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Garrett P. Lent

glent@postschell.com  
717-612-6032 Direct  
717-731-1985 Direct Fax  
File #: 203073

March 14, 2024

**VIA ELECTRONIC FILING**

Rosemary Chiavetta, Secretary  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street, 2nd Floor  
P.O. Box 3265  
Harrisburg, PA 17105-3265

**Re: Petition of Aqua Pennsylvania, Inc. For Approval of its Third Long-Term  
Infrastructure Improvement Plan  
Docket No. P-2023-3043755**

Dear Secretary Chiavetta:

Attached for filing please find the Supplemental Response of Aqua Pennsylvania, Inc. (“Aqua”) to the Data Request of the Pennsylvania Public Utility Commission’s (“Commission”) Bureau of Technical Utility Services (“TUS”) Set I-2, in the above-referenced proceeding. Included as an attachment to its Supplemental Response to TUS Set I-2, Aqua provides a further updated version of its proposed Third Long-Term Infrastructure Improvement Plan (“LTIP”).


The Third LTIP was originally included as Exhibit A to Aqua’s Petition for Approval of its Third LTIP, which was submitted to the Commission on October 25, 2023. On December 28, 2023, Aqua provided updated pages to the Third LTIP to reflect updates to the numbers included in Table 4 and Table 18 of the Third LTIP. The attached further update to the Third LTIP presents updates to numbers included in Tables 17, 18, and 19 of the Third LTIP.

Please direct any questions regarding this submission to the undersigned.

Copies will be provided as indicated on the Certificate of Service.

Rosemary Chiavetta, Secretary  
March 14, 2024  
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Respectfully submitted,



Garrett P. Lent

GPL/dmc  
Enclosure

cc: Ken Shaffer (*kennshafe@pa.gov*)  
Certificate of Service

## CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

### VIA E-MAIL

Erin L. Gannon, Esquire  
Office of Consumer Advocate  
555 Walnut Street  
Forum Place, 5th Floor  
Harrisburg, PA 17101-1923  
[egannon@paoca.org](mailto:egannon@paoca.org)  
[OCAShenandoah@paoca.org](mailto:OCAShenandoah@paoca.org)

Steven C. Gray, Esquire  
Office of Small Business Advocate  
555 Walnut Street  
Forum Place, 1<sup>st</sup> Floor  
Harrisburg, PA 17101  
[sgray@pa.gov](mailto:sgray@pa.gov)

John W. Sweet, Esquire  
Ria M. Pereira, Esquire  
Elizabeth R. Marx, Esquire  
Lauren Berman, Esquire  
Pennsylvania Utility Law Project  
118 Locust Street  
Harrisburg, PA 17101  
[PULP@pautilitylawproject.org](mailto:PULP@pautilitylawproject.org)

Date: March 14, 2024



Garrett P. Lent

**PETITION OF AQUA PENNSYLVANIA, INC.**

**DOCKET NO. P-2023-3043755**

**BUREAU OF TECHNICAL UTILITY SERVICES**

**SET I DATA REQUESTS**

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**TUS-I-2** Reference Exhibit A, Section 4: Location of Eligible Property

- a. Provide a detailed list of all water systems in each Aqua operating district (GPA, SEPA), that are eligible to have infrastructure replaced in the Third LTIP.
- b. Provide the specific eligible property to be replaced, by water system, as part of the Third LTIP.

**SUPPLEMENTAL RESPONSE**

- a. Below is a listing of all of Aqua’s systems by operating division:

Division	System Name
GPA	East Cameron
GPA	Kratzerville
GPA	Links at Gettysburg
GPA	Meribah
GPA	Mifflinville
GPA	Monroe Manor
GPA	Pennsview
GPA	Roaring Creek
GPA	Shenandoah
GPA	White Rock
GPA	Susquehanna
GPA	Belle Aire Acres*
GPA	Canal Acres
GPA	Elmbrook
GPA	Fawn Lake
GPA	Garden Hills
GPA	Gouldsboro

Division	System Name
GPA	Hawley
GPA	Honesdale
GPA	Jefferson Heights
GPA	Moscow
GPA	Mount Cobb
GPA	Mountainhome
GPA	Paupackan Lake Est
GPA	Pine Beach
GPA	Pinecrest Lake
GPA	SCI Waymart/FBOP
GPA	Tafton
GPA	Tanglwood Lakes
GPA	Tanglwood Motor Lodge
GPA	Tanglwood North
GPA	Twin Lakes Utilities*
GPA	Waymart
GPA	Wayne County Prison
GPA	Wild Pines
GPA	Woodledge
GPA	Woodmont
GPA	Applewood
GPA	Barrett
GPA	Beech Mountain
GPA	Brooklyn
GPA	Bunker Hill
GPA	Chinchilla
GPA	Christian Springs
GPA	Country Club Gardens
GPA	Deer Lake
GPA	Eagle Rock
GPA	Edgewood
GPA	Evanwood
GPA	Factoryville
GPA	Fieldcrest
GPA	Forest Park
GPA	Garbush
GPA	Glenburn
GPA	Golden Oaks
GPA	Greenbriar
GPA	Hamilton

<b>Division</b>	<b>System Name</b>
GPA	Hauler White Haven
GPA	Hex Acres
GPA	Hop Bottom
GPA	Laurel Lakes
GPA	Maple Hills
GPA	Midway Manor
GPA	Oakhill
GPA	Oneida
GPA	Penn Lake
GPA	Rhodes Terrace
GPA	Rivercrest
GPA	Robin Hood Lakes
GPA	Sand Springs
GPA	Shickshinny Lake
GPA	Springhouse Farms
GPA	St. Johns
GPA	Sun Valley
GPA	Sunset Hills
GPA	Thornhurst Country Club
GPA	Wapwallopen
GPA	Warden Place
GPA	Washington Park
GPA	White Haven
GPA	Yalick Farms
GPA	Clarendon
GPA	Crawford
GPA	Emlenton
GPA	Forest County Marienville Jenks Twp
GPA	Lake Latonka
GPA	Mahoning Township
GPA	Mt Jewett
GPA	Shenango
GPA	Venango*
GPA	Treasure Lake
SEPA	Bensalem
SEPA	Bristol
SEPA	Chalfont
SEPA	Hatboro
SEPA	Peddlers View
SEPA	Perkiomen Twp

Division	System Name
SEPA	East Pikeland
SEPA	East Pointe
SEPA	Flying Hills
SEPA	Franklin
SEPA	Friendship
SEPA	Geigertown
SEPA	Hillcrest Estates
SEPA	Honey Brook
SEPA	Ivy Ridge
SEPA	Main
SEPA	Meadowbrook
SEPA	Perkiomen Woods
SEPA	Spring Run
SEPA	Stonecroft
SEPA	Suburbia
SEPA	Superior Main
SEPA	Upper Providence
SEPA	Uwchlan
SEPA	West Chester
SEPA	Center Point Farm

\* Under Receivership

b. Please see the below table for specific property replaced in 2023 and in 2024.

System Name	2023 Replacement				2024 Replacement			
	Mileage	Services	Valves	Hydrants	Mileage	Services	Valves	Hydrants
Bensalem	2.3	156	63	11	3.6	252	56	16
Bristol	0.3	9	3	2	1.2	107	37	8
Chalfont	0.9	61	11	0	0.0	0	0	0
Clarendon	0.1	3	0	0	0.0	0	0	0
Country Club Gardens	0.5	22	11	0	0.0	0	0	0
Crawford	0.0	0	0	0	0.6	36	3	0
Eagle Rock	0.0	0	0	0	1.3	21	26	9
East Pikeland	0.0	0	0	0	0.0	0	0	0
Edgewood	1.8	122	12	0	0.0	0	0	0
Fawn Lake	2.0	120	20	4	1.6	117	20	4
Fieldcrest	0.0	0	0	0	0.0	0	0	0
Flying Hills	0.0	0	0	0	0.0	0	0	0
Forest Park	0.0	0	0	0	0.0	0	0	0
Franklin	0.0	0	0	0	0.2	0	0	0
Friendship	0.0	0	0	0	3.0	0	1	0

System Name	2023 Replacement				2024 Replacement			
	Mileage	Services	Valves	Hydrants	Mileage	Services	Valves	Hydrants
Geigertown	0.2	0	0	0	0.4	17	5	0
Gouldsboro	0.2	13	1	0	0.0	0	0	0
Hatboro	0.0	0	0	0	1.3	110	20	4
Honesdale	0.0	0	0	0	0.0	0	0	0
Honey Brook	0.0	0	0	0	0.1	1	0	0
Jenks Twp	0.0	0	0	0	0.0	0	0	0
Kratzerville	0.0	0	0	0	0.0	0	0	0
Lake Latonka	0.0	0	0	0	1.5	145	18	1
Laurel Lakes	0.0	0	0	0	0.0	0	0	0
Main	56.5	4475	1028	176	36.6	2386	553	100
Maple Hills	0.0	0	0	0	0.0	0	0	0
Moscow	0.6	37	13	2	0.0	0	0	0
Mountainhome	0.5	16	2	1	0.0	0	0	0
Mt Jewett	0.0	0	0	0	0.0	0	0	0
Oneida	1.8	22	19	0	0.0	0	0	0
Paupackan Lake Estates	1.0	12	10	0	0.0	0	0	0
Penn Lake Park	0.0	0	0	0	0.4	7	9	0
Perkiomen Twp	0.0	0	0	0	0.3	0	0	0
Perkiomen Woods	0.0	0	0	0	0.0	0	0	0
Roaring Creek	4.1	206	57	7	3.0	440	31	7
Shenandoah	0.0	0	0	0	0.7	2	0	0
Shenango Franchise	2.6	388	62	10	1.9	137	29	6
Spring Run	1.7	8	2	0	0.0	0	0	0
Springhouse Farms	0.0	0	0	0	0.0	0	0	0
Suburbia	0.0	0	0	0	0.5	0	0	0
Superior Main	0.0	0	0	0	0.1	0	3	0
Susquehanna	0.1	11	0	0	0.0	0	0	0
Tanglwood North	1.1	28	6	0	0.6	9	6	0
Treasure Lake	1.4	104	4	0	4.1	372	23	2
Upper Providence	0.0	0	0	0	0.0	0	0	0
Uwchlan	0.1	0	0	0	1.5	32	27	5
West Chester	4.0	227	92	18	0.0	0	0	0
White Haven	0.0	0	0	0	0.0	0	0	0
White Rock Acres	0.2	9	2	0	0.0	0	0	0
Woodledge Village	0.0	0	0	0	0.0	0	0	0
<b>Totals</b>	<b>84.0</b>	<b>6049</b>	<b>1418</b>	<b>231</b>	<b>64.5</b>	<b>4191</b>	<b>867</b>	<b>162</b>

The data provided in Aqua's response to TUS-I-2 Attachment 1 on December 15, 2023 which showed by division breakdown of mains and appurtenances was based upon estimates of cost by division for main replacements to arrive at miles of main by division to be replaced and a multiplier to arrive at projected service, valves, and hydrants. The data provided in Aqua's response to SUPPLEMENTAL TUS-I-2, part b. on January 10, 2024, was derived by breaking out the projected pipe mileage by system pulled from the Company's GIS system and utilized a multiplier to arrive at the related approximate appurtenances by system. The mileages for the January 10, 2024, response was the best available information at the time, but did not include a complete data set for some 2023 projects because of data that was still being incorporated into our GIS system from as built documentation. The data in the above table has been updated to reflect the more accurate mileages of main replaced by system in 2023 without rounding the pipe mileages. The data here also reflects the updates for 2024 being made in the Third LTIP explained in the paragraph below. The Updated Third LTIP is being filed with this response as FURTHER SUPPLEMENTAL TUS-I-2 Attachment 1.

After the Company submitted its Third LTIP, updated cost estimates for the coming years were received from the Company's vendors. Significant cost increases required adjustment to the quantities of pipe, services, valves and hydrants the Company would be installing under the current budget. Those changes are reflected in Tables 17-19 of the Updated Third LTIP. These price increases amounted to a 24% increase in cost per foot for main replacement projects over the projected life of the Third LTIP.

For the later years of the Company's LTIP, the Company's planning process for DSIC eligible main replacements typically includes identification of projects for the following year, during the current year. The Company establishes and finalizes a budget for the DSIC eligible projects and then categorizes them into its GIS system. For larger or long-term projects those projects are identified and included in the Company's five-year projected budget and categorized as DSIC eligible as applicable. In addition to known projects scheduled in the out years of the five-year budget, the Company includes estimates for additional projects based on pipe age, material and break rates. These estimates are then refined in the year prior to the year they are implemented.

In addition to the projects identified in the table above, the Company has planned major main replacement projects in the out years of the LTIP as set forth below. Some projects have been shifted since the SUPPLEMENTAL TUS-I-2 response was provided.

Year	System	Estimated Footage	Description
2026	Main	4,388	Project needed to supply additional supply to distribution system
2025	Main	3,716	Project needed to replace old water main that is past its useful life. Project coordinated with overlapping PECO project to take advantage of cost savings
2025	Shenango	797	Project needed to meet increased customer demands
2025	Main	4,296	Project needed to replace old water main that is past its useful life. Project coordinated with overlapping PECO project to take advantage of cost savings
2026	Main	5,733	Project needed to upsize existing mains for system reliability and customer demand.
2026	Main	8,055	Project needed to replace old water main that is past its useful life and consolidate parallel water mains.
2025	West Chester	345	Project needed to supply increased fire flow to distribution system
2025	Shenango	1,034	Project needed to replace old water main that is past its useful life.
2026	Main	10,525	Project needed to replace old water main that is past its useful life. Project coordinated with overlapping township project to take advantage of cost savings
2025	Spring Run	10,760	Project needed to provide redundancy and system reliability in water system
2026	Spring Run	11,900	Project needed to provide redundancy and system reliability in water system
2026	Perkiomen Woods	8,781	Project needed to provide increased water quality.
2026	Perkiomen Woods	1,098	Project needed to provide increased water quality.
2026	Perkiomen Woods	9,771	Project needed to provide increased water quality.
2025	Main	1,644	Project needed to supply additional supply to distribution system
2026	Main	3,244	Project needed to replace old water main that is past its useful life in difficult location for maintenance.
2026	Main	4,097	Project needed to replace old water main that is past its useful life.
2026	Main	2,224	Project needed to upsize existing mains for system reliability and customer demand.
2026	Main	2,515	Project needed to replace old water main that is past its useful life.

Year	System	Estimated Footage	Description
2026	Main	4,977	Project needed to replace old water main that is past its useful life.
2026	Main	6,483	Project needed to replace old water main that is past its useful life.
2026	Main	6,985	Project needed to replace old water main that is past its useful life.
2025	Main	1,517	Project needed to replace old water main that is past its useful life. Project coordinated with overlapping PECO project to take advantage of cost savings
2026	Main	4,977	Project needed to replace old water main that is past its useful life.
2026	Main	1,478	Project needed to replace old water main that is past its useful life.
2026	Main	6,483	Project needed to replace old water main that is past its useful life.

# **EXHIBIT A**

## **AQUA PENNSYLVANIA, INC.**

### **Updated 2023 Long Term Infrastructure Improvement Plan – March 14, 2024**

Aqua Pennsylvania, Inc. (“Aqua” or the “Company”) is submitting this 2023 Long Term Infrastructure Improvement Plan (“LTIP”) in accordance with the requirements of Chapter 13 of the Public Utility Code, 66 Pa. C.S. §§ 1350-1360, Chapter 121 of Title 52 of the Pennsylvania Code, the Pennsylvania Public Utility Commission’s (“PUC” or the “Commission”) Final Implementation Order entered on August 2, 2011 in Docket No. M-2012-2293611, the Commission’s Supplemental Implementation Order entered on September 15, 2016 in Docket No. M-2012-2293611, and the Commission’s Final Rulemaking Order regarding Act 120 of 2018<sup>1</sup> (“Act 120”) entered on March 14, 2022 in Docket No. L-2020-3019521. The Company’s LTIP covers infrastructure investment through its established and longstanding Distribution System Improvement Charge (“DSIC”). Aqua had previously submitted and has operated under its existing LTIP approved by the Commission on February 27, 2020 at Docket No. P-2019-3013940 covering the period from 2020-2024. Since Aqua filed its LTIP in 2019, Aqua has acquired several systems (and several of these have been through the Company’s most recent rate case) and the Commission has implemented rules regarding customer-owned lead service lines (“COLSL”) under Act 120. In addition, this LTIP is being filed to include Aqua’s recent acquisition of the Municipal Authority of the Borough of Shenandoah’s water system in accordance with the Joint Settlement approved by the Commission.<sup>2</sup> Aqua now files a new LTIP for the years 2023-2027 which will replace the existing 2019 LTIP and include its plan for COLSL replacements consistent with Act 120.

#### **1. INTRODUCTION**

Aqua owns and operates water systems serving approximately 450,000 customers in 32 counties throughout Pennsylvania. Its water distribution systems include approximately 5,928 miles of pipe, 25,210 hydrants, 85,135 valves, and 449,298 customer meters.

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<sup>1</sup> Act of Oct. 24, 2018, P.L. 738, No. 120.

<sup>2</sup> *Application of Aqua Pennsylvania, Inc. pursuant to Sections 1102, 1329, and 507 of the Public Utility Code for Approval of its Acquisition of the Water System Assets of Shenandoah Borough and the Municipal Authority of the Borough of Shenandoah*, Docket No. A-2022-3034143, Opinion and Order, Ordering Paragraph 11 (Jul. 13, 2023).

Aqua's service territories are designated as either Southeast Pennsylvania ("SEPA"), which includes a contiguous distribution system within portions of Bucks, Chester, Delaware, and Montgomery counties and separate smaller systems in portions of Berks, Bucks, Chester, and Montgomery counties, or Greater Pennsylvania ("GPA"), which includes Aqua's service territories outside of SEPA.

In response to the problems presented by the Commonwealth's aging water infrastructure, the Commission, on August 22, 1996, issued an order authorizing Aqua (then Philadelphia Suburban Water Company) to establish a DSIC. Thereafter, on December 18, 1996, the General Assembly enacted Section 1307(g) of the Public Utility Code, 66 Pa. C.S. § 1307(g), to eliminate any uncertainty as to the Commission's authority in this area. Aqua subsequently filed and had approved a DSIC following the Commission's requirements and procedures for processing and calculation. Aqua's recovery was capped at 5%.

On December 8, 2008, Aqua filed Supplement No. 88 to Tariff Water-Pa. P.U.C. No. 1, requesting approval to increase the DSIC cap from 5% to 7.5%. In support of that tariff supplement, Aqua included a detailed analysis and long-term pipe replacement plan. The Commission approved the increase in the DSIC cap from 5% to 7.5% in a Final Order entered July 23, 2009 in Docket No. R-2008-2079310. The Commission, in that order, concluded that the water DSIC model was working effectively and, indeed, that its use has made a significant impact in terms of improving Aqua's distribution system. Aqua has continued its DSIC program under that model and has been successful in improving its distribution system.

Act 11 of 2012 ("Act 11") amended Chapter 13 of the Public Utility Code by adding Subchapter B, Sections 1350 through 1360 (66 Pa. C.S. §§ 1350-1360). Act 11 permitted water and wastewater utilities, electric distribution companies, natural gas distribution companies, and gas distribution operations to petition the Commission to implement a DSIC. The Commission entered its Final Implementation Order on Act 11 on August 2, 2012 at Docket M-2012-2293611. The Commission entered its Supplemental Implementation Order on Act 11 on September 21, 2016 at Docket M-2012-2293611 directing water utilities with pre-existing DSIC programs to file LTIIPs on a staggered filing schedule.

Aqua filed its first LTIP on January 20, 2017, which the Commission approved on May 18, 2017 at Docket No. P-2017-2584953. Aqua filed its second LTIP on October 31, 2019, which the Commission approved on February 27, 2020 at Docket No. P-2019-3013940.

On October 24, 2018, Governor Wolf signed Act 120 which allowed for public utilities to replace COLSLs and recover those costs through a utility’s DSIC if the utility has a DSIC program. The Commission implemented a rulemaking to set forth the requirements and guidelines for utilities that implement a Lead Service Line (“LSL”) Replacement Program (“LSLR Program”), which includes submitting a LSLR Plan to the Commission.

Since the inception of the DSIC program, Aqua has replaced approximately 2,676 miles of pipe and cleaned and lined an additional 331 miles of pipe for a total of 3,007 miles, or an average of over 100 miles per year. This represents approximately 46% of its distribution system that has been renewed under the DSIC. **Figure 1** presents a year-by-year overview of the DSIC program.

**Figure 1 – Miles of Main Replaced or Rehabilitated**

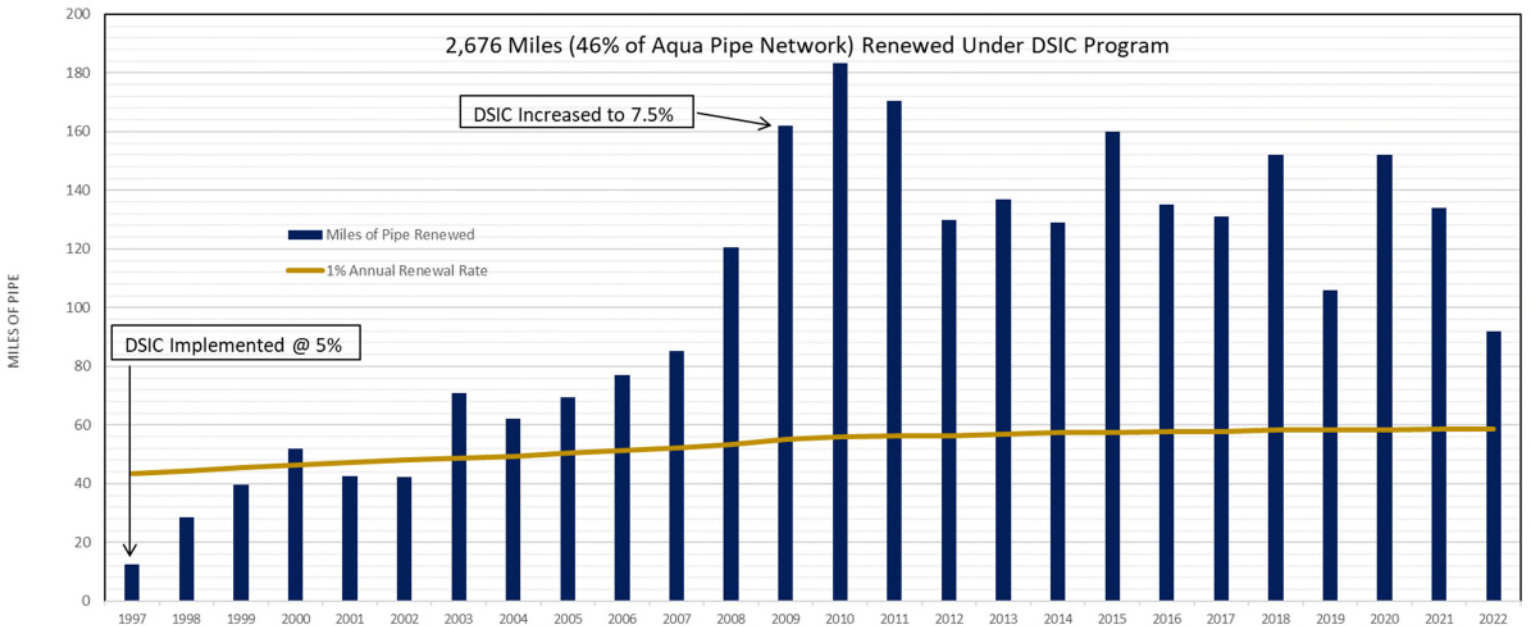


Figure 1 also displays the amount of pipe that would have been renewed at a 1% annual rate of renewal. The DSIC program has allowed Aqua to accelerate its renewal program

beyond the general rule of a 100-year replacement cycle. This LTIP demonstrates that over the next five years Aqua will continue an accelerated water main replacement program in excess of the 1% annual rate.

In addition to pipe, Aqua has also addressed services, valves, hydrants, and meters as part of its DSIC program. **Table 1** provides an estimate of the total number of these assets installed under DSIC since 1997.

**Table 1 – Summary of Assets Installed Under DSIC Program 1997- Oct 2023**

<b>Asset</b>	<b>Approximate Number Installed under DSIC 1997 - 2022</b>	<b>% of Total</b>
Pipe (miles) <sup>3</sup>	2,676	46%
Company Services <sup>4</sup>	148,545	34%
Valves <sup>5</sup>	43,725	51%
Hydrants <sup>6</sup>	6,041	24%
Meters <sup>7</sup>	636,197	142%

The data in Table 1 show that in addition to pipe, Aqua’s DSIC program has resulted in significant renewal of other distribution system assets since 1997.

<sup>3</sup> The miles of pipe shown includes both replaced pipe and pipe that was cleaned and lined.

<sup>4</sup> As a water main is replaced, the Company portion of the service line is entirely replaced. The value shown for “replaced” services represents the approximate number of service lines impacted by main replacement projects.

<sup>5</sup> Valves are not “replaced” during a water main replacement project. The original pipe and valves are abandoned in place, and new pipe and valves are installed. Often, the new pipe will include more valves, to provide better control of the system, than existed on the old pipe. The value shown for “replaced” valves is the approximate number of valves installed as part of main replacement projects.

<sup>6</sup> As with valves, hydrants are not “replaced” during a main replacement project. The old hydrants remain in place and in service until the new pipe is activated. New hydrants are connected to the new pipe and the old hydrants are removed. Inspections then occur on the new hydrants. Sometimes, the new pipe will include more hydrants than were located on the old pipe. The value shown for “replaced” hydrants is the approximate number of hydrants installed as part of main replacement projects.

<sup>7</sup> Meter replacement is not associated with water main replacement projects. Meters are replaced according to age and mandated replacement schedule.

## 2. TYPE AND AGE OF ELIGIBLE PROPERTY

Eligible asset property addressed under the DSIC program includes water mains, valves, hydrants, services and meters. In addition, items such as capitalized main breaks, tie-in of dead end mains, cleaning and lining, highway relocations, and other DSIC-eligible activities are included in Aqua’s DSIC program.

Aqua developed a Geographic Information System (“GIS”) for its water systems beginning in 2005. The GIS stores data on water mains, valves, and hydrants and is continually updated as the systems change with the addition of new assets and the replacement of old assets.

**Table 2** through **Table 13**, below, describe Aqua’s distribution system asset inventory and includes information on material, diameter, and age using GIS data as of October 2023. There is a subset of data that is “Unknown”, as occasionally data and/or plans are simply not available, particularly for older facilities and acquisitions. However, the GIS provides the means to capture data moving forward as continuing investigatory and repair work proceeds.

**Table 2 – Aqua Pipe Inventory by Diameter**

Pipe Diameter	Miles	% of Total
<=4	215	4%
6	839	14%
8	3365	57%
10	89	1%
12	839	14%
>12	420	7%
Unknown	2	0%
<b>TOTAL</b>	<b>5,928</b>	<b>100%</b>

**Table 3 – Aqua Pipe Inventory by Material**

Material	Miles	% of Total
Asbestos Cement	230	4%
Cast Iron	1,101	19%
Cement Stovepipe <sup>8</sup>	11	0%
Ductile Iron	4,186	71%
Other	151	3%
PVC	243	4%
Unknown	7	0%
<b>TOTAL</b>	<b>5,928</b>	<b>100%</b>

**Table 4 – Aqua Pipe Inventory by Installation Decade**

Decade	Miles	% of Total
< 1900	14	0%
1900-1909	71	1%
1910-1919	31	1%
1920-1929	190	3%
1930-1939	62	1%
1940-1949	87	1%
1950-1959	177	3%
1960-1969	347	6%
1970-1979	424	7%
1980-1989	429	7%
1990-1999	501	8%
2000-2009	1,093	18%
2010-2019	1,601	27%
2020-2023 <sup>9</sup>	441	7%
Unknown	460	8%
<b>TOTAL</b>	<b>5,928</b>	<b>100%</b>

<sup>8</sup> Cement stovepipe is a pipe material unique to SEPA. It consists of a “sandwich” of a cement material surrounding by an inner and outer jacket of galvanized iron. This pipe was installed in SEPA prior to 1930.

<sup>9</sup> As of October 2023.

**Table 5 – Aqua Valve Inventory by Diameter**

<b>Pipe Diameter</b>	<b>Number of Valves</b>	<b>% of Total</b>
<= 4-inch	3,375	4%
6-inch	13,827	16%
8-inch	52,821	62%
10-inch	1,163	1%
12-inch	10,425	12%
> 12-inch	3,305	4%
Unknown	219	0%
<b>TOTAL</b>	<b>85,135</b>	<b>100%</b>

**Table 6 – Aqua Valve Inventory by Pipe Material**

<b>Pipe Material</b>	<b>Number of Valves</b>	<b>% of Total</b>
Asbestos Cement	2,173	3%
Cast Iron	11,365	13%
Cement Stovepipe	161	0%
Ductile Iron	67,096	79%
Other	1,083	1%
PVC	2,941	%
Unknown	316	0%
<b>TOTAL</b>	<b>85,135</b>	<b>100%</b>

**Table 7 – Aqua Valve Inventory by Installation Decade**

Valve Installation Decade	Number of Valves	% of Total
<1900	167	0%
1900-1909	670	1%
1910-1919	271	0%
1920-1929	1,782	2%
1930-1939	667	1%
1940-1949	775	1%
1950-1959	1,756	2%
1960-1969	3,432	4%
1970-1979	4,429	5%
1980-1989	4,920	6%
1990-1999	6,545	8%
2000-2009	17,587	21%
2010-2019	28,923	34%
2020-2023 <sup>10</sup>	8,589	10%
Unknown	4,622	5%
<b>TOTAL</b>	<b>85,135</b>	<b>100%</b>

**Table 8– Aqua PA Hydrant Inventory by Installation Decade**

Hydrant Installation Decade	Number of Hydrants	% of Total
1900-1909	5	0%
1910-1919	16	0%
1920-1929	24	0%
1930-1939	47	0%
1940-1949	41	0%
1950-1959	154	1%
1960-1969	501	2%
1970-1979	899	4%
1980-1989	1,511	6%
1990-1999	2,157	9%
2000-2009	5,207	21%
2010-2019	6,816	27%
2020-2023 <sup>11</sup>	2,088	8%
Unknown	5,744	22%
<b>TOTAL</b>	<b>25,210</b>	<b>100%</b>

<sup>10</sup> As of October 2023.

<sup>11</sup> As of October 2023.

**Table 9 – Aqua PA Meter Inventory by Size**

Size	Description	Connection Size	Quantity	% of Total
1	1 INCH METER	1	9,168	2%
2	2 INCH METER	2	3,441	1%
3	3 INCH METER	3	785	0%
4	4 INCH METER	4	649	0%
6	6 INCH METER	6	508	0%
8	8 INCH METER	8	377	0%
10	10 INCH METER	10	48	0%
1 ½	1 1/2 INCH METER	1 ½	2722	1%
¾	3/4 INCH METER	3/4"	12,122	3%
5/8"	5/8 INCH METER	5/8"	387,642	86%
A	1" FIRE WITH BYPASS NON RES	1	18	0%
AA	2 X 2" RES MULT M	2	2	0%
B	1 1/2 WITH BYPASS NON[1] RES	1 ½	66	0%
C	2" WITH BYPASS NON RES	2	341	0%
D	3" WITH BYPASS NON RES	3	1	0%
E	4" WITH BYPASS NON RES	4	1,883	0%
G	6" WITH BYPASS NON RES	6	2,120	0%
K	8" WITH BYPASS NON RES	8	569	0%
L	10" WITH BYPASS NON RES	10	17	0%
M	5/8 X 3/4" RES MULT M[2]	5/8"	142	0%
N	5/8 X 1" RES MULT M	5/8"	21,863	5%
O	5/8 X 1 1/2" RES MULT M	5/8"	3,797	1%
P	5/8 X 2" RES MULT M	5/8"	75	0%
Q	3/4 X 1 RES MULT M	3/4"	184	0%
R	3/4 X 1 1/2" RES MULT M	3/4"	313	0%
S	3/4 X 2" RES MULT M	3/4"	14	0%
T	1" X 1" RES MULT M	1	100	0%
U	1" X 1 1/2" RES MULT M	1	265	0%
V	1" X 2" RES MULT M	1	58	0%
XX	1 1/2" X 1 1/2" RES MULT M	1 ½	2	0%
YY	1 1/2" X 2" RES MULT M	1 ½	4	0%
ZZ	2" X 1 1/2" RES MULT M	2	2	0%
<b>TOTAL</b>			<b>449,298</b>	<b>100%</b>

**Table 10 – Aqua Meter Inventory by Installation Year**

Meter Installation Year	Number of Meters	% of Total
Pre 1990	43	0%
1991	24	0%
1992	45	0%
1993	77	0%
1994	92	0%
1995	118	0%
1996	192	0%
1997	187	0%
1998	404	0%
1999	397	0%
2000	278	0%
2001	400	0%
2002	1,574	0%
2003	11,380	3%
2004	29,407	7%
2005	29,652	7%
2006	4,903	1%
2007	4,023	1%
2008	3,426	1%
2009	5,998	1%
2010	7,927	2%
2011	10,326	2%
2012	14,894	3%
2013	14,834	3%
2014	16,592	4%
2015	19,682	4%
2016	18,517	4%
2017	42,202	9%
2018	53,117	12%
2019	49,292	11%
2020	19,398	4%
2021	43,193	10%
2022	27,325	6%
2023 <sup>12</sup>	19,379	4%
<b>Total</b>	<b>449,298</b>	<b>100%</b>

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<sup>12</sup> As of October 2023.

**Table 11 – Aqua Services Inventory by Size**

Service Size	Number of Services	% of Total
½	168	0%
5/8	1,510	0%
¾	92,996	21%
1	143,278	33%
1 ¼	22	0%
1 ½	3,477	1%
2	3,143	1%
3	46	0%
4	1,319	0%
6	2,365	1%
8	755	0%
10	27	0%
12	30	0%
16	5	0%
20	1	0%
Unknown	185,767	43%
<b>Total</b>	<b>434,910</b>	<b>100%</b>

**Table 12 – Aqua Services Inventory by Material**

Service Material (Aqua owned portion)	Number of Services	% of Total
Copper	339,979	78%
Unknown	81,391	19%
Ductile Iron	5,807	1%
PVC	920	0%
Cast Iron	418	0%
Other	520	0%
Brass	517	0%
Galvanized Iron	920	0%
PolyEthylene (HDPE)	3,785	1%
Lead	43	0%
Black Iron	603	0%
Steel Welded	7	0%
<b>Total</b>	<b>434,910</b>	<b>100%</b>

**Table 13 – Service Lines by Installation Year**

Service Line Installation Year (Aqua owned portion)	Number of Services	% of Total
Pre 2005 or Unknown	250,862	52%
2005	7,019	2%
2006	6,319	1%
2007	6,715	2%
2008	8,147	2%
2009	10,530	2%
2010	11,875	3%
2011	11,170	3%
2012	9,548	2%
2013	8,428	2%
2014	10,959	3%
2015	13,136	3%
2016	13,027	3%
2017	14,328	3%
2018	10,954	3%
2019	10,108	2%
2020	9,298	2%
2021	10,913	3%
2022	8,215	2%
2023 <sup>13</sup>	3,323	1%
<b>Total</b>	<b>434,910</b>	<b>100%</b>

Service lines are the pipes that deliver water from a Company owned water main to the customer’s premise. Ownership of the service line is split between the Company and the customer. The Company owns the service line from its connection (tap) at the water main to a valve (curb stop), typically located near the customer’s property line. The customer is then responsible for the service line from the curb stop to the premise. **Figure 2** illustrates service line ownership for a typical situation.

The service line information provided represents the Company owned portion of the service line only. The values shown were obtained from the Company’s Tap Card data. Although tap cards are available for most of the original Philadelphia Suburban Water Company system, most acquisitions did not include tap cards. As a result, the Company often does

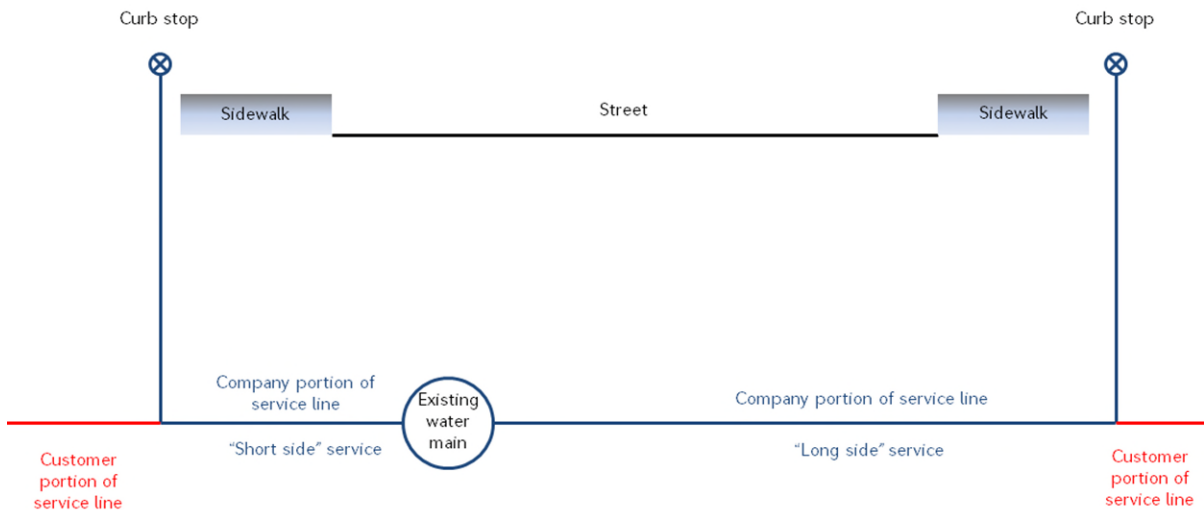
<sup>13</sup> As of October 2023.

not have good records of service line sizes, ages or material in acquired systems. And even when older tap cards do exist, the data is often incomplete. Thus, information on service line sizes and material may not be known until the service line is exposed. Therefore, the data provided represents the best available information, and is considered accurate after the implementation of GIS and related systems in the mid 2000's. The number of unknown sizes and materials is being reduced through the development of the Company's lead service line inventory, by which the Company is identifying both customer-side and Company-side service line material.

Service lines need to be addressed during water main replacement projects. The entire Company portion of the service line, both short side and long side, are replaced during a main replacement project. In some circumstances, plastic pipe is installed instead of copper when corrosive conditions are present.

Note that in both situations the customer portion of the service line currently is not replaced by the Company during the main replacement project. The exception to this is when a customer owned LSL is known or discovered. See the Company's LSLR Plan for more information.

**Figure 2 – Typical Service Lines**



## Customer-owned Lead Service Lines

Lead was sometimes used for service lines in the early portion of the 20<sup>th</sup> Century. According to Company records, Aqua ceased the installation of lead Company-owned services in the 1930's. Lead Company-owned services are occasionally discovered during main replacement projects. Prior to Act 120 and the Commission's regulations, Company-owned LSLs were replaced when they were encountered during a water main replacement project, and information was provided to the customer to review their service line material and encourage the customer to replace their service line if it was lead.

The Pennsylvania General Assembly passed, and the Governor signed, Act 120 into law on October 24, 2018. The Company petitioned for, and the Commission approved, a COLSL replacement program on July 15, 2021 to allow Aqua to replace COLSLs during a main replacement project or upon customer request. Subsequent to the Commission's approval of Aqua's replacement program, the Commission issued final regulations on the implementation of Act 120. A requirement of the Commission's regulations is that an utility that has prior Commission approval to perform LSLR activities must file a LSLR Program that conforms with the Commission's regulations the earlier of the effective date of new base rates in the utility's rate case filed after the effective date of the LSL regulations or within two years after the Commission's LSL regulations take effect (July 26, 2024), whichever is sooner.<sup>14</sup> The Commission also required that for those utilities with existing LTIPs, their Petition for approval of their LSLR Program shall include a modified LTIP that includes the LSLR Plan as a distinct component of the utility's LTIP.<sup>15</sup>

The Company has included its LSLR Plan as **Attachment A** to this new LTIP. The LSLR Plan complies with the Commission's regulations and proposes modifications to the Company's current cap of 200 on the number of replacements the Company may perform annually. The Company is not proposing a budget cap in its LSLR Plan, as a budgetary cap is not required by the Commission's regulations, but will seek to meet the targeted budget amounts stated in this LTIP similar to other categories of DSIC-eligible property.

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<sup>14</sup> 52 Pa. Code § 65.61.

<sup>15</sup> Id. at § 65.54(b).

### 3. SCHEDULE FOR PLANNED REPAIR AND REPLACEMENT OF ELIGIBLE PROPERTY

Aqua initiated its DSIC program in 1997 and has replaced significant portions of its distribution system since that time. Figure 1 showed the work that has been completed through December 31, 2022.

#### Macro Planning

In 2008 Aqua submitted Supplement No. 88 to Tariff Water-Pa. P.U.C. No. 1, requesting approval to increase its DSIC surcharge cap from 5% to 7.5%. Included with that Supplement was a technical memo (Appendix E to that filing) that described Aqua’s approach to water main renewal. That approach continues to be applied today, with some additional “candidate pipe” targets added in the years since. A copy of that Appendix E was included in the Company’s 2017 LTIP.

The 2008 report identified a “candidate pool” of approximately 1,500 miles of pipe in Aqua’s distribution system to be targeted for replacement. Since then, Aqua has replaced more than 1,000 miles of pipe. Not all of this pipe was from that candidate pool, since other replacement needs arise each year (such as opportunistic coordination with municipal repaving projects). In addition, continuing data gathering as well as a better understanding of pipe inventories outside of SEPA has refined the estimate of the original candidate pool.

**Table 14** summarizes the current “candidate pool” of pipe for Aqua. It indicates which pipe was included in the 2008 report and new footage that has been added to the candidate pool since then based on new information. A discussion of why the pipe in the additional pool is being targeted follows the table.

**Table 14 – Aqua Current Candidate Pool**

Pipe Category	Miles from Appendix E	Miles Remaining
Cement Stovepipe	195	11
Unlined Cast Iron 1936-1948	243	41 <sup>16</sup>
1890-1926 pipe	825	121
≤ 4-inch	275	22 <sup>17</sup>
<b>Subtotal Original Pool</b>	<b>1,538</b>	<b>195</b>
Unlined Cast Iron (1949-1951)	-	14
Factory Lined Cast Iron (1952-1960)	-	130
Unlined Cast Iron (1927-1935)	-	34
Asbestos Cement	-	230
Cleaned and Lined Pipe	-	228 <sup>18</sup>
Factory Lined Cast Iron (1961-1963)	-	83
Factory Lined Cast Iron (1964-1970)	-	227
<b>Subtotal Additional Pool</b>	<b>-</b>	<b>946</b>
<b>TOTAL</b>	<b>1,538</b>	<b>1,141</b>

With the implementation of GIS, Aqua was able to effectively extend its long-term water main replacement program planning. Prior to the GIS, project selection was an annual process, relying on various spreadsheets and paper notes maintained by various groups and individuals within the Company. While effective, this approach did not allow for a broader, more long-term view of the program. Since the GIS has been in place, a significant amount of pipe that is not ductile iron, or is older than 50 to 60 years, has been captured in a future replacement project. This approach recognizes the fact that all pipe will eventually need to be replaced, and ensures that no pipe will be “missed”.

The candidate pools listed in Table 14 represent the categories of pipe that are highest on the priority list for replacement. Selection of specific replacement projects in a given year is done annually as described below in “Micro Planning”.

Unlined Cast Iron (1949-1951) pipe is very similar to the 1936-1948 vintage cast iron pipe that was included in the original candidate pool. The only difference is that additional joint types

<sup>16</sup> Only includes pipe in SEPA since data is not readily available to supplement this in GPA.

<sup>17</sup> Does not include Ductile Iron, PVC, and other “newer” pipe materials that are likely to be sized appropriately and thus not in need of replacement.

<sup>18</sup> The Cleaned and Lined pipe is all unlined Cast Iron installed prior to 1951. It is all in SEPA as that is the only region where Aqua performed cleaning and lining.

were starting to be used between 1949-1951. Break rates for this category of pipe were similar to the 1936-1948 vintage, and this pipe is also unlined.

The Factory Lined Cast Iron (1952-1960) category represents the first use of factory lined pipe in the Company. While the break rates for this pipe are not as high as the unlined 1936-1948 and 1949-1951 categories, Aqua has observed high break frequencies in specific water main installation projects from that era. Therefore, pipe in this category has been added to future replacement projects in the GIS, and specific projects are selected for construction based upon observed local high break frequencies. Factory Lined Cast Iron for the 1961-1963 and 1964-1970 periods have also recently been added to candidate pool which the Company will now incorporate into its replacement planning. These vintage categories contain the majority of the remaining mileage of fragile, thin-walled cast iron material and were added due to exhibitions of higher levels of break rates compared to Aqua's overall distribution network break rate.

The Unlined Cast Iron (1927-1935) was originally the preferred candidate for cleaning and lining. This pipe was manufactured using the "pit casting" method resulting in thicker walled pipe than the subsequent "spun cast" pipe that Aqua began installing in 1936. The thicker walls make this pipe less prone to breaking, thus making it a good candidate to clean and line. But as noted elsewhere, the 34 miles of pipe remaining in this category is scattered throughout the system making cleaning and lining less cost effective. As this pipe is nearing 100 years of age, it becomes a candidate for replacement.

Asbestos cement pipe is concentrated in several acquisitions in SEPA and a small number of systems in GPA. Asbestos cement pipe was most commonly installed in the 1940's and 1950's, but it was available and still being installed into the early 1980's. While the asbestos cement pipe does not create water quality concerns, special precautions must be taken when repairing such a pipe so that asbestos fibers are not released to the air. In addition, this pipe material often "crumbles" when under repair, increasing the scope and duration of a main break repair.

As noted elsewhere, cleaning and lining of unlined cast iron pipe resolved water quality and hydraulic problems, but did not extend the life of the pipe indefinitely. Some of that pipe (33 miles) is already more than 100 years old, and nearly half (164 miles) is more than 90 years

old. Generally, Aqua expects to get a minimum additional 20 years of life out of the cleaned and lined pipe. However, depending on ongoing break rates a lined pipe may be replaced earlier or later.

Aqua continues to monitor break rates for these cohorts as they age.

Valves, services, and hydrants are replaced generally as part of the Company's main replacement schedule. Meters are replaced, per Commission regulation, on a 20 year replacement schedule.

Please see Section 5, below, for the property to be improved during this LTIP period.

### Micro Planning

In SEPA, all pipes within the candidate pool have already been grouped into prospective projects. From these prospective projects, specific projects for the upcoming year are selected starting in early summer of the preceding year. The micro-level planning involves selecting specific projects from those, coordinating with local and state organizations, refining project scope as needed, balancing workload across the divisions, avoiding overloading any particular area, addressing new or worsening conditions, and addressing newly discovered issues.

The process is slightly different outside of SEPA. The characteristics of those systems require a different approach. Because the systems tend to be smaller, a relatively small project can have a significant impact on the overall system. Therefore, the selection of specific projects is driven more by "local knowledge" of the operators and engineers that work closely with those systems. Projects are selected to address pipes with high break frequencies or areas with ongoing water quality or hydraulic issues.

## **4. LOCATION OF ELIGIBLE PROPERTY AND REGIONAL CHARACTERISTICS**

Aqua's water systems are distributed across the state, but are concentrated in SEPA. The SEPA "region" includes a contiguous distribution system within Bucks, Chester, Delaware, and Montgomery counties and separate smaller systems in Berks, Bucks,



**Table 15 – Pipe Mileage By Region and Material**

Region	Material_Category	Miles of Pipe	% of Total
<b>Greater PA</b>	Asbestos Cement	36	1%
	Cast Iron	199	3%
	Ductile Iron	889	15%
	Other	210	4%
	Unknown	6	0%
<b>Greater PA subtotal</b>		<b>1,341</b>	<b>23%</b>
<b>SEPA</b>	Asbestos Cement	194	3%
	Cast Iron	903	15%
	Cement Stovepipe	11	0%
	Ductile Iron	3,296	56%
	Other	183	3%
	Unknown	0	0%
<b>SEPA subtotal</b>		<b>4,587</b>	<b>77%</b>
<b>TOTAL</b>		<b>5,928</b>	<b>100%</b>

**Table 16 – Other Assets By Region**

Region	Number of Valves	% of Total	Number of Hydrants	% of Total	Number of Meters	% of Total
<b>GPA</b>	18,262	21%	4,945	20%	71,636	16%
<b>SEPA</b>	66,873	79%	20,265	80%	377,662	84%
<b>TOTAL</b>	<b>85,135</b>	<b>100%</b>	<b>25,210</b>	<b>100%</b>	<b>449,298</b>	<b>100%</b>

## 5. REASONABLE ESTIMATE OF THE QUANTITY OF PROPERTY TO BE IMPROVED

Note that in addition to planned water main replacements, the DSIC budget also addresses capital cost of 1) water main breaks, 2) highway relocations, and 3) tie-ins to eliminate dead ends.

**Table 17** presents Aqua’s planned water main replacement plans for the 5-year period 2023-2027. This projected mileage to be replaced has been included in the 5-year capital budget and assumes a slight annual increase in the average cost per foot for main replacement. Pipe replacement costs are also dependent on the types and locations of projects. For example, work done in a state road and large diameter pipe

replacement projects are typically more expensive than a “typical” 8-inch main replacement project in a small residential street. Thus, the actual mileage replaced in future years will be driven by these various factors, and may vary from the projected mileage presented in Table 17.

**Table 17 – Projected 5-year Water Main Replacement Schedule**

Year	Projected Miles of Pipe to be Replaced
2023	83
2024	64
2025	60
2026	58
2027	59

The 5-year main replacement projections demonstrate a continued accelerated replacement rate for Aqua. The pace also reflects plans to replace some larger mains, in congested construction areas, and addresses approximately 324 miles of our prioritized “pool” of candidate main replacement projects.

In addition to pipe replacement, the DSIC program will continue to address services, valves, hydrants, and meters. The DSIC program will also address COLSLs as described in Attachment A. **Table 18** presents 5 year projections of the number of these assets to be addressed. The values for service, valves and hydrants are projected based on historic “per mile” values. Meter replacement is independent of main replacement projects, and those values are based on scheduled meter replacements.

**Table 18 – Projected 5-year Replacement Schedule**

Year	Services	COLSL	Valves	Hydrants	Meters
2023	6,049	288	1,418	231	22,442
2024	4,191	1,200	867	162	53,100
2025	3,060	1,500	900	120	21,730
2026	2,958	1,500	870	116	11,175
2027	3,009	1,500	885	118	7,419

## 6. PROJECTED ANNUAL EXPENDITURES AND MEASURES TO ENSURE COST-EFFECTIVENESS

Aqua’s projected budget for 2023 through 2027 is in **Table 19** below.

**Table 19 – Projected Budget 2023-2027**

Project Group	2023	2024	2025	2026	2027
Main Replacements	\$ 158,130,781	\$ 124,910,049	\$ 128,786,868	\$ 121,245,137	\$ 121,585,291
Tie-In Dead End Mains	6,466,087	15,444,708	6,850,000	16,760,000	22,760,000
Capitalized Main Breaks	4,489,597	4,085,000	4,560,000	4,261,000	4,941,000
Highway Relocations	2,336,581	1,271,800	675,000	1,056,800	1,806,800
Valve Replacements	824,861	1,356,000	1,211,000	1,311,000	1,371,000
Other Main/DistrSysImpr	2,374,806	2,198,400	1,860,800	4,176,700	6,650,299
Eligible Meters	6,692,629	12,499,834	6,159,995	4,243,289	2,619,340
ERT Devices	861,074	3,637,222	1,532,977	812,047	555,285
Renewal Services - Regular	4,568,392	4,695,000	4,495,000	4,425,000	4,405,000
Renewal Services Main Rehab	16,969,011	18,510,649	18,070,062	17,014,219	17,061,841
Replace/Relocate Hydrants	5,702,755	4,251,568	4,057,156	3,775,904	3,786,109
COLSLs	2,106,359	9,782,664	14,580,928	15,018,356	15,468,906
<b>TOTAL DSIC ELIGIBLE</b>	<b>\$ 211,522,931</b>	<b>\$ 202,642,894</b>	<b>\$ 192,839,786</b>	<b>\$ 194,099,452</b>	<b>\$ 203,010,870</b>

Table 19 above displays Aqua’s 5 year capital budget for DSIC eligible projects. This budget is based upon the water main replacement “pace” described herein, planned “tie-ins” of dead ends, anticipated water main relocations associated with highway projects, and Aqua’s experience on the levels of valve, hydrant, and service line replacement that will be associated with these water main replacements, tie-ins and relocations. Budgets for DSIC eligible replacements associated with water main breaks and other eligible distribution system work are based upon past experience. Meter replacement budgets consider meter age, and PUC mandated meter replacement intervals. Aqua’s investment in these capital expenditures will be financed by a mix of equity and borrowed funds.

Aqua’s operation, maintenance and construction activities are structured into two main regions – SEPA and GPA. The GPA region evolved from the 1999 acquisition of the former Consumers Water Company as well as additional, smaller acquisitions. SEPA, formerly known as The Philadelphia Suburban Water Company, employed a long-time organizational structure with several regional offices to allow for efficient service. In both SEPA and GPA DSIC eligible main replacement projects are performed by

independent, pre-approved contractors. Other DSIC-eligible activities, such as service, hydrant and valve replacement, are performed by Aqua maintenance and construction crews augmented by independent contractors when necessary.

#### Contract Bidding Procedures – SEPA

SEPA has utilized a long-standing program of bidding and awarding construction contracts in each of its operating divisions. Each division contract primarily includes the construction of pipeline projects up to and including mains 16-inches in diameter. The contract also includes small installation and repair of services, hydrants, valves, etc. as needed to augment Aqua crews as well as road and ground restoration. These contracts are typically bid and awarded for a multi-year term. Contractors, usually 6 in number, are invited to bid based on past experience with Aqua. Most of the work performed under the contract is main replacement projects under Aqua's annual DSIC program. Currently, more than 100 pipe replacement projects annually are constructed under the multi-year contract. With the growth of the DSIC program since 1997, Aqua has steadily increased the number of pipe replacement projects which exceed the size limits under the multi-year contract. The majority of longer length projects or projects that involve mains 16-inches in diameter and greater are generally bid individually under a separate project-specific contract. Typically, 5 to 6 contractors are invited to bid based on past experience with Aqua, including those awardees of the multi-year contracts. In recent years, 20 to 25 projects per year have been individually bid in SEPA, accounting for approximately one third of the total length of pipe replaced.

#### Contract Bidding Procedures – GPA

The GPA region does not utilize the multi-year contracts. Since the operating areas are smaller than SEPA, the same efficiencies cannot be realized. DSIC-eligible main replacement projects are competitively bid as individual or multi-project bundles regardless of main size. Currently, these operating areas undertake 0 to 12 pipe replacement projects in each area annually or approximately 30-35 projects in total. As with SEPA, contractors are invited to bid based on past experience with Aqua or other utilities.

## 7. ACCELERATION PLAN AND MAINTENANCE OF SAFE AND RELIABLE SERVICE

Aqua has utilized the DSIC to renew its distribution system since 1997. Over that approximately 26-year period, over 46% of the pipe (2,676 miles) in the system has been renewed. This amount of pipe mileage renewed over 26 years comes to an average of 100 miles per year. This accelerated rate of renewal is nearly twice what a 1% per year renewal rate would have accomplished (1,384 miles). The Company considers a 1% per year renewal rate to be a baseline replacement rate. During the implementation of Aqua’s DSIC program over the past 26 years, Aqua has far surpassed that baseline replacement rate, and will continue to maintain its accelerated rate of replacement.

**Table 20** shows Aqua’s historic rehabilitation and replacement of mains for the period 2018-2022, and **Table 21** shows Aqua’s historic replacement of services, valves hydrants, and meters for the period 2018-2022.

**Table 20 – Historic Main Replacement and Rehabilitation**

Year	Actual Miles of Pipe Replaced or Rehabilitated
2018	152
2019	106
2020	152
2021	134
2022	92

**Table 21 – Historic Replacement Schedule Other Property**

Year	Services <sup>19</sup>	COLSLs	Valves <sup>20</sup>	Hydrants <sup>21</sup>	Meters
2018	9,188	N/A	3,171	454	47,688
2019	9,371	N/A	1,880	276	46,654
2020	9,894	N/A	2,571	408	23,613
2021	10,696	66	2,143	389	39,475
2022	7,760	200	1,643	277	23,199

<sup>19</sup> The number of services replaced is an estimate based on the miles of pipe that was replaced in each year shown in Table 21. Please see also footnote 4, above.

<sup>20</sup> The number of valves replaced is estimated based on the miles of pipe that was replaced in each year shown in Table 21. Please see also footnote 5, above.

<sup>21</sup> The number of hydrants replaced is estimated based on the miles of pipe that was replaced in each year shown in Table 21. Please see also footnote 6, above.

The associated expenditures for 2018-2022 are included below in **Table 22**.

**Table 22 – DSIC Expenditures for Prior Years**

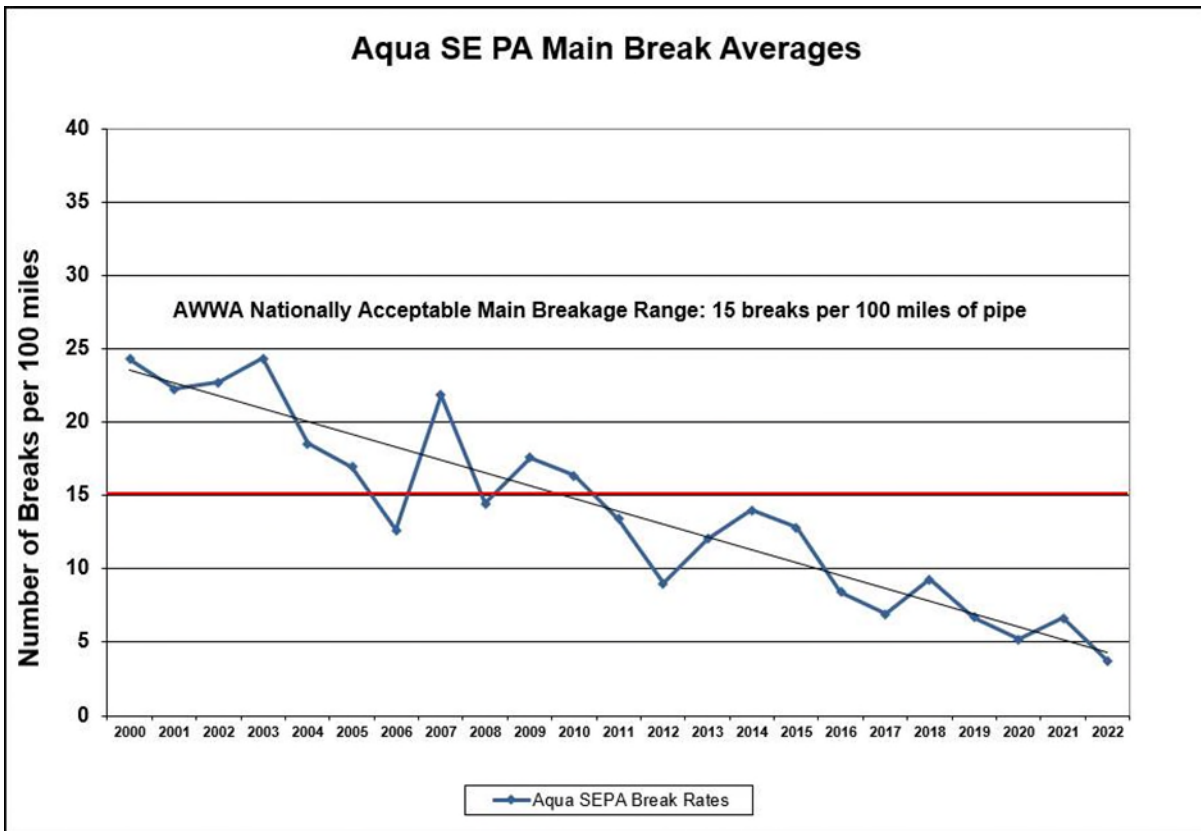
Project Group	2018	2019	2020	2021	2022
Main Replacements	\$ 146,442,379	\$ 174,569,280	\$ 158,577,871	\$ 152,676,638	\$152,114,123
Tie-In Dead End Mains	1,717,467	2,731,720	10,559,071	10,380,542	2,516,589
Capitalized Main Breaks	5,701,155	5,156,508	4,120,686	4,122,595	5,824,922
Highway Relocations	1,644,244	2,280,952	675,911	3,684,747	2,363,580
Valve Replacements	1,605,193	1,878,211	789,551	1,417,778	1,286,097
Other Main/DistrSystImpr	1,666,834	1,614,845	2,028,486	1,400,313	2,281,036
Eligible Meters	9,050,652	7,865,341	3,086,785	5,809,267	5,167,008
ERT Devices	3,582,349	3,575,972	2,007,335	3,031,446	747,963
Renewal Services - Regular	5,978,413	5,461,011	4,499,018	5,093,888	4,280,220
Renewal Services Main Rehab	17,856,738	18,124,916	16,658,391	20,768,430	18,807,918
Replace/Relocate Hydrants	6,388,695	5,934,460	4,333,198	4,831,088	4,208,325
COLSLs	-	-	-	342,424	1,134,417
<b>TOTAL DSIC ELIGIBLE</b>	<b>\$ 201,634,121</b>	<b>\$ 229,193,217</b>	<b>\$ 207,336,303</b>	<b>\$ 208,367,616</b>	<b>\$ 200,732,199</b>

The DSIC program has been successful in improving reliability (main breaks), efficiency (non-revenue water), and water quality.

**Figure 4** shows the general decline in water main break rates since 2000 in SEPA. Most water main breaks occur during the cold winter months, so yearly variations are expected depending on the severity of the weather. However, there is a definite downward trend in main breaks in SEPA resulting from the DSIC program. This results in fewer interruptions of service to customers.

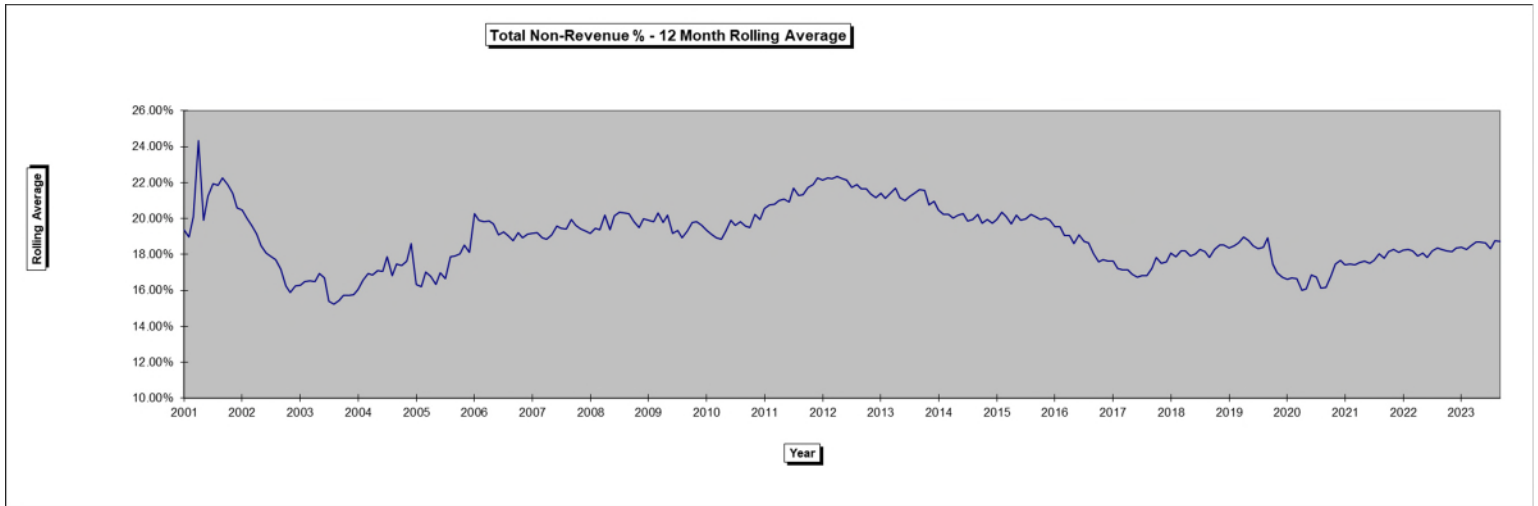
Another way to examine the declining main break trend is to consider the total number of breaks each year, rather than the break rate. In 2003 there were a total of 998 break events in SEPA, which is the most over this time period. In 2022, the number of breaks was a new low of 171. For the past twelve years, the SEPA break rate has been below the American Water Works Association (“AWWA”) nationally acceptable main breakage rate of 15 breaks per 100 miles.

**Figure 4 – Aqua SEPA Main Break Averages Since 2000**



Non-revenue water (“NRW”) is also declining. Replacement of older, potentially leaky pipes with newer pipes should result in lower leakage. **Figure 5** shows metered ratio trends for SEPA. The percentages shown represent the amount of unbilled water divided by the total water produced. While this is not the preferred approach to NRW evaluations today, it is the only data that is available dating back to 2001.

**Figure 5 – Metered Ratio Trends**

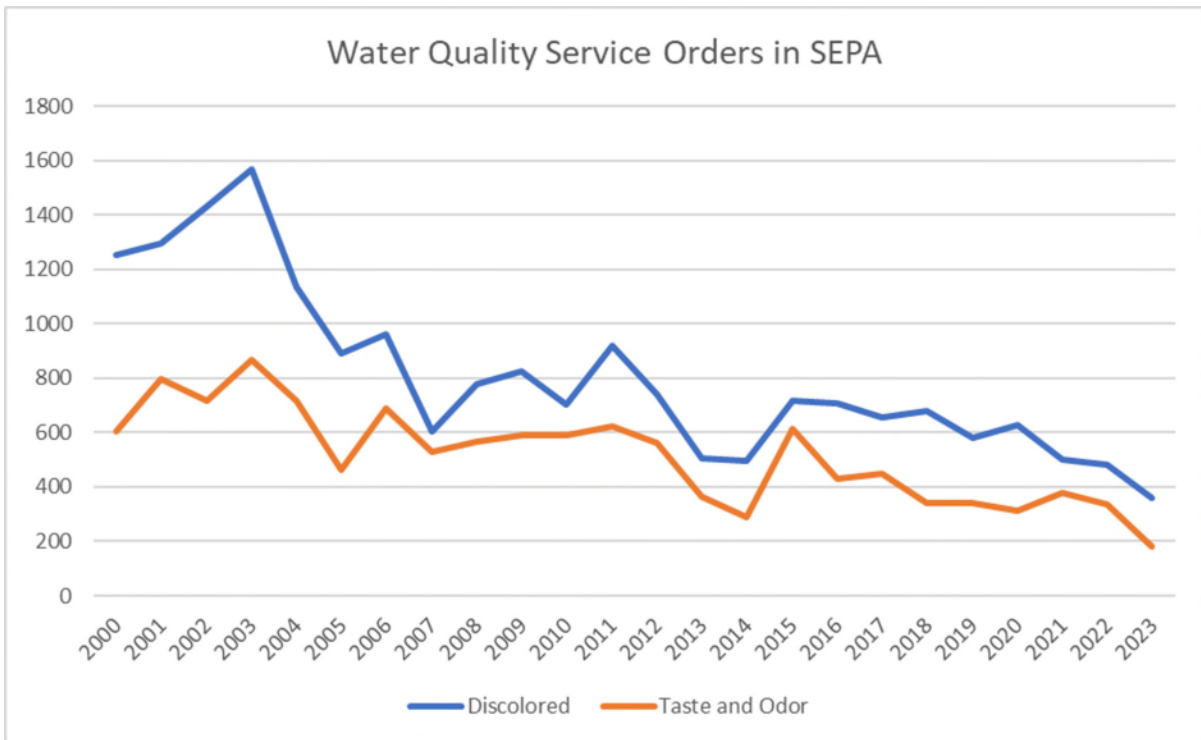


Applying more current approaches to analyzing and managing NRW has been a particular focus of the Company in recent years. This includes applying the AWWA water audit method. In 2013, a consultant was retained to conduct a study of NRW in SEPA. Considerable effort was spent examining real and apparent loss percentages and volumes. One finding of that study was that earlier metered ratio trends (prior to 2007) were actually flatter than shown on the chart due to errors discovered in the method used to account for Prior Month Billing Adjustments during that period. As a result of the study, the Company has identified and continues to pursue a number of business cases to address the efficient, sustainable distribution of water. These include standardization of customer meter testing, application of theft reduction techniques, calibration of production meters, and standardization of leak detection practices. The latter case, along with the ongoing replacement of old pipe from the DSIC program, has been a driver in reducing NRW. Figure 5 shows the impact of this effort on metered ratio as one performance indicator. Since total water send-out has been declining, metered ratio does not portray the more significant decline in water loss volume. Examined a different way, in SEPA alone, NRW has decreased by approximately 1.0 billion gallons per year since 2015.

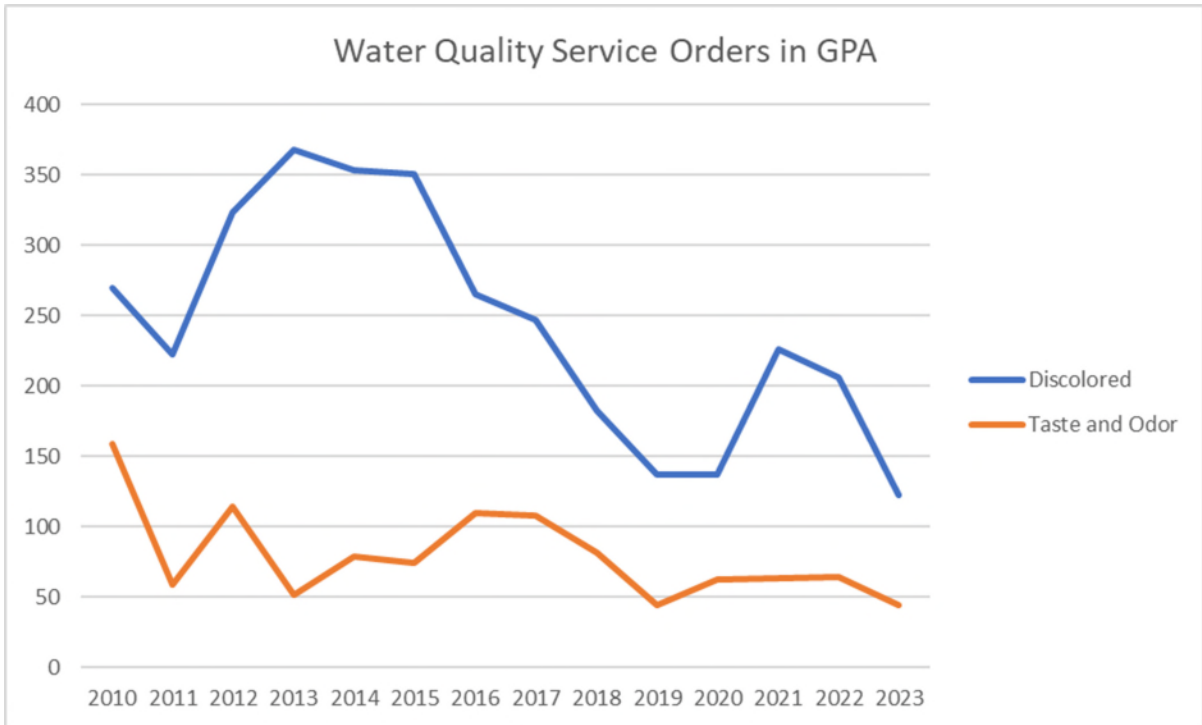
In addition to desktop NRW analysis, the Company has increased efforts in proactive leak detection, including lift and shift acoustic surveys, pilot satellite leak detection, pilot real-time permanently installed leak and transient monitoring on critical infrastructure, and partial theft of service algorithm directed investigations.

Water quality complaints have declined over time as noted in **Figure 6** which shows significant reductions in the number of both taste and odor and discolored water service orders since 2000 in SEPA. Similarly in **Figure 7**, both taste and odor and discolored water service orders have been reduced in GPA.

**Figure 6 – Water Quality Service Orders in SEPA**



**Figure 7 – Water Quality Service Orders in GPA**



This is another achievement for the DSIC program. As old, unlined cast iron pipes were replaced or cleaned and lined, the Company has experienced reduced complaints about water quality associated with the corrosion of the interior pipe walls. **Figure 8** shows an older unlined cast iron pipe that was replaced.

**Figure 8 – Replacement of Older Pipes**



The cleaning and lining program also contributed to improved water quality as the cement mortar lining applied to the walls of the unlined cast iron pipe prevents the interior corrosion of the iron. See **Figure 9** for before and after examples of the impact of cleaning and lining. However, it should be noted that the cleaning and lining process can only allow the Company to maintain the useful life of a cast iron pipe. Eventually that pipe will still need to be replaced due to age.

**Figure 9 – Impact of Cleaning and Lining**



Aqua’s cleaning and lining program was limited to the more urban areas in SEPA and ended after 2014. Cleaning and lining was an attractive alternative to pipe replacement in the 1990’s and early 2000’s as the population of candidate pipe (unlined cast iron with good remaining structural life) was concentrated in neighborhoods. This allowed contractors to mobilize in a single location and clean and line large quantities of pipe, resulting in cost efficiencies. At its peak, the cleaning and lining program was able to renew pipe for approximately half the cost of replacement.

As the population of this “candidate” pipe declined and became more geographically dispersed, the efficiencies of cleaning and lining were lost and the cost savings compared to pipe replacement became much less. As a result, Aqua has not included cleaning and lining of mains in its current LTIP budget.

## **8. WORKFORCE MANAGEMENT**

The Commission requires that a utility that utilizes DSIC have a workforce management and training program designed to ensure that the utility has access to a qualified workforce to perform work in a cost-effective, safe and reliable manner.

## Inspectors

Aqua utilizes construction inspectors to provide numerous services during the installation of mains, services, and hydrants in the distribution system. The inspectors are there to perform the following tasks, as well as any other work that may be necessary:

- Monitor the installation of the lines to confirm that they are properly bedded and installed to Aqua specifications.
- Monitor the backfill of the project for proper compaction as per Aqua specifications.
- Confirm that all materials such as pipe, fittings, backfill, concrete, etc. in the project meet the Aqua specifications.
- Capture the quantities of pipe and other materials for proper record keeping, plans, etc.
- Capture the quantities of pipe and other materials, labor, etc. for accurate billing and payments.
- Document all locations of pipe, fittings, valves, service lines, etc. for accurate mapping and recordkeeping.
- Work with residential customers to lessen the impact of the project and answer or address any issues that occur within the project.
- Work with businesses that are impacted by the project to insure deliveries, access, and service outages do not disrupt business.
- Coordinate contractors with school districts, municipalities, and emergency services so that bus routes, trash pick-up, mail delivery, and emergency response are not impacted.
- Monitor the temporary restoration during the project to make certain that roads are safely traveled.
- Monitor the restoration required in projects to make certain they are done to state or municipal specifications, and insure that proper payment is achieved.
- Observe contractor's implementation of contractor safety plans and advise contractor of any observed conditions of imminent danger. Inspectors can shut down a project until an imminent danger situation is addressed.

## Safety and Training

Aqua requires its employees in the Distribution/Construction arena to have mandatory safety training throughout the year. Aside from the required annual training, there is additional training that also takes place. Examples of the required annual training are confined space, traffic safety, excavation/trenching, general safety hazards, and hazard communications. In addition, there are other programs that are required, but not on an annual basis, including Personal Protection Equipment (“PPE”), electrical hazard, competent person, and others. First Aid/CPR and automated external defibrillator training are offered yearly to maintain certifications and proficiency. In 2019, Aqua developed a training program to educate drivers and reduce the frequency of backing accidents. Driving continues to be an integral part of training. In addition, to the video segments, Safety Days include keynote speakers discussing driving skills & techniques. In 2022, monthly video segments were implemented along with instructor led classes on reverse driving and backing, and in 2023 the Company included spotter training. Aqua routinely sends out “Tool Box” Talks on safety topics; tripping hazards, electrical, tools, and seasonal topics such as weather, holidays, and Back to School. The Safety department also issues “Safety Alerts” previewing incidents and near misses. In addition, Aqua has instituted a “Near Miss” (Safety Learning Opportunities) initiative where hazards are identified and resolved within 30 days.

All employees in Distribution/Construction are required to wear their Personal Protection Equipment whenever they exit their vehicles on a jobsite. The PPE includes hard hat, safety vest, safety glasses, and steel toe shoes. All of this PPE is supplied by the Company. Aqua also instituted a change in a policy for cutting pipe in a trench. The use of cut-off saws, also sometimes called demo saws, is prohibited from use in a trench by our employees and any contractors working for Aqua. These saws utilized in a trench have nationally been a source of fatalities and injuries in the industry. There are numerous other methods of cutting pipe or other material in trenches, so to prevent any incidents the use of the cut-off saws has been prohibited.

Aqua requires all employees, and contractors, to report immediately any injury that takes place to an employee of either party. Aqua also requires employees and contractors to report any damage to utilities during the excavation process. As part of

the Pennsylvania Underground Utility Protection Law, Aqua and its contractors are required to submit an Alleged Violation Report for all utility damage occurrences to the Commission.

### Contractors

To supplement Aqua's employee workforce, Aqua utilizes outside contractors for main replacement projects, including the service and hydrant connections that go along with the project. Contractors are required at Aqua's request to provide Aqua with their safety policy and documentation of training to their employees, including but not limited to competent person, utility damage prevention, and traffic safety.

Aqua requires contractors to follow all state, federal, and Occupational Safety and Health Administration rules and regulations in the implementation of a project. This is required in all contract documents for construction. Aqua utilizes a third-party safety consultant to perform site inspections on a regular basis for Aqua's contractors. Contractors are also required to fill out a Job Hazard Awareness form daily, either utilizing the Aqua form or a similar form designated by the contractor.

Contractors are also required to provide the PPE for their employees, including hard hat, work gloves, reflective vest or shirt, safety shoes, and safety eyewear.

Contractors are also responsible for reporting to Aqua any injuries sustained on an Aqua project. They are also required to report any utility damage that occurs on the jobsite. As part of the Pennsylvania Underground Utility Line Protection Law, the contractor is required to submit an Alleged Violation Report for all utility damage occurrences to the Commission. Contractors are responsible for following the requirements of PA One Call, including being responsible for all PA One Call requests for their project.

Aqua's inspectors are also required to coordinate all service outages or main outages with contractor and other Aqua personnel, including notification of the customers.

## **9. OUTREACH AND COORDINATION ACTIVITIES WITH OTHER UTILITIES, PENNDOT, AND LOCAL GOVERNMENTS**

Using Aqua’s GIS and historical asset data, Aqua has developed an inventory of pipe replacement candidates throughout its footprint. Between the months of May and October, replacement candidates are typically chosen and prioritized for replacement in the subsequent budget year. Each potential replacement project is vetted by the corresponding construction division’s manager, i.e., analyzed for feasibility of construction in the coming budget year. As part of the analysis process, Aqua collects information from the Pennsylvania Department of Transportation (“PENNDOT”), counties and municipalities as to their intentions to undertake paving and other public works projects during the budget year. Paving projects known by Aqua in advance of replacement project selection are posted to the GIS alongside candidate replacement projects and utilized in prioritizing specific projects for selection and refining of specific project scopes. Where Aqua chooses to undertake a pipe replacement project on a road pre-scheduled for paving, the project will be coordinated with the state, county or municipality. Aqua and the government agency will work together to insure that the design, permitting and construction of the pipe project will be completed in time to allow for the road to be paved. In some cases, where pipe replacement projects are large, the government agencies will agree to postpone paving of its roads to the following year. Aqua’s Engineering Department meets several times a year with PENNDOT’s Permits, Traffic and Maintenance officials, formally presenting plans for pipe replacement projects in state roads for the coming year or longer. As a result of these meetings PENNDOT may adjust its paving plans and other construction project schedules for Aqua’s benefit. Where PENNDOT schedules cannot accommodate Aqua’s projects, Aqua will defer its project a minimum of 5 years. Typically, when Aqua undertakes a project where paving has been pre-planned by the government agency, Aqua and its rate payers will benefit financially through the avoidance of road surface restoration, usually a full-lane or half-road milling and macadam overlay.

Unfortunately, most municipalities do not identify their paving plans in advance of Aqua’s project selection. Annual municipal budgets may not be approved until early in the budget year resulting in paving projects not being formalized until well into the budget year. In these instances, Aqua must be proactive in identifying opportunities to coordinate pipe

replacement and road paving. Following the selection of pipe replacement projects in early fall preceding Aqua's budget year, construction division managers and superintendents visit with each municipality in which pipe projects are planned. In many instances, municipal officials and engineers will identify roads where repaving can be coordinated with Aqua's project. A sharing of costs is negotiated and the municipality will undertake the milling and paving of the entire road with a monetary contribution from Aqua.

In 2020- October 2023, Aqua undertook 119 pipe projects which resulted in savings to Aqua in surface restoration avoidance.

Although less frequent, continuous outreach by Aqua has resulted in additional coordination opportunities recently, including track construction by SEPTA, and sanitary, storm sewer and bridge construction by state, county and municipal governments.

Following the initiation of the Gas DSIC in Pennsylvania, additional coordination opportunities for joint water main and gas main replacement have substantially increased, especially in SEPA between Aqua and PECO. Beginning in 2013, Aqua and PECO undertook a sharing of asset data including high-priority candidate replacement water and gas pipes. Joint project review meetings have been held every 6 to 8 weeks to coordinate replacement schedules where water and gas main replacement projects intersect in each municipality. Aqua and PECO have also met jointly with municipal officials, residents and businesses to present the timing and coordination plans of each utility's projects. Working together benefits the general public through greater efficiency, coordinated traffic control and the avoidance of wasteful demolition of recently paved roads by the second utility to construct. In addition, this coordination results in nominal cost savings to the utilities, associated with economies of scale, since installation of both water and gas mains usually requires repaving of the full road.

# ATTACHMENT A

Lead Service Line Replacement Plan

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## VERIFICATION

I, Michael Fili, Vice President, Capital Planning, Design & Construction of Aqua Pennsylvania, Inc., hereby state that the facts set forth in Aqua Pennsylvania, Inc.'s Further Supplemental Response to the Bureau of Technical Utility Services Data Requests Set 1 No. 2 in the matter at Docket No. P-2023-3043755, are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).



Michael Fili  
Vice President, Capital Planning,  
Design & Construction  
Aqua Pennsylvania, Inc.

Dated: March 14, 2024