and sewers (sanitary and combined). The third category of service is stormwater, which will be addressed in a subsequent LTIIP if and when necessary. Items 1-6 of the LTIIP requirements in PA Code Chapter 121 §121.3 identified above are described for each category, followed by separate sections on cost-effectiveness and evaluation metrics, workforce management, training, and outreach activities.

Water and sewer system maps and other over-size figures referred to in this LTIIP are located in Appendix A and are noted as such in the text. Other figures are embedded in the text. In addition, the capital projects tables containing project descriptions, schedules, costs, and other information and other oversize tables are similarly noted and are located in Appendix B. Smaller tables are embedded in the text.

The Lead Service Line Replacement (LSLR) program is a significant part of the capital improvements being undertaken by the Authority over the next several years. This program is described in section 2.2 of this LTIIP.

2 WATER SYSTEM

2.1 General Description of Eligible Water System Property

The eligible property associated with the Authority's water supply and distribution system consists of approximately 962 miles of mains, 26,388 valves (isolation and hydrant), and 7,539 fire hydrants. According to past reports, the water pipes average more than 80 years old, with more than 40% installed prior to 1920, and 67% built prior to 1970. Upgrades to the water system have been primarily through the small diameter main replacement program (SDWMRP), which commenced in 2019. In addition, PWSA has entered into an aggressive lead service line replacement (LSLR) program.

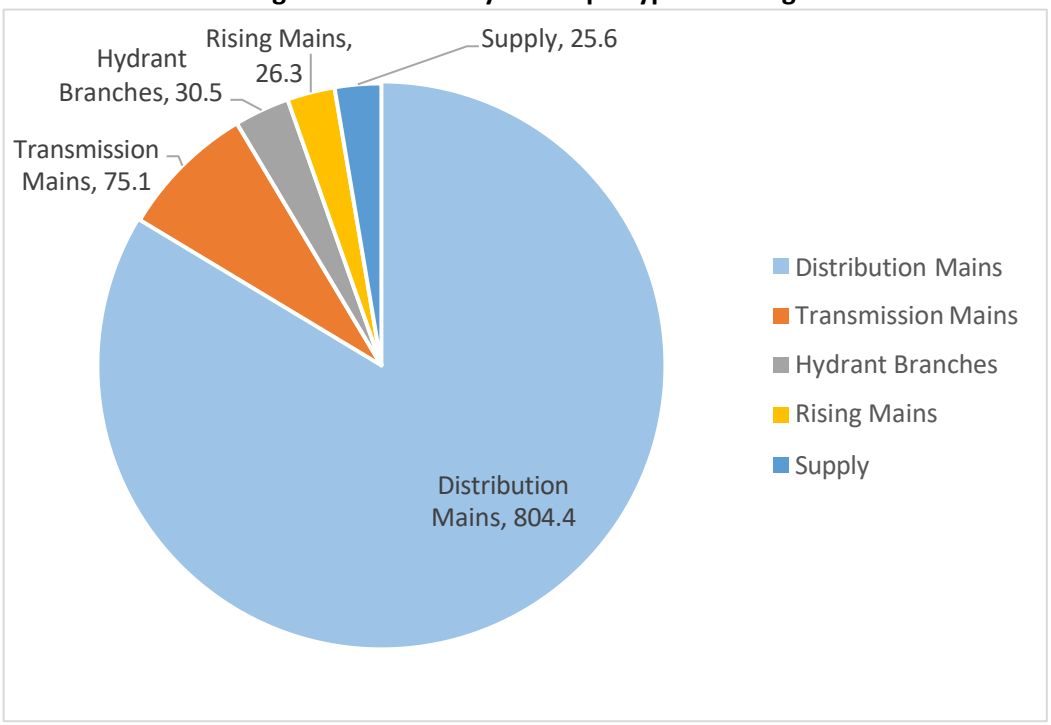
The Authority's Geographic Information System (GIS) database is being updated constantly, and not all eligible property is currently updated in the system. The data input into GIS is an on-going effort, and statistics change with the on-going system updates, reorganization of data, and updates to the features within the system. The Authority's objective is to ultimately expand the GIS to support a mobile workforce digital monitoring and reporting system. As one of the key systems for managing and tracking data within the Authority's water and sewer systems, the GIS will be the repository of critical data that can be used to manage day-to-day operations as well as a valuable tool for analyzing future capital improvement needs. In addition, a digital communication and work order tracking system, supplied by a third party vendor, known as SpryMobile has been implemented to serve all field operations (maintenance, repairs and upgrades) and ultimately all construction monitoring and systemwide facilities' data updates.

To round out PWSA's suite of management information systems improvements for depicting and tracking the water and sewer systems, a Digital Document Management system (Docuware) has been implemented as of 2020. This tool functions as a fully indexed and researchable archive of all PWSA system schematics, both historical and present. Along with GIS and SpryMobile, the Docuware system serves to provide PWSA engineering and operations staff with the most accurate and useful system records for planning system improvements, repairs, and long-term maintenance. Along with this tool PWSA has invested in a new records management team which works to maintain the physical and digital archive and streamline PWSA's general records management practices.

With these significant investments, PWSA has made considerable progress in improving its information management policies and strategies, and work will consolidate these improvements as a part of the LTIIP.

Figure 2-1, on the following page, shows the length of water lines identified by service type and diameters, a total length of 962 miles, of which almost 788 miles is constructed of small diameter pipes (defined as 12-inch diameter and smaller). Small diameter water main construction materials are primarily cast iron and ductile iron pipe. Large diameter water main materials of construction include cast iron, riveted steel, wrought iron, ductile iron, and small quantities of High-Density Polyethylene (HDPE) and Pre-stressed Concrete Cylinder Pipe (PCCP).

Figure 2-1: Water System Pipe Type and Length



Source: PWSA GIS Database September 2022

A project to review record info and populate water main material and installation date attribute information associated with each water main was started in 2021 and is nearly completed.

PWSA repaired 651 leaks in 2020, 603 leaks in 2021, and 440 in 2022 through September 22, 2022, and commonly occur within the small diameter water distribution pipes. Pipe breaks have recently been analyzed for the root cause, which appears to be caused primarily by one of three causes: (1) pipe metallic joint caulking materials used as a replacement for lead when scarcity occurred during the 1930's and 1940's, (2) use of steel slag materials for pipe bedding and general trench fill materials, and (3) general age and condition. The predominate mode of pipe failure has been shown to be related to corrosion of the external pipe surface as a result of the slag fill materials, which encourage cast iron, steel and ductile iron pipe pitting. The only successful methods of small diameter pipe restoration appear to be replacement, given their age and condition. The largest diameter pipe can often be structurally lined to restore the capacity and structural integrity of these key water transmission pipes.

Annual water loss statistics have consistently shown an elevated water loss rate, more than 50% of the produced water. This metric confirms the overall poor condition of the PWSA water mains. As mandated by the PUC Compliance Plan, PWSA has embarked on a continuous program of water leak detection. This program attempts to preempt resultant major water main breaks by identifying leak locations for immediate repair before a break occurs. Also, in accordance with the water main conditions exposed during the leak detection, specific water main replacement projects are identified and prioritized.

Water valve sizes range from 4 inches to 96 inches and include those shown in Table 2-1.

Table 2-1: Number of Water System Isolation Valves by Size

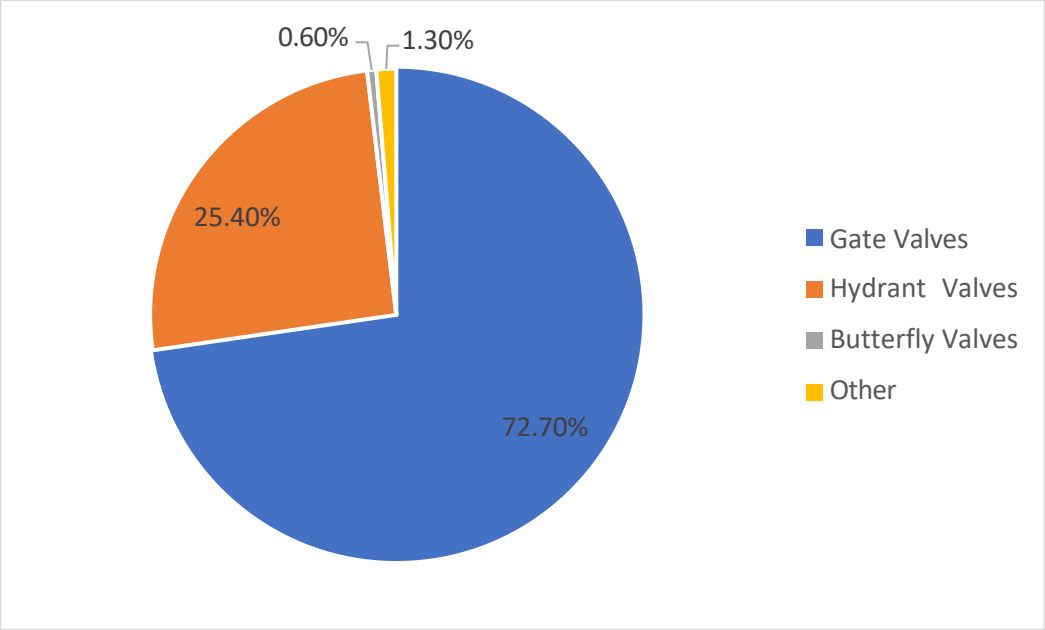
Size	Estimated Quantity		Size	Estimated Quantity
4"	491		30"	147
6"	7,828		36"	100

8”	6,477		42”	18
10”	301		42 ½"	6
12”	2,681		48”	61
14”	8		50”	4
15”	27		50 ¼"	2
16”	584		60”	10
18”	2		72”	3
20”	323		96”	1
24”	178		TOTAL	19,252

Source: PWSA GIS Database September 2022

Figure 2-2 identifies the types of valves in the system and their relative proportions.

Figure 2-2: Water Valves by Type



Source: PWSA GIS Database September 2022

Dividing pressure valves (currently closed) account for 475 of the valves shown in Figure 2-3. The “Other” valve category shown in the figure includes ball, cone, air control, check, pressure regulating, and vacuum release valves. Hydrant valves are typically gate valves.

The most recent systemwide valve assessment project was performed in 2010.

PWSA’s water system was believed to have over 400 water “washout” locations by which the water system can be drained for maintenance and repair. All of these locations were evaluated for potential connections that may be connected directly or indirectly to adjacent sewers or drains, which no longer comply with the design requirements. PWSA completed this evaluation prior to the September 1, 2020, Consent Order and Agreement (COA) deadline and determined that 141 of these “washout” connections did not exist or were previously removed; leaving 279 “washout” connections that are connected to a point of potential contamination. Based on the PADEP’s November 2017 COA mandate, PWSA has embarked on a plan that will eliminate these washout locations by the end of 2031. PWSA has already disconnected 10 washout locations and has another 25 planned within the next year.

The Authority's GIS database is currently being reviewed to: a) confirm locations where meters are installed; b) identify locations where meters should be added; and, c) confirm locations where a meter is legitimately absent (e.g., flat rate customer or no water service). The total meter tally is currently over 80,000 based upon the information in Figure 2-3.

Figure 2-3: Number and Type of Meter Connections

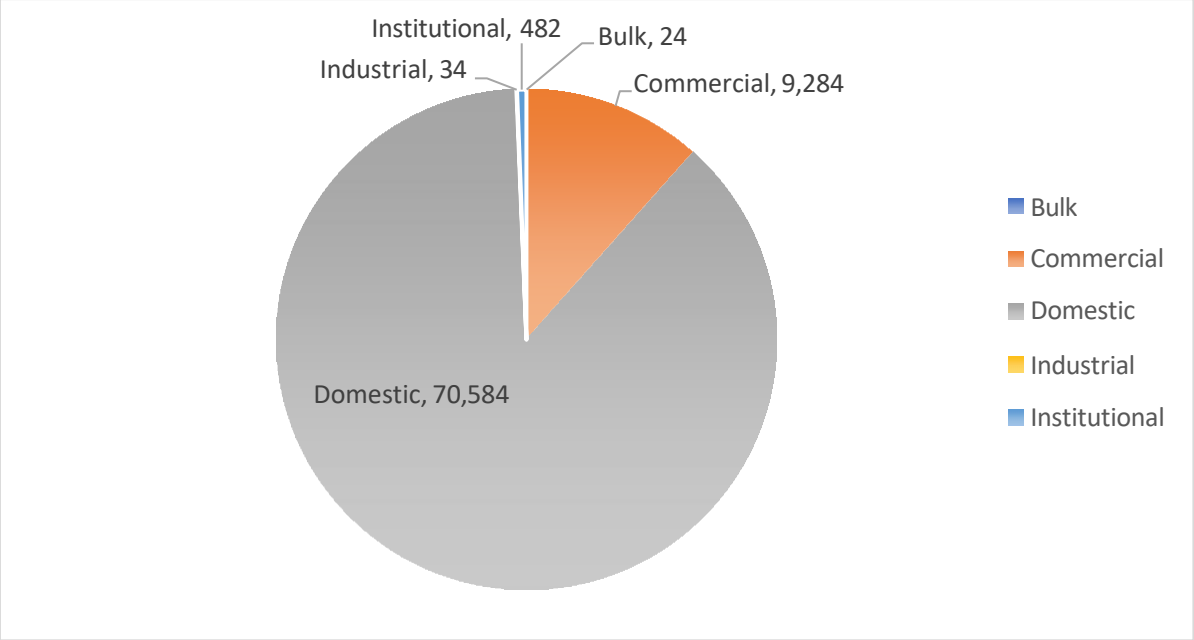
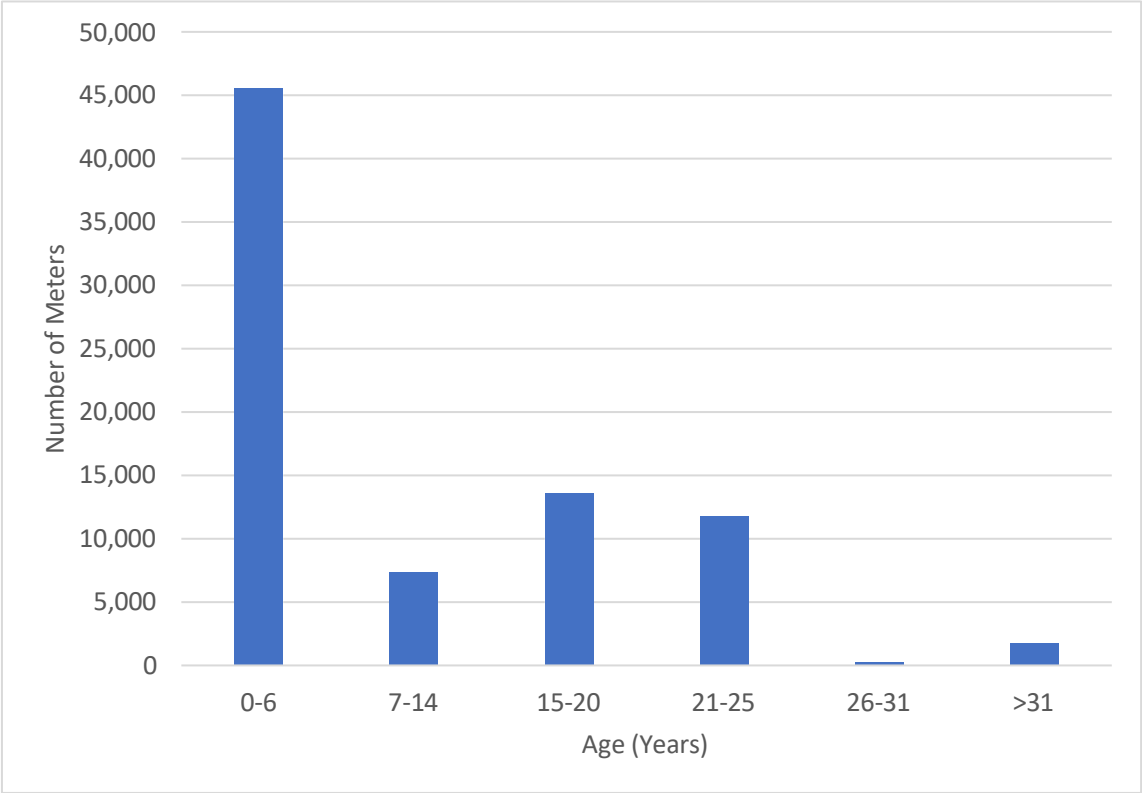


Figure 2-4, on the following page, shows the number of meters by approximate age.

Figure 2-4: Number of Meters by Approximate Age



There are approximately 7,539 public fire hydrants in the system.

2.2 Lead Service Line Replacement Program

During the June 30 and December 31, 2016, and December 31, 2017 rounds of compliance sampling of water in the Authority's distribution system, the lead action level of 15 ppb as enumerated in 25 Pa. Code § 109.1101 was exceeded. The Authority's Lead Service Line Replacement (LSLR) Program was developed to address the requirements of the aforementioned code, an April 25, 2016 Pennsylvania Department of Environment (PADEP) Administrative Order, and a November 17, 2017 PADEP COA. The Authority was also directed to optimize corrosion control measures in the system to mitigate the release of lead in drinking water.

The LSLR Program has undergone significant review by the Commission as part of the compliance plan process and is set forth in Appendix C of PWSA's current LTIIP. The initial version of Appendix C was revised with the filing of PWSA's Amended LTIIP on April 27, 2020 pursuant to the Commission's March 26, 2020 Final Order addressing Stage 1 Compliance Plan issues. Following the March 26, 2020 Final Order, the Commission continued to review PWSA's proposed LSLR Program and directed additional revisions in its February 2, 2021 Order regarding the Stage 1 Compliance Plan issues. Accordingly, on April 1, 2021, PWSA filed an updated amended Appendix C pursuant to the directives of the February 2, 2021 Order. ~~The April 1, 2021 version of Amended Appendix C is the current Commission approved Lead Infrastructure Plan.~~Subsequently, PWSA established a Lead Service Line Replacement Program Plan pursuant to the PUC's LSLR regulations. Pittsburgh Water filed its current Lead Service Line Replacement Program Plan on August 25, 2025, pursuant to the PUC's July 24, 2025 Order in PWSA's LSLR Program proceeding at Docket No. P-2024-3046468, and corrections to this Amended LTIIP were subsequently filed in October 2025.

Part VI of PWSA's Water Tariff incorporates PWSA's Lead Service Line Remediation program. These tariff provisions ~~were most recently~~have been revised ~~effective January 12, 2022 as part of PWSA's most recent~~

consistent with the PUC's July 24, 2025 Order ~~base rate proceeding~~ at Docket No. ~~R-2021-3024773.~~P-2024- 3046468. PWSA's LSLR Plan is no longer included in Appendix C ~~included~~ herein ~~has been updated to be~~, consistent with the ~~current Commission approved Tariff.~~settlement as approved by the PUC's July 24, 2025 Order at Docket No. P-2024-3046468. However, PWSA's current LSLR Plan is incorporated herein by reference.

2.2.1 Lead ~~Infrastructure~~Service Line Replacement Program Plan

~~PWSA's current goal is to complete the replacement of all public- and private-side lead service lines in its system by 2026. The objectives of the Program are to:~~

PWSA's current goal is to complete the replacement of all residential lead service lines in its system by the end of 2027 and to remove and replace all lead service lines, whether PWSA-owned or customer-owned, within its water distribution system as required by the PUC's regulations at 52 Pa. Code § 65.53, the applicable Environmental Protection Agency regulations, and in accordance with the Lead Service Line Replacement Program Plan ("LSLR") approved at Docket Number P-2024-3046468. As discussed further herein, PWSA will use funding from the Commission approved Distribution System Infrastructure Improvement Charge ("DSIC") to recover the costs of replacing lead service lines. Lead service lines not replaced using DSIC funds will be funded by revenue bonds or external funding, such as PENNVEST low-interest loans and grants.

PWSA has maintained a comprehensive lead section of its website since 2018. The website (https://www.pgh2o.com/your-water/lead-information) includes the following:

- A GIS-based webmap showing project locations and service line materials for all customer locations in our water service area. Customers can search on any address in our water system and learn what information we have regarding their service line materials. The information on the webmap is updated on a monthly basis with information PWSA is developing concerning the service line material inventory.
- General information about the use of orthophosphate for corrosion control at PWSA.
- ~~Reduce the amount of lead (and ultimately eliminate~~Information about lead in general and specifically lead service lines ~~entirely) in the Authority's water distribution system;~~, including Frequently Asked Questions.

  ~~• Mitigate lead exposure through water consumption for the customer as quickly as possible;~~

  ~~• Comply with state and federal regulations; and~~
- Links to PWSA's customer request lead sampling program to order a test kit and how to get a free filter if your lead results are elevated (> 10.0 ppb).
- Sample results from PWSA Customer Request Program and LCR Compliance Testing Program. These results are updated every six months for the customer request program, and within 60 days of the completion of each compliance sampling event.
- Details and descriptions of the PWSA Line Replacement Reimbursement Program that provides an income-based reimbursement for customers electing to proactively replace their own private LSL.

- ~~Prohibit partial~~Information and resources on health risks associated with lead and lead service ~~line replacements~~lines.

~~The Policy includes the replacement of public- and private-side lead service lines at any residence, of which PWSA is aware, where the replacement is operationally feasible. In the case of a private-side line, the owner must authorize the replacement by PWSA, replace the line in accordance with PWSA policy, or be subject to termination of water service.~~

- Meeting minutes of the CLRAC, which meets quarterly.

2.2.2 Inventory of Lead Service Lines

~~PWSA prepared a residential~~A comprehensive discussion of PWSA's service line inventory ~~and submitted it to PADEP in accordance with the COA in December 2020. Another update for all service lines is due and will be submitted by December 31, 2022. Since 2018 PWSA has maintained an on-line web map showing the status of all service line materials on our public-facing website. The inventory and web map are updated monthly as new information is gathered regarding service line materials.~~is discussed in Section 2 of PWSA's LSLR Program Plan. As discussed therein, PWSA started developing a service line inventory in 2016. Its inventory efforts have evolved and continue to evolve since then to conform to changing regulations, guidance and developing technology. PWSA submitted an updated service line inventory to PADEP on October 16, 2024 pursuant to the requirements of 40 C.F.R. § 141.80.

~~PWSA is closely evaluating the future requirements of the Lead and Copper Rule Revisions (LCRR) and worked with the United States Environmental Protection Agency (US EPA) as they developed their "Guidance for Developing and Maintaining a Service Line Inventory" (August 2022) and are following the development of PADEP's guidance as well.~~

2.2.3 Corrosion Control Program

In April 2016, the Authority initiated a Corrosion Control Study to determine the optimum ~~chemical~~corrosion control treatment strategy for reducing lead release due to corrosion of lead service lines and building plumbing. The study's goal was to identify an effective, immediate and minimal cost approach to achieve compliance with the lead action level. The approach was assessed to ensure that it did not otherwise adversely impact water quality in the distribution system. The study tested two corrosion inhibitors: orthophosphate and silicate. Each has advantages and disadvantages for water quality management, risks to sustained performance and cost-effectiveness. After study, orthophosphate was determined to be the best solution for the Authority.

The Authority completed the design of the appropriate corrosion control chemical feed storage and feed facilities for the water system, obtained all necessary permits and completed construction of the facilities in early 2019. Orthophosphate feed commenced in about one third of the water system in early April 2019, and in the entire water system by the end of April 2019.

Since the time of initial orthophosphate feed, the Authority has continued LCR Compliance Sampling in accordance with the schedule established by PADEP. The following are the results, presented in Table 2-2~~ on the following page~~, of the completed sampling events.

Table 2-2: LCR Compliance Sampling

Event	Dates	90th Percentile Lead Level (ppb)
2019b	July – December, 2019	10.0
2020a	January to June, 2020	5.1
~~2021b~~2021	July to December, 2021	~~7.7~~7.052
2022a	January to June, 2022	4.4
2022b	July to December, 2022	5.0
2023a	January to June, 2023	3.35
2023b	July to December, 2023	3.58

The Authority continues to monitor the application of orthophosphate across the distribution system and evaluate its effectiveness. The Authority is also closely monitoring the upcoming requirements of the LCRR to determine potential impacts on the corrosion control program.

Finally, the Authority continues to provide the Commission, and the CLRAC with quarterly updates regarding the progress of PWSA's orthophosphate program and the results of the lead level testing.

2.3 Water System Replacement and Prioritization Approach

The Authority is working to accelerate the replacement of small diameter water mains. In both 2018 and 2019, the Authority committed to replacing two miles of small diameter main per year. With approximately 788 miles of small diameter main in the system, this equated to 0.2% of the system per year. In the previous LTIIP, the Authority targeted to annually replace 1% of the system by 2024.

In addition to continuing to accelerate the replacement of small diameter water mains, PWSA has ~~committed to~~established a goal of replacing all remaining residential lead service lines by ~~2026~~2027. This is to be accomplished using a combination of Small Diameter Water Main Replacement (SDWMR) and Lead Service Line Replacement (LSLR) projects. In cases where service lines are replaced as part of a LSLR

project, the water main would typically need to be replaced later as part of a completely separate

project. However, this is not the preferred approach for several reasons: Tapping new service lines into older, brittle water mains can be difficult, and completing two separate projects is not as cost effective and is more disruptive to our customers.

~~Based on our proposed CIP, it was determined that we would be able to~~The Authority anticipates that it will replace ~~64~~56.7 miles of water mains by the end of 2026. ~~This led to an initiative to develop~~The Authority uses a GIS based web application that ~~would allow the Authority~~allows it to select which water mains to replace.

The developed web application prioritizes mains to be replaced utilizing three criteria: the potential number of lead service lines, low fire flow areas, and frequency of main breaks. It scores pipes on a formula that is based on these criteria, and projects are selected based on the scores.

Additionally, ~~a small~~an annual contract for the urgent replacement of water mains, valued at approximately $~~1 to 8~~
$~~2~~10 million a year is also part of the Program. The purpose of the Water Relay Program is to replace small areas, typically a block or less, where a water main replacement is needed urgently due to a failure to a pipeline with a highly compromised condition.

2.3.1 Small Diameter Water Main Replacement Program

The current SDWMR Program consists of the projects identified in Table 2-3, Table 2-4, and Table 2-5.

Table 2-3: Location and Quantities for 2021 SDWMR Program		
Neighborhood	Length (mi)	Estimated Qty. of Water Service Lines
2021 SDWMR - Contract B		
Central Lawrenceville	1.2	233
Central Oakland	1.4	235
Highland Park	1.5	167
Contract Total	4.1	635
2022 SDWMR - Contract C		
Point Breeze	0.6	76
Shadyside/Squirrel Hill	0.9	91
Hazelwood	0.9	92
Contract Total	2.4	259
Total	6.5	894

Table 2-4: Location and Quantities for 2022 SDWMR Program		
Neighborhood	Length (mi)	Estimated Qty. Of Water Service Lines
2021 SDWMR - Contract A		
Marshall-Shadeland	2.2	283
Spring Garden	1.3	169
North Side	0.2	23
Contract Total	4.4	475
2022 SDWMR - Contract A		
Brighton Heights	2.1	282
Squirrel Hill	1.8	315
Contract Total	3.8	597
2022 SDWMR - Contract B		
Elliott	1.4	276
Millvale	1.4	244
Stanton Heights	0.4	78
Point Breeze	1.3	118
Contract Total	4.5	716
Total	12.0	1,788

Table 2-5: Location and Quantities for 2023 SDWMR Program		
Neighborhood	Length (mi)	Estimated Qty. of Water Service Lines

Squirrel Hill	4.0	568
Point Breeze	0.6	106
Bloomfield	1.3	365
Total	5.9	1,039

2.3.2 Small Diameter Water Main Replacement Prioritization Program

As noted above, PWSA has developed a GIS based web application to assist in prioritizing mains to select for replacement. Previously, PWSA utilized a combination of factors, including six "Likelihood of Failure" criteria (pipe diameter, fire flow data, pipe break history, working pressure, frequency of potential lead service lines, and pipe age) and three "Consequences of Failure" criteria (water main location, traffic functional classification, and presence of critical facilities) to rank projects. This method was largely a manual process, whereby projects were identified and then scored by PWSA staff by entering scores into an Excel spreadsheet using the established criteria. This process was labor intensive and still involved subjective judgements in the scoring process. It was useful for scoring projects previously identified by staff, but could not practically be used to identify new projects.

Therefore, a GIS based web application was developed to score projects based on the same nine criteria. This was a step forward, but the way that it was implemented still required manual data entry to score pre-identified projects. Ultimately, staff needed a way to score pipe segments system-wide to select projects from the beginning rather than scoring predefined projects. The challenge was that the data was not entered into PWSA's GIS database in a way that could be reliably linked to individual pipe segments.

In 2022, primarily through the efforts of PWSA's GIS Department, data was compiled and associated with pipe segments to begin to develop a system-wide scoring system. This scoring system includes three criteria, which are further described in Table 2-6: Lead and Unknown Service Lines per Mile, Water Main Break Frequency, and Low Flow Fire Areas. All three of the criteria are linked to each pipe segment.

While this system does not include as many criteria as the previous scoring system, there was a consensus that these three criteria were both critical and were able to be linked to the pipe segments in a usable way. For example, while pipe diameter, pipe break history, working pressure, and pipe age can all be used as predictor of the likelihood of a potential break, the single greatest factor in predicting future main breaks is the history of past breaks on that same segment.

Table 2-6: Current Criteria for Prioritization of Small Diameter Water Main Replacement

Criteria	Source	Weighting
Lead and Unknown Service Lines per Mile	Historical service line records and verified data from recent service line replacement projects.	20%
Water Main Break Frequency	Internal reporting on water main repairs completed by PWSA Operations and Urgent Contracts. Existing water main break data was associated with the correct pipe segment in preparation of the GIS web application.	40%
Low Fire Flow Areas	Water Distribution System Master Plan, completed February 2020. Low flow areas were identified using a hydraulic model of the water distribution system.	40%

The three criteria are then entered into a formula that weights each criterion, and a score is assigned to each pipe segment. To better visualize the data, the pipe segments were then grouped into 50 miles tiers and displayed with varying line weights and colors within the GIS web application.

The ranked pipe segments are then reviewed by PWSA staff, and projects are selected using engineering judgement. This included taking other factors into consideration and grouping water main segments into contiguous groups for added constructability.

2.3.3 Annual Valve Replacement Program

The Authority maintains an annual contract to replace broken or inoperable valves. This contract does not include the replacement of valves though watermain replacement projects.

Valves 4 to 10 inches in diameter that are found to be inoperable are typically replaced by Authority maintenance personnel when encountered during routine operations. Valves 12 inches in diameter and larger are replaced under an annual contractor replacement contract.

To improve the efficiency of water operations staff managing the day-to-day maintenance of the system, as well as addressing emergent needs during water main breaks, the Authority has implemented an interim computerized work order maintenance system to track valve status and closures. As valve management is a long-term program, as an initial step, and as part of the valve survey, a valve database is being developed to document the location, size, type, and operating condition of the valve in the system.

The valve location will be linked to geographic coordinates (GPS) and linked to the water GIS. The goal of the program is to have all valves in the system linked to the GIS and valve database so that field crews can have real-time access to this information. Field crews will be able to quickly identify inoperable valves, normally closed valves (boundary valves, for example) and valves that may be closed for routine maintenance or system operations. As the valve database is expanded, it will also facilitate rapid system analysis to identify which valves will need to be closed to isolate a main for repairs. In addition, the valve database will improve tracking of closed valves to ensure that all valves closed during a main repair are returned to open status.

2.4 Eligible Water System Property to be Improved

Table 2-7 describes the 4 project categories which comprise the eligible water system projects of this LTIIP as discussed above. These projects conform to the definition of "eligible property" described in section 1.1.1.

Table 2-7: Water System Eligible Properties to be Improved	
Project Category	**Project Descriptions**
Urgent and Priority Lead Service Line Replacement	Replacement of lead service lines, both public and private. Due to exceedance of the action levels from compliance tests for lead and copper, the Pennsylvania Department of Environmental Protection required the authority to perform additional distribution system water quality monitoring, optimization of corrosion control treatment, source water monitoring/treatment, public education, and lead service line replacement.
Small Diameter Water Main Replacement	Strategic replacement of water mains (including lead service lines) to improve system reliability as well as improve water pressure, maintain water quality, and minimize disturbance to the community. By maintaining a proactive approach to asset management, efforts can be directed towards remedying assets before failure, thus saving in overall replacement cost. Additionally, projects will be coordinated with other utilities to minimize disturbance to the community and street surface restoration costs. Water quality and available hydrant flows will also improve by removing tuberculated mains.
Water Relay	Replacement of existing water mains, valves, fittings, service connections and hydrants due to emergency situations
Valve Replacement	Replacement of defective or non-operational valves on transmission and distribution mains throughout the water distribution system, excluding valves replaced during relays. Includes locating, assessing and documenting the operability, raising to grade and/or cleaning existing buried or obstructed valves. Increasing the number of operable valves in the system will reduce the number of customers that may be impacted and the number of valves that would need to be closed during emergency conditions.

2.5 Initial Planned Repair and Replacement Schedule and Projected Annual Expenditures

Table 2-8: Water System Eligible Properties Project Schedules and Costs in Appendix B identifies the costs associated with the projects for each year of the project schedule (2023-2027), organized into the following major project categories:

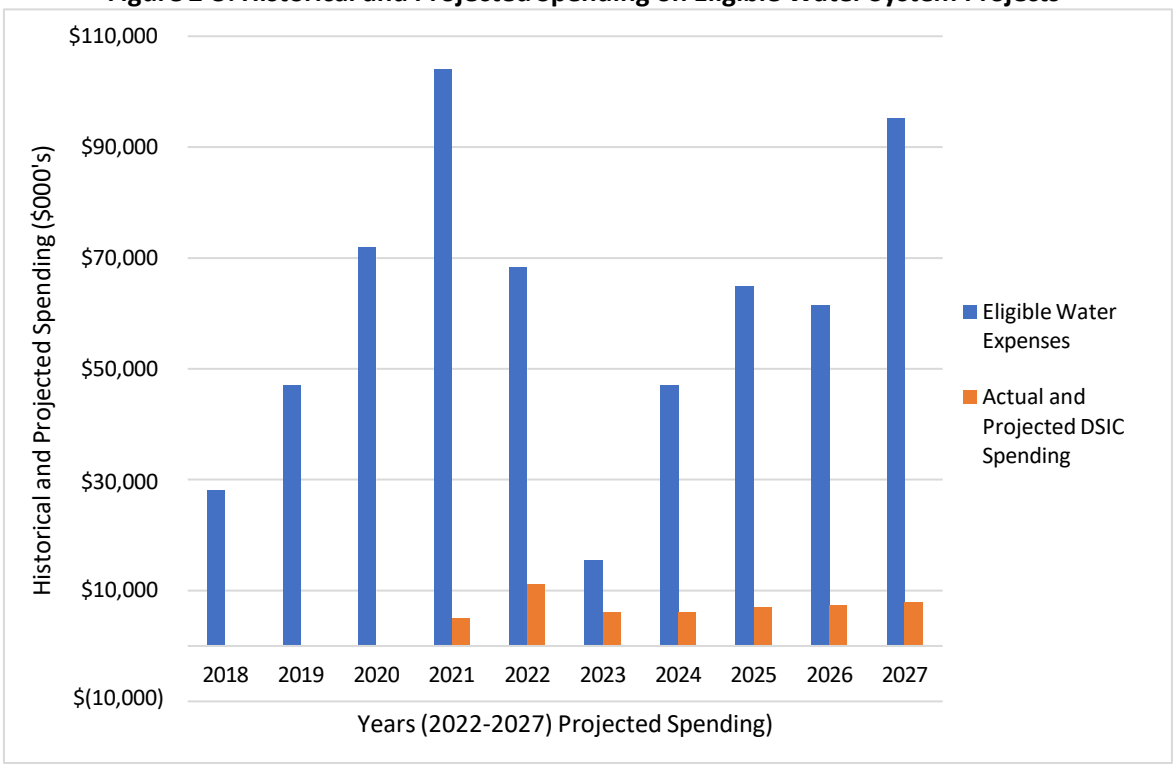
- Urgent and Priority Lead Service Line Replacement
- Small Diameter Main Replacement
- Water Relay Replacement
- Valve Replacement

2.6 Acceleration of Water Projects

For the past 30 years, PWSA has run an engineering and construction department comprised of employees and contracted professionals. The PWSA engineering and construction department will continue to work as a unit in terms of controlling and monitoring all aspects of the capital program. The increase in the volume of capital project delivery planned for the next 5 years demands an ever-increasing level of management excellence to achieve the efficiencies necessary to meet the challenge of adhering to project budgets and schedules.

Figure 2-5 presents actual and projected spending on eligible water system projects for the period 2018-2027. This figure shows a significant increase in capital spending for DSIC-eligible water improvements and rehabilitation over the historical rate. At current rates, the DSIC charge provides enough funding to replace an additional mile of small water main per year. This funding and the number of miles replaced is expected to grow in the future as base rate Tariff increases are approved by the PUC, thereby increasing the amount of revenue received through the DSIC.

Figure 2-5: Historical and Projected Spending on Eligible Water System Projects

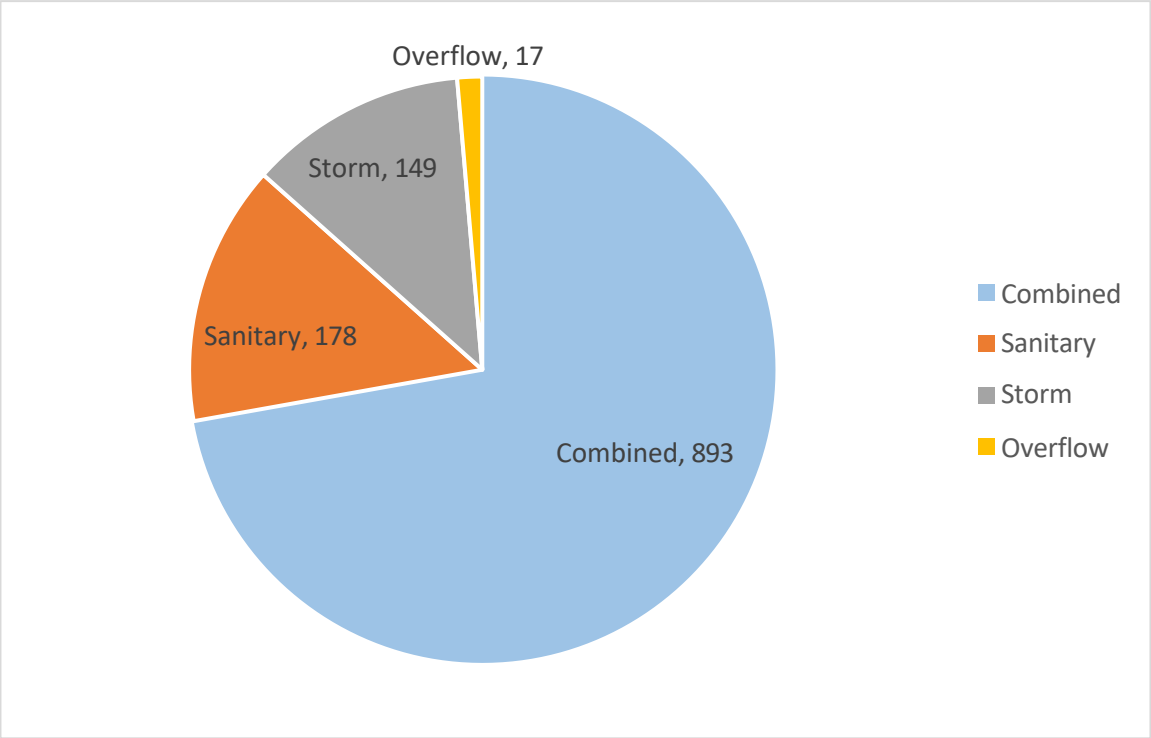


3 SEWER SYSTEM

3.1 General Description of Eligible Sewer Property

The eligible property associated with the Authority's sewer system consists of approximately 1,237 miles of sewer comprising separate sanitary and combined sanitary and storm, overflows, and sanitary force mains as shown in Figure 3-1. Approximately three-quarters of the Authority's sewers are combined (pipes that carry both sanitary and storm flows).

Figure 3-1: Sewer System Pipe Type and Length (Miles)

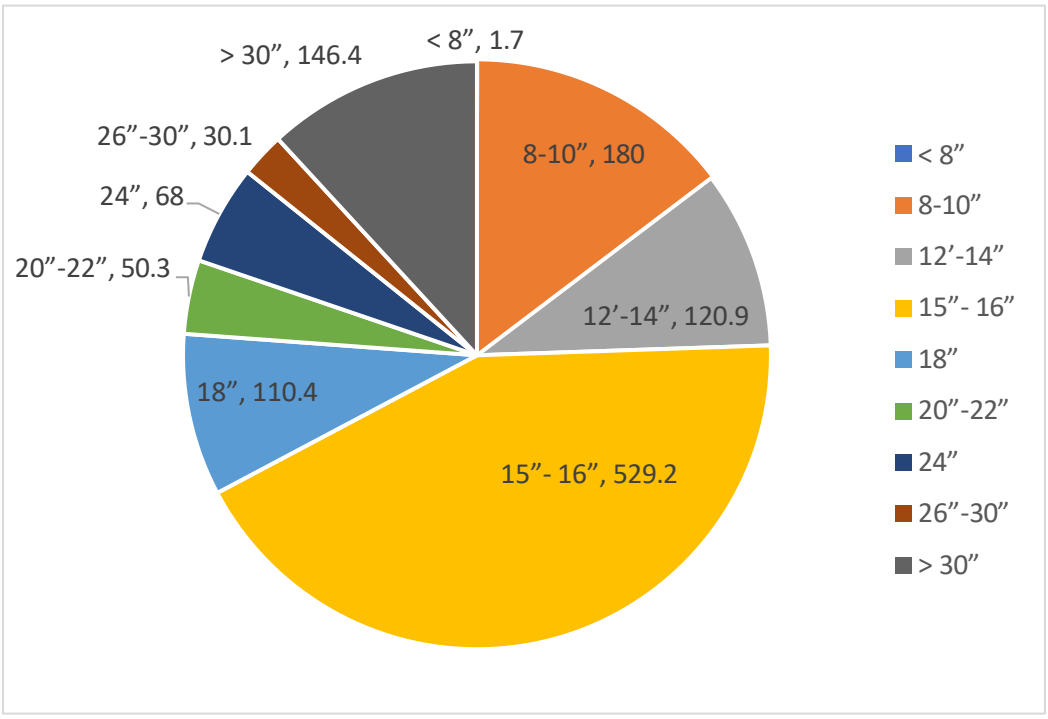


Source: PWSA GIS Database September 2022

The eligible property within the system includes lift stations (also referred to as pump stations). The Authority operates and maintains four sanitary sewer lift stations: Browns Hill Road Pump Station, Evergreen Road Pump Station, Mifflin Road Pump Station, and Rodgers Street Pump Station. The Browns Hill Road Pump Station has two constant speed pumps/motors each rated at 250 gallons per minute (gpm) at 55 feet total dynamic head (TDH). The Evergreen Road Pump Station has two constant speed pumps/motors each rated at 150 gpm at 55 feet TDH. Mifflin Road Pump Station has two constant speed pumps/motors each rated at 500 gpm at 88 feet TDH. The Rodgers Street Pump Station has two constant speed pumps/motors each rated at 1,000 gpm at 95 feet TDH.

Sewer pipe sizes range from less than 8-inch diameter to greater than 30-inch diameter (up to 120-inch diameter), as shown in Figure 3-2, which includes the lengths of storm sewers because separate sizes for sanitary, combined, and storm are not presently available.

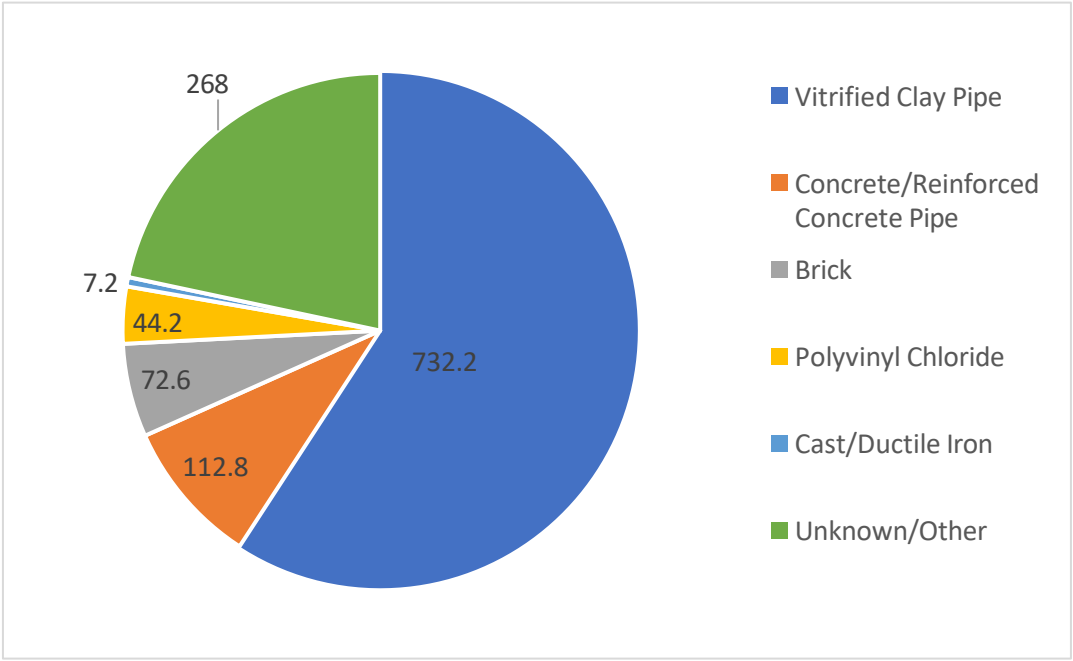
Figure 3-2: Sewer Length (Miles) by Diameter



Source: PWSA GIS Database September 2022

As would be expected of an older sewer system, a majority of the sewers are composed of Vitrified Clay Pipe (VCP), as shown in Figure 3-3.

Figure 3-3: Sewer Length (Miles) by Material of Construction



Source: PWSA GIS Database September 2022

The sewer system contains approximately 29,797 manholes, including 100 CSO diversion chambers. Manhole types include standard, equalization chamber, and flow dividers. The total does not include 46 manholes with sewer use defined in the GIS system as "undefined"; these "undefined manholes" could be private manholes since no record drawings have been located to date to confirm ownership. This

total also does not include 321 lampholes. The system also contains 35 CSO.

As noted above, the Authority's GIS database is being updated constantly, and not all eligible property is currently "logged" into the system. The data upload to the GIS system is an on-going effort, and the statistics reported above may change as a result of ongoing system data review and "clean-ups".

3.2 Eligible Sewer System Property to be Improved

Recognizing the need for continual renewal of the Authority's sewer collection and conveyance system to maintain quality and reliable service to its customers, the Authority has established two annual rehabilitation and pipe reconstruction project types to accelerate the renewal of its system: Small Diameter Sewer Rehabilitation and Sewer Reconstruction. The Small Diameter Sewer Rehabilitation projects utilize cost effective trenchless technologies to restore the structural integrity, reduce root intrusion, and reduce infiltration and inflow on mains less than 36-inch in diameter.

Little sewer system investment other than annual repair construction contracts and a few miles of sewer separation has been made to the PWSA sewer system in the past 20 years. To accelerate the sewer system CIP investments, the Authority initiated the aforementioned sewer renewal contracts in 2018. Sites are selected based on the asset's physical condition, location, and/or regulatory compliance obligations.

Table 3-1: Selected Sewer System Eligible Property Locations for Rehabilitation or Replacement

Neighborhood	Length (LF)	New Manholes Installed	Excavated Point Repairs
2022 Small Diameter Sewer Rehabilitation			
Contract 1 – West End	22,500	14	13
Contract 2 – Overbrook	21,000	2	21
Indefinite Quantity, Indefinite Delivery	9,300	N/A	N/A
Total	52,800	16	34
2023 Small Diameter Sewer Rehabilitation (Proposed)			
Contract 1 – Knoxville	N/A[1]	125	30
Contract 2 – Homewood	41,000	37	17
Contract 3 – Carrick	33,000	13	43
Indefinite Quantity, Indefinite Delivery	13,500	N/A	N/A
Total	87,500	175	90
2022 Sewer Reconstruction			
Fuchsia Way	1,000[2]	4	N/A

[1]Future SDSR project in 2024 will be issued to rehabilitate the sewer mains in this neighborhood
[2]Project also includes the replacement of 700 linear feet of water main and lead service lines

These and the additional projects projected to be implemented throughout the 5-year duration of this LTIIP are identified and described in Table 3-2 below.

Table 3-2: Sewer System Eligible Properties to be Improved

Project Category	Project Descriptions

Small Diameter Sewer Rehabilitation	Proactive, trenchless rehabilitation of less than 36-inch diameter sewer mains to restore structural integrity, reduce root intrusion, and reduce infiltration and inflow, includes cleaning, pre and post construction CCTV inspections, and if necessary, excavated point repairs and manhole rehabilitation. Provides PWSA a means to address inflow and infiltration and several moderate/major structural defects in a pipe segment prior to complete failure. This trenchless pipe renewal method eliminates disruptive digging and restoration and is cost effective.
Sewer Reconstruction	Reconstruction of existing sewers, manholes, catch basins, and inlets due to emergency situations or pipe failures.

3.3 Future Sewer Prioritization Approach

In order to cost-effectively prioritize future sanitary sewer rehabilitation, the Authority will employ a risk-based approach to prioritize the neighborhoods and/or pipe segments that are included in the annual projects, where risk is defined as:

$$Risk = Likelihood\ of\ Failure \times Consequence\ of\ Failture \times Redundancy$$

To accomplish this cost-effective prioritization, the Authority has retained a consultant to develop the methodology and integrate best practices for Assessment Management for the sewer system. This analysis will assign a risk score to each pipe segment within its system when complete. Additionally, to reduce the impact to customers and save on mobilization and demobilization costs, projects will be formed by grouping prioritized assets by geographic proximity and similar risk rankings.

3.3.1 Likelihood of Failure

The likelihood of failure component represents the probability that the asset will fail based on the asset's physical condition. This score will be determined by reviewing internal, closed-circuit television (CCTV) inspections coded using the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP), which is an industry standard for performing condition assessments. Table 3-3 lists and describes the condi7tion scoring for sewers in the wastewater collection system.

Table 3-3: Likelihood of Failure Scoring

PACP Grade	Description	General Guidelines for Timing of Pipe Failure
1	Minor Defects	Failure unlikely in the foreseeable future
2	Defects that have not begun to deteriorate	Failure unlikely for 20 years
3	Moderate defects that will continue to deteriorate	May fail in 10 to 20 years
4	Defects that will become a grade 5 in the foreseeable future	Likely to fail in 5 to 10 years
5	Defects requiring immediate action	Has failed, or will fail in less than 5 years

For assets without existing inspection data, desktop assessments using operations and maintenance history (if available), material, and date of construction will be used until condition assessment data is

available. Collapses or other significant defects that cannot be rehabilitated using trenchless technology on critical pipe segments (e.g., deformation) will be repaired or replaced using open-cut methods as soon as possible using the Authority's annual urgent or reconstruction contracts. These segments will be assigned a condition score of 6.

3.3.2 Consequence of Failure

The consequence of failure (CoF) score represents the direct and indirect impact to the customers and environment if the asset fails; it will utilize the following "Triple Bottom Line" criteria:

- Financial impact resulting from the need to conduct an urgent repair: this accounts for the relative cost to repair failures (i.e. depth, pipe size, and accessibility) and any fines or other regulatory costs incurred due to a failure.
- Societal impact resulting from the loss of service of the asset: this takes in account the number of customers affected by the failure, the type of customers affected (i.e. hospitals, schools, etc.), and the location of the asset.
- Environmental impact resulting from any discharges: this accounts for the relative impact to the surrounding environment if a failure leads to a discharge.

An overall consequence of failure score will be calculated (see Table 3-4) as a weighted average of all the individual consequence of failure factors and the maximum score will be 6. The weighting factors will be 0.25 for each financial and social criterium and 0.50 for environmental criteria. Proposed weightings and ranges presented may be adjusted as the systemwide analysis is performed.

Table 3-4: Consequence of Failure Scoring

CoF Factor	Description	CoF Score	Triple Bottom Line Criteria
Diameter	Less than 10"	1	Financial, Social
	≥ 10" < 15"	2	
	≥ 15" < 24"	3	
	≥ 24" < 36"	4	
	≥ 36" < 60"	5	
	≥ 60"	6	
Depth	Less than 6'	1	Financial, Social
	≥ 6' < 10'	2	
	≥ 10' < 14'	3	
	≥ 14' < 18'	4	
	≥ 18' < 24'	5	
	>24'	6	
Location	Unpaved Road	1	
	Minor Local Road	2	
	Major Local Road	3	

	Collector Road	4	Financial, Social
	Arterial/Building/Pool	5	
	Highway/Waterway/Railroad	6	
Distance from Environmentally Sensitive Features	150 LF or more	1	Environmental
	100 - 150 LF	2	
	75 - 100 LF	3	
	50 - 75 LF	4	
	25 - 50 LF	5	
	Less than 25 LF	6	
Distance Between Downstream Pipe to a Service Lateral for Customer with High Importance	20,000 LF or more	1	Social
	15,000 – 20,000 LF	2	
	10,000 – 15,000 LF	3	
	5,000- 10,000 LF	4	
	1,000 – 5,000 LF	5	
	Less than 1,000 LF	6	
Accessibility of Pipe	On Right-of-Way - No Traffic Control	1	Financial
	On Right-of-Way - Traffic Control	2	
	On Public Land with Vehicle Access	3	
	On Public Land without Vehicle Access	4	
	On Private Lands with Vehicle Access	5	
	On Private Land without Vehicle Access	6	

3.3.3 Redundancy

The availability of redundant assets mitigates the consequences of asset failure and overall risk. Redundancy scores will range from 0.1 for complete redundancy to 1 for no redundancy. In general, the redundancy factor for most of the wastewater collection system will be 1 because gravity sewer systems do not typically have redundancy in their design. However, for specific assets known to have alternate flow paths where diversion can occur with no system impacts, redundancy will be factored into the risk calculation.

In summary, the proposed risk scoring methodology is summarized in Table 3-5.

Table 3-5: Risk Scoring Methodology	
Criteria	Scale (Best Case → Most Risk)
Likelihood of Failure	1 (almost new) to 6 (failed)
Consequence of Failure	1 (least critical) to 6 (most critical)
Redundancy	0.1 (complete redundancy) to 1 (no redundancy)
Risk	1 (least risk) to 36 (highest level of risk)

3.4 Initial Planned Repair and Replacement Schedule and Projected Annual Expenditures

Table 3-6: Sewer System Eligible Properties Project Schedules and Costs in Appendix B identifies the costs associated with the projects for each year of the project schedule (2023-2027), organized into the following major project categories:

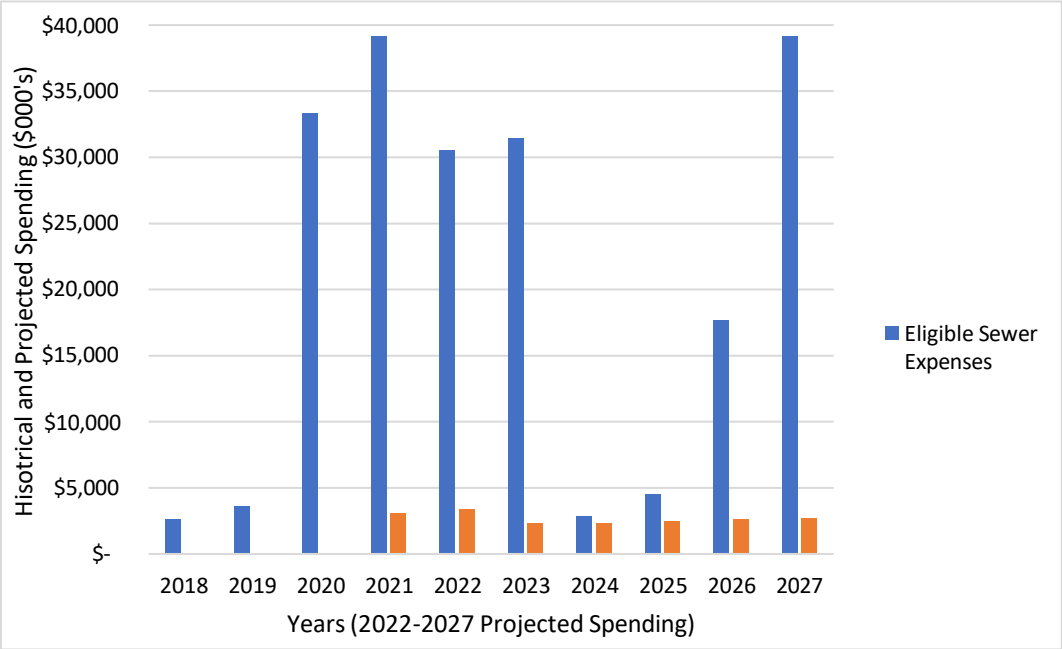
- Small-Diameter Sewer Rehabilitation
- Sewer Reconstruction (Annual Indefinite Delivery Indefinite Quantity (IDIQ) Contract)

3.5 Acceleration of Sewer Projects

Figure 3-4 shows past and projected spending on eligible sewer system projects for the period 2018 through 2027. The value for 2015 reflects projects which were funded through a combined capital and operations budget, which accounts for its disproportion to years prior and after.

This figure shows a significant increase in capital spending for DSIC-eligible sewer improvements and rehabilitation over the historical rate. At current rates, the DSIC charge provides enough funding to rehabilitate an additional two and a half miles of small diameter main per year. This funding and the number of miles rehabilitated is expected to grow in the future as base rate Tariff increases are approved by the PUC which will also increase the amount of revenue received through the DSIC.

Figure 3-4: Historical and Projected Spending Eligible Sewer System Projects



4 SUMMARY OF PAST AND PROJECTED CAPITAL SPENDING

Table 4-1 shows the past and projected spending for water, and sewer projects, all previously described in this LTIIP. The projected spending (2023 – 2027) for all eligible property types is approximately $313.6 million.

Table 4-1: Historical (2018-2021) and Projected (2022-2027) Capital Spending (in Thousands of Dollars)

Fiscal Year	Total Capital Spending	Water Projects	Sewer Projects	Total Eligible	DSIC Spent Water	DSIC Spend Sewer	Total DSIC Spent
2018	$67,717	$28,002	$2,599	$30,601	N/A	N/A	N/A
2019	$106,998	$47,071	$3,586	$50,657	N/A	N/A	N/A
2020	$122,108	$71,887	$33,283	$105,160	N/A	N/A	N/A
2021	$130,732	$103,975	$39,142	$143,117	$4,970	$3,071	$8,041
2022	$180,858	$68,374	$37,143	$105,517	$11,158	$3,397	$14,555
2023	$266,173	$15,461	$5,229	$20,690	$5,993	$2,317	$8,310
2024	$277,247	$47,895	$5,031	$52,926	$6,023	$2,328	$8,351
2025	$319,830	$64,820	$5,137	$69,957	$6,866	$2,491	$9,357
2026	$360,232	$61,452	$5,327	$66,779	$7,278	$2,591	$9,869
2027	$375,213	$97,021	$6,256	$103,277	$7,788	$2,722	$10,510

[1]Number of Eligible Projects reduced in 2023.

[2]2022-2027 DSIC spend is projected.

5 COST EFFECTIVENESS AND EVALUATION METRICS

The increase in the volume of capital project delivery planned for the next 5 years demands an ever-increasing level of management excellence to achieve the efficiencies necessary to meet the challenge of adhering to project budgets and schedules. The Authority has for the past 30 years run an engineering and construction department comprised of Authority employees and contracted professionals. The Authority staff and its outside consultants and contractors will continue to work seamlessly as a unit in terms of controlling and monitoring all aspects of the capital program. Impediments to the attainment of the aggressive construction program proposed must be identified in advance and when barriers to the efficient attainment of pre-established budget and schedule goals are identified, they must be resolved quickly and consistently. This approach will ensure the success of the program, measured in large part by cost savings.

The rehabilitation and replacement of water mains, for example, will undoubtedly result in a reduction in non-revenue water losses and future main breaks. However, there is a need for a comprehensive and systematic approach to the delivery of the accelerated capital improvements program. The Authority has implemented (and is continuously improving) a number of tools which will ensure the cost-effective and efficient planning, design, procurement, construction, and close-out of projects. These tools include the e-Builder project management information system, the Project Management Policies and Standard Operating Procedure (PMP-SOP), and contractor procurement process. All three tools are described in more detail below. In addition, cost-effectiveness will be ensured by the selection of the appropriate construction techniques (such as trenchless construction) during the planning stages of a project.

5.1 e-Builder (EB) Project Management Information System

e-Builder (EB) is a robust, web-based project management information system. It allows, through specifically defined permissions, both internal and external project managers to manage their project budgets, schedules, change orders, contractor/vendor invoice payments, and other critical project related activities in one centralized location. In addition, this system allows the Authority to better manage the interactions and integral project finances for multiple, related projects at a program level.

e-Builder was initiated by the Authority in July 2015. e-Builder has allowed the establishment of customized processes that best fit day-to-day project management activities or align with best industry practice workflows. The e-Builder system allows Authority personnel at all levels to access data and tangible project status reports for the project. Dashboards have been developed for internal and external project participants, allowing the e-Builder users the ability to manage, monitor and quickly identify:

- Bottlenecks within the processes
- Staffing needs
- Capital and operations expenditures
- Change orders
- Schedule adherence and deviations throughout the project cycle
- Establish monthly Engineering and Financial benchmarks and metrics to help measure how the Authority is performing

The e-Builder system has helped move the Authority from a manual paper-based management system

to an electronic, collaborative, web-based system that captures critical project related data and information in one centralized repository. The Authority has designed their system to allow access by contractors and consultants who use e-Builder for a number of critical project processes, such as to process payments electronically, process change orders to contracts, upload 30%-60%-90% and final design documents, house daily site reports and construction photos/videos, initiate Consultant On-Call Task Orders and Amendments under specific projects, Senior Group Managers to review monthly Project Audits submitted by Project Managers, and other project related activities. e-Builder provides a vehicle for continuous communication between primary project participants.

The Authority will continue the development and refinement of its e-Builder system to accommodate the expansion of the capital improvement program.

5.2 Project Management Policies and Standard Operating Procedure (PMP-SOP)

A Project Management Policies and Standard Operating Procedure (PMP-SOP) was finalized to facilitate the incorporation of best industry practices to optimize project planning and delivery at the Authority. Standard processes and procedures supported e-Builder represent many of the documented primary tools outlined in this document. The PMP is a “living and breathing” document and is being updated on a continual basis to encourage uniformity in staff practices, record retention, and contracting practices.

The PMP-SOP describes the processes, activities, and procedures that the Authority’s project management and administrative staff will use to organize to manage the increased workload outlined in the CIP and to efficiently and effectively maintain its water and sewer utility systems. The PMP-SOP is contained in Appendix D of this LTIIP.

Development and use of standard processes and procedures by Authority staff assures the consistency, quality, and timeliness of actions taken by project personnel in the delivery of critical capital projects. Improved interfaces between Authority personnel and external resources improves the ability to deliver projects on time and within budget, while working to meet or exceed pre-established project performance goals.

The PMP-SOP provides a living template to successfully and sustainably manage and deliver the Authority’s CIP projects. It is designed to provide a blueprint to track project activities and program progress against compliance obligations and other benchmarks, thus giving the Authority an accurate "finger on the pulse" for each project, and in aggregate, for each program. Its implementation outlines the processes to encourage timely and appropriate corrective action. It will also help the Engineering and Construction Department improve consistency and quality in many areas, such as data management, contract language, policies and procedures, standardized forms and formats, interpretation, design standards, analysis, problem resolution, change management, construction management, documentation, and more, all of which lead to better performance and productivity.

The PMP-SOP establishes the framework for a high-level overview of the processes inherent in the successful development, planning, design, and construction of a project. In addition, it includes core functional procedures to be performed on a routine basis. Procedures were developed by interviewing Authority staff and consultants with specific hands on per topic covered, and the development of workflows to optimize the steps associated with specific processes.

The PMP-SOP includes a number of tools, forms, and references to further support project activities. These tools provide the Authority with guidance, information, and supplemental materials for better comprehension and for use in conjunction with the procedures. These PMP-SOP materials are intended

to keep the processes and procedures as concise as practical and limit the need to revise procedures when the tools and forms are revised.

5.3 Cost-effective Design, Project Management and Construction

5.3.1 Design and Constructability Reviews

In general, a majority of the Authority's construction projects are designed by contracted professional engineering consulting firms. Therefore, the Authority employs a robust review process that includes input from the Authority's engineering department and operations staff as well as independent third-party reviewers.

The design Scope of Work (SOW) generally requires the consultant to undertake an initial study or evaluation phase to document the detailed design in a Technical Design Memorandum (TM), or Basis of Design Report (BODR), depending on the complexity of the project. These documents are reviewed by the Authority and an independent third-party reviewer (typically a third-party engineering consulting firm). Following acceptance of the TM or BODR, the consultant will be notified to advance (or modify) the detailed design.

Independent reviews of the detailed design are typically performed following the completion of the 30%, 60% and 90% design phases. These technical reviews are completed prior to the issuance of final Contract Documents by the Authority. Constructability reviews, including a detailed evaluation of the cost estimate, are performed at a minimum at the 60% and 90% phases, and at 30% for more complex projects. Submittals include contract drawings developed at the appropriate level of detail, draft specifications incorporating the Authority's standard specifications, updated construction cost (to a level of refinement in accordance with the Association for the Advancement of Cost Engineering (AACE)), an update on the required permits for the project, and an update on the comments and actions from the previous reviews.

The overall design review process is designed to ensure that the project meets the Authority's goals and objectives, the implementation schedule is being maintained and the budget is being monitored to ensure it is within available project funding. The review process also includes stakeholder input and interaction, again depending on the type of project and potential impact on the community, other utilities, or concerned citizen groups.

As part of the Authority's design review, appropriately selected subject material experts (SME's) are included in the process to incorporate lessons learned from similar projects. Reviews are performed with the focus on potential areas of contract claims, design recommendations to improve the overall construction process, and avoidance of potential conflicts within the documents.

In addition to these design reviews, the Authority also has an internal post-construction review process that obtains feedback on recently completed construction projects to solicit lessons learned or construction techniques that can be utilized on future contracts to save money or avoid costly construction claims.

5.3.1.1 PWSA Project Audits

As the Authority continues to accelerate the CIP, staff are encouraged to identify potential obstacles and challenges in advance and mitigation actions before issues are encountered and cause project delays. By conducting internal project audits with project managers with specific "look ahead" and "cost to complete" reviews, the Authority will be alerted quickly and will be able to take action. The project

audits are intended (for internal purposes only) to review significant project milestones, final deliverables, and current project status. A workflow process has been developed in e-Builder called "PWSA Project Audit Process (PPA)", which will house all the talking points and discussions that take place during the project audit meeting. This information will then be summarized in a report used to brief the Director of Engineering and Construction.

This process provides Project Managers a chance to report to management the project status or phase, percent completion, accomplished task for that month, any upcoming change order or project schedule delays, identify upcoming Procurement Services (e.g., Professional Services or Contractor Services), Consultant or Contractor performance issues, current project budget and expenditures, or any other project related information they would like to document within the monthly project audit.

PPA's, initiated by Project Controls Team, on the 1st of every month (unless the 1st lands on a weekend or holiday which will be moved to the next business day) and the Project Manager has 2-weeks (15th of every month) to complete their PPA and 1 week for Senior Group Managers to review the PPA. The Project Manager has the option to request an "Audit" on their project which would entail a schedule meeting with the following internal PWSA personnel staff;

- Director of Engineering and Construction
- Deputy of Engineering and Construction
- Program Senior Manager
- Finance CIP Manager
- Project Controls Team
- Construction Senior Group Manager (if necessary)

Project Managers will express any issues or concerns with management and Project Controls Team will document any highlights or items that need addressed within the PPA. Senior Group Managers also have the ability to audit the Project or Project Manager after reviewing the PPA if necessary. PPA reporting is also available for management to review and determine if they would like to audit the project or project manager based on the PPA information on the report.

To date, a number of valuable "Lessons Learned" have been identified and shared with staff to provide the basis for improved the performance of future projects. The Authority will build upon the aforementioned "lessons learned" which will result in the development of:

- Strategies which will increase the successful outcomes of future projects
- Project success criteria which will include schedule, budget, and customer and stakeholder satisfaction metrics
- Change management success criteria which will include metrics associated with staff involvement, public interaction, and change transition

5.3.2 Consultant Performance Evaluations

In addition to Project Audits, the Authority has implemented "Consultant Performance Evaluations" (CPE) to provide feedback, both positive and constructive, to all consultants. At a minimum, the project manager is required to complete this process yearly, but it is automatically initiated by a change in the project phase or can be initiated manually if documentation of performance (positive or negative) is

required. The consultant is evaluated (1-Unacceptable through 5-Exceed Expectations) on the following categories: Quality of Work, Management, Resource Utilization, Time/Schedule, Cooperation-/Coordination, and Diversity Participation/Inclusion. This information is then briefed by the Director of Engineering and issued to the consultant's client service manager for their review, comment/and or rebuttal.

5.4 Contract Bidding Procedures

As a Municipal Authority, the Authority is required to publicly bid construction contracts and the purchase of goods in accordance with Chapter 56, PL 287. The Authority has a long history of successfully bidding such services. Generally, large improvement projects such as pump stations or storage facility upgrades would be bid as one construction project with multiple contracts. The Authority is required to follow the Separations Act 53 P.S. 1003 and 71 C.S.A. 1618 which requires the use of a separate contract for plumbing, heating & ventilating, and electrical work. In addition, the Authority has updated its Supplier Diversity Program and Policies in 2021. The Supplier Diversity Program specifics are available on the Authority's website. Potential vendors and contractors are encouraged to review the Supplier Diversity Program information that defines the participation goals for the engagement of currently certified minority, women, small businesses, veteran business contractors, including service-disabled veterans, disability-owned, and LGBTQ business contracts. The bidders are required to submit certifications with the contract documents. For linear projects such as water main replacements and sewer rehabilitation contracts, the projects are organized into large enough contracts that provide economic incentive for contractors to bid.

The Authority has pre-qualified several engineering firms to provide expedited design phase services. These firms are selected based on the anticipated scopes of work and the firm's qualifications to complete the work, including availability and experience of the staff, proximity of the staff to the City, and other parameters. Firms are selected to perform expedited designs of water main and sewer line rehabilitation and/or replacement, green stormwater infrastructure projects, and other infrastructure improvements. As a project scope of work is developed, a request for proposal (RFP) is prepared by the Authority and issued to several (pre-qualified) on-call consultants. The RFP includes the detailed scope of work, contracting requirements, project delivery schedules and deliverables. For larger projects, separate RFPs are developed, and the engineering services are publicly advertised, and a selection is made based on proposals submitted.

6 WORKFORCE MANAGEMENT AND TRAINING PROGRAM

The Commission requires a utility to have a workforce management and training program adequate to ensure that the utility has access to a qualified workforce to perform work in a cost-effective, safe, and reliable manner. The PWSA announced a Comprehensive Training & Development Policy, addressing annual employee training requirements in March 2022. This addendum provides details of extensive workforce management and training programs for all PWSA employees. Further training and development specific to individualized PWSA roles are described below.

In recognition of the expanding needs of the Authority in a Human Resources system, the PWSA selected, through open procurement, and implemented a single HRIS application. The selected Ceridian Dayforce provides Payroll & Tax, Benefits, Human Resources, Talent Management, Workforce Management, Document Management and Analytics. By using the SaaS business model, Dayforce effectively eliminated costly hardware, customization, and maintenance expenses-thus reducing the total cost of ownership. Key advantages include Single application, Compliance Automation, Speed, Accuracy, Self- Service and Configurability.

6.1 Current and Proposed Workforce

6.1.1 Workforce Development

The challenges presented by an expanded infrastructure improvement program described in Section 4 of this LTIIP are not insurmountable. The existing workforce at the Authority provides a solid foundation upon which to build the staff and skills it needs to become a high-performing organization.

The current full-time workforce of the Authority is presented in Table 6-1. The Authority's headcount has grown substantially in recent years with the addition of over 135 employees since 2016. An accurate projected 2023 headcount cannot be given at this time because the Authority is in the process of creating the 2023 Operating Budget. However, the headcount expansion is projected to continue in order to support the Capital Improvement Plan and PUC mandated compliance activities, which includes eligible property infrastructure improvements.

Table 6-1: Current Workforce		
Department	**Current**	**2022 Budget**
Executive Office	5	7
Customer Service	71	80
Management Information Systems	21	24
Finance	17	20
Human Resources	9	12
Legal	3	7
Warehouse	5	5
Public Affairs	9	10
Water Quality (Lab)	15	18
Water Treatment Plant	48	60
Water Operations	117	130
Sewer Operations	19	23
Engineering & Construction	35	46
Table 6-1: Current Workforce		
Department	**Current**	**2022 Budget**

Environmental Compliance	6	6
Safety and Security	4	6
Total	384	454

Staff will be supplemented by contracted personnel as needed. However, PWSA is not able to present an estimate of the exact number of contractors or staff that may needed in 2023 as that figure is dependent on budgeting and both the progress of building an internal workforce and the final determination of actual needs and scope of the projects associated with the CIP. The objectives, commitments, outreach activities, and measures of success discussed below will enable PWSA to build a workforce to meet the needs of increased capital spending, as well as increased responsibilities to address PUC compliance requirements.

Success in hiring new permanent employees will depend upon the attainment of three major objectives:

- Increasing our hiring effectiveness
- Ability to continue to attract staff domiciled in Allegheny County or as outlined in the PWSA domicile policy or any union agreement
- Enhancing workforce engagement and performance

Developing a strong workforce to meet the demands of planning, designing, and overseeing the construction of new and rehabilitated infrastructure and other capital improvement programs will rely upon identifying and hiring qualified applicants. To that end, the Authority is committed to:

- Reviewing and improving job postings and position descriptions. These activities will address the rapid expansion of staff, as well as modified and new job functions.
- PWSA's HR Department has been successful in hiring most of the required staff resources needed by the end of 2021. The Coronavirus continues to delay many projects, so the need for all these staff will depend upon the implementation delays of the Capital projects, and operations improvements currently being implemented.
- PWSA has increased its compensation for many positions based upon the current salaries for similar positions in the region. The shortage of Water Treatment Operators and other key tradesmen appears to be an impediment to our expansion (and retention) of these staff positions. PWSA entered into a professional services agreement in February 2022 to assist the Authority with the development of a comprehensive classification and compensation study. The goal of the services provided shall be to evaluate the union and non-union positions within the Authority and create compensation analysis, pay grades, and recommended changes based on local, national and industry comparatives.

The Authority has extended its outreach to industry publications, community partnerships, and other venues to reach prospective talent. We are specifically pursuing an effort to diversify our workforce to the greatest extent possible. Some of its recent and upcoming partnerships include:

- The Homewood YMCA Workforce Development Office
- Energy Innovation Center (EIC)
- Community College of Allegheny County (CCAC)

- Imani Christian Academy/Pittsburgh Public Schools (PPS)
- Manchester-Bidwell Lab Training Partnership
- Landforce Pittsburgh

The Authority will use measures of success to determine the effectiveness of its hiring program. Although the HR department is still developing and refining its metrics, some of the upcoming metrics would be as follows:

- Hiring response time: our goal will be that the average time to fill existing positions is less than three months from the date of the vacancy.
- Position vacancy rate: our goal will be an average vacancy rate of less than 8%
- Achieve a workforce diversity which emulates the Allegheny County Region and the City of Pittsburgh to the greatest extent possible.
- Creating a talent pipeline that results in a large number of applicants that want to work at the PWSA.

In terms of the goal to enhance workforce engagement and performance, the Authority understands that increasing the efficiency and effectiveness of the organization requires engaged, developed, and high-performing employees. Growing and retaining the existing workforce will require the Authority to:

- Work cooperatively with unions to find and act on opportunities to increase workforce performance and effectiveness. PWSA continues to work with local Union leadership to assist PWSA with specific training required for our utility workers, equipment operators, electricians, plumbers, and utility workers.
- Complete a training program roadmap and inventory of the training requirements for all positions at the Authority. The Authority's training for all staff has increased and includes required trainings such as Environmental Compliance & Ethics, Harassment, and Diversity, Equity, and Inclusion, and also assists the staff to acquire certifications and licenses for their specialized capabilities (e.g., Water Treatment Operators, Distribution System Operators, etc.). This information can be obtained from the PWSA's Comprehensive Training & Development Policy which was developed and implemented March 2022. Additionally, this training is tracked through the PWSA's Learning Management System, an integrated part of the Ceridian Dayforce system.
- Dedicate additional resources to training and development, as well as health, safety, and risk management. PWSA hired a permanent Senior Manager, Safety and Security who provides Safety Training and working with the Operation and Water Production Teams on a weekly basis. In addition, Safety and Security has been developed as its own separate department, currently with a staff that consists of a Workplace Safety Manager and an Emergency Planning and Water Production Safety Manager. Establish and track productivity goals for work groups, where applicable. PWSA has implemented performance metrics for the organization, which are being reported to the PUC on a quarterly basis.
- Develop a program to recognize high-performing employees. In 2019 PWSA

implemented a quarterly recognition of staff whose work performance showed efforts above and beyond. As of October 2022 more, than 94 staff at all levels from all Departments have been so recognized.

Four measures of success will be used to determine effectiveness of its workforce engagement program:

- Training hours per year: with a goal of 20 hours per year per employee.
- Safety compliance: our goal will be to maintain a worker's compensation experience modification rate of less than 1.0
- OSHA compliance: meet OSHA requirements
- Staff engagement survey: once a year

The Authority will use a combination of internal and external resources to address the critical staffing needs associated with the infrastructure improvement program. The Authority will utilize Program Management support to execute the program with design and construction management services primarily provided by consultants. Based upon all of the above programs and plans, the Authority believes it will be successful in cost-effectively increasing staffing levels to successfully manage the projects identified in the CIP.

6.1.2 Overcoming Workforce Challenges

In order for PWSA to implement the wide variety of improvements discussed in this LTIIP, PWSA must continue to restructure its resources, increase the number and expertise of staff, and increase the number of available private consultants and contractors. PWSA has addressed its previous workforce challenges by stabilizing its Executive, Senior and Middle management, and leadership positions with experienced professionals, while continuing to operate in a union environment that limits workforce flexibility, review and revise residency requirements, operate on limited availability of experienced water utility professional issues, and managing an aging workforce. PWSA has addressed these workforce challenges by focusing on its workforce objectives, adhering to its workforce commitments, extending its outreach activities, and evaluating its measures of success, as described in detail in Section 6.1.1. PWSA is committed to continuing these practices. PWSA's success in overcoming its workforce challenges is demonstrated as follows:

- Operations Leadership has been reorganized to further strengthen our culture of high performance, excellence, measurement, and accountability. The new senior management team is inculcating the staff with current water utility practices which is improving staff safety, productivity, and workforce job satisfaction. The new and more defined structure will also enable Operations to better strategize around our goals, and to develop, empower and equip them for success.
- Operations is realigning its resources to ensure that the key program metrics are being met, such as meter installation rates. A number of plumbers have been assigned to these tasks and have increased the meter install rate from about 350 to 1000 per month. In addition, PWSA's meter installers do building reconnaissance to verify the plumbing system construction materials and existence of backflow preventers which facilitate the lead service line and water service backflow programs.
- PWSA developed a new department focused on Environmental Compliance and hiring

staff that specialize and focus in that area to oversee our compliance with Administrative Agreements or other regulatory entities.

- Operations continues to hire Utility Workers to the extent that they are available. Plumbers, electricians, and other trades candidates have become limited because of the general economy. Consultants operate under On Call Services Agreements which permits a streamlined process of engagement for specific projects. These more than 20 selected consultants have ONCALL Services Agreements in several categories: Water, Wastewater, Stormwater, Water Treatment, among others.

The Authority continues to increase its staff and consultant resources to increase the rate of project implementation, at all levels and departments. The Authority is confident that the proposed schedules can be met, and possibly improved upon, dependent upon the ability of its Management Team to effectively add the additional resources. PWSA anticipates that its restructured Executive and Senior Management Teams has the basic resources to implement the entire program, though we continue to add "ramp up" capacity as Authority takes on responsibilities for stormwater management and major systemwide upgrades. The Authority is extremely sensitive to the need for its capacity increase to be sustainable, and is developing internal infrastructure and related systems, policies, and procedures to continue project execution and delivery, including the hiring of more than 100 staff since 2023. The Authority continues to be deliberately cautious with the rate of personnel increase to ensure the sustainability and optimize performance of its organization.

PWSA continues to update its project schedules based upon the availability and capability of its workforce, and the commitments of its Consultants and Contractors. All schedules will account for the larger issues related to other mandates from Federal and State regulators, which could pre-empt some of PWSA's commitments to the PUC.

6.2 Training Programs

6.2.1 e-Builder Training

The Authority's Program Management Team with support of Authority Project Controls personnel have conducted e-Builder training for Authority personnel and others on the myriad elements of the system. The personnel trained and to be trained, and the topics of training, are shown in Table 6-2 (located in Appendix B). The Team provides one-on-one and group training and distributes reference materials to each participant. In addition to this formal training, "e-Builder Hot Topic Meetings" are held monthly. Typical topics include:

- Common issues of frequent occurrence that need to be addressed with project managers and others
- Feedback from project managers regarding any e-Builder issues
- Notification or updates related to existing internal processes or procedures
- Refresher training on any e-Builder modules requested by Project or Program Manager or repeating issues identified by the Project Controls Team
- Reinforcing rules to Project Managers and others responsible actors within established EB workflows
- Introducing newly purchased e-Builder modules

- Notification on any e-Builder system updates or changes made by e-Builder
- Updates on Authority policies or procedures (i.e., Finance, Fleet, Procurement, and Executive Departments)
- Presenting Engineering and Finance Benchmarks and Metrics

6.2.2 Management Training and Development

As the Authority continues transformational change and growth to accomplish our strategic initiatives, a specific management development program was implemented to deliver the foundational skills and knowledge necessary to ensure managers are equipped to handle operational problems, build and maintain a high-performing, culturally inclusive workforce, and deliver on organizational commitments, all while we simultaneously adapt to new technologies to manage sophisticated, complex, and more dynamic businesses.

6.2.3 Annual Policy Acknowledgement

In compliance with security and information standards, the PWSA employees and embedded consultants participate in an Annual Policy Sign-Off. While this list does not encompass all PWSA policies and procedures, employees are informed of standards, updates, and accessibility of other documents for accountability.

6.2.4 Other Training

Other training programs are conducted by in-house and contracted personnel on such topics as hydraulic modeling, low impact development (LID), sustainability, and safety. Authority engineering staff are certified Sustainability Professionals (SPs) through the Institute for Sustainable Infrastructure training on the Envision rating system. Training programs associated with Health & Safety are described in Section 6.4 of this LTIIP.

6.3 Talent Acquisition Management

To meet the increasing staffing needs of the Authority, the Human Resources Department hired a Talent Acquisition Specialist in 2021. The newly added talent acquisition component of the Human Resources department extends far beyond recruiting and is the entire process of hiring individuals with the skills and abilities required for a role, including attracting talent, interviewing, negotiating the offer process, and managing the onboarding process. This function aims to fill vacant job requisitions with the most qualified candidate while implementing the best practices to ensure fairness and promote diversity.

In the summer of 2021, the Authority moved away from a paper application process. Talent Acquisition built and launched an online application and review process within the Ceridian Dayforce E-Recruitment module. Table 6-2 highlights the achievements from this change.

Table 6-2: Talent Acquisition

Reporting Period Q3 2021 to Q2 2022	Percent Increase
Number of Applications	53%
Number of Applications per Position	46%
Self-Identified Diversity	134%

6.4 Construction Management and Inspection

The Authority utilizes subcontracted construction inspectors to provide numerous services during the installation of water mains, service lines, sewer lines, and manholes in the collection system. The Authority maintains three inspectors on staff, is seeking additional inspection staff, and also utilizes qualified consultants to provide construction inspection services. These inspectors perform a wide range of services including the following tasks, as well as any other work that may be necessary to complete the construction activities.

- Monitor the installation of the water and sewer lines and appurtenances to confirm that they are properly bedded and installed in accordance with the Authority's specifications and/or Contract Documents
- Observe, perform testing to ensure that the new utilities meet specified performance requirements
- Monitor the pipe backfill for proper compaction in accordance with Authority's specifications and/or local municipal, county or PennDOT requirements
- Confirm that all materials such as pipe, fittings, hydrants, valves, service connections, backfill materials, etc. being used in the project meet the Authority's specifications
- Record the quantities of pipe and other materials installed
- Document the quantities of pipe and other materials, labor, equipment, etc., for accurate billing and payments
- Document all locations of pipe, valves, service connections, laterals, etc., for accurate mapping and record keeping
- Interact with City residents to coordinate water service line or sewer lateral installations, lessen the impact of the project and answer or address issues that may arise during the project
- Communicate with local businesses that may be impacted by the construction activities to ensure that service disruptions can be minimized to the greatest extent possible and service outages are minimized and do not disrupt business
- Coordinate contractors with school districts, various City agencies, and emergency services so that bus routes, trash pick-up, mail delivery, and emergency response are minimally impacted
- Monitor temporary restoration activities during construction to ensure that roads are restored to approved vehicular travel conditions and sidewalk areas are clear for pedestrians
- Monitor the final restoration required in projects to ensure that they are done in compliance with City of Pittsburgh, Allegheny County and/or PennDOT specifications
- Observe contractor's implementation of contractor safety plans and advise contractor of any observed conditions of imminent risks to public health or safety. Inspectors are authorized to advise supervisors of unsafe conditions and can shut down a project until an imminent danger situation is addressed.

6.5 Safety

In August 2020, the Authority hired an internal Health & Safety Manager to manage and enhance the existing Health and Safety program. This individual is a Certified Safety Professional (CSP) and has continued to build out the PWSA Safety Department by hiring a Workplace Safety Manager in January of 2022 to oversee field services and contractor safety. In March of 2022, PWSA hired an Emergency Planning and Water Production Safety Manager (CSP) to oversee health & safety at the Treatment Plant and water production facilities. PWSA plans to hire an additional person in 2023 to specifically oversee contractor safety as well.

A strategic plan was developed to properly maintain the existing Health and Safety program initiatives by setting annual goals and metrics, ensuring existing written programs are routinely reviewed and updated, completing routine inspections, meeting staff training requirements and overseeing a certified safety committee. New initiatives were also added to enhance the program.

PWSA has improved on training initiatives by integrating safety training into the online Learning Management System (LMS). Enhancements were made to the new employee safety orientation process and additional specialized trainings were recently provided to staff including PA One Call, Defensive Driving, Competent Persons for Excavations and First Aid, CPR Training. PWSA also recently completed OSHA 10-Hour Construction training for the Engineering and Construction department as well as Operations managers. Safety has also continued to provide Safety Culture training to PWSA managers.

PWSA has implemented new safety programs to address the COVID-19 Pandemic, Fire Prevention and Hot Work program and a Safety Incentive program to enhance reporting, awareness and participation. The Safety incentive program includes a near miss reporting component as well as a daily stretching program to assist in reducing the number or strain and lifting injuries. The program also includes safe driving incentives and incentives for operations managers who meet certain requirements.

PWSA continues to maintain a “Certified” Safety Committee through the Pennsylvania Department of Labor. The committee consists of 20 members who represent various locations and departments in an effort to drive safety from “bottom-to-top.” Safety manages the committee to ensure certification requirements are met such as meeting monthly, completing inspections and taking action to address safety concerns.

PWSA has implemented a basic Contractor Safety program that requires all contractors to submit Health & Safety Plans for the projects they are awarded. These plans are reviewed by safety and follow-up inspections are being completed to verify that contractors are abiding by their plans.

PWSA continues to maintain and update both the existing Emergency Action Plan and the Emergency Response Plan to address emergency preparedness, continuity and recovery activities. PWSA recently implemented the use of an Incident Command System (ICS) for larger scale emergencies and assigned roles and responsibilities to key personnel throughout the organization. A written Physical and Cyber Security Plan has also been established.

7 OUTREACH AND COORDINATION ACTIVITIES

7.1 Construction Coordination

The Authority has developed a coordination team with the City and its other utility members. In addition, PWSA is developing a robust GIS based data layer to communicate its plans to other utilities. At present, the critical coordination appears to be with the City, specifically the annual paving plans, and the local Gas Companies' piping improvements. Significant improvement is expected with the coordination between the PWSA and the City as a result of the City's hiring of a new Chief Engineer, and additional engineering staff, which has delayed coordination in the past. Additionally, PWSA has assigned specific utility coordination duties to a primary, internal utility coordination staff member within the Engineering Department.

Additionally, as previously indicated in this report, the Authority is always updating its GIS to add water and sewer system data, evaluate and edit existing data, and refine its data retrieval processes in order to make the system more comprehensive, dependable, and easy to use. Annually, water and sewer system capital projects including replacements, rehabilitations, and repairs are selected and vetted to the Authority's engineering department before being prioritized for the coming budget year. As part of this process, the Authority solicits information from PennDOT, Allegheny County, homeowner's associations and other utilities as to their intentions to undertake paving and other public works projects during the budget year. The Authority attends monthly utility coordination meetings with the City's Department of Mobility and Infrastructure (DOMI) and other local utilities and coordinates construction and repair efforts when possible to avoid conflicts where overlapping work is identified. Additionally, PWSA will utilize resources, including the Pennsylvania 811 Coordination web service application, to identify opportunities for collaboration between projects and to meet the need for increased coordination with local utilities and local, state, county and city government agencies.

Whenever and wherever the Authority decides to undertake a pipe or manhole refurbishment project on a road pre-scheduled for paving, the project is coordinated with the State, County, City or appropriate municipality. The Authority works closely with the government agency to ensure that the design, permitting and construction of the Authority's infrastructure project will be completed in time to allow for the road to be paved.

In some cases, the government agencies will agree to postpone paving of its roads to match the Authority's completion of construction date, even if it extends into the subsequent year. Typically, where the Authority undertakes a project where paving has been pre-planned by the involved government agency, the Authority and its rate payers will benefit financially through the avoidance of road surface restoration.

The Authority will continue the proactive means to identify opportunities to coordinate pipe replacement and road paving.

7.2 Lead Service Line Replacement Program Outreach

In full support of the COA, the Authority has built a program to support its customers through the lead service replacement process. These outreach and communication efforts encourage property owners to participate in the current no-cost private lead service replacements offered in contract work areas. The Authority is committed to these outreach efforts as a way of encouraging private line replacements and to reduce the number of partial (public-only) lead service line replacements.

The Authority's outreach and communications programs involve written communications with property

owners and residents about the LSLR program and includes a letter describing the process, several information sheets and an agreement necessary for the Authority's contractors to perform the work. In addition to this initial information package, the Authority follows up with door hangers, service line work notices, 48-hour notices, post-replacement service line flushing instructions, test kit instructions and door-to-door canvassing of unresponsive customers. In addition to the written communications, the Authority also has a fully staffed Lead Help Desk team at the Authority's office. The Lead Help Desk team is responsible for the communication with the property owner and resident for the lead service line replacement program. Their primary goals are to inform property owners and residents about the program and reduce the number of service terminations by encouraging eligible property owners to agree to private lead line replacements. Not only does the Lead Help Desk team respond to questions via their dedicated email and hotline, they also proactively call property owners in the work order areas to follow-up on unsigned property owner agreement forms and to schedule pre-construction coordination meetings.

The Authority also employs Field Liaisons who are responsible for coordinating lead service line replacement work between the Authority's contractors, property owners and often tenants. Field Liaisons contact each property owner to help them understand the replacement process and potential impacts of the work, and to encourage private property owners who have not responded to communications from the Authority's Lead Help Desk. Their presence on-site also helps assure that the Authority's contractor's meet all quality assurance and regulatory requirements such as providing NSF-approved filters and lead water test kits.

Other LSLR outreach includes presentations at community meetings within the work areas, advertisements in neighborhood publications, press releases (and resulting press coverage) of work areas, social media posts, collaboratively working with City Councilors regarding work done in their district, construction signage detailing the work and weekly updates concerning streets where work is occurring.

7.3 Other Capital Improvement Construction Outreach

As the Authority grows its capital improvement program, there is a greater need to work closely with stakeholders throughout the community to prepare them for water, sewer, and green stormwater infrastructure projects impacting their communities. The Authority has created a comprehensive capital improvement outreach protocol to connect project managers and the Authority's public affairs team in the early stages of a project to ensure that the Authority clearly communicates the benefits, impacts, and expectations of construction work. Public Affairs team members attend many of the engineering progress meetings to ensure they are in the loop as projects progress so that the public has the most pertinent, time-sensitive information on projects that will impact where they live or work.

The protocol sets timelines and expectations for communications on projects, from the 30% design phase until completion. Public Affairs has committed to providing direct contacts for customers when they have issues or concerns on a project and will work directly with project managers to resolve issues. Project managers and members of the Authority's Public Affairs team are expected to use an approved set of communications templates, such as letters and informational handouts, to properly relay project details to residents, business owners, and other community leaders who represent those affected by the work. The information is also disseminated to stakeholders in the form of releases to media and government officials and emails to residents who may have concerns about construction impacts.

PWSA's website, which was updated to be more user-friendly and function for customers in late 2019,

houses a project page for most PWSA capital projects in design or construction. Residents can check an interactive map of their neighborhood to see which projects are upcoming and easily access contact information for project managers and members of the Public Affairs team.

PWSA hosts and participates in meetings and events throughout the city to share information on our programs and projects. Our staff attended 61 meetings in 2018, 83 meetings in 2019, and 41 meetings in 2020, 44 in 2021, and 37 meetings to-date in 2022. PWSA's outreach team has hosted and attended virtual construction outreach meetings since 2020 to ensure the safety of staff and community members. Going forward, it is anticipated that many meetings will return to in-person attendance.

7.4 Industry Relations Outreach

Throughout 2022, PWSA industry relations focused on enhancing the relationship with developer and contractor customers through increased outreach and technological improvements. PWSA Public Affairs established a point of contact for any development questions or commercial customer issues. Potential applicants now have the flexibility to select an available pre-development meeting time slot that fits their schedule through an improved scheduling process. At this meeting, the property owner, their consultants, and contractors meet with PWSA staff to ensure that the project complies with water and sewer regulations. To provide an equal level of service to each customer, the information provided at meetings has been standardized while maintaining the flexibility required for each unique project. We have held 107 pre-development meetings in 2021 and 105 to date in 2022.

As a companion document to pre-development meetings, the Developer's Manual aims to simplify the development process for our customers and staff. The Developer's Manual continues to be updated annually to align with recent improvements and changes to processes impacting our customers. We hold an open Developer's Roundtable Event each spring with developer's, owners, and consultants to discuss changes to the manual and receive feedback on proposed revisions.

In 2022, PWSA introduced a new online permitting portal where customers can submit permit applications and make credit card payments directly to us. The tool offers new resources such as automated email notifications, chat discussions, digital permits, and 24/7 access to an applicant's user dashboard. The permit applications available include dye testing, hydrant flow tests, hydrant meters, tap terminations, residential tap permits, development permits, and DOMI Utility Verification letters. The cross-departmental team from customer service, engineering, operations, and public affairs have modernized the customer experience through increased staffing, standardized regulations, simplified applications, updated permit checklists, and open lines of communication.

PWSA also ramped up efforts to reach industry partners including contractors, third party engineers, plumbers, and non-profits. We attended events to promote our upcoming work contracts to organizations such as the Engineering Society of Western Pennsylvania, Southwestern Pennsylvania Engineering Outreach, Society of Military Engineers, Government Agency Procurement Office, MWDBE Governmental Committee, Building Owners and Manager Association, and more. PWSA also attended open houses, office openings, and industry award ceremonies to meet and network with new talent and potential partners. A PWSA Public Affairs team member was also selected to serve as a board member for the ACE Mentor Program of America Western PA affiliate. The program promotes careers in architecture, construction, and engineering to high school students and is supported by the largest industry partners in Western Pennsylvania.

APPENDIX B (Revised)

Table 2-8: Revised as of August 25, 2025

	Table 2-8 ~~Table 2-8~~ Water System ~~Eligible~~Elligble Properties Project Schedules and Costs Projected Annual Expenditures ~~(2022 Dollars)~~					
Project Name	**2023**	**2024**	**2025**	**2026**	**2027**	**Total Cost**
2022 Urgent and Priority Lead Service Line Replacement	$ ~~762,720.00~~2,275,274					$ ~~762,720.00~~ **2,275,274**
2023 Urgent and Priority Lead Service Line Replacement	$ ~~1,015,934.00~~419,954	$ ~~721,566.00~~1,393,422	$ 1,556,202			$ ~~1,737,500.00~~ **3,369,579**
2024 Urgent and Priority Lead Service Line Replacement		~~$ 1,027,628.00~~	~~$ 729,872.00~~			$ ~~1,757,500.00~~
2025 Urgent and Priority Lead Service Line Replacement			$ ~~940,214.00~~172,729	$ ~~667,786.00~~683,323	$ 227,774	$ ~~1,608,000.00~~ **1,083,826**
2026 Urgent and Priority Lead Service Line Replacement				~~$ 922,965.00~~	~~$ 655,535.00~~	$ ~~1,578,500.00~~
2027 Urgent and Priority Lead Service Line Replacement					~~$ 591,142.00~~	$ ~~591,142.00~~
2023 Small Diameter Water Main Replacement	$ ~~7,982,472.00~~7,982,472	$ ~~26,104,038.00~~ 26,104,038	$ ~~8,701,346.00~~8,701,346			$ ~~42,787,856.00~~ **42,787,856**
2024 Small Diameter Water Main Replacement	$ ~~1,049,766.00~~1,049,766	$ ~~14,287,293.00~~ 14,287,293	$ ~~37,846,331.00~~ 37,846,331	$ ~~9,461,583.00~~ 9,461,583		$ ~~62,644,973.00~~ **62,644,973**
2025 Small Diameter Water Main Replacement		$ ~~805,441.00~~805,441	$ ~~10,109,849.00~~ 10,109,849	$ ~~26,498,219.00~~ 26,498,219	$ ~~6,624,555.00~~ 6,624,555	$ ~~44,038,064.00~~ **44,038,064**
2026 Small Diameter Water Main Replacement			$ ~~1,105,849.00~~1,105,849	$ ~~14,431,097.00~~	$ ~~38,033,034.00~~	$ ~~53,569,980.00~~

				14,431,097	38,033,034	**53,569,980**
2027 Small Diameter Water Main Replacement				$ ~~3,41~~ ~~6,232.00~~ 3,416,232	$ ~~44,7~~ ~~51,187.00~~ 44,751,187	$ ~~48,1~~ ~~67,419.00~~ **48,167,419**
2022 Water Relay	$ ~~1,500,00~~ ~~0.00~~1,500,000					$ ~~1,50~~ ~~0,000.00~~ **1,500,000**
2023 Water Relay	$ ~~645,000~~ ~~.00~~645,000	$ ~~1,290,00~~ ~~0.00~~1,290,000				$ ~~1,93~~ ~~5,000.00~~ **1,935,000**
2024 Water Relay		$ ~~860,000~~ ~~.00~~860,000	$ ~~1,720,00~~ ~~0.00~~1,720,000			$ ~~2,58~~ ~~0,000.00~~ **2,580,000**
2025 Water Relay			$ ~~992,308~~ ~~.00~~992,308	$ ~~2,23~~ ~~2,692.00~~ 2,232,692		$ ~~3,22~~ ~~5,000.00~~ **3,225,000**
2026 Water Relay				$ ~~1,02~~ ~~2,077.00~~ 1,022,077	$ ~~2,29~~ ~~9,673.00~~ 2,299,673	$ ~~3,32~~ ~~1,750.00~~ **3,321,750**
2027 Water Relay					$ ~~1,14~~ ~~0,468.00~~ 1,140,468	$ ~~1,14~~ ~~0,468.00~~ **1,140,468**
2021 Valve Replacement	$ ~~150,000~~ ~~.00~~150,000					$ ~~150,00~~ ~~0.00~~**150,000**
2022 Valve Replacement	$ ~~722,152~~ ~~.00~~722,152					$ ~~722,15~~ ~~2.00~~**722,152**
2023 Valve Replacement	$ ~~1,633,33~~ ~~3.00~~1,633,333	$ ~~1,166,66~~ ~~7.00~~1,166,667				$ ~~2,80~~ ~~0,000.00~~ **2,800,000**
2024 Valve Replacement		$ ~~1,633,33~~ ~~3.00~~1,633,333	$ ~~1,166,66~~ ~~7.00~~1,166,667			$ ~~2,80~~ ~~0,000.00~~ **2,800,000**
2025 Valve Replacement			$ ~~1,507,69~~	$ ~~1,29~~		$ ~~2,80~~

			~~2.00~~1,507,692	~~2,308.00~~ 1,292,308		~~0,000.00~~ **2,800,000**
2026 Valve Replacement				$ ~~1,50 7,692.00~~ 1,507,692	$ ~~1,29 2,308.00~~ 1,292,308	$ ~~2,80 0,000.00~~ **2,800,000**
2027 Valve Replacement					$ ~~1,63 3,333.00~~ 1,633,333	$ ~~1,63 3,333.00~~ **1,633,333**
~~**Total**~~	~~**$ 15,4 61,377.00**~~	~~**$ 47,8 95,966.00**~~	~~**$ 64,8 20,128.00**~~	~~**$ 61, 452,651.00**~~	~~**$ 97, 021,235.00**~~	~~**$ 2 86,651,357. 00**~~

Table 3-6
Sewer System Eligible Properties Project Schedules and Costs

	Projected Annual Expenditures (2022 Dollars)					
Project Name	**2023**	**2024**	**2025**	**2026**	**2027**	**Total Cost**
2022 Small Diameter Sewer Rehabilitation IDIQ	$ 413,758.00					$ 413,758.00
2023 Small Diameter Sewer Rehabilitation IDIQ	$ 2,124,000.00	$ 1,016,000.00				$ 3,140,000.00
2024 Small Diameter Sewer Rehabilitation IDIQ		$ 2,205,000.00	$ 1,055,000.00			$ 3,260,000.00
2025 Small Diameter Sewer Rehabilitation IDIQ			$ 2,272,500.00	$ 1,087,500.00		$ 3,360,000.00
2026 Small Diameter Sewer Rehabilitation IDIQ				$ 2,353,500.00	$ 1,126,500.00	$ 3,480,000.00
2027 Small Diameter Sewer Rehabilitation IDIQ					$ 2,428,500.00	$ 2,428,500.00
2021 Sewer Reconstruction	$ 200,000.00					$ 200,000.00
2022 Sewer Reconstruction	$ 1,456,849.00					$ 1,456,849.00
2023 Sewer Reconstruction	$ 1,034,920.00	$ 775,080.00				$ 1,810,000.00
2024 Sewer Reconstruction		$ 1,034,920.00	$ 775,080.00			$ 1,810,000.00
2025 Sewer Reconstruction			$ 1,034,920.00	$ 775,080.00	$ 775,080.00	$ 2,585,080.00
2026 Sewer Reconstruction				$ 1,111,378.00	$ 833,622.00	$ 1,945,000.00
2027 Sewer Reconstruction					$ 1,092,628.00	$ 1,092,628.00
Total	**$ 5,229,527.00**	**$ 5,031,000.00**	**$ 5,137,500.00**	**$ 5,327,458.00**	**$ 6,256,330.00**	**$ 26,981,815.00**