

**PENNSYLVANIA INFRASTRUCTURE INVESTMENT AUTHORITY
PENNVEST APPLICATION FORMS**

**City of Philadelphia
Philadelphia Flat Rock Dam Manayunk Canal
512033022012-CN
05/19/2021**

DESCRIPTION

PROJECT DESCRIPTION

What is the project type?	Non-point Source
What is the project name?	Philadelphia Flat Rock Dam Manayunk Canal
What is the project's Primary County?	Philadelphia
What is the project's Primary Municipality?	Philadelphia City
What is the application type?	Traditional Construction
What is the project stage?	Construction
Is this related to a previous advanced funding application through PENNVEST?	No
If yes, enter the project name or number.	

COMMENTS

SYSTEM

SYSTEM DESCRIPTION

What type of system is this?	Existing System
What is your NPDES number?	
What is your PWSID number?	1510001
Do you own the system?	Yes
If no, explain	
Do you operate the system?	Yes
if no, explain	
Do you maintain the system?	Yes
If no, explain	
Will you construct the system?	Yes

If no, explain

Does this project include costs associated with the purchase of system capacity from another entity (i.e. capital contribution)? No

If yes, explain

Does this project include costs associated with the construction of capacity in your system for use and/or purchase by other entity (ies) (i.e. capital contribution)? No

If yes, explain

Is, or does the Applicant intend to be, a party to any inter-municipal agreements which affect this project or your system? No

Has the applicant issued debt or borrowed money, or does the applicant intend to issue debt or borrow money, under a trust indenture (i.e. Bonds)? No

Do you charge residential or commercial user fees? Yes

COMMENTS

FUNDING

REQUESTED PENNVEST AMOUNT

This is your requested PENNVEST amount. \$20,960,000.00

COMMITTED OTHER SOURCES OF FUNDS

Source Type	Source Name	Source Amount	Funding Comments
		\$	
	Total:	\$0.00	

ESTIMATED TOTAL PROJECT COST

This is your estimated total project cost. \$20,960,000.00

COMMENTS

PROJECT CONTACTS

City of Philadelphia		Legal Entity	
Address: 1401 John F. Kennedy Boulevard Philadelphia, PA 19107		Email: Phone: 2156854948	
SAP Vendor Number: 177575013	DUNS: 133889241	Federal ID/FIN: 236003047	

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Philadelphia Water Department	Email: Lawrence.yangalay@phila.gov
	Phone:
	Phone Ext:

PROJECT SITE(S)

Manayunk Canal	Primary Site
Address: 5000 East Flat Rock Road Philadelphia, PA 19127	Latitude: 40.0339985 Longitude: -75.2387906

City of Philadelphia	
Address: 1401 John F Kennedy Boulevard Philadelphia, PA 19102	Latitude: 39.9540966 Longitude: -75.1644793

PROJECT PLAN

PROJECT PLAN

Planning Consultation Date	07/23/2020
Planning Completion Date	09/30/2020
Design Start Date	05/01/2020
Design Completed Date	05/02/2021
Date Obtained All Needed DEP Permits	05/02/2021
Anticipated Construction Start Date	03/01/2022
Anticipated Construction End Date	03/01/2025

Letter of No Prejudice Issued by PENNVEST

PROJECT PHASE

Phase Name	Design Complete	Obtain All Permits	Start Construction	End Construction

COMMENTS

PWD will not start construction on this project until funds are secured through PENNVEST. The project will be bid during the settlement phase and awarded. Construction will not start until after the settlement is completed.

NARRATIVE : DESCRIPTION

NARRATIVE DESCRIPTIONS

Describe the problem that this project will correct or resolve. Please be specific and include such discussion points as the cause and impact of the problem, permit exceedances or compliance related problems, if any and/or any additional operational issues caused or contributed by the identified problem(s).

The historical intake structure to the Manayunk Canal, Lock No. 68, has been barricaded with a steel sheet pile bulkhead. The Feeder Gate House is in a dilapidated condition and the entire lock and feeder system is inoperable, preventing flow into the Canal from the Intake Channel under typical flow conditions. The Canal water level is maintained with a stop log control structure at the location of the former Lock No. 69, near the Lock Street Bridge at the downstream end of the Canal. Visual inspection of the Canal Intake Channel Wall revealed that a significant portion of the concrete structure is in a deteriorated condition. Concrete cracking, efflorescence, spalling, and seepage through separated lift joints were observed along the spillway and non-overflow sections. Stability analyses revealed that the structures do not meet the current criteria for structural stability of the Pennsylvania Department of Environmental Protection Dam Safety program. In the period since the entire lock and feeder system was barricaded or inoperable, silt and debris have accumulated (ca. 10,000 yd³) within the intake channel, further obstructing "natural" flow into the Canal. Due to the obstruction of flow the water quality in the Manayunk canal suffers from the current circumstances at the dam. Moreover, the concentration of oxygen-poor discharge from the Manayunk Schuylkill Canal is just over one mile upstream of the Queen Lane raw water intake on the east bank of the Schuylkill River and has been linked to high concentrations of methylisoborneol (MIB) and geosmin, chemically derived constituents from certain species of algae and bacteria (e.g., cyanobacteria). The proposed improvements has been designed to reintroduce the flow to the Manayunk Canal to improve downstream water quality and improve the water quality for the Queen Lane WTP.

Describe the scope of the project. List in quantitative terms what is planned to be constructed, rehabilitated and decommissioned. For Example: 'The 12,000 feet of 8-inch waterline will be replace, one 200,000 gallon standpipe will be constructed, the current Market Street Pump Station will be decommissioned, a new 250 gallon per minute duplex pump station will be constructed on Leisure Street, 44 hydrants will be replaced...'

The project proposed by the PWD and the Department of Parks and Recreation (PPR), entitled Manayunk Schuylkill Canal Diversion Facility & Intake Structure, has been designed with the following project goals and functional requirements: Re-introducing flow to the Canal to improve downstream water quality, Addressing the structural stability of the City-owned portion of the Canal Intake Channel Wall, Managing sediment and debris in the Canal Intake Channel, Preserving and protecting the Canal's historic features to the maximum extent practical.

To achieve these project objectives, the following main components of the project are proposed: Installation of temporary cofferdams and erosion and sedimentation control measures during construction Selective demolition of the brick Feeder Gate House and concrete portions of the Feeder Structure to facilitate construction of a new site access drive from the adjacent paperWorks property, Selective demolition, crest lowering and structural rehabilitation of a portion of the Canal Intake Channel Wall, Construction of a new waste weir (spillway) and sluiceway to replace a portion of the Canal Intake Channel Wall, Buttressing and restoration of a portion of the Canal Intake Channel Wall adjacent to the Commonwealth owned portion of the wall, Construction of a new diversion structure bulkhead wall across the Canal Intake Channel, Construction of a new intake structure with sluice gates to regulate flow from the Schuylkill River into a new concrete conveyance channel discharging into Lock No. 68. Construction of site improvements including paved maintenance driveways, stormwater collection and conveyance systems, perimeter fencing and slope protection.

Describe the cost effectiveness of this project. List physical and administrative alternatives and selected alternatives and justify proposed alternative. Include all issues discussed in Planning Consultation related to cost effectiveness.

This project involves the rehabilitation and replacement during the design of the project, numerous alternatives were evaluated. The “no action” alternative is not feasible. Reintroducing flow into the Manayunk Schuylkill Canal necessitates work within Waters of the US and the deficiencies in the Canal Intake Channel Wall must be addressed to meet Pennsylvania Dam Safety Regulations. Numerous alternative layouts for the proposed improvements were considered during the design process. These alternatives included:

- * Different locations of the diversion facility
- * Different top of wall elevations to provide varying levels of flood protection. The diversion facility bulkhead wall top elevation was chosen to provide flood protection during the 50-year flood, as opposed to the 100-year flood which would require significantly more fill and modification of the North Schuylkill River Trail.
- * Different methods for stabilizing the existing Canal Intake Channel wall, including buttressing the downstream side of the wall with a new massive concrete structure, or converting the entire wall into an overflow spillway.
- * Different locations and configurations of the intake structure
- * Use of closed conduits to convey flow to the canal in lieu of an open channel
- * Different configurations and sizes of the new waste weir and sluiceway.
- * Different construction methods and materials for the diversion facility, such as earth embankment, rock embankment, sheet pile walls and soldier pile walls with precast panels.
- * Different alignments, widths and profiles for site access drives. Use of the North Schuylkill River trail for site access is not feasible due to its narrow width, limited bridge capacity at several locations and the presence of pedestrians. Access by water is impractical as there is no suitable launching point within close proximity to the project site. The proposed design was ultimately selected based on its ability to meet the project goals, its constructability given the site’s physical constraints and its relatively minimal impacts to Waters of the United States and Commonwealth of Pennsylvania, particularly the Schuylkill River.

COMMENTS

NARRATIVE : DRINKING WATER SUPPORTING PROJECT INFORMATION

DRINKING WATER SUPPORTING PROJECT INFORMATION

Category/Subcategory	Total
Source / Rehab Existing Surface Source Design (Capacity in Gallons)	

PROBLEM DESCRIPTION

Unfiltered Water Source:	Yes
Ground water source under influence of Surface Water:	No
Insufficient pressure in distribution system:	No
Inadequate water storage volume in system:	No
Insufficient yeild of the existing water source:	No
Additional Capacity required due to service area growth and development:	No
Antiquated, undersized, or leaky distribution lines:	No
Contamination of existing wells:	No
If applicable, surveyed malfunction rate of on-lot septic systems(%):	0
Treatment plant does not meet current or future treatment standards:	No
Deterioration or disrepair of existing facilities:	Yes

COMMENTS

NARRATIVE : STORMWATER SUPPORTING PROJECT INFORMATION

STORMWATER/NPS SUPPORTING PROJECT INFORMATION

Category/Subcategory	Total
Other / Other	Canal rehabilitation (see Second Opinion Cost Review)

COMMENTS

Please see the Second opinion cost review and the cost effective analysis for description of the condition of the canal, source water, storm water affects and the rehabilitation of the canal.

New Waste Weir (spillway) and Sluiceway to replace a portion of the Canal Intake Channel Wall

New Intake Structure with sluice gates to regulate flow from the Schuylkill River into a new concrete conveyance channel discharging into Lock No. 68

New Diversion Structure bulkhead wall across the Canal Intake Channel

Rehabilitation of a select sections of the Canal Intake Channel Wall

Feeder Gate House and concrete portions of the Feeder Structure

Temporary cofferdams and erosion and sedimentation control measures during construction

Mechanical Equipment and Appurtenances for Water Control

Trash / Debris / Sediment Management

PROJECT SPECIFIC DATA : LAND USE

LAND USE

Has the area served by this project been covered by an adopted municipal comprehensive plan? Yes

Is this project located in an area where there is an adopted county comprehensive plan? Yes

Is there an adopted multi-municipal or multi-county comprehensive plan for the area(s) covered by this project? No

Is there an adopted county or municipal zoning ordinance or a joint municipal zoning ordinance for the area covered by this project? Yes

Is the proposed project consistent with these comprehensive plans and/or zoning ordinances? Yes

Is the project consistent with county agricultural preservation efforts. No

COMMENTS

The City of Philadelphia does not have an agricultural preservation board and therefore no approval is sought.

PROJECT SPECIFIC DATA : DRINKING WATER SUPPORTING PROJECT INFORMATION

DRINKING WATER COST BREAKDOWN

Planning & Design Only :	\$0.00	0.00%
Source Development Amount:	\$0.00	0.00%
Transmission Amount:	\$0.00	0.00%
Treatment Amount:	\$0.00	0.00%
Finished Water Storage Amount:	\$0.00	0.00%
Distributed System Amount:	\$0.00	0.00%
Pump Stations Amount:	\$0.00	0.00%
Meters Amount:	\$0.00	0.00%
Safety/Security Amount:	\$0.00	0.00%
Purchase of Systems Amount:	\$0.00	0.00%
Restructing Amount:	\$0.00	0.00%
Land Acquisiton Amount:	\$0.00	0.00%
Total:	\$0.00	

DRINKING WATER COMPLIANCE

Does the project help to bring the facility back into compliance with existing or future State or Federal regulatory requirements?

No

If yes, enter what percentage of the project meets that criteria:

Does the project help the facility to maintain current compliance?

No

If yes, enter what percentage of the project meets that criteria:

Does the project help the facility to achieve compliance with upcoming requirements?

No

If yes, enter what percentage of the project meets that criteria

Does the project assist the facility with other non-compliance related activities?

No

If yes, enter what percentage of the project meets that criteria:

DRINKING WATER ENHANCEMENT

Does the project help enhance well capacity? (source development/upgrade)

No

If yes, the impact is:

Does the project enhance treatment plant capacity?

No

If yes, the impact is:

Does the project enhance security measures at the drinking water facility?

No

If yes, the impact is:

Does project enhance public safety? (Fire hydrants and related)

No

If yes, the impact is:

COMMENTS

PROJECT SPECIFIC DATA : NON-POINT SOURCE SUPPORTING PROJECT INFORMATION

MEASURES NON POINT SOURCE COST BREAKDOWN

Green Infrastructure	\$0.00	0.00%
Confined Animals(CAFO)	\$0.00	0.00%
Agricultural Cropland	\$0.00	0.00%
Silviculture	\$0.00	0.00%
Urban(excluded decentralized systems)	\$0.00	0.00%
Ground Water(unknown source)	\$0.00	0.00%
Marinas	\$0.00	0.00%
Resource extraction(include Acid mine)	\$0.00	0.00%
Brownfields	\$0.00	0.00%
Storage Tanks	\$0.00	0.00%
Sanitary Landfills	\$	0.00%
Hydromodification	\$20,960,000.00	0.00%
Individual/Decentralized Sewage treatment(include On-Lot systems)	\$0.00	0.00%
Unclassified	\$0.00	0.00%
TOTAL	\$	

COMMENTS

Please see the *Second Opinion Project Review* for a detailed cost breakdown.

DRINKING WATER BENEFITS

COMMUNITY HEALTH (DRINKING WATER)

Explain any existing environmental condition that will be addressed with the project (example: sludge handling facility).

The Manayunk Canal water quality adversely impacts the drinking water intakes for the Queen Lane and Belmont Treatment Plants, as well as the recreational use of the Schuylkill River Trail, the Manayunk Business district and myriad of residential units that have developed along the Manayunk Canal in this area that once supported heavy industry . To address this far-reaching water quality issue, the Philadelphia Water Department (PWD) determined that the most efficient and sustainable means to improve the water quality is by reestablishing sustained but controlled flow into the Manayunk Canal and engaged *O'Brien & Gere Engineers (OBG -*aka Ramboll Americas Engineering Solutions as of 10.01.2020) to develop a program of improvements to correct this condition.

In order to achieve the project’s objective to reestablish and sustain satisfactory water quality in the Manayunk Canal, it has been necessary to include the following project features in the design; to satisfy regulatory requirements, facilitate routine maintenance, and ensure long-term sustainable operations:

- * Design infrastructure to re-introduce flow to the Canal to improve downstream water quality
- * Include features to modulate the flow into the Canal during a wide range of river flow regimes
- * Include features to manage sediment and debris in order to maintain long-term water quality
- * Include features to facilitate staff, vehicles, and heavy equipment site access that is independent of, and does not utilize, the Schuylkill River Trail
- * Include features to address the deficiencies/instability in the existing infrastructure
- * Include features for site security and to maintain separation from the Schuylkill River Trail
- * Preserve and protect the Canal’s historic features to the maximum extent practical

How will this project improve the quality of life for the system customers?

The design of the Flat Rock Dam and Manayunk Canal Improvements project is to meet the critical objective of improving the water quality in the Canal by restoring controlled water flow into Manayunk Canal. The key to restoring the controlled water flow is the design of the Intake structure with twin sluice gates that modulate this flow, ensuring a steady but limited stream of raw water that increases dissolved oxygen, which improves the natural habitat to minimize or eliminate the fish-kills and algae blooms that have historically occurred in the Canal. The resultant higher water quality is highly beneficial to the river intakes for the Queen Lane and Belmont Treatment Plants, located just downstream of the Manayunk Canal, that produce approximately one-half of the drinking water used by the City of Philadelphia.

SOURCE WATER PROTECTION (DRINKING WATER)

If this project WILL increase the available water, please explain.

If this project promotes water conservation, please explain.

If this project includes or promotes water system consolidation, please explain efforts to consolidate/regionalize.

PUBLIC SAFETY (DRINKING WATER)

Will this project address replacement or major rehabilitation of an unsafe water supply storage tank?	No
Does this project include installation or replacement of fire hydrants?	No
Does this project include work to address workplace safety standards?	No
Will this project address issues related to water source and/or system security?	No
Will this project allow the system to meet fire codes - quantity/pressure for fire protection?	No

PUBLIC HEALTH (DRINKING WATER)

Will this project eliminate critical or chronic health hazards? No

Violation of Primary Maximum Contaminant Level (MCL)? List the contaminant along with the exceedance and frequency of exceedance, if applicable.

Presence of coliform or fecal coliform? No

No water available at the tap? No

Giardia or Cryptosporidium Cysts in the filtered water? No

DEP COMPLIANCE (DRINKING WATER)

If this project satisfies a compliance order or to address a problem with acute health or safety hazards (example Primary MCL violation), please explain.

If this project satisfies compliance with issues where a compliance order has not been issued or that are not an acute health or safety hazard, please explain.

Please see the community health section above.

If this project has components that take proactive steps to maintain compliance and ensure adequate operation and maintenance of the water system, please explain?

Please see the community health section above.

COMMENTS

BENEFITS : STORMWATER

STORMWATER COMPLIANCE WITH ACT 167 AND MS4

Is there a municipal stormwater ordinance in effect within the project area? Yes

Is the project within a Municipal Separate Storm Sewer System (MS4) designated area? Yes

Is the project designed to meet an MS4 permit requirement or part of an adopted Pollutant Reduction Plan?

No

Is the applicant a MS4 regulated entity? Yes

Upon completion of construction will the ownership, operation and maintenance for the stormwater project be conveyed to a MS4 entity? Yes

SAFETY (STORMWATER)

If the project addresses a critical or on-going safety or health hazard, please explain.

COMMUNITY HEALTH (STORMWATER)

If this project provides a regional approach to stormwater management and facilities, please explain.

If this project addresses problems in multiple locations, please explain.

AQUATIC HEALTH (STORMWATER)

If the project directly corrects a water quality problem, please explain.

The upstream end of Lock No. 68 has been barricaded with a steel sheet pile bulkhead and the entire lock and feeder system rendered inoperable, preventing flow into the Canal from the Intake Channel. The brick Feeder Gate House, sitting atop the Feeder Structure is now in a dilapidated condition. In the period since the entire Canal lock and feeder system was barricaded and inoperable, silt and debris have accumulated within the Intake Channel, further obstructing flow through the Canal. Water supply for the Canal is presently limited to stormwater runoff from the adjacent urban area via stormwater outfalls. The water level in the Canal is maintained by a stop log control structure at the downstream end of the Canal at the location of the former Lock No. 69, near the Lock Street Bridge. Due to the lack of regular inflow, siltation from stormwater runoff and the decomposition of organic debris, the Canal waters are typically shallow and stagnant and are prone to foul odors, algal blooms, and fish kills, especially during the summer months. This condition has been a cause for disturbance to recreational activities along the adjacent North Schuylkill River Trail (the former canal towpath), and to nearby residents and business owners.

If this project provides secondary benefits which improve or prevent water quality problems, please explain.

The concentration of oxygen-poor discharge from the Manayunk Schuylkill Canal is also known to affect water quality at the Queen Lane Water Treatment Plant raw water intake located just over 1 mile downstream of the canal discharge point on the left bank of the Schuylkill River and similarly, to the Belmont Water Treatment Plant raw water intake on the right bank of the Schuylkill River, both within the Fairmount Dam reservoir pool, which is the source for approximately half of the drinking water produced for the City of Philadelphia.

If this project is located in an area of karst topography and susceptible to sinkhole development, please explain.

If the project is located in areas having no natural watercourse, please explain.

INFRASTRUCTURE HEALTH (STORMWATER)

If the existing stormwater system is at the end of its useful life, please explain.

NA

If the existing system is undersized, please explain

NA

Does the applicant and/or municipality monitor and enforce illegal dumping into the stormwater system? Yes

Does the applicant and/or municipality have an active Asset Management Plan? Yes

COMPLIANCE (STORMWATER)

Has DEP taken enforcement action with an order or issued a Notice of Violation which requires the project? No

Is there an approved Total Maximum Daily Load (TMDL) which requires reductions in the pollutant(s) to be controlled by the project? No

COMMENTS

The City of Philadelphia has an entity within the Philadelphia Water Department that monitors and regulates stormwater within the City limits. The department is very active in green stormwater infrastructure and reducing the effects of stormwater. You can find their stormwater regulations at <https://www.pwdplanreview.org/manual-info/guidance-manual> they are too numerous and large to upload.

BENEFITS : NON-POINT SOURCE

NPS SUB TYPES

EXPLANATION FOR OTHER NON-POINT SOURCE SUB TYPE

NPS COMPLIANCE WITH ACT 167 AND MS-4

Is the project in an MS-4 regulated community (with either a draft or final permit)? Yes

If Yes, does the MS-4 permit require the work that is proposed in the funding application? No

NPS PLANNING

Is your project addressing a Department of Environmental Protection approved 319 Watershed Implementation Plan (WIP), or contained in an Municipal Separate Storm Sewer System (MS4) Pollutant Reduction Plan (PRP), or Total Maximum Daily Load (TMDL) strategy plan that is submitted for an MS4 Notification of Intent (NOI) permit application.

No

If Yes, please explain:

If No, will your project implement Best Management Practices (BMP) identified as needed to improve water quality in a water quality plan?

No

If Yes, please explain:

URBAN RUNOFF PROJECTS

What is the total area treated by BMP in acres?

NA

What is the impervious area treated by each BMP in acres?

NA

What is the runoff or storage volume in acre-ft for each BMP?

NA

AGRICULTURAL PROJECTS

How many animals are currently at the project site? 0

Explain what manure management controls or BMPs are currently being implemented and what is the state of their condition?

What is the name of the receiving stream and how far is the receiving stream from the project site?

Is the receiving stream impaired due to agriculture and/or sediment?

What is the estimated annual nitrogen reduction to the stream as a result of the project?

What is the estimated annual phosphorus reduction to the stream as a result of the project?

What is the estimated annual sediment reduction to the stream as a result of the project?

NPS SAFETY

If the project addresses a critical or on-going safety or health hazard, please explain.

The concentration of oxygen-poor discharge from the Manayunk Schuylkill Canal is just over one mile upstream of the Queen Lane raw water intake on the east bank of the Schuylkill River and has been linked to high concentrations of methylisoborneol (MIB) and geosmin, chemically derived constituents from certain species of algae and bacteria (e.g., cyanobacteria). The proposed improvements has been designed to reintroduce the flow to the Manayunk Canal to improve downstream water quality and improve the water quality for the Queen Lane WTP.

BROWNFIELDS SYSTEM INFORMATION

Who owns the property to be remediated?

This project is not a brownfields.

Does the project site have ACT 2 Clearance, or will the project site obtain ACT 2 Clearance as a result of project?

Will the owner's company be completing any of the construction (force account)?

Can you provide evidence that all federal supercrosscutters have been met? If so, please upload any evidence of federal supercrosscutters compliance.

Is the cost of acquiring the land to be remediated as part of this project?

Do you have a survey and title search of the real estate to be used for collateral; including title insurance policies and endorsements?

Do you have 'as is', 'as remediated' or 'as developed' appraisals of any real estate to be used for collateral?

NPS WATER QUALITY IMPACTS

Identify the receiving water(s) impacted by this project.

Due to the lack of regular inflow, the current sole source of water in the Canal is urban stormwater runoff. Water level in the Canal is maintained by a stop log control structure at the downstream end of the Canal where it rejoins the Schuylkill River. Reach Code 02040203000021 is listed on the 303(d) list as impaired for aquatic life use from urban runoff/storm sewers from unknown causes.

Describe the length stream or acres of lake that will show water quality improvement as a result of your project.

The length of stream that will be affected positively from the improvements is over 1 mile of stream on the Schuylkill River. The concentration of oxygen-poor discharge from the Manayunk Schuylkill Canal is also known to affect water quality at the Queen Lane Water Treatment Plant raw water intake located just over 1 mile downstream of the canal discharge point on the left bank of the Schuylkill River and similarly, to the Belmont Water Treatment Plant raw water intake on the right bank of the Schuylkill River, both within the Fairmount Dam reservoir pool, which is the source for approximately half of the drinking water produced for the City of Philadelphia.

Is the receiving water(s) listed as impaired on the PA Integrated Water Quality and Assessment Report? Yes

If Yes, list the causes of impairment.

Reach Code 02040203000021 of the Schuylkill River is listed on the 303(d) list as impaired for aquatic life use from urban runoff/storm sewers from unknown causes.

If Yes, identify the benefits of the project on water quality.

Due to the lack of regular inflow, the current sole source of water in the Canal is urban stormwater runoff. Plagued by siltation from stormwater runoff and the decomposition of organic debris, the Manayunk Canal waters are typically shallow and stagnant and are prone to foul odors, algal blooms, and fish kills, especially during the summer months. The result of disconnecting the Schuylkill River and the Manayunk Canal degraded the quality of the water returning to the Schuylkill River from the Canal, which negatively impacts the quality of water in the 303(d) listed river, and the source water used in the treatment process for producing drinking water at the Queen Lane and Belmont Treatment Plants. Of acute concern are intermittent discharges of stagnant Canal water (caused by precipitation events) containing high concentrations of organics, pathogens and other contaminants, including cyanobacteria, an emerging contaminant.

The primary objective for this project is the design of infrastructure that will reverse the isolation of the Manayunk Canal by reconnecting the flows of the Schuylkill River into Manayunk Canal. By reestablishing approximately 100 CFS of continuous flow into the Canal, this consistent regulated flow will improve dissolved oxygen concentrations, eliminate the conditions for growth of organics and disperse the concentration of pathogens and other contaminants, improving quality of water within the Canal and waters joining the Schuylkill River.

This project creates infrastructure that will provide sustainable and modulated river flow in the Manayunk Canal that will significantly increase the long-term water quality of the Canal, which, in turn, will have a positive impact on the quality of water discharged to the Schuylkill River, which is listed on the 303(d) list as impaired for aquatic life use from unknown causes from urban runoff, and the source water treated at the Queen Lane and Belmont Treatment Plants, to produce high-quality drinking water for hundreds of thousands of commercial and residential users.

If Yes, how are the benefits of the project linked to the impairment?

Based on data collected by the Philadelphia Water Department (PWD) over the last decade, it is evident that the water quality in the Canal has been compromised due to the stagnant flow conditions and organic enrichment from the Manayunk catchment. By reestablishing flow into the Canal from the Schuylkill River through regulating control structures (e.g., sluice gates) and the development of a consistent maintenance program, measurable improvements in water quality are achievable.

Construction of a new headworks and intake channel will enhance the quality of water flowing through the canal, reducing hypoxia during summer conditions (i.e., high temperatures and low flow), decreasing stagnation and improving Biochemical Oxygen Demand (BOD). As described in Technical Memorandum II: Identifying Optimum Flows to Address Water Quality in the Manayunk Canal (PWD, 2016), water quality would show significant improvements in dissolved oxygen with increases of flow from the Schuylkill River. Simulated flows of 50 cfs, 75 cfs, and 100 cfs have shown marked increase in dissolved oxygen concentrations, with optimum conditions for DO minimum being reached between 75 cfs and 100 cfs.

With decreased residence time and increased velocities within the Canal, the presence of nuisance algal mats and low dissolved oxygen conditions, chronic to this area in summer months, may also be minimized or eliminated. Moreover, with the reestablishment of connectivity between the Schuylkill River and Manayunk Canal, biological communities will once again be afforded the opportunity to disperse into and out of the canal, increasing their home range and minimizing the effects of limiting resources in the previously isolated system. Based on these potential water quality and ecological benefits, it is apparent that the flow attraction system and upstream control structure(s) are integral to improving water quality in the Canal and Schuylkill River.

Is the receiving water(s) listed as high quality (HQ) or exceptional value (EV) by DEP? No

If Yes, list the pollutant(s) to be a threat to the HQ/EV existing use.

If Yes, list the source of water quality data/report that documents the threat to HQ/EV.

If Yes, explain how the benefits of the project will remove the threat to HQ/EV.

The receiving water(s) or groundwater is not listed as impaired or HQ/EV by the DEP, Yes but has identified water quality problems:

If Yes, list the source of water quality data, assessment report, or watershed plan that documents the water quality problems.

Schuylkill River Action Network -<https://www.schuylkillwaters.org/>

The Schuylkill Action Network (SAN) is a collaborative network of over 100 partners working together to improve water resources in the Schuylkill River watershed. With "action" as SAN's middle name, SAN partners have been working since 2003 to implement best practices across the Schuylkill River Watershed.

The smallest and most populated county in the Schuylkill Watershed is Philadelphia County. The only major tributary of the river in this county is the Wissahickon Creek, which begins in Montgomery County and joins the Schuylkill just before it flows into the Delaware. There are six trails and 9 parks within the Schuylkill Watershed in Philadelphia County.

If Yes, explain how the project will have a direct and substantial benefit in addressing the documented water quality problems.

Based on data collected by the Philadelphia Water Department (PWD) over the last decade, it is evident that the water quality in the Canal has been compromised due to the stagnant flow conditions and organic enrichment from the Manayunk catchment. By reestablishing flow into the Canal from the Schuylkill River through regulating control structures (e.g., sluice gates) and the development of a consistent maintenance program, measurable improvements in water quality are achievable.

Construction of a new headworks and intake channel will enhance the quality of water flowing through the canal, reducing hypoxia during summer conditions (i.e., high temperatures and low flow), decreasing stagnation and improving Biochemical Oxygen Demand (BOD). As described in Technical Memorandum II: Identifying Optimum Flows to Address Water Quality in the Manayunk Canal (PWD, 2016), water quality would show significant improvements in dissolved oxygen with increases of flow from the Schuylkill River. Simulated flows of 50 cfs, 75 cfs, and 100 cfs have shown marked increase in dissolved oxygen concentrations, with optimum conditions for DO minimum being reached between 75 cfs and 100 cfs.

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If Yes, will this project have direct pollutant benefits to waters beyond the immediate receiving waters (e.g. Chesapeake Bay Estuary, Gulf of Mexico, Lake Erie, or Delaware Estuary)? Please explain.

NO

NPS COMPLIANCE

Has DEP taken enforcement action(order or consent order and agreement) or issued a Notice of Violation which requires the project? No

Is there an approved Total Maximum Daily Load(TMDL) which requires reductions in the pollutants(s) to be controlled by the project? No

COMMENTS

KEYSTONE BENEFITS

KEYSTONE BENEFITS

If any of the communities served by this project have been granted special economic designation by the Department of Community and Economic Development or by the Governor's Action Team, please identify the program and the municipality(ies) and county(ies).

If any of the communities served by this project have been designated as distressed under the Municipalities Financial Recovery Act 47 of 1987, please identify the municipality(ies) and county(ies).

If this project directly serves a Brownfield site as designated by the PA Department of Environmental Protection, please identify the site.

If this project serves a City, Borough or 1st Class Township, please identify.

This project is within the City of Philadelphia service area and will benefit the City's water customers and users of the Manayunk Canal and downstream Schuylkill River.

COMMENTS

INCOME

COUNTY MUNICIPALITY & APPLICATION LEGISLATIVE

Primary	County	Municipality		System Served	Project Served	Households Served	Bulk
<input checked="" type="checkbox"/>	Philadelphia	Philadelphia City		<input type="checkbox"/>	<input checked="" type="checkbox"/>	490,000	<input type="checkbox"/>
						Total:	
						490000	
Primary	District	Congress Name	District	House Name	District	Senate Name	
<input type="checkbox"/>	2	Boyle, Brendan	194	Khan, Tarik	7	Hughes, Vincent	

BILLING

	Last Completed Audited Year	First Full Year After Project is Completed
	2020	2026
Estimate Population	1,584,064	1,584,064
Households served by System	490,000	490,000
Total EDUs served by system		
Residential EDUs served by system		
Average annual Residential bill	\$801.00	\$801.00
Total residential bills levied	\$0.00	\$0.00
Total residential bills collected	\$676,498,000.00	\$676,498,000.00
Total Commercial/Industrial bills levied	\$0.00	\$0.00
Total Commercial/Industrial bills collected	\$43,164,000.00	\$43,164,000.00

INCOME FOR GOVERNMENT ENTITY

	Last Completed Fiscal Year	First Full Year After Project Completed
	2020	2026
Total Bills Collected	\$719,662,000.00	\$719,662,000.00
Other Charges Collected	\$13,656,000.00	\$13,656,000.00
Total Operating Revenues	\$733,318,000.00	\$733,318,000.00
Non-Operating Revenues	\$23,717,000.00	\$23,717,000.00
Total Income	\$757,035,000.00	\$757,035,000.00

INCOME FOR PROFIT ENTITY

	Last Completed Fiscal Year	First Full Year After Project Completed
	2020	2026
Sales of Products	\$0.00	\$0.00
Investment Income	\$0.00	\$0.00
Rental Income	\$0.00	\$0.00
Other Income	\$0.00	\$0.00
Total Income	\$0.00	\$0.00

INCOME FOR NON-PROFIT ENTITY

	Last Completed Fiscal Year	First Full Year After Project Completed
	2020	2026
Provisions of Services	\$0.00	\$0.00
Government Grants Subsidies	\$0.00	\$0.00
Program Services	\$0.00	\$0.00
Investment Income	\$0.00	\$0.00
Contribution from Donors	\$0.00	\$0.00
Rental Income	\$0.00	\$0.00
Other Income	\$0.00	\$0.00
Total Income	\$0.00	\$0.00

OPERATING EXPENSES

	Last Completed Fiscal Year	First Full Year After Project Completed
	2020	2026
Labor Salaries Benefits	\$299,356,000.00	\$299,356,000.00
Utilities	\$0.00	\$0.00
Rent	\$0.00	\$0.00
Materials/Supplies	\$38,465,000.00	\$38,465,000.00
Cost of Goods Sold	\$0.00	\$0.00
Program Expenses	\$0.00	\$0.00
Administration Expenses	\$3,189,000.00	\$3,189,000.00
Professional Fees	\$125,163,000.00	\$125,163,000.00
Depreciation Expense	\$125,834,000.00	\$125,834,000.00
Other Expenses	\$0.00	\$0.00
Outside Services	\$0.00	\$0.00
Total (Minus Depreciation Expense)	\$466,173,000.00	\$466,173,000.00

NON-OPERATING EXPENSES

	Last Completed Fiscal Year	First Full Year After Project Completed
	2020	2026
Annual Debt Service Excluding This Project	\$87,106,000.00	\$87,106,000.00
Other Non-Operating Expenses	\$32,237,000.00	\$32,237,000.00
Total	\$119,343,000.00	\$119,343,000.00

NET CASH

	Last Completed Fiscal Year	First Full Year After Project Completed
Total Cash	\$	\$
Total Cash Expenses	\$	\$
Total Cash (Minus Total Cash Expenses)	\$	\$

COMMENTS

Explain other charges, non-operating revenues and identify sources of the above information: Bulk Agreements with FY20= Revenues totaling \$43.164.000 million and is listed as total commercial.

Other Operating Revenue FY20 = interest income + small grant

Other Non-Operating Expense FY20 = items removed from fixed assets of the system.

All Water and Wastewater Revenue Bonds (other than Subordinated Bonds) are equally and ratably secured under the General Ordinance. No Subordinated Bonds are Outstanding under the General Ordinance. Pursuant to the General Ordinance, the City pledges and assigns to the Fiscal Agent, in trust, for the security and payment of all Water and Wastewater Revenue Bonds (other than Subordinated Bonds) issued under or subject to the General Ordinance, and grants to the Fiscal Agent, in trust, a lien on and security interest in all Project Revenues and amounts on deposit in or standing to the credit of the Water and Wastewater Funds (other than the Rebate Fund). The Fiscal Agent must hold and apply the security interest in and lien on Project Revenues and funds and accounts, in trust, for the equal and ratable benefit and security of all present and future holders of Water and Wastewater Revenue Bonds (other than Subordinated Bonds). The General Ordinance provides that such pledge also may be for the benefit of the provider of a Credit Facility or a Qualified Swap (as defined therein), or any other person who undertakes to provide monies for the account of the City for the payment of principal or redemption price of and interest on any series of Water and Wastewater Revenue Bonds (other than Subordinated Bonds), on an equal and ratable basis with the holders of Water and Wastewater Revenue Bonds (other than Subordinated Bonds).

DEBT

DEBT

\$

COMMENTS

CITY OF PHILADELPHIA WATER DEPARTMENT BONDED DEBT WATER AND WASTEWATER REVENUE BONDS AS OF OCTOBER 31, 2020

Year End	Principal Requirements	Interest Requirements	Total Debt
Service 06/30/2021	\$45,119,572	60,194,698	105,314,270
06/30/2022	80,232,298	93,915,002	174,147,300
06/30/2023	80,493,182	94,695,826	175,189,007
06/30/2024	66,692,914	95,239,782	161,932,696
06/30/2025	69,751,576	92,317,257	162,068,833
06/30/2026	73,874,251	89,195,491	163,069,742
06/30/2027	77,206,026	85,896,814	163,102,840
06/30/2028	65,011,987	82,799,920	147,811,907
06/30/2029	66,282,224	80,458,690	146,740,914
06/30/2030	64,786,827	78,123,511	142,910,337
06/30/2031	67,725,889	75,261,158	142,987,046
06/30/2032	67,730,629	72,324,012	140,054,641
06/30/2033	54,657,971	69,618,136	124,276,107
06/30/2034	57,223,383	67,057,391	124,280,774
06/30/2035	59,815,000	64,466,561	124,281,561
06/30/2036	62,445,000	61,831,226	124,276,226
06/30/2037	65,405,000	58,872,174	124,277,174
06/30/2038	68,700,000	55,577,880	124,277,880
06/30/2039	72,170,000	52,113,145	124,283,145
06/30/2040	75,805,000	48,469,442	124,274,442
06/30/2041	79,640,000	44,641,441	124,281,441
06/30/2042	81,345,000	40,646,500	121,991,500
06/30/2043	85,520,000	36,474,875	121,994,875
06/30/2044	84,170,000	32,232,625	116,402,625
06/30/2045	77,435,000	28,192,500	105,627,500
06/30/2046	81,410,000	24,221,375	105,631,375
06/30/2047	49,640,000	20,945,125	70,585,125
06/30/2048	52,185,000	18,399,500	70,584,500
06/30/2049	54,880,000	15,711,781	70,591,781
06/30/2050	57,710,000	12,874,256	70,584,256
06/30/2051	60,700,000	9,890,031	70,590,031
06/30/2052	52,050,000	7,046,044	59,096,044
06/30/2053	54,750,000	4,349,675	59,099,675
06/30/2054	38,000,000	2,017,500	40,017,500
06/30/2055	21,350,000	533,750	21,883,750
	Total	\$ 2,271,913,729	\$ 1,776,605,093

4,048,518,822 (1) Totals may not add due to rounding. (2) Total Debt Service reflects the impact of a Capitalized Interest account for FY2021 FY2022 and FY2023

BUDGET INFORMATION

PROJECT BUDGET

Administrative Cost:	\$0.00
Legal Fees:	\$0.00
Financial/Accounting Charges:	\$0.00
Interest During Construction:	\$0.00
Engineering/Architecture Fees:	\$1,060,000.00
Permits:	\$0.00
Land	\$0.00
Construction	\$18,950,000.00
Contingency	\$950,000.00

Other Costs:	\$0.00
Total:	\$20,960,000.00

COMMENTS

RATES

RATES

Metered:	Monthly
Flat:	Not Selected Yet
Other:	Not Selected Yet

Explain special rate structure or agreement. Indicate if no rates apply for this project.

Special rates with partial discounts are established pursuant to the Water Department's Rates and Charges for the following customers: (1) public and private schools which provide instruction up to or below the twelfth grade; (2) institutions of "purely public charity;" (3) places used for religious worship; (4) residences of eligible senior citizens; (5) universities and colleges; and (6) public housing properties of the Philadelphia Housing Authority. In addition, the Rate Board approved discounts of 100% on stormwater rates for eligible community gardens in 2016 and an exemption from water, sewer and stormwater rates for unoccupied properties of the Philadelphia Land Bank in 2018. Some real estate also is exempt from stormwater charges, including, cemeteries, residential sideyards, City-owned or City-controlled vacant lots or improvements, portions of Fairmount Park, streets, medians, sidewalks, and rights-of-way. Water and sewer charges, including stormwater charges, terminate when any vacant or unoccupied premises are acquired by the City and when property is acquired by the Philadelphia Housing Development Corporation or the Philadelphia Redevelopment Authority under provisions of the Philadelphia Code pertaining to vacant properties.

In addition to the special rates referenced above, the Water Department offers additional assistance and incentive programs to customers, which constitute either an Operating Expense of the Water Department or contra-revenue in the form of credits or reductions to customers' bills.

The Tiered Assistance Program ("TAP") program was launched on July 1, 2017 and assists low-income households at or below 150% of the federal poverty level ("FPL") and those experiencing a special hardship, as discussed herein. Under the TAP program bills are tied to household income and do not fluctuate based on actual consumption.

Under the TAP program, monthly bills for water, sewer, and stormwater usage and service charges are as follows:

Income Fixed Charge %*

50% of FPL or lower at 2% of the household income \$12.00 minimum bill

Above 50% and at or below 100% At 2.5% of the household income

Above 100% and at or below 150% FPL 3% of the household income

Above 150% FPL, with proof of hardship 4% of the household income A special hardship can be increase in household size, loss of a job lasting more than 4 months, serious illness lasting more than 9 months, death of primary wage earner, domestic violence, other circumstances that threaten household's access to necessities of life

COMMENTS