PHILADELPHIA'S WET WEATHER MANAGEMENT PROGRAMS

COMBINED SEWER MANAGEMENT PROGRAM ANNUAL REPORT

National Pollutant Discharge Elimination System (NPDES) Permits
Nos. PA0026689, PA0026662, PA0026671

STORMWATER MANAGEMENT PROGRAM ANNUAL REPORT

National Pollutant Discharge Elimination System (NPDES) Permit
No. PA 0054712

Reporting Period July 1st 2019 to June 30th 2020

Submitted to:

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Water Quality Management

And

ENVIRONMENTAL PROTECTION AGENCY – REGION III
Water Protection Division

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Erratum

1. The erratum submitted on November 12th, 2020 includes the replacement of the data table of Appendix 3 of Appendix A – *Green City, Clean Waters* FY 2020 Annual Report.

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I. Management and Control of CSOs

This report is submitted pursuant to meeting the requirements of NPDES Permits #'s PA0026662, PA0026671, and PA0026689; PART C, I. Other Requirements, Combined Sewer Overflows (CSOs), III. Implementation of the Long Term CSO Control Plan, C. Watershed-Based Management, IV. Monitoring and Assessment. This section requires that the permittee submit an Annual CSO Status Report. The purpose of this report is to document the status and changes made to programs implemented by the City of Philadelphia (City), during Fiscal Year 2020 (FY20), which encompasses the period of July 1st, 2019 through June 30th, 2020, to manage and reduce the CSOs permitted to discharge to waters of the Commonwealth of Pennsylvania.

II. Implementation of the Nine Minimum Controls

The Philadelphia Water Department (PWD) submitted an Updated Nine Minimum Control Report to the Department on June 1, 2013 to supplement the 1995 report and describe current activities as a result of new technology or practices. The nine minimum controls (NMCs) are low-cost actions or measures that can reduce CSO discharges and their effect on receiving waters, do not require significant engineering studies or major construction, and can be implemented in a relatively short time frame.

II.A NMC 1 - Proper Operation and Regular Maintenance Programs for the Sewer System and the CSOs

II.A.1 Implement a Comprehensive Geographic Information System (GIS) of the City Sewer System

To ensure PWD's investment in GIS is as accurate and up to date as possible, edits and improvements are made to data on a daily basis. PWD utilizes the GIS coverages as the foundation for many of its operations including maintenance management, capital improvements, and hydraulic modeling. During FY20, GIS layers were updated and maintained to ensure the accurate tracking and reporting of PWD assets and infrastructure.

II.A.2 Implement a Comprehensive Sewer Assessment Program (SAP)

PWD continues to implement a comprehensive SAP to provide inspection of the collection system using closed circuit television (CCTV) and Sonar. The SAP is a critical tool for operations and maintenance as it provides information on existing pipe conditions and helps to locate where repairs are needed. The program is also used to guide the capital improvement program to ensure that the existing sewer systems are adequately maintained, rehabilitated, and reconstructed.

CCTV inspections are conducted/managed by PWD's Flow Control group and also performed by PWD contractors. During FY20, 34.15 miles of sewer inspections were completed via CCTV and SONAR, averaging about 2.85 miles a month as shown in **Table II.A.2-1 Monthly TV Inspections.** In addition, the CCTV unit completed 708 post construction and 484 preventative maintenance inspections of green stormwater infrastructure assets during FY20.

Table II.A.2-1 Monthly TV Inspections

Date	Collector Systems (Miles Inspected)
Jul-19	2.42
Aug-19	2.87
Sep-19	4.18
Oct-19	5.64
Nov-19	2.52
Dec-19	2.84
Jan-20	3.27
Feb-20	2.96
Mar-20	2.57
Apr-20	0.95
May-20	1.59
Jun-20	2.34
Average	2.85
Total	**34.15**

II.B NMC 2 - Maximum Use of the Collection System for Storage

II.B.1 Continue to Institutionalize a Comprehensive Monitoring and Modeling Program

Monitoring

PWD maintains an extensive monitoring network throughout the combined sewer system including rain gages, pump stations, and connections from adjacent outlying communities. Information on the monitoring network with an updated listing of the monitors, rain gages, and pumping stations can be found in **Appendix B - Flow Monitoring**.

Modeling

The hydrologic and hydraulic models will be updated as needed to support Nine Minimum Controls implementation and reporting.

II.B.2 Continue to Operate and Maintain a Network of Permanent and Temporary Flow Monitoring Equipment

PWD continues to maintain a CSO permanent monitoring network and temporary monitoring programs to support planning for CSO control projects and to minimize dry weather overflows and tidal inflows.

Permanent Flow Monitoring Program

PWD uses a network of permanent flow monitors that are connected to a data acquisition system (TELOG) which uses cellular-based telemetry and improved enterprise data management software. As of FY20, the Collector System Monitoring Network is connected to over 320 sites at various locations including CSO Regulators, Rain Gauges, Pump Stations, Interceptors, Chemical Feed Tanks and Hydraulic Control Points which collect over 720 individual measurements with over a ninety percent operational status. All monitoring devices deployed throughout the PWD Collector System continually store data and periodically communicate monitoring information back for review and use by staff. The listing of permanent flow monitors can be found in **Appendix B – Flow Monitoring.**

Temporary Flow Monitoring Program

PWD maintains its temporary flow monitoring program, initiated in July 1999, which consists of deploying portable flow meters throughout targeted Philadelphia sewershed areas to quantify sanitary and combined flow from the sewer system and characterize the tributary sewersheds. During FY20, PWD monitored 68 sites for the purposes of model calibration, inflow/infiltration (I/I) identification and design support. The listing of all temporary flow monitors, their location, and the deployment projects can be found in **Appendix B – Flow Monitoring: Table 6 – Listing of all Temporary Flow Monitors Deployed by Projects.**

II.B.3 Continue to Evaluate the Collection System to Ensure Adequate Transport Capacity for Dry and Wet Weather Flow

Long Term Control Plan Update

System-wide hydrologic and hydraulic (H&H) models have been developed in support of the Long Term CSO Control Plan Update (LTCPU). Model evaluations have been performed to evaluate the system performance benefits of various system improvement scenarios.

The evaluations of the system-wide models were completed in FY08 to support the LTCPU. Since 2008 EPA's Stormwater Management Model (SWMM) has been updated to SWMM 5. PWD continues to update the H&H models as needed to support planning and regulatory reporting needs.

PC-30 Extreme Wet Weather Overflow

PWD continues to monitor PC-30. For additional information on other efforts conducted for this site, please refer to **Section III.B.2.: Table III.B.2-1** on page 35.

Flood Risk Management

PWD has a robust flood risk management program to analyze and reduce property damage from flooding and basement backups. Aspects of this program include property data collection, implementing individual property mitigation when appropriate, sewer system H&H analysis to understand flood prone areas, and developing policies to reduce flood risk in the City.

Flood Relief Project Summary

More recently, the focus of PWD's flood risk management efforts include: South Philadelphia, Northern Liberties, Germantown, and Eastwick. The goal of these efforts is to improve the conveyance of stormwater by targeting peak flow and volume reduction and reducing the potential for flooding. Hydrologic and hydraulic modeling indicates that sewer system improvements or source reduction can sometimes reduce the frequency and/or severity of flooding events. However, the potential benefits of structural improvements to the City's drainage infrastructure must always be counterbalanced by the financial, economic, and social impacts of implementation. PWD continues to refine and optimize mitigation solutions to minimize negative impacts to communities.

South Philadelphia

In FY20, PWD has completed the 50% Design of the Moore Street Storm Flood Relief Project. The project involves the construction of 8' x 12' reinforced concrete box sewers that drain to the Delaware River.

Northern Liberties

Storm Flood Relief sewer projects were initiated in the Northern Liberties neighborhood to reduce flood risk in the combined sewer neighborhoods of Northern Liberties, Fishtown, Port Richmond and Lower Kensington. **Table II.B.3-1** demonstrates the status of the Northern Liberties SFR program at the end of FY20:

Table II.B.3-1 Northern Liberties SFR Sewer Improvement Projects

Project Name	Location	Project Status
Northern Liberties Phase 1	Delaware Avenue and Laurel Street	Construction Complete (2011)
Northern Liberties Phase 2	Canal Street Chamber	Construction Complete (2016)
Northern Liberties Phase 3	Delaware Ave to River (Undertaken by Sugar House)	Construction Complete (2016)
Northern Liberties Phase 4	Canal & Laurel Sts. to Germantown Ave. &Wildey St.	Construction Complete (2016)
Northern Liberties Phase 5	Germantown Ave. from Wildey St. to Girard Ave.	Construction underway
Northern Liberties Phase 6	Germantown Ave. & Thompson St. to Master & Randolph Sts.	In Design at 90%

Germantown

The East Germantown section of Philadelphia was impacted by flooding from intense rainstorms, such as Hurricane Irene (8/27/11) and Tropical Storm Lee (9/7/11). In FY20, PWD and its consultant completed the Alternative Evaluation and Recommended Outcome (AERO) Report phase of capital planning. Over the fiscal year, two high performing alternatives were further analyzed to optimize the diversion chambers and refine the 2-dimensional routing PWD also initiated the design of a sewer improvement project along 21st Street to reduce residual flooding outside of the geographic scope of the capital project.

Eastwick

The Eastwick neighborhood is located in a naturally low-lying area in southwest Philadelphia. The neighborhood has experienced severe riverine flooding from multiple storms including Hurricane Floyd, Hurricane Irene, and Tropical Storm Lee. The City of Philadelphia, acting through PWD, executed the Federal Cost Share Agreement in May 2019 to move forward with the feasibility study through the Continuing Authorities Program. PWD has been working closely with the USACE in completing the Alternative Formulation Briefing by September 2020.

II.B.4 Fully Integrate the Real-Time Control Facility into the Operations of PWD

Real Time Control Evaluation

Several projects were previously evaluated for Real Time Control; for additional information on these projects, please refer to Section 2.1 Evaluate Real Time Control in LTCP on page 10 of the 1996 Annual CSO Status Report and Section II.B.3.4 Real Time Control Evaluation on page 26 of the CSO-Stormwater FY10 Annual Report. For details regarding the current operational statuses of the City's real time control CSO regulator sites, see **Section II.B.5** below.

There are currently two projects in the Department's design process that are being evaluated for the use of real-time control technology:

D-05 CSO Regulator (State Road and Magee Avenue)

The D05 regulator is being examined for additional CSO capture through the installation of a new, enlarged interceptor connection with a real-time controlled sluice gate. As of FY20, this project is in the design stage. This project is coupled to the Frankford Siphon replacement project, which is also in the design stage, and is expected to result in enhanced storage and conveyance of wet weather flows via modification to an existing computer controlled CSO.

Thomas Run Relief Sewer (R-01)

A capital construction project for the modification of the Thomas Run relief sewer has been initiated. The project is evaluating the potential for this system to be maximized for in-line storage during wet weather by creating a new interceptor connection and CSO regulator site at the outfall of this storm flood relief system and will consider the effectiveness of real-time control. This project is in the early stages of design as FY20.

II.B.5 Operate and Maintain In-Line Collection Storage System Projects Contained within the LTCP

Main Relief

The Main Relief project is operating as designed with a 7.5 foot static dam. The current configuration achieves an overflow reduction of approximately 30 MG annually.

Tacony Creek Park (T-14)

The T14 storage sewer provides combined sewer overflow capture in the Northeast Drainage District (NEDD). The T-14 storage sewer system is operating under automated controls and reducing overflow volume during wet weather events. T14 operated at the full design level during FY20.

Rock Run Relief (R-15)

The Rock Run Relief Sewer provides flood relief to combined sewer areas upstream of regulator T-8 in the Northeast Drainage District (NEDD). An inflatable dam was constructed in the Rock Run Relief Sewer to allow for utilization of in-system storage to retain combined flows during wet weather events. The Rock Run storage facility operated at the full design capacity during FY20.

Computer-Controlled CSO Regulators

PWD has eight computer-controlled CSO regulators that are configured to maximize storage during wet weather. All the computer-controlled regulators are in the northeast drainage district (NEDD). Five of the eight computer-controlled regulator sites had control upgrades installed in FY17. During FY19 D-07 had a new control panel installed. The remaining two computer-controlled regulators (D-11 and F-25) are scheduled for upgrades.

II.C NMC 3 - Review and Modification of Pretreatment Requirements to Assure CSO Impacts Are Minimized

II.C.1 Expand the Pretreatment Program to Include Significant Industrial Users (SIUs) Whose Facilities Contribute Runoff to the Combined Sewer System

The City of Philadelphia's Pretreatment Program regulates all significant industrial users (SIUs) that discharge into PWD's service area, which includes SIUs in both separate and combined sewer systems. The City continually reevaluates the Pretreatment Program to determine if improvements can be made. Through annual monitoring and inspection activities, PWD currently regulates 126 SIUs that discharge to the sanitary system. PWD conducts SIU program review and inspections on a calendar year cycle, having inspected all 126 permitted facilities during the 2019 calendar year.

PWD also maintains a website to inform the public and industries of permitting regulations, requirements and other information that may benefit or impact industrial users. The responsible PWD group's website is located at the following web address: http://www.phila.gov/water/IWU.html.

II.C.2 Incorporate Guidance on BMPs for Industrial Stormwater Discharges into Stormwater Management Regulations Guidance

Regular updates are made to the Philadelphia Stormwater Management Guidance Manual. The manual assists developers in meeting the requirements of the Stormwater Regulations and can be updated when necessary to incorporate new information. The current version of the manual is available at http://www.pwdplanreview.org/manual/introduction.

Please refer to the MS4 Annual Report **Section F.5.g - Stormwater BMP Handbook and Construction Site BMP Sediment & Erosion Control Checklist** on page 30 for additional information on the updated manual.

II.C.3 Continue to Serve as a Member of the Philadelphia Inter-Governmental Scrap and Tire Yard Task Force

The Scrap Yard Task Force (SYTF) was created to address numerous complaints about the operation of scrap metal and auto salvage businesses, which may cause polluted runoff to enter the City's sewers, blight in City neighborhoods, and contribute to short dumping and other environmental hazards to area waterways.

The SYTF is in its twelfth year of operation since it was reorganized in September of 2008. Regular inspections and meetings occur, inspecting about 4 scrap facilities each month to bring businesses conducting these activities into compliance. The SYTF will occasionally inspect facilities that do not fit the strict definitions of either a junkyard or metal recycler but present potential for negative impact on the environment and surrounding area. Some of these sites include sites with tire accumulations, overflow lots, other recycling facilities, and shipping operations. The SYTF also responds to community complaints having to do with facilities or properties that are considered a nuisance or problematic in a given neighborhood.

The core agencies involved in the SYTF are PWD, PADEP's Solid Waste division, Department of License and Inspections (L&I), Philadelphia Police Auto Squad and the Philadelphia Fire Dept. Hazmat Administration Unit. Each attending agency performs specific tasks as dictated by their primary regulatory mission. For example, PWD inspects sites for water and sewer violations, as well as violations that may be referred to the PADEP Clean Water division. PWD is the coordinating entity that designates the facilities to be visited.

During FY20, the SYTF held 6 meetings resulting in 26 facility inspection attempts. No SYTF meetings or inspections have been since March 2020, due to concerns relating to the COVID-19 Pandemic. Facilities inspected are shown in **Table II.C.3-3: SYTF FY20 Inspections** on page 8, while locations are displayed in **Figure II.C.3: SYTF Sites Inspected in FY20** on page 9.

The findings from sites inspected in FY20 include:

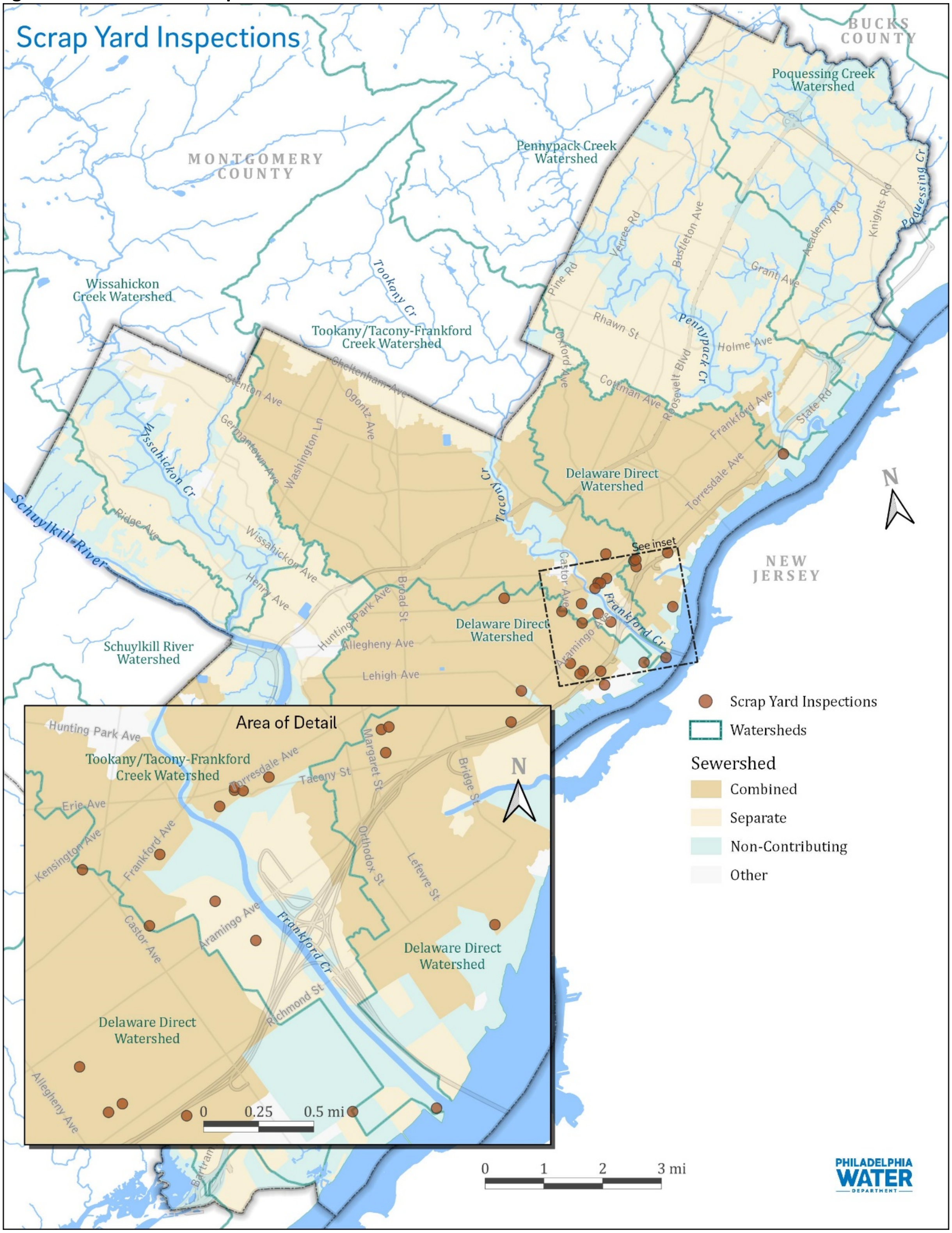
- Majority were minor infractions such as improper labeling and storage, blocked fire lanes and missing business/special work licenses which typically are addressed shortly after identified. Any potential water quality concerns are referred to PWD.
- Three (3) sites were discovered to be no longer active scrapyards or going out of business, the SYTF will continue to monitor these sites as these areas often reestablish as new scrapyards as they change hands.
- Two (2) sites were not inspected and the SYTF was denied access. One known scrapyard denied access.

Table II.C.3-2: FY20 SYTF Inspections

Company Address	Company Name	Date Inspected
4601 Bath St	KanCo	7/11/2019
7777 Rear State Rd	Morris Iron & steel loading dock	7/11/2019
4750 James St	Shaw's	7/11/2019
4745 Worth St.	Unknown	7/11/2019
4779 Worth St.	Unknown	7/11/2019
2335 Wheatsheaf Lane	Green Dog	9/12/2019
2435 Wheatsheaf Lane	SD Richman& sons	9/12/2019
4301 N Delaware Ave	ARCA	9/12/2019
3950 Delaware Ave	Final Destination	9/12/2019
2942 E. Tioga	EMR Rhino	10/3/2019
3065 E. Ontario	Temple Enterprises	10/3/2019
3361 Edgemont Ave	Sullivan Scrap	10/3/2019
3711 Sepviva St	Auto Spot II	10/3/2019
1825 E. Pacific St	Castor Trucks & Parts	11/7/2019
4175 Torresdale Ave	Allied Auto Parts	11/7/2019

2180 Church St	Steffa Metals	11/7/2019
2251 Fraley St	Absco Metals	11/7/2019
3850 Coral St	Cheap 4 U	11/7/2019
2200 E Adams Ave	Allegheny Metal	12/5/2019
2250 E Adams Ave	Almet	12/5/2019
2701 E Westmoreland	Sullivan's	12/5/2019
3317 Gaul St	JC Auto	12/5/2019
4534 Hedge St	Karr Parts	2/6/2020
3737 D St	Philly Auto II	2/6/2020
4034 Orchard St	Steffa Metals Overflow yard	2/6/2020
2157 E Lehigh Ave	Second Time Auto	2/6/2020

Figure II.C.3: SYTF Sites Inspected in FY20



II.D NMC 4 - Maximization of Flow to the Publicly Owned Treatment Works (POTW) for Treatment

II.D.1 Continue to Analyze and Implement Non-Capital Intensive Steps to Maximize the Wet Weather Flow to the POTW

Modified Regulator Plan

The Modified Regulator Plan (MRP) was designed to deliver more flow to the WPCPs more frequently and enable greater pollutant removals. The projected flow increase associated with the MRP was completely implemented by the submission of the 1997 Annual Combined Sewer Overflow Status Report. Additional plan implementation efforts were included in the Updated Nine Minimum Controls Report which can be found online by accessing the following link: http://water.phila.gov/pool/files/NMC_Report_Final.pdf.

Maximization of Wet Weather Treatment in the LTCPU

PWD completed and submitted a comprehensive Wet Weather Facility Plan on June 1, 2016, which provides details including schedule, cost and anticipated performance for each project presented in and supersedes the FCPs. More details on these plans can be accessed at the following link: http://water.phila.gov/reporting/ltcp/.

II.D.2 Continue the Program Which Requires Flow Reduction Plans in Agreements to Treat Wastewater Flows from Satellite Collection Systems Where Violations of Contractual Limits are Observed

PWD provides wastewater service to some of its neighboring communities. Communities that exceed their contractual limits must develop flow reduction plans, under PWD review. In FY20, there were no significant updates to the Wholesale Wastewater Customer contracts. The list of outlying community contracts can be found below in **Table II.D.2-1: Listing of Wholesale Wastewater Customer Contracts and Capacities**.

Table II.D.2-1 Listing of Wholesale Wastewater Customer Contracts and Capacities

Customers	Average Annual Daily Flow Maximum (MGD)	Maximum Daily Flow (MGD)	Instantaneous Maximum Rate (Cubic ft./sec)	Maximum Annual BOD Loadings (1,000's lbs.)	Maximum Annual SS Loadings (1,000's lbs.)
Northeast Plant					
Abington	2.97	4.45	9.54	2,102	2,481
Bensalem	6.13	-	11.74	5,340	3,734
Bucks	24	33.00	74.26	13,400	13,400
Cheltenham	-	-	26	-	-
Lower Moreland	1.90	2.85	5.88	729	966
Lower Southampton	7.14	9.28	15.79	5,500	6,000
Southwest Plant					
DELCORA	50.00	75.00	155.00	21,771	19,487
Lower Merion	14.50	-	31.57	6,871	7,250
Springfield (Erdenheim)	3.20	-	6.65	3,100	3,300
Upper Darby	17.00	-	35.00	6,831	7,348
Southeast Plant					
Springfield (Wyndmoor)	1.00	-	1.93	300	400

II.D.3 Use Comprehensive Monitoring and Modeling Program to Identify Suburban Communities where Excessive Rainfall-dependent I/I Appear to be Occurring

The US EPA's SWMM was used to develop the watershed-scale model for the combined and separate sewer systems. Suburban communities are modeled as separate sanitary sewersheds that load to the PWD sewer network. The rainfall response from these sheds is calibrated to flow monitoring data collected at each respective connection to PWD sewer network (if the sewershed is not monitored then a reference shed is used to obtain the rainfall response). Presently, permanent flow monitors are installed at 63 connections. **Appendix B – Flow Monitoring: Table 2** contains the list of all known connections, their location and whether the connection is permanently monitored.

Since the FY20 annual report submission, some minor changes have been made to the SWMM 5 model to include operational and structural changes to the collection system. Modifications include the following:

- Rock Run Relief: The dry weather outlet gate was returned to computer control on 7/1/2019
- S10: A 6" stop log was added to dry weather diversion dam on 8/29/2019
- T14: Dry weather outlet gate 1 was closed and gate 2 was set to 50% closed, and the trunk storage level was set to 7' on 4/23/2020. The site was returned to trunk storage level of 14.8' and dry weather outlet gate 2 was returned to computer control on 5/8/2020.

Appendix D – FY20 NPDES Annual CSO Status Report: Table 2 shows the CSO volume, duration, and frequency of overflow events per permitted outfall for the rainfall that fell in FY20 utilizing SWMM 5 model version 2017.B.02.04. Table 3 shows the same statistics as table 2 but for the typical year rainfall utilizing the SWMM model that support the 5-year Evaluation and Adaptation Plan (EAP) submitted in October 2016.

II.E NMC 5 - Prohibition of CSOs during Dry Weather

II.E.1 Optimize the Real-Time Control Facility to Identify and Respond to Blockages and (non-chronic) Dry Weather Discharges

Regular inspections, reactive inspections, and maintenance of combined sewer overflow (CSO) regulators are performed throughout the City to ensure that sediment accumulations and/or blockages are identified and corrected immediately to avoid dry weather overflows. PWD utilizes a remote monitoring network system daily to help identify locations showing abnormal flow patterns.

CSO Regulator Inspection & Maintenance Program

PWD maintains 175 CSO regulator chambers with regulator devices that control the diversion of wastewater flow to the interceptor system and 26 storm relief diversion chambers that allow excess flow during storm events to be diverted to storm relief sewers. These chambers discharge through 164 NPDES permitted point sources which make up the CSO outfalls. The maintenance of the chambers is critical to the performance of the system in that they control the frequency, duration and quantity of CSO discharges. Annual summaries of the comprehensive and preventative maintenance activities completed in the combined sewer system over the past year are detailed in **Appendix D -FY20 NPDES Annual CSO Status Report** and any changes are discussed below.

PWD continues to implement its policy of conducting next day follow-up inspections at sites that experience a dry weather discharge. Ongoing assessment of all inspection scheduling continues to ensure that CSO regulators are inspected at the frequency required to ensure timely response to operational issues and minimize the likelihood of dry weather discharges. During FY20, Flow Control crews completed 4,178 inspections on 201 CSO regulator sites and storm relief diversion chambers. The crews cleared 97 CSO regulator blockages to prevent possible discharges from developing. There were 8 dry weather discharges total during this fiscal year. Details of the inspections during the past fiscal year can be found beginning on page 15 of **Appendix C – 2020 CSO Maintenance Program Annual Report.**

Tide Gate Inspection and Maintenance Program

Eighty-nine tide gates are located at approximately half of the CSO regulator chambers in the City's system and prevent tidal inflow into the combined sewer system from the estuary receiving water body. Maintenance of the gates is critical to system performance because inflow from the receiving water body can adversely affect the combined sewer system and treatment facilities by reducing system capacities, potentially causing dry weather discharges. In FY20, CSO tide gate preventative maintenance was completed at 16 of the tidally affected CSO regulator sites. Summaries of the tide gate inspection and maintenance completed during the past fiscal year are in **Appendix C – 2020 CSO Maintenance Program Annual Report**, which documents the locations of tide gate preventative maintenance performed in FY20.

Somerset Grit Chamber Cleaning

During FY14, the Somerset grit chamber was removed from service because the upstream regulator was being relocated. This relocation project was completed during FY16.

Central Schuylkill Pumping Station Grit Pocket Cleaning

During FY20, the two grit pockets at the CSPS siphon were cleaned two times, and a total of 60 cubic yards of grit with an approximate weight of 56 tons were removed to ensure proper functionality of the site. Additional information on the CSPS cleaning activities conducted in FY20 is available in **Appendix C – FY20 CSO Maintenance Program Annual Report**.

Routine Grit Cleaning

PWD regularly inspects regulators, pump stations, junction chambers and sewers which are known to accumulate grit. These sites are scheduled for flushing and vacuuming on as-needed basis.

II.F NMC 6 - Control of Solid and Floatable Materials in CSOs

II.F.1 Control the Discharge of Solids and Floatables by Cleaning Inlets and Catch Basins

PWD's Inlet Cleaning Unit (ICU) is responsible for inspecting and cleaning stormwater inlets within the City. When fully staffed, there are thirty-seven inlet cleaning crews whose primary duties include cleaning, removing and properly disposing of debris (solids and floatables) from inside City inlets as well as street level cleaning in the vicinity of inlets to prevent debris from entering the collection system and waterways. Other duties include inspection of inlet conditions and referral of structural defects to the Sewer Maintenance Unit for repair to ensure proper function. Crews are responsible for cleaning high volume traffic areas, retrieving and installing inlet covers, replacing missing inlet covers, installing locking covers, and unclogging choked inlet traps and outlet pipes so inlets can take water. A high level of focus is placed on responding to customer complaints of flooding, blockages, and foul odors.

During FY20, the ICU was responsible for maintenance of approximately 71,500 stormwater inlets connected to the City's combined and separate storm sewer systems (gray inlets). ICU is also responsible for cleaning of pretreatment on stormwater inlets connected to green stormwater infrastructure (green inlets). By the end of the year, ICU was responsible for preventative maintenance of approximately 760 green inlets monthly. Fiscal year totals for work on GSI-connected inlets included 9,088 inlet inspections and 8,813 pretreatment cleanings.

Statistics related to the ICU's work productivity during FY20 and the previous two fiscal years can be found in **Table II.F.1-1**, below. The quantities for inlets inspected, inlets cleaned, debris removed and pounds per inlet during FY20 include work conducted at both gray and green inlets. The process of dewatering debris at a central location has increased cleaning efficiency (higher number of inlets cleaned) and decreased the weight of materials taken for disposal.

Table II.F.1-1: Inlet Cleaning Statistics

	FY17	FY18	FY19	FY20
Total Inlets Inspected	134,256	132,699	138,226	106,567
Total Inlets Cleaned	107,638	106,796	111,979	93,453
Total Covers Replaced	103	124	59	74
Total Covers Retrieved	28	14	47	63
Total Covers Chained	3,106	2,685	2,987	1,547
Debris Removed (tons)	7,405	6,286	5,515	4,192
Avg. Lbs./ Inlet	138	118	121	99

II.F.2 Continue to Fund and Operate the Waterways Restoration Team (WRT)

PWD's Waterways Restoration Team (WRT) is a multi-crew force dedicated to performing stream examinations, infrastructure protection projects and cleanup work throughout the city including large trash and debris removal and restoration of eroded streambanks and streambeds. WRT's stream examinations consist of assessing a variety of field conditions including waterway, infrastructure, site access and sewage discharge assessments. WRT waterway maintenance work involves debris removal, stream restoration work, and assisting with sewer maintenance work to help provide a safe work environment while protecting stream ecosystems. WRT works in partnership with Philadelphia Parks and Recreation (PPR) staff and various Friends of the Parks groups to maximize resources and build positive relationships with our communities.

During FY20, WRT conducted 357 stream examinations and performed 764 maintenance activities. WRT removed a total of 618 tons of debris from the City's waterways (**Table II.F.2-1**). Of the total debris removed, most of the weight can be attributed to large organic material (e.g. trees) that have fallen into the waterways and restricted flow, thus increasing the potential for bank erosion and/or damage to infrastructure.

Table II.F.2-1 Waterways Restoration Team – Annual Activity Summary FY 2011-2020

Activity	FY 11	FY 12	FY 13	FY 14	FY 15	FY16	FY 17	FY 18	FY 19	FY20
Total Tons Removed	750	741	1416	710	918	1130	817	1582	1070	618
Cars Removed	11	14	4	4	9	2	2	1	0	2
Tires Removed	1392	1256	4756	1428	427	1069	1153	859	1713	1983
Shopping Carts Removed	89	50	27	20	67	38	87	74	203	20
# of Stream Site Cleanups	459	434	467	686	645	721	872	933	997	764
# of Stream Site Exams	*	*	*	438	369	378	374	272	381	357

*This metric was not available until FY2014

II.F.3 Continue to Operate and Maintain a Floatables Skimming Vessel

The skimming vessel is used as a control measure, capable of managing debris at various locations in open water after the debris and floatables have bypassed static control methods (e.g., debris screens). Also, these traditionally large vessels provide increased public awareness and education of floatables impacts to Philadelphia receiving waterways. The PWD currently has three (3) skimming vessels; a large marine vessel, the R.E. Roy, a smaller pontoon vessel, and a small general workboat.

Large Floatables Skimming Vessel – R.E. Roy

The 39-foot skimmer vessel is operated for approximately five days per week, for about 7 months out of the year, or more as appropriate conditions allows (i.e. weather). The vessel's main purpose is to perform general debris collection and removal on both these rivers, while also serving as a mechanism for public relations events. During the 118 days of on-water operation in FY20, a total 180 cubic yards and 4.89 tons of debris and floatables material were removed from the Delaware and Schuylkill Rivers

(**Table II.F.3-1**). During the FY20 season, the R.E. Roy continued sorting and separating recyclable material, which equated to 4994 lbs. This recycling procedure on the R.E. Roy was significantly optimized during FY16 resulting in a nearly 4-fold improvement in amount collected in comparison to the previous year. In addition, the R.E. Roy initiated a partnership with Bridgestone through their Tires4Ward Program to recycle the tires collected from skimming operations to be reused for rubberized asphalt, construction materials, landscaping mulch, consumer products and as tire-derived fuel for energy.

Table II.F.3-1 Debris Collected and Days of Operation by R.E. Roy Skimming Vessel

Date	Total Tons Removed*	Cubic Yards Collected	Recyclables Collected (lbs.)	Days in Operation	Days on Schuylkill	Days on Delaware
July 2019	1.70	40	1280	19	16	3
August 2019	0	30	800	19	18	1
September 2019	0	35	770	20	12	8
October 2019	1.94	35	1216	22	15	7
November 2019	1.25	25	928	15	14	1
December 2019	RE Roy Out of Service (Dry-docked & Winterized) for Winter Season					
January 2020						
February 2020						
March 2020						
April 2020**	0	0	0	0	0	0
May 2020**	0	0	0	2	1	1
June 2020	0	15	0	21	18	3
FY20 Total	**4.89**	**180**	**4994**	**118**	**94**	**24**

* *Tons removed* is not a monthly metric and is only calculated when floatables/debris are removed from the shipyard and transported to the weigh station at the trash collection facility. Additional focus on the recycling of tires and wheels has decreased the total tons of debris removed.
**Halted activity due to COVID-19 Pandemic

Small Skimming Vessels

PWD operates and maintains a small pontoon skimming vessel and recently added a small general workboat to retrieve floating trash and debris from the Schuylkill and Delaware Rivers within Philadelphia. The smaller skimming vessels are effective in tight spaces found in marinas, among piers, and in near shore (shallow) areas.

PWD's workboat conducted skimming operations and other activities in the tidal portions of the Delaware and Schuylkill rivers, specifically in areas not desirable or accessible by the larger skimming vessels. The marine flotsam and floatables are picked with long handled pickers or hand netted from the water surface by employees standing on the vessel deck or from the shoreline when necessary. The materials are emptied and segregated into separate bags for trash and recyclable material. The bags are stored on deck, until they are offloaded when the work boat is docked.

In FY20, the skimming vessel was operational from July – October 2019, equating to 20 deployments. Unfortunately, due to safety concerns from the COVID-19 pandemic, operations have not restarted in calendar year 2020. During this FY20, the small skimming vessel removed a total of 17.1 cubic yards (1.12 tons) of material, comprised of 9.67 cubic yards (0.52 tons) of recyclable material including bottles, plastic, paper; 7.32 cubic yards (0.59 tons) of mixed trash and 7 tires (**Table II.F.3-2**). The small skimming vessel was in active operation for a total of 111.65 hours in FY20.

Table II.F.3-2 FY20 Small Skimming Vessel Collection Metrics

Date	# of Collections Events	Total Volume Collected (gal)	Total Weight Collected (lbs.) not including tires	Total Volume of Recyclables (gal)	Total Volume of Mixed Trash (gal)	Tires Collected
July 2019	5	973.5 37	660	553	437	3
August 2019	6	1221.5	660	637.5	584	2
September 2019	3	386	441	204	182.5	2
October 2019	6	873	453	559	273.75	0
November 2019	Skimming Vessel Dry-Docked for Winterization Period					
December 2019						
January 2020						
February 2020						
March 2020						
April 2020	Delayed start due to COVID-19 Pandemic					
May 2020						
June 2020						
Total	**20**	**3,454 Gal**	**2,214 lbs.**	**1,953.5 Gal**	**1,477.25 Gal**	**7 Tires**
Total Yd^3/Tons	**20 Events**	**17.1 Yds^3**	**1.12 tons**	**9.67 Yds^3**	**7.31 Yds^3**	**~350 lb .**

II.F.4 Other Floatables Control Activities

Other activities practiced within the City are conducted with the intention of managing floatables. These initiatives provide integral components to ensure additional floatable and solids do not enter the City's waterways and surrounding areas. Some of these activities are described below.

Volunteer Water Adjacent Cleanups

The City has embraced the value of supporting and conducting volunteer water adjacent land-based cleanups with local partners and communities in areas in Philadelphia and surrounding region. These volunteer cleanup events provide an opportunity to make a significant difference in a given area within a few hours with the help of people willing to volunteer their time. The cleanup events also serve as opportunities to provide important information and public outreach about PWD's and the City's programs and how the volunteers' efforts are beneficial not only on an environmental/ecological standpoint but also helps promote social behavior changes.

United By Blue Cleanups

In 2016, PWD began to partner with United By Blue (UBB), a Philadelphia-based sustainable outdoor apparel company who conducts annual stream cleanups programs. Part of the company's business model includes the amiable mission: "For every product sold, United By Blue removes one pound of trash from oceans and waterways through company organized and hosted cleanups." PWD partners with UBB by recommending litter-prone locations that are adjacent to Philadelphia waterways, promoting and supporting volunteer based cleanup events hosted by UBB, and helping coordinate pick up of event collections by PWD's Waterways Restoration Team (WRT) or the Philadelphia Streets Department staff. Much of the work conducted by UBB are often in locations under the purview of PWD's floatables control and pollution prevention programs. In FY20, UBB conducted 2 clean up events in Philadelphia with over 576 volunteers collecting 36,539 lbs. of trash. Unfortunately, 3 cleanup events were planned in Philadelphia were postponed due the COVID-19 pandemic. In the meantime, UBB has been offering a DIY Cleanup Kit which includes all the tools that a person would need to organize their own cleanup anytime, including a pair of work gloves, two large bags (blue for recycling, white for trash), exclusive enamel waves pin and a how-to guide..

Schuylkill Scrub

The Schuylkill Scrub is a program that encourages and supports cleanup events taking place during the spring throughout the entire Schuylkill watershed- from the headwaters in Schuylkill County down to its confluence with the Delaware River in Philadelphia. Although this year to align with the Pick Up PA initiative from Keep PA Beautiful, the 2020 Schuylkill Scrub is postponed until September 1 to November 30, 2020. The Schuylkill Action Network coordinates the initiative, along with multiple partners, with a shared goal of cleaning as many miles of road, stream, and parkland in the Schuylkill watershed. Their efforts help prevent trash from making its way into our drinking water sources and keep our land and waters clean, litter-free, and beautiful. In calendar year 2019, 412 cleanups were registered as part of the Schuylkill Scrub resulting in 28,433 volunteers, 431 miles of streams cleaned, 1.12 millions of pounds of litter and bulk waste removed, and 727 tires collected. To help prevent the spread of the coronavirus diseases, Schuylkill Scrub is discouraging planning public gatherings during this time of National Emergency, suggesting enthusiastic individuals to practice solo litter cleanups using the CleanSweep app, more information on the smartphone app is available at the following link: http://schuylkillwaters.org/projects/cleansweep.

Tookany/Tacony-Frankford Trash Task Force

In recent years, more targeted efforts to focus on litter have been initiated in the corridors surrounding the Tacony Creek watershed. PWD gathered members of different City agencies including Streets and Philadelphia Parks and Recreation (PPR), as well as representatives from the TTF Watershed Partnership (TTF), SEPTA, United by Blue, and Keep Philadelphia Beautiful (KPB), to initiate discussions and coordinate efforts to alleviate the litter problem and its impact on Tacony Creek.

The goal of the study is to establish trash resources and transport methods and then experiment with trash management practices which can then be applied to other drainage areas. The Task Force is continuing to research and explore methods for reducing the trash problem in the Tacony Watershed. During FY20, the TTF installed 20 new trash cans in the Juniata neighborhood decorated by local artists which was supported by a grant provided by the Environmental Protection Agency's Trash Free Waters Program, Partnership for the Delaware Estuary, Mural Arts Philadelphia, and the Zero Waste and Litter Cabinet. This grant also brought another 30 trash cans to Southwest Philadelphia. TTF also continued to partner with PowerCorpsPHL and the Alliance for Watershed Education to deploy Trail Ambassadors on a regular basis to walk the trail, clean the gateways and trail, and report dumping and other issues needing attention to Philly311. The consistent presence and reporting have resulted in quicker resolution of trash issues and a cleaner, more welcoming park. TTF is powering through the pandemic, retooling previous programs and finding safe ways to build community connection such as distributing trash cleanup kits (each kit comes with a bag, gloves, a cotton mask, a long-armed trash picker, and a map of Tacony Creek Park to guide them on their cleanup journey), offering virtual tours of park, and conducting community meetings over Zoom (virtually) to discuss park issues and how to address them.

Love Your Park

Love Your Park is a collaboration between Fairmount Park Conservancy, Philadelphia Parks & Recreation, and Philadelphia's Park Friends Network. They work together to support communities in activating City neighborhood parks and watershed natural areas, with a focus on volunteering. Their flagship events are Love Your Park Week in May and the Love Your Park Fall Service Day in November, when over 5,000 volunteers support City parks. This year-round Neighborhood Park Stewardship program supports a network of 135 community-run park friends groups, and our regular volunteer opportunities invite groups and individuals to get involved. In 2019 alone, this program organized 279 volunteer events and engaged 6,792 volunteers who contributed 19,723 hours of service. This included planting 685 trees, weeding and mulching over 800 existing trees, removing several tons of trash from our parks and waterways, and collecting thousands of bags of organic plant debris (like branches and leaves) for composting. In May 2020, Love Your Park began implementing Love your Park Solo Cleanups, encouraging park users to safely clean up trash and litter individually or with their families as they enjoy Philly parks this year. Volunteers can sign up to receive free cleanup kits in the mail (while supplies last) by pledging to track their work online.

Friends of the Wissahickon Cleanups

The Friends of the Wissahickon (FOW) has conducted park cleanups within the Wissahickon Valley Park for many years. The Wissahickon Creek is a treasure to many Philadelphians and visitors to the area, who are searching for an escape to nature, providing a stunning green space for hiking, biking, and fishing. Devil's Pool, in particular, is one of the most beautiful places in the park – an iconic spot along the Cresheim Creek, just before it flows into the Wissahickon. Due to the popularity of this location, an excess of trash is sadly left behind by many of its visitors. This not only looks terrible but is dangerous to the fish and other wildlife that live in our watershed. Each year, FOW volunteers work over 12,000 hours to help FOW perform duties and complete projects including park cleanups that are essential for the Wissahickon to thrive, and the skills they learn can be transferred to the work sector. During COVID-19, the Wissahickon park has simultaneously seen a huge increase in users in the park while also seeing a reduction in many of the necessary resources required to keep the park clean. The novel virus Covid-19 has made FOW's stewardship efforts in the past months extremely challenging, especially with the suspension of volunteer trail improvement days and cleanups in Wissahickon Valley Park.

Bridgestone Tires4ward Partnership

In the summer of 2016, PWD established a partnership with Bridgestone, a tire manufacturer, to recycle tires collected from PWD-sponsored cleanup events including efforts conducted by the Waterways Restoration Team (WRT), Floatables Skimming Vessels and other cleanup activities. Bridgestone or one of its associated partners collects these tires at one of PWD's maintenance facilities as part of their Tires4ward program. This program was initiated to support Bridgestone's goals of ensuring that one spent tire or any tire been taken out of use goes on to another valuable purpose such as for "use as material in rubberized asphalt, construction materials, landscaping mulch and as tire-derived fuel for energy" for every tire sold. During FY20, a total of 1,918 tires were collected in Philadelphia for the Bridgestone Tires4ward program.

Repair, Rehabilitation, and Expansion of Outfall Debris Grills and Grit Cleanings
Debris grills are maintained regularly at sites where the tide introduces large floating debris into the outfall conduit. This debris can become lodged in a tide gate, causing inflow from the receiving water. Additionally, debris grills provide entry restriction and some degree of floatables control.

Standard operating procedures require the inspection of debris during all regulator inspections unless the outfall is submerged at the time of inspection. During FY20, 55 debris grill maintenance events were completed. The list of the debris grill preventative maintenance activities is available in **Appendix C– 2020 CSO Maintenance Program Annual Report**. Debris grills are maintained regularly at sites where the tide introduces large floating debris into the outfall conduit. This debris can become lodged in a tide gate, causing inflow from the receiving water. Additionally, debris grills provide entry restriction and some degree of floatables control.

II.G NMC 7 - Pollution Prevention

II.G.1 Continue to Develop and Share a Variety of Public Information Materials Concerning the CSO LTCP

The Public Outreach and Participation conducted in FY20 for the Green City, Clean Waters program has been provided in **Section 7.0 - Public Outreach and Participation** starting on page 22 **of Appendix A – Green City, Clean Waters FY20 Annual Report** and **Section II.G.3 Continue to Provide Annual Information to City Residents about Programs via Traditional PWD Publications** on page 26 of this report.

II.G.2 Continue to Maintain Watershed Management and Source Water Protection Partnership Websites

In May 2018, PWD incorporated watershed protection projects and program information onto the City of Philadelphia's official website at http://www.phila.gov/water/sustainability/protectingwaterways/. This provides an alternate channel for PWD customers and the public to learn about watershed protection initiatives. The website contains key plans and reports as well as detailed information on watershed partnerships, planning, public communication, and technology-based planning and assessment tools. During FY20, informational pages about harmful algal blooms, Philly RiverCast water quality forecasting system, and polyfluoroalkyl substances (PFAS) were added to the Watershed Protection website.

RiverCast
Philly RiverCast (http://www.phillyrivercast.org) is the first operable web-based recreational warning system in the United States. Using near real-time flow, precipitation, and turbidity data, the RiverCast algorithm translates predicted bacteria levels in the non-tidal Schuylkill River from Boathouse Row to

Flatrock Dam in Manayunk into one of three ratings, each of which corresponds to suggested guidelines for safe recreation. RiverCast guidelines offer tools for the public to make informed decisions about recreation, and thus helps protect the public against illnesses caused by bacteria. Ultimately, RiverCast will help ensure continued safe recreational use of the Schuylkill River, while promoting public awareness of water quality concerns and indirectly engaging support for source water protection measures. More than 1.3 million users have visited the Philly RiverCast website since it launched in June 2005.

Schuylkill Action Network

The Schuylkill Action Network (SAN) was established as a permanent watershed-wide organization charged with identifying problems, prioritizing projects, and securing funding sources to bring about real water quality improvement in the Schuylkill River watershed. The SAN is organized into a number of focused workgroups. One of the workgroups, the SAN Stormwater workgroup, was formed to identify a cost-effective approach to stormwater management through project prioritization and planning. The workgroup is a partnership of representatives from PWD, PADEP, EPA, DRBC, conservation districts, watershed organizations, municipalities, and other groups throughout the Schuylkill River watershed. The SAN website supports the SAN's Stormwater Workgroup by providing project and event information, SAN publications, and public messaging about restoring and protecting the Schuylkill River. The SAN Stormwater Workgroup’s ultimate goal is to prevent or maximize reduction of stormwater runoff pollution. During its 16 years of existence, the workgroup has served as an advisory committee for state and local governments, an ordinance review board for municipalities, and a support group for large and small projects throughout the Schuylkill River watershed. During the last year, SAN projects have addressed important pollution sources including agriculture, abandoned mine drainage and stormwater. Efforts from SAN partners in the last calendar year are included in the following table (**Table II.G.2-1**):

Table II.G.2-1: Schuylkill Action Network Partner Progress

<table>
<tr><th></th><th>Agriculture</th><th>Abandoned Mine Drainage (AMD)</th><th>Stormwater</th></tr>
<tr><td rowspan="2">Cumulative Progress (2003-2020)</td><td>Constructed 175 manure storage facilities
Completed 185 barnyard repairs or heavy use area construction
Installed 89 stream crossings
Planted 494 acres of riparian buffers on agricultural lands</td><td>Received more than $14.3M an AMD workgroup funding
Reduced annual watershed loadings of iron, aluminum, and manganese by 88, 3, and 6 tons, respectively
Continued to improve water quality with maintenance and monitoring at existing treatment system sites
Hosted annual educational tours of AMD treatment systems with interested watershed partners and academic groups</td><td>Engaged more than 25 schools in green stormwater infrastructure through Schuylkill Action Students
Hosted workshops for businesses and municipalities to learn about stormwater best management practices and available resources
Preserved more than 20% of land in the Schuylkill River Watershed Area</td></tr>
<tr><td colspan="3">Schuylkill River Restoration Fund provided more than $4M in funding for 113 environmental restoration projects throughout the Schuylkill River Watershed, with $5.4M in additional funding leveraged (2006-2019)</td></tr>
<tr><td rowspan="2">2019 Highlights</td><td>$1.67 million invested from the Natural Resources Conservation Service (NRCS) in 2019
Constructed 9 new manure storage basins to help control nutrient and pathogen loadings into the watershed</td><td>Completed the New Philadelphia Walking Trail project to supplement a previous trout habitat and AMD improvement project
Rebuilt the Reevesdale treatment system to protect clean water in the Wabash Creek and Upper Schuylkill River</td><td>Hosted the 2019 Funding for MS4 Projects Workshop at Ursinus College, with 80 attendees from municipalities and water agencies
Hosted over 400 cleanups through the Schuylkill Scrub in 2019, engaging over 28,000 volunteers and removing over 1 million pounds of litter and bulk waste</td></tr>
<tr><td colspan="3">In 2019, the Schuylkill River Restoration Fund awarded $326,359 in grants to fund 9 projects in the Schuylkill River Watershed</td></tr>
</table>

During its 17 years of existence, the SAN has grown to include nearly 350 organizational and individual partners working together to protect the Schuylkill River watershed. To communicate the accomplishments of the SAN Stormwater workgroup to stakeholders as well as other SAN workgroups, the SAN routinely updates their website, http://www.schuylkillwaters.org, with input from PWD, the SAN Planning Committee and other SAN workgroups. The website was redesigned in February 2018 and includes an internal component that allows for improved communication among SAN workgroup members and facilitates on-the-ground work. The SAN website, together with http://phillywatersheds.org and http://www.phila.gov/water, provide data and reports from the source water assessments for the Schuylkill River.

Delaware Valley Early Warning System

The Delaware Valley Early Warning System (EWS) is an integrated monitoring, notification, and communication system designed to provide advanced warning of surface water contamination events to subscribing water suppliers, industrial surface water users and partner government agencies in the Schuylkill and Lower Delaware River Watersheds. The Delaware Valley EWS covers the entire length of the Schuylkill River as well as the Delaware River from the Delaware Water Gap to just below Wilmington, Delaware.

The EWS monitoring network is comprised of nearly 90 online water quality data stations throughout the watershed. Access to this real-time data allows EWS users to identify changes in water quality associated with both natural and accidental contamination events. The user can also access historical data from these stations with the data query wizard. Real-time and historic flow data are applied to a time of travel model that generates a range of estimated arrival times for each intake in the system. This time of travel model is also incorporated into a spill simulation tool that can be used for planning and training purposes.

When a responding agency reports a water quality event via the EWS website or telephone hotline, the entire user base is notified almost instantaneously via email. In the case of a high-risk event, supplemental phone notifications are placed using CodeRed technology, allowing all users to receive an automated telephone notification in less than three minutes. EWS users can log in to the secure website to view additional event details, spill routing, and predicted arrival times to their intakes. Additionally, a sophisticated tidal modeling component has been developed to better predict and communicate the arrival times of spills on the tidal Delaware River with a user-friendly spill trajectory animation. The EWS received the Governor's Award for Environmental Excellence and is nationally recognized for its use of stakeholder partnerships to meet regional source water protection objectives. In 2016, the EWS was featured as a case study in EPA's publication Online Source Water Quality Monitoring: For Water Quality Surveillance and Response Systems.

During FY20, a total of 29 unique water quality events were reported to the EWS. Additional outreach events throughout FY20 expanded the EWS user base, which is currently comprised of more than 450 individual users from 55 organizations.

During FY20, PWD implemented significant updates to the EWS user interface. Notable updates include full mobile device (smartphone) functionality for the EWS web site and improved mapping and notification features. These updates were presented to EWS users through a series of regional trainings and webinars.

Other PWD Related Websites and Social Media

PWD Main Web Site
www.phila.gov/water

The official website for the Philadelphia Water Department (PWD) contains comprehensive information about stormwater management for our customers. Resources span from the CSO LTCPU to plain language statements to help the average customer understand the importance of stormwater management.

The pages at www.phila.gov/water/wu/stormwater had 26,389 active visitors during FY20 spending an average of 2 minutes on the pages. The Stormwater Grants page is geared to non-residential property owners interested in receiving grants to construct stormwater retrofit projects. The Stormwater Grants web page received 5471 unique page views in FY20.

PWD Parcel Viewer and Stormwater Billing online:
https://stormwater.phila.gov/

In FY 20, PWD launched stormwater.phila.gov, a new microsite that allows users to see how their stormwater bill is calculated, learn how to apply for credits, or make appeals. Previous links, including www.phila.gov/water/swmap and www.phillystormwater.org are automatically redirected to the new site to ensure customers get to the right location with the best information. The "parcel viewer" map application is the core of the site. Here, customers are able to search for a specific parcel or freely explore the map. When a parcel is clicked, data such as gross area, impervious area, and the monthly stormwater charge breakdown, are displayed. Users are encouraged to take actionable steps to reduce the amount of stormwater entering the sewer system and lower their stormwater bills.
There were approximately 56,000 sessions in FY20, averaging just over two minutes per session.

Phillywatersheds.org
Watershed information was also housed on Phillywatersheds.org; however, PWD began archiving this site on September 1st, 2019. The content is being migrated to www.phila.gov/water. Phillywatersheds.org will remain an archived site that redirects to phila.gov/water until all content is moved or decommissioned. More information about content available on the site is discussed below but notice that some content may no longer be housed on phillywatersheds.org. For example, the CSO Cast mapping application was rebuilt using a new mapping framework in the last month of FY20.

The website provides information to the public on issues that are currently problematic for the City's watersheds, what PWD is doing to address these issues, and what residents of Philadelphia can do to help improve watershed health. It also includes educational tools, public meeting materials, maps and reports generated by PWD or partners. According to Google Analytics, the website received more than 35,500 visitors in FY20.

The website features interactive mapping for green stormwater infrastructure projects, traditional infrastructure projects, waterways restoration projects, and community partnership projects. There are also maps for each of the seven major watersheds within Philadelphia. One of the main uses of the mapping system is the Combined Sewer Overflow Public Notification System, known as CSOcast. CSOcast shows CSO outfall overflow information retrieved from PWD's sewer monitoring network. More information on CSOcast is described in further detail in **Section II.H.2** of this report on page 30.

The website also hosts information for various PWD initiatives and programs related to Green Stormwater Infrastructure (GSI). The pages for the Soak It Up GSI Adoption Program, for example, allow Registered Community Organizations (RCO) to check if their organization is eligible to participate, complete the program applications, and schedule training. Additionally, once groups are active in the program they can report issues and log their adoption activities.

Development Review Program Website

https://www.pwdplanreview.org/

Since its deployment in FY16, the use of this site has grown and continues to be one of the most used websites in the City, a testament to its effectiveness in helping developers to meet Philadelphia's stormwater regulations. Over 34,000 users (34,390) accessed the site in FY20. Improvements to the site design and customer experienced were implemented, as well.

For more information on the activities conducted by the Development Review Program please refer to the MS4 Annual Report **Section F.5 – Monitor and Control Stormwater from Construction Activities** on page 22.

PWD Department on Social Media

Social media is an essential tool for engaging communities in the development of stormwater infrastructure projects and best-practices. These platforms are an important tool for disseminating departmental messaging about stormwater management, pollution prevention, and programs that improve the City's water resources. Social media is also an accessible tool for building and strengthening relationships with partner organizations and community groups.

The sections below describe the City's social media:

@PhillyH2O Blog

The @PhillyH20 Blog (water.phila.gov/blog/) launched in 2018 as a mobile-friendly "rolling collection of stories, tips, and news powered by the people of the Philadelphia Water Department."

The blog is part of a customer priority-focused digital strategy and provides quick access to information residents served by the department can use. The site often acts as a streamlined showcase of messaging campaigns that are amplified by press releases, social media, direct mail, and email.

Posts promote a wide variety of topics, including how to use the Basement Protection Program, which provides free plumbing improvements for those impacted by combined sewer overflows; community input meetings for GSI construction sites and other projects; updates about the progress of Green City, Clean Waters, and highlights of current programs and events and relevant partner initiatives.

There was a total of 41 posts in FY20.

In FY20, the blog received roughly 34,000-page views, with a Black History Month post by Commissioner Randy Hayman receiving the largest audience. The aforementioned post on the Basement Protection Program was read approximately 1,300 times.

Facebook

PWD maintains two Facebook pages to keep residents informed on any news and events at or hosted by the Water Department:

- Main Philadelphia Water Department page (http://www.facebook.com/PhillyH2O)
- Green City Clean Waters page (http://www.facebook.com/phillywatersheds)

The Fairmount Water Works (FWW) also maintains a Facebook page that extends the reach of departmental messaging. The page can be accessed at https://www.facebook.com/FairmountWW/

Between these three Facebook pages, the department has 7,500 followers.

Twitter

Twitter is a valuable communications channel for resolving customer complaints, providing customer information, and delivering news concerning the department, education, and water in general. The Department also builds connections with national and international peer cities and other stakeholders in the stormwater management field through Twitter.

The PWD twitter account is found at https://twitter.com/PhillyH2O. The @PhillyH2O account activity increased in FY20, averaging 74 tweets per month compared to 45 tweets per month in FY19.

The @PhillyH2O account now has about 9,400 followers, up from 8,600 in FY19.

Nextdoor

The Philadelphia Water Department maintains a NextDoor.com account with over 150,000 followers representing Department customers in city neighborhoods. With the elimination of public meetings and flyer-distribution in spring 2020, the platform has proved a valuable tool for hyper-local outreach. Posts containing detailed information about construction projects supporting the LTCPU are made available to communities directly impacted.

The platform was also a key source of responses to the 2020 Customer Satisfaction Survey, which collects information pertaining to the LTCPU.

A total of 93 posts received 167,770 impressions from Philadelphia users in FY20.

LinkedIn

The Philadelphia Water Department LinkedIn account had a total of 4,441 followers at the end of FY20. The Department expanded content on the app in FY20, sharing both employment-based posts and general information pertaining to the utility and services.

The social media team expects to further grow engagement in FY21 with a goal of showcasing the Department as a leader in wastewater and stormwater management and attracting new talent to the workforce.

PWD Department Videos

PWD hosts videos on Vimeo, YouTube, and all social media platforms. Video content provides information about topics including:

- Why infrastructure investment is needed to reduce sewer overflows
- How green and traditional infrastructure protects waterways
- Careers building and maintaining infrastructure, and more.

PWD video content includes animation. While some content is highly produced with support from contracted professionals, videos produced in-house by Public Affairs staff also play an important role in communicating with residents.

Videos not shared on social media can be accessed at the following links:

- http://www.vimeo.com/phillywatersheds
- http://www.youtube.com/pwdepartment

Between YouTube and Vimeo, the videos have been viewed over 7,500 FY20. The bulk of video views are experienced through Facebook, Instagram and Twitter.

II.G.3 Continue to Provide Annual Information to City Residents about Programs via Traditional PWD Publications

The PWD develops numerous publications for the public that are distributed throughout the City at advisory committee meetings, public meetings and other public events, in addition to being distributed through the water/sewer/stormwater bill to PWD customers. The following publications, meetings and events have been shared with and/or involved the public during FY20:

Billstuffers

- September, 2019 - Your Bill Will Reflect New Rates
  A billstuffer was distributed to customers in their water/sewer/stormwater bills that explains the first of a two-phase change to rates spread over a two-year period.
- November 2019 – Tap You Can Trust
  A billstuffer was distributed that presented 2019 water quality data in a simpler format to educate and increase customers' awareness of Philadelphia's excellent tap water quality.
- December 2019 – Guide to Water Emergencies
  A billstuffer was distributed to customers in their water/sewer/stormwater bills to provide guidance on what to expect when there is a water or sewer emergency.
- December, 2019 – RainCheck
  A billstuffer was distributed that provided customers with information on how to help

Philadelphia residents pay for special landscaping tools that improve the environment and beautify their homes and properties.

- February, 2020 - Act Now to Prevent Frozen Pipes
  A billstuffer was distributed to customers in their water/sewer/stormwater bills that provided tips for customers to prevent frozen pipes and steps to take in case their pipes were already frozen.
- February, 2020 – Tell Us What you Think! All participants have a chance to win a $100 gift card!
  A billstuffer was distributed to customers in their water/sewer/stormwater bills to get feedback from Philadelphia residents on PWD and the services it provides.

Publications

- June 2020 – Water Quality Report Postcard
  A postcard was created and distributed via mail to alert Philadelphia residents that the annual Water Quality Report was available electronically at phillyh2o.info/2019/water-quality and that hard copies of the report were available by request at waterquality@phila.gov or 215-685-6300.
- June 2020- 2019 Water Quality Report (published Summer 2020)
  Annual consumer confidence report mandated by the federal Safe Drinking Water Act is published each year and sent to PWD wholesale and retail account customers, and other consumers of the city's water. PWD makes this report available electronically on its website at https://water.phila.gov/pool/files/2019-PWD-Water-Quality-Report.pdf. Hard copies are also available by request at waterquality@phila.gov. The report was also translated into Spanish and formatted like the English version and is available upon request.

Media Advisories

- May 12, 2020 – Online Community Meetings, Two dates available: evening & lunchtime options! Be there (virtually) for the unveiling of a new tap water mural coming to Cruz Rec Center!

Press Releases

- September 4, 2019 – Delaware River Fest Brings Two Cities Together, Full Day of Free Fun on Philly and Camden Riverfronts
- January 22, 2020 – PWD Position Statement on the Environmental Working Group's PFAS Report
- February 12, 2020 - $100 Raffle: Take 2020 Philadelphia Water Department Survey
- March 19, 2020 – Philadelphia Water Department COVID-19 Statement and Updates, Drinking water is safe and customers will not lose water services
- April 14, 2020 – Water Department Warns Residents: COVID-19 Emergency Exacerbating Wipe-Flushing Dangers
- April 27, 2020 – Philadelphia Water Department Extends COVID-19 Shutoff Freeze Through June 1
- May 21, 2020 – Philadelphia Extends Water Shutoff Protection Through July 10, Customers unable to pay due to COVID-19 impacts won't be shut off but should apply for assistance
- June 22, 2020 – Northern Liberties 2nd Street Detour Begins June 22, Construction of a large box sewer along Germantown Avenue in Northern Liberties detours N. 2nd Street starting Monday June 22

- June 29, 2020 – New Water Quality Report for Philadelphia Tap Out Today, Free report compiles a year of data detailing local drinking water quality

Events/Campaigns

- Stenton Park and Neighborhood Greening Project Ribbon-Cutting
  July 16, 2019 – The Philadelphia Water Department partnered with Philadelphia Parks and Recreation held a joint ribbon-cutting to mark the completion of the Stenton Park and Neighborhood Greening project.

- Phillie Phanatic Makes Guest Appearance at the Philly Water Bar
  July 25, 2019 – Commissioner Hayman welcomed the Phillie Phanatic at the Philly Water Bar! Philly Water Bar is a Philadelphia Water Department (PWD) campaign to bust myths about the safety and quality of local tap water and highlight Philadelphia's high-quality tap as a sustainable, affordable, safe and healthy beverage that's available in the home of every Philadelphia resident.

- Delaware River Day Festival
  September 7, 2019 – A press conference was held to kick off the Delaware River Day Festival where the Partnership for the Delaware Estuary (PDE), the Philadelphia Water Department (PWD), the Center for Aquatic Sciences, representatives from Camden County and others gathered together to enjoy a variety of **free** activities for the whole family. Environmental exhibits, games, prizes, crafts for kids, face painting and boat rides were featured to celebrate and connect the public with the Delaware River.

- Berks & Sedgley Ribbon-Cutting
  September 9, 2019 - The Philadelphia Water Department partnered with Council President Darrell Clarke, State Representative Donna Bullock and the Strawberry Mansion CDC to celebrate the completion of construction of a green stormwater infrastructure project with a ribbon-cutting at the intersection of Berks Street, Sedgley Avenue and 30th Street, contributing stormwater management features as part of the Green City, Clean Waters Program.

- ECA's 2019 Utility Partnership Conference "Heating Up Philly"
  October 11, 2019: The Public Utility Commission held a professional development conference to promote consumer awareness, education and healthy living. Participants received information on utility assistance, conservation, family services and consumer protections. PWD served on the panel and manned an information table.

- Maplewood Mall Streetscape Project Groundbreaking
  October 31, 2019: The Philadelphia Water Department held a groundbreaking to kick-off the Maplewood Mall Streetscape project.

- West Philly Utility Fairs
  October 10 and November 9, 2019 – Former Councilmember Jannie Blackwell along with customer service staff from the Philadelphia Water Department (PWD), Philadelphia Gas Works (PGW), and PECO joined other assistance experts to bring utility bill assistance to the constituents in West Philadelphia. This project aims to partner with City Council members bi-annually to bring utility bill assistance to all neighborhoods in Philadelphia and reduce shutoffs.

II.G.4 Continue to Support the Fairmount Water Works

As detailed in **Table II.G.4-1**, during FY20, just under 20,000 people visited the Fairmount Water Works during the covid-19 shortened year. Visitors consisted of general walk-in, adults, families and children, school groups, community groups, and attendees for special exhibits. Outreach efforts (**Table II.G.4-1)** include 1,682 teachers and students participating in UUW middle years curriculum project, and 723 young children, caregivers and families participating in a community-based literacy program*. Both programs are grant supported.

Table II.G.4-1 Fairmount Water Works – FY20 Education Center Attendance

Types of Attendance	Visitors
General FWW Visitors	6,799
School Groups, Camps and Recreational Center	4,682
Tours	570
Special Events	620
Outreach Efforts*	4,813
FY20 Total Visitors	**19,892**

II.H NMC 8 - Public Notification to Ensure that the Public Receives Adequate Notification of CSO Occurrences and CSO Impacts

PWD has developed and will continue to develop a series of informational brochures and other materials about its CSO discharges and the potential effects these discharges have on the receiving waters. In addition, PWD has enlisted watershed organizations and partnerships to assist in this endeavor to raise the level of citizen awareness about the function of CSO and stormwater outfalls through a variety of educational mediums.

II.H.1 Launch a Proactive Public Notification Program Using Numerous Media Sources

PWD is advancing a proactive public notification program that uses print, internet, outfall signage, and other media to distribute information on the locations of CSOs, information on hazards, and potential public actions.

CSO Outfall Signage

In summer 2007, PWD initiated a pilot project to install 13 signs at CSO outfalls throughout the City. During a follow-up survey in October 2007 it was found that 5 of the 13 signs had been either removed or vandalized. During FY20, a working group continued to analyze the feasibility of installing updated informational signage at the City's CSO outfalls. The working group has performed outfall assessments for outfalls accessible both by land and boat, which includes materials and mounting assessments for signage. Currently each CSO outfall location, except for 8 inaccessible locations, has an identification sign installed which helps the public to accurately identify an outfall when reporting a problem.

Other Notification Measures

PWD continues to develop informational materials and maintain websites to educate the public about its CSO discharges and the potential effect on receiving waters. PWD has found that one of the best ways for public notification of CSOs is through the traditional public outreach programs described in NMC7: Pollution Prevention Program, please refer **Section II.G – NMC 7- Pollution Prevention** on page 19.

II.H.2 Expand the Internet-Based Notification System (RiverCast) to the Tidal Section of the Lower Schuylkill River

In order to expand the web-based water quality forecasting system for the Schuylkill River, RiverCast, PWD developed another internet-based notification system called CSOcast in 2008, which reports on the overflow status of outfalls in every CSO shed.

The website is built using the Google Maps API which allows for the dynamic loading of geographically referenced data that can be viewed with a familiar and user-friendly interface. The map is available 24 hours a day and displays the most up-to-date data available. PWD is constantly updating and improving the notification system as well as the flow monitoring network to deliver the best information possible to the public. During FY20, CSOcast reported had a total of 2115 page views. The CSOcast notification system can be accessed through:
http://www.phillywatersheds.org/what_were_doing/documents_and_data/live_data/csocast.

II.I NMC 9 - Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls

II.I.1 Report on the Status and Effectiveness of Each of the NMCs in the Annual CSO Status Report

The CSO Annual Report, combined with the Stormwater Annual Report, will be submitted in September of each year, documenting the previous fiscal year activities.

III. Implementation of the LTCP

Table III.B-1: Summary of 1997 CSO LTCP Capital Projects

Project	Status
Real Time Control (RTC) Program	
RTC - Main Relief Sewer Storage (R-7 through R-12)	Complete
RTC - Tacony Creek Park Storage (T-14)	Complete
RTC - Rock Run Relief Sewer Storage (R-15)	Complete
Establish RTC Center	Complete
RTC & Flow Optimization (Southwest Main Gravity Interceptor, Cobbs Creek Cut-Off, and Lower Schuylkill West Side)	Complete
Targeted Infiltration/Inflow Reduction Programs	On-Going
Solids & Floatables Control Program	On-Going
85% CSO Capture Pennypack Watershed (P1 through P5)	Complete
Eliminate Outfalls: Dobson's Run Phase I	Complete
Eliminate Outfalls: Dobson's Run Phase II & III	Complete
Eliminate Main & Shurs Overflow (R-20)	Complete
Eliminate 32nd & Thompson Outfall (R-19)	Complete
Collection System Improvements	
Upgrade Frankford Siphon	Complete
Somerset Interceptor Sewer Conveyance Improvements	Complete
Cobbs Creek Low Level Conveyance Improvements	Complete
Cobbs Creek Low Level Control Project	Complete
Water Pollution Control Plant (WPCP) Wet Weather Treatment Maximization Program	Complete

III.A CSO LTCP Update

The full Philadelphia Combined Sewer Overflow LTCPU report can be found at the following address: http://www.phillywatersheds.org/ltcpu.

Please refer to **Appendix A – Green City, Clean Waters FY20 Annual Report** for an update on implementation progress.

III.B Capital Improvement Projects

Please see **Table III.B.1-1** – Status updates for On-going Capital Improvement Projects on page 32.

Table III.B.1-1 – Status updates for On-going Capital Improvement Projects

Project	Status	Update / Reference
Completion and Operation of the Real-time Control Center and Rehabilitate and Maintain the Monitoring Network	Completed in 2003	For details on FY20 maintenance of monitoring network please refer to Appendix C-FY20 Program Maintenance Annual Report.
WPCP Wet Weather Treatment Maximization (NE)	Evaluated and implemented options from the Jan. 2000 Stress Testing Report	Refer to Section III.B.1.2 WPCP Wet Weather Treatment Maximization (NE) on page 66 of the CSO-Stormwater FY 2012 Annual Report
Evaluate Stress Test Report Options in the LTCPU	Completed March 2009 (all three WPCPs)	Refer to Section III.B.1.2.1 Evaluate Stress Test Report Options in the LTCPU on page 69 of the CSO-Stormwater FY 2012 Annual Report
Implement Options 1, 2, and 4 from the Stress Test Report (NE)	Completed January 2006	Refer to Section III.B.1.3.2 Implement Options 1, 2, and 4 from the Stress Test Report on page 91 in the CSO-Stormwater FY 2010 Annual Report.
Plan, Design, and Construct Options 5 & 7 of the Stress Test Report to Increase the Secondary Plant Capacity to 435 MGD	Completed February and August 2012	Refer to Section III.B.1.2.3 Plan, Design, and Construct Options 2 & 6 from the Stress Test Report on page 70 in the CSO-Stormwater FY 2012 Annual Report.
Explore increasing the preliminary treatment, primary treatment, and final effluent disinfection treatment capacities in excess of the existing secondary treatment capacity at the NE WPCP	Plan was originally submitted to the PADEP on June 1, 2013. The NE Facility Concept Plan (FCP) was revised based on comments from PADEP and re-submitted on December 31, 2013.	A Wet Weather Facility plan was submitted on June 1, 2016 which supersedes the FCP. These plans are available on-line through the following website: http://water.phila.gov/reporting/ltcp/
Initiate the Facility Planning and Design for the By-pass Conduit	PADEP approved on April 1, 2009, the bypass of secondary treatment for 100 MGD of additional wet weather flow at NE WPCP	As described in the LTCPU, PWD committed to the expansion of the NE WPCP to include a 215 million gallon/day secondary treatment bypass.
Report to the DEP the Status of these Projects in the Annual Status Reports when Major Work Elements Are Completed	N/A	The CSO Annual Report continues to include information in the WPCP wet weather treatment maximization at the NE WPCP
85% Capture (NE) - 85% Flow Capture Technical Report	August 2008	Refer to Section III.B.1.3 85% Capture (NE) on page 71 of the CSO-Stormwater FY 2012 Annual Report.
In-Line System Storage Projects (NE)	N/A	Reported on in Section II.B.5 Operate and Maintain In-line Collection Storage System Projects Contained Within the LTCP of this report, starting on page 5.

Implementation of the Southwest Plant Stress Test Report Option 1	Option 1, to inspect and repair leaking weirs and concrete surfaces in the final sedimentation tanks at the Southwest Plant, was completed in April of 2002	Option 1 and other improvements were also discussed in further detail within the Facility Concept Plan for the Southwest Water Pollution Control Plant that was submitted to the PADEP on June 1, 2013. This plan is available on-line through the following website: http://phillywatersheds.org/doc/SW%20Facility%20Concept%20Plan%20-%20Final_FINAL.pdf.
Real Time Control (RTC) and Flow Optimization for the Southwest Drainage (SW) - Implementation of Projects for Real Time Control (RTC) and Flow Optimization for the Southwest Drainage District	Completed April 2010	Refer to Section III.B.1.8 Real Time Control and Flow Optimization for the Southwest Drainage on page 74 of the CSO-Stormwater FY 2012 Annual Report.
RTC/Main Relief Sewer Storage (SW) - Construction and Implementation of Main Relief Sewer Storage and Real-time Control		Refer to Section II.B.5 Main Relief on page 7 of this report
Eliminate CSO/Dobsons Run Project (SW) - Construction and Implementation of the Dobson's Run Project	Phases I completed in 1998; Phases II and III were completed by 2011.	Refer to Section III.B.1.10 Eliminate CSO/Dobson's Run Project on page 95 of the CSO-Stormwater FY 2011 Annual Report
Eliminate CSO/Main and Shurs Off-Line Storage (SW) - Construction and Implementation of the Main and Shurs Off-line Storage Project	In FY20, the facility successfully captured 15 major storms storing a total of approximately 3.08 MG of sanitary wastewater. There were no overflows at R-20 during FY20.	Grit accumulation is a known USES issue that reduces interceptor capacity and the effectiveness of the Venice Island storage tank. PWD performs periodic grit surveys of the USES to better understand grit type and accumulation frequency. Cleanings are scheduled on an as needed basis.

III.B.1 On-going Capital Improvement Projects

Eliminate CSO/Main and Shurs Off-Line Storage (SW) - Construction and Implementation of the Main and Shurs Off-line Storage Project

The Upper Schuylkill East Side Interceptor Sewer (USES) is located along the Schuylkill River adjacent to the Manayunk Canal in the northwest section of Philadelphia. It conveys sewage from collection systems which serve the northwest section of the City. During extreme wet weather events, the USES exceeded its capacity and overflows occurred at relief point R-20 into a storm sewer upstream of storm water outfall S-052-5. To abate the hydraulic overload conditions in the USES, PWD finished construction of a four-million-gallon offline storage tank in May of 2013, which captures and stores excess flows. The tank would serve to eliminate surcharges and prevent overflow conditions at the R-20 relief location.

The Venice Island Storage Facility is currently in service and operating as designed. In FY20, the facility took on water for 15 major storms storing a total of approximately 3.08 MG of sanitary wastewater. The weir elevation at the R20 relief window remained at 65 inches during FY20. There were no overflow events at R20 during FY20.

Grit accumulation is a known USES issue that reduces interceptor capacity and the effectiveness of the Venice Island storage tank. PWD performs periodic grit surveys of the USES to better understand grit type and accumulation frequency. PWD performed a sonar inspection on the lower reach of the USES interceptor in FY19 which showed minimal grit deposition at that time. Routine level trending of the R-20 interceptor sensor indicated that grit deposition was not enough to warrant an interceptor cleaning during FY20. PWD will continue to track grit deposition in the USES. By taking a proactive approach, PWD can schedule flushing and sewer cleaning to maximize capacity of the interceptor and the Venice Island storage tank's effectiveness.

Storm and sanitary sewer shed investigations are ongoing in areas where high levels of infiltration and inflow have been observed.

III.B.2 New Capital Improvement Projects to be Included in LTCPU

Please see **Table III.B.2-1** – Status updates for New Capital Improvement Projects to be included in LTCPU on page 35.

PC-30 Parallel Relief Sewer

The project and all stipulations of the COA regarding the parallel relief sewer were completed on 12/27/11. As of July 2013, the parallel relief sewer and all appurtenances have been operating as designed. In FY19 two float switches were installed at PC-0030 to monitor overflows at the location with greater accuracy.

During fiscal year 2020, there were no overflow events at manhole PC-0030. Detailed information regarding PC-30 can be found in the reports submitted to PADEP each month.

Project	Status	Update / Reference
Asset and Capacity Management Program		
Geographic Information System	Ongoing	Refer to Section II.A.1 Implement a Comprehensive Geographic Information System (GIS) of the City sewer system on page 2
Sewer Assessment Program	Ongoing	Refer to Section II.A.2 Implement a Comprehensive Sewer Assessment Program (SAP) on page 2
Monitoring and Modeling Program	Ongoing	Refer to II.B.1 Continue to Institutionalize a Comprehensive Monitoring and Modeling Program on page 3
Inflow/Infiltration (I/I) Controls		
Tide Inflow	Completed in 1999	PWD continues to inspect and maintain all tide gates to ensure their correct performance. Refer to Section 2.1.2 Corrective Actions – Tide Inflow on page 28 of the 2001 CSO Annual Status Report
Sewer Assessment Program		Refer to Section II.A.2 Implement a Comprehensive Sewer Assessment Program (SAP) on page 1 of this report
Infrastructure Assessments	Completed in 2008; PWD continues to monitor and inspect for problem areas	Refer to Section III.B.2.2 Infrastructure Assessments on page 82 of the CSO-Stormwater FY 2008 Annual Report
Interceptor Relining	• Cobbs Creek Interceptor (CC) – Ongoing (~50% Complete) • Tacony Creek Interceptor (TC) – Ongoing (~50% Complete)	• CC – Phase 2 – In Projects Control • CC – Phase 4 – In Projects Control (Bid Awarded) • TC – Phase 3 – Design 30% • TC – Phase 4 – Design 90% • TC – Phase 4 – Design 90%
PC-30 Parallel Relief Sewer	COA stipulations completed on 12/27/11. Operating as designed as of July 2013. Floats installed in FY19.	During fiscal year 2020, there were no overflow events at manhole PC-0030. The overflow level is at 166 in. with two float switches acting as high level and overflow alarms.
Sewer Separation		
	Sewer separation was studied and modeled as one of the options in the LTCPU and deemed cost prohibitive. No sewer separation projects have been identified or implemented during the reporting period.	
New Storage Facilities		
	PWD is continuing to investigate opportunities to construct off-line CSO storage facilities to maximize existing sewer treatment capacity and increase the volume of CSO captured and treated. No new storage facility projects have been implemented during the reporting period.	

III.C Watershed-Based Management - Continue to Apply the Watershed Management Planning Process and Produce and Update the Watershed Implementation Plans

Watershed Alliance of Southeastern Pennsylvania

In 2013, PWD and its designated watershed partnership facilitator, the Pennsylvania Environmental Council (PEC), initiated the Watershed Alliance of Southeastern PA to unite the watershed partnerships in the Philadelphia area. In FY20, PEC continued its support of the implementation of the Upstream Philadelphia Cluster.

Tookany/Tacony-Frankford Watershed Partnership

In FY20, the TTF Watershed Partnership held 158 outreach events in Philadelphia County with approximately 2,327 participants in attendance. For more information on the activities conducted by TTF Watershed Partnership please refer to **Section II.F.4** on page 16.

Darby – Cobbs Watershed Partnership

During the past fiscal year, the Partnership focused on outreach and education, to implement previously identified project opportunities through the William Penn Foundation's Delaware Watershed Protection Initiative. Also during FY20, the partnership continued work on implantation of projects funded through the Delaware River Watershed Initiative.

Pennypack Creek Watershed Partnership

The Partnership continues to organize activities to involve the community in improving the watershed. In FY20 the partnership continued education and outreach towards implementing the projects identified under the William Penn Foundation's Delaware Watershed Protection Initiative. The partnership also conducted workshops on rain gardens, citizen stream monitoring, Mowing to Meadows and municipal MS4 compliance.

Poquessing Creek Watershed Partnership

The Poquessing Creek Watershed Partnership holds a range of public education and outreach activities and events every year for residents. The Poquessing Partnership also participates in the Upstream Philadelphia Cluster of the William Penn Watershed Initiative developing programs for citizen monitoring and identification of stormwater projects in the watershed.

Delaware Direct Watershed Partnership

Throughout FY20, the Partnership continued its work acquiring grant funding to support restoration projects throughout the watershed. The Kensington and Tacony Trail, an abandoned riverfront rail line, continued to move forward in FY20 with the expansion of new trail segments. PWD also continued a successful partnership with sustainable retailer United by Blue (UBB). For more information, please refer to **Section II.F.4** United By Blue Cleanups on page 16.

Wissahickon Creek Watershed Partnership

PWD continued its participation in the Wissahickon Partnership throughout FY20. A key component of these efforts was the continuation of an alternative TMDL program for phosphorous in the watershed. The City of Philadelphia is one of 16 regional municipalities cooperating in this program with assistance from the Pennsylvania Department of Environmental Protection, the Wissahickon Valley Watershed Association and the Pennsylvania Environmental Council (PEC). The Wissahickon Partnership is also actively participating in components of the Delaware River Watershed Initiative, including citizen monitoring as well as project identification and implementation.

Schuylkill River Watershed Partnership (Philadelphia-Based Partnership)
PWD continued to support the efforts of the Schuylkill Action Network (SAN), a regional watershed partnership dedicated to improving the water resources of the Schuylkill River Watershed through strategic implementation of protection measures. More information on the SAN can be found in **Section II.G.2** on page 19 of this Annual Report. Also in FY20, PWD continued to build on the successful partnership with the Schuylkill Navy of Philadelphia. This partnership led to the Head of the Schuylkill Regatta, becoming the first national rowing event to ban the use of plastic water bottles.

Implementation Planning - Development of Target Approach for Meeting Goals and Objectives
The culmination of the watershed management planning process often results in an Integrated Watershed Management Plan (IWMP), or a watershed-specific planning document. The process for developing watershed planning documents has evolved and depends on the interests of the partnerships. Table III.C.1-2 contains the status of the various plans in each of Philadelphia's watersheds. Information on the each of the watersheds and the completed plans can be found at www.phillywatersheds.org/your_watershed. Many of the recommended management options in the TTF and Cobbs Creek IWMPs have been institutionalized a city-wide basis and continue to be implemented.

The watersheds in the MS4 section of the City have undergone a slightly different process. In these watersheds (Pennypack, Poquessing, and Wissahickon), the stakeholder goals and objectives were established through the development of Rivers Conservation Plans and Act 167 Plans. PWD has decided to work with the watershed partners through these existing watershed-based planning efforts. Details on the Act 167 Plans can be found in **Section III.C.3.7 Basin-Specific Stormwater Management Plans (ACT 167)** on page 49. The Act 167 process has met PWD's goal to have watershed-wide commitment to the watershed planning process and allows the process to be partner-driven and focus on implementation.

Table III.C.1-2 – Planning by Watershed

Watershed	Preliminary Reconnaissance	Watershed Monitoring Program	River Conservation Plan	Watershed Management Plan	Implementation Commitment Status
Delaware River (tidal, non-tidal)	Monitoring Only		Completed in 2011	PWD continues to work with watershed partners on implementing specific projects.	Philadelphia commitment documented in the LTCPU and its supplements.
Cobbs-Darby Creeks	2003	2003	Darby RCP completed in 2005 by Darby Creek Valley Association	Completed 2004	Philadelphia commitment documented in the LTCPU and its supplements.
Tacony-Frankford Creek	2000/2001	2004	Completed in 2004	Completed 2005	Philadelphia commitment documented in the LTCPU and its supplements.
Pennypack Creek	2002	2007-2008	Completed in 2005	Act 167 Stormwater Management Plan approved in July 2013	Philadelphia is implementing the Act 167 Plan through the Philadelphia Stormwater Management Regulations.
Schuylkill River (tidal, non-tidal)	Monitoring Only		Completed in 2001 by the Academy of Natural Sciences, Natural Lands Trust, and the Conservation Fund	PWD continues to work with watershed partners on implementing specific projects.	Documented in the LTCPU and its supplements.
Poquessing Creek	2001	2008-2009	Completed in 2007	Act 167 Stormwater Management Plan approved August 28, 2013.	Philadelphia is implementing the Act 167 Plan through the Philadelphia Stormwater Management Regulations.
Wissahickon Creek	2001	2005-2006	Completed in 2000 by FPC	Act 167 Stormwater Management Plan approved on July 10, 2015	A Wissahickon TMDL Implementation Plan was submitted in 2012. Implementation plan depends on watershed partnership support for a watershed-wide initiative.

III.C.1 LAND: Wet-Weather Source Control

Watershed management fosters the coordinated implementation of programs to control sources of pollution, reduce polluted runoff, and promote managed growth in the City and surrounding areas, while protecting the region's drinking water supplies, fishing and other recreational activities, and preserving sensitive natural resources such as parks and streams.

PWD is committed to a balanced "land-water-infrastructure" approach to achieve its watershed management and CSO control goals. Where appropriate, this method includes infrastructure-based approaches, but focuses on implementation of a range of land-based stormwater management techniques and physical reconstruction of aquatic habitats where appropriate. The ultimate goal of PWD's approach is to regain the resources in and around streams that have been lost due to urbanization, both within the City of Philadelphia and in the surrounding counties, while achieving regulatory compliance objectives in a cost-effective manner. Central to all of these planning programs is a commitment to greening, sustainability, open space, waterfront revitalization, outdoor recreation, and quality of life.

The wet-weather source controls have been formalized in the LTCPU and its supplements, including the Consent Order and Agreement signed on June 1, 2011, which formally approved the Green City, Clean Waters program. Detailed information on the land-based wet-weather source controls can be found in **Appendix A – Green City, Clean Waters FY20 Annual Report**.

III.C.1.1 Ordinance and Regulations Modifications - Continue to review and revise stormwater management regulations for development and redevelopment

PWD's Stormwater Management Regulations became effective in Philadelphia on January 1, 2006, which provided PWD with an opportunity to ensure development/redevelopment that protects our water resources, reduces neighborhood flooding, and improves the quality of life in our communities. The Stormwater Management Regulations are triggered when a project disturbs 15,000 or more square feet of earth. Effective July 1, 2015, the Stormwater Regulations were updated to improve and strengthen PWD's stormwater programs. For more information on PWD's Regulations, please see the MS4 Annual Report **Section F.5.b – Post-Construction Stormwater Management in New Development and Redevelopment** on page 27.

III.C.1.2 Conduct workshops on LID

PWD staff in charge of Stormwater Regulation implementation holds weekly walk-in hours, encouraging the development community to attend to discuss general and technical details regarding their projects. Guidance is provided by PWD staff as it relates to regulatory applicability as well as stormwater management implementation and approach without the need to schedule an appointment. During the last quarter of FY20, PWD did not host walk-ins; however, staff were available for pre-application meetings and project discussions on demand as needed. Applicants can email PWD to request a call or meeting, or may use the online pre-application meeting request form: https://www.pwdplanreview.org/apply/application/pre_app_meeting.

III.C.1.3 Implementation of Stormwater BMPs and LID - Continue to implement best management and LID demonstration

PWD continues to implement stormwater BMPs and LID, now referred to as Green Stormwater Infrastructure (GSI) through the Green City, Clean Waters program. Please refer **to Appendix A – Green City, Clean Waters FY20 Annual Report** for a detailed description on the City's implementation of GSI during FY20.

III.C.1.4 Catch Basin Control Program - Continue to maintain the trapped inlets

PWD continues to maintain all City-owned inlets and catch basins to ensure they are clear and operating correctly. For a full description of the activities conducted by inlet cleaning programs during FY20, please refer to **Section II.F.1 Control the Discharge of Solids and Floatables by Cleaning Inlets and Catch Basins** on page 13.

III.C.1.5 Impervious Cover Disconnection - Evaluate the feasibility of separating the stormwater runoff from large impervious land tracts for management and direct discharge

PWD is working to separate stormwater runoff from large impervious tracts of land using incentives and regulatory-based approaches. Projects that apply for PWD's grant programs, Stormwater Management Incentives Program (SMIP) and Greened Acre Retrofit Program (GARP), are evaluated for disconnection potential and encouraged to construct connections to available separate storm sewer or private stormwater outfalls where feasible. To date, PWD has awarded a number of projects where this potential exists, and in the last year, three projects successfully disconnected from the combined sewer system.

III.C.1.6 Reforestation - Work to implement reforestation demonstration projects to provide additional tree canopy

Green Stormwater Infrastructure Projects

Community greening and tree planting is a key component of green stormwater infrastructure and the Green City, Clean Waters plan. PWD has been planting trees as part of the GSI projects. Please refer to **Appendix A – Green City, Clean Waters FY20 Annual Report** for information on trees planted as part of GSI projects implemented in the City.

Street Tree Planting

As part of supporting the City's GreenWorks goals, PWD has partnered with PPR to conduct street tree plantings. PPR contracted trees to be planted in the right-of-way in front of properties and on public lands. During FY20, 750 street trees were planted through this contract.

TreePhilly Yard Tree Program

TreePhilly is an urban forestry community engagement initiative led by PPR, in partnership with the Fairmount Park Conservancy. TreePhilly directly engages all Philadelphians in improving their communities by planting and maintaining trees. Through TreePhilly's Yard Tree Giveaway program, Philadelphia residents can sign up for free yard trees for their private property (front, back, and side yards). In the FY20 the Yard Tree Giveaway program distributed approximately 1,450 trees for residents to plant on their private property, pivoting their programming due to the COVID-19 pandemic to include door-to-door delivery of trees and contact-less pickup events.

Pennsylvania Horticultural Society's Tree Plantings

PWD is an active partner and supporter of TreeVitalize and PHS's other tree planting programs. TreeVitalize was developed by the Pennsylvania Department of Conservation and Natural Resources to increase the tree canopy in the five-county Philadelphia area. TreeVitalize partners with numerous community Tree Tenders groups throughout this area in order to plant trees in neighborhoods lacking sufficient tree canopy. During FY20, PHS tree planting events resulted in 413 trees planted in Philadelphia.

III.C.2 Water Ecosystem Restoration and Aesthetics

III.C.2.1 Waterways Restoration Team - Continue the assignment of a dedicated clean-up team to remove cars, shopping carts, and other debris, from CSO receiving waters

During FY20, the Waterways Restoration Team has continued their program which includes removal of cars, shopping carts, and other debris from receiving waters. Please refer to **Section II.F.2 Continue to Fund and Operate the Waterways Restoration Team** on page 14 for information pertaining to the Waterways Restoration Team's activities during FY20.

III.C.2.2 Waterways Restoration Team - Evaluate the capabilities of this crew in performing minor stream bank and bed repair around outfall pipes and to remove debris at these outfalls

During FY20, the Waterways Restoration Team continued their program, which includes conducting minor stream bank and bed repairs around outfalls and removing debris around them. Please refer to **Section II.F.2 Continue to Fund and Operate the Waterways Restoration Team** on page 14 for information pertaining to the Waterways Restoration Team's activities during FY20.

III.C.2.3 Stream Habitat Restoration - Propose and implement demonstration projects to address habitat degradation by engineering the stream channels to modern day flows and directly reconstructing the aquatic habitat

PWD employs natural stream channel design (NSCD) and associated stormwater management BMPs as a means to improve the health of aquatic communities in receiving waters with degraded flow and habitat alterations due to stormwater runoff. PWD has adopted a more targeted approach to stream restoration to optimize capital funds and ecological uplift. The integration of environmental stressor reduction as a component of PWD's stream habitat restoration program has resulted in efforts being paired with streamside sewer asset protection and/or relocation.

Project Name	Stream Length (ft)| Drainage Area (acres)	Description
Status: **Complete**		
Saylor Grove	150 acres	• First stormwater wetland constructed by PWD in the fall of 2005. • The one-acre wetland treats~70 million gallons of urban stormwater a year before it reaches the Monoshone Creek. • This project is now monitored regularly through a formal inspection protocol. Monitoring efforts at this site are now included in the Wissahickon TMDL monitoring efforts. • Site is scheduled for a maintenance dredging in the Fall 2020.
Cathedral Run Stormwater Wetland	90 acres	• Cathedral Run Wetland is a stormwater management facility that is about an acre in area and treats ~90 acres of drainage area. • The wetland removes sediment and nutrients from storm runoff while helping reduce the peak volume reaching Cathedral Run and Wissahickon Creek.
Marshall Road Stream Restoration	900	• Goal was to stabilize an exposed section of the Cobbs Creek Interceptor. • Through funding from a Growing Greener Grant in 2003, PWD embarked on full scale stream restoration design to stabilize the 900 ft segment of the Creek. • Construction was completed in 2006. • PWD has maintained an active role in seasonal and annual monitoring of the restoration site and continually evaluates the long-term success of the project.
Whitaker Ave Stream Restoration	2200	• 2,200 foot stretch of the Tacony Creek main stem that begins 500 feet downstream of the Whitaker Avenue bridge and ends about 800 feet upstream of the Fishers Lane bridge. • PWD, in partnership with the USACE – Philadelphia District, bid and constructed this project which was completed in November 2010. • PWD began its monitoring program at this site in spring 2011.
Indian Creek CSO Storage and Daylighting	2100	• Located within the Cobbs Creek Watershed at the confluence of the East and West branches of Indian Creek in Morris Park, Philadelphia, Pennsylvania. • Included the construction of a new stream channel by removing approximately 700 ft. of the West Branch Indian Creek from a brick culvert. Also included bank stabilization of the existing creek and the associated forested riparian buffer around the new channel. The new stream channel reconnects the West Branch to the East Branch of Indian Creek. • The existing brick culvert was converted into temporary storage for Combined Sewer Overflow (CSO) during wet weather events reducing the total CSO discharges into the Cobbs Creek Watershed. Estimated removal of approximately 2 million gallons of combined sewage discharge to Indian Creek annually.

Project Name	Stream Length (ft)| Drainage Area (acres)	Description
Wises Mill Stream Restoration	1000	• 1st/2nd order tributary to the Wissahickon Creek • Stream was fully assessed and determined to be a significant source of sediment to Wissahickon Creek through bank erosion and sediment transport processes. • The project is currently in the project monitoring phase.
Bells Mill Stream Restoration	5100	• 2nd order tributary to the Wissahickon Creek • The tributary arises from an outfall near the intersection of Lykens Lane and Bells Mill Roads. It then travels through a wooded area parallel to Bells Mill Road for approximately 5,100 ft before reaching the confluence with the Wissahickon Creek. • Energy dissipating structures such as rock vanes and channel-spanning boulder step structures were installed.
Gorgas Run Stream Restoration	2100	• Gorgas Run is a steep headwater tributary to the Wissahickon Creek with a drainage area of 499 acres. • High peak stormwater flows have severely degraded Gorgas Run • PWD used NSCD principles to restore the 1,800 feet of stream channel that encompasses Gorgas Run and another 300 feet of tributary to Gorgas Run. • Rehabilitation of the stream corridor included in-stream stabilization structures, repairs and protection for PWD and Fairmount Park infrastructure, stabilization of stormwater gullies below Henry Avenue and park trail enhancements.
Wissahickon Creek Ridge Ave 2nd Dam	200	• Bank restoration around exposed manhole at the dam on Wissahickon Creek upstream of the Ridge Ave culvert. • The project restored approximately 200 feet of stream bank.
Pauls Run Stream Restoration	500	• Approximately 350 feet of stream restoration along Pauls Run, tributary to Pennypack Creek to protect an exposed sanitary sewer and stabilize the stream channel.
Wises Mill Wetland	92 acres	• System of 3 stormwater wetlands with total surface area of approximately 2 acres. • Manages stormwater from a 92 acre drainage area. • PWD monitoring sediment accumulation and vegetation within the wetlands. • PWD has conducted site maintenance recently including construction of an armored channel between the wetlands to fix gully erosion, repairs to a berm that separates the wetland from the Wises Mill Run stream channel, and installation of a larger outlet inflow pipe for proper drainage of the wetlands.
Carpenters Woods	600	• Project addressed significant gully erosion downstream of 3 outfalls. • Included construction of channel bed armoring, bank revetments, and vegetation to stabilize the channels and enhance the forest off Mount Pleasant Rd in northwest Philadelphia.
Cathedral Run Stream Restoration	300	• The culvert below Forbidden Drive trail had become clogged with debris and the banks upstream of the structure had eroded and bed downgraded. • The project constructed bank and bed stabilization structures in the area just upstream of the culvert.

Project Name	Stream Length (ft)| Drainage Area (acres)	Description
Rex Ave	300	• Project included stabilization of a portion of the stream channel parallel to Rex Avenue.
Cresheim Creek St. Martins	450	• Construction of 3 grade control structures (cross-vanes) and bank revetments on both sides of the stream channel below the pedestrian bridge off St. Martins Road.
Hartwell Lane	300	• Restoration of the stream channel upstream of a culvert structures that conveys PWD's Wissahickon High Level Interceptor. • Includes 3 cross vanes for grade control and bank revetments on both sides of Hartwell Run. • Bank revetments and scour protection downstream of the culvert. • Masonry repairs were made to the culvert structures.
Status: **In Design**		
Cresheim Creek Interceptor and Outfall	200	• Project goals include reconfiguration of the intercepting sewer crossing between the two culverts near Woodbrook Lane, replacement of a deteriorated outfall, and installation of bank stabilization and grade control features in the stream channel.
Cresheim Creek Outlet Tunnel	300	• The end of the culvert tunnel has degraded and the stream banks and bed around the culvert have significantly eroded. The erosion has exposed a 36 inch water main that was previously in the bank next to the culvert. The water main passes through the culvert, creating blockage for water flow through the culvert. • The project will relocate the water main below the culvert, repair and/or rebuild storm and sanitary infrastructure, and stabilize stream banks downstream of the culvert exit.
Cardone Outfall Bank Stabilization at Rock Run	350	• A stormwater outfall owned by the adjacent Cardone Factory and draining its parking lot has been collapsing into the stream due in part to its location directly across from the Rock Run regulator. • The regulator's flows have also resulted in about 70 LF of active bank erosion downstream of the outfall. • This project aims to stabilize the outfall structure, protect the eroded bank with a new boulder wall tying in to an existing wall, and enhance the stream channel upstream of the outfall using an engineered riffle with riprap bank protection.
Park Line Dr Interceptor - Gorgas Chute and Outfall	250	• Project work is to occur across three sites. • Site 1 includes stabilization and structural repairs to the interceptor crossing and installation of a plunge pool and stream bank stabilization structures at the sewer crossing down the trail from the intersection of Park Line Dr and Hortter St. • Site 2 includes repairs to the concrete chute that conveys storm runoff flows to Gorgas Run from the outfall near Fountain St. • Site 3 includes the installation of new pipe from the collapsed outfall off of Henry Ave that has created a large gully crossing the Yellow Trail and a new outfall structure discharging under the trail into Gorgas Run.
Millbourne Cobbs Creek Bank Stabilization	500	• The project goals comprise protection of a 3'-6" brick sewer exposed near the channel downstream of Millbourne Dam and stabilization of two separate portions of the downstream left side of Cobbs Creek.

Project Name	Stream Length (ft)| Drainage Area (acres)	Description
		• The design includes concrete encasement and boulder toe revetments to protect the existing brick sewer and the access roadway, replacement of an undersized and collapsed corrugated metal pipe with a larger RCP culvert, and removal of the compromised stormwater conduit to promote proper drainage beneath the sewer maintenance access road.
Neill Drive Stream Corridor Restoration	1600	• The stream channel, , is deeply entrenched and eroding. There is a significant amount of exposed and vulnerable PWD infrastructure including sanitary sewers, a sanitary force main, a water main crossing, and damaged stormwater outfalls. • The project will protect the vital infrastructure and stabilize eroding banks.
Sandy Run Stream Restoration, Infrastructure Protection and Stormwater Wetland	500	• The objective of the design will relocate a sewer crossing downstream of the Ryan Avenue Bridge and include related stream restoration elements such as floodplain reconnection.
Pennypack Corridor Improvement Project at Holme Ave	1500	• Two sanitary sewer crossings are exposed in the mainstem of the Pennypack Creek between Holme Ave and Axe Factory Run. Increased widening and downcutting of the channel over time has destabilized the banks and stranded a manhole. • Project design consists of installing grade control measures to protect the assets in-place, removing the manhole, stabilizing banks to prevent further erosion and widening, and increasing floodplain connectivity along this reach to the maximum extents possible.
Mount Moriah Streambank and Cobbs Creek Interceptor Stabilization	500	• Located along Cobbs Creek in the "3 bridges" area adjacent to Mt. Moriah Cemetery, about 350 ft of a 5'-0" brick interceptor and its manholes are exposed along the left bank in multiple areas of the reach. • Work will focus on protecting the sewer in-place using bank protection structures while also employing stream restoration principles to optimize the compromised flow pattern through the three bridges.
Benton Brook Stream Restoration	1200	• The project will address streambank erosion and exposed infrastructure along Benton Brook in the Pennypack Creek Watershed.
Flat Rock Dam Flow Diversion		• Project goals include improving flow to the Manayunk Canal by effectively diverting more flow through the canal and remove the dam designation from the City owned portion of the dam.
Green Tree Run Outfall Stabilization	200	• Objective: stabilize the stream channel around the 54 inch outfall just off Shawmont Ave at Minerva Rd. The gabion baskets have collapsed into the stream channel and the banks continue to erode. • The private property owner signed an easement agreement with Streets when the outfall was originally installed and has complained about the discharge from the outfall causing the erosion of the stream channel.
Roosevelt Blvd Dam Removal	1,000	• This project will lower the existing dam by 4 feet and stabilize the walls protecting the trail by installing bank protection measures. • Periodic flooding and erosion of the adjacent Pennypack Trail surface will be reduced through the lowering of the dam crest elevation.

Project Name	Stream Length (ft)| Drainage Area (acres)	Description
		• A culvert conveying a tributary will be repaired as it has collapsed and is causing further damage on the trail. • A rock ramp will be constructed to promote fish passage.
Tacony Creek - Reach 6 (Juniata Dam Removal)	1000	• Project will improve water quality and aquatic habitat and provide fish passage. • The Juniata dam is on the Tacony Creek, approximately 700-feet upstream from the Castor Ave. bridge . The dam is in good condition however, much of the upstream impoundment was filled by sediment. • The combination of the reduced flow velocity and nutrient-rich sediment supply are suspected of reducing the available dissolved oxygen in the water column. • The height of the dam also presents a complete barrier to fish passage during the majority of flow conditions.
Status: **On Hold**		
Tacony Creek - Reaches 4-5	2500	• This project entails the restoration of Tacony Creek Reaches 4 and 5 as identified by the Tacony Creek Restoration and Ecosystem Enhancement Program, 4/28/2010. • Objective: restore ~2500 feet of stream channel, enhancement of floodplain wetlands, improvement of the riparian buffer, the completion of a paved Fairmount Park trail connection from Tabor Road to I and Ramona Sts, and implementation of green infrastructure at five trail entrances. • This project will connect with the existing Whitaker Avenue stream rehabilitation project.
Woodland Dam Removal		• Will investigate, select, design and construct the best alternative to reestablish fish passage along Cobbs Creek. • After selection of a recommend type of fish passage design, concurred by both the Corps and PWD, the project will progress to plans and specifications, and construction contingent on the availability of funds.
Cobbs Creek - Reaches 6-8		• The Reaches 6-8 Restoration project will include elements of Natural Stream Channel Design, wetland creation as well as conventional bank stabilization applications. • The project reach, approximately 9,000 ft in length, extends from just above Market Street to the SEPTA Regional Rail Bridge south of Baltimore Avenue. • The project reach encompasses the previously restored Marshall Road restoration reach. • Aside from corridor restoration there will be green stormwater infrastructure applications designed throughout the site on both Cobb's Creek Parkway as well within the Park.

III.C.2.4 Wetland Enhancement and Construction

Three stormwater treatment wetlands facilities were designed and implemented to remove pollutants and mitigate peak flows, while providing aesthetic and ecological benefits. These projects are:

- Saylor's Grove (Construction Completed in 2006)
- Wise's Mill (Construction Completed in 2012)
- Cathedral Run (Construction Completed in 2012)

In total, these three facilities receive and treat stormwater from more than 300 acres of the MS4 service area. Because these projects were completed as part of PWD's Wissahickon Sediment TMDL Implementation Plan, a more detailed description of the Department's efforts has been provided in **Section D - Wissahickon Sediment TMDL Monitoring plan implementation** of the Stormwater Management Program Report. PWD is working to maintain these project sites.

Watershed Mitigation Registry

PWD has continued investigating projects and partnerships that could potentially be suited for the state's mitigation banking program.

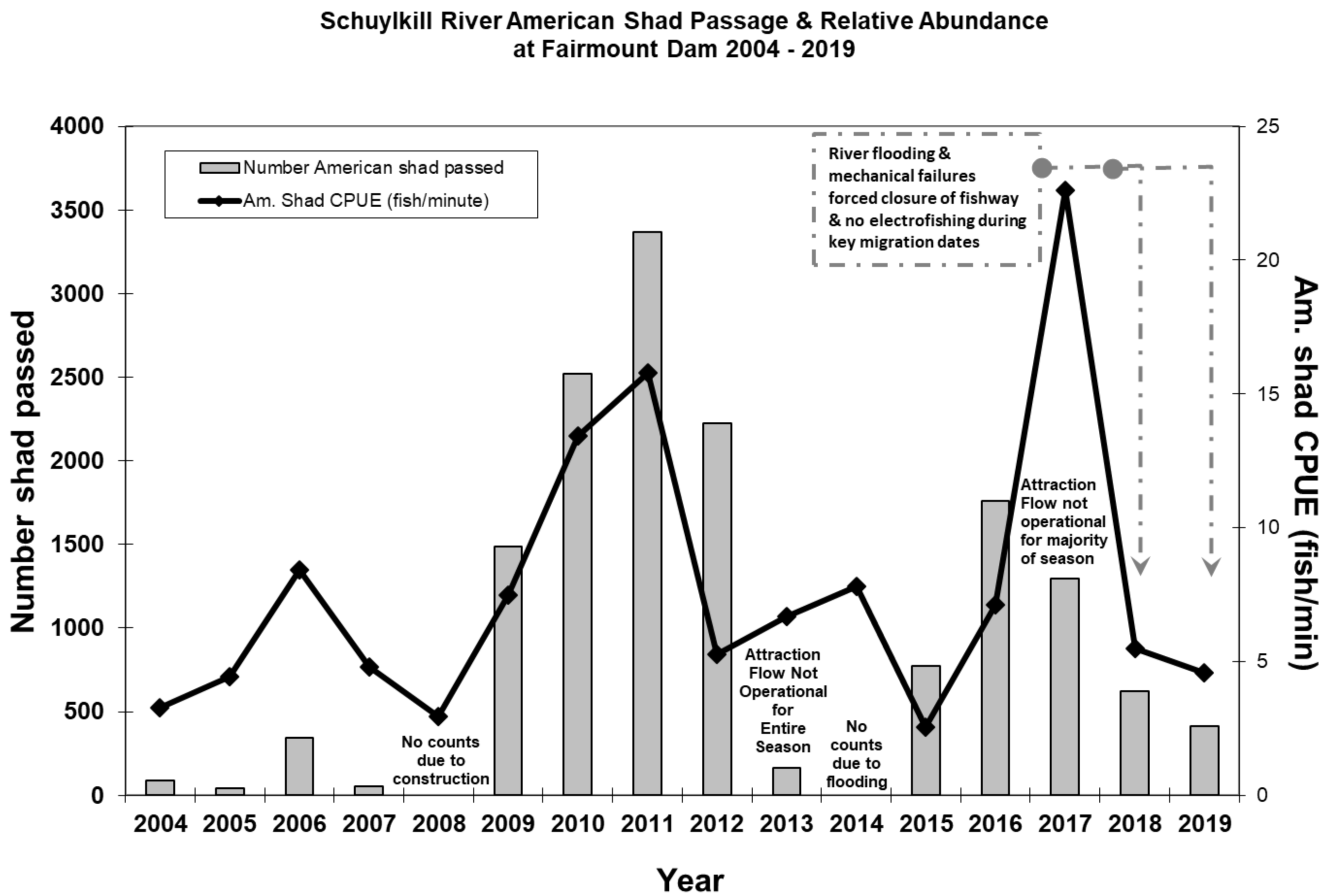
III.C.2.5 Fish Passage Projects

Schuylkill River: Fairmount Fishway

The Fairmount Dam Fishway located on the western side of the Fairmount Dam, was completed in 1979. In 2009, through a joint cooperative agreement with the United States Army Corps of Engineers (USACE), the City of Philadelphia upgraded many features of the fishway to improve hydraulics and overall fish passage efficiency.

Adult American Shad relative abundance (number of shad per hour of electrofishing) in the Schuylkill River in 2019 ranked 12th overall in the time-series (2002-2019). The 2019 CPUE at Fairmount Dam (276.6 shad/hour) was below the time series average (2002 – 2019). It should be noted that boat electrofishing surveys could not be conducted during peak migration dates for American Shad because of river flooding and high river flows, as well as excessive turbidity, which resulted in reduced overall catch of shad. As a result, the 2019 survey year experienced the 4th lowest sampling effort in the 18-year time series. Similarly, river flooding forced complete closure of the Fairmount Fishway during key migration dates; and when we could operate the fishway, excessive turbidity at the viewing window reduced ability to accurately identify species and enumerate individuals, thus counts suffered. The 2019 American Shad passage at Fairmount Fishway (415 shad) decreased from the previous year and fell well below the 16-year time series average (1083.1 shad). The 2019 shad passage at Fairmount was the 9th highest recorded in the time-series (2004 to 2019). River flooding, high water flows, and excessive turbidity occurred during the 2019 shad season, which negatively impacted our ability to catch and video monitor shad in the Schuylkill River. Hatchery contribution for the Schuylkill River adult shad was 67% in 2019; the second lowest hatchery contribution observed in the time series and well below the 12-year average of 90%.

Figure III.C.2.5 -1 Catch-Per-Unit-Effort and Fish Passage of American Shad



Pennypack Creek: Rock Ramp Fishway at Sanitary Sewer Crossing

A rock ramp fishway was constructed in Pennypack Creek in 2007 in an attempt to alleviate the excessive drop in water surface elevation caused by the sanitary sewer crossing of the creek which prevented fish from moving upstream of this site. PWD electrofishing surveys of the tidal Pennypack Creek have documented a limited spawning population of anadromous Alewife and Blueback Herring several miles downstream of the rock ramp fishway. Both juvenile and adult Striped Bass have been collected in the tidal portion, but not above the rock ramp. No adult Hickory Shad have been collected above or below the rock ramp; no larvae were stocked 2016 to 2019 by PA Fish and Boat Commission, who had been stocking larvae for several years in an attempt to establish a self-sustaining wild population, which has yet to have been realized.

III.C.2.6 Riparian Buffer Creation and Enhancement

Environment, Stewardship & Education Division

PWD continues to support Philadelphia Parks and Recreation, which undertakes a broad range of environmental restoration activities throughout the park system. Restoration activities have been ongoing since 2008. These efforts have been discussed in previous years; for more details and a full list of these activities, please refer to Section III.C.2.6 Environment, Stewardship & Education Division on page 121 of the CSO-Stormwater FY12 Annual Report.

Riparian Buffer component of Stream Restorations

Riparian buffer enhancement will be evaluated in all stream restorations that are completed. Typically, riparian buffer enhancement activity includes invasive species management, live-stake planting, tree and shrub planting, and native seed mix application. Invasive species management usually begins one to two years prior to construction. Once the construction of the stream restoration project is complete, a landscaping plan is implemented which includes all of the applications mentioned above. Please refer to **Section III.C.2.3 Stream Habitat Restoration** on page 41 and **Section III.C.2.4 Wetland Enhancement and Construction** on page 47 in this report for more information on these topics.

Natural Lands Team

The Natural Lands Team, initiated in 2011, is a group comprised of members from PWD's Ecological Restoration Unit, Waterways Restoration Team, Public Affairs, PWD Design Branch and staff from Philadelphia's Department of Parks and Recreation. Bi-monthly meetings are held to coordinate a wide range of projects that affect the City's stream corridors and natural areas. Through centralizing the myriad of ongoing and upcoming projects, this group works to improve efficiency and communication. Projects include but are not limited to stream restoration, wetland creation, stormwater management, infrastructure protection and invasive species management. During FY20, the Natural Lands Team convened 3 times to discuss upcoming projects and potential issues that could be addressed by the team members.

III.C.3 Other Watershed Projects

III.C.3.1 River Conservation Plan - Continue to work in partnership with local partners to complete and implement River Conservation Plans (RCPs)

All River Conservation Plans (RCPs) are available for viewing at:
http://www.phillywatersheds.org/your_watershed/ under each respective watershed's key documents.

Table III.C.3-1: River Conservation Plan References

River Conservation Plans	Complete Date	Previous Reference
Darby Creek	2005	Page 121 of the CSO-Stormwater FY 2008 Annual Report
Tacony-Frankford	2004	Page 74 of the FY 2005 Stormwater Annual Report
Pennypack	2005	Page 122 of the CSO-Stormwater FY 2008 Annual Report
Poquessing	2007	Page 155 of the CSO-Stormwater FY 2010 Report
Delaware Direct	2011	Page 151 of the CSO-Stormwater FY 2011 Annual Report

III.C.3.2 Watershed Information Center - Create a website to serve as a Watershed Information and Technology Center

The City maintains several websites that provide information on our watersheds and activities within them, please refer to **Section II.G.2 Continue to Maintain Watershed Management and Source Water Protection Partnership Websites** on page 19 and **Section II.H.2 Expand the Internet-Based Notification System (River cast) to the Tidal Section of the Lower Schuylkill River** on page 30 for additional information on the websites.

III.C.3.3 Integrated Water Use Status Networks - Pilot a communication and water quality monitoring network that supports the identification and analysis of water quality events

PWD has two communication and water quality monitoring networks. RiverCast supports the identification and analysis of water quality events to support recreational water use status decisions (swimming, triathlons, rowing, etc.) and makes this information available in real time to the public. EWS is used to monitor water quality and notify water utilities about such events as hazardous substance spills or sudden changes in water quality.

Please refer to **Section II.G.2 Continue to Maintain Watershed Management and Source Water Protection Partnership Websites** on page 19 for details about these communication and water quality monitoring systems.

III.C.3.4 Integrated Water Use Status Networks - Evaluate the technical and fiscal needs to expand the network into additional receiving waters where recreational uses are taking place.

Please refer to Section II.H.2 Expand the Internet-based Notification System (Rivercast) to the Tidal Section of the Lower Schuylkill River on page 30 for information pertaining to this topic.

III.C.3.5 Interpretive Signage - Continue to implement interpretive signage

Green Stormwater Infrastructure and Restoration Locations Signage

Information on the Green City, Clean Waters Signage Program can be found within **Appendix A- Green City, Clean Waters FY20 Annual Report**.

III.C.3.6 Interpretive Centers - Continue to support existing educational interpretive centers to educate citizens about their community and the water environment

PWD supports several existing educational centers including FWW and many public outreach efforts conducted by partners. Please refer to **Section II.G.3 Continue to Provide Annual Information to City Residents about Programs via Traditional PWD Publications** on page 26 and **Section II.G.4 Continue to Support the Fairmount Water Works** on page 29 for more information on activities done in FY20 by the FWW and partner sponsored events.

III.C.3.7 Basin-Specific Stormwater Management Plans (Act 167) - Continue to support the State Act 167 Storm water Management Planning process and integrate the results of these efforts into the watershed management plans and implementation plans

As of July 10, 2015, all Act 167 plans have been approved. Please refer **to Table III.C.1-2 Planning by Watershed** on page 38 for more information.

III.C.3.8 Sewage Facility Planning - Continue to review sewage facility planning modules and downstream sewage conveyance and treatment facilities to ensure that adequate capacity exists within these systems to accommodate flow

During FY20, PWD reviewed 557 "Sewage Facilities Planning Module Application Mailers" for projects requiring building permits within Philadelphia County. During the same period, PWD issued 54 sanitary sewer capacity certifications for projects in tributary municipalities.

III.C.4 Monitoring and Assessment

III.C.4.1 NPDES – Quarterly Special Discharge Monitoring Report

PWD is committed to submitting the Quarterly Special Discharge Monitoring Report (DMR) documenting the Department's CSO discharges during the specified time periods. This report is due 45 days after the end of each quarter, and is submitted by February 15, May 15, August 15, and November 15 of each year. During FY20, four DMRs were submitted within the 45-day timeframe. These reports are also referred to as Quarterly Combined Sewer Overflow Status Reports.

III.C.4.2 NPDES - Annual CSO Status Report

Monitoring and characterization of CSO impacts from a combined wastewater collection and treatment system are necessary to document existing conditions and to identify water quality benefits achievable by CSO mitigation measures. The tables included in **Appendix D** and other information provided within this annual report represent the average annual CSO overflow statistics for period July 1 2019 – June 30 2020 as required in the NPDES Permit. Please refer to **Table 1 in Appendix D – NPDES – FY20 CSO Status Report** for a listing of all CSO permitted outfalls. The tables have been reorganized to present overflows by the specific receiving water into which the CSOs from a given interceptor system discharge. In order to be consistent, the column headings are presented in the same format found in the System Hydraulic Characterization (SHC) and NMC Documentation.

III.C.4.3 Rotating Basin Approach to Watershed Monitoring - Continue to implement a rotating basin approach to watershed monitoring in CSO receiving waters in order to characterize the impact of CSO discharges and other pollutant/pollution sources and the efficacy of CSO controls and watershed restoration practices.

The Rotating Basin Approach has been replaced with a "Comprehensive Watershed Monitoring Program," a monitoring strategy developed by PWD to comply with both the City's stormwater and CSO permit requirements and to assist with the Source Water Protection Program's objectives.

Please refer MS4 Annual Report **Section F.2.Step 1.b – Preliminary physical, chemical and biological quality assessment** on page 8 for information about Comprehensive Watershed Monitoring Program.

Stormwater Management Program
Annual Report

National Pollutant Discharge Elimination System (NPDES) Permit
No. PA 0054712
Reporting Period July 1, 2019 to June 30, 2020

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Section F

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Part I Permit Conditions

Section A Applicability and Limitation on Coverage

The City will comply with the permit language on what are authorized and unauthorized stormwater discharges.

Section B Legal Authority

In accordance with the National Pollutant Discharge Elimination System (NPDES) regulations contained in 40 C.F.R. Sections 122.26(d)(1)(ii) and (d)(2)(i), the City maintains adequate legal authority to enforce the Stormwater Management Program through the Philadelphia Code (Code) and the Water Department (PWD) Regulations.

Code Section 13-603 regulates discharges into the storm sewer system and includes penalties for violations. Code Section 13-603(4)(a) grants PWD and the Department of Licenses and Inspections (L&I) the authority to require compliance, including issuing regulations, and investigating, inspecting, and monitoring all premises. Under the City's zoning provisions in Code Sections 14-301(10) and 14-704(3), PWD has the authority to regulate stormwater management on a City-wide basis. Code Section 14-306(1) grants PWD and L&I specific enforcement authority for zoning violations. The Code can be accessed at https://codelibrary.amlegal.com/codes/philadelphia/latest/overview.

PWD Regulations further provide PWD legal authority to enforce the Stormwater Management Program. Section 500 prohibits cross connected sewer laterals and Chapter 6 implements the authority to regulate stormwater management for new and redevelopment in the City. PWD Regulations can be accessed at https://www.phila.gov/water/wu/ratesregulationsresp/Pages/Regulations.aspx.

This Annual Report is submitted to the Pennsylvania Department of Environmental Protection (PADEP) and the US EPA, in accordance with requirements of the City of Philadelphia's NPDES Stormwater Management Permit No. PA 0054712. The report documents the Fiscal Year 2020 (FY20) progress completed in order to comply with the requirements during the reporting period from July 1, 2019 to June 30, 2020.

Section D Sediment Total Maximum Daily Load (TMDL) for Wissahickon Creek

Wissahickon Sediment TMDL Monitoring Plan Implementation

PWD's commitment to meeting the Wissahickon Sediment TMDL was initiated in 2005 through detailed monitoring and assessment of the Wissahickon Creek Watershed. The goal of PWD's implementation is to reduce the amount of sediment reaching the Wissahickon Creek using a multi-faceted approach. In addition to continuing street sweeping and implementing and strengthening stormwater management regulations, the PWD has implemented three stormwater wetland facilities and seven stream restoration and stabilization projects. During FY14, PWD completed the Sediment TMDL Baseline Monitoring Report in November 2013 based on the previously submitted TMDL Monitoring Plan. This report was submitted with the FY14 CSO-MS4 Annual Report. The baseline monitoring report documents the data collected following the implementation of the stormwater wetland facilities and stream restoration projects. This information will be used to measure sediment reductions as a result of the implemented projects. The initial phase of this effort included baseline monitoring to measure the effectiveness of the stream restoration and stormwater treatment wetland facilities projects in meeting the targeted sediment reductions and H&H modeling and topographic survey monitoring to confirm sediment reduction estimates presented in PWD's Implementation Plan.

PWD submitted a Wissahickon Siltation TMDL Implementation Plan Update in March 2018. This document includes updates on the 2012 Siltation TMDL Implementation Plan’s four components: stream restoration, stormwater wetlands, inlet catchbasin cleaning, City of Philadelphia Stormwater Regulations and the estimated sediment reduction associated with these activities. A more detailed Wissahickon Siltation TMDL Monitoring Report (with appendices) was also submitted in March 2018. The Monitoring report includes results from cross-sectional survey analysis of stream restoration projects, photo monitoring, in-stream evaluations of stream restoration structures and Hydraulic and Hydrologic modeling of stormwater wetlands.

Section E Pollutant Minimization Plan for Polychlorinated Biphenyls in the City’s MS4

During the thirteenth year of the PCB PMP, the following tasks were accomplished:

- 77 of the 337 remaining sites listed by EPA or other agencies as housing PCB containing devices were inspected.
- Wet-weather PCB sampling and analysis of the three WPCPs effluent was performed as required by the WPCP NPDES permits.
- PWD continued monitoring outlying township connections using EPA Method 680.
- PWD continued monitoring of groundwater discharged from new construction and remediation sites to ensure compliance with PWD’s published PCB limit of “non-detection by EPA Method 608.”
- PWD issued 19 groundwater discharge permits in calendar year 2019. Every permit except one was compliant with PWD’s regulatory PCB limit of “non-detectable by EPA Method 608". During April 2019, one of the permittees reported a detection for Aroclor 1262. Additional samples collected in May 2019 for this site shows non-detectable results.
- PWD wet and dry weather WPCP effluent data have been entered into the DRBC PCB database.
- Overall, results of the 2019 sampling, excluding an anomaly in October, show substantial reductions of 68-89% from the baseline PCB loading levels.

Additionally, the following initiatives were undertaken:

- PWD’s PCB database, developed in 2017, is now being utilized to track and report the 2019 inspections.
- Each inspection location has been given a unique ID and geocoded in PWD’s GIS database. Maps of PCB sites inspected in 2019 were created to display inspections by water pollution control plant drainage area.
    - PWD can generate interactive GIS maps to assist in the identification of areas of concern and plan additional efforts to identify potential sources.

Section F Stormwater Management

F.1. Source Identification

A description of PWD's MS4 Infrastructure, including stormwater outfalls, lengths of sanitary sewer, and lengths of stormwater sewer within Philadelphia are shown in Table F.1-1. The 205 "Non-PWD Owned" outfalls listed in the table are owned by other City agencies, private entities, or individuals. The PWD-owned stormwater outfall locations and MS4 areas are shown in Figure F.1-1.

Table F.1-1: Description of MS4 Infrastructure

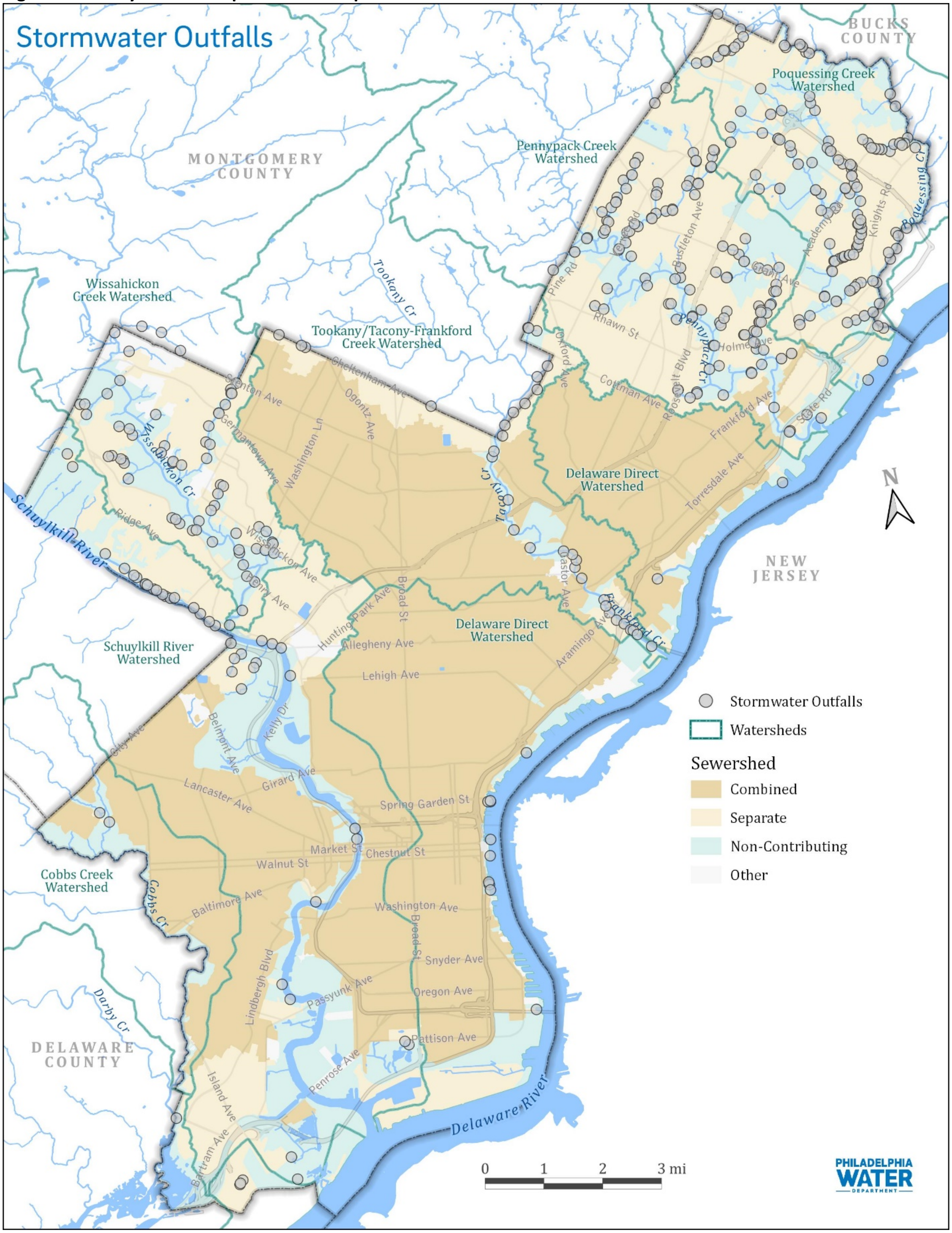
Watershed	Drainage Area (Square Miles)	Miles of Pipe			MS4 Outfalls Count	
		Stormwater	Sanitary	Total MS4	PWD Owned	Non-PWD Owned
Darby-Cobbs	-	1.02	0.81	1.82	3	-
Delaware Direct	3.15	79.81	52.68	132.49	18	122
Pennypack	11.67	234.93	234.03	468.96	130	14
Poquessing	8.00	154.71	156.52	311.23	141	19
Schuylkill	8.48	153.43	156.82	310.26	45	47
Tacony	2.47	54.46	59.02	113.48	34	1
Wissahickon	5.79	95.18	104.86	200.03	63	2
Total	**39.56**	**773.53**	**764.74**	**1538.27**	**434**	**205**

GIS Data Layers have been submitted within a geodatabase, **PWD_Annual_Report_GIS_Data_2020.mdb** which can be found in the **digital download link**. The GIS Data Feature class filenames within the geodatabase are provided in **Table F.1-2**.

Table F.1-2: GIS Data Feature Classes within Geodatabase named - PWD_Annual_Report_GIS_Data_2020.mdb

• All_PWD_Monitoring_FY20	• NPDES_Permitted_Dischargers_FY20
• GSI_Monitored_Locations_FY20	• Detention_Basins_Philadelphia
• Public_GSI_Projects_Completed_FY20	• Impervious_Surfaces_Planimetric_2004
• Public_GSI_Projects_Planned_FY20	• Major_Watersheds_Full_Extent
• Pollution_Migration_Events_FY20	• Major_Watersheds_Philadelphia_Clip
• Active_Construction_Sites_FY20	• Sewersheds_FY20
• Verified_Regulations_FY20	• Census_Blocks_2010_Philadelphia
• Verified_Retrofits_FY20	• Stormwater_Outfalls
• New_Project_Submissions_FY20	• Stormwater_Outfalls_with_DrainageArea_Summary
• Technical_Approvals_FY20	• Stormwatersheds_Pennypack
• Hydrology_Centerline	• Stormwatersheds_Poquessing
• Hydrology_Polygon	• Stormwatersheds_Wissahickon
• Land_Use_PCPC_2018Land_Use_PCPC_2020	• Point_Sources_Wissahickon
• PCB_Locations_Known_Historical	• Scrap_Yard_Inspections_FY20

Figure F.1-1 City of Philadelphia Water Department Stormwater Outfalls



Descriptions of the GIS layers referenced in **Table F.1-2** are provided below:

All_PWD_Monitoring_FY20
This layer presents the locations of PWD's chemical, fish, macroinvertebrate, and algae sampling sites. The contents of this feature class are discussed in **Section F.2.Step.1.b** on page 8.

GSI_Monitored_Locations_FY20
This layer presents the locations of existing green stormwater infrastructure projects actively monitored by PWD in Philadelphia County.

Public_GSI_Projects_Completed_FY20
This layer presents the locations of completed publicly implemented green stormwater infrastructure projects sorted by their current status within Philadelphia County.

Public_GSI_Projects_Planned_FY20
This layer presents the locations of planned publicly implemented green stormwater infrastructure projects sorted by their status within Philadelphia County.

Pollution_Migration_Events_FY20
This layer presents the locations of spills documented by PWD Industrial Waste Unit within Philadelphia in FY20. The contents of this layer are discussed in **Section F.7.a – Pollutant Migration/Infiltration to the MS4 System** on page 31.

Active_Construction_Sites_FY20
This layer presents the locations of active construction private development projects within Philadelphia in FY20. The contents of this layer are discussed in **Section F.5 – Monitor and Control Stormwater from Construction Activities** on page 22.

Verified_Regulations_FY20
This layer presents the locations of constructed and verified private development projects subjected to stormwater regulations within Philadelphia in FY20. The contents of this layer are discussed in **Section F.5 – Monitor and Control Stormwater from Construction Activities** on page 22.

Verified_Retrofits_FY20
This layer presents the locations of constructed and verified private retrofit development projects subjected to stormwater regulations within Philadelphia in FY20. The contents of this layer are discussed in **Section F.5 – Monitor and Control Stormwater from Construction Activities** on page 22.

New_Project_Submissions_FY20
This layer presents the locations of new project submissions for conceptual stormwater plan review in FY20. The contents of this layer are discussed in **Section F.5.b – Post-Construction Stormwater Management in New Development and Redevelopment** on page 27.

Technical_Approvals_FY20
This layer presents the locations of projects issued technical approvals by PWD in FY20. The contents of this layer are discussed in **Section F.5.b – Post-Construction Stormwater Management in New Development and Redevelopment** on page 27.

Hydrology_Centerline
This layer presents the surrounding watershed hydrology in a polyline based feature class.

Hydrology_Polygon
This layer presents the surrounding watershed hydrology in a polygon based feature class.

Land_Use_PCPC_2020
This layer presents Philadelphia land use as ascribed to individual parcel boundaries or units of land. Land use is the type of activity occurring on the land such as residential, commercial or industrial. Each unit of land is assigned to one of nine major classifications of land use (2-digit codes) and where possible more narrowly defined into one of 70 sub-classifications (3-digit codes).

PCB_Locations_Known_Historical
This layer presents the location of all known and historical PCB locations within Philadelphia. The contents of this layer are discussed in **Section E – Pollutant Minimalization Plan for Polychlorinated Biphenyls in the City's MS4** on page 2.

NPDES_Permitted_Dischargers_FY20
This layer presents the location within Philadelphia of all NPDES Industrial Stormwater permitted Discharger. The contents of this layer are discussed in **Section F.2.Step 1.c** on page 14 and a list of permitted facilities can be found in **Appendix K – NPDES Industrial Stormwater Permitted Sites – Philadelphia County.**

Detention_Basins_Philadelphia
This layer presents the location of all known stormwater detention basins within Philadelphia County.

Impervious_Surfaces_Planimetric_2004
This layer presents percent imperviousness and the amount of impervious area in Philadelphia County.

Major_Watersheds_Full_Extent
This layer presents the delineation of the Philadelphia County and surrounding counties' watershed boundaries including Darby-Cobbs, Delaware-Direct, Pennypack, Poquessing, Schuylkill, Tacony-Frankford, and Wissahickon watersheds.

Major_Watersheds_Philadelphia_Clip
This layer presents the delineation of the Philadelphia County's watershed boundaries including Darby-Cobbs, Delaware-Direct, Pennypack, Poquessing, Schuylkill, Tacony-Frankford, and Wissahickon watersheds.

Sewersheds_FY20
This layer presents the boundaries of the MS4, combined sewer, un-sewered, non-contributing, and stormwater only areas within Philadelphia County and the neighboring contributing areas.

Census_Blocks_2010_Philadelphia
This layer presents the results of the 2010 Census in Philadelphia County on a block level.

Stormwater_Outfalls
This layer presents locations of all permitted stormwater outfalls within Philadelphia County and the neighboring contributing areas.

Stormwater_Outfalls_with_DrainageArea_Summary
This layer presents locations of all permitted stormwater outfalls within Philadelphia County and the neighboring contributing areas. Drainage area analysis values are appended in the attribute table to display outfall metrics including total drainage area, total impervious drainage area, percent impervious, and runoff coefficient.

Stormwatersheds_Pennypack
This layer presents the stormwater drainage areas to receiving waterways and stormwater outfalls within the Pennypack Watershed.

Stormwatersheds_Poquessing
This layer presents the stormwater drainage areas to receiving waterways and stormwater outfalls within the Poquessing Watershed.

Stormwatersheds_Wissahickon
This layer presents the stormwater drainage areas to receiving waterways and stormwater outfalls within the Wissahickon Watershed.

Point_Sources_Wissahickon
This layer presents permitted Point source locations within the Wissahickon Watershed.

Scrap_Yard_Inspections_FY20
This layer presents locations of scrap yards inspected during the fiscal year.

GIS Stormwater Data Conversion Geodatabase Layers
The City has previously submitted additional GIS data layers that will not be included this year. These layers include outfalls, manholes, inlets, and various pipe as listed in **TABLE F.1-3**. The reason for their removal is the City's policy to not release these data layers to the general public due to security concerns. These data layers would be made available for viewing by PWD, should it be necessary.

Table F.1-3 GIS Data Feature Classes within Geodatabase named -StormwaterDataConversion.mdb

DataConv_GISAD_stBasin	DataConv_GISAD_stInletPipe
DataConv_GISAD_stBoring	DataConv_GISAD_stMeterChamber
DataConv_GISAD_stCasin	DataConv_GISAD_stOffsetAccess
DataConv_GISAD_stChamber	DataConv_GISAD_stOpenChannel
DataConv_GISAD_stCulvert	DataConv_GISAD_StormNetwork_Junctions
DataConv_GISAD_stDisconnectedInlet	DataConv_GISAD_stOutfall
DataConv_GISAD_stFitting	DataConv_GISAD_stPointFeature
DataConv_GISAD_stFlare	DataConv_GISAD_stPump
DataConv_GISAD_stForceMain	DataConv_GISAD_stRainGauges
DataConv_GISAD_stGravityMain	DataConv_GISAD_stStructure
DataConv_GISAD_stHostPipe	DataConv_GISAD_stTunnel
DataConv_GISAD_stManhole	DataConv_GISAD_stVentPipe
DataConv_GISAD_stManholeOther	DataConv_GISAD_stVirtualLink
DataConv_GISAD_stInlet	DataConv_GISAD_stVirtualNo

F.2. Discharge Management, Characterization, and Watershed-based Assessment and Management Program

Step 1. Preliminary Reconnaissance: Permit Issuance through end of Year 2

a. Land use and resource mapping

PWD has conducted extensive mapping of information relevant to stormwater management planning. Previously discussed in **Section F.1 – Source Identification** of this document on page 3, the GIS files include MS4 outfalls and contributing drainage areas, land use, population, monitoring locations, and other relevant layers. The maps and supporting GIS layers are included in the **digital download link**.

b. Preliminary physical, chemical, and biological quality assessment

Comprehensive Watershed Monitoring Program

Comprehensive assessment of our waterways is integral to planning for the long-term health and sustainability of our water systems. By measuring all factors that contribute to supporting fishable, swimmable, and drinkable water uses, appropriate management strategies can be developed for each watershed land area that Philadelphia shares.

PWD has carried out extensive sampling and monitoring programs to characterize conditions in seven local watersheds**,** both within the county boundaries and outside counties/municipalities. From 1999 to 2020, PWD has implemented a comprehensive watershed assessment strategy, integrating biological, chemical and physical assessments to provide both quantitative and qualitative information regarding the aquatic integrity of the Philadelphia regional watersheds. This information was published in Comprehensive Characterization Reports (CCRs) and used to plan improvements to watersheds in the Southeast Region of Pennsylvania.

Monitoring Timeline Strategy

Prior to the creation of PWD's Comprehensive Watershed Monitoring Program, baseline assessments were conducted in all Philadelphia regional watersheds to assess the degree, location and type of impairments occurring within each system. Baseline assessments, encompassing benthic, fish, habitat and discrete water quality monitoring, were routinely completed on a watershed within one year. With the addition of continuous and wet-weather water quality monitoring, periphyton assessments, and specialized physical assessment programs (*e.g.*, FGM assessments), CCRs were typically accomplished on a two-year timeline.

PWD conducted benthic macroinvertebrate and physical habitat monitoring activities in the Schuylkill River Watershed tributaries in spring 2019 **(Table F.2.Step 1.B-1).**

As described in PWD's *Comprehensive Watershed Monitoring Program: Proposed Strategy 2010-2015*, the scale of watershed stressors is so expansive and the BMP program is still in its initial phase that full implementation is limited but will increase once the program is established. Therefore, PWD is focusing its monitoring efforts at maintaining a "sentinel" monitoring presence in each of the City's watersheds rather than dedicating monitoring efforts to individual watersheds. This regional monitoring approach has been greatly enhanced through a partnership with USGS. Continuous water quality data are collected from 11 USGS gaging stations, and quarterly baseflow water samples are analyzed for microbial and nutrient parameters of concern. PWD also continues to assess performance of stormwater BMP projects as they are constructed.

Table F.2.Step 1.B-1 Overview of PWD Proposed Watershed Monitoring Activities 2010-2020

Watershed/Geographic Area	Activity	Period
PWD/USGS Gages	Continuous Water Quality Monitoring	2010-2020
PWD/USGS Gages	Quarterly Water Quality Grab Samples	2010-2020
Philadelphia Area Watersheds	Stormwater BMP Monitoring	2010-2020
Philadelphia Area Watersheds	Stream Restoration Project Monitoring	2010-2020
Cobbs Creek Watershed	Watershed-wide Comprehensive Assessment	2012-2013
Tookany-Tacony/Frankford Watershed	Watershed-wide Comprehensive Assessment	2013-2014
Wissahickon Creek Watershed	Tributary Assessment	2014-2015
Wissahickon Creek Watershed	Watershed-wide Comprehensive Assessment	2015-2016
Pennypack Creek Watershed	Tributary Assessment	2016-2017
Poquessing Creek Watershed	Watershed-wide Comprehensive Assessment	2018-2019
Schuylkill River Watershed	Tributary Assessment	2019

Monitoring Timeline 2010-2020

As described in the *Comprehensive Watershed Monitoring Program: Proposed Strategy 2010-2015*, PWD's current proposed strategy for watershed assessments includes a less intense, but ongoing monitoring effort within each watershed, primarily through a partnership with the USGS. It should be noted that although the monitoring plan nominally covers 2010-2015, the assessments of the Wissahickon, Pennypack and Poquessing watersheds are continuations of that plan and are thus included here. Currently, PWD's is focused on monitoring efforts to evaluate the performance of stormwater BMPs and restoration projects. Allowing 10 years before watershed re-assessment will potentially allow for a greater number of projects to be implemented.

The proposed strategy for watershed assessments 2010-2020 includes resuming watershed-scale bioassessment activities at several stations within targeted watersheds **(Table F.2.Step 1.B-2 Proposed Watershed Monitoring Timeline 2010-2020)**. These watershed scale reassessments should complement the "adaptive management" approach favored by the IWMP implementation process and allow for the locations and methods of assessment to be changed, depending upon the number of projects implemented and their spatial distribution within the watershed. It is hoped that these data will be useful as a long-term record of water quality changes in the region, more appropriate for assessing the goals of a City-wide distributed green infrastructure program than an approach that focuses on individual watersheds.

Table F.2.Step 1.B-2 Proposed Watershed Monitoring Timeline 2010-2020

Watershed	BMP Monitoring	Quarterly WQ Grab sampling	Continuous WQ Monitoring	Annual WQ Summary	Bioassessm ent	Bioassessment Data Analysis
Cobbs	2010-2020	2010-2020	2010-2020	2010-2020	2012, 2020	2012-2013
Tacony-Frankford	2010-2020	2010-2020	2010-2020	2010-2020	2013	2013-2014
Wissahickon	2010-2020	2010-2020	2010-2020	2010-2020	2014-2016	2014-2016
Pennypack	2010-2020	2010-2020	2010-2020	2010-2020	2016-2018	2016-2018
Poquessing	2010-2020	2010-2020	2010-2020	2010-2020	2018	2018-2019

Water Quality Sampling and Monitoring

Guiding Principles of Urban Water Chemistry Assessment

PWD’s water quality assessment strategy has been designed to facilitate separate analyses of dry weather (i.e., baseflow) and wet weather water quality conditions. This program has evolved over time, as personnel and technological improvements have improved our abilities to collect more data from an increasing number of sampling locations in a more efficient manner. Automated sampling, in particular, has greatly increased the temporal resolution of stormwater sampling at multiple sampling locations for a single storm event.

In order to comply with the State-regulated stormwater permit obligations, PWD worked with USGS to record continuous water quality data at 10 gage stations in the Philadelphia region from July 2019 through November 2019 and March 2020 through June 2020. The sampling and monitoring sites are presented in **Appendix F – Monitoring Locations**. Four types of sampling were performed as discussed below. Parameters were chosen based on state water quality criteria, or because they are known or suspected to be important in urban watersheds.

Discrete Water Chemistry Assessment

Each USGS/PWD cooperative monitoring gage site was sampled once during the course of a few hours, to allow for travel time and sample processing/preservation. Samples are collected during dry weather and parameters were chosen based on the conclusions from baseline sampling that indicated dry weather problems are primarily related to bacteria and nutrients. Results of samples collected to date are presented in **Appendix G – PWD Quarterly Dry Weather Water Quality Monitoring Program.** Previous annual reports describe PWD's extensive surface water grab sampling efforts dating back to 2002.

Grab samples were also collected from three locations in the tidal Schuylkill River by boat in October 2019. PWD has collected 24 samples from the Schuylkill River and 49 samples from the Delaware River by boat since 2011. Results from quarterly dry weather grab sampling thus far are generally similar to data collected during the CCR data collection periods.

Continuous Water Quality Assessment

Each USGS/PWD cooperative monitoring gage site records water quality data for dissolved oxygen, temperature, flow, pH, and specific conductance. Selected locations are also instrumented for turbidity, precipitation and photosynthetically active radiation (PAR). These data are made available to the public in near real-time on the internet at https://www.usgs.gov/centers/pa-water/science/philadelphiawater-resources-monitoring-program. The monitoring results from FY 2020 are presented in **Appendix H – PWD-USGS Cooperative Water Quality Monitoring Program Annual Summary**.

In addition to continuously monitoring water quality at USGS gaging stations, PWD continued deployment of an in situ self-contained data logging continuous water quality monitoring sonde (YSI Inc. Model EXO2) in the tidal Schuylkill River at SC048 (Schuylkill River at the Navy Yard) from March – November in 2019 and will be monitored between March and November in 2020.

Long-term continuous monitoring for TMDL compliance and building a long-term water quality data record for the aforementioned watersheds will be accomplished in 2010-2020 through a partnership with the USGS. Results from City-wide continuous monitoring thus far are generally similar to data collected during the CCR data collection periods. For this reason, PWD will re-evaluate whether additional water quality sampling is needed to characterize water quality in targeted watersheds on a case-by-case basis. Continuous water quality instruments will also be utilized in evaluating the performance of certain stormwater BMPs and assessing conditions in tidal portions of the Schuylkill and Delaware Rivers as well as Frankford Creek.

Groundwater Monitoring

A city-wide groundwater level monitoring network will provide long-term monthly data documenting current water levels and trends in groundwater elevations throughout the City, helping to track the impacts of widespread implementation of stormwater management practices (SMPs) and global climate change. Data from the groundwater monitoring network will also be used to calibrate a Philadelphia groundwater model and update the USGS groundwater contour map of Philadelphia (Paulachok 1984).

PWD and USGS identified existing wells that would be suitable for the network and obtained permission for site access. Once wells were identified and accessible, well condition and suitability for inclusion in the monitoring network were investigated by continuous water level monitoring and remote video camera inspection when accessible. Wells that met acceptance criteria were added to the monitoring network. After examining readily available information about existing wells, PWD elected to drill additional wells in order to provide better spatial distribution of wells in the monitoring network. Current status of the groundwater monitoring network and a summary of data collected through June 30, 2020 are presented in **Appendix I – PWD/USGS Groundwater Monitoring Program**.

Biological Monitoring

The biological monitoring protocols employed by PWD are based on methods developed by the US EPA (Barbour et al. 1999) and the PADEP. These procedures are as follows:

- Rapid Bioassessment Protocol III (Benthic Macroinvertebrate Sampling)
- Periphyton Assessment (Algae Monitoring)

Macroinvertebrate Assessments

As described in the PWD Comprehensive Watershed Monitoring Program: Proposed Monitoring Strategy 2010-2015, PWD's approach is intended to be a compromise, recognizing not only the benefits of collecting data from randomly selected sites but also the importance of maintaining a monitoring effort at consistent locations over time. This plan is based on a similar monitoring program that USGS has implemented in Chester County (Reif 2002, Reif 2004). The plan reflects the manpower constraints of collecting and processing samples with the PADEP ICE protocol. It is hoped that this approach will achieve some of the benefits of a randomized approach, while providing periodic re-evaluation of our watersheds required to inform the watershed planning process and comply with environmental mandates. Targeted watershed assessments resumed in Schuylkill River tributaries in spring 2019 **(Table F.2-3 Proposed Benthic Invertebrate Monitoring Timeline 2010-2020).**

Table F.2-3: Proposed Benthic Invertebrate Monitoring Timeline 2010-2020

Period	Monitoring Activity (number of samples*)
2010	Stream Restoration Monitoring (3)
2011	USGS gage samples (9); Randomly selected sites (16)
2012	Cobbs Creek (6**); USGS gage samples (9); Random (10)
2013	Tookany/Tacony Creek (10**) USGS gage samples (9); Random (6)
2014	Wissahickon Creek Tributaries (15); USGS gage samples (9); Random (1)
2015	Wissahickon Creek (10**); USGS gage samples (8); Random (4)
2016	Pennypack Creek Tributaries (11**); USGS gage samples (9); Random (5)
2017	Pennypack Creek (12**); USGS gage samples (9); Random (4)
2018	Poquessing Creek (12**); USGS gage samples (9); Random (4)
2019	USGS gage samples (9); Randomly selected sites (16)
2020	Schuylkill River Tributaries (3); USGS gage samples (8); Random (3)

* Number of samples estimated, actual number of samples may vary

** Number of monitoring sites excludes 2 USGS gage sites in target watershed

During March and April 2019, PWD conducted Rapid Bioassessment Protocols (RBP III) at 14 (n=14) locations within Philadelphia area watersheds. Sampling was conducted at 8 USGS gages in the PWD/USGS Cooperative Monitoring program, 3 Schuylkill River tributary sites, and 3 randomly selected sites. These data are presented in **Appendix J – PWD Wadeable Streams Benthic Macroinvetebrate and Physical Habitat Assessments**. In spring 2020, PWD sampled 9 USGS gages, 6 sites in the Darby-Cobbs Watershed, and 10 randomly chosen sites.

Fish Assessments

Fish were not assessed in 2017-2020 due to a shortage of resources and staffing **(Table F.2-4 Proposed Fish Monitoring Timeline 2010-2018)**. All surveys were conducted using electrofishing gear as described in EPA RBP V (Barbour, et al. 1999).

Table F.2-4: Proposed Fish Monitoring Timeline 2012-2020

Period	Monitoring Activity (number of samples*)
2012	Cobbs Creek Watershed Assessment (4)
2013	Tookany/Tacony Creek Watershed Assessment (8)
2015	Wissahickon Creek Watershed Assessment (10)
2016	Fish not assessed; tributaries targeted in 2016.
2017-2020	Fish not assessed

* Number of samples estimated, actual number of samples may vary

Algae Assessments

Chlorophyll-a measurements may be used to provide information for the parameterization of water quality models. In spring 2016, PWD began a pilot effort to collect continuous chlorophyll-a data at three USGS stations along the Delaware River: 01467200 (Ben Franklin Bridge), 014670261 (Delaware River near Pennypack Woods), and 01463500 (Trenton). In addition, PWD deployed two buoys in the Delaware River (at Pea Patch Island and upstream of the confluence with the Schuylkill River) from March-November. Sondes attached to these buoys monitor continuous chlorophyll-a levels; the Woods Hole Group collects and analyzes bi-weekly grab samples at these locations to calibrate the sensors.

Physical Monitoring

Physical Habitat Assessments

Habitat assessments are conducted along with benthic macroinvertebrate monitoring and thus the habitat assessment strategy is described under the heading **Biological Monitoring – Macroinvertebrate Assessments**, above. PWD assesses stream physical habitat condition using PADEP Instream Comprehensive Evaluation (ICE) protocols. During calendar year 2019, PWD conducted physical habitat assessments at 14 locations within Philadelphia area watersheds. Sampling was conducted at 8 USGS gages in the PWD/USGS Cooperative Monitoring program, 3 Schuylkill River tributary sites, and 3 randomly selected sites. These data are presented in **Appendix J – PWD Wadeable Stream Benthic Macroinvertebrate and Physical Habitat Assessments**. In spring 2020, PWD sampled 9 USGS gages, 6 sites in the targeted Darby-Cobbs Watershed, and 10 randomly chosen sites.

Habitat Suitability Index (HSI)

In addition to habitat assessments, Habitat Suitability Index (HSI) models, developed by the U.S. Fish and Wildlife Service (USFWS), have been incorporated into the monitoring program. Based on empirical data and supported by years of research and comprehensive review of scientific literature, these models present numerical relationships between various habitat parameters and biological resources, particularly gamefish species and species of special environmental concern. To date, HSI have applied to Darby-Cobbs, Tookany/Tacony-Frankford, Wissahickon, and Pennypack Creek Watersheds. The Poquessing Creek Watershed CCR approach attempted to simplify the application of fish habitat suitability analysis to generalized guilds.

Fluvial Geomorphologic (FGM) / Infrastructure Analysis

Fluvial Geomorphologic (FGM) studies establish the physical attributes of the stream, identify areas of concern, and provide recommendations for rehabilitation of the stream corridors and floodplains. To date, FGM analysis has been conducted on the Darby-Cobbs, Tookany/Tacony-Frankford, Wissahickon, Pennypack, and Poquessing Creeks. Analysis was conducted in order to characterize channel morphology, disturbance, stability, and habitat parameters as well as to provide a template for hydrologic and hydraulic modeling and serve as a baseline for assessing channel bank and bed changes. Data provided from the FGM analyses will also serve to develop reach rankings within each watershed in order to prioritize restoration strategies.

Summary of Monitoring Locations

Biological, physical and chemical monitoring locations are based on 3 criteria: 1) appropriate habitat heterogeneity; 2) access availability; and 3) proximity to USGS stream gaging stations and PADEP 305b monitoring sites. In general, the number of monitoring sites is proportional to the size of the drainage and the watershed’s link magnitude (i.e., number of 1st order streams). Maps of assessment sites by watershed and program (biological, chemical, or physical) are available as GIS data.

Quality Assurance/Quality Control (QA/QC) and Data Evaluation

PWD has planned and carried out an extensive sampling and monitoring program to characterize conditions in Philadelphia’s watersheds. Sampling and monitoring follow the Standard Operating Protocols (SOPs) and Quality Manual as maintained by PWD’s Bureau of Laboratory Services (BLS). These documents cover the elements of quality assurance, including field and laboratory procedures, chain of custody, holding times, collection of blanks and duplicates, and health and safety.

They are intended to help the program achieve a level of quality assurance and control that is acceptable to regulatory agencies. More information regarding Standard Operating Procedures (SOPs) for chemical and biological assessments is available from BLS.

c. Inventory of Point and Non-Point sources

At the end of FY20, there are 107 NPDES permitted dischargers in Philadelphia County, as shown in **Appendix K – NPDES Industrial Stormwater Permitted Sites – Philadelphia County**. This listing was downloaded from the PADEP Environment Facility Compliance Tracking System (eFACTS). The eFACTS website can be accessed through the following link: http://www.ahs.dep.pa.gov/eFACTSWeb/default.aspx.

PWD is also actively involved in developing estimates of non-point source pollutants. The results of this analysis are described in the hydrologic models in **Section G - Assessment of Controls** on page 39.

d. Preliminary problem assessment

CCRs were completed for the Wissahickon (2007), Pennypack (2009) and the Poquessing (2010) Creek Watersheds. These reports include analysis of data collected over the monitoring period and present a characterization of problems within the watershed. The reports for each watershed are available to the public through the internet at the following address: http://water.phila.gov/reporting/watershed-plans-reports/.

Step 2. Watershed Plan Development: Permit issuance through end of Year 5

For information on the status of the Act 167 plans, please refer to the CSO Annual Report **Table III.C.1-2 - Planning by Watershed** on page 38 for more information.

Step 3. Watershed Plan Implementation and Performance Monitoring: Permit issuance through expiration

a. Dry Weather Water Quality and Aesthetics

Operate the Defective Lateral Program

Over the last fiscal year, PWD has continued to successfully operate its Defective Lateral Program. A detailed discussion of this program is provided within this report **in Section F.3 - Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal** on page 19.

Debris removal from waterways impacted by storm water discharges

PWD continues to employ the Waterways Restoration Team (WRT) to remove debris and conduct small scale stream restoration projects within the City's waterways. Please refer the CSO Annual Report **Section II.F – NMC 6 - Control of Solid and Floatable Materials in CSOs** on page 13 for information about debris removal from waterways impacted by storm water discharges.

Lincoln Drive sewer relining

PWD completed the Lincoln Drive sewer relining in 2004. Additional information on this project was reported in previous reports; please refer to Section F.2.3.a.iii on page 261 of the FY10 CSO-Stormwater Annual Report.

Stormwater Outfall Dry Weather Inspections

The City maintains an outfall inspection program in compliance with the MS4 permit. Each of the 434 of the City's permitted MS4 outfalls are scheduled to be inspected by the Industrial Waste and Backflow Control (IWBC) unit at least once each 5 year permit cycle. Those with dry weather flow are sampled for fecal coliform and fluoride analysis. The results of these samples are reported on a quarterly basis to DEP and summarized in this annual report. Those outfalls identified as priority outfalls under the MS4 permit are inspected quarterly. The required 433 stormwater outfalls are on track to be inspected by August 2020 in compliance with the EPA AOCC CWA-03-2017-0146DN.

During FY20, 46 outfall inspections were conducted, and 39 samples were taken due to observed dry weather flow as part of the Priority Outfall inspection program. During FY20, 98 outfall inspections were conducted, and 62 samples were taken due to observed dry weather flow as part of the Permit inspection program.

The full details of program accomplishments for FY2020 can be found in **Appendix M – FY2020 Defective Lateral Connection Quarterly Status Reports.**

Table 3.a -1: Stormwater Outfall Inspection Program – 5 Year Summary

	Permit Inspection Program		Priority Outfall Program	
Fiscal Year	Inspections	Samples	Inspections	Samples
2016	118	54	43	37
2017	171	91	44	37
2018	117	57	41	37
2019	123	70	40	36
2020	96	62	46	39
Total	**625**	**334**	**214**	**186**

Defective Lateral Program - Priority Outfalls

Outfalls are prioritized for investigative work by the Defective Connections Group (DCG) using the Stormwater Outfall Priority Score list.

7th & Cheltenham Avenue Outfall (T-088-01)

As of June 30, 2020, DCG program activities have performed 2,831 complete tests in this sewershed, identifying 134 cross-connections, all of which have been abated.

The locations of dry weather diversion devices, and the number of inspections, blockages, and discharges found by the Flow Control unit during FY20 are listed below.

Table F.2-6: 7th & Cheltenham Ave – Diversion Devices - FY20 Summary

Location	ID #	Inspections	Blockages	Discharges
Plymouth St. west of Pittsville St.	CFD-01	38	1	0
Pittsville St. south of Plymouth St.	CFD-02	41	1	0
Elston St. east of Bouvier St.	CFD-03	34	1	0
Ashley St. west of Bouvier St.	CFD-04	26	0	0
Cheltenham Ave. east of 19th St.	CFD-05	24	0	0
Verbena St. south of Cheltenham Ave.	CFD-06	28	0	0
Cheltenham Ave. east of 7th St.	CFD-07	85	8	0
7th St. south of Cheltenham Ave.	CFD-08	82	1	0

Inspections and fecal coliform sampling at this outfall continue quarterly. Results for the outfall samples during FY20 are listed below.

Table F.2--7: 7th & Cheltenham Ave - Fecal Coliform Results – FY20 Summary

Date	Fecal Count (MPN per 100 ml)
07/22/2019	11199
11/04/2019	1565
02/21/2020	>2420
05/14/2020	7701

Monastery Avenue Outfall (W-060-01)

As of June 30, 2020, DCG program activities have performed 632 complete tests in this sewershed, identifying 17 cross-connections, with 16 abated and only 1 abatement awaiting completion.

The locations of dry weather diversion devices and the number of inspections, blockages, and discharges found by the Flow Control unit during FY20 are listed below.

Table F.2-8: Monastery Ave - Diversion Devices - FY20 Summary

Location	ID#	Inspections	Blockages	Discharges
Jannette St. west of Monastery Ave.	MFD-01	21	1	0
Green La. North of Lawnton St.	MFD-02	22	0	0

Inspections and fecal coliform sampling at this outfall continue quarterly. Results for the outfall samples during FY2020 are listed below.

Table F.2-9: Monastery Ave - Fecal Coliform Results – FY20 Summary

Date	Fecal Count (MPN per 100 ml)
07/22/2019	980
11/04/2019	109
01/28/2020	236
05/14/2020	122

Monoshone Creek Outfalls (W-068-05)
Additional areas of focus: W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04

As of June 30, 2020, DCG program activities have performed 2,750 complete tests in these sewershed areas, identifying 94 cross-connections, all of which have been abated. The majority of the efforts have been in the W-068-05 sewershed area which is by far the largest in terms of drainage area and properties served.

Inspections and fecal coliform sampling at the W-068-05 outfall continue quarterly. Results for the outfall samples during FY20 are listed below.

Table F.2-10: Monoshone Creek (W-068-05 Outfall) - Fecal Coliform Results – FY20 Summary

Date	Fecal Count (MPN per 100 ml)
07/22/2019	8164
11/04/2019	24196
1/28/2020	17329
05/14/2020	9804

Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)
As of June 30, 2020, DLC program activities have performed 2,479 complete tests in these sewershed areas, identifying 62 cross-connections, all of which have been abated. The majority of the efforts have been in the S-059-04 sewershed area.

Inspections and fecal coliform sampling at the following outfalls continue quarterly. Results for the outfall samples during FY20 are listed below.

Table F.2-11: Manayunk Canal - Fecal Coliform Results – FY20 Summary

Outfall	Fecal Count (MPN per 100 mL)			
	07/02/2019	*10/07/2019*	*01/02/2020*	*05/15/2020*
S-058-01	>24196	537	214.3	520
S-059-01	>24196	1259	2419.3	2430
S-059-02	>24196	>24196	2419.3	19863
S-059-03	1119.9	>24196	64880	86640
S-059-04	360.9	2282	1119.9	72700
S-059-05	920.8	1187	727	2180
S-059-07	NF*	NF*	NF*	NF*
S-059-09	>2419.6	>24196	2419.6	5760

Note: * NF indicates that no flow was observed

Defective Lateral Program - Other Important Outfalls

Outfalls are prioritized for investigative work by the Defective Connections Group (DCG) using the Stormwater Outfall Priority Score list.

Sandyford Run Outfall (P-090-02)

As of June 30, 2020, DCG program activities have performed 5,836 complete tests in this sewershed, identifying 87 cross-connections, all of which have been abated. The location of the dry weather diversion device and the number of inspections, blockages, and discharges found by the Flow Control unit during FY20 are listed below.

Table F.2-12: Sandyford Run - Diversion Device - FY20 Summary

Location	ID#	Inspections	Blockages	Discharges
Brous and Lexington Aves.	PFD-01	84	4	0

Table F.2-13: Sandyford Run – Diversion Device - Fecal Coliform Results – FY20 Summary

Date	Fecal Count (MPN per 100 ml)
07/22/2019	143.9
11/04/2019	133.4
1/29/2020	14.4
05/14/2020	<1

Franklin and Hasbrook Outfall (T-089-04)

As of June 30, 2020, DCG program activities have performed 1,021 complete tests in this sewershed, identifying 46 cross-connections, all of which have been abated. The location of the dry weather diversion device and the number of inspections, blockages, and discharges found by the Flow Control unit during FY20 are listed below.

Table F.2-14: Franklin and Hasbrook - Diversion Device - FY20 Summary

Location	ID#	Inspections	Blockages	Discharges
Franklin and Hasbrook	CFD-01	88	2	2

The Outfall was inspected throughout the year but was found to be clean and dry during all quarterly visits.

Please refer to **Section F.3 - Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal** on page 19 for additional information on activities conducted for the Defective Lateral Program.

Priority Outfall Closure Testing

Investigation will continue within each particular outfall area (sewershed) until the Priority outfall status may be closed. During FY20, none of the Priority outfalls were authorized to be removed from the list by PADEP.

Healthy Living Resources

Develop integrated storm water management plans

PWD developed integrated stormwater management plans for all of the City's watersheds. Please refer to the CSO Annual Report in **Section III.C.3.7 - Basin-Specific Stormwater Management Plans (ACT 167)** on page 47 for an explanation of the City's watersheds stormwater management plans.

Assess the benefits of implementing a Natural Stream Channel Design (NSCD) and effectiveness of the NSCD restoration approach

PWD has conducted several projects that have been designed with Natural Stream Channel Design concepts in mind. As each of PWD's NSCD projects are constructed, PWD realizes the importance of the extensive monitoring and O&M that accompanies such projects. Each project provides the opportunity to learn about what techniques do and do not work in their respective hydrologic and hydraulic regimes. In order to assess the effectiveness of these NSCD projects, PWD conducts post implementation monitoring at each site that includes the measurement of relevant biological, habitat, and physical parameters to be used in comparison to pre-construction conditions.

Wet Weather Water Quality and Quantity

Implement several BMP projects

PWD and its partners have implemented many BMP projects throughout the City including GSI, stream restoration, and wetland creation projects. For a complete listing of both completed and current GSI projects in the CSS, please refer to the **Appendix A - Green City, Clean Waters FY20 Annual Report**. For a description of activities conducted for PWD's stream restoration, and wetland creation projects, please refer to the CSO Annual Report **Sections III.C.2.3 Stream Habitat Restoration** on page 41 and **III.C.2.4 Wetland Enhancement and Construction** starting on page 47.

Monitor three demonstration BMPs

PWD is committed to ensuring stormwater BMPs owned and operated by the City are maintained. This commitment is often evaluated through monitoring of these sites. PWD is currently monitoring multiple stormwater BMP project types – for example, stormwater tree trenches, stormwater planters, and porous pavement – and continue to develop and improve monitoring protocols. Monitoring activities for PWD's green stormwater infrastructure projects during FY20 are documented within **Appendix A: Green City, Clean Waters FY20 Annual Report Section-Appendix 4: GSI Monitoring Status Report**. PWD has detailed activities conducted during FY20 for PWD's stream restoration, and wetland creation; please refer to the CSO Annual Report **Sections III.C.2.3 Stream Habitat Restoration** on page 41 and **III.C.2.4 Wetland Enhancement and Construction** starting on page 47.

F.3 Detection, Investigation, and Abatement of Illicit Connection and Improper Disposal

a. Prevention of Illicit Discharges

Sewer and Lateral Inspections

The City requires plumbing permits for connections to the municipal sewer system. The permit affords the property owner an inspection of the plumbing work performed. Corrections of defective connections are confirmed to ensure that the ultimate discharge to the receiving waters does not contain sanitary waste. Philadelphia Water reviewed 1653 new sewer connections between 5" and 6" and 167 proposed sewer connections 8" and larger during FY20. This numbers includes all connections (storm, sanitary and /or combined sewers). A single project or permit may also have one connection or multiple connections.

b. Investigation of Illicit Discharge Sources

Rank the MS4 outfalls according to their priority for corrective actions

PWD maintains a stormwater outfall monitoring system in compliance with the MS4 permit issued by the PADEP. Samples are collected for outfalls that have dry weather flow and analyzed for fecal coliform and fluoride. Priority outfalls have been established through the 1998 Stormwater Consent Order and Agreement and internally, additional areas of focus have been added to maintain progress in the screening, testing and abating program and for efficient crew deployment. Priority Outfalls are sampled on a quarterly basis. Refer to page 15 of this report for FY20 priority outfall summaries.

Investigate dry weather flow to identify sewer lateral defects

During FY20, the DCG performed 1,568 complete dye tests with 120 defective connections found and 65 abatements completed. Details of FY20 activities are listed below.

Table F.3-1: Defective Connections Program – FY20 Summary

Quarter	CY2019-3	CY2019-4	CY2020-1	CY2020-2	Total
Date Coverage	Jul1-Sep30	Oct1-Dec31	Jan1-Mar31	Apr1-Jun30	**FY2020**
Completed Tests	246	136	27	6	415
No Cross Connections	190	123	22	5	340
Cross Connection Identified	56	13	5	1	75
Abatements *	9	15	25	21	70

Note: *Some cross connections abated may have been identified in prior fiscal years

Reports of potential dry weather discharge from the stormwater system are also investigated, primarily through the IWBC and/or Sewer Maintenance units. During FY20, 23 incidents were investigated. For details, refer to **Appendix P – Sanitary Infiltration Events for Potential Sewage Discharges** during FY20.

The DCG Field Investigation SOP was updated in March 2017. A copy is available upon request.

d. Abatements

Written notice about sewer lateral defects

The Plumbing Repair Programs unit handles customer communications (through letters, telephone or site visits) and is responsible for the abatement of the defects identified.

Abatements of Cross Connections

70 abatements were completed during FY20. Details of abatement types and costs are listed below.

Table F.3-2 Defective Connection Abatement – 5 Year Summary

Fiscal Year	# Cross Connections Abated		Total Cost of Abatements
	Residential	Commercial	
2016	32	7	$247,514.90
2017	31	5	$317,851.00
2018	56	7	$562,747.33
2019	57	4	$555,933.30
2020	69	1	$701,210.00
Total	245	24	$2,385,256.53

Residential Properties Cross Connections Abatement

During FY20, 69 residential abatements were completed at a cost of $692,043.00.

Commercial and Industrial Properties Cross Connections Abatement

During FY20, 1 commercial abatement was completed at a cost of $9,167.00.

Defective Connections Abatement Schedule

All defective connections are required to be abated within 120 days of discovery, in compliance with the MS4 permit. Please view **Appendix P – FY20 Defective Lateral Quarterly Reports** for properties that exceeded the 120-day requirement in FY20. These properties are under administrative action.

Defective Connections Abatement Confirmation Tests

All abatements completed during FY20 were tested to confirm that the abatement was completed properly.

e. Defective Connection Program Reporting

Illicit connection program quarterly report

Defective Lateral Quarterly Reports are submitted four times a year to Andrew Sinclair at PADEP as part of the reporting requirements of the City of Philadelphia NPDES Storm Water Management Permit No. PA 0054712. The report covers three-month periods staring in January, April, July, and October which are submitted no later than 45 days from the end of the reporting period. The Quarterly reports were submitted as required during FY20, and **Appendix P – FY20 Defective Lateral Quarterly Reports** contains all of these reports.

Illicit connection program quarterly report contents

The report content within the illicit connection program quarterly reports has not changed in FY20.

F.4 Monitor and Control Pollutants from Industrial Sources

a. Applications/Permits

The City obtains NPDES permits/discharge information from industries if they contribute significant amounts of stormwater into the City's sewer system. Industries that contribute stormwater directly into a waterway or discharge non-industrial waste into the system usually coordinate directly with the PADEP. A list of NPDES permits that involve stormwater associated with industrial activities in the City were obtained from the PADEP's website and are listed in **Appendix K – NPDES Industrial Stormwater Permitted Sites**.

b. Inspections

Industrial inspections

The Philadelphia Local Emergency Planning Committee (PLEPC) is the entity tasked with meeting the responsibilities of SARA Title III. Under PLEPC, the Philadelphia Fire Department (PFD) Hazmat Administrative Unit (HMAU) representative is the individual that carries out the inspections. HMAU personnel inspect SARA facilities to ensure that information submitted in their Tier II report is accurate. The inspection includes a visual on-site inspection, verifying the facility has a Preparedness, Prevention, and Contingency (PPC) plan and reviewing any other information contained within the Tier II report.

As part of the 2017 EPA AOCC CWA-03-2017-0146DN, the City submitted a signed Memorandum of Understanding (MOU) to EPA on February 22, 2018 that formalized the coordination between the PFD and PWD to verify stormwater inspections at SARA Title III Tier II facilities located in the MS4. As part of the MS4 permit requirement, the City is required to inspect all SARA Title III facilities located in the MS4 each fiscal year. In FY20, the City conducted a stormwater inspection at all 179 SARA Title III facilities located in the MS4.

Industrial waste inspection forms

The Industrial Waste Inspection Form was updated in 2006 to include a stormwater inspection section. A copy of the form can be found in previous reports; please refer to Appendix O of the CSO-Stormwater FY09 Annual Report.

c. Monitoring/Enforcement

Industrial DMR submission

When necessary, the City shall request DMRs or additional sampling from the PADEP for surrounding industries to ensure compliance with NPDES effluent limitations.

NPDES permits enforcement

Should PWD personnel observe a violation of NPDES permit terms and conditions, PWD will report the violation immediately and notify PADEP, on a case by case basis.

F.5 Monitor and Control Stormwater from Construction Activities

Stormwater runoff is a concern both during construction and post-construction. Integrated in the City's development review process, PWD is provided the authority to review and regulate the runoff from earth disturbance activities to improve water quality. Additionally, post-construction stormwater management plan review extends beyond peak rate control and encompasses water quality and water quantity technical requirements for more frequent storm events. Efforts continue to be focused on improving plan review for both Erosion & Sedimentation (E&S) as well as post-construction stormwater management. The following sections document the progress made so far in terms of stormwater runoff from construction activities including the collaboration between the Philadelphia development community, multiple City Departments, and State agencies.

During FY20, PWD performed numerous tasks in direct compliance with the NPDES Permit as well as tasks supporting continuance and improvement of a growing stormwater management program and watershed program. Some of the FY20 activities include the following:

- Continued coordination efforts with Philadelphia Licenses and Inspections (L&I) regarding permit review and issuance for private development projects applicable to the Stormwater Regulations. At a minimum, the L&I issuance of a Zoning, Demolition, Foundation, and Building permit was coordinated appropriately between the two agencies. L&I supports PWD in enforcement measures through the issuance of Stop Work Orders and withholding Certificate of Occupancy permits for sites that are non-compliant. In addition, L&I recently launched an electronic commercial licensing, inspection, and permitting services enterprise software (eCLIPSE) allowing applicants to obtain zoning and building permits online. PWD serves as a reviewing entity in eCLIPSE by providing remote pre-requisite signoff on applicable permits, thus reducing the need for applicants to visit the PWD office for in-person permit signoff.
- Continued coordination with the PADEP Southeast Regional Office Waterways and Wetlands program through regular project communication and quarterly meetings with PADEP and southeast region conservation district staff. The purpose of the quarterly meetings is to discuss regional and district updates, permitting services and projects, and other various topics. PWD also participated in pre-application and project meetings with PADEP staff and applicants to discuss upcoming projects and active projects.
- Scheduled and held coordination meetings with local universities and other large landowners to discuss upcoming or current development projects as well as identify ways to strengthen communication and streamline the review process. Additionally, projects in enforcement are discussed and guidance is provided to bring projects back into compliance.
- Continued to implement erosion and sediment (E&S) compliance as an element of all active construction inspections by ensuring appropriate controls are in place throughout construction activity. Potential E&S issues or violations are documented as part of an inspection report provided to the on-site representative. The reports identify the required corrective actions, and active construction inspectors will return to the site to verify compliance. E&S violations may trigger active construction enforcement actions such as a Stop Work Order, requiring continued coordination through L&I.
- Continued to update plan review website content in an effort to provide clear and accessible resources to the applicant to support quality submittals and efficient reviews. In Fall 2019, PWD launched a revamped website that included an updated landing page as well as new content and features such as online plan submission for all review stages, a new Maintenance section and SMP Maintenance Guide.
- Continued to review projects applying for Philadelphia's Green Roof Density Bonus, which was incorporated into the Zoning Code in 2015. This bonus offers exceptions to certain residential density rules for development projects that include a green roof. In calendar year 2018, the bonus was expanded to allow eligibility for existing buildings undergoing renovation or expansion. The green roof must meet PWD's requirements and be approved by PWD before the bonus can be awarded. In FY20, PWD approved 36 projects citywide as eligible to apply for this bonus.
- Continued to attend bi-monthly Business Industry Association (BIA) meetings for the Government Affairs/Fix It Philly subcommittee. In these meetings, representatives from the

development community including developers, architects, and engineers come together with City agency representatives from Water, L&I, Planning, and Streets to discuss policy and legislation impacting development in Philadelphia to ensure a transparent and efficient development process.

- Continued to hold Development Services Committee (DSC) meetings with representatives from the development community including developers, designers, large landowners, and attorneys to discuss ideas for improving the PWD stormwater regulatory review and inspections program to better streamline development in the City. In FY20, the DSC served as an important voice as the Department gathered feedback about potential short and long term changes to the stormwater billing credit structure. The committee continues to be a valuable resource for PWD to gather input on existing procedures as well as new policies and programs.
- PWD continued to conduct reviews of stormwater management plans, hold weekly walk-in hours for applicants and maintain the website to allow online submittal of plans.

A summary of plan review activities city-wide in FY20 is presented in **Table F.5-1** on page 25.

a. Construction Site Runoff Control

PWD reviews and approves E&S Plans, along with Post-Construction Stormwater Management Plans, for all development sites disturbing more than 15,000 square feet of earth citywide. For E&S plans, PWD follows policies and practices as provided within the PADEP E&S Control Manual. PWD conducts coordinated reviews with the PADEP for projects disturbing more than one acre of earth.

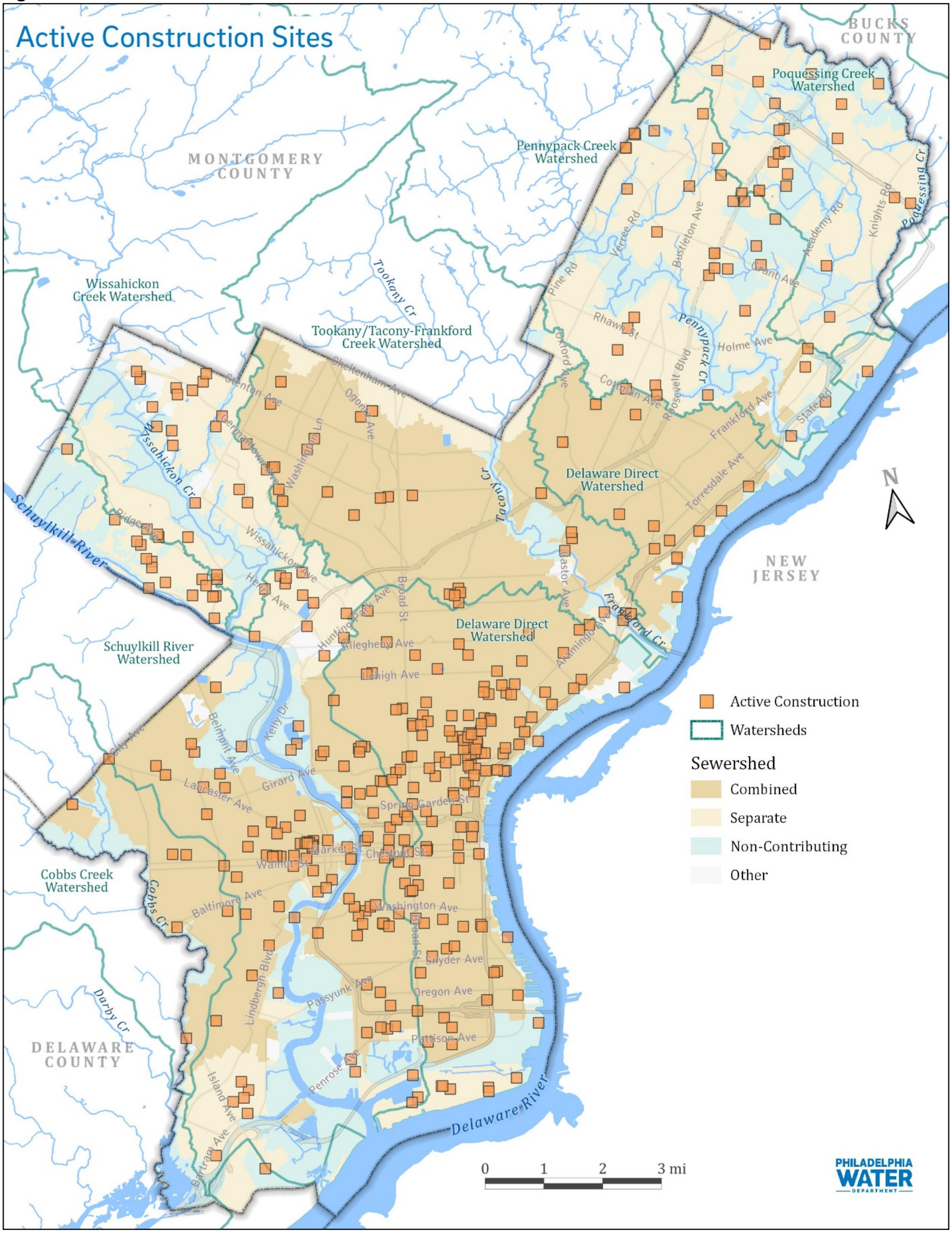
Site inspections of E&S controls are conducted on a reoccurring basis and in response to any received complaints during active construction. The purpose of reoccurring inspections is to monitor E&S controls on projects where construction and earth moving activities are active, and to require site operators to maintain E&S controls as needed. PWD inspects controls such as, but not limited to, rock construction entrances, silt fencing, inlet protection, stockpile location and protection, and concrete washouts. During an inspection, the inspector communicates with the construction manager or site representative and requests to see a copy of the on-site E&S Plan. Photographs are taken documenting site conditions. An inspection report detailing any out-of-compliance items is generated and distributed to the site manager, and then maintained as part of PWD’s electronic project file. Failure to adhere to the requirements in the inspection reports can result in a Notice of Violation or a Stop Work Order. For more information regarding enforcement actions, see **Section F.5.e** on page 29.

The sites visited cover all of Philadelphia including both separate storm sewer areas and combined sewer areas as depicted in **Figure F.5-1** on page 26.

Table F.5-1: FY20 Summary of Plan Review Activities

	Jul. '19	*Aug. '19*	*Sep. '19*	*Quarter Total*	*Oct. '19*	*Nov. '19*	*Dec. '19*	*Quarter Total*	*Jan. '20*	*Feb. '20*	*Mar. '20*	*Quarter Total*	*Apr. '20*	*May '20*	*Jun. '20*	*Quarter Total*	*FY 20 Total*
Conceptual Review Stage																	
Approvals	16	19	15	50	11	9	13	33	16	11	15	42	8	4	18	30	155
Rejections	71	74	76	221	70	76	85	231	57	70	62	189	35	56	58	149	790
Reviews	87	93	91	271	81	85	98	264	73	81	77	231	43	60	76	179	945
New Project Submittals	35	34	34	103	38	32	31	101	24	40	34	98	28	36	35	99	401
Average Review Time (days)	4.5	4.0	3.5	4.0	4.8	5.0	3.9	4.6	3.3	3.4	4.4	3.7	20.9	15.9	15.9	17.6	7.5
Post Construction Stormwater Management Plan Review Stage																	
Administrative Screenings	15	22	22	59	23	12	15	50	15	12	23	50	1	1	0	2	161
Technical Approvals Issued	11	11	10	32	10	11	7	28	7	13	7	27	7	6	12	25	112
Rejections	31	38	33	102	38	39	38	115	29	37	30	96	33	37	37	107	420
Full Technical Reviews	62	70	57	189	63	67	63	193	46	66	50	162	54	59	63	176	720
New Project Submittals Received	27	23	22	72	39	20	25	84	28	26	30	84	14	19	22	55	295
Average Number of Reviews per Approval	3.7	4.4	3.2	3.8	3.7	3.6	4.7	4.0	3.6	4.2	4.9	4.2	4.3	4.0	4.3	4.2	4.1
Average Approval Time (days)	104	153	111	122	187	96	208	164	143	157	141	147	333	168	191	231	166
Acres of Earth Disturbance Approved	59.3	41.2	18.6	119.1	46.4	13.3	39.9	99.6	22.4	83.9	42.1	148.5	141.6	25.3	25.5	192.5	559.7
Acres of Green Roofs Approved	0.8	0.8	1.5	3.1	0.4	0.4	0.0	0.8	0.8	0.7	1.4	2.9	0.0	0.3	0.2	0.6	7.5
Acres of Porous Pavement Approved	0.9	0.5	0.3	1.7	0.0	0.8	0.0	0.9	0.2	1.5	0.1	1.8	0.2	0.1	0.0	0.3	4.6
PADEP Reviews																	
New Coordinated Reviews	5	6	7	18	3	2	7	12	15	9	12	36	4	5	2	11	77
Erosion and Sedimentation Plan Review																	
Defer to PADEP	0	1	0	1	1	1	3	5	0	0	1	1	0	0	0	0	7
Approved	6	12	10	28	6	10	10	26	7	5	6	18	4	6	6	16	88
Rejected	14	16	9	39	13	11	16	40	8	13	13	34	13	14	18	45	158
Not Applicable	17	11	8	36	28	10	13	51	20	17	16	53	6	8	14	28	168
Total Inspections																	
New Sites Inspected	24	28	42	94	57	26	29	112	37	21	24	82	13	52	180	245	533
Total Inspections	509	521	545	1575	575	435	389	1399	522	421	359	1302	149	435	340	924	5200
Active Construction Inspections at Project Sites with MS4 Sewers	139	156	158	453	171	122	120	413	141	118	102	361	22	120	129	271	1498
Post Construction Inspections at Project Sites with MS4 Sewers	3	8	6	17	10	4	0	14	4	0	2	6	0	1	2	3	40
Total Inspections at Project Sites with MS4 Sewers	142	164	164	470	181	126	120	427	145	118	104	367	22	121	131	274	1538
Active Construction Inspections at Project Sites with Combined Sewers	306	297	294	897	308	251	227	786	307	259	214	780	123	275	176	574	3037
Post Construction Inspections at Project Sites with Combined Sewers	17	14	27	58	33	20	9	62	18	9	5	32	0	2	0	2	154
Total Inspections at Project Sites with Combined Sewers	323	311	321	955	341	271	236	848	325	268	219	812	123	277	176	576	3191

Figure F.5-1: FY20 Active Construction Sites



b. Post-Construction Stormwater Management in New Development and Redevelopment

Adopted in January 2006, the Philadelphia Stormwater Regulations enabled PWD to review plans for both new and redevelopment sites throughout the City to ensure water quality and quantity were part of the proposed management plan. Since 2006, PWD has collected and synthesized feedback from the development community regarding improvements to the stormwater plan review program. With the signing of a Consent Order and Agreement with the PADEP in June 2011, PWD saw an opportunity to increase stormwater management from land development projects while simultaneously implementing business-friendly improvements to the program. Updates are made to the Stormwater Regulations to improve and strengthen PWD's stormwater programs and stay current in policy procedures. The Philadelphia Stormwater Management Regulations are available online at http://www.phila.gov/water/PDF/PWDregCH6.pdf.

c. Applications/Permits

Across the entire city during FY20, 401 unique projects were submitted to PWD for conceptual review through the program's website. PWD approved full technical plans for 112 projects during FY20 citywide. It should be noted that this number does not include plans re-submitted for review, some of them multiple times. The distribution of development projects that submitted post-construction stormwater management plans for review is presented in **Table F.5-2 & 3**.

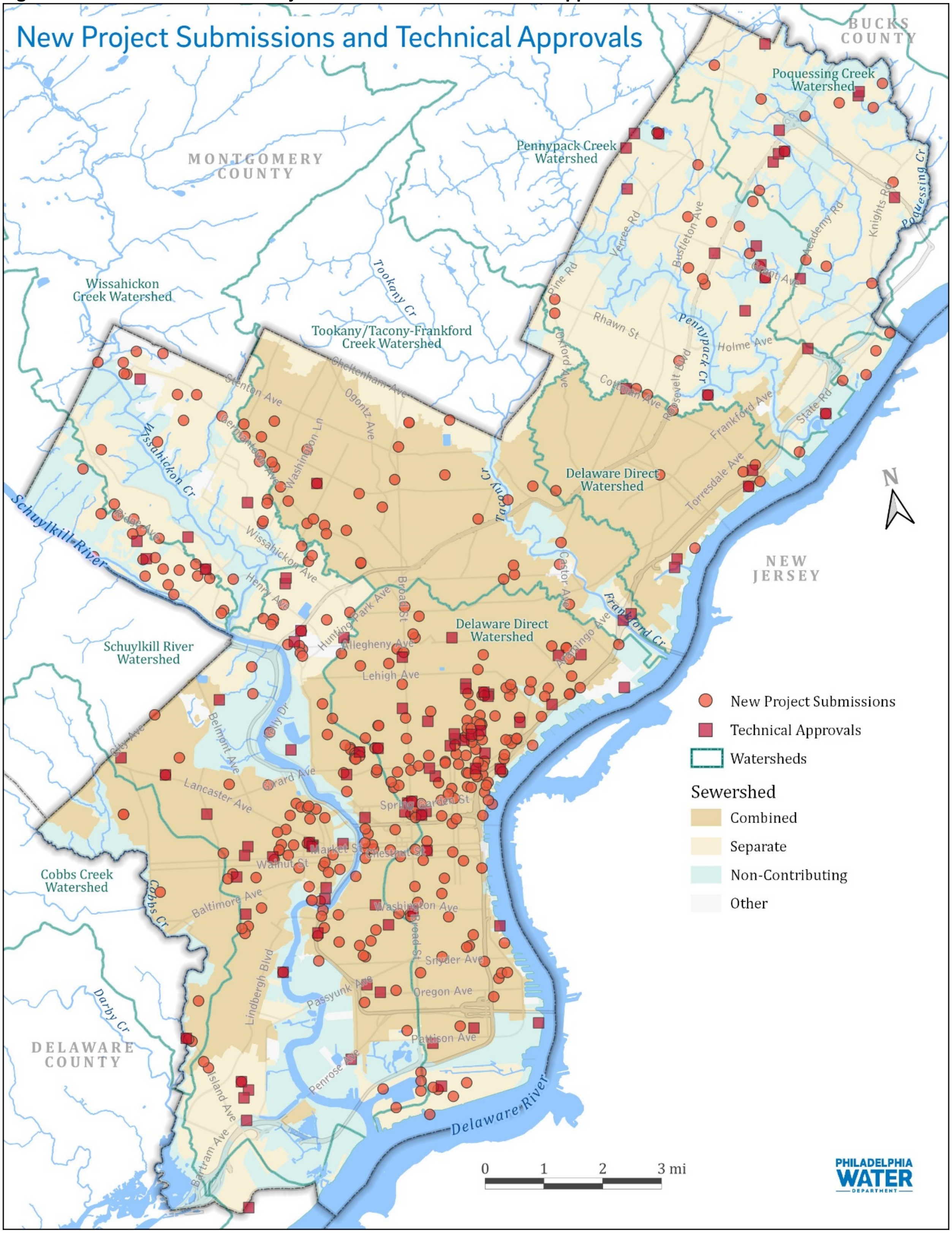
Table F.5-2: Approved Stormwater Plan Location Summary by Contributing Area

Drainage Type	Number of Locations
Combined Sewer Area	61
Non-Contributing Area	15
Separate Sewer Area	36
Total	**112**

Table F.5-3: Approved Stormwater Plan Location Summary by Watershed

Drainage Watershed	Number of Locations
Delaware River	45
Poquessing Creek	9
Pennypack Creek	12
Schuylkill River	39
Tacony/Frankford Creek	3
Wissahickon Creek	3
Darby-Cobbs Creek	1
Total	**112**

Figure F.5-2: Locations of New Project Submissions and Technical Approvals



d. Inspections

PWD requires a pre-construction meeting prior to commencement of earth moving activities for projects applicable to post-construction stormwater management requirements. In FY20, PWD conducted 116 pre-construction meetings citywide for development projects. During the pre-construction meeting, both the approved E&S Control Plan and the approved Post-Construction Stormwater Management Plan (PCSMP) are discussed with the construction manager and property owner representative. Post-Construction Stormwater Management inspections are discussed in **Section F.8** on page 32.

The inspection program continued in FY20 by conducting inspections of stormwater structural controls on land development sites. PWD stormwater inspectors conducted site visits for 410 active sites citywide during FY20. Technical plan review staff was also on-site, as needed, to verify construction of the SMPs was completed in accordance with the approved plan. In the case that concerns are identified regarding SMP installation during construction, the technical plan reviewer will discuss the necessary corrective actions for the project with the PWD inspector, as well as the project's engineering and construction manager.

PWD stormwater inspectors observe the installation of SMPs and erosion and sedimentation controls during active construction for private development sites. During FY20, PWD was able to maintain its presence in the field by conducting 1,498 active construction inspections on 108 sites in the separate sewered areas of the city. Many sites were visited multiple times to ensure compliance with appropriate requirements **(Table F.5-4)**.

Table F.5-4: Active Construction Inspection Site Location Summary

Drainage Watershed	Number of Locations
Combined Sewer Area	263
Non-Contributing Area	39
Separate Sewer Area	108
Total	**410**

e. Monitoring/Enforcement

As part of the 2017 EPA AOCC CWA-03-2017-0146DN, PWD was required to develop an SOP to detail enforcement procedures for responding to E&S control issues when established enforcement methods do not result in compliance. In FY20, PWD continued to use the Repeat Offenders Standard Operation Procedure (SOP) as a guide when implementing enforcement action.

The SOP outlines Notice of Violations which includes a deadline for compliance and re-inspection. If a project remains out of compliance, PWD may coordinate with the L&I to issue a Stop Work Order. PWD also coordinates with L&I to hold the building Certificate of Occupancy for any projects where major issues are identified during the construction process. In some cases, projects may fall out of compliance after enforcement actions were previously taken during the construction period.

PWD issues a Notice of Violation to sites when significant or persistent issues with E&S controls or the installation of required SMPs are not addressed in a timely manner. In FY20, PWD issued a total of 11 Notice of Violations (NOVs) to projects under construction citywide. None of these NOVs were associated with projects who had received a previous NOV in FY19. In addition, PWD issued a follow-up NOV notice to 10 of the 11 projects in order to ensure full compliance. Of the 11 active NOVs issued in FY20, 10 have been partially or fully resolved bringing the site back into compliance. An additional 5

NOVs issued in FY19 were resolved in FY20. The major compliance issues for active construction projects include improper installation or absence of E&S controls, contractor not following the onsite E&S Plan, and non-permitted construction activity.

f. NPDES Permit Requests

PWD continues to serve as the Conservation District for the City of Philadelphia for NPDES Construction Permitting Requirements and Chapter 102 Regulations relating to Erosion and Sedimentation Pollution Control. PWD continues to receive notifications and coordinate reviews for permitting. For more information and full details on this process described in previous reports; please refer to Section F.5.f NPDES Permit Requests on page 204 of the CSO-Stormwater FY12 Annual Report.

g. Stormwater BMP Handbook and Construction Site BMP Sediment & Erosion Control Checklist

The Stormwater Management Guidance Manual Version 3.0 represents a comprehensive revision released in conjunction with the updated Stormwater Regulations on July 1, 2015. On July 2, 2018 the Stormwater Management Guidance Manual Version 3.1 was released. Primarily a web-based resource, this version of the manual is organized to reflect the life cycle of a development project from initial submission through operation and maintenance. In addition to providing context on the regulatory framework for stormwater management in the city, the manual builds upon over a decade of program growth and technological advancements to streamline the technical design requirements and clearly document the plan review process for applicants. The PWD leveraged feedback from design engineers to clarify existing content, provide new resources and develop a fully searchable and accessible online manual. The manual is located on the web at https://www.pwdplanreview.org/manual/introduction.

F.6 Watershed, Combined Sewer Overflow (CSO), and Source Water Protection Programs

PWD, through the Planning and Environmental Services Division (PESD), strives to reduce the amount of point and non-point discharges entering regional waterways and improve the environmental health of the region so that all waters are fishable and swimmable. The main programs within PESD, in addition to the Stormwater Management Program, that work together to improve regional ecological health, water quality, and sustainability are: Delaware Valley Early Warning System (EWS), CSO Management Program, Watershed Planning, Source Water Protection Program, and Wetlands Mitigation Registry. The Watershed Planning Program is presently explained in detail throughout **Section III.C of the CSO Annual Report** on page 35

Source Water Protection Program

PWD's Source Water Protection Program embodies PWD's multi-barrier approach to ensuring the safety and quality of Philadelphia's drinking water, whose sources consist of the Schuylkill and Delaware Rivers. The Source Water Protection Program staff work closely with PWD water treatment plant operators to anticipate and respond to emergencies and challenges to conventional treatment technology. PWD continues to implement the Source Water Protection Program and has discussed it in full detail in the past. For more information on this program, please refer to the following sections:

- Schuylkill Action Network
  Please refer the CSO Annual Report **Section II.G.2 – Schuylkill Action Network** on page 20 for information about this topic.
- Delaware Valley Early Warning System
  Please refer the CSO Annual Report **Section II.G.2 – Delaware Valley Early Warning System** on page 22 for information about this topic.
- RiverCast
  Please refer the CSO Annual Report **Section II.G.2 – RiverCast** on page 19 information about RiverCast.

Combined Sewer Overflow Management Program

The Combined Sewer Overflow management program works to implement technically viable, cost effective improvements and operational changes that mitigate the impacts of combined sewer overflows. Please refer to **Section I Management and Control of CSOs** on page 1 in the CSO Annual Report for additional information.

Watershed Mitigation Registry

Please refer to the CSO Annual Report **Section III.C.2.4 – Wetland Enhancement and Construction** on page 47 for information about the Watershed Mitigation Registry.

F.7 Miscellaneous Programs and Activities

a. Pollutant Migration/Infiltration to the MS4 System

PWD responds to all notifications and reported complaints of liquid, solid, or gaseous pollutants within Philadelphia. A list of all pollutant migration events in the MS4 section of the City that occurred in FY20 is presented in **Appendix O – FY20 Pollutant Migration/Infiltration**.

b. Public Education and Awareness

Public Education Literature

The City takes an active role in providing information and education to the public and our community. Several events and programs are conducted each year in which the City provides numerous amounts of literature to the public. Please refer to the CSO Annual Report **Section II.G – Pollution Prevention** on page 19 for information about this topic.

c. Pesticides, Herbicides, and Fertilizer Controls

Integrated Pest Management protocol

The majority of the City does not use pesticides or conduct any practices that require the use of the Integrated Pest Management (IPM) protocol. The City is currently focusing on invasive plant management through the use of herbicide to remove invasive plants.

The Philadelphia Health Department uses larvicides, Bacillus Sphaericus (brand name Vectolex), Methoprene (Altosid), and Spinosad (Natular), to prevent mosquito breeding. These larvicides are approved for use in the stormwater catch basins and are applied as such. The IPM protocol is followed when using the larvicides by inspecting the catch basins before treatments, using the least toxic or non-toxic product, and submitting a request for repairs when necessary. PWD and the Department of Public Health work closely together. This collaboration has resulted in the Health Department receiving maps with locations of the City's storm water inlets and surface basins. This allows PWD improved access to refer concerns of pests in the water collections systems for treatment by Health Department staff.

All associated Philadelphia Health Department staff are certified pest control applicators in accordance with Pennsylvania Department of Agriculture. To maintain this certification, on-going training is required. The Philadelphia Health Department holds several on-site trainings per year for staff.

Education materials to private pesticide users

The Philadelphia Health Department provides educational materials to organizations, companies and/or individuals upon request. Often private exterminators, especially companies that handle pest control work for City facilities, request this information since most buildings in the City contract out for pest control work through the individual Departments. Health Department Sanitarians (Inspectors) have this information available to provide to the public.

d. Snow Management Plan

The City faces winter storms that bring potentially dangerous accumulations of ice, sleet, freezing rain, and snow. To mitigate the impact of these storms, the Streets Department has prepared a Snow and Ice Operations Plan which provides a detailed outline of the City's response to adverse winter weather conditions. The plan includes the salt storage locations at the six Highway Districts. Page 40 of the Plan describes the Streets Department salting policy. The updated Snow and Ice Removal Operations Plan for winter 2019-2020 is provided **in Appendix M - City of Philadelphia Snow and Ice Operations Plan Winter 2019-2020.**

e. Municipal/Hazardous Waste, Storage, Treatment, and Processing Facilities

The City's one waste transfer station, Northwest Transfer Station, is located at Domino Lane and Umbria Street. During FY20, the City was in the design phase for a new waste facility to replace the one currently on the site. The design includes stormwater management best practices such as oil/water separators in the trench drains near the waste compactor and rain gardens to manage stormwater runoff on site. The City is conducting soil delineation testing and groundwater sampling which may inform the stormwater management practice final design.

F.8 Best Management Practices (BMPs)

a. Submit storm sewer discharge ordinance

The authority for PWD to adopt stormwater regulations is found within Title 14 Zoning and Planning Code under §14-704(3) Stormwater Management. PWD maintains Stormwater Regulations as Chapter 6 of PWD's regulations. These regulations were originally adopted in 2006 and were most recently updated in July of 2015. These regulations require stormwater management on development projects that exceed an earth disturbance threshold of 15,000 square feet. For more information regarding PWD's regulation updates within the last year, see **Section F.5.b. – Post-Construction Stormwater Management in New Development and Redevelopment** on page 27.

PWD has added documentation to a website (http://www.pwdplanreview.org) to provide the development community a means of accessing the most recent stormwater management information.

b. Commercial and Residential Source Controls

b.i. Mingo Creek Surge Basin

A capital construction project for the rehabilitation of Mingo Creek is currently in design. The project is targeting FY2022 for bid. The Basin was last dewatered in August of 2012 to inspect the sediment levels. The basin sediment appeared to have not changed since its last inspection in 2009; therefore, no further accumulation had occurred. For more information on this project, please refer to Section F.8.b.i on page 214 of the CSO-Stormwater FY 2012 Annual Report.

b.ii. Existing privately owned structural controls

To ensure ongoing SMP maintenance of private facilities, PWD continues to utilize three means: executing Operation & Maintenance Agreements, maintaining comprehensive operations and maintenance information, and conducting post-construction maintenance inspections.

An Operation & Maintenance Agreement is executed by PWD and the property owner, notarized, and recorded to the property prior to the issuance of a Post-Construction Stormwater Management Plan Approval by PWD. These agreements outline the SMP(s) on the private site and stipulate maintenance requirements. The agreements also include language granting PWD the right to inspect on-site SMPs and even perform maintenance on behalf of the property owner if necessary. PWD also maintains a comprehensive operations and maintenance manual for SMPs geared toward private development users: http://www.phila.gov/water/PDF/Retrofit-O.M.Manual.pdf.

Post-construction maintenance inspections of private facilities were conducted through the reporting period. PWD utilizes both specialized inspection techniques as well as visual inspections to assess the performance of private SMPs. Early in the post-construction inspection stage, PWD conducts a Maintenance Site Visit for recently constructed projects. This visit gives PWD staff the opportunity to communicate expectations for SMP maintenance to the appropriate property owner and walk the site to review the stormwater management strategy. In addition, PWD conducts post-construction maintenance inspections on all applicable private facilities. As projects are identified for maintenance inspection, the PWD post-construction inspection staff contacts the property owner to schedule the inspection. PWD attempts to conduct the inspection with the property owner or their maintenance representative present so they can verbally discuss any concerns or questions. After the inspection, a post-construction inspection report is generated and shared back with the property owner. Any required corrective actions are identified in the report along with a deadline for resolution. After actions are taken, PWD re-inspects the property and compliant sites are closed until their next periodic inspection date. Inspectors will provide guidance to the property owner to ensure corrective actions are resolved. In addition to visual inspections, PWD has identified other effective methods and technologies, including closed-circuit television, ground penetrating radar, surveys of critical system elevation points, confined space, pole-mounted camera photography, and visual and wet weather inspections. PWD will continue to evaluate and refine post-construction inspection protocols. In FY20, PWD performed 203 post-construction inspections citywide.

If compliance is not achieved within the timeframe specified during the inspection process, the project is referred to enforcement. PWD has implemented a database tracking system within the existing PWD Stormwater Tracking Database, which allows for the tracking of enforcement case and corrective action statuses and submissions of corrective action plans and other documentation of work completed to satisfy corrective actions. PWD initiates an enforcement case with the issuance of a post-construction enforcement letter to the property owner if an SMP is found to be insufficiently maintained. This notification includes a description of any issues identified with corrective actions noted and a timeline for achieving compliance. The City is authorized to compel maintenance of SMPs on private property under the Philadelphia Code and PWD Regulations. Development sites that are subject to PWD's stormwater regulations are required to maintain the SMP(s) to function as designed. If this initial notification is unsuccessful at bringing action from the property owner, PWD can compel compliance through a number of enforcement tools, including issuance of notice of violations, fines, court action, and/or a nuisance abatement and lien by the City. For non-compliant projects, PWD will also suspend any applicable stormwater billing credits if the required maintenance is not performed. FY20, PWD successfully brought 98 projects consisting of 258 SMPs back into compliance citywide. Of the enforcement cases closed, escalated enforcement tools were utilized consisting of four NOVs of which one proceeded to fines. PWD will continue to work with property owners to ensure that SMPs are inspected and maintained in accordance with Regulations and recorded O&M agreements.

c. Development plans review

PWD and the City Planning Commission provide review of drainage plans for new and redevelopment. The drainage plans address both flood control and potential stormwater pollutants under the authority of the Philadelphia Code. Please refer to **Section F.5 – Monitor and Control Stormwater from Construction Activities** on page 22 for additional information.

d. Street Cleaning Program

During FY20, the Streets Department continued its street cleaning programs that target street debris and litter. With its fleet of mechanical sweepers, the Streets Department provides daily street cleaning in Center City and on major arteries and commercial corridors throughout the city. Since FY14 the Streets Department has initiated monthly street sweeping operations on routes along the Tookany/ Tacony Frankford, Wissahickon, Cobbs Creek and Pennypack watersheds within the city.

In addition, the Center City District (CCD) and University City District (UCD) conduct sidewalk cleaning. Heavily-trafficked commercial streets and areas receive daily sweeping with pans and brooms and mechanical cleaning. Other areas with a high density are cleaned at least twice weekly with machines (some areas are cleaned daily). Sidewalks also get a monthly power washing, except in winter, to remove accumulated stains, gum and grime. In FY20 17,831 miles of streets were mechanically cleaned. Through a variety of fee-for-service arrangements, CCD crews clean several adjacent commercial and residential areas and provide a 24-hour deployment to clean the three and a half mile long underground subway concourse and Center City's two regional rail stations.

Public awareness of litter

The City promotes, develops, and implements litter reduction programs in an effort to increase public awareness of litter as a source of stormwater pollution. There are about 500 solar-powered, compaction litter receptacles in Center City, and another 460 in other commercial districts throughout the city. Over 600 standard wire baskets are also in place through the Philadelphia More Beautiful Committee (PMBC) Adopt-A-Basket program, which provides block captains with wire waste baskets to distribute and manage across city neighborhoods. PMBC also organizes neighborhood cleaning events citywide. Such cleaning efforts are bolstered every April by the Philly Spring Cleaning day, a citywide anti-litter event partnering various city agencies and neighborhood community groups, which is an annual event. This year's event was cancelled due to the COVID 19 pandemic. These efforts are bolstered by Philadelphia's

SWEEP program. SWEEP officers, employees of the Streets Department, work with residential communities to address locations with problematic amounts of litter and short dumping. In cases of non-compliance, SWEEP officers will issue warnings and citations to the appropriate individuals.

e. Animal Waste and Code Enforcement

Educational material regarding control of animal waste

The Philadelphia Code and Charter Chapter 10.100 – Animals and Chapter 10.700 – Refuse and Littering address the proper clean-up of pet waste and applicable fines and penalties. In addition, signs advertising said penalties are displayed city-wide in an effort to prevent residents from violating this statute. The City of Philadelphia also provides the text of this code online at http://municipalcodes.lexisnexis.com/codes/philadelphia/.

PWD provides additional information on pet waste to the public including how it affects stormwater and why to pick it up through its website located at the following site: http://water.phila.gov/drops/dog-waste/

Dog Waste Control Program

PWD launched an innovative approach to address dog waste in targeted neighborhoods in July of 2010. Through a pilot project in the Delaware Watershed, the Partnership for the Delaware Estuary found that many dog-owners are unaware of the connection of dog waste to water pollution. Building on almost of decade of experience, PWD redeveloped the dog waste program in FY18 to more broadly appeal to dog owners across the City. The new program will expand outreach into community dog parks, City-owned parks and various events hosted by organizations across the city. More information can be found at the following website: http://www.delawareestuary.org/manage-dog-waste/.

f. Flood Management and Flood Control Devices

Structures built within the floodplain

All development within the Special Flood Hazard Area (SFHA), which is identified on FEMA's Flood Information Rate Maps (FIRM's), is reviewed and approved per the City's codes and regulations found in both Zoning and Building codes. L&I will identify all City parcels within the SFHA, and upon an application submission will determine whether the floodplain codes apply. If the development site itself is determined to be within the SFHA, structures built will be designed to an elevation of Base Flood Elevation (BFE) plus a safety factor of at least 18 inches. The L&I will maintain records of compliance for all development located with the SFHA. Licenses and Inspections issued 941 permits in total, that includes separate building, MEP, and alteration permits. Approximately 200 separate building permits were submitted for individual structures in FY20.

Evaluate new and existing structural drainage controls

Our evaluation of structural drainage controls was discussed in further detail **in Section F.8.b.ii - Existing privately owned structural controls** on page 33 of this report.

Work is being done on sections of the city that have chronic flooding to eliminate or reduce these occurrences; please refer to CSO Annual Report **Section II.B.3 – Flood Relief Project Summary** on page 3 for more information about the SFR projects and details on evaluating structural drainage controls.

Streambank Restoration and Wetland Enhancement
Please refer to the CSO Annual Report **Section III.C.2.3 – Stream Habitat Restoration** on page 41 for information pertaining to streambank restoration.

Please refer to the CSO Annual Report **Section III.C.2.4 – Wetland Enhancement and Construction** on page 43 for information pertaining to wetland enhancement.

g. Sanitary Infiltration Controls

Limit sanitary infiltration
As part of the Cross-Connection Repair Program, PWD has conducted 1,614 abatements to correct cross connection in sewer laterals since 1994; 72 abatements were completed in FY20 alone. PWD also has in place twelve (12) dry weather diversion devices which divert sanitary flow back into the sanitary sewer but still allow stormwater to pass through during wet weather events. PWD estimates that these abatements and dry weather diversion devices have prevented over 226.5 million gallons of contaminated flow from entering our waterways since the inception of the program and about 10.1 million gallons during FY20. Please refer to **Section F.3 – Detection, investigation and abatement of Illicit Discharges** on page 19 for more information on the Cross-Connection Repair Program.

In addition, as part of PWD's Sewer Maintenance Program, sewer lining is routinely conducted on both sanitary and storm sewers. Lining sewers helps to reinforce, seal, and rehabilitate the existing sewers, specifically preventing infiltration to allow the pipe capacity to be reserved for sanitary and storm flow. Apart from those being done under consent orders, there are several sewer lining projects in the City that originate from sewer maintenance issues like street cave-ins, depressions, backups, as well as sewer assessment meetings.

As a part of PWD's commitment to improvement of water quality and aesthetics in dry weather, large sewer lining projects began on the entire length of intercepting sewers along the Tookany/Tacony-Frankford and Cobbs Creeks. Please refer to **Appendix A Green City, Clean Waters FY20 Annual Report Section 1.1 Interceptor Rehabilitation Program** on page 1 for more information on the interceptor relining project.

Construction of a storage tank upstream of relief sewer manhole R-20, located at Main Street and Shurs Lane, to capture and store excess flows was completed during November of 2013. The consent order requirement for sewer linings to be done around regulator R-20 in an effort to reduce inflow and infiltration has been completed. Please refer to CSO Annual Report **Section III.B.1– Construction and Implementation of the Main and Shurs Off-line Storage Project** on page 34 for more information on the Main and Shurs Off-line Storage Project and efforts to reduce inflow and infiltration at R-20.

PWD constructed a parallel relief sewer in December of 2011 to eliminate overflows at manhole PC-30 as per a consent order issued by the DEP. The overflows at PC-30 were caused by a combination of various factors which influence the hydraulic carrying capacity of the Poquessing Creek Interceptor during wet weather events. In FY20, PWD continued to monitor the effectiveness of this relief sewer. There were also several sewer lining projects done under the consent order for PC- 30 area in conjunction with the relief sewer being constructed. Please refer to CSO Annual Report **Section III.B.2. – PC-30 Relief Sewer** on page 34 for more information on the PC-30 Relief Sewer.

Investigate, remediate, and report sanitary infiltration

PWD responds to all citizen complaints of liquid, solid, or gaseous pollutants within Philadelphia. A database called the Sewage Pollution Incident & Location Log (SPILL), which stores information about unintentional sanitary discharges including the date reported, problem location, spill type, description, and abatement date, is maintained. Detailed information on the events found on the SPILL database of reported sewage pollution incidents in FY20 are found within in **Appendix P – FY20 Sanitary Infiltration Events**. The following locations have been identified by the Department as locations suffering from chronic discharges of sanitary sewage to the storm sewer system and/or waterways. A description of the specific site issues and the current status of remediation efforts is provided for each location:

Holme and Longford Avenue (MH P100-14-S0015)

During FY20, PWD experienced 2 discharges of sanitary sewage to the nearby Pennypack Creek tributary due to an accumulation of material constricting the flow and causing surcharged conditions. Additionally, discharges had been observed during the previous two fiscal years. This location is particularly difficult to inspect, maintain and repair due to excessive depth of the pipe below grade. The Department has increased inspection frequencies to prevent future discharges. In addition, during FY20, a full manhole inspection was conducted. From the results of the inspection the trough at the bottom of the manhole had several repairs completed to improve conveyance. There have been no issues at this site following those repairs.

Navy Yard Force Main Discharges

During FY20, the Department continued to respond to SSOs in the Navy Yard caused by extreme corrosion of the ductile iron force mains serving Pump Stations P648 and P603. Force main deterioration issues have been ongoing for several years at these locations and have triggered a rehabilitation project. The project consists of replacing cast iron force mains with HDPE and all internal station piping, pumps and fittings with stainless steel to help resist corrosion. During FY20, construction was completed at pump station 64. Construction has begun at P603 for replacement of pumps, internal piping, and fitting. The Department anticipates construction will be completed during FY21. A new project will be initiated in FY21 to replace P603's cast iron force main with HDPE.

Cresheim Valley Drive (CV-0145)

The PWD has identified a hydraulic overload along a 1,000-foot section of separate sanitary sewer in the Cresheim Valley. A hydraulic model analysis has revealed a portion of this system is hydraulically limited during wet weather events with a 1-year return interval. Pursuant to Chapter 94 reporting requirements, the PWD notified the DEP of this restriction and submitted a Corrective Action Plan (CAP) as a component of its Chapter 94 Report for the 2019 calendar year. PWD continues to work to work to resolve this issue under the framework of its CAP.

On-lot septic/disposal system

During FY20, zero complaints of malfunctioning on-lot sewage disposal systems were investigated and serviced. Also, during FY20, 18 applications were reviewed for the installation of on-lot sewage disposal systems. Of those applications, 13 permits were approved. In addition, 879 portable toilet permits were issued. PWD continues to support the inspection and remediation of these systems.

h. Spill Prevention and Response

The City's response plan to respond to and contain harmful spills that may discharge to the municipal separate storm sewer system is managed by the Office of Emergency Management. The City of

Philadelphia Emergency Operations Plan – Annex F Hazardous Materials and PWD – Waterways Contamination Response Protocol, can be found in the Additional Documents folder on the **digital download link**.

In order to protect PWD's structures and treatment processes, PWD staff respond to oil and chemical spills and other incidents that have the potential to threaten the water supply or impact the sewer system, twenty-four hours per day, seven days per week. PWD responds to all incidents that can impact the sewer system or endanger PWD employees. This includes both the sanitary sewer system and the storm sewer system. PWD supervises cleanup activities and assesses environmental impact. PWD inspectors also investigate various other types of complaints. In FY20, 202 pollution migration events occurred. A list of all pollutant migration events in the MS4 section of the City that occurred in FY20 is presented in **Appendix O – Pollutant Migration/Infiltration**.

i. Public Reporting of Illicit Discharges, Improper Disposal

The City encourages residents to report the occurrence of illicit discharges that may impact the sewer system and water bodies. To facilitate the timely reporting of such events, PWD operates a Municipal Dispatcher 24 Hours/Day, 7 Days/Week to handle reports from the public. In addition, a customer service hotline (215 686-6300) is also operated that provides the ability to connect to the Dispatcher. This information is distributed in mailings, as well as online at http://www.phila.gov/water/contact_us.html.

Upon the reporting of such an incident, a PWD inspector is immediately dispatched to the site to investigate and determine the source of the discharge, as well as the extent of impact on the receiving water body. Each incident is logged into an electronic database that enables tracking of the details of each occurrence.

PWD received 380,137 phone calls which led to 18,186 service requests being conducted during FY20. Currently PWD does not track phone calls specifically related to illicit discharges and improper disposals in the MS4 area, but instead tracks much broader topics including sewage backup, flooding, street cave-ins and water service disruptions.

Philly 311

Philly311 was created to help eliminate the need to sort through the numerous phone numbers and hotlines available to contact the City government. A customer service specialist will connect the user to the information and services they may need either by calling 3-1-1, asking a question on the website or through Twitter @philly311. A Philly 311 mobile app is available for iPhone, Android, or Blackberry devices to report issues such as graffiti, potholes, litter and more. For more information on uses of Philly311, please visit: http://www.phila.gov/311/. During FY20, Philly 311 transferred 1,588 non-emergency inlet and hydrant requests to Customer Service Call Center.

j. Used Oil and Toxic Material Disposal

The City continues to facilitate the proper disposal of used oil and other toxic materials. This program includes collections events, distribution of educational materials, the operation of a website, and a hotline accessible to the public. For more information on the hazardous waste program please visit: http://www.philadelphiastreets.com/hazardous-waste.

k. Storm Water Inlet Labeling/Stenciling

In September 2015, PWD released a refreshed storm drain marking program. This new iteration features watershed specific storm drain markers. Each of the seven new markers prominently features a unique color scheme and an animal native to that respective watershed. Educational materials provided with each kit better inform the public about how their actions on the street can reduce stormwater runoff pollution. In 2020, PWD launched an updated version of a web-based storm drain marking app. This new app will allow participants to more accurately mark inlets on their blocks and public spaces. Inlets are color coded by watershed allowing participants to view the often hidden natural watershed boundaries of our city. The direct capture of information via the app will also allow PWD to more accurately track the placement of markers throughout the city. The app can be accessed here: https://markingapp.philadelphiawater.org/.

During FY20 PWD saw a decrease in storm drain marking activity due to poor weather and the COVID-19 pandemic. The Department distributed 41 storm drain marking kits, totaling 611 individual stormwater inlet labels. PWD continues to encourage community organizations and citizens to get involved in storm drain marking projects. More information on this program has been provided in previous years; please refer to Section F.8.k on page 312 of the CSO-MS4FY10 Annual Report.

Section G Assessment of Controls

Annually estimate pollutant loadings & reductions from stormwater management plan

PWD selected a set of effective post-construction stormwater management controls to address problems identified in the waterways and documented these controls in the Stormwater Management Guidance Manual. Philadelphia's stormwater management regulation obligates all development and redevelopment projects subject to these regulations to implement the identified controls. The requirements of the stormwater regulations were developed through the Act 167 planning process in coordination with neighboring counties. The requirements are explained in detail in Section 1.2.1 of the Stormwater Management Guidance Manual and summarized below.

Water Quality

The Water Quality requirement focuses on the removal of both runoff volume and pollutants and is similar to requirements in surrounding states and other major cities across the country. Because flow rates and velocities were identified as significant causes of aquatic ecosystem impairment, infiltration is emphasized as the preferred water quality management practice unless evidence is provided that it is infeasible on a particular site. Additional water quality benefits are provided, in part, by slowing water down and allowing suspended solids and associated pollutants to settle.

The Water Quality requirement stipulates infiltration of the first 1.5 inches of runoff from all directly connected impervious area (DCIA) within the limits of earth disturbance. The initial 2006 regulations required 1.0 inch of runoff to be managed, based on water budget analyses and precedents for control of the 90th percentile event set by Maryland and other nearby states with similar climates. This requirement has been increased in 2015 to 1.5 inches based on evidence provided by simulations showing that this level of control will further reduce the volume and flow rate of runoff to waterways.

Channel Protection

Erosion of stream beds and banks caused by high volumes and velocities of urban runoff was identified as a significant contributing factor to aquatic ecosystem impairment in Philadelphia's stream systems. For this reason, a channel protection requirement was incorporated in the stormwater regulations. This requirement is based on the concept of effective channel forming discharge and is similar to precedents set by Maryland and other nearby states with similar climates and geology.

The Channel Protection requirement stipulates the detention and release of runoff from the one-year, 24-hour Natural Resources Conservation Service Type II design storm event for all DCIA within the limits of earth disturbance at a maximum rate of 0.24 cfs per acre of directly connected impervious drainage area in no more than 72 hours.

Flood Control

Act 167 Plans identified peak rates of runoff as a contributing factor to out-of-bank flooding events in Philadelphia and surrounding counties. To address peak rate control, geographically specific requirements were incorporated in Philadelphia's stormwater regulations and manual.

The Flood Control requirement stipulates that a development project meet or reduce peak rates of runoff, as determined by its Flood Management District, from predevelopment to post-development conditions during certain storm events.

There are approximately 20.7 square miles of impervious area in the portion of the City that falls under the MS4 permit. Since July 2010, approximately 1.32 square miles (842 acres) of directly connected impervious area are tributary to completed or approved green stormwater infrastructure. This is approximately 6.4% of the impervious area.

Section H Fiscal Resources

Maintain adequate program funding

During FY20, the City provided fiscal resources needed to support operation and maintenance of the Stormwater Management Program. The budget for the upcoming FY21 budget is available upon request.

Annually submit fiscal analysis

The conditions of the NPDES permit can be achieved through appropriate budget planning supporting the projects and assessments critical to a successful program. Any funding changes will be included as part of subsequent annual reports.

APPENDIX A

Green City, Clean Waters

FY 2020 Annual Report

Ninth Annual Report for the City of Philadelphia's Consent Order and Agreement on Green City, Clean Waters

Reporting period July 1, 2019 – June 30, 2020

Submitted to
The Commonwealth of Pennsylvania
Department of Environmental Protection
And
The United States Environmental Protection Agency

By the City of Philadelphia Water Department
September 30, 2020

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Glossary of Acronyms

AOCC	Administrative Order for Compliance on Consent
BMP	Best Management Practice
BOD	Biological Oxygen Demand
City	City of Philadelphia
CMP	Comprehensive Monitoring Plan
COA	Consent Order and Agreement
CSO	Combined Sewer Overflow
GA	Greened Acre
GARP	Greened Acre Retrofit Program
GIS	Geographic Information Systems
GSI	Green Stormwater Infrastructure
LTCPU	Long Term Control Plan Update
NPDES	National Pollutant Discharge Elimination System
PADEP	Pennsylvania Department of Environmental Protection
PCSMP	Post Construction Stormwater Management Plan
PennDOT	Pennsylvania Department of Transportation
PIDC	Philadelphia Industrial Development Corporation
PPR	Philadelphia Parks and Recreation
PSWMR	Philadelphia Stormwater Management Regulations
PWD	Philadelphia Water Department
SDP	School District of Philadelphia
SMIP	Stormwater Management Incentive Program
SMP	Stormwater Management Practice
SRT	Simulated Runoff Testing
US EPA	United States Environmental Protection Agency
WPCP	Water Pollution Control Plant
WQBEL	Water Quality-Based Effluent Limit

1.0 Introduction

The Consent Order and Agreement (COA) between the City of Philadelphia (City) and the Pennsylvania Department of Environmental Protection (PADEP), and the Administrative Order for Compliance on Consent (AOCC) between the City and the United States Environmental Protection Agency (US EPA), formalized the regulatory approval of the Green City, Clean Waters program and amended the 2009 CSO Long Term Control Plan Update (LTCPU). This is the ninth Annual Report submitted under the requirements of the COA. Fiscal Year 2020 (FY20) covers the City's Green City, Clean Waters implementation progress activities that occurred between July 1, 2019 and June 30, 2020.

The Philadelphia Water Department (PWD) submitted the Year 5 Evaluation and Adaptation Plan (EAP) on October 30, 2016 to PADEP. The EAP focused on the cumulation of the first target in Year 5 (2016) and can be found at http://water.phila.gov/pool/files/Year5_EAPBody_website.pdf.

1.1 Water Quality Based Effluent Limit Performance Standards

The Water Quality-Based Effluent Limits (WQBEL) performance standards are broken into incremental targets that must be achieved by the City every five years of the 25-year program. The following report includes water pollution control plant and collection system improvements, interceptor lining, and greened acre (GA) interim progress towards the Year 10 WQBEL targets. Volume reduction and mass capture are only reported every 5 years and will be included in the Year 10 EAP. **Table 1-1: Water Quality-Based Effluent Limits** displays the cumulative progress towards meeting the Year 5 WQBEL target and includes the upcoming Year 10 (2021) WQBEL target.

Table 1-1: Water Quality-Based Effluent Limits

Metric	Units	Base Line Value	Year 5 WQBEL Target	Cumulative Amount as of Year 5 (2016)	Year 10 WQBEL Target
NE WPCP Improvements	*Percent Complete*	0	See Section 3.1.1 in this report for status updates		Report progress in Year 10 EAP
SE WPCP Improvements	*Percent Complete*	0	See Section 3.1.2 in this report for status updates		
SW WPCP Improvements	*Percent Complete*	0	See Section 3.1.3 in this report for status updates		
Miles of Interceptor Lined	*Miles*	0	2	**7.5**	6
Overflow Reduction Volume	*Million Gallons Per Year*	0	600	**1,710**	2,044
Total GAs	*GAs*	0	744	**837.7**	2,148
Equivalent Mass Capture *(TSS)*	*Percent*	62%	Report value	**70.5%**	Report value
Equivalent Mass Capture *(BOD)*	*Percent*	62%	Report value	**88.9%**	Report value
Equivalent Mass Capture *(Fecal Coliform)*	*Percent*	62%	Report value	**72.0%**	Report value

1.2 Green City, Clean Waters Greened Acres

GA progress is achieved through three implementation approaches: Public Retrofits, (Re)Development Regulations, and Incentivized Retrofits. **Table 1-2: Cumulative Greened Acres** displays the cumulative program progress towards meeting the total GAs at the end of Year 9.

Table 1-2: Cumulative Greened Acres

Implementation Approach	Cumulative Number of Projects (FY11-FY20)	Cumulative GAs (FY11-FY20)
Public Retrofits	233	394
Private Development	431	624
Incentivized Retrofits	114	613
Total	**778**	**1631**

2.0 Implementation Tracking and Reporting

2.1 *Green City, Clean Waters* Program Tracking System

Currently the existing databases and systems track program implementation and support data requests for internal and external reporting. The development of the *Green City, Clean Waters* program tracking system will integrate this data from the existing Water Department systems to streamline the process.

During FY20, milestones were achieved in the development of the *Green City, Clean Waters* program tracking system. This year, continued User Acceptance Testing was completed on the system to ensure proper programmatic alignment for metric calculations along with the finalization of the Component Design Documents to memorialize dashboards, data visualizations and calculation of metrics. Enhancements to the system were completed to incorporate updated versions of a connecting database.

Table 2-1: FY20 Status Updates for Existing Databases and Systems

Existing Databases and Systems	Status
PlanIT	PWD's tracking system that stores information from site evaluations conducted on locations throughout Philadelphia. All sites must undergo an initial evaluation to determine the feasibility of green infrastructure before they can be transferred to CIPIT to begin design phase. In FY20, PWD upgraded its ArcGIS mapping software, base map, geocoding tools and geoprocessing services.
GreenIT	PWD's metrics tracking system for all public green stormwater infrastructure (GSI) projects. GreenIT tracks estimated, designed, built, and maintained compliance metrics. The GreenIT Data Entry Application is used to create metrics reports by consultants and staff that are directly uploaded to the GreenIT database. In FY20, PWD added tracking for inlet disconnection projects and provided clarifying updates to the definitions for SMP footprint, total vegetated, and total pervious field.
CIPIT	CIPIT is PWD's Capital Program Information Tracking System. In FY20, PWD improved construction tracking of GSI systems, adding tracking of important dates fields to support the hand-off between Construction and Operations.
Stormwater Plan Review Database	PWD's tracking system that stores metrics, including detailed stormwater management practice (SMP) data, related to private development project compliance with the Philadelphia Stormwater Regulations as well as voluntary stormwater management retrofit projects. The database is designed to track workflows related to reviews and inspections, including the status of conceptual and technical reviews, record drawing reviews, active and post-construction inspections, and post-construction enforcement case status.
Geographic Information System (GIS) Asset Tracking	GIS is used to track the location of all PWD assets. This includes public retrofit, private development and incentivized retrofit SMPs. In FY20, PWD continued work on adding geotechnical testing information to the GIS datasets. This effort is anticipated to go live in FY21.
Maintenance Management Systems	Inspection and maintenance activities for green stormwater infrastructure are track in PWD's Cityworks work order management system. This system is linked to the City's GIS data and provides tools to track and manage work performed on other PWD assets such as fire hydrants, inlets, water mains, and sewers.

2.2 Reporting Metrics

Green Stormwater Infrastructure through Public Implementation

The information in GreenIT is used to produce compliance reporting outputs for the completed and planned public project tables in Appendices 1 and 2 of this report. The Public Completed Projects reporting format and metric definitions are described in Table 1 and Table 2, respectively, in **Appendix 1**. The Public Planned Projects reporting format is described in Table 1 in **Appendix 2**.

Green Stormwater Infrastructure through Private Development

Information from the Stormwater Plan Review Database is used to produce reporting outputs for completed private redevelopment and incentives project tables in **Appendix 3**. The reporting format is described in Table 1 in **Appendix 3**.

Stormwater Management Types

SMP types used for public implementation are described in Table 3 of **Appendix 1** and SMP types used for private implementation are defined in Table 2 of **Appendix 3**.

3.0 Water Pollution Control Plant and Collection System Project Progress

3.1 Water Pollution Control Plant and Collection System Project Progress

Upgrades to increase the peak flow capacity at each of the City's Water Pollution Control Plants (WPCPs) were described in the Wet Weather Facility Plan, submitted on June 1, 2016. During FY20, PWD has continued working towards completing the projects committed to in the Wet Weather Facility Plan. Within the following sections, progress in FY20 on these projects is discussed. The Green City, Clean Waters Wet Weather Facility Plan can be referenced here: http://water.phila.gov/pool/Wet_Weather_Facility_Plan_website.pdf.

3.1.1 Northeast Water Pollution Control Plant

Within Table 3-1, the seven Northeast WPCP improvements committed to in the Wet Weather Facility Plan are listed with their required operation years, as approved by the PADEP. To date, five improvements have been completed and the remaining two improvements are on track for completion by the required operation date.

Table 3-1: Status of Northeast WPCP Improvements

Northeast WPCP Improvements	Required Operation	Project Status (FY20)
Facility Improvements		
Remove Double Deck Effluent Channel in Final Sedimentation Tanks Set 2	6/1/2016	Complete
New (4 x 48") conduits from Preliminary Treatment Building to Primary Sedimentation Tanks Set 1	6/1/2016	Complete
High Flow Management System	6/1/2021	Complete
Gravity Sludge Thickeners	6/1/2021	Complete
Preliminary Treatment Building #2	6/1/2031	In Design
New Influent Baffles in Primary Sedimentation Tanks Set	6/1/2031	In Design
Operational Improvements		
Operate with minimal sludge blanket when Gravity Sludge Thickeners in service	6/1/2021	Complete

3.1.2 Southeast Water Pollution Control Plant

All Southeast WPCP improvement commitments in the Wet Weather Facility Plan were completed in FY16, meeting the required operation date of June 1, 2016. For more detailed information, please see the *Green City, Clean Waters* Wet Weather Facility Plan or the Year 5 EAP.

3.1.3 Southwest Water Pollution Control Plant

Within **Table 3-2**, the Southwest WPCP improvement committed to in the Wet Weather Facility Plan is listed with its associated required operation year. The project has been completed prior to the required operation date.

Table 3-2: Status of Southwest WPCP Improvements

Southwest WPCP Improvements	Required Operation	Project Status (FY20)
Facility Improvements		
Additional Effluent Pump	6/1/2026	Complete

3.2 Philadelphia Collection System Improvements

Within **Table 3-3**, the three Collection System improvements committed to in the Wet Weather Facility Plan are listed with their required operation dates. Two of the improvements were completed, meeting the required deadlines. The other improvement identified is a study to evaluate CSO regulator capacities and identify improvements, if necessary. This study is ongoing and is anticipated to continue throughout the implementation of the LTCPU, as PWD is committed to maintaining and improving the efficiency of the collection system. For more Collection System improvements, please see the CSO Annual Report **Section II.B.4 – Fully Integrate the Real-Time Control Facility into the Operations of PWD** on page 5.

Table 3-3: Status of Collection System Improvements

Collection System Improvements	Required Operation	Project Status (FY20)
Improvements		
NE Second 66” Frankford Grit Chamber Bypass In Service	6/1/2016	Complete
NE Frankford High Level Second Barrel Rehabilitation	6/1/2016	Complete
All Districts: Balancing CSO Regulator Wet Weather Capacities	Study - Ongoing	On Track

3.3 Interceptor Relining

FY20 Progress on Miles of Interceptor Lined

The WQBEL Performance Standards requires 6 miles of interceptor lining completed by the end of Year 10 (2021). During FY20 the number of completed miles increased and the City is well ahead of the Year 10 target with 9.2 miles completed. Additionally, there are 2.6 miles in construction or in contract management, and 3.3 miles in design (**Table 3-4**).

Table 3-4: Interceptor Relining FY20 Status

Project Name	Street Extents	Length (Miles)
Construction Complete		**9.2**
60th and Cobbs Creek Parkway to 75th and Wheeler Sewer Lining	60th and Cobbs Creek Parkway to 75th and Wheeler	2.2
Cobbs Creek Park to 63rd and Market Sewer Lining	Cobbs Creek Park to 63rd and Market	0.5
Cobbs Creek Interceptor Phase 1 CIPP Lining	63rd and Market to 62nd and Baltimore	1.6
Tacony Creek Intercepting Sewer Lining Phase 1	Chew & Rising Sun to I & Ramona	1.9
Tacony Creek Intercepting Sewer Lining Phase 2	2nd St & 64th Ave to Chew & Rising Sun; DRW Mascher to Tacony Interceptor; Cheltenham Ave to Crescentville & Godfrey	1.3
Cobbs Creek Interceptor Lining Phase 3	City Avenue to D R/W in former 67th Street	1.7
In Construction		**1.6**
Cobbs Creek Intercepting Sewer Lining Phase 4 (Indian Creek Branch)	City Avenue to D R/W in former 67th Street	**1.6**
In Contract Management		**1.0**
Cobbs Creek Intercepting Sewer Lining Phase 2	61st and Baltimore to 60th and Warrington	1.0
In Design		**3.3**
Tacony Creek Intercepting Sewer Lining Phase 3	I & Ramona to O & Erie	1.0
Upper Frankford LL Collector/Tacony Intercepting Sewer Lining Phase 4	Castor & Wyoming to Frankford/Hunting Park	1.1
Upper Frankford Creek LL Collector/Tacony Intercepting Sewer Lining Phase 5	Frankford/Hunting Park to Luzerne & Richmond	1.2
Total Anticipated Miles of Interceptor Lined		**15.1**

4.0 Green Stormwater Infrastructure through Public Implementation

The programmatic strategies for achieving public GAs are benchmarked in four phases: planning, design, construction, and post-construction maintenance. The following four subsections describe the progress made during FY20 for each of these phases. **Table 4-1** summarizes Public GSI projects and GAs for FY20. **Figure 4.2** displays the Planned and Completed Public GSI projects.

Table 4-1: FY20 Summary of Public Green Stormwater Infrastructure

	End of FY20			Cumulative
Project Phase	**In Design**	**In Contract Development**	**In Construction**	**Completed**
Number of Projects	170	50	65	**233**
Current Number of GAs	TBD*	127	357	**394**

*Current number of GAs is subject to change as projects go through the design process

4.1 Planning Approaches for Green Stormwater Infrastructure Implementation

PWD has continued to evaluate entire neighborhoods and specific sites to identify appropriate locations to site GSI footprints. During FY20, PWD continued to streamline a planning district-based approach to develop a diverse set of project types that range from smaller green street SMPs to larger systems on parcels. PWD staff strategically prioritize and package these projects for the design phase. In FY20, PWD continued to refine planning strategies to ensure compliance with future implementation targets based on program type and implementation approach. Strategies included short-term and long-term policy recommendations for achieving maximum stormwater management. This past year progress was made on integrating GSI planning efforts with water and sewer projects. Planning also strengthened the direct feedback loop with maintenance to improve system siting and SMP type selection.

Planning Outreach and Coordination

PWD works closely with a variety of partners to implement the *Green City, Clean Waters* program throughout all stages of a project. During the planning phase, PWD continued to coordinate the siting of GSI footprints with city agency partners, community groups, and other stakeholders via regular communication and meetings. The Mayor's initiative, Rebuild Community Infrastructure (Rebuild), continued to push forward with implementation and PWD has coordinated closely with project users to incorporate stormwater management in Rebuild projects. PWD continues to maximize stormwater management on all types of GSI projects, beyond just PWD-led capital planning efforts. PWD provided recommendations for maximizing the amount of stormwater managed on private development sites that had potential to manage additional drainage or right of way (ROW) and recommended private properties with potential to manage large amounts of drainage areas to apply for stormwater retrofit grants.

4.2 Design Approaches

In FY20, PWD continued work on streamlining the design process through coordination and improvement of design guidance:

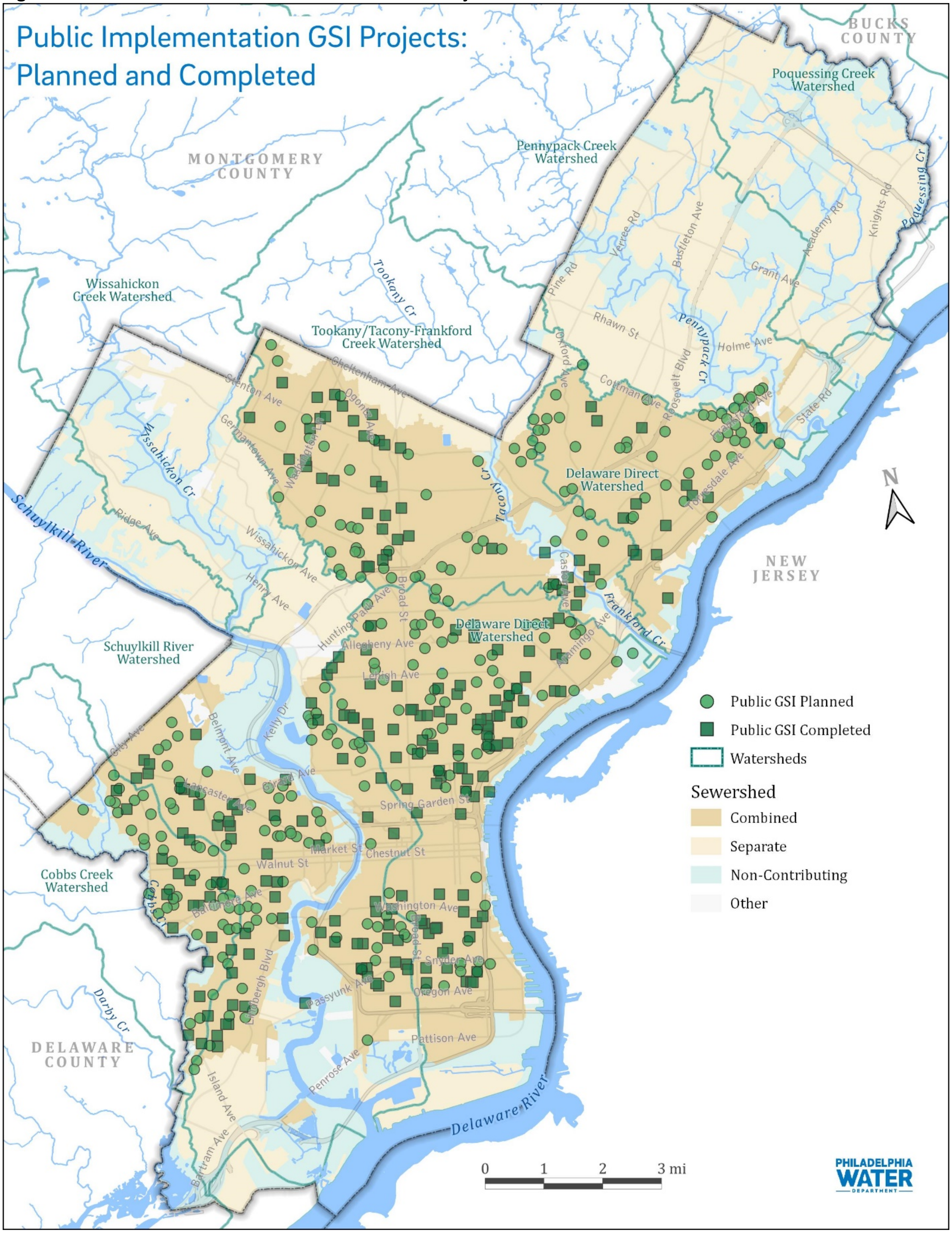
- Ongoing coordination meetings within PWD to facilitate project reviews and improve feedback.
- Worked on improving coordination within PWD through regular coordination and establishment of new and updated procedures for joint projects.
- Released version 4.0 of the GSI Landscape Design Guidebook.
- Continued research, construction improvement pilots, and modifications to design and construction guidance to improve performance of fully lined and partially lined systems.
- Updated offset guidance for working around existing utilities and other PWD infrastructure.
- Continued work to integrate capital improvements across various asset types.
- Created standard responses, factsheets, and internal workflow for instances where developers are working adjacent to existing PWD GSI.
- Ongoing updates to existing procedures, standards, and guidance building on feedback from operations, monitoring, partner agencies, and other PWD units. Includes development of guidance when working around abandoned sewer laterals, updates to bumpout design guidance, impermeable liner standards, and revisions to designer review practices.

4.3 Construction

In FY20, PWD continued work on streamlining and improving the construction process through staffing, guidance updates, and coordination:

- Refined annual updates to the GSI Master Specifications and Bid Item List/Engineering Estimate template.
- Began work for on-call contract for small GSI sites and right-of-way connections to incentivized retrofits. Once complete, the contract will increase the speed of system construction and retrofits and improve PWD's ability to work with partner agencies and private developers.
- Implementation of pilot protocol for construction performance and acceptance testing of systems that are fully lined with impermeable geomembranes.
- Ongoing trainings for inspectors and contractors.

Figure 4-1: Public Green Stormwater Infrastructure Projects



4.4 Public Green Stormwater Infrastructure Maintenance Program

To ensure the function and sustainability of stormwater management infrastructure investments, PWD continues to implement a GSI maintenance program. Table 4-2 provides a count of SMPs by type currently in PWD's maintenance program. These numbers include SMPs on quasi-public properties, such as the School District of Philadelphia where PWD has performed the maintenance during an initial two-year interim maintenance period. PWD implements post construction maintenance in accordance with the maintenance manual.

Table 4-2: FY20 PWD SMP Types in Maintenance

SMP Types	Total Number of SMPs
Stormwater Tree Trench	322
Rain Garden	118
Stormwater Planter	104
Stormwater Bump out	64
Infiltration/Storage Trench	241
Pervious Paving	9
Green Roof	1
Swale	29
Basin	6
Stormwater Tree	83
Drainage Well	4
Inlet Connection	26
Trench Drain Connection	5
Total Number of SMP	**1012**

4.4.1 Inspections

While PWD has prescribed maintenance frequencies for GSI, practice and experience have determined that pre-maintenance inspections are the best method to determine the level of maintenance required. At each SMP that has surface features, PWD completed pre-maintenance surface inspections.

Inspection of Surface Elements

In FY20, PWD conducted 3,770 pre-maintenance surface inspections. The condition of the site at the time of the pre-maintenance inspection determines whether maintenance is required. PWD also performs dry weather and wet weather inspections for a more comprehensive assessment. By the conclusion of FY20, PWD completed 2,090 dry weather inspections and 280 wet weather inspections. In FY20, PWD conducted a total of 4,728 inspections.

Inspection of Subsurface Elements

The objective of the subsurface inspection program is to observe and assess all structural components of SMPs that exist below street level. Inspections are performed in dry weather conditions as capturing discernable video during wet weather conditions is difficult. Inspection staff is certified through the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment Certification Program (PACP).

PWD completed a total of 1,450 subsurface inspection work orders which were associated with the inspection of 496 SMPs and a total of 17 miles of pipe during FY20. The conditions of each pipe run at the time of the inspection determined whether maintenance was completed and if any structural defects were present.

The inspections consisted of 709 post-construction inspections of new SMPs, 241 “NASSCO” inspections at select SMPs, and 478 Post Maintenance. NASSCO inspections are used to track NASSCO-specified “Construction” or “Structural” defects to determine if defects remain stable over time.

4.4.2 Maintenance

PWD's GSI maintenance program operates through three types of maintenance activities to adequately address the maintenance needs of PWD's GSI. Maintenance events associated with surface maintenance, subsurface maintenance and porous maintenance are summarized in **Table 4-3**.

Table 4-3: FY20 Summary of Maintenance Events by Type

Maintenance Work Order Type	Number of FY20 Events
Surface	**14,712**
Surface Maintenance -Routine	3,336
Surface - Mulching	297
Surface - Pruning	272
Surface Maintenance -Watering	767
Tree Maintenance	385
Surface Inlet Protection Maintenance	9,107
Trench Drain Maintenance	160
Work Zone Protection	2
Aesthetic	135
Signage Repair	251
Snow Removal	0
Surface Maintenance - Reactive	**137**
Surface Vegetation Repair	76
Earthwork	0
Surface Structural Repair	21
Green Infrastructure Request	0
Drainage Modification	40
Subsurface	**1,907**
Subsurface Maintenance	824
Inlet Cleaning	764
Subsurface Inlet Protection Maintenance	298
Non-Standard Subsurface Inspection	11
Non-Standard Subsurface Maintenance	2
Subsurface Structural Repair	8
Porous	**11**
Routine Porous Maintenance	4
Restorative Porous Maintenance	7
Total	**16,767**

PowerCorpsPHL

Over the past decade, the City and PWD have implemented new strategies to promote the economic and social growth of the City and meet environmental, ecological and business missions. In support of these initiatives, and to augment PWD's GSI aesthetic maintenance responsibilities, PWD entered into partnership with PowerCorpsPHL. PowerCorps is a City of Philadelphia AmeriCorps initiative designed to engage youth, ages 18-26, which transforms lives through service and workforce development. **Table 4-4** summarizes the type and amount of material collected by PowerCorps in FY20.

Table 4-4: PowerCorpsPHL Trash Removal in FY20

Type of material collected	Amount collected (in pounds)	Amount collected (in tons)
Trash	31,140	15.6
Leaves and Organic Debris	6,084	3.0
Total	**37,224**	**18.6**

5.0 Green Stormwater Infrastructure through Private Development

5.1 Philadelphia Stormwater Management Regulations

The Philadelphia stormwater management regulations (PSWMR) were revised in January of 2006 and July of 2015, providing the foundation of the private sector's role in stormwater management. In July 2018, the regulations were further updated to change how streets are regulated. The City of Philadelphia requires stormwater management for land development projects in the City of Philadelphia with 15,000 or more square feet of earth disturbance. Plans for proposed projects must be submitted for conceptual review to pursue a zoning permit, while the submission of detailed stormwater management plans must receive a technical review and approval prior to obtaining a building permit. For the projects that proceed to construction, the installations of SMPs are inspected during construction. Active construction inspections are completed for both PSWMR and incentivized retrofits based on the inspection manual. During FY20, PWD conducted 3,036 inspections during active construction in the combined sewer area. **Figure 5.2** displays the completed green infrastructure installed through private development and incentivized retrofits. A full list of complete private development projects can be found in **Appendix 3**. A summary of constructed GAs through private development projects by watershed are listed below in **Table 5-1**.

Table 5-1: FY20 Cumulative Completed Greened Acres by Watershed through Private Development

Watershed	Darby-Cobbs	Delaware	Pennypack	Tookany-Tacony/ Frankford	Schuylkill	Cumulative Completed
Number of Projects	15	186	3	59	168	431
PSWMR GAs	14	274	5	77	254	624

Expedited Review

PWD offers a service level goal of no more than a fifteen-day review for all projects submitting for post-construction stormwater management plan review. However, projects that use preferred green stormwater management approaches are eligible for an expedited, five-day review. PWD offers two types of expedited review: 1) disconnection green review and 2) surface green review. The disconnection green review ensures redevelopment projects that disconnect 95% or more of the post-construction impervious area (DCIA) using features such as green roofs, porous pavement and new tree canopy will receive a review response within five days. The surface green review expands the number of eligible projects by including both new development and redevelopment projects that manage 100% of the post-construction DCIA through bioinfiltration and bioretention basins as well as the practices that qualify for the disconnection green review. In FY20, a total of twenty-seven projects qualified for an expedited review in the combined sewer, with twenty-three projects selecting the disconnection green review and four projects selecting the surface green review.

Green Roof Density Bonus

The Philadelphia Zoning Code offers incentives to projects citywide that install green roofs by providing exceptions to certain residential density rules. To be eligible for these exceptions, the project must be located in the designated zoning districts and propose to cover at least sixty-percent (60%) of the roof with green roof. In July 2018, the Zoning Code was amended to allow eligibility for existing buildings. New building construction must involve at least 5,000 square feet of disturbance and existing buildings must have a minimum footprint of 5,000 square feet. The green roofs are designed to PWD standards and inspected by PWD during construction. PWD also executes operation & maintenance agreements with the project owners, ensuring long-term maintenance and functionality of the green roof system. To date, at least half of the projects submitting for this bonus were sized between 5,000 square feet and 15,000 square feet of disturbance, meaning the projects were not otherwise required to install stormwater management practices to comply with PSWMR. In FY20, a total of thirty-six projects took advantage of the green roof density bonus, thirty-four of which were located in the combined sewer.

Construction Verification Initiative

PWD continued to refine a construction verification process with the goal of assessing individual projects prior to counting GAs toward compliance totals. This process emphasizes communication efforts from the start of the development project so property owners can adequately plan for record drawing creation. Throughout construction and at the time of construction completion, PWD conducts inspections of the site to observe and document installation of the approved SMPs. PWD also continued to perform outreach at the close of construction to solicit record drawings from project engineers and owners. These record drawings allow PWD to verify SMP installation and function.

In addition to this process, PWD continued to pursue a verification initiative to gather documentation of approvals that have not otherwise been verified and create record drawings to document the constructed conditions. To date, 171 projects totaling 220 GAs have been inspected and verified through this supplemental approach.

I-95 Reconstruction Project

Pennsylvania Department of Transportation (PennDOT) is performing reconstruction and expansion work on Interstate 95 (I-95) in Philadelphia. Three components of the I-95 reconstruction project support stormwater management: 1) disconnection of stormwater from the combined sewer system; 2) ensuring that redevelopment occurs in a manner consistent with the PSWMR; and 3) installation of GSI in the public right-of-way.

The work on I-95 in Philadelphia is broken into two sectors: Sector A and Sector B. The multi-phased work between Bleigh Avenue and Race Street is known collectively as Sector A. Sector A of the I-95 Reconstruction Project is divided into five major design sections, moving from north to south: CPR, BSR, BRI, AFC, and GIR. Each of these sections is further subdivided into a total of twenty-five construction subsections. Sector B encompasses the area from Race Street to Girard Point Bridge (airport side). At present, Sector B has two design sections delineated, Section CAP from Chestnut to Walnut, and Section CSP from Vine Street to Girard Point Bridge (stadium side). Some of the design and construction work for Sector B may be concurrent with the work in Sector A.

A graphic illustrating the I-95 Reconstruction Project sections is featured below in **Figure 5-1**.

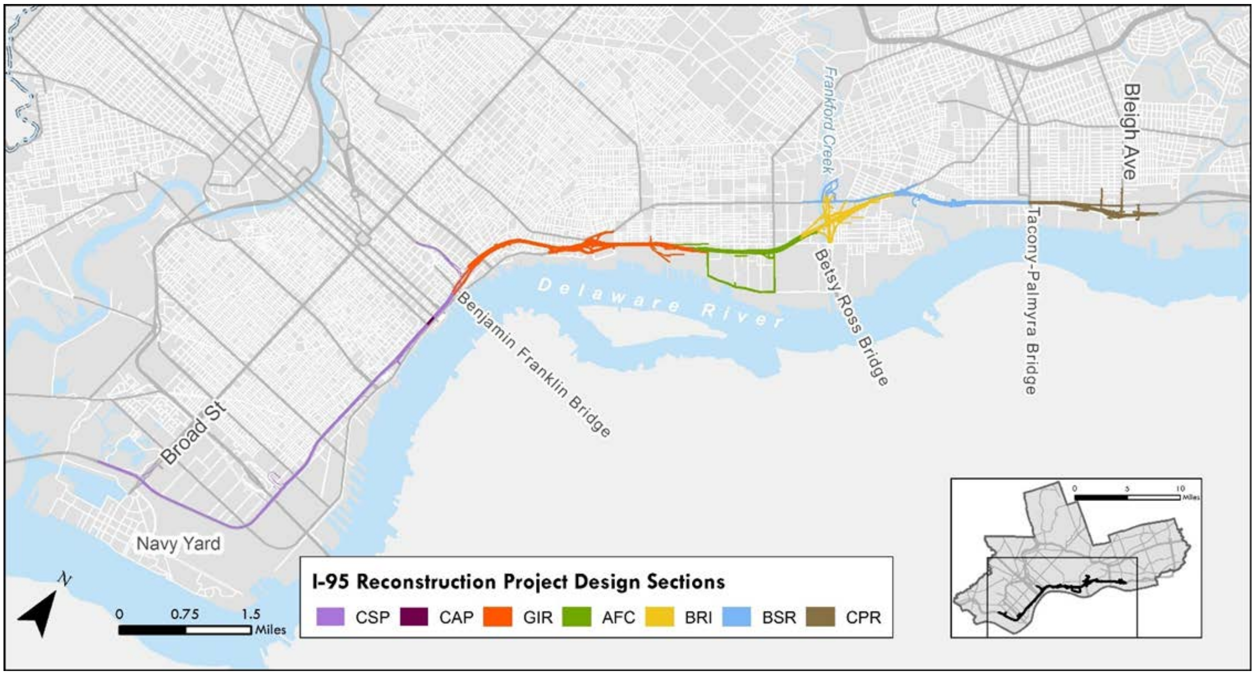


Figure 5-1: I-95 Reconstruction Project Sections

Project updates for the construction subsections with significant design or construction progress in FY20 are summarized in **Table 5-2.**

Table 5.2: I-95 Construction Section FY20 Updates and Anticipated Let Dates

Section	Project Update	Estimated Project Timeline
Sector A – Between Bleigh Avenue and Race Street		
Section CPR (Cottman-Princeton Ramp Area)		
CP2	Six new separate stormwater outfalls have been completed in Cottman Avenue, Princeton Avenue, Magee Avenue, Disston Street, Unruh Avenue, and Bleigh Avenue. The stormwater pipes are designed to accept the drainage from the highway as well as the area in between the highway and the Delaware River as development occurs.	2019, completed
Section BSR (Bridge Street Ramp Area)		
BS1	This project has been approved. Work will include the construction of one bioretention system, one media filter, two vortech separators, and one new outfall in Levick Street will be constructed to treat stormwater from the mainline highway.	2019, anticipated let date
BS4	New PWD storm sewers, inlets, and new outfalls will be installed to covey the new Adams Street runoff. Three basins with amended soils and impervious liners are being constructed to treat stormwater from the new interchange ramps.	2021, estimated completion
BS2	Work will include two bioinfiltration basins and five bioretention basins to manage stormwater from the mainline highway. Also proposing 9 tree trenches which will be owned and maintained by PWD. A portion of the drainage area to the tree trenches is existing impervious ROW which will be banked for trade in future phases of the 95 expansion project.	End of 2021, anticipated let date

Section	Project Update	Estimated Project Timeline
Section BRI (Betsy Ross Interchange Area)		
BR0	PWD sanitary and storm sewer culverts were relocated. Stormwater runoff from the reconstructed portions of the highway and ramps was treated by under-drained bioretention and water quality units then directly discharged to the Frankford Creek, removing the drainage area from the CSO system.	2018, completed
BR2	Basins built in BR0 will be reused in BR2 and new basins will be installed. The new basins will be sized for future phases as well. All basins will have forebays, be non-infiltrating, and have amended soils and underdrains with a rock layer and liner. The PennDOT-owned outfall locations in BR2 will be reconstructed in the same locations as existing outfalls.	2022, estimated completion
Section AFC (Ann to Frankford Creek Area)		
AF1	Streetscape work within the Richmond Street right-of-way between Allegheny and Westmoreland is not subject to the stormwater regulations. Improvements to Melvale Street will be managed by two infiltration trenches that will be owned and maintained by PWD.	2021, estimated completion
AF2	Work includes rebuilding of side streets prior to mainline construction. Proposing a net decrease in impervious area and a GSI tree trench along Castor avenue. The managed area will be banked for future phases.	November 2020, construction let
Section GIR (Girard Avenue Interchange Area)		
GR1	The reconstruction of Richmond Street was managed by street trees and a bioretention basin. A new separate sewer system was constructed and connected below the regulators in Dyott Street and Cumberland Street.	2019, completed
GR2	The mainline highway areas are managed by multiple bioretention basins along the side of the highway.	2017, completed
GR3/GR4	One separate sewer outfall was constructed in Cumberland Street, and PennDOT is evaluating whether a separate outfall can be constructed in Berks Street as part of GR4. In Dyott Street, a pipe was constructed and will tie in below the regulating chamber. A sewer was found in the old Lehigh Avenue right of way and rehabilitated to separate a portion of the highway drainage. Stormwater is managed in GR3 using bioretention basins, infiltration basins, and detention basins. The basins are designed to manage the water quality volume.	2019, GR3 Completed / 2023, GR4 estimated completion
Sector B – Race Street to Girard Point Bridge (Airport Side)		**Planning Study Underway**
Section CSP (Central and South Philadelphia Area)		
CAP	CAP project is a 600’ wide structure spanning over I-95 and Christopher Columbus Blvd between Walnut and Chestnut Streets. An area of fill will gently slope from the structure to the Delaware River waterfront. A vegetated park, recreational areas, walkways and several building structures are proposed on the CAP structure and fill area. The majority of the CAP structure is proposed to function as a green roof and remaining DCIA proposed to be managed by a cistern with runoff re-used as gray-water for the restroom facilities and a subsurface detention basin. Earth disturbance in 95 and Columbus will be minimal under the CAP. Areas outside of LOD, managed by the CAP are eligible for management banking. All SWM components must be designed and built in accordance with the Green Stormwater Infrastructure design standards.	Mid 2021, construction let End 2021, construction start

Section	Project Update	Estimated Project Timeline
CAP - I-95 NB/SB between Race Street and Girard Point Bridge		To be determined

5.2 Incentives for Private Property Owners to Implement Green Stormwater Infrastructure

PWD offers incentives to private property owners to implement stormwater management practices on existing properties that reduce stormwater pollution to the City's sewers and surrounding waterways and enhance water quality in the region's watersheds. PWD, in partnership with the Philadelphia Industrial Development Corporation (PIDC), created the Stormwater Management Incentives Program (SMIP) in FY12 and Greened Acre Retrofit Program (GARP) in FY15 to reduce the cost for qualified non-residential PWD customers and contractors to design and install stormwater best management practices (BMP). **Figure 5-2** displays the completed green infrastructure installed through incentivized retrofits. A summary of completed GAs from incentivized retrofit projects by watershed are listed below in **Table 5-3**. A full list of completed incentivized retrofit projects is in Table 2 of **Appendix 3**.

Table 5-3: FY20 Cumulative Completed Greened Acres by Watershed through Incentivized Retrofits

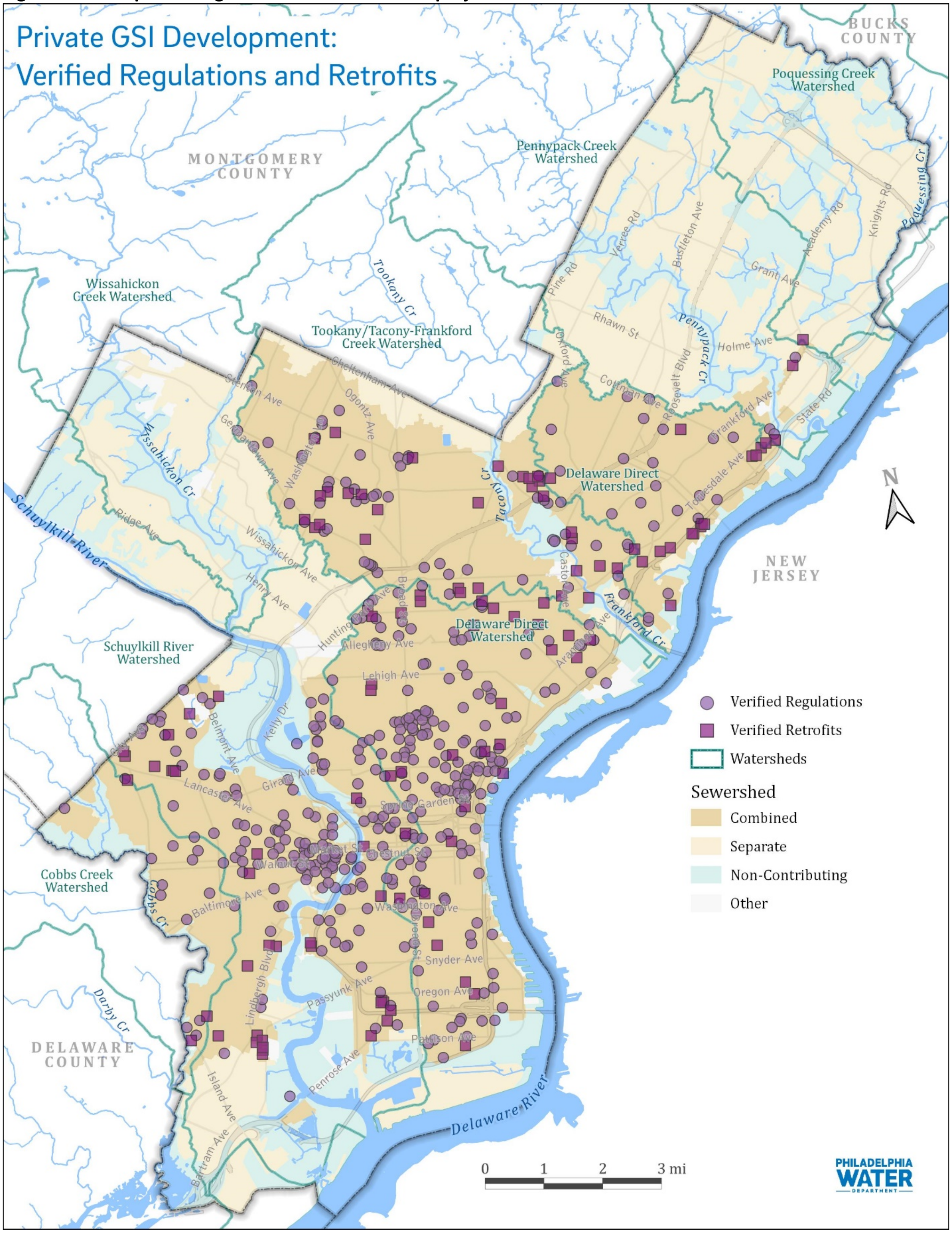
Watershed	Darby-Cobbs	Delaware	Pennypack	Tookany-Tacony/ Frankford	Schuylkill	Cumulative Completed
Number of Projects	1	41	5	30	37	**114**
Incentivized GAs	0.2	174	38	186	215	**613**

Stormwater Pioneers

In 2014, PWD started Stormwater Pioneers, a recognition program for excellence in design and construction of stormwater management practices on private property. Since that time, PWD has honored a total of six projects. Most recently, in 2020, PWD selected its newest Stormwater Pioneers: Chaes Foods and Birchwood at Cedars Village. Both awardees were honored for their exceptional work in maintaining stormwater management practices on their site. Chaes Foods is a commercial property located in the combined sewer section in North Philadelphia. To meet PWD's Stormwater Regulations, Chaes Foods installed a biofiltration basin which is easily maintained by on-site personnel. Birchwood at Cedars Village is a senior living facility in the combined sewer section in South Philadelphia. PWD honored this project for its ongoing maintenance of a variety of SMP types as well as their ability to address critical maintenance concerns. After a project is built, long-term maintenance is critical to the functionality of stormwater management systems. The 2020 Stormwater Pioneers acknowledges the property owners in this important responsibility.

The Stormwater Pioneers program brings elected officials, community members, private landowners and department officials together to recognize the importance of stormwater management on private property. Past awardees were celebrated with a press event and a short video was created to highlight the project. Most critically, PWD prepares a case study about each project to help other developers and business owners learn from these successful case studies. More information about the Stormwater Pioneers program including past awardees and the 2020 Stormwater Pioneers is available at https://www.phila.gov/water/wu/stormwater/Pages/Pioneers.aspx.

Figure 5-2: Completed Regulations and Retrofit GSI projects



5.3 Post Construction Maintenance of Private Facilities

To ensure ongoing SMP maintenance of private facilities constructed through the stormwater management regulations, SMIP or GARP, PWD continues to use the following combination of tools: executing operation & maintenance agreements, conducting post-construction maintenance inspections, relying on enforcement, and administering stormwater credits.

In FY20, sixty-one projects were brought back into compliance in the combined sewer areas of the City using the protocols described below. PWD will continue to work with property owners to ensure that SMPs are inspected and maintained in accordance with regulations and recorded O&M agreements.

An operation & maintenance agreement between the property owner and PWD is executed and recorded against the property as part of the PWD post-construction stormwater management plan process. These agreements outline the SMP(s) on the private site and stipulate maintenance requirements. The agreements also include language granting PWD the authority to inspect on-site SMPs and even perform maintenance on behalf of the property owner if necessary.

PWD maintains comprehensive operations and maintenance information geared toward the private development community in Chapter 4 of the Philadelphia Stormwater Management Guidance Manual. Each SMP section provides guidance on SMP maintenance activities, including a recommended SMP maintenance schedule and maintenance factsheets are available as a quick resource for applicants. In addition, as part of the post-construction stormwater management plan review process, projects must create an SMP Maintenance Guide. The SMP Maintenance Guide is unique to each project and includes a site map and Maintenance Schedule Form for each SMP to allow the owner to track maintenance activities for the site. As an additional resource, PWD has compiled an O&M Manual for property owners. Please see links below for more information:

Philadelphia Stormwater Management Guidance Manual:
https://www.pwdplanreview.org/manual/chapter-4

Maintenance Schedule and Fact Sheets:
https://www.pwdplanreview.org/upload/pdf/SMP_Maintenance_18.06.04.pdf

SMP Maintenance Guide:
https://www.pwdplanreview.org/maintenance

O&M Manual for Property Owners:
http://www.phila.gov/water/PDF/Retrofit-O.M.Manual.pdf

Post-construction maintenance inspections of private facilities were conducted through the reporting period. PWD utilizes both specialized inspection techniques as well as visual inspections to assess the performance of private SMPs. Early in the post-construction inspection stage, PWD conducts a Maintenance Site Visit for recently constructed projects. This visit gives PWD staff the opportunity to communicate expectations for SMP maintenance to the appropriate property owner and walk the site to review the stormwater management strategy. In addition, PWD conducts post-construction maintenance inspections on all applicable private facilities. As projects are identified for maintenance inspection, the PWD post-construction inspection staff contacts the property owner to schedule the inspection. PWD attempts to conduct the inspection with the property owner or their maintenance representative present so they can verbally discuss any concerns or questions. After inspection, a post-construction inspection report is generated and issued to the property owner. Any required corrective actions are identified in the report along with a deadline for resolution. After actions are taken, PWD re-inspects the property and compliant sites are closed until their next routine inspection date. Inspectors will provide guidance to the property owner to ensure corrective actions are resolved. In addition to visual inspections, PWD has identified other effective methods and technologies, including closed-circuit television, surveys of critical system elevation points, confined space, pole-mounted camera photography, and visual and wet weather inspections. PWD will continue to evaluate and refine post-construction inspection protocols. In FY20, PWD performed 154 post-construction inspections in the combined sewer areas of the City.

If compliance is not achieved within the timeframe specified during the inspection process, the project is referred to **enforcement**. PWD implemented expanded tracking within the existing PWD Stormwater Tracking Database, which allows for the tracking of enforcement case and corrective action statuses and submissions of corrective action plans and other documentation of work completed to satisfy corrective actions. PWD initiates an enforcement case with the issuance of a post-construction enforcement letter to the property owner if a post construction stormwater management plan (PCSMP) is found to be insufficiently maintained. This notification includes a description of any issues identified and a timeline to achieve compliance. Development sites that are subject to PSWMR, as well as properties that have SMPs funded by SMIP and GARP, are required to maintain the SMP(s) to function as designed. If initial notification is unsuccessful at bringing action from the property owner, PWD can compel compliance through several enforcement tools, including notices of violation, fines, court action, and/or a nuisance abatement and lien by the City. For non-compliant projects, PWD will also suspend any applicable stormwater billing credits if the required maintenance is not performed. In FY20, PWD successfully resolved 61 enforcement cases consisting of 156 SMPs in the combined sewer area of the city. Of the enforcement cases closed, escalated enforcement tools were utilized consisting of two NOVs of which one proceeded to fines.

Stormwater Credits

Non-residential property owners are eligible for stormwater credits, a direct reduction to the monthly stormwater charge, if they own and maintain stormwater management practices that reduce stormwater flows and volume to the City's sewer systems and surrounding waterways. Retrofit and development projects are eligible for credits against their stormwater charge upon completion of construction, and owners must renew their credits every four years. With the credits renewal application, owners may provide maintenance logs and/or PWD may perform an inspection to demonstrate that the SMPs continue to be functional. PWD approved or renewed 98 combined sewer area (233 citywide) stormwater billing credit applications during the reporting period.

6.0 Data Collection and Analysis

6.1 Green Stormwater Infrastructure Post-Construction Monitoring

Proposed methodologies for the Green City, Clean Waters monitoring program were outlined in a revised CMP that was submitted on January 10, 2014 and approved on May 28, 2014 by PADEP. PWD has updated methods through new standard operating procedures (SOPs) that better reflect current techniques.

Monitoring and testing green stormwater infrastructure are essential to evaluate its effectiveness in managing stormwater and reducing CSOs. PWD uses post-construction monitoring and post-construction testing at the SMP and system levels to ensure functionality, evaluate the performance of stormwater management practices and to provide information for improvements to design and maintenance. FY20 monitoring activities are described in detail in **Appendix 4 GSI Monitoring Status Report.** FY20 updates on non-green infrastructure components of the CMP can be referenced in Section **F.2 Step 1.b. of the Stormwater Management Program Annual Report.**

PWD has completed its 5-year green stormwater infrastructure pilot program and results were reported in the Year 5 Evaluation and Adaptation Plan. Information on the selected sites, associated variables and results are available here:
http://water.phila.gov/pool/files/Year5_EAPCombinedAppendices_website.pdf.

7.0 Public Outreach and Participation

PWD continues to enhance tools for engaging a broad range of stakeholders. In FY20, PWD engaged approximately 34,156 individuals through a variety of public education, outreach and participation initiatives. This figure represents a significant decrease in programming due to the COVID-19 pandemic. In order to maintain to social distancing guidelines, PWD cancelled all education and engagement programming starting in March 2020 through the remainder of the fiscal year. The following includes updates on current programs and projects.

7.1 Green Stormwater Infrastructure Notification & Outreach Process for Green Programs

Public notification, education and outreach for GSI in Philadelphia's neighborhoods continued to facilitate the number of GSI projects planned, designed and constructed in FY20. PWD also launched the Philly Water Bar to promote water quality city-wide, which facilitated even more outreach and engagement. PWD resources were distributed at all events and partnerships were strengthened with civics, partners and customers. During FY20, approximately 4,840 community members participated in 93 community meetings or events where PWD promoted green stormwater infrastructure projects and/or promoted the status of water quality in the City through the Drink More Tap and Philly Water Bar experiences. All events were primarily one-on-one conversations with local residents and/or small gatherings (i.e., community meetings with civic leaders and active residents).

Also, 823 customers attended Rain Check workshops and 540 green stormwater infrastructure tools were installed on private properties through the residential program.

Finally, 16 organizations participated in Soak It Up Adoption, where 75 community representatives helped maintain the public green stormwater infrastructure at 108 sites while removing 45,830 lbs. of residential waste and engaging 5,192 local residents.

Regarding environmental education, approximately in FY20 20,527 individuals participated in the following education and outreach events that featured *Green City, Clean Waters* and/or urban waters themed content:

- Environmental education programming offered by PWD educators and Fairmount Water Works educators
- Environmental education programming offered by Philadelphia Parks and Recreation (PPR) educators
- Environmental education and outreach programming offered in Philadelphia by the Tookany/Tacony-Frankford Watershed Partnership and Partnership for Delaware Estuary
- Environmental education and outreach by the Land Health Institute

It should be noted that the number of participants associated with Rain Check and Soak It Up Adoption are detailed in **Section 7.3** of this report

7.2 Public Education and Outreach Programs

Philadelphia Water Department Master List

The Philadelphia Water Department master list is the previously referenced *Green City, Clean Waters* Partners master list, which is a distribution list of email addresses that gets updated from contact information collected at public events and meetings hosted by PWD. By the conclusion of FY20, there were approximately 21,838 live entries on the list, *excluding* e-billing subscribers. The master list gained approximately 2,311 new subscribers since last year, also *excluding* e-billing subscribers. This number reflects the number of individuals confirmed through the email management system as participants with accurate contact information and those specifically interested in receiving email updates and e-newsletters regarding PWD special initiatives and events.

Out of the individual email bulletins sent in FY20, 91,449 ***"unique"*** emails were opened. A "unique open" is calculated by only counting the *first* time a single subscriber opens a delivered email. Subsequent opens of the same email by the same subscriber are *not* calculated. Any contacts found to be redundant or nonresponsive are removed from the master list through use of the GovDelivery software or self-service "unsubscribe" features and are not represented in this number.

Green City, Clean Waters Signage

In FY20, PWD continued to develop the interpretive Green City, Clean Waters permanent signage, which included new designs, more fabrication and additional installation of the signage. This process also included site visits, coordination with property owners/partners, and promotion of the signage. To date, PWD has installed a total of 161 *Green City, Clean Waters* interpretive signs at 111 sites. For images of the installed signage, please visit:
https://www.flickr.com/photos/philadelphiawater/sets/72157654299547526.

Art & Design

Art and design are used to further communication and education with stakeholders and customers. Projects such as yarn bombing (temporary knitted yarn art) of stormwater tree trenches, rain barrel wrap original designs created by local students in addition to temporary and permanent vibrant murals are examples of opportunities to engage residents through visual learning. In FY20, community meetings, paint days and the majority of the installation of the Calo Rosa "Drink More Tap" mural at Penrose Recreation Center was completed as a result of PWD's partnership with Mural Arts of Philadelphia. The piece is part of a two-mural series to raise awareness of water quality (tap water) in Philadelphia, particularly in underserved communities. Community meetings for the second location (Cruz Recreation Center) were also held. Penrose Recreation Center is located at 1101 West Susquehanna Ave. Philadelphia, PA 19122.

Drink More Tap Mural by Calo Rosa

Soak It Up Adoption

In FY20, two new organizations were accepted into the Soak It Up Adoption program (Friends Rehabilitation Center & Cloud9 Rooftop Solutions) creating a program comprising 16 total organizations with 75+ individuals acting as Adoption representatives collectively. Throughout the fiscal year, Adoption partners engaged residents and completed several community events highlighting their adopted infrastructure. These events included things like: guided tours, tabling sessions at local public events, presentations at civic association meetings, as well as engagement with their social media networks. The Adoption program also unveiled a new website last year (link below).
Information and/or photos from Soak It Up Adoption events are available at the following links:

- New Home Page - http://water.phila.gov/adoption/
- PWD SIUA Blog - http://water.phila.gov/blog/2020-soak-it-up-call-to-action
- PWD Highlighting the SIUA Partnership on Social Media - https://www.facebook.com/PhillyWatersheds/photos/a.10150194806358791/10157469104748791/?type=3&theater
- TTF SIUA Blog - https://ttfwatershed.org/2020/05/27/were-still-soaking-it-up-for-clean-water/
  PWD Re-Posting SIUA Partner's Social Media Picture - https://www.facebook.com/centennypark/photos/a.1239838666089403/4016359505103958/?type=3&theater

Table 7-1 Provides metrics used by PWD to track the Soak It Up Adoption program throughout FY20. These figures reflect the variety of adopted SMPs and the amount of trash collected.

Table 7-1: Soak It Up Adoption Metrics for FY20

Soak It Up Adoption Partner List	Number of SMPs Adopted in FY20	*Amount of Residential Waste Collected in FY20 (LBS)	Number of Residents Engaged in FY20
Asociacion Puertorriquenos en Marcha	14	3,888	874
Centennial Commons CDC	7	4,161	<50**
Cloud 9 Rooftop Solutions	3	0	900
East Falls Development Corporation	6	723	<50**
Empowered CDC	1	960	<50**
Frankford CDC	2	9,216	147
Make the World Better	2	8,633	170
New Kensington CDC	9	476	<50**
Newbold CDC	9	5,133	101
Northeast Treatment Center	6	5,677	<50**
Northern Liberties Neighbors Assoc.	11	705	<50**
Southwest CDC	14	6,617	2,500
TTF-Friends of Vernon Park	1	1,181	<50**
TTF-Carl Mackley Apts	4	3,023	<50**
UC Green	10	1,341	<50**
Upper Roxborough Conservancy	2	1,584	<50**
TOTALS:	**108 SMPs**	**45,830+ lbs**	**~5,192 engagements**

*All Adoption partners collected trash in 30-gallon paper bags in FY20. The total weights are converted from this base unit (gallons) in pounds.

Urban Waters Curriculum

Understanding the Urban Watershed is a cross-disciplinary curriculum, aligned with School District of Philadelphia core content and Education for Sustainability standards for 6th, 7th and 8th grades. Development and implementation have been a collaborative effort with School District of Philadelphia's (District) Offices of Curriculum, Instruction and Assessment, and Environmental Management and Services. Developed with major support from the William Penn Foundation and the Philadelphia Water Department.

The curriculum is an exemplar for goals and targets as outlined in the District's Sustainability Plan, GreenFutures and easily embedded into core curriculum because the Units are aligned with Academic (Science, ELA Math and SS) and Education for Sustainability Standards. All standards and performance indicators are assessed for using performance criteria.

The program provides online access to 6 Units. The units include links to videos and student materials, as well as engaging field trips and experiences for students that support differentiated learning.

Highlights of the curriculum:

- Provides Vertical articulation grades 6, 7, 8
- Provides opportunities for differentiated learning
- Learner centered/hands on; Place based; Project-Inquiry based
- Authentic, relevant to school community, neighborhood, creek, sub-watershed, public water system and infrastructure
- Experiences both inside the classroom and outside (from schoolyard, block, park)
- Interdisciplinary
- District teachers become teacher leaders and will train and mentor new teachers implementing the curriculum.
- Developed in partnership with District's GreenFutures Plan
- Aligned with the City's Greenworks Plan, District's GreenFutures Plan and the Philadelphia Water Department's Green City, Clean Waters Program
- Online and accessible to all through website resourcewater.org
- Continuing support during School Year 2019-20 includes coaching and content growth through classroom visit check-ins, monthly seminars, workshops and ongoing field experiences
- Active participation in developing an expanding learning community supporting education for sustainability in schools and communities
- Opportunity for teachers to participate and present at local, regional and national conferences (e.g. STEM GSK Workshop, National Green Schools Conference and NAAEE Conference)

The Curriculum offers students, teachers, schools and the community active learning experiences about the value of water, water systems, civic action and responsibility with meaning and context.

It connects students to the real world and the role they play in their own future and the future of the planet.

In 2020, Fairmount Water Works received the Meaningful Watershed Education Experience (MWEE) Partner of Excellence Award for their outstanding partnership with Pennsylvania schools to support MWEEs for Pre-K - 12 students. This was the inaugural year of the award and we were 1 of 3 organizations statewide to receive it. It was awarded by NOAA-funded Pennsylvania Watershed Education Task Force led by Stroud Water Research Center, PA Department of Education and the PA Department of Environmental Protection

7.3 Green Homes Initiatives

Rain Check Program

Participation in the Rain Check program remained steady and is highlighted in table 7-2. In FY20, PWD made significant improvements in program management, data tracking, and marketing. More information on the program is available at: http://www.pwdraincheck.org.

Table 7-2: Rain Check Program Metrics

Rain Check Metrics	FY20
Workshops Hosted	46
Workshop Attendees*	823
Contractor Training Participants	n/a
Rain Barrel Installations**	363
Downspout Planter Installations**	65
Rain Garden Installations**	11
Permeable Paving Installations**	57
Depaving Projects	4

**Workshop Attendees: This represents the total number of people who attended a Rain Check workshop. These hour-long educational workshops are mandatory for participation in Rain Check. Some FY20 attendees had their tools installed in FY20, but others will have their tools installed in FY21.*
***Installations Completed: For some participants who signed up this year, the installation of their tools is still in progress.*

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Appendix 1

Completed Public Green Stormwater Infrastructure Projects

Public Green Infrastructure Reporting Metrics

Table 1: Public Completed Project Tracking Metrics and Reporting Format

Public Completed Project Tracking Metrics											
Work Number	**Project ID**	**Construction Completion Date**	**Storage Volume (cf)**	**New Trees**	**Drainage Area (acres)**	**Greened Acres (acre-inch)**	**SMP Type(s)**	**Program**	**Green Construction Cost****	**Partner(s)**	**Watershed**

Over the past year, PWD's new capital projects tracking system's (CIPIT) interaction with its GSI tracking system (GreenIT) has slightly changed. To accommodate this change, we have replaced Project Names with a Work Number and a Project ID. The Project ID is unique to individual projects and these projects can be bundled under one Work Number for bidding purposes. Moving forward, Work Numbers will have a 1:1 relationship with projects.

Table 2: Public Reporting Metric Definitions

Metric	Definition
Work Number	Work Number is a unique assigned identifier from the CIPIT program. A CIPIT work number is attached to construction proposals, bids, work orders, contracts and invoices.
Project ID	This is a unique number, which is assigned automatically by the system when the project is created.
Status	Current project status. Statuses include: In Design, In Projects Control (Under Contract Management), In Construction, and Construction Complete.
Storage Volume	The volume of runoff managed by the system. For all systems, the entire depth of the system is counted, except for detention/slow-release systems that are completely lined with an impermeable liner. For those systems, only the depth above the orifice is counted.
New Trees	Total number of new trees planted in association with a system. This number also includes non-SMP trees, which are trees planted as part of a project but are not part of a stormwater management system.
Drainage Area	Area, in square footage, of impervious and/or pervious surface(s) flowing into a system(s) and SMP(s).
Greened Acres (GAs)	Greened Acres is a metric that accounts for the conversion of a highly impervious urban landscape through the implementation of projects that reduce storm water runoff. A Greened Acre is described as an acre of impervious cover connected (tributary) to a combined sewer that subsequently is reconfigured to utilize green stormwater infrastructure to manage at least one inch of stormwater runoff. If storage is provided, systems can credit up to two inches of the storm water runoff from that acre. The best available Greened Acre value is pulled from the database for regulatory reporting.
Stormwater Management Practice (SMP) Type	A Stormwater Management Practice is a technique that controls the rate and volume of stormwater runoff and/or improves runoff water quality. Multiple SMP types can be grouped together in a larger GSI system. The SMP types were originally defined in Table 2-1 of the IAMP.
Program	Current public programs which a greened acre can be assigned to include: • Alleys/Driveways • Campuses

Metric	Definition
	• Facilities • Industry and Business • Open Space • Parking • Schools • Streets • Vacant Land
Construction Cost	Projects with a status of Construction Complete will have a finalized cost of construction provided.
Partner(s)	External entities involved in a project.
Watershed	The City of Philadelphia watershed where the project is located. Four of the City's seven watersheds fall at least partially within the combined sewer area. These watersheds are: • Cobbs Creek Watershed • Delaware Direct Watershed • Tookany/Tacony-Frankford Creek Watershed • Schuylkill River Watersheds

Table 3: Public SMP Definitions

Public SMP Type Definitions	
Field/Metric	**Definition/Purpose**
Basin*	A stormwater basin is a basin or depression that is vegetated with mowed grass. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Blue Roof	A blue roof is a storage system designed into a roof surface such that the roof retains stormwater. Blue roofs are designed to reduce the rate of stormwater runoff.
Bump-out*	A stormwater bump-out is a vegetated curb extension that intercepts gutter flow. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Cistern/Rain Barrel	A cistern/rain barrel is a tank or storage receptacle that captures and stores runoff and can thereby reduce runoff volume. The stored water may be used to serve a variety of non-potable water needs (e.g., irrigation).
Depaving	Depaving projects remove existing impervious pavement and restore the surface with grass, other types of vegetation, or loose materials (stone, mulch, etc.) such that the area can thereafter be considered pervious area. Depaving projects remove contributing impervious area from the sewer system.
Drainage Well	A stormwater drainage well is manhole structure designed to manage stormwater runoff by receiving stormwater from upstream collection and pretreatment systems and then discharging the stormwater into the surrounding soils through perforations in the manhole. It is designed to infiltrate stormwater.
Green Gutter	A green gutter is a narrow and shallow landscaped strip along a street’s curb line. It is designed to manage stormwater runoff by placing the top of the planting media in the green gutter lower than the street’s gutter elevation allowing stormwater runoff from both the street and sidewalk to flow directly into the green gutter. It is designed to slowly infiltrate stormwater.
Green Roof	A green roof is a vegetated surface installed over a roof surface.

Public SMP Type Definitions	
Infiltration/Storage Trench	An infiltration/storage trench is a subsurface structure designed to detain and release stormwater runoff and/or infiltrate where feasible.
Non-SMP Tree	A non-SMP tree is a planted tree that does not have stormwater directed to it.
Pervious Paving	Pervious paving is a hard permeable surface commonly composed of concrete, asphalt or pavers. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Planter*	A stormwater planter is a structure filled with soil media and planted with vegetation or trees. It is designed to detain and release stormwater runoff and/or infiltrate where feasible. Planters often contain curb edging or fencing as barrier protection around the planter.
Rain Garden	A rain garden is a shallow vegetated area designed to detain and release stormwater runoff and/or infiltrate where feasible. Rain gardens may also be referred to as bio-infiltration basins and bio-retention basins. They are typically integrated into landscape features (e.g. median strips) and are non-mowed areas.
Stormwater Tree	A stormwater tree is planted in a specialized tree pit that has stormwater runoff directed to its pit. It is designed to manage stormwater by placing the top of the planting media in a tree pit lower than the street's gutter elevation and connecting the tree pit to an inlet which directs runoff from the street into the tree pit. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Swale	A swale is a channel designed to convey stormwater. It can be designed to attenuate and/or infiltrate where feasible.
Tree Trench*	A stormwater tree trench is a subsurface infiltration/storage trench that is planted with trees. They are typically linear features that are constructed between the curb and the sidewalk. It is designed to detain and release stormwater runoff and/or infiltrate where feasible.
Wetland*	A stormwater wetland is a vegetated basin designed principally for pollutant removal. It typically holds runoff for periods longer than 72 hours and may include a permanent pool. Wetlands can also detain and release stormwater runoff.

*The word 'stormwater' was previously included in these types but was removed because it was redundant.

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
20391	1056	5/4/2020	9674	0	1.6	2.7	Infiltration Storage Trench,	Streets	$596,795		Delaware, Pennypack
20400	306	3/24/2017	5445	18	0.9	1.5	Stormwater Tree Trench,	Streets	$460,792		Delaware
20422	517	5/6/2016	2410	10	0.5	0.7	Stormwater Tree Trench,	Streets	$164,932		Schuylkill
20439	584	11/7/2018	7512	20	1.2	2.0	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$600,403		Delaware, Schuylkill
20443	411	12/8/2017	53074	4	7.3	14.6	Infiltration Storage Trench, Rain Garden, Swale,	Open Space	$3,343,251	Philadelphia Department of Parks & Recreation	TTF
20444	563	3/26/2019	11538	8	2.0	3.2	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$787,942		Delaware, Schuylkill
20456	994	12/14/2017	6350	0	1.3	1.7	Infiltration Storage Trench,	Streets	$568,491		TTF
20458	1006	4/23/2018	16131	20	2.7	4.4	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$1,258,845		Delaware
20461	1066	8/22/2016	7757	0	1.5	2.1	Infiltration Storage Trench,	Streets	$569,557		Delaware, TTF
20489	1136	2/26/2019	4248	0	0.9	1.2	Infiltration Storage Trench,	Streets	$423,203		Cobbs-Darby
20490	1206	1/18/2019	3216	0	0.6	0.9	Infiltration Storage Trench,	Streets	$341,020		Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
20497	1215	11/22/2019	1270	10	0.2	0.4	Stormwater Tree Trench,	Streets	$127,770		Schuylkill
40224	240	7/18/2011	657	0	0.1	0.2	Pervious Pavement,	Streets	Cost Not Available		Delaware
40330	289*	1/27/2010	1601	34	0.6	0.4	Infiltration Storage Trench, Stormwater Tree,	Streets	Cost Not Available		Delaware
40368	234	10/24/2013	7215	36	1.4	2.0	Stormwater Tree Trench,	Streets	Cost Not Available		Delaware
40577	441*	4/8/2011	6520	52	4.4	1.8	Infiltration Storage Trench, Stormwater Tree,	Streets	Cost Not Available		TTF
40599	233	12/20/2012	1263	0	0.3	0.3	Infiltration Storage Trench,	Streets	Cost Not Available		Delaware
40607	235	7/15/2016	2511	24	1.1	0.6	Stormwater Planter, Stormwater Tree Trench,	Streets	$474,785		Delaware
40659	207	7/1/2008	1836	16	0.3	0.5	Pervious Pavement, Stormwater Planter, Stormwater Tree Trench,	Streets	Cost Not Available	Pennsylvania Horticulture Society, Philadelphia Department of Recreation	TTF
40662	218	3/5/2013	10468	0	1.4	1.3	Stormwater Bump-out,	Streets	Cost Not Available	Philadelphia Streets Department	Schuylkill
40669	331	2/8/2016	1274	0	0.2	0.4	Pervious Pavement,	Streets	$240,171		Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
40713	288	8/15/2018	1079	0	0.2	0.3	Pervious Pavement,	Streets	$152,907		Delaware
40750	304	3/9/2020	1894	2	0.4	0.5	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$324,760		TTF
40755	305	9/25/2019	2845	4	0.5	0.8	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$238,088	Philadelphia Department of Parks & Recreation	Delaware
40771	301	8/26/2015	4630	4	0.7	1.3	Pervious Pavement, Stormwater Tree Trench,	Streets	$133,192		Delaware
40773	469	6/13/2018	1312	10	0.2	0.4	Stormwater Tree Trench,	Streets	$112,876		Delaware
40784	406	11/25/2019	1970	0	0.4	0.5	Infiltration Storage Trench,	Streets	$169,388		Schuylkill
40796	1086	12/27/2012	1006	54	0.0	0.3	Stormwater Tree,	Streets	$150,000		Delaware
40798	518	7/16/2020	3351	0	0.8	0.9	Infiltration Storage Trench,	Streets	$651,226		Cobbs-Darby
40799	556	11/1/2018	4317	0	0.8	1.2	Infiltration Storage Trench,	Streets	$308,585		TTF
40816	554	1/7/2019	10995	10	1.6	2.7	Infiltration Storage Trench, Stormwater Tree, Stormwater Tree Trench,	Streets	$669,946		Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
40817	1293	1/29/2018	4096	0	1.0	1.1	Infiltration Storage Trench,	Streets	$285,800		Delaware
40821	504	12/19/2018	1194	4	0.2	0.3	Stormwater Tree Trench,	Streets	$821,260		Delaware
40828	657	6/7/2017	1217	4	0.3	0.3	Stormwater Tree Trench,	Streets	$118,305		Delaware
40829	990	9/27/2019	1890	0	0.4	0.5	Infiltration Storage Trench,	Streets	$249,338		Delaware
40863	1010	6/3/2019	5127	6	1.0	1.4	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$488,972		Delaware
40865	1057	8/30/2018	5473	0	1.3	1.5	Infiltration Storage Trench,	Streets	$552,851		TTF
40891	1062	5/25/2017	16511	26	2.9	4.5	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$684,311		Schuylkill
40900	1058	5/31/2016	2473	0	0.5	0.7	Infiltration Storage Trench,	Streets	$178,903		TTF
40903	656	9/7/2016	541	0	0.1	0.1	Infiltration Storage Trench,	Streets	$78,980		Schuylkill
40906	1246	3/12/2020	867	0	0.1	0.2	Infiltration Storage Trench,	Streets	$124,112		TTF
40918	1149	9/28/2017	1954	0	0.5	0.5	Infiltration Storage Trench,	Streets	$138,348		TTF

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50001	14*	9/17/2013	1977	0	0.5	0.5	Infiltration Storage Trench, Rain Garden,	Streets	$965,800	Department of Recreation, Passyunk Square Civic Association	Delaware
	15*	9/17/2013	1536	8	0.3	0.4	Stormwater Tree Trench,	Streets		Passyunk Square Civic Association	Delaware
	16*	9/17/2013	1112	4	0.2	0.3	Stormwater Tree Trench,	Streets		Department of Recreation, Passyunk Square Civic Association, South Philadelphia Older Adult Center	Delaware
	162*	9/17/2013	5197	26	1.0	1.4	Stormwater Bump-out, Stormwater Tree Trench,	Streets		Department of Recreation	Delaware, Schuylkill
	313*	9/17/2013	1452	0	0.3	0.4	Infiltration Storage Trench,	Streets		Department of Recreation, Passyunk Square Civic Association, South Philadelphia Older Adult Center	Delaware
50002	8*	11/4/2011	3386	6	1.1	0.9	Rain Garden, Stormwater Tree Trench,	Streets	Cost Not Available	Department of Recreation, New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50003	12*	2/8/2013	989	6	0.4	0.3	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Streets	$458,633	City Play, Mural Arts Program, Northern Liberties Neighborhood Association	Delaware
	91*	2/8/2013	1463	10	0.4	0.4	Stormwater Bump-out, Stormwater Tree Trench,	Streets		Northern Liberties Neighborhood Association	Delaware
50005	1*	11/10/2010	3556	12	1.0	1.0	Stormwater Tree Trench,	Streets	Cost Not Available	Pennsylvania Horticulture Society	Delaware
	9*	11/10/2010	1273	8	0.2	0.3	Stormwater Tree Trench,	Streets		New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware
	18*	11/10/2010	609	8	0.3	0.2	Stormwater Tree Trench,	Streets			Schuylkill
50006	187	5/26/2010	922	0	0.2	0.3	Infiltration Storage Trench, Stormwater Planter,	Streets	Cost Not Available	Department of Public Property, Department of Recreation, Friends of Columbus Square	Delaware
50007	21*	10/31/2013	2066	12	0.6	0.6	Swale,	Streets	$297,000	Fairmount Park Commission, Pennsylvania Horticulture Society, Philadelphia Department of Parks & Recreation	Cobbs-Darby

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50009	20*	5/14/2011	4423	26	1.2	0.4	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Streets	Cost Not Available		TTF
50010	19*	10/14/2013	16144	58	2.5	4.2	Stormwater Tree Trench,	Streets	$1,039,450	Department of Recreation	Schuylkill
50011	194	6/1/2009	849	0	0.2	0.2	Rain Garden,	Open Space	Cost Not Available	Northern Liberties Neighborhood Association, Pennsylvania Department of Environmental Protection, Pennsylvania Horticulture Society, Philadelphia Department of Parks & Recreation	Delaware
50012	186	10/1/2007	4563	0	1.2	1.3	Rain Garden,	Open Space	Cost Not Available	Pennsylvania Department of Environmental Protection, Pennsylvania Horticulture Society, Philadelphia Department of Parks & Recreation	TTF
50013	208	7/1/2006	830	8	0.4	0.2	Pervious Pavement, Stormwater Tree Trench,	Streets	Cost Not Available	Pennsylvania Department of Environmental Protection, Pennsylvania Horticulture Society, Philadelphia Department of Recreation	Schuylkill
50014	181	4/1/2007	1260	14	0.4	0.3	Rain Garden,	Vacant Land	Cost Not Available	Pennsylvania Department of Environmental Protection, Pennsylvania Horticulture Society, University City Green	Schuylkill

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50015	185	11/1/2007	3080	0	0.7	0.8	Infiltration Storage Trench,	Open Space	Cost Not Available	Pennsylvania Department of Environmental Protection, Pennsylvania Department of Conservation & Natural Resources, Philadelphia Department of Parks & Recreation	Schuylkill
50016	196	5/1/2006	360	8	0.3	0.1	Rain Garden, Swale,	Streets	Cost Not Available	Pennsylvania Department of Environmental Protection, Philadelphia Water Department, Pennsylvania Horticulture Society	Schuylkill
50019	17*	11/25/2014	3650	4	0.6	1.0	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$1,059,450	Department of Recreation, Friends of Dickinson Park, Southeastern Transportation Authority	Delaware
	79*	11/25/2014	619	0	0.1	0.2	Infiltration Storage Trench,	Streets		Lower Moyamensing Civic Association	Delaware
	81*	11/25/2014	2980	4	0.6	0.8	Infiltration Storage Trench, Stormwater Tree Trench,	Streets		Lower Moyamensing Civic Association	Delaware
	154*	11/25/2014	9882	30	1.7	2.7	Stormwater Tree Trench,	Streets		Tookany/Tacony-Frankford Watershed Partnership	TTF

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50020	2*	4/23/2013	1817	14	0.5	0.5	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Streets	$745,800	Pennsylvania Horticulture Society	Delaware
	157*	4/23/2013	3077	24	0.7	0.8	Stormwater Tree Trench,	Streets		Department of Recreation	Delaware
	245*	4/23/2013	974	6	0.2	0.3	Stormwater Tree Trench,	Streets		Pennsylvania Horticulture Society	Delaware
	296*	4/23/2013	1034	8	0.2	0.3	Stormwater Tree Trench,	Streets		Pennsylvania Horticulture Society	Delaware
	312*	4/23/2013	2313	14	0.6	0.6	Stormwater Tree Trench,	Streets		Department of Recreation	Delaware
50022	13	12/16/2011	402	0	0.2	0.1	Infiltration Storage Trench,	Open Space	Cost Not Available	City Play, Digsau, Northern Liberties Neighborhood Association, Philadelphia Department of Parks & Recreation	Delaware
50023	192	10/2/2012	2689	24	0.3	0.5	Infiltration Storage Trench, Pervious Pavement, Rain Garden,	Open Space	Cost Not Available	Philadelphia Capital Program Office, Philadelphia Department of Parks & Recreation	Delaware
50024	170	10/10/2010	3033	8	0.4	0.8	Stormwater Tree Trench,	Open Space	Cost Not Available	New Kensington Community Development Corporation, Pennsylvania Horticulture Society, Philadelphia Department of Parks & Recreation	Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50025	223*	10/22/2013	3374	6	0.5	0.9	Stormwater Tree Trench,	Streets	$1,184,930	Lower Moyamensing Civic Association	Delaware
	224*	10/22/2013	6569	8	1.1	1.8	Stormwater Tree Trench,	Streets			Delaware
	226*	10/22/2013	2905	10	0.5	0.8	Stormwater Tree Trench,	Streets			Schuylkill
	227*	10/22/2013	4723	10	1.0	1.3	Stormwater Tree Trench,	Streets			Schuylkill
50026	210*	12/13/2012	8296	18	1.5	2.3	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$1,717,800	Pennsylvania Environmental Council	Cobbs-Darby
	211*	12/13/2012	9382	24	1.5	2.4	Stormwater Bump-out, Stormwater Planter, Stormwater Tree Trench,	Streets		Pennsylvania Environmental Council	Schuylkill
	216*	12/13/2012	4551	8	1.0	1.3	Stormwater Tree Trench,	Streets		Pennsylvania Environmental Council	Cobbs-Darby
	231*	12/13/2012	10310	24	1.8	2.8	Stormwater Bump-out, Stormwater Planter, Stormwater Tree Trench,	Streets		Pennsylvania Environmental Council	Cobbs-Darby, Schuylkill

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50027	59*	11/23/2012	3251	4	0.5	0.9	Stormwater Tree Trench,	Streets	$1,083,720	Pennsylvania Environmental Council	Cobbs-Darby
	212*	11/23/2012	5179	14	0.8	1.4	Stormwater Tree Trench,	Streets		Pennsylvania Environmental Council	Cobbs-Darby
	213*	11/23/2012	5456	14	1.0	1.5	Stormwater Tree Trench,	Streets		Department of Recreation, Pennsylvania Environmental Council	Cobbs-Darby
	214*	11/23/2012	2804	8	0.4	0.8	Stormwater Tree Trench,	Streets			Cobbs-Darby
	215*	11/23/2012	6421	12	1.0	1.8	Stormwater Tree Trench,	Streets		Pennsylvania Environmental Council	Cobbs-Darby
50028	175*	12/24/2012	5051	12	0.7	1.4	Stormwater Tree Trench,	Streets	$672,320		Delaware
	176*	12/24/2012	2401	6	0.5	0.7	Stormwater Tree Trench,	Streets			Delaware
	177*	12/24/2012	7190	20	1.0	1.6	Stormwater Tree Trench,	Streets			Delaware
	178*	12/24/2012	4252	12	0.5	1.0	Stormwater Tree Trench,	Streets		Fairmount Park Commission, Pennsylvania Horticulture Society	Delaware
50029	147*	5/10/2013	709	0	0.3	0.2	Infiltration Storage Trench,	Streets	$1,577,800	Department of Recreation	TTF
	179*	5/10/2013	31170	78	5.3	8.6	Stormwater Tree Trench,	Streets			TTF

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50030	171	9/27/2018	5122	22	0.9	1.4	Stormwater Tree Trench,	Streets	$1,500,170	Fairmount Park Commission, Pennsylvania Horticulture Society	Delaware
	172	9/27/2018	11055	28	1.8	3.0	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Streets		Fairmount Park Commission, Pennsylvania Horticulture Society	Delaware
	173	9/27/2018	2428	10	0.4	0.7	Stormwater Tree Trench,	Streets			Delaware
50031	123	1/15/2013	4911	14	1.1	1.4	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Streets	$218,321		Cobbs-Darby, Schuylkill
50032	180	11/5/2011	646	8	0.1	0.2	Stormwater Tree Trench,	Streets	Cost Not Available	Pennsylvania Horticulture Society	Delaware
	324	11/5/2011	768	8	0.2	0.2	Stormwater Tree Trench,	Streets		Pennsylvania Horticulture Society	Delaware
	325	11/5/2011	1088	8	0.2	0.3	Stormwater Tree Trench,	Streets		Pennsylvania Horticulture Society	Delaware
	326	11/5/2011	1047	12	0.4	0.3	Stormwater Tree Trench,	Streets		Pennsylvania Horticulture Society	Delaware
	327	11/5/2011	1029	8	0.2	0.3	Stormwater Tree Trench,	Streets		Pennsylvania Horticulture Society	Delaware
	342	11/5/2011	1292	8	0.3	0.4	Stormwater Tree Trench,	Streets		Pennsylvania Horticulture Society	Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50033	46	11/1/2010	6091	34	1.0	1.6	Stormwater Bump-out, Rain Garden, Swale, Stormwater Tree Trench,	Streets	Cost Not Available	Environmental Protection Agency, Philadelphia Department of Commerce, Philadelphia Industrial Development Corporation	Schuylkill
50034	10*	9/20/2013	3921	8	0.8	1.08	Stormwater Bump-out, Stormwater Tree Trench,	Streets	$638,960	New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware
	88*	9/20/2013	3866	2	0.7	1.1	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Streets		New Kensington Community Development Corporation, Pennsylvania Horticulture Society	Delaware
50035	45	6/1/2011	3561	0	0.7	1.0	Infiltration Storage Trench,	Streets	Cost Not Available	Fairmount Park Commission	Schuylkill
50036	50*	4/25/2014	3353	0	0.6	0.9	Stormwater Bump-out, Infiltration Storage Trench,	Streets	$693,670	Philadelphia Department of Parks & Recreation	Delaware, Schuylkill
	228*	4/25/2014	1189	2	0.2	0.3	Stormwater Tree Trench,	Streets		Philadelphia Department of Parks & Recreation	Delaware
	277*	4/25/2014	4880	10	0.8	1.3	Stormwater Tree Trench,	Streets			Delaware
	278*	4/25/2014	4885	6	0.9	1.3	Stormwater Tree Trench,	Streets			TTF

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50037	250*	9/9/2013	6497	26	1.1	1.8	Stormwater Tree Trench,	Streets	$1,627,500		Schuylkill
	251*	9/9/2013	3614	12	0.6	1.0	Stormwater Tree Trench,	Streets			Schuylkill
	252*	9/9/2013	2933	14	0.6	0.8	Stormwater Tree Trench,	Streets			Schuylkill
	253*	9/9/2013	7095	30	1.3	1.9	Stormwater Tree Trench,	Streets			Schuylkill
	254*	9/9/2013	3297	8	0.5	0.9	Stormwater Tree Trench,	Streets			Schuylkill
	255*	9/9/2013	5776	8	1.0	1.6	Stormwater Tree Trench,	Streets			Cobbs-Darby
	256*	9/9/2013	3189	6	0.6	0.9	Stormwater Tree Trench,	Streets			Schuylkill
	257*	9/9/2013	2921	10	0.6	0.8	Stormwater Tree Trench,	Streets			Schuylkill
50038	247*	5/16/2013	3566	14	0.5	1.0	Stormwater Tree Trench,	Streets	$1,348,200	Department of Public Property	Schuylkill
	258*	5/16/2013	3728	24	0.7	1.0	Stormwater Tree Trench,	Streets			Schuylkill
	259*	5/16/2013	8933	36	1.3	2.5	Stormwater Tree Trench,	Streets			Schuylkill
	260*	5/16/2013	4471	14	0.7	1.2	Stormwater Tree Trench,	Streets			Schuylkill
	261*	5/16/2013	1604	8	0.2	0.4	Stormwater Tree Trench,	Streets			Schuylkill
	262*	5/16/2013	2029	8	0.4	0.6	Stormwater Tree Trench,	Streets			Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50039	268*	8/1/2014	4225	18	0.9	1.2	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$978,020		Delaware
	269*	8/1/2014	7687	42	1.1	2.0	Stormwater Tree Trench,	Streets			Delaware
	270*	8/1/2014	6641	22	0.6	1.2	Stormwater Tree Trench,	Streets			Delaware
	283*	8/1/2014	1985	2	0.3	0.5	Stormwater Tree Trench,	Streets		Philadelphia Housing Authority	Delaware
50040	153	1/0/1900	8562	30	1.8	2.4	Infiltration Storage Trench, Stormwater Planter,	Streets	$1,469,280		Delaware
50041	167*	1/13/2014	9885	26	1.7	2.7	Stormwater Tree Trench,	Streets	$1,272,600	Snyderville Community Development Corporation	Schuylkill
	264*	1/13/2014	4488	12	0.8	1.2	Stormwater Planter, Stormwater Tree Trench,	Streets		Snyderville Community Development Corporation	Cobbs-Darby
	265*	1/13/2014	8480	10	1.4	2.3	Infiltration Storage Trench, Stormwater Tree Trench,	Streets		Snyderville Community Development Corporation	Cobbs-Darby
	266*	1/13/2014	3312	0	0.8	1.5	Infiltration Storage Trench, Rain Garden,	Streets		Snyderville Community Development Corporation	Cobbs-Darby

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50042	271*	9/30/2013	7709	6	1.2	2.0	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Streets	$1,875,300	Philadelphia Department of Parks & Recreation, Tacony Civic Association	Delaware
	272*	9/30/2013	12714	26	2.0	3.4	Infiltration Storage Trench, Stormwater Tree Trench,	Streets		Tacony Civic Association	Delaware, TTF
	273*	9/30/2013	5752	14	0.8	1.6	Stormwater Tree Trench,	Streets		Tacony Civic Association	Delaware
	274*	9/30/2013	8439	12	1.3	2.2	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Streets		Roosevelt Playground Park Advisory Council, Tacony Civic Association	Delaware
	275*	9/30/2013	1968	4	0.3	0.5	Stormwater Tree Trench,	Streets		Tacony Civic Association	Delaware
50043	279*	12/4/2012	2996	0	0.6	0.8	Stormwater Basin,	Open Space	$521,400	Philadelphia Department of Parks & Recreation	TTF
	281*	12/4/2012	4567	0	0.9	1.3	Rain Garden,	Open Space		Philadelphia Department of Parks & Recreation	TTF
50044	280	1/21/2015	36648	138	5.2	10.1	Infiltration Storage Trench, Rain Garden, Swale,	Open Space	$2,360,400	Philadelphia Department of Parks & Recreation	TTF
	282	1/21/2015	41165	14	4.8	9.5	Rain Garden,	Open Space		Philadelphia Department of Parks & Recreation	TTF

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50045	292	3/16/2017	13098	0	1.9	3.5	Infiltration Storage Trench,	Streets	Cost Not Available	Department of Public Property, Philadelphia Department of Parks & Recreation	Schuylkill
50046	243*	9/27/2012	3539	0	1.1	1.0	Infiltration Storage Trench, Rain Garden, Swale,	Open Space	$574,200	Tookany/Tacony-Frankford Watershed Partnership, Philadelphia Department of Parks & Recreation, Frankford Civic Association	TTF
50047	366	5/29/2013	6510	0	1.2	1.8	Infiltration Storage Trench, Stormwater Planter, Rain Garden,	Streets	Cost Not Available	Philadelphia Department of Parks & Recreation, Philadelphia Zoo	Schuylkill
50048	375	10/26/2017	6067	20	0.9	1.6	Stormwater Tree Trench,	Streets	$1,156,260		TTF
	377	10/26/2017	1898	0	0.5	0.5	Infiltration Storage Trench, Rain Garden, Swale,	Streets			TTF
	378	10/26/2017	3260	18	0.6	0.9	Stormwater Tree Trench,	Streets			TTF
	379	10/26/2017	5370	22	1.0	1.5	Stormwater Tree Trench,	Streets			TTF

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50049	291	9/27/2017	5961	6	1.0	1.6	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$1,251,475	Community Design Collaborative	Delaware
	388	9/27/2017	5964	10	1.2	1.7	Infiltration Storage Trench, Stormwater Tree Trench,	Streets			Delaware
	389	9/27/2017	3483	6	0.8	1.0	Infiltration Storage Trench, Stormwater Tree Trench,	Streets			Delaware
50051	392	2/3/2015	9534	16	1.7	2.6	Stormwater Tree Trench,	Streets	$2,686,122		Cobbs-Darby, Schuylkill
	393	2/3/2015	17099	18	3.1	4.7	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Streets		Philadelphia Department of Parks & Recreation	Schuylkill
	394	2/3/2015	5490	12	0.9	1.5	Infiltration Storage Trench, Stormwater Tree Trench,	Streets			Schuylkill
	396	2/3/2015	8973	34	1.6	2.5	Stormwater Tree Trench,	Streets			Schuylkill
	397	2/3/2015	5678	16	1.1	1.6	Stormwater Tree Trench,	Streets			Schuylkill
	398	2/3/2015	16467	36	2.6	4.3	Stormwater Tree Trench,	Streets			Cobbs-Darby, Schuylkill

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50052	335	3/12/2018	6081	4	1.0	1.7	Stormwater Bump-out, Infiltration Storage Trench,	Streets	$2,415,060	Southeastern Transportation Authority	TTF
	380	3/12/2018	29798	0	4.7	8.0	Stormwater Bump-out, Infiltration Storage Trench, Swale,	Streets			TTF
	383	3/12/2018	6574	0	1.2	1.8	Infiltration Storage Trench,	Streets			TTF
50053	314	3/28/2018	6144	32	1.5	1.7	Stormwater Tree Trench,	Streets	$1,926,357		TTF
	384	3/28/2018	4170	18	0.7	1.1	Stormwater Tree Trench,	Streets			Delaware
	385	3/28/2018	2959	14	0.5	0.8	Stormwater Tree Trench,	Streets			Delaware
	386	3/28/2018	5569	16	0.8	1.5	Stormwater Tree Trench,	Streets			Delaware
	413	3/28/2018	2458	0	0.4	0.7	Stormwater Bump-out, Infiltration Storage Trench,	Streets		Department of Public Property	TTF
	439	3/28/2018	2770	6	0.4	0.8	Stormwater Tree Trench,	Streets			Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50055	246	3/20/2019	5252	26	0.8	1.4	Stormwater Tree Trench,	Streets	$2,264,300	Drexel University	Schuylkill
	344	3/20/2019	2506	6	0.3	0.6	Stormwater Tree Trench,	Streets			Schuylkill
	399	3/20/2019	11271	58	1.8	3.0	Stormwater Tree Trench,	Streets		Philadelphia Planning Commission, Philadelphia Department of Parks & Recreation	Cobbs-Darby, Schuylkill
	400	3/20/2019	11821	0	1.7	3.0	Stormwater Bump-out, Infiltration Storage Trench, Swale,	Streets		American Cities Foundation	Schuylkill
50057	417	7/8/2014	2326	0	0.3	0.6	Rain Garden,	Streets	$34,123	Philadelphia Streets Department, Ogontz Avenue Revitalization Corporation, Mayors Office of Transportation & Utilities	TTF
50059	410	9/1/2016	12731	0	1.8	3.5	Rain Garden,	Open Space	$849,370	Southeastern Transportation Authority, Philadelphia Department of Parks & Recreation	Delaware
50061	471	2/8/2016	2650	0	0.5	0.7	Infiltration Storage Trench,	Streets	$179,530	Philadelphia Streets Department	Delaware
50062	470	12/14/2015	6732	30	1.4	1.9	Stormwater Tree Trench,	Streets	$458,168	Philadelphia Streets Department	Cobbs-Darby, Schuylkill
50063	310	5/2/2012	10798	40	2.0	2.9	Rain Garden,	Parking	Cost Not Available	Department of Public Property	Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50065	367	5/14/2015	3770	16	0.9	1.0	Infiltration Storage Trench, Rain Garden,	Open Space	$235,015	Department of Public Property, Philadelphia Department of Parks & Recreation	Delaware
50067	276	10/31/2016	8510	20	1.6	2.3	Swale, Stormwater Tree Trench,	Streets	$1,030,985		Delaware
50068	244	11/8/2016	6056	10	0.7	1.4	Infiltration Storage Trench, Rain Garden, Swale,	Open Space	$762,467	Community Ventures, Department of Public Property, Philadelphia Department of Parks & Recreation	Delaware
50069	511	2/5/2016	272	20	0.0	0.1	Stormwater Tree,	Streets	Cost Not Available	Philadelphia Streets Department	Delaware
50070	524	11/13/2015	700	0	0.2	0.4	Infiltration Storage Trench, Pervious Pavement,	Open Space	$199,104	Department of Public Property, Philadelphia Department of Parks & Recreation	Delaware
50071	475	6/23/2017	5697	12	1.2	1.6	Infiltration Storage Trench, Rain Garden,	Open Space	$242,000	Philadelphia School District, Philadelphia Department of Parks & Recreation, Trust for Public Land	Delaware
50075	479	6/13/2014	8738	0	1.5	2.4	Rain Garden,	Schools	Cost Not Available	Philadelphia School District, Philadelphia Department of Parks & Recreation, Trust for Public Land	Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50077	322	9/16/2016	5574	20	1.2	1.5	Rain Garden, Swale, Stormwater Tree Trench,	Vacant Land	$724,900		Schuylkill
	530	9/16/2016	1417	0	0.3	0.4	Infiltration Storage Trench, Rain Garden,	Open Space		Philadelphia Department of Parks & Recreation	Schuylkill
	558	9/16/2016	3638	8	0.7	1.0	Infiltration Storage Trench, Rain Garden,	Vacant Land		Department of Public Property, Philadelphia Department of Parks & Recreation	Schuylkill
50078	303	10/7/2016	3531	0	0.7	1.0	Infiltration Storage Trench, Rain Garden,	Vacant Land	$887,337	Tookany/Tacony-Frankford Watershed Partnership	TTF
	642	10/7/2016	7685	24	1.4	2.1	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Open Space		Philadelphia Department of Parks & Recreation	TTF
50079	401	7/23/2018	15204	0	2.1	4.2	Depaving, Infiltration Storage Trench,	Open Space	$1,070,000	Philadelphia Department of Parks & Recreation	Schuylkill
50080	588	6/13/2013	2265	46	0.9	0.5	Rain Garden,	Streets	Cost Not Available	DRWC	Delaware
50082	597	7/31/2013	481	0	0.1	0.1	Infiltration Storage Trench,	Streets	Cost Not Available	Southeastern Transportation Authority	Schuylkill
50083	151	12/9/2016	1181	0	0.3	0.4	Depaving, Infiltration Storage Trench, Rain Garden,	Open Space	$122,000	Philadelphia Department of Parks & Recreation	Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50084	487	1/13/2020	17566	30	2.8	4.8	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Open Space	$1,854,915	Philadelphia Department of Parks & Recreation	Delaware
	580	1/13/2020	19075	0	2.9	5.3	Infiltration Storage Trench, Rain Garden,	Open Space		Philadelphia Department of Parks & Recreation	Delaware, TTF
50085	574	10/8/2015	1609	0	0.3	0.4	Infiltration Storage Trench, Rain Garden,	Open Space	$152,300	Philadelphia Department of Parks & Recreation, Councilman Johnson, Urban Roots	Schuylkill
50089	455	10/29/2019	8478	0	1.2	2.3	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter,	Streets	$1,894,365		TTF
	459	10/29/2019	10796	8	2.2	3.0	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Streets			TTF
	586	10/29/2019	7267	14	1.8	2.0	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Streets			TTF

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50091	589	7/6/2016	3033	2	0.6	0.8	Infiltration Storage Trench, Rain Garden,	Open Space	$255,000	Philadelphia Department of Parks & Recreation	Schuylkill
50097	483	8/16/2018	2711	0	0.5	0.7	Infiltration Storage Trench,	Open Space	$1,254,030	Philadelphia Department of Parks & Recreation	Delaware
	634	8/16/2018	1683	6	0.3	0.5	Stormwater Tree Trench,	Streets			Delaware
	637	8/16/2018	5732	20	0.8	1.5	Stormwater Tree Trench,	Streets			Delaware
	638	8/16/2018	4809	26	0.7	1.3	Stormwater Tree Trench,	Streets			Delaware
	993	8/16/2018	1471	4	0.2	0.4	Stormwater Tree Trench,	Streets			Delaware
50098	1007	2/15/2018	7040	0	1.6	1.9	Infiltration Storage Trench, Rain Garden,	Open Space	$745,500	Philadelphia Department of Parks & Recreation	Delaware
50102	1012	10/6/2016	237101	0	0.0	0.0	Infiltration Storage Trench,	Open Space	$3,868,357	Philadelphia Department of Parks & Recreation	Schuylkill
50103	1024	9/7/2018	561	0	0.2	0.3	Drainage Well,	Streets	$641,190		Cobbs-Darby
	1025	9/7/2018	258	0	0.2	0.2	Drainage Well,	Streets			Delaware
	1029	9/7/2018	458	0	0.4	0.3	Drainage Well,	Streets			Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50104	578	12/7/2018	24682	40	3.2	6.4	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Open Space	$2,364,875	Philadelphia Department of Parks & Recreation	TTF
	1050	12/7/2018	18611	68	3.1	5.1	Infiltration Storage Trench, Stormwater Tree Trench,	Streets			TTF
50109	1023	4/10/2019	440	22	0.2	0.1	Stormwater Tree,	Streets	$207,955		Schuylkill
50112	1055	2/9/2018	16811	34	2.5	3.8	Infiltration Storage Trench, Rain Garden,	Streets	$500,000	Philadelphia Department of Parks & Recreation	Schuylkill
50113	600	12/16/2016	2006	4	0.3	0.5	Infiltration Storage Trench, Rain Garden,	Open Space	$90,000	Philadelphia Department of Parks & Recreation	Schuylkill
50124	1085	2/5/2020	55349	0	7.7	15.2	Infiltration Storage Trench,	Open Space	$3,218,515		Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50129	1127	6/29/2020	5602	22	0.8	1.5	Rain Garden, Stormwater Tree Trench,	Vacant Land	$2,485,075	Philadelphia Department of Parks & Recreation	Schuylkill
	1128	6/29/2020	14384	16	2.2	3.9	Stormwater Bump-out, Stormwater Tree Trench,	Streets		Philadelphia Department of Parks & Recreation	Schuylkill
	1129	6/29/2020	14605	44	2.4	4.0	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Streets			Schuylkill
50138	1145	11/19/2019	22300	42	3.7	6.1	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$2,605,100	Philadelphia Department of Parks & Recreation	Schuylkill
	1146	11/19/2019	7861	6	1.3	2.2	Stormwater Bump-out, Infiltration Storage Trench, Rain Garden,	Open Space			Schuylkill
50143	1195	1/19/2018	25668	0	2.6	5.2	Infiltration Storage Trench, Rain Garden,	Open Space	$1,163,250	Fairmount Park Conservancy	Schuylkill
50145	1163	2/7/2020	10060	12	1.8	2.8	Infiltration Storage Trench, Rain Garden,	Open Space	$718,105		Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50146	1197	5/21/2019	1750	6	0.3	0.5	Infiltration Storage Trench, Rain Garden,	Vacant Land	$2,242,540		Schuylkill
	1198	5/21/2019	20674	86	3.4	5.4	Stormwater Bump-out, Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Streets			Schuylkill
50150	1015	2/10/2017	4224	2	0.7	1.2	Infiltration Storage Trench, Rain Garden,	Open Space	$285,550	Philadelphia Department of Parks & Recreation	Delaware
50151	1204	6/13/2018	1106	0	0.1	0.3	Stormwater Bump-out, Infiltration Storage Trench,	Streets	Cost Not Available	Center City District	Delaware
50152	1209	1/29/2020	9931	22	1.6	2.7	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Streets	$879,875		Schuylkill
50155	488	5/22/2018	10725	16	1.9	3.0	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Open Space	$745,800	Department of Public Property, Philadelphia Department of Parks & Recreation, Councilman Johnson, Urban Roots	Schuylkill
50157	1240	3/20/2020	12134	36	2.3	3.3	Infiltration Storage Trench, Stormwater Tree Trench,	Streets	$1,076,515		Delaware

Work Number	Project ID	Construction Complete Date	Storage Volume (cf)	New Trees	Drainage Area (acres)	Greened Acre (acre-inches)	SMP Types	Program	Green Construction Cost**	Partner(s)	Watershed
50179	1288	2/21/2019	20873	36	4.1	5.7	Infiltration Storage Trench, Stormwater Planter, Rain Garden, Stormwater Tree Trench,	Streets	$1,804,250		Schuylkill
50195	290	4/3/2019	10451	0	1.5	2.7	Stormwater Bump-out, Infiltration Storage Trench,	Streets	$1,018,205	Philadelphia Planning Commission, Southeastern Transportation Authority, Nicetown Community Development Corporation	TTF
Total Greened Acres						**394**					

* Pennvest project

** Reported construction costs may vary from past fiscal years. Beginning in FY19, PWD developed the capability to track Green Construction Cost, cost specifically associated Green Stormwater Infrastructure line items.

Appendix 2

Planned Public Green Stormwater Infrastructure Projects

Table 1: Public Planned Project Tracking Metrics and Reporting Format

Public Project Tracking Metrics										
Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partners	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost

Over the past year, PWD's new capital projects tracking system's (CIPIT) interaction with its GSI tracking system (GreenIT) has slightly changed. To accommodate this change, we have replaced Project Names with a Work Number and a Project ID. The Project ID is unique to individual projects and these projects can be bundled under one Work Number for bidding purposes. Moving forward, Work Numbers will have a 1:1 relationship with projects.

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
20407	351	Combined	Cobbs-Darby	Streets	Design	Infiltration Storage Trench,	Philadelphia Water Department	TBD	2023	TBD
	492	Combined	Cobbs-Darby	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	
50090	539	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
	540	Combined	Delaware	Streets	Design	Stormwater Bump-out, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	
50126	1088	Combined	TTF	Streets	Design	Stormwater Bump-out,	Streets Department	TBD	2023	TBD
	1089		TTF	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench,	Streets Department	TBD	2023	
	1262	Combined	Delaware	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Streets Department	TBD	2023	

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50141	1150	Combined	TTF	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
	1151	Combined	TTF	Open Space	Design	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	TBD	2023	
50196	1318	Combined, Separate	Schuylkill, TTF	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
	1319	Combined, Separate	Schuylkill, TTF	Open Space	Design	Rain Garden, Swale, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	
50202	1333	Combined	TTF	Open Space	Design	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	TBD	2023	TBD
	1334	Combined	TTF	Streets, Open Space	Design	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	
20464	1381	Combined, Separate	Schuylkill, TTF, Wissahickon	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
20468	1468	Combined	Cobbs-Darby	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20479	1451	Combined	Delaware, TTF	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,		TBD	2023	TBD
20496	1212	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
20517	1418	Combined, Separate	TTF	Streets	Design	Stormwater Tree,	Philadelphia Water Department	TBD	2023	TBD
20552	1489	Combined	Delaware	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20559	1463	Combined	Delaware	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,		TBD	2023	TBD
20573	1479	Combined	Delaware	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20575	1465	Combined	TTF	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,		TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
20578	1542	Combined	Delaware	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20579	1466	Combined	Cobbs-Darby	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench,		TBD	2023	TBD
20583	1470	Combined, Separate	TTF	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,		TBD	2023	TBD
20588	1487	Combined	TTF	Streets	Design	Infiltration Storage Trench,		TBD	2023	TBD
20597	1543	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20599	1501	Combined	Delaware	Streets	Design	Stormwater Planter,		TBD	2023	TBD
20601	1464	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20609	1484	Combined	Delaware	Streets	Design	Infiltration Storage Trench ,Stormwater Tree Trench,		TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
20614	1494	Combined, Separate	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20619	1485	Combined, Separate	Delaware, Pennypack	Streets	Design	Stormwater Bump-out,		TBD	2023	TBD
20622	1523	Combined	TTF	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
20624	1530	Combined, Separate	Delaware, TTF	Streets	Design			TBD	2023	TBD
20625	1504	Combined	TTF	Streets	Design	Stormwater Bump-out,		TBD	2023	TBD
20630	1547	Combined	Delaware	Streets	Design			TBD	2023	TBD
40736	236	Combined	Delaware	Streets	Design	Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40780	1496	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
40826	1063	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40857	1008	Combined	Delaware, Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40860	1443	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
40864	1132	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40869	1289	Combined	TTF	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40875	1515	Combined, Non-Contributing	Cobbs-Darby	Streets	Design	Infiltration Storage Trench,		TBD	2023	TBD
40877	1550	Combined	Delaware	Streets	Design		Pennsylvania Department of Transportation	TBD	2023	TBD
40882	1245	Combined	Delaware	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
40923	1244	Combined	Delaware	Streets	Design	Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40933	1521	Combined	Delaware	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
40975	1377	Combined	Schuylkill	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40989	1340	Combined	Pennypack	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40996	1366	Combined	Delaware	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
40999	1391	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
41008	1402	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
41025	1409	Combined	Delaware	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
41033	1505	Combined	Schuylkill	Streets	Design	Infiltration Storage Trench,		TBD	2023	TBD
41039	1455	Combined	Delaware	Streets	Design	Stormwater Tree Trench,	Pennsylvania Department of Transportation	TBD	2023	TBD
41049	1398	Combined	Delaware	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
41064	1452	Combined	Delaware	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
41068	1407	Combined	Cobbs-Darby	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
41070	1435	Combined	Delaware, Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
41071	1471	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
41080	1506	Combined	Schuylkill	Streets	Design	Infiltration Storage Trench,		TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
41096	1457	Combined	Cobbs-Darby	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
41098	1518	Combined	Cobbs-Darby	Streets	Design	Infiltration Storage Trench,		TBD	2023	TBD
41103	1492	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
41105	1497	Combined	Cobbs-Darby	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
41115	1552	Combined	Schuylkill	Streets	Design			TBD	2023	TBD
41117	1551	Combined	Cobbs-Darby	Streets	Design			TBD	2023	TBD
41122	1514	Combined	Delaware	Streets	Design	Infiltration Storage Trench,		TBD	2023	TBD
41124	1540	Combined	TTF	Streets	Design			TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
41126	1549	Combined	Delaware	Streets	Design			TBD	2023	TBD
41135	1553	Combined	Delaware	Streets	Design			TBD	2023	TBD
50081	408	Combined	Delaware	Open Space	Design	Infiltration Storage Trench, Rain Garden, Swale,	Philadelphia Parks & Recreation	TBD	2023	TBD
50107	1052	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50140	1148	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50144	1165	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Rain Garden, Swale,	Department of Commerce	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50154	1211	Combined	TTF	Streets	Design	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50164	1258	Combined	TTF	Facilities	Design	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	TBD	2023	TBD
50168	1271	Combined	Cobbs-Darby	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50169	1365	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50176	1283	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50180	1285	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50186	1301	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50192	1311	Combined	Delaware	Open Space	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50197	1322	Combined	Delaware	Streets	Design	Rain Garden,	Philadelphia Water Department	TBD	2023	TBD
50198	1327	Combined	Schuylkill	Streets	Design	Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50199	1328	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50201	1335	Combined	TTF	Vacant Land	Design	Infiltration Storage Trench, Rain Garden, Swale,	Philadelphia Water Department	TBD	2023	TBD
50203	1336	Combined	Schuylkill	Streets	Design	Infiltration Storage Trench, Rain Garden, Swale, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50204	1339	Combined	Delaware	Open Space	Design	Infiltration Storage Trench, Stormwater Planter, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50205	1341	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50206	1343	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50207	1342	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50214	1353	Combined, Non-Contributing	Pennypack	Streets	Design	Infiltration Storage Trench,	Philadelphia Parks & Recreation	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50215	1354	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50218	1357	Combined	Cobbs-Darby	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50219	1360	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50220	1361	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50222	1374	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Rain Garden, Stormwater Tree,	Philadelphia Water Department	TBD	2023	TBD
50226	1382	Combined	Delaware, TTF	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50233	1389	Combined	Cobbs-Darby	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
	1390	Combined	Cobbs-Darby	Open Space	Design	Rain Garden,	Philadelphia Water Department	TBD	2023	
50236	1393	Combined	TTF	Parking, Streets, Vacant Land	Design	Infiltration Storage Trench, Rain Garden,	Philadelphia Industrial Development Corporation	TBD	2023	TBD
50237	1394	Combined	Delaware	Streets	Design	Rain Garden,	Philadelphia Water Department	TBD	2023	TBD
50240	1401	Combined	Cobbs-Darby	Open Space, Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50241	1403	Combined	TTF	Open Space, Streets	Design	Infiltration Storage Trench, Rain Garden, Swale,	Philadelphia Water Department	TBD	2023	TBD
50242	1404	Combined	TTF	Open Space, Streets	Design	Stormwater Basin, Stormwater Bump-out, Stormwater Planter, Swale,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50243	1405	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50246	1412	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50248	1414	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50252	1420	Combined	TTF	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50253	1421	Combined	Schuylkill	Streets, Vacant Land	Design	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50255	1425	Combined, Non-Contributing	Cobbs-Darby	Open Space, Streets	Design	Stormwater Bump-out, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50258	1429	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50259	1431	Combined, Separate	Delaware, Pennypack	Streets	Design	Infiltration Storage Trench,	Streets Department	TBD	2023	TBD
50260	1433	Combined, Non-Contributing	Cobbs-Darby	Open Space, Streets	Design	Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50262	1436	Combined, Non-Contributing	Cobbs-Darby	Open Space, Streets	Design	Stormwater Bump-out, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50263	1437	Combined, Separate	Delaware, Pennypack	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50264	1438	Combined	Delaware	Streets, Vacant Land	Design	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	TBD	2023	TBD
50265	1439	Combined	Cobbs-Darby	Open Space, Streets	Design	Stormwater Bump-out, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50266	1440	Combined	TTF	Open Space, Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50267	1441	Combined, Separate	Pennypack	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50268	1442	Combined, Non-Contributing	TTF	Streets	Design	Stormwater Planter,	Pennsylvania Department of Transportation	TBD	2023	TBD
50269	1444	Combined	Delaware, Pennypack	Open Space, Streets	Design	Infiltration Storage Trench,	Philadelphia Water Department	TBD	2023	TBD
50270	1445	Combined	Delaware	Streets, Vacant Land	Design	Rain Garden,	Philadelphia Water Department	TBD	2023	TBD
50271	1446	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,		TBD	2023	TBD
50272	1447	Combined	Delaware	Streets	Design	Stormwater Bump-out, Rain Garden, Stormwater Tree,	Philadelphia Water Department	TBD	2023	TBD
50274	1449	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,		TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50275	1450	Combined, Separate	Pennypack	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,		TBD	2023	TBD
50276	1454	Combined	Delaware, Pennypack	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50277	1456	Combined	Delaware, Schuylkill	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50279	1459	Combined	TTF	Streets, Vacant Land	Design	Stormwater Basin,	Philadelphia Water Department	TBD	2023	TBD
50281	1461	Combined	Cobbs-Darby, Schuylkill	Facilities, Streets	Design	Rain Garden,		TBD	2023	TBD
50282	1462	Combined	Delaware	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Streets Department	TBD	2023	TBD
50283	1467	Combined, Separate, Non-Contributing	TTF	Open Space, Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50284	1469	Combined	Delaware, Pennypack	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50286	1473	Combined	Cobbs-Darby	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,		TBD	2023	TBD
50287	1474	Combined	Schuylkill	Streets	Design	Stormwater Tree Trench,		TBD	2023	TBD
50288	1475	Combined	Delaware, Pennypack	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50290	1477	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50292	1480	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50293	1481	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50294	1482	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Swale, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50295	1483	Combined	Delaware	Streets	Design	Stormwater Tree Trench,	HACE	TBD	2023	TBD
50296	1486	Combined	Schuylkill	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50297	1490	Combined	Delaware	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50298	1491	Combined	Delaware, TTF	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50299	1495	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50300	1498	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50302	1500	Combined, Separate	Delaware, TTF	Streets	Design	Stormwater Bump-out,	Philadelphia Water Department	TBD	2023	TBD
50303	1502	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench,	Philadelphia Water Department	TBD	2023	TBD
50304	1503	Combined	Cobbs-Darby, Schuylkill	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50307	1509	Combined	Cobbs-Darby, Schuylkill	Open Space, Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50309	1512	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50311	1516	Combined, Separate	Schuylkill, TTF	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50312	1517	Combined	Delaware, TTF	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50313	1519	Combined	Delaware	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50314	1522	Combined	Schuylkill	Streets	Design	Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50315	1524	Combined	Delaware	Streets	Design	Stormwater Bump-out,	Philadelphia Water Department	TBD	2023	TBD
50316	1525	Combined	Delaware	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50317	1527	Combined	Delaware, TTF	Streets	Design	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50319	1531	Combined	Cobbs-Darby	Facilities, Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50320	1544	Combined	Schuylkill	Streets	Design			TBD	2023	TBD
50321	1537	Combined	TTF	Streets	Design	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50322	1538	Combined	TTF	Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50323	1541	Combined	Cobbs-Darby	Streets	Design	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50324	1545	Combined	Delaware, TTF	Streets	Design	Stormwater Bump-out, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50325	1546	Combined	Schuylkill	Open Space, Streets	Design	Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
50326	1548	Combined	Delaware, TTF	Open Space, Streets	Design	Stormwater Bump-out, Stormwater Planter, Swale, Stormwater Tree Trench,	Philadelphia Water Department	TBD	2023	TBD
71102	1526	Combined, Separate, Non-Contributing	Delaware, TTF	Facilities	Design			TBD	2023	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50128	1090	Combined	Delaware	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	4.6	2022	TBD
	1107	Combined	Delaware	Streets	In Contract Management	Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	1.4	2022	
	1269	Combined	Delaware	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	0.6	2022	
50133	1139	Combined	TTF	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree, Stormwater Tree Trench,	Philadelphia Water Department	17.6	2022	TBD
	1298	Combined	TTF	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.9	2022	
50181	1290	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	0.7	2022	TBD
	1291	Combined	Schuylkill	Facilities, Parking	In Contract Management	Infiltration Storage Trench, Stormwater Planter,	Philadelphia Water Department	3.8	2022	

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
20417	1061	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	1.7	2022	TBD
20437	1124	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	3.6	2022	TBD
20472	1040	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.5	2022	TBD
20474	1243	Combined	Delaware, TTF	Streets	In Contract Management	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	3.4	2022	TBD
20483	1294	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.7	2022	TBD
20485	1126	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	1.4	2022	TBD
20486	1282	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.7	2022	TBD
20487	1133	Combined	Schuylkill	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	0.9	2022	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
20513	1338	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	1.1	2022	TBD
20525	1310	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.4	2022	TBD
20532	1417	Combined	Cobbs-Darby	Streets	In Contract Management	Stormwater Bump-out, Stormwater Tree,	Philadelphia Water Department	3.0	2022	TBD
20536	1330	Combined	TTF	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	2.8	2022	TBD
20540	1422	Combined	Pennypack	Streets	In Contract Management	Rain Garden,	Philadelphia Water Department	0.4	2022	TBD
20546	1350	Combined	TTF	Parking, Open Space	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.6	2022	TBD
20558	1376	Combined	TTF	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.6	2022	TBD
20562	1395	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.7	2022	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
20564	1419	Combined	TTF	Facilities, Industry & Business, Vacant Land	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	2.9	2022	TBD
40856	1060	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.3	2022	TBD
40899	1219	Combined	Delaware	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	0.5	2022	TBD
40904	1134	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	0.6	2022	TBD
40908	1370	Combined	Cobbs-Darby, Schuylkill	Streets	In Contract Management	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	1.4	2022	TBD
40939	1331	Combined	Delaware	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	1.3	2022	TBD
40951	1280	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.4	2022	TBD
40965	1369	Combined	Schuylkill	Streets	In Contract Management	Stormwater Planter,	Philadelphia Water Department	1.8	2022	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
40985	1375	Combined	Cobbs-Darby, Schuylkill	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	2.2	2022	TBD
40990	1355	Combined	Cobbs-Darby	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	1.2	2022	TBD
40998	1493	Combined	Schuylkill	Streets	In Contract Management	Rain Garden,		1.1	2022	TBD
41034	1399	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench,	Philadelphia Water Department	0.3	2022	TBD
50130	1135	Combined	Delaware	Streets	In Contract Management	Stormwater Bump-out, Depaving, Infiltration Storage Trench, Stormwater Planter,	Streets Department	0.8	2022	TBD
50139	1147	Combined	Cobbs-Darby, Schuylkill	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	7.4	2022	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50182	1296	Combined	TTF	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	5.6	2022	TBD
50194	1315	Combined	Schuylkill	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	4.5	2022	TBD
50200	1329	Combined	Schuylkill	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	4.0	2022	TBD
50210	1345	Combined	Schuylkill	Streets	In Contract Management	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	10.8	2022	TBD
50211	1347	Combined	Delaware	Open Space	In Contract Management	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	4.8	2022	TBD
50213	1351	Combined	Schuylkill	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	2.1	2022	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50221	1363	Combined	Delaware, TTF	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	5.8	2022	TBD
50232	1387	Combined	Delaware	Open Space	In Contract Management	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Make the World Better	1.3	2022	TBD
50234	1388	Combined	Delaware	Streets	In Contract Management	Stormwater Tree Trench,	Philadelphia Water Department	2.8	2022	TBD
50238	1396	Combined	Delaware	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	6.8	2022	TBD
50245	1410	Combined	Delaware	Open Space	In Contract Management	Infiltration Storage Trench,	HACE	0.0	2022	TBD
50247	1413	Combined	Delaware, TTF	Streets	In Contract Management	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	4.1	2022	TBD
50257	1428	Combined	Delaware	Facilities	In Contract Management	Infiltration Storage Trench, Rain Garden,	Philadelphia Parks & Recreation	0.8	2022	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50088	546	Combined	Delaware	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Swale, Stormwater Tree Trench,	Philadelphia Water Department	5.5	2021	TBD
	595	Combined	Delaware, Pennypack	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	12.3	2021	
	596	Combined	Pennypack	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench,	Philadelphia Water Department	3.1	2021	
50101	608	Combined	Schuylkill	Open Space	Construction	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	9.4	2021	TBD
	1049	Combined	Cobbs-Darby, Schuylkill	Streets	Construction	Stormwater Tree Trench,	Philadelphia Water Department	1.7	2021	

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50108	1053	Combined	Delaware	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	4.5	2021	TBD
	1054	Combined	Delaware	Open Space	Construction	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	0.5	2021	
50119	1067	Combined	Delaware	Parking, Streets	Construction	Infiltration Storage Trench, Stormwater Planter, Rain Garden,	Philadelphia Water Department	2.7	2021	TBD
	1068	Combined	Delaware	Streets	Construction	Infiltration Storage Trench, Stormwater Planter,	Philadelphia Water Department	0.4	2021	
50122	1077	Combined	Delaware, TTF	Open Space, Vacant Land	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	2.1	2021	TBD
	1083	Combined	Delaware, TTF	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Swale, Stormwater Tree Trench,	Philadelphia Water Department	12.5	2021	

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50132	1137	Combined	Delaware	Streets, Open Space	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Rain Garden, Swale, Stormwater Tree Trench,	Philadelphia Water Department	12.9	2021	TBD
	1138	Combined	Delaware	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	3.7	2021	
50149	1202	Combined, Separate	Delaware	Streets	Construction	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	4.9	2021	TBD
	1379	Combined	Delaware	Open Space	Construction	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	1.6	2021	
50170	1272	Combined	Schuylkill	Streets	Construction	Stormwater Bump-out, Stormwater Tree Trench,	Philadelphia Water Department	1.2	2021	TBD
	1273	Combined	Schuylkill	Streets	Construction	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	6.0	2021	

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50187	1302	Combined	Delaware	Streets	Construction	Infiltration Storage Trench,	Philadelphia Water Department	0.7	2021	TBD
	1303	Combined	Delaware	Streets	Construction	Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	0.6	2021	
20475	1042	Combined	Schuylkill	Streets	Construction	Stormwater Tree Trench,	Philadelphia Water Department	0.7	2021	TBD
20480	1266	Combined	Delaware	Streets	Construction	Stormwater Tree Trench,	Philadelphia Water Department	0.8	2021	TBD
20499	1248	Combined	Delaware	Streets	Construction	Infiltration Storage Trench,	Philadelphia Water Department	0.3	2021	TBD
40795	443	Combined	Cobbs-Darby	Streets, Open Space	Construction	Stormwater Basin ,Stormwater Bump-out, Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	13.5	2021	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
40798	518	Combined	Cobbs-Darby	Streets	Construction	Infiltration Storage Trench,		0.923	2021	TBD
40800	502	Combined	Cobbs-Darby	Streets	Construction	Stormwater Tree Trench,	Philadelphia Water Department	0.5	2021	TBD
40824	525	Combined	Schuylkill	Streets	Construction	Stormwater Tree Trench,	Philadelphia Water Department	1.4	2021	TBD
40839	995	Combined	Cobbs-Darby, Schuylkill	Streets	Construction	Infiltration Storage Trench,	Philadelphia Water Department	1.3	2021	TBD
40844	989	Combined	Schuylkill	Streets	Construction	Infiltration Storage Trench,	Philadelphia Water Department	1.2	2021	TBD
40858	1123	Combined		Streets	Construction		Philadelphia Water Department	0.0	2021	TBD
40862	1064	Combined	Delaware	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	1.0	2021	TBD
40866	1065	Combined	Cobbs-Darby	Streets	Construction	Infiltration Storage Trench,	Philadelphia Water Department	0.4	2021	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
40888	1011	Combined	Schuylkill	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Pennsylvania Department of Transportation	2.9	2021	TBD
40928	1275	Combined	TTF	Streets	Construction	Stormwater Tree Trench,	Pennsylvania Department of Transportation	4.4	2021	TBD
40938	1423	Combined	Delaware	Streets	Construction	Infiltration Storage Trench,	Pennsylvania Department of Transportation	1.1	2021	TBD
40945	1292	Combined	Schuylkill	Streets	Construction	Infiltration Storage Trench,	Private Developer	2.2	2021	TBD
50060	416	Combined	Delaware, TTF	Open Space	Construction	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	12.7	2021	TBD
50105	1051	Combined	Cobbs-Darby, Schuylkill	Streets	Construction	Stormwater Bump-out, Green Gutter, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	16.1	2021	TBD
50110	242	Non-Contributing, Combined	Cobbs-Darby	Streets, Open Space	Construction	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	4.8	2021	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50111	376	Combined	TTF	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	3.8	2021	TBD
50118	1059	Combined	Delaware	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	3.2	2021	TBD
50120	1070	Combined	Delaware	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	7.6	2021	TBD
50123	1084	Combined	Delaware	Streets	Construction	Infiltration Storage Trench, Rain Garden,	Pennsylvania Department of Transportation	3.1	2021	TBD
50125	1087	Combined	Delaware, TTF	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench,	Philadelphia Water Department	12.5	2021	TBD
50134	1140	Combined	Schuylkill	Open Space	Construction	Infiltration Storage Trench, Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	6.2	2021	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50135	1142	Combined	Schuylkill	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter,	Philadelphia Housing Authority	3.0	2021	TBD
50148	1200	Combined	Cobbs-Darby, Schuylkill	Streets	Construction	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	5.0	2021	TBD
50158	1221	Combined	Cobbs-Darby	Streets	Construction	Infiltration Storage Trench, Rain Garden,	Streets Department	2.5	2021	TBD
50160	1242	Combined	Delaware	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	4.5	2021	TBD
50162	1265	Combined	Cobbs-Darby, Schuylkill	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	5.9	2021	TBD
50166	1264	Combined	Delaware	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Stormwater Tree Trench,	Philadelphia Water Department	4.9	2021	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50167	1267	Combined	Delaware	Open Space	Construction	Infiltration Storage Trench, Rain Garden, Stormwater Wetland,	Philadelphia Water Department	41.7	2021	TBD
50171	1274	Combined	Delaware	Streets	Construction	Infiltration Storage Trench,	Department of Commerce	3.4	2021	TBD
50174	1279	Combined	Delaware	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	6.0	2021	TBD
50175	1281	Combined	Delaware	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Planter, Rain Garden, Swale, Stormwater Tree Trench,	Streets Department	50.8	2021	TBD
50177	1287	Combined	Schuylkill, TTF	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	5.8	2021	TBD
50184	1299	Combined	Delaware, TTF	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	6.2	2021	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
50189	1307	Combined	Schuylkill	Streets	Construction	Stormwater Tree Trench,	Philadelphia Water Department	3.3	2021	TBD
50190	1308	Combined	Schuylkill	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	5.4	2021	TBD
50212	1348	Combined	Delaware, Schuylkill	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	5.5	2021	TBD
50217	1359	Combined	Delaware, TTF	Streets	Construction	Stormwater Bump-out, Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	5.4	2021	TBD
50229	1383	Combined	Delaware	Facilities, Open Space	Construction	Infiltration Storage Trench, Rain Garden,	Philadelphia Water Department	3.5	2021	TBD
50235	1392	Combined	Delaware, TTF	Streets	Construction	Infiltration Storage Trench, Stormwater Tree Trench,	Philadelphia Water Department	4.1	2021	TBD
50256	1499	Combined	Delaware, Pennypack, Poquessing, TTF	Vacant Land	Construction	Rain Garden, Stormwater Tree Trench,	Philadelphia Water Department	1.2	2021	TBD

Work Number	Project ID	Sewer Type	Watershed	Program	Status	Estimated SMP Type(s)	Potential Partner(s)	Greened Acre (acre-inches)	Completion Date Estimate	Estimated Construction Cost
64056	564	Combined	Schuylkill	Open Space	Construction	Rain Garden,	Philadelphia Water Department	0.5	2021	TBD
90055	1539	Combined	Delaware	Streets	Construction		Private Developer	0.6	2021	TBD

Appendix 3

Complete Redevelopment and Incentivized Green Stormwater Infrastructure Projects

Table 1: Private Project Tracking Metrics and Reporting Format

Private Project Tracking Metrics						
Tracking Number	**Sewer Type**	**Category**	**Watershed**	**Zip Code**	**SMP Type (s)**	**Greened Acres (acre-inch)**

Table 2: Private/Incentives SMP Type Definitions

Private / Incentives SMP Type Definitions	
Basin	Includes surface basins or depression that are vegetated with mowed grass and subsurface infiltration and detention basins. In both cases, the basins are designed to detain and release stormwater runoff and/or infiltrate where feasible.
Bioinfiltration / Bioretention	A bioinfiltration/bioretention basin is a vegetated basin or depression designed to either infiltrate or release stormwater runoff.
Blue Roof	A blue roof is a storage system designed into a roof surface such that the roof retains stormwater. Blue roofs are designed to reduce the rate of stormwater runoff.
Cistern	Storage tanks, located either above or below ground, that capture and store runoff and can thereby reduce runoff volume. Stored water may drain by gravity or be pumped to its ultimate end use for a variety of non-potable water needs.
Depaving	Depaving projects remove existing impervious pavement and restore the surface with grass, other types of vegetation, or loose materials (stone, mulch, etc.) such that the area can thereafter be considered pervious area. Depaving projects remove contributing impervious area from the sewer system. Categorized as a Disconnection and logged in square feet.
Disconnected Impervious Area - Pavement Disconnections	Area where pavement runoff is designed to be directed to a vegetated area that allows for infiltration, filtration, and an increased time of concentration. Tracked as the square footage of runoff from impervious surfaces directed to a pervious area.
Disconnected Impervious Area - Planters	At or above grade planter area and number of planters that do not contribute to water quality.
Disconnected Impervious Area - Rooftop Area Disconnected	Rooftop drainage directed to a vegetated area that allows for infiltration, filtration, and increased time of concentration. Tracked as the square footage of roof runoff directed to a pervious area.
Disconnected Impervious Area - Tree Credit	New or existing tree canopy from an approved species list that extends over or is in close proximity to impervious area. Tracked as either "existing" or "new" tree credits. Each new tree is credited with 100 square feet of management per tree and each existing tree is credited as determined by the results of a canopy survey or by applying a 50 square foot credit to each existing tree that is not removed.
Green Roof	Vegetated surface installed over a roof surface. Green roofs are effective in reducing the volume and rates of stormwater runoff.
Porous Pavement	Permeable surface commonly composed of concrete, asphalt, pavers, turf, or rubber play surface. Stormwater flows through the porous surface during a rain event, then

Private / Incentives SMP Type Definitions	
	drains into the subbase beneath the pavement, where it is stored until it infiltrates into the soil.
Water Quality Device	Filter products that reduce pollutant levels by removing sediments, metals, hydrocarbons, and other pollutants from stormwater.

Table 3: Complete Private Development Green Stormwater Infrastructure

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2005-0052-01	Combined	Verified	Lower Schuylkill River	19139	Subsurface Infiltration Basin	2.5
2005-0099-01	Combined	Verified	Lower Schuylkill River	19131	Surface Infiltration Basin	37.4
2006-0017-01	Combined	Verified	Lower Schuylkill River	19142	Porous Pavement, Subsurface Infiltration Basin	1.2
2006-0057-01	Combined	Verified	Delaware Direct	19123	Subsurface Detention Basin	0.0
2006-0063-01	Combined	Verified	Delaware Direct	19122	Subsurface Infiltration Basin	1.9
2006-0074-01	Combined	Verified	Lower Schuylkill River	19145	Disconnected Impervious Area, Subsurface Infiltration Basin	0.7
2006-0084-01	Combined	Verified	Delaware Direct	19121	Subsurface Infiltration Basin	2.5
2006-0110-01	Combined	Verified	Delaware Direct	19140	Subsurface Detention Basin, Subsurface Infiltration Basin	0.7
2006-129-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Subsurface Detention Basin	0.5
2006-132-01	Combined	Verified	Delaware Direct	19133	Subsurface Detention Basin	0.2
2006-30TH-236-01	Combined	Verified	Lower Schuylkill River	19104	Surface Infiltration Basin	0.6
2006-777L-326-01	Combined	Verified	Delaware Direct	19147	Porous Pavement, Subsurface Infiltration Basin	2.0
2006-9349-349-01	Combined	Verified	Delaware Direct	19123	Subsurface Detention Basin	0.1
2006-94-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin	2.3
2006-96-01	Combined	Verified	Lower Schuylkill River	19140	Subsurface Detention Basin	0.1
2006-ANGE-268-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface Infiltration Basin	0.8
2006-ANNE-209-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface Detention Basin	0.2
2006-BCRC-246-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	0.2
2006-BEAZ-250-01	Combined	Verified	Delaware Direct	19134	Subsurface Detention Basin	1.6
2006-BOOT-310-01	Combined	Verified	Cobbs Creek	19139	Subsurface Detention Basin, Subsurface Infiltration Basin	0.7
2006-BRID-200-01	Combined	Verified	Delaware Direct	19137	Disconnected Impervious Area, Subsurface Infiltration Basin	0.7

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2006-CCPO-276-01	Combined	Verified	Delaware Direct	19122	Surface Detention Basin, Surface Infiltration Basin	4.5
2006-CINT-431-01	Combined	Verified	Lower Schuylkill River	19131	Surface Detention Basin	9.5
2006-COMM-328-01	Combined	Verified	Cobbs Creek	19139	Cistern, Porous Pavement, Subsurface Detention Basin	0.9
2006-EDWI-215-01	Combined	Verified	Delaware Direct	19136	Disconnected Impervious Area, Subsurface Detention Basin, Subsurface Infiltration Basin	0.8
2006-FAIR-175-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	1.2
2006-FEDE-409-01	Combined	Verified	Delaware Direct	19106	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.3
2006-FRON-290-01	Combined	Verified	Delaware Direct	19140	Subsurface Infiltration Basin	0.5
2006-GENE-192-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area, Subsurface Detention Basin	0.3
2006-HESS-267-01	Combined	Verified	Lower Schuylkill River	19146	Subsurface Detention Basin	0.6
2006-HOPE-447-01	Combined	Verified	Delaware Direct	19122	Porous Pavement	0.5
2006-HUNT-445-01	Combined	Verified	Delaware Direct	19133	Porous Pavement, Subsurface Infiltration Basin	1.4
2006-LAWT-291-01	Combined	Verified	Delaware Direct	19135	Subsurface Detention Basin	1.2
2006-LE22-460-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	0.7
2006-MANT-306-01	Combined	Verified	Lower Schuylkill River	19104	Porous Pavement, Subsurface Infiltration Basin	0.5
2006-MARS-381-01	Combined	Verified	Lower Schuylkill River		Subsurface Detention Basin	0.1
2006-MARS-407-01	Combined	Verified	Lower Schuylkill River		Subsurface Detention Basin	0.0
2006-MICH-419-01	Combined	Verified	Delaware Direct	19125	Porous Pavement, Subsurface Infiltration Basin	0.4
2006-MOOR-320-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin, Subsurface Infiltration Basin	0.3
2006-NATI-441-01	Combined	Verified	Delaware Direct	19106	Subsurface Detention Basin	0.5
2006-NEWF-343-01	Combined	Verified	Pennypack Creek	19136	Subsurface Infiltration Basin	2.5
2006-OVER-462-01	Combined	Verified	Lower Schuylkill River	19151	Subsurface Infiltration Basin	1.8

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2006-PASQ-416-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Detention Basin	0.3
2006-PENN-421-01	Combined	Verified	Lower Schuylkill River	19107	Subsurface Detention Basin	2.3
2006-PHIL-205-01	Combined	Verified	Delaware Direct	19123	Porous Pavement, Subsurface Detention Basin	0.1
2006-PILG-444-01	Combined	Verified	Delaware Direct	19111	Subsurface Infiltration Basin	1.1
2006-PIZZ-242-01	Combined	Verified	Tacony-Frankford Creek	19138	Disconnected Impervious Area, Subsurface Infiltration Basin	0.2
2006-PREF-176-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin	1.6
2006-PROG-400-01	Combined	Verified	Delaware Direct	19122	Subsurface Infiltration Basin	3.7
2006-PROP-233-01	Combined	Verified	Lower Schuylkill River	19146	Subsurface Infiltration Basin	1.0
2006-REBA-275-01	Combined	Verified	Lower Schuylkill River	19143	Subsurface Infiltration Basin	2.1
2006-SAFE-234-01	Combined	Verified	Delaware Direct	19134	Bioretention, Subsurface Detention Basin	0.6
2006-SAMU-440-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin, Surface Detention Basin	0.9
2006-SOLI-300-01	Combined	Verified	Delaware Direct	19149	Bioretention, Subsurface Infiltration Basin	2.0
2006-STHE-171-01	Combined	Verified	Lower Schuylkill River	19130	Subsurface Infiltration Basin	0.4
2006-STJO-273-01	Combined	Verified	Lower Schuylkill River	19131	Porous Pavement, Subsurface Infiltration Basin	1.1
2006-TACO-337-01	Combined	Verified	Delaware Direct	19149	Subsurface Infiltration Basin	0.2
2006-TEMP-197-01	Combined	Verified	Tacony-Frankford Creek	19138	Porous Pavement, Subsurface Detention Basin	0.2
2006-TEMP-210-01	Combined	Verified	Delaware Direct	19122	Porous Pavement, Subsurface Detention Basin	0.6
2006-TEMP-245-01	Combined	Verified	Delaware Direct	19122	Subsurface Infiltration Basin	1.1
2006-UNIO-235-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Porous Pavement, Subsurface Detention Basin, Surface Infiltration Basin	1.1
2006-VAUX-338-01	Combined	Verified	Lower Schuylkill River	19121	Subsurface Infiltration Basin	1.3
2006-WALN-251-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Detention Basin	0.7

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2007-1615-544-01	Combined	Verified	Lower Schuylkill River	19121	Porous Pavement, Subsurface Infiltration Basin	0.6
2007-4839-625-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Detention Basin	1.0
2007-AROU-626-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface Infiltration Basin	0.5
2007-BENC-482-01	Combined	Verified	Tacony-Frankford Creek	19124	Porous Pavement, Subsurface Detention Basin	1.0
2007-CECI-556-01	Combined	Verified	Delaware Direct	19121	Subsurface Detention Basin	1.1
2007-CECI-561-01	Combined	Verified	Delaware Direct	19121	Subsurface Detention Basin, Subsurface Infiltration Basin	0.8
2007-DREX-669-01	Combined	Verified	Lower Schuylkill River	19104	Cistern, Disconnected Impervious Area, Porous Pavement	0.8
2007-EYEI-616-01	Combined	Verified	Tacony-Frankford Creek	19141	Subsurface Detention Basin	0.4
2007-GAMB-624-01	Combined	Verified	Tacony-Frankford Creek	19124	Porous Pavement	0.1
2007-GAMB-701-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioinfiltration, Disconnected Impervious Area, Porous Pavement	1.5
2007-GERM-647-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioinfiltration, Bioretention, Cistern, Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.8
2007-GUIO-721-01	Combined	Verified	Lower Schuylkill River	19131	Disconnected Impervious Area, Porous Pavement, Subsurface Detention Basin	1.4
2007-HACE-731-01	Combined	Verified	Delaware Direct	19140	Disconnected Impervious Area, Subsurface Infiltration Basin	0.5
2007-HERR-690-01	Combined	Verified	Delaware Direct	19147	Disconnected Impervious Area, Porous Pavement	0.6
2007-HOWI-498-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area, Subsurface Detention Basin	0.3
2007-LASA-593-01	Combined	Verified	Tacony-Frankford Creek	19144	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	10.6
2007-MCDO-558-01	Combined	Verified	Delaware Direct	19133	Subsurface Detention Basin	0.5
2007-MCDO-560-01	Combined	Verified	Delaware Direct	19135	Subsurface Detention Basin	0.1
2007-MTTA-480-01	Combined	Verified	Delaware Direct	19123	Green Roof, Porous Pavement	0.3

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2007-NELL-504-01	Combined	Verified	Lower Schuylkill River		Green Roof, Subsurface Detention Basin	0.7
2007-PASH-524-01	Combined	Verified	Cobbs Creek	19142	Subsurface Infiltration Basin	0.8
2007-POWE-679-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area	0.4
2007-PRAD-489-01	Combined	Verified	Delaware Direct	19122	Subsurface Infiltration Basin	1.5
2007-SAIN-553-01	Combined	Verified	Lower Schuylkill River	19131	Disconnected Impervious Area, Porous Pavement	3.6
2007-SIMO-496-01	Combined	Verified	Tacony-Frankford Creek	19138	Bioinfiltration, Porous Pavement	0.5
2007-SOUT-557-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin	0.1
2007-THEC-538-01	Combined	Verified	Cobbs Creek	19143	Green Roof, Porous Pavement	0.6
2007-THEL-606-01	Combined	Verified	Tacony-Frankford Creek	19119	Subsurface Detention Basin	0.5
2007-THEM-495-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Detention Basin, Surface Detention Basin	6.4
2007-UNIV-633-01	Combined	Verified	Lower Schuylkill River	19104	Bioinfiltration, Disconnected Impervious Area, Subsurface Infiltration Basin	0.4
2007-WARN-646-01	Combined	Verified	Delaware Direct	19133	Subsurface Infiltration Basin	2.1
2007-WARN-651-01	Combined	Verified	Delaware Direct	19133	Subsurface Infiltration Basin	2.7
2007-WASH-642-01	Combined	Verified	Delaware Direct	19146	Subsurface Infiltration Basin	1.0
2007-WEST-684-01	Combined	Verified	Cobbs Creek	19139	Disconnected Impervious Area, Subsurface Detention Basin	0.0
2007-WILL-699-01	Combined	Verified	Delaware Direct	19134	Bioretention, Subsurface Detention Basin	5.0
2008-1600-898-01	Combined	Verified	Delaware Direct	19122	Bioretention	0.5
2008-20UN-767-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Porous Pavement	0.4
2008-2116-992-01	Combined	Verified	Lower Schuylkill River	19103	Bioretention, Disconnected Impervious Area, Green Roof, Surface Detention Basin	0.5
2008-2552-873-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	0.7
2008-4014-979-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area, Subsurface Infiltration Basin	0.5

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2008-BARN-986-01	Combined	Verified	Lower Schuylkill River	19130	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin, Subsurface Infiltration Basin	3.5
2008-CAST-875-01	Combined	Verified	Delaware Direct	19149	Subsurface Detention Basin	0.0
2008-CLAS-765-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	0.3
2008-COMM-763-01	Combined	Verified	Lower Schuylkill River	19130	Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Infiltration Basin	2.3
2008-DREX-788-01	Combined	Verified	Lower Schuylkill River	19104	Bioinfiltration, Porous Pavement, Subsurface Infiltration Basin	1.5
2008-DREX-950-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.2
2008-FRAN-921-01	Combined	Verified	Lower Schuylkill River	19104	Porous Pavement	0.3
2008-FRAN-994-01	Combined	Verified	Delaware Direct	19130	Porous Pavement, Subsurface Infiltration Basin	0.7
2008-MART-980-01	Combined	Verified	Delaware Direct	19147	Subsurface Infiltration Basin	0.6
2008-NAVA-893-01	Combined	Verified	Lower Schuylkill River	19146	Subsurface Infiltration Basin	5.7
2008-NEWK-958-01	Combined	Verified	Delaware Direct	19122	Bioinfiltration, Green Roof, Porous Pavement, Subsurface Detention Basin	5.2
2008-NEWL-778-01	Combined	Verified	Delaware Direct	19140	Subsurface Infiltration Basin	0.5
2008-NEWL-839-01	Combined	Verified	Delaware Direct	19140	Subsurface Infiltration Basin	0.5
2008-NORT-1012-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Subsurface Infiltration Basin	0.4
2008-PROP-824-01	Combined	Verified	Lower Schuylkill River	19139	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	5.4
2008-ROLA-813-01	Combined	Verified	Tacony-Frankford Creek	19141	Green Roof, Subsurface Infiltration Basin	0.2
2008-SCHM-902-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Infiltration Basin	4.4
2008-SHER-926-01	Combined	Verified	Delaware Direct	19122	Green Roof, Porous Pavement	0.2

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2008-STRA-799-01	Combined	Verified	Lower Schuylkill River	19121	Porous Pavement, Subsurface Infiltration Basin	0.4
2008-STRA-802-01	Combined	Verified	Lower Schuylkill River	19121	Porous Pavement, Subsurface Infiltration Basin	0.3
2008-THEC-806-01	Combined	Verified	Delaware Direct	19103	Green Roof, Subsurface Detention Basin	0.2
2008-WALG-838-01	Combined	Verified	Delaware Direct	19146	Bioretention, Subsurface Infiltration Basin	0.5
2008-WOOD-864-01	Combined	Verified	Lower Schuylkill River	19104	Porous Pavement	0.5
2009-GLOB-1016-01	Combined	Verified	Lower Schuylkill River	19131	Bioretention, Subsurface Detention Basin	1.8
2009-PENN-1019-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Subsurface Detention Basin	3.9
2009-IATS-1023-01	Combined	Verified	Delaware Direct	19148	Green Roof, Subsurface Detention Basin	0.8
2009-PRES-1037-01	Combined	Verified	Tacony-Frankford Creek	19150	Bioretention, Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	1.9
2009-DORA-1041-01	Combined	Verified	Lower Schuylkill River	19131	Porous Pavement, Subsurface Infiltration Basin	0.4
2009-STRA-1050-01	Combined	Verified	Lower Schuylkill River	19121	Subsurface Infiltration Basin	0.2
2009-STRA-1055-01	Combined	Verified	Lower Schuylkill River	19121	Subsurface Infiltration Basin	0.3
2009-MANT-1033-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface Infiltration Basin	3.6
2009-LAWR-1044-01	Combined	Verified	Delaware Direct	19140	Porous Pavement, Subsurface Infiltration Basin	3.0
2009-SIST-1062-01	Combined	Verified	Lower Schuylkill River	19103	Disconnected Impervious Area	0.2
2009-NEWH-1079-01	Combined	Verified	Lower Schuylkill River	19139	Disconnected Impervious Area, Subsurface Infiltration Basin	0.3
2009-TEMP-1077-01	Combined	Verified	Delaware Direct	19122	Bioretention, Porous Pavement, Subsurface Detention Basin	0.9
2009-TDBA-1072-01	Combined	Verified	Delaware Direct	19149	Bioinfiltration, Disconnected Impervious Area, Subsurface Infiltration Basin	1.1
2009-2007-1090-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin	17.7
2009-PHIL-1101-01	Combined	Verified	Lower Schuylkill River	19102	Bioretention, Subsurface Detention Basin	0.3
2009-TEMP-1096-01	Combined	Verified	Delaware Direct	19122	Subsurface Detention Basin	1.5

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2009-FRAN-1130-01	Combined	Verified	Delaware Direct	19137	Disconnected Impervious Area, Subsurface Infiltration Basin	4.1
2009-PECO-1133-01	Combined	Verified	Lower Schuylkill River	19146	Subsurface Infiltration Basin	2.8
2009-SIST-1131-01	Combined	Verified	Lower Schuylkill River	19103	Disconnected Impervious Area, Green Roof, Subsurface Infiltration Basin	0.4
2009-HELP-1138-01	Combined	Verified	Lower Schuylkill River	19153	Subsurface Infiltration Basin	3.7
2009-NICE-1136-01	Combined	Verified	Tacony-Frankford Creek	19140	Bioretention, Subsurface Detention Basin	0.4
2009-JANN-1141-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Green Roof, Porous Pavement	0.3
2009-PRIN-1147-01	Combined	Verified	Lower Schuylkill River	19121	Green Roof, Subsurface Infiltration Basin	0.5
2009-CANC-1145-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioretention, Disconnected Impervious Area, Surface Detention Basin	6.1
2009-HAWT-1102-01	Combined	Verified	Delaware Direct	19147	Disconnected Impervious Area, Porous Pavement	0.3
2009-SCHU-1140-01	Combined	Verified	Lower Schuylkill River	19103	Disconnected Impervious Area	0.7
2009-THEM-1167-01	Combined	Verified	Delaware Direct	19121	Disconnected Impervious Area, Green Roof, Porous Pavement	0.4
2009-NEWP-1166-01	Combined	Verified	Delaware Direct	19140	Disconnected Impervious Area, Subsurface Infiltration Basin	0.7
2009-WOLC-1169-01	Combined	Verified	Tacony-Frankford Creek	19138	Bioinfiltration, Disconnected Impervious Area, Subsurface Detention Basin	1.7
2009-PENN-1144-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Detention Basin	0.4
2009-RODI-1176-01	Combined	Verified	Lower Schuylkill River	19130	Subsurface Infiltration Basin	0.2
2009-THEC-1174-01	Combined	Verified	Delaware Direct	19135	Bioretention, Disconnected Impervious Area, Green Roof	0.6
2009-THEP-1173-01	Combined	Verified	Lower Schuylkill River	19140	Green Roof	0.1
2009-7149-1186-01	Combined	Verified	Delaware Direct	19135	Disconnected Impervious Area, Subsurface Infiltration Basin	0.4
2009-PARK-1197-01	Combined	Verified	Lower Schuylkill River	19104	Bioinfiltration, Disconnected Impervious Area	0.1

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2009-PHIL-1205-01	Combined	Verified	Delaware Direct	19148	Porous Pavement	14.6
2009-WEST-1222-01	Combined	Verified	Lower Schuylkill River	19139	Disconnected Impervious Area, Green Roof, Porous Pavement	1.4
2009-CONG-1210-01	Combined	Verified	Delaware Direct	19133	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	2.8
2009-PASC-1226-01	Combined	Verified	Cobbs Creek	19142	Porous Pavement, Subsurface Infiltration Basin	3.3
2010-BRID-1233-01	Combined	Verified	Delaware Direct	19137	Porous Pavement, Subsurface Infiltration Basin	1.1
2010-PSDC-1234-01	Combined	Verified	Delaware Direct	19147	Subsurface Infiltration Basin	1.1
2010-PASC-1238-01	Combined	Verified	Cobbs Creek	19142	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	2.2
2010-STJO-1239-01	Combined	Verified	Lower Schuylkill River	19131	Bioinfiltration, Green Roof, Subsurface Infiltration Basin	1.0
2010-THEF-1254-01	Combined	Verified	Lower Schuylkill River	19103	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	0.4
2010-ESPE-1288-01	Combined	Verified	Tacony-Frankford Creek	19140	Subsurface Infiltration Basin	1.1
2010-1800-1260-01	Combined	Verified	Lower Schuylkill River	19146	Disconnected Impervious Area, Subsurface Infiltration Basin	0.8
2010-4109-1277-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Porous Pavement	0.2
2010-MOYE-1306-01	Combined	Verified	Delaware Direct	19125	Green Roof, Porous Pavement	0.6
2010-411W-1300-01	Combined	Verified	Delaware Direct	19122	Bioretention, Subsurface Detention Basin	0.2
2010-UNIV-1312-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Subsurface Detention Basin	0.7
2010-TEMP-1302-01	Combined	Verified	Delaware Direct	19122	Cistern, Disconnected Impervious Area, Subsurface Infiltration Basin	2.9
2010-8828-1321-01	Combined	Verified	Pennypack Creek	19136	Subsurface Infiltration Basin	1.2
2010-3737-1331-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Subsurface Detention Basin	0.3
2010-WATE-1343-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area	0.1
2010-BROA-1347-01	Combined	Verified	Tacony-Frankford Creek	19141	Subsurface Infiltration Basin	0.9
2010-PSPH-1353-01	Combined	Verified	Lower Schuylkill River	19131	Green Roof, Subsurface Infiltration Basin	8.4

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2010-PNKW-1360-01	Combined	Verified	Tacony-Frankford Creek	19140	Porous Pavement, Subsurface Infiltration Basin	2.3
2010-HUNT-1351-01	Combined	Verified	Tacony-Frankford Creek	19140-2107	Disconnected Impervious Area	0.1
2010-PHIL-1362-01	Combined	Verified	Delaware Direct	19148	Bioretention, Surface Detention Basin	0.9
2010-CHOP-1367-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Green Roof, Surface Detention Basin	2.6
2010-GEST-1346-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Detention Basin, Subsurface Infiltration Basin	1.1
2010-PROP-1376-01	Combined	Verified	Delaware Direct	19141	Bioinfiltration, Bioretention, Subsurface Infiltration Basin	2.4
2010-ARCH-1393-01	Combined	Verified	Delaware Direct	19122	Disconnected Impervious Area, Green Roof	0.2
2010-WIST-1397-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Subsurface Detention Basin	0.4
2010-DREX-1399-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Subsurface Detention Basin	1.5
2010-DICK-1410-01	Combined	Verified	Delaware Direct	19148	Disconnected Impervious Area, Porous Pavement	0.7
2010-1940-1435-01	Combined	Verified	Delaware Direct	19140	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	0.6
2010-5526-1348-01	Combined	Verified	Darby Creek	19139	Porous Pavement, Subsurface Infiltration Basin	0.5
2010-CREA-1427-01	Combined	Verified	Delaware Direct	19125	Disconnected Impervious Area, Green Roof, Porous Pavement	0.3
2010-NORT-1449-01	Combined	Verified	Tacony-Frankford Creek	19124-3024	Subsurface Infiltration Basin	0.9
2010-EARL-1460-01	Combined	Verified	Lower Schuylkill River	19146	Disconnected Impervious Area, Subsurface Infiltration Basin	0.5
2010-PLEA-1444-01	Combined	Verified	Tacony-Frankford Creek	19119	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.2
2010-PHIL-1469-01	Combined	Verified	Delaware Direct	19148	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin, Surface Detention Basin	3.4
2010-NORR-1475-01	Combined	Verified	Delaware Direct	19122	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	2.1
2010-4FRA-1464-01	Combined	Verified	Lower Schuylkill River	19103	Green Roof, Subsurface Detention Basin	0.9

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2010-AGIL-1461-01	Combined	Verified	Delaware Direct	19121	Disconnected Impervious Area, Subsurface Infiltration Basin	1.4
2010-UNIV-1385-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	1.4
2011-PROP-1483-01	Combined	Verified	Tacony-Frankford Creek	19144	Porous Pavement, Surface Infiltration Basin	1.6
2011-CANC-1485-01	Combined	Verified	Tacony-Frankford Creek	19124	Green Roof	0.2
2011-LOCU-1503-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area	0.2
2011-CONV-1491-01	Combined	Verified	Lower Schuylkill River	19107	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.3
2011-STMA-1508-01	Combined	Verified	Delaware Direct	19147	Green Roof, Porous Pavement, Subsurface Detention Basin, Subsurface Infiltration Basin	0.5
2011-KARA-1505-01	Combined	Verified	Lower Schuylkill River	19139	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	4.0
2011-HAMI-1518-01	Combined	Verified	Lower Schuylkill River	19104	Cistern, Disconnected Impervious Area, Green Roof, Subsurface Infiltration Basin	1.9
2011-FAIR-1488-01	Combined	Verified	Delaware Direct	19130	Green Roof, Subsurface Detention Basin	0.4
2011-MONT-1516-01	Combined	Verified	Delaware Direct	19122	Subsurface Infiltration Basin	2.8
2011-CHRI-1545-01	Combined	Verified	Delaware Direct	19147	Green Roof, Porous Pavement, Subsurface Infiltration Basin	1.0
2010-GRAN-1432-01	Combined	Verified	Lower Schuylkill River	19130	Green Roof, Subsurface Detention Basin	0.6
2011-4240-1543-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface Infiltration Basin	0.7
2011-CCTD-1535-01	Combined	Verified	Lower Schuylkill River	19139	Subsurface Infiltration Basin	1.0
2011-HAGE-1562-01	Combined	Verified	Delaware Direct	19125	Porous Pavement, Subsurface Infiltration Basin	1.5
2011-SAMU-1569-01	Combined	Verified	Delaware Direct	19111	Porous Pavement	0.4
2011-HOME-1571-01	Combined	Verified	Delaware Direct	19107	Bioretention, Green Roof, Subsurface Detention Basin	0.2
2011-TOLL-1586-01	Combined	Verified	Lower Schuylkill River	19146	Disconnected Impervious Area, Green Roof, Subsurface Infiltration Basin	2.4

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2011-THEB-1594-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin, Subsurface Infiltration Basin	0.8
2011-DIAM-1617-01	Combined	Verified	Delaware Direct	19140	Green Roof, Subsurface Detention Basin	0.4
2011-NEWN-1620-01	Combined	Verified	Delaware Direct	19123	Green Roof, Porous Pavement, Subsurface Infiltration Basin	0.9
2011-822N-1632-01	Combined	Verified	Delaware Direct	19123	Green Roof, Porous Pavement	0.3
2011-DOLL-1636-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface Infiltration Basin	0.3
2011-TEMP-1622-01	Combined	Verified	Delaware Direct	19122	Blue Roof, Green Roof, Porous Pavement, Subsurface Infiltration Basin	1.9
2011-DREX-1638-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Disconnected Impervious Area, Green Roof	0.8
2011-3343-1653-01	Combined	Verified	Tacony-Frankford Creek	19144	Porous Pavement, Subsurface Infiltration Basin	0.7
2011-8318-1655-01	Combined	Verified	Lower Schuylkill River	19121	Green Roof, Porous Pavement	0.2
2011-BOTT-1646-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioretention, Subsurface Detention Basin	2.7
2011-PHIL-1596-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Disconnected Impervious Area, Porous Pavement, Surface Detention Basin	3.2
2011-PROP-1662-01	Combined	Verified	Lower Schuylkill River	19130	Subsurface Infiltration Basin, Surface Infiltration Basin	3.7
2011-NEWB-1672-01	Combined	Verified	Lower Schuylkill River	19145	Green Roof, Porous Pavement	0.4
2011-WEST-1675-01	Combined	Verified	Lower Schuylkill River	19139		0.0
2011-PENN-1681-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof	0.4
2011-JWSD-1674-01	Combined	Verified	Delaware Direct	19122	Disconnected Impervious Area, Subsurface Infiltration Basin	1.8
2011-33RD-1697-01	Combined	Verified	Lower Schuylkill River	19132	Bioretention, Disconnected Impervious Area, Green Roof	0.1
2011-I95S-1699-01	Combined	Verified	Delaware Direct	19125	Bioinfiltration, Bioretention, Surface Detention Basin	4.7
2011-GREE-1706-01	Combined	Verified	Tacony-Frankford Creek	19138	Porous Pavement, Subsurface Detention Basin, Surface Infiltration Basin	1.9

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2011-PENN-1664-01	Combined	Verified	Lower Schuylkill River	19104	Porous Pavement	0.2
2011-TEMP-1739-01	Combined	Verified	Delaware Direct	19122	Bioretention, Cistern, Porous Pavement, Subsurface Detention Basin, Subsurface Infiltration Basin	2.1
2011-NICE-1728-01	Combined	Verified	Tacony-Frankford Creek	19140	Porous Pavement, Subsurface Infiltration Basin	0.3
2011-NICE-1729-01	Combined	Verified	Tacony-Frankford Creek	19140	Porous Pavement, Subsurface Detention Basin	0.5
2011-NICE-1730-01	Combined	Verified	Tacony-Frankford Creek	19140	Porous Pavement, Subsurface Infiltration Basin	1.1
2012-1900-1754-01	Combined	Verified	Lower Schuylkill River	19145	Green Roof, Porous Pavement	0.6
2012-CARP-1765-01	Combined	Verified	Delaware Direct	19146	Bioretention, Green Roof, Porous Pavement	0.4
2012-SOUT-1782-01	Combined	Verified	Delaware Direct	19102	Green Roof, Subsurface Detention Basin	0.8
2012-CENT-1791-01	Combined	Verified	Delaware Direct	19122	Porous Pavement	1.3
2012-PRES-1785-01	Combined	Verified	Lower Schuylkill River	19131-3348	Green Roof, Porous Pavement	0.5
2012-BUIL-1807-01	Combined	Verified	Tacony-Frankford Creek	19111	Disconnected Impervious Area	0.1
2012-CANC-1770-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioinfiltration, Green Roof	0.6
2012-SPRU-1813-01	Combined	Verified	Delaware Direct	19107	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.1
2012-1426-1805-01	Combined	Verified	Lower Schuylkill River	19102	Blue Roof, Green Roof	0.3
2012-RODE-1835-01	Combined	Verified	Delaware Direct	19130	Subsurface Infiltration Basin	0.7
2012-2549-1840-01	Combined	Verified	Delaware Direct	19125	Porous Pavement	1.0
2012-INGE-1798-01	Combined	Verified	Delaware Direct	19121	Disconnected Impervious Area, Subsurface Infiltration Basin	0.9
2012-412N-1844-01	Combined	Verified	Delaware Direct	19123	Green Roof, Porous Pavement, Subsurface Infiltration Basin	1.2
2012-SPAR-1850-01	Combined	Verified	Delaware Direct	19148	Bioinfiltration, Disconnected Impervious Area, Porous Pavement	0.7
2012-HUNT-1764-01	Combined	Verified	Tacony-Frankford Creek	19140-2107	Disconnected Impervious Area, Porous Pavement	1.8

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2012-915N-1854-01	Combined	Verified	Delaware Direct	19123	Porous Pavement, Subsurface Infiltration Basin	0.8
2012-UNIV-1848-01	Combined	Verified	Lower Schuylkill River	19104	Bioinfiltration, Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Detention Basin	1.6
2012-PROP-1883-01	Combined	Verified	Tacony-Frankford Creek	19138	Subsurface Infiltration Basin	1.0
2012-WISS-1891-01	Combined	Verified	Tacony-Frankford Creek	19138	Bioretention, Disconnected Impervious Area	1.3
2012-EPIS-1888-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Subsurface Detention Basin	0.2
2012-TOLL-1898-01	Combined	Verified	Delaware Direct	19147	Disconnected Impervious Area, Green Roof	1.2
2012-1220-1913-01	Combined	Verified	Delaware Direct	19123	Green Roof, Porous Pavement	0.4
2012-THEM-1892-01	Combined	Verified	Delaware Direct	19106	Cistern, Disconnected Impervious Area, Green Roof, WQ Treatment Device	0.2
2012-SENI-1900-01	Combined	Verified	Lower Schuylkill River	19145	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	0.4
2012-PENN-1774-01	Combined	Verified	Lower Schuylkill River	19104	Bioinfiltration, Subsurface Detention Basin	0.9
2012-1919-1929-01	Combined	Verified	Lower Schuylkill River	19103	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	1.2
2012-1213-1925-01	Combined	Verified	Delaware Direct	19107	Cistern, Green Roof, Subsurface Detention Basin	0.3
2012-SYSC-1931-01	Combined	Verified	Delaware Direct	19148	Bioretention	3.9
2012-CIRA-1937-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Subsurface Detention Basin	2.0
2012-ESPE-1947-01	Combined	Verified	Tacony-Frankford Creek	19140	Disconnected Impervious Area, Porous Pavement, Subsurface Detention Basin	3.7
2012-INGL-1949-01	Combined	Verified	Lower Schuylkill River	19131	Bioretention, Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	2.6
2012-600N-1963-01	Combined	Verified	Delaware Direct	19123	Green Roof, Porous Pavement	0.4
2012-810A-1974-01	Combined	Verified	Delaware Direct	19107	Bioretention, Subsurface Detention Basin	0.2
2011-NORT-1700-01	Combined	Verified	Tacony-Frankford Creek	19124	Porous Pavement, Subsurface Detention Basin	0.9

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2012-STFR-1986-01	Combined	Verified	Delaware Direct	19125	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	0.3
2012-LINC-2012-01	Combined	Verified	Delaware Direct	19148	Bioinfiltration, Porous Pavement	1.8
2012-TDBA-2047-01	Combined	Verified	Delaware Direct	19149	Bioinfiltration, Disconnected Impervious Area, Subsurface Infiltration Basin	0.8
2012-3601-2053-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Subsurface Detention Basin	0.4
2012-RIVE-2027-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Porous Pavement	3.3
2012-SCHU-2065-01	Combined	Verified	Lower Schuylkill River	19146	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	4.1
2013-2012-2072-01	Combined	Verified	Lower Schuylkill River	19121	Green Roof, Porous Pavement	0.2
2013-9THS-2075-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	4.6
2013-DREX-2081-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface Detention Basin, Surface Detention Basin	1.3
2013-SETT-2085-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioretention, Disconnected Impervious Area, Porous Pavement, Subsurface Detention Basin	2.1
2013-COBB-2080-01	Combined	Verified	Cobbs Creek	19143	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	0.8
2013-STCH-2103-01	Combined	Verified	Delaware Direct	19134	Bioinfiltration, Bioretention, Disconnected Impervious Area	4.6
2013-1901-2109-01	Combined	Verified	Lower Schuylkill River	19146	Green Roof, Porous Pavement, Subsurface Infiltration Basin	0.6
2013-8268-2116-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	0.4
2012-LAWR-1945-01	Combined	Verified	Delaware Direct	19123	Green Roof, Porous Pavement	0.4
2012-GARY-1938-01	Combined	Verified	Lower Schuylkill River	19146	Bioinfiltration, Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	1.3
2013-HALP-2134-01	Combined	Verified	Lower Schuylkill River	19121	Disconnected Impervious Area, Subsurface Infiltration Basin	1.6
2013-NEUR-2140-01	Combined	Verified	Lower Schuylkill River	19104	Bioinfiltration, Bioretention, Disconnected Impervious Area, Green Roof, Porous Pavement	0.4

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2013-STCH-2149-01	Combined	Verified	Delaware Direct	19134	Bioretention, Disconnected Impervious Area	3.8
2013-1900-2151-01	Combined	Verified	Lower Schuylkill River	19132	Bioretention, Subsurface Detention Basin, Surface Detention Basin	2.0
2013-CECI-2157-01	Combined	Verified	Lower Schuylkill River	19121	Disconnected Impervious Area, Green Roof, Subsurface Infiltration Basin	0.9
2013-900S-2174-01	Combined	Verified	Delaware Direct	19147	Bioinfiltration, Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	1.2
2013-THES-2177-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	1.2
2013-PROP-2163-01	Combined	Verified	Tacony-Frankford Creek	19141	Subsurface Infiltration Basin	0.9
2013-RESI-2173-01	Combined	Verified	Cobbs Creek	19143	Disconnected Impervious Area, Green Roof	0.1
2013-TEMP-2178-01	Combined	Verified	Delaware Direct	19140	Bioretention, Subsurface Detention Basin	1.1
2013-2413-2183-01	Combined	Verified	Delaware Direct	19132	Green Roof, Subsurface Infiltration Basin	0.8
2013-NEWC-2114-01	Combined	Verified	Lower Schuylkill River	19104	Bioinfiltration, Disconnected Impervious Area, Green Roof, Porous Pavement	1.3
2013-TACO-2197-01	Combined	Verified	Delaware Direct	19135	Bioinfiltration, Disconnected Impervious Area, Subsurface Detention Basin	2.1
2013-FIRS-2202-01	Combined	Verified	Delaware Direct	19124	Bioinfiltration, Disconnected Impervious Area	4.9
2013-2300-2240-01	Combined	Verified	Lower Schuylkill River	19146	Bioretention, Subsurface Detention Basin	0.9
2013-HELP-2241-01	Combined	Verified	Lower Schuylkill River	19153	Disconnected Impervious Area, Surface Infiltration Basin	1.8
2013-1118-2248-01	Combined	Verified	Delaware Direct	19107	Green Roof, Porous Pavement, Subsurface Detention Basin	0.8
2013-23RD-2272-01	Combined	Verified	Lower Schuylkill River	19140	Disconnected Impervious Area, Subsurface Infiltration Basin	0.4
2013-1601-2261-01	Combined	Verified	Delaware Direct	19148	Disconnected Impervious Area, Subsurface Infiltration Basin	0.9
2013-CHOP-2288-01	Combined	Verified	Delaware Direct	19145	Bioretention, Porous Pavement, Subsurface Detention Basin	1.2

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2013-EDBE-2293-01	Combined	Verified	Delaware Direct	19122	Subsurface Infiltration Basin	4.2
2013-TAJD-2286-01	Combined	Verified	Delaware Direct	19122	Bioretention, Disconnected Impervious Area, Green Roof, Subsurface Detention Basin, Subsurface Infiltration Basin	1.3
2013-MAST-2259-01	Combined	Verified	Lower Schuylkill River	19121	Disconnected Impervious Area	0.6
2013-1323-2310-01	Combined	Verified	Delaware Direct	19122	Porous Pavement, Subsurface Infiltration Basin	0.6
2013-ONER-2304-01	Combined	Verified	Lower Schuylkill River	19103	Bioretention, Green Roof, Subsurface Detention Basin	0.3
2013-708N-2316-01	Combined	Verified	Delaware Direct	19123	Bioinfiltration, Subsurface Infiltration Basin	0.3
2013-ALDI-2287-01	Combined	Verified	Darby Creek	19151	Bioretention	0.3
2013-4783-2339-01	Combined	Verified	Pennypack Creek	19136	Disconnected Impervious Area, Porous Pavement, Subsurface Detention Basin	1.8
2013-MUSE-2346-01	Combined	Verified	Lower Schuylkill River	19130	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	3.6
2013-TALL-2349-01	Combined	Verified	Delaware Direct	19133	Bioinfiltration, Subsurface Infiltration Basin	2.9
2013-PARK-2357-01	Combined	Verified	Lower Schuylkill River	19130	Bioinfiltration, Disconnected Impervious Area	0.8
2013-3541-2376-01	Combined	Verified	Delaware Direct	19147	Disconnected Impervious Area, Subsurface Infiltration Basin	0.6
2013-CIRA-2405-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.6
2013-UPEN-2280-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface Infiltration Basin	0.8
2014-LASA-2425-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioinfiltration, Porous Pavement, Subsurface Infiltration Basin	2.2
2014-STJO-2424-01	Combined	Verified	Delaware Direct	19122	Disconnected Impervious Area, Subsurface Infiltration Basin	5.6
2014-GSTR-2443-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioinfiltration, Subsurface Infiltration Basin	1.1
2014-ALLE-2455-01	Combined	Verified	Delaware Direct	19125	Disconnected Impervious Area, Green Roof, Porous Pavement	0.4
2014-DOLL-2453-01	Combined	Verified	Delaware Direct	19135-4408	Bioretention, Subsurface Detention Basin	1.5

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2014-PHAO-2459-01	Combined	Verified	Lower Schuylkill River	19132	Bioretention, Porous Pavement, Subsurface Detention Basin	0.4
2014-DREX-2457-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Porous Pavement	2.6
2014-1325-2469-01	Combined	Verified	Delaware Direct	19121	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	0.8
2014-PERE-2472-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Subsurface Detention Basin	0.6
2014-PHAM-2476-01	Combined	Verified	Lower Schuylkill River	19121	Bio-infiltration/Bio-retention, Bioretention, Subsurface Detention Basin	1.3
2014-5800-2463-01	Combined	Verified	Lower Schuylkill River	19131	Disconnected Impervious Area, Surface Infiltration Basin	1.0
2014-63RD-2502-01	Combined	Verified	Cobbs Creek	19139	Subsurface Infiltration Basin	1.9
2014-4525-2505-01	Combined	Verified	Lower Schuylkill River	19139	Green Roof	0.3
2014-ALLE-2522-01	Combined	Verified	Delaware Direct	19133	Subsurface Infiltration Basin	0.7
2014-HUNT-2525-01	Combined	Verified	Lower Schuylkill River	19140	Bioretention, Subsurface Detention Basin	0.9
2014-8365-2530-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	1.5
2014-PHAG-2547-01	Combined	Verified	Lower Schuylkill River	19132	Bioretention, Subsurface Detention Basin	0.3
2014-5454-2552-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioretention, Porous Pavement, Subsurface Detention Basin	0.9
2014-420F-2574-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area, Subsurface Infiltration Basin	0.7
2014-INDE-2590-01	Combined	Verified	Delaware Direct	19106	Disconnected Impervious Area	0.0
2014-TRUE-2595-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	0.9
2014-SEPT-2614-01	Combined	Verified	Delaware Direct	19124	Disconnected Impervious Area, Green Roof	0.3
2014-WEST-2612-01	Combined	Verified	Lower Schuylkill River	19121	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	1.9
2014-1350-2658-01	Combined	Verified	Delaware Direct	19122	Bioretention, Subsurface Infiltration Basin	0.9
2014-2201-2677-01	Combined	Verified	Lower Schuylkill River	19145	Subsurface Infiltration Basin, WQ Treatment Device	1.2

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2014-ENVI-2646-01	Combined	Verified	Delaware Direct	19148-5607	Bioretention, Subsurface Detention Basin, Surface Infiltration Basin	2.0
2014-NORT-2603-01	Combined	Verified	Delaware Direct	19123	Bioretention, Subsurface Detention Basin	0.5
2014-VERN-2690-01	Combined	Verified	Tacony-Frankford Creek	19144	Disconnected Impervious Area, Porous Pavement	0.6
2014-2322-2715-01	Combined	Verified	Lower Schuylkill River	19130	Porous Pavement, Subsurface Infiltration Basin	0.4
2014-BLUM-2711-01	Combined	Verified	Lower Schuylkill River	19121	Porous Pavement, Subsurface Infiltration Basin	1.8
2014-TEMP-2699-01	Combined	Verified	Delaware Direct	19121	Disconnected Impervious Area	0.4
2014-WISS-2641-01	Combined	Verified	Delaware Direct	19135	Disconnected Impervious Area, Porous Pavement	0.4
2014-1515-2746-01	Combined	Verified	Delaware Direct	19106	Porous Pavement, Subsurface Infiltration Basin	0.5
2014-UNIV-2747-01	Combined	Verified	Lower Schuylkill River	19104	Porous Pavement	0.5
2014-2013-2751-01	Combined	Verified	Delaware Direct	19125	Porous Pavement, Subsurface Infiltration Basin	0.4
2014-CHIC-2755-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Infiltration Basin	0.5
2015-CAMD-2769-01	Combined	Verified	Delaware Direct	19134	Surface Infiltration Basin	3.4
2015-WAYN-2771-01	Combined	Verified	Tacony-Frankford Creek	19144	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	1.2
2014-PAND-2762-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	0.3
2015-2517-2803-01	Combined	Verified	Delaware Direct	19134	Green Roof, Porous Pavement, Subsurface Detention Basin	0.3
2015-4050-2828-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin	0.4
2015-3201-2786-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.3
2015-TEMP-2829-01	Combined	Verified	Delaware Direct	19122	Porous Pavement, Subsurface Infiltration Basin	0.2
2015-TULI-2824-01	Combined	Verified	Delaware Direct	19122	Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Infiltration Basin	3.1
2015-8385-2856-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	0.9

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2015-LANI-2871-01	Combined	Verified	Lower Schuylkill River	19145	Disconnected Impervious Area, Porous Pavement	0.3
2015-2338-2915-01	Combined	Verified	Delaware Direct	19125	Subsurface Infiltration Basin	0.5
2015-GROC-2925-01	Combined	Verified	Delaware Direct	19137	Bioretention, Subsurface Detention Basin	2.6
2015-UCHS-2939-01	Combined	Verified	Lower Schuylkill River	19104	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin, Subsurface Infiltration Basin	2.2
2015-ROYA-2911-01	Combined	Verified	Tacony-Frankford Creek	19124	Disconnected Impervious Area, Subsurface Infiltration Basin, Surface Detention Basin, Surface Infiltration Basin	4.2
2015-LASA-2848-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioinfiltration, Porous Pavement	1.1
2015-GAUD-2962-01	Combined	Verified	Lower Schuylkill River	19140	Bioretention, Porous Pavement, Subsurface Detention Basin	0.6
2015-JFKP-2951-01	Combined	Verified	Lower Schuylkill River	19102	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	1.0
2015-ROBE-2975-01	Combined	Verified	Tacony-Frankford Creek	19140	Bioretention, Subsurface Detention Basin	0.5
2015-3675-2955-01	Combined	Verified	Lower Schuylkill River	19104	Green Roof, Porous Pavement, Subsurface Detention Basin	0.5
2015-SOUT-2956-01	Combined	Verified	Lower Schuylkill River	19145	Bioretention, Subsurface Detention Basin, Surface Detention Basin	5.0
2015-TEMP-2964-01	Combined	Verified	Delaware Direct	19122	Porous Pavement, Subsurface Infiltration Basin	6.2
2015-PHIL-2982-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Green Roof, Subsurface Detention Basin	0.3
2015-WYNN-2986-01	Combined	Verified	Lower Schuylkill River	19131	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	0.7
FY16-FAIR-4011-01	Combined	Verified	Delaware Direct	19123	Subsurface Infiltration Basin	1.2
FY16-HELP-4027-01	Combined	Verified	Delaware Direct	19123	Disconnected Impervious Area, Subsurface Infiltration Basin	0.2
FY16-FIVE-4029-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioinfiltration, Bioretention, Subsurface Infiltration Basin	1.1

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
FY16-HANO-4040-01	Combined	Verified	Lower Schuylkill River	19107	Subsurface Detention Basin	2.1
FY16-BARI-4074-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Subsurface Infiltration Basin	0.4
FY16-FRAN-4076-01	Combined	Verified	Tacony-Frankford Creek	19124	Disconnected Impervious Area	0.0
FY16-LOVE-4088-01	Combined	Verified	Tacony-Frankford Creek	19119	Bioinfiltration, Disconnected Impervious Area, Green Roof	0.2
FY16-JACK-4123-01	Combined	Verified	Delaware Direct	19124	Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Infiltration Basin	2.1
FY16-THCH-4142-01	Combined	Verified	Lower Schuylkill River	19102	Blue Roof, Green Roof, Subsurface Detention Basin, WQ Treatment Device	1.1
FY16-SMIT-4151-01	Combined	Verified	Lower Schuylkill River	19146	Disconnected Impervious Area, Porous Pavement	3.7
FY16-TEMP-4178-01	Combined	Verified	Delaware Direct	19121	Bioretention, Porous Pavement, Subsurface Detention Basin	4.2
FY16-KENS-4216-01	Combined	Verified	Delaware Direct	19125	Bioinfiltration, Porous Pavement	0.7
FY16-ADAM-4220-01	Combined	Verified	Tacony-Frankford Creek	19120	Bioinfiltration	1.0
FY16-USCI-4261-01	Combined	Verified	Lower Schuylkill River	19143	Bioinfiltration, Bioretention, Porous Pavement	1.4
FY16-NFRO-4270-01	Combined	Verified	Delaware Direct	19122	Subsurface Infiltration Basin	1.0
FY16-TEMP-4277-01	Combined	Verified	Delaware Direct	19122	Porous Pavement	0.4
FY16-DREX-4244-01	Combined	Verified	Lower Schuylkill River	19104	Disconnected Impervious Area, Porous Pavement	1.0
FY16-LINC-4309-01	Combined	Verified	Delaware Direct	19146	Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Infiltration Basin	2.9
FY16-LASA-4354-01	Combined	Verified	Tacony-Frankford Creek	19141	Disconnected Impervious Area, Porous Pavement	0.2
FY17-CAMP-4378-01	Combined	Verified	Lower Schuylkill River	19140	Disconnected Impervious Area, Subsurface Infiltration Basin	0.7
FY17-SENI-4411-01	Combined	Verified	Lower Schuylkill River	19145	Disconnected Impervious Area, Porous Pavement, Subsurface Detention Basin, WQ Treatment Device	1.0

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
FY17-STPI-4413-01	Combined	Verified	Cobbs Creek	19143	Bioinfiltration, Disconnected Impervious Area	0.2
FY17-THAN-4446-01	Combined	Verified	Lower Schuylkill River	19146	Subsurface Detention Basin, WQ Treatment Device	0.8
FY17-VIEW-4457-01	Combined	Verified	Delaware Direct	19122	Bioinfiltration, Disconnected Impervious Area, Green Roof, Porous Pavement, Subsurface Infiltration Basin	4.1
FY17-MALB-4466-01	Combined	Verified	Delaware Direct	19125	Porous Pavement, Subsurface Infiltration Basin	0.7
FY17-LUCI-4480-01	Combined	Verified	Lower Schuylkill River	19139	Disconnected Impervious Area, Porous Pavement, Subsurface Detention Basin, Surface Detention Basin, WQ Treatment Device	1.0
FY17-PESS-4511-01	Combined	Verified	Lower Schuylkill River	19145	Surface Detention Basin	9.3
FY17-EAST-4468-01	Combined	Verified	Lower Schuylkill River	19121	Subsurface Detention Basin	0.8
FY17-WEND-4527-01	Combined	Verified	Cobbs Creek	19139	Subsurface Infiltration Basin	1.3
FY17-BROA-4539-01	Combined	Verified	Lower Schuylkill River	19130	Disconnected Impervious Area, Subsurface Detention Basin	1.0
FY17-ALDI-4565-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioretention, Disconnected Impervious Area, Subsurface Detention Basin, WQ Treatment Device	3.1
FY17-WGOD-4567-01	Combined	Verified	Tacony-Frankford Creek	19141	Disconnected Impervious Area, Porous Pavement, Subsurface Infiltration Basin	1.1
FY17-AUTO-4659-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin, WQ Treatment Device	1.0
FY17-WYNN-4704-01	Combined	Verified	Lower Schuylkill River	19131	Disconnected Impervious Area, Subsurface Infiltration Basin	0.8
FY17-WIDE-4636-01	Combined	Verified	Tacony-Frankford Creek	19141	Bioinfiltration	4.0
FY18-PARK-4775-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Detention Basin, WQ Treatment Device	1.6
FY18-MERC-4857-01	Combined	Verified	Cobbs Creek	19143	Disconnected Impervious Area, Subsurface Detention Basin, WQ Treatment Device	0.4
FY18-PHAS-4886-01	Combined	Verified	Delaware Direct	19148	Bioretention, Disconnected Impervious Area	1.8
FY18-PEAB-4939-01	Combined	Verified	Delaware Direct	19122	Porous Pavement	0.2

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
FY18-HSTX-5076-01	Combined	Verified	Delaware Direct	19134	Subsurface Detention Basin, WQ Treatment Device	1.3
FY19-AUTO-5287-01	Combined	Verified	Lower Schuylkill River	19145	Subsurface Detention Basin, WQ Treatment Device	0.5
2009-WALM-1045-01	Combined	Verified	Delaware Direct	19148	Direct Discharge	8.0
2008-ROTE-960-01	Combined	Verified	Delaware Direct	19148	Bioretention, Porous Pavement, Subsurface Detention Basin	1.6
2015-40TH-2780-01	Combined	Verified	Lower Schuylkill River	19104	Subsurface Infiltration Basin, Disconnected Impervious Area	0.7
Total Greened Acres:						**624**

Table 4: Complete SMIP and GARP Green Stormwater Infrastructure Projects

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2010-COMM-1370-01	Combined	Verified	Delaware Direct	19140	Green Roof	0.1
2011-1518-1561-01	Combined	Verified	Delaware Direct	19130	Subsurface Infiltration Basin	0.2
2011-2150-1616-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	1.4
2011-RETR-001-01	Combined	Verified	Lower Schuylkill River	19142	Disconnected Impervious Area	0.3
2012-THEE-1746-01	Combined	Verified	Lower Schuylkill River	19139	Green Roof	0.1
2012-NEWM-1776-01	Combined	Verified	Delaware Direct	19135	Cistern	1.0
2012-WOLF-1792-01	Combined	Verified	Delaware Direct	19137	Direct Discharge	11.7
2012-6225-1857-01	Combined	Verified	Delaware Direct	19135	Bioinfiltration	0.3
2012-ROOF-1869-01	Combined	Verified	Delaware Direct	19125	Direct Discharge	0.9
2013-CARD-2076-01	Combined	Verified	Delaware Direct	19124	Subsurface Detention Basin, Surface Detention Basin	53.0
2012-GSFS-2028-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioretention, Depave	1.0
2013-1148-2105-01	Combined	Verified	Delaware Direct	19147	Green Roof, Subsurface Infiltration Basin, Surface Infiltration Basin	0.7
2013-METH-2117-01	Combined	Verified	Lower Schuylkill River	19131	Bioinfiltration	1.7
2013-CARD-2220-01	Combined	Verified	Tacony-Frankford Creek	19124	Surface Detention Basin	15.4
2013-SITE-2387-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Infiltration Basin	5.2
2013-SITE-2401-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Infiltration Basin	3.4
2013-6225-2400-01	Combined	Verified	Delaware Direct	19135	Subsurface Infiltration Basin	3.0
2014-GLOB-2467-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Detention Basin, Surface Detention Basin	0.6
2014-SITE-2501-01	Combined	Verified	Lower Schuylkill River	19131	Bioinfiltration	35.5
2014-WILL-2541-01	Combined	Verified	Delaware Direct	19140	Depave	0.2
2014-SITE-2549-01	Combined	Verified	Lower Schuylkill River	19145	Subsurface Infiltration Basin	3.3
2014-SITE-2550-01	Combined	Verified	Delaware Direct	19135	Subsurface Infiltration Basin	1.7
2014-SITE-2592-01	Combined	Verified	Lower Schuylkill River	19153	Subsurface Infiltration Basin	9.1
2014-SITE-2666-01	Combined	Verified	Lower Schuylkill River	19153	Subsurface Infiltration Basin	2.7
2014-SITE-2665-01	Combined	Verified	Lower Schuylkill River	19145	Subsurface Detention Basin, Subsurface Infiltration Basin	8.9
2014-SITE-2682-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Detention Basin, Surface Infiltration Basin	7.4
2014-WARR-2757-01	Combined	Verified	Tacony-Frankford Creek	19124	Bioretention	3.1

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
2015-3560-2776-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	0.6
2015-MAYF-2796-01	Combined	Verified	Delaware Direct	19149	Bioretention	4.8
2015-MART-2832-01	Combined	Verified	Tacony-Frankford Creek	19138	Bioinfiltration, Subsurface Infiltration Basin	3.8
2015-SITE-2810-01	Combined	Verified	Lower Schuylkill River	19153	Subsurface Infiltration Basin	9.9
2015-MINK-2844-01	Combined	Verified	Lower Schuylkill River	19145	Basin, Surface Infiltration Basin	0.7
2015-LUTH-2836-01	Combined	Verified	Delaware Direct	19125	Depave	0.1
2015-SITE-2809-01	Combined	Verified	Tacony-Frankford Creek	19120	Subsurface Infiltration Basin	21.9
2015-LASA-2865-01	Combined	Verified	Tacony-Frankford Creek	19141	Surface Detention Basin	7.4
2015-SITE-2812-01	Combined	Verified	Pennypack Creek	19136	Subsurface Infiltration Basin	10.8
2015-LEAE-2888-01	Combined	Verified	Lower Schuylkill River	19036	Bioinfiltration, Bio-infiltration/Bio-retention, Porous Pavement, Subsurface Infiltration Basin	2.0
2015-STJA-2895-01	Combined	Verified	Tacony-Frankford Creek	19120	Subsurface Detention Basin, Surface Detention Basin, Surface Infiltration Basin	0.5
2015-LIGH-2907-01	Combined	Verified	Delaware Direct	19140	Surface Detention Basin	0.7
2015-TAGG-2931-01	Combined	Verified	Delaware Direct	19148	Bioinfiltration, Depave, Subsurface Detention Basin	0.9
2015-FRAN-2954-01	Combined	Verified	Delaware Direct	19130	Bioretention	0.6
2015-NORT-2977-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Detention Basin, Subsurface Infiltration Basin, WQ Treatment Device	17.6
FY16-SITE-4016-01	Combined	Verified	Lower Schuylkill River	19145	Subsurface Detention Basin	6.4
FY16-SITE-4020-01	Combined	Verified	Delaware Direct	19136	Subsurface Infiltration Basin	1.5
FY16-MIDA-4019-01	Combined	Verified	Delaware Direct	19123	Depave, Surface Infiltration Basin	1.4
FY16-SITE-4039-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin, Surface Detention Basin	5.7
FY16-SITE-4025-01	Combined	Verified	Pennypack Creek	19136	Subsurface Detention Basin	13.7
FY16-LIND-4086-01	Combined	Verified	Tacony-Frankford Creek	19141	Bioinfiltration	0.9
FY16-ADAM-4101-01	Combined	Verified	Tacony-Frankford Creek	19124	Disconnected Impervious Area, Surface Detention Basin	1.8
FY16-SITE-4104-01	Combined	Verified	Tacony-Frankford Creek	19120	Subsurface Infiltration Basin	9.5
FY16-PHIL-4130-01	Combined	Verified	Darby Creek	19142	Depave	0.2
FY16-USGS-4133-01	Combined	Verified	Delaware Direct	19106	Green Roof	0.4

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
FY16-PHIL-4134-01	Combined	Verified	Lower Schuylkill River	19130	Green Roof	0.1
FY16-PECO-4145-01	Combined	Verified	Lower Schuylkill River	19103	Green Roof	0.8
FY16-JOMA-4143-01	Combined	Verified	Tacony-Frankford Creek	19124	Surface Detention Basin	1.3
FY16-ADAI-4164-01	Combined	Verified	Delaware Direct	19125	Bioinfiltration, Depave	2.3
FY16-SITE-4189-01	Combined	Verified	Tacony-Frankford Creek	19120	Subsurface Detention Basin, Surface Detention Basin	12.9
FY16-CHES-4233-01	Combined	Verified	Lower Schuylkill River	19146	Depave, Porous Pavement, Subsurface Infiltration Basin, Surface Infiltration Basin	1.0
FY16-FRIE-4238-01	Combined	Verified	Lower Schuylkill River	19102	Green Roof	0.2
FY16-EMST-4198-01	Combined	Verified	Delaware Direct	19146	Depave, Porous Pavement	0.1
FY16-STHS-4226-01	Combined	Verified	Lower Schuylkill River	19145	Bioretention, Subsurface Detention Basin	4.5
FY16-GAUL-4273-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	1.2
FY16-JMPA-4286-01	Combined	Verified	Lower Schuylkill River	19142	Bioinfiltration, Depave	0.8
FY16-LASA-4274-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface Infiltration Basin, Surface Infiltration Basin	9.5
FY16-ISTR-4292-01	Combined	Verified	Delaware Direct	19134	Blue Roof	1.3
FY16-WAKE-4282-01	Combined	Verified	Delaware Direct	19137	Subsurface Detention Basin	8.1
FY16-NFRA-4325-01	Combined	Verified	Delaware Direct	19125	Porous Pavement	0.1
FY16-NAME-4323-01	Combined	Verified	Tacony-Frankford Creek	19140	Subsurface Detention Basin	7.5
FY16-ESSI-4357-01	Combined	Verified	Lower Schuylkill River	19153	Subsurface Infiltration Basin	8.0
FY17-EERI-4396-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Infiltration Basin	3.6
FY17-ELUZ-4412-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Infiltration Basin	8.1
FY17-PASC-4472-01	Combined	Verified	Lower Schuylkill River	19143	Subsurface Detention Basin, Subsurface Infiltration Basin	7.2
FY17-STEN-4469-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface Detention Basin	3.9
FY17-TACO-4444-01	Combined	Verified	Delaware Direct	19137	Subsurface Infiltration Basin	7.4
FY17-FSFA-4510-01	Combined	Verified	Delaware Direct	19122	Green Roof	0.1
FY17-STHS-4442-01	Combined	Verified	Lower Schuylkill River	19145	Subsurface Detention Basin	14.7
FY17-GRAY-4520-01	Combined	Verified	Lower Schuylkill River	19143	Subsurface Detention Basin	13.5
FY17-WHEA-4544-01	Combined	Verified	Tacony-Frankford Creek	19124	Disconnected Impervious Area, Subsurface Infiltration Basin	14.0

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
FY17-ECHE-4667-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioinfiltration, Subsurface Infiltration Basin	3.4
FY17-HIST-4671-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioretention, Depave, Subsurface Detention Basin	0.6
FY17-OVER-4682-01	Combined	Verified	Lower Schuylkill River	19151	Bioinfiltration, Subsurface Infiltration Basin	2.1
FY17-EDMU-4680-01	Combined	Verified	Pennypack Creek	19136	Subsurface Infiltration Basin	4.3
FY17-POSE-4687-01	Combined	Verified	Pennypack Creek	19136	Subsurface Detention Basin	5.2
FY17-ECHE-4668-01	Combined	Verified	Tacony-Frankford Creek	19144	Bioinfiltration, Subsurface Infiltration Basin	3.4
FY17-ESSI-4624-01	Combined	Verified	Lower Schuylkill River	19153	Subsurface Detention Basin	12.0
FY17-ESSI-4628-01	Combined	Verified	Lower Schuylkill River	19153	Subsurface Detention Basin	7.7
FY17-BAKE-4685-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	2.7
FY17-CAST-4743-01	Combined	Verified	Delaware Direct	19134	Subsurface Detention Basin	7.1
FY17-SAIN-4765-01	Combined	Verified	Delaware Direct	19148	Bioinfiltration	0.3
FY17-BSTR-4742-01	Combined	Verified	Delaware Direct	19134	Subsurface Infiltration Basin	8.9
FY17-NTHS-4620-01	Combined	Verified	Delaware Direct	19140	Subsurface Detention Basin	13.3
FY17-EADO-4760-01	Combined	Verified	Delaware Direct	19137	Subsurface Infiltration Basin	5.3
FY18-WHUN-4834-01	Combined	Verified	Lower Schuylkill River	19140	Subsurface Infiltration Basin	2.1
FY18-WBUL-4819-01	Combined	Verified	Delaware Direct	19140	Subsurface Detention Basin	6.0
FY18-TALM-4904-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Detention Basin	0.9
FY18-PINN-4913-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Infiltration Basin	2.5
FY18-NORT-4846-01	Combined	Verified	Lower Schuylkill River	19140	Subsurface Infiltration Basin	3.7
FY18-COML-4942-01	Combined	Verified	Delaware Direct	19135	Subsurface Detention Basin	1.4
FY18-GRAY-4905-01	Combined	Verified	Lower Schuylkill River	19143	Subsurface Detention Basin	2.0
FY18-DEPA-4944-01	Combined	Verified	Tacony-Frankford Creek	19422	Subsurface Detention Basin	10.3
FY18-LASA-4980-01	Combined	Verified	Tacony-Frankford Creek	19144	Subsurface Infiltration Basin	2.7
FY18-EERI-4992-01	Combined	Verified	Delaware Direct	19124	Subsurface Infiltration Basin	9.1
FY18-TALM-4995-01	Combined	Verified	Lower Schuylkill River	19131	Subsurface Infiltration Basin	1.4
FY18-ACAD-4999-01	Combined	Verified	Pennypack Creek	19114	Subsurface Infiltration Basin	3.5
FY18-PAUL-4979-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Infiltration Basin	1.7
FY18-ORTH-5057-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Detention Basin, Subsurface Infiltration Basin	6.5
FY18-WHIT-5066-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Detention Basin, Subsurface Infiltration Basin	7.2

Tracking Number	Sewer Type	Category	Watershed Type	Zip	SMP Types	Greened Acres
FY18-ADAM-5070-01	Combined	Verified	Tacony-Frankford Creek	19124	Subsurface Infiltration Basin	3.7
FY18-OREG-5175-01	Combined	Verified	Delaware Direct	19148	Subsurface Detention Basin	6.2
FY18-BALA-5159-01	Combined	Verified	Lower Schuylkill River	19131	Surface Detention Basin	24.4
FY19-WGLE-5243-01	Combined	Verified	Lower Schuylkill River	19132	Subsurface Infiltration Basin	6.3
FY19-WGLE-5241-01	Combined	Verified	Delaware Direct	19132	Subsurface Detention Basin	2.7
FY19-PEER-5261-01	Combined	Verified	Lower Schuylkill River	19145	Subsurface Detention Basin	2.6
FY19-ARDL-5323-01	Combined	Verified	Tacony-Frankford Creek	19138	Bioinfiltration	2.6
Total Greened Acres:						**613**

Appendix 4

Green Stormwater Infrastructure Monitoring Status Report

1.0 Introduction

During the reporting period of July 1, 2019 to June 30, 2020, the City's *Green City, Clean Waters* program addressed stormwater runoff reductions in urbanized areas using a combination of traditional infrastructure and green stormwater infrastructure (GSI). GSI systems vary in size, complexity, and interconnectedness to the existing drainage system, but the objective is to infiltrate, evapotranspire, reuse, and/or detain stormwater rather than to convey it directly to the sewer system. Monitoring and testing GSI systems is therefore essential to determine the effectiveness of various stormwater management practices (SMP) types in managing stormwater and reducing combined sewer overflows.

The focus of the *Green City, Clean Waters* monitoring program is post-construction performance monitoring and testing. The primary goal of GSI monitoring and testing is to measure the performance of GSI systems for reducing stormwater runoff volume. Secondary goals include providing information for improvements to GSI design and maintenance and developing appropriate monitoring methods for the variety of GSI projects installed city-wide.

Project characteristics such as contributing drainage area, storage volume, inlet capture efficiency, and slow release discharge parameters can be observed, allowing for a more complete view of a system's functionality. The comprehensive understanding of GSI through monitoring and testing allows the Water Department to make informed decisions for current and future projects regarding the GSI design standards, type and frequency of maintenance activities, and program optimization.

From July 1, 2019 to June 30, 2020, the Water Department performed monitoring and testing of GSI SMPs using methods described in the Comprehensive Monitoring Plan (CMP) submitted January 10, 2014 and approved by PADEP May 28, 2014. In selecting water level monitoring locations, the Water Department has attempted to allocate monitoring effort roughly according to the types of SMPs that are being constructed for the *Green City, Clean Waters* program (**Table 1-1**).

Table 1-1: Monitored SMPs by Type

SMP Type	Monitored SMPs Before or During FY20	Total Constructed Public SMPs
Stormwater Tree Trench	218	316
Stormwater Tree	0	92
Stormwater Planter	13	102
Stormwater Bump-out	8	57
Rain Garden	55*	113
Infiltration/Storage Trench	120**	243
Pervious Paving	2	12
Swale	1	27
Basin	5***	3
Drainage Well	4	4
Green Roof	0	2
Total	426	971

*Number contains 8 privately constructed SMPs classified as rain gardens

**Number contains 14 privately constructed SMPs classified as subsurface trenches

***Number contains 4 privately constructed SMPs classified as basins

2.0 Data Tracking

The data tracking mechanism for *Green City, Clean Waters* GSI monitoring data has evolved significantly since the inception of the program. Raw data are stored on an SMP-by-SMP basis in a filesystem directory tree that is backed up periodically. Derived data from quality assurance calculations are stored in spreadsheets and relational databases, to be used by various data analysis groups. System metrics and design characteristics are stored in other relational databases managed by PWD.

3.0 Comprehensive Monitoring Plan Implementation Status

Proposed methods for performance monitoring were outlined in both the draft Comprehensive Monitoring Plan submitted December 1, 2012 and in a response sent to PADEP and the EPA on July 31, 2013. A revised CMP was submitted on January 10th, 2014 and approved by PADEP on May 28, 2014. The following sections summarize the status of monitoring activities described in the CMP for July 1, 2019 through June 30, 2020.

3.1 Green Stormwater Infrastructure Performance Monitoring

Continuous water level and storage volume monitoring of GSI systems is the primary method that the Water Department evaluates performance of constructed SMPs. All continuous water level monitored SMPs through FY20 are shown in **Figure 3-1**. During FY20, the Water Department has deployed 225 unique HOBO pressure transducers (Onset Computer Corp, Bourne MA) during its GSI monitoring program. Individual sensors can be deployed in various locations throughout their useful life and are often used to monitor multiple SMPs before refurbishment. Of these sensors, 36 were deployed as barometric pressure sensors and 196 were deployed as water level sensors; some sensors were deployed as both barometric pressure sensors and water level sensors at different times, which is why the total number of water level sensors plus barometric sensors is greater than the total number of unique sensors deployed.

Table 3-1: Continuous Water Level Monitoring Sensors

Sensor Type	Number Deployed during FY20
Barometric Pressure Sensor	36
Water Level Sensor	196
Total Unique Sensors	225

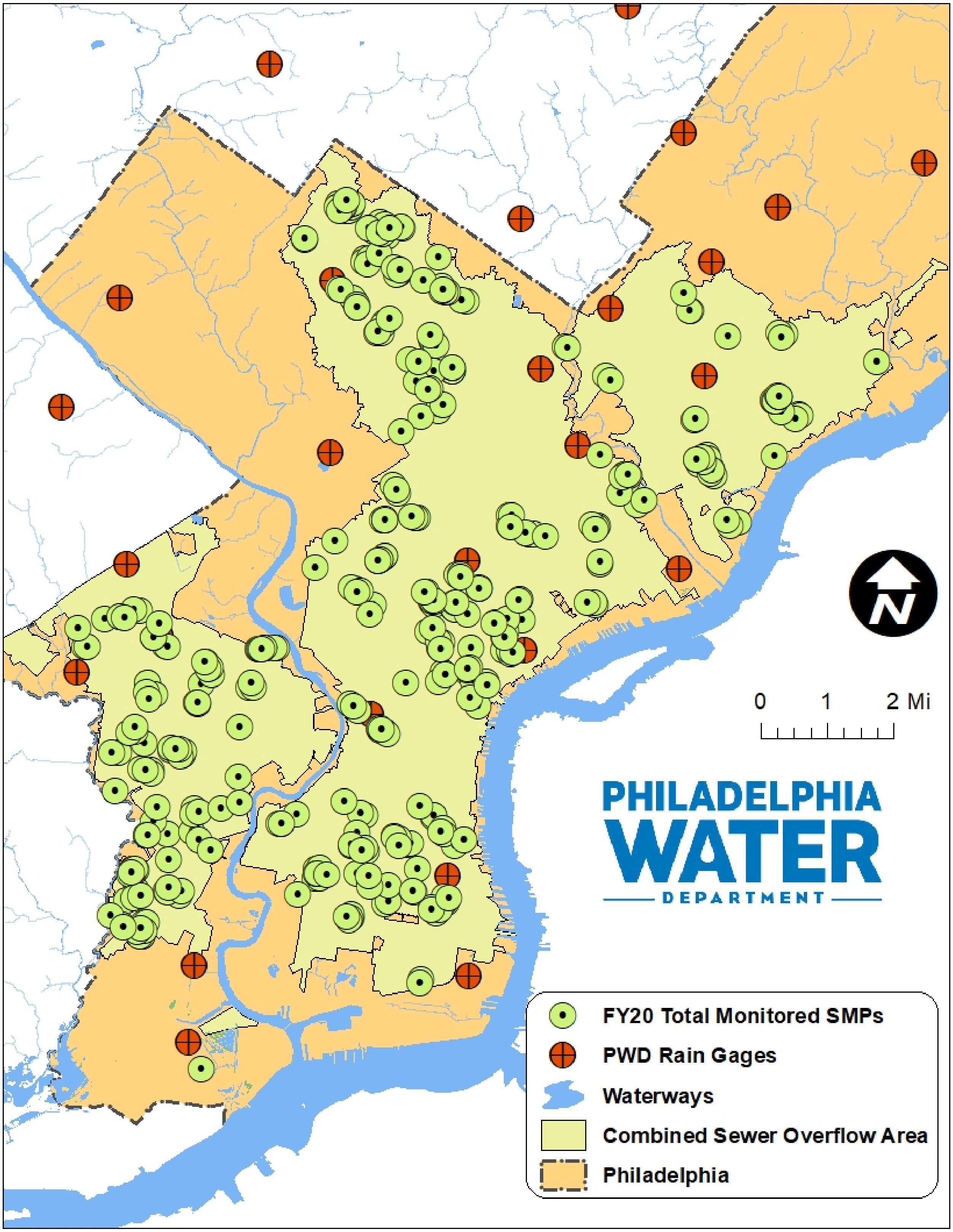


Figure 3-1: Continuous Water Level Monitoring Project Locations and Combined Sewer Area

3.2 Green Stormwater Infrastructure Performance Testing

The Water Department uses two Sensus Water Meter Testers, a WL-1250[1] and Omni V-2[1], for measuring flow applied to an SMP during Simulated Runoff Tests (SRTs). These water meters are capable of estimating flows from 0.04 CFM to 167 CFM (WL-1250[1]) and 0.67 CFM to 66 CFM (Omni V2[1]). 56 SRTs were performed on 41 GSI systems, which included 49 SMPs, between July 1, 2019 to June 30, 2020. Breakdown of tests per SRT type is in **Tables 3-2 and 3-3**. Breakdown of SRTs per SMP type can be found in **Table 3-4**. FY20 SRT locations are shown **Figure 3-2**.

Table 3-2: Post-Construction SRTs performed by category in FY20

SRT Type	Number of SRTs Performed
Pre-Inspection Dye Tests	30
Performance SRTs	9
CCTV Dye Tests	10

Table 3-3: In-Construction SRTs performed by category in FY20

SRT Type	Number of SRTs Performed
Pre-Inspection Dye Tests	4
Performance SRTs	2
CCTV Dye Tests	1

Table 3-4: SMP Attributes for SMPs tested with SRT in FY20

SMP Type	Number of SRTs Performed
Bumpout	4
Drainage Well	1
Planter	3
Rain Garden	3
Stormwater Tree	10
Tree Trench	14
Trench	14

3.3 Permeable Pavement Surface Infiltration Rate Testing

The Water Department uses ASTM Standards (ASTM Committee D18, ASTM C1701/C1701M-09 Standard Test method for Infiltration Rate of In Place Pervious Concrete, 2009) (ASTM Committee C15, 2013), with minor modifications for pervious paving infiltration testing. Development of these

[1] Reference in this document to any specific commercial product, process, or service, or the use of any trade, firm or corporation name is for the information and convenience of the public, and does not constitute endorsement, recommendation, or favoring by PWD.

procedures was completed in FY13 and refinement of the methods is ongoing. Two 12" diameter sections of Schedule 60 PVC pipe are used as infiltration rings to allow for performing multiple tests simultaneously. Modifications were made to the test calculations to compensate for the different infiltration ring diameter compared to the ring diameter specified in the method. 13 SMPs have been selected for surface infiltration rate testing in FY20. Monitoring locations are shown in **Table 3-4** and **Figure 3-2**.

Table 3-4: Permeable Pavement SMPs Selected for Surface Infiltration Rate Testing

SMP ID	Project Name	Surface Type	No. Test Locations
192-2-1	Herron Playground	Porous Asphalt	6
207-1-3	Waterview Recreation Center	Pervious Concrete	6
240-1-1	Percy St from Catharine St to Christian St	Porous Asphalt	6
288-1-1	Mole St from Fitzwater to Catharine St and Webster St from 16th to 17th	Porous Asphalt	6
301-1-1	Dauphin from Frankford to Tulip	Porous Asphalt	10
301-3-1	Dauphin from Frankford to Tulip	Porous Asphalt	6
329-1-1	Hope St from Master to Jefferson	Porous Asphalt	6
331-1-1	Hope St from Berks to Norris	Porous Asphalt	6
445-1-1	Southwest Treatment Plant Parking Lot	Paver Block	7
445-1-1	Southwest Treatment Plant Parking Lot	Pervious Concrete	4
445-1-1	Southwest Treatment Plant Parking Lot	Pervious Stamped Concrete	4
445-1-1	Southwest Treatment Plant Parking Lot	Rubberized Pervious Asphalt	3
524-2-1	Benson Park	Paver Block	3
58912	777 Lofts	Pervious Paving	3
61175	Queen Lane Water Treatment Plant - Parking Lot Improvements	Pervious Concrete	12
62739	1118-28 Chestnut Street	Porous Asphalt	3

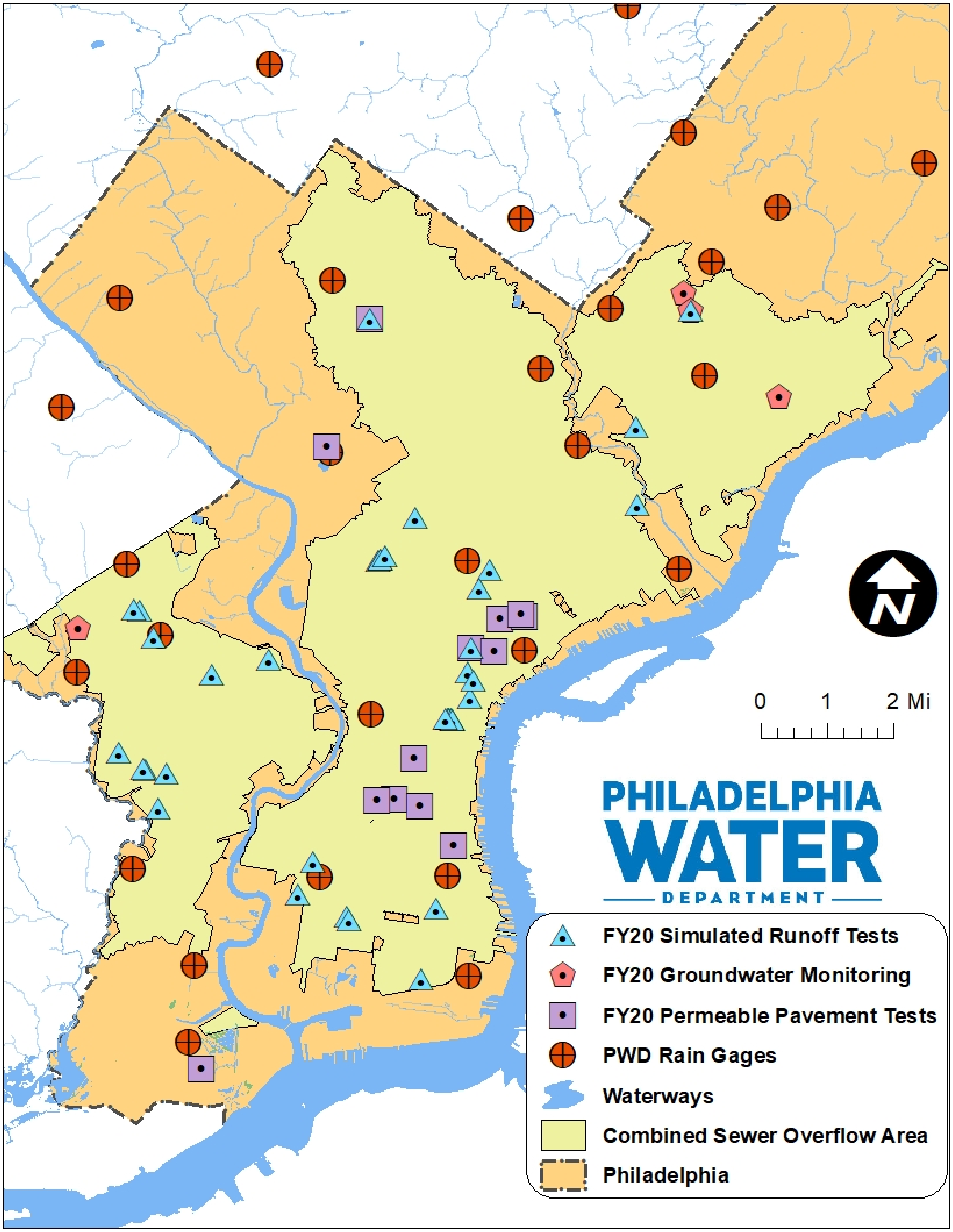


Figure 3-2: Simulated Runoff Tests, Porous Pavement Tests, and Groundwater Monitoring Locations

3.4 Lateral Groundwater Mounding

The Water Department installed sensors within groundwater monitoring wells near four SMPs to assess the effect of infiltrating SMPs on the water table. Monitoring locations are shown in **Table 3-5** and **Figure 3-2**.

Table 3-5: SMP Attributes for SMPs Selected for Lateral Groundwater Mounding Monitoring

SMP Type	Project Name	Number of Wells
Drainage Well	Algon Ave from Glenview St to Longshore Ave	3
Drainage Well	Malvern Ave from Atwood Rd to 65th St	4
Trench	Roosevelt Playground	4
Drainage Well	Unruh Ave between Summerdale and Frontenac	3

3.5 Sewer System Monitoring

The Water Department continues to perform sewer system monitoring per the methods outlined in the CMP. More information is available in **Appendix B**.

3.6 Meteorological Monitoring

The Water Department continues to perform meteorological monitoring, including operation and maintenance of a rain gauge network, as described in the CMP. More information is available in **Appendix B.**

3.7 Groundwater Level Monitoring

The Water Department is monitoring groundwater levels in the Philadelphia region in partnership with the U.S. Geological Survey. As of July 2020, 29 wells have been established from which water level measurements are made monthly. Results of groundwater monitoring are presented in **Appendix I PWD-USGS Cooperative Groundwater Monitoring Program**. Well PH1043, located in the Germantown section of the City, is equipped with continuous water level recording and telemetry equipment making the data available in near-real time.

4.0 CMP Implementation Successes and Challenges Encountered

The GSI monitoring program has been successful in acquiring the needed equipment, deploying water level sensors in GSI systems, and performing simulated runoff and permeable pavement infiltration tests. During FY20, the number of SRT's performed was greatly increased relative to the previous fiscal year. SRT methods have been modified using experiences from Year 5 EAP. These methods have been developed to incorporate the assessment of GSI's impact on the subsurface and infrastructure in proximity to GSI. Updated SOPs of all monitoring methods were included as Appendices to the FY19 annual report.

The GSI monitoring team has continued providing monitoring assistance to the GSI Implementation program to collect data from systems where challenges have been observed to help interpret cause(s) and verify remediation measures. The performance of these systems is evaluated using the updated SOPs that were included in the FY19 report.

PWD has provided support to the recipients of the EPA STAR grant since FY13. This has provided PWD with valuable insight and productive academic partnerships. To continue these partnerships PWD has invested resources into developing academic research contracts with Villanova University and Drexel University.

Appendix B – Flow Monitoring

APPENDIX B –
FLOW MONITORING

Page

Table 1 - Summary of All Monitors

	# of Permanent Monitors	# of Temporary Monitors
Combined/Separate Sewer Monitors	469	68
Outlying Community Monitors	63	-
Pumping Stations	82	-
Rain Gages	37	1
Total	651	69

Table 2 - Listing of Monitored Outlying Community Connections

Site ID	Connection Type	Township	Measurement Name	Measurement Type
MA_1	STD	Abington	TEMPORARY	FLOW
MA_2	MTR	Abington	METERING CHAMBER FLOW	FLOW
MA_3	STD	Abington	TEMPORARY	FLOW
MA_4	STD	Abington	TEMPORARY	FLOW
MAx1	STD	Abington	TEMPORARY	FLOW
MB_1	MTR	Bucks Co.	METERING CHAMBER FLOW	FLOW
MBE_01	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_02	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_03	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_04	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_05	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_06	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_07	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_08	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_09	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_10	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_11	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_12	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_13	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_14	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_15		Bensalem	UNMONITORED	
MBE_16	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MBE_17	MTR	Bensalem	METERING CHAMBER FLOW	FLOW
MC_1	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MC_2	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MC_3	MTR	Abington	METERING CHAMBER FLOW	FLOW
MCx_1	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_2	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_3	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_4	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_5	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_6	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MCx_7	MTR	Cheltenham	METERING CHAMBER FLOW	FLOW
MD_1	MTR	Delaware Co.	METERING CHAMBER FLOW	FLOW
ML_1	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_2	STD	Lower Merion	TEMPORARY	FLOW
ML_3	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_4	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW

Site ID	Connection Type	Township	Measurement Name	Measurement Type
ML_5	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_6	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
ML_7	MTR	Lower Merion	METERING CHAMBER FLOW	FLOW
MLM_1	MTR	Lower Moreland	METERING CHAMBER FLOW	FLOW
MLM_2	MTR	Lower Moreland	METERING CHAMBER FLOW	FLOW
MLM_3	STD	Lower Moreland	TEMPORARY	FLOW
MLM_4	STD	Lower Moreland	TEMPORARY	FLOW
MLM_5	STD	Lower Moreland	TEMPORARY	FLOW
MLM_6	STD	Lower Moreland	TEMPORARY	UNKNOWN
MLM_7	STD	Lower Moreland	TEMPORARY	UNKNOWN
MS_1	STD	Springfield	TEMPORARY	FLOW
MS_2	MTR	Springfield	METERING CHAMBER FLOW	FLOW
MS_3	MTR	Springfield	METERING CHAMBER FLOW	FLOW
MS_4	STD	Springfield	TEMPORARY	FLOW
MS_5	STD	Springfield	TEMPORARY	FLOW
MS_6	MTR	Springfield	METERING CHAMBER FLOW	FLOW
MS_7	STD	Springfield	TEMPORARY	UNKNOWN
MS_8	STD	Springfield	TEMPORARY	FLOW
MSH_1	MTR	Southampton	METERING CHAMBER FLOW	FLOW
MSH_2	STD	Southampton	TEMPORARY	FLOW
MSHX_1	STD	Southampton	TEMPORARY	FLOW
MSHX_2	STD	Southampton	TEMPORARY	FLOW
MUD_1N	MTR	Upper Darby	METERING CHAMBER FLOW	FLOW
MUD_1S	MTR	Upper Darby	METERING CHAMBER FLOW	FLOW
MUD_1O	MTR	Upper Darby	METERING CHAMBER FLOW	FLOW

*STD – temporary flow monitor

**MTR – Permanent monitor

Table 3 - Listing of Combined/Separate Sewer Monitors

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
C_01	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_01	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_02	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_02	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_04	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_04	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_05	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_05	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_06	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_06	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_07	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_07	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_09	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_09	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_10	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_10	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_11	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_11	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_12	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_12	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_14	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_14	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_15	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_15	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_17	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_17	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_18	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_18	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_19	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_19	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_20	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_20	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_21	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_21	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_22	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_22	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_23	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_23	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_24	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_24	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_26	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_26	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_28A	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
C_28A	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_29	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_29	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_30	Cobbs Creek Low Level	Cobbs Creek	SWO LEVEL	LEVEL
C_30	Cobbs Creek Low Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_31	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_31	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_32	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_32	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_33	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_33	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_34	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_34	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_35	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_35	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_36	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_36	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
C_37	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
C_37	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
CSPS	Central Schuylkill	Schuylkill River	INTERCEPTOR LEVEL N	LEVEL
CSPS	Central Schuylkill	Schuylkill River	INTERCEPTOR LEVEL S	LEVEL
D_02	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_02	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_02	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_02	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_02	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_03	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_03	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_03	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_03	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_03	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_04	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_04	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_04	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_04	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_04	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_05	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_05	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_05	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_05	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_05	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_06	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_06	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_06	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
D_07	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_07	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_07	Upper Delaware Low Level	Delaware River	SWO GATE POSITION 1	POSITION
D_07	Upper Delaware Low Level	Delaware River	SWO GATE POSITION 2	POSITION
D_07	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_07	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_08	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_08	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_09	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_09	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_09	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_09	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_09	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_11	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_11	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_11	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_11	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_11	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_12	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_12	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_13	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_13	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_15	Upper Delaware Low Level	Delaware River	DWO GATE POSITION	POSITION
D_15	Upper Delaware Low Level	Delaware River	DWO LEVEL	LEVEL
D_15	Upper Delaware Low Level	Delaware River	SWO GATE POSITION	POSITION
D_15	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_15	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_17	Somerset	Delaware River	SWO LEVEL	LEVEL
D_17	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_18	Somerset	Delaware River	SWO LEVEL	LEVEL
D_18	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_19	Somerset	Delaware River	SWO LEVEL	LEVEL
D_19	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_20	Somerset	Delaware River	SWO LEVEL	LEVEL
D_20	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_21	Somerset	Delaware River	SWO LEVEL	LEVEL
D_21	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_22	Somerset	Delaware River	SWO LEVEL	LEVEL
D_22	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_23	Somerset	Delaware River	SWO LEVEL	LEVEL
D_23	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_24	Somerset	Delaware River	SWO LEVEL	LEVEL
D_24	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_25	Somerset	Delaware River	SWO LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
D_25	Somerset	Delaware River	TRUNK LEVEL	LEVEL
D_37	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_37	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_38	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_38	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_39	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_39	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_40	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_40	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_41	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_41	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_42	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_42	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_43	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_43	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_47	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_47	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_48	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_48	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_49	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_49	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_50	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_50	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_51	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_51	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_51A	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_52	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_52	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_53	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_53	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_54	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_54	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_58	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_58	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_61	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_61	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_63	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_63	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_64	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_64	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_65	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_65	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_66	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_66	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
D_67	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_67	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_68	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_68	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_69	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_69	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_70	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_70	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_72	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_72	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
D_73	Lower Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
D_73	Lower Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
F_03	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_03	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_04	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_04	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_05	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_05	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_06	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_06	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_07	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_07	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_08	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_08	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_09	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_09	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_10	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_10	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_11	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_11	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_12	Lower Frankford Low Level	Frankford Creek	SWO LEVEL	LEVEL
F_12	Lower Frankford Low Level	Frankford Creek	TRUNK LEVEL	LEVEL
F_13	Lower Frankford Creek	Frankford Creek	DWO LEVEL	LEVEL
F_13	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_13	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_14	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_14	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_23	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_23	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_24	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_24	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
F_25	Lower Frankford Creek	Frankford Creek	DWO GATE POSITION	POSITION
F_25	Lower Frankford Creek	Frankford Creek	SWO GATE POSITION 1	POSITION
F_25	Lower Frankford Creek	Frankford Creek	SWO GATE POSITION 2	POSITION

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
F_25	Lower Frankford Creek	Frankford Creek	SWO LEVEL	LEVEL
F_25	Lower Frankford Creek	Frankford Creek	TRUNK LEVEL	LEVEL
H_29		Schuylkill River	DWO LEVEL	LEVEL
H_29		Schuylkill River	SWO LEVEL	LEVEL
H_29		Schuylkill River	TRUNK LEVEL	LEVEL
H_35		Schuylkill River	BLOWER 1 RUN	EVENT
H_35		Schuylkill River	BLOWER 2 RUN	EVENT
H_35		Schuylkill River	DAM AIR PRESSURE	PSI
H_35		Schuylkill River	DWO GATE POSITION	POSITION
H_35		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
H_35		Schuylkill River	SWO GATE POSITION	POSITION
H_35		Schuylkill River	SWO LEVEL	LEVEL
H_35		Schuylkill River	TRUNK LEVEL	LEVEL
I_BYH09		Byberry Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC07	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC12	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC13	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC14	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC17	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC18	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLC34	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCHLH18	Cobbs Creek High Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC19	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC20	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC22	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC24	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLC26	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_CCLLH01	Cobbs Creek Low Level	Cobbs Creek	INTERCEPTOR LEVEL	LEVEL
I_COHOH16		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESH11	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESH15	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS09	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS14	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS17	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSESS26	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CSSSH15	Central Schuylkill	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_CVBH08		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_FHLH03	Frankford High Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_FHLTT08	Frankford High Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_FHLTT15	Frankford High Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_FLLH03	Frankford Low Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LDLLD43	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD45	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD47	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
I_LDLLD53	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD62	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD69	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LDLLD70	Lower Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_LFCH07	Lower Frankford Creek	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LFCH19	Lower Frankford Creek	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LFLLF08	Lower Frankford Low Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LFLLF10	Lower Frankford Low Level	Frankford Creek	INTERCEPTOR LEVEL	LEVEL
I_LSESH15	Lower Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSESS36	Lower Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSH01	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSS33	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSS38	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_LSWSS45	Lower Schuylkill West Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_MRH21	Main Relief Sewer	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_OH12		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PASYH13		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PDRLH01		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PDRLH02		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PENRH02		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PH04	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PH05	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PH06	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PH10	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PMPFH03		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_PP02	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PP04	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PP05	Pennypack	Pennypack Creek	INTERCEPTOR LEVEL	LEVEL
I_PQH09	Poquessing	Poquessing Creek	INTERCEPTOR LEVEL	LEVEL
I_PRH10		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SD19	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SD21	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SD25	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SH03	Somerset	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_SRH05		Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGCHLH01	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGEHLH01	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGH17	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGH20	Southwest Main Gravity	Schuylkill River	C GATE POSITION	POSITION

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
I_SWMGH20	Southwest Main Gravity	Schuylkill River	E GATE POSITION	POSITION
I_SWMGH20	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGH20	Southwest Main Gravity	Schuylkill River	W GATE POSITION	POSITION
I_SWMGS28	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS34	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS43	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS47	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGS50	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_SWMGWHLH01	Southwest Main Gravity	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
I_UDLLD04	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLD08	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH03	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH04	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH07	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_UDLLH14	Upper Delaware Low Level	Delaware River	INTERCEPTOR LEVEL	LEVEL
I_WBH06		Wissahickon Creek	INTERCEPTOR LEVEL	LEVEL
I_WHLH08	Wissahickon High Level	Wissahickon Creek	INTERCEPTOR LEVEL	LEVEL
I_WLLH11	Wissahickon Low Level	Wissahickon Creek	INTERCEPTOR LEVEL	LEVEL
P_01	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_01	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_02	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_02	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_03	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_03	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_04	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_04	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
P_05	Pennypack	Pennypack Creek	SWO LEVEL	LEVEL
P_05	Pennypack	Pennypack Creek	TRUNK LEVEL	LEVEL
R_06	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_06	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
R_07	Main Relief Sewer	Schuylkill River	SWO LEVEL	LEVEL
R_07	Main Relief Sewer	Schuylkill River	TRUNK LEVEL	LEVEL
R_12	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
R_12	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
R_13	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
R_13	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL
R_14	Upper Delaware Low Level	Delaware River	SWO LEVEL	LEVEL
R_14	Upper Delaware Low Level	Delaware River	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
R_15	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
R_15	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
R_18	Frankford High Level	Tacony Creek	INTERCEPTOR LEVEL	LEVEL
R_18	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
R_20	Central Schuylkill East Side	Schuylkill River	INTERCEPTOR LEVEL	LEVEL
R_20	Central Schuylkill East Side	Schuylkill River	STORMWATER LEVEL	LEVEL
R_24	Cobbs Creek High Level	Cobbs Creek	SWO LEVEL	LEVEL
R_24	Cobbs Creek High Level	Cobbs Creek	TRUNK LEVEL	LEVEL
S_01	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_01	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_03	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_03	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_04	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_04	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_05	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_05	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_06	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_06	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_07	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_07	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_08	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_08	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_09	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_09	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_10	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_10	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_11	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_11	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_12	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_12	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_12A	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_12A	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_13	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_13	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_15	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_15	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_17	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_17	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_18	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_18	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_19	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_19	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_22	Central Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_22	Central Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
S_23	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_23	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_25	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_25	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_26	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_26	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_27	Central Schuylkill East Side	Schuylkill River	DWO LEVEL	LEVEL
S_27	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_27	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_28	Central Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_28	Central Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_30	Southwest Main Gravity	Schuylkill River	SWO LEVEL	LEVEL
S_30	Southwest Main Gravity	Schuylkill River	TRUNK LEVEL	LEVEL
S_31	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_31	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_32	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_32	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_33	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_33	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_34	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_34	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_35	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_35	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_36	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_36	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_36A	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_36A	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_37	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_37	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_38	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_38	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_39	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_39	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_40	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_40	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_42	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_42	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_42A	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_42A	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_43	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_43	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_44	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_44	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_45	Lower Schuylkill West Side	Schuylkill River	DWO LEVEL	LEVEL

Site Name	Interceptor	Waterbody	Measurement Name	Measurement Type
S_45	Lower Schuylkill West Side	Schuylkill River	SWO LEVEL	LEVEL
S_45	Lower Schuylkill West Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_46	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_46	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_47	Lower Schuylkill East Side	Schuylkill River	SWO LEVEL	LEVEL
S_47	Lower Schuylkill East Side	Schuylkill River	TRUNK LEVEL	LEVEL
S_50	Southwest Main Gravity	Schuylkill River	SWO LEVEL	LEVEL
S_50	Southwest Main Gravity	Schuylkill River	TRUNK LEVEL	LEVEL
S_51	Southwest Main Gravity	Schuylkill River	SWO LEVEL	LEVEL
S_51	Southwest Main Gravity	Schuylkill River	TRUNK LEVEL	LEVEL
T_01	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_01	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_03	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_03	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_04	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_04	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_05	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_05	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_06	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_06	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_07	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_07	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_08	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_08	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_09	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_09	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_10	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_10	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_11	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_11	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_12	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_12	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_13	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_13	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_14	Frankford High Level	Tacony Creek	DWO GATE 1	POSITION
T_14	Frankford High Level	Tacony Creek	DWO GATE 2	POSITION
T_14	Frankford High Level	Tacony Creek	SWO CREST GATE	POSITION
T_14	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_14	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL
T_15	Frankford High Level	Tacony Creek	SWO LEVEL	LEVEL
T_15	Frankford High Level	Tacony Creek	TRUNK LEVEL	LEVEL

Table 4 - Listing of all Rain Gages (7/1/2019 - 6/30/2020)

Rain Gage	Location	Percent Working

RG_1	70th and Essington Ave	94.94%
RG_2	66th and Regent St	99.58%
RG_3	Fox Chase Rd. and Castor Ave	98.88%
RG_4	State Rd and Pennypack St	99.50%
RG_5	3rd and Mifflin St	97.67%
RG_6	Cardinal Ave and City Line Ave	94.14%
RG_7	G St. and E Annsbury St	99.36%
RG_8	N Water St. and E Clarkson Ave	98.94%
RG_9	54th and Lancaster Ave	99.44%
RG_10	Pine Rd and Susquehanna Rd	96.23%
RG_11	Rising Sun Ave and Lardner St	98.88%
RG_12	Pattison Ave and Columbus Blvd	96.86%
RG_13	Glendale Ave and Algon Ave	99.59%
RG_14	Delaware Ave and Lewis St	99.27%
RG_15	E Montgomery Ave and Thompson St	90.59%
RG_16	19th and Wood St	99.96%
RG_17	Saul St. and Benner St	99.58%
RG_18	Fox St. and Roosevelt Blvd	78.78%
RG_19	Chew Ave and Sharpnack St	94.85%
RG_20	Woodhaven Rd and Knights Rd	85.92%
RG_21	Shawmont Ave and Eva St	99.59%
RG_22	N 67th and Callowhill St	96.56%
RG_23	Penrose Ave and Mingo Ave	99.96%
RG_24	Lockart Rd and Lockart Ln	99.99%
RG_25	24th and Wolf St	96.37%
RG_26	621 Lehigh Ave	89.84%
RG_27	Grant Ave and Ashford Rd	95.82%
RG_28	1350 Southampton Rd	99.02%
RG_29	Springfield Way and PaperMill Rd	93.98%
RG_30	7609 Montgomery Ave	79.94%
RG_31	Valley Rd and Old Valley Rd	99.16%
RG_32	Rozel Ave and Crushmore Rd	99.45%
RG_33	Jackson St and E Broadway Ave	89.39%
RG_34	Lawrence Rd and Chester Ave	86.05%
RG_35	Hagysford Rd and Tower Lane	85.64%
RG_36	Schuylkill Canal and Lock St	89.34%
RG_37	S 13 St and Normandy Pl	68.99%

Table 5 - Listing of All Pumping Station Monitors

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_26VA	Storm Water	PUMP 1 RUN	EVENT	26th and Vare Ave
PS_26VA	Storm Water	PUMP 2 RUN	EVENT	27th and Vare Ave
PS_26VA	Storm Water	WET WELL LEVEL	LEVEL	28th and Vare Ave
PS_42ST	Waste Water	PUMP 1 RUN	EVENT	761 S 43rd St
PS_42ST	Waste Water	PUMP 2 RUN	EVENT	762 S 43rd St
PS_42ST	Waste Water	PUMP 3 RUN	EVENT	763 S 43rd St
PS_42ST	Waste Water	WET WELL LEVEL	LEVEL	764 S 43rd St
PS_BANK	Waste Water	PUMP 1 RUN	EVENT	15 S Bank St (Bank & Elbow Ln)
PS_BANK	Waste Water	PUMP 2 RUN	EVENT	16 S Bank St (Bank & Elbow Ln)
PS_BANK	Waste Water	WET WELL LEVEL	LEVEL	17 S Bank St (Bank & Elbow Ln)
PS_BELD	Waste Water	PUMP 1 RUN	EVENT	751 S Manatawna St (Belfry & Steeple)
PS_BELD	Waste Water	PUMP 2 RUN	EVENT	752 S Manatawna St (Belfry & Steeple)
PS_BELD	Waste Water	WET WELL LEVEL	LEVEL	753 S Manatawna St (Belfry & Steeple)
PS_BLVD	Storm Water	PUMP 1 RUN	EVENT	4251 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	PUMP 2 RUN	EVENT	4252 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	PUMP 3 RUN	EVENT	4253 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	PUMP 4 RUN	EVENT	4254 N Broad St (Broad & Roosevelt Blvd)
PS_BLVD	Storm Water	WET WELL LEVEL	LEVEL	4255 N Broad St (Broad & Roosevelt Blvd)
PS_CSPS	Waste Water	N GATE POSITION	POSITION	600 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	N SIPHON LEVEL	LEVEL	601 University Ave (34th St Bridge & University)

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_CSPS	Waste Water	N SIPHON LEVEL	LEVEL	602 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	N WET WELL LEVEL	LEVEL	603 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 1 RUN	EVENT	604 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 2 RUN	EVENT	605 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 3 RUN	EVENT	606 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 4 RUN	EVENT	607 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 5 RUN	EVENT	608 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	PUMP 6 RUN	EVENT	609 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	S GATE POSITION	POSITION	610 University Ave (34th St Bridge & University)
PS_CSPS	Waste Water	S WET WELL LEVEL	LEVEL	611 University Ave (34th St Bridge & University)
PS_FORD	Waste Water	PUMP 1 RUN	EVENT	3800 Ford Rd (Across from West Park Hospital)
PS_FORD	Waste Water	PUMP 2 RUN	EVENT	3801 Ford Rd (Across from West Park Hospital)
PS_FORD	Waste Water	WET WELL LEVEL	LEVEL	3802 Ford Rd (Across from West Park Hospital)
PS_HOGI	Waste Water	PUMP 1 RUN	EVENT	3 Hog Island Rd (east of Airport control tower)
PS_HOGI	Waste Water	PUMP 2 RUN	EVENT	4 Hog Island Rd (east of Airport control tower)
PS_HOGI	Waste Water	WET WELL LEVEL	LEVEL	5 Hog Island Rd (east of Airport control tower)
PS_LIND	Waste Water	PUMP 1 RUN	EVENT	5200 Linden Ave (Linden & Milnor)
PS_LIND	Waste Water	PUMP 2 RUN	EVENT	5201 Linden Ave (Linden & Milnor)
PS_LIND	Waste Water	WET WELL LEVEL	LEVEL	5202 Linden Ave (Linden & Milnor)
PS_LOCK	Waste Water	PUMP 1 RUN	EVENT	10778 Lockart Rd (Lockart St & Locart Ln)
PS_LOCK	Waste Water	PUMP 2 RUN	EVENT	10779 Lockart Rd (Lockart St & Locart Ln)

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_LOCK	Waste Water	WET WELL LEVEL	LEVEL	10780 Lockart Rd (Lockart St & Locart Ln)
PS_MILN	Waste Water	PUMP 1 RUN	EVENT	9647 Milnor St (between Grant Ave & Eden St)
PS_MILN	Waste Water	PUMP 2 RUN	EVENT	9648 Milnor St (between Grant Ave & Eden St)
PS_MILN	Waste Water	PUMP 3 RUN	EVENT	9649 Milnor St (between Grant Ave & Eden St)
PS_MILN	Waste Water	WET WELL LEVEL	LEVEL	9650 Milnor St (between Grant Ave & Eden St)
PS_MING	Storm Water	BASIN LEVEL	LEVEL	7000 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 1 RUN	EVENT	7001 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 2 RUN	EVENT	7002 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 3 RUN	EVENT	7003 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 4 RUN	EVENT	7004 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 5 RUN	EVENT	7005 Penrose Ave (Schuylkill River under Platt Bridge)
PS_MING	Storm Water	PUMP 6 RUN	EVENT	7006 Penrose Ave (Schuylkill River under Platt Bridge)
PS_NEIL	Waste Water	PUMP 1 RUN	EVENT	4000 Neill Dr (Neill Dr & Falls Rd)
PS_NEIL	Waste Water	PUMP 1 RUN	EVENT	4001 Neill Dr (Neill Dr & Falls Rd)
PS_NEIL	Waste Water	PUMP 3 RUN	EVENT	4002 Neill Dr (Neill Dr & Falls Rd)
PS_NEIL	Waste Water	WET WELL LEVEL	LEVEL	4003 Neill Dr (Neill Dr & Falls Rd)
PS_P603	Waste Water	PUMP 1 RUN	EVENT	2000 Langley Ave (PNBC)
PS_P603	Waste Water	PUMP 2 RUN	EVENT	2001 Langley Ave (PNBC)
PS_P603	Waste Water	WET WELL LEVEL	LEVEL	2002 Langley Ave (PNBC)
PS_P648	Waste Water	PUMP 1 RUN	EVENT	PNBC
PS_P648	Waste Water	PUMP 2 RUN	EVENT	PNBC
PS_P648	Waste Water	WET WELL LEVEL	LEVEL	PNBC
PS_P796	Waste Water	PUMP 1 RUN	EVENT	4801 S 13th St (PNBC)

Monitor ID	Type of Pumping Station	Measurement Name	Measurement Type	Address
PS_P796	Waste Water	PUMP 2 RUN	EVENT	4802 S 13th St (PNBC)
PS_P796	Waste Water	PUMP 3 RUN	EVENT	4803 S 13th St (PNBC)
PS_P796	Waste Water	WET WELL LEVEL	LEVEL	4804 S 13th St (PNBC)
PS_POLI	Waste Water	PUMP 1 RUN	EVENT	
PS_POLI	Waste Water	PUMP 2 RUN	EVENT	
PS_POLI	Waste Water	WET WELL LEVEL	LEVEL	
PS_RENN	Waste Water	PUMP 1 RUN	EVENT	11064 Rennard St (Philmont Shopping Center)
PS_RENN	Waste Water	PUMP 2 RUN	EVENT	11065 Rennard St (Philmont Shopping Center)
PS_RENN	Waste Water	WET WELL LEVEL	LEVEL	11066 Rennard St (Philmont Shopping Center)
PS_SPLA	Waste Water	PUMP 1 RUN	EVENT	9021 Buttonwood Pl (Spring Lane Meadows)
PS_SPLA	Waste Water	PUMP 2 RUN	EVENT	9022 Buttonwood Pl (Spring Lane Meadows)
PS_SPLA	Waste Water	WET WELL LEVEL	LEVEL	9023 Buttonwood Pl (Spring Lane Meadows)

Table 6 - Listing of all Temporary Flow Monitors Deployed by Projects

Site Name	Start	End	Project
GSI MH-010-16	5/19/2017	7/10/2019	GSI Long-term
GSI DST-010-02	5/24/2017	7/10/2019	GSI Long-term
GSI MH-010-24	5/24/2017	7/10/2019	GSI Long-term
NE WPCP AT1_PA	4/5/2019	10/4/2019	WPCP Level
NE WPCP AT1_PB	4/5/2019	10/4/2019	WPCP Level
NE WPCP AT3_PB	4/5/2019	10/4/2019	WPCP Level
NE WPCP AT4_PA	4/8/2019	10/4/2019	WPCP Level
NE WPCP AT5_PA	4/8/2019	10/4/2019	WPCP Level
NE WPCP AT5_PB	4/5/2019	10/4/2019	WPCP Level
NE WPCP AT6_PA	4/5/2019	10/4/2019	WPCP Level
NE WPCP AT7_PA	4/5/2019	10/4/2019	WPCP Level
NE WPCP AT7_PB	4/5/2019	10/4/2019	WPCP Level
LDLL-0010	2/22/2019	6/1/2020	CSO
P083-03-S0050	10/11/2011	Present *	I&I Long-term
WLL-0565	3/7/2013	Present *	I&I Long-term
USE-0400	5/29/2014	Present *	I&I Long-term; SSO Support
WLL-0650	3/10/2015	Present *	I&I Long-term
S059-02-S0010	4/22/2016	Present *	I&I Long-term; SSO Support
Bala Golf Course	8/16/2017	Present *	GSI Long-term
Yeadon	2/6/2019	Present *	I&I
W086-01-S0060	8/29/2019	Present *	I&I
W086-01-S0040	8/30/2019	Present *	I&I
P116-01-S0015	8/30/2019	Present *	I&I
P116-01-S0065	8/30/2019	Present *	I&I
SOM-0040	9/19/2019	Present *	CSO
UFLL-0010	9/19/2019	Present *	CSO
LSE-0015	9/20/2019	Present *	CSO
CSE-0030	9/20/2019	Present *	CSO Long-term
LSW-0077	9/24/2019	Present *	CSO
OA-0020	9/25/2019	Present *	CSO
S05-000012	3/30/2011	Present	CSO Long-term
S45-001110	10/13/2011	Present	CSO Long-term
D63-000035	10/14/2011	Present	CSO Long-term
BC-0055	11/30/2011	Present	I&I Long-term

Site Name	Start	End	Project
IALL-B0355	12/12/2011	Present	I&I Long-term
C17-003360	12/13/2011	Present	CSO Long-term
T14-013875	1/30/2012	Present	CSO Long-term; SFR Support
M005-09-0140	9/27/2012	Present	Stormwater Long-term; SFR Support
UDLL-0125	1/24/2014	Present	I/I
PC-0040	1/21/2014	Present	I&I Long-term; SSO Support
D45-000015	5/8/2014	Present	CSO Long-term
UDLL-0045	5/29/2014	Present	CSO Long-term
USE-0365	5/29/2014	Present	I&I Long-term; SSO Support
SWMG-B0265	6/24/2014	Present	CSO Long-term
UDLL-0085	6/25/2014	Present	CSO Long-term
UDLL-0275	9/19/2014	Present	CSO Long-term
WLL-0675	3/13/2015	Present	I&I Long-term
THL-0085	4/14/2015	Present	CSO Long-term
S051-05-S0015	5/5/2016	Present	I&I Long-term; SSO Support
S051-08-S0015	4/28/2016	Present	I&I Long-term; SSO Support
S051-08-S0180	4/29/2016	Present	I&I Long-term; SSO Support
S059-04-S0027	5/4/2016	Present	I&I Long-term; SSO Support
CV-0145	6/24/2016	Present	I&I Long-term; SSO Support
GSI DST-010-03	5/24/2017	Present	GSI Long-term
S50-011230	8/29/2017	Present	CSO Long-term
DD DST-010-01	11/7/2017	Present	GSI Long-term
THL-0045	11/23/2017	Present	CSO Long-term
CF-DST-4	4/27/2018	Present	GSI Long-term
T14-000252	12/6/2018	Present	CSO
T14-000140	1/10/2019	Present	CSO
T14-000115	1/10/2019	Present	CSO Long-term
GSI DD RG	6/23/2017	Present	GSI Long-term
SW WPCP P	10/14/2014	Present	WPCP Level Long-term
SW WPCP Q	10/14/2014	Present	WPCP Level Long-term
SW WPCP R	10/14/2014	Present	WPCP Level Long-term
SW WPCP DP 2017	4/28/2017	Present	WPCP Level Long-term
CV-0130	8/28/2019	Present	I&I SSO Support
CV-0162	8/28/2019	Present	I&I SSO Support
CV-B0250	10/24/2019	Present	I&I SSO Support

Site Name	Start	End	Project
***Present as of 6/30/2020. Monitor removed in FY2021.**			

Table 7 - Listing of Outlying Community Contract Limits

Metered	Contract Limits					
Standardized	**Instantaneous**		**Daily Max**	**Township Total**		
Site ID	**CFS**	**MGD**	**MGD**	**Inst. CFS**	**Inst. MGD**	**Daily Max MGD**
MA1						
MA2						
MA3						
MA4						
MAx1						
Abington Total				9.542	6.168	4.453
MB1				74.26	47.996	33
Bucks Total						
MBE1						
MBE2						
MBE3						
MBE4						
MBE5						
MBE6						
MBE7						
MBE8						
MBE9						
MBE10						
MBE11						
MBE12						
MBE13						
MBE14						
MBE15						
MBE16						
Bensalem Total				11.74	7.588	6.133
MC1	2.75	1.777				
MC2	18	11.634				
MC3	0.480	0.31				
MCx1	8	5.171	Combined total for all the MCx#			
MCx2						
MCx3						
MCx4						
MCx5						
MCx6						

Metered	Contract Limits					
Standardized	Instantaneous		Daily Max	Township Total		
Site ID	CFS	MGD	MGD	Inst. CFS	Inst. MGD	Daily Max MGD
MCx7						
Cheltenham Total				20.75	13.411	13.380
MD1	155	100.179	50	155	100	50
DELCORA Total				155	100	50
ML1			5.474			
ML2			1.48			
ML3						
ML4			10.264			
ML5			1.848			
ML6			0.252			
ML7			0.84			
Lower Merion Total				31.57	20.404	14.5
MLM1						
MLM2	3.71	2.4	1.8			
MLM3						
MLM4						
MLM5						
MLM6						
MLM7						
Lower Moreland Total				5.88	3.80	2.85
MS1						
MS2						
MS3						
MS4						
MS5						
MS6						
MS7						
MS8						
Springfield Total				8.58	5.55	4.2
MSH1						
MSH2						
MSHX_1						
MSHX_2						
Southampton Total				15.79	10.205	7.14
MUD-N						
MUD-S						

Metered	**Contract Limits**					
Standardized	**Instantaneous**		**Daily Max**	**Township Total**		
Site ID	**CFS**	**MGD**	**MGD**	**Inst. CFS**	**Inst. MGD**	**Daily Max MGD**
MUD-O						
MUD-1						
Upper Darby Total				35	22.621	17

Appendix C – FY20 CSO Program Maintenance Annual Report

PWD Collector System -Flow Control Unit

FY2020 ANNUAL REPORT

PHILADELPHIA WATER DEPARTMENT

FLOW CONTROL

Submitted by:
Michael D. Hengstler
Water Conveyance Systems Superintendent
Flow Control

FLOW CONTROL UNIT-FY2020
OPERATION and MAINTENANCE

The Collector System Flow Control Unit's primary responsibilities are divided into four groups; Combined Sewer Overflow (CSO) Regulator Maintenance, Pumping Station Operation & Maintenance, Collector System Instrumentation and CCTV Technical Inspections. The Wastewater Pumping Group main office is located at 5202 Pennypack Street in the Torresdale Raw Water Pumping Station. The WWP Group assembles at this facility, which also has a maintenance machine shop, storage garage, and workshop to handle maintenance assignments. The other three groups have maintenance shops and assemble at the Fox Street Headquarters Facility. Brief descriptions of each group's responsibilities and their FY2020 annual year highlights follow.

CSO REGULATOR MAINTENANCE GROUP

Inspecting and servicing the combined sewer overflow regulating and diversion chambers are completed by 19 Interceptor maintenance personnel. This group is responsible for the operations, maintenance, inspections and cleaning of 175 combined sewer-regulating chambers, 89 tide gate chambers, 26 storm relief chambers, 12 sanitary flow diversions, several siphons and other related wastewater control devices throughout the collection system.

Currently the Philadelphia Water Department Flow Control Unit maintains ten types of CSO regulators and storage systems:

Brown & Brown (B&B) mechanical	Mechanical Sluice Gates
Computer Controlled Sluice Gates	Side Overflow Weirs
Computer Controlled B&B Shutter Gates	Inflatable Rubber Dam
Static Dams	Water Hydraulic Sluice Gates
Slot type regulators	Computer Controlled Crest Gates

Mechanical or operational malfunctions of regulators and tide gates can cause dry weather discharges and stream and river inflow. These types of events can have a major impact on the Wastewater and Fresh Water Treatment Plant’s performance and the quality of stream water. They can also affect the recreational use of our local waterways. Thus, the combined sewer regulator systems are closely monitored for potential blockages and when identified the problems are corrected quickly. CSO chamber Inspections and clearing of any regulator blockages prior to causing a dry weather discharge are the primary responsibilities of this group and are key areas in assessing the group’s overall performance.

By continually tracking and analyzing Dry Weather Discharges it can be determined if new or modified maintenance procedures would help to prevent them from occurring. Although our established procedures have greatly reduced the number and duration of these discharges, the combined system picks up all manner of trash and debris that is unpredictable in its pattern of causing flow disruptions. Despite incorporating best management practices such as having all inlets trapped and cleaned, preventative maintenance schedules for sewer flushing and cleaning of the regulators, CCTV inspection of DWO pipes, etc., it is virtually impossible to eliminate all blockages before they occur.

The PWD Flow Control Unit continues to aggressively control and minimize these dry weather overflows by utilizing the latest technology-based controls including our Collector System Remote Monitoring Network that currently includes over 320 sites with over 720 individual level and/or flow measurements. Training the CSO maintenance personnel in the use of the system’s computer programs for analyzing the trend data has developed a comprehensive understanding of individual CSO sites and their distinctive flow patterns. This familiarity helps them recognize abnormal conditions quickly at a location so that they can respond before the conditions develop into a dry weather CSO blockage or discharge.

The CSO Maintenance Group performed 4178 inspections of the regulating chambers in FY2020. The work includes frequent visual inspections of the equipment and flow patterns to make sure everything is operating properly. The more comprehensive work such as the cleaning and lubricating of the mechanical equipment is scheduled during lower flow periods between rain events.

In FY2020, the crews cleared 97 regulator blockages before they developed into a CSO dry weather discharge. There were eight CSO dry weather discharges for this annual year.

Many discharges are a result of debris such as rags, sticks, stones and other debris that become lodged in the CSO regulator diversion or the dry weather outlet pipe during dry weather periods. These types of blockages are virtually unpredictable so frequent inspections and closely observing the monitoring trend data is essential to our prevention program. Following moderate to heavy rain events the CSO regulators can have grit, sticks, rags and other debris caught at various places in and around the regulator that could eventually result in a discharge. The CSO maintenance crews perform quick topside inspections of the CSO sites throughout the City for several days following these events to remove or clear away any of this storm debris. The work schedule will then revert to the more comprehensive maintenance such as cleaning, lubricating, adjusting equipment and performing minor repairs to the mechanical regulators.

CSO Regulator Group with the help of Sewer maintenance and Mobile Dredging Vactoring Services, cleaned and removed approximately 56 tons of debris and grit from the D-25 regulating chamber.

WASTEWATER PUMPING STATION MAINTENANCE GROUP

The Wastewater Pumping Station Maintenance Group consisting of 35 maintenance personnel are located at the 5202 Pennypack St. Maintenance Shop. They are responsible for the operations and maintenance of 16 wastewater-pumping stations, 3 stormwater pumping stations, 2 sodium hypochlorite dosing stations, 11 computer controlled CSO storage regulators and several in-line and offline wastewater-storage facilities among other duties.

Many of the pumping stations provide for only one running pump and one reserve pump. This arrangement means that pump breakdowns are responded to immediately and that overhauls need to be completed in a minimum amount of time. The main pump availability statistic is a good indicator of the Maintenance Group's performance in this area. The main pumping units were in service 98% of the time in FY2020. The WWP Group completed eleven main wastewater pump overhauls at the stations. These overhauls consist of repair and replacement of the worn pump and motor components to bring the equipment's performance up to new operating condition.

The Wastewater Pumping Station Maintenance Group had no main pumps out of service during annual year FY2020 because of failures or breakdowns. The reason for this is that during pump maintenance and overhauls the in-service pump was rotated out of activity and replaced by the spare pump for the station. This accomplishes two things, one the station always has its full complement of pumps available and the spare pump for the station gets used. The only pump station that did have a pump out or was not at full capacity was the Central Schuylkill Pump station which is going through a Capital Project of replacing all pumps. Pump #3 and Pump #2 were out of service for 8 weeks while the replacement was being completed. The pumps were back in service in April and the project is continuing with the next pump, Pump#1 currently being replaced.

In addition to the pumping station maintenance, the group maintains a variety of other equipment throughout the Collector System. They are responsible for the operations and maintenance of the two sodium hypochlorite dosing stations. The stations are located next to the Queen Lane Raw Water pumping station, which injects hypo into the Upper Schuylkill East Interceptor, and at the Totem Rd. pumping station, which injects hypo into the Bucks County force main. The group is responsible for maintaining adequate supply of the chemical, over 942,988 gallons in FY2020, for monitoring the downstream hydrogen sulfide levels and adjusting the dosage levels in addition to the maintenance and repair of the equipment. The Totem Road pumping station currently has one tank which is out of service due to leakage. BCWSA is currently replacing the damaged tank, The group also fabricates and repairs bar screens, debris grills and other equipment for the Collector System and performs major maintenance of the CSO mechanical regulators such as installation of tide gates, overflow gates and servicing of the Brown & Brown regulators.

COLLECTOR SYSTEM INSTRUMENTATION MAINTENANCE GROUP

The fourteen Instrument and Electronic Technicians located at the Fox Street facility are primarily responsible for installing, calibrating and maintaining the electronic and instrumentation equipment in the Collector System monitoring and control network. They also repair, calibrate and certify the hazardous gas detection meters for the Department as well as install temporary flow and level monitors for various units in the Water Department.

One of the primary responsibilities of the CS Instrumentation Group is to maintain the network of level sensors, flow meters, and rain gauges and keep them up and running with a minimum of downtime while maintaining accurate and reliable data. The network currently consists of 258 level and flow monitoring locations in the NE, SE, and SW Drainage Districts, 35 gauges in the citywide rain gauge network, 56 Township flow-metering stations, and a number of additional monitors at various control sites. It is crucial that the remote site equipment is communicating and downloading data to the server so that the information is available for trend chart viewing and analysis for the users. The CSO maintenance group relies heavily on these charts to monitor the performance of all the CSO regulators while paying special attention to the sites that have had recent or a history of discharges. The monitoring data is used for a wide variety of other purposes such as calibrating the Collector System’s hydraulic model, generating township sewage flows for billing and for various Planning and Engineering studies.

The CS Instrumentation Maintenance group performed 1690 maintenance inspections in FY2020. The data collections used by Flow Control are TELOG units.

CCTV TECHNICAL INSPECTIONS GROUP

The CCTV Technical Inspections group consists of one Supervisor, two group leaders, and sixteen technicians who operate and maintain the seven closed circuit TV camera trucks and Green Storm Infrastructure inspection cameras. The seven CCTV trucks and CCTV Contractor logged 34.15 miles of sewer inspections in FY2020. The CCTV GSI Unit completed 708 Post Construction Inspections, 484 Maintenance Inspections, and 241 NASSCO PACP Inspections in FY2020.

The CCTV group has several primary functions which include inspections of sewers turned in for sewer complaints, special inspection requests from the Water/ Sewer Design group and the post construction inspection program which involves videoing the sewer at the completion of all sewer construction work. Another function of the group is to work with the Defective Connection Program group to identify the defective lateral connections.

SERVICE LEVEL GOALS

The goal of the Flow Control Unit is to maintain and exceed the service level goals. One area that directly affects the service level of the Flow Control Unit is personnel vacancies.

MONTH	CSO DISCHARGES PER 100 INSPECTIONS	% METERING CHAMBERS OPERATIONAL	% CSO LEVEL METERS OPERATIONAL	CCTV INSPECTIONS	MAIN PUMP AVAILABILITY
GOAL -->	**0.0**	**95% OR HIGHER**	**90% OR HIGHER**	**2.8 MILES**	**95% OR HIGHER**
JULY - 2019	0.0	84.0%	96.9%	2.42	100.0%
AUGUST - 2019	0.0	95.0%	98.7%	2.87	98.3%
SEPTEMBER - 2019	0.3	93.0%	98.1%	4.18	98.2%
OCTOBER - 2019	0.2	93.0%	97.5%	5.64	98.2%
NOVEMBER - 2019	0.0	97.0%	95.9%	2.52	98.2%
DECEMBER - 2019	0.0	94.0%	98.0%	2.84	98.2%
JANUARY - 2020	0.5	97.0%	99.0%	3.27	98.2%
FEBRUARY - 2020	0.0	100.0%	99.0%	2.96	98.2%
MARCH - 2020	0.0	96.0%	99.6%	2.57	98.2%
APRIL - 2020	0.4	89.0%	97.7%	0.95	98.2%
MAY - 2020	0.0	85.0%	97.1%	1.59	100.0%
JUNE - 2020	0.8	83.0%	93.0%	2.34	100.0%

FLOW CONTROL PERSONNEL SUMMARY

The Flow Control Unit makes every effort to fill all 95 approved positions in order to maintain the service level goals. In FY2021 the approved positions increase by 2 to 97.

95 Flow Control Positions [95 Listed]	Active	Vacant	Total
Clerk III	1	0	1
Clerk Typist II	1	1	2
Data Services Support Clerk	1	0	1
Electrician 1	3	0	3
Electronic Equipment Supervisor	2	0	2
Electronic Technician 1	7	3	10
Electronic Technician 2	12	1	13
Electronic Technician Grp. Ldr.	4	0	4
Electronic Technician Trainee	10	0	10
Ind. Process Mach. Mech. Grp. Ldr.	2	0	2
Industrial Electrician 1	0	1	1
Industrial Electrician 2	1	1	2
Industrial Electrician Group Leader	1	0	1
Industrial Process Mach. Mech.	4	1	5
Interceptor Service Worker I	4	2	6
Interceptor Service Worker II	5	0	5
Interceptor Services Supervisor	2	0	2
Mach. & Equipment Mech.	10	1	11
Public Works Maintenance Trainee	5	0	5
Semiskilled Laborer	1	1	2
Sewer Maintenance Inspector	1	0	1
Water Conveyance Sys. Asst. Supt. (P)	2	0	2
Water Conveyance Sys. Supt.	1	0	1
Water Operations Repair Helper	3	0	3
Totals	83	12	95

APPENDICES

- Appendix A - FY2020 Annual CSO Report Spreadsheets
- Appendix B - FY2020 Annual CSO Miscellaneous Site & Maintenance Reports
- Appendix C - FY2020 Main Pump Availability Chart
- Appendix D - Historical CSO Charts

Appendix A

FY 2020

Annual CSO Spreadsheets

PART 1 — PHILADELPHIA WATER DEPARTMENT — Section 1

DRY WEATHER STATUS — WASTE AND STORM WATER COLLECTION

REPORT — July 2019 - June 2020

COLLECTOR	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Totals
UPPER PENNYPACK - 5 UNITS													
INSPECTIONS	10	10	12	10	11	7	10	10	5	9	5	10	109
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	1	1
BLOCKS CLEARED	2	0	0	0	0	0	1	0	0	0	0	0	3
UPPER DELAWARE LOW LEVEL - 12 UNITS													
INSPECTIONS	27	24	25	31	24	22	21	25	20	14	12	30	275
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	0	1	2	2	2	4	1	0	0	0	0	13
LOWER FRANKFORD CREEK - 6 UNITS													
INSPECTIONS	20	14	15	13	18	13	13	12	10	6	8	13	155
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	0	1	1	2	0	0	0	1	0	0	0	5
LOWER FRANKFORD LOW LEVEL - 10 UNITS													
INSPECTIONS	28	30	33	28	27	14	27	21	24	11	18	27	288
DISCHARGES	0	0	1	0	0	0	1	0	0	0	0	0	2
BLOCKS CLEARED	3	0	3	1	0	0	1	0	0	0	0	4	12
FRANKFORD HIGH LEVEL - 14 UNITS													
INSPECTIONS	28	36	31	31	29	30	31	28	29	21	18	28	340
DISCHARGES	0	0	0	0	0	0	1	0	0	0	0	0	1
BLOCKS CLEARED	0	3	0	0	0	1	0	0	0	0	0	0	4
SOMERSET - 9 UNITS													
INSPECTIONS	22	31	21	18	18	9	20	23	16	15	8	27	228
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	0	2	1	2	0	0	0	0	0	0	0	6
LOWER DELAWARE LOW LEVEL - 33 UNITS													
INSPECTIONS	55	27	44	77	51	59	69	62	43	35	38	77	637
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	2	0	0	3	0	1	4	0	0	1	1	5	17
CENTRAL SCHUYLKILL EAST - 18 UNITS													
INSPECTIONS	30	37	31	39	39	33	37	36	24	27	23	35	391
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	2	2
BLOCKS CLEARED	2	5	0	3	0	2	0	1	0	0	2	3	18
LOWER SCHUYLKILL EAST - 9 UNITS													
INSPECTIONS	23	12	9	19	15	17	19	23	28	8	7	8	188
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	0	0	0	0	1	0	0	0	0	0	0	2
CENTRAL SCHUYLKILL WEST - 9 UNITS	0												
INSPECTIONS	20	21	18	18	19	10	18	20	21	9	11	18	203
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	0	0	0	0	0	0	0	0	0	0	1	1
SOUTHWEST MAIN GRAVITY - 10 UNITS													
INSPECTIONS	33	33	34	20	22	17	30	24	25	12	13	7	270
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	2	1	1	1	0	0	0	0	0	0	0	0	5
LOWER SCHUYLKILL WEST - 4 UNITS													
INSPECTIONS	4	8	5	9	9	9	8	8	11	4	4	4	83
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	0	0	0	0	0	0	0	0	0	0	0	0
COBBS CREEK HIGH LEVEL - 23 UNITS													
INSPECTIONS	49	36	44	54	42	29	54	51	31	33	22	35	480
DISCHARGES	0	0	0	1	0	0	0	0	0	1	0	0	2
BLOCKS CLEARED	1	1	0	0	1	2	2	0	0	0	0	0	7
COBBS CREEK LOW LEVEL - 13 UNITS													
INSPECTIONS	23	11	15	28	15	13	25	24	18	12	12	13	209
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	1	1	0	0	0	0	0	0	0	1	0	4
RELIEF SEWERS - 26 UNITS													
INSPECTIONS	39	27	27	42	14	22	16	26	33	24	15	37	322
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS / MONTH for 201 REGULATOR UNITS													Totals
TOTAL INSPECTIONS	411	357	364	437	353	304	398	393	338	240	214	369	4178
TOTAL DISCHARGES	0	0	1	1	0	0	2	0	0	1	0	3	8
TOTAL BLOCKS CLEARED	16	11	9	12	7	9	12	2	1	1	4	13	97
AVER. # of INSP. / BC	26	32	40	36	50	34	33	197	338	240	54	28	92
DISC / 100 INSPECTIONS	0.0	0.0	0.3	0.2	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.8	0.2

I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for Knowing violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

CSO REGULATING CHAMBER MONTHLY INSPECTION

NEWPC & SEWPC PLANT REGULATORS

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
UPPER PENNYPACK 5 NEWPC UNITS															
P01	2	2	2	2	2	1	2	2	1	2	1	2	21	1.8	17.4
P02	2	2	2	2	2	1	2	2	1	2	1	2	21	1.8	17.4
P03	2	2	3	2	2	2	2	2	1	2	1	2	23	1.9	15.9
P04	2	2	3	2	3	2	2	2	1	1	1	2	23	1.9	15.9
P05	2	2	2	2	2	1	2	2	1	2	1	2	21	1.8	17.4
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS															
D02	2	2	2	2	2	2	2	2	2	1	1	2	22	1.8	16.6
D03	2	2	2	2	2	3	2	2	2	2	1	2	24	2.0	15.2
D04	3	2	2	3	2	2	2	3	2	2	1	2	26	2.2	14.0
D05	3	2	3	2	2	2	2	2	1	1	1	2	23	1.9	15.9
D06	2	2	2	2	2	2	2	2	1	1	1	3	22	1.8	16.6
D07	2	2	2	3	2	2	2	2	2	1	1	2	23	1.9	15.9
D08	2	2	3	2	2	2	2	2	2	1	1	3	24	2.0	15.2
D09	2	2	3	2	2	2	2	2	1	1	1	4	24	2.0	15.2
D11	2	2	2	3	2	2	2	2	2	1	1	4	25	2.1	14.6
D12	2	2	2	3	2	1	2	2	2	1	1	2	22	1.8	16.6
D13	2	2	1	3	2	1	1	2	2	1	1	2	20	1.7	18.2
D15	3	2	1	4	2	1	0	2	1	1	1	2	20	1.8	18.2
LOWER FRANKFORD CREEK 6 NEWPC UNITS															
F13	4	3	3	2	5	4	2	2	1	1	0	2	29	2.6	12.6
F14	4	3	3	2	5	1	2	2	1	1	0	3	27	2.5	13.5
F21	3	2	2	2	2	2	2	2	1	1	1	2	22	1.8	16.6
F23	4	2	2	3	2	2	2	2	4	1	2	2	28	2.3	13.0
F24	3	2	3	2	2	2	3	2	2	1	3	2	27	2.3	13.5
F25	2	2	2	2	2	2	2	2	1	1	2	2	22	1.8	16.6
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS															
F03	2	3	2	2	2	2	2	2	2	1	2	3	25	2.1	14.6
F04	2	3	3	2	2	2	2	2	2	1	2	3	26	2.2	14.0
F05	4	5	2	3	2	2	2	2	2	1	1	4	30	2.5	12.2
F06	2	3	5	4	2	2	5	2	3	1	2	3	34	2.8	10.7
F07	2	3	2	2	2	1	2	2	2	1	1	5	25	2.1	14.6
F08	1	3	2	2	2	1	3	3	2	1	2	2	24	2.0	15.2
F09	4	3	6	4	3	1	4	2	4	1	1	2	35	2.9	10.4
F10	3	2	3	3	4	1	3	2	2	1	3	2	29	2.4	12.6
F11	5	2	4	3	3	1	2	2	3	2	3	1	31	2.6	11.8
F12	3	3	4	3	5	1	2	2	2	1	1	2	29	2.4	12.6
FRANKFORD HIGH LEVEL 14 NEWPC UNITS															
T01	2	2	2	2	2	1	2	2	2	1	1	2	21	1.8	17.4
T03	2	4	2	2	2	2	3	2	2	2	2	2	27	2.3	13.5
T04	2	3	2	2	2	1	2	2	2	2	1	2	23	1.9	15.9
T05	2	3	2	2	2	2	2	2	2	2	1	2	24	2.0	15.2
T06	2	3	2	2	2	2	2	2	2	2	1	2	24	2.0	15.2
T07	2	3	2	2	2	2	2	2	2	2	1	2	24	2.0	15.2
T08	2	3	2	2	2	4	2	2	2	2	1	2	26	2.2	14.0
T09	2	2	2	2	2	2	2	2	3	2	1	2	24	2.0	15.2
T10	3	3	2	3	2	3	2	2	3	1	2	2	28	2.3	13.0
T11	3	3	2	3	3	3	2	2	2	1	1	2	27	2.3	13.5
T12	2	2	3	3	2	4	2	2	2	1	2	2	27	2.3	13.5
T13	2	2	4	2	2	2	4	2	2	1	2	2	27	2.3	13.5
T14	1	2	2	2	2	1	2	2	2	1	1	2	20	1.7	18.2
T15	1	1	2	2	2	1	2	2	1	1	1	2	18	1.5	20.3

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
SOMERSET LOW LEVEL 9 NEWPC UNITS															
D17	2	2	2	2	2	1	2	3	2	2	1	2	23	1.9	15.9
D18	2	1	2	2	2	1	2	3	2	2	1	2	22	1.8	16.6
D19	2	1	2	2	2	1	2	2	2	3	1	2	22	1.8	16.6
D20	3	1	2	2	2	1	4	4	2	2	1	2	26	2.2	14.0
D21	2	3	2	2	2	1	2	2	2	2	1	2	23	1.9	15.9
D22	2	1	2	2	2	1	2	2	2	2	1	2	21	1.8	17.4
D23	2	1	1	2	2	1	2	2	1	0	1	2	17	1.5	21.5
D24	2	1	1	2	2	1	2	2	1	0	0	2	16	1.6	22.8
D25	5	20	7	2	2	1	2	3	2	2	1	11	58	4.8	6.3
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS															
D37	3	3	2	3	2	1	2	3	2	1	1	2	25	2.1	14.6
D38	2	2	2	2	3	1	2	4	2	1	1	2	24	2.0	15.2
D39	2	2	2	2	1	1	2	2	2	1	1	2	20	1.7	18.2
D40	6	3	2	4	2	6	2	2	2	1	1	2	33	2.8	11.1
D41	2	1	1	2	2	2	2	2	2	1	1	2	20	1.7	18.2
D42	6	3	1	2	1	1	2	2	2	1	1	3	25	2.1	14.6
D43	2	2	1	2	1	1	2	2	1	1	1	2	18	1.5	20.3
D44	3	1	1	2	1	1	2	1	1	1	1	2	17	1.4	21.5
D45	2	2	3	2	2	1	2	2	1	1	1	3	22	1.8	16.6
D46	1	1	2	3	2	1	2	2	2	1	2	3	22	1.8	16.6
D47	1	1	2	2	2	1	2	2	1	1	1	2	18	1.5	20.3
D48	1	1	2	2	2	2	2	2	1	1	1	2	19	1.6	19.2
D49	1	1	2	2	2	2	2	2	1	1	1	2	19	1.6	19.2
D50	1	1	2	2	1	3	2	2	1	1	1	2	19	1.6	19.2
D51	1	1	1	2	1	1	5	2	1	1	1	3	20	1.7	18.2
D52	1	0	1	2	1	2	2	2	1	1	1	4	18	1.6	20.3
D53	1	0	1	2	1	1	2	1	1	1	3	3	17	1.5	21.5
D54	1	0	1	2	1	1	2	1	1	1	1	2	14	1.3	26.1
D58	2	1	1	2	2	2	2	2	2	1	2	2	21	1.8	17.4
D61	1	0	1	2	1	2	2	1	1	1	1	2	15	1.4	24.3
D62	1	0	1	2	1	2	2	1	2	1	1	2	16	1.5	22.8
D63	1	0	1	2	1	2	2	2	1	1	1	3	17	1.5	21.5
D64	1	0	1	2	1	2	2	2	1	1	1	2	16	1.5	22.8
D65	1	0	1	2	1	2	2	2	1	1	1	2	16	1.5	22.8
D66	1	0	1	1	1	2	2	2	1	1	1	1	14	1.3	26.1
D67	2	0	1	2	1	2	2	2	1	1	1	2	17	1.5	21.5
D68	1	1	2	4	1	4	2	2	1	1	1	2	22	1.8	16.6
D69	2	0	1	2	2	2	2	2	1	1	1	2	18	1.6	20.3
D70	2	0	1	3	2	3	2	2	1	3	2	2	23	2.1	15.9
D71	1	0	0	6	3	2	3	2	1	1	2	4	25	2.5	14.6
D72	0	0	1	3	3	1	2	2	1	1	1	3	18	1.8	20.3
D73	0	0	1	2	2	1	1	0	2	1	1	2	13	1.4	28.1
TOTAL	190	172	181	208	178	154	191	181	147	111	107	212	2032		
I /D/C	3.1	2.8	3.0	3.4	2.9	2.5	3.1	3.0	2.4	1.8	1.8	3.5			
UP	10	10	12	10	11	7	10	10	5	9	5	10	109	1.8	16.8
UDLL	27	24	25	31	24	22	21	25	20	14	12	30	275	1.9	16.0
LFC	20	14	15	13	18	13	13	12	10	6	8	13	155	2.2	14.3
LFLL	28	30	33	28	27	14	27	21	24	11	18	27	288	2.4	12.9
FHL	28	36	31	31	29	30	31	28	29	21	18	28	340	2.0	15.3
SLL	22	31	21	18	18	9	20	23	16	15	8	27	228	2.2	16.3
LDLL	55	27	44	77	51	59	69	62	43	35	38	77	621	1.7	19.5

4	TOTAL DISCHARGES FOR NE & SE DISTRICTS	DTR = DAYS TO RETURN TO SITE
0.3	AVERAGE DISCHARGES PER MONTH	I/D/C = INSPECTIONS PER DAY PER CREW
15.8	AVER. DAYS BEFORE RETURNING TO SITE	I/D = INSPECTIONS PER DISCHARGE
2.8	AVER. INSPECTIONS PER DAY PER CREW	

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
UPPER PENNYPACK 5 NEWPC UNITS													
P01	0	0	0	0	0	0	0	0	0	0	0	0	0
P02	0	0	0	0	0	0	0	0	0	0	0	0	0
P03	0	0	0	0	0	0	0	0	0	0	0	1	1
P04	0	0	0	0	0	0	0	0	0	0	0	0	0
P05	0	0	0	0	0	0	0	0	0	0	0	0	0
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS													
D02	0	0	0	0	0	0	0	0	0	0	0	0	0
D03	0	0	0	0	0	0	0	0	0	0	0	0	0
D04	0	0	0	0	0	0	0	0	0	0	0	0	0
D05	0	0	0	0	0	0	0	0	0	0	0	0	0
D06	0	0	0	0	0	0	0	0	0	0	0	0	0
D07	0	0	0	0	0	0	0	0	0	0	0	0	0
D08	0	0	0	0	0	0	0	0	0	0	0	0	0
D09	0	0	0	0	0	0	0	0	0	0	0	0	0
D11	0	0	0	0	0	0	0	0	0	0	0	0	0
D12	0	0	0	0	0	0	0	0	0	0	0	0	0
D13	0	0	0	0	0	0	0	0	0	0	0	0	0
D15	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER FRANKFORD CREEK 6 NEWPC UNITS													
F13	0	0	0	0	0	0	0	0	0	0	0	0	0
F14	0	0	0	0	0	0	0	0	0	0	0	0	0
F21	0	0	0	0	0	0	0	0	0	0	0	0	0
F23	0	0	0	0	0	0	0	0	0	0	0	0	0
F24	0	0	0	0	0	0	0	0	0	0	0	0	0
F25	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS													
F03	0	0	0	0	0	0	0	0	0	0	0	0	0
F04	0	0	0	0	0	0	0	0	0	0	0	0	0
F05	0	0	0	0	0	0	0	0	0	0	0	0	0
F06	0	0	0	0	0	0	1	0	0	0	0	0	1
F07	0	0	0	0	0	0	0	0	0	0	0	0	0
F08	0	0	0	0	0	0	0	0	0	0	0	0	0
F09	0	0	0	0	0	0	0	0	0	0	0	0	0
F10	0	0	0	0	0	0	0	0	0	0	0	0	0
F11	0	0	1	0	0	0	0	0	0	0	0	0	1
F12	0	0	0	0	0	0	0	0	0	0	0	0	0
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01	0	0	0	0	0	0	0	0	0	0	0	0.00	0
T03	0	0	0	0	0	0	0	0	0	0	0	0	0
T04	0	0	0	0	0	0	0	0	0	0	0	0	0
T05	0	0	0	0	0	0	0	0	0	0	0	0	0
T06	0	0	0	0	0	0	0	0	0	0	0	0	0
T07	0	0	0	0	0	0	0	0	0	0	0	0	0
T08	0	0	0	0	0	0	0	0	0	0	0	0	0
T09	0	0	0	0	0	0	0	0	0	0	0	0	0
T10	0	0	0	0	0	0	0	0	0	0	0	0	0
T11	0	0	0	0	0	0	0	0	0	0	0	0	0
T12	0	0	0	0	0	0	0	0	0	0	0	0	0
T13	0	0	0	0	0	0	1	0	0	0	0	0	1
T14	0	0	0	0	0	0	0	0	0	0	0	0	0
T15	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
SOMERSET LOW LEVEL 9 NEWPC UNITS													0
D17	0	0	0	0	0	0	0	0	0	0	0	0	0
D18	0	0	0	0	0	0	0	0	0	0	0	0	0
D19	0	0	0	0	0	0	0	0	0	0	0	0	0
D20	0	0	0	0	0	0	0	0	0	0	0	0	0
D21	0	0	0	0	0	0	0	0	0	0	0	0	0
D22	0	0	0	0	0	0	0	0	0	0	0	0	0
D23	0	0	0	0	0	0	0	0	0	0	0	0	0
D24	0	0	0	0	0	0	0	0	0	0	0	0	0
D25	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS													0
D37	0	0	0	0	0	0	0	0	0	0	0	0	0
D38	0	0	0	0	0	0	0	0	0	0	0	0	0
D39	0	0	0	0	0	0	0	0	0	0	0	0	0
D40	0	0	0	0	0	0	0	0	0	0	0	0	0
D41	0	0	0	0	0	0	0	0	0	0	0	0	0
D42	0	0	0	0	0	0	0	0	0	0	0	0	0
D43	0	0	0	0	0	0	0	0	0	0	0	0	0
D44	0	0	0	0	0	0	0	0	0	0	0	0	0
D45	0	0	0	0	0	0	0	0	0	0	0	0	0
D46	0	0	0	0	0	0	0	0	0	0	0	0	0
D47	0	0	0	0	0	0	0	0	0	0	0	0	0
D48	0	0	0	0	0	0	0	0	0	0	0	0	0
D49	0	0	0	0	0	0	0	0	0	0	0	0	0
D50	0	0	0	0	0	0	0	0	0	0	0	0	0
D51	0	0	0	0	0	0	0	0	0	0	0	0	0
D52	0	0	0	0	0	0	0	0	0	0	0	0	0
D53	0	0	0	0	0	0	0	0	0	0	0	0	0
D54	0	0	0	0	0	0	0	0	0	0	0	0	0
D58	0	0	0	0	0	0	0	0	0	0	0	0	0
D61	0	0	0	0	0	0	0	0	0	0	0	0	0
D62	0	0	0	0	0	0	0	0	0	0	0	0	0
D63	0	0	0	0	0	0	0	0	0	0	0	0	0
D64	0	0	0	0	0	0	0	0	0	0	0	0	0
D65	0	0	0	0	0	0	0	0	0	0	0	0	0
D66	0	0	0	0	0	0	0	0	0	0	0	0	0
D67	0	0	0	0	0	0	0	0	0	0	0	0	0
D68	0	0	0	0	0	0	0	0	0	0	0	0	0
D69	0	0	0	0	0	0	0	0	0	0	0	0	0
D70	0	0	0	0	0	0	0	0	0	0	0	0	0
D71	0	0	0	0	0	0	0	0	0	0	0	0	0
D72	0	0	0	0	0	0	0	0	0	0	0	0	0
D73	0	0	0	0	0	0	0	0	0	0	0	0	0
D75	0	0	0	0	0	0	0	0	0	0	0	0	0
													TOTAL DISC
	0	0	1	0	0	0	2	0	0	0	0	1	4

													TOTAL
UP	0	0	0	0	0	0	0	0	0	0	0	1	1
UDLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LFC	0	0	0	0	0	0	0	0	0	0	0	0	0
LFLL	0	0	1	0	0	0	1	0	0	0	0	0	2
FHL	0	0	0	0	0	0	1	0	0	0	0	0	1
SLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LDLL	0	0	0	0	0	0	0	0	0	0	0	0	0

	NO OF UNITS IN DISTRICT BLOCKED												TOTAL
UP	0	0	0	0	0	0	0	0	0	0	0	1	1
UDLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LFC	0	0	0	0	0	0	0	0	0	0	0	0	0
LFLL	0	0	1	0	0	0	1	0	0	0	0	0	2
FHL	0	0	0	0	0	0	1	0	0	0	0	0	1
SLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LDLL	0	0	0	0	0	0	0	0	0	0	0	0	0

CSO REGULATING CHAMBER MONTHLY BLOCKS CLEARED

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
UPPER PENNYPACK 5 NEWPC UNITS													
P01	0	0	0	0	0	0	1	0	0	0	0	0	1
P02	0	0	0	0	0	0	0	0	0	0	0	0	0
P03	2	0	0	0	0	0	0	0	0	0	0	0	2
P04	0	0	0	0	0	0	0	0	0	0	0	0	0
P05	0	0	0	0	0	0	0	0	0	0	0	0	0
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS													
D02	0	0	0	0	0	0	1	0	0	0	0	0	1
D03	0	0	0	0	0	1	1	0	0	0	0	0	2
D04	1	0	0	0	0	0	0	0	0	0	0	0	1
D05	0	0	0	0	0	0	0	0	0	0	0	0	0
D06	0	0	0	0	1	0	1	0	0	0	0	0	2
D07	0	0	0	0	0	0	0	0	0	0	0	0	0
D08	0	0	0	0	0	0	0	0	0	0	0	0	0
D09	0	0	0	0	0	0	0	0	0	0	0	0	0
D11	0	0	0	0	0	0	0	0	0	0	0	0	0
D12	0	0	0	0	0	0	1	0	0	0	0	0	1
D13	0	0	0	0	0	0	0	0	0	0	0	0	0
D15	0	0	1	2	1	1	0	0	0	0	0	0	5
LOWER FRANKFORD CREEK 6 NEWPC UNITS													
F13	0	0	0	0	0	0	0	0	0	0	0	0	0
F14	0	0	0	0	2	0	0	0	0	0	0	0	2
F21	0	0	0	0	0	0	0	0	0	0	0	0	0
F23	0	0	1	1	0	0	0	0	0	0	0	0	2
F24	0	0	0	0	0	0	0	0	0	0	0	0	0
F25	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS													
F03	0	0	0	0	0	0	0	0	0	0	0	0	0
F04	0	0	0	0	0	0	0	0	0	0	0	0	0
F05	0	0	0	0	0	0	0	0	0	0	0	0	0
F06	0	0	1	0	0	0	0	0	0	0	0	0	1
F07	0	0	0	0	0	0	0	0	0	0	0	0	0
F08	0	0	0	0	0	0	0	0	0	0	0	0	0
F09	1	0	2	1	0	0	0	0	0	0	0	0	4
F10	1	0	0	0	0	0	0	0	0	0	0	0	1
F11	0	0	0	0	0	0	0	0	0	0	0	0	0
F12	1	0	0	0	0	0	1	0	0	0	0	0	2
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01	0	0	0	0	0	0	0	0	0	0	0	0	0
T03	0	0	0	0	0	0	0	0	0	0	0	0	0
T04	0	0	0	0	0	1	0	0	0	0	0	0	1
T05	0	0	0	0	0	0	0	0	0	0	0	0	0
T06	0	0	0	0	0	0	0	0	0	0	0	0	0
T07	0	0	0	0	0	0	0	0	0	0	0	0	0
T08	0	0	0	0	0	0	0	0	0	0	0	0	0
T09	0	0	0	0	0	0	0	0	0	0	0	0	0
T10	0	2	0	0	0	0	0	0	0	0	0	0	2
T11	0	0	0	0	0	0	0	0	0	0	0	0	0
T12	0	0	0	0	0	0	0	0	0	0	0	0	0
T13	0	1	0	0	0	0	0	0	0	0	0	0	1
T14	0	0	0	0	0	0	0	0	0	0	0	0	0
T15	0	0	0	0	0	0	0	0	0	0	0	0	0

7 AVERAGE BLOCKAGES PER MONTH

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
SOMERSET LOW LEVEL 9 NEWPC UNITS													
D17	0	0	0	0	0	0	0	0	0	0	0	0	0
D18	0	0	0	0	0	0	0	0	0	0	0	0	0
D19	0	0	0	0	0	0	0	0	0	0	0	0	0
D20	1	0	0	0	0	0	0	0	0	0	0	0	1
D21	0	0	2	0	0	0	0	0	0	0	0	0	2
D22	0	0	0	0	0	0	0	0	0	0	0	0	0
D23	0	0	0	1	1	0	0	0	0	0	0	0	2
D24	0	0	0	0	1	0	0	0	0	0	0	0	1
D25	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS													
D37	0	0	0	0	0	0	0	0	0	0	0	0	0
D38	0	0	0	0	0	0	1	0	0	0	0	0	1
D39	0	0	0	0	0	0	0	0	0	0	0	0	0
D40	2	0	0	0	0	0	0	0	0	0	0	0	2
D41	0	0	0	0	0	0	0	0	0	0	0	0	0
D42	0	0	0	0	0	0	0	0	0	0	0	0	0
D43	0	0	0	0	0	0	0	0	0	0	0	0	0
D44	0	0	0	0	0	0	1	0	0	0	0	0	1
D45	0	0	0	0	0	0	0	0	0	0	0	0	0
D46	0	0	0	0	0	0	0	0	0	0	0	0	0
D47	0	0	0	0	0	0	0	0	0	0	0	0	0
D48	0	0	0	0	0	0	0	0	0	0	0	0	0
D49	0	0	0	0	0	0	0	0	0	0	0	0	0
D50	0	0	0	0	0	0	0	0	0	0	0	0	0
D51	0	0	0	0	0	0	1	0	0	0	0	0	1
D52	0	0	0	0	0	0	0	0	0	0	0	0	0
D53	0	0	0	0	0	0	0	0	0	0	0	0	0
D54	0	0	0	0	0	0	0	0	0	0	0	0	0
D58	0	0	0	0	0	0	0	0	0	0	0	0	0
D61	0	0	0	0	0	0	0	0	0	0	0	0	0
D62	0	0	0	0	0	0	0	0	0	0	0	0	0
D63	0	0	0	0	0	0	0	0	0	0	0	0	0
D64	0	0	0	0	0	0	0	0	0	0	0	0	0
D65	0	0	0	1	0	0	0	0	0	0	0	0	1
D66	0	0	0	0	0	0	0	0	0	0	0	0	0
D67	0	0	0	0	0	0	0	0	0	0	0	0	0
D68	0	0	0	0	0	0	0	0	0	0	0	0	0
D69	0	0	0	0	0	1	0	0	0	0	0	0	1
D70	0	0	0	0	0	0	0	0	0	0	0	0	0
D71	0	0	0	4	0	0	1	0	0	0	0	0	5
D72	0	0	0	0	0	0	0	0	0	0	0	0	0
D73	0	0	0	0	0	0	0	0	0	0	0	0	0
D75	0	0	0	0	0	0	0	0	0	0	0	0	0
													TOTAL
	9	3	7	10	6	4	10	0	0	0	0	0	49

UP	2	0	0	0	0	0	1	0	0	0	0	0	3
UDLL	1	0	1	2	2	2	4	0	0	0	0	0	12
LFC	0	0	1	1	2	0	0	0	0	0	0	0	4
LFLL	3	0	3	1	0	0	1	0	0	0	0	0	8
FHL	0	3	0	0	0	1	0	0	0	0	0	0	4
SLL	1	0	2	1	2	0	0	0	0	0	0	0	6
LDLL	2	0	0	5	0	1	4	0	0	0	0	0	12

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS															
S05	2	2	2	3	2	2	2	2	2	2	1	2	24	2.0	15.2
S06	2	2	2	3	2	2	2	2	2	2	1	2	24	2.0	15.2
S07	2	2	2	2	2	2	2	2	2	2	1	2	23	1.9	15.9
S08	2	3	2	2	2	2	2	2	2	2	2	4	27	2.3	13.5
S09	2	2	2	2	2	2	2	2	2	2	1	1	22	1.8	16.6
S10	3	2	2	2	2	2	2	2	1	2	1	2	23	1.9	15.9
S12	2	2	1	2	3	2	2	3	2	2	2	4	27	2.3	13.5
S12A	2	3	2	0	1	1	2	1	1	1	1	1	16	1.5	22.8
S13	2	3	2	4	3	2	2	2	1	2	2	2	27	2.3	13.5
S15	2	4	2	2	3	2	3	2	1	2	2	2	27	2.3	13.5
S16	1	2	2	2	2	1	2	1	1	1	1	2	18	1.5	20.3
S17	1	1	2	2	2	1	2	1	1	1	1	2	17	1.4	21.5
S18	1	1	1	2	2	1	2	2	1	1	1	2	17	1.4	21.5
S19	1	1	1	2	3	2	2	2	1	1	2	2	20	1.7	18.2
S21	1	1	1	2	2	2	2	2	1	1	1	1	17	1.4	21.5
S23	2	2	2	3	2	3	2	3	1	1	1	1	23	1.9	15.9
S25	1	1	2	2	2	2	2	3	1	1	1	2	20	1.7	18.2
S26	1	3	1	2	2	2	2	2	1	1	1	1	19	1.6	19.2
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS															
S31	1	2	1	2	2	1	2	2	3	1	1	1	19	1.6	19.2
S35	2	2	1	2	2	2	2	3	3	1	1	2	23	1.9	15.9
S36	2	0	0	1	1	1	2	2	1	0	0	0	10	1.4	36.5
S36A	2	0	2	2	2	2	2	2	3	1	1	0	19	1.9	19.2
S37	1	0	0	1	1	1	1	1	1	0	0	0	7	1.0	52.1
S42	11	4	3	5	3	4	5	6	8	3	1	3	56	4.7	6.5
S42A	1	2	1	3	1	4	2	4	7	1	2	2	30	2.5	12.2
S44	1	0	0	1	1	1	1	1	0	0	0	0	6	1.0	60.8
S46	2	2	1	2	2	1	2	2	2	1	1	0	18	1.6	20.3
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS															
S01	2	2	2	2	2	1	2	2	2	1	2	2	22	1.8	16.6
S02	3	2	2	2	2	1	2	2	2	1	2	2	23	1.9	15.9
S03	3	3	2	3	2	2	2	2	3	1	2	2	27	2.3	13.5
S04	2	2	2	2	2	1	2	2	2	1	1	2	21	1.8	17.4
S11	2	2	3	2	3	1	2	2	2	1	1	2	23	1.9	15.9
S14	3	1	2	2	2	1	2	2	2	1	1	2	21	1.8	17.4
S20	2	4	1	1	2	1	2	2	2	1	0	2	20	1.8	18.2
S22	2	3	2	2	2	1	2	3	3	1	1	2	24	2.0	15.2
S24	1	2	2	2	2	1	2	3	3	1	1	2	22	1.8	16.6
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS															
S27	2	2	2	2	2	1	3	2	2	1	1	1	21	1.8	17.4
S28	2	2	2	2	2	1	3	2	2	1	1	1	21	1.8	17.4
S30	2	2	2	2	2	1	2	2	2	1	1	1	20	1.7	18.2
S34	2	2	2	2	2	2	2	2	2	1	2	1	22	1.8	16.6
S39	1	2	1	1	2	2	2	1	2	1	1	1	17	1.4	21.5
S40	1	1	1	1	0	0	2	1	2	0	1	0	10	1.3	36.5
S43	1	2	4	2	3	4	2	2	1	1	2	0	24	2.2	15.2
S47	1	2	2	1	2	2	2	2	1	1	1	0	17	1.5	21.5
S50	16	14	14	5	5	2	10	8	7	4	2	1	88	7.3	4.1
S51	5	4	4	2	2	2	2	2	4	1	1	1	30	2.5	12.2
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS															
S32	1	2	1	2	2	3	2	2	3	1	1	1	21	1.8	17.4
S33	1	2	1	2	2	3	2	2	3	1	1	1	21	1.8	17.4
S38	1	2	2	2	2	2	2	2	3	1	1	1	21	1.8	17.4
S45	1	2	1	3	3	1	2	2	2	1	1	1	20	1.7	18.2

4 TOTAL DISCHARGES IN SW DISTRICT — DTR = DAYS TO RETURN TO SITE

0.3 AVERAGE DISCHARGES PER MONTH — I/D/C = INSPECTIONS PER DAY PER CREW

19.5 AVER. DAYS BEFORE RETURNING TO SITE — I/D = INSPECTIONS PER DISCHARGE

1.7 AVER. INSPECTIONS PER DAY PER CREW

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
COBBS CREEK HIGH LEVEL 24 SWWPC UNITS															
C01	2	1	3	2	2	1	2	2	2	2	1	2	22	1.8	16.6
C02	2	1	2	2	2	1	2	2	2	2	1	2	21	1.8	17.4
C04	2	5	2	2	2	1	3	2	2	2	1	2	26	2.2	14.0
C04A	2	3	2	2	2	1	2	2	2	2	1	2	23	1.9	15.9
C05	2	1	1	2	2	1	2	2	2	2	1	2	20	1.7	18.2
C06	3	2	2	2	3	2	2	3	3	1	1	0	24	2.2	15.2
C07	3	2	2	2	2	2	2	3	1	4	1	3	27	2.3	13.5
C09	3	2	1	7	3	1	4	3	1	1	1	2	29	2.4	12.6
C10	2	1	1	2	2	1	2	2	1	1	1	2	18	1.5	20.3
C11	3	3	2	2	2	2	2	3	1	1	1	1	23	1.9	15.9
C12	2	2	1	2	2	1	2	2	1	1	1	1	18	1.5	20.3
C13	2	1	1	2	2	1	2	2	1	1	1	2	18	1.5	20.3
C14	2	1	2	2	2	3	2	2	1	2	1	1	21	1.8	17.4
C15	2	1	2	2	1	1	2	2	1	1	1	1	17	1.4	21.5
C16	2	1	2	2	2	1	2	2	1	1	1	1	18	1.5	20.3
C17	2	1	2	2	1	1	2	2	1	1	1	1	17	1.4	21.5
C18	2	1	2	3	2	1	3	2	1	1	1	1	20	1.7	18.2
C31	2	1	2	2	1	1	2	2	1	1	1	2	18	1.5	20.3
C32	1	1	2	2	1	1	3	2	1	1	1	2	18	1.5	20.3
C33	2	1	2	2	1	1	2	2	1	1	1	1	17	1.4	21.5
C34	2	1	2	2	1	1	2	2	1	1	1	1	17	1.4	21.5
C35	2	1	2	2	2	1	2	2	1	1	1	1	18	1.5	20.3
C36	1	1	2	2	1	1	3	2	1	1	0	1	16	1.5	22.8
C37	1	1	2	2	1	1	2	1	1	1	0	1	14	1.3	26.1
COBBS CREEK LOW LEVEL 12 SWWPC UNITS															
C19	2	1	2	2	2	1	2	2	1	1	1	1	18	1.5	20.3
C20	2	1	2	2	2	1	2	2	1	1	1	1	18	1.5	20.3
C21	2	1	2	2	1	1	2	2	1	1	1	1	17	1.4	21.5
C22	2	1	1	2	1	1	2	2	1	1	1	1	16	1.3	22.8
C23	2	1	1	2	1	1	2	2	1	1	1	1	16	1.3	22.8
C24	2	1	1	2	1	1	3	2	1	1	1	1	17	1.4	21.5
C25	2	2	1	3	2	2	2	2	2	1	1	2	22	1.8	16.6
C26	2	1	1	2	1	1	2	2	2	1	1	2	18	1.5	20.3
C27	2	0	1	3	1	1	2	2	2	1	1	2	18	1.6	20.3
C28A	1	2	1	4	1	1	3	2	2	1	1	1	20	1.7	18.2
C29	2	0	1	2	1	1	2	2	2	1	1	0	15	1.5	24.3
C30	2	0	1	2	1	1	1	2	2	1	1	0	14	1.4	26.1
TOTAL	182	158	156	187	161	128	191	186	158	105	92	120	1824		
I /D/C	2.0	1.7	1.7	2.0	1.8	1.4	2.1	2.0	1.7	1.2	1.0	1.3			
CSES	30	37	31	39	39	33	37	36	24	27	23	35	391	1.8	17.3
LSES	23	12	9	19	15	17	19	23	28	8	7	8	188	2.0	27.0
CSW	20	21	18	18	19	10	18	20	21	9	11	18	203	1.9	16.3
SWMG	33	33	34	20	22	17	30	24	25	12	13	7	270	2.3	18.0
LSW	4	8	5	9	9	9	8	8	11	4	4	4	83	1.7	17.6
CCHL	49	36	44	54	42	29	54	51	31	33	22	35	480	1.7	18.8
CCLL	23	11	15	28	15	13	25	24	18	12	12	13	209	1.5	21.2

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS													
S05	0	0	0	0	0	0	0	0	0	0	0	0	0
S06	0	0	0	0	0	0	0	0	0	0	0	0	0
S07	0	0	0	0	0	0	0	0	0	0	0	0	0
S08	0	0	0	0	0	0	0	0	0	0	0	0	0
S09	0	0	0	0	0	0	0	0	0	0	0	0	0
S10	0	0	0	0	0	0	0	0	0	0	0	0	0
S12	0	0	0	0	0	0	0	0	0	0	0	1	1
S12A	0	0	0	0	0	0	0	0	0	0	0	0	0
S13	0	0	0	0	0	0	0	0	0	0	0	0	0
S15	0	0	0	0	0	0	0	0	0	0	0	0	0
S16	0	0	0	0	0	0	0	0	0	0	0	0	0
S17	0	0	0	0	0	0	0	0	0	0	0	0	0
S18	0	0	0	0	0	0	0	0	0	0	0	0	0
S19	0	0	0	0	0	0	0	0	0	0	0	0	0
S21	0	0	0	0	0	0	0	0	0	0	0	0	0
S23	0	0	0	0	0	0	0	0	0	0	0	0	0
S25	0	0	0	0	0	0	0	0	0	0	0	1	1
S26	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS													
S31	0	0	0	0	0	0	0	0	0	0	0	0	0
S35	0	0	0	0	0	0	0	0	0	0	0	0	0
S36	0	0	0	0	0	0	0	0	0	0	0	0	0
S36A	0	0	0	0	0	0	0	0	0	0	0	0	0
S37	0	0	0	0	0	0	0	0	0	0	0	0	0
S42	0	0	0	0	0	0	0	0	0	0	0	0	0
S42A	0	0	0	0	0	0	0	0	0	0	0	0	0
S44	0	0	0	0	0	0	0	0	0	0	0	0	0
S46	0	0	0	0	0	0	0	0	0	0	0	0	0
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01	0	0	0	0	0	0	0	0	0	0	0	0	0
S02	0	0	0	0	0	0	0	0	0	0	0	0	0
S03	0	0	0	0	0	0	0	0	0	0	0	0	0
S04	0	0	0	0	0	0	0	0	0	0	0	0	0
S11	0	0	0	0	0	0	0	0	0	0	0	0	0
S14	0	0	0	0	0	0	0	0	0	0	0	0	0
S20	0	0	0	0	0	0	0	0	0	0	0	0	0
S22	0	0	0	0	0	0	0	0	0	0	0	0	0
S24	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS													
S27	0	0	0	0	0	0	0	0	0	0	0	0	0
S28	0	0	0	0	0	0	0	0	0	0	0	0	0
S30	0	0	0	0	0	0	0	0	0	0	0	0	0
S34	0	0	0	0	0	0	0	0	0	0	0	0	0
S39	0	0	0	0	0	0	0	0	0	0	0	0	0
S40	0	0	0	0	0	0	0	0	0	0	0	0	0
S43	0	0	0	0	0	0	0	0	0	0	0	0	0
S47	0	0	0	0	0	0	0	0	0	0	0	0	0
S50	0	0	0	0	0	0	0	0	0	0	0	0	0
S51	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	**0**	**0**	0	0	0
S32	0	0	0	0	0	0	0	0	0	0	0	0	0
S33	0	0	0	0	0	0	0	0	0	0	0	0	0
S38	0	0	0	0	0	0	0	0	0	0	0	0	0
S45	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
COBBS CREEK HIGH LEVEL 24 SWWPC UNITS													
C01	0	0	0	0	0	0	0	0	0	0	0	0	0
C02	0	0	0	0	0	0	0	0	0	0	0	0	0
C04	0	0	0	0	0	0	0	0	0	0	0	0	0
C04A	0	0	0	0	0	0	0	0	0	0	0	0	0
C05	0	0	0	0	0	0	0	0	0	0	0	0	0
C06	0	0	0	0	0	0	0	0	0	0	0	0	0
C07	0	0	0	0	0	0	0	0	0	1	0	0	1
C09	0	0	0	1	0	0	0	0	0	0	0	0	1
C10	0	0	0	0	0	0	0	0	0	0	0	0	0
C11	0	0	0	0	0	0	0	0	0	0	0	0	0
C12	0	0	0	0	0	0	0	0	0	0	0	0	0
C13	0	0	0	0	0	0	0	0	0	0	0	0	0
C14	0	0	0	0	0	0	0	0	0	0	0	0	0
C15	0	0	0	0	0	0	0	0	0	0	0	0	0
C16	0	0	0	0	0	0	0	0	0	0	0	0	0
C17	0	0	0	0	0	0	0	0	0	0	0	0	0
C18	0	0	0	0	0	0	0	0	0	0	0	0	0
C31	0	0	0	0	0	0	0	0	0	0	0	0	0
C32	0	0	0	0	0	0	0	0	0	0	0	0	0
C33	0	0	0	0	0	0	0	0	0	0	0	0	0
C34	0	0	0	0	0	0	0	0	0	0	0	0	0
C35	0	0	0	0	0	0	0	0	0	0	0	0	0
C36	0	0	0	0	0	0	0	0	0	0	0	0	0
C37	0	0	0	0	0	0	0	0	0	0	0	0	0
COBBS CREEK LOW LEVEL 12 SWWPC UNITS													
C19	0	0	0	0	0	0	0	0	0	0	0	0	0
C20	0	0	0	0	0	0	0	0	0	0	0	0	0
C21	0	0	0	0	0	0	0	0	0	0	0	0	0
C22	0	0	0	0	0	0	0	0	0	0	0	0	0
C23	0	0	0	0	0	0	0	0	0	0	0	0	0
C24	0	0	0	0	0	0	0	0	0	0	0	0	0
C25	0	0	0	0	0	0	0	0	0	0	0	0	0
C26	0	0	0	0	0	0	0	0	0	0	0	0	0
C27	0	0	0	0	0	0	0	0	0	0	0	0	0
C28A	0	0	0	0	0	0	0	0	0	0	0	0	0
C29	0	0	0	0	0	0	0	0	0	0	0	0	0
C30	0	0	0	0	0	0	0	0	0	0	0	0	0
													TOTAL DISC
	0	0	0	1	0	0	0	0	0	1	0	2	4

	NO OF UNITS IN DISTRICT BLOCKED												TOTAL
CSE	0	0	0	0	0	0	0	0	0	0	0	2	2
LSE	0	0	0	0	0	0	0	0	0	0	0	0	0
CSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SWG	0	0	0	0	0	0	0	0	0	0	0	0	0
LSW	0	0	0	0	0	0	0	0	0	0	0	0	0
CCHL	0	0	0	1	0	0	0	0	0	1	0	0	2
CCLL	0	0	0	0	0	0	0	0	0	0	0	0	0

	NO OF DISCHARGES IN DISTRICT												TOTAL
CSE	0	0	0	0	0	0	0	0	0	0	0	2	2
LSE	0	0	0	0	0	0	0	0	0	0	0	0	0
CSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SWG	0	0	0	0	0	0	0	0	0	0	0	0	0
LSW	0	0	0	0	0	0	0	0	0	0	0	0	0
CCHL	0	0	0	1	0	0	0	0	0	1	0	0	2
CCLL	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS													
S05	0	0	0	0	0	0	0	0	0	0	0	0	0
S06	0	0	0	0	0	0	0	0	0	0	0	0	0
S07	0	0	0	0	0	1	0	0	0	0	0	0	1
S08	0	2	0	0	0	0	0	0	0	0	0	0	2
S09	0	0	0	0	0	0	0	0	0	0	0	0	0
S10	0	0	0	0	0	0	0	0	0	0	0	0	0
S12	0	0	0	1	0	0	0	0	0	0	0	0	1
S12A	0	0	0	0	0	0	0	0	0	0	0	0	0
S13	0	0	0	0	0	0	0	0	0	0	0	0	0
S15	0	1	0	0	0	0	0	0	0	0	0	0	1
S16	0	0	0	2	0	0	0	0	0	0	0	0	2
S17	0	0	0	0	0	0	0	0	0	0	0	0	0
S18	0	0	0	0	0	0	0	0	0	0	0	0	0
S19	0	0	0	0	0	0	0	0	0	0	0	0	0
S21	0	1	0	0	0	0	0	0	0	0	0	0	1
S23	1	1	0	0	0	0	0	0	0	0	0	0	2
S25	1	0	0	0	0	1	0	0	0	0	0	0	2
S26	0	0	0	0	0	0	0	0	0	0	0	0	0
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS													
S31	0	0	0	0	0	1	0	0	0	0	0	0	1
S35	0	0	0	0	0	0	0	0	0	0	0	0	0
S36	0	0	0	0	0	0	0	0	0	0	0	0	0
S36A	0	0	0	0	0	0	0	0	0	0	0	0	0
S37	0	0	0	0	0	0	0	0	0	0	0	0	0
S42	1	0	0	0	0	0	0	0	0	0	0	0	1
S42A	0	0	0	0	0	0	0	0	0	0	0	0	0
S44	0	0	0	0	0	0	0	0	0	0	0	0	0
S46	0	0	0	0	0	0	0	0	0	0	0	0	0
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01	0	0	0	0	0	0	0	0	0	0	0	0	0
S02	0	0	0	0	0	0	0	0	0	0	0	0	0
S03	0	0	0	0	0	0	0	0	0	0	0	0	0
S04	0	0	0	0	0	0	0	0	0	0	0	0	0
S11	0	0	0	0	0	0	0	0	0	0	0	0	0
S14	0	0	0	0	0	0	0	0	0	0	0	0	0
S20	0	0	0	0	0	0	0	0	0	0	0	0	0
S22	0	0	0	0	0	0	0	0	0	0	0	0	0
S24	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS													
S27	0	0	0	0	0	0	0	0	0	0	0	0	0
S28	0	0	0	0	0	0	0	0	0	0	0	0	0
S30	0	0	0	0	0	0	0	0	0	0	0	0	0
S34	1	0	0	0	0	0	0	0	0	0	0	0	1
S39	0	0	0	0	0	0	0	0	0	0	0	0	0
S40	0	0	0	0	0	0	0	0	0	0	0	0	0
S43	0	0	0	1	0	0	0	0	0	0	0	0	1
S47	0	0	0	0	0	0	0	0	0	0	0	0	0
S50	1	1	0	0	0	0	0	0	0	0	0	0	2
S51	0	0	1	0	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	**0**	**0**	0	**0**	0
S32	0	0	0	0	0	0	0	0	0	0	0	0	0
S33	0	0	0	0	0	0	0	0	0	0	0	0	0
S38	0	0	0	0	0	0	0	0	0	0	0	0	0
S45	0	0	0	0	0	0	0	0	0	0	0	0	0

4.286 AVERAGE BLOCKAGES PER MONTH

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
COBBS CREEK HIGH LEVEL 24 SWWPC UNITS													0
C01	0	0	0	0	0	0	0	0	0	0	0	0	0
C02	0	0	0	0	1	0	0	0	0	0	0	0	1
C04	0	0	0	0	0	1	0	0	0	0	0	0	1
C04A	0	0	0	0	0	0	0	0	0	0	0	0	0
C05	0	0	0	0	0	0	0	0	0	0	0	0	0
C06	0	0	0	0	0	0	0	0	0	0	0	0	0
C07	0	0	0	0	0	0	0	0	0	0	0	0	0
C09	0	0	0	0	0	0	0	0	0	0	0	0	0
C10	0	0	0	0	0	0	0	0	0	0	0	0	0
C11	0	0	0	0	0	0	0	0	0	0	0	0	0
C12	0	0	0	0	0	0	0	0	0	0	0	0	0
C13	0	0	0	0	0	0	0	0	0	0	0	0	0
C14	0	0	0	0	0	1	0	0	0	0	0	0	1
C15	0	0	0	0	0	0	0	0	0	0	0	0	0
C16	0	0	0	0	1	0	0	0	0	0	0	0	1
C17	0	0	0	0	0	0	0	0	0	0	0	0	0
C18	0	0	0	0	0	0	0	0	0	0	0	0	0
C31	0	0	0	0	0	0	1	0	0	0	0	0	1
C32	0	0	0	0	0	0	0	0	0	0	0	0	0
C33	1	1	0	0	0	0	0	0	0	0	0	0	2
C34	0	0	0	0	0	0	0	0	0	0	0	0	0
C35	0	0	0	0	0	0	0	0	0	0	0	0	0
C36	0	0	0	0	0	0	1	0	0	0	0	0	1
C37	0	0	0	0	0	0	0	0	0	0	0	0	0
COBBS CREEK LOW LEVEL 12 SWWPC UNITS													
C19	0	0	0	0	0	0	0	0	0	0	0	0	0
C20	0	0	0	0	0	0	0	0	0	0	0	0	0
C21	0	0	0	0	0	0	0	0	0	0	0	0	0
C22	0	0	0	0	0	0	0	0	0	0	0	0	0
C23	1	0	0	0	0	0	0	0	0	0	0	0	1
C24	0	0	0	0	0	0	0	0	0	0	0	0	0
C25	0	0	0	0	0	0	0	0	0	0	0	0	0
C26	0	0	0	0	0	0	0	0	0	0	0	0	0
C27	0	0	0	0	0	0	0	0	0	0	0	0	0
C28A	0	1	1	0	0	0	0	0	0	0	0	0	2
C29	0	0	0	0	0	0	0	0	0	0	0	0	0
C30	0	0	0	0	0	0	0	0	0	0	0	0	0
													TOTAL
	7	8	2	4	2	5	2	0	0	0	0	0	30
CSE	2	5	0	3	0	2	0	0	0	0	0	0	12
LSE	1	0	0	0	0	1	0	0	0	0	0	0	2
CSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SWG	2	1	1	1	0	0	0	0	0	0	0	0	5
LSW	0	0	0	0	0	0	0	0	0	0	0	0	0
CCHL	1	1	0	0	2	2	2	0	0	0	0	0	8
CCLL	1	1	1	0	0	0	0	0	0	0	0	0	3

RELIEF SEWER MONTHLY INSPECTION

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01	2	1	2	2	1	1	1	2	2	1	1	2	18
R02	2	1	2	2	1	1	1	2	2	1	1	2	18
R03	2	1	1	2	1	1	1	2	2	1	1	2	17
R04	2	1	1	2	1	1	1	2	2	1	1	2	17
R05	2	1	1	2	0	1	1	2	3	1	1	2	17
R06	2	1	1	2	0	1	0	2	1	1	2	2	15
MAIN RELIEF SEWER													
R07	2	1	1	2	0	1	1	1	1	1	1	2	14
R08	2	1	2	2	0	1	1	1	2	1	1	2	16
R09	2	1	0	2	0	1	1	0	1	1	1	2	12
R10	2	1	0	3	0	1	1	0	1	1	1	2	13
R11	2	1	1	2	0	1	1	0	1	1	1	2	13
R11A	2	1	0	2	0	1	1	0	1	1	0	2	11
R12	2	1	0	1	0	1	1	1	1	1	1	2	12
WAKLING RELIEF SEWER													
R13	1	2	1	2	1	1	0	1	1	1	0	2	13
R14	1	2	1	2	1	1	0	1	1	1	0	2	13
ROCK RUN STORM FLOOD RELIEF SEWER													
R15	1	2	2	2	1	1	0	1	1	1	0	1	13
OREGON AVE RELIEF SEWER													
R16	1	0	1	0	0	0	0	0	0	0	0	0	2
R17	1	0	1	0	0	0	0	0	0	0	0	0	2
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18	1	1	2	1	1	1	0	1	1	1	0	0	10
32ND ST RELIEF SEWER													
R19	1	0	0	1	0	1	0	1	2	1	0	2	9
MAIN STREET RELIEF SEWER													
R20	2	2	1	1	2	1	0	1	1	1	0	1	13
SOMERSET SYSTEM DIVERSION CHAMBER													
R21	0	0	0	0	0	0	0	0	0	0	0	0	0
TEMPORARY REGULATOR CHAMBER													
R22	0	0	0	0	0	0	0	0	0	0	0	0	0
R23	2	1	1	1	1	0	0	1	1	0	0	1	9
ARCH ST RELIEF SEWER													
R24	1	1	2	2	2	1	2	2	2	2	1	0	18
16TH & SNYDER													
R25	1	1	2	2	0	1	2	1	2	1	1	0	14
GRANT & STATE RD. RELIEF													
R26	0	2	1	2	1	1	0	1	1	2	0	2	13
TOTAL	39	27	27	42	14	22	16	26	33	24	15	37	322
AVER	1.4	1.0	1.0	1.6	0.5	0.8	0.6	1.0	1.2	0.9	0.6	1.4	1.0

RELIEF SEWER MONTHLY DISCHARGE

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01	0	0	0	0	0	0	0	0	0	0	0	0	0
R02	0	0	0	0	0	0	0	0	0	0	0	0	0
R03	0	0	0	0	0	0	0	0	0	0	0	0	0
R04	0	0	0	0	0	0	0	0	0	0	0	0	0
R05	0	0	0	0	0	0	0	0	0	0	0	0	0
R06	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIN RELIEF SEWER													
R07	0	0	0	0	0	0	0	0	0	0	0	0	0
R08	0	0	0	0	0	0	0	0	0	0	0	0	0
R09	0	0	0	0	0	0	0	0	0	0	0	0	0
R10	0	0	0	0	0	0	0	0	0	0	0	0	0
R11	0	0	0	0	0	0	0	0	0	0	0	0	0
R11A	0	0	0	0	0	0	0	0	0	0	0	0	0
R12	0	0	0	0	0	0	0	0	0	0	0	0	0
WAKLING RELIEF SEWER													
R13	0	0	0	0	0	0	0	0	0	0	0	0	0
R14	0	0	0	0	0	0	0	0	0	0	0	0	0
ROCK RUN STORM FLOOD RELIEF SEWER													
R15	0	0	0	0	0	0	0	0	0	0	0	0	0
OREGON AVE RELIEF SEWER													
R16	0	0	0	0	0	0	0	0	0	0	0	0	0
R17	0	0	0	0	0	0	0	0	0	0	0	0	0
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18	0	0	0	0	0	0	0	0	0	0	0	0	0
32ND ST RELIEF SEWER													
R19	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIN STREET RELIEF SEWER													
R20	0	0	0	0	0	0	0	0	0	0	0	0	0
SOMERSET SYSTEM DIVERSION CHAMBER													
R21	0	0	0	0	0	0	0	0	0	0	0	0	0
TEMPORARY REGULATOR CHAMBER													
R22	0	0	0	0	0	0	0	0	0	0	0	0	0
R23	0	0	0	0	0	0	0	0	0	0	0	0	0
ARCH ST RELIEF SEWER													
R24	0	0	0	0	0	0	0	0	0	0	0	0	0
16TH & SNYDER													
R25	0	0	0	0	0	0	0	0	0	0	0	0	0
GRANT & STATE RD. RELIEF													
R26	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITS	0	0	0	0	0	0	0	0	0	0	0	0	

RELIEF SEWER MONTHLY BLOCKS CLEARED

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01	0	0	0	0	0	0	0	0	0	0	0	0	0
R02	0	0	0	0	0	0	0	0	0	0	0	0	0
R03	0	0	0	0	0	0	0	0	0	0	0	0	0
R04	0	0	0	0	0	0	0	0	0	0	0	0	0
R05	0	0	0	0	0	0	0	0	0	0	0	0	0
R06	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIN RELIEF SEWER													
R07	0	0	0	0	0	0	0	0	0	0	0	0	0
R08	0	0	0	0	0	0	0	0	0	0	0	0	0
R09	0	0	0	0	0	0	0	0	0	0	0	0	0
R10	0	0	0	0	0	0	0	0	0	0	0	0	0
R11	0	0	0	0	0	0	0	0	0	0	0	0	0
R11A	0	0	0	0	0	0	0	0	0	0	0	0	0
R12	0	0	0	0	0	0	0	0	0	0	0	0	0
WAKLING RELIEF SEWER													
R13	0	0	0	0	0	0	0	0	0	0	0	0	0
R14	0	0	0	0	0	0	0	0	0	0	0	0	0
ROCK RUN STORM FLOOD RELIEF SEWER													
R15	0	0	0	0	0	0	0	0	0	0	0	0	0
OREGON AVE RELIEF SEWER													
R16	0	0	0	0	0	0	0	0	0	0	0	0	0
R17	0	0	0	0	0	0	0	0	0	0	0	0	0
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18	0	0	0	0	0	0	0	0	0	0	0	0	0
32ND ST RELIEF SEWER													
R19	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIN STREET RELIEF SEWER													
R20	0	0	0	0	0	0	0	0	0	0	0	0	0
SOMERSET SYSTEM DIVERSION CHAMBER													
R21	0	0	0	0	0	0	0	0	0	0	0	0	0
TEMPORARY REGULATOR CHAMBER													
R22	0	0	0	0	0	0	0	0	0	0	0	0	0
R23	0	0	0	0	0	0	0	0	0	0	0	0	0
ARCH ST RELIEF SEWER													
R24	0	0	0	0	0	0	0	0	0	0	0	0	0
16TH & SNYDER													
R25	0	0	0	0	0	0	0	0	0	0	0	0	0
GRANT & STATE RD. RELIEF													
R26	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0
AVER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FY20 CSO Dry Weather Discharge Listing

Discharge Observed		Discharge Stopped		Last Inspection						
Date	Time	Date	Time	Date	Time	Site ID	Collector	Type Unit	Location	Comment
20-Sep-19	1:10:00 PM	20-Sep-19	1:40:00 PM	19-Sep-19	11:20:00 AM	F-11	LFLL	WH-S	Paul St. S of Vandyke St.	TIRE IN DWO GATE. OTHER REMOVED TIRE FROM DWO GATE.
04-Oct-19	10:50:00 AM	04-Oct-19	11:40:00 AM	02-Oct-19	2:20:00 PM	C-09	CCHL	SLOT	64th St. & Cobbs Creek	DEBRIS IN SLOT AND DWO PIPE. SLOT BLOCKAGE USED VACTOR TO REMOVE BLOCKAGE.
28-Jan-20	10:50:00 AM	28-Jan-20	12:00:00 PM	11-Jan-20	1:10:00 PM	T-13	FHL	SLOT	Whitaker Ave. W of Tacony Creek	STICKS, PLASTIC BAGS AND LEAVES IN DWO PIPE MOUTH. DWO PIPE BLOCKAGE USED HOOK, PUSHRODS AND HEAVY BAR TO REMOVE BLOCKAGE.
28-Jan-20	11:40:00 AM	28-Jan-20	1:30:00 PM	27-Jan-20	11:20:00 AM	F-06	LFLL	DAM	Worrell St. E of Frankford Creek	GRIT IN LINE. DWO PIPE BLOCKAGE USE VACTOR TRUCK TO REMOVE GRIT.
14-Apr-20	12:30:00 PM	14-Apr-20	1:00:00 PM	08-Apr-20	10:50:00 AM	C-07	CCHL	SLOT	Lansdowne Ave. & 69th St.	DEBRIS IN SLOT. SLOT BLOCKAGE REMOVED DEBRIS FROM SLOT.
02-Jun-20	9:00:00 AM	02-Jun-20	9:50:00 AM	13-May-20	9:00:00 AM	P-03	PP	SLOT	Torresdale Ave., NW of Pennypack St.	GRIT AND DEBRIS IN DWO PIPE. DWO PIPE BLOCKAGE REMOVED GRIT AND DEBRIS.
04-Jun-20	11:00:00 AM	04-Jun-20	12:00:00 PM	21-May-20	9:10:00 AM	S-12	CSES	SLOT	24th St. N of Chestnut St. Bridge	GRIT AND DEBRIS IN SLOT AND DWO PIPE. SLOT BLOCKAGE REMOVED GRIT FROM SLOT WITH SHOVEL AND FLUSHED DWO PIPE.
15-Jun-20	10:00:00 AM	15-Jun-20	11:10:00 AM	05-May-20	1:20:00 PM	S-25	CSES	B & B	Schuylkill Ave. & Christian St.	DEBRIS BLOCKING REGULATOR INLET. REGULATOR INLET BLOCKAGE REMOVED BLOCKAGE WITH HOOK AND SHOVEL.

Dry Weather Discharges are continually tracked and analyzed to determine if new or modified maintenance procedures would help to prevent them from occurring. Although our established procedures have greatly reduced the number and duration of these discharges, the combined system picks up all manner of trash and debris that is unpredictable in its pattern of causing flow disruptions. Despite incorporating best management practices including; having all inlets trapped and cleaned; preventative maintenance schedules for sewer flushing and cleaning or the regulators; CCTV inspection of DWO pipes; etc., it is virtually impossible to eliminate all blockages before they occur.

The City continues to aggressively control and minimize these dry weather overflows by utilizing the latest technology-based controls including our Collector System Remote Monitoring Network that currently includes over 320 sites with over 720 individual level and/or flow measurements. The CSO maintenance personnel are trained in the use of the system’s computer programs for analyzing the data and have developed a comprehensive understanding of individual CSO site’s distinct flow patterns. This familiarity allows them to quickly recognize abnormal conditions that may indicate accumulating debris so that they can respond before developing into a dry weather CSO blockage.

MISCELLANEOUS SITE INSPECTIONS

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
P-090-02-PFD-01 SANDY RUN CREEK DIVERSION REGULATOR													
	11	11	7	10	3	9	2	5	9	7	4	6	84
T-088-01-CFD-01 PLYMOUTH ST. WEST OF PITTVILLE													
	5	6	3	6	2	2	1	2	4	2	2	3	38
T-088-01-CFD-02 PITTVILLE ST. SOUTH OF PLYMOUTH ST.													
	5	5	4	6	2	3	2	3	4	2	2	3	41
T-088-01-CFD-03 ELSTON ST. E. OF BOUVIER ST.													
	4	5	3	4	1	3	2	3	4	2	1	2	34
T-088-01-CFD-04 ASHLEY ST. W. OF BOUVIER ST.													
	5	2	3	2	0	1	1	4	4	2	1	1	26
T-088-01-CFD-05 CHELTENHAM AVE. E. OF 19TH ST.													
	3	2	2	4	0	2	2	3	3	2	1	0	24
T-088-01-CFD-06 VERBENA ST. S. OF CHELTENHAM AVE.													
	6	1	3	6	0	2	2	3	2	1	1	1	28
W-060-01-MFD-01 JANNETTE ST. WEST OF MONASTERY AVE.													
	2	3	1	3	1	1	1	2	3	1	0	3	21
W-060-01-MFD-02 GREEN LANE NORTH OF LAWNTON ST.													
	2	3	2	3	1	1	1	2	3	1	0	3	22
T-089-04-CFD-01 FRANKLIN & HASBROOK													
	11	12	7	10	3	8	1	5	12	9	4	6	88
T-088-01-CFD-07 CHELTENHAM E. OF 7 TH ST.													
	10	11	8	10	3	9	2	5	10	7	4	6	85
T-088-01-CFD-08 7 TH ST. S. OF CHELTENHAM													
	10	11	7	10	2	9	2	5	9	7	4	6	82
Totals	74	72	50	74	18	50	19	42	67	43	24	40	573

MISCELLANEOUS SITE DISCHARGES

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
P-090-02-PFD-01 SANDY RUN CREEK DIVERSION REGULATOR													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-01 PLYMOUTH ST. WEST OF PITTVILLE													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-02 PITTVILLE ST. SOUTH OF PLYMOUTH ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-03 ELSTON ST. E. OF BOUVIER ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-04 ASHLEY ST. W. OF BOUVIER ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-05 CHELTENHAM AVE. E. OF 19TH ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-06 VERBENA ST. S. OF CHELTENHAM AVE.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
W-060-01-MFD-01 JANNETTE ST. WEST OF MONASTERY AVE.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
W-060-01-MFD-02 GREEN LANE NORTH OF LAWNTON ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-089-04-CFD-01 FRANKLIN & HASBROOK													
	0	0	0	0	1	0	0	0	0	1	0	0	2
T-088-01-CFD-07 CHELTENHAM E. OF 7 TH ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-08 7 TH ST. S. OF CHELTENHAM													
	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	1	0	0	0	0	1	0	0	2

MISCELLANEOUS SITE BLOCKAGES CLEARED

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
P-090-02-PFD-01 SANDY RUN CREEK DIVERSION REGULATOR													
	2	1	0	0	0	0	0	0	0	0	0	0	3
T-088-01-CFD-01 PLYMOUTH ST. WEST OF PITTVILLE													
	1	0	0	0	0	0	0	0	0	0	0	0	1
T-088-01-CFD-02 PITTVILLE ST. SOUTH OF PLYMOUTH ST.													
	1	0	0	0	1	0	0	0	0	0	0	0	2
T-088-01-CFD-03 ELSTON ST. E. OF BOUVIER ST.													
	0	0	1	0	0	0	0	0	0	0	0	0	1
T-088-01-CFD-04 ASHLEY ST. W. OF BOUVIER ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-05 CHELTENHAM AVE. E. OF 19TH ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-088-01-CFD-06 VERBENA ST. S. OF CHELTENHAM AVE.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
W-060-01-MFD-01 JANNETTE ST. WEST OF MONASTERY AVE.													
	0	0	0	1	0	0	0	0	0	0	0	0	1
W-060-01-MFD-02 GREEN LANE NORTH OF LAWNTON ST.													
	0	0	0	0	0	0	0	0	0	0	0	0	0
T-089-04-CFD-01 FRANKLIN & HASBROOK													
0	1	0	0	0	1	0	0	0	0	1	1	2	6
T-088-01-CFD-07 CHELTENHAM E. OF 7 TH ST.													
	1	2	1	0	1	1	0	0	0	0	0	2	8
T-088-01-CFD-08 7 TH ST. S. OF CHELTENHAM													
	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	6	3	2	1	3	1	0	0	0	1	1	5	23

Appendix B

FY 2020

Annual CSO Miscellaneous Site & Maintenance Reports

Flow Control Maintenance Report- July 2019 through June 2020

SOMERSET GRIT D-25 CHAMBER & DWO CLEANINGS

DATE	TONS
8/16/2019	7.17
8/17/2019	0.97
6/2/2020	10.87
6/3/2020	5.84
6/4/2020	4.77
6/5/2020	4.46
6/6/2020	4.6
6/15/2020	5.84
6/16/2020	3.22
6/17/2020	2.14
6/29/2020	3.51
6/30/2020	2.44

CSPS SIPHON GRIT POCKET CLEANINGS

DATE	CU. YARDS
8/8/2019	30 Cu. Yrds.
11/4/2019	30 Cu. Yrds.

CSO B&B REGULATOR MAINTENANCE

DATE	SITE
9/30/2019	S-50
10/5/2019	S-50
12/7/2019	S-50
12/7/2019	S-5
12/7/2019	S-6
12/7/2019	S-7
12/7/2019	S-8
12/12/2019	S-50
2/29/2020	D-4
2/29/2020	D-37
2/29/2020	D-38
2/29/2020	S-22
2/29/2020	S-24
2/29/2020	S-23
2/29/2020	S-25

CSO TIDE GATE MAINTENANCE

DATE	SITE	DATE	SITE	DATE	SITE
7/1/2019	Rock Run	10/21/2019	D-9	2/19/2020	D-11
7/10/2019	D-2	10/23/2019	Rock Run	2/19/2020	F-25
7/10/2019	D-3	10/24/2019	D-9	2/21/2020	D-7
7/10/2019	D-15	10/28/2019	T-14	2/21/2020	D-9
7/10/2019	D-9	11/4/2019	D-5	2/24/2020	D-5
7/11/2019	D-11	11/6/2019	F-25	2/29/2020	D-37
7/11/2019	D-5	11/6/2019	D-7	3/11/2020	Fish Ladder
7/11/2019	T-14	11/7/2019	D-3	3/11/2020	Rock Run
7/15/2019	D-7	11/8/2019	D-2	3/12/2020	T-14
7/16/2019	D-7	11/8/2019	D-9	3/12/2020	D-2
7/17/2019	D-7	11/8/2019	D-11	3/12/2020	D-3
7/18/2019	D-7	11/8/2019	D-15	3/12/2020	D-5
7/19/2019	D-7	11/13/2019	Rock Run	3/12/2020	D-7
7/22/2019	D-7	11/14/2019	Fish Ladder	3/13/2020	D-9
7/22/2019	Fish Ladder	11/20/2019	T-14	3/13/2020	D-11
8/5/2019	F-25	11/22/2019	Fish Ladder	3/13/2020	F-25
8/5/2019	D-11	11/29/2019	F-13	3/13/2020	D-15
8/7/2019	D-3	12/2/2019	F-13	3/13/2020	Venice
8/14/2019	D-2	12/3/2019	F-13	3/18/2020	Fish Ladder
8/14/2019	D-9	12/4/2019	D-2	4/2/2020	Rock Run
8/19/2019	Rock Run	12/4/2019	D-3	4/6/2020	T-14
8/21/2019	T-14	12/5/2019	D-5	4/7/2020	D-5
8/26/2019	D-7	12/5/2019	D-7	4/7/2020	D-7
8/26/2019	Fish Ladder	12/5/2019	D-9	4/9/2020	D-15
9/9/2019	F-25	12/5/2019	D-11	4/9/2020	F-25
9/9/2019	D-11	12/6/2019	F-25	4/13/2020	D-2
9/11/2019	D-3	12/6/2019	D-15	4/20/2020	Fish Ladder
9/11/2019	D-5	12/7/2019	S-50	4/27/2020	D-3
9/12/2019	D-15	12/11/2019	Rock Run	4/27/2020	D-9
9/13/2019	D-2	12/11/2019	T-14	4/28/2020	D-11
9/19/2019	State Road	12/12/2019	S-50	5/8/2020	T-14
9/19/2019	D-9	1/3/2020	D-5	5/11/2020	F-25
9/19/2019	D-7	1/9/2020	D-7	5/18/2020	Fish Ladder
9/20/2019	T-14	1/13/2020	Rock Run	5/21/2020	D-11
9/20/2019	Rock Run	1/13/2020	T-14	5/21/2020	D-15
9/23/2019	Fish Ladder	1/16/2020	D-15	5/28/2020	D-3
9/25/2019	D-7	1/17/2020	D-2	5/28/2020	D-5
9/30/2019	S-50	1/17/2020	D-3	5/28/2020	D-9
10/1/2019	S-50	1/17/2020	D-5	5/29/2020	D-2
10/3/2019	S-50	1/17/2020	D-9	6/5/2020	Rock Run
10/4/2019	S-50	1/22/2020	D-15	6/8/2020	Fish Ladder
10/5/2019	S-50	1/22/2020	D-11	6/9/2020	T-14
10/9/2019	F-25	1/31/2020	D-5	6/15/2020	D-2
10/9/2019	D-11	2/10/2020	Rock Run	6/15/2020	D-3
10/11/2019	D-3	2/10/2020	T-14	6/15/2020	D-11
10/11/2019	D-5	2/11/2020	S-50	6/17/2020	D-5
10/18/2019	Fish Ladder	2/12/2020	S-50	6/17/2020	D-9
10/21/2019	D-2	2/18/2020	D-15	6/18/2020	F-25
10/21/2019	D-15	2/19/2020	D-2	6/18/2020	D-15
10/21/2019	D-7	2/19/2020	D-3		

COMPUTER CONTROL CHAMBER PREVENTATIVE MAINTENANCE

DATE	SITE	DATE	SITE	DATE	SITE
7/1/2019	Rock Run	10/23/2019	Rock Run	2/21/2020	D-9
7/3/2019	State Road	10/24/2019	State Road	2/24/2020	Venice
7/10/2019	D-2	10/25/2019	Venice	2/24/2020	D-5
7/10/2019	D-3	10/28/2019	T-14	3/11/2020	Fish Ladder
7/10/2019	D-15	11/4/2019	D-5	3/11/2020	Rock Run
7/10/2019	D-9	11/6/2019	F-25	3/11/2020	T-14
7/11/2019	D-11	11/6/2019	D-7	3/12/2020	D-2
7/11/2019	D-5	11/7/2019	D-3	3/12/2020	D-3
7/11/2019	T-14	11/8/2019	D-2	3/12/2020	D-5
7/12/2019	Venice	11/8/2019	D-9	3/12/2020	D-7
7/22/2019	D-7	11/8/2019	D-11	3/13/2020	D-9
7/22/2019	Fish Ladder	11/8/2019	D-15	3/13/2020	D-11
7/29/2019	F-25	11/13/2019	State Road	3/13/2020	F-25
8/5/2019	F-25	11/13/2019	Venice	3/13/2020	D-15
8/5/2019	D-11	11/13/2019	Rock Run	3/13/2020	Venice
8/7/2019	D-3	11/20/2019	T-14	3/16/2020	State Road
8/9/2019	D-5	11/22/2019	Fish Ladder	3/18/2020	Fish Ladder
8/9/2019	D-15	12/4/2019	D-2	4/2/2020	Rock Run
8/14/2019	D-2	12/4/2019	D-3	4/3/2020	State Road
8/14/2019	D-9	12/5/2019	D-5	4/6/2020	T-14
8/15/2019	State Road	12/5/2019	D-7	4/7/2020	D-5
8/19/2019	Rock Run	12/5/2019	D-2	4/7/2020	D-7
8/21/2019	T-14	12/5/2019	D-3	4/9/2020	D-15
8/22/2019	Venice	12/6/2019	D-9	4/9/2020	F-25
8/23/2019	F-25	12/6/2019	D-15	4/13/2020	D-2
8/26/2019	D-7	12/9/2019	State Road	4/15/2020	Venice
8/26/2019	Fish Ladder	12/10/2019	Venice	4/20/2020	Fish Ladder
9/9/2019	F-25	12/11/2019	Rock Run	4/27/2020	D-3
9/9/2019	D-11	12/11/2019	T-14	4/27/2020	D-9
9/11/2019	D-3	1/8/2020	State Road	4/28/2020	D-11
9/11/2019	D-5	1/13/2020	Rock Run	5/6/2020	Rock Run
9/12/2019	D-15	1/13/2020	T-14	5/7/2020	State Road
9/13/2019	D-2	1/16/2020	D-15	5/8/2020	T-14
9/19/2019	State Road	1/17/2020	D-2	5/11/2020	F-25
9/19/2019	D-9	1/17/2020	D-3	5/13/2020	Venice
9/19/2019	D-7	1/17/2020	D-5	5/18/2020	Fish Ladder
9/20/2019	T-14	1/17/2020	D-9	5/21/2020	D-11
9/20/2019	Rock Run	1/22/2020	D-15	5/21/2020	D-15
9/23/2019	Fish Ladder	1/22/2020	D-11	5/26/2020	D-7
9/25/2019	Venice	1/22/2020	D-7	5/28/2020	D-3
9/25/2019	D-7	1/23/2020	Venice	5/28/2020	D-5
10/9/2019	F-25	2/10/2020	T-14	5/28/2020	D-9
10/9/2019	D-11	2/10/2020	Rock Run	5/29/2020	D-2
10/11/2019	D-3	2/18/2020	D-15	6/5/2020	D-7
10/11/2019	D-5	2/19/2020	D-2	6/5/2020	Rock Run
10/18/2019	Fish Ladder	2/19/2020	D-3	6/8/2020	Fish Ladder
10/21/2019	D-2	2/19/2020	D-11	6/8/2020	Venice
10/21/2019	D-15	2/19/2020	F-25	6/9/2020	T-14
10/21/2019	D-7	2/20/2020	State Road	6/15/2020	D-2
10/21/2019	D-9	2/21/2020	D-7	6/15/2020	D-3
				6/15/2020	D-11
				6/17/2020	D-5
				6/17/2020	D-9
				6/17/2020	State Road
				6/18/2020	F-25
				6/18/2020	D-15

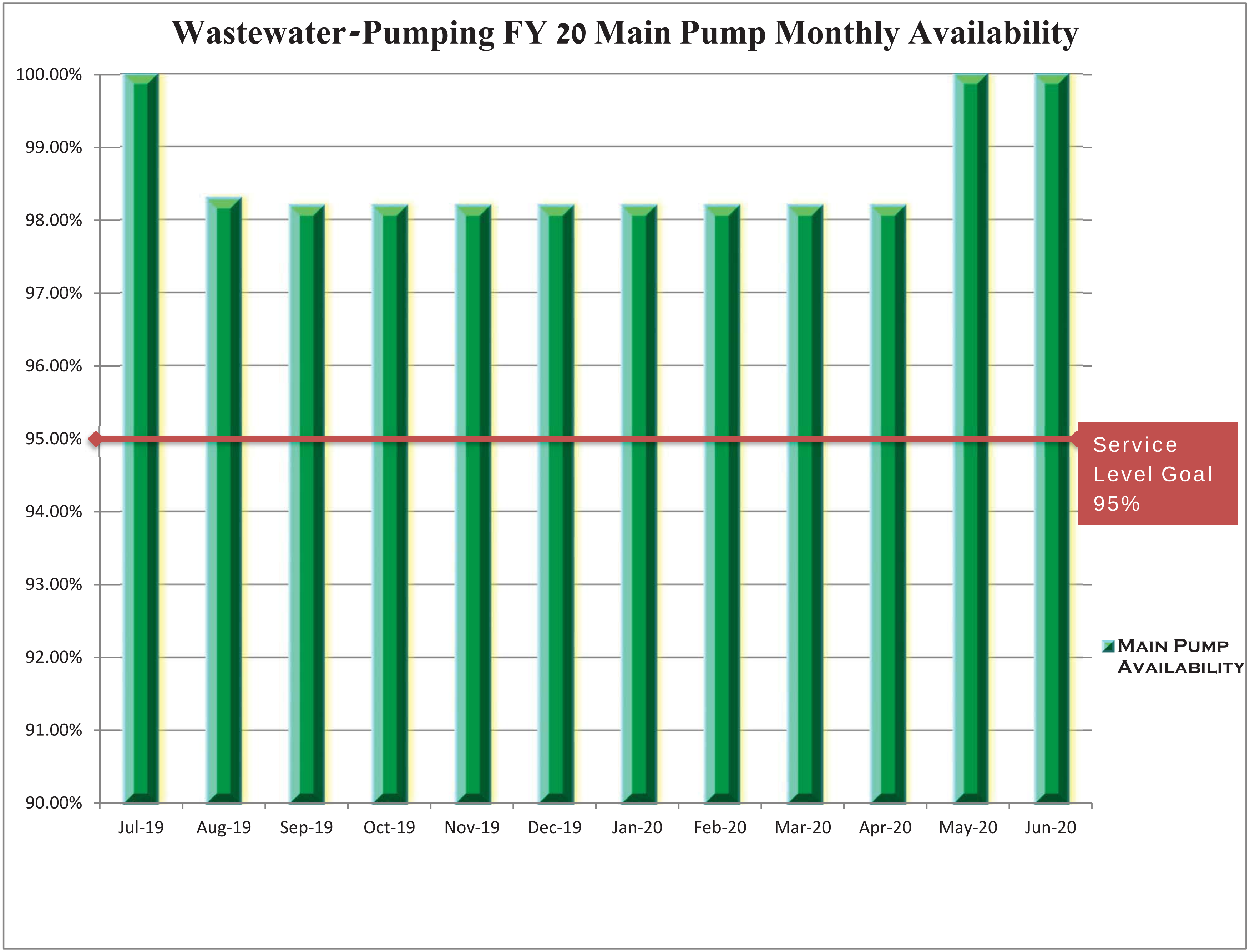
CSO OUTFALL - DEBRIS GRILL MAINTENANCE

DATE	SITE
7/30/2019	Linden Outfa
7/30/2019	D-2
7/30/2019	D-3
7/30/2019	D-5
7/30/2019	D-11
7/30/2019	R-13/14
7/30/2019	D-13
7/30/2019	D-64
7/30/2019	D-68
7/30/2019	D-72
8/9/2019	Linden OutF
8/9/2019	D-2
8/9/2019	D-3
8/9/2019	D-5
8/9/2019	D-11
8/9/2019	R-13/14
8/9/2019	D-13
8/16/2019	T-14
11/14/2019	D-5
12/18/2019	C-4
12/19/2019	C-4
12/20/2019	C-4
12/21/2019	C-4
12/12/2019	D-15
12/12/2019	D-11
12/12/2019	D-5
1/14/2020	C-4
1/15/2020	C-4
1/28/2020	Linden Outfa
1/28/2020	D-2
1/28/2020	D-3
3/26/2020	D-2
3/26/2020	D-3
3/26/2020	D-11
3/25/2020	D-63
6/16/2020	Linden Outfa
6/18/2020	D-3
6/18/2020	D-5
6/18/2020	D-11
6/18/2020	R-13/14
6/18/2020	D-39
6/18/2020	D-45
6/18/2020	D-46
6/18/2020	D-67
6/22/2020	D-7
6/22/2020	D-2
6/23/2020	D-9
6/23/2020	D-61
6/23/2020	D-62
6/23/2020	D-63
6/23/2020	D-64
6/23/2020	D-65
6/23/2020	D-66
6/23/2020	D-69
6/23/2020	D-70

Appendix C

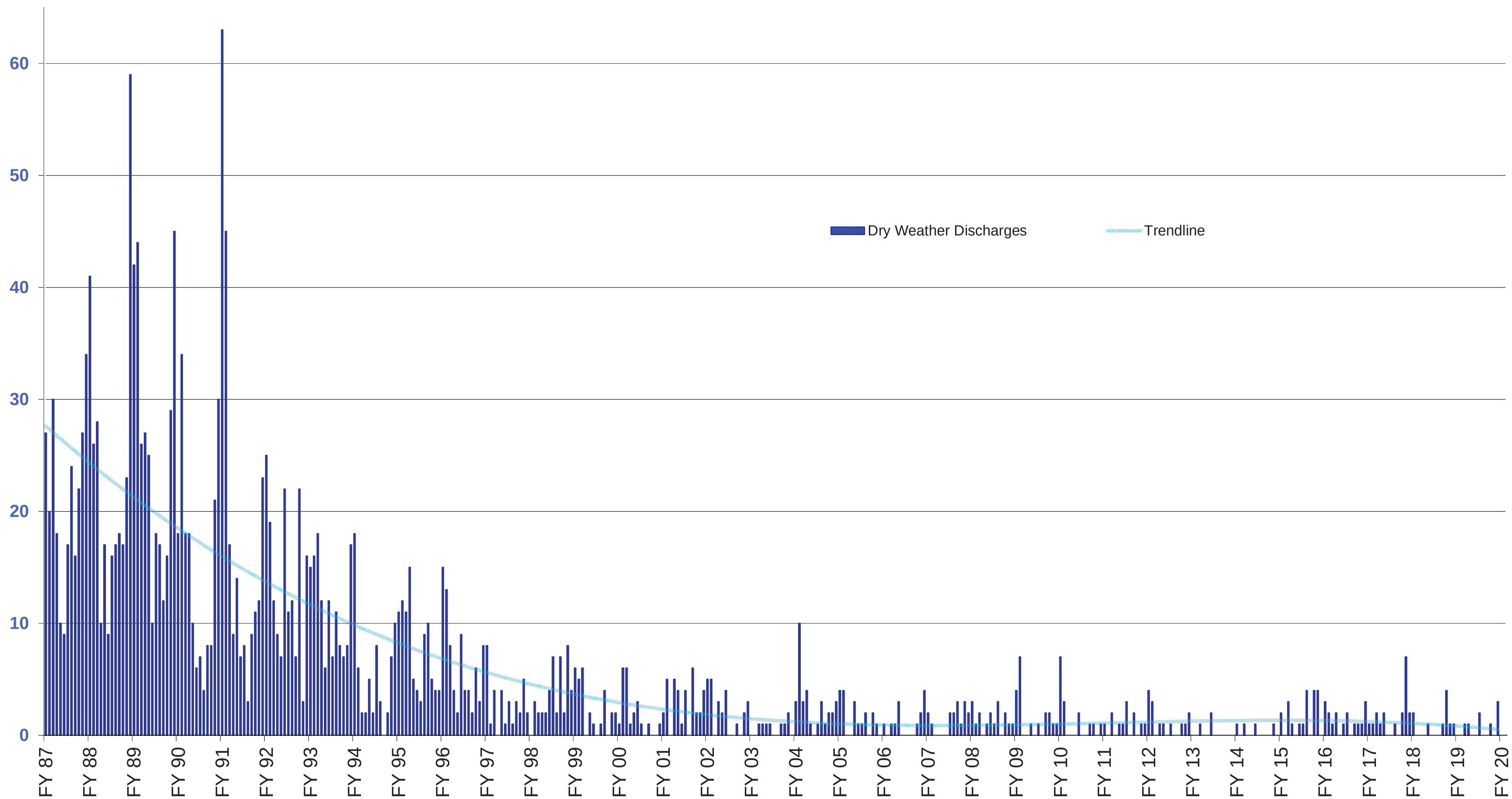
FY 2020

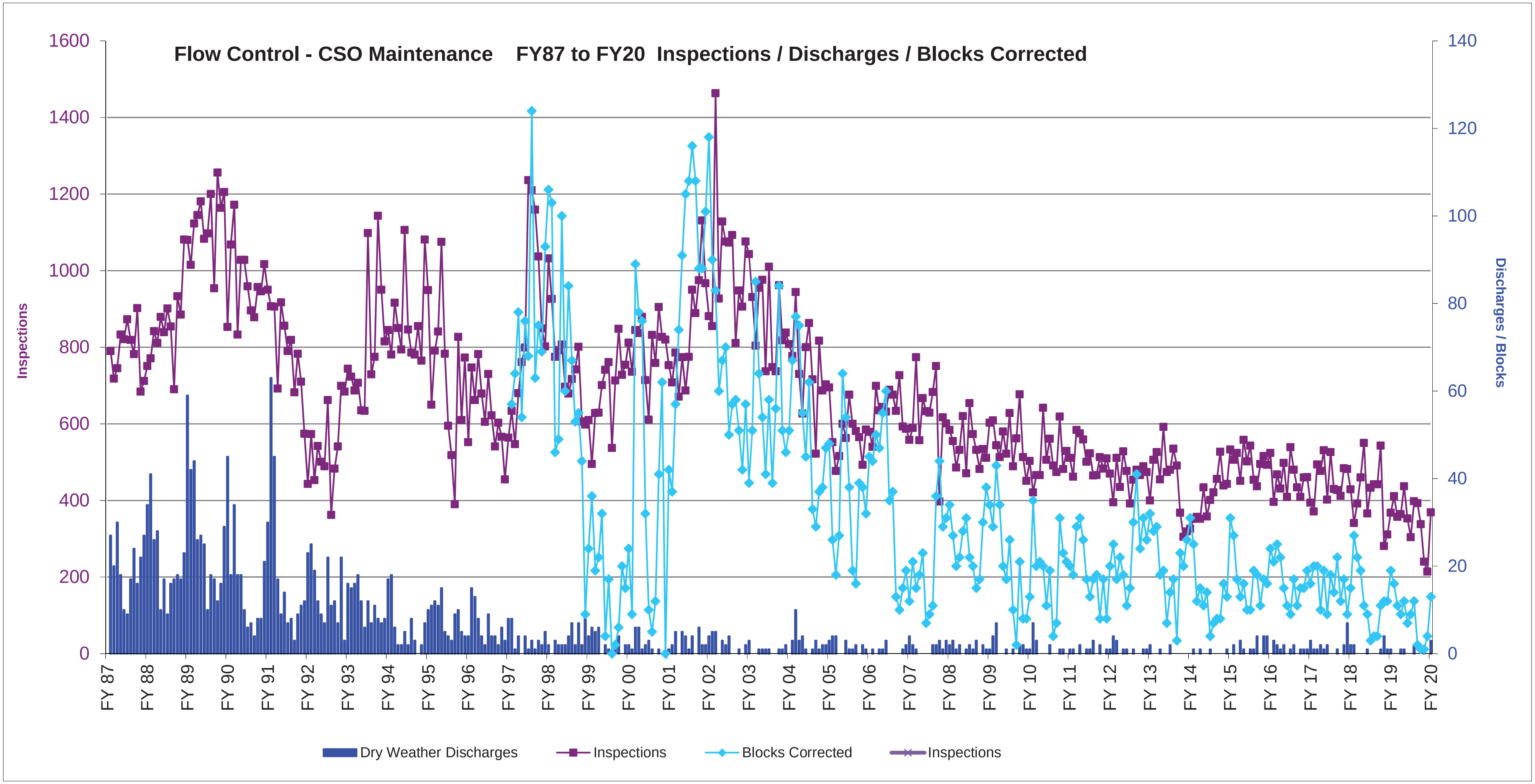
Main Pump Availability Chart


Wastewater-Pumping FY 20 Main Pump Monthly Availability
100.00%
99.00%
98.00%
97.00%
96.00%
95.00%
94.00%
93.00%
92.00%
91.00%
90.00%
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Service Level Goal 95%
Main Pump Availability

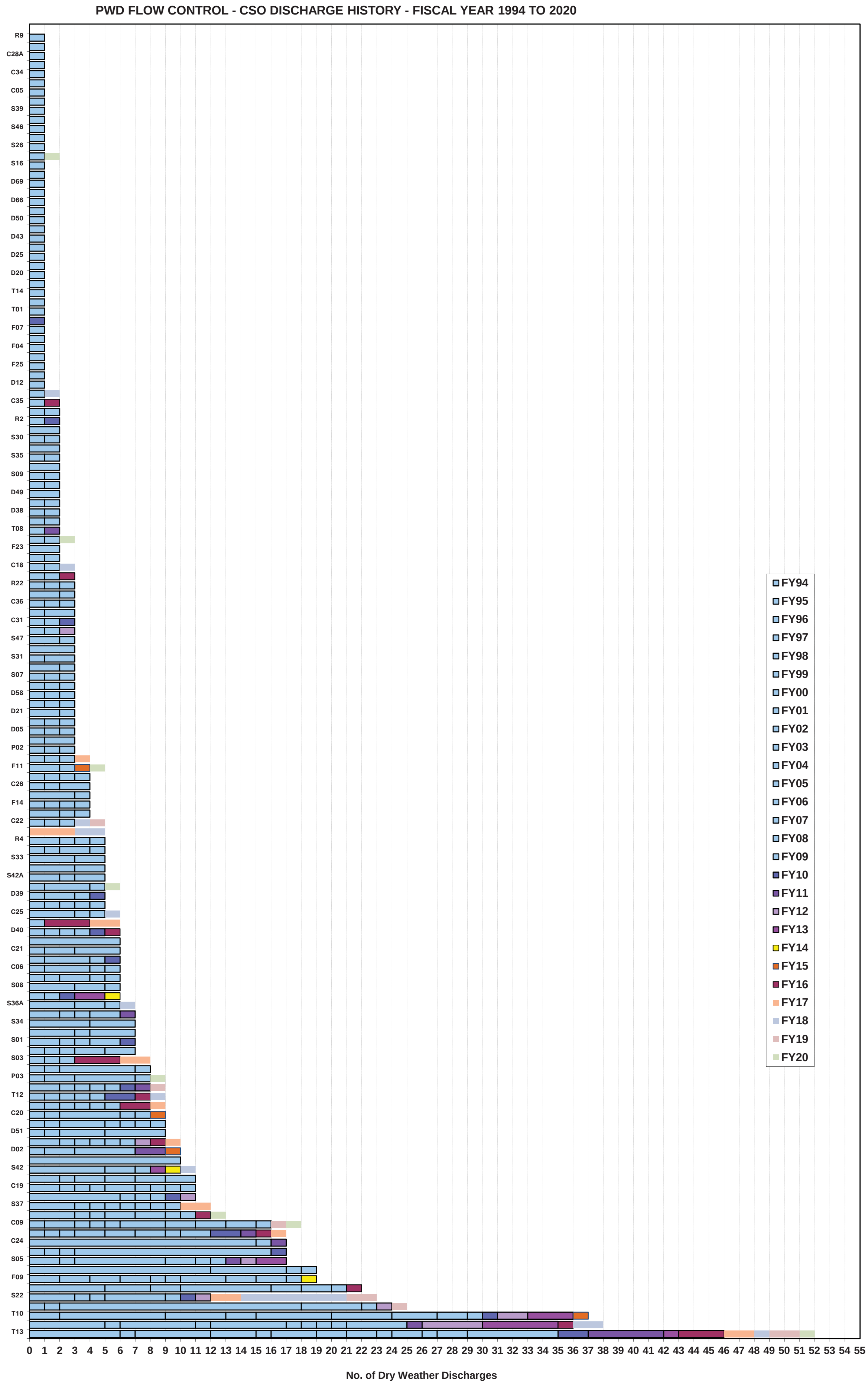
Appendix D
Historical CSO Charts

Flow Control - CSO Maintenance FY87 to FY20 Dry Weather Discharges

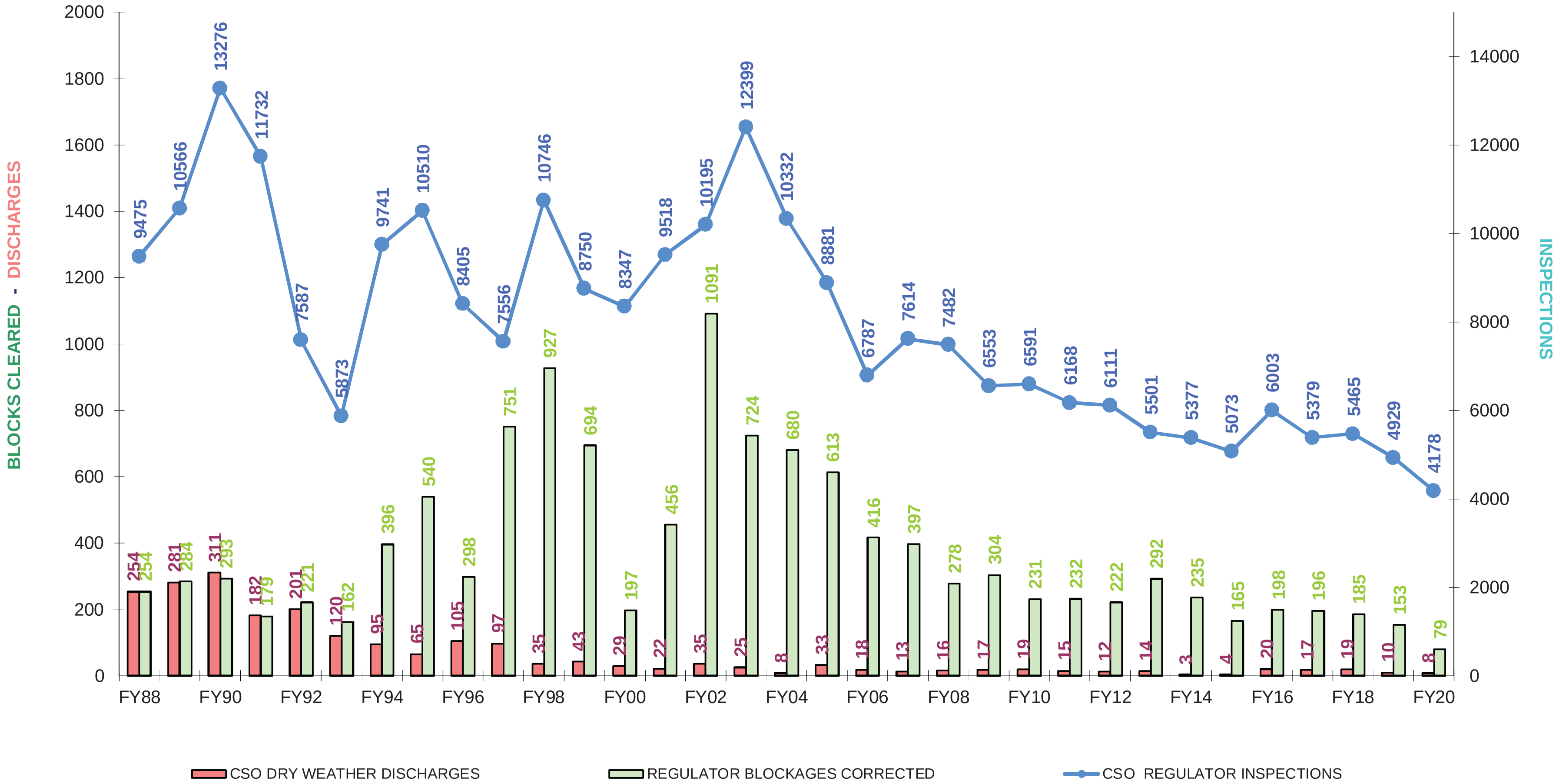




Flow Control - CSO Maintenance FY87 to FY20 Inspections / Discharges / Blocks Corrected
Inspections
Discharges / Blocks
1600
1400
1200
1000
800
600
400
200
0
140
120
100
80
60
40
20
0
FY 87
FY 88
FY 89
FY 90
FY 91
FY 92
FY 93
FY 94
FY 95
FY 96
FY 97
FY 98
FY 99
FY 00
FY 01
FY 02
FY 03
FY 04
FY 05
FY 06
FY 07
FY 08
FY 09
FY 10
FY 11
FY 12
FY 13
FY 14
FY 15
FY 16
FY 17
FY 18
FY 19
FY 20
Dry Weather Discharges
Inspections
Blocks Corrected
Inspections


PWD FLOW CONTROL - CSO DISCHARGE HISTORY - FISCAL YEAR 1994 TO 2020
R9
C28A
C34
C05
S39
S46
S26
S16
D69
D66
D50
D43
D25
D20
T14
T01
F07
F04
F25
D12
C35
R2
S30
S35
S09
D49
D38
T08
F23
C18
R22
C36
C31
S47
S31
S07
D58
D21
D05
P02
F11
C26
F14
C22
R4
S33
S42A
D39
C25
D40
C21
C06
S08
S36A
S34
S01
S03
P03
T12
C20
D51
D02
S42
C19
S37
C09
C24
S05
F09
S22
T10
T13
FY94
FY95
FY96
FY97
FY98
FY99
FY00
FY01
FY02
FY03
FY04
FY05
FY06
FY07
FY08
FY09
FY10
FY11
FY12
FY13
FY14
FY15
FY16
FY17
FY18
FY19
FY20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
No. of Dry Weather Discharges

Flow Control - CSO Maintenance   FY87 to FY20 Inspections / Discharges / Blocks Corrected



Appendix D – NPDES Annual CSO Report Status FY20

APPENDIX D –
NPDES ANNUAL CSO STATUS REPORT FY 2020

Page

Table 1 - Listing of all CSO permitted outfalls

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
NPDES Permit #0026689 - Northeast						
2	39d 58m 50s	75d 4m 58s	Castor Ave. and Balfour St.	Delaware River	Somerset	D_17
3	39d 58m 45s	75d 5m 6s	Venango St. NW of Casper St.	Delaware River	Somerset	D_18
4	39d 58m 41s	75d 5m 15s	Tioga St. NW of Casper St.	Delaware River	Somerset	D_19
5	39d 58m 43s	75d 5m 28s	Ontario St. NW of Casper St.	Delaware River	Somerset	D_20
6	39d 58m 44s	75d 5m 41s	Westmoreland St. NW of Balfour St.	Delaware River	Somerset	D_21
7	39d 58m 42s	75d 5m 53s	Allegheny Ave. SE of Bath St.	Delaware River	Somerset	D_22
8	39d 58m 38s	75d 6m 12s	Indiana Ave. SE of Allen St.	Delaware River	Somerset	D_23
10	39d 58m 38s	75d 6m 28s	Cambria St. E of Melvale St.	Delaware River	Somerset	D_25
11	40d 1m 18s	75d 1m 44s	Cottman St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_02
12	40d 1m 14s	75d 2m 0s	Princeton Ave SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_03
13	40d 1m 8s	75d 2m 13s	Disston St. SE of Wissinoming St.	Delaware River	Upper Delaware Low Level	D_04
14	40d 0m 58s	75d 2m 34s	Magee St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_05
15	40d 0m 53s	75d 2m 46s	Levick St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_06
16	40d 0m 44s	75d 3m 5s	Lardner St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_07
17	40d 0m 38s	75d 3m 13s	Comly St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_08
18	40d 0m 34s	75d 3m 18s	Dark Run La and Milnor St.	Delaware River	Upper Delaware Low Level	D_09
19	40d 0m 21s	75d 3m 28s	Sanger St. SE of Milnor St.	Delaware River	Upper Delaware Low Level	D_11
20	40d 0m 2s	75d 3m 43s	Bridge St. Se of Garden St.	Delaware River	Upper Delaware Low Level	D_12

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
21	39d 59m 53s	75d 3m 47s	Kirkbride St. and Delaware Ave.	Delaware River	Upper Delaware Low Level	D_13
22	39d 59m 24s	75d 4m 4s	Orthodox St. and Delaware Ave.	Delaware River	Upper Delaware Low Level	D_15
23	40d 2m 36s	75d 1m 15s	Frankford Avenue & Ashburner Street	Pennypack Creek	Pennypack	P_01
24	40d 2m 36s	75d 1m 16s	Frankford Avenue & Holmesburg St.	Pennypack Creek	Pennypack	P_02
25	40d 2m 13s	75d 1m 19s	Torresdale Ave. NW of Pennypack Ck.	Pennypack Creek	Pennypack	P_03
26	40d 2m 23s	75d 1m 21s	Cottage Avenue & Holmesburg Avenue	Pennypack Creek	Pennypack	P_04
27	40d 2m 2s	75d 1m 21s	Holmesburg Ave SE of Hegerman St	Pennypack Creek	Pennypack	P_05
28	40d 4m 34s	75d 9m 44s	Williams Avenue SE of Sedgewick	Tacony Creek	Frankford High Level	T_01
29	40d 2m 28s	75d 6m 56s	Complost Ave West of Tacony Creek	Tacony Creek	Frankford High Level	T_03
30	40d 2m 11s	75d 6m 48s	Rising Sun Ave East of Tacony Creek	Tacony Creek	Frankford High Level	T_04
31	40d 2m 9s	75d 6m 48s	Rising Sun Ave West of Tacony Creek	Tacony Creek	Frankford High Level	T_05
32	40d 2m 3s	75d 6m 41s	Bingham Street East of Tacony Creek	Tacony Creek	Frankford High Level	T_06
33	40d 1m 51s	75d 6m 43s	Tabor Road West of Tacony Creek	Tacony Creek	Frankford High Level	T_07
34	40d 1m 42s	75d 6m 47s	Ashdale Street West of Tacony Creek	Tacony Creek	Frankford High Level	T_08
35	40d 1m 37s	75d 6m 48s	Roosevelt Blvd. West of Tacony Creek	Tacony Creek	Frankford High Level	T_09
36	40d 1m 37s	75d 6m 47s	Roosevelt Blvd. East of Tacony Creek	Tacony Creek	Frankford High Level	T_10

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
37	40d 1m 29s	75d 6m 43s	Ruscomb Street East of Tacony Creek	Tacony Creek	Frankford High Level	T_11
38	40d 1m 23s	75d 6m 41s	Whitaker Avenue East of Tacony Creek	Tacony Creek	Frankford High Level	T_12
39	40d 1m 22s	75d 6m 42s	Whitaker Avenue West of Tacony Ck	Tacony Creek	Frankford High Level	T_13
40	40d 0m 59s	75d 6m 28s	I Street & Ramona Ave.	Tacony Creek	Frankford High Level	T_14
41	40d 0m 57s	75d 6m 20s	J Street & Juniata Park	Tacony Creek	Frankford High Level	T_15
42	40d 0m 57s	75d 5m 51s	Castor Avenue at Unity Street Circle	Frankford Creek	Upper Frankford Low Level	F_03
43	40d 0m 52s	75d 5m 42s	Wingohocking St East of Adams Ave	Frankford Creek	Upper Frankford Low Level	F_04
44	40d 0m 41s	75d 5m 41s	Bristol Street West of Adams Avenue	Frankford Creek	Upper Frankford Low Level	F_05
45	40d 0m 25s	75d 5m 33s	Worrel Street East of Frankford Creek	Frankford Creek	Upper Frankford Low Level	F_06
46	40d 0m 26s	75d 5m 34s	Worrel Street West of Frankford Creek	Frankford Creek	Upper Frankford Low Level	F_07
47	40d 0m 21s	75d 5m 36s	Torresdale Ave & Hunting Park Ave	Frankford Creek	Upper Frankford Low Level	F_08
48	40d 0m 19s	75d 5m 34s	Frankford Ave North of Frankford Ck	Frankford Creek	Upper Frankford Low Level	F_09
49	40d 0m 19s	75d 5m 35s	Frankford Ave South of Frankford Ck	Frankford Creek	Upper Frankford Low Level	F_10
50	40d 0m 15s	75d 5m 26s	Orchard Street South of Vandyke Creek	Frankford Creek	Upper Frankford Low Level	F_11
51	39d 59m 56s	75d 5m 14s	Sepviva Street North of Butler Street	Frankford Creek	Upper Frankford Low Level	F_12
52	39d 59m 49s	75d 5m 3s	Duncan Street Under Delaware Exp.	Frankford Creek	Lower Frankford Low Level	F_13

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
54	40d 0m 16s	75d 4m 15s	Wakeling Street NW of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_21
55	40d 0m 19s	75d 4m 5s	Bridge Street NW of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_23
56	40d 0m 18s	75d 4m 5s	Bridge Street SE of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_24
57	40d 0m 15s	75d 4m 15s	Ash Street West of Creek Basin	Frankford Creek	Lower Frankford Low Level	F_25
58	40d 0m 30s	75d 3m 20s	Levick St. & Everett Ave.	Delaware River	Wakling Relief Sewer	D_FRW
59	40d 2m 16s	75d 6m 53s	Nedro Ave & 7th St.	Tacony Creek	Rock Run Flood Relief Sewer	T_FRRR
60	40d 0m 36s	75d 5m 44s	Castor Ave. & East Hunting Park Ave.	Frankford Creek	Frankford High Level Relief Sewer	F_FRFG
NPDES Permit # 0026662 – Southeast						
2	39d 58m 9s	75d 7m 19s	Dyott Street & Delaware Ave.	Delaware River	Lower Delaware Low Level	D_38
3	39d 58m 7s	75d 7m 23s	Susquehanna Ave. East of Beach Street	Delaware River	Lower Delaware Low Level	D_39
4	39d 58m 5s	75d 7m 26s	Berks Street East of Beach Street	Delaware River	Lower Delaware Low Level	D_40
5	39d 58m 3s	75d 7m 37s	Palmer Street East of Beach Street	Delaware River	Lower Delaware Low Level	D_41
6	39d 57m 54s	75d 7m 42s	Columbia Avenue East of Beach Street	Delaware River	Lower Delaware Low Level	D_42
7	39d 57m 56s	75d 7m 48s	Marlborough Street & Delaware Ave	Delaware River	Lower Delaware Low Level	D_43
8	39d 57m 53s	75d 7m 54s	Shackamaxon St East of Delaware Ave	Delaware River	Lower Delaware Low Level	D_44
9	39d 57m 48s	75d 8m 0s	Laurel Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_45

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
10	39d 57m 41s	75d 8m 11s	Penn Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_46
11	39d 57m 37s	75d 8m 9s	Fairmont Ave West of Delaware Ave	Delaware River	Lower Delaware Low Level	D_47
12	39d 57m 28s	75d 8m 13s	Willow Street West of Delaware Ave	Delaware River	Lower Delaware Low Level	D_48
13	39d 57m 24s	75d 8m 20s	Callowhill Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_49
14	39d 57m 21s	75d 8m 13s	Delaware Avenue North of Vine Street	Delaware River	Lower Delaware Low Level	D_50
15	39d 57m 11s	75d 8m 17s	Race Street West of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_51
16	39d 57m 7s	75d 8m 25s	Delaware Avenue & Arch Street	Delaware River	Lower Delaware Low Level	D_52
17	39d 56m 57s	75d 8m 23s	Market Street & Front Street	Delaware River	Lower Delaware Low Level	D_53
20	39d 56m 50s	75d 8m 24s	Front Street South of Chestnut Street	Delaware River	Lower Delaware Low Level	D_54
21	39d 56m 26s	75d 8m 32s	South Street & Delaware Avenue	Delaware River	Lower Delaware Low Level	D_58
22	39d 56m 12s	75d 8m 33s	Catharine Street East of Swanson Street	Delaware River	Lower Delaware Low Level	D_61
23	39d 56m 10s	75d 8m 32s	Queen Street East of Swanson Street	Delaware River	Lower Delaware Low Level	D_62
24	39d 56m 5s	75d 8m 33s	Christian St West of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_63
25	39d 55m 59s	75d 8m 35s	Washington Ave East of Delaware Ave	Delaware River	Lower Delaware Low Level	D_64
26	39d 55m 45s	75d 8m 29s	Reed Street East of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_65

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
27	39d 55m 37s	75d 8m 28s	Tasker Street East of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_66
28	39d 55m 26s	75d 8m 21s	Moore Street East of Delaware Avenue	Delaware River	Lower Delaware Low Level	D_67
33	39d 54m 6s	75d 8m 12s	Pattison Avenue & Swanson Street	Delaware River	Lower Delaware Low Level	D_73
36	39d 58m 21s	75d 6m 58s	Cumberland St East of Richmond St	Delaware River	Lower Delaware Low Level	D_37
37	39d 57m 12s	75d 8m 24s	Race Street West of Delaware Avenue, North of D-51	Delaware River	Lower Delaware Low Level	D_51A
29	39d 55m 13s	75d 8m 20s	Snyder Avenue & Delaware Avenue	Delaware River	Oregon	D_68
30	39d 54m 60s	75d 8m 13s	Delaware Ave North of Porter Street	Delaware River	Oregon	D_69
31	39d 54m 44s	75d 8m 15s	Oregon Avenue & Delaware Avenue	Delaware River	Oregon	D_70
32	39d 54m 33s	75d 7m 59s	Bigler Street & Delaware Avenue	Delaware River	Oregon	D_71
34	39d 54m 24s	75d 8m 8s	Packer Avenue East of Delaware Ave	Delaware River	Oregon	D_72
NPDES Permit # 0026671 - Southwest						
2	39d 56m 17s	75d 12m 17s	Reed Street & Schuylkill Avenue	Schuylkill River	Lower Schuylkill East Side	S_31
3	39d 55m 54s	75d 12m 28s	35th St. and Mifflin St.	Schuylkill River	Lower Schuylkill East Side	S_36A
4	39d 55m 41s	75d 12m 38s	Vare Avenue & 29th Street	Schuylkill River	Lower Schuylkill East Side	S_37
5	39d 55m 12s	75d 12m 5s	Passyunk Avenue & 29th Street	Schuylkill River	Lower Schuylkill East Side	S_42
6	39d 55m 12s	75d 12m 5s	Passyunk Avenue & 28th Street	Schuylkill River	Lower Schuylkill East Side	S_42A

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
7	39d 54m 57s	75d 12m 16s	26th Street 700′ North of Hartranft St	Schuylkill River	Lower Schuylkill East Side	S_44
8	39d 53m 53s	75d 12m 39s	Penrose Avenue & 26th Street	Schuylkill River	Lower Schuylkill East Side	S_46
9	39d 57m 38s	75d 10m 50s	24th Street 155′ South of Parktown Pl	Schuylkill River	Central Schuylkill East Side	S_05
10	39d 57m 39s	75d 10m 49s	24th Street 350′ South of Parktown Pl	Schuylkill River	Central Schuylkill East Side	S_06
11	39d 57m 39s	75d 10m 50s	24th Street East of Schuylkill River	Schuylkill River	Central Schuylkill East Side	S_07
12	39d 57m 29s	75d 10m 43s	Race Street & Bonsall Street	Schuylkill River	Central Schuylkill East Side	S_08
13	39d 57m 30s	75d 10m 45s	Arch Street West of 23rd Street	Schuylkill River	Central Schuylkill East Side	S_09
14	39d 57m 16s	75d 10m 49s	Market Street 25′ East of 24th Street	Schuylkill River	Central Schuylkill East Side	S_10
15	39d 57m 11s	75d 10m 51s	24th St. N of Chestnut St. Bridge	Schuylkill River	Central Schuylkill East Side	S_12A
16	39d 57m 7s	75d 10m 52s	Sansom Street West of 24th Street	Schuylkill River	Central Schuylkill East Side	S_13
17	39d 57m 5s	75d 10m 53s	Walnut Street West of 24th Street	Schuylkill River	Central Schuylkill East Side	S_15
18	39d 57m 1s	75d 10m 56s	Locust Street & 25th Street	Schuylkill River	Central Schuylkill East Side	S_16
19	39d 56m 57s	75d 11m 0s	Spruce Street & 25th Street	Schuylkill River	Central Schuylkill East Side	S_17
20	39d 56m 52s	75d 11m 5s	Pine Street West of Taney Street	Schuylkill River	Central Schuylkill East Side	S_18
21	39d 56m 49s	75d 11m 9s	Lombard Street West of 27th Street	Schuylkill River	Central Schuylkill East Side	S_19

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
22	39d 56m 47s	75d 11m 12s	South Street East of 27th Street	Schuylkill River	Central Schuylkill East Side	S_21
23	39d 56m 44s	75d 11m 18s	Schuylkill Avenue & Bainbridge Street	Schuylkill River	Central Schuylkill East Side	S_23
24	39d 56m 34s	75d 11m 28s	Schuylkill Avenue & Christian Street	Schuylkill River	Central Schuylkill East Side	S_25
25	39d 56m 29s	75d 11m 35s	Ellsworth St West of Schuylkill Avenue	Schuylkill River	Central Schuylkill East Side	S_26
26	39d 58m 1s	75d 11m 17s	Mantua Avenue & West River Drive	Schuylkill River	Central Schuylkill West Side	S_01
27	39d 57m 54s	75d 11m 7s	Haverford Avenue & West River Drive	Schuylkill River	Central Schuylkill West Side	S_02
28	39d 57m 51s	75d 11m 4s	Spring Garden St W of Schuylkill Expy	Schuylkill River	Central Schuylkill West Side	S_03
29	39d 57m 53s	75d 11m 4s	Powelton Ave W of Schuylkill Expy	Schuylkill River	Central Schuylkill West Side	S_04
30	39d 57m 16s	75d 10m 53s	Market St West of Schuylkill Expy	Schuylkill River	Central Schuylkill West Side	S_11
31	39d 57m 5s	75d 10m 58s	Schuylkill Expressway & Walnut Street	Schuylkill River	Central Schuylkill West Side	S_14
32	39d 56m 51s	75d 11m 14s	440′ Northwest of South Street	Schuylkill River	Central Schuylkill West Side	S_20
33	39d 56m 46s	75d 11m 22s	660′ South of South St E of Pennfield	Schuylkill River	Central Schuylkill West Side	S_22
34	39d 56m 43s	75d 11m 26s	1060′ South of South St E of Pennfield	Schuylkill River	Central Schuylkill West Side	S_24
35	39d 56m 32s	75d 12m 27s	46th Street & Paschall Avenue	Schuylkill River	Southwest Main Gravity	S_30
36	39d 56m 36s	75d 12m 18s	43rd St. and Locust St.	Schuylkill River	Southwest Main Gravity	S_50

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
37	39d 56m 13s	75d 12m 23s	49th Street South of Botanic Street	Schuylkill River	Lower Schuylkill West Side	S_32
38	39d 56m 8s	75d 12m 24s	51st Street South of Botanic Street	Schuylkill River	Lower Schuylkill West Side	S_33
39	39d 55m 43s	75d 12m 45s	56th Street East of P&R Railroad	Schuylkill River	Lower Schuylkill West Side	S_38
40	39d 54m 39s	75d 12m 55s	64th St. and Buist Ave.	Schuylkill River	Lower Schuylkill West Side	S_45
41	39d 56m 10s	75d 14m 6s	60th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek High Level	C_18
51	39d 58m 51s	75d 16m 4s	City Line Avenue & 73rd Street	Cobbs Creek	Cobbs Creek High Level	C_01
52	39d 58m 51s	75d 16m 1s	City Line Ave 100' South Side of Creek	Cobbs Creek	Cobbs Creek High Level	C_02
54	39d 58m 30s	75d 15m 26s	Lebanon Ave Southwest of 73rd Street	Cobbs Creek	Cobbs Creek High Level	C_05
55	39d 58m 31s	75d 15m 25s	Lebanon Avenue & 68th Street	Cobbs Creek	Cobbs Creek High Level	C_06
56	39d 58m 26s	75d 15m 26s	Lansdowne Avenue & 69th Street	Cobbs Creek	Cobbs Creek High Level	C_07
57	39d 57m 51s	75d 14m 56s	54th Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_09
58	39d 57m 50s	75d 14m 53s	Gross Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_10
59	39d 57m 43s	75d 14m 53s	Cobbs Creek Pky South of Market St	Cobbs Creek	Cobbs Creek High Level	C_11
60	39d 57m 27s	75d 14m 60s	Spruce Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_12
61	39d 56m 45s	75d 14m 58s	62nd Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_13
62	39d 56m 36s	75d 14m 50s	Baltimore Avenue & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_14

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
63	39d 56m 31s	75d 14m 26s	59th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek High Level	C_15
64	39d 56m 26s	75d 14m 23s	Thomas Avenue & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_16
65	39d 56m 13s	75d 14m 6s	Beaumont Street & Cobbs Creek	Cobbs Creek	Cobbs Creek High Level	C_17
66	39d 58m 29s	75d 16m 48s	Cobbs Creek Pky S of City Line Ave	Cobbs Creek	Cobbs Creek High Level	C_31
67	39d 58m 12s	75d 15m 56s	Brockton Road & Farrington Road	Cobbs Creek	Cobbs Creek High Level	C_33
68	39d 58m 40s	75d 15m 44s	Woodcrest Avenue & Morris Park	Cobbs Creek	Cobbs Creek High Level	C_34
69	39d 58m 47s	75d 15m 54s	Morris Park West of 72nd Street & Sherwood Road	Cobbs Creek	Cobbs Creek High Level	C_35
70	39d 58m 49s	75d 15m 35s	Woodbine Ave South of Brentwood Rd	Cobbs Creek	Cobbs Creek High Level	C_36
71	39d 57m 55s	75d 15m 15s	Cobbs Creek Parkway South of 67th & Callowhill Streets	Cobbs Creek	Cobbs Creek High Level	C_37
72	39d 58m 22s	75d 16m 11s	Cobbs Creek Parkway & 77th Street	Cobbs Creek	Cobbs Creek High Level	C_32
82	39d 58m 38s	75d 15m 28s	Malvern Ave. and 68th St.	Cobbs Creek	Cobbs Creek High Level	C_04A
42	39d 55m 57s	75d 14m 19s	Mount Moriah Cemetary & 62nd Street	Cobbs Creek	Cobbs Creek Low Level	C_19
43	39d 55m 46s	75d 14m 39s	65th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_20
44	39d 55m 37s	75d 14m 40s	68th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_21
45	39d 55m 27s	75d 14m 46s	70th Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_22
46	39d 55m 15s	75d 14m 52s	Upland Street & Cobbs Creek Parkway	Cobbs Creek	Cobbs Creek Low Level	C_23

Point Source #	Outfall Latitude	Outfall Longitude	Regulator Location	Discharges to:	Interceptor	Outfall Name
47	39d 55m 1s	75d 14m 49s	Woodland Avenue East of Island Ave.	Cobbs Creek	Cobbs Creek Low Level	C_25
49	39d 54m 44s	75d 14m 56s	Claymont Street & Grays Avenue	Cobbs Creek	Cobbs Creek Low Level	C_29
50	39d 54m 34s	75d 15m 1s	77th Street West of Elmwood Avenue	Cobbs Creek	Cobbs Creek Low Level	C_30
78	39d 54m 49s	75d 14m 50s	Island Ave. Southeast of Glenmore Ave	Cobbs Creek	Cobbs Creek Low Level	C_28A
75	39d 57m 59s	75d 11m 3s	16th St. & Clearfield St.	Schuylkill River	Main Relief Sewer	S_FRM
83	39d 56m 31s	75d 14m 25s	56th St. & Locust	Cobbs Creek	Thomas Run Relief Sewer	C_FRTR
84	39d 57m 49s	75d 14m 53s	Arch Street & Cobbs Creek	Cobbs Creek	Arch Street Relief Sewer	C_FRA

Table 2 - Overflow Summary for 7/1/2019 – 6/30/2020

District	Permitted Outfall	Frequency	Duration (hours)	Volume (ft^3)
Northeast	D_FRW	53	143.25	27,759,042
Northeast	D02	22	45.75	6,849,491
Northeast	D03	23	43.25	2,014,241
Northeast	D04	18	28	434,452
Northeast	D05	49	162.25	51,571,271
Northeast	D06	19	19	553,997
Northeast	D07	56	158.75	25,010,747
Northeast	D08	19	17.25	335,200
Northeast	D09	12	8.25	356,353
Northeast	D11	20	30.75	4,017,992
Northeast	D12	51	86.25	351,609
Northeast	D13	20	22	692,957
Northeast	D15	20	34	1,611,261
Northeast	D17	50	140.25	8,907,686
Northeast	D18	41	91.75	4,727,875
Northeast	D19	48	158	4,728,954
Northeast	D20	34	57.25	2,496,083
Northeast	D21	48	119.25	6,814,733
Northeast	D22	73	329.25	21,929,783
Northeast	D23	41	65.75	276,762
Northeast	D25	61	264.75	67,449,152
Northeast	F_FRFG	2	11.5	92,2171
Northeast	F03	39	49.25	1,766,039
Northeast	F04	64	162.75	5,454,197
Northeast	F05	63	142.25	771,742
Northeast	F06	18	23	830,179
Northeast	F07	44	69.25	2,000,378
Northeast	F08	39	60.25	1,543,572
Northeast	F09	70	187	1,142,799
Northeast	F10	20	39.75	1,424,803
Northeast	F11	70	262.75	11,454,021
Northeast	F12	30	37.25	539,704
Northeast	F13	49	103.25	1,546,772
Northeast	F21	78	369.5	95,692,435
Northeast	F23	58	129.75	1,874,685

District	Permitted Outfall	Frequency	Duration (hours)	Volume (ft^3)
Northeast	F24	52	91.75	873,224
Northeast	F25	14	18	2,833,717
Northeast	P01	18	21	613,051
Northeast	P02	52	105.5	2,646,068
Northeast	P03	26	39.75	470,579
Northeast	P04	11	34.5	1,713,641
Northeast	P05	34	81.25	4,994,946
Northeast	T_FRRR	36	145	19,843,258
Northeast	T01	63	244.75	5,065,933
Northeast	T03	56	134.75	2,276,217
Northeast	T04	60	158.25	2,054,770
Northeast	T05	44	61	811,523
Northeast	T06	38	70	5,586,924
Northeast	T07	7	6.5	88,690
Northeast	T08	61	178.5	22,673,444
Northeast	T09	38	41.75	486,382
Northeast	T10	65	203.25	2,544,689
Northeast	T11	45	80.5	615,037
Northeast	T12	6	3.25	32,867
Northeast	T13	41	102.5	2,233,631
Northeast	T14	31	114	102,301,853
Northeast	T15	53	121	4,930,240
Southeast	D37	49	198.5	11,817,853
Southeast	D38	43	129	12,292,795
Southeast	D39	48	181	22,718,154
Southeast	D40	52	183	988,433
Southeast	D41	40	105.75	990,272
Southeast	D42	11	6.5	36,435
Southeast	D43	11	10.75	50,887
Southeast	D44	25	42	1,846,240
Southeast	D45	41	104.75	39,605,059
Southeast	D46	24	35	390,563
Southeast	D47	59	182	5,031,945
Southeast	D48	37	64.75	7,891,914
Southeast	D49	3	2	17,812
Southeast	D50	7	6	61,205
Southeast	D51	52	127	845,193

District	Permitted Outfall	Frequency	Duration (hours)	Volume (ft^3)
Southeast	D51A	41	90.5	736,032
Southeast	D52	27	31	249,702
Southeast	D53	9	10.25	1,230,435
Southeast	D54	19	27	6,581,681
Southeast	D58	21	26.5	651,288
Southeast	D61	48	70.5	543,525
Southeast	D62	27	29	181,158
Southeast	D63	31	44.5	7,163,438
Southeast	D64	48	67.75	365,180
Southeast	D65	40	80.5	8,962,135
Southeast	D66	57	165.5	11,067,471
Southeast	D67	40	136.5	5,091,188
Southeast	D68	44	136.5	19,608,837
Southeast	D69	24	136.5	5,935,459
Southeast	D70	20	136.5	7,903,728
Southeast	D71	24	136.5	4,381,048
Southeast	D72	15	136.5	3,175,518
Southeast	D73	57	192	22,538,354
Southwest	C_FRA	11	9.75	1,984,142
Southwest	C_FRTR	86	443	25,057,905
Southwest	C01	19	16	442,377
Southwest	C02	4	2.25	17,934
Southwest	C04A	24	23.75	1,203,017
Southwest	C05	4	2.75	109,303
Southwest	C06	57	99.25	3,632,404
Southwest	C07	30	29.5	802,883
Southwest	C09	41	68.25	1,811,588
Southwest	C10	33	67.75	525,847
Southwest	C11	49	113.75	14,781,624
Southwest	C12	41	97	1,812,382
Southwest	C13	38	61.75	1,043,145
Southwest	C14	37	67	2,005,765
Southwest	C15	5	4	101,569
Southwest	C16	2	1.5	14,697
Southwest	C17	54	140	21,274,045
Southwest	C18	38	42.5	1,855,723
Southwest	C19	14	13.5	483,625

District	Permitted Outfall	Frequency	Duration (hours)	Volume (ft^3)
Southwest	C20	15	14.5	286,999
Southwest	C21	8	6.5	194,649
Southwest	C22	38	57.5	1,338,599
Southwest	C23	9	13.5	117,280
Southwest	C25	18	41	1,618,813
Southwest	C28A	45	58	357,966
Southwest	C29	27	87	1,786,439
Southwest	C30	25	67.25	517,719
Southwest	C31	47	85	1,216,386
Southwest	C32	49	74.5	1,605,106
Southwest	C33	29	23.25	541,009
Southwest	C34	12	10	359,737
Southwest	C35	8	5.75	80,835
Southwest	C36	6	5	98,438
Southwest	C37	19	14.75	153,437
Southwest	S_FRM	31	57.25	14,397,772
Southwest	S01	45	122.75	11,732,328
Southwest	S01T	40	62.75	2,942,306
Southwest	S02	49	104.25	978,154
Southwest	S03	3	1.75	14,491
Southwest	S04	61	177	1,925,580
Southwest	S05	79	337.75	36,600,271
Southwest	S06	57	145.25	12,401,091
Southwest	S07	35	56.25	2,603,969
Southwest	S08	39	55.75	222,151
Southwest	S09	41	84	8,459,740
Southwest	S10	59	185.25	3,046,491
Southwest	S11	62	172.25	1,416,114
Southwest	S12A	52	86.75	1,152,104
Southwest	S13	18	15	324,223
Southwest	S14	69	221.25	2,531,036
Southwest	S15	28	33.25	293,835
Southwest	S16	57	121.25	1,030,703
Southwest	S17	28	33.25	570,251
Southwest	S18	55	141.25	6,431,574
Southwest	S19	28	32	293,781
Southwest	S20	76	277.25	18,543,586

District	Permitted Outfall	Frequency	Duration (hours)	Volume (ft^3)
Southwest	S21	34	40	192,065
Southwest	S22	48	92	2,436,596
Southwest	S23	60	178.25	1,870,643
Southwest	S24	38	55.25	352,891
Southwest	S25	46	86.5	1,992,468
Southwest	S26	70	233	13,890,600
Southwest	S30	7	4.25	102,323
Southwest	S31	47	85.25	2,140,624
Southwest	S32	12	11	129,731
Southwest	S33	65	281.75	14,838,258
Southwest	S36A	75	243	6,357,297
Southwest	S37	62	185.25	2,478,654
Southwest	S38	27	33.25	3,032,003
Southwest	S42	52	165	14,868,874
Southwest	S42A	73	349.5	17,629,962
Southwest	S44	45	117.5	8,459,922
Southwest	S45	35	51.25	13,342,265
Southwest	S46	34	76	1,793,890
Southwest	S50	75	338	159,716,580

Table 3 - Overflow Summary for Typical Year Precipitation (based on Year-5 EAP submission)

District	Permitted Outfall	Frequency	SWO Duration (hrs)	Overflow Volume (MG)
Northeast	D_FRW	44	117.75	96.0
Northeast	D02	26	0	45.3
Northeast	D03	26	61.75	13.3
Northeast	D04	10	21.75	1.7
Northeast	D05	49	251	360.7
Northeast	D06	9	11	1.3
Northeast	D07	54	204.75	135.9
Northeast	D08	40	92.5	3.3
Northeast	D09	5	3.5	0.5
Northeast	D11	21	56.75	24.6
Northeast	D12	46	114.5	1.6
Northeast	D13	9	12.25	1.3
Northeast	D15	15	30	8.0
Northeast	D17	45	169	64.8
Northeast	D18	52	180.25	53.6
Northeast	D19	53	223.75	48.0
Northeast	D20	36	114.5	28.7
Northeast	D21	45	184.75	65.9
Northeast	D22	71	512	251.7
Northeast	D23	42	72	1.6
Northeast	D25	66	422.75	963.3
Northeast	F_FRFG	5	2.5	0.3
Northeast	F03	33	55.75	18.8
Northeast	F04	63	239.25	63.5
Northeast	F05	69	272	8.1
Northeast	F06	20	36.75	5.5
Northeast	F07	40	94.75	20.4
Northeast	F08	39	76.25	11.0
Northeast	F09	59	231	9.2
Northeast	F10	63	322.25	26.5
Northeast	F11	71	431.75	133.7
Northeast	F12	31	53.25	5.8
Northeast	F13	46	130.25	14.0
Northeast	F21	67	385.5	800.2
Northeast	F23	44	113.75	11.6
Northeast	F24	47	99.75	5.1
Northeast	F25	15	32	28.5
Northeast	P01	15	16.25	3.2
Northeast	P02	49	115.75	14.9
Northeast	P03	20	26.25	2.0

District	Permitted Outfall	Frequency	SWO Duration (hrs)	Overflow Volume (MG)
Northeast	P04	9	30.25	11.5
Northeast	P05	27	56.75	22.3
Northeast	T_FRRR	37	274.5	281.9
Northeast	T01	64	262.5	45.1
Northeast	T03	61	158	22.8
Northeast	T04	59	154.25	15.9
Northeast	T05	42	64.25	7.6
Northeast	T06	39	72	55.3
Northeast	T07	9	8.5	1.0
Northeast	T08	62	234.75	257.0
Northeast	T09	44	68.25	5.7
Northeast	T10	63	258.5	22.3
Northeast	T11	59	165.75	10.1
Northeast	T12	8	7	0.2
Northeast	T13	63	191.75	31.4
Northeast	T14	37	356.5	1546.5
Northeast	T15	54	158	42.1
Southeast	D37	54	282	184.0
Southeast	D38	43	169.75	178.9
Southeast	D39	54	270.75	276.7
Southeast	D40	57	282	14.4
Southeast	D41	42	153.75	17.7
Southeast	D42	18	22	1.5
Southeast	D43	19	31.75	1.3
Southeast	D44	23	55	23.8
Southeast	D45	36	121	357.6
Southeast	D46	19	30.75	3.9
Southeast	D47	56	215	46.3
Southeast	D48	40	94.25	112.3
Southeast	D49	6	4.5	0.4
Southeast	D50	14	12.5	1.5
Southeast	D51	56	372	11.4
Southeast	D51A	49	174	12.5
Southeast	D52	22	31	2.7
Southeast	D53	7	7.5	9.6
Southeast	D54	19	30	48.3
Southeast	D58	18	26.5	5.1
Southeast	D61	46	94.75	6.2
Southeast	D62	20	23.25	1.8
Southeast	D63	31	65.25	73.9
Southeast	D64	27	41.75	1.5
Southeast	D65	29	66.25	52.4

District	Permitted Outfall	Frequency	SWO Duration (hrs)	Overflow Volume (MG)
Southeast	D66	37	105.75	58.8
Southeast	D67	31	80.75	28.0
Southeast	D68	41	183.75	156.0
Southeast	D69	24	70.75	47.2
Southeast	D70	20	45.5	48.3
Southeast	D71	24	63	45.5
Southeast	D72	18	34.75	29.2
Southeast	D73	51	236	159.2
Southwest	C_FRA	11	9.5	5.2
Southwest	C_FRTR	83	500.5	161.8
Southwest	C01	15	15.25	1.7
Southwest	C02	6	4.25	0.2
Southwest	C04A	19	28	12.6
Southwest	C05	2	2.75	0.4
Southwest	C06	61	195.75	40.1
Southwest	C07	19	39.25	10.2
Southwest	C09	33	65	13.6
Southwest	C10	16	36.5	1.6
Southwest	C11	42	122.75	97.1
Southwest	C12	39	100	16.7
Southwest	C13	30	68.25	11.0
Southwest	C14	30	80.5	22.1
Southwest	C15	18	40.75	2.7
Southwest	C16	5	4.75	0.2
Southwest	C17	55	266.5	294.4
Southwest	C18	29	64.75	21.0
Southwest	C19	18	21.75	4.6
Southwest	C20	14	22	2.5
Southwest	C21	15	26.25	3.5
Southwest	C22	37	78.75	14.5
Southwest	C23	12	25	1.7
Southwest	C25	22	61	19.5
Southwest	C28A	36	58.5	2.1
Southwest	C29	48	189.25	16.2
Southwest	C30	30	118.5	8.4
Southwest	C31	40	90.25	10.3
Southwest	C32	31	56.25	9.8
Southwest	C33	20	24.25	3.1
Southwest	C34	13	11.75	1.7
Southwest	C35	10	11.25	0.7
Southwest	C36	10	9.25	0.6
Southwest	C37	15	17.5	0.9

District	Permitted Outfall	Frequency	SWO Duration (hrs)	Overflow Volume (MG)
Southwest	S_FRM	8	10.75	41.9
Southwest	S01	41	122	86.4
Southwest	S02	49	142	7.4
Southwest	S03	11	8	0.6
Southwest	S04	72	385.5	19.8
Southwest	S05	71	338.25	236.5
Southwest	S06	65	281.5	98.6
Southwest	S07	16	22.75	9.1
Southwest	S08	36	64.25	1.3
Southwest	S09	39	78	42.8
Southwest	S10	56	185.25	18.9
Southwest	S11	53	153	4.9
Southwest	S12A	44	80.5	4.9
Southwest	S13	17	12.75	2.0
Southwest	S14	62	263.5	16.4
Southwest	S15	22	27.75	1.7
Southwest	S16	67	238.75	9.1
Southwest	S17	25	32.75	3.8
Southwest	S18	51	188.25	45.1
Southwest	S19	29	33.5	1.8
Southwest	S20	78	517.5	145.6
Southwest	S21	22	22	1.0
Southwest	S22	40	85	15.5
Southwest	S23	59	182.25	10.7
Southwest	S24	41	81.25	5.3
Southwest	S25	45	113.5	12.6
Southwest	S26	69	376.25	133.5
Southwest	S30	7	5.5	0.4
Southwest	S31	57	175	32.4
Southwest	S32	14	14	1.3
Southwest	S33	70	349.75	132.0
Southwest	S36A	66	323	59.8
Southwest	S37	60	239	24.1
Southwest	S38	28	48.75	30.1
Southwest	S42	50	185.25	97.9
Southwest	S42A	74	530.25	177.8
Southwest	S44	43	125	59.4
Southwest	S45	41	104.25	139.0
Southwest	S46	25	48	13.5
Southwest	S50	61	326.75	1067.6

Table 4 - July 2019 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
7/1/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/2/2019	0.33	0.31	0.08	0.08	0.61	0.2	0.56	0.08	0.24	0.09	0.08	0.484	0.08	0.43	0.22	0.64	0.08	0.53
7/3/2019	0.13	0.47	0	0	0.01	0.01	0	0.01	0.01	0	0.26	0.154	0	0.01	0	0.01	0.29	0
7/4/2019	0	0.01	0	0	0	0.56	0	0	0.22	0	0	0.001	0	0.01	0	0	0	0
7/5/2019	0.21	0.36	0	0.01	0.01	0.041	0	0	0.01	0	0	0.094	0	0.01	0	0.02	0	0
7/6/2019	1.3	1.76	0.67	1.32	0.77	0.8	0.63	0.37	0.43	0.36	0.65	1.018	0.87	0.87	0.39	0.7	1.17	0.75
7/7/2019	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0
7/8/2019	0.09	0.09	0.17	0.16	0.13	0.12	0.13	0.16	0.03	0.15	0.19	0.118	0.25	0.09	0.05	0.11	0.2	0.14
7/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/11/2019	1.16	1.65	2.03	1.95	1.35	1.55	1.78	1.56	1.403	1.75	1.53	1.18	1.79	1.75	0.96	1.52	2.26	1.38
7/12/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/13/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/14/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/16/2019	0.1	0.24	0.1	0.21	0.12	0.22	0.22	0.09	0	0.03	0.05	0.09	0.19	0.01	0.01	0.06	0.07	0.14
7/17/2019	0.37	0.45	0.32	0.35	0.48	0.36	0.43	0.39	0.52	0.37	0.36	0.59	0.35	0.52	0.2	0.49	0.43	0.4
7/18/2019	0.19	0.46	0.12	0.33	0.07	1.26	0.64	0.25	1.11	0.13	0.23	0.08	0.17	0.45	0.12	0.24	1.14	0.65
7/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/21/2019	0	0	0.03	0.09	0	0	0.17	0.12	0	0.02	0.13	0	0.07	0	0	0	0.11	0.09
7/22/2019	0.7	0.85	0.51	0.43	0.67	0.63	0.6	0.64	0.6	0.5	0.61	0.42	0.55	0.84	0.42	0.9	0.92	0.55
7/23/2019	0.57	0.66	0.79	0.62	0.67	0.901	0.51	0.65	0.82	0.77	0.7	0.73	0.67	0.51	0.28	0.53	0.52	0.63
7/24/2019	0	0	0	0	0.01	0	0	0	0	0.01	0	0	0	0	0	0	0	0
7/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/29/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/30/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/31/2019	0.318	1.53	2.08	2.02	0.39	0.24	1.25	1.6	0.59	1.15	2.32	0.08	2.64	0.88	0.4	0.68	2.97	1

Table 5 - July 2019 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
7/1/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/2/2019	0.232	0.06	0.17	0.53	0.44	0.05	0.41	0.62	0.08	0.07	0.08	0.09	0.07	0.05	0.38	0.53	0.1	0	0.35
7/3/2019	0.047	0.01	0	0.25	0.46	0	0.06	0	0	0.06	0	0.2	0	0.15	0.01	0	0	0.01	0.34
7/4/2019	0.112	0	0.67	0.06	0	0	0	0	0	0	0	0	0	0	0	0.249	1.29	0	0
7/5/2019	0.01	0.49	0.02	0.2	0.4	0	0.38	0	0	0.41	0	0	0	0	0.68	0.239	0.09	0.01	0.15
7/6/2019	0.488	0.33	0.52	1.27	2.22	0.51	0.98	0.37	0.58	0.43	0.24	0.38	0.62	0.4	1.1	0.947	0.48	0.01	1.32
7/7/2019	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0.002	0	0.01	0
7/8/2019	0.125	0.2	0.1	0.12	0.09	0.15	0.1	0.1	0.183	0.26	0.15	0.16	0.15	0.23	0.13	0.112	0.16	0.02	0.11
7/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/11/2019	0.71	2.52	1.46	1.45	1.4	1.65	1.22	1.39	2.22	2.19	1.192	1.18	1.42	2.52	1.68	1.37	1.45	1.14	1.35
7/12/2019	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0
7/13/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/14/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/16/2019	0.1	0.06	0.41	0.08	0.19	0	0.09	0.07	0.12	0.02	0.11	0.12	0.09	0	0.08	0.2	0.31	0.16	0.17
7/17/2019	0.15	0.393	0.31	0.47	0.37	0.35	0.36	0.5	0.3	0.49	0.32	0.23	0.35	0.28	0.49	0.37	0.33	0.31	0.65
7/18/2019	0.07	0.65	0.11	0.91	0.07	0.1	0.15	0.26	0.67	0.08	0.08	0.12	0.11	1.44	0.91	1.58	0.24	0.65	0.12
7/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/21/2019	0.09	0.017	0.07	0	0	0.02	0	0.06	0.02	0	0	0.05	0	0	0	0	0.14	0.35	0
7/22/2019	0.4	0.533	0.73	0.74	0.48	0.45	0.72	0.62	0.62	0.44	0.67	0.52	0.53	0.63	0.76	0.74	0.79	0.85	0.42
7/23/2019	0.479	0.73	1.11	0.99	0.55	0.83	0.59	0.56	0.68	0.75	0.59	0.73	1.31	1.32	1.76	0.67	0.89	0.86	0.56
7/24/2019	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0
7/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/29/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/30/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/31/2019	0.23	1.412	0.17	0.6	0.03	0.7	0.49	1.28	1.95	0.91	0.95	0.9	0.4	0.25	0.51	0.33	0.13	0.405	0.02

Table 6 – August 2019 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
8/1/2019	0	0	0.17	0.02	0	0	0.15	0.05	0	0.07	0.09	0	0.66	0.13	0	0	0.22	0
8/2/2019	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0
8/3/2019	0	0	0	0	0.09	0	0.01	0	0	0	0.01	0	0	0.05	0.03	0.01	0	0
8/4/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/5/2019	0.02	0	0	0	0.22	0	0	0	0	0	0	0.13	0	0.29	0.3	0.69	0	0
8/6/2019	0.06	0.15	0.02	0	0.03	1.61	0.08	0.11	0.97	0.07	0.08	0	0.05	0.01	0.02	0.07	0.05	0.33
8/7/2019	1.829	2.5	2.08	1.51	1.9	2.64	1.59	2.12	2.74	3.74	2.12	1.31	1.92	1.85	0.89	2.06	1.64	3.24
8/8/2019	0	0	0	0	0	0	0.04	0.01	0	0.01	0	0	0	0.03	0	0	0.06	0.01
8/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/11/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/12/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/13/2019	0.09	0.13	0.03	0.07	0.18	0.59	0.07	0.05	0.04	0.03	0.03	0.12	0.04	0.13	0.05	0.08	0.09	0.03
8/14/2019	0.366	0.44	0.53	0.45	0.32	0.89	0.22	0.46	0.55	0.85	0.52	0.28	0.4	0.51	0.48	0.9	0.29	0.37
8/15/2019	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0
8/16/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/17/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/18/2019	0	0	0	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/19/2019	0	0	0.24	0.15	0.01	0.5	0.15	0.06	0.08	0.1	0.2	0	0.35	0.7	0.44	0.28	0.23	0.59
8/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/21/2019	0.455	0.57	0.68	0.53	0.95	0.1	0.29	0.53	0.5	0.89	0.6	0.71	0.62	1.37	0.7	1.11	0.56	0.27
8/22/2019	0.202	0.22	0.12	0.13	0.19	0.15	0.14	0.12	0.19	0.12	0.13	0.21	0.12	0.16	0.1	0.21	0.13	0.13
8/23/2019	0.094	0.11	0.04	0.03	0.1	0.06	0.03	0.05	0.05	0.07	0.04	0.09	0.05	0.04	0.03	0.08	0.03	0.05
8/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/28/2019	0.036	0.03	0.04	0	0.01	0	0.04	0.04	0.01	0.03	0.04	0	0.04	0.01	0.01	0.05	0.03	0.02
8/29/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/30/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/31/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7 - August 2019 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
8/1/2019	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0.003	0
8/2/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/3/2019	0	0	0	0	0	0.15	0	0.43	0	0	0	0.01	0	0	0	0	0	0.004	0
8/4/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/5/2019	0	0	0	0	0	0	0.37	0.03	0	0	0	0	0	0	0	0	0	0.006	0.01
8/6/2019	0.36	0	1.42	1.38	0.03	0.02	0.08	0.1	0	0	0.78	0.18	0.1	0.08	0.4	0	1.5	0.69	0
8/7/2019	1.85	1.47	2.79	2.49	1.69	2.92	1.76	1.88	1.54	2.82	2.09	3.85	3.91	2.94	1.8	2.91	2.68	2.41	1.67
8/8/2019	0.02	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0.03	0
8/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/11/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/12/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/13/2019	0.038	0.044	0.04	0.03	0.1	0.02	0.1	0.05	0.06	0.03	0.02	0.02	0.03	0.02	0.1	0.04	0.02	0.01	0.13
8/14/2019	0.715	0.607	1.4	0.65	0.32	1.14	0.39	0.67	0.37	0.77	1.91	0.51	1.46	1.02	0.7	0.88	0.795	0.62	0.57
8/15/2019	0.001	0	0	0	0	0	0.01	0	0	0	0.01	0	0	0	0	0	0	0	0
8/16/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/17/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/18/2019	0	0.123	0	0	0	0	0	0	0.14	0.14	0	0	0	0.58	0	0	0	0	0
8/19/2019	0	0.064	0.01	0.02	0	0	0	0.53	0.11	0	0	0	0	0	0	0	0.4	1.01	0
8/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/21/2019	0.34	1.06	0.15	0.43	0.41	0.43	0.64	0.75	0.89	0.78	0.37	0.68	0.43	0.15	0.27	0.07	0.07	0.23	0.66
8/22/2019	0.08	0.11	0.11	0.2	0.2	0.09	0.19	0.15	0.12	0.12	0.06	0.1	0.09	0.09	0.21	0.15	0.12	0.13	0.22
8/23/2019	0.03	0.06	0.06	0.05	0.09	0.06	0.1	0.04	0.03	0.06	0.07	0.04	0.07	0.12	0.1	0.05	0.05	0.03	0.09
8/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/28/2019	0	0	0	0	0.04	0.02	0.04	0.04	0	0.01	0	0.02	0.01	0.01	0	0	0.01	0	0.01
8/29/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/30/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/31/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 8 – September 2019 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
9/1/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/2019	0.562	0.4	0.1	0.85	0.4	0.357	0.41	0.24	0.43	0.11	0.18	0.24	0.13	1.17	0.53	0.31	0.61	0.12
9/3/2019	0	0	0	0	0	0.001	0.01	0	0	0.01	0	0	0	0	0	0	0	0
9/4/2019	0	0.72	0	0	0.37	0.38	0.1	0.12	0.21	0	0.03	0.33	0	0.06	0.04	0.16	0.09	0.07
9/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/6/2019	0.08	0.06	0.16	0.11	0.06	0.14	0.07	0.09	0.12	0.28	0.11	0.03	0.17	0.03	0.03	0.09	0.1	0.09
9/7/2019	0	0	0	0	0	0	0.01	0	0	0.01	0	0	0	0	0	0	0	0
9/8/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/11/2019	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/12/2019	0.15	0.16	0.47	0.83	0.28	0.39	0.41	0.44	0.35	0.38	0.52	0.13	0.83	0.38	0.27	0.36	0.42	0.19
9/13/2019	0	0	0.02	0.01	0	0.01	0	0.02	0	0.02	0.02	0	0.02	0	0	0	0.02	0.02
9/14/2019	0.05	0	0.01	0.17	0.08	0.1	0.05	0.04	0.09	0.01	0.04	0.02	0.01	0.04	0	0.02	0.1	0.1
9/15/2019	0.11	0.04	0.07	0.07	0.16	0	0.1	0.1	0.07	0.02	0.12	0.06	0.11	0.08	0.05	0.1	0.1	0.02
9/16/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/17/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/21/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/22/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/23/2019	0.11	0.08	0	0.13	0.17	0.01	0.03	0	0.05	0	0	0.25	0	0.08	0.06	0.12	0.05	0.01
9/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/26/2019	0	0	0.04	0.03	0	0.01	0	0.04	0	0.09	0.07	0	0.11	0.01	0	0.01	0.02	0.01
9/27/2019	0	0.01	0.01	0	0	0	0	0	0.01	0.01	0.01	0	0.01	0	0	0	0	0.01
9/28/2019	0.1	0.11	0.09	0.2	0.14	0.39	0.32	0.16	0.57	0.08	0.15	0.14	0.22	0.55	0.3	0.43	0.18	0.32
9/29/2019	0	0	0	0	0	0	0	0	0.01	0.01	0	0	0	0	0	0	0	0
9/30/2019	0	0	0	0	0.01	0	0	0	0	0	0	0.01	0	0	0	0	0	0

Table 9 - September 2019 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
9/1/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/2/2019	0.08	0.33	0.31	0.17	0.62	0.21	0.36	0.67	0.14	0.25	0.185	0.04	0.4	1.04	0.26	0.15	0.17	0.09	0.545
9/3/2019	0	0	0	0.01	0	0	0	0.01	0	0	0	0	0	0.01	0	0	0.01	0	0
9/4/2019	0	0	0	0.24	0.17	0	0.33	0.11	0	0	0.043	0	0	0	1.02	0.27	0.25	0.21	0.35
9/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/6/2019	0.08	0.156	0.2	0.12	0.05	0.14	0.07	0.11	0.1	0.21	0.2	0.14	0.24	0.35	0.09	0.17	0.2	0.14	0.06
9/7/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/8/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/11/2019	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0.03	0	0	0	0.01
9/12/2019	0.16	0.707	0.14	0.28	0.06	0.58	0.17	0.31	0.57	0.85	0.4	0.5	0.5	0.91	0.13	0.22	0.36	0.22	0.11
9/13/2019	0.02	0.015	0.03	0	0	0.01	0	0	0.02	0.01	0.02	0.03	0.01	0.03	0	0	0.03	0.03	0
9/14/2019	0.01	0.015	0.02	0.1	0.16	0.01	0.05	0.03	0.01	0	0.01	0.02	0.01	0	0.05	0.05	0.01	0.09	0.04
9/15/2019	0	0.059	0.07	0.07	0.11	0.11	0.11	0.09	0.06	0.05	0.08	0.01	0.12	0.03	0.03	0	0.02	0.01	0.08
9/16/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/17/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/21/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/22/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/23/2019	0	0.008	0.01	0.06	0.26	0	0.1	0.08	0	0	0	0	0.01	0	0.1	0	0	0	0.26
9/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/26/2019	0.02	0.031	0.06	0	0	0.01	0	0	0.04	0.02	0	0.05	0.01	0.05	0.01	0	0.07	0.02	0
9/27/2019	0	0.009	0.02	0.01	0	0	0	0	0.01	0.01	0.004	0	0	0.01	0	0.01	0.01	0	0
9/28/2019	0.1	0.103	0.19	0.41	0.09	0.06	0.13	0.54	0.1	0.09	0.202	0.15	0.06	0.05	0.05	0.05	0.72	0.78	0.14
9/29/2019	0	0	0.01	0	0	0	0	0	0	0	0.001	0	0	0	0	0	0	0	0
9/30/2019	0	0	0	0	0	0.01	0	0.01	0	0	0	0	0	0	0	0	0	0	0

Table 10 - October 2019 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
10/1/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/2/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/3/2019	0.07	0.11	0.339	0.49	0.12	0.15	0.14	0.22	0.14	0.36	0.27	0.05	0.43	0.12	0.07	0.12	0.15	0.17
10/4/2019	0	0.01	0	0	0.01	0	0	0	0	0.01	0	0.01	0	0	0	0	0	0.01
10/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/6/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/7/2019	0	0.01	0.08	0.01	0	0.19	0.04	0.05	0.09	0.2	0.07	0	0.15	0	0	0	0.03	0.05
10/8/2019	0.04	0.04	0.07	0.09	0.02	0.04	0.03	0.04	0.04	0.03	0.05	0.01	0.08	0.06	0.04	0.02	0.07	0.03
10/9/2019	0.12	0.07	0.07	0.38	0.25	0.05	0.78	0.23	0.06	0.05	0.16	0.19	0.12	0.28	0.12	0.13	0.14	0.13
10/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/11/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/12/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/13/2019	0	0.02	0	0	0.01	0.01	0.01	0	0.01	0	0	0	0	0.03	0.01	0.02	0.01	0
10/14/2019	0	0	0	0	0	0	0	0	0.01	0.01	0	0	0	0	0	0	0	0.01
10/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/16/2019	0.96	1.21	1.67	1.49	1.24	1.22	1.17	1.26	1.27	1.65	1.35	1.09	1.61	1.16	0.64	1.34	1.24	1.44
10/17/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11
10/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/20/2019	0.5	0.55	0.58	0.65	0.56	0.55	0.55	0.52	0.57	0.61	0.5	0.39	0.6	0.51	0.3	0.58	0.46	0.491
10/21/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/22/2019	0.55	0.73	0.68	0.6	0.75	0.75	0.61	0.67	0.9	0.7	0.65	0.62	0.63	0.64	0.36	0.66	0.62	0.86
10/23/2019	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0
10/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/26/2019	0	0	0.01	0.01	0	0	0.01	0.01	0	0.01	0.01	0	0.01	0	0	0.01	0.01	0
10/27/2019	0.708	0.87	0.97	0.61	0.73	1.16	0.81	0.97	1.14	1.11	0.93	0.58	0.88	0.68	0.41	0.84	0.8	1.25
10/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/2019	0.018	0.02	0.06	0.08	0.04	0.03	0.05	0.06	0.04	0.07	0.04	0.05	0.05	0.04	0.03	0.08	0.04	0.07
10/30/2019	0.141	0.15	0.18	0.14	0.16	0.15	0.17	0.17	0.14	0.21	0.1	0.14	0.17	0.12	0.11	0.22	0.16	0.19
10/31/2019	0.758	0.84	0.84	0.7	0.71	0.93	0.68	0.9	0.9	0.76	0.84	0.64	0.8	0.79	0.46	0.8	0.74	0.83

Table 11 - October 2019 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
10/1/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/2/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0	0	0	0	0
10/3/2019	0.15	0.392	0.24	0.13	0.08	0.31	0.05	0.14	0.36	0.42	0.208	0.27	0.37	0.5	0.13	0.12	0.2	0.13	0.09
10/4/2019	0	0.009	0	0	0.01	0.01	0	0	0.01	0.01	0	0	0	0	0.01	0.01	0	0	0.01
10/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/6/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/7/2019	0.09	0.111	0.1	0.09	0	0.16	0	0	0.08	0.15	0.098	0.09	0.15	0.14	0.03	0.06	0.14	0.18	0.01
10/8/2019	0.03	0.068	0.1	0.05	0.04	0.02	0.05	0.04	0.07	0.07	0.047	0.04	0.06	0.05	0.06	0.1	0.07	0.04	0.03
10/9/2019	0.04	0.111	0.02	0.03	0.08	0.1	0.13	0.22	0.06	0.1	0.083	0.17	0.03	0.16	0.04	0.02	0.04	0.03	0.23
10/10/2019	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0
10/11/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/12/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/13/2019	0	0	0	0	0	0	0.01	0.01	0	0	0.02	0	0.01	0.02	0.03	0.01	0.01	0	0.01
10/14/2019	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/16/2019	0.85	1.73	1.59	1.33	1.17	1.82	0.85	1.09	1.62	1.7	1.67	1.25	1.66	2	1.27	1.34	1.52	1.45	1.05
10/17/2019	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0
10/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/20/2019	0.3	0.52	0.52	0.57	0.46	0.48	0.48	0.55	0.47	0.55	0.52	0.48	0.59	0.64	0.52	0.42	0.52	0.53	0.48
10/21/2019	0	0.01	0	0	0	0.01	0	0	0	0	0	0	0	0	0.01	0	0	0	0
10/22/2019	0.43	0.57	0.81	0.89	0.62	0.6	0.53	0.55	0.61	0.56	0.78	0.62	0.72	0.71	0.82	0.73	0.81	0.86	0.7
10/23/2019	0	0	0.01	0	0	0	0	0	0	0	0.01	0.01	0	0	0	0	0	0	0.01
10/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/26/2019	0	0.01	0.01	0	0	0.01	0	0	0.01	0.01	0.02	0.01	0.03	0.02	0	0	0	0	0
10/27/2019	0.7	0.78	1.59	1.23	0.67	1.15	0.64	0.79	0.87	0.94	1.37	1.01	1.38	1.44	1.1	1.32	1.63	1.48	0.6
10/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/2019	0.03	0.08	0.05	0.03	0.014	0.06	0.03	0.06	0.06	0.08	0.07	0.06	0.06	0.08	0.02	0.03	0.04	0.02	0.06
10/30/2019	0.09	0.18	0.21	0.15	0.14	0.17	0.15	0.19	0.16	0.2	0.24	0.16	0.2	0.22	0.13	0.12	0.18	0.17	0.15
10/31/2019	0.5	0.76	1.06	0.97	0.74	0.86	0.81	0.69	0.8	0.9	1.02	0.97	1.09	0.99	0.84	1	1.22	1.05	0.7

Table 12 - November 2019 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
11/1/2019	0	0.1	0.1	0.12	0.1	0.11	0.08	0.12	0.11	0.06	0.11	0.1	0.08	0.11	0.06	0.11	0.11	0.09
11/2/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/3/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/4/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/6/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/7/2019	0.08	0.09	0.11	0.11	0.088	0.12	0.09	0.11	0.1	0.119	0.11	0.09	0.11	0.1	0.04	0.09	0.1	0.09
11/8/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/11/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/12/2019	0.11	0.14	0.13	0.12	0.119	0.14	0.11	0.14	0.14	0.132	0.14	0.11	0.13	0.12	0.06	0.14	0.14	0.12
11/13/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/14/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/16/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/17/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/21/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/22/2019	0.033	0.064	0.06	0.04	0.05	0.05	0.04	0.06	0.06	0.08	0.057	0.04	0.053	0.05	0.02	0.059	0.07	0.04
11/23/2019	0.07	0.1	0.06	0.05	0.09	0.13	0.07	0.08	0.1	0.1	0.08	0.06	0.07	0.05	0.03	0.08	0.06	0.11
11/24/2019	0.72	0.94	1.05	1.12	1.01	0.91	0.99	1.03	0.99	1.09	1	0.71	1.04	0.93	0.57	0.92	0.99	0.95
11/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/29/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/30/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 13 - November 2019 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
11/1/2019	0.06	0.1	0.13	0.09	0.1	0.1	0.1	0.11	0.1	0.13	0.11	0.11	0.12	0.16	0.11	0.08	0.14	0.11	0.12
11/2/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/3/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/4/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/6/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/7/2019	0.08	0.11	0.15	0.1	0.09	0.12	0.08	0.09	0.11	0.12	0.16	0.13	0.15	0.14	0.1	0.1	0.14	0.12	0.1
11/8/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/9/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/10/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/11/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/12/2019	0.07	0.11	0.14	0.13	0.13	0.12	0.14	0.086	0.11	0.13	0.16	0.15	0.13	0.15	0.14	0.12	0.18	0.12	0.15
11/13/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/14/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/16/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/17/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/21/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/22/2019	0.031	0.06	0.07	0.05	0.044	0.07	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.08	0.06	0.05	0.08	0.05	0.05
11/23/2019	0.07	0.05	0.12	0.12	0.09	0.09	0.08	0.07	0.06	0.07	0.11	0.1	0.09	0.09	0.13	0.15	0.13	0.13	0.09
11/24/2019	0.53	0.93	0.96	0.87	0.77	0.89	0.83	0.98	1.03	0.9	0.96	0.99	1.09	1.1	0.81	0.73	0.91	0.96	0.82
11/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/29/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/30/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 14 – December 2019 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
12/1/2019	0.52	0.66	0.51	0.77	0.67	0.62	0.46	0.51	0.59	0.58	0.52	0.43	0.6	0.57	0.57	0.62	0.54	0.5
12/2/2019	0.07	0.09	0.16	0.16	0.1	0.17	0.14	0.18	0.16	0.26	0.19	0.04	0.19	0.1	0.091	0.11	0.19	0.11
12/3/2019	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.02	0	0.01	0	0	0	0.01	0
12/4/2019	0.05	0.07	0.03	0.05	0.07	0.06	0.06	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.03	0.06	0.07	0.07
12/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/6/2019	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.02	0.02
12/7/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/8/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/9/2019	1.2	1.48	1.4	1.47	1.49	1.24	1.38	1.34	1.42	1.4	1.32	1.29	1.44	1.44	0.84	1.49	1.43	1.27
12/10/2019	0.18	0.19	0.18	0.17	0.23	0.18	0.17	0.2	0.19	0.21	0.19	0.19	0.18	0.18	0.09	0.21	0.19	0.19
12/11/2019	0.11	0.14	0.14	0.18	0.16	0.15	0.11	0.15	0.16	0.19	0.14	0.15	0.14	0.12	0.16	0.12	0.13	0.12
12/12/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/13/2019	0.41	0.47	0.52	0.52	0.55	0.46	0.44	0.46	0.45	0.53	0.46	0.39	0.48	0.47	0.28	0.52	0.44	0.44
12/14/2019	0.16	0.18	0.26	0.32	0.2	0.16	0.22	0.23	0.17	0.25	0.25	0.13	0.35	0.2	0.14	0.2	0.27	0.2
12/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/16/2019	0.35	0.44	0.28	0.35	0.43	0.41	0.34	0.35	0.39	0.32	0.21	0.28	0.33	0.33	0.21	0.35	0.34	0.38
12/17/2019	0.82	0.94	0.97	1.03	1.05	0.9	0.9	0.96	0.98	1.04	0.77	0.69	1.04	0.93	0.54	0.9	0.97	1
12/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/21/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/22/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/23/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/29/2019	0.31	0.39	0.34	0.34	0.41	0.34	0.3	0.34	0.35	0.35	0.327	0.25	0.36	0.3	0.19	0.34	0.3	0.36
12/30/2019	0.49	0.7	0.71	0.79	0.78	0.59	0.56	0.59	0.57	0.75	0.612	0.32	0.69	0.59	0.38	0.77	0.64	0.59
12/31/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 15 - December 2019 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
12/1/2019	0.29	0.54	0.55	0.62	0.52	0.41	0.56	0.523	0.51	0.55	0.52	0.47	0.53	0.54	0.63	0.51	0.56	0.6	0.58
12/2/2019	0.1	0.21	0.25	0.16	0.06	0.18	0.1	0.115	0.17	0.26	0.21	0.15	0.24	0.3	0.13	0.14	0.22	0.17	0.08
12/3/2019	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.003	0.01	0.02	0.02	0.03	0.02	0.03	0.01	0.01	0.02	0.01	0
12/4/2019	0.04	0.04	0.06	0.06	0.07	0.05	0.05	0.06	0.04	0.05	0.08	0.06	0.07	0.07	0.07	0.04	0.07	0.07	0.08
12/5/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/6/2019	0	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0	0.01	0.01	0	0.02	0.02	0.02	0.02	0.01
12/7/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/8/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/9/2019	0.73	1.4	1.31	1.45	1.25	1.37	1.29	1.3	1.42	1.37	1.23	1.16	1.37	1.34	1.44	1.08	1.25	1.4	1.34
12/10/2019	0.1	0.17	0.21	0.2	0.21	0.19	0.19	0.18	0.17	0.18	0.24	0.17	0.2	0.25	0.2	0.18	0.21	0.19	0.22
12/11/2019	0.09	0.17	0.16	0.17	0.1	0.15	0.12	0.13	0.15	0.18	0.14	0.16	0.16	0.19	0.14	0.11	0.15	0.14	0.14
12/12/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/13/2019	0.26	0.47	0.49	0.47	0.41	0.45	0.44	0.48	0.46	0.51	0.5	0.42	0.59	0.55	0.47	0.38	0.46	0.47	0.43
12/14/2019	0.1	0.26	0.16	0.18	0.17	0.18	0.18	0.23	0.27	0.24	0.15	0.18	0.21	0.22	0.17	0.15	0.15	0.17	0.16
12/15/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/16/2019	0.23	0.25	0.33	0.42	0.32	0.22	0.37	0.34	0.26	0.246	0.287	0.28	0.25	0.2	0.43	0.38	0.372	0.41	0.33
12/17/2019	0.81	1.06	0.97	1	0.77	0.94	0.86	0.89	1.02	1.013	0.883	0.8	1.01	1.04	0.9	0.75	0.944	0.93	0.8
12/18/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/19/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/20/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/21/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/22/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/23/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/24/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/25/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/26/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/27/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/28/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/29/2019	0.22	0.35	0.31	0.37	0.33	0.27	0.34	0.34	0.36	0.34	0.28	0.27	0.34	0.31	0.37	0.3	0.29	0.34	0.3
12/30/2019	0.53	0.67	0.65	0.62	0.47	0.51	0.52	0.82	0.72	0.7	0.54	0.52	0.68	0.64	0.57	0.51	0.63	0.63	0.57
12/31/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 16 - January 2020 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
1/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/3/2020	0.2	0.22	0.17	0.17	0.24	0.16	0.18	0.18	0.19	0.2	0.169	0.22	0.17	0.18	0.11	0.21	0.17	0.17
1/4/2020	0.15	0.17	0.18	0.18	0.17	0.2	0.19	0.17	0.19	0.18	0.173	0.17	0.17	0.19	0.1	0.19	0.18	0.18
1/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/6/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/7/2020	0.12	0.12	0.06	0.15	0.15	0.09	0.09	0.09	0.1	0.1	0.07	0.12	0.08	0.12	0.06	0.12	0.09	0.08
1/8/2020	0	0.01	0	0	0	0.01	0	0	0.01	0.01	0	0	0	0	0	0.01	0	0
1/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/11/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/12/2020	0.14	0.12	0.15	0.08	0.22	0.12	0.16	0.13	0.25	0.15	0.19	0.24	0.24	0.17	0.08	0.12	0.16	0.06
1/13/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/14/2020	0.02	0.03	0.04	0.04	0.05	0.04	0.03	0.04	0.04	0.05	0.03	0.05	0.04	0.03	0.02	0.03	0.03	0.05
1/15/2020	0.01	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/16/2020	0.02	0.02	0.1	0.06	0.03	0.02	0.04	0.05	0.02	0.1	0.07	0.02	0.08	0.04	0.01	0.03	0.05	0.03
1/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/18/2020	0.27	0.267	0.26	0.255	0.243	0.248	0.277	0.278	0.244	0.261	0.28	0.254	0.266	0.267	0.243	0.24	0.275	0.252
1/19/2020	0.02	0.021	0.04	0.036	0.029	0.025	0.038	0.039	0.028	0.038	0.04	0.026	0.04	0.035	0.029	0.03	0.039	0.015
1/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/23/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/24/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/25/2020	1.45	1.75	1.68	1.89	1.75	1.85	1.55	1.574	1.85	1.64	1.61	1.49	1.72	1.59	0.91	1.79	1.58	1.79
1/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/27/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/28/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/29/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/30/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/31/2020	0.05	0.05	0.04	0.03	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.03	0.05	0.05	0.05

Table 17 - January 2020 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
1/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/3/2020	0.12	0.17	0.18	0.2	0.21	0.19	0.21	0.17	0.16	0.18	0.19	0.17	0.2	0.19	0.22	0.16	0.18	0.19	0.23
1/4/2020	0.15	0.17	0.16	0.19	0.17	0.18	0.16	0.17	0.17	0.17	0.14	0.16	0.18	0.16	0.19	0.17	0.19	0.18	0.18
1/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0	0
1/6/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/7/2020	0.03	0.1	0.05	0.09	0.11	0.05	0.13	0.1	0.08	0.08	0.06	0.07	0.09	0.06	0.1	0.07	0.05	0.09	0.14
1/8/2020	0	0	0.03	0.01	0	0	0	0.01	0	0	0.02	0.01	0	0.03	0	0.01	0.05	0	0
1/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/11/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/12/2020	0.09	0.14	0.19	0.24	0.19	0.21	0.15	0.18	0.16	0.13	0.17	0.21	0.18	0.12	0.09	0.1	0.19	0.18	0.25
1/13/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/14/2020	0.037	0.04	0.04	0.03	0.04	0.03	0.02	0.03	0.03	0.04	0.04	0.03	0.05	0.05	0.04	0.04	0.03	0.03	0.05
1/15/2020	0.001	0	0	0.01	0.01	0	0.01	0.01	0	0	0	0.01	0	0	0	0	0.01	0	0
1/16/2020	0.05	0.12	0.08	0.02	0.01	0.08	0.02	0.02	0.11	0.12	0.06	0.09	0.08	0.11	0.03	0.02	0.08	0.04	0.02
1/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0	0
1/18/2020	0.25	0.24	0.253	0.251	0.27	0.25	0.249	0.247	0.249	0.242	0.252	0.273	0.253	0.253	0.263	0.254	0.249	0.25	0.267
1/19/2020	0.01	0.03	0.012	0.027	0.02	0.02	0.027	0.031	0.033	0.026	0.013	0.036	0.028	0.022	0.023	0.023	0.017	0.013	0.021
1/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/23/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/24/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/25/2020	1.93	1.62	1.99	1.94	1.53	1.44	1.56	1.51	1.66	1.64	1.89	1.43	1.71	1.68	1.67	1.71	2.04	2.04	1.51
1/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/27/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/28/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/29/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/30/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/31/2020	0.03	0.03	0.06	0.05	0.05	0.03	0.05	0.05	0.03	0.05	0.06	0.05	0.04	0.04	0.05	0.06	0.06	0.06	0.05

Table 18 – February 2020 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
2/1/2020	0.04	0.05	0.03	0.06	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.01	0.04	0.04	0.05
2/2/2020	0	0	0.01	0.02	0.01	0.01	0.01	0.01	0	0.02	0.01	0.01	0.01	0.01	0.01	0	0.02	0.01
2/3/2020	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0	0
2/4/2020	0.08	0.09	0.07	0.06	0.11	0.08	0.07	0.07	0.09	0.09	0.08	0.11	0.07	0.07	0.04	0.09	0.06	0.07
2/5/2020	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.05	0.04	0.05	0.03	0.04	0.04	0.06	0.03	0.05	0.05	0.04
2/6/2020	0.46	0.53	0.56	0.6	0.59	0.59	0.51	0.56	0.54	0.62	0.57	0.42	0.63	0.53	0.29	0.51	0.52	0.611
2/7/2020	0.14	0.29	0.27	0.2	0.26	0.38	0.24	0.33	0.33	0.33	0.35	0.21	0.25	0.2	0.12	0.3	0.23	0.346
2/8/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/10/2020	0.24	0.27	0.317	0.244	0.28	0.22	0.23	0.28	0.24	0.35	0.29	0.25	0.32	0.27	0.12	0.25	0.29	0.249
2/11/2020	0.37	0.42	0.408	0.41	0.49	0.39	0.4	0.39	0.41	0.42	0.38	0.38	0.41	0.41	0.23	0.44	0.39	0.4
2/12/2020	0.05	0.07	0.05	0.03	0.06	0.06	0.05	0.05	0.06	0.08	0.05	0.05	0.06	0.05	0.03	0.07	0.04	0.058
2/13/2020	0.22	0.24	0.26	0.29	0.27	0.24	0.27	0.26	0.24	0.27	0.25	0.24	0.27	0.26	0.14	0.24	0.27	0.229
2/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/15/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/18/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/19/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/23/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/24/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/25/2020	0.2	0.26	0.22	0.3	0.26	0.22	0.22	0.22	0.23	0.23	0.21	0.15	0.24	0.27	0.14	0.28	0.22	0.22
2/26/2020	0.22	0.2	0.09	0.13	0.15	0.15	0.13	0.15	0.2	0.15	0.14	0.11	0.13	0.1	0.08	0.28	0.09	0.27
2/27/2020	0.21	0.22	0.25	0.2	0.23	0.32	0.18	0.24	0.28	0.24	0.23	0.19	0.23	0.19	0.14	0.25	0.28	0.22
2/28/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 19 - February 2020 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
2/1/2020	0.01	0.05	0.04	0.05	0.06	0.05	0.04	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.07
2/2/2020	0	0.03	0.01	0	0	0.02	0.01	0.01	0.03	0.03	0.02	0.01	0.03	0.05	0	0.01	0.01	0.01	0
2/3/2020	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0	0
2/4/2020	0.05	0.06	0.08	0.09	0.1	0.09	0.09	0.07	0.06	0.08	0.06	0.08	0.08	0.06	0.11	0.09	0.09	0.07	0.11
2/5/2020	0.02	0.03	0.03	0.03	0.04	0.04	0.03	0.06	0.04	0.05	0.07	0.04	0.05	0.07	0.03	0.04	0.04	0.03	0.06
2/6/2020	0.48	0.58	0.61	0.56	0.46	0.57	0.49	0.48	0.55	0.58	0.56	0.49	0.67	0.61	0.52	0.56	0.6	0.62	0.49
2/7/2020	0.3	0.22	0.41	0.39	0.21	0.32	0.24	0.25	0.22	0.25	0.4	0.3	0.35	0.35	0.29	0.36	0.42	0.44	0.21
2/8/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/10/2020	0.19	0.28	0.29	0.27	0.28	0.31	0.25	0.22	0.27	0.29	0.32	0.28	0.34	0.41	0.25	0.24	0.28	0.29	0.27
2/11/2020	0.39	0.41	0.4	0.43	0.41	0.35	0.39	0.38	0.39	0.41	0.35	0.35	0.39	0.37	0.41	0.35	0.41	0.43	0.39
2/12/2020	0.04	0.04	0.08	0.08	0.06	0.07	0.05	0.05	0.05	0.06	0.09	0.053	0.08	0.09	0.07	0.07	0.07	0.07	0.06
2/13/2020	0.17	0.29	0.22	0.25	0.23	0.27	0.22	0.24	0.26	0.29	0.24	0.25	0.27	0.3	0.22	0.21	0.23	0.24	0.25
2/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/15/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/18/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/19/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/23/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/24/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/25/2020	0.19	0.24	0.17	0.23	0.19	0.19	0.21	0.21	0.22	0.21	0.18	0.215	0.23	0.21	0.23	0.2	0.19	0.22	0.18
2/26/2020	0.22	0.11	0.18	0.14	0.18	0.08	0.23	0.19	0.12	0.11	0.22	0.148	0.21	0.14	0.14	0.09	0.17	0.22	0.14
2/27/2020	0.34	0.21	0.32	0.37	0.19	0.26	0.22	0.23	0.22	0.25	0.33	0.244	0.3	0.32	0.32	0.24	0.35	0.34	0.2
2/28/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 20 – March 2020 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
3/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2020	0.07	0.08	0.04	0.03	0.08	0.05	0.05	0.05	0.07	0.05	0.05	0.04	0.05	0.06	0.03	0.08	0.08	0.04
3/3/2020	0.21	0.26	0.39	0.32	0.22	0.214	0.26	0.32	0.21	0.4	0.32	0.19	0.33	0.25	0.08	0.24	0.28	0.2
3/4/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/6/2020	0.31	0.35	0.24	0.32	0.39	0.38	0.32	0.35	0.38	0.35	0.34	0.25	0.31	0.3	0.2	0.3	0.29	0.28
3/7/2020	0	0	0.04	0.07	0.01	0.01	0	0.01	0.01	0.02	0.01	0	0.02	0.01	0	0	0.02	0.01
3/8/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/11/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/12/2020	0	0	0	0.01	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0
3/13/2020	0.3	0.35	0.29	0.3	0.4	0.31	0.3	0.31	0.28	0.33	0.28	0.36	0.28	0.32	0.18	0.36	0.27	0.29
3/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/15/2020	0.02	0.02	0.02	0.03	0.02	0.04	0.03	0.03	0.04	0.04	0.03	0.01	0.03	0.01	0.01	0.02	0.02	0.023
3/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/17/2020	0.04	0.05	0.04	0.05	0.06	0.05	0.05	0.04	0.04	0.07	0.05	0.04	0.05	0.06	0.03	0.04	0.05	0.045
3/18/2020	0.07	0.08	0.07	0.07	0.08	0.08	0.08	0.09	0.08	0.08	0.08	0.07	0.08	0.07	0.04	0.08	0.07	0.073
3/19/2020	0.84	0.93	0.98	1.03	1.08	0.94	0.93	0.97	0.94	1.03	0.96	0.85	1.11	0.97	0.55	0.96	0.97	0.932
3/20/2020	0	0.01	0.01	0.01	0	0.01	0	0	0	0.01	0.01	0	0.01	0.01	0	0	0	0.004
3/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/23/2020	0.77	0.94	0.88	1.09	1.13	0.87	0.78	0.89	0.87	0.91	0.86	0.54	0.99	0.87	0.52	1	0.87	0.89
3/24/2020	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0	0	0
3/25/2020	0.01	0.01	0.01	0	0.02	0.02	0	0.01	0.02	0.02	0.01	0	0.01	0.01	0.01	0.01	0	0.006
3/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/27/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/28/2020	1.16	1.36	1.1	1.03	1.43	1.27	1.01	1	1.4	1.1	1	1.16	1.06	1.13	0.69	1.34	0.97	1.15
3/29/2020	0	0.01	0	0	0.01	0	0	0	0	0	0	0.01	0	0	0	0	0	0.003
3/30/2020	0.12	0.13	0.11	0.09	0.15	0.21	0.15	0.11	0.15	0.11	0.08	0.17	0.08	0.13	0.06	0.11	0.15	0.149
3/31/2020	0.01	0.01	0.03	0.03	0.01	0.02	0	0.01	0.01	0.05	0.01	0.01	0.03	0.02	0	0.01	0.01	0.009

Table 21 - March 2020 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
3/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2020	0.01	0.04	0.03	0.07	0.05	0.02	0.08	0.06	0.04	0.03	0	0.03	0.03	0.01	0.08	0.06	0.041	0.05	0.05
3/3/2020	0.37	0.3	0.33	0.24	0.16	0.36	0.21	0.26	0.36	0.37	0.36	0.37	0.38	0.45	0.29	0.256	0.308	0.3	0.23
3/4/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/6/2020	0.28	0.26	0.41	0.41	0.38	0.2	0.33	0.32	0.24	0.25	0.33	0.32	0.34	0.22	0.34	0.368	0.386	0.37	0.29
3/7/2020	0	0.05	0	0.01	0	0.03	0.01	0.01	0.04	0.05	0.01	0.02	0.02	0.04	0.01	0.008	0.005	0.01	0.002
3/8/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/11/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/12/2020	0	0	0.02	0	0	0	0	0	0	0	0.01	0	0	0.01	0.01	0.01	0.04	0	0
3/13/2020	0.36	0.26	0.35	0.31	0.33	0.29	0.3	0.31	0.27	0.28	0.29	0.28	0.35	0.28	0.29	0.41	0.69	0.38	0.347
3/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/15/2020	0.01	0.03	0.04	0.03	0.02	0.03	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.03	0.03	0.06	0.02	0.014
3/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/17/2020	0.03	0.06	0.07	0.04	0.04	0.07	0.05	0.04	0.04	0.07	0.09	0.05	0.09	0.09	0.04	0.04	0.11	0.05	0.044
3/18/2020	0.05	0.06	0.08	0.09	0.07	0.06	0.07	0.06	0.07	0.06	0.08	0.07	0.07	0.06	0.08	0.1	0.15	0.08	0.072
3/19/2020	0.97	0.99	0.95	0.95	0.87	0.95	0.89	0.86	0.97	1	0.89	0.79	0.99	0.92	0.79	0.89	1.55	0.92	0.883
3/20/2020	0	0.01	0.01	0	0.01	0.02	0	0	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.02	0.01	0.001
3/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/23/2020	0.81	0.9	0.93	0.88	0.71	0.8	0.78	0.88	0.94	0.92	0.88	0.73	1	0.95	0.78	0.89	1.51	0.93	0.676
3/24/2020	0	0	0	0	0	0.01	0	0	0	0.01	0	0	0	0	0	0	0	0	0.006
3/25/2020	0	0	0.03	0.02	0.01	0	0.01	0.01	0	0.01	0.03	0.01	0.02	0.02	0.01	0.02	0.03	0	0.005
3/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/27/2020	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0.01	0.01	0	0
3/28/2020	1.03	1.05	1.14	1.45	1.34	1.05	1.16	1.03	1.05	1.03	1.12	0.85	1.17	0.96	1.24	1.45	2.09	1.23	1.204
3/29/2020	0	0	0.01	0	0.01	0	0	0	0.01	0.01	0	0	0.01	0.02	0.01	0.01	0.01	0.01	0.008
3/30/2020	0.12	0.04	0.14	0.17	0.2	0.09	0.16	0.15	0.06	0.06	0.12	0.09	0.1	0.07	0.13	0.19	0.18	0.18	0.162
3/31/2020	0	0.04	0.03	0.02	0.01	0.03	0	0.01	0.04	0.02	0.02	0.02	0.06	0.05	0.02	0.08	0.05	0.01	0.009

Table 22 - April 2020 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
4/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/3/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/4/2020	0	0	0	0	0	0	0	0	0.01	0.01	0	0	0	0	0	0	0	0
4/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/6/2020	0	0	0	0.01	0	0.02	0.02	0.02	0.02	0.01	0.03	0	0.02	0	0.01	0.01	0.03	0.016
4/7/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/8/2020	0.42	0.46	0.67	0.58	0.47	0.57	0.58	0.6	0.61	0.65	0.63	0.42	0.55	0.47	0.488	0.49	0.58	0.606
4/9/2020	0.07	0.07	0.02	0.08	0.06	0.08	0.03	0.03	0.06	0.04	0.03	0.06	0.02	0.07	0.068	0.09	0.02	0.046
4/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/11/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/12/2020	0.07	0.09	0.07	0.04	0.08	0.09	0.08	0.09	0.1	0.07	0.08	0.06	0.08	0.06	0.079	0.08	0.08	0.087
4/13/2020	1.52	1.57	1.67	1.67	1.71	1.71	1.8	1.61	2.11	1.78	1.55	1.62	1.72	1.83	1.792	1.82	1.78	1.832
4/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/15/2020	0.02	0.01	0	0.03	0.05	0	0.01	0.01	0	0.01	0.01	0.05	0.01	0.03	0.02	0.01	0.02	0.007
4/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/18/2020	0.06	0.06	0.05	0.04	0.07	0.05	0.05	0.05	0.05	0.07	0.05	0.06	0.05	0.05	0.043	0.05	0.05	0.049
4/19/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/21/2020	0.13	0.12	0.18	0.17	0.12	0.17	0.15	0.16	0.19	0.26	0.16	0.14	0.18	0.15	0.163	0.14	0.16	0.197
4/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/23/2020	0.39	0.44	0.34	0.38	0.49	0.44	0.36	0.37	0.41	0.34	0.34	0.36	0.38	0.39	0.368	0.42	0.35	0.394
4/24/2020	0.58	0.68	0.68	0.73	0.76	0.77	0.6	0.66	0.73	0.79	0.63	0.53	0.72	0.68	0.647	0.64	0.61	0.697
4/25/2020	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.011
4/26/2020	0.1	0.2	0.25	0.18	0.23	0.29	0.18	0.25	0.24	0.29	0.21	0.11	0.3	0.21	0.237	0.17	0.19	0.279
4/27/2020	0.01	0.01	0.06	0.05	0.01	0.01	0	0.01	0.01	0.03	0.01	0	0.03	0	0.008	0.01	0.02	0.008
4/28/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/29/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/30/2020	0.36	0.36	0.52	0.43	0.39	0.35	0.38	0.42	0.4	0.474	0.38	0.29	0.46	0.37	0.34	0.44	0.43	0.41

Table 23 – April 2020 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
4/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/3/2020	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0.004	0	0
4/4/2020	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0.01	0.03	0.004	0	0
4/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/6/2020	0.01	0.02	0.02	0.01	0	0.03	0	0.01	0	0.02	0.02	0.02	0.03	0.02	0	0	0.018	0.02	0
4/7/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/8/2020	0.54	0.54	0.56	0.49	0.42	0.6	0.43	0.48	0.6	0.58	0.53	0.605	0.6	0.56	0.36	0.62	0.626	0.74	0.429
4/9/2020	0.04	0.02	0.05	0.06	0.05	0.05	0.09	0.07	0.02	0.07	0.03	0.034	0.1	0.04	0.1	0.07	0.047	0.03	0.065
4/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/11/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/12/2020	0.07	0.06	0.1	0.11	0.07	0.05	0.07	0.08	0.06	0.06	0.09	0.079	0.08	0.06	0.08	0.11	0.098	0.1	0.066
4/13/2020	1.71	1.41	1.93	2.19	1.44	1.65	1.41	1.8	1.63	1.58	1.96	1.644	1.86	1.82	1.78	2.09	1.916	1.95	1.588
4/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/15/2020	0	0.02	0.01	0.01	0.03	0.01	0.02	0.02	0.02	0.01	0	0.008	0	0.01	0.01	0	0.004	0	0.041
4/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/17/2020	0	0.01	0	0	0	0.01	0	0	0	0.01	0	0	0.01	0.01	0	0	0	0	0
4/18/2020	0.03	0.05	0.06	0.04	0.06	0.06	0.06	0.04	0.05	0.07	0.08	0.05	0.07	0.07	0.05	0.05	0.058	0.06	0.061
4/19/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/21/2020	0.24	0.17	0.18	0.16	0.15	0.19	0.12	0.17	0.17	0.22	0.2	0.176	0.16	0.25	0.1	0.19	0.192	0.22	0.135
4/22/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/23/2020	0.35	0.33	0.41	0.45	0.41	0.3	0.39	0.35	0.34	0.35	0.38	0.354	0.36	0.36	0.44	0.49	0.422	0.43	0.385
4/24/2020	0.67	0.7	0.73	0.74	0.53	0.59	0.6	0.64	0.66	0.71	0.68	0.663	0.71	0.73	0.68	0.76	0.731	0.74	0.571
4/25/2020	0	0.02	0	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0	0.015	0	0	0.01	0.01	0.006	0.01	0.017
4/26/2020	0.33	0.24	0.3	0.3	0.12	0.27	0.11	0.26	0.27	0.34	0.3	0.246	0.36	0.44	0.27	0.34	0.3	0.32	0.126
4/27/2020	0	0.01	0	0.02	0.02	0.04	0.01	0.01	0.04	0.02	0	0.013	0.02	0.04	0.01	0.02	0.006	0.01	0.005
4/28/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/29/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/30/2020	0.46	0.43	0.53	0.39	0.35	0.46	0.31	0.31	0.56	0.598	0.55	0.417	0.49	0.49	0.38	0.64	0.466	0.44	0.317

Table 24 – May 2020 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
5/1/2020	0	0.03	0	0.06	0	0	0	0	0	0.01	0	0.03	0	0	0.01	0.24	0	0.007
5/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/3/2020	0.17	0.19	0.08	0.08	0.19	0.12	0.09	0.11	0.12	0.07	0.11	0.17	0.1	0.1	0.07	0.13	0.11	0.113
5/4/2020	0	0.03	0	0.02	0.01	0	0.01	0.01	0.02	0	0	0.02	0	0.06	0.02	0.05	0.03	0.006
5/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2020	0.06	0.1	0.05	0.06	0.09	0.11	0.09	0.06	0.1	0.07	0.06	0.05	0.06	0.08	0.04	0.08	0.06	0.074
5/7/2020	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/8/2020	0.34	0.45	0.47	0.49	0.46	0.54	0.96	0.48	0.47	0.5	0.46	0.28	0.47	0.45	0.25	0.49	0.46	0.497
5/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/11/2020	0.04	0.06	0.06	0.05	0.06	0.05	0.04	0.05	0.04	0.06	0.05	0.06	0.04	0.04	0.02	0.04	0.05	0.044
5/12/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/13/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/15/2020	0.02	0.02	0	0	0.02	0	0	0	0	0	0	0.03	0	0	0	0	0	0
5/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/18/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/19/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2020	0.39	0.42	0.21	0.28	0.59	0.65	0.51	0.48	0.71	0.335	0.49	0.47	0.34	0.29	0.32	0.5	0.27	0.47
5/23/2020	0.93	0.4	1.33	1.49	1.82	0.44	0.65	0.54	0.4	1.014	0.74	1.73	0.87	1.33	0.51	0.94	1.5	0.46
5/24/2020	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0
5/25/2020	0	0	0.01	0.01	0	0	0	0	0	0.006	0	0	0.01	0	0	0	0	0
5/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/28/2020	0.05	0.07	0.08	0.03	0.1	0.05	0.09	0.07	0.06	0	0.07	0.04	0.09	0.06	0.05	0.048	0.06	0.06
5/29/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0	0	0
5/30/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/31/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 25 - May 2020 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
5/1/2020	0	0.07	0	0	0.04	0.02	0	0	0.04	0.04	0	0.002	0.03	0.02	0.01	0.03	0.001	0	0.022
5/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/3/2020	0.1	0.07	0.11	0.14	0.18	0.08	0.18	0.1	0.07	0.07	0.09	0.101	0.07	0.12	0.2	0.14	0.12	0.13	0.172
5/4/2020	0	0	0	0.01	0.01	0	0.02	0.01	0	0	0	0.004	0	0	0.02	0	0.001	0	0.018
5/5/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/6/2020	0.06	0.06	0.11	0.11	0.07	0.04	0.07	0.08	0.05	0.07	0.074	0.06	0.07	0.05	0.11	0.12	0.093	0.07	0.059
5/7/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/8/2020	0.51	0.44	0.59	0.48	0.38	0.46	0.37	0.43	0.43	0.54	0.521	0.489	0.53	0.52	0.41	0.49	0.531	0.49	0.329
5/9/2020	0	0	0	0.01	0	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0
5/10/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/11/2020	0.04	0.04	0.05	0.04	0.07	0.04	0.06	0.04	0.07	0.04	0.04	0.048	0.05	0.04	0.05	0.06	0.049	0.05	0.059
5/12/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/13/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/15/2020	0	0	0	0	0.04	0	0.02	0	0	0	0.01	0	0	0	0.03	0	0	0	0.027
5/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/18/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/19/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/20/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/21/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2020	0.64	0.3	0.58	0.64	0.39	0.27	0.42	0.389	0.26	0.24	0.67	0.477	0.53	0.38	0.54	0.588	0.51	0.81	0.467
5/23/2020	0.52	0.85	0.43	0.39	1.01	0.84	1.36	0.6	1.6	0.88	0.41	0.715	0.68	0.35	0.43	0.474	0.47	0.51	1.543
5/24/2020	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/25/2020	0	0.01	0	0	0	0	0	0	0	0.01	0	0.001	0	0.01	0	0	0	0	0
5/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/28/2020	0.08	0.01	0.06	0.03	0.06	0.06	0.04	0	0.05	0.05	0.06	0.067	0.08	0.11	0.057	0.042	0.03	0.05	0.05
5/29/2020	0	0	0.02	0	0	0	0.01	0	0	0.04	0.23	0.003	0	0.06	0	0.001	0	0	0.001
5/30/2020	0	0	0	0	0	0	0	0	0	0	0.02	0	0.01	0.04	0	0	0	0	0
5/31/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 26 - June 2020 PWD Rain Gage Records

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
6/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/3/2020	1.09	1.13	0.49	0.46	0.87	0.82	0.409	0.37	0.82	0.411	0.36	1.08	0.32	0.75	0.36	0.93	0.47	0.74
6/4/2020	0.32	0.46	0.25	0.38	0.52	0.34	0.31	0.42	0.27	0.315	0.39	0.55	0.27	0.54	0.17	0.49	0.37	0.41
6/5/2020	0.31	0.32	0.61	0.88	0.45	0.53	0.72	0.35	0.41	0.532	0.39	0.51	0.59	0.95	0.36	0.35	0.83	0.4
6/6/2020	0.01	0.02	0.02	0.01	0.01	0.02	0.03	0.04	0.01	0.02	0.03	0.01	0.03	0.02	0.01	0.01	0.02	0.02
6/7/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/8/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/10/2020	0	0	0.01	0.04	0	0	0	0	0	0	0	0	0	0.03	0.04	0	0.04	0
6/11/2020	0.38	0.39	0.2	0.21	0.52	0.26	0.24	0.27	0.33	0.2	0.19	0.6	0.23	0.28	0.69	0.36	0.26	0.36
6/12/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/13/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/15/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/18/2020	0.07	0.06	0.15	0.09	0.23	0.07	0.39	0.38	0.1	0.17	0.13	0.1	0.24	0.44	0.3	0.17	0.26	0.62
6/19/2020	0	0	0.16	0	0	0	0	0	0	0	0	0	0.11	0	0	0	0	0
6/20/2020	0.49	0.24	0.1	0.13	0.2	0.09	0.13	0.14	0.1	0.9	0.13	0.22	0.15	0.18	0.08	0.15	0.16	0.1
6/21/2020	0	0.01	0.03	0.04	0	0	0	0	0.01	0.05	0.04	0	0.11	0	0	0	0.01	0
6/22/2020	0	0	0	0.03	0	0.008	0	0	0.01	0	0	0	0.01	0.04	0	0	0.05	0
6/23/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/24/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/25/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/27/2020	0.02	0.02	0.04	0.03	0.02	0.029	0.02	0.07	0.03	0.05	0.035	0.02	0.03	0.02	0.01	0.03	0.15	0.03
6/28/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/29/2020	0	0	0.41	0.11	0	0	0.01	0.03	0	0.14	0	0	0.13	0.01	0	0	0.04	0
6/30/2020	0	0	0.01	0.01	0	0	0	0	0	0.06	0	0	0	0	0	0	0	0

Table 27 - June 2020 PWD Rain Gage Records

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
6/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/2/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/3/2020	0.26	0.4	0.45	0.87	1.17	0.33	0.98	0.48	0.55	0.498	0.31	0.374	0.38	0.494	1.033	0.86	0.96	0.754	1.044
6/4/2020	0.39	0.23	0.37	0.26	0.62	0.28	0.35	0.269	0.27	0.16	0.34	0.48	0.42	0.31	0.4	0.331	0.41	0.38	0.503
6/5/2020	0.34	0.7	0.42	0.42	0.36	0.56	0.32	0.431	0.68	0.97	0.58	0.29	0.36	0.23	0.355	0.432	0.46	0.445	0.45
6/6/2020	0.03	0.02	0.03	0.02	0.01	0.02	0.01	0.015	0.02	0.01	0.02	0.02	0.01	0.01	0.018	0.02	0.03	0.025	0.01
6/7/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/8/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/9/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/10/2020	0	0.05	0	0	0	0	0	0.025	0.025	0.01	0	0	0	0	0	0.001	0	0	0
6/11/2020	0.21	0.23	0.54	0.316	0.5	0.22	0.36	0.527	0.218	0.22	0.42	0.22	0.25	0.26	0.387	0.34	0.32	0.35	0.528
6/12/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/13/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/14/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/15/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/16/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/17/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/18/2020	0.35	0.02	0.21	0.06	0.07	0.05	0.06	0.326	0.103	0.07	0.41	0.29	0.24	0.07	0.071	0.101	0.11	0.233	0.105
6/19/2020	0	0	0	0	0	0.3	0	0	0.063	0.02	0	0	0	0	0	0	0	0	0
6/20/2020	0.09	0.12	0.14	0.05	0.35	0.07	0.256	0.103	0.151	0.09	0.02	0.217	0.87	0.17	0.215	0.107	0.125	0.109	0.248
6/21/2020	0	0	0	0	0	0.01	0.001	0	0.024	0.01	0	0.029	0.05	0	0.006	0.003	0.01	0.003	0
6/22/2020	0	0	0	0	0	0	0	0.002	0	0	0	0.002	0	0	0.001	0.001	0	0.001	0
6/23/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/24/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/25/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/26/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/27/2020	0.03	0.03	0.04	0.02	0.03	0.01	0.021	0.019	0.03	0.06	0.05	0.046	0.04	0.02	0.021	0.026	0.03	0.032	0.021
6/28/2020	0	0.01	0	0	0	0.2	0	0	0	0.02	0	0.001	0	0	0	0	0	0	0
6/29/2020	0	0.05	0	0	0	0.13	0	0.004	0.06	0.07	0.01	0.043	0.13	0.06	0	0.002	0	0	0
6/30/2020	0	0.01	0	0	0	0.08	0	0	0.04	0.02	0.01	0.011	0.14	0.03	0	0	0	0	0

Table 28 - Rain Gage records by year and month for FY20

Date/RG	RG1	RG2	RG3	RG4	RG5	RG6	RG7	RG8	RG9	RG10	RG11	RG12	RG13	RG14	RG15	RG16	RG17	RG18
Jul19	5.468	8.84	6.9	7.57	5.29	6.892	6.92	5.92	5.983	5.34	7.11	5.039	7.63	6.38	3.05	5.9	10.16	6.26
Aug19	3.152	4.15	3.95	2.92	4	6.54	2.81	3.6	5.14	5.99	3.86	2.85	4.25	5.28	3.05	5.54	3.33	5.04
Sep19	1.162	1.59	0.97	2.4	1.67	1.788	1.51	1.25	1.91	1.03	1.25	1.21	1.61	2.4	1.28	1.6	1.69	0.96
Oct19	3.865	4.63	5.549	5.25	4.6	5.23	5.05	5.1	5.31	5.79	4.97	3.77	5.53	4.43	2.55	4.82	4.47	5.641
Nov19	1.013	1.434	1.51	1.56	1.457	1.46	1.38	1.54	1.5	1.581	1.497	1.11	1.483	1.36	0.78	1.399	1.47	1.4
Dec19	4.69	5.78	5.53	6.17	6.16	5.31	5.11	5.42	5.53	5.99	5.079	4.23	5.88	5.31	3.531	5.72	5.54	5.25
Jan20	2.45	2.788	2.72	2.891	2.932	2.823	2.605	2.601	2.972	2.779	2.682	2.63	2.856	2.672	1.592	2.82	2.624	2.677
Feb20	2.27	2.68	2.565	2.584	2.8	2.75	2.39	2.66	2.71	2.91	2.64	2.21	2.71	2.46	1.38	2.8	2.5	2.773
Mar20	3.93	4.59	4.25	4.48	5.09	4.484	3.96	4.19	4.5	4.57	4.09	3.71	4.44	4.22	2.4	4.55	4.05	4.104
Apr20	3.74	4.09	4.53	4.41	4.45	4.56	4.26	4.29	4.96	4.844	4.13	3.72	4.54	4.33	4.283	4.4	4.34	4.639
May20	2	1.77	2.3	2.58	3.34	1.96	2.44	1.8	1.92	2.065	1.98	2.88	1.98	2.42	1.29	2.518	2.55	1.731
Jun20	2.69	2.65	2.48	2.42	2.82	2.167	2.259	2.07	2.09	2.848	1.695	3.09	2.22	3.26	2.02	2.49	2.66	2.68
Total	**36.43**	**44.992**	**43.254**	**45.235**	**44.609**	**45.964**	**40.694**	**40.441**	**44.525**	**45.737**	**40.983**	**36.449**	**45.129**	**44.522**	**27.206**	**44.557**	**45.384**	**43.155**

Date/RG	RG19	RG20	RG21	RG22	RG23	RG24	RG25	RG26	RG27	RG28	RG29	RG30	RG31	RG32	RG33	RG34	RG35	RG36	RG37
Jul19	3.244	7.415	5.85	7.67	6.7	4.81	5.55	5.83	7.423	6.12	4.382	4.68	5.05	7.28	8.51	7.339	6.4	4.785	5.56
Aug19	3.434	3.538	6	5.25	2.88	4.85	3.68	4.67	3.26	4.74	5.31	5.41	6.1	5.01	3.58	4.1	5.725	5.173	3.36
Sep19	0.47	1.433	1.06	1.47	1.53	1.14	1.32	1.96	1.05	1.49	1.145	0.94	1.36	2.48	1.77	0.92	1.85	1.59	1.595
Oct19	3.21	5.331	6.31	5.48	4.024	5.76	3.73	4.33	5.19	5.69	6.156	5.15	6.35	7	5.01	5.28	6.38	5.94	4.13
Nov19	0.841	1.36	1.57	1.36	1.224	1.39	1.28	1.386	1.47	1.41	1.57	1.55	1.66	1.72	1.35	1.23	1.58	1.49	1.33
Dec19	3.51	5.61	5.49	5.75	4.7	4.95	5.04	5.421	5.57	5.669	5.08	4.68	5.68	5.68	5.55	4.56	5.346	5.55	5.04
Jan20	2.698	2.66	3.045	3.058	2.61	2.48	2.586	2.528	2.682	2.678	2.895	2.539	2.811	2.715	2.676	2.627	3.186	3.073	2.718
Feb20	2.4	2.55	2.84	2.89	2.41	2.62	2.47	2.43	2.48	2.66	2.89	2.51	3.05	3.03	2.64	2.5	2.91	3.03	2.43
Mar20	4.04	4.09	4.57	4.69	4.21	4.01	4.07	4.03	4.17	4.22	4.28	3.69	4.69	4.23	4.16	4.832	7.24	4.55	4.003
Apr20	4.45	4.03	4.9	4.98	3.67	4.32	3.63	4.26	4.43	4.648	4.82	4.324	4.85	4.9	4.28	5.42	4.898	5.07	3.806
May20	1.95	1.85	1.96	1.85	2.25	1.81	2.55	1.649	2.58	1.98	2.125	1.967	2.05	1.7	1.857	1.945	1.805	2.11	2.747
Jun20	1.7	1.87	2.2	2.016	3.11	2.26	2.358	2.201	2.234	2.228	2.17	2.023	2.89	1.654	2.507	2.224	2.455	2.332	2.909
Total	**31.947**	**41.737**	**45.795**	**46.464**	**39.318**	**40.4**	**38.264**	**40.695**	**42.539**	**43.533**	**42.823**	**39.463**	**46.541**	**47.399**	**43.89**	**42.977**	**49.775**	**44.693**	**39.628**

Table 29 - SSO Statistics for Period July 1 2019 – June 30 2020

Main & Shurs					
Event No.	**Start of Overflow Date Time**	**End of Overflow Date Time**	**Event Duration (hours:mins)**	**Flow Volume (ft^3)**	**Flow Volume (Millions of gallons)**
0			0	0	0

PC-30					
Event No.	**Start of Overflow Date**	**End of Overflow Date**	**Event Duration (hours:mins)**	**Flow Volume (ft^3)**	**Flow Volume (Millions of gallons)**
0			0	0	0

Appendix E – PCB PMP 13th Annual Report

PCB

Pollutant Minimization Plan

Thirteenth Annual Report

Calendar Year 2019

Table of Contents

1 PMP Achievement Executive Summary

The Philadelphia Water Department (PWD) submitted its PCB Pollutant Minimization Plan (PCB PMP) on September 30, 2005 and was issued a Completeness Determination letter on January 12, 2006. PWD initiated the actions called for in its PCB PMP on March 4, 2006.

PWD's PCB PMP set out the following approaches to achieving PCB minimization:

- Sample three Water Pollution Control Plants' effluent every two years and analyze using Method 1668A.
- Visit and inspect three hundred ninety-nine (399) sites listed by either EPA or other agencies as housing PCB-containing devices and report the number of devices that have been removed from each site, both prior to our inspection and subsequent to it.
- Visit and inspect thirty-one (31) sites listed by the Philadelphia Department of Public Health as having previously undergone some type of PCB remediation activity and report the number of sites removed from the list as posing no threat of PCB discharge to PWD's sewer system.
- Report any reductions in PCB concentrations in the wastestreams from our three Water Treatment Plants by measuring PCBs in the ferric chloride used in the treatment process as well as reductions of PCBs in the source water (Delaware River or Schuylkill River).
- Continue the sewershed PCB trackdown sampling program for each of our three Water Pollution Control Plants.

Revisions to the original PMP have been made over the years. Refer to the First through the Twelfth Annual Reports for specific information on PMP efforts during Years 1 - 12. No changes to the PMP were made in Year 13 (2019). Year 13 efforts are detailed in the attached report.

During the thirteenth year of PWD's PCB PMP, the following tasks were performed:

- ❖ Wet-weather PCB sampling and analysis of the three Water Pollution Control Plants' (WPCPs') effluent was performed as required by PWD's NPDES permits. See Section 7, "Tabular Summary", for data.

- ❖ PWD inspected seventy-seven (77) of the three hundred thirty-seven (337) sites remaining on the list by EPA or other agencies as housing PCB-containing devices. This exceeds the goal of 70 site inspections per year. These inspections identified 2 locations where transformers and/or capacitors had been removed from the site. Historical information for these sites will be retained, but they will be removed from the schedule for future inspection.

- ❖ PWD wet weather and dry weather WPCP effluent data have been entered into the DRBC PCB database.

- ❖ Significant reductions in WPCP effluent PCB loadings were seen over the course of the PMP (see "Tabular Summary").

Additionally, the following initiatives were undertaken:

- ❖ PWD's PCB database was developed in 2017 and is now being populated. The database was utilized to track and report the 2019 inspections. Going forward, the database will allow PWD to track "active" sites (where Liquid Cooled Electrical Equipment (LCEE) devices are still located on site) versus "inactive" sites (where LCEE devices were previously located but have been removed). Each location has been given a unique ID and has been geocoded in PWD's GIS database. Maps of PCB sites, inspected in 2019, by water pollution control plant drainage area and those in separate sewer areas were developed and can be found in Attachment B of this report.

- ❖ In 2019, PWD continued to monitor outlying township connection points for PCBs using EPA Method 680. Results for the locations sampled were below the detection limit, and are presented in Attachment C.

- PWD issued 19 new groundwater discharge permits in 2019. Every permit except one was compliant with PWD's regulatory PCB limit of "non-detectable by EPA Method 608". During April 2019, one of the permittees reported a detection for Aroclor 1262. Additional samples collected in May 2019 for this site shows non-detectable results.

2 Facility and Contact Information

Facility Name and Address:	Philadelphia Water Department 1101 Market Street Philadelphia, PA 19107
Water Pollution Control Plants:	Northeast WPCP 3899 Richmond St. Philadelphia, PA 19137
	Southeast WPCP 25 Pattison Ave. Philadelphia, PA 19148
	Southwest WPCP 8200 Enterprise Ave. Philadelphia, PA 19153
Contact Person:	Jennifer L. Moore Manager Industrial Waste & Backflow Compliance 1101 Market St., 6th Floor Philadelphia, PA 19107
	Phone: 215-685-6085 Fax: 215-685-6236 Email: jennifer.l.moore@phila.gov
Date of Submittal of PMP:	September 30, 2005
Date of Completeness Determination:	January 12, 2006
Date of Initiation of PMP:	March 4, 2006
Reporting Period:	Year 13 (Calendar Year 2019)

3 Revisions to PMP

During Year 13, no revisions were made to the PMP.

4 Material and Process Modifications

During Year 13 of the PMP, there were no material or process modifications made relevant to PCB minimization.

5 Measures to Address Known, Probable and Potential Sources

5.1 Known and Probable Sources

Two known sources of PCBs were identified in PWD's PCB PMP. These were the source water for PWD's Water Treatment Plants (Delaware and Schuylkill Rivers) and the ferric chloride supplied to PWD by DuPont and used in the water treatment process. A change of ferric chloride supplier in Year 5 resulted in a 95% reduction in PCB content of the product used by PWD in its water treatment process.

A probable source of PCBs identified in PWD's PCB PMP is sludge stored in lagoons at both NEWPCP and SWWPCP. Trackdown efforts conducted in the sewersheds of both NEWPCP and SWWPCP included sampling of the lagoons. The data are available in Attachment B of the Year 5 report.

5.2 Potential Sources

5.2.1 Historical Potential Sources:

Numerous potential sources of PCBs were identified in PWD's PCB PMP. These were identified from databases supplied by EPA, the Philadelphia Fire Department, the Philadelphia Department of Public Health and others. The thirty-one (31) potential sources supplied by the Philadelphia Department of Public Health were identified as sites at which some form of prior PCB remediation had taken place. All thirty-one (31) of these sites were inspected during Year 1 of the PMP.

The remaining potential sources of PCBs, taken from information supplied by EPA and others, were identified as sites on which PCB devices were believed to be present. These sites were separated into three groups by sewershed (NEWPCP, SEWPCP or SWWPCP). Approximately one hundred sixty-seven (167), seventy-three (73) and one hundred fifty-seven (157) sites were listed for NEWPCP, SEWPCP and SWWPCP, respectively. During 2019 (Year 13 of the PMP), PWD's Industrial Waste group inspected forty (40) of the NEWPCP-related sites, thirteen (13) of the SEWPCP-related sites and twenty-four (24) of the

SWWPCP-related sites. Details of these inspections are summarized in the Tables, “Inspections of Potential Source Sites” in Attachment B of this report.

Inspections confirmed that 2 of these sites have had transformers and/or capacitors removed from the site. Historical information for these sites will be retained, but the sites will be removed from the schedule for future inspection.

5.2.2 New Construction and Groundwater Remediation Sites:

In an effort to minimize the amount of PCBs entering the City’s sewer system, PWD requires PCB monitoring in all Groundwater Discharge Permits. These permits are used to regulate specific pollutants of concern from groundwater discharges to the City’s sewer system. Generally, these permits are for remediation sites with groundwater contaminated with petroleum products, such as former gasoline stations. However, all temporary discharges from construction activities are permitted under the Groundwater Discharge Permit Program. The Groundwater Discharge Permits require all Contractors and/or Subcontractors to monitor their discharges monthly for PCBs via sampling and to report their activities and results. All Groundwater Discharge Permits include PWD’s regulatory PCB limit of “non-detectable by EPA Method 608” limitation. All PCB detections require additional monitoring by the contractor or subcontractor to show compliance with the permit limitation.

In 2019, 19 new groundwater permits were issued. All permittees except one reported non-detectable for PCBs. During April 2019, one of the permittees reported a detection of 0.058 ug/L for Aroclor 1262. PWD required additional samples to be collected in May 2019, for this site. The results for PCBs were all non-detectable by EPA Method 608. The construction activities at this site has ceased and there is no additional groundwater discharged to the City sewer system.

5.2.3 Township Connections

PWD has agreements with the surrounding townships to convey and treat township wastewater, which is ultimately discharged at NEWPCP, SEWPCP and SWWPCP. Part of the agreement includes sampling the respective township's wastewater at the connection to the City's sewer system (i.e. near Philadelphia border).

In 2019, PWD sampled two connection points in Springfield Township in Montgomery County. One of the samples was analyzed using EPA Method 680 to determine if there are PCB loadings entering the City through the surrounding township connections. PWD's contract lab, erroneously, analyzed the other township sample using EPA Method 608. Results of these two sampling events, presented in Attachment C, were all below the detection limits.

PWD plans on sampling earlier in the year for 2020, so that additional samples may be gathered if any issues arise with the sample analyses or results. Also, PWD is preparing to monitor additional township connections in 2020.

6 Incremental and Cumulative Changes from the Baseline Loading

6.1 Loading Baseline

PWD's PCB PMP provides the following baseline loadings (see Section 7, "Tabular Summary):

WPCP	Baseline Loading (mg/day)
NEWPCP	11,510
SEWPCP	7,559
SWWPCP	10,970

These loadings differ from those found in the TMDL. This is because the data are from different sampling events, the PMP baseline loadings are weighted by wet versus dry weather results, the analyses are for different numbers of congeners and there is a difference in analytical methods.

6.2 Baseline Loading Reduction – Direct Measurement

During Year 13, wet-weather effluent sampling for PCBs was performed at each of PWD's three Water Pollution Control Plants (WPCPs), as required by PWD's NPDES permits. See Section 7 ("Tabular Summary") for data. The numerical data sets are presented in Section 7, Tables 7.1 through 7.4. This data is presented in graphical form in Appendix A, Figures A1 through A3.

Loadings were generally comparable to those calculated in Year 11 (2017). Wet weather sample results in October 2019 at SWWPCP were higher than any results previously reported. The October 17th sample from SWWPCP showed high tetra-, penta-, hexa-, and hepta-homologs. There were no obvious correlations between elevated total PCB concentration and WPCP discharge or rainfall. Wet weather homolog contribution from 2015-2019 is presented in Figure A4 through A6.

Overall, results of the 2019 sampling, excluding the anomaly in October, show substantial reductions of 68-89% from the baseline PCB loading levels.

PWD explored the PCB homolog contribution for wet and dry weather samples. The average percent contribution by homolog for both dry and wet weather samples collected between 2009 and 2018 was compared to that in 2019 for each plant. These data are presented in Attachment A, Figures A7 through A9. Both Northeast and Southwest tend to have the highest contribution from the penta- through hepta- homologs. Southeast, however, tends to have the highest contribution from di- through tri- homologs. Northeast and Southwest also tend to have similar patterns in wet and dry weather, whereas at Southeast the data showed more variability between samples. PWD plans to continue to explore these types of patterns in the 2020 data to see if the trends continue or if others emerge.

6.3 Baseline Loading Reduction – Other Measures of Progress

See Attachment B ("Potential Sources and Inspection Findings"). A report with results from 2019 inspections is shown in this section. This report was developed from the new PCB database. PWD will continue to update and refine this report with the inspection maps associated with it in future reports.

Two outlying township locations were sampled in 2019, using EPA method 680. The first location, Erdenheim, was sampled but not measured due to a lab error. This location drains to SEWPCP. The second location, Mermaid, which also drains to SEWPCP was sampled and results have been provided in Table C1. Mermaid had results below the detection level. In 2020, additional outlying township connection sampling is planned.

7 Tabular Summary

The subsequent pages provide a summary of the PCB loading calculations for NEWPCP, SEWPCP and SWWPCP, along with the total and penta-PCB concentration results for each of the treatment plant effluents in 2019.

Table 7.1
Summary of PCB Loadings
Northeast Water Pollution Control Plant
NPDES # PA0026689

Year 2005 Baseline Loading (mg/day): 11,510

Date	Calculated Loading (mg/day)	Estimated Reduction From Baseline (mg/day)	Cumulative Reduction From Baseline (%)
12/3/07	8,594	2,916	25.3
3/27/09	5,846	5,664	49.2
10/16/09	6,571	4,939	42.9
4/21/10	5,490	6,020	52.3
12/13/10	4,615	6,895	59.9
9/6/11	6,224	5,286	45.9
11/17/11	3,745	7,765	67.5
6/13/12	11,189	321	2.8
10/16/12	2,542	8,968	77.9
4/20/13	2,849	8,661	75.2
10/8/13	2,349	9,161	79.6
4/16/14	2,315	9,195	79.9
9/25/14	1,552	9,958	86.5
5/28/15	3,157	8,353	72.6
10/10/15	2,291	9,219	80.1
5/14/16	1,755	9,755	84.8
10/23/16	1,479	10,031	87.1
5/6/17	1,749	9,761	84.8
10/9/17	972	10,538	91.6
3/2/18	17,293	-5,783	-50.2
10/12/18	4,219	7,291	63.3
5/6/19	2,856	8,654	75.2
10/17/19	3,067	8,443	73.4

Measure	Date Initiated	Date Completed
NEWPCP Phase 1 Trackdown	November 3, 2010	November 4, 2010
NEWPCP Phase 2 Trackdown	January 26, 2012	January 27, 2012

Table 7.2
Summary of PCB Loadings
Southeast Water Pollution Control Plant
NPDES # PA0026662

Year 2005 Baseline Loading (mg/day): 7,559

Date	Calculated Loading (mg/day)	Estimated Reduction From Baseline (mg/day)	Cumulative Reduction From Baseline (%)
12/3/07	4,595	2,964	39.2
3/27/09	3,435	4,124	54.6
10/16/09	4,287	3,272	43.3
4/21/10	2,155	5,404	71.5
12/2/10	2,736	4,823	63.8
9/6/11	4,135	3,424	45.3
11/17/11	1,368	6,191	81.9
6/13/12	5,659	1,900	25.1
10/16/12	1,296	6,263	82.9
4/20/13	2,803	4,756	62.9
11/27/13	2,599	4,960	65.6
4/16/14	6,370	1,189	15.7
9/25/14	1,827	5,732	75.8
5/28/15	2,744	4,815	63.7
10/10/15	2,795	4,764	63.0
5/14/16	1,525	6,034	79.8
10/28/16	1,058	6,501	86.0
5/6/17	2,762	4,797	63.5
10/9/17	1,212	6,347	84.0
4/16/18	21,681	-14,122	-186.8
10/12/18	9,543	-1,984	-26.2
4/6/19	828	6,731	89.0
10/28/19	2,386	5,173	68.4

Measure	Date Initiated	Date Completed
SEWPCP Phase 2 Trackdown	October 17, 2006	October 20, 2006

Table 7.3
Summary of PCB Loadings
Southwest Water Pollution Control Plant
NPDES # PA0026671

Year 2005 Baseline Loading (mg/day): 10,970

Date	Calculated Loading (mg/day)	Estimated Reduction From Baseline (mg/day)	Cumulative Reduction From Baseline (%)
12/3/07	6,369	4,601	41.9
3/27/09	7,334	3,636	33.1
10/16/09	5,690	5,280	48.1
4/21/10	2,948	8,022	73.1
12/2/10	5,027	5,943	54.2
9/6/11	10,270	700	6.4
11/17/11	4,280	6,690	61.0
6/13/12	5,766	5,204	47.4
10/16/12	2,663	8,307	75.7
4/20/13	3,673	7,297	66.5
10/8/13	3,040	7,930	72.3
4/16/14	2,939	8,031	73.2
9/25/14	2,882	8,088	73.7
8/12/15	4,265	6,705	61.1
10/10/15	3,610	7,360	67.1
5/14/16	3,662	7,308	66.6
10/23/16	1,416	9,554	87.1
5/6/17	3,273	7,697	70.2
10/9/17	3,294	7,676	70.0
3/2/18	6,015	4,955	45.2
4/16/18	7,183	3,787	34.5
10/12/18	4,870	6,100	55.6
4/6/19	2,596	8,374	76.3
10/17/19	26,869	-15,899	-144.9

Measure	Date Initiated	Date Completed
SWWPCP Phase 1 Trackdown	October 12, 2011	October 13, 2011
SWWPCP Phase 2 Trackdown	February 23, 2012	February 24, 2012

Attachment A

Data Graphs

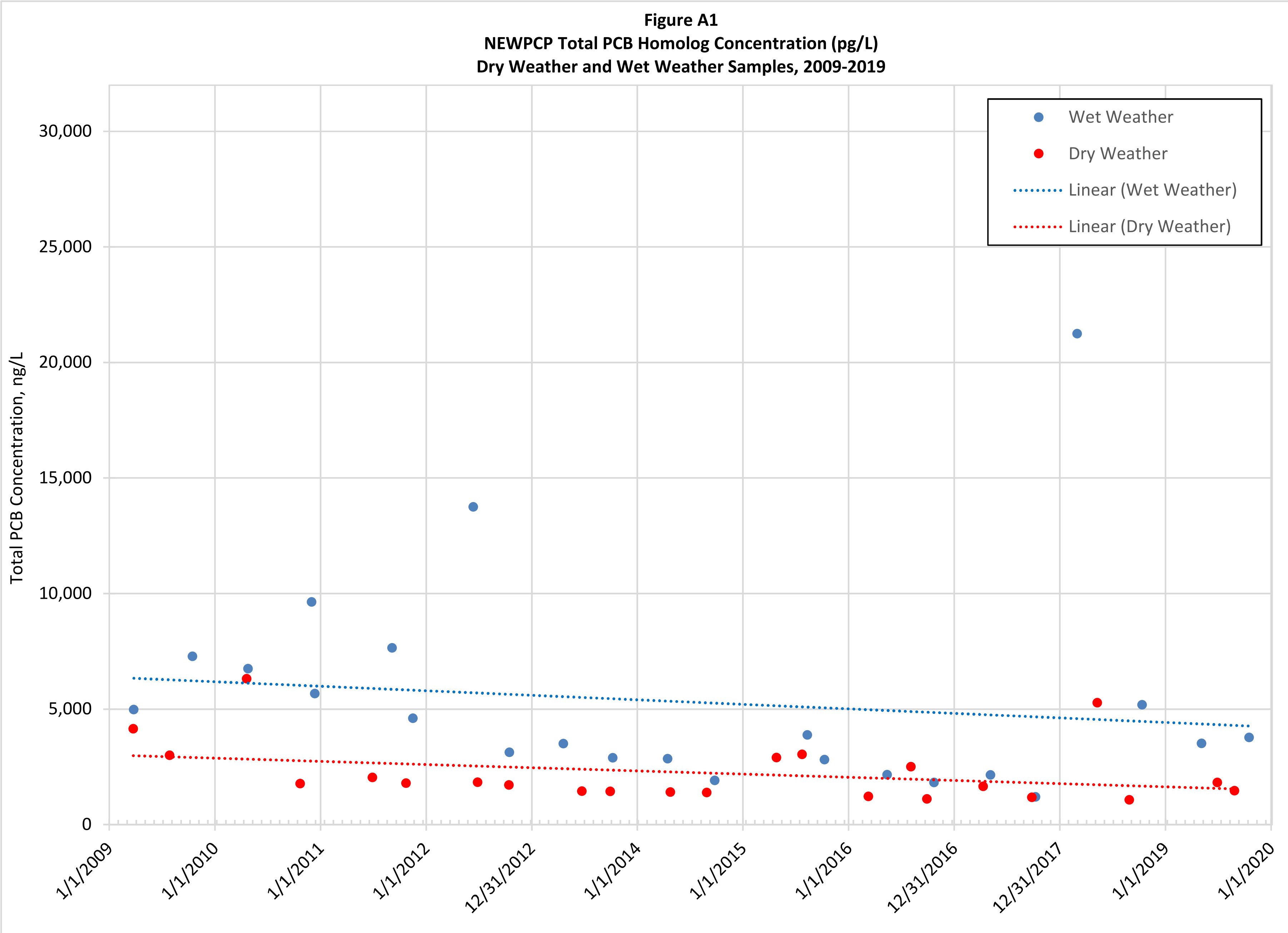


Figure A1
NEWPCP Total PCB Homolog Concentration (pg/L)
Dry Weather and Wet Weather Samples, 2009-2019
Total PCB Concentration, ng/L
30,000
25,000
20,000
15,000
10,000
5,000
0
Wet Weather
Dry Weather
Linear (Wet Weather)
Linear (Dry Weather)
1/1/2009
1/1/2010
1/1/2011
1/1/2012
12/31/2012
1/1/2014
1/1/2015
1/1/2016
12/31/2016
12/31/2017
1/1/2019
1/1/2020

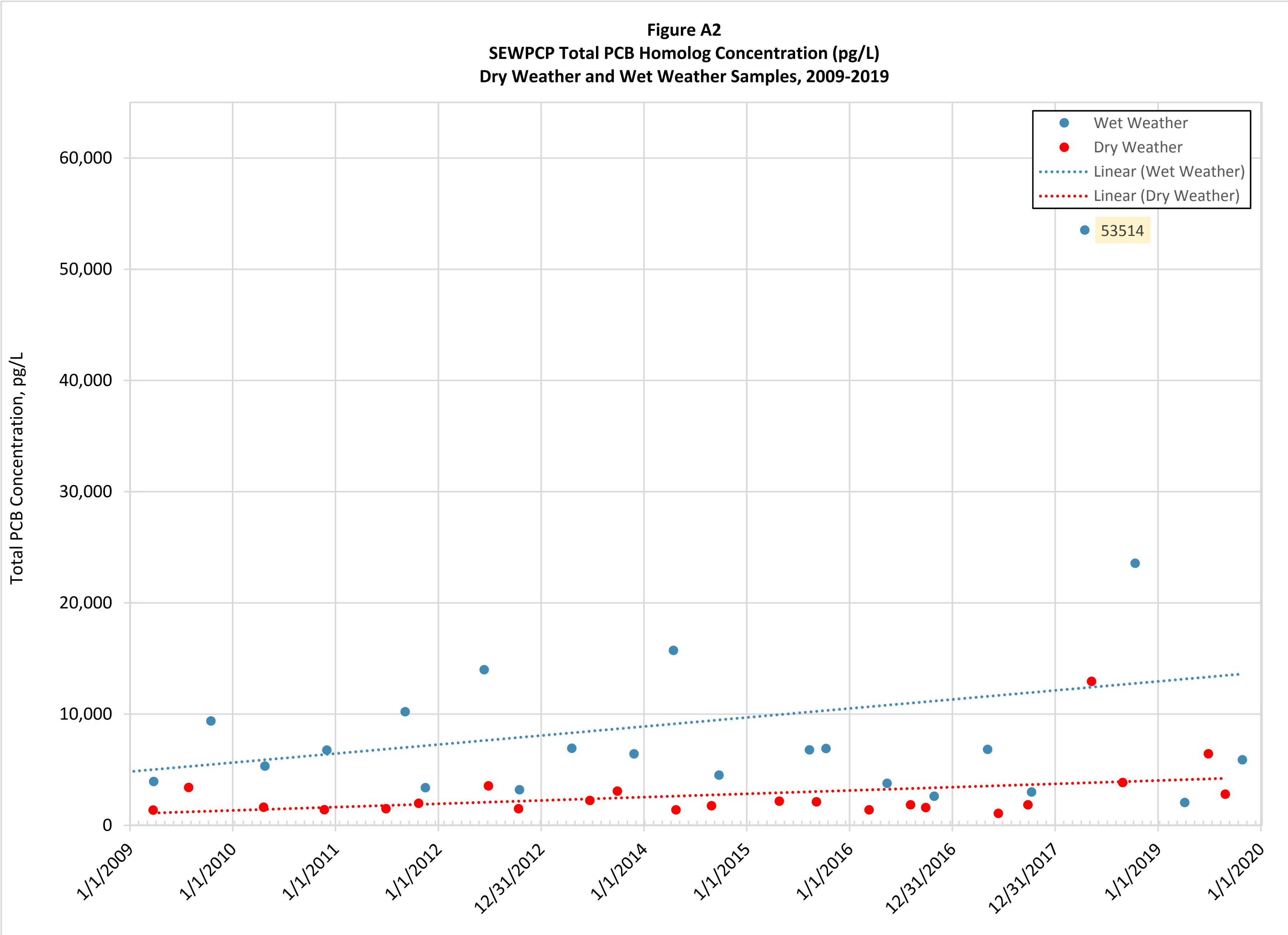
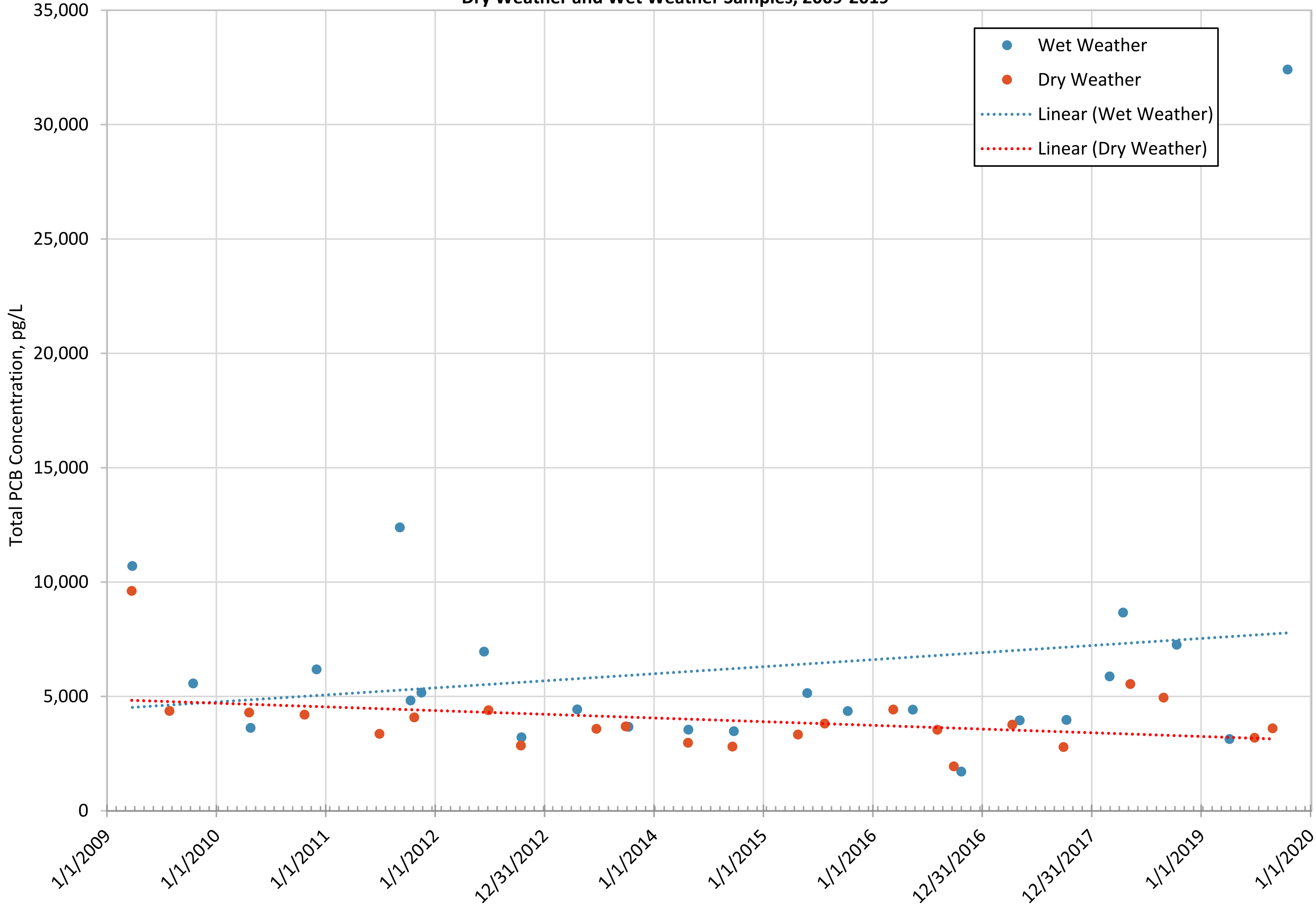


Figure A2
SEWPCP Total PCB Homolog Concentration (pg/L)
Dry Weather and Wet Weather Samples, 2009-2019
Total PCB Concentration, pg/L
60,000
50,000
40,000
30,000
20,000
10,000
0
Wet Weather
Dry Weather
Linear (Wet Weather)
Linear (Dry Weather)
53514
1/1/2009
1/1/2010
1/1/2011
1/1/2012
12/31/2012
1/1/2014
1/1/2015
1/1/2016
12/31/2016
12/31/2017
1/1/2019
1/1/2020

Figure A3
SWWPCP Total PCB Homolog Concentration (pg/L)
Dry Weather and Wet Weather Samples, 2009-2019



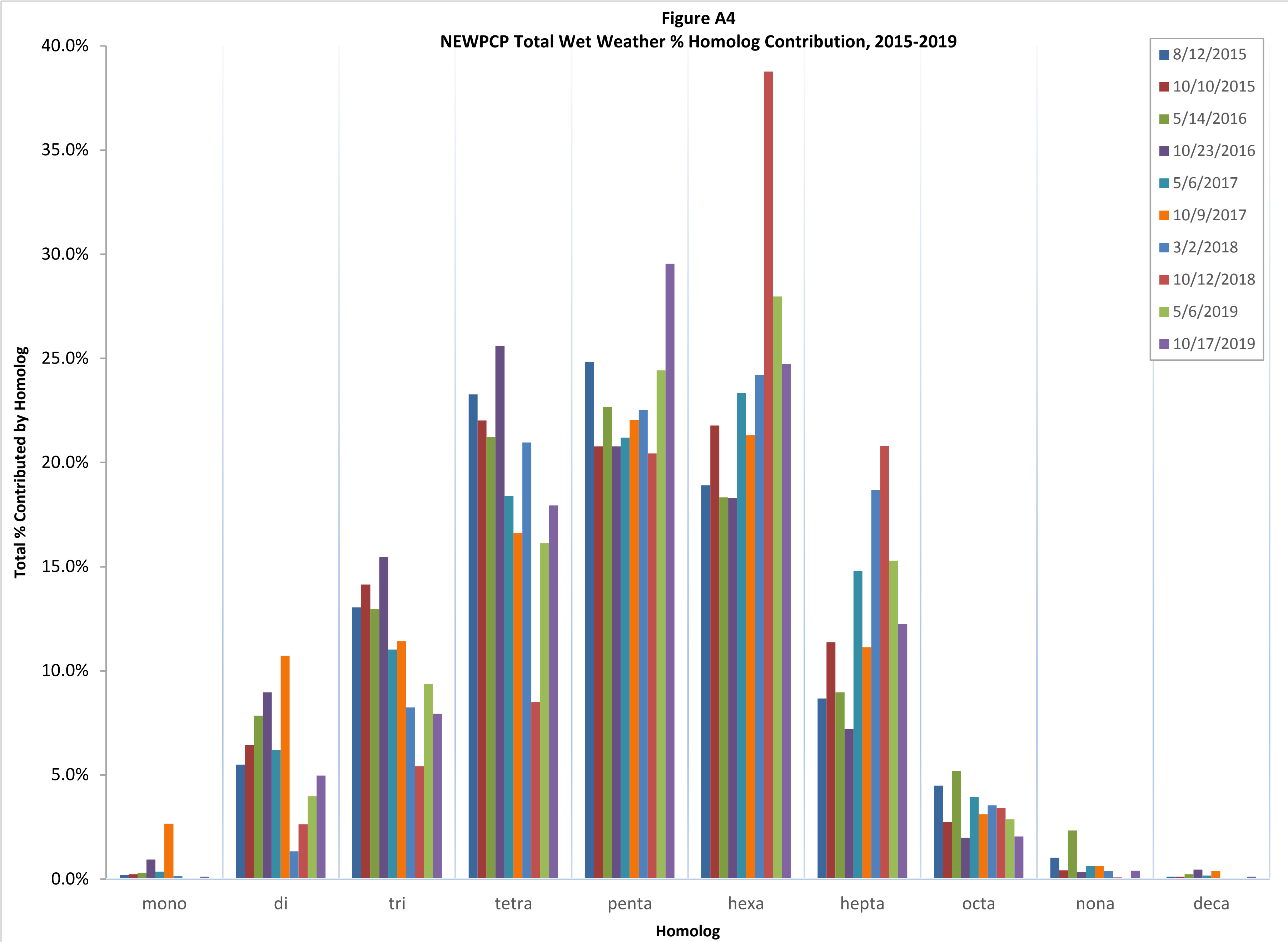


Figure A4
NEWPCP Total Wet Weather % Homolog Contribution, 2015-2019
Total % Contributed by Homolog
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
mono
di
tri
tetra
penta
hexa
hepta
octa
nona
deca
Homolog
8/12/2015
10/10/2015
5/14/2016
10/23/2016
5/6/2017
10/9/2017
3/2/2018
10/12/2018
5/6/2019
10/17/2019

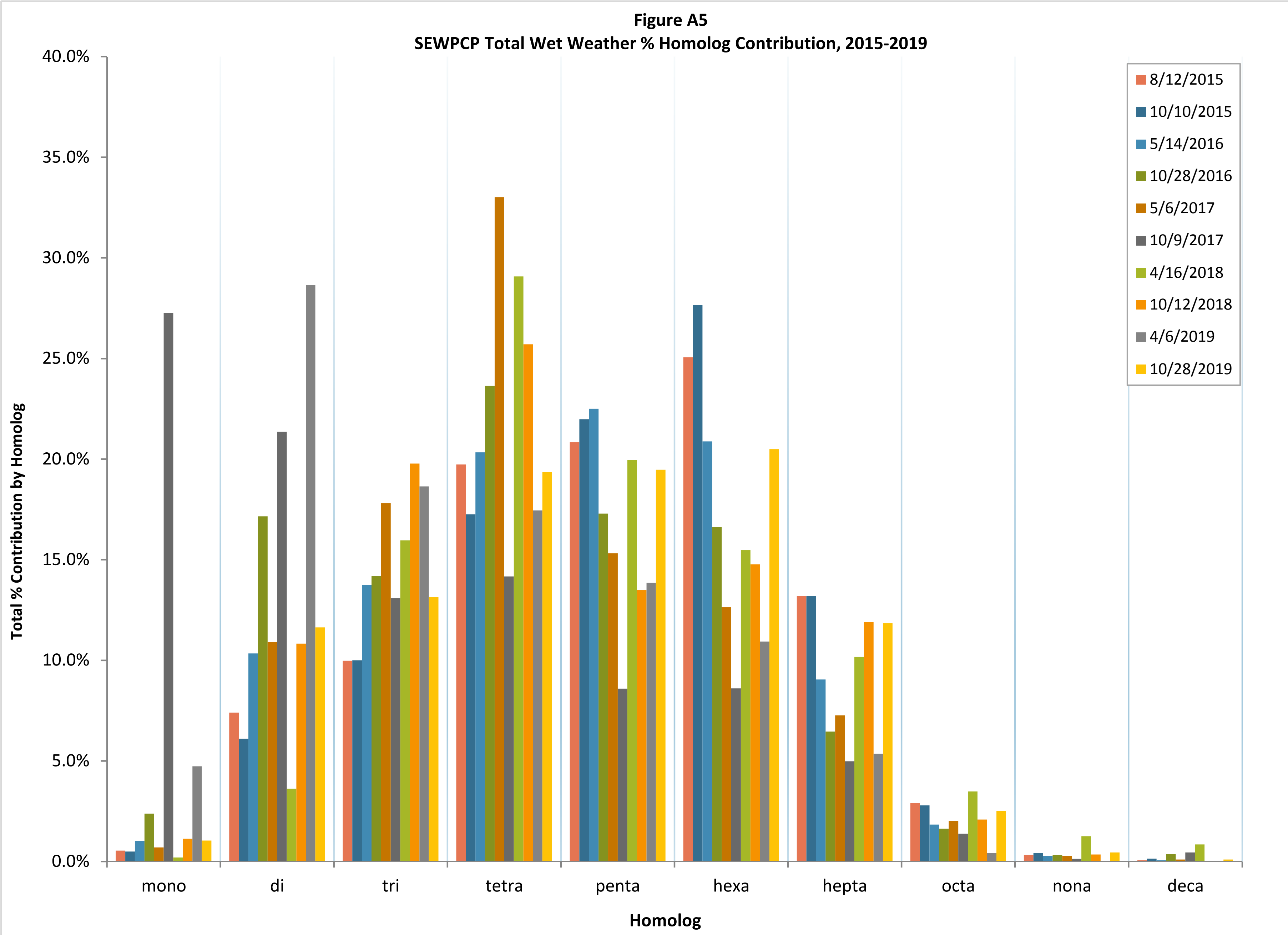


Figure A5
SEWPCP Total Wet Weather % Homolog Contribution, 2015-2019
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
Total % Contribution by Homolog
mono
di
tri
tetra
penta
hexa
hepta
octa
nona
deca
Homolog
8/12/2015
10/10/2015
5/14/2016
10/28/2016
5/6/2017
10/9/2017
4/16/2018
10/12/2018
4/6/2019
10/28/2019

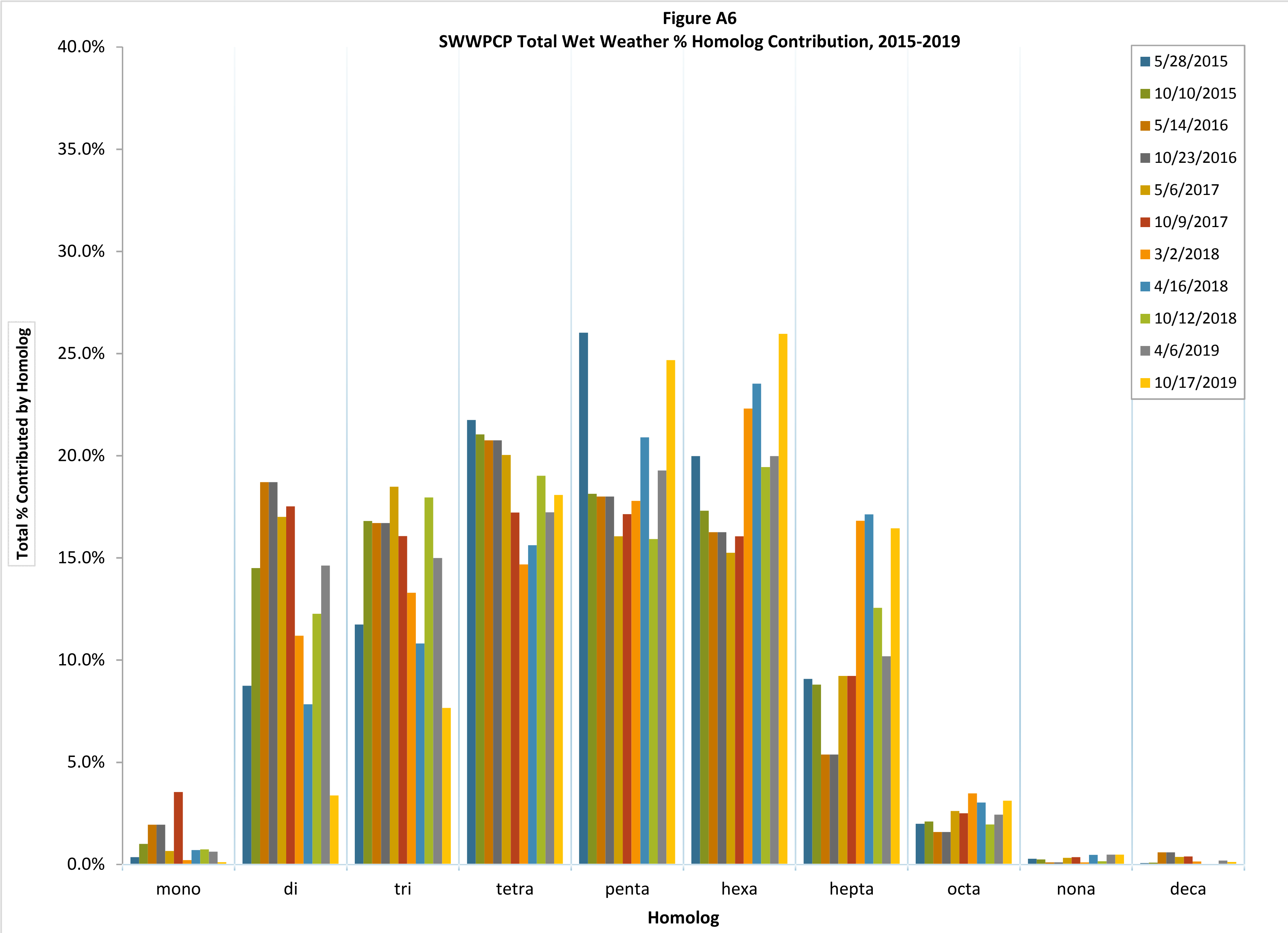
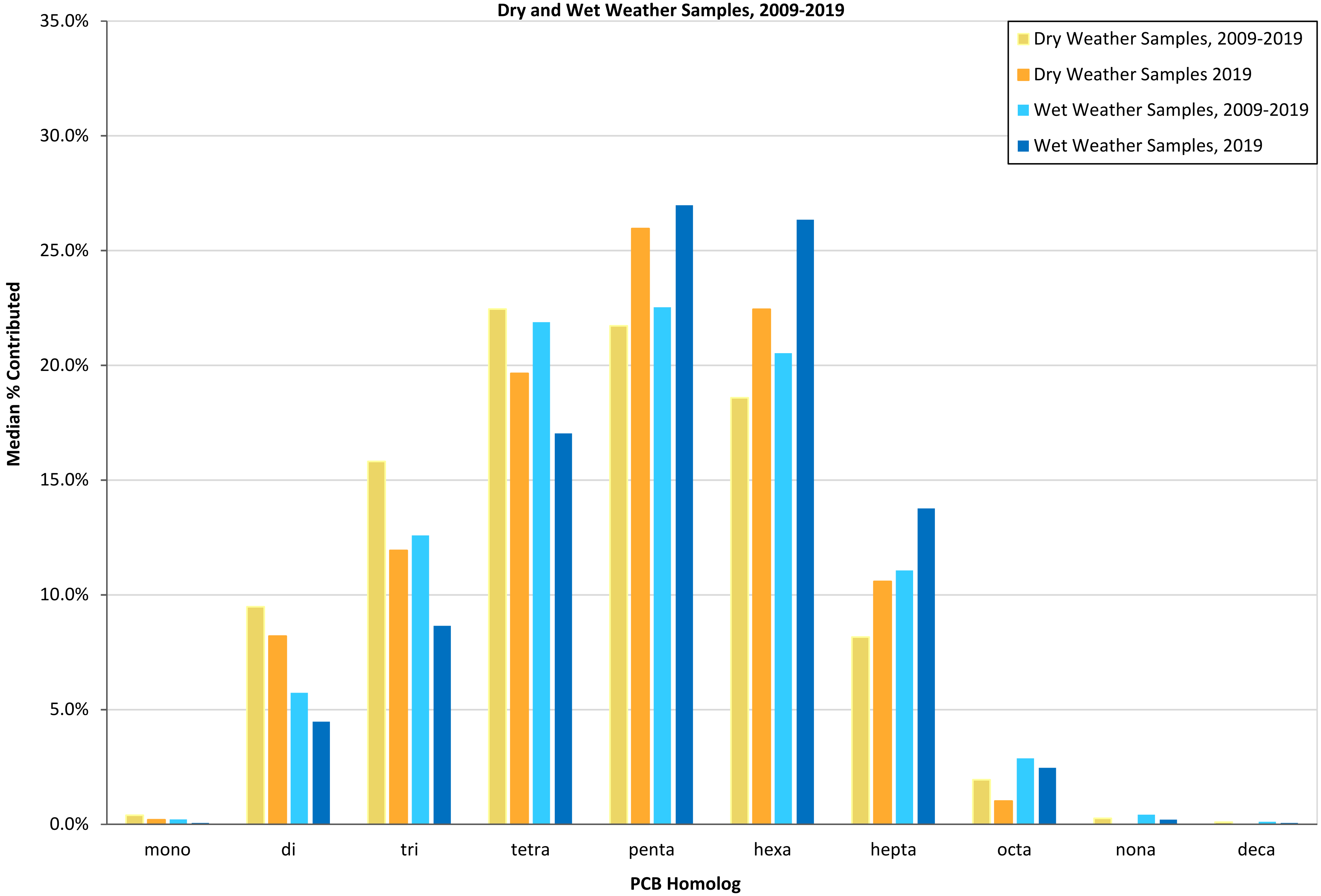


Figure A6
SWWPCP Total Wet Weather % Homolog Contribution, 2015-2019
Total % Contributed by Homolog
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
mono
di
tri
tetra
penta
hexa
hepta
octa
nona
deca
Homolog
5/28/2015
10/10/2015
5/14/2016
10/23/2016
5/6/2017
10/9/2017
3/2/2018
4/16/2018
10/12/2018
4/6/2019
10/17/2019

Figure A7
NEWPCP Median PCB Homolog % Contribution
Dry and Wet Weather Samples, 2009-2019



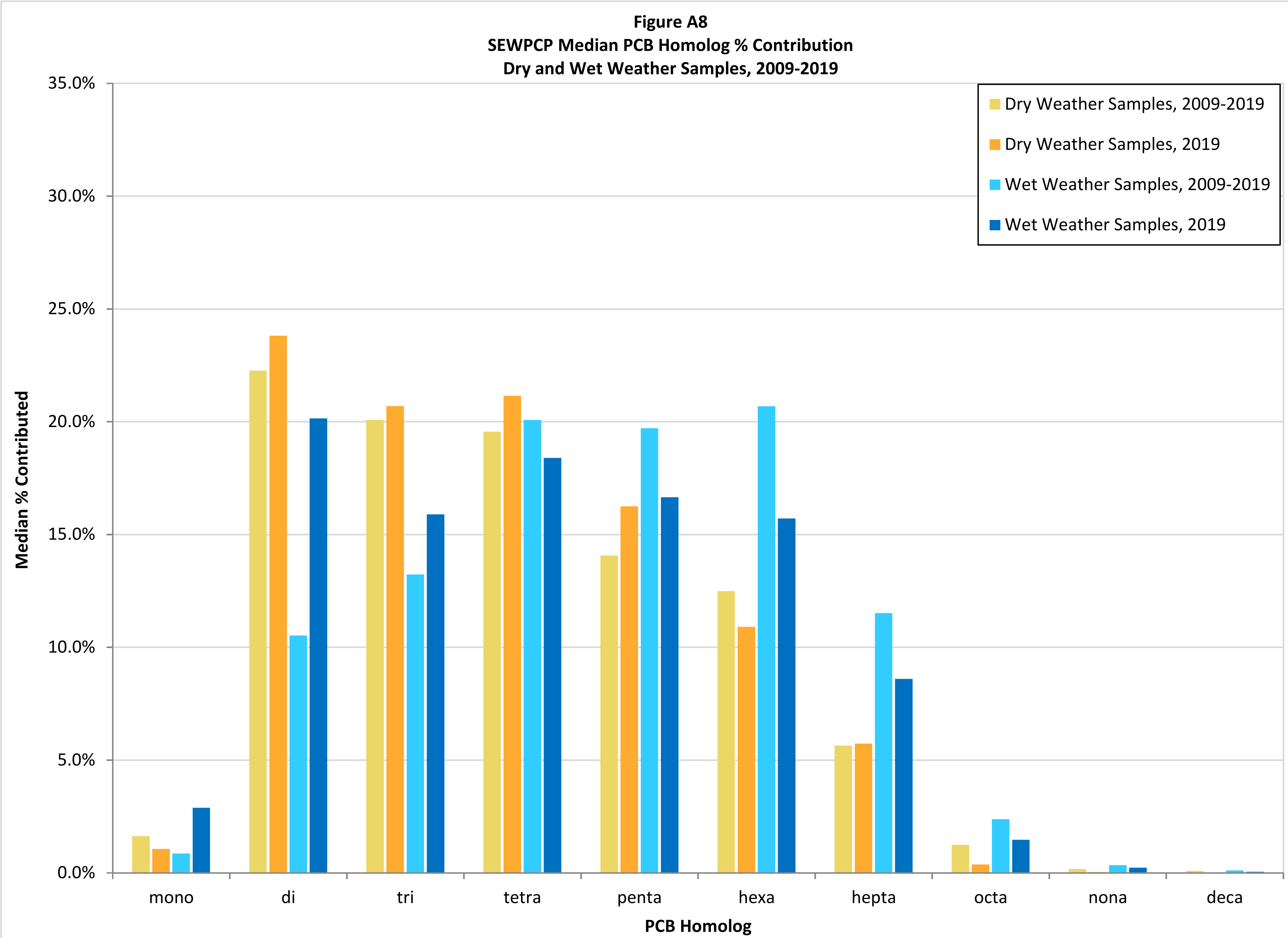


Figure A8
SEWPCP Median PCB Homolog % Contribution
Dry and Wet Weather Samples, 2009-2019
Dry Weather Samples, 2009-2019
Dry Weather Samples, 2019
Wet Weather Samples, 2009-2019
Wet Weather Samples, 2019
Median % Contributed
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
mono
di
tri
tetra
penta
hexa
hepta
octa
nona
deca
PCB Homolog

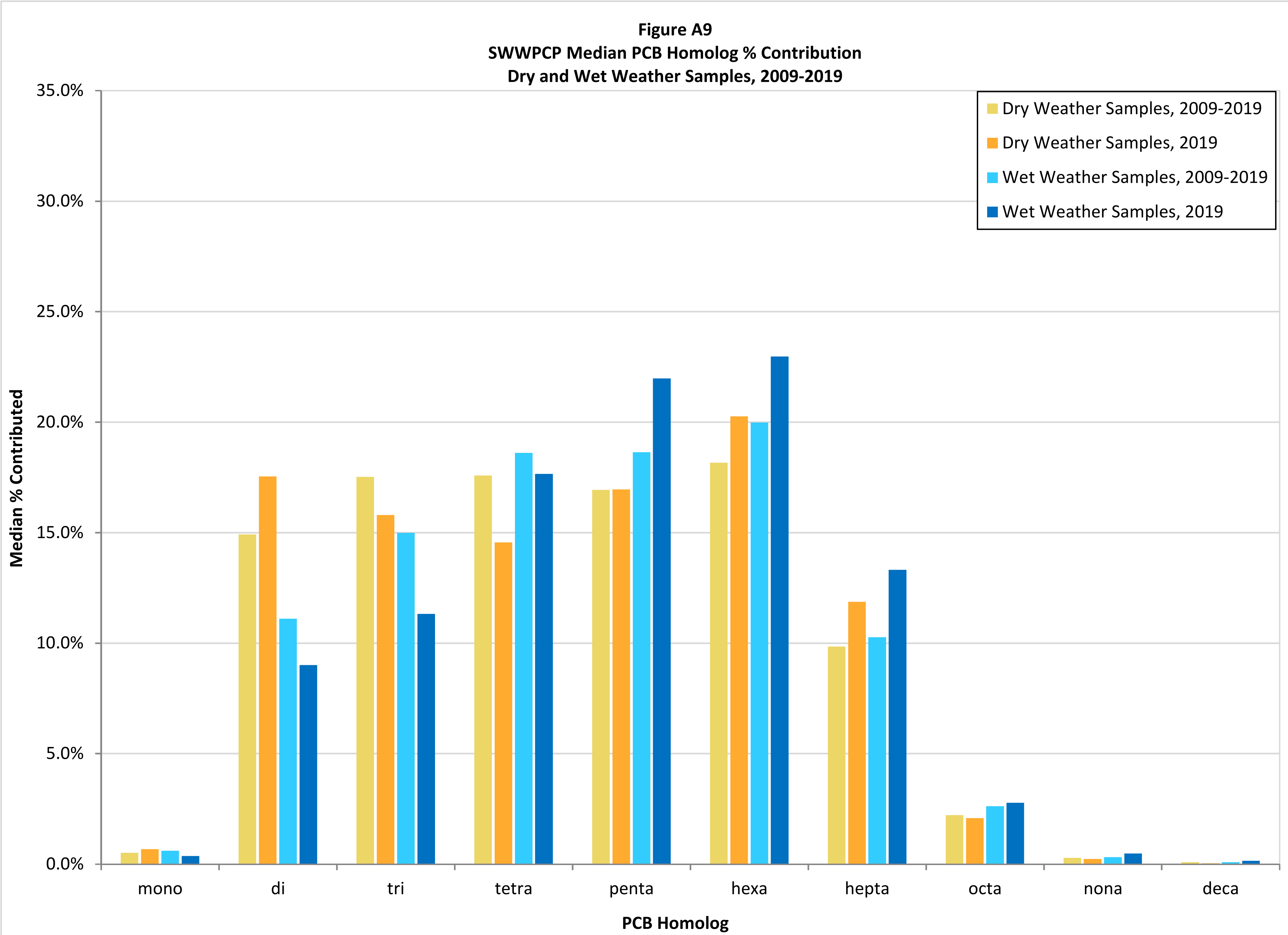


Figure A9
SWWPCP Median PCB Homolog % Contribution
Dry and Wet Weather Samples, 2009-2019
Dry Weather Samples, 2009-2019
Dry Weather Samples, 2019
Wet Weather Samples, 2009-2019
Wet Weather Samples, 2019
Median % Contributed
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
mono
di
tri
tetra
penta
hexa
hepta
octa
nona
deca
PCB Homolog

Attachment B

Potential Sources and Inspection Findings

Table B1 - Known, Probable and Potential Sources and Measures to Address Sources

Source	Source Type: Known	Source Type: Probable	Source Type: Potential	Measure to Address Source
Water Supply (Delaware and Schuylkill Rivers)	X			PCB PMP and action by others
Ferric Chloride used in Water Treatment	X			Switched ferric chloride suppliers
Sludge Lagoons (NEWPCP and SWWPCP)		X		Trackdown for each WPCP calls for sampling and analysis
PCB Device sites in sewershed of each WPCP (see Attachment B, "Inspections of Potential Source Sites")			X	Site inspections, evaluation and followup
Significant Industrial Users			X	Modify permits as warranted
Electric Company (PECO) customers			X	Undetermined. PECO will not share customer information.
Township Connections			X	Sample points of connections for PCBs
Groundwater Discharges			X	Require PCB monitoring

Philadelphia Water Department

Inspections by Treatment Plant

01/1/2019 - 12/31/2019

LocID	NAME:	ADDRESS:	LOCATION	CONTACT	EQUIPMENT	NUMBER	CONC (PPM)	GALLONS	LEAKS?	INSP DATE	STATUS
Receiving Plant: NEWPCP											
PCB-NE022	GE International, Inc.	1040 E. Erie Ave 19124	Outside (West and South)	Ana M. Adorno	Transformer	4	1.4	220	No	07/30/19	In Use
PCB-NE023	GE International, Inc.	1040 E. Erie Ave 19124	Test balcony	Ana Adorno	Capacitor & Transformer	8	<50	N/A	No	07/30/19	In Use
PCB-NE024	GE International, Inc.	1040 E. Erie Ave 19124	W Indoor Undercar test cage	Ana M. Adorno	Transformer	3	N/A	N/A	Staining	07/30/19	In Use
PCB-NE203	Henshell Corporation	2922 N. 19th St 19132	Outside by Indiana St	Kevin Maloney	Transformer	1	<50	240	No	12/06/19	In Use
PCB-NE213	Frontida BioPharm	1100 Orthodox St 19124	Bld Rear	Michael D'Ippolito	Transformer	4	N/A	N/A	No	08/22/19	In Use
PCB-NE221	Abbey Color Incorporated	400 E. Tioga St 19134	Transformer Vault	Roger Nielson	Transformer	2	<50	102	No	06/24/19	In Use
PCB-NE226	Domestic Uniform Rental	4100 Frankford Ave 19124	Outside	Jerry Tannian	Transformer	1	N/A	414	No	05/15/19	In Use
PCB-NE230	Henshell Corporation	2922 N. 19th St 19132	Outside	Kevin Maloney	Transformer	1	N/A	N/A	No	12/06/19	In Use
PCB-NE260	Michel's Bakery, Inc.	5698 Rising Sun Ave 19120	Electrical Room	Mike Sizer	Transformer	2	<50	637	Staining	07/23/19	In Use
PCB-NE261	Dietz & Watson, Inc.	5701 Tacony St 19135	Boiler Room	Wes Sweany	Transformer	2	<50	705	No	07/17/19	In Use
PCB-NE262	Dietz & Watson, Inc.	5701 Tacony St 19135	Electrical Room	Wes Sweany	Capacitor	10	N/A	N/A	No	07/17/19	In Use
PCB-NE278	J.P. Cerini Technologies, Inc.	4600 N. Fairhill St 19140	Electrical Room in Basement	Mary Cerini	Transformer	2	5.9	N/A	No	09/26/19	In Use
PCB-NE284	GE International, Inc.	1040 E. Erie Ave 19124	Column 10 H	Ana Adorno	Other	1	N/A	N/A	No	07/30/19	Out of Use

Receiving Plant: NEWPCP

Drainage Area: Combined **Total Number of Inspections completed: 13**

Receiving Plant: NEWPCP

LocID	NAME:	ADDRESS:	LOCATION	CONTACT	EQUIPMENT	NUMBER	CONC (PPM)	GALLONS	LEAKS?	INSP DATE	STATUS
PCB-NE204	SPD Technologies	13500 Roosevelt Blvd 19116	Transformer Room	Evan Zak	Transformer	4	25	345	No	09/25/19	In Use
PCB-NE208	HP Hood, LLC	10975 Dutton Rd 19154	Outside Cage	James Hawkinson	Transformer	2	N/A	N/A	No	07/30/19	In Use
PCB-NE210	Cintas Corporation	10080 Sandmeyer Ln 19116	Rear Parking Lot	Luis Pugi	Transformer	1	N/A	N/A	No	07/17/19	In Use
PCB-NE211	Delavau, LLC	10101 Roosevelt Blvd 19154	Bld Rear	Thomas McHale	Transformer	1	<50	284	No	09/18/19	In Use
PCB-NE224	Pepsi Beverages Company	11701 Roosevelt Blvd 19154	Boiler Room	Kellie Caldwell	Transformer	2	<50	465	No	03/05/19	In Use
PCB-NE225	Pepsi Beverages Company	11701 Roosevelt Blvd 19154	Outside	Kellie Caldwell	Transformer	2	<50	465	No	03/05/19	In Use
PCB-NE234	NE Philadelphia Airport	9800 Ashton Rd 19114	Aviation Ins. of Maintenance	Wayne Darney	Transformer	1	<50	140	No	12/12/19	In Use
PCB-NE236	NE Philadelphia Airport	9800 Ashton Rd 19114	By Shop 209	Wayne Darney	Transformer	1	<1	124	No	12/12/19	In Use
PCB-NE237	NE Philadelphia Airport	9800 Ashton Rd 19114	Weather Station	Wayne Darney	Transformer	1	<50	180	No	12/12/19	In Use
PCB-NE238	NE Philadelphia Airport	9800 Ashton Rd 19114	Keystone Bld	Wayne Darney	Transformer	1	<50	N/A	No	12/12/19	In Use
PCB-NE239	NE Philadelphia Airport	9800 Ashton Rd 19114	Field Lighting Vault	Wayne Darney	Transformer	1	<1	196	No	12/12/19	In Use
PCB-NE240	NE Philadelphia Airport	9800 Ashton Rd 19114	Hortman	Wayne Darney	Transformer	3	3	N/A	No	12/12/19	In Use
PCB-NE241	NE Philadelphia Airport	9800 Ashton Rd 19114	Airport Tower	Wayne Darney	Transformer	1	<1	170	No	12/12/19	In Use
PCB-NE241	NE Philadelphia Airport	9800 Ashton Rd 19114	Airport Tower	Wayne Darney	Transformer	1	<1	170.4	No	12/12/19	In Use
PCB-NE242	NE Philadelphia Airport	9800 Ashton Rd 19114	Atlantic Aviation	Wayne Darney	Transformer	1	<1	133	No	12/12/19	In Use
PCB-NE243	NE Philadelphia Airport	9800 Ashton Rd 19114	Admin Bld	Wayne Darney	Transformer	1	<50	N/A	No	12/12/19	In Use
PCB-NE244	NE Philadelphia Airport	9800 Ashton Rd 19114	Red Lion Rd	Wayne Darney	Transformer	1	<1	150	No	12/12/19	In Use
PCB-NE259	Zentis North America, LLC	1741 Tomlinson Rd 19116	Bld by Waste Tank	Jennifer Fitzgerald	Transformer	1	0	428	No	07/02/19	In Use
PCB-NE274	Stockwell Elastomerics, Inc.	4749 Tolbut St 19136	Bld 4749	Jay Hough	Capacitor	7	N/A	N/A	No	07/19/19	In Use
PCB-NE279	Cintas Corporation	10080 Sandmeyer Ln 19116	By Tempered Water Tank	Luis Pigi	Capacitor	9	N/A	N/A	No	07/17/19	In Use
PCB-NE280	Agusta	3050-3076 Red Lion Rd 19114	IFO Bld 3050	Laurence Smith	Transformer	1	N/A	N/A	No	09/19/19	In Use
PCB-NE281	Agusta	3076 Red Lion Rd 19114	IFO Bld 3076	Laurence Smith	Transformer	2	N/A	N/A	No	09/19/19	In Use
PCB-NE283	Custom Powder Coating	8451 Hegerman Street 19136	Behind Admin Bld	Bill O'Sullivan	Transformer	1	N/A	N/A	No	04/02/19	In Use
PCB-NE285	NE Philadelphia Airport	9800 Ashton Rd 19114	Runway 15 West End	Wayne Darney	Transformer	1	N/A	N/A	No	12/12/19	In Use
PCB-NE286	NE Philadelphia Airport	9800 Ashton Rd 19114	Emerald Tech Ops	Wayne Darney	Transformer	1	<1	N/A	No	12/12/19	In Use

LocID	NAME:	ADDRESS:	LOCATION	CONTACT	EQUIPMENT	NUMBER	CONC (PPM)	GALLONS	LEAKS?	INSP DATE	STATUS
Receiving Plant: NEWPCP											
PCB-NE287	NE Philadelphia Airport	9800 Ashton Rd 19114	Old Vehicle Shop	Wayne Darney	Transformer	1	<1	N/A	No	12/12/19	In Use
Receiving Plant: NEWPCP											
Drainage Area: MS4		**Total Number of Inspections completed: 26**									
PCB-NE209	C. Lever Colors, Inc.	736 Dunks Ferry Rd 19020	Outside	Kila Estes	Transformer	1	N/A	N/A	No	05/29/19	In Use
Receiving Plant: NEWPCP											
Drainage Area: Township		**Total Number of Inspections completed: 1**									

Receiving Plant: NEWPCP **Total Number of Inspections completed: 40**

LocID	NAME:	ADDRESS:	LOCATION	CONTACT	EQUIPMENT	NUMBER	CONC (PPM)	GALLONS	LEAKS?	INSP DATE	STATUS
Receiving Plant: SEWPCP											
PCB-SE201	Columbia Silk Dyeing Co., Inc.	1726 N. Howard St 19122	Vault	Craig Garten	Transformer	3	<50	N/A	No	09/03/19	In Use
PCB-SE202	PECO Oregon	2610 Christopher Columbus Blvd 19148	Parking Lot	George Horvat	Other	20	<50	0	No	06/07/19	Out of Use
PCB-SE203	Simons Brothers Co.	2438 Sergeant St 19125	By Front Door	Nelson Kaiser	Capacitor	1	N/A	N/A	No	07/25/19	In Use
PCB-SE204	Inolex Chemical Company	2101 South Swanson St 19148	Jackson St	Marc Brown	Transformer	1	<50	N/A	No	09/12/19	In Use
PCB-SE205	Ashland Chemical Company	2801 Christopher Columbus Blvd 19148	By Nitrogen	William Celtnieks	Transformer	1	4	370	No	08/14/19	In Use
PCB-SE206	Ashland Chemical Company	2801 Christopher Columbus Blvd 19148	Front Gate	Lars Oortgiesen	Transformer	1	<50	300	No	08/14/19	In Use
PCB-SE207	Ashland Chemical Company	2801 Christopher Columbus Blvd 19148	Roof of Bld 10	Lars Oortgiesen	Transformer	1	<50	238	No	08/14/19	In Use
PCB-SE208	Inolex Chemical Company	2101 South Swanson St 19148	Reactor Dock	Marc Brown	Transformer	3	<50	N/A	No	09/12/19	In Use
PCB-SE209	Inolex Chemical Company	2101 South Swanson St 19148	Waccocoe St	Marc Brown	Transformer	1	NA	N/A	No	09/12/19	In Use
PCB-SE210	Inolex Chemical Company	2101 South Swanson St 19148	Railroad/Swanson St	Marc Brown	Transformer	1	<50	N/A	No	10/12/19	Out of Use
PCB-SE243	National Chemical Laboratories, Inc.	401 N. 10th St 19123	Transformer Room	Harry Pollack	Transformer	4	<50	410	No	05/21/19	In Use
Receiving Plant: SEWPCP											
Drainage Area: Combined		**Total Number of Inspections completed: 11**									
PCB-SE246	PSNY (NFPC)	4747 S. Broad St 19112	S Bld 20 (transformer 4, 5, 10, 11)	Allison Star	Transformer	4	N/A	N/A	No	09/17/19	In Use
PCB-SE247	PSNY (NFPC)	4747 S. Broad St 19112	SW Bld 20 (transformer 6, 7, 8, 9, 12)	Allison Star	Transformer	5	N/A	N/A	No	09/17/19	In Use
Receiving Plant: SEWPCP											
Drainage Area: MS4		**Total Number of Inspections completed: 2**									
Receiving Plant: SEWPCP		**Total Number of Inspections completed: 13**									

Table B2

LocID	NAME:	ADDRESS:	LOCATION	CONTACT	EQUIPMENT	NUMBER	CONC (PPM)	GALLONS	LEAKS?	INSP DATE	STATUS
Receiving Plant: SWWPCP											
PCB-SW064	SPC Corp	2600 Penrose Ferry Ave 19145	Bld Exterior	N/A	Transformer	0	0	0	No	09/16/19	Removed From Site
PCB-SW065	SPC Corp	2600 Penrose Ferry Ave 19145	Bld SW Room	N/A	Transformer	0	0	0	No	09/16/19	Removed From Site
PCB-SW245	National Railroad Passenger Corp.	30th & Race Sts Amtrak Race St./Penn Coach Yard 19104	Overhead Sub Station #16-#24 in Site Plan	Michael Panhuise	Transformer	8	N/A	800	No	09/24/19	In Use
PCB-SW246	National Railroad Passenger Corp.	30th & Race Sts Amtrak Race St./Penn Coach Yard 19104	Near Generator with Day Tank. #28 in Site Plan	Michael Panhuise	Transformer	1	N/A	800	No	09/24/19	In Use
PCB-SW247	National Railroad Passenger Corp.	30th & Race Sts Amtrak Race St./Penn Coach Yard 19104	Car repair shop #29 on Site Plan	Michael Panhuise	Transformer	1	<50	800	No	09/24/19	In Use
PCB-SW248	National Railroad Passenger Corp.	30th & Race Sts Amtrak Race St./Penn Coach Yard 19104	North of Oil Water Sseparator #39 on Site Plan	Michael Panhuise	Transformer	1	<50	280	No	09/24/19	In Use
PCB-SW249	National Railroad Passenger Corp.	30th & Race Sts Amtrak Race St./Penn Coach Yard 19104	Further North of Oil Water Separator #41 in Site Plan	Michael Panhuise	Transformer	1	<50	280	No	09/24/19	In Use
PCB-SW250	National Railroad Passenger Corp.	30th & Race Sts Amtrak Race St./Penn Coach Yard 19104	SE of Waste Oil Recovery System #42 on site plan	Michael Panhuise	Transformer	1	N/A	280	No	09/24/19	In Use

Receiving Plant: SWWPCP

Drainage Area: Combined **Total Number of Inspections completed: 8**

LocID	NAME:	ADDRESS:	LOCATION	CONTACT	EQUIPMENT	NUMBER	CONC (PPM)	GALLONS	LEAKS?	INSP DATE	STATUS
PCB-SW110	Philadelphia International Airport	8000 Essington Ave 19153	Main Terminal Sub Station	Wayne Darney	Capacitor	96	<1	N/A	No	12/17/19	In Use
PCB-SW140	Philadelphia International Airport	8000 Essington Ave 19153	Atlantic Aviation	Wayne Darney	Transformer	1	<50	280	No	12/17/19	In Use
PCB-SW141	Philadelphia International Airport	8000 Essington Ave 19153	Baggage Claim (Substation BBC)	Wayne Darney	Transformer	4	<1	860	No	12/17/19	In Use
PCB-SW142	Philadelphia Parking Authority	8000 Essington Ave 19153	Parking Garage C Grd Level Ramp	Wayne Darney	Transformer	1	<1	N/A	No	12/17/19	In Use
PCB-SW143	Philadelphia Parking Authority	8000 Essington Ave 19153	Parking Garage D Ground Level Ramp	Wayne Darney	Transformer	1	<1	N/A	No	12/17/19	In Use
PCB-SW203	LSG Sky Chefs	8401 Escort Ave 19153	Admin Bld	Peter Klabunde	Transformer	2	<50	N/A	No	09/06/19	In Use
PCB-SW212	G.J. Littlewood & Son, Inc.	4045 Main St 19127	Vault	Robert Littlewood	Transformer	5	<50	N/A	No	07/24/19	In Use
PCB-SW243	Tasty Baking	4300 South 26th St 19112	Bld Rear	Pat West	Transformer	1	<50	N/A	No	09/04/19	In Use

Receiving Plant: SWWPCP

Drainage Area: MS4 **Total Number of Inspections completed: 8**

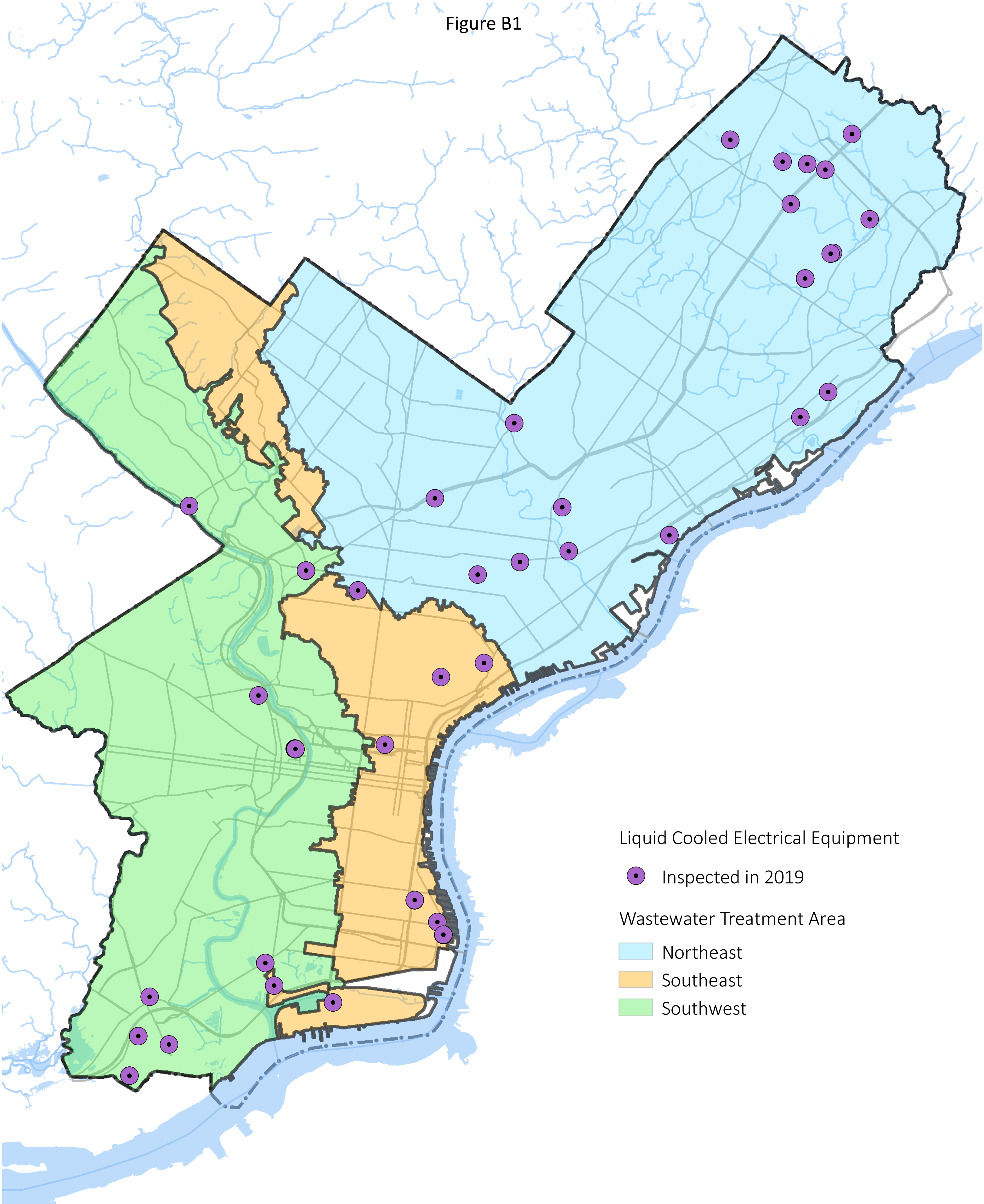
Table B2

LocID	NAME:	ADDRESS:	LOCATION	CONTACT	EQUIPMENT	NUMBER	CONC (PPM)	GALLONS	LEAKS?	INSP DATE	STATUS
Receiving Plant: SWWPCP											
PCB-SW218	Philadelphia Zoo	3400 W. Girard Ave 19104	Picnic Grove	Matt Corcoran	Transformer	1	N/A	N/A	No	06/19/19	In Use
PCB-SW222	Philadelphia Zoo	3400 W. Girard Ave 19104	Solitude	Matt Corcoran	Transformer	1	N/A	N/A	No	06/19/19	In Use
Receiving Plant: SWWPCP											
Drainage Area: Non-Contributing			**Total Number of Inspections completed: 2**								
PCB-SW204	Starlite Industries, Inc.	1111 Lancaster Ave 19010	1st Floor Transformer Room	Jay Rosenbluth	Transformer	1	>500	N/A	No	11/26/19	In Use
PCB-SW208	Johnson & Johnson Consumer Inc.	7050 Camp Hill Rd 19034	WWTP	Scott Kessler	Transformer	1	<50	135	No	09/18/19	In Use
PCB-SW213	Astra Foods, Inc.	6430 Market St 19082	Boiler Room T1	Dimitri Poulimenos	Transformer	1	N/A	N/A	No	10/16/19	In Use
PCB-SW214	Astra Foods, Inc.	6430 Market St 19082	South Bld T4	Demitri Poulmentous	Regulator	1	N/A	N/A	No	10/16/19	In Use
PCB-SW215	Astra Foods, Inc.	6430 Market St 19082	East Bld T5	Demitri Poulmentous	Transformer	1	N/A	N/A	No	10/16/19	In Use
PCB-SW216	Astra Foods, Inc.	6430 Market St 19082	Centrifudge Bld West of T4	Demitri Poulmentous	Transformer	1	N/A	N/A	No	10/16/19	In Use
Receiving Plant: SWWPCP											
Drainage Area: Township			**Total Number of Inspections completed: 6**								

Receiving Plant: SWWPCP **Total Number of Inspections completed: 24**

Total Inspections: 77

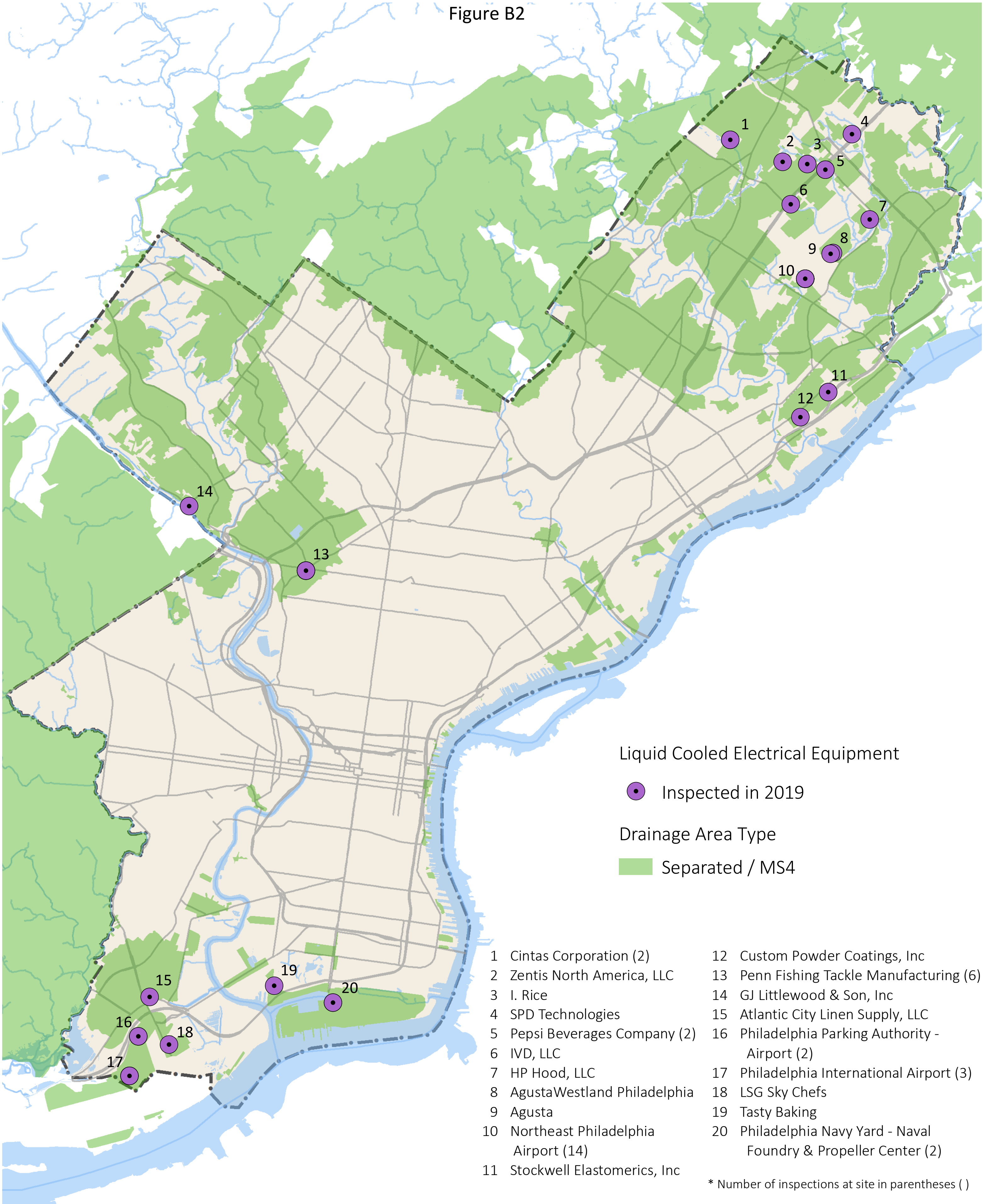
Figure B1



Liquid Cooled Electrical Equipment Sites Inspected in 2019
By Wastewater Treatment Area, Philadelphia, PA

Source: Philadelphia Water Department, 2020
Created By: PWD GIS Unit, Feb 19, 2020

Figure B2

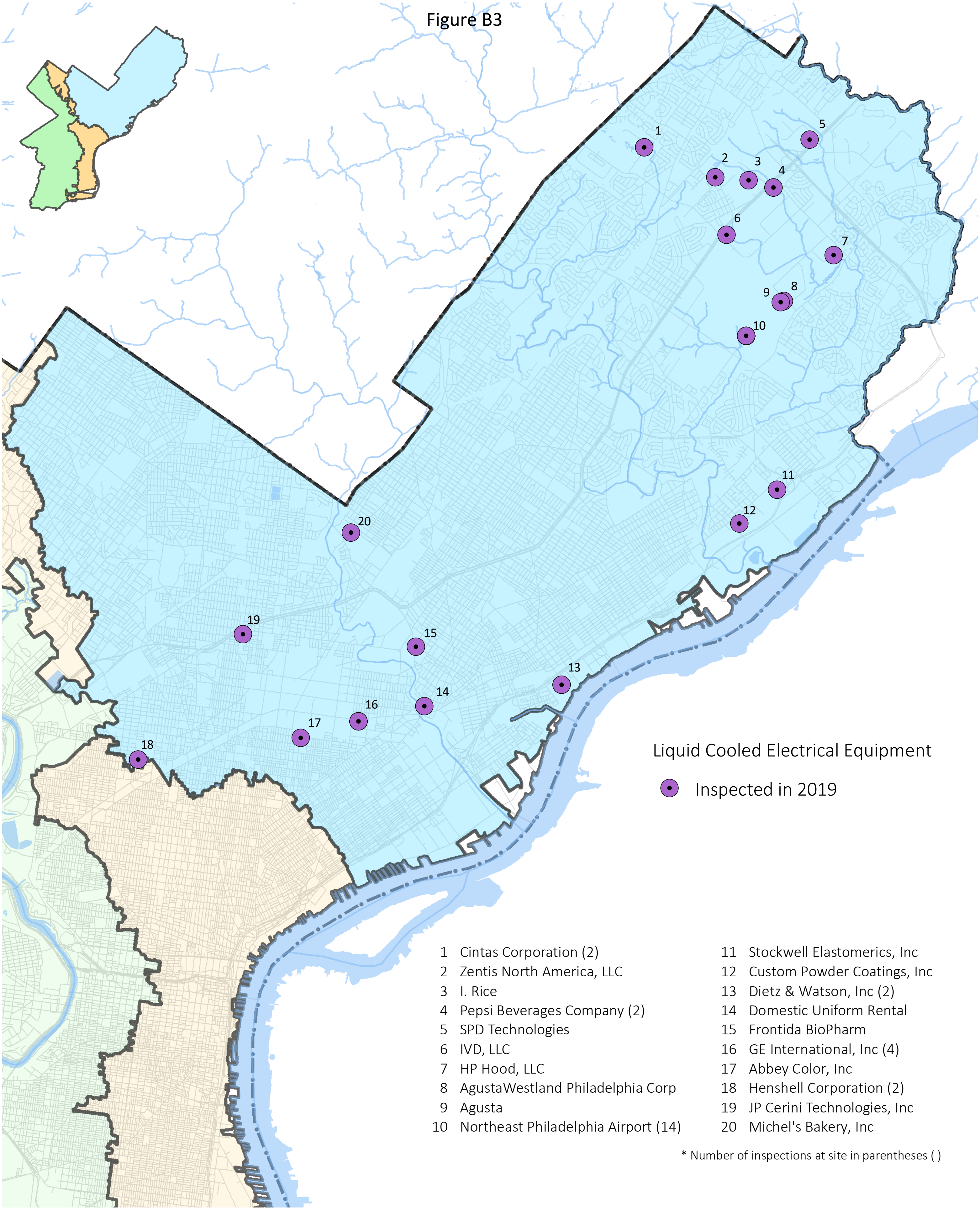


Liquid Cooled Electrical Equipment Sites Inspected in 2019

In MS4 Areas, Philadelphia, PA

Source: Philadelphia Water Department, 2020
Created By: PWD GIS Unit, Feb 19, 2020

Figure B3

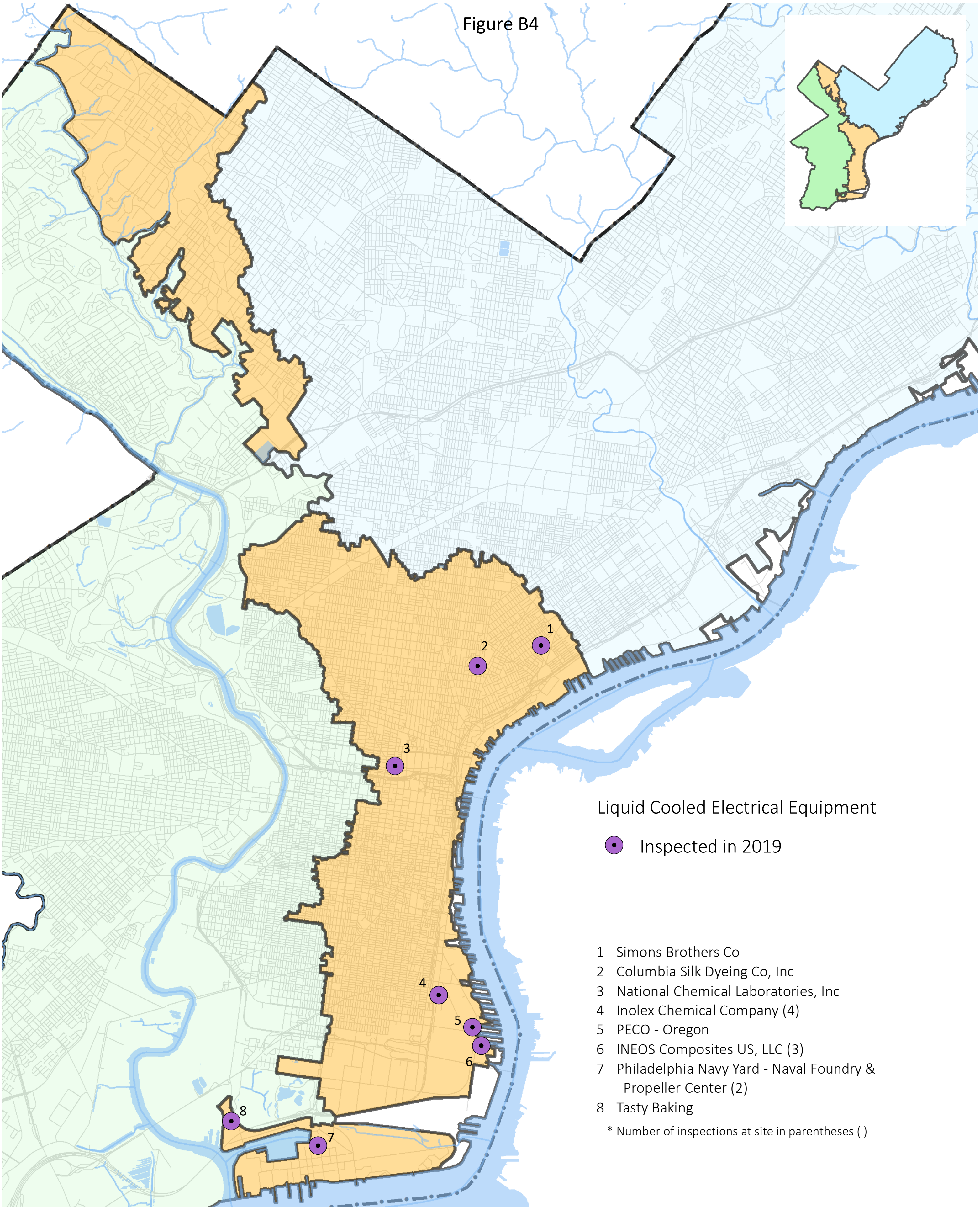


Liquid Cooled Electrical Equipment Sites Inspected in 2019

Northeast Treatment Area, Philadelphia, PA

Source: Philadelphia Water Department, 2020
Created By: PWD GIS Unit, Feb 19, 2020

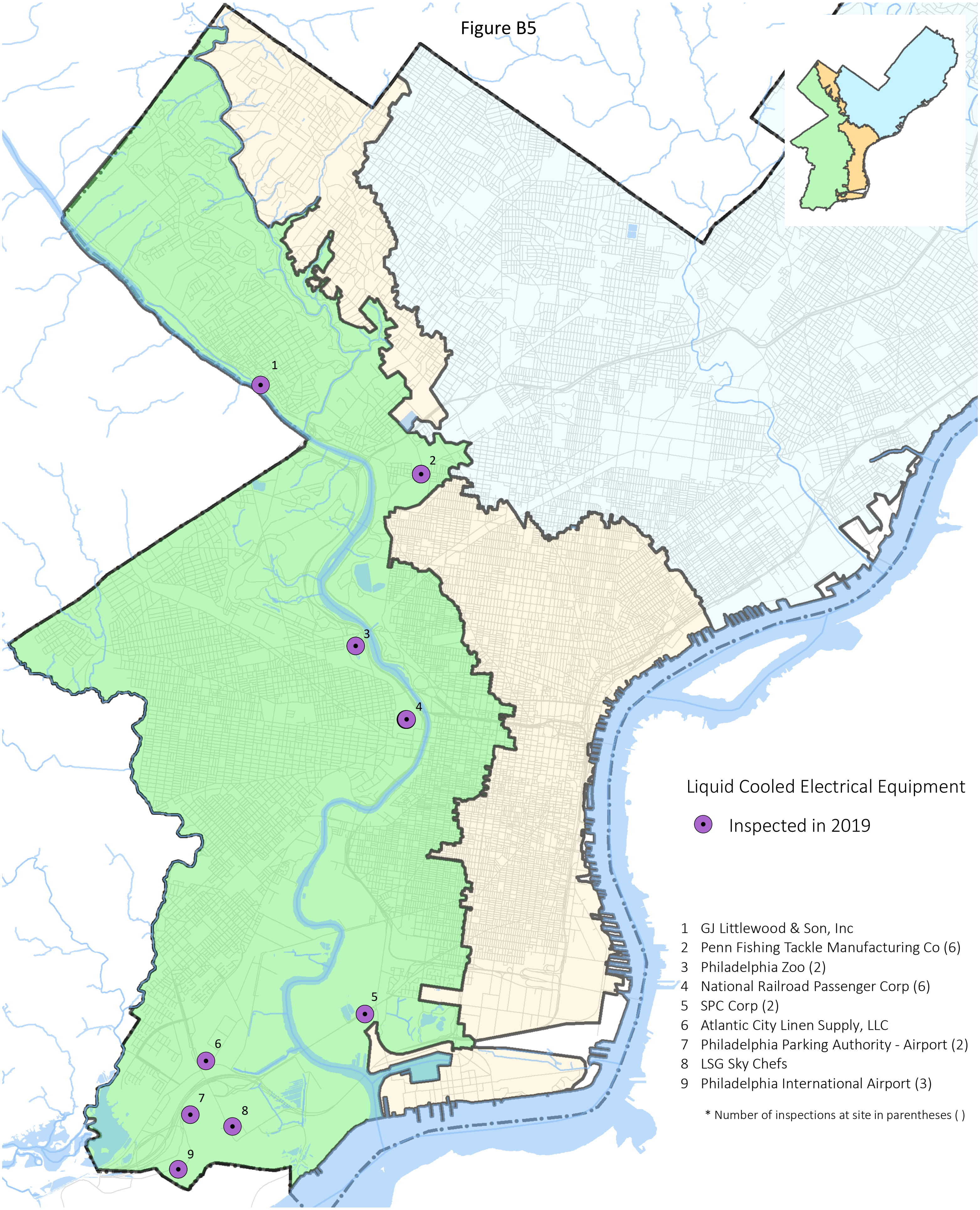
Figure B4



Liquid Cooled Electrical Equipment Sites Inspected in 2019
Southeast Treatment Area, Philadelphia, PA

Source: Philadelphia Water Department, 2020
Created By: PWD GIS Unit, Feb 19, 2020

Figure B5



Liquid Cooled Electrical Equipment Sites Inspected in 2019
Southwest Treatment Area, Philadelphia, PA

Source: Philadelphia Water Department, 2020
Created By: PWD GIS Unit, Feb 19, 2020

Attachment C

Township Connection PCB Summary

Table C1: 2019 Township PCB Summary
PCB Homolog Concentration (µg/L)

Township Location ID	Sample Date	Parameter	"< >"	Data Value	Units	Sample Type
MERMAID	12/17/2019	Decachlorobiphenyls	<	0.49	µg/L	24 Hr Composite
MERMAID	12/17/2019	Dichlorobiphenyls	<	0.099	µg/L	24 Hr Composite
MERMAID	12/17/2019	Heptachlorobiphenyls	<	0.3	µg/L	24 Hr Composite
MERMAID	12/17/2019	Hexachlorobiphenyls	<	0.2	µg/L	24 Hr Composite
MERMAID	12/17/2019	Monochlorobiphenyls	<	0.099	µg/L	24 Hr Composite
MERMAID	12/17/2019	Nonachlorobiphenyls	<	0.49	µg/L	24 Hr Composite
MERMAID	12/17/2019	Octachlorobiphenyls	<	0.3	µg/L	24 Hr Composite
MERMAID	12/17/2019	Pentachlorobiphenyls	<	0.2	µg/L	24 Hr Composite
MERMAID	12/17/2019	Tetrachlorobiphenyls	<	0.2	µg/L	24 Hr Composite
MERMAID	12/17/2019	Trichlorobiphenyls	<	0.099	µg/L	24 Hr Composite

Table C2: 2019 Township PCB Summary
PCB Aroclor Concentration (µg/L)

Township Location ID	Sample Date	Parameter	"< >"	Data Value	Units	Sample Type
ERDENHEIM	9/20/2019	Aroclor 1016	<	0.50	µg/L	24 Hr Composite
ERDENHEIM	9/20/2019	Aroclor 1221	<	0.50	µg/L	24 Hr Composite
ERDENHEIM	9/20/2019	Aroclor 1232	<	0.50	µg/L	24 Hr Composite
ERDENHEIM	9/20/2019	Aroclor 1242	<	0.50	µg/L	24 Hr Composite
ERDENHEIM	9/20/2019	Aroclor 1248	<	0.50	µg/L	24 Hr Composite
ERDENHEIM	9/20/2019	Aroclor 1254	<	0.50	µg/L	24 Hr Composite
ERDENHEIM	9/20/2019	Aroclor 1260	<	0.50	µg/L	24 Hr Composite

Appendix F – Monitoring Locations

APPENDIX F –

MONITORING LOCATIONS

Page

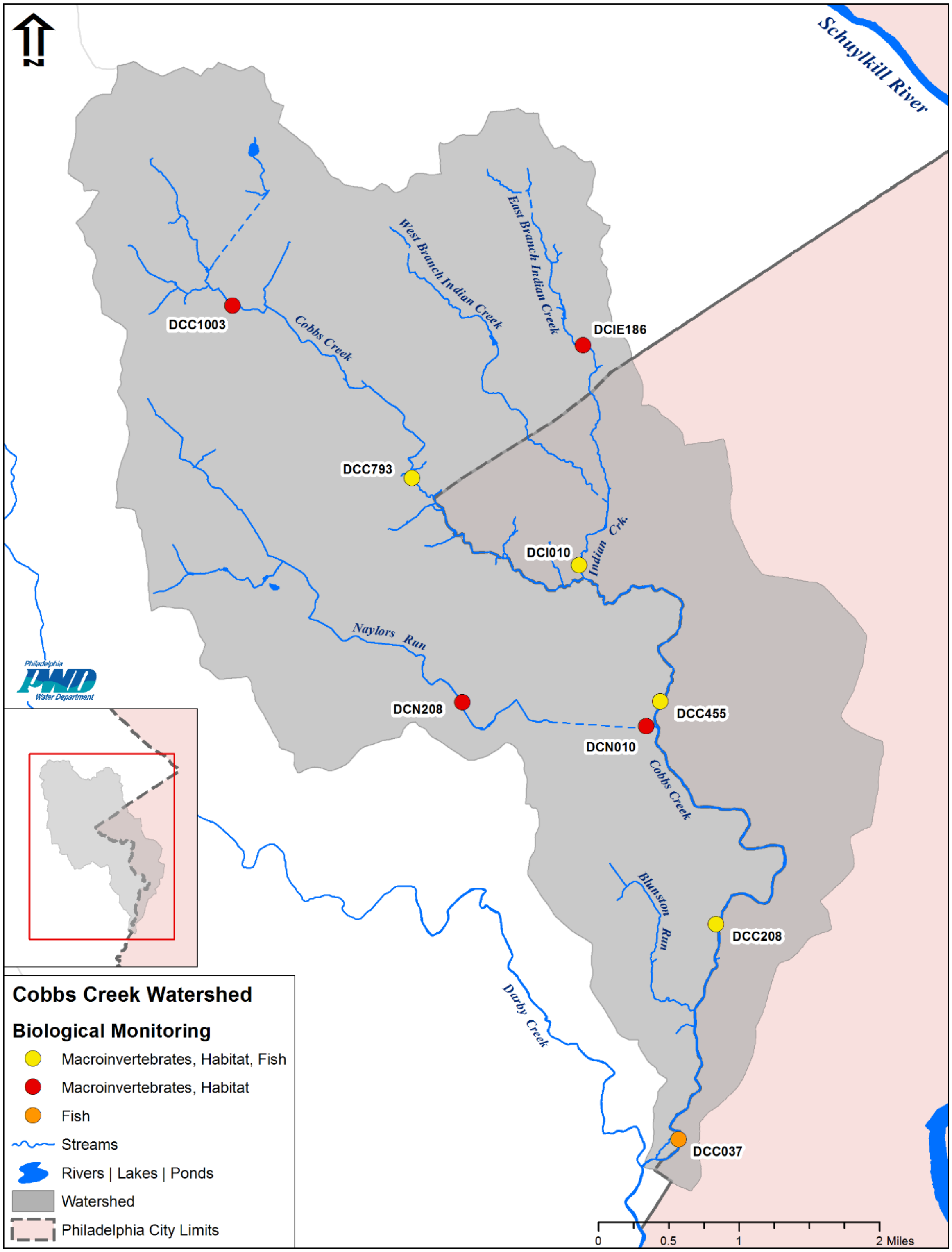


Figure - 1 Biological and Physical assessment locations in Cobbs Creek Watershed

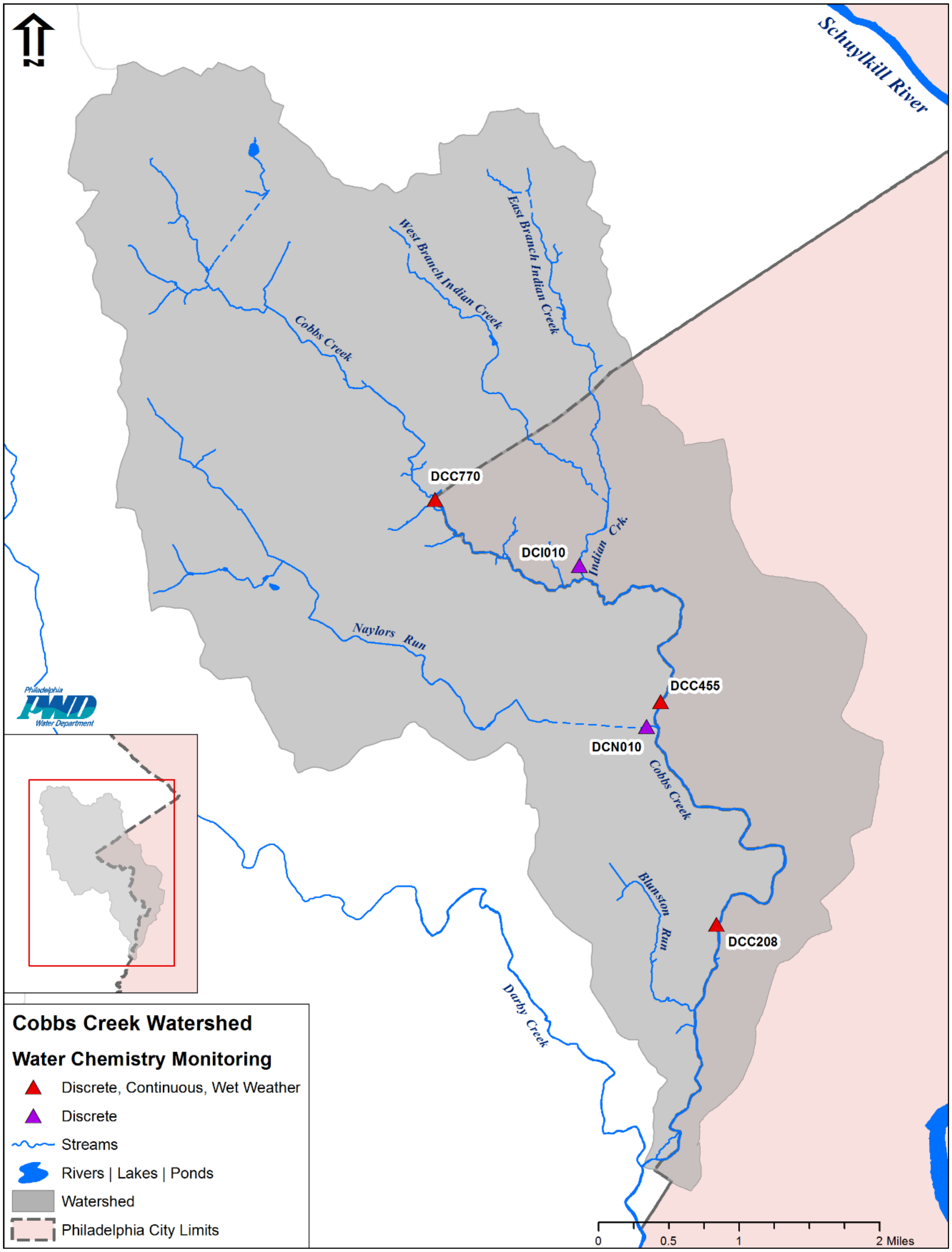


Figure - 2 Chemical monitoring locations in Cobbs Creek Watershed

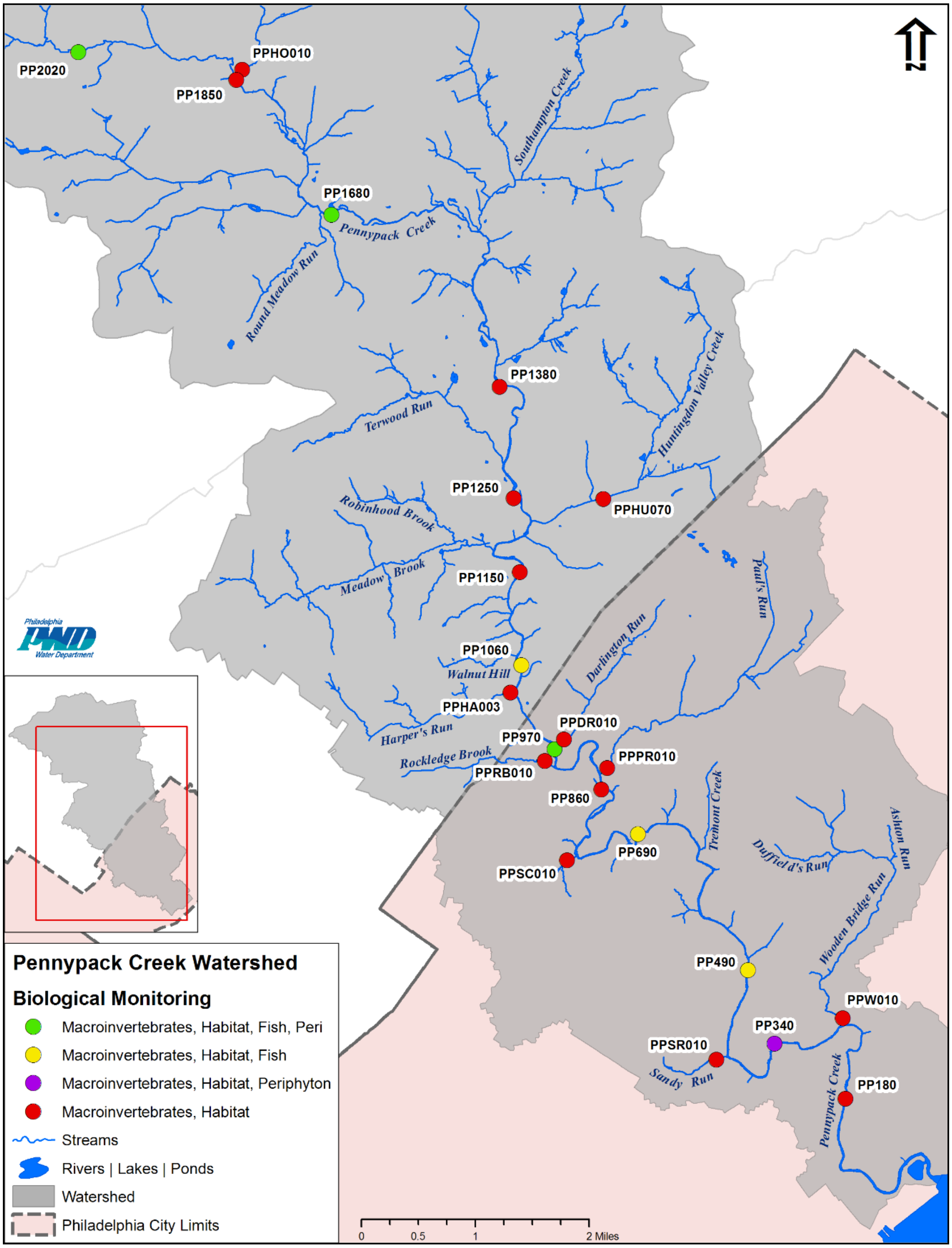


Figure - 3 Biological and Physical assessment locations in Pennypack Watershed

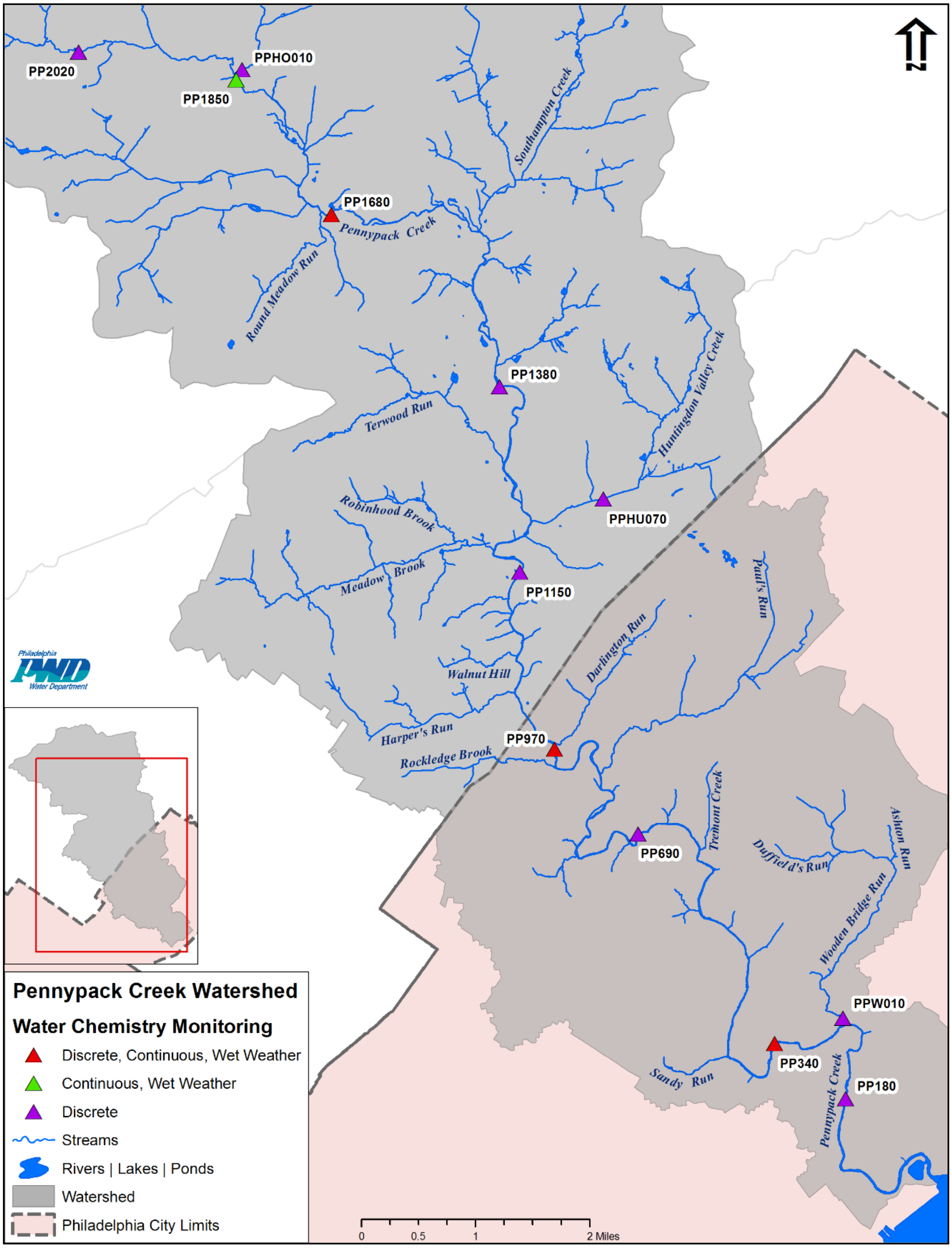


Figure - 4 Chemical monitoring locations in Pennypack Watershed

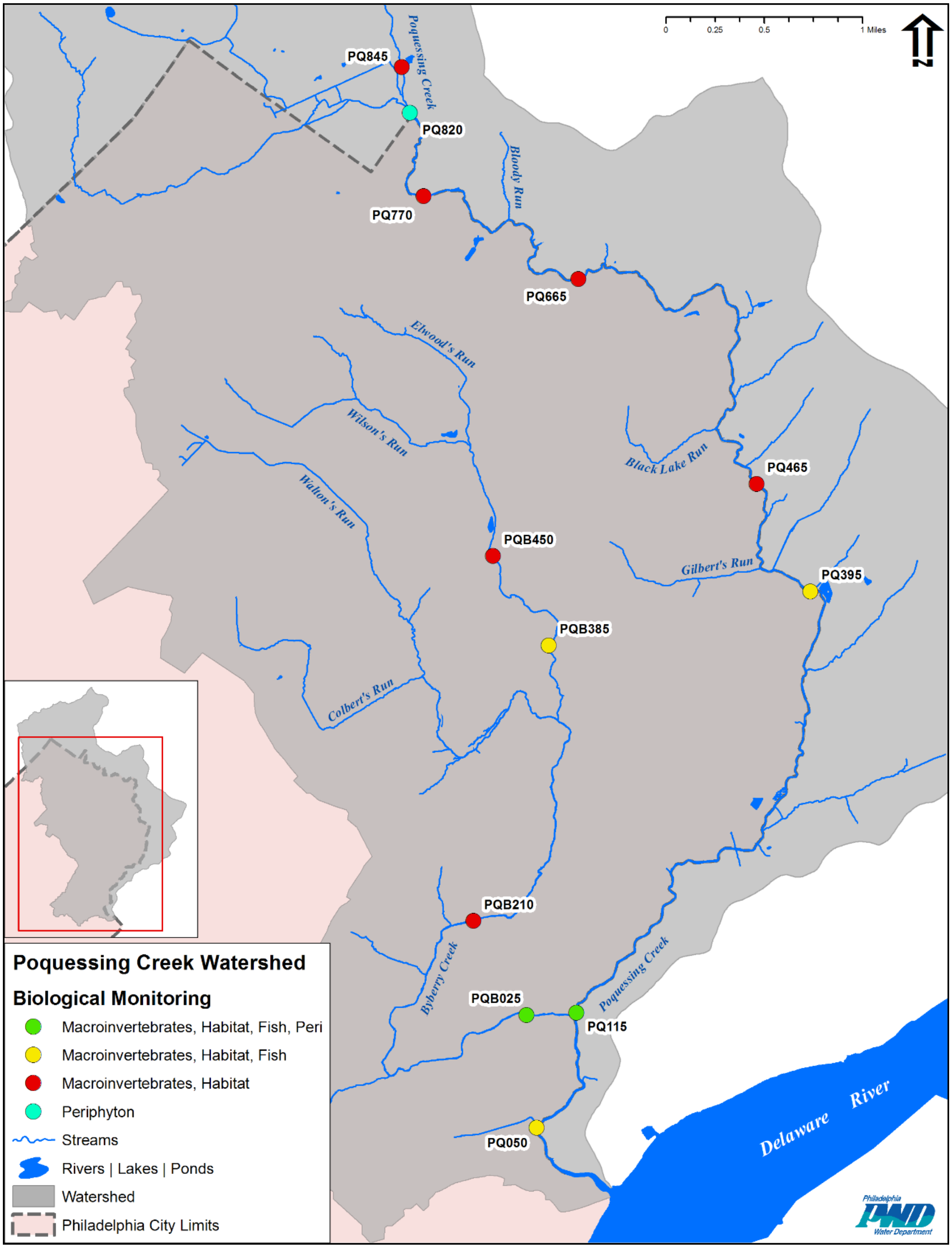


Figure - 5 Biological and Physical assessment locations in Poquessing-Byberry Watershed

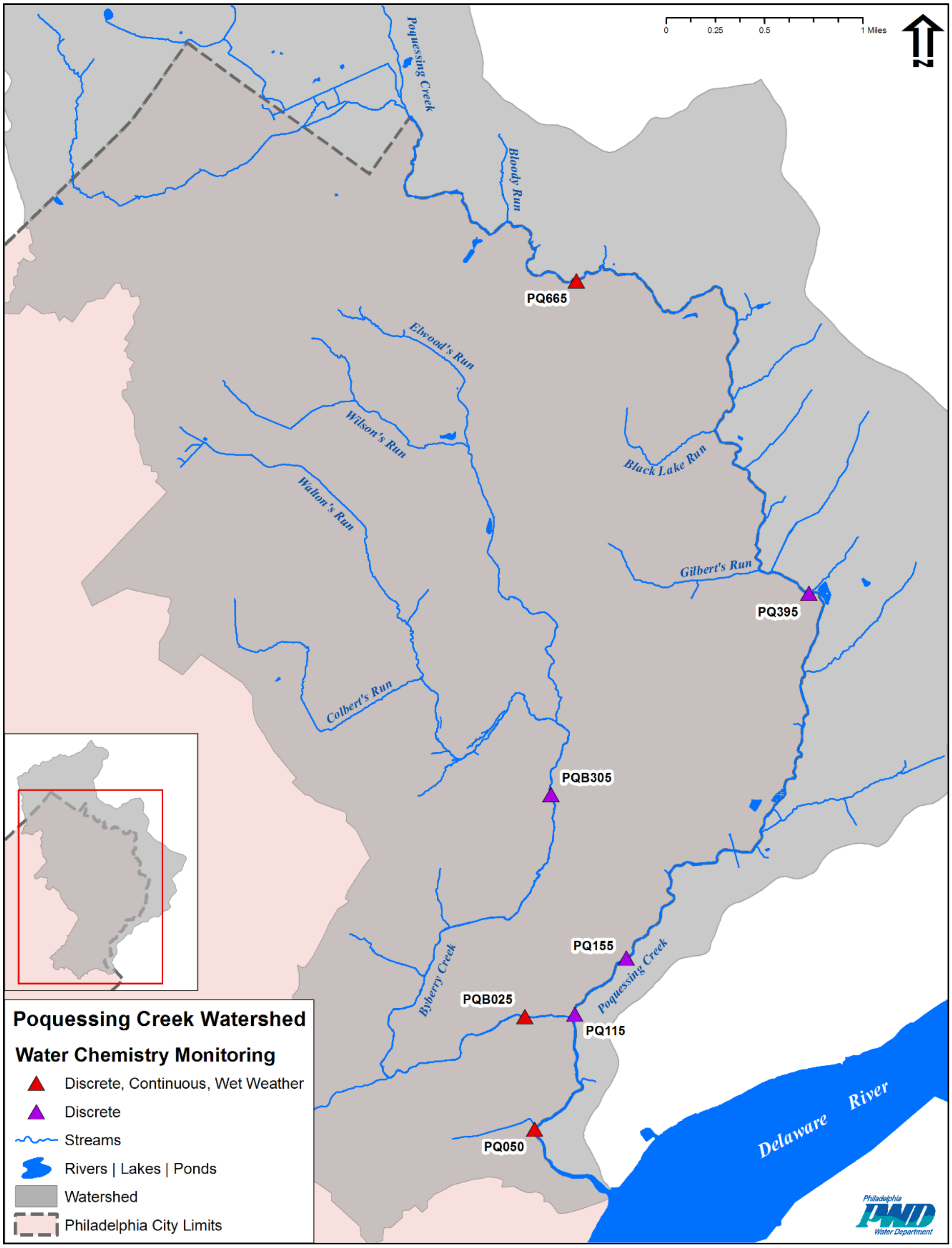


Figure - 6 Chemical monitoring locations in Poquessing-Byberry Watershed

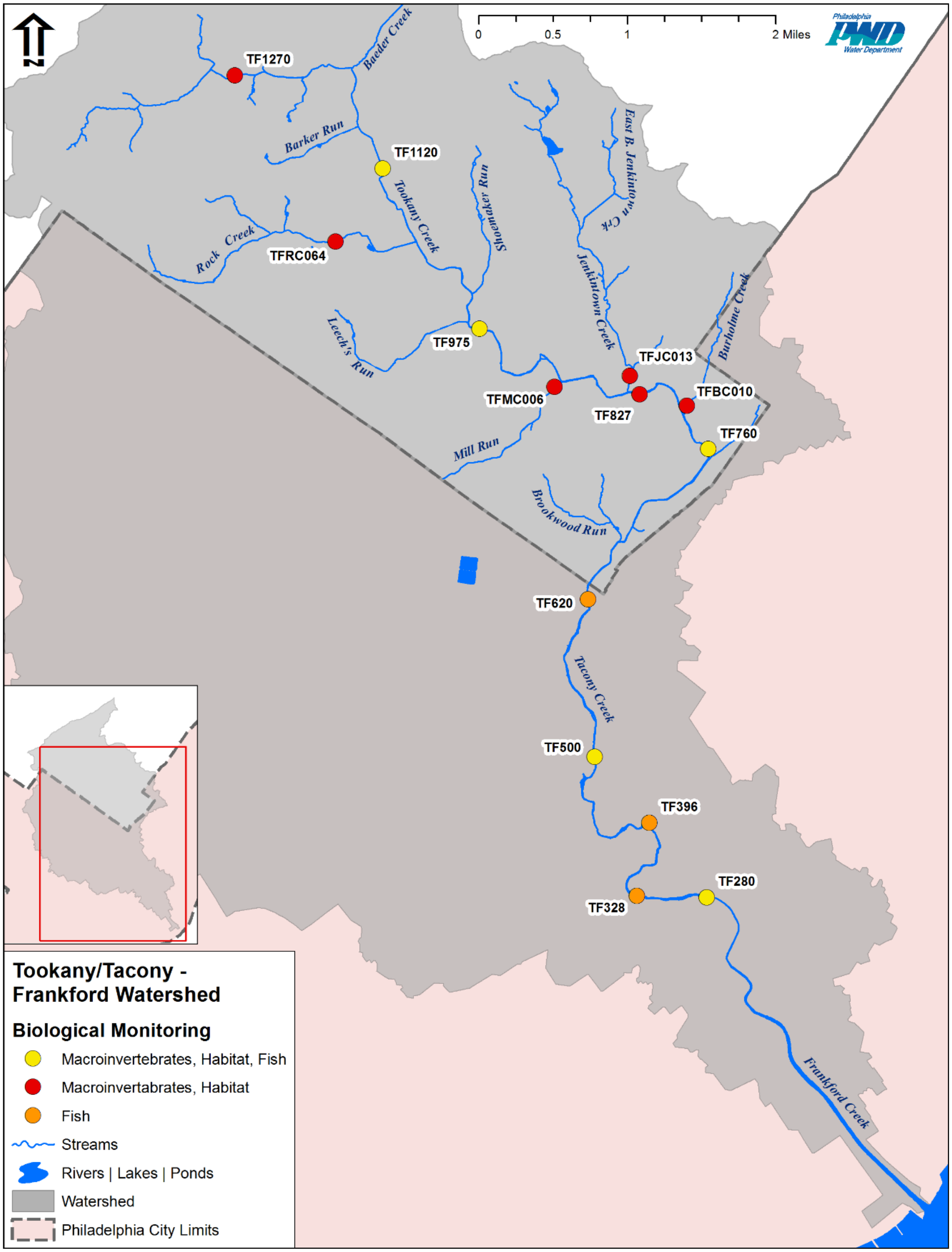


Figure - 7 Biological and Physical assessment locations in Tacony-Frankford Watershed

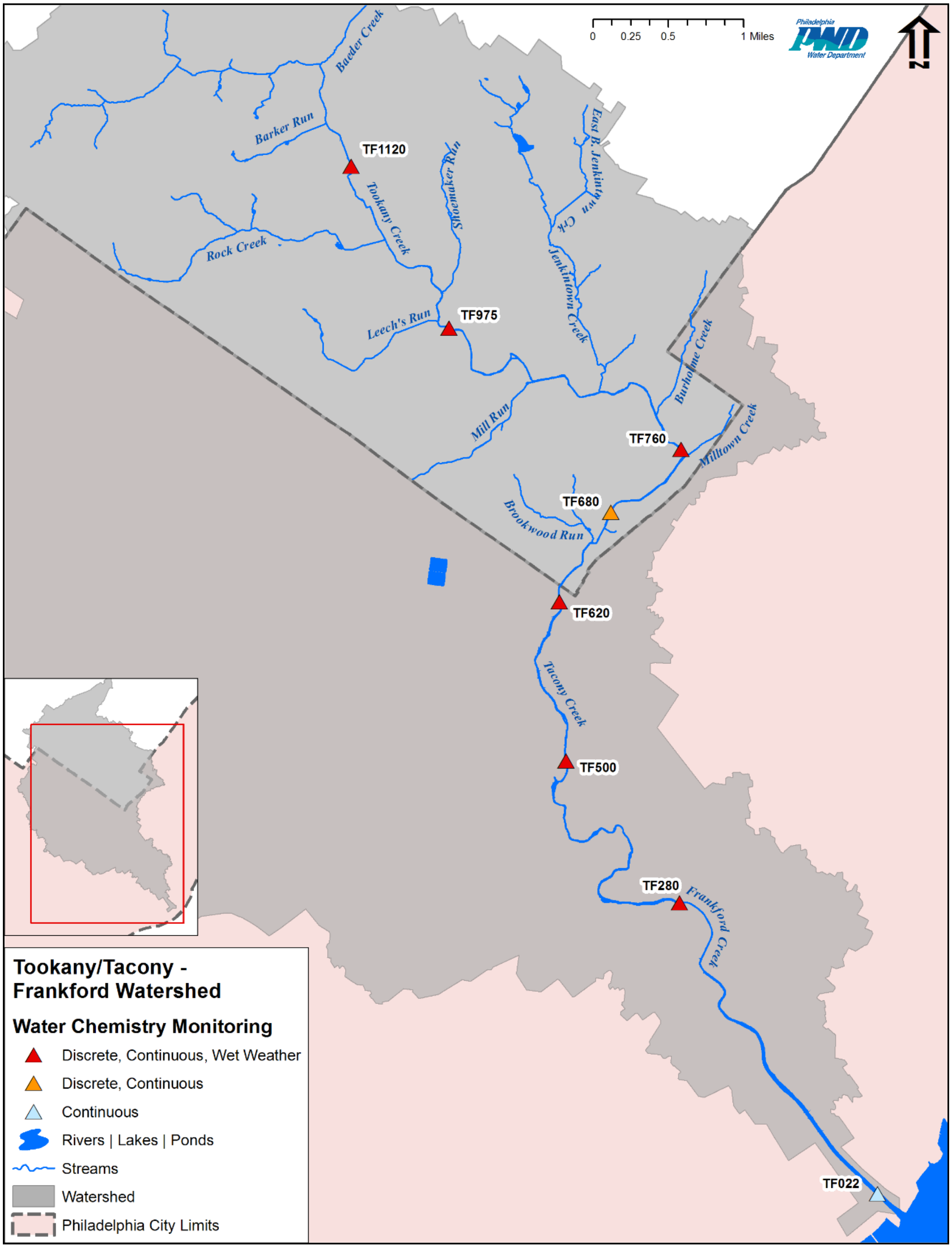


Figure - 8 Chemical monitoring locations in Tacony-Frankford Watershed

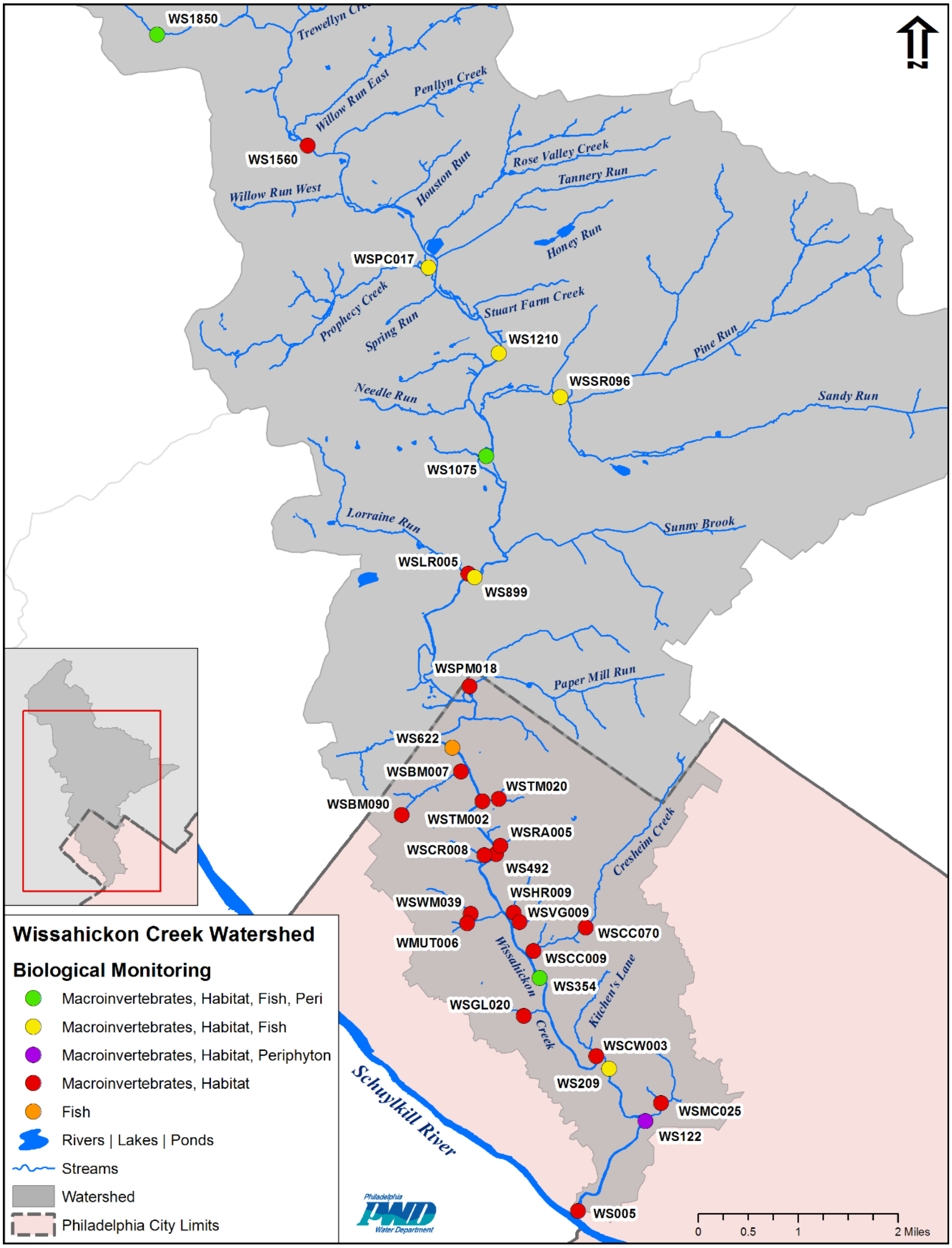


Figure - 9 Biological and Physical assessment locations in Wissahickon Watershed

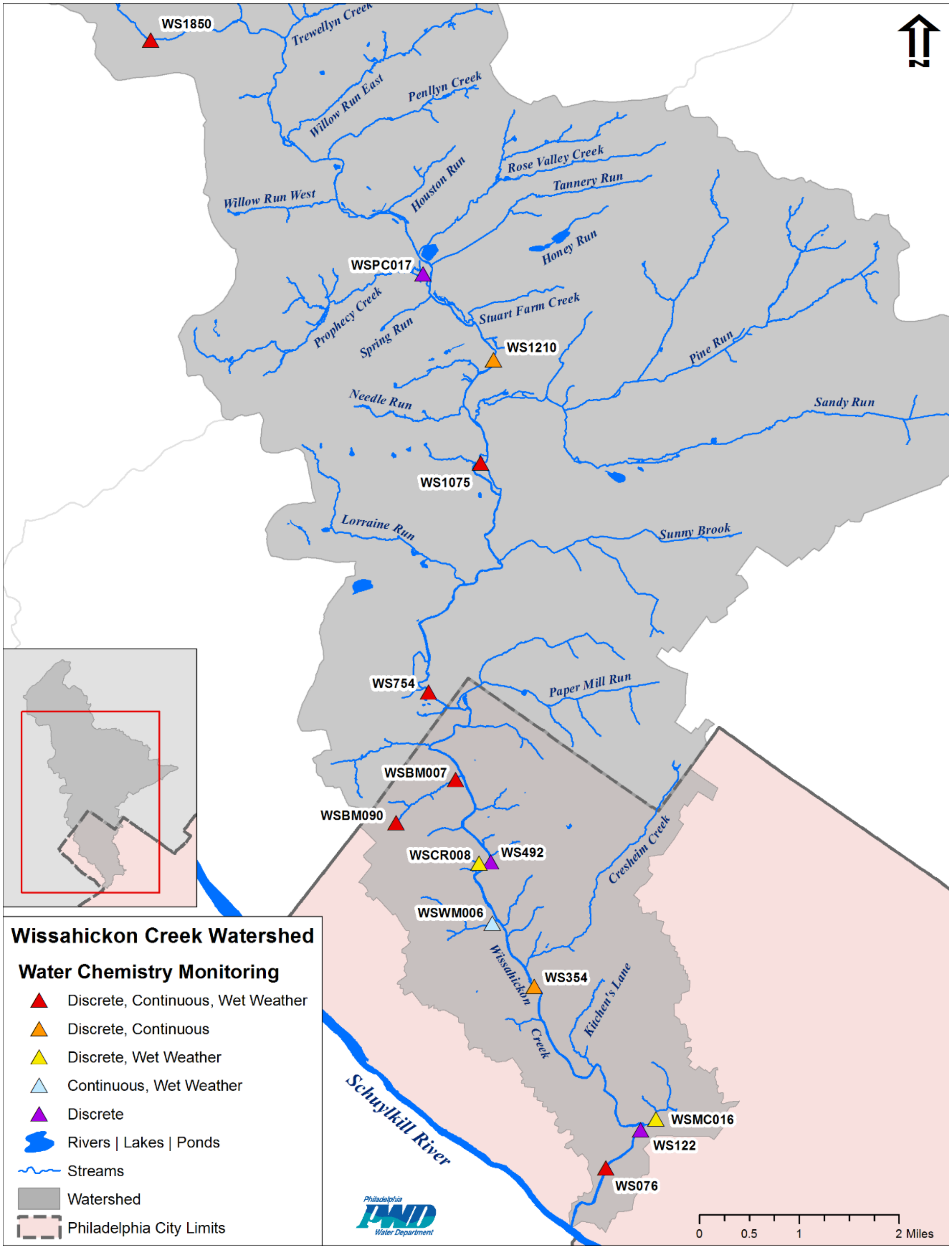


Figure - 10 Chemical monitoring locations in Wissahickon Watershed

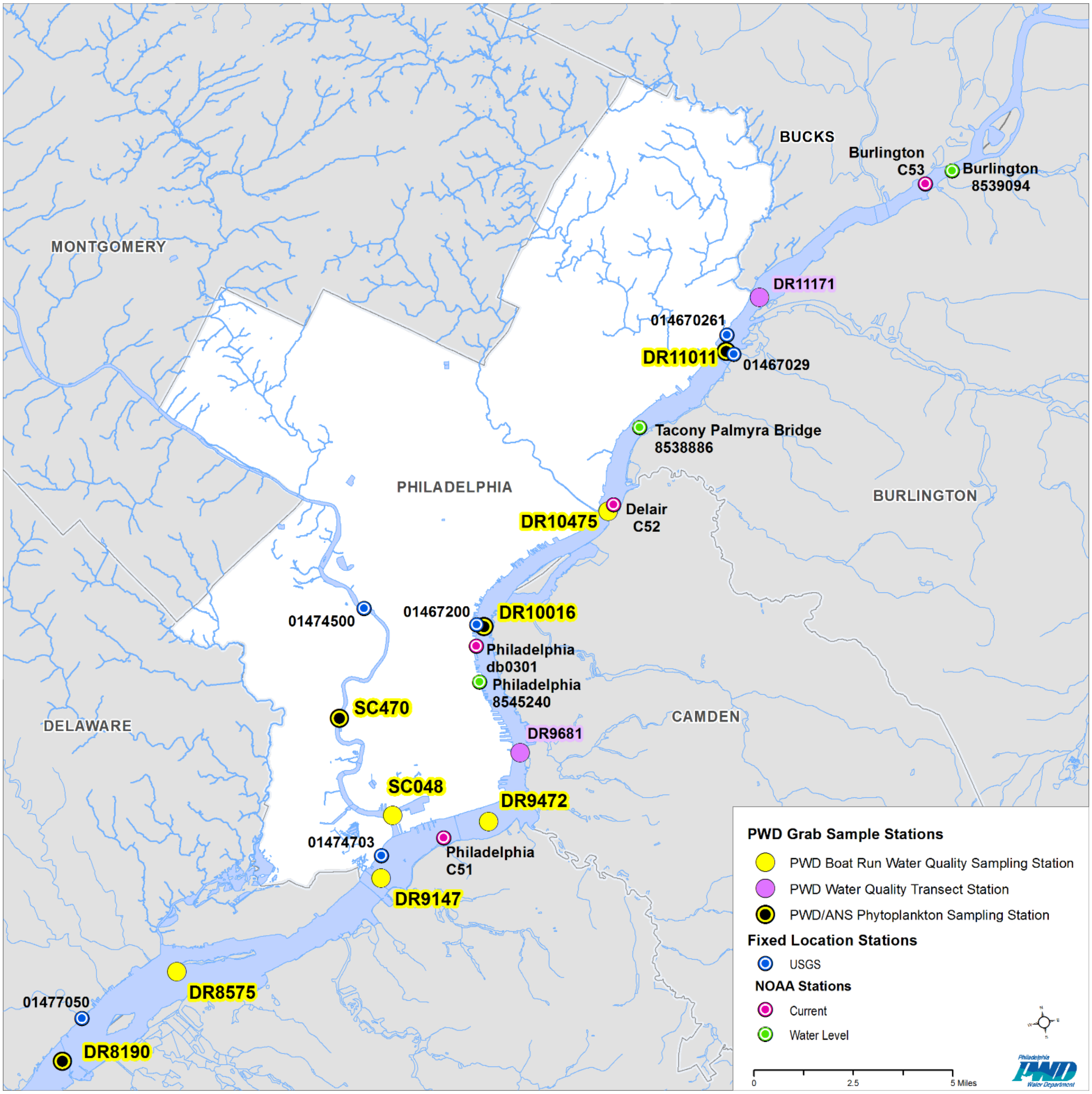


Figure - 11 Chemical monitoring locations in Delaware Estuary and Lower Schuylkill River Watershed

Appendix G – PWD Quarterly Dry Weather Water Quality Monitoring Program

Background

In 2009, the Philadelphia Water Department (PWD) initiated a dry weather water quality sampling program designed to work in tandem with the continuous data collection efforts of the PWD/USGS Cooperative Continuous Water Quality Monitoring Program. Grab samples are collected from 10 sites covering all six of Philadelphia County's watersheds on a quarterly basis by the staff of PWD's Bureau of Laboratory Services (BLS). Data collected through this program are most pertinent to Target A (Dry Weather Water Quality & Aesthetics) of PWD's Integrated Watershed Management Plan (IWMP) Strategy, as outlined in the following section.

The IWMP Target Strategy

IWMPs are designed to meet the goals and objectives of numerous water resources-related regulations and programs. Each IWMP results in a series of implementation recommendations that utilize adaptive management approaches to achieve measurable, watershed-wide benefits. By working with stakeholder groups to prioritize goals and evaluate options, PWD has learned that stakeholder priorities can at times differ from those identified by the data-driven problem identification process. This can present challenges in development and approval of a management alternative for watershed implementation. PWD has developed an approach that addresses what often emerges as a set of high-priority stakeholder concerns while simultaneously addressing the scientifically defined priorities.

By defining three distinct targets to meet the overall plan objectives, priorities identified by stakeholders can be addressed simultaneously with those identified through scientific data. Two of the targets were defined so they could be fully met through implementation of a limited set of options, while the third target would be best addressed through an adaptive management approach. In addition to the three targets, a fourth category has been developed to capture the more programmatic implementation options related to planning, outreach, reporting and continuation of the Watershed Partnership.

Targets are defined here as groups of objectives that each focus on a different problem related to the urban stream system. They can be thought of as different parts of the ultimate goal of fishable and swimmable waters through improved water quality, more natural flow patterns and restored aquatic and riparian habitat. Targets are specifically designed to help focus plan implementation. By defining these targets and designing alternatives and an implementation plan to address the targets simultaneously, the plan will have a greater likelihood of success. It also achieves some of the objectives within a relatively short time frame, providing incentives to the communities and agencies involved in the restoration, as well as immediate benefits to the people living in the watershed. PWD's IWMP planning targets are defined below:

3 Targets of the IWMP

- Aesthetically appealing, accessible streams during dry weather
- Improved stream habitat for fish and macroinvertebrates
- Wet weather water quality that meets fishable and swimmable criteria

Program Support

A number of implementation options deemed appropriate for a given watershed are "programmatic" in nature. While these options may support achievement of Targets A, B, and/or C, implementation of these options alone would not result in achievement of a particular target. These "Program Support" associated options include items such as monitoring, reporting, feasibility studies, outreach/education, and continuation of the Watershed Partnership.

Target A: Dry Weather Water Quality and Aesthetics

Streams should be aesthetically appealing (look and smell good), accessible to the public, and an amenity to the community. Target A was defined with a focus on eliminating sources of sewage discharge and other pollution during dry weather, along with trash removal and litter prevention. Access and interaction with the stream during dry weather has the highest priority, because dry weather flows occur about 60-65% of the time during the course of a year. These are also the times when the public is most likely to be near or in contact with the stream. In dry weather, stream water quality should be similar to background concentrations in groundwater, particularly with respect to bacteria.

Figure 1. Eroded stream bank at Poquessing Creek

Target B: Healthy Living Resources

Improvements to the number, health, and diversity of benthic macroinvertebrate and fish species need to focus on habitat improvement and the creation of refuges for organisms to avoid high velocities during storms. Fluvial geomorphological studies, wetland and streambank restoration/creation projects, and stream modeling should be combined with continued biological monitoring to ensure that correct procedures are implemented to increase habitat heterogeneity within the aquatic ecosystem.

Improving the ability of an urban stream to support viable habitat and fish populations focuses primarily on the elimination or remediation of the more obvious impacts of urbanization on the stream. These include loss of riparian habitat, eroding and undercut banks, scoured streambed or excessive sediment deposits, channelized and armored stream sections, trash buildup, and invasive species. Thus, the primary tool to accomplish Target B is stream restoration.

Target C: Wet Weather Water Quality and Quantity

The third target is to restore water quality to meet fishable and swimmable criteria during wet weather. Improving water quality and flow conditions during and after storms is the most difficult target to meet in the urban environment. During wet weather, extreme increases in streamflow are common, accompanied by short-term changes in water quality. Where water quality and quantity problems exist, options may be identified that address both. Any stormwater management practice that increases infiltration or detains flow will help decrease the frequency of damaging floods; however, the size of such structures may need to be increased in areas where flooding is a major concern. (Reductions in the frequency of erosive flows and velocities will also help protect the investment in stream restoration made as part of Target B.)

Target C must be approached somewhat differently from Targets A and B. Full achievement of this target means meeting all water quality standards during wet weather, as well as elimination of flood-related issues.

Meeting these goals will be difficult. It will be expensive and requires a long-term effort. A rational approach to achieve this target includes stepped implementation with interim goals for reducing wet weather pollutant loads and stormwater flows, along with monitoring for the efficacy of control measures.

Monitoring Locations

Water quality samples are taken at 10 USGS gage sites in the USGS/PWD Cooperative Monitoring Program (Figure 2). Site identification codes used by PWD's Bureau of Laboratory Services (BLS)

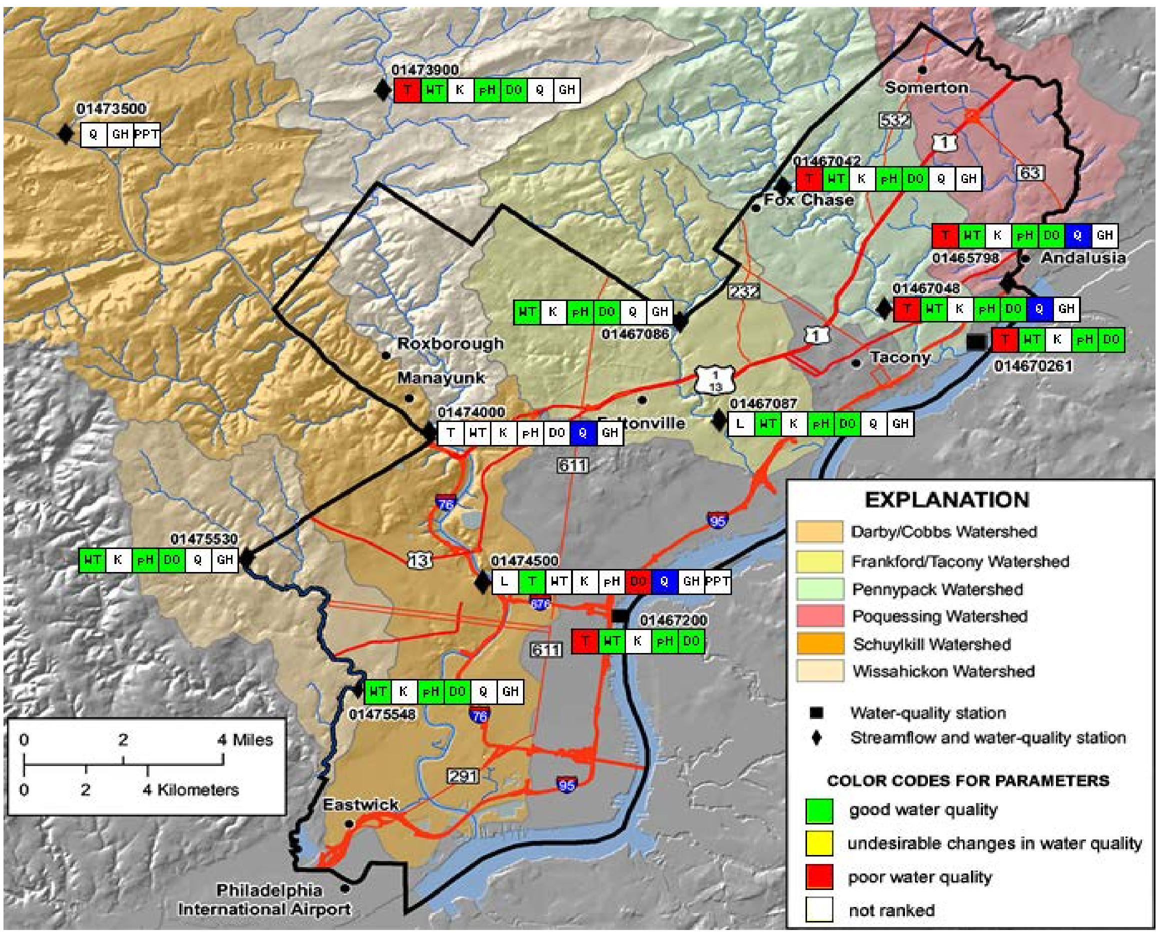


Figure 2. Philadelphia Water Quality Gage Stations as Viewed on Cooperative USGS-PWD Website (https://www.usgs.gov/centers/pa-water/science/philadelphia-water-resources-monitoring-program)

and rivermile-based site ID codes are presented alongside USGS gage station numbers in Table 1. USGS stream gaging stations are ideal monitoring points as they allow discrete sample data to be coupled with continuous discharge data being collected year-round at these sites for loading estimate purposes. Furthermore, grab sample results and field meter readings taken at the time of grab sampling may be invaluable when evaluating continuous water quality data from these USGS gages.

PWD is implementing a City-wide approach to dry weather water quality monitoring, rather than focusing on an individual watershed. Because a number of Green Stormwater Infrastructure (GSI) and other stormwater management projects are in the early stages of implementation, water quality benefits will only be observable over a period of several years.

Gauging the success of such projects on a more immediate scale is best accomplished solely by hydrological analysis. Therefore, the strategic value of the widespread sampling approach is that as more GSI projects are completed over the coming years, the water quality data should gradually begin to reflect their positive environmental impacts.

Table 1. Monitoring Locations in the PWD/USGS Cooperative Program with Location IDs used by PWD Bureau of Laboratory Services and River Mile-Based Site IDs

Description	USGS Gage #	BLS Location ID	Site ID
Cobbs Creek at US Rte. 1 (City Line Ave.)	01475530	COBB700	DCC770
Cobbs Creek at Mt. Moriah Cemetery	01475548	COBB355	DCC251
Schuylkill River at Fairmount Dam	01474500	SCHU154	SC825
Wissahickon Creek at Ft Washington (Rte. 73)	01473900	WISS500	WS1075
Wissahickon Creek at Ridge Ave.	01474000	WISS130	WS076
Tacony Creek at Castor Ave.	01467087	TACO250	TF280
Tacony Creek at Adams Ave.	01467086	TACO435	TF597
Pennypack Creek at Pine Rd.	01467042	PENN407	PP993
Pennypack Creek at Rhawn St.	01467048	PENN175	PP340
Poquessing Creek at Grant Ave.	01465798	POQU150	PQ050

Table 2. PWD/USGS Quarterly Dry Weather Grab Sample Dates

Sample Date	Season	Recreational Use Season
30-Jun-09	summer	Swimming
02-Oct-09	fall	Non-Swimming
17-Dec-09	winter	Non-Swimming
11-Mar-10	spring	Non-Swimming
22-Jun-10	summer	Swimming
15-Sep-10	fall	Swimming
20-Dec-10	winter	Non-Swimming
29-Mar-11	spring	Non-Swimming
27-Jun-11	summer	Swimming
15-Sep-11	fall	Swimming
13-Dec-11	winter	Non-Swimming
20-Mar-12	spring	Non-Swimming
18-Jun-12	summer	Swimming
26-Sep-12	fall	Swimming
02-Jan-13	winter	Non-Swimming
04-Apr-13	spring	Non-Swimming
17-Jul-13	summer	Swimming
26-Sep-13	fall	Swimming
17-Jan-14	winter	Non-Swimming
26-Mar-14	spring	Non-Swimming
17-Jun-14	summer	Swimming
23-Sep-14	fall	Swimming
19-Dec-14	winter	Non-Swimming
18-Mar-15	spring	Non-Swimming
23-Jun-15	summer	Swimming
6-Oct-15	fall	Non-Swimming
6-Jan-16	winter	Non-Swimming
20-Apr-16	spring	Non-Swimming
12-Jul-16	summer	Swimming
22-Sep-16	fall	Swimming
10-Jan-17	winter	Non-Swimming
20-Apr-17	spring	Non-Swimming
11-Jul-17	summer	Swimming
13/22-Sep-17	fall	Swimming
28-Feb-18	winter	Non-Swimming
02-May-18	spring	Swimming
10-Jul-18	summer	Swimming
24-Oct-18	fall	Non-Swimming
17-Jan-19	winter	Non-Swimming
20-Mar-19	spring	Non-Swimming
31-Jul-19	summer	Swimming
2-Oct-19	fall	Non-Swimming
29-Jan-20	winter	Non-Swimming
17-Jun-20	summer	Swimming

Quarterly Dry Weather Monitoring July 2009 – June 2020

Sample Collection Dates

This report summarizes cumulative results from 44 sets of quarterly grab samples that were collected from June 2009 through June 2020. Samples were categorized by season (winter, spring, summer, fall) as well as according to PA DEP seasonal recreational use water quality criteria for interpretation of microbial sample results (Non-Swimming season or Swimming season) (Table 2). Spring 2020 sample collection was cancelled due to COVID-19 pandemic conditions.

Nutrient Analysis

The macronutrients phosphorus and nitrogen are essential to the growth and overall survival of all plants. However, when occurring in surplus they can be extremely detrimental to aquatic ecosystems, and in turn to the human population that utilizes these water bodies for drinking water and recreational activities such as fishing, boating, and swimming. Elevated nutrient concentrations in rivers and streams can most often be attributed to anthropogenic pollution sources. In these situations, the most common sources of both nutrients are runoff from fertilized lawns/farmland and wastewater discharge.

The most immediate result of excessive nutrient concentrations in any natural water body is excessive plant growth, seen in a variety of growth forms from suspended algae to aquatic macrophytes. As the first step in the process of eutrophication, this unnatural acceleration of aquatic plant growth can start a chain reaction leading to highly adverse effects to that ecosystem. For example, in small shallow streams, unnaturally high densities of algal periphyton can cause pronounced fluctuations in dissolved oxygen and pH and also adversely affect aquatic habitat by forming thick mats of filamentous algae or algal scums on stream substrates. Moreover, alteration of the algal community structure can lead to the proliferation of nuisance taxa, taste and odor problems in the drinking water supply, increased water treatment costs and, in rare cases, production of toxins (*e.g.*, from cyanobacteria blooms). As a result of these direct and indirect responses, streams and rivers can suffer severe impacts to both aquatic biodiversity and human recreational use.

It should be noted that several phosphorus-containing compounds, known as polyphosphates, can be found in the region's waterways, but they are naturally occurring and are present due to the geologic composition of the area. Furthermore, these polyphosphates pose little ecological threat as they are not present in a biologically available form. Only over long periods of time can these compounds be broken down into orthophosphates, which plants and algae can absorb and utilize for growth. Therefore, aside from the relatively minor contributions of the region's geology, the most significant source of orthophosphates in rivers and streams is human-generated pollution. It is for this reason that orthophosphates, along with nitrates, are included as components of this water quality monitoring program. These forms of N and P are readily available to stream producers.

Ammonia, present in surface waters as un-ionized ammonia gas (NH_3) or as ammonium ion (NH_4^+), is produced by deamination of organic nitrogen-containing compounds such as proteins, and also by hydrolysis of urea. In the presence of oxygen, ammonia is converted to nitrate (NO_3^-) by a pair of bacteria-mediated reactions, together known as the process of nitrification. Nitrification occurs quickly in oxygenated waters with sufficient densities of nitrifying bacteria, effectively reducing ammonia concentration, although at the expense of increased NO_3^- concentration. Ammonia is a primary form of nitrogen produced from excretory waste products and other organic material in sewage. Thus, presence of ammonia can be an indicator of sewage pollution. As ammonia is converted to nitrate in oxygenated streams, ammonia is a non-conservative pollution indicator that tends to decrease in concentration with increasing distance from the source of pollution. PA DEP water quality criteria for NH_3 reflect the relationship between stream pH, temperature, and ammonia dissociation. Ammonia toxicity is inversely related to hydrogen ion [H^+] concentration (*e.g.*, an increase in pH from 7 to 8 increases NH_3 toxicity by approximately an order of magnitude). At pH 9.5 and above, even background concentrations of NH_3 may be considered potentially toxic.

Ammonia may be introduced to streams through fertilizers, breakdown of natural organic material, stables and livestock operations, stormwater runoff, and in some cases from more serious anthropogenic sources of untreated sewage such as defective laterals, crossed/illicit connections, and sanitary sewer overflows (SSOs). PWD has established intensive field infrastructure trackdown, infrared photography, sewer camera monitoring, and dye testing programs to identify and correct these problems where and when they occur.

Nutrient Results

Nutrient data collected thus far at each of the sites are generally consistent with the data collected for Comprehensive Characterization Reports (CCRs) prepared for each of the respective watersheds. Five of 10 sites are not affected by treated wastewater discharges and usually had orthophosphate concentration less than the reporting limit. The reporting limit for the majority of samples was 0.05 mg/L, but limits of 0.1 mg/L and 0.09 mg/L were also in effect at various times during the quarterly grab sampling program (Table 3). Conversely, Pennypack and Wissahickon creeks had multiple instances of elevated orthophosphate concentration, which is likely attributable to point source discharge of treated wastewater. Dilution effects were seen between upstream and downstream gages, particularly in the cases of Pennypack and Wissahickon creeks.

Though the Schuylkill River sampling station is downstream from several discharges of treated wastewater, nutrient concentrations are generally smaller than those observed from the Pennypack and Wissahickon creeks, perhaps reflecting the Schuylkill station's much larger overall watershed size and dilution capacity.

Summary statistics for the orthophosphate samples, including results from the application of the PA DEP Chemistry Statistical Assessments protocol (PA DEP, 2007), are shown in Table 3. Exceedances were evaluated relative to the US EPA (2000) Subecoregion 64 guideline for orthophosphate of 0.02625 mg/L, *i.e.*, the median of the 25th percentile seasonal concentrations. Since the detection limit in past analyses has often been greater than the guideline, all non-detected samples were considered "possible exceedances." The nonparametric statistical assessment results show that the locations at Pennypack and Wissahickon creeks, and the Schuylkill River, failed to attain water quality consistent with this guideline. The other locations are classified as needing further evaluation due to the predominance of samples below the detection limit that are all possible exceedances.

Similar examples of wastewater discharge impacts and upstream/downstream dilution have also begun to emerge with regard to the nitrate data that have been collected. The data seem to indicate a trend toward decreased nitrate

Table 3. Orthophosphate Summary Statistics and Assessments. (Concentrations in mg/L)

Gage	Mean	Median	Std. dev.	Min.	Max.	n	n, non-detects	Exceedances	Possible Exceedances	Assessment
1465798	0.054	0.050	0.022	0.014	0.100	44	34	6	34	Needs more evaluation
1467042	0.332	0.254	0.218	0.099	0.953	42	0	37	0	Non-attaining
1467048	0.233	0.180	0.166	0.053	0.852	44	0	40	0	Non-attaining
1467086	0.059	0.050	0.053	0.000	0.363	43	31	5	31	Needs more evaluation
1467087	0.059	0.050	0.030	0.011	0.177	44	29	9	29	Needs more evaluation
1473900	0.278	0.262	0.124	0.050	0.723	44	1	40	1	Non-attaining
1474000	0.163	0.157	0.060	0.050	0.414	43	3	37	3	Non-attaining
1474500	0.137	0.107	0.087	0.050	0.367	44	5	36	5	Non-attaining
1475530	0.052	0.050	0.023	0.019	0.100	44	33	3	33	Needs more evaluation
1475548	0.058	0.050	0.030	0.000	0.152	43	33	5	33	Needs more evaluation

concentrations during warmer months, which would correspond to the increased uptake of nutrients by plant life during those growing seasons (Table 4 and Figure 4). The only exceptions are the Pennypack and Wissahickon Creek gage sites, which as previously stated are directly impacted by treated wastewater discharge. It should be noted, however, that these statements and observations are in no way conclusive given that the dataset is still relatively limited in size. As this dataset grows in subsequent years, further statistical analysis can be carried out and any apparent patterns or phenomena can be explored.

Summary statistics for the nitrate samples, including results from application of the PA DEP Chemistry Statistical Assessment protocol (PA DEP, 2007), are shown in Table 4. Exceedances were evaluated relative to a) the PA DEP water quality standard for nitrite and nitrate of 10 mg/L, and b) the US EPA (2000) subecoregion 64 guideline for nitrite and nitrate of 0.995 mg/L, *i.e.*, the median of the 25th percentile seasonal concentrations. The nonparametric statistical assessment results show that with respect to the PA DEP standard, all locations were in attainment except the upstream Wissahickon gage. One exceedance at 12 mg/L was observed at that site, and more data is needed to make an evaluation. All sites failed to attain water quality consistent with the US EPA subecoregion-based guideline.

Quarterly dry-weather analysis of ammonia began in the fall of 2011, limiting the size of the current dataset to approximately 35 results per location. PWD laboratory reporting limits for ammonia fluctuated based on the performance of lab analytical equipment with spiked and blank samples. Ammonia concentration detection limits were 0.5 mg/L for the fall 2011 sample set, and the subsequent sample set results had detection limits of 0.1 mg/L or 0.167 mg/L. Ammonia concentration exceeded the detection limit in only 32 of the 349 samples: The downstream Tacony site (01467087) most often exceeded the detection limit, where a maximum concentration of 0.4 mg/L was observed in both fall 2014 and summer 2015. Results are shown in Table 5 and Figure 5.

There were no observed violations of ammonia water quality criteria at any site during this period of dry-weather monitoring. With 317 of the 349 sample results characterized as non-detects due to laboratory reporting limits, ammonia criteria was calculated with corresponding temperature and pH values to determine if possible exceedances existed (i.e., the criteria fell below the detection limit). None of the non-detect samples had the potential to violate water quality criteria.

Table 4. Nitrate Summary Statistics and Assessments. Concentrations are in mg/L.

Gage	Mean	Median	Std. dev.	Min.	Max.	n	n, non-detects	Exceedances, PADEP	Exceedances, Subecoregion	PADEP Assessment	EPA Subecoregion Assessment
1465798	1.768	1.707	0.549	0.797	3.750	42	0	0	42	Attaining	Non-attaining
1467042	4.495	4.125	0.966	3.200	7.943	40	0	0	40	Attaining	Non-attaining
1467048	3.564	3.386	1.037	1.209	6.326	42	0	0	42	Attaining	Non-attaining
1467086	2.491	2.257	1.223	1.510	9.740	41	0	0	41	Attaining	Non-attaining
1467087	1.827	1.800	0.706	0.505	3.373	43	0	0	40	Attaining	Non-attaining
1473900	5.938	5.420	1.959	2.690	12.039	41	0	1	42	Needs more evaluation	Non-attaining
1474000	3.961	3.892	0.925	1.288	6.180	42	0	0	41	Attaining	Non-attaining
1474500	2.972	2.950	0.432	2.141	3.960	43	0	0	43	Attaining	Non-attaining
1475530	2.974	2.971	0.323	2.489	3.521	43	0	0	43	Attaining	Non-attaining
1475548	2.501	2.527	0.533	1.395	3.500	42	0	0	42	Attaining	Non-attaining

Table 5. Ammonia Summary Statistics and Assessments. Concentrations are in mg/L.

Gage	Mean	Median	Std. dev.	Min.	Max.	n	n, non-detects	Exceedances
1465798	0.121	0.100	0.073	0.041	0.500	35	28	0
1467042	0.125	0.100	0.079	0.027	0.500	35	31	0
1467048	0.124	0.100	0.079	0.043	0.500	35	30	0
1467086	0.117	0.100	0.072	0.020	0.500	35	32	0
1467087	0.161	0.121	0.102	0.028	0.500	35	19	0
1473900	0.122	0.100	0.080	0.023	0.500	35	32	0
1474000	0.116	0.100	0.073	0.024	0.500	35	33	0
1474500	0.129	0.100	0.073	0.075	0.500	35	27	0
1475530	0.117	0.100	0.073	0.030	0.500	35	33	0
1475548	0.116	0.100	0.073	0.040	0.500	34	29	0

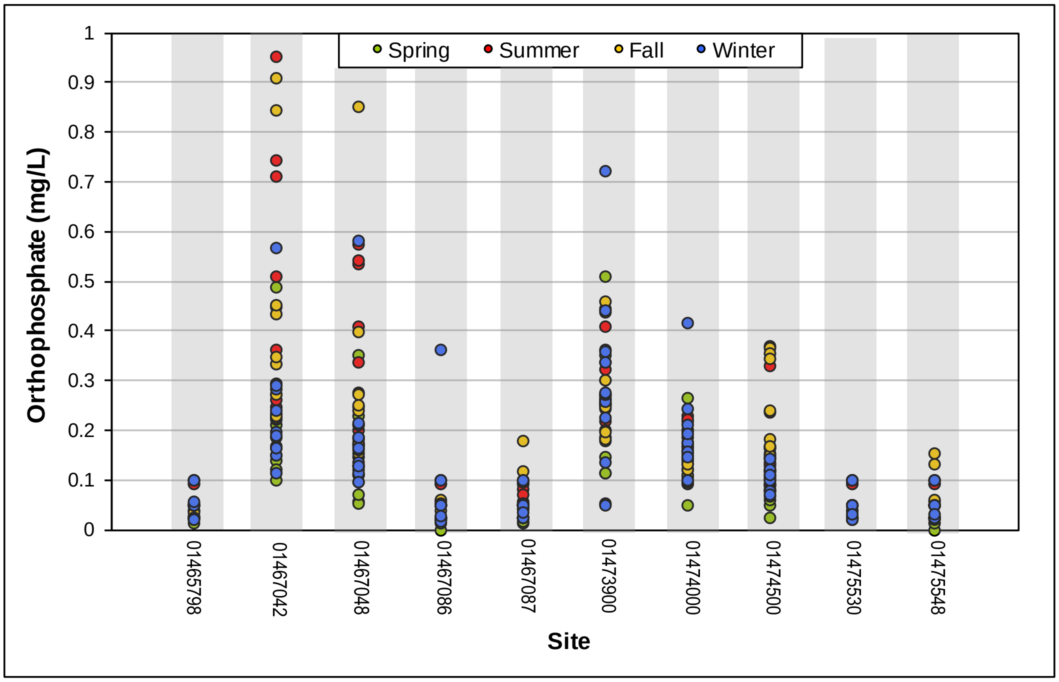


Figure 3. Orthophosphate concentration at 10 USGS gage stations, July 2009-June 2020

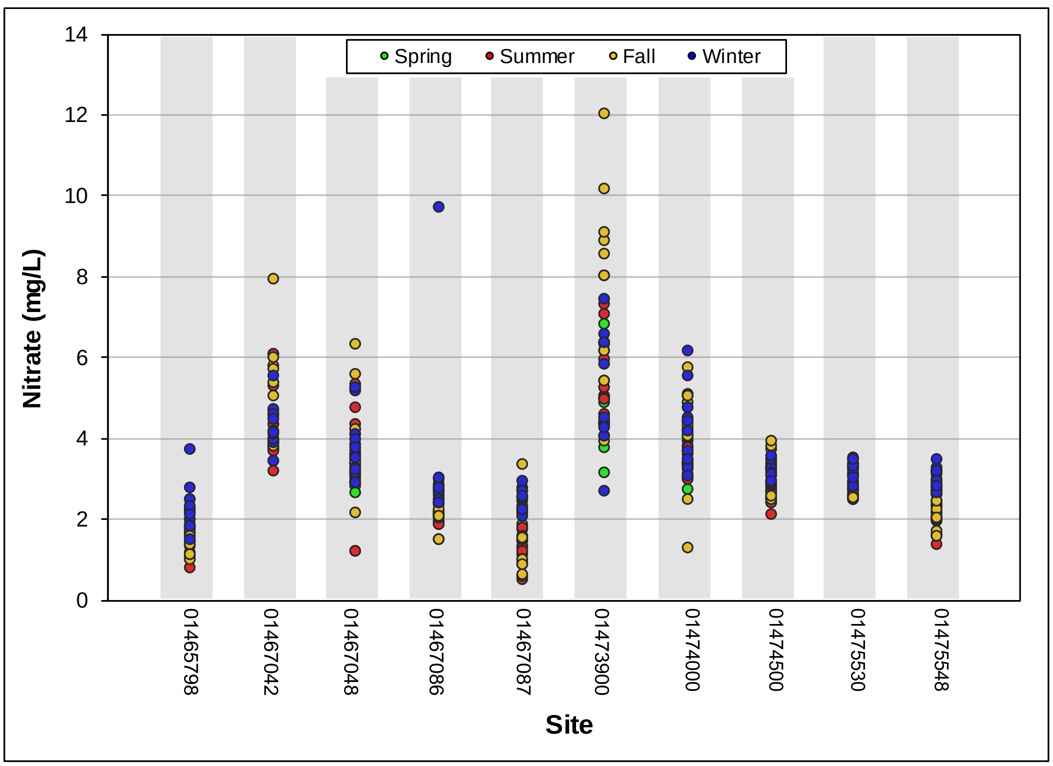


Figure 4. Nitrate concentration at 10 USGS gage stations, July 2009-June 2020

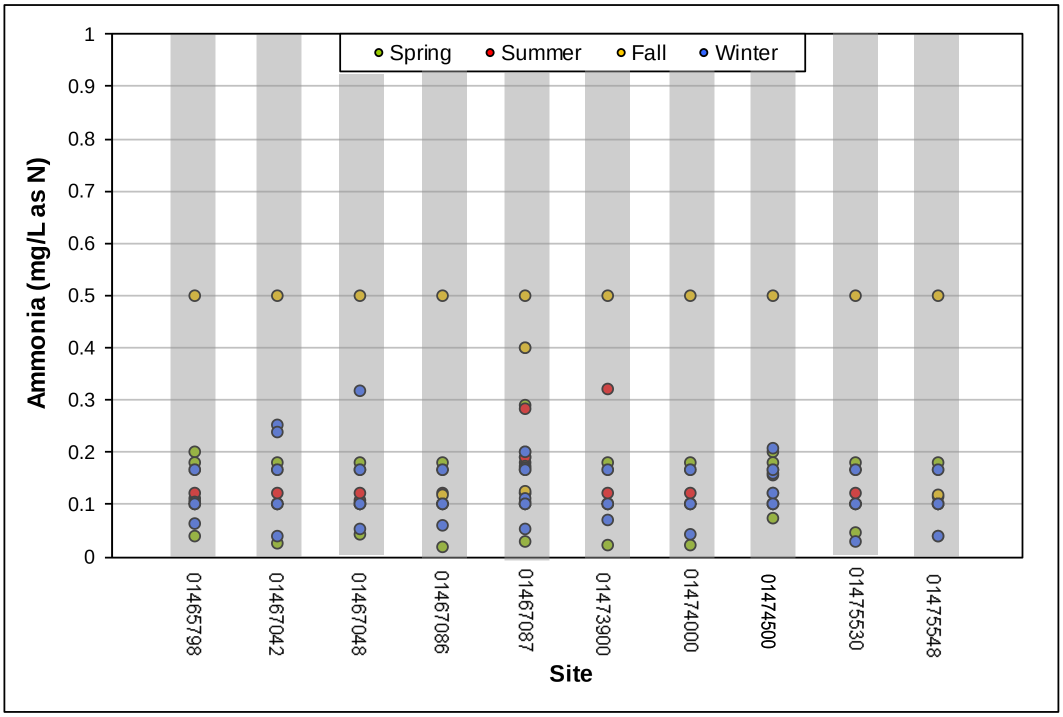


Figure 5. Ammonia concentration at 10 USGS gage stations, September 2011-June 2020

Microbial Analysis

Fecal indicator bacteria, found naturally in the gut of warm-blooded animals, can be used in the detection of human or animal waste contamination in a body of water. While these bacteria themselves are generally harmless to humans, they are considered to be very reliable indicators of the presence of other, more serious fecal-borne pathogens such as viruses, protozoa and other bacteria. The extent to which a water body is contaminated with fecal indicator bacteria can indicate the likelihood that the water has been contaminated by human or animal wastes. In urban environments, the most likely dry weather pollution sources are domestic animals, wildlife and untreated sewage from improperly connected or leaking sanitary sewers.

PWD performs fecal indicator bacteria tests for fecal coliform and *E. coli*. The fecal coliform test covers a relatively wide subgroup of fecal-specific bacteria; however, it does include some species that are not necessarily fecal in origin. *E. coli*, on the other hand, is a single coliform species that is noteworthy due to the fact that it occurs only in the fecal matter of humans and other warm-blooded animals. This qualifies *E. coli* as an excellent indicator of human waste.

Microbial Analysis Results

PA DEP has established seasonal bacteria water quality criteria that are more stringent in warmer months, or the “swimming season.” For the period May 1 through September 30, water quality standards require that the geometric mean of a group of at least five samples collected on non-consecutive days over a 30-day period not exceed 200 fecal coliform CFU (colony forming unit) per 100mL. During the non-swimming season, this value increases to 2000 CFU/100mL.

While samples were collected on a quarterly basis and not within a 30-day period as required by PA DEP water quality criteria, results of microbial analyses from the 20 swimming season samples generally indicate fecal coliform geometric means greater than 200 CFU/100mL (Table 6). The only exceptions were the downstream Wissahickon Creek and Schuylkill River gage sites, which each had fecal coliform geometric means less than 200 CFU/100mL, based on 20 samples each. The 2000 CFU/100mL geometric mean standard for non-swimming season samples was not exceeded at any of the 10 sites, based on 24 samples at each site.

US EPA recommended water quality criteria (1986) were used as guidelines for evaluation of sample results for other microbial parameters, as PA DEP does not have recreational use water quality criteria for *E. coli*. The guideline used for *E. coli* was the geometric mean of 126 CFU/100mL. The *E. coli* geometric mean guideline was exceeded at eight of the 10 sites (Table 7).

Table 6. Fecal Coliform Geometric Mean Results and PA DEP Water Quality Recreational Use Criteria Achievement Status by Season

Gage	n	n, non-detects	Geometric mean (CFU/100 mL)	Season	Attaining Standard
1465798	24	1	99	non-swimming	Yes
1465798	20	0	452	swimming	No
1467042	24	1	51	non-swimming	Yes
1467042	20	0	292	swimming	No
1467048	24	0	302	non-swimming	Yes
1467048	20	1	973	swimming	No
1467086	24	0	193	non-swimming	Yes
1467086	20	0	921	swimming	No
1467087	24	0	347	non-swimming	Yes
1467087	20	0	548	swimming	No
1473900	24	0	71	non-swimming	Yes
1473900	20	0	262	swimming	No
1474000	24	1	36	non-swimming	Yes
1474000	20	0	110	swimming	Yes
1474500	24	1	27	non-swimming	Yes
1474500	20	2	44	swimming	Yes
1475530	24	1	83	non-swimming	Yes
1475530	20	0	316	swimming	No
1475548	24	0	155	non-swimming	Yes
1475548	19	0	762	swimming	No

Table 7. *E. Coli* Geometric Mean Results and US EPA Recreational Use Water Quality Guideline Achievement

Gage	n	n, non-detects	Geometric mean (CFU/100 mL)	Attaining Guideline
01465798	43	1	250	No
01467042	43	1	131	No
01467048	43	0	591	No
01467086	43	1	419	No
01467087	43	1	435	No
01473900	43	0	167	No
01474000	43	1	67	Yes
01474500	43	4	36	Yes
01475530	43	1	163	No
01475548	42	1	318	No

Results for both microbial parameters exhibited similar seasonal patterns, with samples collected during spring and winter generally having smaller concentrations than fall and summer samples (Figures 6-7). Bacteria samples collected from 2009-2020 indicate a fair correlation between fecal coliform and *E. coli* (r = 0.76) (Figure 8).

In 2018, PWD ceased collection of Enterococci samples as the scientific consensus has built toward examining *E. coli* as a primary indicator of pollution.

The number of samples limits further conclusive statements for microbial parameters at this time, particularly in the case of fecal coliform where the number of results is further reduced by categorization according to swimming vs. non-swimming season. Furthermore, US EPA is currently revising recommended recreational use water quality criteria for microbial parameters. As the quarterly dry weather monitoring program continues, more samples will be obtained, allowing for more rigorous statistical analyses in the future.

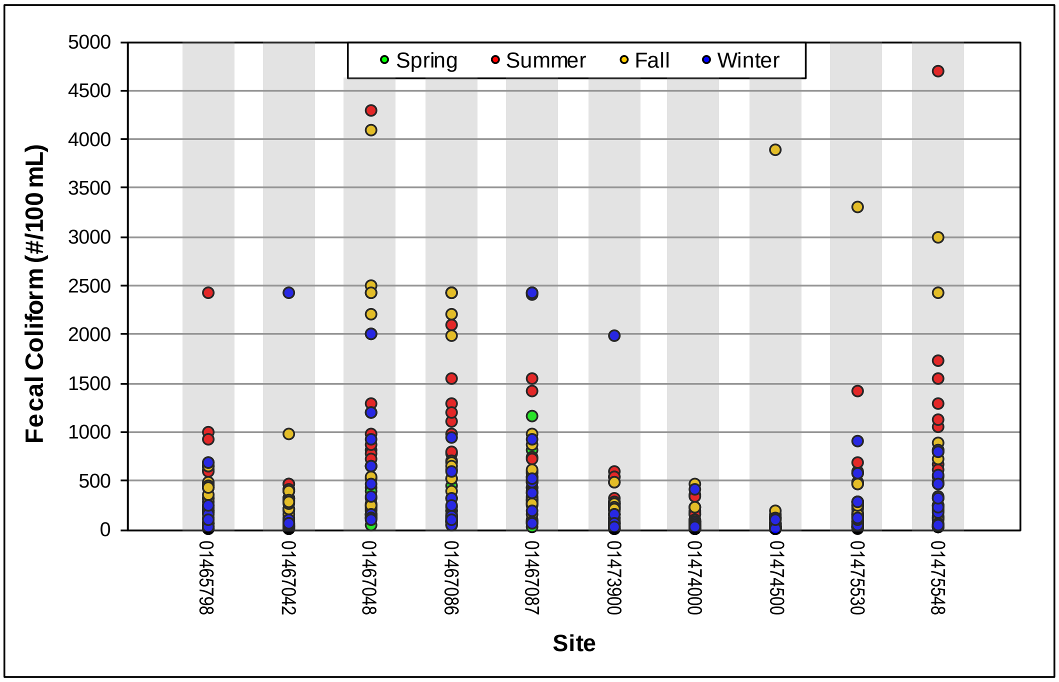


Figure 6. Fecal Coliform results at 10 USGS gage stations, July 2009-June 2020

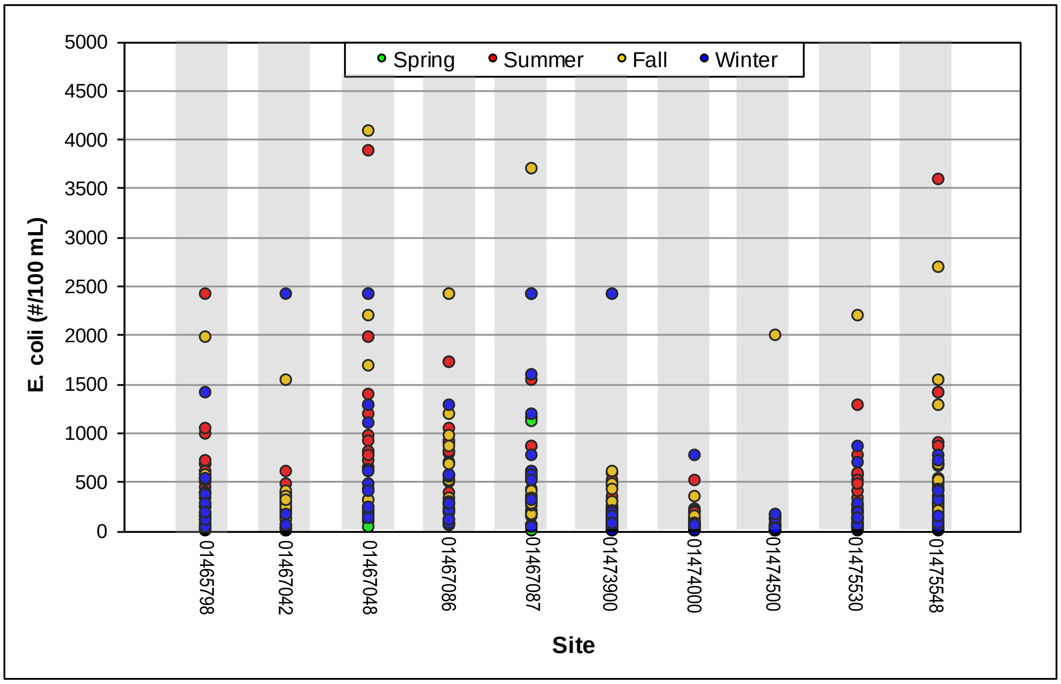


Figure 7. E. coli results at 10 USGS gage stations, July 2009-June 2020

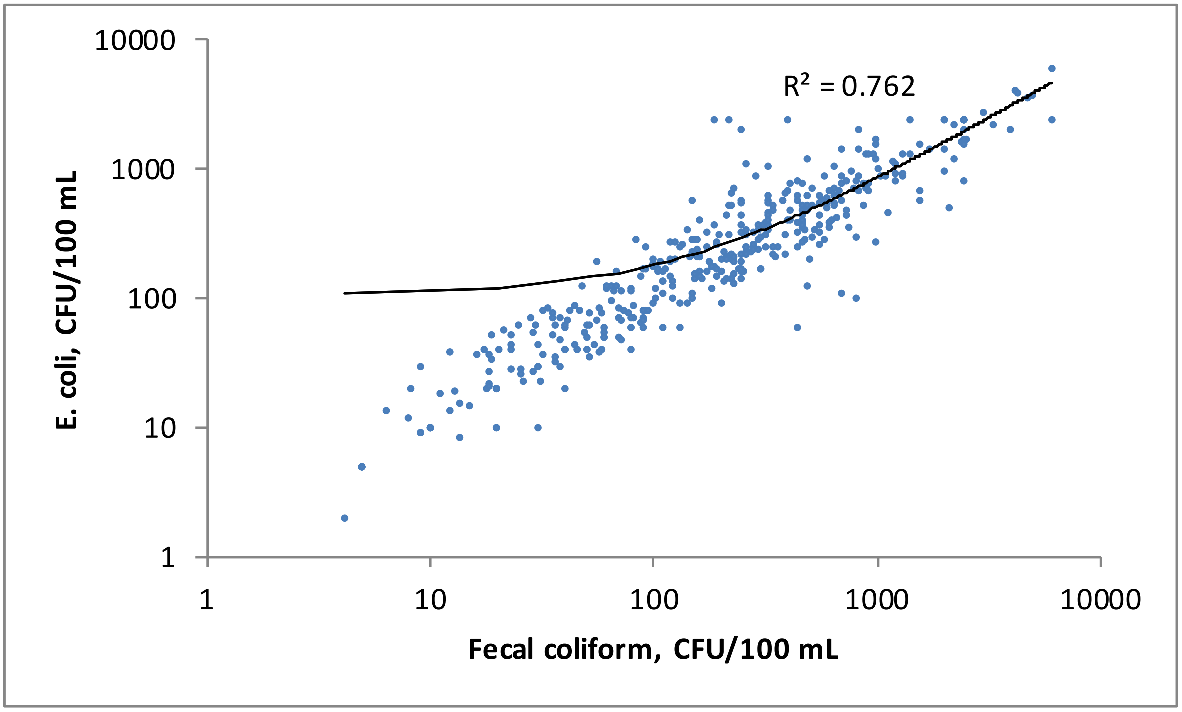


Figure 8. Scatterplot of 2009-2020 Correlating E. coli and Fecal coliform (x-y axes plotted in log10 scale)

Physicochemical Analysis

In addition to nutrient and microbial analyses, a basic set of physicochemical parameters were also monitored as part of the discrete quarterly sampling program. These parameters (dissolved oxygen, pH, temperature, and specific conductance) were specifically chosen to coincide with those being measured by the USGS continuous water quality monitoring gages. These data can then be utilized as valuable field checks when analyzing continuous water quality data from USGS gages. The physicochemical data are summarized by parameter in Figures 9-12.

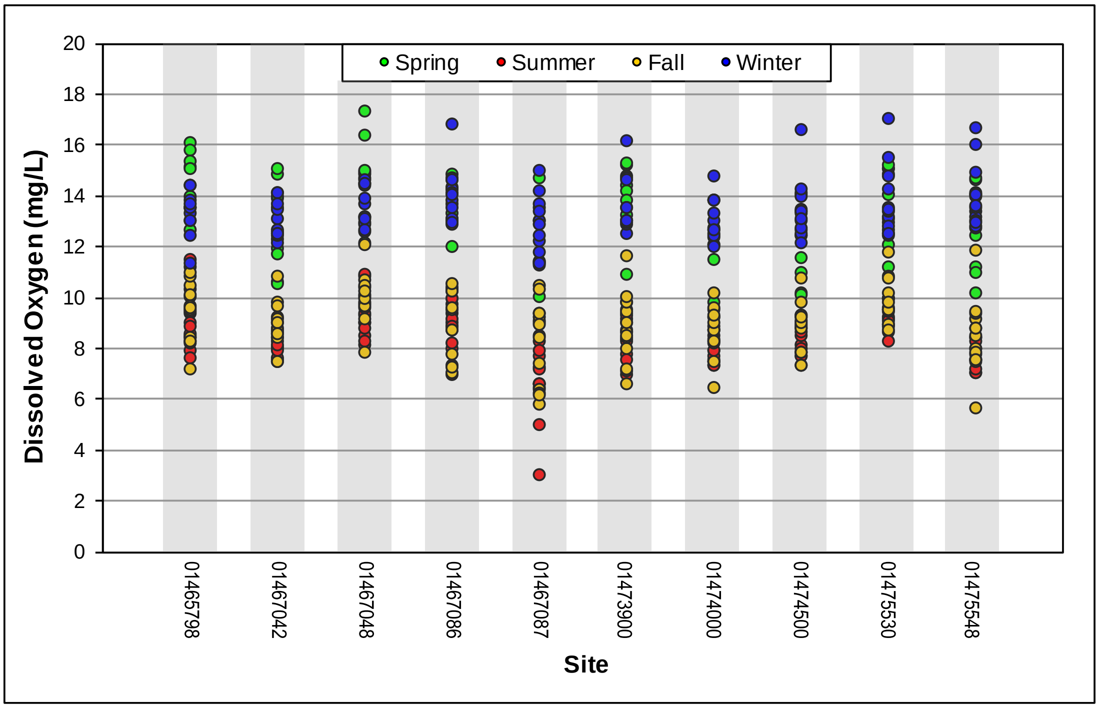


Figure 9. Dissolved oxygen results at 10 USGS gage stations, July 2009-June 2020

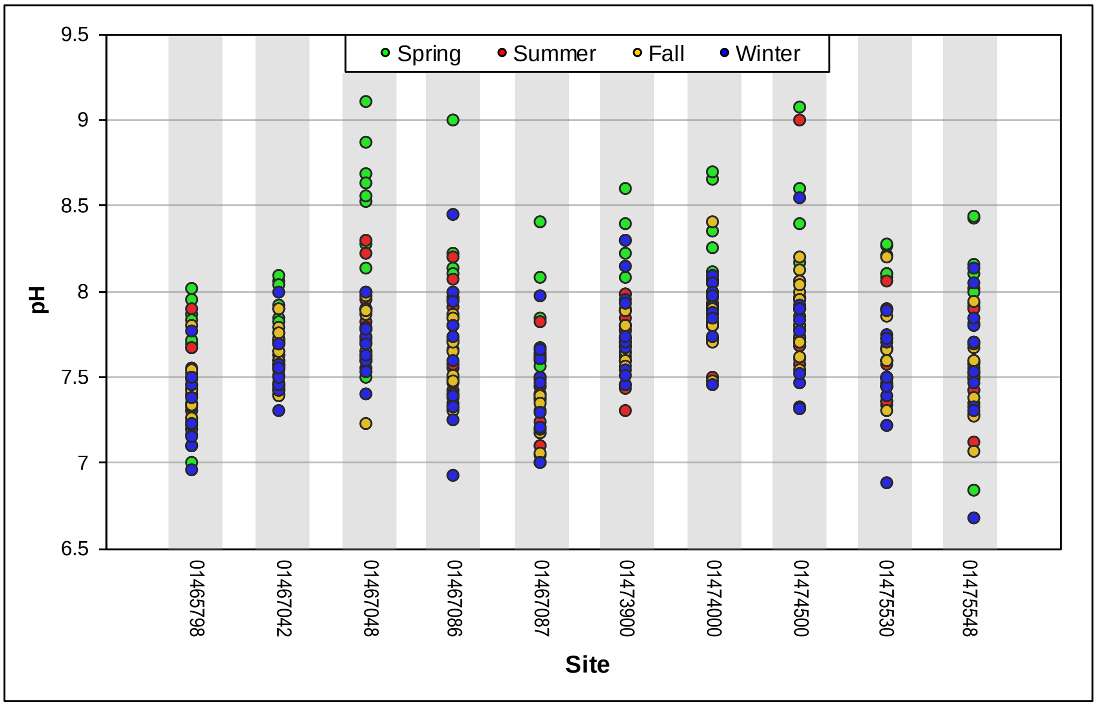


Figure 10. pH results at 10 USGS gage stations, July 2009-June 2020

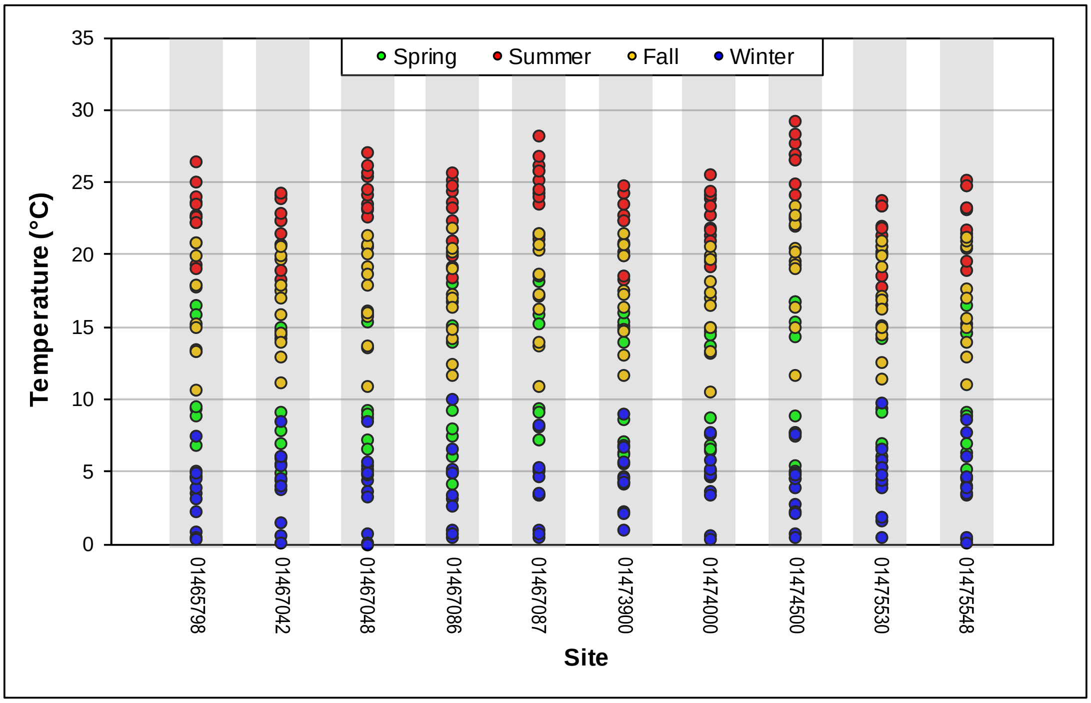


Figure 11. Temperature results at 10 USGS gage stations, July 2009-June 2020

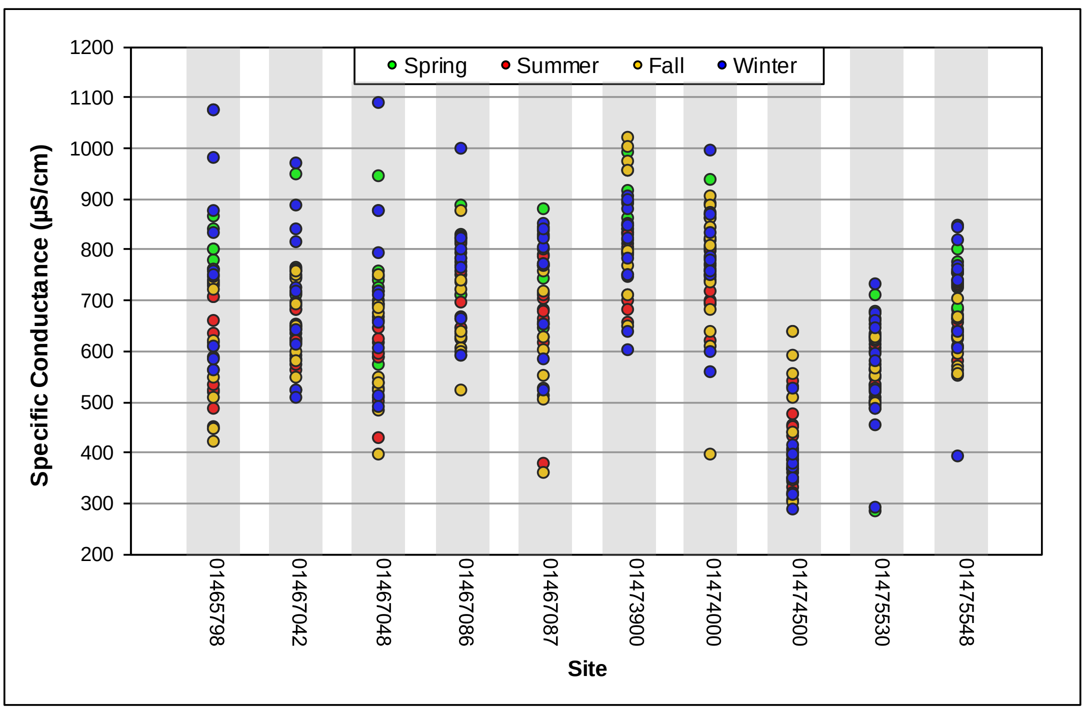


Figure 12. Specific conductance results at 10 USGS gage stations July 2009-June 2020

References

Pennsylvania Department of Environmental Protection (PA DEP). (2007). Chemistry Statistical Assessments. Harrisburg, PA. 17 p.

United States Environmental Protection Agency (US EPA). (1986). Quality Criteria for Water. EPA 440/5/86/001. Washington, D.C. 447 p.

United States Environmental Protection Agency (US EPA). (2000). Ambient Water Quality Criteria Recommendations: Rivers and Streams in Nutrient Ecoregion IX. EPA 822/B/00/019. Office of Water, U.S. Environmental Protection Agency, Washington D.C.

Appendix H – PWD-USGS Cooperative Water Quality Monitoring Program Annual Summary

Background

PWD and the United States Geological Survey (USGS) have constructed and/or refurbished gaging stations in 10 locations throughout Philadelphia's watersheds. USGS staff is responsible for construction and maintenance of the gage structure, stream stage monitoring instruments, data communications, maintaining and verifying stage-discharge rating curves and pumping apparatus. PWD staff is responsible for installation and maintenance of continuous water quality instrumentation. Data collected through the PWD/USGS cooperative water quality monitoring program are disseminated through the USGS National Water Information System (NWIS) Web Interface (https://pa.water.usgs.gov/apps/pwd/), as well as a website specifically dedicated to Philadelphia's watersheds (Figure 1).

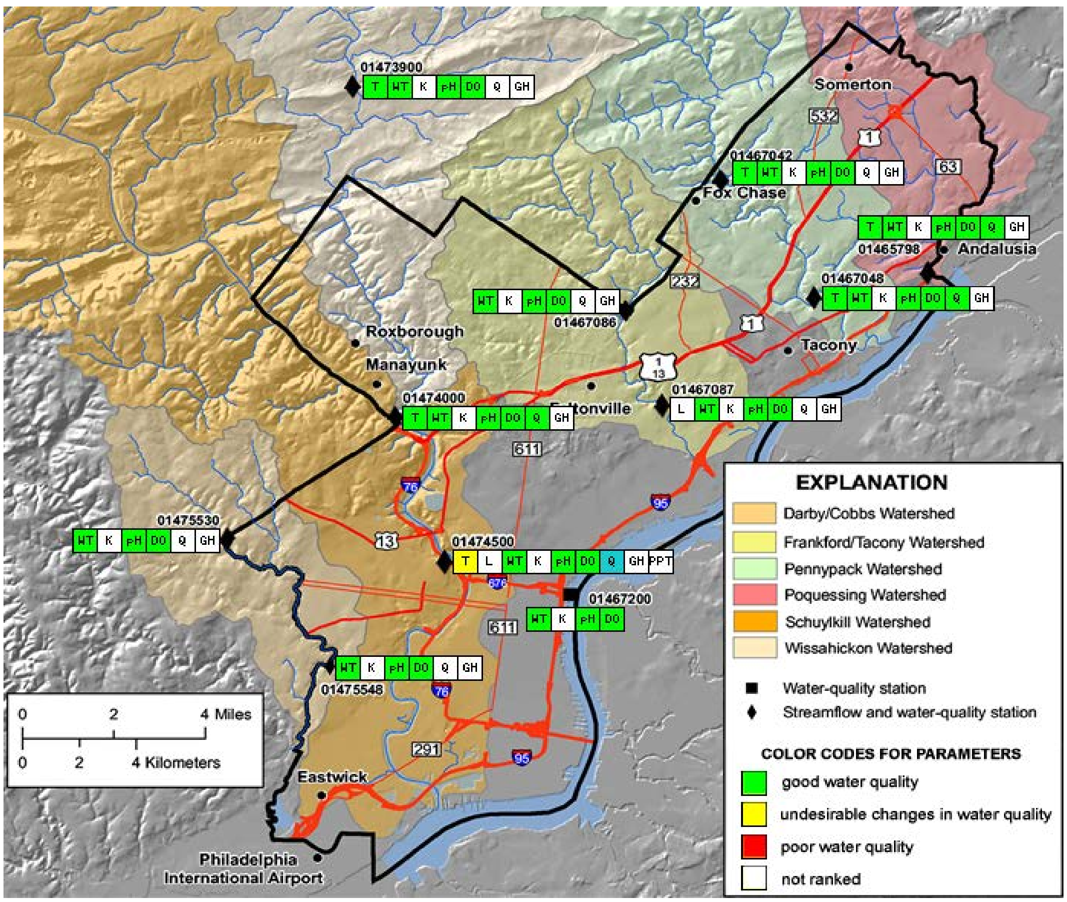


Figure 1. Philadelphia Water Quality Gauge Stations as Viewed on Cooperative USGS-PWD Website (https://usgs.gov/centers/pa-water/science/philadelphia-water-resources-monitoring-program).

Monitoring Locations

The PWD/USGS Cooperative Monitoring Program builds upon the widespread network of USGS gages that were formerly operated throughout Philadelphia. These gages are logically situated and/or have a continuous period of record, making them ideal for water quality monitoring purposes. Within a given watershed, downstream-most historic stations were chosen to represent water quality, as these streams flow through Philadelphia into the receiving waters (*i.e.*, the Schuylkill and Delaware rivers).

Regarding upstream stations, three gages (Pennypack Creek at Pine Rd, Tacony Creek at Adams Ave, and Cobbs Creek at US Rte. 1) are strategically located to monitor water quality of the streams as they enter Philadelphia (Figure 1). The upstream Wissahickon Creek monitoring station is located at Rte. 73 in Fort Washington, which is approximately 3.7 river miles upstream of the City. This location was chosen due to its extensive period of record (Table 1). Upstream water quality is not measured in the Poquessing-Byberry Creek Watershed. The Schuylkill River gage is in an ideal location to provide data related to the Schuylkill River Fairmount Dam Fish Ladder Renovation Project and was equipped with water quality monitoring instrumentation upon project completion in early 2009.

This annual report summarizes water quality data from July 1, 2019 – June 30, 2020, excluding the period of December 2019 through February 2020, during which time monitoring probes were not deployed in order to protect the equipment from cold temperatures. Water quality data at the Delaware River gage 014670261 was collected year-round. Due to routine maintenance such as cleaning and calibration, gages are periodically taken offline, usually for no more than the span of two hours, and do not collect data. Significant gaps in data collection due to gage malfunction, repair, vandalism, etc. are noted in the Monthly Results section.

In order to summarize hydrologic conditions during the monitoring period, daily mean discharge was plotted along with the median of all daily flows for USGS gage 01474000 (Wissahickon Creek at Ridge Ave.). The period of record for this gage is 54 years. The influence of severe storms can be observed in Figure 2; approved daily mean discharge data was available only until May 3, 2020 at the time of this writing.

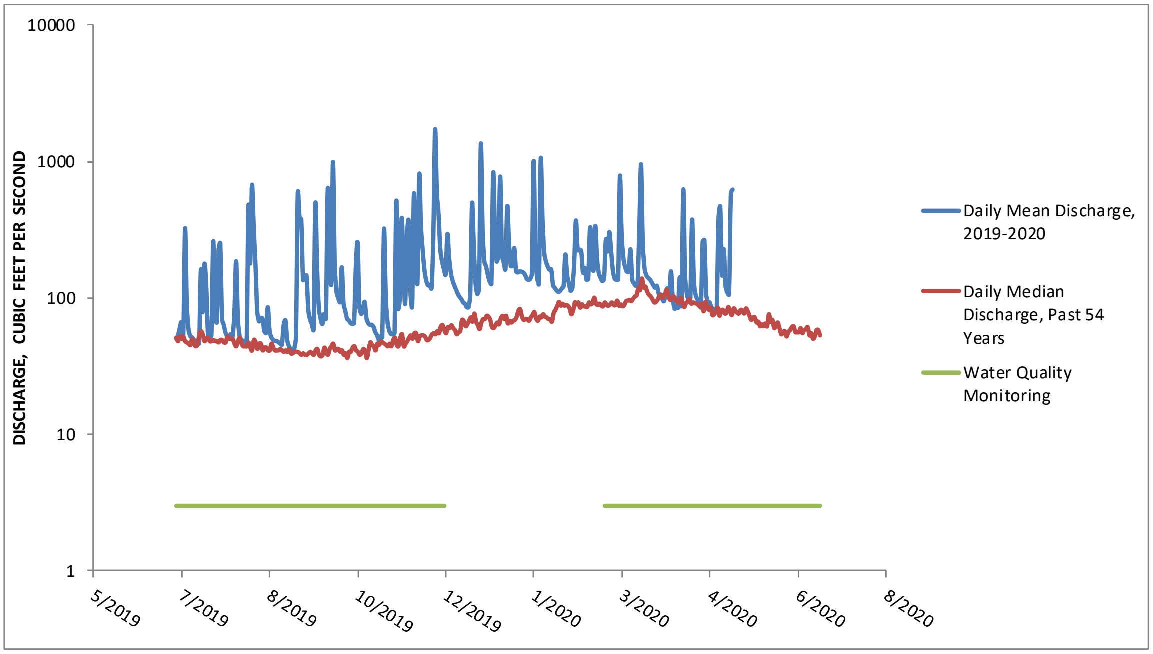


Figure 2. Daily mean flow July 1, 2019 - May 3, 2020 and daily median flow for 54 years of record at USGS gage 01474000 (Wissahickon Creek at Ridge Ave.).

Table 1. PWD/USGS Cooperative Water Quality Monitoring Program Gages

Gage Number	Gage name	Flow Data Record
01465798	Poquessing Creek at Grant Avenue, Philadelphia, PA	July 1965 to Present
01467042	Pennypack Creek at Pine Road, Philadelphia, PA	August 1964 to September 1974; September 2007 to Present
01467048	Pennypack Creek at Lower Rhawn St Br., Philadelphia, PA	June 1965 to Present
01467086	Tacony Creek at County Line, Philadelphia, PA	October 1965 to September 1986; September 2005 to Present
01467087	Frankford Creek at Castor Ave, Philadelphia, PA	July 1982 to Present
014670261	Delaware River near Pennypack Woods, PA	February 2011 to Present
01467200*	Delaware River at Ben Franklin Bridge, Philadelphia, PA	August 1949 to Present
01473900**	Wissahickon Creek at Ft. Washington, PA	September 1961 to September 1968; June 2000 to Present
01474000	Wissahickon Creek at Mouth, Philadelphia, PA	June 1897 to September 1903; January 1905 to July 1906; October 1965 to Present
01474500	Schuylkill River at Philadelphia, PA	October 1931 to Present
01475530	Cobbs Creek at U.S. Highway No. 1, Philadelphia, PA	October 1964 to September 1981; September 2004 to Present
01475548	Cobbs Creek at Mt. Moriah Cemetery, Philadelphia, PA	October 2005 to Present

*Funding for the operation of this gage is provided by USGS and the Delaware River Basin Commission (DRBC)
**Funding for the operation of this gage is provided by DRBC

USGS Gage Data Processing & Analysis Procedures

With 10 USGS gages collecting data for multiple water quality parameters at half-hour or 15-minute intervals, a large amount of data are produced. PWD Office of Watersheds (OOW) staff have developed procedures for the processing and analysis of these data using Microsoft Excel and Access software, as well as R, a free software environment for statistical computing and graphics. Most aspects of the data processing and analysis have been automated with custom Visual Basic and R code.

OOW independently maintains databases of water quality and streamflow via automated regular retrievals of these data from USGS NWIS. On a monthly basis, the databases are queried and results for each gage are imported into MS Excel workbooks. If available, any field data collected during that period (*e.g.*, hand meter readings from field maintenance checks, water quality grab samples, etc.) are also imported. Once all required data have been entered, separate plots are produced for each parameter (dissolved oxygen, turbidity, pH, specific conductance, and temperature) to enable a subjective review of data quality.

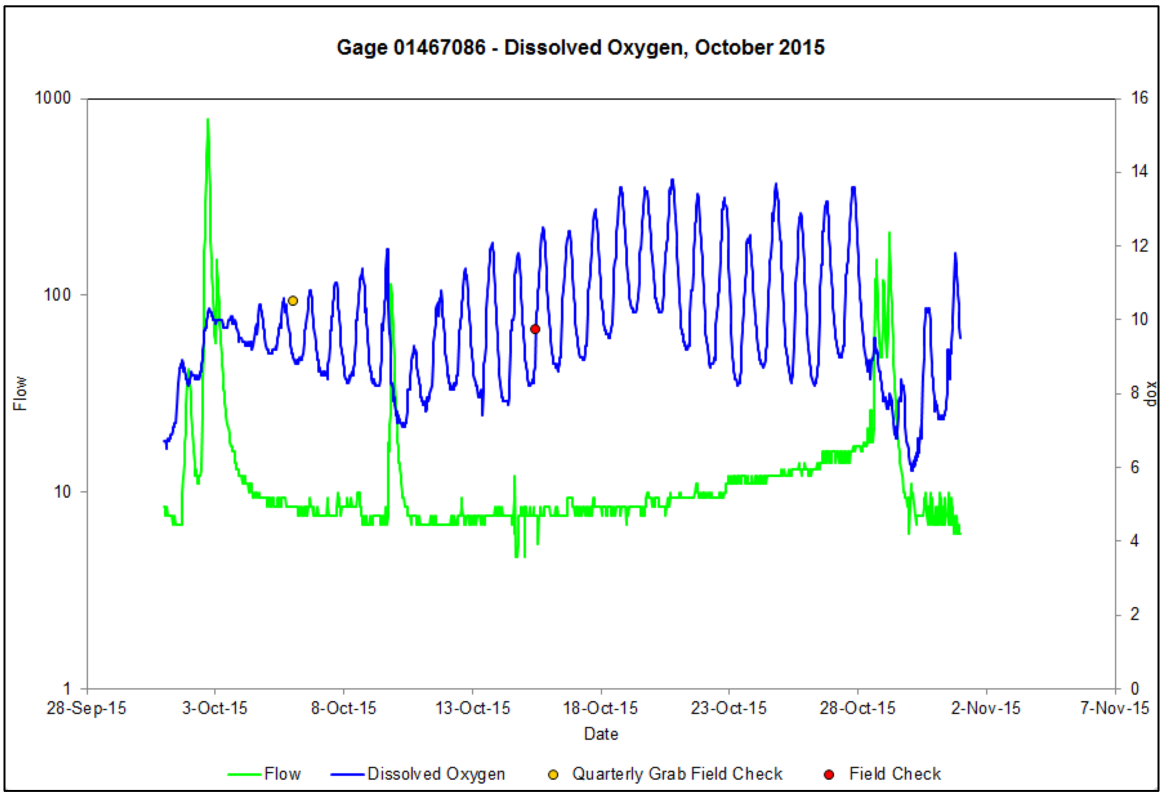


Figure 3. Example of an Excel-generated data processing/analysis plot; Gage 0146786, Dissolved Oxygen, October 2015.

These plots are examined and are the primary basis for the selection of good vs. questionable data for a given month. Intervals of questionable data are located and added to a table of "flagged" data for that particular parameter, which is then used to update the water quality database. Logs of field meter readings taken by PWD staff inform the flagging process, along with email records containing field notes and observations whenever water quality instrumentation is cleaned, calibrated, or otherwise maintained.

The final step of the procedure utilizes R, a statistical programming language and software environment. The R software code developed by OOW staff analyzes all of the water quality data in a database, as well as the good and questionable flags, and generates statistical and graphic results in a variety of forms. These include monthly plots for all data parameters for each site, showing accepted and questionable data, water quality criteria, grab sample data, and streamflow (Figure 4); assorted statistics including accepted and questionable data comparisons, monthly attainment percentages, and comparisons of wet and dry weather periods; and additional plots, including average dissolved oxygen (DO), percent DO saturation, and pH/percent DO saturation.

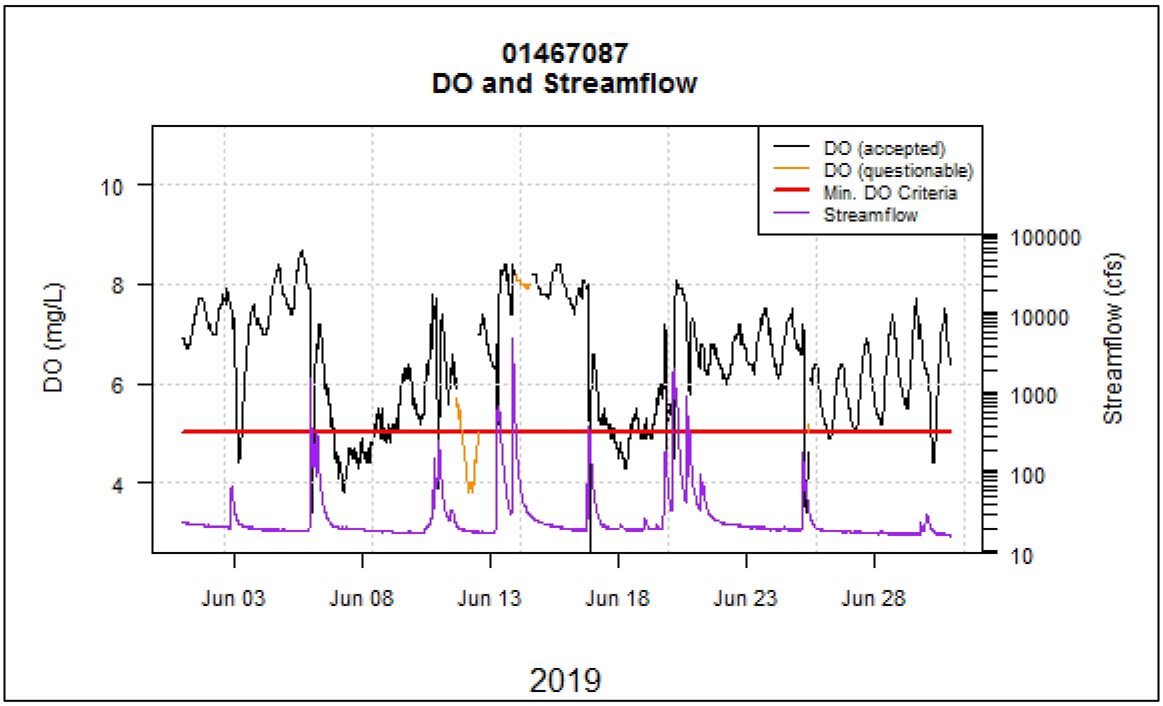


Figure 4. Example of an R-generated plot showing accepted and questionable data, and minimum water quality criteria; Gage 01467087, Dissolved Oxygen, June 2019.

Continuous Water Quality Monitoring Results Annual Summary, July 2019 - June 2020

Dissolved Oxygen

Background

Dissolved oxygen concentrations are a concern in several of Philadelphia's watersheds. Dissolved oxygen concentration is suppressed by high temperatures, respiratory activity of stream organisms, and nitrification and other oxidation reactions. Streams generally develop problems with dissolved oxygen due to water column BOD, sediment oxygen demand (SOD) and eutrophication due to increased nutrient concentration. These processes are inter-related, and physical conditions can also affect dissolved oxygen concentrations.

Designated Uses

Streams in the Philadelphia region are affected by ambient temperatures, which can be quite warm in the spring and summer months. For this reason, these streams cannot support natural self-sustaining populations of cold water fish. Different water quality criteria for dissolved oxygen and temperature are applied to different stream segments. Of the sites that were instrumented for water quality, the Wissahickon and Pennypack Creek gages (*i.e.*, 01473900, 01474000, 01467042, and 01467048) are each designated as a Trout Stocking Fishery (TSF) with conditions appropriate for maintenance of stocked trout over the period February 15 to July 31. Water quality criteria for dissolved oxygen are more stringent for these sites, with a daily instantaneous minimum criterion of 5 mg/L and a 7-day average of 6 mg/L from February 15 to July 31 and 5.5 mg/L the remainder of the year. Dissolved oxygen criteria for Warm Water Fisheries (WWF) are an instantaneous minimum of 5 mg/L and a 7-day average of 5.5 mg/L.

The 7-day average criteria were introduced in 2014 by PA DEP. Prior to 2014, DEP specified daily average criteria for dissolved oxygen (5.0 mg/L for WWF waters; 6.0 mg/L for TSF waters from February 15 to July 31, 5.0 mg/L the remainder of the year). It is also noted that the instantaneous minimum DO criterion for WWF waters became more stringent in 2014; it was previously 4.0 mg/L.

The Delaware River gage 01467200 dissolved oxygen criteria are defined by the Delaware River Basin Commission (DRBC) criteria for Zone 3 (DRBC, 2007) with a daily mean of 3.5 mg/L and a seasonal mean (April 1 to June 15, and September 16 to December 31) of 6.5 mg/L. The same seasonal criteria apply to Delaware River gage 014670261 (Zone 2), but there is a more stringent daily mean guideline of 5.0 mg/L (Table 2).

Table 2. PADEP Dissolved Oxygen Water Quality Criteria

Gage number	Designated Use	Minimum Criterion	7-Day Average Criterion	Daily Average Criterion
01465798	WWF	5.0 mg/L	5.5 mg/L	None
014670261	DRBC**	None	None	5.0 mg/L
01467042	TSF*	5.0 mg/L	6.0 mg/L	None
01467048	TSF*	5.0 mg/L	6.0 mg/L	None
01467086	WWF	5.0 mg/L	5.5 mg/L	None
01467087	WWF	5.0 mg/L	5.5 mg/L	None
01467200	DRBC**	None	None	3.5 mg/L
01473900	TSF*	5.0 mg/L	6.0 mg/L	None
01474000	TSF*	5.0 mg/L	6.0 mg/L	None
01474500	WWF	5.0 mg/L	5.5 mg/L	None
01475530	WWF	5.0 mg/L	5.5 mg/L	None
01475548	WWF	5.0 mg/L	5.5 mg/L	None

*TSF criteria for DO only apply from February 15 - July 31. WWF criteria are applicable from August 1 – January 31.
**A seasonal mean criterion of 6.5 mg/L also applies from April 1 - June 15 and September 16 - December 31.

Results

Results were processed as follows for Table 3. The “percent accepted data” are the total number of observations that were not flagged. The remainder of the table lists the percent of data that was flagged, and the percentages of accepted data that attained or failed to attain water quality standards were calculated.

Results were processed as follows for Tables 4 and 5. If more than 25% of the data in the 7-day window was flagged as questionable, the data point was considered questionable. The 7-day average was calculated as a two-sided moving average. During data processing and analysis, output files are split by calendar year; thus, statistics for 2019 and 2020 appear in separate tables.

Water quality at the downstream Tacony Creek site (gage 01467087) was most likely to exceed DO minimum and 7-day average criteria. A more in-depth discussion of potential causes of DO problems at gage 01467087 is presented in the Monthly Results section. A notable portion of flagged data at 01467087 and other sites is related to the fouling of sonde pipes due to sediment and debris that inhibit data collection. The DO probes are particularly susceptible to the effects of trapped sediment; when routine cleaning of the sonde pipes show that low DO readings were affected by fouling, the questionable data prior to cleaning is flagged.

Table 3. USGS Gage July 2019 - June 2020 Dissolved Oxygen Minimum Criterion Summary Results

Gage number	Designated Use	Observations, n	% accepted data	% flagged data	% non-attaining	% attaining
01465798	WWF	26107	96.7	3.3	0.4	99.6
014670261*	DRBC	NA	NA	NA	NA	NA
01467042	TSF	26261	99.3	0.7	0	100
01467048	TSF	26192	99.8	0.2	0	100
01467086	WWF	12922	99.7	0.3	0.7	99.3
01467087	WWF	25424	96.6	3.4	14.1	85.9
01467200*	DRBC	NA	NA	NA	NA	NA
01473900	TSF	12461	100	0	0	100
01474000	TSF	13022	100	0	0	100
01474500	WWF	12797	100	0	0	100
01475530	WWF	26280	100	0	0	100
01475548	WWF	25231	99.7	0.3	3.9	96.1

*No minimum DO criterion applies at gages 01467200 and 014670261

Table 4. USGS Gage July 2019 - November 2019 Dissolved Oxygen 7-Day Average Criterion Summary Results

Gage number	Designated Use	Total hours accepted data	% hours flagged data	% hours non-attaining	% hours attaining
01465798	WWF	3273	6.6	0	100
014670261	DRBC	NA	NA	NA	NA
01467042	TSF	3504.5	0	0	100
01467048	TSF	3504.5	0	0	100
01467086	WWF	3504.5	0	0	100
01467087	WWF	3376.5	3.7	12.5	87.5
01467200	DRBC	NA	NA	NA	NA
01473900	TSF	3179.5	9.3	0	100
01474000	TSF	3349	4.4	0	100
01474500	WWF	3504.5	0	0	100
01475530	WWF	3381.5	3.5	0	100
01475548	WWF	3349	4.4	0	100

Table 5. USGS Gage March 2020 - June 2020 Dissolved Oxygen 7-Day Average Criterion Summary Results

Gage number	Designated Use	Total hours accepted data	% hours flagged data	% hours non-attaining	% hours attaining
01465798	WWF	2559.5	4.8	0	100
014670261	DRBC	NA	NA	NA	NA
01467042	TSF	2688.5	0	0	100
01467048	TSF	2688.5	0	0	100
01467086	WWF	2634.5	0.2	0	100
01467087	WWF	2260	9.5	21.7	78.3
01467200	DRBC	NA	NA	NA	NA
01473900	TSF	2544.5	0	0	100
01474000	TSF	2712.5	0	0	100
01474500	WWF	2292	8.2	0	100
01475530	WWF	2712.5	0	0	100
01475548	WWF	2337	13.8	0	100

Table 6. USGS Gage 01467200 and 014670261 Dissolved Oxygen Seasonal Mean Criterion Summary Result

Gage number	Designated Use	Total hrs. accepted data	Total days accepted data	% hrs. flagged data	Seasonal mean	Attained Standard?
01467200	DRBC	1775.5	74.0	2.7	8.8	Yes
014670261	DRBC	1815	75.6	0.5	9.1	Yes

pH

Background

pH has been identified as a parameter of potential concern for some of Philadelphia's watersheds, primarily because of algal effects on the dissolved inorganic carbon (DIC) composition of stream water. Algae take up CO_2 during photosynthesis and shift the composition of DIC toward the alkaline carbonates, resulting in occasional failure to attain maximum pH criteria at some sites (Table 7). pH fluctuations are typically observed concomitant with pronounced dissolved oxygen fluctuations, as detailed in the Monthly Results section.

At gages 01467200 and 014670261, pH criteria (regulated by DRBC) are bounded by 6.5 and 8.5. At all other gages, pH criteria are bounded by daily minima and maxima of 6.0 and 9.0, respectively, as defined by PA DEP water quality standards.

Results

Results were processed as follows for Table 7. The "percent accepted data" are the percentage of observations that were not flagged. The remainder of the table lists the percentage of data that was flagged, the percentages of accepted observations that attained or failed to attain criteria, and the percentages of daily minima and maxima that attained or failed to attain criteria.

Minimum pH criteria were attained at all gages for the reporting time frame. Algal blooms may be responsible for daily maximum pH criterion exceedance at several sites during March and April.

Table 7. USGS Gage July 2019 - June 2020 pH Criteria Summary Results

Gage number	Observations, n	% accepted data	% flagged data	% min. non-attaining	% max. non-attaining	% min. attaining	% max. attaining	% attaining
01465798	26103	99.5	0.5	0.0	0.2	100.0	99.8	99.8
014670261	34805	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01467042	26252	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01467048	26244	99.4	0.6	0.0	0.2	100.0	99.8	99.8
01467086	12990	100.0	0.0	0.0	1.0	100.0	99.0	99.0
01467087	25724	99.7	0.3	0.0	0.0	100.0	100.0	100.0
01467200	27224	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01473900	12452	100.0	0.0	0.0	1.1	100.0	98.9	98.9
01474000	13068	99.8	0.2	0.0	1.2	100.0	98.8	98.8
01474500	12834	92.7	7.3	0.0	0.0	100.0	100.0	100.0
01475530	26451	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01475548	26142	98.6	1.4	0.0	0.6	100.0	99.4	99.4

Turbidity

Background

Turbidity in Philadelphia's streams increases with increased flow as inorganic sediment and additional constituents of stormwater runoff are introduced to the stream or scoured/eroded from the stream channel. There are no numeric PA DEP water quality criteria for turbidity, so PWD watershed management plans used a reference value for turbidity that was derived from EPA Guidance document EPA 822-B-00-023 (*i.e.*, 2.825 NTU). This value is surpassed more often in wet weather than in dry weather (Tables 84-85). Turbidity data has also been used to help investigate sediment loading and transport in the Wissahickon Creek Watershed for the Wissahickon Creek Sediment TMDL.

Results

Results were processed as follows for Table 8. The "percent accepted data" are the percentage of observations that were not flagged. The remainder of the table lists the percentage of observations that were flagged, and the percentages of accepted data that either surpassed or fell below the maximum guideline.

Among the tributary sites, the maximum guideline was most frequently surpassed at the Schuylkill gage, and least frequently surpassed at the upstream Pennypack gage.

Table 8. USGS Gage July 2019 - June 2020 Turbidity Summary Results

Gage number	Observations, n	% accepted data	% flagged data	% hrs. above max. guideline	% hrs. below max. guideline
01465798	26073	94.8	5.2	24.7	75.3
014670261	35019	100.0	0.0	97.4	2.6
01467042	25629	99.1	0.9	18.6	81.4
01467048	26028	98.2	1.8	42.6	57.4
01467086*	NA	NA	NA	NA	NA
01467087*	NA	NA	NA	NA	NA
01467200*	NA	NA	NA	NA	NA
01473900	12429	95.0	5.0	32.5	67.5
01474000	13072	96.8	3.2	28.2	71.8
01474500	12794	100.0	0.0	55.0	45.0
01475530*	NA	NA	NA	NA	NA
01475548*	NA	NA	NA	NA	NA

*Turbidity is not continuously monitored at these locations

Specific Conductance

Background

Specific conductance is a measure of the ability of water to conduct electricity over a given distance, expressed as microsiemens/cm (corrected to 25ºC). Conductivity in Philadelphia streams is extremely sensitive to changes in flow, as stormwater (diluent) usually contains smaller concentrations of dissolved ions than stream baseflow. Stormwater runoff typically lowers conductivity in streams; an exception sometimes occurs in winter and early spring, when road salt applied prior to snowstorms enters the stream in runoff or during snowmelt. Data collected in the report timeframe were generally consistent with earlier observations. When significant changes in conductivity are observed during dry weather, it can be an indicator of anthropogenic influence or pollution in the stream; stations receiving inputs of treated wastewater generally had greater conductivity.

Results

There is no water quality standard for specific conductance. Table 9 merely illustrates the number of observations that were not flagged and considered "accepted" and the percentage of observations that were flagged. More detailed results at each site are described in the Monthly Results section.

Table 9. USGS Gage July 2019 - June 2020 Specific Conductance Summary Results

Gage number	Observations, n	% accepted data	% flagged data
01465798	26097	98.3	1.7
014670261	35005	100	0
01467042	26240	100	0
01467048	26222	100	0
01467086	13036	100	0
01467087	34494	100	0
01467200	34414	100	0
01473900	12454	100	0
01474000	13069	99.3	0.7
01474500	17338	100	0
01475530	26451	100	0
01475548	26148	98.0	2.0

Temperature

Background

Streams in the Philadelphia region are designated Warm Water Fisheries (WWF) or Trout Stocking Fisheries (TSF), with separate corresponding temperature criteria (Table 10). These criteria are “stepped” (remaining constant for 15- or 30-day intervals), while streams tend to warm up and cool down more gradually due primarily to changes in ambient temperature. (Gages 01467200 and 014670261 are the exceptions and are subject to a DRBC criterion of 30°C maximum). Stream temperatures were observed to exceed these criteria, somewhat frequently in springtime. These exceedances are generally natural, as there are no major sources of heated wastes. It is possible that baseflow diminution is partially responsible for a lack of buffering against temperature increases.

Table 10. PA DEP Temperature Water Quality Criteria

Date range start	Date range end	WWF maximum (°C)	WWF maximum (°F)	TSF maximum (°C)	TSF maximum (°F)
1/1	1/31	4	40	4	40
2/1	2/29	4	40	4	40
3/1	3/31	8	46	8	46
4/1	4/15	11	52	11	52
4/16	4/30	14	58	14	58
5/1	5/15	18	64	18	64
5/16	5/31	22	72	20	68
6/1	6/15	27	80	21	70
6/16	6/30	29	84	22	72
7/1	7/31	31	87	23	74
8/1	8/15	31	87	27	80
8/16	8/30	31	87	31	87
9/1	9/15	29	84	29	84
9/16	9/30	26	78	26	78
10/1	10/15	22	72	22	72
10/16	10/31	19	66	19	66
11/1	11/15	14	58	14	58
11/16	11/30	10	50	10	50
12/1	12/31	6	42	6	42

Results

Results were processed in the same manner as the parameters described above. The highest exceedance rate occurred at the downstream Pennypack Creek gage. Aside from the Delaware River gages, lower exceedance rates tend to be observed at the Poquessing, both Cobbs, both Tacony, and the Schuylkill River gages (Table 11). Those six gages are all designated as WWF and have less stringent criteria.

Table 11. USGS Gage July 2019 - June 2020 Temperature Maximum Criteria Summary Results

Gage number	Designated Use	Observations, n	% accepted data	% flagged data	% exceedance	% attaining
01465798	WWF	26106	100.0	0.0	14.1	85.9
014670261	DRBC	35010	100.0	0.0	0.0	100.0
01467042	TSF	26262	100.0	0.0	15.1	84.9
01467048	TSF	26250	100.0	0.0	16.4	83.6
01467086	WWF	13038	100.0	0.0	13.8	86.2
01467087	WWF	34955	100.0	0.0	11.8	88.2
01467200	DRBC	34766	100.0	0.0	0.0	100.0
01473900	TSF	12372	100.0	0.0	14.1	85.9
01474000	TSF	13019	100.0	0.0	15.6	84.4
01474500	WWF	17297	100.0	0.0	10.1	89.9
01475530	WWF	26454	100.0	0.0	13.3	86.7
01475548	WWF	26152	100.0	0.0	15.0	85.0

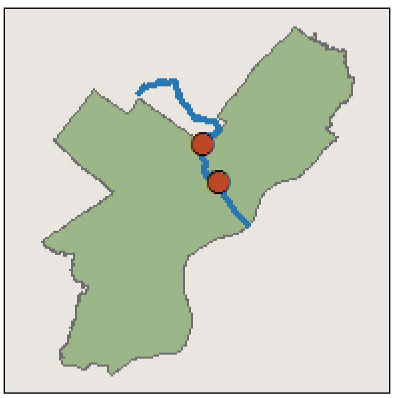
Monthly Results, July 2019 - June 2020

This section summarizes results at the monthly time scale. Results were processed in the same manner as in the previous section. Gages are grouped according to the type of sewer system that impacts water quality at the site.

Gages in Combined Sewer System Watersheds

The combined sewer system serves more than three-quarters of Philadelphia's residents and covers the oldest and densest parts of the city. Combined sewer outfalls affect the Tookany/Tacony-Frankford and Darby-Cobbs watersheds. (The Delaware and Schuylkill rivers also contain combined sewer outfalls but are detailed in a later section focused on large watersheds.) The gages in this section are subject to the deleterious effects of periodic combined sewer overflows during wet weather and snowmelt.

Tookany/Tacony-Frankford Creek (Gages 01467086 and 01467087)



Dissolved oxygen and pH

Dissolved oxygen concentrations were markedly worse between the upstream and downstream Tacony Creek gages. The monthly minima, percentage of hours the minimum criterion was not attained, exceedance of the 7-day average guideline, and percentage of days the daily mean criteria was not attained were typically much worse at the downstream gage (Tables 12-13, Figures 5-8). For example, DO was poor at the downstream Tacony Creek gage during July 2019 (Figure 9). However, the minimum criterion was almost always attained at gage 01467086 during that same month (Figure 10). This difference likely reflects the additional stormwater runoff and sewage overflows that entered the creek between the two gages.

The lowest DO concentrations are typically seen in the period after storm events, reflecting both the immediate and lingering, oxygen-depleting effects of stormwater runoff and biochemical oxygen demand (BOD) entering the stream. Diel DO fluctuations are suppressed for a few days following a storm event because the event either scours away algae or temporarily inhibits their growth. As dry weather continues, the algae recover and diel DO and pH fluctuations typically increase, sometimes resulting in non-attainment of pH maximum criteria, as observed at the upstream gage in March 2019 (Figure 11). Percent DO saturation of more than 150% in daylight were also observed at gage 01467086 in March 2020, indicating high levels of algal activity (Figure 12; PAR is defined as photosynthetically active radiation). Diel DO fluctuations tended to increase with prolonged periods of sunlight, further indicating high levels of algal activity.

A lower monthly mean pH was usually observed at gage 01467087, along with generally less pronounced diel pH fluctuations, probably due to an increased buffering capacity at the downstream gage and a lesser degree of algal growth (Tables 14-15).

Table 12. Gage 01467086 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	WWF	1438	4.8	12.8	7.5	100.0	0.0	0.4	99.6
Aug-19	WWF	1486	4.4	12.9	8.0	100.0	0.0	0.4	99.6
Sep-19	WWF	1436	5.2	13.3	8.0	100.0	0.0	0.0	100.0
Oct-19	WWF	1457	5.7	12.1	8.8	98.2	1.8	0.0	100.0
Nov-19	WWF	1436	6.9	15.0	11.4	99.7	0.3	0.0	100.0
Mar-20	WWF	1152	8.2	17.2	11.3	100.0	0.0	0.0	100.0
Apr-20	WWF	1439	7.4	17.7	11.0	100.0	0.0	0.0	100.0
May-20	WWF	1485	5.0	15.0	9.1	100.0	0.0	0.0	100.0
Jun-20	WWF	1431	2.8	11.1	6.8	99.4	0.6	5.8	94.2

Table 13. Gage 01467087 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	WWF	2827	0.7	9.4	5.7	96.1	3.9	31.1	68.9
Aug-19	WWF	2768	2.3	9.0	6.7	100.0	0.0	11.0	89.0
Sep-19	WWF	2735	2.1	8.7	6.2	95.2	4.8	21.1	78.9
Oct-19	WWF	2808	4.1	10.0	7.2	94.5	5.5	2.9	97.1
Nov-19	WWF	2742	5.6	11.6	9.8	95.3	4.7	0.0	100.0
Mar-20	WWF	1874	6.8	12.4	9.8	100.0	0.0	0.0	100.0
Apr-20	WWF	2867	4.2	12.0	9.4	99.7	0.3	1.2	98.8
May-20	WWF	2448	4.4	11.8	7.5	94.4	5.6	1.1	98.9
Jun-20	WWF	2586	0.7	9.2	4.7	94.1	5.9	57.8	42.2

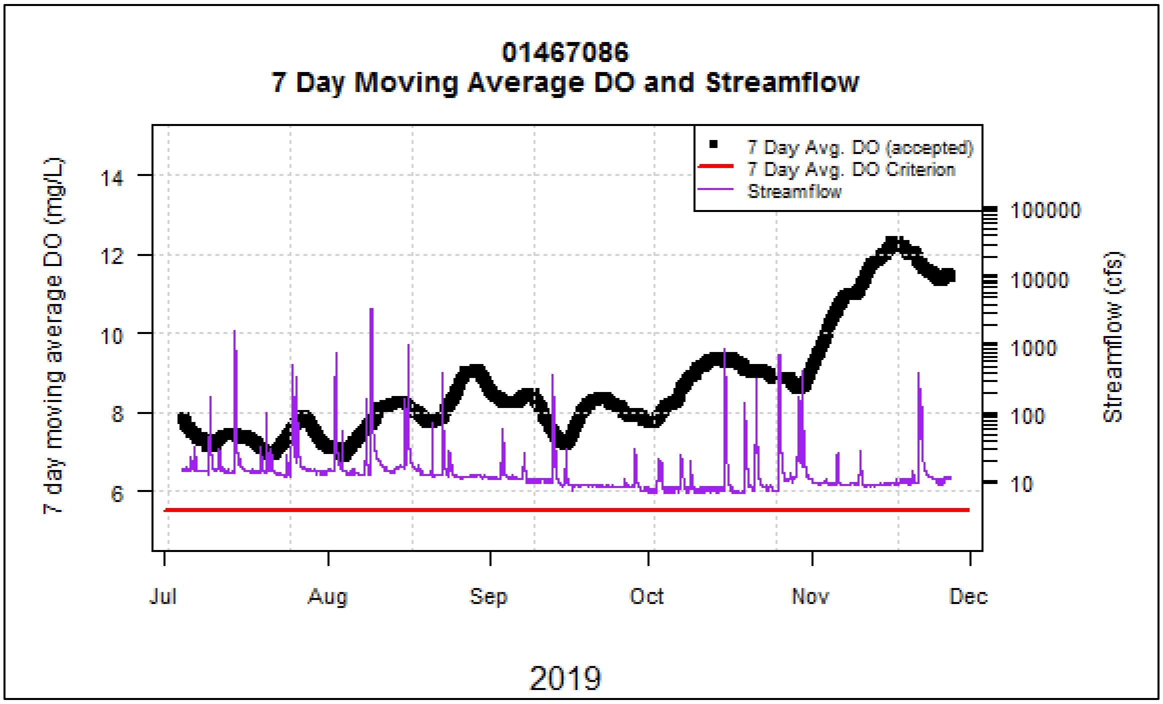


Figure 5. Gage 01467086, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

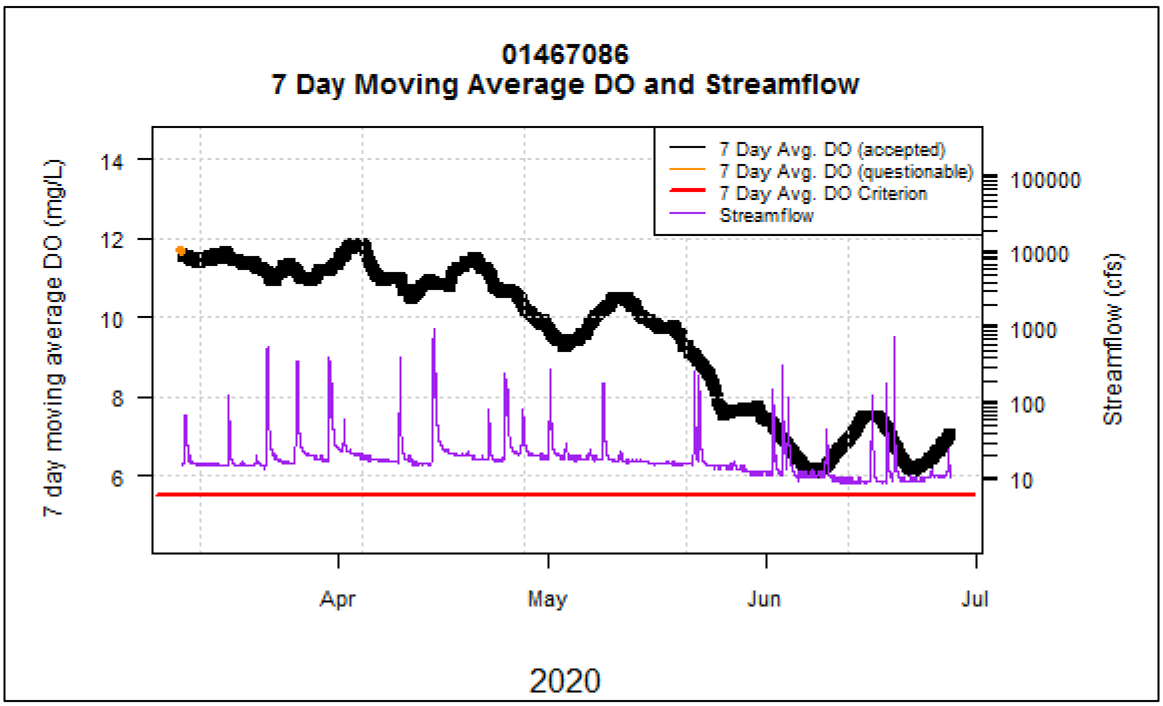


Figure 6. Gage 01467086, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

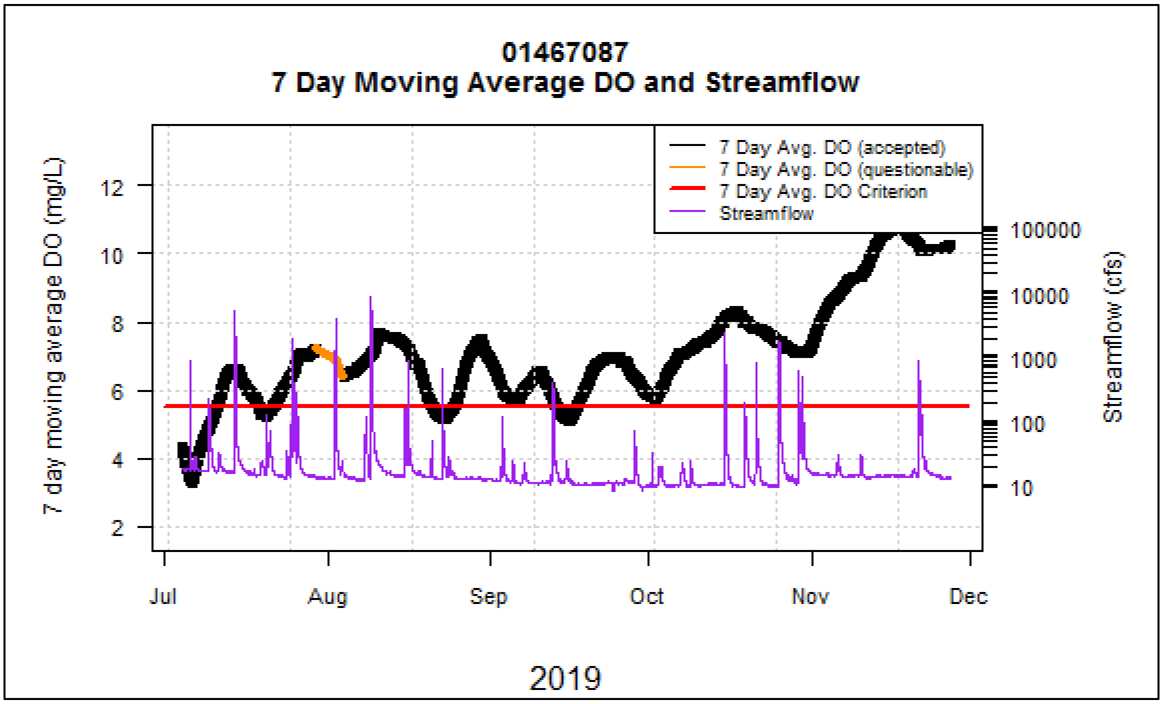


Figure 7. Gage 01467087, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

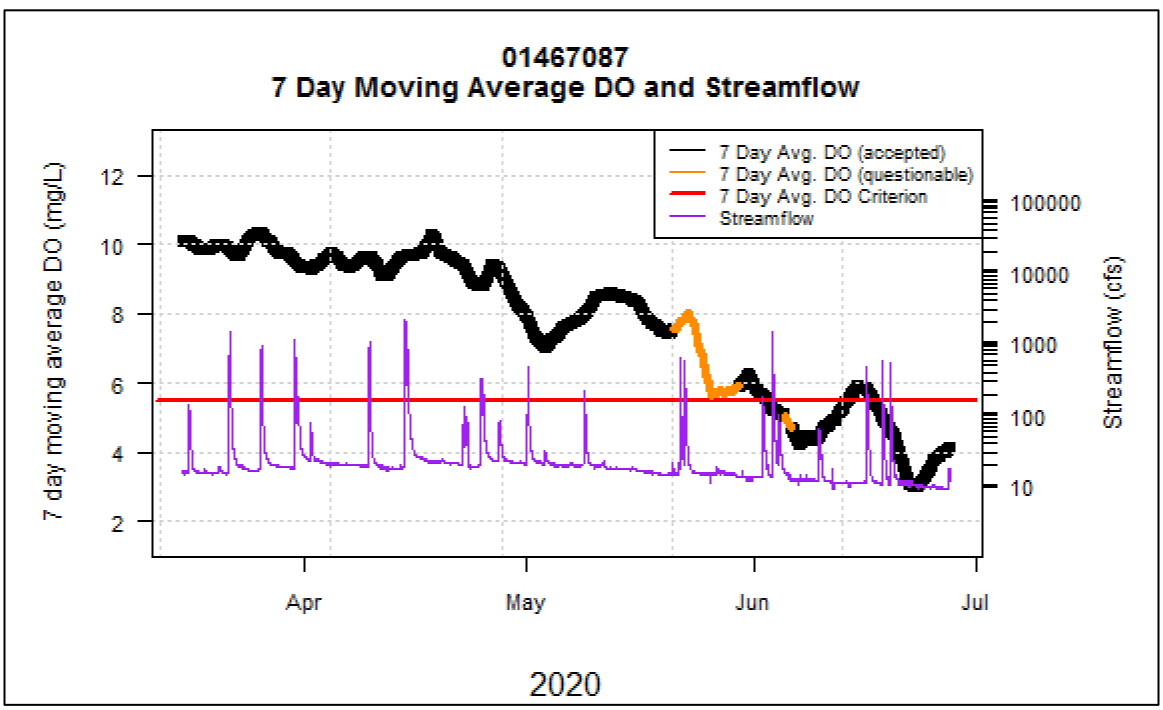


Figure 8. Gage 01467087, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

Table 14. Gage 01467086 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	1434	6.2	8.7	7.6	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	1486	6.8	8.8	7.7	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	1436	6.9	8.8	7.6	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	1483	6.8	7.9	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	1441	6.6	8.1	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	1224	7.1	9.3	7.9	100.0	0.0	0.0	2.3	100.0	97.7
Apr-20	1439	7.2	9.4	8.1	100.0	0.0	0.0	7.3	100.0	92.7
May-20	1485	7.0	9.0	7.8	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	1439	6.8	8.4	7.4	100.0	0.0	0.0	0.0	100.0	100.0

Table 15. Gage 01467087 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2967	6.4	7.8	7.1	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2912	6.1	7.6	7.2	99.9	0.1	0.0	0.0	100.0	100.0
Sep-19	2871	6.8	7.5	7.2	99.9	0.1	0.0	0.0	100.0	100.0
Oct-19	2971	6.6	7.5	7.1	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	2813	6.6	7.5	7.3	97.7	2.3	0.0	0.0	100.0	100.0
Mar-20	1875	7.1	8.0	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	2872	6.9	8.2	7.5	100.0	0.0	0.0	0.0	100.0	100.0
May-20	2600	6.7	8.0	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	2865	6.7	7.8	7.2	99.9	0.1	0.0	0.0	100.0	100.0

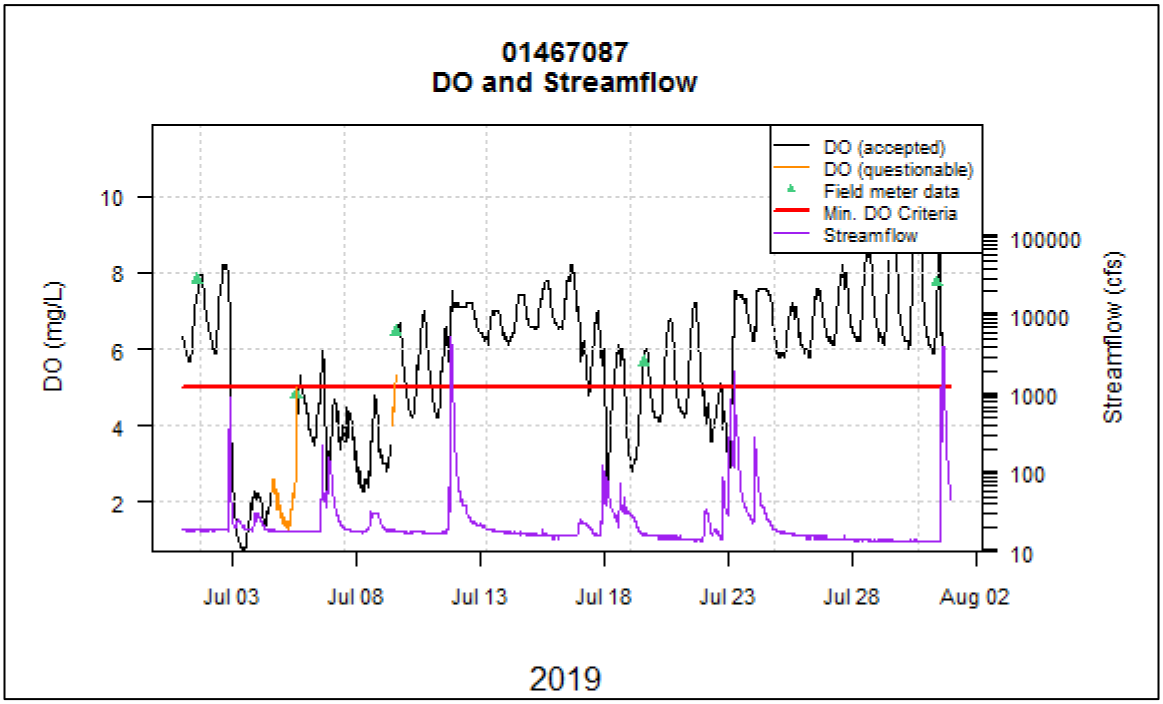


Figure 9. Gage 01467087, Dissolved Oxygen and Streamflow, July 2019.

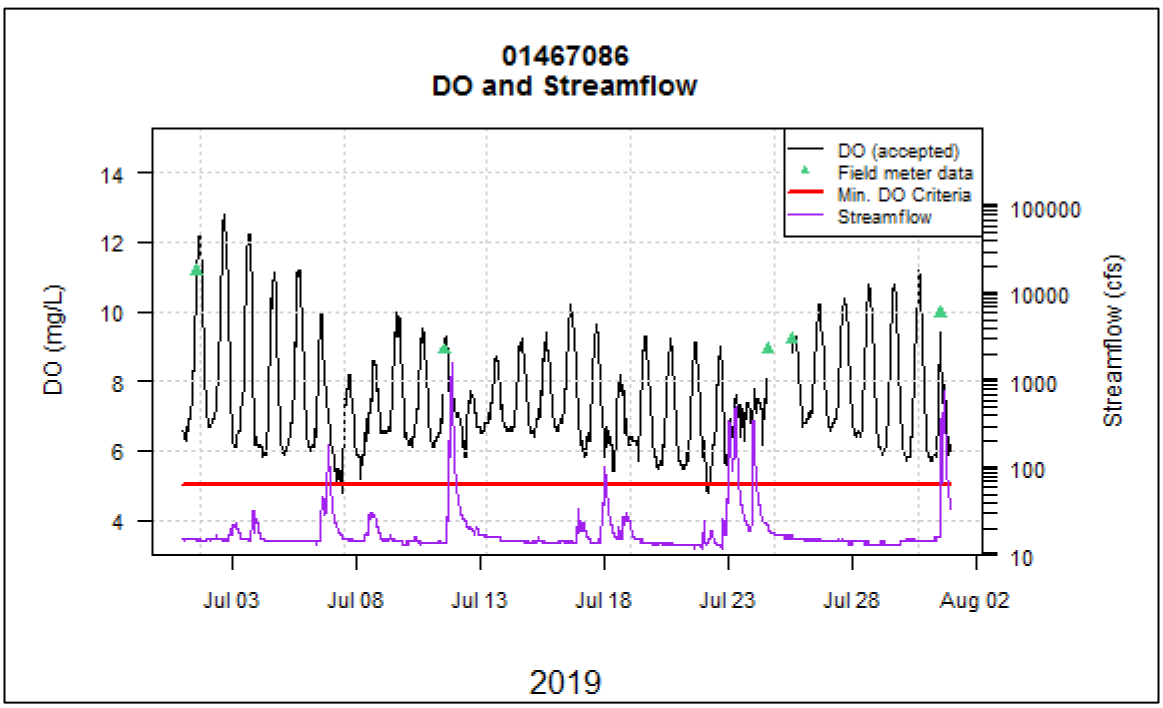


Figure 10. Gage 01467086, Dissolved Oxygen and Streamflow, July 2019.

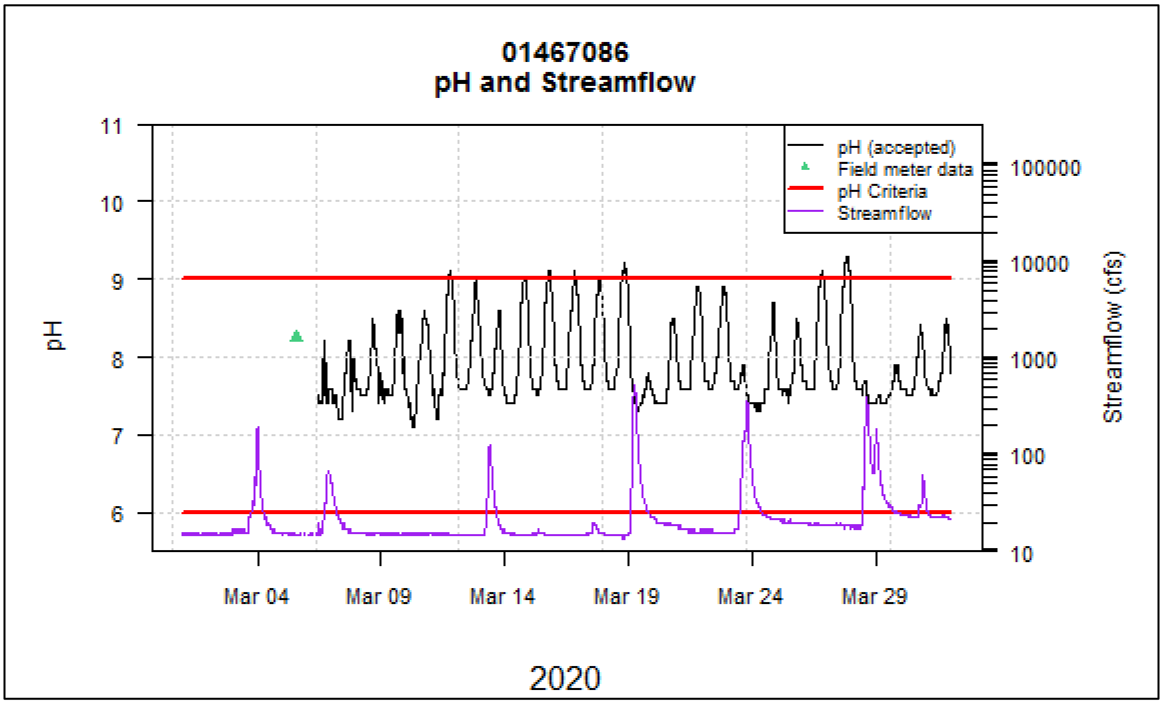


Figure 11. Gage 01467086, pH and Streamflow, March 2020.

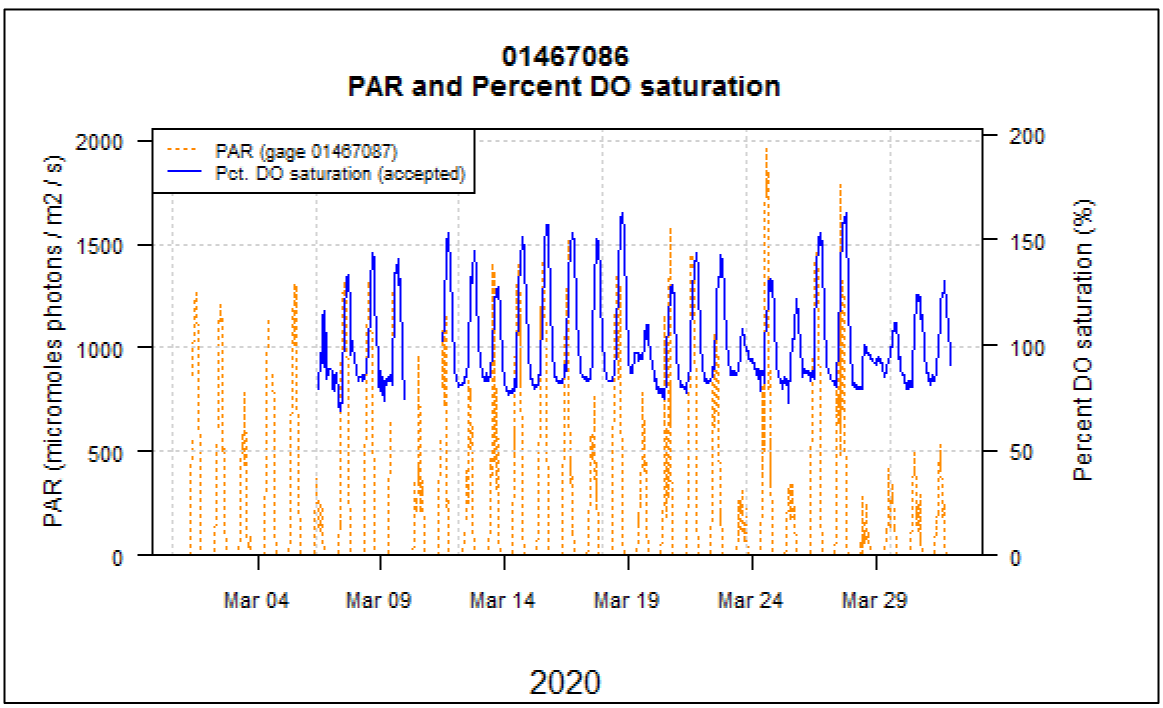


Figure 12. Gage 01467086, PAR and Percent Dissolved Oxygen Saturation, March 2020.

Figure 13. Gage 01467086, Tacony Creek at Adams Ave.

Figure 14. Gage 01467087, Frankford Creek at Castor Ave., looking downstream

Specific Conductance

Specific conductance observations were usually consistent between the two gage sites (Tables 16-17). Elevated levels of specific conductance observed in late fall and early spring months are likely due to the effects of road salt entering the stream.

Table 16. Gage 01467086 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	1482	82.0	779.0	642.1	100.0	0.0
Aug-19	1486	59.0	780.0	605.4	100.0	0.0
Sep-19	1436	249.0	818.0	720.8	100.0	0.0
Oct-19	1483	88.0	799.0	601.0	100.0	0.0
Nov-19	1441	155.0	790.0	687.4	100.0	0.0
Mar-20	1223	113.0	750.0	598.6	100.0	0.0
Apr-20	1439	89.0	724.0	611.4	100.0	0.0
May-20	1485	198.0	747.0	653.1	100.0	0.0
Jun-20	1438	180.0	886.0	636.8	100.0	0.0

Table 17. Gage 01467087 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2969	81.0	793.0	566.5	100.0	0.0
Aug-19	2907	55.0	792.0	601.6	100.0	0.0
Sep-19	2871	328.0	815.0	709.7	100.0	0.0
Oct-19	2970	101.0	795.0	541.2	100.0	0.0
Nov-19	2879	143.0	805.0	649.3	100.0	0.0
Mar-20	2925	143.0	738.0	537.6	100.0	0.0
Apr-20	2875	118.0	727.0	572.5	100.0	0.0
May-20	2601	292.0	754.0	663.8	100.0	0.0
Jun-20	2869	209.0	793.0	598.4	100.0	0.0

Temperature

Monthly mean temperatures observed at the downstream gage were usually higher than at the upstream gage. Consequently, a higher rate of temperature criteria exceedance was typically observed at the downstream gage (Tables 18-19).

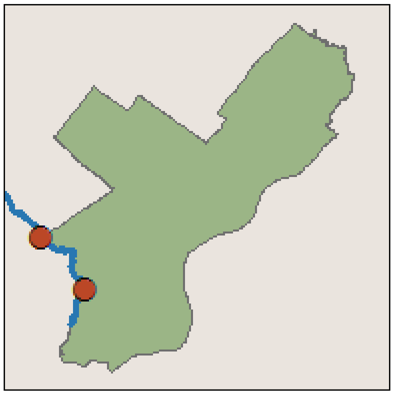
Table 18. Gage 01467086 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
WWF	1-Jul	31-Jul	0	100	0	100	19.4	29.1	23.8
WWF	1-Aug	15-Aug	0	100	0	100	19.4	26.2	23.1
WWF	16-Aug	31-Aug	0	100	0	100	18.1	26.7	22.3
WWF	1-Sep	15-Sep	0	100	0	100	17	25.2	21.1
WWF	16-Sep	30-Sep	0	100	0	100	15.2	23.2	19.4
WWF	1-Oct	15-Oct	2.6	97.4	0	100	13.6	22.5	16.7
WWF	16-Oct	31-Oct	0	100	0	100	10.1	18.6	14.2
WWF	1-Nov	15-Nov	4.2	95.8	0	100	2.6	18.7	8.1
WWF	16-Nov	30-Nov	0	100	0	100	2.9	9.1	6.4
WWF	1-Mar	31-Mar	86.4	13.6	0	100	5.2	16.4	10.4
WWF	1-Apr	15-Apr	73.4	26.6	0	100	7.6	18.4	12.6
WWF	16-Apr	30-Apr	14.2	85.8	0	100	7.3	16.6	11.7
WWF	1-May	15-May	9.2	90.8	0	100	7.8	21.1	14.2
WWF	16-May	31-May	5.9	94.1	0	100	12.1	24.1	18.4
WWF	1-Jun	15-Jun	0	100	0	100	15.7	25.2	21
WWF	16-Jun	30-Jun	0	100	0	100	17.8	27	22.8

Table 19. Gage 01467087 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
WWF	1-Jul	31-Jul	0.2	99.8	0	100	21.3	31.2	25.5
WWF	1-Aug	15-Aug	0	100	0	100	22	27.6	24.4
WWF	16-Aug	31-Aug	0	100	0	100	19.9	27.2	23.6
WWF	1-Sep	15-Sep	0	100	0	100	19.2	25.8	22.2
WWF	16-Sep	30-Sep	0	100	0	100	17.2	23.4	20.6
WWF	1-Oct	15-Oct	3.1	96.9	0	100	14.3	23.1	17.3
WWF	16-Oct	31-Oct	0	100	0	100	11.6	18.4	14.7
WWF	1-Nov	15-Nov	5.4	94.6	0	100	3.7	19.1	8.5
WWF	16-Nov	30-Nov	0	100	0	100	3.7	9.3	6.1
WWF	1-Mar	31-Mar	84.4	15.6	0	100	3.4	14.6	10.1
WWF	1-Apr	15-Apr	80.7	19.3	0	100	9.5	16.5	12.9
WWF	16-Apr	30-Apr	11.1	88.9	0	100	9.2	15.8	12.1
WWF	1-May	15-May	9.2	90.8	0	100	9.8	19.6	14.8
WWF	16-May	31-May	10.5	89.5	0	100	14.6	24.3	19.4
WWF	1-Jun	15-Jun	0	100	0	100	18.1	26.1	22.4
WWF	16-Jun	30-Jun	0	100	0	100	20.2	27.8	24.1

Cobbs Creek (Gages 01475530 and 01475548)



Dissolved oxygen and pH

The upstream Cobbs Creek site (01475530) almost always met the minimum dissolved oxygen criterion and never exceeded the 7-day average guideline (Table 20, Figures 15, 16, 19). Dissolved oxygen at the downstream site (01475548) did not always attain the minimum, particularly during the warmer months. The downstream site mostly attained the 7-day average guideline.

The pattern of dissolved oxygen and pH values between the upstream and downstream Cobbs Creek gages is likely due to greater algal activity at the downstream gage. During the spring—key months for algal growth—pH exceeded the maximum guideline at the downstream gage site (Tables 22-23). Algae remove CO_2 during photosynthesis, raising pH by shifting the dissolved inorganic carbon (DIC) balance toward alkaline carbonates. Furthermore, the diel fluctuations in DO were more pronounced at the downstream gage during these months (Figures 19-20).

A third indicator of increased algal activity in Cobbs Creek is the supersaturation of oxygen caused by photosynthesis. During April, the downstream gage recorded peak DO saturation levels greater than 150% during the day in dry weather conditions (Figures 21-22).

Table 20. Gage 01475530 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	WWF	2970	0.1	10.8	8.0	100.0	0.0	0.1	99.9
Aug-19	WWF	2793	5.8	10.9	8.2	100.0	0.0	0.0	100.0
Sep-19	WWF	2876	6.5	11.7	8.4	100.0	0.0	0.0	100.0
Oct-19	WWF	2975	6.6	12.3	9.1	100.0	0.0	0.0	100.0
Nov-19	WWF	2880	7.9	14.2	11.1	100.0	0.0	0.0	100.0
Mar-20	WWF	2725	8.5	14.1	11.0	100.0	0.0	0.0	100.0
Apr-20	WWF	2873	8.0	13.5	10.5	100.0	0.0	0.0	100.0
May-20	WWF	2974	6.9	12.4	9.2	100.0	0.0	0.0	100.0
Jun-20	WWF	2874	5.8	10.1	7.7	100.0	0.0	0.0	100.0

Table 21. Gage 01475548 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	WWF	2969	2.5	11.2	7.1	100.0	0.0	5.2	94.8
Aug-19	WWF	2877	2.2	11.2	7.2	100.0	0.0	1.4	98.6
Sep-19	WWF	2585	3.0	11.4	6.5	100.0	0.0	16.9	83.1
Oct-19	WWF	2971	4.5	11.4	8.2	100.0	0.0	4.0	96.0
Nov-19	WWF	2883	6.8	13.8	11.3	100.0	0.0	0.0	100.0
Mar-20	WWF	2727	7.7	16.6	11.5	100.0	0.0	0.0	100.0
Apr-20	WWF	2867	4.4	16.8	10.6	100.0	0.0	0.3	99.7
May-20	WWF	2520	3.4	14.6	8.6	97.2	2.8	2.0	98.0
Jun-20	WWF	2415	3.0	9.7	6.8	100.0	0.0	6.7	93.3

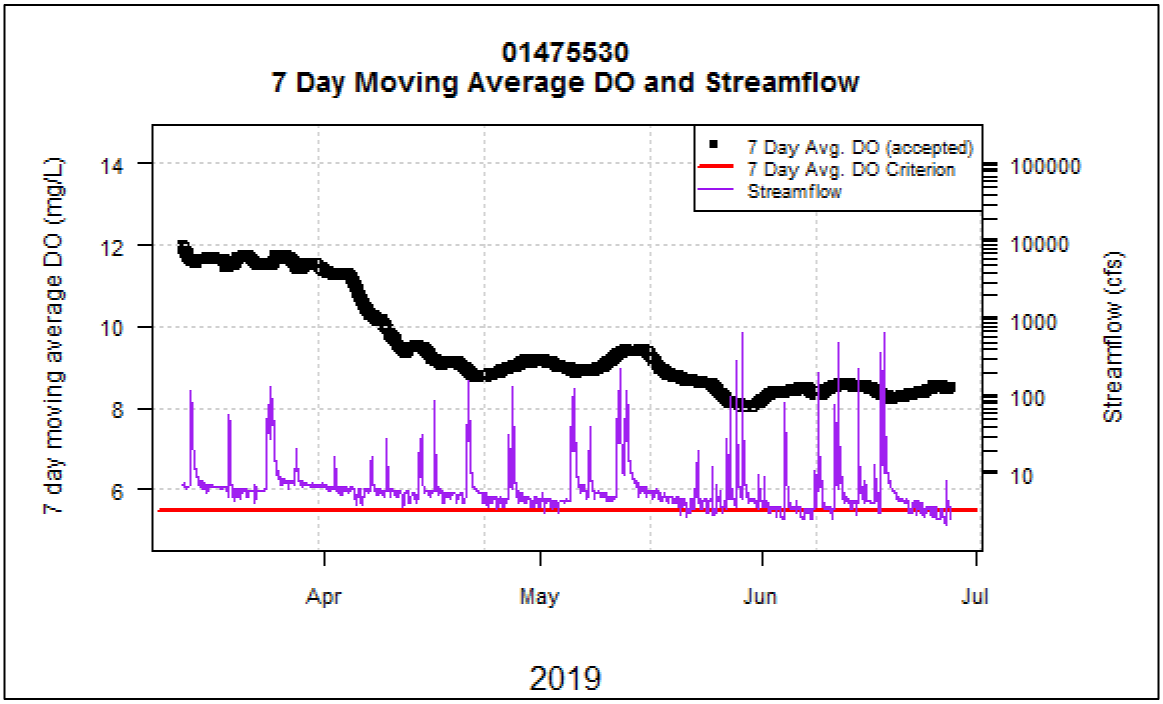


Figure 15. Gage 01475530, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

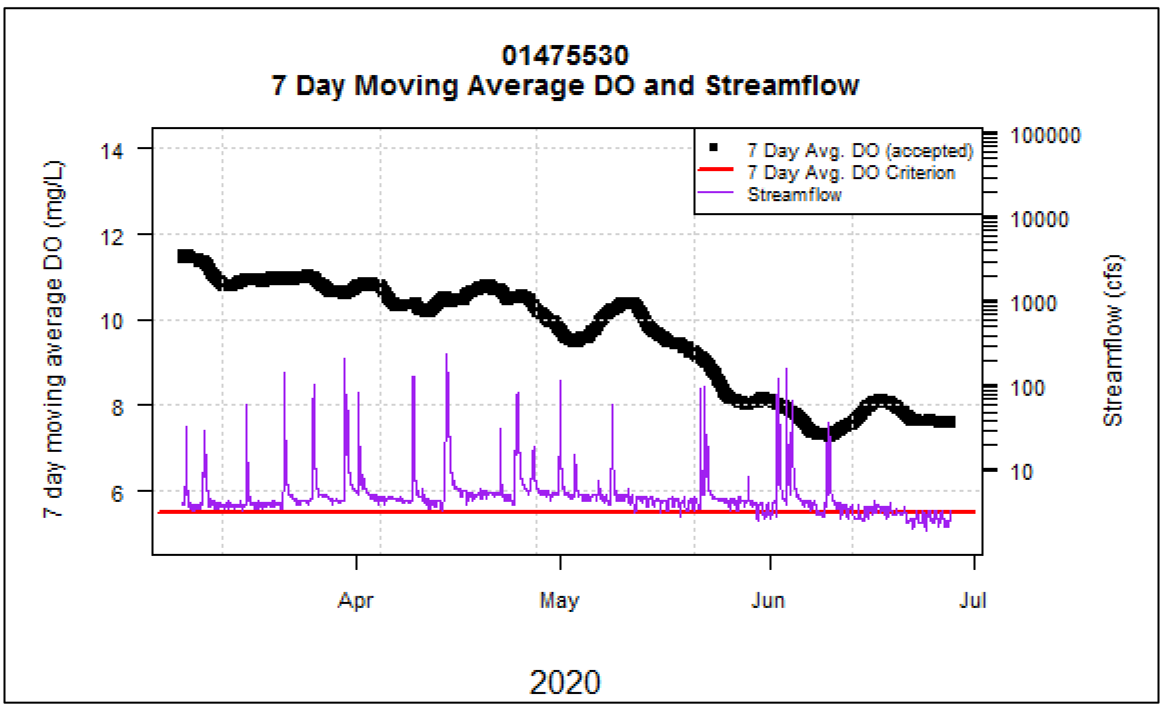


Figure 16. Gage 01475530, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

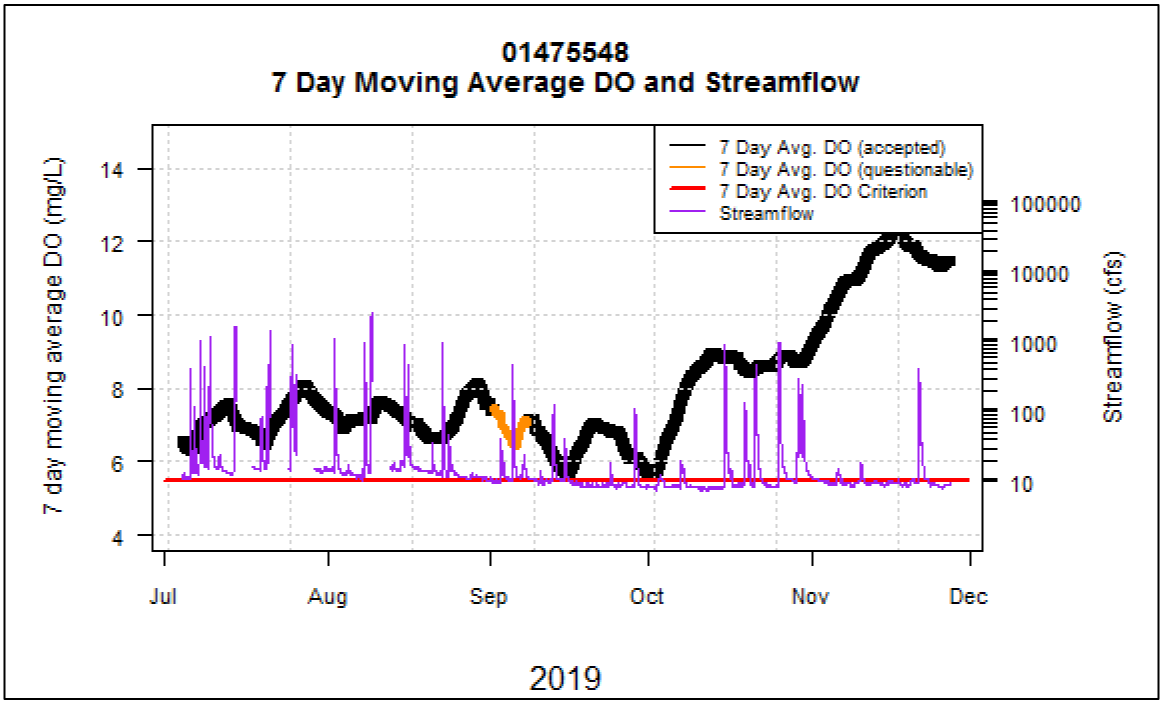


Figure 17. Gage 01475548, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

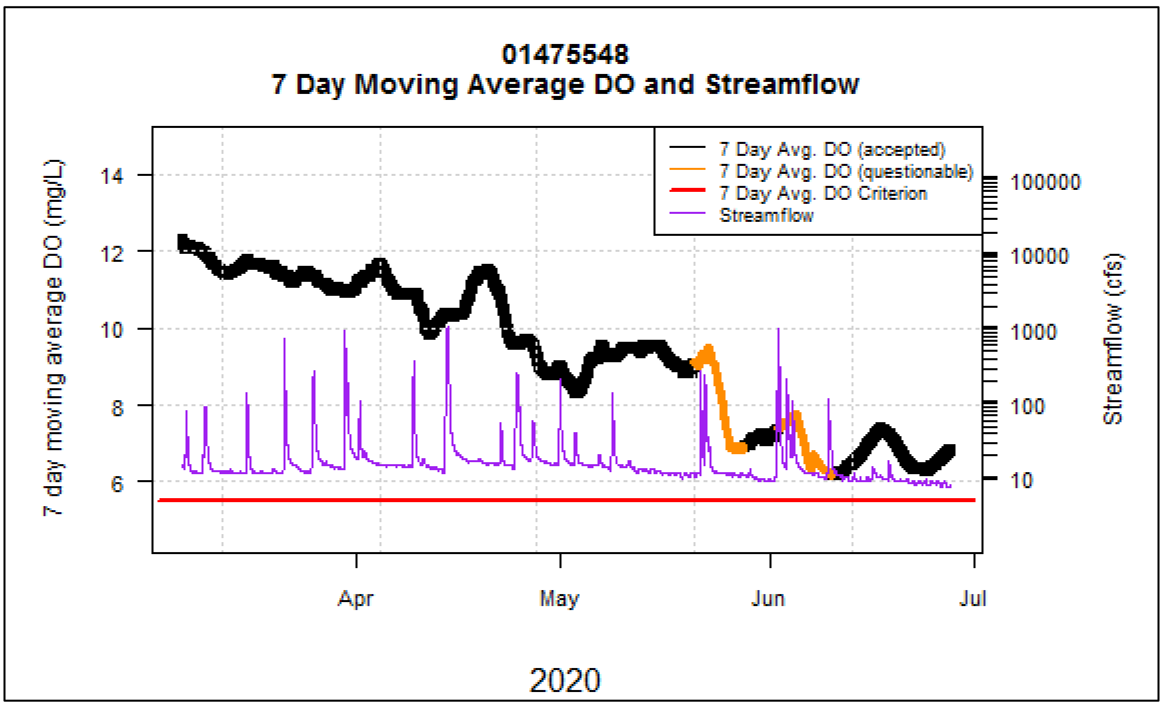


Figure 18. Gage 01475548, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

Table 22. Gage 01475530 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2969	6.8	8.6	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2967	6.8	8.1	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	2876	7.1	8.2	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	2974	7.1	8.2	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	2877	7.1	8.2	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	2726	7.1	8.4	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	2873	7.1	8.6	7.5	100.0	0.0	0.0	0.0	100.0	100.0
May-20	2974	7.1	8.2	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	2874	6.7	7.9	7.3	100.0	0.0	0.0	0.0	100.0	100.0

Table 23. Gage 01475548 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2970	6.8	8.6	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2976	6.7	8.5	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	2585	7.0	8.4	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	2961	7.0	8.2	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	2883	7.0	8.2	7.7	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	2727	7.3	9.2	8.0	100.0	0.0	0.0	1.9	100.0	98.1
Apr-20	2866	7.1	9.4	8.0	100.0	0.0	0.0	3.9	100.0	96.1
May-20	2770	7.0	9.0	7.8	93.5	6.5	0.0	0.0	100.0	100.0
Jun-20	2686	6.4	8.2	7.5	93.7	6.3	0.0	0.0	100.0	100.0

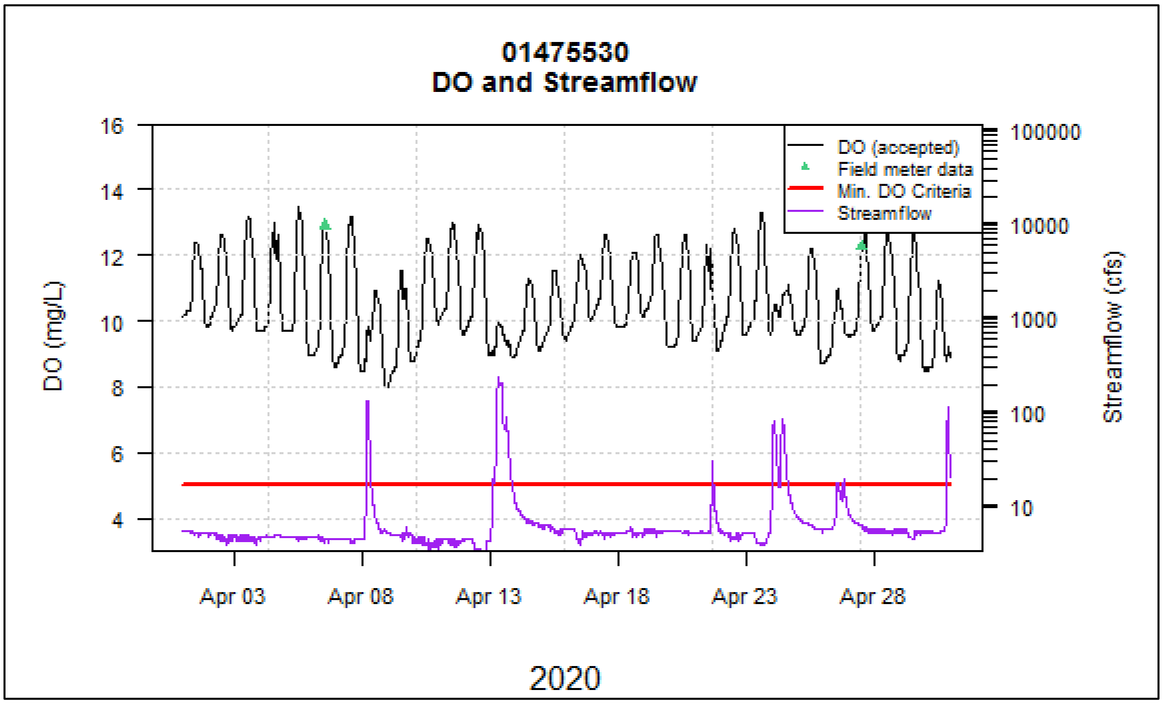


Figure 19. Gage 01475530, Dissolved Oxygen and Streamflow, April 2020.

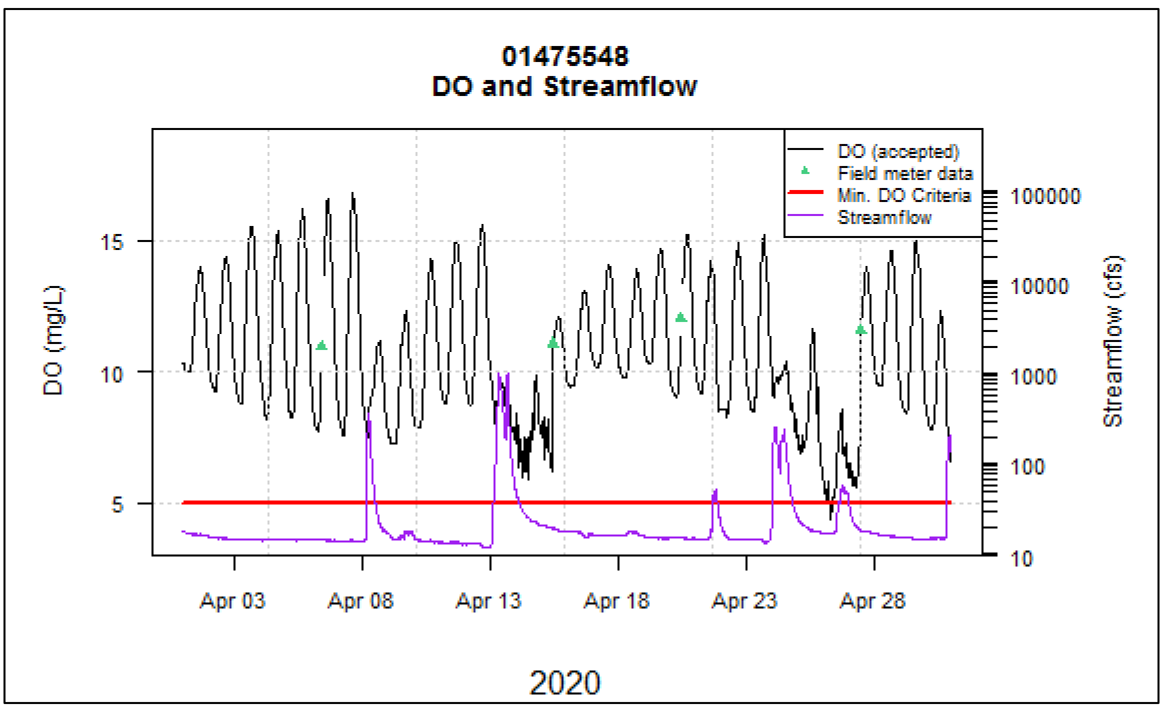


Figure 20. Gage 01475548, Dissolved Oxygen and Streamflow, April 2020.

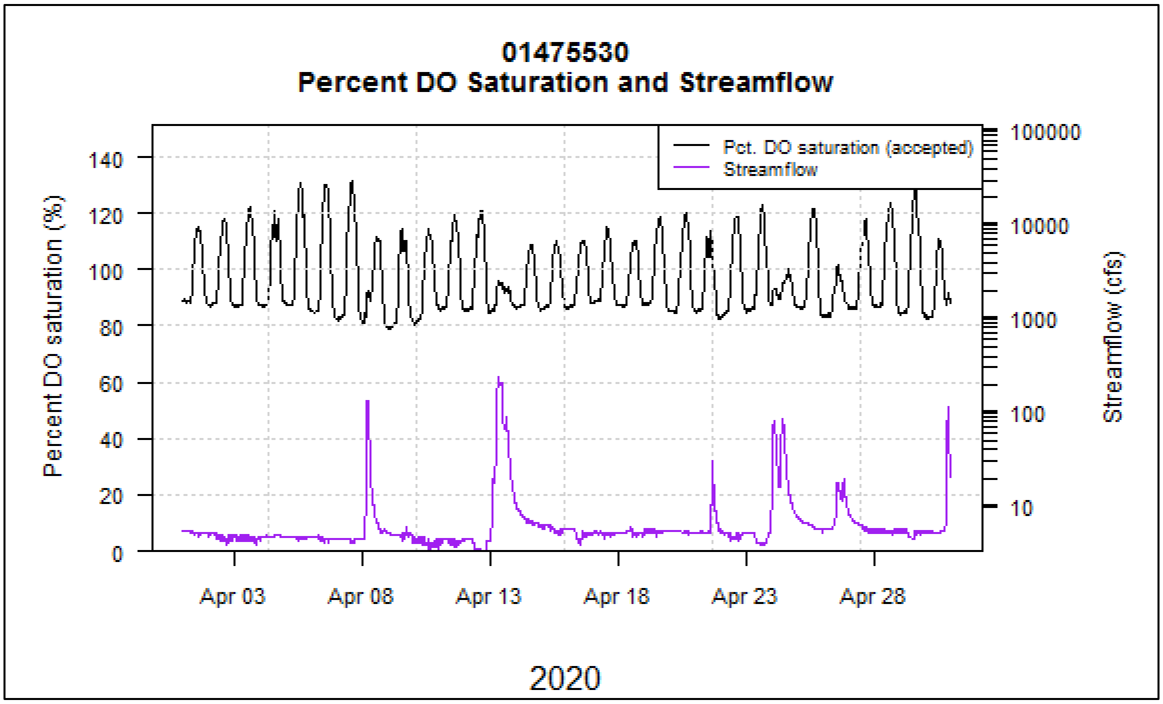


Figure 21. Gage 01475530, Percent DO Saturation and Streamflow, April 2019.

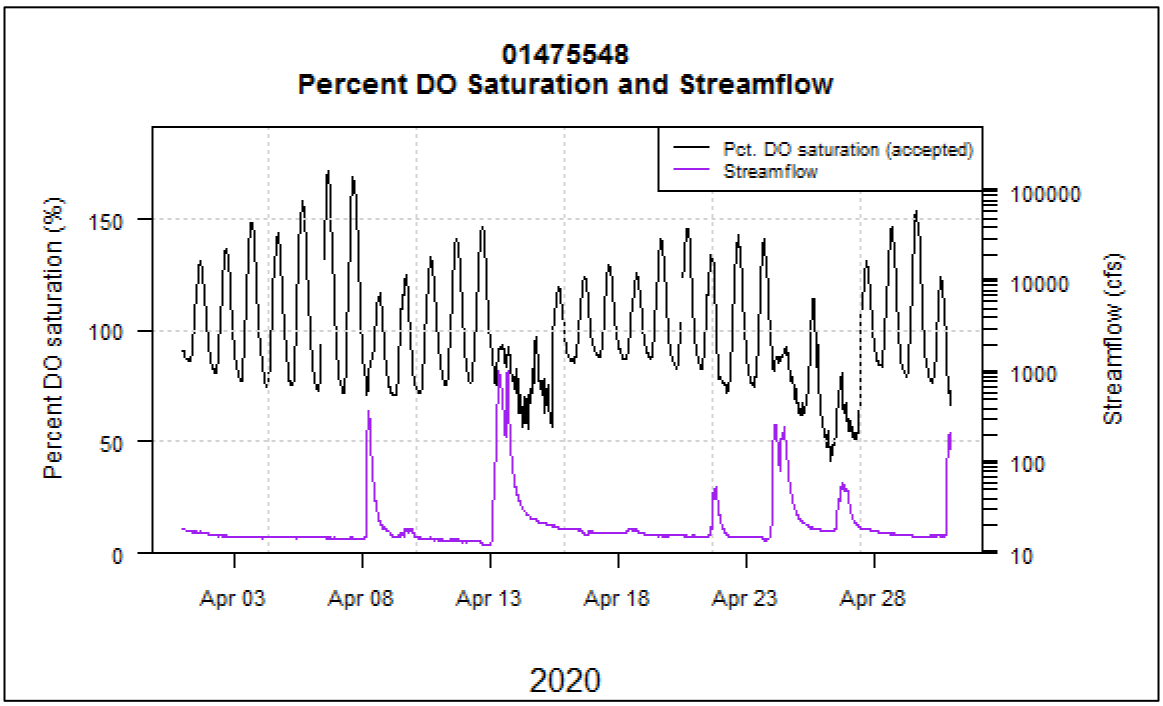


Figure 22. Gage 01475548, Percent DO Saturation and Streamflow, April 2020.

Figure 23. Gage 01475530, Cobbs Creek at Rte. 1, looking upstream

Figure 24. Gage 01475548, Cobbs Creek at Mt. Moriah Cemetery

Specific Conductance

Specific conductance observations were similar to those observed in Tacony Creek (Tables 24-25). During a typical winter, road salt may have some impact on conductance at both gages. However, the typical pattern of stormwater lowering conductance levels in the stream is well-observed during the storms that occurred in April (Figures 25-26).

Table 24. Gage 01475530 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2969	50.0	639.0	512.7	100.0	0.0
Aug-19	2967	53.0	644.0	477.2	100.0	0.0
Sep-19	2876	206.0	644.0	566.8	100.0	0.0
Oct-19	2976	92.0	637.0	512.5	100.0	0.0
Nov-19	2880	121.0	638.0	570.0	100.0	0.0
Mar-20	2725	88.0	624.0	522.8	100.0	0.0
Apr-20	2873	80.0	619.0	530.9	100.0	0.0
May-20	2974	150.0	886.0	562.3	100.0	0.0
Jun-20	2871	136.0	650.0	571.5	100.0	0.0

Table 25. Gage 01475548 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2969	106.0	750.0	520.3	100.0	0.0
Aug-19	2976	87.0	694.0	515.4	100.0	0.0
Sep-19	2584	422.0	778.0	680.7	100.0	0.0
Oct-19	2971	110.0	752.0	575.1	100.0	0.0
Nov-19	2347	200.0	756.0	601.9	81.4	18.6
Mar-20	2727	155.0	735.0	546.8	100.0	0.0
Apr-20	2866	130.0	739.0	572.6	100.0	0.0
May-20	2963	251.0	757.0	625.8	100.0	0.0
Jun-20	2867	169.0	760.0	654.8	100.0	0.0

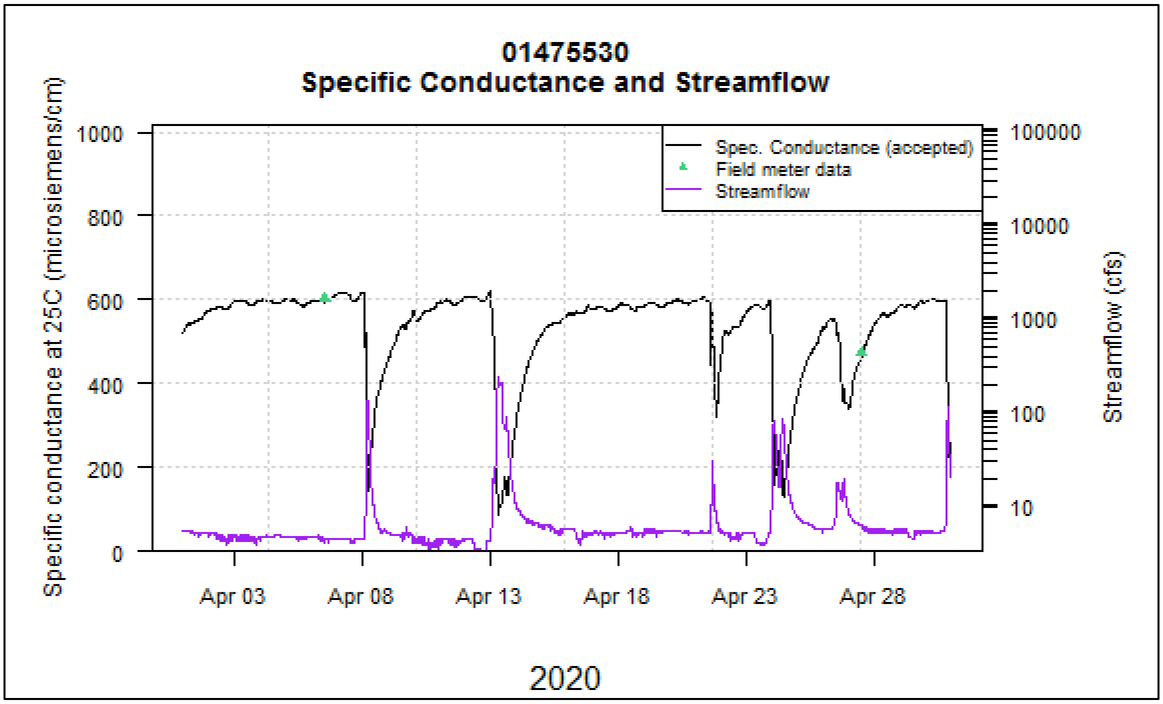


Figure 25. Gage 01475530, Specific Conductance and Streamflow, April 2020.

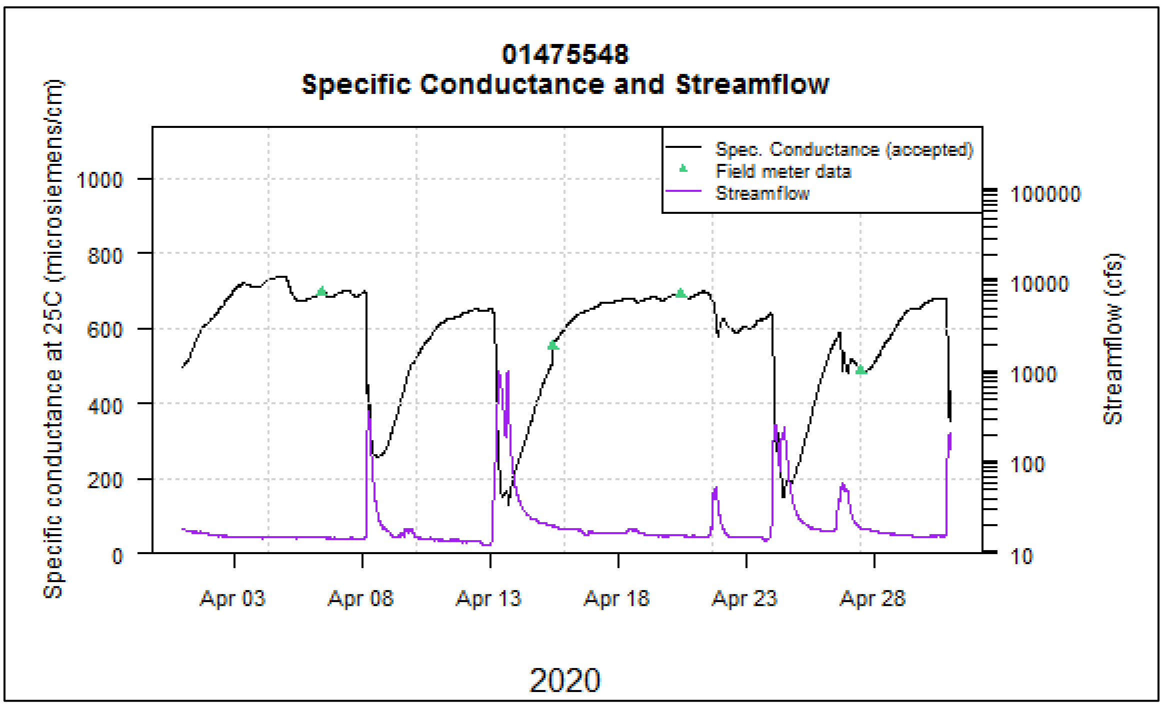


Figure 26. Gage 01475548, Specific Conductance and Streamflow, April 2020.

Temperature

Both Cobbs Creek gages showed exceedances of temperature maximum criteria during the fall and spring seasons, when temperature criteria are more stringent (Tables 26-27).

Table 26. Gage 01475530 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
WWF	1-Jul	31-Jul	0	100	0	100	18.9	27.8	22.8
WWF	1-Aug	15-Aug	0	100	0	100	18.6	25.2	22
WWF	16-Aug	31-Aug	0	100	0	100	17.4	25.8	21.4
WWF	1-Sep	15-Sep	0	100	0	100	16.8	25.3	20.4
WWF	16-Sep	30-Sep	0	100	0	100	14.8	22.1	18.7
WWF	1-Oct	15-Oct	1	99	0	100	13.1	22.3	16.3
WWF	16-Oct	31-Oct	0	100	0	100	10.1	18.1	14
WWF	1-Nov	15-Nov	1.9	98.1	0	100	3.4	18	8.6
WWF	16-Nov	30-Nov	0	100	0	100	4.2	9.9	7.1
WWF	1-Mar	31-Mar	84.2	15.8	0	100	4.7	15.4	10.2
WWF	1-Apr	15-Apr	65.3	34.7	0	100	7.2	17.6	12
WWF	16-Apr	30-Apr	13	87	0	100	7.2	17.1	11.5
WWF	1-May	15-May	5.1	94.9	0	100	7.9	20.4	13.6
WWF	16-May	31-May	1.4	98.6	0	100	11.7	23.2	17.5
WWF	1-Jun	15-Jun	0	100	0	100	14.8	24.6	20
WWF	16-Jun	30-Jun	0	100	0	100	16.8	26.1	21.5

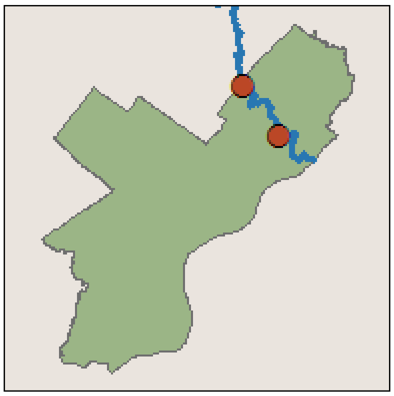
Table 27. Gage 01475548 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
WWF	1-Jul	31-Jul	0	100	0	100	21.2	29.5	24.5
WWF	1-Aug	15-Aug	0	100	0	100	20.4	26.1	23.4
WWF	16-Aug	31-Aug	0	100	0	100	19	27.6	22.8
WWF	1-Sep	15-Sep	0	100	0	100	18.2	24.7	21.3
WWF	16-Sep	30-Sep	0	100	0	100	16.1	22.7	19.7
WWF	1-Oct	15-Oct	2.8	97.2	0	100	14.1	22.8	17
WWF	16-Oct	31-Oct	0	100	0	100	11	18.4	14.5
WWF	1-Nov	15-Nov	4.8	95.2	0	100	3.2	18.5	8.5
WWF	16-Nov	30-Nov	0	100	0	100	3.8	8.8	6.6
WWF	1-Mar	31-Mar	88.9	11.1	0	100	5.2	14.9	10.3
WWF	1-Apr	15-Apr	75.4	24.6	0	100	8.3	17.3	12.6
WWF	16-Apr	30-Apr	14.4	85.6	0	100	8	16.6	11.8
WWF	1-May	15-May	8.3	91.7	0	100	8.6	20.2	14.3
WWF	16-May	31-May	6.7	93.3	0	100	13.3	24.3	18.7
WWF	1-Jun	15-Jun	0	100	0	100	16.5	25.5	21.4
WWF	16-Jun	30-Jun	0	100	0	100	18.6	27.3	23.1

Gages in Separate Sewer System Watersheds

Gages in the Pennypack, Wissahickon and Poquessing watersheds are situated in the separate sewer system areas of Philadelphia. Although these sites are not affected by combined sewer overflows, discharge of untreated stormwater runoff from stormwater outfalls can negatively affect water quality.

Pennypack Creek (Gages 01467042 and 01467048)



Dissolved oxygen and pH

Both the upstream (01467042) and downstream (01467048) gages of Pennypack Creek showed pronounced diel fluctuations in dissolved oxygen and pH as a result of algal activity. These patterns are most evident during dry weather periods, when algal growth is able to excel because of abundant sunshine and a lack of storm events that might otherwise scour the algal population.

At both upstream and downstream Pennypack Creek gages, periods of dry weather in warm months are conducive to excessive algal growth. During these periods, algal populations seemed to flourish, with large daily DO amplitudes during April (Figures 31-32).

In April, maximum daily pH fluctuations of approximately 1.25 units were observed (Figures 33-34). Maximum pH criteria exceedance occurred at both gages in the spring. It would be reasonable to conclude that if not for periodic interruptions of algal activity due to rainfall, those extreme fluctuations and chronic pH criteria exceedance would likely occur through the entire season.

Algal communities in the area of both gages recover quickly after storm events, as seen in Figures 33-34. Prior to a series of small storms occurring in August 2019, both DO and pH showed the typical pronounced fluctuations indicative of strong algal activity. This pattern diminished with the storms, when much of the algae was likely scoured away and overcast conditions likely inhibited further growth, as indicated by the PAR data at 01467042 for August 2019 (Figure 35). However, within 2-3 days of the conclusion of the rainfall and the return of sunny conditions, fluctuations of DO and pH resumed, indicative of high algal density. This not only demonstrates the resilience of the algal population in this ecosystem, but also a likely abundance of nutrients that allows regrowth to occur so quickly.

Table 28. Gage 01467042 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	TSF	2972	4.9	10.7	7.5	100.0	0.0	0.0	100.0
Aug-19	TSF	2946	5.7	11.8	7.8	99.1	0.9	0.0	100.0
Sep-19	TSF	2831	5.9	11.9	8.3	98.4	1.6	0.0	100.0
Oct-19	TSF	2872	6.4	12.7	9.1	96.6	3.4	0.0	100.0
Nov-19	TSF	2880	7.6	13.6	11.0	100.0	0.0	0.0	100.0
Mar-20	TSF	2632	8.5	15.3	11.0	100.0	0.0	0.0	100.0
Apr-20	TSF	2872	7.9	16.1	10.5	100.0	0.0	0.0	100.0
May-20	TSF	2966	6.2	11.8	8.8	100.0	0.0	0.0	100.0
Jun-20	TSF	2853	5.4	10.1	7.5	99.4	0.6	0.0	100.0

Table 29. Gage 01467048 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	TSF	2970	6.1	11.3	8.1	100.0	0.0	0.0	100.0
Aug-19	TSF	2915	6.5	12.0	8.3	100.0	0.0	0.0	100.0
Sep-19	TSF	2821	6.4	12.4	8.6	98.1	1.9	0.0	100.0
Oct-19	TSF	2966	7.0	13.6	9.5	99.9	0.1	0.0	100.0
Nov-19	TSF	2880	8.2	14.0	11.6	100.0	0.0	0.0	100.0
Mar-20	TSF	2624	9.4	17.3	11.8	100.0	0.0	0.0	100.0
Apr-20	TSF	2873	8.7	18.5	11.3	100.0	0.0	0.0	100.0
May-20	TSF	2968	7.0	13.3	9.5	100.0	0.0	0.0	100.0
Jun-20	TSF	2875	5.3	11.9	7.9	100.0	0.0	0.0	100.0

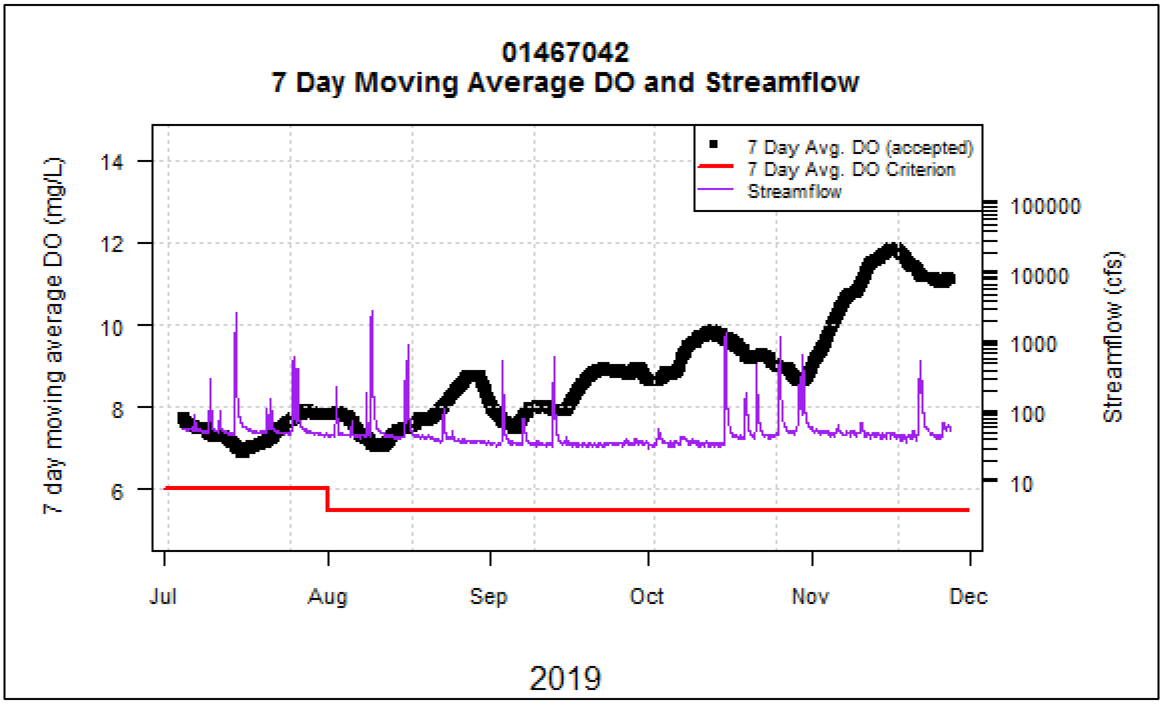


Figure 27. Gage 01467042, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

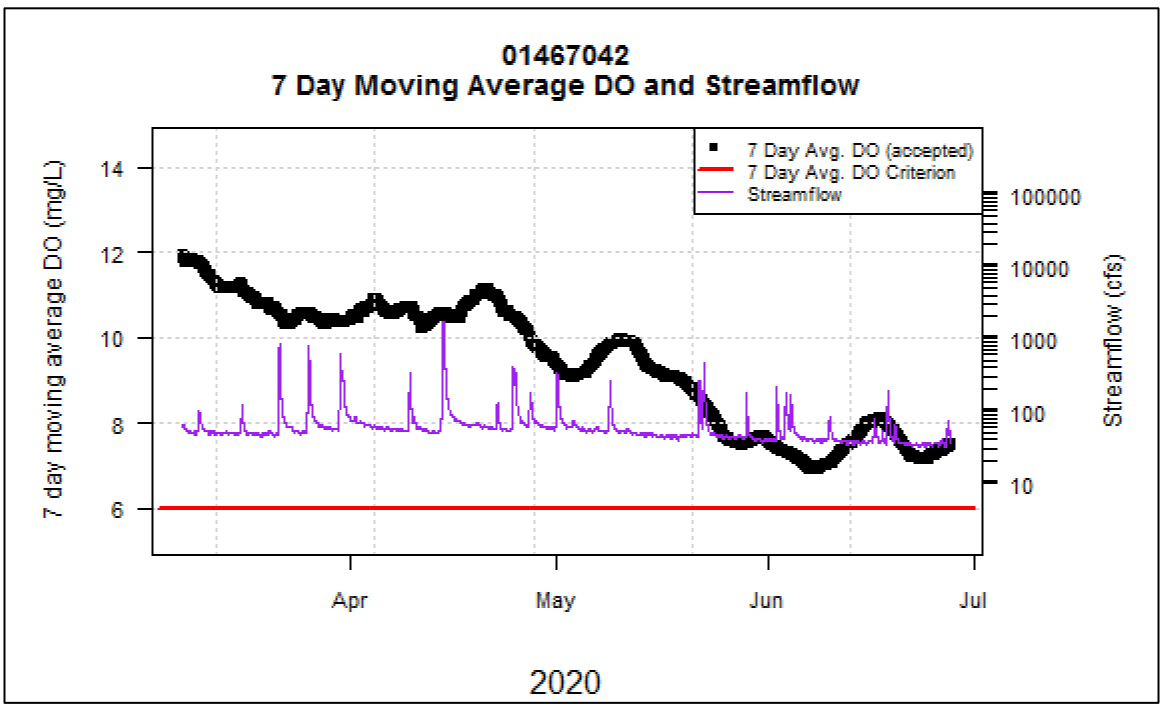


Figure 28. Gage 01467042, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

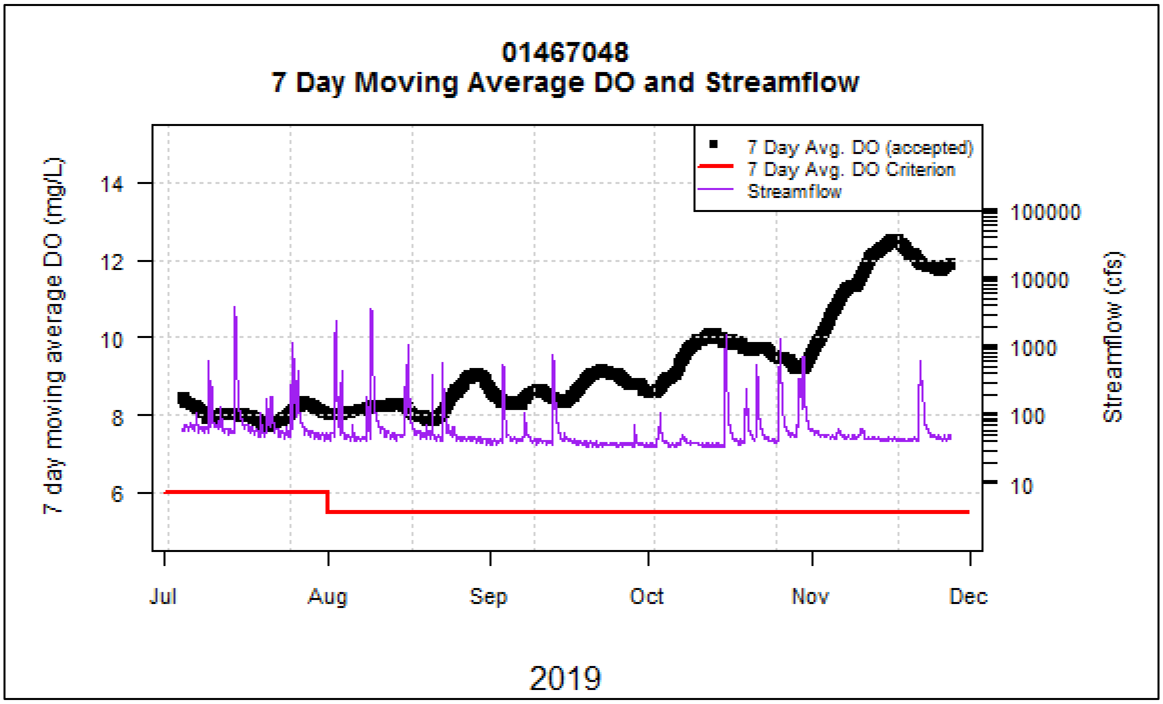


Figure 29. Gage 01467048, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

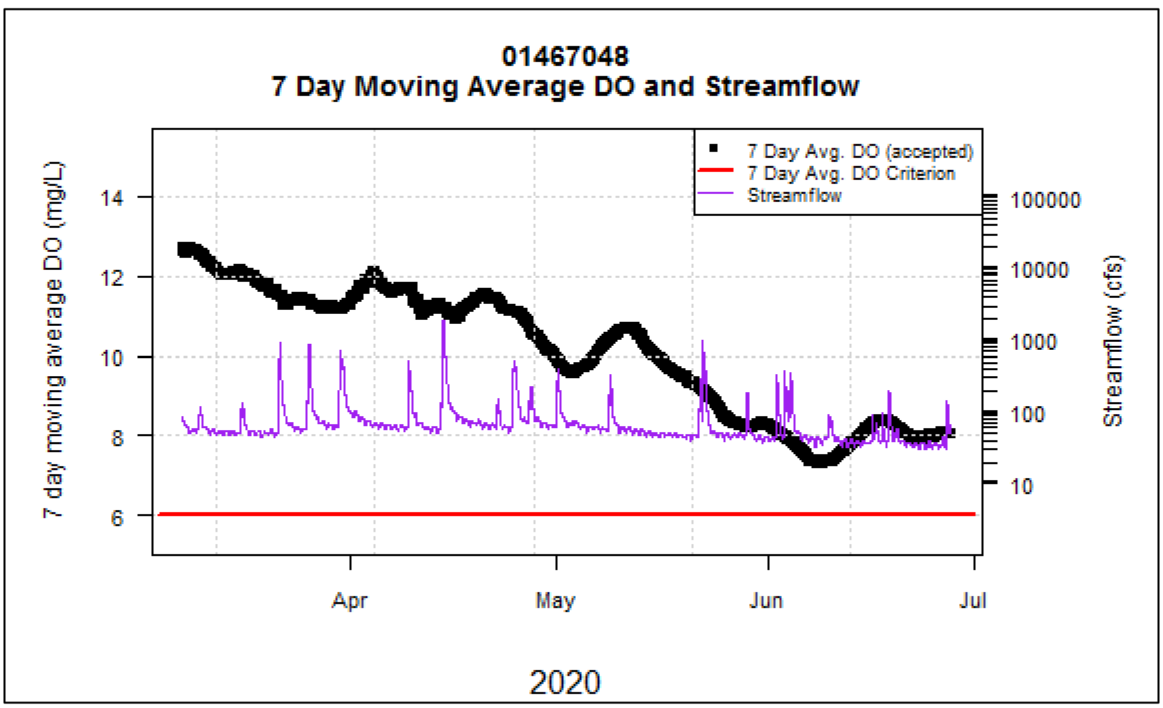


Figure 30. Gage 01467048, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

Table 30. Gage 01467042 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2971	6.9	8.4	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2972	7.0	8.7	7.7	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	2876	7.1	8.5	7.6	99.9	0.1	0.0	0.0	100.0	100.0
Oct-19	2972	7.0	8.3	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	2881	7.0	7.9	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	2632	7.2	8.7	7.7	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	2872	7.2	9.0	7.8	100.0	0.0	0.0	0.0	100.0	100.0
May-20	2960	7.2	8.0	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	2870	7.2	8.2	7.6	100.0	0.0	0.0	0.0	100.0	100.0

Table 31. Gage 01467048 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2968	6.8	8.6	7.6	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2970	6.9	8.5	7.6	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	2876	7.1	8.6	7.7	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	2970	6.7	8.7	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	2721	7.2	8.9	7.9	94.4	5.6	0.0	0.0	100.0	100.0
Mar-20	2624	7.3	9.0	7.9	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	2869	7.2	9.3	7.9	100.0	0.0	0.0	2.0	100.0	98.0
May-20	2970	7.2	8.5	7.7	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	2875	7.1	8.8	7.6	100.0	0.0	0.0	0.0	100.0	100.0

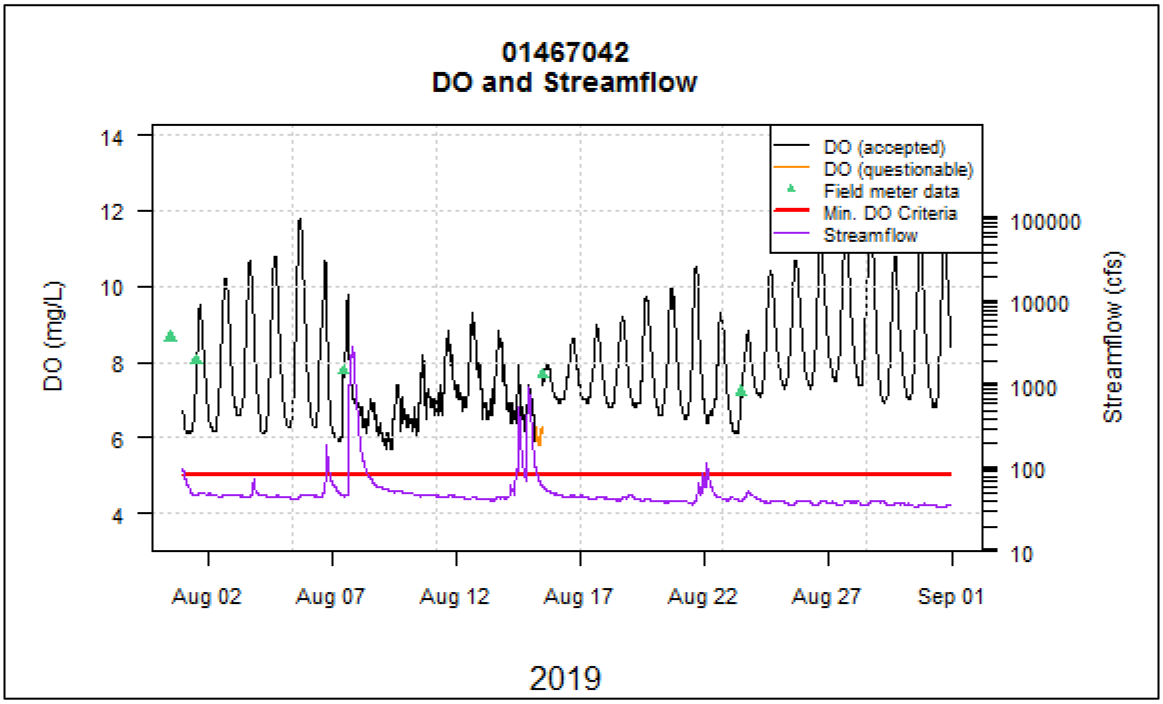


Figure 31. Gage 01467042, Dissolved Oxygen and Streamflow, August 2019.

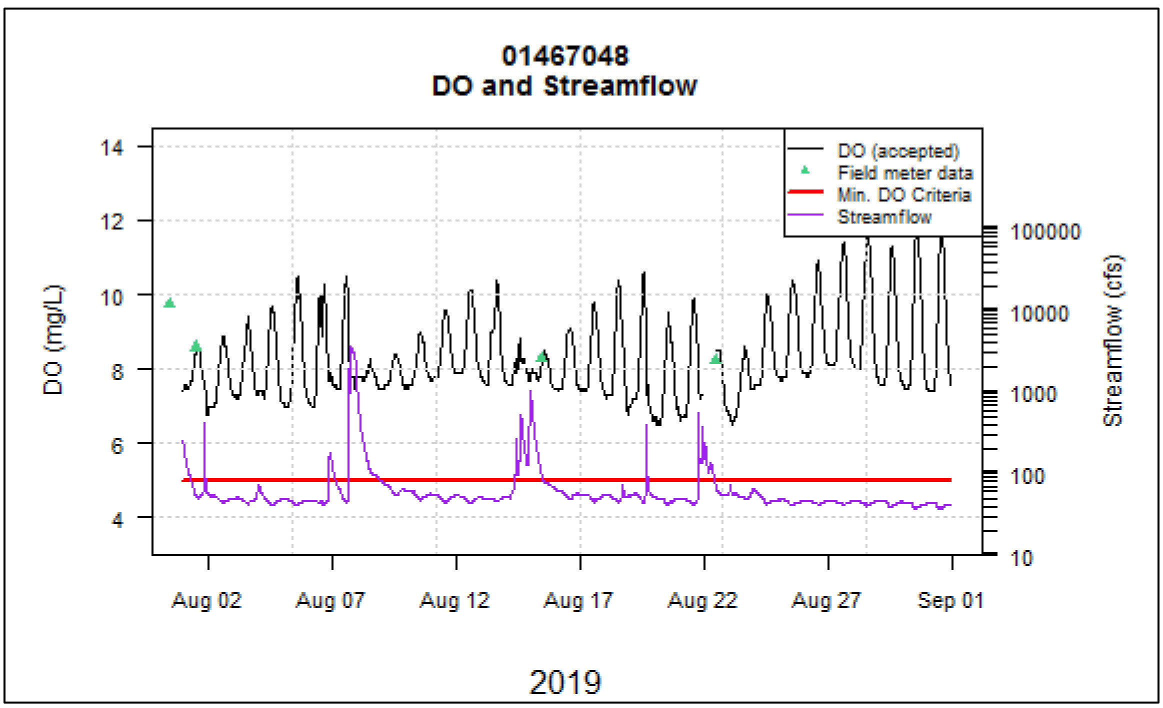


Figure 32. Gage 01467048, Dissolved Oxygen and Streamflow, August 2019.

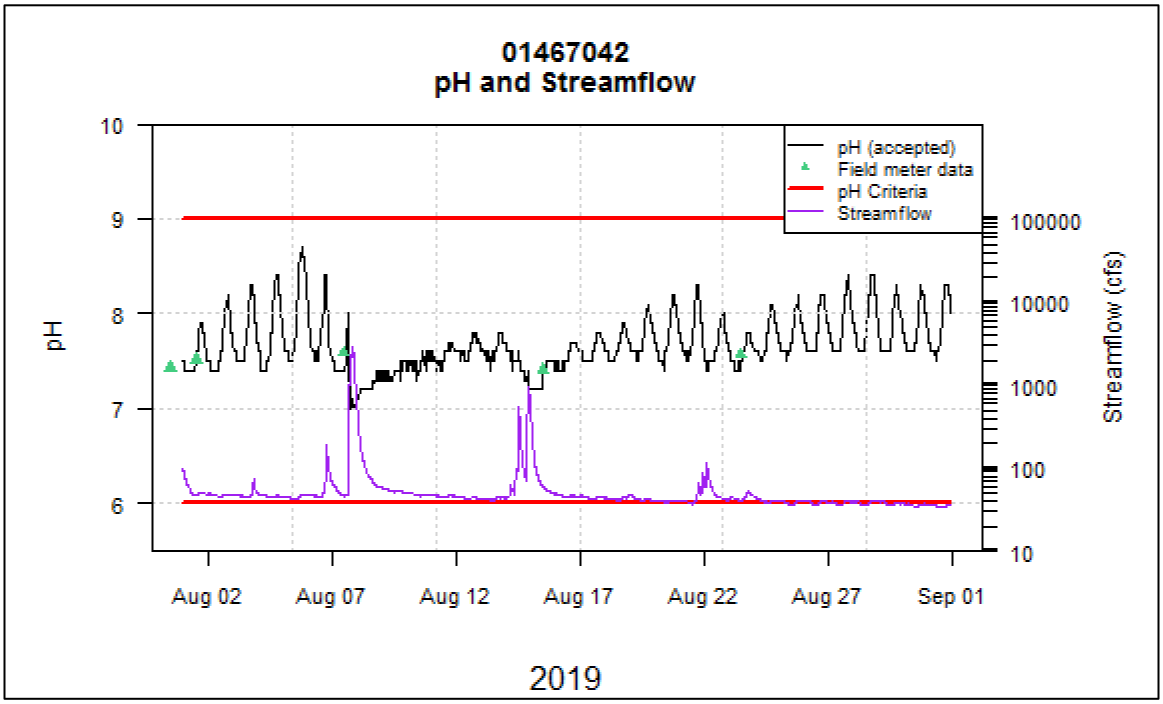


Figure 33. Gage 01467042, pH and Streamflow, August 2019.

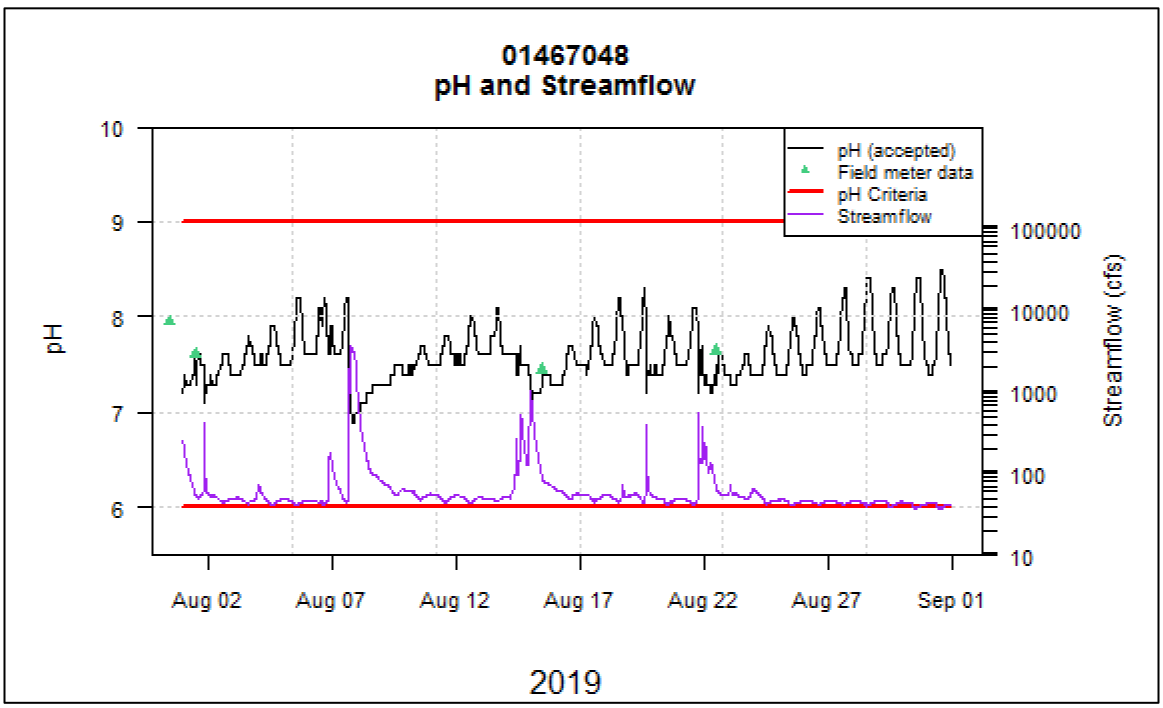


Figure 34. Gage 01467048, pH and Streamflow, August 2019.

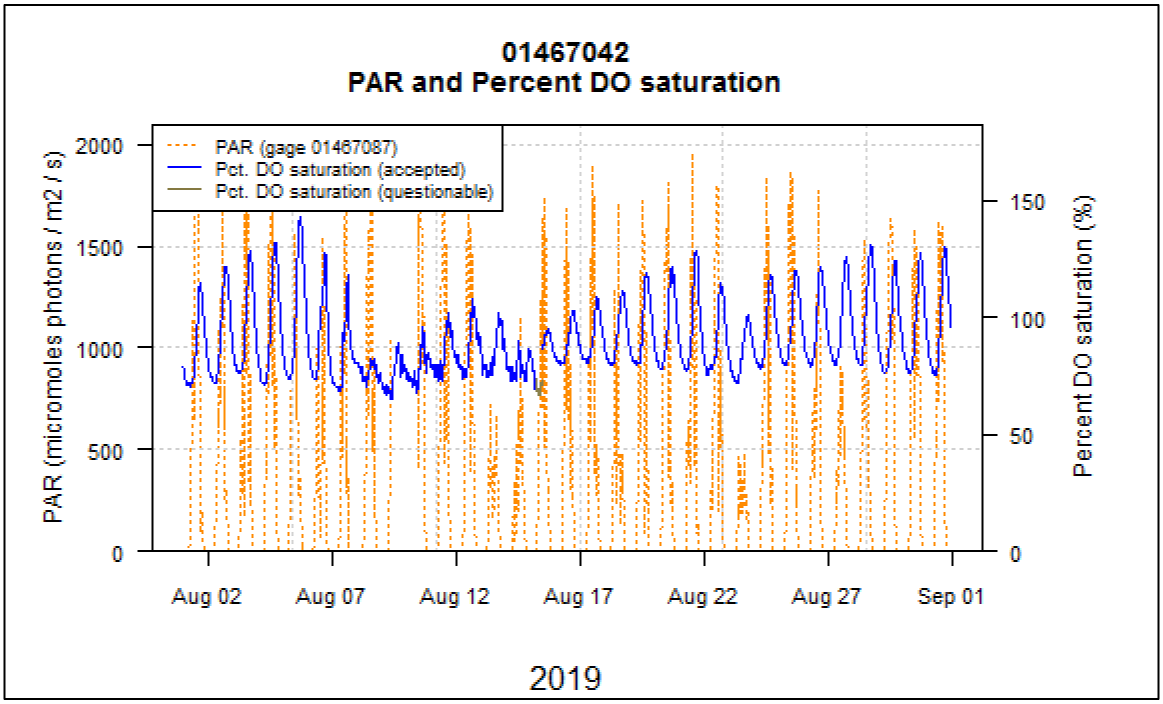


Figure 35. Gage 01467042, PAR and Percent Dissolved Oxygen Saturation, August 2019.

Figure 36. Gage 01467042, Pennypack Creek at Pine Rd., looking upstream

Figure 37. Gage 01467048, Pennypack Creek at Lower Rhawn St. Bridge, looking upstream

Turbidity

Turbidity data at the Pennypack Creek gages tend to reflect streamflow conditions. When there is high flow (*i.e.*, during and after storms), increases in turbidity are common and expected, as sediment in the creek bed is resuspended and particles present in runoff enter the stream (Figure 38). The downstream gage generally exhibited higher turbidity values throughout the year (Tables 32-33).

Flagged data are often due to periods during the month when sondes report high turbidity values that were corrected after the instrumentation was cleaned. After a storm, optical sensors such as those used to detect dissolved oxygen and turbidity can return inaccurate readings due to the sonde pipe becoming clogged with sediment and other debris. When turbidity readings come down after a cleaning, it is typical procedure to flag data back to the end of a storm, when the sonde pipe likely became clogged and did not reflect actual conditions in the stream.

Table 32. Gage 01467042, Turbidity Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% above max. guideline	% below max. guideline
Jul-19	2846	0.1	370.0	4.2	100.0	0.0	17.4	82.6
Aug-19	2911	0.1	378.0	9.5	97.9	2.1	30.6	69.4
Sep-19	2798	0.1	201.0	3.1	100.0	0.0	15.0	85.0
Oct-19	2797	0.1	187.0	4.3	95.9	4.1	19.2	80.8
Nov-19	2871	0.4	213.0	2.3	99.7	0.3	11.7	88.3
Mar-20	2628	1.3	176.0	5.5	100.0	0.0	31.2	68.8
Apr-20	2867	0.4	165.0	3.8	100.0	0.0	21.2	78.8
May-20	2661	0.1	50.3	1.5	99.8	0.2	10.3	89.7
Jun-20	2763	0.1	27.5	1.2	98.3	1.7	6.9	93.1

Table 33. Gage 01467048, Turbidity Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% above max. guideline	% below max. guideline
Jul-19	2969	0.7	345.0	8.2	100.0	0.0	41.2	58.8
Aug-19	2921	0.4	329.0	9.1	98.4	1.6	58.1	41.9
Sep-19	2842	0.4	208.0	5.9	98.8	1.2	28.5	71.5
Oct-19	2967	0.5	500.0	7.3	100.0	0.0	43.9	56.1
Nov-19	2797	1.9	134.0	4.4	97.1	2.9	27.7	72.3
Mar-20	2410	0.6	311.0	9.8	100.0	0.0	38.9	61.1
Apr-20	2871	1.1	328.0	5.9	100.0	0.0	31.7	68.3
May-20	2678	1.1	243.0	4.7	90.1	9.9	48.4	51.6
Jun-20	2874	0.5	119.0	4.3	100.0	0.0	60.8	39.2

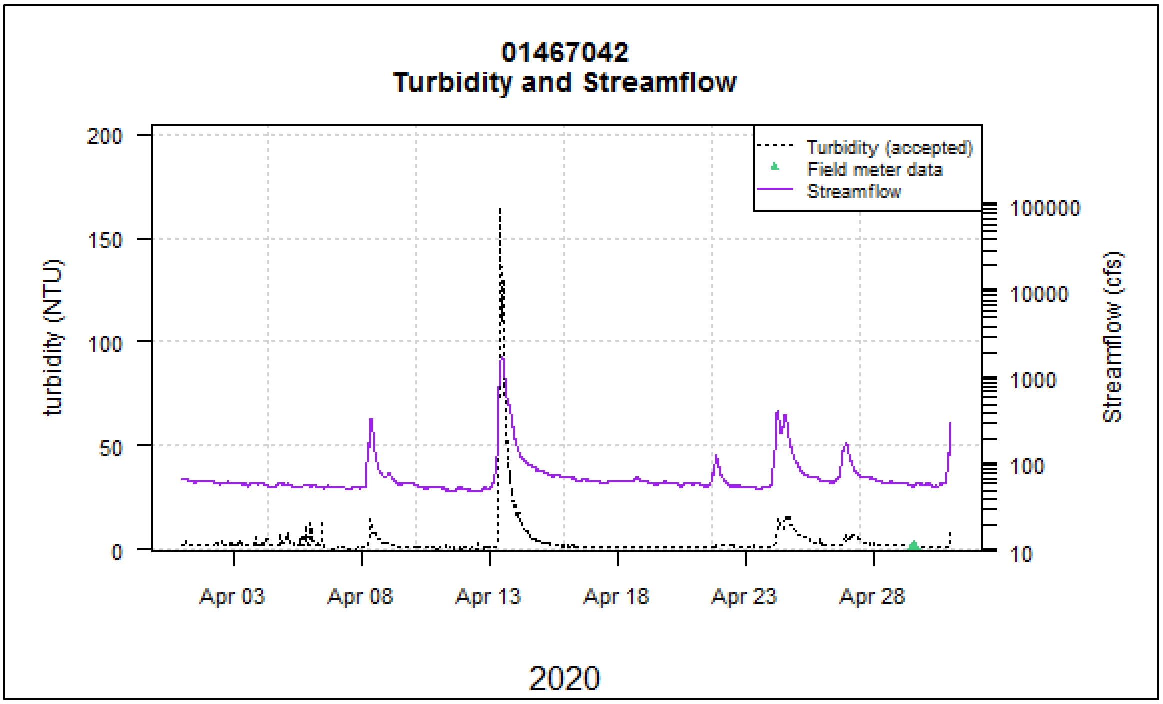


Figure 38. Gage 01467042, Turbidity and Streamflow, April 2020.

Specific Conductance

Specific conductance data were similar to other Philadelphia area streams. Elevated mean and maximum conductance values at both gages in November may be evidence of the effects of stormwater runoff and snowmelt containing road salt.

Table 34. Gage 01467042 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2968	118.0	699.0	563.9	100.0	0.0
Aug-19	2971	115.0	806.0	579.3	100.0	0.0
Sep-19	2878	222.0	777.0	646.1	100.0	0.0
Oct-19	2970	162.0	795.0	598.5	100.0	0.0
Nov-19	2879	213.0	735.0	625.1	100.0	0.0
Mar-20	2632	237.0	684.0	559.6	100.0	0.0
Apr-20	2869	144.0	635.0	544.9	100.0	0.0
May-20	2960	237.0	716.0	579.7	100.0	0.0
Jun-20	2869	274.0	754.0	624.9	100.0	0.0

Table 35. Gage 01467048 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2968	75.0	666.0	523.1	100.0	0.0
Aug-19	2963	80.0	762.0	539.3	100.0	0.0
Sep-19	2874	146.0	773.0	605.6	100.0	0.0
Oct-19	2965	154.0	758.0	545.6	100.0	0.0
Nov-19	2877	221.0	719.0	571.4	100.0	0.0
Mar-20	2624	222.0	661.0	514.9	100.0	0.0
Apr-20	2870	124.0	603.0	502.7	100.0	0.0
May-20	2966	230.0	680.0	548.0	100.0	0.0
Jun-20	2874	207.0	718.0	578.0	100.0	0.0

Temperature

Temperature data showed variable attainment of maximum temperature criteria (Tables 36-37). Spring and early summer months are always subject to major air temperature fluctuations, and reliably predicting average stream temperatures during these periods is difficult at best. Maximum criteria for the summer months, for example, do not take into account natural summer temperature peaks. Above normal air temperatures are the likely cause of stream temperature exceedance rates in Spring 2020 (Figures 39-40).

Table 36. Gage 01467042 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
TSF	1-Jul	31-Jul	62.4	37.6	0	100	20	28.5	23.6
TSF	1-Aug	15-Aug	0	100	0	100	19.6	25.7	23
TSF	16-Aug	31-Aug	0	100	0	100	18.2	25.9	22.2
TSF	1-Sep	15-Sep	0	100	0	100	17.9	24.3	21.1
TSF	16-Sep	30-Sep	0	100	0	100	15.6	22	19.1
TSF	1-Oct	15-Oct	0	100	0	100	13.8	21.9	16.6
TSF	16-Oct	31-Oct	0	100	0	100	10.8	18.3	14.2
TSF	1-Nov	15-Nov	5	95	0	100	3.6	18.2	8.7
TSF	16-Nov	30-Nov	0	100	0	100	4.3	9.2	6.9
TSF	1-Mar	31-Mar	88.4	11.6	0	100	5.4	15	10.3
TSF	1-Apr	15-Apr	74	26	0	100	8.3	16.4	12.3
TSF	16-Apr	30-Apr	11.1	88.9	0	100	7.9	15.3	11.5
TSF	1-May	15-May	4.7	95.3	0	100	8.6	20.1	14
TSF	16-May	31-May	23.3	76.7	0	100	12.9	23.2	18.2
TSF	1-Jun	15-Jun	50.2	49.8	0	100	16	24.5	20.7
TSF	16-Jun	30-Jun	62.6	37.4	0	100	18	25.9	22.5

Table 37. Gage 01467048, Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
TSF	1-Jul	31-Jul	86.4	13.6	0	100	21.1	30	24.7
TSF	1-Aug	15-Aug	0	100	0	100	20.9	26.9	23.9
TSF	16-Aug	31-Aug	0	100	0	100	19.1	27.1	23.1
TSF	1-Sep	15-Sep	0	100	0	100	18.2	26.2	21.7
TSF	16-Sep	30-Sep	0	100	0	100	16.4	22.7	19.8
TSF	1-Oct	15-Oct	2.3	97.7	0	100	13.8	22.8	17
TSF	16-Oct	31-Oct	0	100	0	100	11.2	17.9	14.4
TSF	1-Nov	15-Nov	5.5	94.5	0	100	3.2	18.2	8.4
TSF	16-Nov	30-Nov	0	100	0	100	3.6	8.3	6.3
TSF	1-Mar	31-Mar	88.6	11.4	0	100	5.8	14.8	10.3
TSF	1-Apr	15-Apr	81.6	18.4	0	100	9.1	16.4	12.6
TSF	16-Apr	30-Apr	9.4	90.6	0	100	8.4	15.8	11.7
TSF	1-May	15-May	7.2	92.8	0	100	9	19.9	14.5
TSF	16-May	31-May	37.3	62.7	0	100	13.9	24	19
TSF	1-Jun	15-Jun	65.9	34.1	0	100	17.6	25.8	21.8
TSF	16-Jun	30-Jun	74	26	0	100	19.6	28.1	23.6

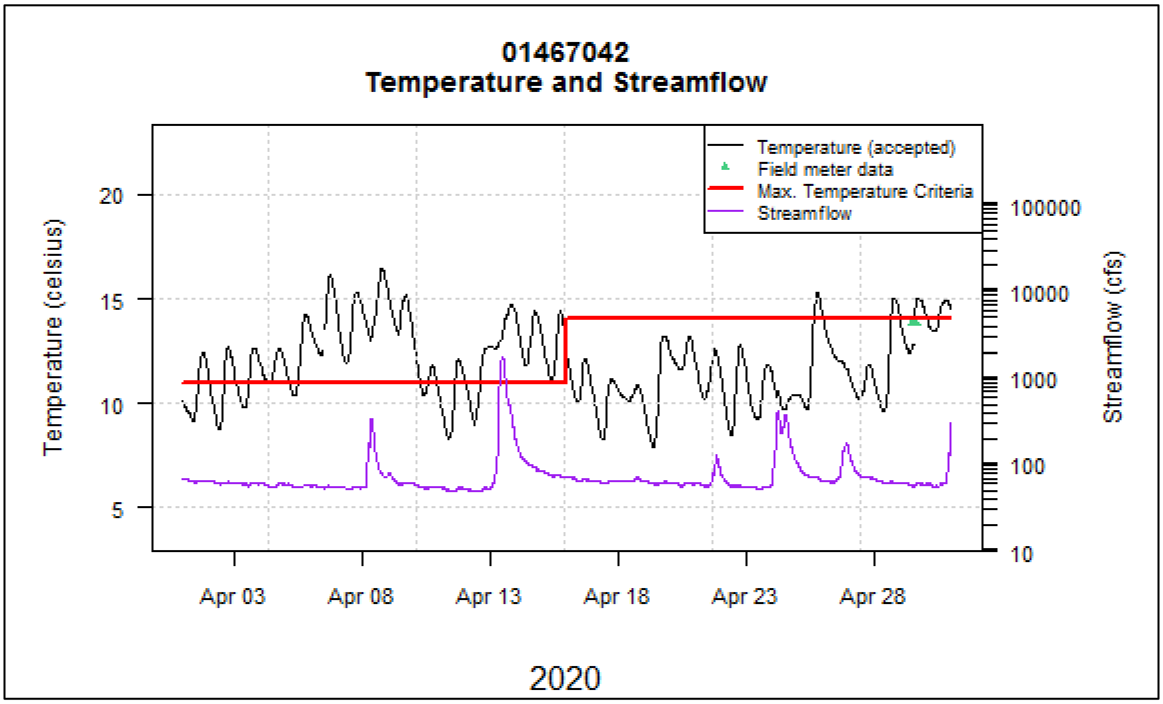


Figure 39. Gage 01467042, Temperature and Streamflow, April 2020.

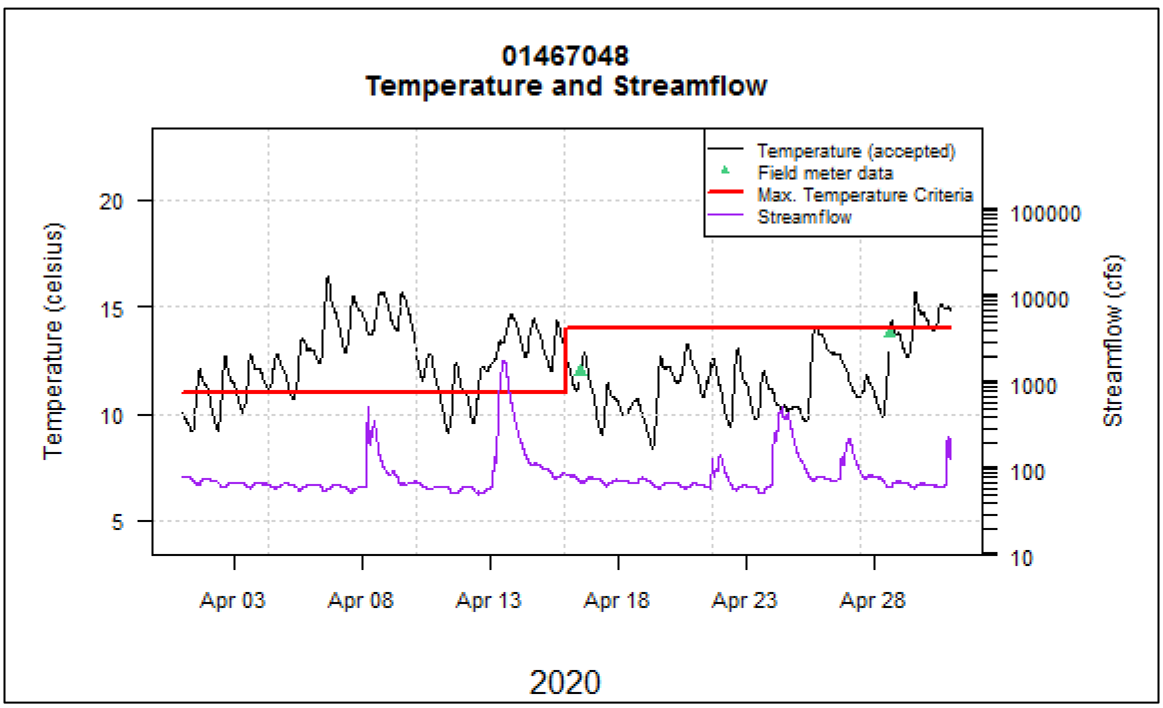
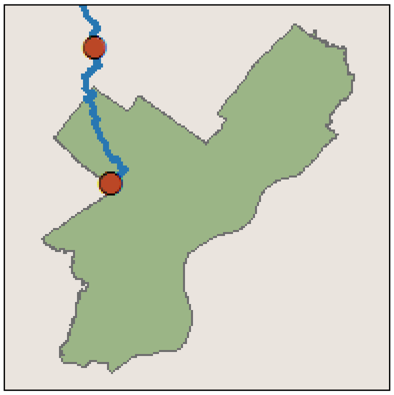


Figure 40. Gage 01467048, Temperature and Streamflow, April 2020.

Wissahickon Creek (Gages 01473900 and 01474000)



Dissolved oxygen and pH

Dissolved oxygen and pH data collected from the Wissahickon Creek gages also show signs of strong algal activity in the form of diel fluctuations. Although these two sites never exceeded the 7-day average guideline for dissolved oxygen, the upper gage (01473900) exhibits some of the most dramatic diel fluctuations of any of the Philadelphia USGS gage sites. In April 2020, dissolved oxygen can be observed to fluctuate by approximately 14 mg/L in a single day/night period (Figure 45), with pH ranging from approximately 7.6 to 9.3 at the same time (Figure 46). The pH maxima were exceeded in spring, a direct result of algal activity (Table 40).

Table 38. Gage 01473900 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	TSF	1486	5.8	12.6	7.7	100.0	0.0	0.0	100.0
Aug-19	TSF	1265	5.9	11.8	7.6	100.0	0.0	0.0	100.0
Sep-19	TSF	1176	5.7	12.4	8.3	100.0	0.0	0.0	100.0
Oct-19	TSF	1487	5.1	13.4	8.8	100.0	0.0	0.0	100.0
Nov-19	TSF	1440	7.6	18.9	11.5	100.0	0.0	0.0	100.0
Mar-20	TSF	1029	7.8	22.8	11.9	100.0	0.0	0.0	100.0
Apr-20	TSF	1437	7.0	21.8	11.3	100.0	0.0	0.0	100.0
May-20	TSF	1485	5.6	16.3	9.3	100.0	0.0	0.0	100.0
Jun-20	TSF	1438	5.6	11.7	7.7	100.0	0.0	0.0	100.0

Table 39. Gage 01474000 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	TSF	1487	6.4	11.7	8.3	100.0	0.0	0.0	100.0
Aug-19	TSF	1294	6.8	12.0	8.4	100.0	0.0	0.0	100.0
Sep-19	TSF	1438	6.8	11.9	8.9	100.0	0.0	0.0	100.0
Oct-19	TSF	1488	7.3	12.6	9.6	100.0	0.0	0.0	100.0
Nov-19	TSF	1438	8.6	14.5	11.8	100.0	0.0	0.0	100.0
Mar-20	TSF	1357	9.7	17.5	11.9	100.0	0.0	0.0	100.0
Apr-20	TSF	1437	8.7	15.9	11.1	100.0	0.0	0.0	100.0
May-20	TSF	1480	7.4	12.7	9.6	100.0	0.0	0.0	100.0
Jun-20	TSF	1434	6.5	12.7	8.7	100.0	0.0	0.0	100.0

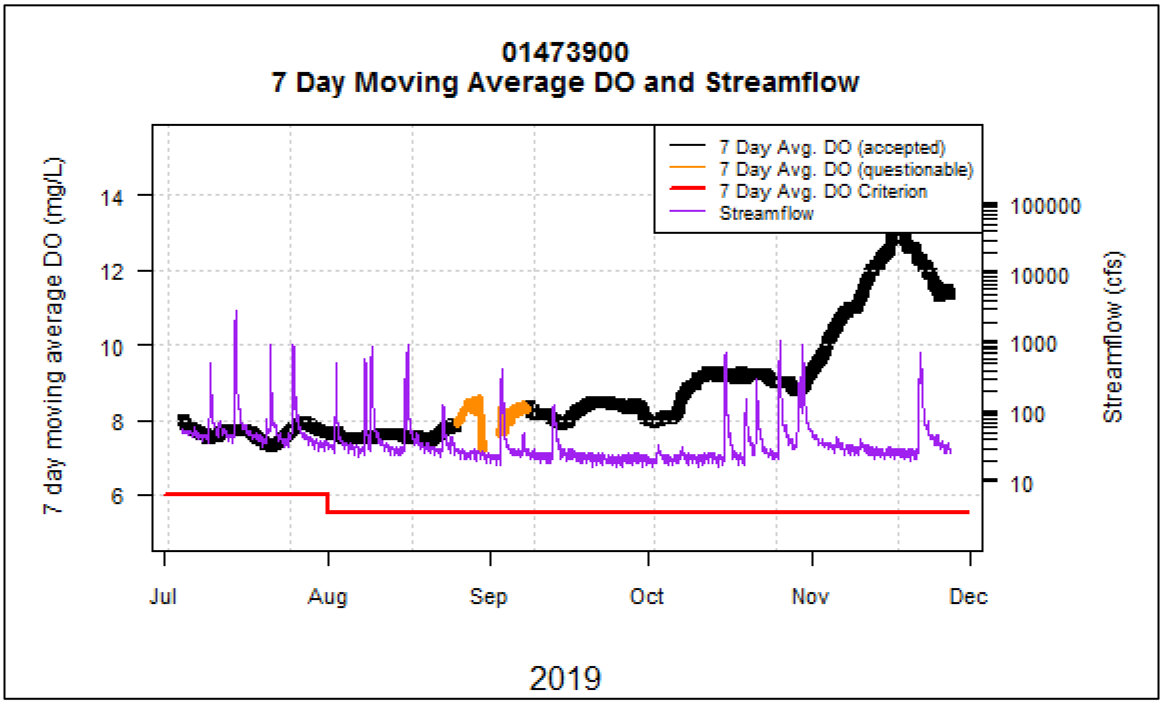


Figure 41. Gage 01473900, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

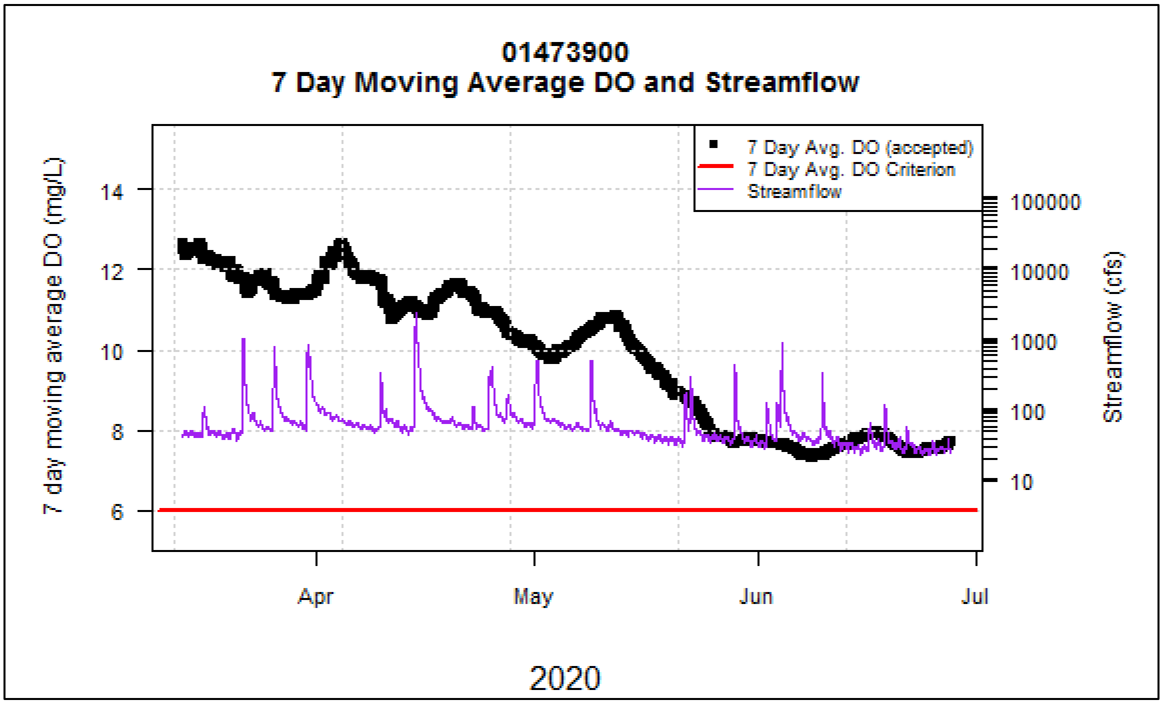


Figure 42. Gage 01473900, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

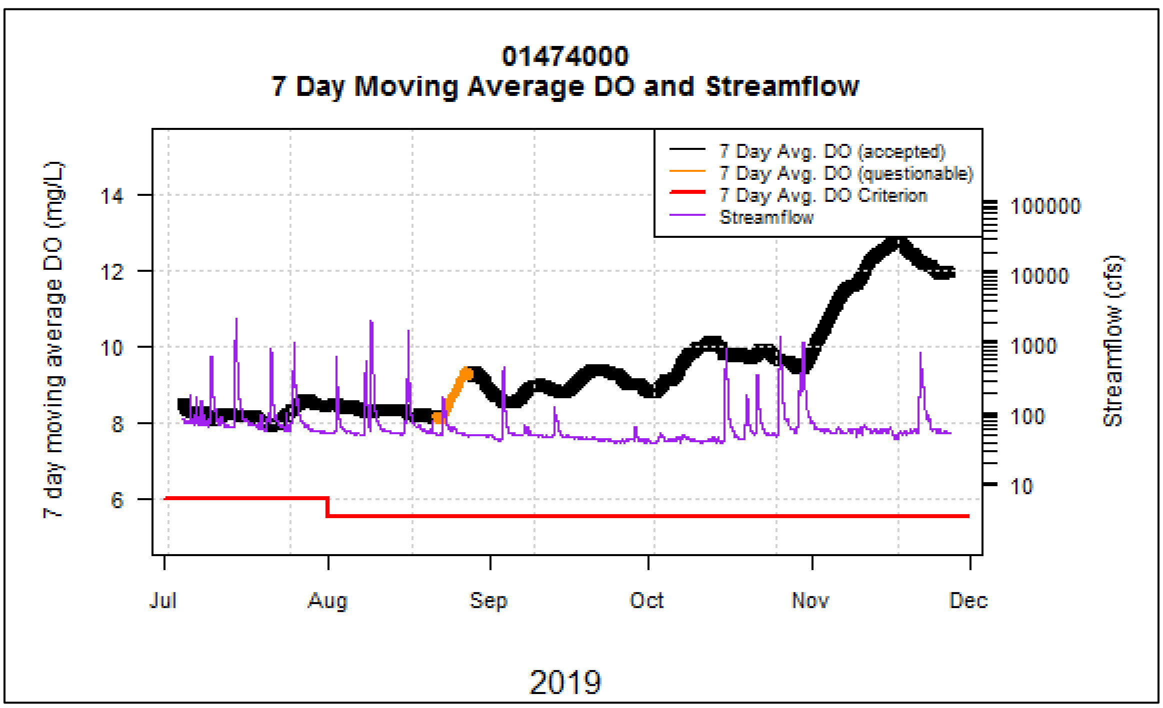


Figure 43. Gage 01474000, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

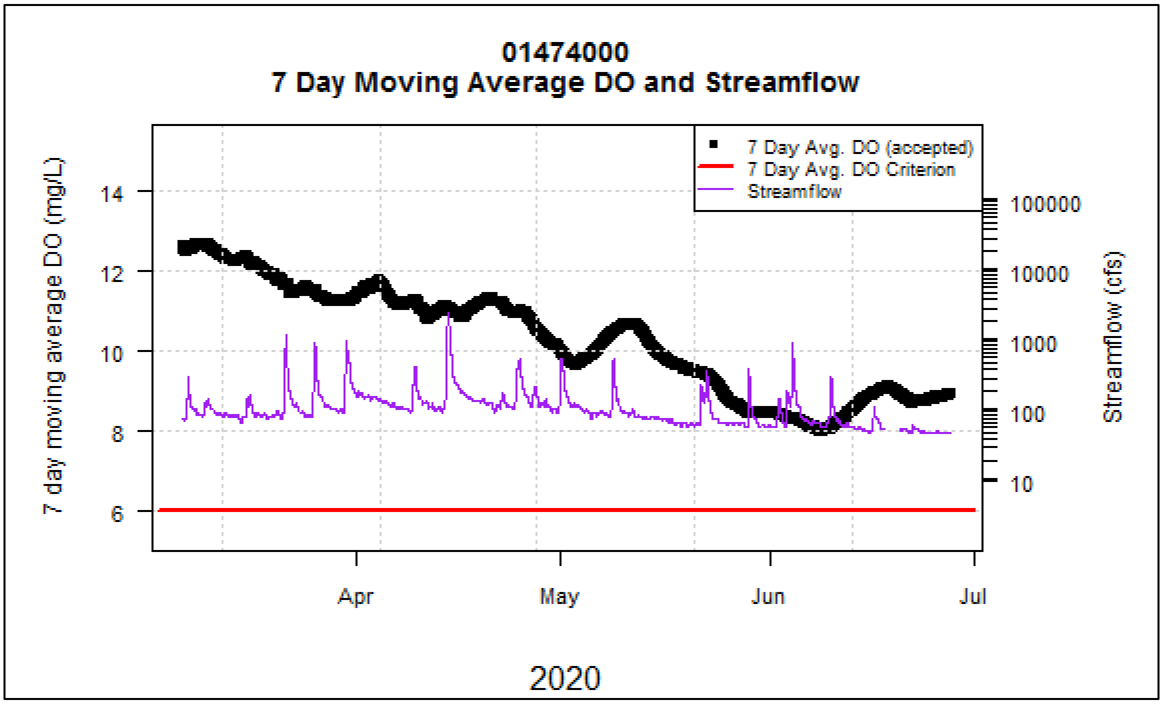


Figure 44. Gage 01474000, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

Table 40. Gage 01473900 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	1484	7.1	8.6	7.8	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	1264	7.2	8.5	7.8	99.9	0.1	0.0	0.0	100.0	100.0
Sep-19	1175	7.5	8.3	7.8	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	1487	7.4	8.5	7.8	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	1438	7.4	8.9	7.9	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	1029	7.3	9.3	8.0	100.0	0.0	0.0	7.4	100.0	92.6
Apr-20	1437	7.2	9.4	8.1	100.0	0.0	0.0	4.0	100.0	96.0
May-20	1481	7.3	8.8	7.9	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	1438	7.2	8.4	7.6	100.0	0.0	0.0	0.0	100.0	100.0

Table 41. Gage 01474000 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	1487	7.2	9.0	8.1	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	1342	7.4	9.3	8.2	100.0	0.0	0.0	2.0	100.0	98.0
Sep-19	1438	7.6	8.6	8.2	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	1488	7.6	8.7	8.2	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	1408	7.6	8.9	8.3	97.9	2.1	0.0	0.0	100.0	100.0
Mar-20	1357	7.7	9.2	8.4	100.0	0.0	0.0	5.6	100.0	94.4
Apr-20	1437	7.5	9.4	8.3	100.0	0.0	0.0	4.1	100.0	95.9
May-20	1478	7.5	8.6	8.0	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	1434	7.4	8.9	8.0	100.0	0.0	0.0	0.0	100.0	100.0

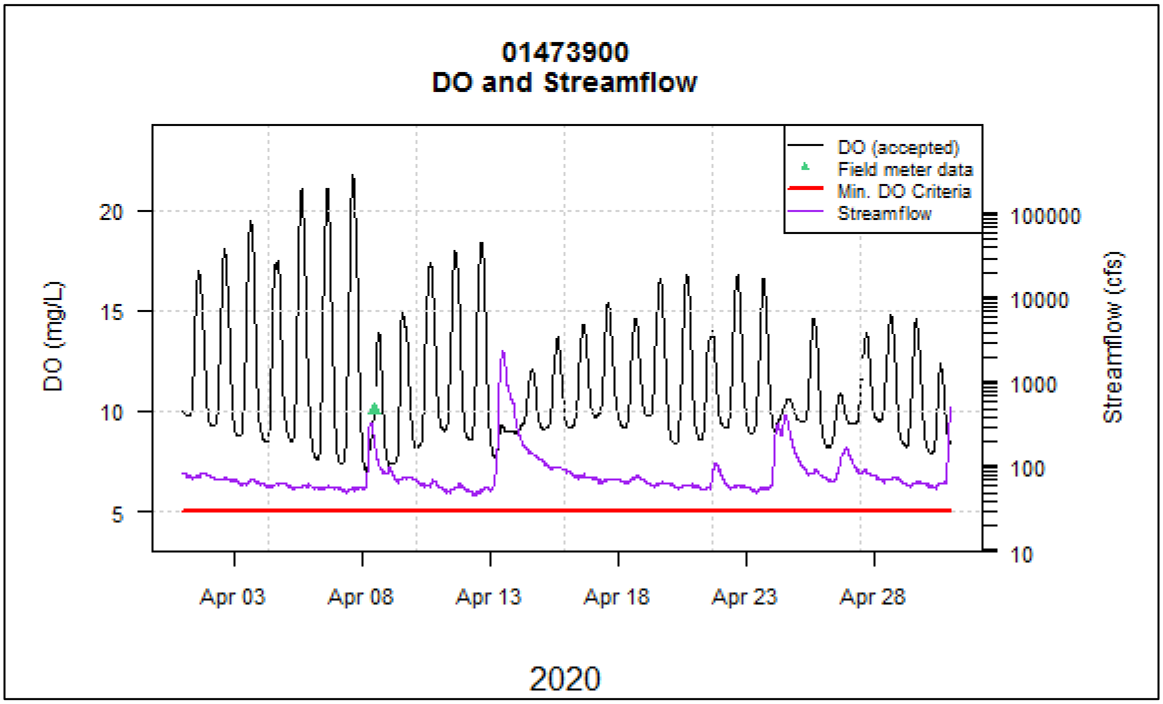


Figure 45. Gage 01473900, Dissolved Oxygen and Streamflow, April 2020.

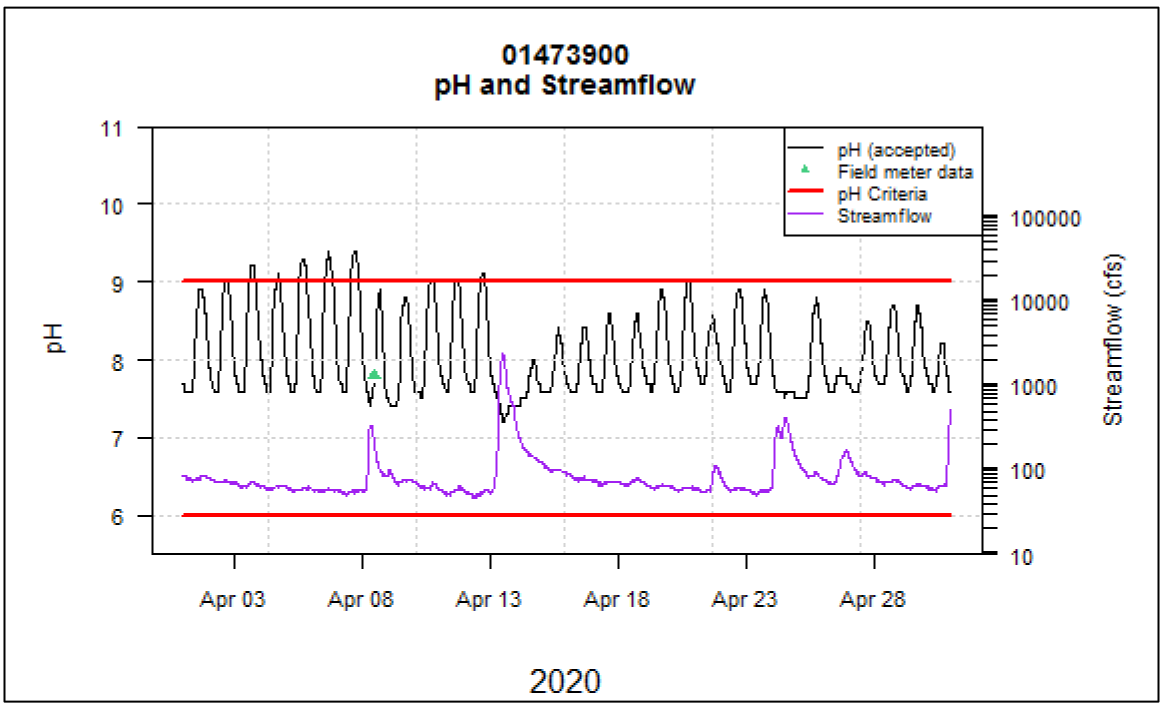


Figure 46. Gage 01473900, pH and Streamflow, April 2020.

Figure 47. Gage 01473900, Wissahickon Creek at Ft. Washington, looking downstream

Figure 48. Gage 01474000, Wissahickon Creek at mouth, looking downstream

Turbidity

Turbidity in the Wissahickon, as with most of Philadelphia's streams, increases drastically with increased flow from rainfall (Tables 42-43). It is possible that these spikes represent a temporarily fouled sensor (i.e., sediment or debris obscures the optical probe for turbidity), but the general rule in QAQC procedures is not to flag turbidity spikes that recede to normal levels on their own. If the sensor remains fouled after a storm or a field check confirms aberrant values, the data is flagged as in Figure 49.

Table 42. Gage 01473900 Turbidity Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% above max. guideline	% below max. guideline
Jul-19	1486	0.4	570.0	8.0	100.0	0.0	38.4	61.6
Aug-19	1263	0.5	194.0	5.6	100.0	0.0	22.7	77.3
Sep-19	714	0.3	16.0	2.6	60.7	39.3	36.8	63.2
Oct-19	1461	0.1	118.0	4.5	100.0	0.0	30.7	69.3
Nov-19	1437	1.6	86.9	3.9	99.9	0.1	18.4	81.6
Mar-20	1029	0.8	107.0	5.7	100.0	0.0	28.6	71.4
Apr-20	1422	1.1	154.0	5.0	99.0	1.0	34.5	65.5
May-20	1375	0.9	62.6	4.5	92.7	7.3	32.1	67.9
Jun-20	1407	0.4	139.0	4.4	97.8	2.2	45.6	54.4

Table 43. Gage 01474000 Turbidity Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% above max. guideline	% below max. guideline
Jul-19	1487	0.6	270.0	9.4	100.0	0.0	40.8	59.2
Aug-19	1187	0.8	369.0	10.8	88.5	11.5	43.1	56.9
Sep-19	1349	0.9	104.0	2.9	93.8	6.2	15.4	84.6
Oct-19	1488	0.8	122.0	4.9	100.0	0.0	26.3	73.7
Nov-19	1440	1.0	87.5	4.0	100.0	0.0	18.7	81.3
Mar-20	1357	0.6	97.0	6.1	100.0	0.0	30.7	69.3
Apr-20	1436	0.6	212.0	5.5	99.9	0.1	25.7	74.3
May-20	1479	0.5	42.3	3.0	99.9	0.1	23.5	76.5
Jun-20	1261	0.6	105.0	4.1	87.9	12.1	26.9	73.1

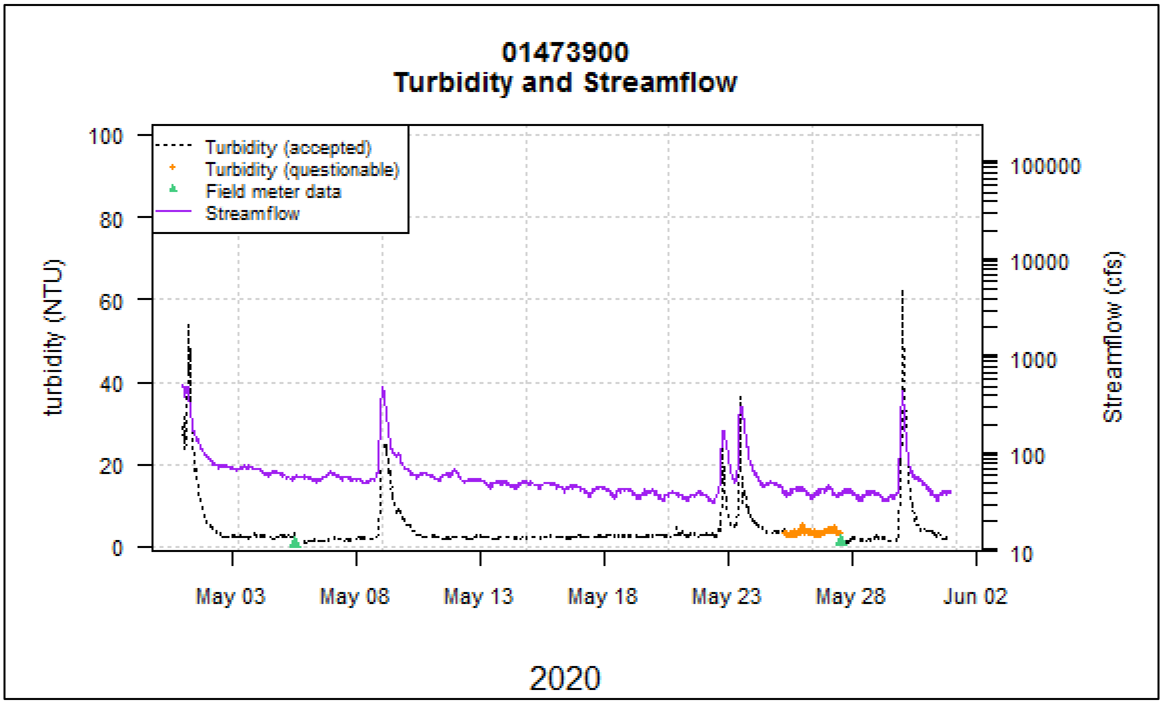


Figure 49. Gage 01473900, Turbidity and Streamflow, May 2020.

Specific Conductance

Specific conductance data at the Wissahickon Creek gage sites generally follow the established pattern in other Philadelphia streams: Runoff from rain events dilutes the stream and decreases conductivity. However, a reversal in this trend sometimes occurs during winter storms, when it is presumed that the application of road salt (sodium chloride) prior to the storm washes into Wissahickon Creek and causes conductivity to increase in conjunction with streamflow. This pattern was not apparent during a winter with few snowstorms, but elevated conductivity levels exist in early March 2020 (Figure 50).

Table 44. Gage 01473900 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	1486	115.0	833.0	648.8	100.0	0.0
Aug-19	1264	107.0	888.0	726.5	100.0	0.0
Sep-19	1176	608.0	1010.0	891.0	100.0	0.0
Oct-19	1485	212.0	1070.0	800.5	100.0	0.0
Nov-19	1440	216.0	939.0	769.9	100.0	0.0
Mar-20	1029	226.0	791.0	602.6	100.0	0.0
Apr-20	1436	128.0	698.0	566.4	100.0	0.0
May-20	1483	246.0	802.0	639.7	100.0	0.0
Jun-20	1437	195.0	924.0	694.6	100.0	0.0

Table 45. Gage 01474000 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	1487	140.0	794.0	633.9	100.0	0.0
Aug-19	1342	100.0	849.0	667.1	100.0	0.0
Sep-19	1438	341.0	902.0	796.3	100.0	0.0
Oct-19	1488	262.0	923.0	717.5	100.0	0.0
Nov-19	1440	247.0	871.0	727.7	100.0	0.0
Mar-20	1269	269.0	761.0	601.7	93.5	6.5
Apr-20	1436	145.0	701.0	585.3	100.0	0.0
May-20	1478	324.0	778.0	640.4	100.0	0.0
Jun-20	1434	254.0	834.0	676.5	100.0	0.0

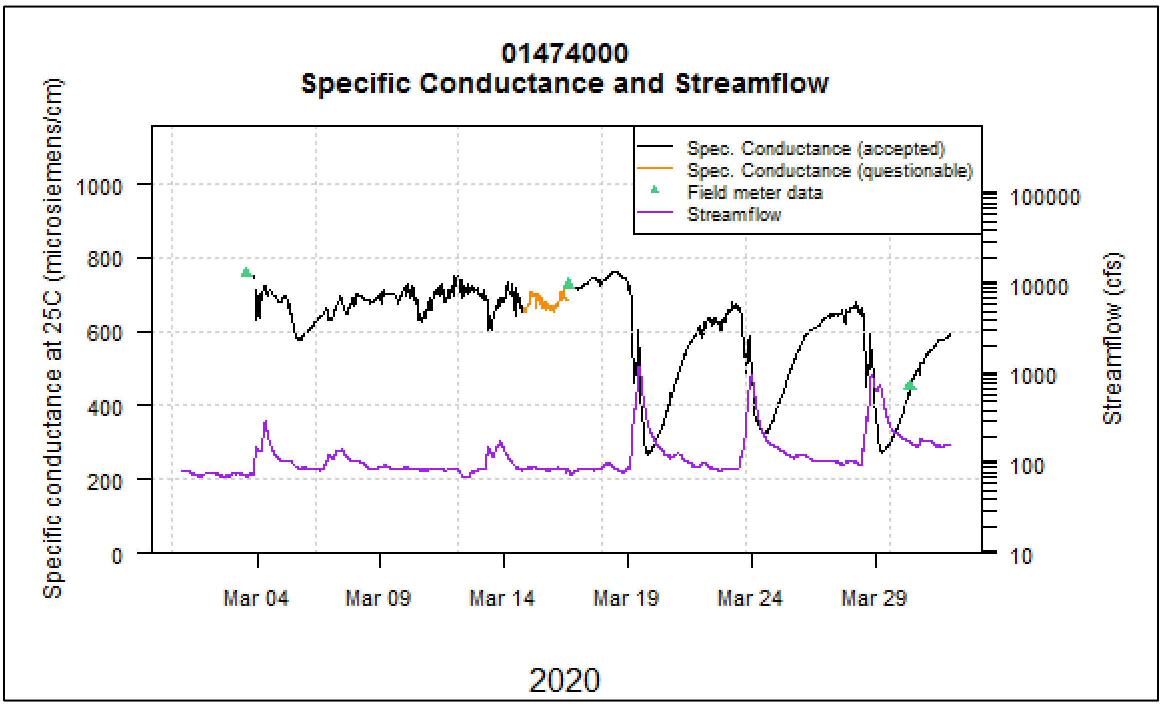


Figure 50. Gage 01474000, Specific Conductance and Streamflow, March 2020.

Temperature

Temperature trends and exceedance rates in Wissahickon Creek Watershed were similar to those observed in Pennypack Creek, with frequent exceedances during the spring in conjunction with higher ambient air temperatures (Tables 46-47, Figures 51-52).

Table 46. Gage 01473900 Temperature Summary Results by Month by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
TSF	1-Jul	31-Jul	56.7	43.3	0	100	19.7	28.1	23.5
TSF	1-Aug	15-Aug	0	100	0	100	19.7	25.6	22.9
TSF	16-Aug	31-Aug	0	100	0	100	18.2	25.6	22.7
TSF	1-Sep	15-Sep	0	100	0	100	17.6	23.8	20.6
TSF	16-Sep	30-Sep	0	100	0	100	15.5	22.5	19.4
TSF	1-Oct	15-Oct	3.1	96.9	0	100	14.1	22.6	17
TSF	16-Oct	31-Oct	0	100	0	100	10.9	18.3	14.5
TSF	1-Nov	15-Nov	4.3	95.7	0	100	4.2	18.2	9.3
TSF	16-Nov	30-Nov	0	100	0	100	4.9	10	7.7
TSF	1-Mar	31-Mar	96.4	3.6	0	100	7.4	15	10.7
TSF	1-Apr	15-Apr	73.2	26.8	0	100	8	16.5	12.2
TSF	16-Apr	30-Apr	11.6	88.4	0	100	7.9	15.6	11.5
TSF	1-May	15-May	3.8	96.2	0	100	8.5	19.9	13.9
TSF	16-May	31-May	16.7	83.3	0	100	12.7	23	18
TSF	1-Jun	15-Jun	40.2	59.8	0	100	15.8	24.2	20.3
TSF	16-Jun	30-Jun	52.4	47.6	0	100	17.5	25.5	22

Table 47. Gage 01474000 Temperature Summary Results by Month by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
TSF	1-Jul	31-Jul	70.5	29.5	0	100	21.2	28.4	23.9
TSF	1-Aug	15-Aug	0	100	0	100	20	25.5	23.1
TSF	16-Aug	31-Aug	0	100	0	100	18.4	25.6	22.4
TSF	1-Sep	15-Sep	0	100	0	100	18	23.8	20.9
TSF	16-Sep	30-Sep	0	100	0	100	16	21.3	18.9
TSF	1-Oct	15-Oct	0	100	0	100	13.8	20.9	16.6
TSF	16-Oct	31-Oct	0	100	0	100	11	17.5	14.1
TSF	1-Nov	15-Nov	5.4	94.6	0	100	4.1	17.6	8.7
TSF	16-Nov	30-Nov	0	100	0	100	4.4	8.4	6.7
TSF	1-Mar	31-Mar	91.2	8.8	0	100	6.1	13.8	10
TSF	1-Apr	15-Apr	73.4	26.6	0	100	9.3	15.8	12.3
TSF	16-Apr	30-Apr	9.6	90.4	0	100	8.8	15.2	11.5
TSF	1-May	15-May	2.2	97.8	0	100	9.2	18.4	14
TSF	16-May	31-May	25.1	74.9	0	100	13.6	23	18.3
TSF	1-Jun	15-Jun	54.9	45.1	0	100	16.9	24.7	20.9
TSF	16-Jun	30-Jun	62.7	37.3	0	100	18.4	26.2	22.5

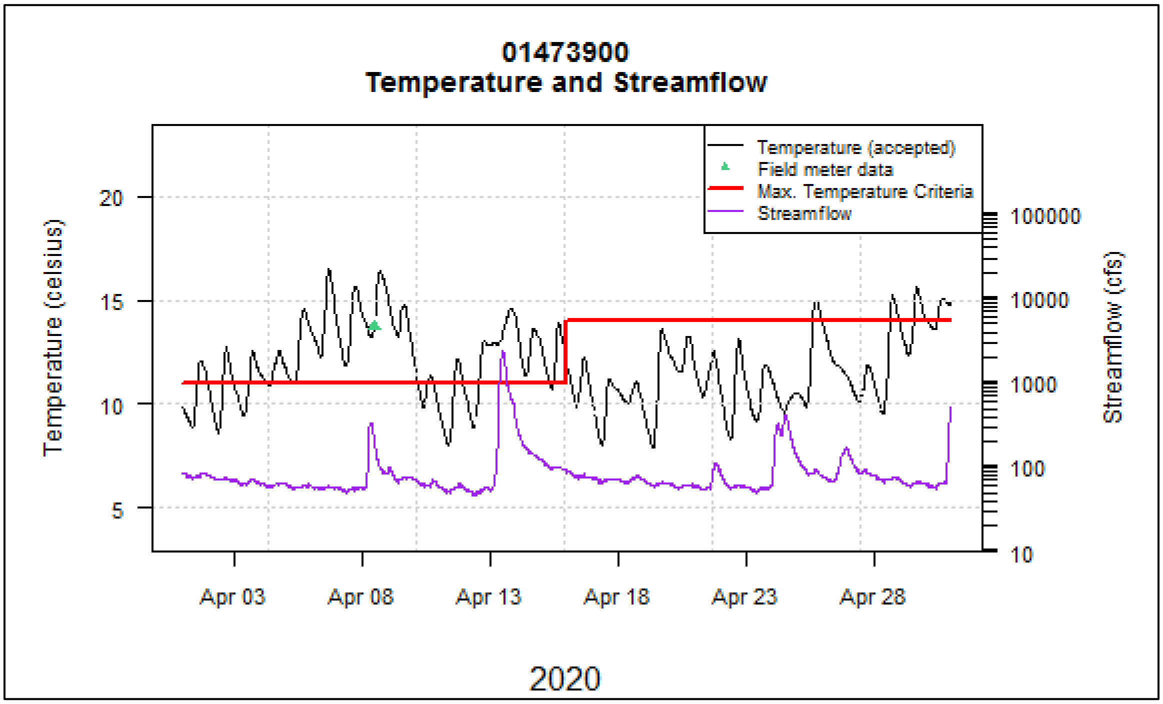


Figure 51. Gage 01473900, Temperature and Streamflow, April 2020.

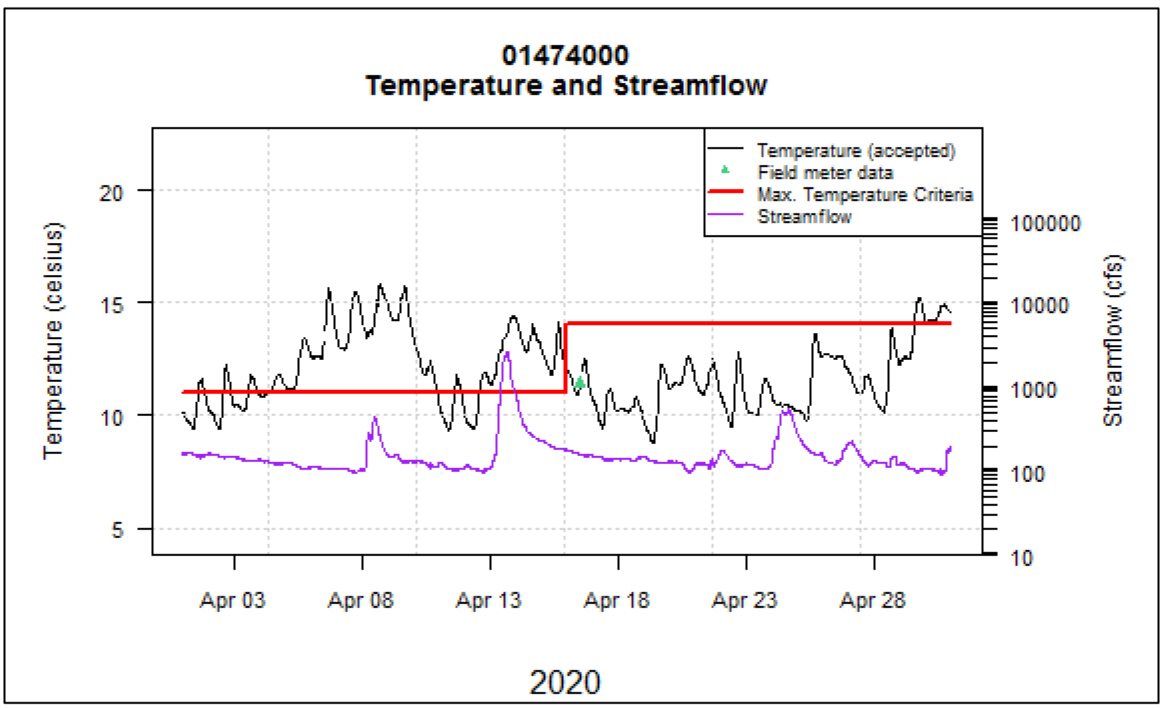
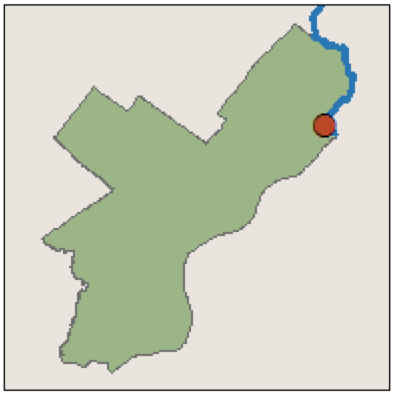


Figure 52. Gage 01474000, Temperature and Streamflow, April 2020.

Poquessing Creek (Gage 01465798)



Dissolved oxygen and pH

Dissolved oxygen and pH at this gage site were usually within acceptable ranges and only occasionally fell below the minimum DO criterion. The site rarely exceeded the pH maximum criterion (Tables 48-49, Figures 53-54). Data collected from Poquessing Creek did exhibit classic signs of algal activity, as indicated by diel fluctuations in both DO and pH.

As seen with previous sites, the algal activity and related diel fluctuations in DO and pH are only suppressed by storm events. These suppressions, however, are only very temporary. Given an adequate period of uninterrupted algal growth, such as occurred in the latter part of August 2019 (Figures 55-56), one can expect increased DO and pH fluctuations.

Table 48. Gage 01465798 Dissolved Oxygen Min. Criteria Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	WWF	2967	5.3	12.2	7.7	100.0	0.0	0.0	100.0
Aug-19	WWF	2932	5.1	12.5	7.8	98.7	1.3	0.0	100.0
Sep-19	WWF	2876	5.2	12.7	8.1	100.0	0.0	0.0	100.0
Oct-19	WWF	2804	2.6	13.8	8.6	98.1	1.9	2.1	97.9
Nov-19	WWF	2283	6.3	13.9	11.2	79.3	20.7	0.0	100.0
Mar-20	WWF	2622	7.7	17.2	11.3	100.0	0.0	0.0	100.0
Apr-20	WWF	2867	7.6	17.5	11.1	100.0	0.0	0.0	100.0
May-20	WWF	2966	4.8	14.8	9.1	100.0	0.0	0.1	99.9
Jun-20	WWF	2687	3.4	11.2	7.0	93.9	6.1	1.7	98.3

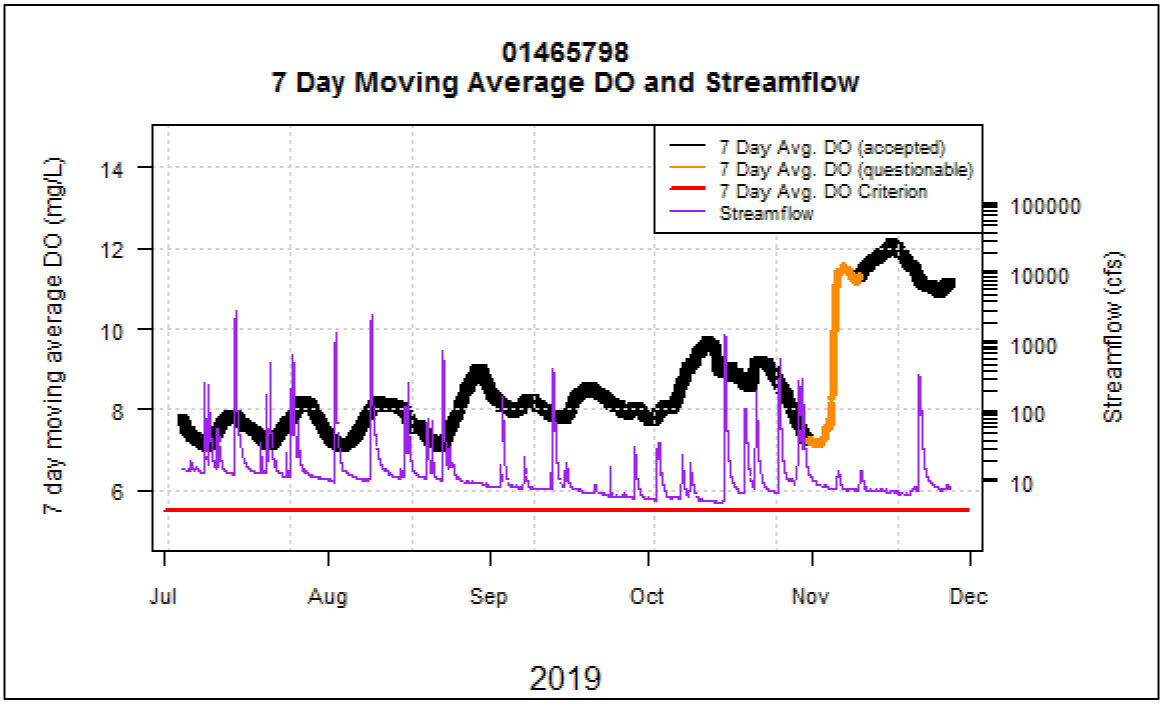


Figure 53. Gage 01465798, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

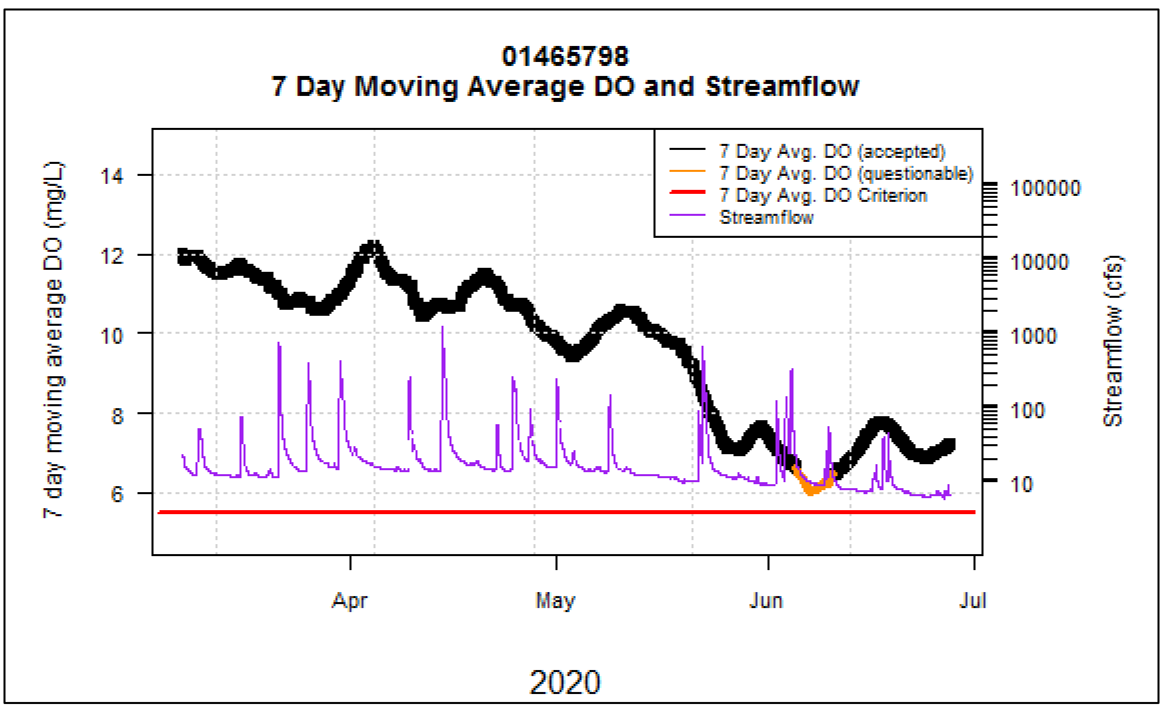


Figure 54. Gage 01465798, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

Table 49. Gage 01465798 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2967	6.6	8.4	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2970	6.7	8.5	7.2	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	2875	6.9	8.5	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	2734	6.6	8.4	7.3	95.7	4.3	0.0	0.0	100.0	100.0
Nov-19	2879	7.0	7.6	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	2622	7.0	8.9	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	2866	6.8	9.3	7.5	100.0	0.0	0.0	1.8	100.0	98.2
May-20	2966	6.8	8.8	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	2861	6.8	8.0	7.2	100.0	0.0	0.0	0.0	100.0	100.0

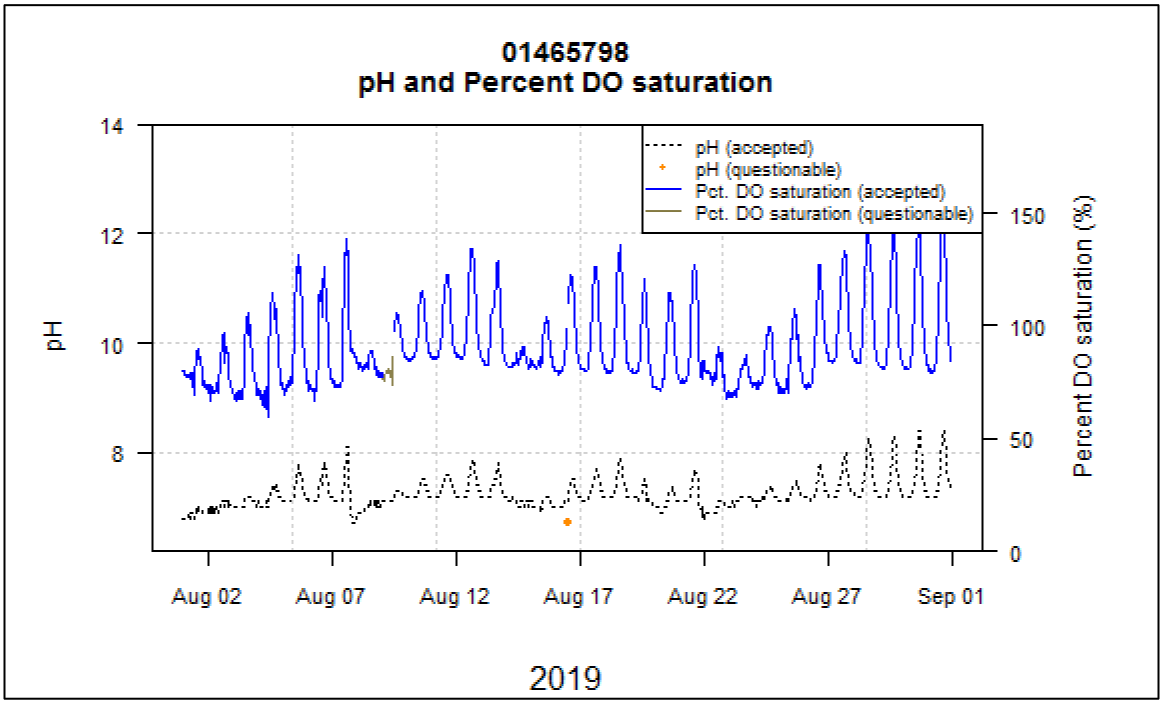


Figure 55. Gage 01465798, pH and Percent DO Saturation, August 2019.

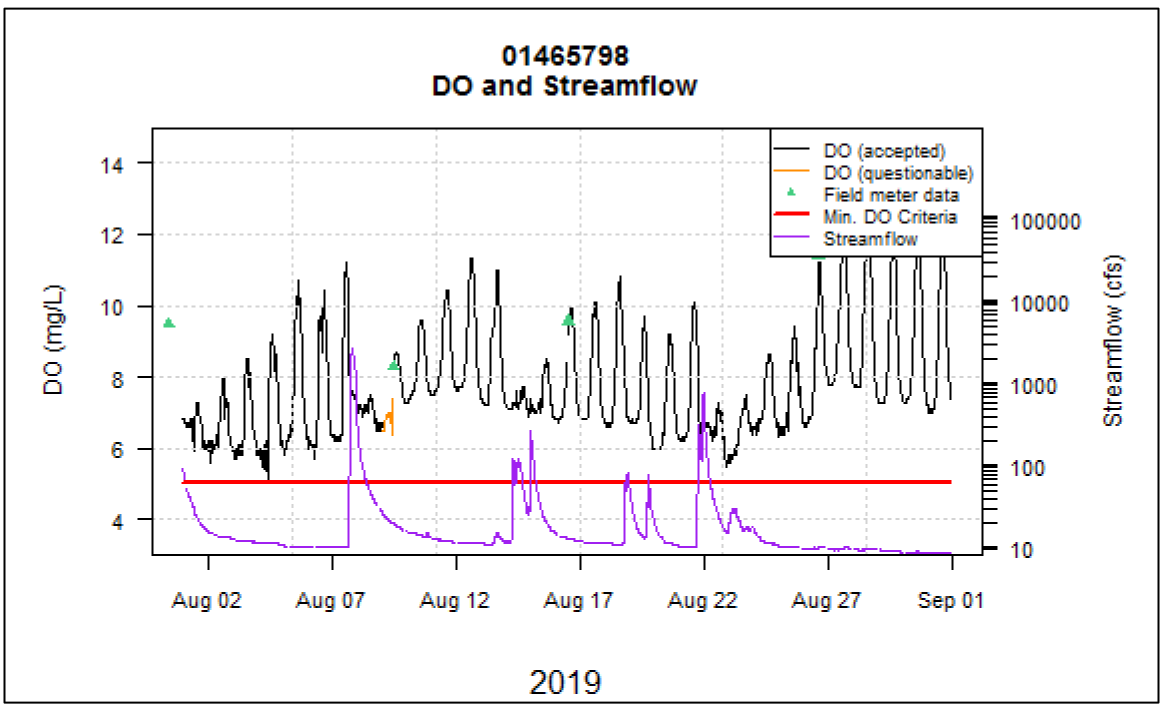


Figure 56. Gage 01465798, DO and Streamflow, August 2019.

Figure 57. Gage 01465798, Poquessing Creek at Grant Ave., looking upstream

Turbidity

As in other Philadelphia streams, high turbidity levels accompanied storm events and increased streamflow.

Table 50. Gage 01465798 Turbidity Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% above max. guideline	% below max. guideline
Jul-19	2964	0.2	436.0	8.4	100.0	0.0	27.9	72.1
Aug-19	2789	0.3	340.0	6.4	94.2	5.8	38.1	61.9
Sep-19	2875	0.3	1300.0	3.9	100.0	0.0	8.5	91.5
Oct-19	2747	0.2	991.0	5.5	96.1	3.9	23.3	76.7
Nov-19	2254	0.3	54.9	2.1	78.3	21.7	13.7	86.3
Mar-20	2518	1.0	202.0	8.8	96.4	3.6	48.3	51.7
Apr-20	2864	0.9	1560.0	7.2	100.0	0.0	26.0	74.0
May-20	2768	0.6	1180.0	8.8	93.5	6.5	17.3	82.7
Jun-20	2698	0.4	207.0	3.0	94.2	5.8	15.3	84.7

Specific Conductance

Specific conductance data were similar to other Philadelphia streams.

Table 51. Gage 01465798 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2968	59.0	793.0	554.2	100.0	0.0
Aug-19	2970	79.0	788.0	548.9	100.0	0.0
Sep-19	2874	197.0	809.0	662.5	100.0	0.0
Oct-19	2857	95.0	782.0	510.8	100.0	0.0
Nov-19	2470	158.0	742.0	610.3	85.8	14.2
Mar-20	2582	163.0	711.0	529.3	98.5	1.5
Apr-20	2864	101.0	703.0	545.1	100.0	0.0
May-20	2966	97.0	756.0	593.3	100.0	0.0
Jun-20	2861	121.0	777.0	607.1	100.0	0.0

Temperature

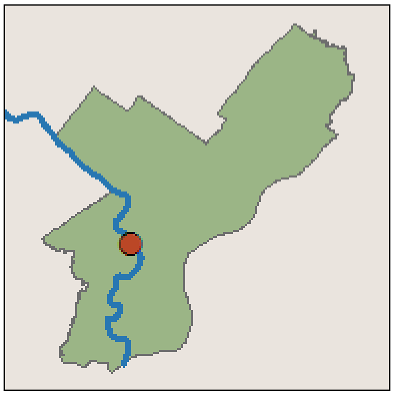
Temperature exceedance rates observed in Poquessing Creek were similar to those in other WWF designated-use creeks (*e.g.*, Tacony and Cobbs Creeks).

Table 52. Gage 01465798 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
WWF	1-Jul	31-Jul	0	100	0	100	20.5	30	24.4
WWF	1-Aug	15-Aug	0	100	0	100	20.1	26.9	23.5
WWF	16-Aug	31-Aug	0	100	0	100	18.5	27.4	22.9
WWF	1-Sep	15-Sep	0	100	0	100	17.6	25.9	21.5
WWF	16-Sep	30-Sep	0	100	0	100	15.7	23.7	19.8
WWF	1-Oct	15-Oct	3.7	96.3	0	100	13.8	23.4	17
WWF	16-Oct	31-Oct	0	100	0	100	10.6	18.7	14.5
WWF	1-Nov	15-Nov	5.1	94.9	0	100	2.6	18.7	8.4
WWF	16-Nov	30-Nov	0	100	0	100	3.2	9	6.4
WWF	1-Mar	31-Mar	85.3	14.7	0	100	4.7	16.2	10.2
WWF	1-Apr	15-Apr	72.2	27.8	0	100	7.8	17.7	12.4
WWF	16-Apr	30-Apr	10.6	89.4	0	100	7.4	16	11.5
WWF	1-May	15-May	8.1	91.9	0	100	8.2	21.1	14.2
WWF	16-May	31-May	9.3	90.7	0	100	12.5	25.1	18.6
WWF	1-Jun	15-Jun	0	100	0	100	16	26.2	21.3
WWF	16-Jun	30-Jun	0	100	0	100	18	28.1	23.3

Gages in Large Watersheds

Schuylkill River (Gage 01474500)



Dissolved oxygen and pH

DO water quality criteria were not exceeded at this location (Table 53, Figures 58-59), and pH criteria were also attained (Table 54). The Schuylkill gage attained pH criteria, even during stretches of spring when algal activity is usually greatest (Figure 60).

Table 53. Gage 01474500 Dissolved Oxygen Minimum Criterion Summary Results by Month

Month	Des. Use	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	WWF	1485	6.3	12.9	7.9	99.9	0.1	0.0	100.0
Aug-19	WWF	1487	6.4	9.1	7.4	99.9	0.1	0.0	100.0
Sep-19	WWF	1436	6.9	9.4	8.2	100.0	0.0	0.0	100.0
Oct-19	WWF	1484	6.9	10.1	9.0	100.0	0.0	0.0	100.0
Nov-19	WWF	1442	9.0	12.6	11.6	100.0	0.0	0.0	100.0
Mar-20	WWF	932	10.6	13.3	11.6	100.0	0.0	0.0	100.0
Apr-20	WWF	1392	9.4	12.1	10.8	100.0	0.0	0.0	100.0
May-20	WWF	1358	7.3	11.0	9.5	100.0	0.0	0.0	100.0
Jun-20	WWF	1325	6.9	8.8	7.8	100.0	0.0	0.0	100.0

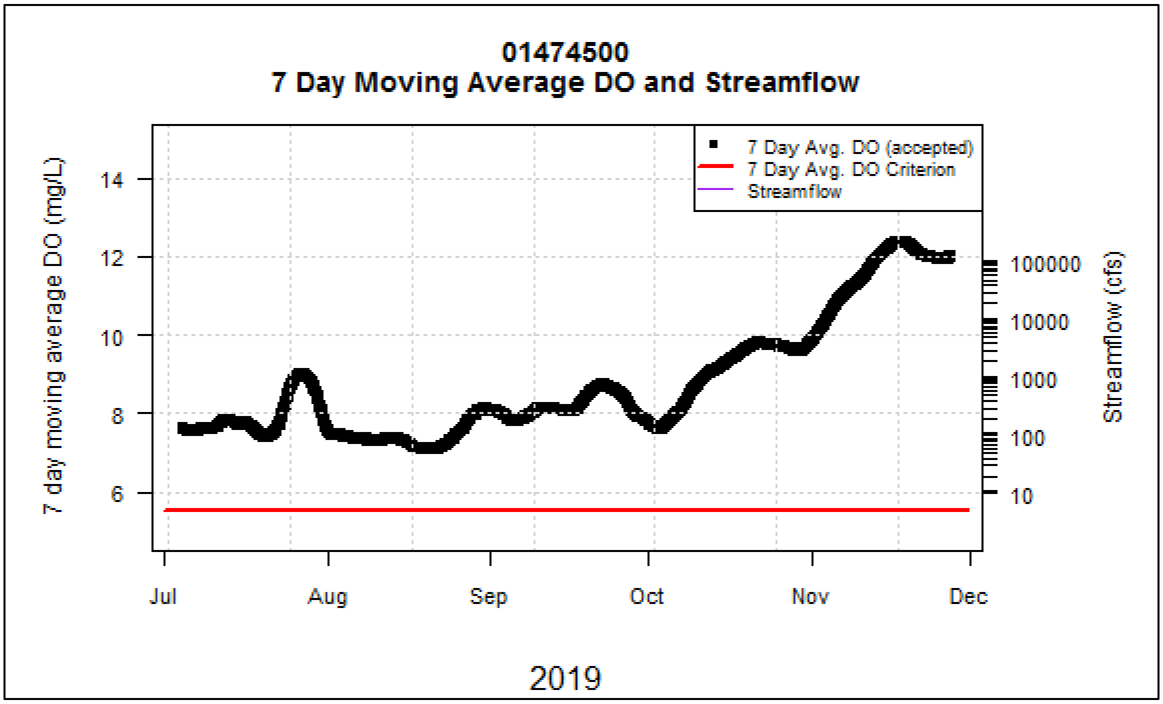


Figure 58. Gage 01474500, 7 Day Average Dissolved Oxygen and Streamflow, Jul-Dec 2019.

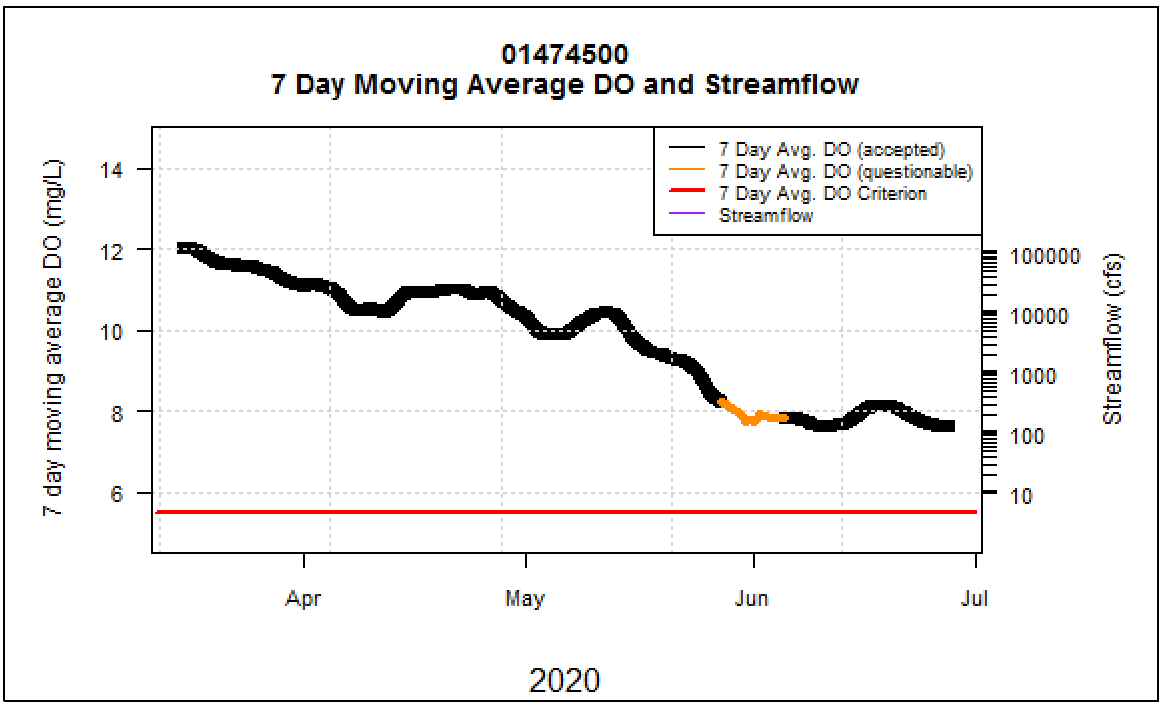


Figure 59. Gage 01474500, 7 Day Average Dissolved Oxygen and Streamflow, Mar-Jun 2020.

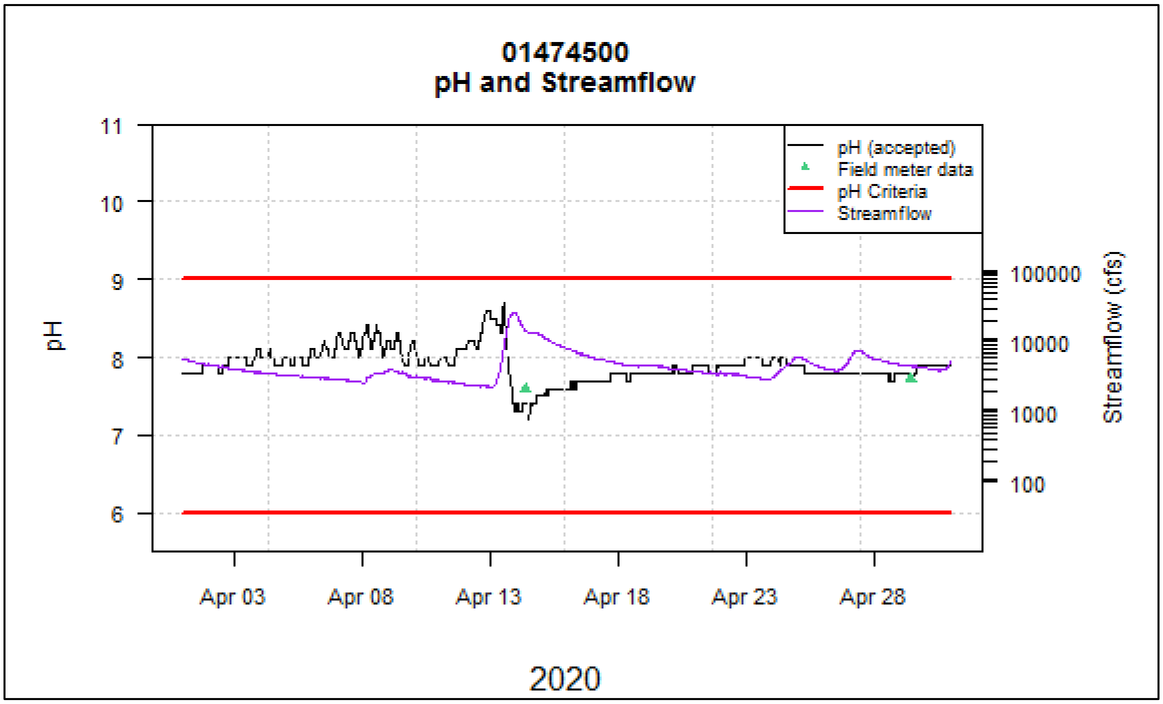


Figure 60. Gage 01474500, pH and Streamflow, April 2020.

Table 54. Gage 01474500 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	1485	7.1	8.9	7.8	99.9	0.1	0.0	0.0	100.0	100.0
Aug-19	1488	7.6	8.7	8.0	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	1326	7.9	8.9	8.4	92.3	7.7	0.0	0.0	100.0	100.0
Oct-19	664	7.7	8.5	7.9	44.7	55.3	0.0	0.0	100.0	100.0
Nov-19	1442	7.5	8.2	8.0	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	932	7.6	8.8	8.1	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	1429	7.2	8.7	7.9	100.0	0.0	0.0	0.0	100.0	100.0
May-20	1357	7.5	8.7	7.9	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	1325	7.4	8.1	7.6	100.0	0.0	0.0	0.0	100.0	100.0

Temperature

Table 55. Gage 01474500 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	% exceedance	% attaining	% flagged data	% accepted data	Min	Max	Mean
WWF	1-Jul	31-Jul	0	100	0	100	22.7	30.2	26.2
WWF	1-Aug	15-Aug	0	100	0	100	24.4	28.2	26.6
WWF	16-Aug	31-Aug	0	100	0	100	22.4	28.7	25.6
WWF	1-Sep	15-Sep	0	100	0	100	22.4	25.7	23.9
WWF	16-Sep	30-Sep	0	100	0	100	21.6	24.6	22.8
WWF	1-Oct	15-Oct	18.5	81.5	0	100	16.6	24.2	19.3
WWF	16-Oct	31-Oct	0	100	0	100	13	17.1	14.7
WWF	1-Nov	15-Nov	8.3	91.7	0	100	5.7	16.3	9.7
WWF	16-Nov	30-Nov	0	100	0	100	4.9	7.3	6.2
WWF	1-Mar	31-Mar	77.7	22.3	0	100	4.4	12	9.4
WWF	1-Apr	15-Apr	74.4	25.6	0	100	9.8	15.6	12.3
WWF	16-Apr	30-Apr	2	98	0	100	9.8	14.2	11.4
WWF	1-May	15-May	0	100	0	100	11	16.8	14.1
WWF	16-May	31-May	8.1	91.9	0	100	16.4	22.8	19.1
WWF	1-Jun	15-Jun	0	100	0	100	20.6	25.6	23.4
WWF	16-Jun	30-Jun	0	100	0	100	21.7	28.3	25.3

Figure 61. Gage 01474500, Schuylkill River at the Fairmount Dam, looking upstream

Turbidity

Turbidity levels at the Schuylkill gage were less susceptible to extreme peaks due to storms and increased flow.

Table 56. Gage 01474500 Turbidity Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% above max. guideline	% below max. guideline
Jul-19	1486	2.0	492.0	15.1	100.0	0.0	94.8	5.2
Aug-19	1488	1.5	28.6	4.0	100.0	0.0	71.3	28.7
Sep-19	1436	1.1	6.3	2.3	100.0	0.0	21.4	78.6
Oct-19	1484	1.1	25.4	3.5	100.0	0.0	37.4	62.6
Nov-19	1442	1.1	98.0	7.6	100.0	0.0	45.7	54.3
Mar-20	932	1.0	40.5	5.0	100.0	0.0	46.2	53.8
Apr-20	1392	1.5	49.7	4.9	100.0	0.0	66.3	33.7
May-20	1355	1.2	39.8	5.2	100.0	0.0	55.4	44.6
Jun-20	1325	0.3	22.8	3.1	100.0	0.0	48.2	51.8

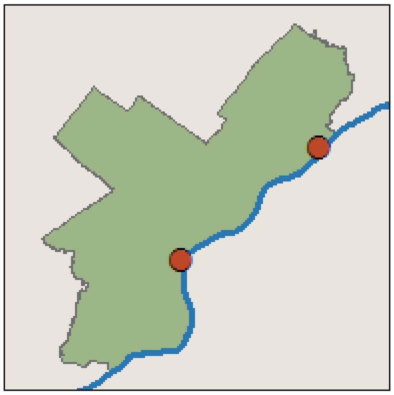
Specific Conductance

The Schuylkill River generally exhibits intermediate conductance, lower than the small Philadelphia tributary streams described elsewhere in this report, but greater than that observed in the Delaware River. Observed differences are likely due to geology and preponderance of anthropogenic sources in the respective watersheds.

Table 57. Gage 01474500 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	1485	122.0	461.0	373.4	100.0	0.0
Aug-19	1488	308.0	536.0	464.1	100.0	0.0
Sep-19	1436	446.0	640.0	562.2	100.0	0.0
Oct-19	1484	270.0	652.0	512.3	100.0	0.0
Nov-19	1442	201.0	488.0	375.3	100.0	0.0
Mar-20	1484	232.0	464.0	380.9	100.0	0.0
Apr-20	1429	165.0	370.0	309.3	100.0	0.0
May-20	1358	218.0	434.0	339.4	100.0	0.0
Jun-20	1325	304.0	486.0	392.2	100.0	0.0

Delaware River (Gages 01467200 and 014670261)



Dissolved oxygen and pH

The DRBC DO daily mean and pH criteria for Zone 3 was attained at Gage 01467200 for the entire reporting period (Tables 58 and 60). The Zone 2 DO daily mean and pH criteria were also attained at Gage 014670261 (Tables 59 and 61). Data is collected year-round at 014670261. From December 15, 2019 to March 1, 2020, water quality monitoring equipment used to measure pH, DO and turbidity was removed from site 01467200 in order to protect it from ice.

Figure 62. Delaware River at Ben Franklin Bridge, near Gage 01467200

Table 58. Gage 01467200 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Days	Daily Avg. Min	Daily Avg. Max	Daily Avg. Mean	% non-attaining	%attaining
Jul-19	DRBC	31.0	4.6	7.2	5.8	0.0	100.0
Aug-19	DRBC	31.0	3.9	6.4	5.0	0.0	100.0
Sep-19	DRBC	30.0	4.7	6.4	5.4	0.0	100.0
Oct-19	DRBC	31.0	4.5	8.1	6.6	0.0	100.0
Nov-19	DRBC	30.0	7.7	11.5	10.0	0.0	100.0
Mar-20	DRBC	31.0	9.7	12.7	11.1	0.0	100.0
Apr-20	DRBC	30.0	9.0	10.5	9.8	0.0	100.0
May-20	DRBC	31.0	7.9	10.0	9.1	0.0	100.0
Jun-20	DRBC	30.0	4.6	8.5	6.0	0.0	100.0

Table 59. Gage 014670261 Dissolved Oxygen Daily Mean Criterion Summary Results by Month

Month	Des. Use	Days	Daily Avg. Min	Daily Avg. Max	Daily Avg. Mean	% non-attaining	%attaining
Jul-18	DRBC	31	5.2	7.1	6.1	0.0	100.0
Aug-18	DRBC	31	5.2	7.6	6.1	0.0	100.0
Sep-18	DRBC	30	5.8	7.2	6.5	0.0	100.0
Oct-18	DRBC	31	6.2	8.9	7.8	0.0	100.0
Nov-18	DRBC	30	8.7	12.2	10.9	0.0	100.0
Dec-18	DRBC	31	11.7	14.0	12.8	0.0	100.0
Jan-19	DRBC	31	12.1	14.0	12.9	0.0	100.0
Feb-19	DRBC	29	12.2	13.5	13.0	0.0	100.0
Mar-19	DRBC	31	10.5	13.1	11.6	0.0	100.0
Apr-19	DRBC	30	9.2	10.9	10.2	0.0	100.0
May-19	DRBC	31	7.4	10.3	9.0	0.0	100.0
Jun-19	DRBC	30	6.1	8.7	7.0	0.0	100.0

Table 60. Gage 01467200 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2968	7.0	7.3	7.1	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2962	6.9	7.1	7.0	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	2851	7.0	7.3	7.1	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	2930	7.2	7.6	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	2841	7.2	7.7	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	2800	7.3	7.7	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	2769	7.1	7.4	7.3	100.0	0.0	0.0	0.0	100.0	100.0
May-20	2922	7.0	7.4	7.2	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	2812	6.8	7.3	7.1	100.0	0.0	0.0	0.0	100.0	100.0

Table 61. Gage 014670261 pH Criteria Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% min non-attaining	% max non-attaining	% min attaining	% max attaining
Jul-19	2975	6.9	7.3	7.1	100.0	0.0	0.0	0.0	100.0	100.0
Aug-19	2976	7.0	7.4	7.2	100.0	0.0	0.0	0.0	100.0	100.0
Sep-19	2694	7.1	7.4	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Oct-19	2912	7.3	7.6	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Nov-19	2869	7.1	7.6	7.4	100.0	0.0	0.0	0.0	100.0	100.0
Mar-20	2963	7.2	7.8	7.5	100.0	0.0	0.0	0.0	100.0	100.0
Apr-20	2859	7.0	7.4	7.2	100.0	0.0	0.0	0.0	100.0	100.0
May-20	2960	7.0	7.6	7.3	100.0	0.0	0.0	0.0	100.0	100.0
Jun-20	2871	7.1	7.6	7.3	100.0	0.0	0.0	0.0	100.0	100.0

Temperature

Temperature criteria for the Delaware River were not exceeded at either gage.

Table 62. Gage 01467200 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
DRBC	1-Jul	31-Jul	2975	23.9	28.6	27.0	100.0	0.0	0.0	100.0
DRBC	1-Aug	31-Aug	2976	25.2	28.2	27.0	100.0	0.0	0.0	100.0
DRBC	1-Sep	30-Sep	2879	23.1	25.6	24.1	100.0	0.0	0.0	100.0
DRBC	1-Oct	31-Oct	2963	14.5	23.4	18.6	100.0	0.0	0.0	100.0
DRBC	1-Nov	30-Nov	2855	5.7	15.2	9.2	100.0	0.0	0.0	100.0
DRBC	1-Dec	31-Dec	2941	2.0	6.2	4.1	100.0	0.0	0.0	100.0
DRBC	1-Jan	31-Jan	2925	2.5	5.5	4.1	100.0	0.0	0.0	100.0
DRBC	1-Feb	28-Feb	2716	3.3	5.6	4.5	100.0	0.0	0.0	100.0
DRBC	31-Mar	31-Mar	2896	4.3	10.7	8.2	100.0	0.0	0.0	100.0
DRBC	1-Apr	30-Apr	2831	9.5	12.9	10.9	100.0	0.0	0.0	100.0
DRBC	1-May	31-May	2952	11.6	20.9	15.0	100.0	0.0	0.0	100.0
DRBC	1-Jun	30-Jun	2857	20.2	26.2	23.6	100.0	0.0	0.0	100.0

Table 63. Gage 014670261 Temperature Summary Results by Maximum Criteria Period

Designated Use	Date range start	Date range end	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
DRBC	1-Jul	31-Jul	2975	24.2	29.6	26.9	100.0	0.0	0.0	100.0
DRBC	1-Aug	31-Aug	2976	24.9	28.3	26.7	100.0	0.0	0.0	100.0
DRBC	1-Sep	30-Sep	2880	22.5	25.6	23.8	100.0	0.0	0.0	100.0
DRBC	1-Oct	31-Oct	2913	13.8	23.3	17.7	100.0	0.0	0.0	100.0
DRBC	1-Nov	30-Nov	2876	5.0	15.4	8.1	100.0	0.0	0.0	100.0
DRBC	1-Dec	31-Dec	2976	1.1	5.9	3.6	100.0	0.0	0.0	100.0
DRBC	1-Jan	31-Jan	2966	1.7	6.6	3.8	100.0	0.0	0.0	100.0
DRBC	1-Feb	28-Feb	2784	3.3	5.8	4.3	100.0	0.0	0.0	100.0
DRBC	31-Mar	31-Mar	2965	4.4	10.9	8.3	100.0	0.0	0.0	100.0
DRBC	1-Apr	30-Apr	2864	9.1	13.6	10.8	100.0	0.0	0.0	100.0
DRBC	1-May	31-May	2960	11.2	22.2	15.5	100.0	0.0	0.0	100.0
DRBC	1-Jun	30-Jun	2875	21.3	27.2	24.0	100.0	0.0	0.0	100.0

Specific Conductance

The Delaware River exhibits much lower conductivity than the small Philadelphia tributary streams described elsewhere in this report. This is likely caused by differences in geology and proportionally fewer anthropogenic sources in the less-developed Delaware River watershed.

Table 64. Gage 01467200 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2971	198.0	288.0	243.6	100.0	0.0
Aug-19	2972	234.0	323.0	281.2	100.0	0.0
Sep-19	2862	294.0	400.0	334.6	100.0	0.0
Oct-19	2919	246.0	453.0	359.1	100.0	0.0
Nov-19	2843	146.0	274.0	208.1	100.0	0.0
Mar-20	2836	201.0	243.0	220.2	100.0	0.0
Apr-20	2795	153.0	222.0	190.2	100.0	0.0
May-20	2923	131.0	223.0	185.7	100.0	0.0
Jun-20	2814	192.0	261.0	228.3	100.0	0.0

Table 65. Gage 014670261 Specific Conductance Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data
Jul-19	2975	199.0	290.0	236.8	100.0	0.0
Aug-19	2976	223.0	303.0	274.8	100.0	0.0
Sep-19	2880	278.0	355.0	314.2	100.0	0.0
Oct-19	2915	226.0	358.0	307.3	100.0	0.0
Nov-19	2872	131.0	286.0	211.3	100.0	0.0
Mar-20	2965	187.0	290.0	215.8	100.0	0.0
Apr-20	2863	144.0	314.0	189.6	100.0	0.0
May-20	2959	114.0	259.0	184.2	100.0	0.0
Jun-20	2875	160.0	255.0	209.8	100.0	0.0

Turbidity

Turbidity guidelines at 014670261 were almost always exceeded throughout the year. Turbidity is not continuously measured at 01467200.

Table 66. Gage 014670261 Turbidity Summary Results by Month

Month	Observations, n	Min	Max	Mean	% accepted data	% flagged data	% non-attaining	% attaining
Jul-19	2975	3.4	53.5	11.6	100.0	0.0	100.0	0.0
Aug-19	2976	2.7	45.7	7.3	100.0	0.0	99.9	0.1
Sep-19	2880	2.3	23.0	6.2	100.0	0.0	98.1	1.9
Oct-19	2915	2.4	36.3	7.0	100.0	0.0	99.3	0.7
Nov-19	2880	3.6	65.8	10.3	100.0	0.0	100.0	0.0
Dec-19	2976	2.9	43.4	8.9	100.0	0.0	100.0	0.0
Jan-20	2970	0.3	164.0	9.1	100.0	0.0	99.8	0.2
Feb-20	2779	2.0	46.3	5.1	100.0	0.0	92.1	7.9
Mar-20	2966	1.2	17.8	4.3	100.0	0.0	91.3	8.7
Apr-20	2863	1.7	90.3	7.2	100.0	0.0	92.7	7.3
May-20	2964	1.9	61.9	8.2	100.0	0.0	97.8	2.2
Jun-20	2875	2.1	39.9	7.3	100.0	0.0	97.7	2.3

Wet Weather and Dry Weather Results

Annual Summary, July 2019 - June 2020

Water quality data was also categorized as wet or dry for the purpose of evaluating weather effects on water quality, and specifically the incidence of non-attainment of water quality criteria. A wet weather condition was defined as rainfall greater than 0.05 inches in the preceding 72 hours, as measured at the nearest PWD rain gage.

In general, more frequent non-attainment of DO criteria was observed in wet weather due to the tendency of storm events to decrease DO via the introduction of stormwater runoff and BOD (Tables 67-68). The turbidity maximum guideline was also usually more frequently surpassed in wet weather (Tables 71-72). The pH maximum criterion was exceeded in both wet and dry weather (Tables 69-70). Temperature criteria were more likely to be exceeded at Trout Stocking Fishery (TSF) gages due to more stringent seasonal criteria (Tables 75-76).

Table 67. USGS Gage July 2019 - June 2020 Dissolved Oxygen Minimum Criterion Summary Results During Wet Weather

Gage number	Designated Use	Observations, n	% accepted data	% flagged data	% non-attaining	% attaining
01465798	WWF	17379	97	3	0.6	99.4
014670261*	DRBC	NA	NA	NA	NA	NA
01467042	TSF	17775	98.9	1.1	0	100
01467048	TSF	17434	99.7	0.3	0	100
01467086	WWF	8692	99.6	0.4	0.8	99.2
01467087	WWF	16484	95.3	4.7	17.2	82.8
01467200*	DRBC	NA	NA	NA	NA	NA
01473900	TSF	8358	100	0	0	100
01474000	TSF	8321	100	0	0	100
01474500	WWF	8810	100	0	0	100
01475530	WWF	16350	100	0	0	100
01475548	WWF	16359	99.6	0.4	5.4	94.6

*No minimum DO criterion applies at these locations.

Table 68. USGS Gage July 2019 - June 2020 Dissolved Oxygen Minimum Criterion Summary Results During Dry Weather

Gage number	Designated Use	Observations, n	% accepted data	% flagged data	% non-attaining	% attaining
01465798	WWF	8728	96	4	0	100
014670261*	DRBC	NA	NA	NA	NA	NA
01467042	TSF	8486	100	0	0	100
01467048	TSF	8758	100	0	0	100
01467086	WWF	4230	100	0	0.5	99.5
01467087	WWF	8940	99	1	8.5	91.5
01467200*	DRBC	NA	NA	NA	NA	NA
01473900	TSF	4103	100	0	0	100
01474000	TSF	4701	100	0	0	100
01474500	WWF	3987	100	0	0	100
01475530	WWF	9930	100	0	0	100
01475548	WWF	8872	100	0	1.1	98.9

*No minimum DO criterion applies at these locations.

Table 69. USGS Gage July 2019 - June 2020 pH Criteria Summary Results During Wet Weather

Gage number	Observations, n	% accepted data	% flagged data	% min. non-attaining	% max. non-attaining	% min. attaining	% max attaining	% attaining
01465798	17377	99.3	0.7	0.0	0.0	100.0	100.0	100.0
014670261	23478	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01467042	17771	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01467048	17485	99.1	0.9	0.0	0.0	100.0	100.0	100.0
01467086	8697	100.0	0.0	0.0	0.9	100.0	99.1	99.1
01467087	16793	99.6	0.4	0.0	0.0	100.0	100.0	100.0
01467200	18580	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01473900	8354	100.0	0.0	0.0	0.7	100.0	99.3	99.3
01474000	8369	99.6	0.4	0.0	0.8	100.0	99.2	99.2
01474500	8848	93.6	6.4	0.0	0.0	100.0	100.0	100.0
01475530	16524	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01475548	17273	97.8	2.2	0.0	0.4	100.0	99.6	99.6

Table 70. USGS Gage July 2019 - June 2020 pH Criteria Summary Results During Dry Weather

Gage number	Observations, n	% accepted data	% flagged data	% min. non-attaining	% max. non-attaining	% min. attaining	% max attaining	% attaining
01465798	8726	100.0	0.0	0.0	0.6	100.0	99.4	99.4
014670261	11327	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01467042	8481	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01467048	8759	100.0	0.0	0.0	0.6	100.0	99.4	99.4
01467086	4293	100.0	0.0	0.0	1.3	100.0	98.7	98.7
01467087	8931	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01467200	8644	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01473900	4098	100.0	0.0	0.0	1.9	100.0	98.1	98.1
01474000	4699	100.0	0.0	0.0	2.0	100.0	98.0	98.0
01474500	3986	90.8	9.2	0.0	0.0	100.0	100.0	100.0
01475530	9927	100.0	0.0	0.0	0.0	100.0	100.0	100.0
01475548	8869	100.0	0.0	0.0	1.0	100.0	99.0	99.0

Table 71. USGS Gage July 2019 - June 2020 Turbidity Summary Results During Wet Weather

Gage number	Observations, n	% accepted data	% flagged data	% above max. guideline	% below max. guideline
01465798	17345	94.2	5.8	35.6	64.4
014670261	23490	100.0	0.0	97.9	2.1
01467042	17262	98.6	1.4	25.2	74.8
01467048	17268	97.4	2.6	54.1	45.9
01467086*	NA	NA	NA	NA	NA
01467087*	NA	NA	NA	NA	NA
01467200*	NA	NA	NA	NA	NA
01473900	8330	97.3	2.7	43.0	57.0
01474000	8369	98.1	1.9	40.7	59.3
01474500	8810	100.0	0.0	64.4	35.6
01475530*	NA	NA	NA	NA	NA
01475548*	NA	NA	NA	NA	NA

*Turbidity not continuously monitored at this location

Table 72. USGS Gage July 2019 - June 2020 Turbidity Summary Results During Dry Weather

Gage number	Observations, n	%accepted data	% flagged data	% above max. guideline	% below max. guideline
01465798	8728	95.9	4.1	3.2	96.8
014670261	11529	100.0	0.0	96.6	3.4
01467042	8367	100.0	0.0	5.2	94.8
01467048	8760	100.0	0.0	20.3	79.7
01467086*	NA	NA	NA	NA	NA
01467087*	NA	NA	NA	NA	NA
01467200*	NA	NA	NA	NA	NA
01473900	4099	90.5	9.5	9.6	90.4
01474000	4703	94.4	5.6	5.1	94.9
01474500	3984	100.0	0.0	34.3	65.7
01475530*	NA	NA	NA	NA	NA
01475548*	NA	NA	NA	NA	NA

*Turbidity not continuously monitored at this location

Table 73. USGS Gage July 2019 - June 2020 Specific Conductance Summary Results During Wet Weather

Gage number	Observations, n	% accepted data	% flagged data
01465798	17373	99.4	0.6
014670261	23483	100.0	0.0
01467042	17763	100.0	0.0
01467048	17467	100.0	0.0
01467086	8742	100.0	0.0
01467087	22687	100.0	0.0
01467200	23364	100.0	0.0
01473900	8356	100.0	0.0
01474000	8368	98.9	1.1
01474500	11919	100.0	0.0
01475530	16524	100.0	0.0
01475548	17281	100.0	0.0

Table 74. USGS Gage July 2019 - June 2020 Specific Conductance Summary Results During Dry Weather

Gage number	Observations, n	% accepted data	% flagged data
01465798	8724	96.1	3.9
014670261	11522	100.0	0.0
01467042	8477	100.0	0.0
01467048	8755	100.0	0.0
01467086	4294	100.0	0.0
01467087	11807	100.0	0.0
01467200	11050	100.0	0.0
01473900	4098	100.0	0.0
01474000	4701	100.0	0.0
01474500	5419	100.0	0.0
01475530	9927	100.0	0.0
01475548	8867	94.0	6.0

Table 75. USGS Gage July 2019 - June 2020 Temperature Maximum Criteria Summary Results During Wet Weather

Gage number	Designated Use	Observations, n	% accepted data	% flagged data	% exceedance	% attaining
01465798	WWF	17378	100	0	15.7	84.3
014670261	DRBC	23489	100	0	0	100
01467042	TSF	17773	100	0	16.7	83.3
01467048	TSF	17491	100	0	18.4	81.6
01467086	WWF	8742	100	0	15.9	84.1
01467087	WWF	23086	100	0	12.4	87.6
01467200	DRBC	23567	100	0	0	100
01473900	TSF	8303	100	0	15.9	84.1
01474000	TSF	8334	100	0	19.0	81.0
01474500	WWF	11878	100	0	10.9	89.1
01475530	WWF	16525	100	0	16.2	83.8
01475548	WWF	17282	100	0	18.0	82.0

Table 76. USGS Gage July 2019 - June 2020 Temperature Maximum Criteria Summary Results During Dry Weather

Gage number	Designated Use	Observations, n	% accepted data	% flagged data	% exceedance	% attaining
01465798	WWF	8728	100	0	10.8	89.2
014670261	DRBC	11521	100	0	0	100
01467042	TSF	8489	100	0	11.8	88.2
01467048	TSF	8759	100	0	12.5	87.5
01467086	WWF	4296	100	0	9.5	90.5
01467087	WWF	11869	100	0	10.4	89.6
01467200	DRBC	11199	100	0	0	100
01473900	TSF	4069	100	0	10.3	89.7
01474000	TSF	4685	100	0	9.5	90.5
01474500	WWF	5419	100	0	8.4	91.6
01475530	WWF	9929	100	0	8.4	91.6
01475548	WWF	8870	100	0	9.2	90.8

References

Delaware River Basin Commission, 2007. Delaware River Basin Water Code: 18 CFR Part 410 (With Amendments Through September 27, 2006). West Trenton, NJ.

Appendix I – PWD/USGS Groundwater Monitoring Program

Background

The basis of PWD's CSO LTCPU wet weather source control strategy is the "capture" and infiltration of as much rainwater as possible with green stormwater infrastructure (GSI). The direct benefits of such an effort are a reduction of stormwater discharged directly to streams, as well as the increased recharge of stormwater to supplement groundwater resources. Increased infiltration, though advantageous in several respects, must be carefully planned and closely monitored to avoid unwanted impacts. Increasing groundwater levels in areas where the depth to water is shallow could result in the saturation of soils close to the surface, potentially causing basement flooding. In addition, building foundations could be impacted by rising groundwater levels.

The adaptive management approach being employed for the LTCPU is an iterative process strongly dependent on monitoring. In order to quantify the impact of this long-term effort on groundwater resources, it is necessary to monitor groundwater levels in Philadelphia. PWD has partnered with USGS to increase the geographic scope and frequency of groundwater monitoring in the Philadelphia region. A City-wide groundwater level monitoring network will provide long-term monthly data documenting current water levels and trends in groundwater elevations throughout the City, helping to track the impacts of widespread implementation of stormwater management practices (SMPs) and global climate change.

Data from the groundwater monitoring network will also be used to calibrate a Philadelphia groundwater model and update the USGS groundwater contour map of Philadelphia (Paulachok 1984). In addition to this City-wide, long term groundwater monitoring program, PWD is conducting site-scale monitoring to address the effectiveness of individual SMPs. The City-wide groundwater monitoring network and site-scale monitoring at GSI facilities provide complementary information regarding the effects of stormwater management practices at different spatial and temporal scales.

Methods

PWD and USGS identified existing wells that would be suitable for the network and obtained permission for site access. Once wells were identified and accessible, well condition and suitability for inclusion in the monitoring network were investigated by continuous water level monitoring and remote video camera inspection when accessible. Wells that met acceptance criteria were added to the monitoring network. After examining readily available information about existing wells, PWD elected to drill additional wells in order to provide better spatial distribution of wells in the monitoring network. USGS staff conduct groundwater observations monthly and upload water level data to the NWIS web server. PWD staff periodically download water level data from NWIS and summarize these data annually.

Well Network Establishment

Existing wells in the Philadelphia area were identified by USGS and PWD through digital and paper archives as well as through contacting representatives of other City agencies and large institutional landowners (*e.g.*, Philadelphia Fire Department, Philadelphia Department of Parks and Recreation, Philadelphia Gas Works, Southeastern Pennsylvania Transportation Authority, etc.). Priority was given to wells on publicly-owned or large institutional land uses in order to help ensure that wells would remain accessible in the future. The primary goal was to develop a network of wells with a spatial distribution and density sufficient to assess groundwater levels throughout the City of Philadelphia. Other criteria for establishment of the well network were:

- Sufficient density of wells in critical areas with a shallow water table
- No bias given to combined-sewered or separate-sewered areas
- Denser distribution of monitoring wells in the Northern Piedmont Ecoregion to reflect its more varied groundwater contours.

Wells that met acceptance criteria were assigned USGS location codes and added to the USGS well monitoring network and National Water Information System (NWIS) database. The well monitoring network contains 29 active sites that are monitored monthly. Additional sites are expected to be added once landowner access agreements are finalized or new wells are drilled.

Video Camera Inspection

The availability of well attribute information varied from well to well and in most cases the physical characteristics and condition of candidate wells to be added to the network was unknown. USGS staff perform remote video camera inspection, when possible, to determine physical characteristics such as screened intervals, total depth, depth to bottom of casing, and the location of potential water-bearing zones within the bore hole. Wells narrower than 4" diameter and wells with pumps or other plumbing could not accommodate the camera equipment and were not inspected with this method.

Continuous Water Level Monitoring

Monthly measurements are appropriate for monitoring long term trends in groundwater levels. However, it is important to verify that these monthly observations are representative of the unconfined aquifer and not influenced by anthropogenic activity or other conditions. USGS staff used data logging pressure transducers (LevelTroll model 500, In-Situ, Inc.) to conduct continuous water level monitoring in candidate wells. These sensors are vented to the surface of the well to provide atmospheric pressure correction. Continuous monitoring was carried out across all wells in the network to identify any aberrant trends, such as those that might be caused by local pumping operations. Sensors were deployed for three-month periods on a rotating schedule with five wells actively monitored at a time. Wells that appear to be influenced by permanent pumping operations will be removed from the monitoring network (*e.g.*, permanent wells dewatering the stadiums). Wells that are temporarily affected by local, dewatering operations (*e.g.*, a short term construction site), will remain in the system, but data collected during the period when dewatering operations affected the well will not be used in estimates of current water levels and water level trends.

Routine Groundwater Observations

USGS staff conduct groundwater observations monthly at each well using a water sensor and graduated tape. Equipment is sterilized in 10% bleach solution prior to and after measurements are taken in order to prevent introducing or transferring contamination between wells. Well level measurements are converted to elevation above the North American Vertical Datum of 1988 (NAVD88) based upon the known elevation correction factor for each well. Water level data are recorded on site in field notebooks along with any pertinent field notes and then uploaded to the

NWIS web server. PWD periodically downloads data from NWIS and summarizes these data annually.

Monitoring Well Locations

Currently the well monitoring network contains 29 active sites that are monitored monthly. (Table 1, Figure 1). PWD is in the process of drilling additional wells on City-owned property in order to meet spatial distribution and other well network criteria. Of the 29 active wells, 11 are located within the Middle Atlantic Coastal Plain Ecoregion, while the remaining 18 wells are located in the Northern Piedmont (Omernik 1987). As stated above, higher well density is required in the latter region to reflect the more complex geology and interactions with groundwater.

Table 1. PWD-USGS Groundwater Monitoring Well Network Locations.

Site ID	Site Name	Lat.	Long.	Established
USGS-395342075102101	PH 12	39.895	-75.172	10/22/1978
USGS-395353075151501	PH 1052	39.898	-75.254	3/7/2011
USGS-395408075104001	PH 63	39.902	-75.177	9/14/1954
USGS-395416075150301	PH 1053	39.904	-75.251	4/24/2003
USGS-395459075140501	PH 797	39.916	-75.259	10/15/1980
USGS-395516075113901	PH 1051	39.921	-75.194	--
USGS-395611075091301	PH 1059	39.936	-75.154	8/14/2014
USGS-395656075100401	PH 136	39.949	-75.167	12/6/1978
USGS-395656075104401	PH 1064	39.948	-75.178	6/5/2015
USGS-395705075135901	PH 1061	39.951	-75.232	6/5/2015
USGS-395849075134201	PH 1063	39.98	-75.228	6/5/2015
USGS-395859075085401	PH 1042	39.983	-75.148	2/14/2011
USGS-395942075144301	MG 2164	39.995	-75.245	2/14/2011
USGS-400001075040301	PH 1057	40	-75.068	8/14/2014
USGS-400016075102801	PH 1062	39.004	-75.174	6/5/2015
USGS-400038075094601	PH 1058	40.011	-75.163	8/14/2014
USGS-400055075122501	PH 1060	39.015	-75.206	6/5/2015
USGS-400132075031001	PH 1056	40.026	-75.053	8/14/2014
USGS-400211075093701	PH 1050	40.036	-75.16	--
USGS-400217075142101	PH 540	40.038	-75.239	3/29/1948
USGS-400229075104601	PH 1043*	40.041	-75.179	2/14/2011
USGS-400308074592201	PH 397	40.052	-74.989	1/4/1979
USGS-400311075101301	PH 1040	40.053	-75.17	2/17/2011
USGS-400327075152201	PH 1044	40.057	-75.256	3/16/2011
USGS-400424075104901	PH 550	40.073	-75.18	--/--/1906
USGS-400512075033401	PH 1045	40.087	-75.059	7/18/2011
USGS-400516075033201	PH 1046	40.088	-75.059	7/18/2011
USGS-400524075042601	MG 2195	40.09	-75.074	--
USGS-400527075042801	MG 2193	40.091	-75.074	--
USGS-400527075042802	MG 2194	40.091	-75.074	--
USGS-400644074590801	PH 1041	40.112	-74.986	2/17/2011

* Philadelphia County observation well

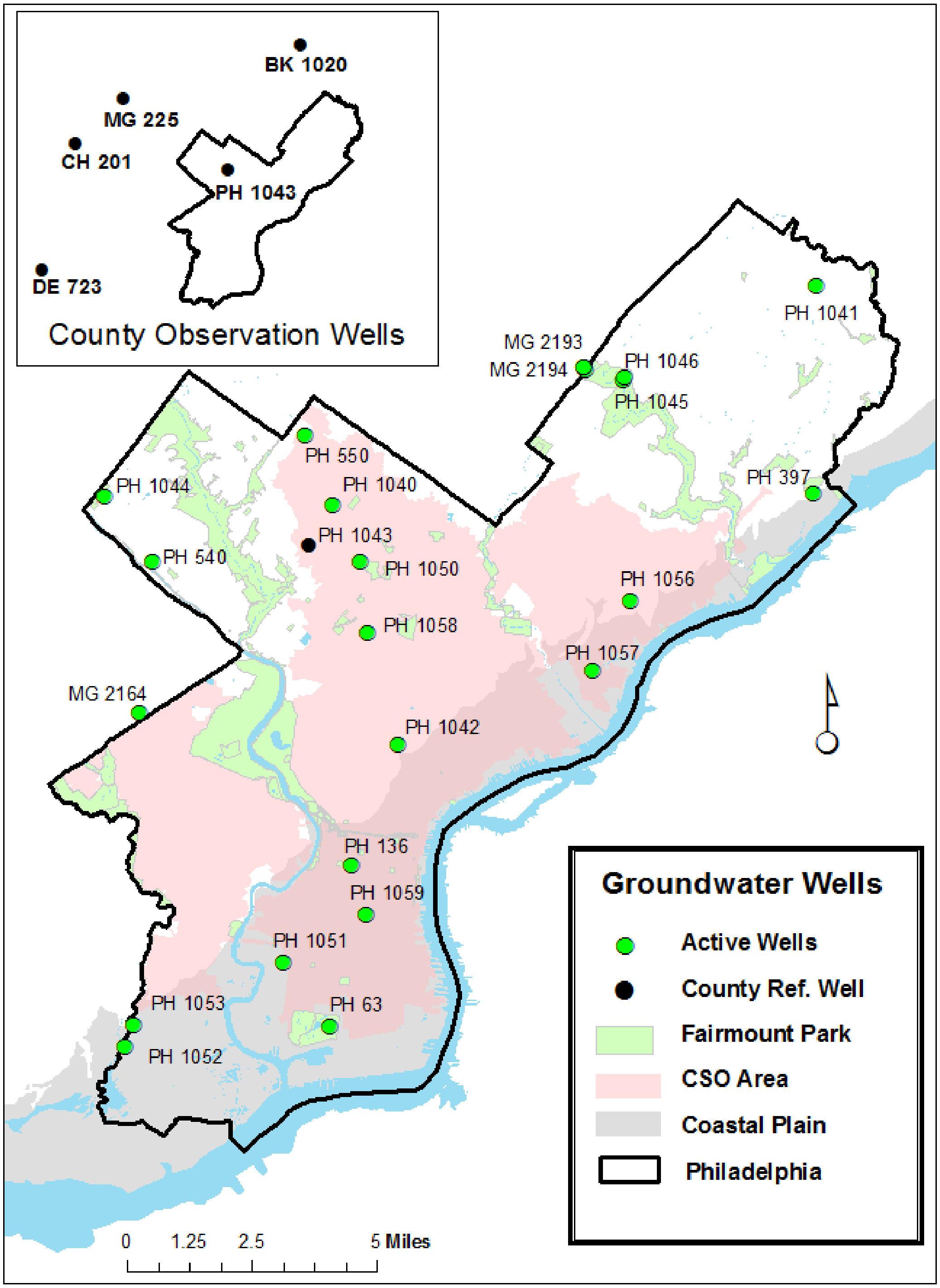


Figure 1. PWD-USGS Groundwater Monitoring Well Network Locations and (inset) County Reference Well Locations.

Wells were also classified according to predominant underlying geology and type of sewer system, *i.e.*, CSO or separate-sewered (Table 2, Figure 1). Another consideration for siting new wells was the potential influence of buried utilities and historic creek beds. During the period of rapid expansion of Philadelphia's grid-like network of streets, historic streams were encased in large brick sewers and buried in order to level and prepare land for development. Recent groundwater mapping and modeling work suggests that these brick sewers strongly influence local groundwater elevations (Paulachok 1991, Maimone et al. 2011).

Table 2. PWD-USGS Groundwater Well Geology and Sewer System Type Classification.

Site ID	Site Name	Sewer Type	Geology
USGS-395353075151501	PH 1052	Separate	Trenton Gravel
USGS-395408075104001	PH 63	Separate	Trenton Gravel
USGS-395416075150301	PH 1053	Separate	Trenton Gravel
USGS-395516075113901	PH 1051	CSO	Magothy Raritan Potomac
USGS-395656075100401	PH 136	CSO	Trenton Gravel
USGS-395859075085401	PH 1042	CSO	Pennsauken and Bridgeton Formation
USGS-395942075144301	MG 2164	Separate	Granitic Gneiss and Granite
USGS-400211075093701	PH 1050	CSO	Wissahickon Formation
USGS-400217075142101	PH 540	Separate	Wissahickon Formation
USGS-400229075104601	PH 1043	CSO	Wissahickon Formation
USGS-400308074592201	PH 397	Separate	Trenton Gravel
USGS-400311075101301	PH 1040	CSO	Wissahickon Formation
USGS-400327075152201	PH 1044	Separate	Wissahickon Formation
USGS-400424075104901	PH 550	CSO	Wissahickon Formation
USGS-400512075033401	PH 1045	Separate	Granitic Gneiss and Granite
USGS-400516075033201	PH 1046	Separate	Granitic Gneiss and Granite
USGS-400527075042801	MG 2193	Separate	Wissahickon Formation
USGS-400527075042802	MG 2194	Separate	Wissahickon Formation
USGS-400644074590801	PH 1041	Separate	Wissahickon Formation
USGS-400132075031001	PH 1056	CSO	Wissahickon Formation
USGS-400001075040301	PH 1057	CSO	Trenton Gravel
USGS-400038075094601	PH 1058	CSO	Pennsauken Formation
USGS-395611075091301	PH 1059	CSO	Trenton Gravel
USGS-395459075140501	PH 797	CSO	Trenton Gravel
USGS-395656075104401	PH 1064	CSO	Trenton Gravel
USGS-395705075135901	PH 1061	CSO	Wissahickon Formation
USGS-395849075134201	PH 1063	CSO	Wissahickon Formation
USGS-400016075102801	PH 1062	Separate	Pennsauken Formation
USGS-400055075122501	PH 1060	Separate	Wissahickon Formation

USGS maintains at least one reference well in most Pennsylvania counties. Reference wells located in neighboring counties (Figure 1, Table 3) may be used as regional reference wells for data analyses. Continuous hourly data are collected at well DE 723 in Delaware County. Reference wells in Chester, Bucks and Montgomery counties are not monitored continuously.

Site ID	Site Name	Lat.	Long.	Established
USGS-400453075255601	CH 201 Chester County Observation Well	40.136	-75.351	06/19/1978
USGS-400808075210401	MG 225 Montgomery County Observation Well	40.199	-75.052	08/15/1956
USGS-401157075032001	BK 1020 Bucks County Observation Well	40.081	-75.432	04/13/1968
USGS-395512075293701	DE 723 Delaware County Observation Well	39.920	-75.493	1983

Data Analysis

USEPA (2009) published detailed guidance on statistical analysis of groundwater contaminant concentrations. In many of the examples, the same logic and techniques could apply to analysis of groundwater levels. In the case of the Philadelphia groundwater monitoring network, the goal is to understand if groundwater levels are changing over time, at either a single well or group of wells. The main statistical tests to be utilized are a) Seasonal Kendall Test, and b) ANOVA. The tests are briefly described below.

The Seasonal Kendall test performs the Mann-Kendall (MK) trend test for individual seasons of the year, where season is defined by the user. It then combines the individual results into one overall test for whether the dependent variable (*i.e.*, groundwater level) changes in a consistent direction (monotonic trend) over time. The magnitude (*i.e.*, slope) of the trend is also determined. The test is nonparametric, therefore non-normal data can be analyzed (Helsel *et al.* 2006). USEPA (2009) advises that at least 10-12 measurements are needed, whereas Helsel and Hirsch (2002) recommends that the product of number of years and number of seasons be greater than 25. Helsel *et al.* (2006) further caution that with more than 10 years of data, adjusted p-values should be calculated to account for the possibility of serial correlation. The Seasonal Kendall test can be applied to data from a single well, not multiple wells. To examine seasonal trends across multiple wells, the Covariance-Sum test is used (Lettenmaier 1988), which is essentially the execution of multiple seasonal Kendall tests and calculation of the covariances between them. To analyze regional trends over time from a group of wells, the Regional Kendall test can be applied. The Regional Kendall test essentially functions the same way as the Seasonal Kendall test, except the data is categorized by region rather than season.

An alternate method to analyze temporal trends on either a single well or group of wells is the analysis of variance (ANOVA). For a single well or group of wells with data subdivided by season, a one-way ANOVA would examine the significance of seasonality as a statistical factor. A two-way ANOVA would be applied to include location or region as a statistical factor. Either form of ANOVA assumes that the datasets are normally distributed with constant variance. Group residuals should be tested for normality and for equality of variance. If the data cannot be transformed to a normal distribution, the nonparametric Kruskal-Wallis test can be used instead to detect significance of the specified statistical factor (USEPA 2009).

Well Monitoring Data Summary

Well monitoring data were summarized from July 2019 to June 2020 (Tables 4-5). Data collection in spring 2020 was cancelled due to the COVID-19 pandemic. These data are presented as an update of the program status. Additional data analysis will be completed as part of the groundwater model calibration and groundwater map update reports. Groundwater trends will be analyzed further once a sufficient amount of data has been collected (See Data Analysis section).

Table 4. PWD-USGS Groundwater Monitoring Well Data 7/2019-6/2020, Depth to Water Level (Feet below Land Surface).

Site ID	J	A	S	O	N	D	J	F	M	A	M	J
395353075151501	13.83	14.03		15.57	15.83	16.04	15.90	15.44	15.51			15.02
395408075104001	4.72	4.75	5.4	5.35	5.36	5.53	5.6	5.25	5.5			5.17
395416075150301	6.95	7.64	9.3	10.18	10.22	10.8	9.71	8.93	9.08			8.33
395459075140501	13.47	13.52	13.73	13.73	13.7	13.5	13.8	13.75	13.83			13.68
395516075113901												
395611075091301	25.5	25.58	25.83	26.12	26.3	26.55	25.68	26.65	26.74			26.57
395656075100401												
395656075104401	12.97	10.13	20.73		20.45	14	14.54	19.45	20.65			
395705075135901	14.27	13.97	14.92	15.21	14.3	13.7	14.42	13.93	14.45			14.55
395849075134201	13.03	12.88	13.36	13.53	13.57	13.25	13.53	13.33	13.5			13.22
395859075085401												
395942075144301	13.01	12.99	16.82	14.98	14.75	13.92	13.45	12.97	13.09			14.67
400001075040301	14.77	15.01	15.48	15.93	16.02	15.69	15.68	15.56	15.78			15.6
400016075102801	10.73	10.77	10.9	10.9	11	10.86	10.91	10.95	10.98		11	10.77
400038075094601	19.53	19.48	19.82	19.99	20.02	19.82	19.88	19.77	19.79		20.74	19.82
400055075122501	15.64	15.63	16.27	16.13	16.03	15.28	15.65	15.44	15.4		15.54	15.63
400132075031001	19.26	19.28	19.95	20.45	20.54	20.62	20.37	20.3	20.26			20.35
400211075093701	13.5	13.38	13.65	13.9	13.87	14.1	14	14	14.03		13.8	13.94
400217075142101	21.59	22.77	24.82	26.4	26.7	28.02	28.71	28.09	29.26		28.51	28.65
400229075104601	15.81	15.39		17.37	16.67	14.93	15.64	15.07	15.34	14.35	15.54	16.21
400308074592201	2.22	2.52	3.52	4.16	4.41	3.38	3.14	3.08	3.2			3.43
400311075101301	10.6	10.72	12.07	12.63	12.01	9.95	9.9	9.24	9.09		9.6	11
400327075152201	61.42	63.14	66.52	74.46	75.3	67.4	62.32	59.7	60.83		60.5	62.11
400424075104901	17.43	18.13	19.09	19.9	20	19.69	18.9	17.96	17.83		17.3	19.85
400512075033401	35.07	34.95	36.58	36.79	36.47	34.88	34.96	34.74	35.21			35.52
400516075033201	27.11	28.35	29.63	30.27	30.58	31.06	31	31.06	30.96			27.48
400527075042801	20.12	20.27	21.4	21.99	21.92	20.2	19.9	19.83				20.3
400527075042802	17.48	18.73	22.37	23.61	23.05	19.2	18.64	17.22				17.32
400644074590801	16.1	16.45	17.33	17.74	17.72	17.01	16.96	16.54	16.73			16.9

Table 5. Regional County Observation Well Data 7/2019 - 6/2020.

Site ID	J	A	S	O	N	D	J	F	M	A	M	J
400453075255601	19.5	21.49	22.79	23.9	23.44	20.97	21.12	18.98	20.16		19.14	19.63
400808075210401	9.79	10.98		11.75		11.3		9.41			8.6	
401157075032001	28.93	32.41		35.34		32.81	29.15	29.26			27.91	
395512075293701	6.59	6.88		6.84		6.65	6.38		6.45			6.9

References

USEPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities -Unified Guidance. Report no. EPA-530-R-09-007. Office of Resource Conservation and Recovery. Available online at http://www.epa.gov/epawaste/hazard/correctiveaction/resources/guidance/sitechar/gwstats/unified-guid.pdf

Helsel, D. R., and Hirsch, R. M., 2002. Statistical methods in water resources: U.S. Geological Survey Techniques of Water-Resources Investigations, book 4, chap. A3, 524 p. Available online at http://water.usgs.gov/pubs/twri/twri4a3/

Helsel, D.R., Mueller, D.K., and Slack, J.R., 2006. Computer Program for the Kendall Family of Trend Tests. U.S. Geological Survey Scientific Investigations Report 2005-5275, 4p. Available online at http://pubs.usgs.gov/sir/2005/5275/pdf/sir2005-5275.pdf

Lettenmaier D.P., 1988. Multivariate Nonparametric Tests for Trend in Water Quality. *Water Resources Bulletin*, 24, 505-512.

Maimone, M., O'Rourke, D.E., Knighton, J.O., and Thomas, C.P. 2011. Potential Impacts Of Extensive Stormwater Infiltration In Philadelphia. Environmental Engineer: Applied Research and Practice. Fall 2011. 29-39.

Paulachok, G. N., and Wood C.R. (1984). Water-table map of Philadelphia, Pennsylvania, 1976-1984. U.S. Geological Survey Hydrologic investigations atlas HA-676. Washington, D.C.

Appendix J – PWD Wadeable Steams Benthic Macroinvertebrate and Physical Habitat Assessments

PWD Wadeable Streams Benthic Macroinvertebrate and Physical Habitat Assessments

Background

Since 1999, the Philadelphia Water Department (PWD) has been using benthic macroinvertebrate sampling and instream physical habitat assessments in order to characterize watershed conditions and track trends in watershed health. Assessments are performed by the staff of PWD's Bureau of Laboratory Services (BLS) using PADEP Instream Comprehensive Evaluation (ICE) methods. As benthic invertebrates may be exposed to both short and long-duration stressors, data collected through this program are pertinent to all targets of PWD's Integrated Watershed Management Plan (IWMP) Strategy.

Common Acronyms Used in This Report

IBI - Index of Biotic Integrity, a biological assessment tool to indicate the capability of a stream to support a healthy aquatic community.
ICE - Instream Comprehensive Evaluation, a protocol to survey and evaluate wadeable streams.
PTV - Pollution Tolerance Values, a numeric measure of an organism's ability to withstand environmental degradation.
EPT - Ephemeroptera + Plecoptera + Trichoptera, the common names for pollution-sensitive mayflies, stoneflies and caddisflies.

Assessment Study Design

In recent years, agencies tasked with evaluating water quality have attempted to incorporate statistical sampling designs, or a "probabilistic" approach, to selecting sampling sites (Paulsen 2008, Borsuk *et al*. 2001) rather than relying on fixed sites. Statistical sampling design is particularly important when the goal of monitoring is to make an estimate of the percentage of waters affected by pollution. Another advantage of probabilistic study design is that the assessment units are distributed over a larger geographic area. When monitoring efforts are directed at individual watersheds on a rotating basis, as has been the case with PWD programs, the possibility arises that larger scale patterns may be missed. For example, the effects of floods or drought conditions are widespread, but only the watershed that is being monitored within the same time period will have data reflecting these effects. Disadvantages of a probabilistic approach include the technical demands of establishing and randomly selecting from geographic data sets containing all possible sampling locations as well as additional field reconnaissance work when conduct the actual monitoring.

The current PWD monitoring strategy is intended to be a compromise, recognizing the benefits of collecting data from randomly selected sites but also the importance of maintaining a consistent monitoring effort at selected locations over time. This plan is based on a similar monitoring program implemented by USGS in Chester County (Reif 2002, Reif 2004). The plan also reflects the manpower constraints of collecting and processing samples with the PADEP ICE protocol. It is hoped that this compromise approach (Table 1) will achieve some of the benefits of a randomized approach, while providing periodic re-evaluation of our watersheds required to inform the watershed planning process and comply with environmental mandates.

Stream Conditions

This report summarizes results from samples that were collected between March 19 and April 30, 2019. PWD is not aware of any spills, discharges or unusual conditions that would tend to cause misleading results.

Methods

Benthic Macroinvertebrate Sample Collection

Table 1. PWD Proposed Wadeable Streams Assessments Schedule

Period	Monitoring Activity (number of samples)
2011	USGS gage samples (8); Randomly selected sites (16)
2012	Cobbs Creek Assessment (6*); USGS gage samples (9); Random (10)
2013	Tookany/Tacony Creek (10*); USGS gage samples (8); Random (7)
2014	Wissahickon Creek Tributaries (11); USGS gage samples (9); Random (5)
2015	Wissahickon Creek (12*); USGS gage samples (8); Random (2)
2016	Pennypack Creek Tributaries (11); USGS gage samples (9); Random (5)
2017	Pennypack Creek (12*); USGS gage samples (9); Random (4)
2018	Poquessing Creek (12*); USGS gage samples (9); Random (4)
2019	Schuylkill River Tributaries (3); USGS gage samples (8); Random (3)
2020	Cobbs Creek (6*); USGS gage samples (9); Random (10)

* Number of monitoring sites excludes USGS gage sites in target watershed

Using the PADEP Instream Comprehensive Evaluation (ICE) protocol (PADEP 2009), macroinvertebrate samples were collected by placing a handheld D-frame net (500µm) at the downstream portion of a riffle. Stream substrate directly upstream of the D-frame net was then disturbed for approximately one minute to a depth of approximately 10 cm as substrate allowed. This procedure was repeated at other riffle locations of variable flow within the 100-m reach such that the sample at each station was a composite of six riffle samples. Composited samples from each biological monitoring location were then preserved in 95% ETOH (ethyl alcohol) and returned to the laboratory in polyethylene containers.

Benthic Macroinvertebrate Laboratory Procedures

Benthic macroinvertebrate samples were processed according to PADEP ICE protocols (PADEP 2009). Each composited sample was placed into an 18 x 12 x 3.5-inch pan marked with 28 four-square-inch grids. Four grids were randomly selected by drawing numbers. All material was extracted from the selected grids using a four-square-inch circular "cookie cutter," and placed into another identical empty pan. From this second pan, organisms were picked from randomly selected grids or “plugs” until a minimum of 200, but not more than 240, individuals were subsampled. This procedure was a misinterpretation of the actual technique, which stipulates a count of 200 (+/- 20%) individuals. When picking either the four initial "plugs" or additional plugs results in subsampling more than 240 individuals, the PADEP ICE protocol outlines a procedure for redistributing the subsample into a clean, gridded pan and "back counting" grids until a subsample consisting of 200 (+/-20%) is obtained. Invertebrates were identified under magnification, with taxonomic classification following PADEP 2009 guidelines.

Habitat Assessment

After collecting benthic invertebrates, biologists surveyed habitat features within the monitoring station and recorded scores for 12 habitat attributes according to the PADEP ICE protocol (Table 2). Biologists completed the survey independently and then discussed the interpretation of individual habitat attribute scores, averaging individual scores when necessary.

Table 2. PA DEP ICE Protocol Habitat Metrics

Habitat Parameter	Description
Instream Cover (Fish)	Mix of boulder, cobble or other stable habitat
Epifaunal Substrate	Length/width of riffles; characterization of boulders, gravel, cobble
Embeddedness	Presence/absence of fine sediment around boulders, gravel, cobble
Velocity/Depth Regimes	Presence/absence of four velocity/depth regimes
Channel Alteration	Degree of channelization or dredging
Sediment Deposition	Measure of sediment deposits, degree of change at the bottom
Frequency of Riffles	Occurrence of riffles and distance between riffles
Channel Flow Status	Degree to which water fills the available channel
Condition of Banks	Stability of streambanks and presence of erosion or bank failure
Bank Vegetative Protection	Percentage of streambank surface covered by vegetation
Grazing or Other Disruptive Pressure	Degree to which vegetation disrupted by grazing or mowing
Riparian Vegetative Zone Width	Width of riparian zone and determination of impact on vegetation by human activities

Data Analysis

Benthic macroinvertebrate and habitat data were compiled in a Microsoft Access database and queries were used to calculate scoring metrics. Individual metric standardized scores and the PADEP Index of Biotic Integrity (IBI) were calculated using the ICE protocol (Table 3).

Table 3. PADEP ICE Protocol Metrics and Metric Standardization Values

Metric	Standardization Value
Total Taxa Richness	33

EPT Taxa Richness (PTV 0-4)	19
Beck's Index, version 3	38
Hilsenhoff Biotic Index	1.89
Shannon Diversity	2.86
Percent Sensitive Individuals (PTV 0-3)	84.5

Monitoring Locations

Assessments were performed at 8 USGS gage sites, 3 tributary sites in the targeted Schuylkill watershed, and 3 randomly chosen sites from PWD's watershed assessment site network between 3/19/2019 and 4/30/2019 (Figure 1, Tables 4-5). USGS stream gaging stations are used as long-term monitoring points at which streamflow and continuous water chemistry data are collected (refer to PWD-USGS Cooperative Water Quality Monitoring appendix). Water chemistry grab sampling for nutrient and bacterial parameters is also conducted at these USGS gage stations on a quarterly basis (refer to PWD Quarterly Dry Weather Water Quality Monitoring appendix). Combining different forms of monitoring at the same station allows for better integration of information and may enable more sophisticated analyses in the future.

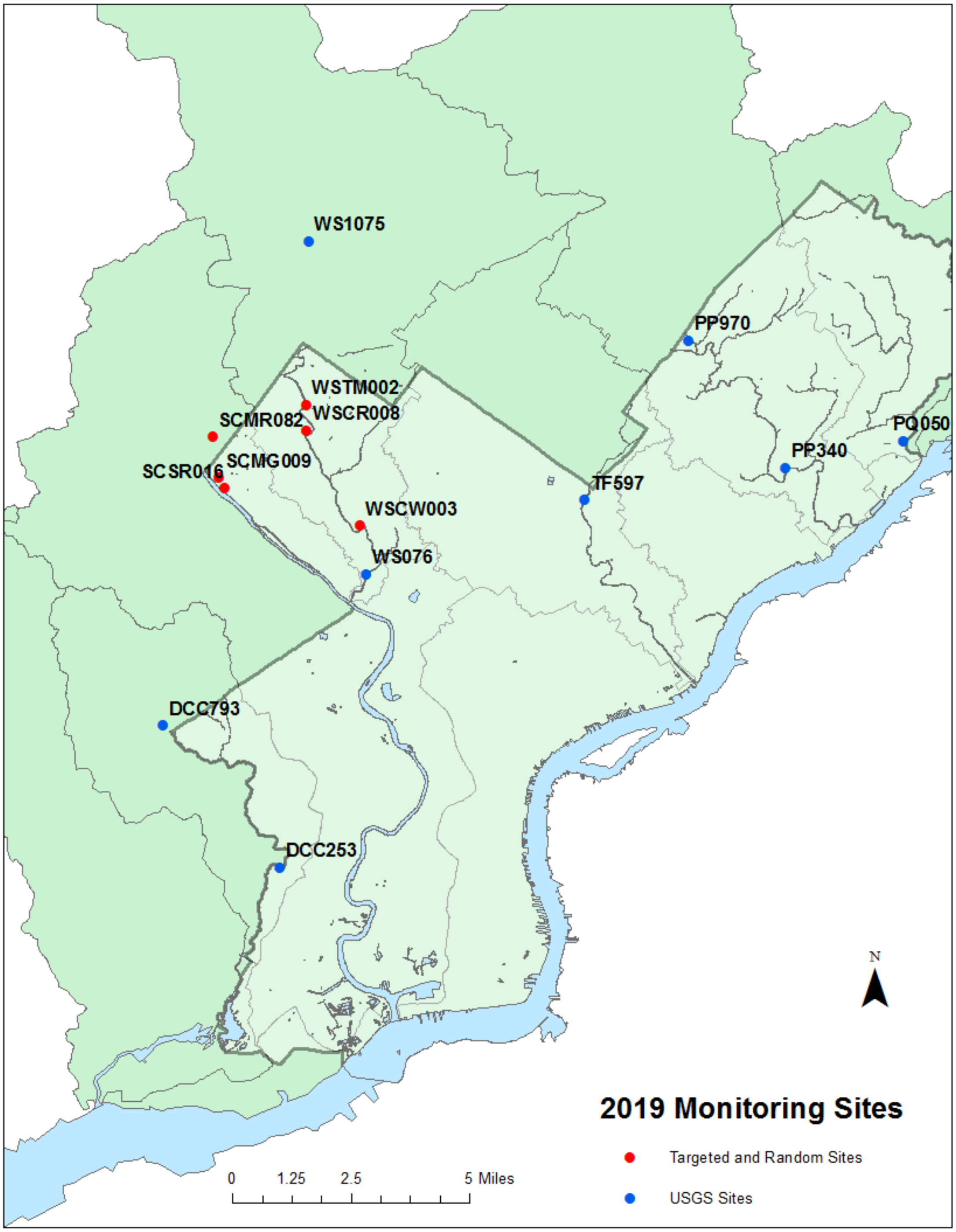


Figure 1. PWD Wadeable Streams Assessment Locations - Spring 2019

Table 4. PWD-USGS Cooperative Monitoring Program Sites

Site ID	USGS Gage	Site Description	Drainage Area (mi^2)
DCC253	01475548	Cobbs Creek at Mount Moriah Cemetery	19.78
DCC793	01475530	Cobbs Creek at City Line Ave.	4.60
PP340	01467048	Pennypack Creek at Lower Rhawn St bridge	49.84
PP970	01467042	Pennypack Creek at Pine Rd.	39.34
PQ053	01465798	Poquessing Creek at Holy Family College	21.67
TF324	01467087	Frankford Creek at Castor Ave.	29.69
TF597	01467086	Tacony Creek below Adams Ave. Bridge	16.25
WS076	01474000	Wissahickon Creek at Ridge Ave.	63.22
WS1075	01473900	Wissahickon Creek at Ft. Washington	40.44

Table 5. Schuylkill Tributary and Random Monitoring Sites, Spring 2019

Site ID	Site Description	Drainage Area (mi^2)
WSCW003	200 ft US of Wissahickon confluence	0.37
WSCR008	400 ft US of Wissahickon confluence	0.23
WSTM002	150 ft US of Wissahickon confluence	0.18
SCSR016	Smith's Run	0.30
SCMG009	Meig's Run	0.25
SCMR083	Manor Run	0.95

Benthic Macroinvertebrate Monitoring Results - Spring 2019

A total of 3,177 benthic macroinvertebrates from 44 taxa were collected from the 14 sampling sites. When compared to PADEP ICE protocol metric reference conditions, 12 assessment sites were classified as impaired. One site achieved 63% comparability of the reference IBI for attaining the designated use, and another attained with 59.8% (Figure 2). Twelve of the 14 sites fell below 50% comparability, meaning that they are not meeting the Aquatic Life Use (ALU) designation. Percent comparability with the standard reference IBI score ranged from 13.0% to 63.0%. Most sites were characterized by low taxa richness, low or absent modified EPT taxa, and elevated Hilsenhoff Biotic Index scores (Table 6, Figures 2-4).

Table 6. PADEP ICE Metric Scores

Site ID	Taxa Richness	EPT richness (PTV 0-4)	% Sensitive individuals	Beck's Index	HBI	Shannon Index	IBI score
PQ054	6	0	1.322	1	6.04	0.298	13.6

TF597	8	1	0.433	0	6.00	0.493	16.1
WS076	7	0	0.948	0	5.95	0.388	14.3
WS1075	5	0	0.465	0	5.95	0.351	13.0
DCC253	6	0	0.465	1	5.99	0.277	13.4
DCC793	13	2	3.636	0	5.71	1.137	24.5
PP340	11	0	0.837	1	5.97	0.816	19.2
PP970	11	1	4.274	1	5.71	1.049	22.7
WSCW003	11	1	3.433	0	5.95	1.397	23.6
WSCR008	10	0	3.333	0	6.17	1.376	21.6
WSTM002	11	3	20.870	6	3.65	1.368	36.0
SCSR016	17	8	65.297	14	3.31	1.959	59.8
SCMG009	19	10	59.307	16	3.15	2.038	63.0
SCMR082	17	3	6.466	3	5.55	1.699	32.9

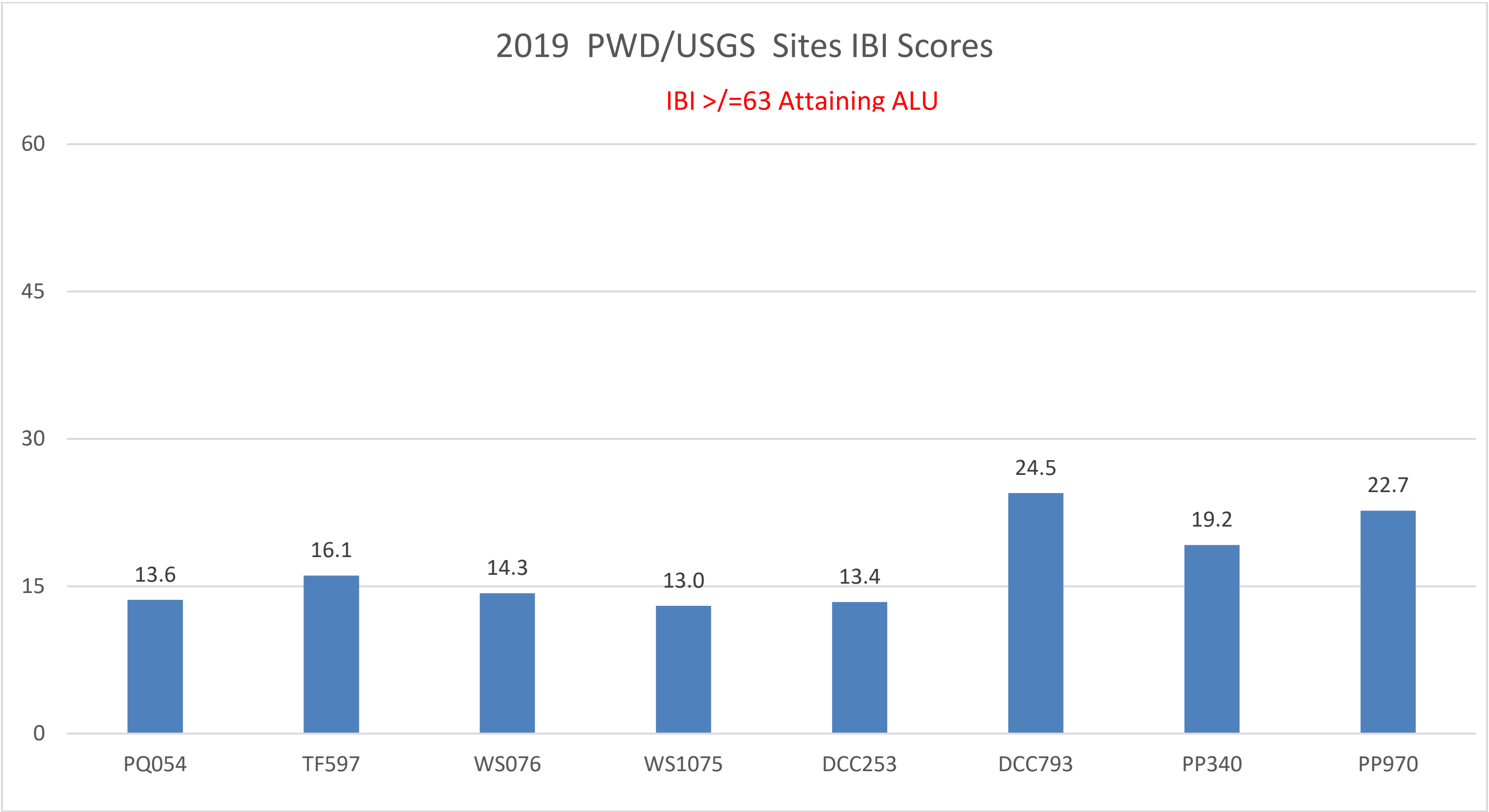


Figure 2. Spring 2019 Macroinvertebrate IBI Scores at USGS Sites

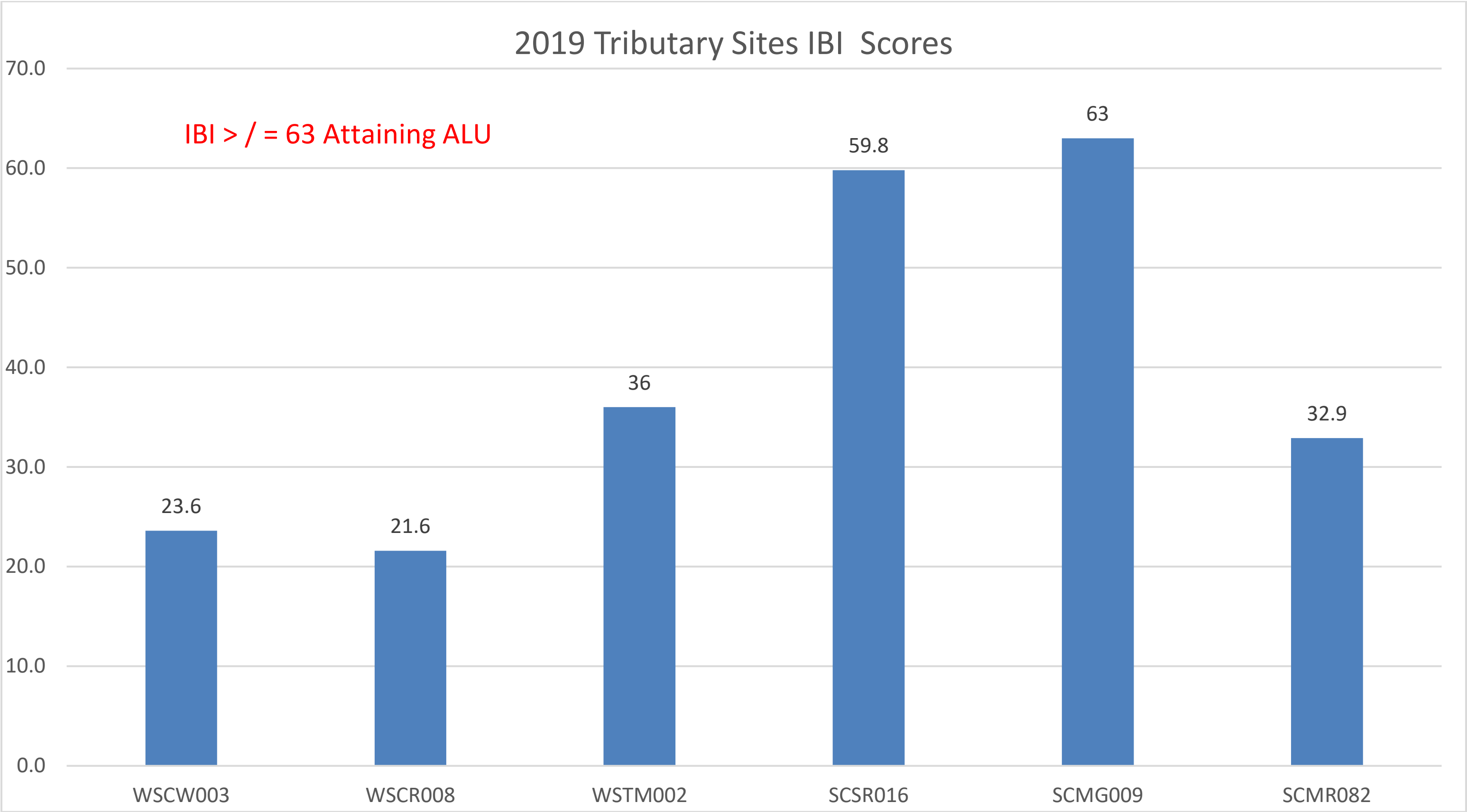


Figure 3. Spring 2019 Macroinvertebrate IBI Scores at Random and Targeted Sites

Very sensitive taxa (pollution tolerance value ≤ 2) were present at 7 of the 14 sites assessed in spring 2019. The Schuylkill River tributary site on Meig's Run (SCMG009) had the highest Beck's Index score (n=16) and included eight taxa. All sites fell below the PADEP reference standard for Percent Intolerant Taxa metric (PTV = 0 to 3) of 84.5%.

Overall diversity was low among most sites. The Shannon Diversity Index scores for all sites ranged from 0.277 to 2.038, compared to the reference metric value of 2.86. The site with the greatest diversity was the Schuylkill River tributary site on Meig's Run (SDI=2.038), with a taxa richness (n=19), EPT taxa richness (n=10), and HBI (3.15).

The Hilsenhoff Biotic Index (HBI) is a metric used to determine the overall pollution tolerance of a site's benthic macroinvertebrate community. This community composition and tolerance metric generally increases with increasing ecosystem stress, resulting in increasing dominance of pollution-tolerant organisms. Oriented toward the detection of org anic pollution, HBI scores can range from 0 (very sensitive) to 10 (very tolerant). The average HBI for all sites was 5.36, and scores at the 14 assessment sites ranged from 3.15 to 6.17.

In addition to metrics used to classify sites as being impaired with respect to regional or statewide reference conditions, additional attributes of macroinvertebrate community structure were also considered at the Schuylkill sites. With regard to trophic structure (*i.e.*, the distribution of feeding strategies), collector/gatherers (32.08%) were most common at the Schuylkill assessment sites (Figure 4). Specialized feeders—a group that is generally more sensitive to perturbation than generalist feeders—comprised 22.64% of taxa. Scrapers comprised 16.98% of all taxa. Other functional feeding groups, predators (15.09%) and shredders (13.21%), were observed in the macroinvertebrate assessment to a slightly lesser extent. Analysis of the aquatic trophic structure can indicate potential stressors such as sedimentation/siltation and eutrophication, and it may identify food resource limitations. However, it cannot distinguish between the interactions of the two factors.

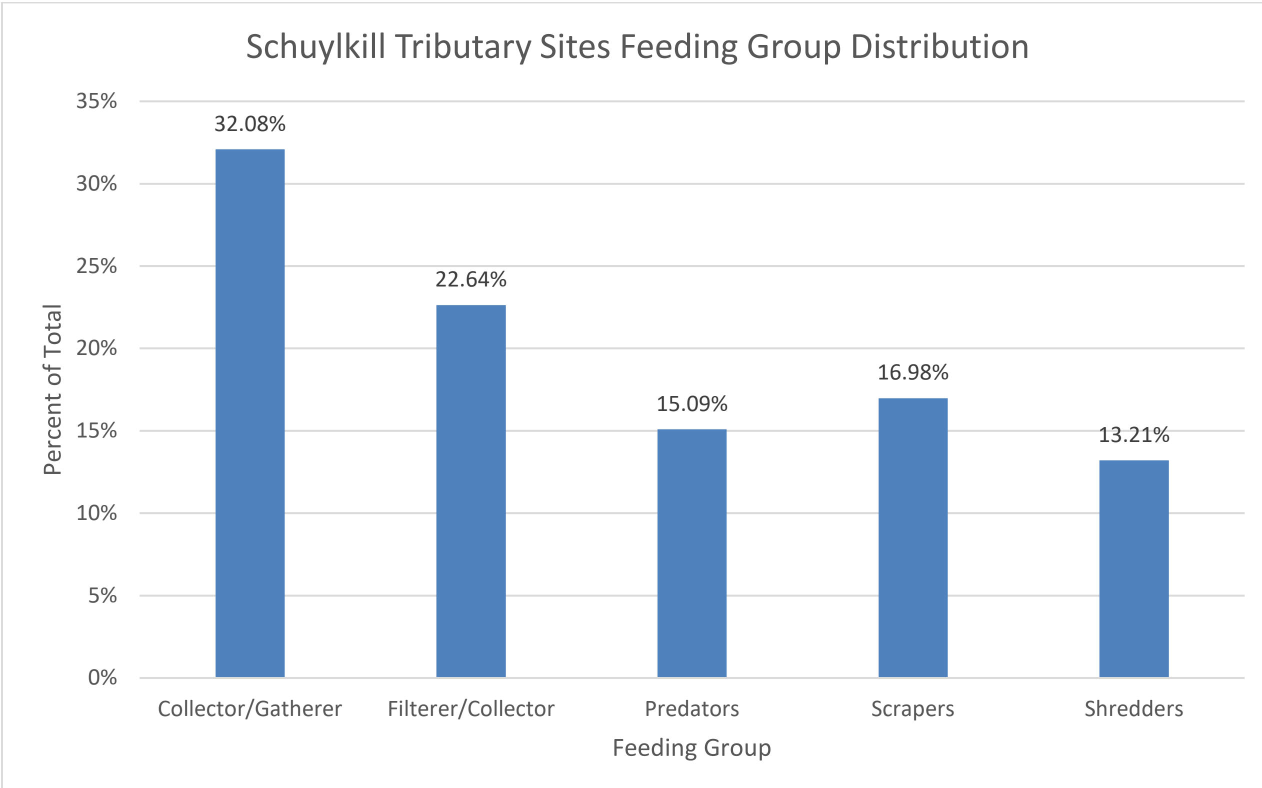


Figure 4. Feeding Group Percent Distribution at Schuylkill Tributary Sites - Spring 2019

Tolerance/intolerance measures are intended to be representative of relative sensitivity to perturbation and may include numbers of pollution tolerant and intolerant taxa or percent composition (Barbour *et al*., 1999). The proportion of moderately tolerant individuals at all sites averaged 76.93%, with a range of 16.09% to 98.60%. The site with the greatest proportion of moderately tolerant taxa was WS1075, with 98.60% dominance directly related to a high number of Chironomidae (n=197) found within the sorted sample (n=215). With the exception of the Schuylkill River tributary sites, Chironomids (Figure 5) were the dominant taxon at all of the assessment locations. The proportional dominance of Chironomids is evidence of increasingly homogenous community assemblages within the selected monitoring sites. Chironomids and other pollution-tolerant, generalist species increase in proportional dominance with increased disturbance due to the loss of optimal habitat conditions for less tolerant, more specialized species.

Figure 5. Chironomid, or non-biting midge
Photo: Simon Johnston

Tolerant taxa accounted for an average of 2.42% of all taxa, and the proportion of tolerant taxa at each monitoring site ranged from 0% to 9.58%. Intolerant taxa were better represented, averaging 20.65% of all taxa collected at the sites. The proportion of intolerant taxa at each site ranged from 0.47% to 80.87%, with a sharp disparity between USGS sites and the Schuylkill River tributary sites. The Wissahickon tributary site on Thomas Mill Run (WSTM002), had the highest proportion of intolerant taxa.

Sensitive taxa (pollution tolerance values ≤ 3) were collected at all sites (Table 7). However, the rarity of sensitive taxa at USGS sites suggests a response to watershed-wide perturbation, such as water quality degradation. Other potential explanations for the rarity of sensitive taxa are habitat degradation caused by fine sediment delivered to the stream channel via bank erosion or stormwater runoff and changes in seasonal base flow and temperature that tend to accompany urbanization. *Antocha* (Diptera; Tipulidae, pollution tolerance value n=3) were found at 9 sites and were the most commonly collected sensitive taxa.

Table 7. Sensitive Taxa Collected

Site	Order	Family	Genus	HBI
PQ054	Diptera	Tipulidae	*Antocha*	3
PQ054	Coleoptera	Elmidae	*Ancyronyx*	2
TF597	Diptera	Tipulidae	*Antocha*	3
WS076	Diptera	Tipulidae	*Antocha*	3
WS1075	Diptera	Tipulidae	*Antocha*	3
PP340	Diptera	Tipulidae	*Antocha*	3
PP340	Coleoptera	Elmidae	*Ancyronyx*	2
PP970	Diptera	Tipulidae	*Antocha*	3
PP970	Coleoptera	Elmidae	*Macronychus*	2
DCC253	Coleoptera	Elmidae	*Ancyronyx*	2
DCC793	Diptera	Tipulidae	*Antocha*	3
WSCW003	Diptera	Tipulidae	*Antocha*	3
WSCW003	Plecoptera	Nemouridae	*Amphinemura*	3
WSCR008	Diptera	Tipulidae	*Antocha*	3
WSTM002	Plecoptera	Nemouridae	*Amphinemura*	3
SCSR016	Trichoptera	Hydropsychiidae	*Diplectrona*	0
SCSR016	Trichoptera	Philopotamidae	*Dolophilodes*	0
SCSR016	Trichoptera	Uenoidae	*Neophylax*	3
SCSR016	Diptera	Simuliidae	*Prosimulium*	2
SCSR016	Ephemeroptera	Ephemerellidae	*Ephemerella*	1
SCSR016	Plecoptera	Nemouridae	*Amphinemura*	3
SCSR016	Plecoptera	Perlodidae	*Isoperla*	2
SCSR016	Plecoptera	Leuctridae	*Leuctra*	0
SCSR016	Plecoptera	Perlidae	*Eccoptura*	2
SCMG009	Trichoptera	Hydropsychiidae	*Diplectrona*	0
SCMG009	Trichoptera	Philopotamidae	*Dolophilodes*	0
SCMG009	Trichoptera	Rhyacophilidae	*Rhyacophila*	1
SCMG009	Trichoptera	Uenoidae	*Neophylax*	3
SCMG009	Diptera	Simuliidae	*Prosimulium*	2
SCMG009	Ephemeroptera	Heptageniidae	*Maccaffertium*	3
SCMG009	Ephemeroptera	Leptophlebiidae	*Paraleptophlebia*	1
SCMG009	Plecoptera	Nemouridae	*Amphinemura*	3
SCMG009	Plecoptera	Perlidae	*Eccoptura*	2
SCMG009	Plecoptera	Perlodidae	*Isoperla*	2
SCMG009	Plecoptera	Leuctridae	*Leuctra*	0
SCMR082	Trichoptera	Hydropsychiidae	*Diplectrona*	0
SCMR082	Plecoptera	Nemouridae	*Amphinemura*	3
SCMR082	Diptera	Tipulidae	*Antocha*	3

Table 8. 2019 Benthic Macroinvertebrate Taxa List

Order	Family	Genus
Amphipoda	Crangonyctidae	*Crangonyx*
Amphipoda	Gammaridae	*Gammarus*
Coleoptera	Dytiscidae	*Copelatus*
Coleoptera	Elmidae	*Ancyronyx*
Coleoptera	Elmidae	*Macronychus*
Coleoptera	Elmidae	*Oulimnius*
Coleoptera	Elmidae	*Stenelmis*
Coleoptera	Psephenidae	*Ectopria*
Coleoptera	Psephenidae	*Psephenus*
Coleoptera	Ptilodactylidae	*Anchytarsus*
Diptera	Ceratopogonidae	*Ceratopogon*
Diptera	Chironomidae	*spp*
Diptera	Empididae	*Clinocera*
Diptera	Empididae	*Hemerodromia*
Diptera	Phoridae	*Megaselia*
Diptera	Psychodidae	*Psychoda*
Diptera	Simuliidae	*Prosimulium*
Diptera	Simuliidae	*Simulium*
Diptera	Tipulidae	*Antocha*
Diptera	Tipulidae	*Molophilus*
Diptera	Tipulidae	*Tipula*
Ephemeroptera	Baetidae	*Acentrella*
Ephemeroptera	Baetidae	*Acerpenna*
Ephemeroptera	Baetidae	*Baetis*
Ephemeroptera	Ephemerellidae	*Ephemerella*
Ephemeroptera	Heptageniidae	*Maccaffertium*
Ephemeroptera	Leptophlebiidae	*Paraleptophlebia*
Gastropoda	Physidae	*sp*
Isopoda	Asellidae	*Caecidotea*
Oligochaeta		
Plecoptera	Leuctridae	*Leuctra*
Plecoptera	Nemouridae	*Amphinemura*
Plecoptera	Perlidae	*Eccoptura*
Plecoptera	Perlodidae	*Isoperla*
Trichoptera	Hydropsychidae	*Cheumatopsyche*
Trichoptera	Hydropsychidae	*Diplectrona*
Trichoptera	Hydropsychidae	*Hydropsyche*
Trichoptera	Philopotamidae	*Chimarra*
Trichoptera	Philopotamidae	*Dolophilodes*
Trichoptera	Rhyacophilidae	*Rhyacophila*
Trichoptera	Uenoidae	*Neophylax*
Turbellaria	Nematoda	
Turbellaria	Nemertea	
Turbellaria	Planariidae	*sp*

Physical Habitat Monitoring Results - Spring 2019

Habitat impairments such as hydrologic extremes (*i.e.*, low base flow and accentuated flow during storm events), physical obstructions, and sedimentation/siltation appear to be the major environmental stressors on the aquatic ecosystem. Accumulation of sediment in the interstitial spaces of riffles has been shown to limit available habitat and possibly smother benthic invertebrate life stages (Runde and Hellenthal, 2000). Two tributary sites, Thomas Mill Run in the Wissahickon watershed and Smith's Run in the Schuylkill, received an optimal rating for habitat (Table 9). The Tacony Creek site at Adams Ave (TF597) had the worst total habitat scores of all sites, while the Schuylkill tributary site on Smith's Run (SCSR016) had the best scores for all sites (Table 9, Figure 6).

Table 9. Physical Habitat Scores at All Monitoring Sites - Spring 2019

Site ID	Instream	Epifaunal	Embed	Veldep	Chanalt	Seddep	Riffreq	Chanflo	Bankcond	Vegpro	Graze	Ripveg	Total Score
DCC253	8.5	12	4.5	11.5	12.5	11	9	13.5	10.5	17	15.5	12	137.5
DCC793	17.5	14.5	9.5	17	17	8.5	15.5	7.5	9.5	18	18	17	169.5
WS076	14.5	15.5	6.5	17	10	9.5	12.5	14.5	12	6	16	8	142
WS1075	9.5	11.5	7	16	15	12	9.5	14.5	11.5	17	16.5	15	155
PP340	12.5	15	8	16.5	15.5	7.5	16.5	12	12	17	17	15.5	165
PP970	16.5	14	9.5	16	17.5	9	14	11	10	16	10	11	154.5
PQ054	10	10	8	12	16	6.5	9.5	13	8.5	15	15.5	11	135
TF597	8	7.5	7	12	10	8	9	10	12	13	17	15	128.5
WSCW003	16	14	14	14	15	14.5	16.5	12	15.5	18.5	18.5	18.5	187
WSCR008	10.5	10	14.5	14	15	14.5	16.5	9	7	16.5	18.5	17	163
WSTM002	16.5	14	15.5	15	18	15.5	18.5	11.5	16.5	19	19.5	19	198.5
SCSR016	17	15.5	16.5	17.5	19	17	18	17.5	14.5	18.5	19.5	19	209.5
SCMG009	17	14.5	16.5	15	18	13	17	14	12	13	19	19	188
SCMR082	15	15	16.5	16	17	13	17	14	10	14.5	16	13	177

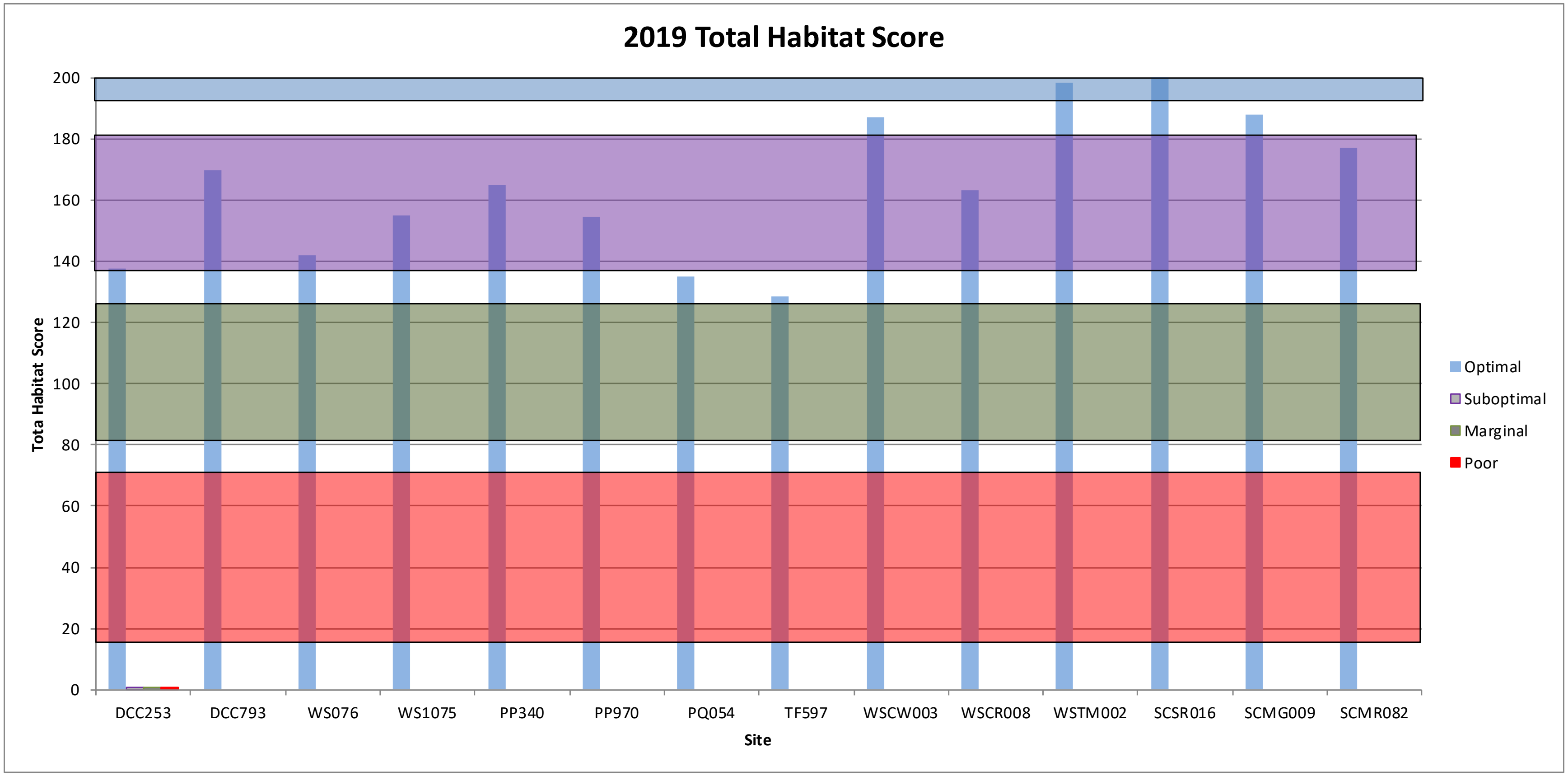
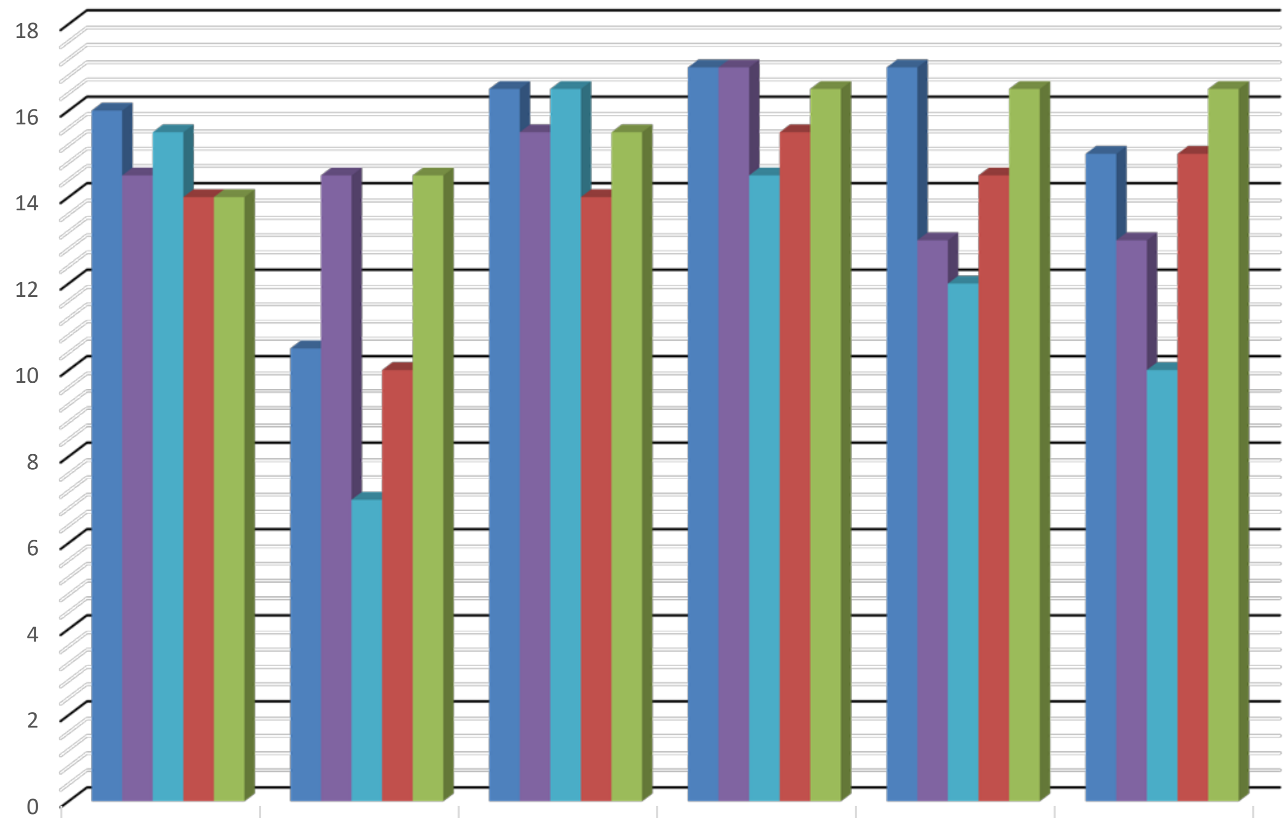


Figure 6. Habitat Scores, Spring 2019



	WSCW003	WSCR008	WSTM002	SCSR016	SCMG009	SCMR082
Instream Cover	16	10.5	16.5	17	17	15
Sediment Deposition	14.5	14.5	15.5	17	13	13
Condition of Banks	15.5	7	16.5	14.5	12	10
Epifaunal substrate	14	10	14	15.5	14.5	15
Embeddedness	14	14.5	15.5	16.5	16.5	16.5

Figure 7. Tributary Site Critical Habitat Parameters, Spring 2019

Although it is too early to draw conclusions regarding trends at the eight long-term PWD-USGS cooperative monitoring sites, embeddedness and sediment deposition results are shown below (Figures 8-9). Many factors contribute to interannual variability in the data, and it is hoped that future work will provide some insight into long-term trends.

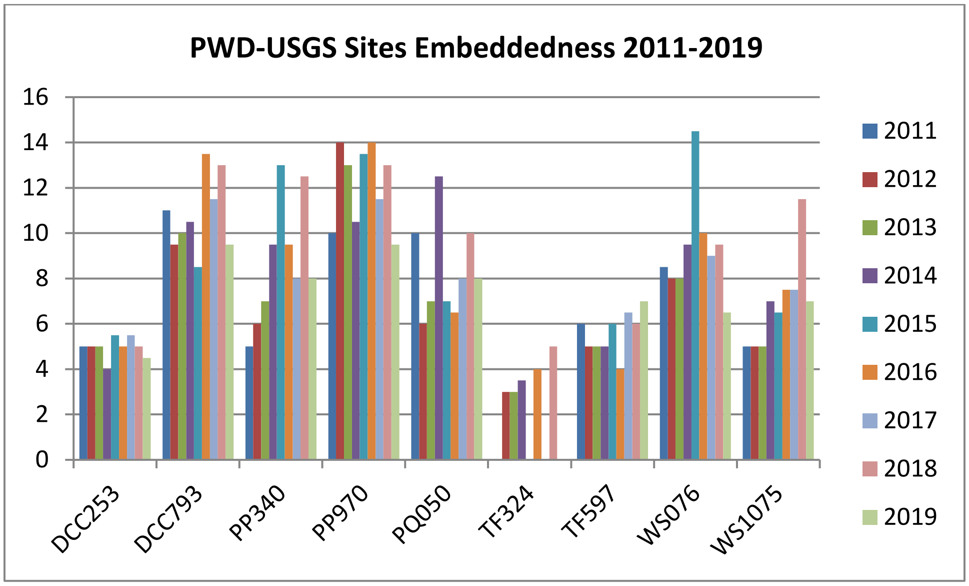


Figure 8. Comparison of PWD-USGS Sites Embeddedness Scores, 2011-2019*

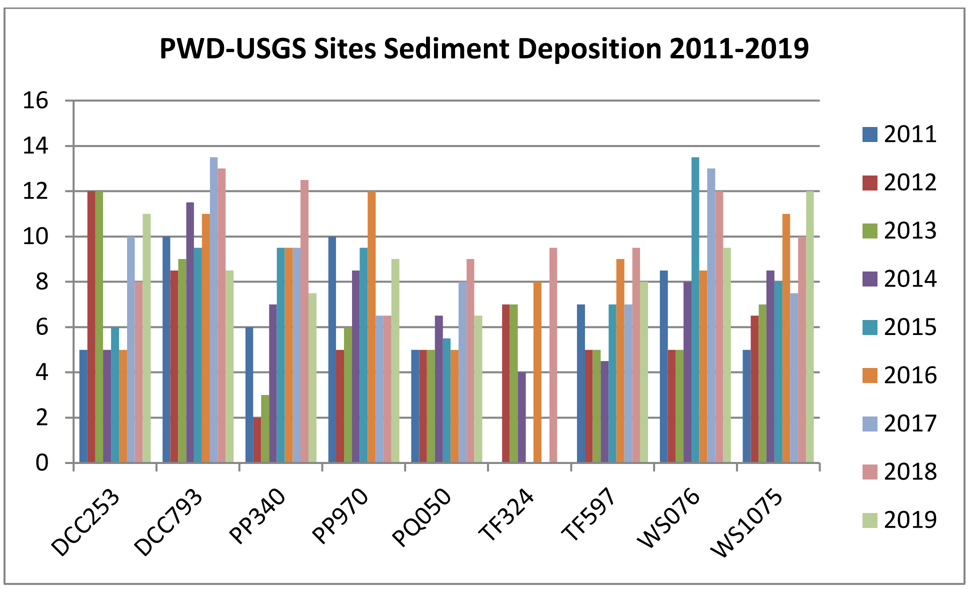


Figure 9. Comparison of PWD-USGS Sites Sediment Deposition Scores, 2011-2019*

*In 2013, samples for TF324 were taken from nearby site TF328. TF324 was not sampled in 2015, 2017 or 2019.

References

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid bioassessment protocols for use in streams and wadeable rivers: periphyton, benthic macroinvertebrates and fish, second edition. EPA 841-B-99-002. United States Environmental Protection Agency; Office of Water. Washington, D.C.

Borsuk, M. E., C. A. Stow, and K. H. Reckhow. 2002. Predicting the frequency of water quality standard violations: A probabilistic approach for TMDL development. Environmental Science & Technology, 36: 2109-2115.

Pennsylvania Department of Environmental Protection (PADEP). (2009). Instream Comprehensive Evaluation Surveys. Harrisburg, PA. 59 p.

Paulsen, S.G. et al. 2008. Condition of stream ecosystems in the US: an overview of the first national assessment. Journal of the North American Benthological Society: December 2008, Vol. 27, No. 4, pp. 812-821.

Reif, A.G. 2002. Assessment of stream quality using biological indices at selected sites in the Red Clay and White Clay Creek Basins, Chester County, Pennsylvania, 1981-97. USGS Fact Sheet FS-118-02.

Reif, A.G. 2004. Assessment of water chemistry, habitat, and benthic macroinvertebrates at selected stream-quality monitoring sites in Chester County, Pennsylvania, 1998-2000: 84.

Runde, J. M., and R. A. Hellenthal. 2000. Behavioral responses of *Hydropsyche sparna* (Trichoptera: Hydropsychidae) and related species to deposited bedload. Environmental Entomology 29:704-709.

Appendix K – NPDES Industrial Stormwater Permitted Sites – Philadelphia County

Authority ID	Permit Type	Site Name	Program Description	Site Address
PAG-03 General				
1283330	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	UNITED METAL TRADERS COMLY ST FAC	Clean Water	5240 COMLY ST PHILADELPHIA, PA 19135-4315
1102712	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	S D RICHMAN SONS WHEATSHEAF LN FAC	Clean Water	2435 WHEATSHEAF LANE PHILADELPHIA, PA 19137
1135947	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PEPSI BOTTLING ROOSEVELT BLVD PLT	Clean Water	11701 ROOSEVELT BLVD PHILADELPHIA, PA 19154-2108
1102641	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	CLEAN EARTH OF PHILA FAC	Clean Water	3201 S 61ST ST PHILADELPHIA, PA 19153-3502
459823	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PHILA WATER DEPT NE WPCP	Clean Water	3895 RICHMOND ST PHILADELPHIA, PA 19137-1418
459790	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PHILA WATER DEPT SE WPCP	Clean Water	25 PATTISON AVE PHILADELPHIA, PA 19148-5607
459812	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PHILA WATER DEPT SW WPCP	Clean Water	8200 ENTERPRISE AVE PHILADELPHIA, PA 19137
931796	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	REPUBLIC SVC QUICKWAY TRANSFER STATION	Clean Water	2960 ORTHODOX ST PHILADELPHIA, PA 19137
1107170	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	SWEET OVATIONS TOMLINSON RD FAC	Clean Water	1741 TOMLINSON RD PHILADELPHIA, PA 19116-3847
1081910	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	SUN CHEM HUNTING PARK AVE PLT	Clean Water	3301 HUNTING PARK AVE PHILADELPHIA, PA 19132
1101644	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PHILA GAS WORKS PASSYUNK AVE PLT	Clean Water	3100 PASSYUNK AVE PHILADELPHIA, PA 19145
325198	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	BUDD PHILA PLT	Clean Water	2450 HUNTINGPARK AVE PHILADELPHIA, PA 19129
21593	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	METRO MACH OF PA SHIP REPAIR FAC	Clean Water	FOOT OF MORTON AVE PHILADELPHIA, PA 19013
878137	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ARDEX LAB	Clean Water	2050 BYBERRY RD PHILADELPHIA, PA 19116
1165282	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	CONTANDA TERMINALS	Clean Water	2900 E ALLEGHENY AVE PHILADELPHIA, PA 19134-6302

Authority ID	Permit Type	Site Name	Program Description	Site Address
1107531	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	TASTYKAKE	Clean Water	2801 HUNTING PARK AVE PHILADELPHIA, PA 19129
970846	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	FC HAAB SCHUYLKILL AVE TERM	Clean Water	SCHUYLKILL AVE & MORRIS ST PHILADELPHIA, PA 19145
1084122	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	WASTE MGMT OF PA GRAYS FERRY AVE FAC	Clean Water	3605 GREYS FERRY AVE PHILADELPHIA, PA 19146
1290160	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	KINGSBURY	Clean Water	10385 DRUMMOND RD PHILADELPHIA, PA 19154
1152621	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	WASTE MGMT BLEIGH AVE FAC	Clean Water	5109 BLEIGH AVE PHILADELPHIA, PA 19136
365644	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	TRC TRANSFER STATION COLUMBUS BLVD FAC	Clean Water	2904 S CHRISTOPHER COLUMBUS BLVD PHILADELPHIA, PA 19148
326466	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PAARNG SOUTHAMPTON FAC	Clean Water	2734 SOUTHAMPTON RD PHILADELPHIA, PA 19154
326472	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PAARNG OGONTZ OMS 14A	Clean Water	5350 OGONTZ AVE PHILADELPHIA, PA 19141
326557	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PAARNG FT MIFFLIN FAC	Clean Water	BLDG 56 FORT MIFFLIN PHILADELPHIA, PA 19153
329442	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	AMER AUTO PARTS 61ST STREET FAC	Clean Water	3501 S 61ST ST PHILADELPHIA, PA 19153
329466	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	FIORES AUTO PARTS 61ST STREET FAC	Clean Water	3300 S 61ST ST PHILADELPHIA, PA 19153
1041802	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	B & L AUTO PARTS 61ST STREET FAC	Clean Water	3404 S 61ST ST PHILADELPHIA, PA 19153
1070573	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	OSCAR'S AUTO PARTS PASSYUNK AVE FAC	Clean Water	6145 W PASSYUNK AVE PHILADELPHIA, PA 19153
1084018	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	RICHARDSAPEX MAIN ST FAC	Clean Water	4202-24 MAIN ST PHILADELPHIA, PA 19127
1035983	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	LKQ VENICE AUTO PARTS	Clean Water	3350 SOUTH 61ST STREET PHILADELPHIA, PA 19153
577993	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	DHL EXPRESS COLUMBUS BLVD FAC	Clean Water	1101 N CHRISTOPHER COLUMBUS BLVD PHILADELPHIA, PA 19125

Authority ID	Permit Type	Site Name	Program Description	Site Address
929399	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	REPUBLIC SVC OF PA PORT RICHMOND HAULING FAC	Clean Water	3000 E HEDLEY ST PHILADELPHIA, PA 19137
1100082	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ALLEGHENY IRON & METAL TACONY ST FAC	Clean Water	TACONY ST & ADAMS AVE PHILADELPHIA, PA 19124
1088603	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ORTHODOX AUTO UNRUH AVE FAC	Clean Water	5247 UNRUH AVE PHILADELPHIA, PA 19135
1016261	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ATLANTIC AVIATION ENTERPRISE AVE FAC	Clean Water	8375 ENTERPRISE AVE PHILADELPHIA, PA 19153
1133700	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	NORTHEAST PHILADELPHIA AIRPORT (PNE)	Clean Water	9800 ASHTON RD PHILADELPHIA, PA 19114
1137723	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	KINDER MORGAN POINT BREEZE TERM	Clean Water	6310 W PASSYUNK AVE PHILADELPHIA, PA 19153-3517
944198	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	TRANSFLO TERM SVC MOORE ST FAC	Clean Water	36TH & MOORE ST PHILADELPHIA, PA 19145
961161	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ABF FREIGHT SYS	Clean Water	4000 RICHMOND ST PHILADELPHIA, PA 19137
1154204	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ADVANSIX INC	Clean Water	MARGARET & BERMUDA STS PHILADELPHIA, PA 19137-1193
1161694	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	DUFFEY OIL TERM	Clean Water	2700 ROBERTS AVE PHILADELPHIA, PA 19129
1008765	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	TJ COPE NORCOM RD FAC	Clean Water	11500 NORCOM RD PHILADELPHIA, PA 19154
887155	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	PASCO PASCHALL AVE FAC	Clean Water	7250 PASCHALL AVE PHILADELPHIA, PA 19142
1033602	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ESSINGTON AVE AUTO PARTS FAC	Clean Water	6746 ESSINGTON AVE PHILADELPHIA, PA 19153
813532	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	HAROLDS USED AUTO PARTS WHITBY AVE FAC	Clean Water	5347 WHITBY AVE PHILADELPHIA, PA 19143
1137392	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	CARTEL AUTO PARTS W PASSYUNK AVE FAC	Clean Water	6330 W PASSYUNK AVE PHILADELPHIA, PA 19153
1047066	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	JACK'S AUTO PARTS S 61ST ST FAC	Clean Water	3517-3555 S 61ST ST PHILADELPHIA, PA 19153

Authority ID	Permit Type	Site Name	Program Description	Site Address
1021396	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	SEPTA ROBERTS AVE FAC	Clean Water	2705 ROBERTS AVE PHILADELPHIA, PA 19129
1029239	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	FEDEX TOWNSEND RD FAC	Clean Water	14300 TOWNSEND RD PHILADELPHIA, PA 19154
1039992	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	BIG HEAD AUTO SALVAGE CORP	Clean Water	3511 S 61ST ST PHILADELPHIA, PA 19153
1033629	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	JIM'S AUTO RECYCLING W PASSYUNK AVE FAC	Clean Water	6299 W PASSYUNK AVE PHILADELPHIA, PA 19153
1044986	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	STEVE'S AUTO PARTS II S 61ST ST FAC	Clean Water	3331 S 61ST ST PHILADELPHIA, PA 19153
921671	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	US POSTAL SVC LINDBERGH BLVD FAC	Clean Water	7500 LINDBERGH BLVD PHILADELPHIA, PA 19176-9998
1081872	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	BILL'S AUTO PARTS PASSYUNK AVE FAC	Clean Water	6235 PASSYUNK AVE PHILADELPHIA, PA 19153
973172	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	DHL EXPRESS HOLSTEIN AVE FAC	Clean Water	7600 HOLSTEIN AVE PHILADELPHIA, PA 19153
1020028	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	DAVE'S DELAWARE VALLEY TOWING PASSYUNK AVE FAC	Clean Water	6159 PASSYUNK AVE PHILADELPHIA, PA 19153
1240915	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	IVD LLC	Clean Water	10101 ROOSEVELT BLVD PHILADELPHIA, PA 19154
1032035	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ATLANTIC USED AUTO PARTS ESSINGTON AVE FAC	Clean Water	6544 ESSINGTON AVE PHILADELPHIA, PA 19153
1011743	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	VANE LINE BUNKERING FT MIFLIN RD FAC	Clean Water	4925 FT MIFLIN RD PHILADELPHIA, PA 19153
1002506	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	CSX INTERMODAL CHRISTOPHER COLUMBUS AVE FAC	Clean Water	3400 S CHRISTOPHER COLUMBUS BLVD PHILADELPHIA, PA 19148
1008654	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	GREENWICH TERM S COLUMBUS BLVD FAC	Clean Water	3301 S COLUMBUS BLVD PHILADELPHIA, PA 19148
1223833	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	RECLEIM PA LLC PHILA PLT	Clean Water	4301 N DELAWARE AVE PHILADELPHIA, PA 19137
1043263	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	NAVAL FOUNDRY AND PROPELLER CTR	Clean Water	1701 KITTY HAWK AVE PHILADELPHIA, PA 1911-5087

Authority ID	Permit Type	Site Name	Program Description	Site Address
1086796	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	ECO ENERGY PHILLY	Clean Water	3400 S CHRISTOPHER COLUMBUS BLVD PHILADELPHIA, PA 19148-5110
1017690	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	THE VANE BROTHERS CO PHILLY LAUNCH	Clean Water	4700 BASIN BRIDGE RD PHILADELPHIA, PA 19112
1056063	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	KANCO METALS INC	Clean Water	4601 BATH ST PHILADELPHIA, PA 19137-2216
1100654	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	CONRAIL - ANN STREET YARD	Clean Water	2801 E ANN STREET PHILADELPHIA, PA 19134
1100667	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	CONRAIL - FRANKFORD JUNCTION YARD	Clean Water	2110 E BUTLER ST PHILADELPHIA, PA 19124
1100662	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	CONRAIL - SOUTH PHILLY YARD	Clean Water	11TH ST & TERMINAL RD PHILADELPHIA, PA 19112
1222888	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	FIRST TRANSIT	Clean Water	2500 WHEATSHEAF LN PHILADELPHIA, PA 19137
1218996	PAG-03 Discharge of Stormwater Assoc w Industrial Activities	RHOADS BUILDING 1028	Clean Water	4703 BASIN BRIDGE ROAD PHILADELPHIA, PA 19112
No Exposure				
1027714	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	VEOLIA ENV SVC HEDLEY ST FAC	Clean Water	3100 HEDLEY ST PHILADELPHIA, PA 19135-1540
1292099	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	L3 TECH INC SPD ELEC SYS	Clean Water	13500 ROOSEVELT BLVD PHILADELPHIA, PA 19116-4201
1147383	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	LANNETT CO INC	Clean Water	9000 STATE ROAD PHILADELPHIA, PA 19136-1615
1098231	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	FIBREFLEX PACKING & MFG UMBRIA ST FAC	Clean Water	5101 UMBRIA ST PHILADELPHIA, PA 19128-4345
1249111	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	HILLOCK ANODIZING MFG FAC	Clean Water	5101 COMLY ST PHILADELPHIA, PA 19135
711143	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	VICINITY ENERGY SCHUYLKILL GEN STA	Clean Water	2800 CHRISTIAN ST PHILADELPHIA, PA 19146
1147387	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	LANNETT CO INC	Clean Water	9001 TORRESDALE AVE PHILADELPHIA, PA 19136-1586

Authority ID	Permit Type	Site Name	Program Description	Site Address
1259135	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	PENN MAID DUTTON RD PLT	Clean Water	10975 DUTTON RD PHILADELPHIA, PA 19154-3288
591838	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	PEARL PRESSMAN LIBERTY	Clean Water	7625 SUFFOLK AVE PHILADELPHIA, PA 19153-3020
1023590	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	SANDMEYER STEEL	Clean Water	10060 SANDMEYER LN PHILADELPHIA, PA 19116
1228873	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	JOWITT & RODGERS STATE RD FAC	Clean Water	9400 STATE RD PHILADELPHIA, PA 19114
1305859	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	USPS VEHICLE MAINTENANCE FAC	Clean Water	1903 BYBERRY RD PHILADELPHIA, PA 19116-9998
1256809	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	DIETZ & WATSON	Clean Water	5701 TACONY ST PHILADELPHIA, PA 19135-4311
1144476	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	SMITH EDWARDS DUNLAP	Clean Water	2867 E ALLEGHENY AVE PHILADELPHIA, PA 19134-5994
1303748	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	PACKAGING COORDINATORS INC	Clean Water	3001 RED LION RD PHILADELPHIA, PA 19114
1135081	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	WUXI APPTEC INC	Clean Water	4751 LEAGUE ISLAND BLVD PHILADELPHIA, PA 19112
1086399	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	USPS PHILA VEHICLE MAINTENANCE FACILITY	Clean Water	3201 SOUTH 74TH ST PHILADELPHIA, PA 19153-9996
1078315	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	INNOVATION PRINTING & COMMUNICATION	Clean Water	11601 CAROLINE RD PHILADELPHIA, PA 19154
1160143	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	LSC COMMUNICATIONS INC ROOSEVELT BLVD FAC	Clean Water	11311 ROOSEVELT BLVD PHILADELPHIA, PA 19154
1142051	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	EFORCE COMPLIANCE	Clean Water	3115 WHARTON ST PHILADELPHIA, PA 19146
874849	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	SPECTRUM MICROWAVE PHILADELPHIA OPERATIONS	Clean Water	2707 BLACK LAKE PLACE PHILADELPHIA, PA 19154-1008
1137663	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	WUXI APP TEC INC	Clean Water	4000 S 26TH ST PHILADELPHIA, PA 19112
1109160	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	API TECH CORP - PHILA OPS	Clean Water	2707 BLACK LAKE PLACE PHILADELPHIA, PA 19112

Authority ID	Permit Type	Site Name	Program Description	Site Address
1257040	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	ARCA RECYCLING INC	Clean Water	2000 BENNETT RD PHILADELPHIA, PA 19116
1235957	No Exposure Certification, Discharge of Stormwater Assoc w Ind Activities, PAG-03	PURE FISHING	Clean Water	3028 W HUNTING PARK AVE PHILADELPHIA, PA 19132
Individual				
985409	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	WHITE PINES PARTNERS GC	Clean Water	1 RED LION RD PHILADELPHIA, PA 19115
1192681	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	PHILA INTL AIRPORT	Clean Water	DIV AVIATION/INTL AIRPORT PHILADELPHIA, PA 19153
963494	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	ROHM & HAAS PHILADELPHIA PLT	Clean Water	5000 RICHMOND ST PHILADELPHIA, PA 19137
1072512	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	SUNOCO PARTNERS MKT & TERM LP FT MIFFLIN TERM	Clean Water	HOG ISLAND RR 4 PHILADELPHIA, PA 19153
1281171	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	PHILLY G STREET TERMINAL	Clean Water	4210 G ST PHILADELPHIA, PA 19124
1259320	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	PBF LOGISTICS PRODUCTS TERMINALS LLC	Clean Water	1630 S 51ST ST PHILADELPHIA, PA 19154
1129339	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	PBF LOGISTICS PRODUCTS TERMINALS LLC	Clean Water	6850 ESSINGTON AVE PHILADELPHIA, PA 19153-3413
1201124	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	AMTRAK 30TH STREET STATION	Clean Water	2955 MARKET ST PHILADELPHIA, PA 19104
18834	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	SEPTA VICTORY AVE TERM	Clean Water	110 & 103 VICTORY AVE PHILADELPHIA, PA 19082
901759	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	PHILLY SHIPYARD INC	Clean Water	2100 KITTY HAWK AVE PHILADELPHIA, PA 19112-1808
1131042	NPDES Pmt Stormwater Industrial Site Runoff (Individual)	JDM MATERIALS CO BARTRAM BATCH PLT	Clean Water	PENROSE FERRY RD PHILADELPHIA, PA 19153

Appendix L – Defective Connections Group FY20 Report

Sewer Maintenance Unit

Defective Connections Group

Fiscal Year 2020 Annual Report

I. BACKGROUND INFORMATION

A. Phase I Stormwater Regulations

In 1990, the Environmental Protection Agency (EPA) promulgated Stormwater Regulations that required National Pollutant Discharge Elimination System (NPDES) permits for stormwater discharges from large (populations in excess of 250,000) and medium-sized (populations between 100,000 and 250,000) municipalities with separate storm sewer systems, (MS4)[1]. The City of Philadelphia with a 1990 population of 1.4 million was one of two NPDES Stormwater Phase I permittees in Pennsylvania. The other permittee was the City of Allentown.

B. NPDES Permit for Stormwater

The City of Philadelphia received its first NPDES Stormwater Permit under the 1990 Federal Regulations as issued by the Pennsylvania Department of Environmental Protection (PA DEP) in September 29, 1995. This permit had a 5-year term. Among other requirements, the permit required the city to reduce stormwater based pollution of local streams, creeks and rivers, from (1) residential and commercial areas, (2) construction sites, (3) industrial sites and (4) defective lateral connections.

The renewal of the NPDES Stormwater Permit that expired in September 2000 was approved by the PA DEP on September 30, 2005. The new permit provides for the same scope and requirements for the Defective Laterals Detection and Abatement Program as the previous permit and incorporates some provisions from the Consent Order and Agreement (COA) of July 1998 although the COA was successfully completed on March 18, 2004.

With the Water Department's internal reorganization and creation of the Office of Watersheds (OOW) in January 1999, the responsibilities numbered (1) through (3) above, along with the periodic reporting thereon was transferred to the OOW. The Defective Connections group (DCG) continues to pursue the 4th objective of NPDES Permit, namely the detection of defective laterals that cause sanitary wastewater to be carried to the local streams and rivers.

DCG field investigations began in March 1994.

II. DEFECTIVE LATERALS DETECTION AND ABATEMENT PROGRAM

A. Scope of Investigations

The MS4 impacts the areas of the city where there are two separate sewers in the street. The sanitary sewer system, which consists of a network of pipes of smaller diameter, carries domestic wastewater to the City's three Water Pollution Control Plants located in the Northeast, Southeast and Southwest sections. The storm sewer system consists of pipes of larger diameter but significantly shorter lengths and transports the stormwater to the nearest natural waterways. In general, the relatively newer sections of the city in the northeast, northwest and southwest are served by a MS4.

[1] Municipal Separate Storm Sewer System

Due to problems generally attributed to improper installation or lack of oversight during construction, sanitary wastewater from some properties can be transported into the storm sewers and from there, to the streams and rivers. This intrusion of sanitary wastewater causes pollution of the streams and rivers, which are the source of city's water supply. The polluted streams and rivers also endanger the physical health and safety of residents and users of the streams. The NPDES Permit requires the city to identify and abate the plumbing connections (defective laterals) that cause the sanitary wastewater to drain into the streams.

The **investigations** of stream pollution are triggered by the presence of a dry weather discharge from the storm sewer outfalls into the streams. There are over 400 stormwater outfalls in city's MS4 system of which some 220 have exhibited some dry weather flow.

It should be mentioned however, that not all dry weather discharge from an outfall comes from sanitary wastewater incursion; some may come from underground natural streams or from groundwater inflow. Additional testing of chemical and biochemical composition of samples collected from the outfalls determines whether or not stream pollution may be caused by defective laterals.

B. Outfall Inspections and Sampling

A systematic sampling of the quality of dry weather flow from the 200 plus wet outfalls was performed in 1991 as part of the initial NPDES permit application process. This program attempted to document the amount of flow (gph) and in many cases, fecal coliform count (number of fecal colonies per ml of water). The outfall sampling results were updated in 1998 when additional observations of fluoride levels (mg/l) were included to provide some indication of the origin of water seen in the outfalls. This is based on the fact that the natural water coming from streams or ground water seepage does not contain any significant fluorides, but the City water contains 0.7 mg/l of fluorides.

The more likely outcomes of fluoride and fecal count analyses are interpreted as follows:

i. **High fluoride level with high fecal count:** possible intrusion of sanitary wastewater into the storm sewer
ii. **Low fluoride level with high fecal count:** possible transport of surface contamination in the non-domestic discharge
iii. **High fluoride with low fecal count**: possible drinking water source

As a part of the MS4 permit, all stormwater outfalls are to be inspected once every five years. If there is dry-weather flow present then the outfall is to be sampled and tested for fecal presence and fluoride levels. In addition, the priority outfalls of the watersheds are to be sampled on a quarterly basis. Outfall inspections and sampling are handled by the Industrial Waste unit. Laboratory analysis is completed by the Bureau of Laboratory Services.

During FY2020, 46 outfall inspections were conducted, and 39 samples were taken due to observed dry-weather flow as part of the Priority Outfall Sampling program. During FY2020, 98 outfall inspections were conducted, and 62 samples were taken due to observed dry-weather flow as part of the Permit Inspection program.

C. Field Screening

The object of **field screening** is to identify the areas in a sewershed that are suspected of contributing to stream pollution through defective laterals. The field screening begins systematically at an outfall that shows a dry weather flow[2].

Proceeding upstream from the outfall, the storm sewer manholes are successively opened and observed for the presence of flow. The term "**flow**" has been widened to include "**wet**" stormwater manholes on the assumption that the wetness was caused by earlier active flow. These observations are continued upstream along a specified sewer line and stop when a stormwater manhole no longer exhibits any flow or wetness. The field screening is then continued along another tributary sewer and eventually through the entire sewershed of the outfall.

D. Identification of Defective Laterals

1) Dye Tests

Dye testing is a process by which a cross-connected lateral at a property that carries sanitary wastewater to a storm sewer is identified.

(a) Initial Dye Test

Before a test is conducted, the fresh air inlets (FAIs) located at the curbside of the property are identified as being the sanitary or storm FAIs. In Philadelphia, the sanitary lateral is located downstream of the stormwater lateral in relation to the flow of the main sewer[3]. The dye test protocol adopted by the City requires the presence of two properly functioning FAIs for successful initial tests. If one or no FAI is seen at a property or one or both of the FAIs are clogged or damaged, the initial dye test is aborted with a notation "**Inconclusive**".

During the initial dye test, a water-soluble fluorescent dye is placed in the fresh air inlets (FAIs). The dye is then washed down with water.

In the case of a **"Camera Assisted Dye Test"** the emergence of the dye is observed in the **storm sewer** by a closed circuit television camera positioned in the storm sewer in front of the stormwater lateral connection of the property. Possible observations include:

(i) Green dye placed in storm FAI is seen in the storm sewer
(ii) Green dye paced in storm FAI is not seen in the storm sewer
(iii) Red dye placed in the sanitary FAI is seen in the storm sewer
(iv) Red dye placed in the sanitary FAI is not seen in the storm sewer.

The above observations are interpreted as follows:

1) Combination of (i) and (iv): **Proper Connection**
2) Combination of (i) and (iii): **Probable Cross Connection**
3) Combination of (ii) and (iv): **Inconclusive**
4) Combination of (ii) and (iii): **Probable Cross Connection**

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[2] A dry weather flow is defined as one that is detected after an elapse of 72 hours of a continuous dry spell from the previous rainfall event.
[3] As discussed in Section D. House Lateral Design, pages 5-3 and 5-4, in the PWD Water and Sewer Design Manual (2nd Edition) 2011.

In certain cases, the use of the closed circuit television camera is not possible. In such cases, the initial tests are conducted with a **"Manual Dye Test"**. Possible observations include:

In a **"Manual Dye Test"**, a green dye is placed in the storm FAI and observed in the **storm sewer**. At the same time, a red dye is placed in the sanitary FAI and observed in the **sanitary sewer**. If the red dye appears in the sanitary sewer, whether or not the green dye appears in the storm sewer, the conclusion arrived at is "**Proper Connection**".

If the red dye is not seen in the sanitary sewer, the test is repeated by placing more red dye in the sanitary FAI and observed in the **storm sewer**. If the red dye appears in the storm sewer, this result signifies the presence of a "**Probable Cross Connection**".

If dye is not seen in the sanitary and storm sewers the observation is "**Inconclusive**".

The initial dye tests, whether conducted manually or by a camera are intended to be least intrusive to the water customers. During these initial tests, no entry into the home is involved. In order to provide water for dye tests at the FAIs, field crews use portable water equipment. The Defective Connections group has two vehicles each retrofitted with water supply tanks.

(b) Confirmation Dye Test

A confirmation dye test is conducted in case of an Inconclusive test or a Probable cross connection. This test is conducted after a second notification to the customer has been sent. This test is **intrusive**; admission inside the home is required to conduct the testing.

The confirmation dye test is conducted **manually** by placing and flushing the fluorescent dye in household plumbing fixtures, such as a toilet[4]. The emergence of the dye is then observed in the **sanitary sewer**.

If the dye does appear only in the sanitary sewer, it is concluded that the property tested has a "**Proper Connection**." If the dye from the household plumbing does not appear in the sanitary sewer, then observation is made in the storm sewer. The presence of the dye in the storm sewer confirms the existence of a "**Cross Connection.**"

(c) Notification of Defective Lateral

When a confirmation dye test indicates that there exists a cross connection at the subject property, the property owner is advised that if the property qualifies as a residential property (with no more than 4 units in one of which the owner has his/her residence), the city will make repairs to the defective lateral(s) at no cost to the property owner. If later on it is discovered that the property does not fall within this category, the customer is informed by a follow up notice of his responsibility to repair the defect at their cost.

The Plumbing Repair Programs unit handles customer communications and is responsible for the abatement of these defects.

2) Customer Notifications

[4] This step was modified in CY2001 to conduct the tests from all plumbing fixtures, including any in the basement in order to identify the existence of an internal cross connection, where all fixtures but one are properly connected to the sanitary sewer, with one offending connection to the storm sewer.

(a) Initial Notification

The identification of the defective laterals begins after delineating the parts of a sewershed suspected of contributing dry weather flow to the MS4 system, after field screening. All property holders in the specified area receive an initial notification letter, generated through the Oracle-based DLS computer program. The notification provides an introduction of the program and requests the customer's cooperation in enabling **dye tests** at their property. A dye test is conducted after an initial notification is sent out to a customer. There are three possible outcomes of a dye test:

(i) A test is conducted and no cross connection is found. In this case, a result of "No Cross Connection" is entered in the database and the case is closed.

(ii) A test is conducted and it is concluded that there might exist a cross connection that results in the transport of sanitary wastewater into the storm sewer. This condition requires additional tests to confirm the existence of a cross connection.

(iii) A test cannot be conducted due to any of a variety of reasons, such as FAIs were not conclusively identified, were clogged, etc. This situation also warrants additional tests to conclude whether or not a cross connection exists.

(b) Confirmation Notification

In either of case (ii) or (iii) above, a follow up notification is sent out to the customer, informing them of the results of the previous attempt and requesting them to be available at a specified date for additional "Confirmation" tests at their property. Of course, if the date provided by the City is not suitable to the customer, they can schedule an alternative appointment that suits them.

Dye tests are then conducted at the property from within the customer's premises as described earlier. The results of the tests, (a) a Proper Connection or (b) a Cross Connection, are entered in the DLS computer program.

(c) Water Shutoff Notification

Not all dye tests are completed as a result of confirmation notifications. Some customers ignore the scheduled date and fail to make an alternative appointment. In such cases an informatory note is left at the property and a follow up attempt for tests is made. If this also results in no test, another notification is sent out informing the customer that if they do not make a firm appointment by a specified date (usually within two calendar weeks of the notification date), their water service would be scheduled to be turned off by the Customer Service unit. Of course if the customers do respond and make an appointment for dye tests, the service shutoff is withdrawn and tests are completed as soon as possible.

(d) Miscellaneous Closures

In some cases, where there was no response to dye test requests or water service shutoff notifications due to properties being vacant or abandoned, the cases were closed with a notation "**Miscellaneous Closure**". A miscellaneous closure is activated because of any of the following reasons:

- No active water service to the premises
- Property abandoned, empty or unoccupied
- No billing to the property per Revenue Department
- No sewer connection

From time to time, the miscellaneously closed accounts are revisited. If we find that the reason that caused the account to be originally closed is no longer valid, a dye test is conducted and the property is then re-classified according to the test results.

III. PRIORITY SCORE LIST OUTFALLS

The emphasis of the Defective Laterals Detection and Abatement program is on outfalls on the Priority Score List. The Priority Score List ranks all outfalls sampled with dry-weather flow based on a preset formula that includes the fecal coliform results, the estimated volume of flow, whether the outfall discharges to a drinking water source water, and a complaint factor. The Priority Score List is periodically updated based on the results of the (Permit) Outfall Inspection and Sampling Program described earlier. This list was updated in July 2013.

IV. SUMMARY OF DYE TESTS AND ABATEMENTS

Table 1 provides a summary of the work performed in detecting and abating defective laterals. It shows the cumulative numbers since the inception of the project in 1994, and the progress that was attained during FY2020.

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Table 1.
Updated Progress on Dye Tests in Philadelphia MS4 Area

	Since Inception of the Program	**During Fiscal 2020**
Dye Tests Initiated	64,859	428
No Cross Connections Found	61,996	342
Cross Connections Identified	1,769	73
Completed Tests	63,765	415
Abatements Completed	1,614	70

Of the 72 abatements done in FY2020, 71 were residential properties, and the cost for these abatements was $709,617.50. Additionally, 1 commercial property was abated at a cost of $9,167.50.

V. MISCELLANEOUS

Estimates of Pollution Removed

The following data provides a rough measure of the effectiveness of the Defective Connections group’s positive contribution to improving the local environment:

- Number of Cross Connections Abated

Since Inception of the Program	1,614
During FY2020	70

- Estimated gallons of Polluted Water Prevented from entering the stormwater outfalls[5]

Since Inception of the Program	226.51 million gallons per
year During FY2020	10.11 million gallons per
year	

VI. STAFF LEVELS

Because of the high priority assigned to the Defective Connections group, the availability of manpower is extremely important. The sanctioned personnel for the unit is as follows:

One **Water Conveyance Supervisor**

Two **Field Representative Supervisors**

Four **SM Crew Chief Is / Science Technicians**

Eight **Utility Representatives**
Two positions vacant

One **Data Services Support Clerk**

The above field and office staffs are organized under the Water Conveyance Supervisor. This position is responsible for all aspects of the unit. The two Field Representative Supervisors are each responsible for two field crews, four crews in all. Each crew is led by a SM Crew Chief I / Science Technician and has two Utility Representatives.

In addition to the field staff, the Defective Connections group has the following position which provides general support:

Data Services Support Clerk: The DSSC handles the intricacies of the DLS database, creation of various correspondences related to dye tests, and follows-up with the field staff.

The DSSC also handles a variety of communications with the customers, makes appointments, and follows-up with delinquent customers. They also maintain the record of water shutoff warnings and miscellaneous closures.

At the end of FY2020, 14 of the 16 approved positions in the Defective Connections group were filled.

[5] Based on an average use of 110 gallons per capita per day, over a family size of 3.5 persons.

Appendix M – City of Philadelphia Snow and Ice Operations Plan Winter 2019-2020

STREETS DEPARTMENT

WINTER 2019 – 2020

SNOW AND ICE OPERATIONS PLAN

Streets Commissioner: Carlton Williams
Deputy Commissioner: Richard Montanez
Chief Highways Engineer: Stephen Lorenz

City of Philadelphia

STREETS PHILADELPHIA

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SECTION 1
SNOW & ICE REMOVAL OPERATIONS PLAN

PLAN SUMMARY

Philadelphia, like many other northeastern cities in the United States, often faces winter storms that bring potentially dangerous accumulations of ice, sleet, freezing rain, and snow.

To provide roadway conditions that are safe for traffic on primary, secondary, and tertiary (residential) streets throughout the entire City of Philadelphia, the Streets Department has prepared a Snow and Ice Removal Operations Plan outlining the City's response to adverse winter weather conditions. This document outlines procedures and responsibilities for responding to winter weather emergencies.

The goal of the Plan is to ensure a continuity of City services by reducing, if not eliminating, the occasions when the City government will have to close or reduce City services due to severe winter weather, particularly with regards to curbside trash & recycling collection. The chief objective for the City in all severe winter weather is to allow all Philadelphians to return to their normal daily activities as quickly as possible.

The Plan prioritizes route systems, indicates the appropriate distribution of resources, and identifies the duties and responsibilities of all personnel engaged in the response. Also, the Plan delineates necessary linkages with other City departments and agencies including but not limited to, the Office of Fleet Management and the Office of Emergency Management.

In addition, the Plan outlines areas requiring planning before, during, and after a winter weather event, understanding that the severity of storms and the resulting conditions vary depending on many environmental factors, the plan allows for flexibility in the department's response. A matrix (see: Chart A, page 6) indicating the storm type with a brief description and resources required to respond to the emergency is provided. An in-depth description of resources required to respond to each storm type is provided in subsequent sections of the plan.

CHART A
RESOURCE DEPLOYMENT WINTER EVENT

POST STORM FORECAST: ABOVE FREEZING TEMPERATURES

STORM TYPE		HIGHWAY DIVISION	SANITATION DIVISION	NEIGHBORHOOD OPERATIONS	BRINE APPLICATION*	CONTRACTORS	LIFT SETS*
5	Sleet/ freezing rain less than 1 inch of snow	✓			✓		
6	1 – 3 inches of snow	✓		Partial clearing focusing on higher terrain (15 routes)	✓	✓	
7	3 – 5 inches of snow	✓		Partial clearing focusing on higher terrain	✓	✓	
8	Above 5 inches of snow	✓	✓	Full Deployment (135 routes)	✓	✓	✓

POST STORM FORECAST: BELOW FREEZING TEMPERATURES

STORM TYPE		HIGHWAY DIVISION	SANITATION DIVISION	NEIGHBORHOOD OPERATIONS	BRINE APPLICATION*	CONTRACTORS	LIFT SETS*
5	Sleet/ freezing rain less than 1 inch of snow	✓		Partial clearing focusing on higher terrain (15 routes)			
6	1 – 3 inches of snow	✓		Partial clearing focusing on higher terrain	✓	✓	
7	3 – 5 inches of snow	✓	✓	Partial clearing focusing on higher terrain	✓	✓	
8	Above 5 inches of snow	✓	✓	Full Deployment (135 routes)	✓	✓	✓

- For pre-storm forecasts of rain to snow, brine will not be pre-applied. It will wash away.
- Lift sets are generally in Center City.
- Full Deployment may be deployed when the National Weather Service issues a winter storm warning.

ESSENTIAL STAFF

A. Purpose

The Streets Department is the primary response agency for the City in winter weather events such as snow and ice storms. As such, it is essential the Department maintain an adequate workforce in such emergencies.

B. Definitions

Weather Event: Includes all weather emergencies as declared by the Managing Director's Office through the Office of Emergency Management, in consultation with the Mayor's Office, and any weather event that requires the mobilization of staff to maintain clear roadways.

Essential Staff: *All Department employees and any employees assigned to Streets Department Operations during a weather event are deemed essential and must report to work unless otherwise instructed by the appropriate supervisor.*
(see: Streets Order No. 100 – Change #6, page 9)

C. Policy Statement

When a weather emergency occurs, all personnel, as determined essential by the appropriate supervisor, will be required to report to their assigned functions. Since there are significant differences in the size and severity of weather events, those employees required to report may vary from event to event. When possible, employees will be notified by the appropriate supervisor/manager as to their status prior to an event. However, since such notification is not feasible in all situations, employees should report for duty unless otherwise instructed.

During weather events all employees should monitor local news broadcasts for information and should contact their work location to obtain direction on their work status.

Employees who are not instructed to report for duty during a weather event shall be authorized to utilize accrued vacation, comp, or AL leave during weather events. Employees not engaged in storm operations may be required to report to work, at the discretion of their supervisor, if the nature of their regular work assignments has become critical.

Employees may be assigned shift work as required by the event response plan.

D. Responsibilities

Streets Commissioner: The Commissioner will serve as incident commander for snow and ice operations. These duties include supervising the logistical response of the Streets Department to winter storm events, and consulting with the Managing Director regarding the declaration of a Snow Event, the declaration of a Snow Emergency, and the activation of the Emergency Operations Center (EOC).

The decision to activate the EOC will be made by the Managing Director's Office.

The Streets Commissioner, MDO, and the EOC will coordinate with the Philadelphia School District and the Philadelphia Archdiocese regarding winter storm events.

Chief Highway Engineer: will develop and maintain a comprehensive snow plan that defines required staffing levels during weather events and identifies specific job positions and functions. Direct all field operations during winter weather events. In addition, will coordinate (or delegate) with all other support Departments and external partners (ie: SEPTA, PPA, PennDOT)

Supervisors: will maintain a list of employees and phone numbers, and notify those employees assigned to snow operations as required by this policy. Supervisors are to grant leave time only as prescribed in this policy statement, or in the event of extraordinary circumstances.

Human Resource Division: will communicate the Essential Staff Policy to all employees prior to the winter season.

Residential Snow Coordinator: under direction of the Chief Highway Engineer, coordinate all residential snow activity.

Snow Contractor Liaison: will maintain a list of contracted snow and ice removal vendors and order their services when necessary. The liaison also monitors contractors' performance and services rendered and authorizes payment for services.

Field Staff: All personnel, including all supporting departments, will be under the direction of the Streets Department personnel. In the interest of public safety, all personnel will report directly to Streets Department supervisors, and will not be released until directed by the Chief Highway Engineer. All are expected to be in place, on time, and ready to perform the duties for which they have been trained. Exceptions will be at the Streets Commissioner's or Managing Director's discretion through the Chief Highway Engineer.

Department of Streets
Office of the Commissioner
City of Philadelphia

Streets Order No. 100 — Change #6
Subject: Essential Staff Policy

General

The City of Philadelphia Streets Department's mission is to maintain clean and safe streets. The Department delivers a number of City services that are critical to maintaining public health and safety in our communities. These essential services include, but are not limited to, maintaining all traffic control devices and street lighting, the safe operation and maintenance of our roads and bridges, timely and consistent removal of trash and debris, and during winter weather events the plowing and salting of City streets. In the performance of such functions, it is essential that employees of the Department report to work on time when scheduled to provide services to the public. Since each division has varying needs, each division head is responsible for implementing staffing policies to effectively manage the number of employees required for duty on a mandatory basis, to insure that these essential services are delivered and that public health and safety are maintained in communities at all times.

To maintain the essential services identified above, employee leave may be canceled as determined necessary by the division head. In addition, employees assigned to essential services are required to continue their assignments until properly relieved.

Winter Weather Events

During a winter weather event, all Streets Department employees are expected to report to work at their regularly scheduled time unless notified to report to a different location and/or at a different time. All employees with a valid Pennsylvania Commercial Driver's License (CDL) shall be considered essential during a winter weather event. Any employee holding a valid Pennsylvania Driver's License will be considered essential if notified of such by the Department. During an event, the times and location of reporting may vary significantly depending upon the nature of the event. The Department will notify, in a timely manner, essential employees whose starting time and location are modified. However, all employees should monitor weather conditions and are expected to report for duty during winter weather events or snow emergencies.

Since there are significant variations in the time, nature and intensity of events, the assignments of employees will vary. Some employees may be excused from reporting during an event. Those employees excluded from reporting shall be granted exemptions on a case by case basis provided their assigned function will not be required as dictated by the event, and if the Department Head, or designee, grants such exception.

Compliance

The Streets Department cannot successfully deliver core services without the participation of its entire team. Due to the critical nature and importance of the work to be performed, an employee who does not work his or her assigned hours may be subject to disciplinary action up to and including discharge.

GOALS

The Streets Department is the lead City agency for development and implementation of Philadelphia's snow and ice removal (de-icing) program. The goal of the program is to maintain safe egress for citizens throughout the duration of a storm and to return the City to normal operations as soon as possible after the event has ceased. The Department works closely with other City & external agencies to clear and make safe more than 2,500 miles of streets and roadways. This allows businesses, SEPTA and City agencies to maintain their normal operations during most events. Significant resources in the form of vehicles, materials, and staff are dedicated to the operation. As in similar emergency response plans, priority is given to major thoroughfares, the primary route system; however, the plan also addresses the needs of all streets within the City limits.

Sanitation service is a critical function for the citizens of Philadelphia; as such an important component of the plan is to maintain trash and recycling collections. To minimize the need to mobilize the Sanitation fleet, and the subsequent cessation of this service, the current plan augments the Streets Department's current resources with a partnership of snow fighting fleet of vehicles from various departments. The Streets Department and supporting agencies are committed to providing the most efficient and effective snow and ice removal operations as possible and are continually evaluating new methods and processes.

SCOPE

The Roadway System

There is a network of approximately 2,575 miles of City and State roads within the boundaries of the City of Philadelphia. The responsibility for maintaining these roadways during winter storms is split among the Pennsylvania Department of Transportation (PennDOT), the Streets Department, and the Department of Parks & Recreation. Of the 360 miles of state roads, PennDOT maintains 50 miles of limited access state highways. These include I-95, the Schuylkill Expressway(I-76), The Vine Street Expressway (I-676), Roosevelt Blvd Extension (Rt-1), Woodhaven Rd extension (Rt-63), all on & off ramps, and Gustine Lakes interchange. 310 miles are state roads that PennDOT contracts with the City for snow and ice removal. This amounts to a total of 2,525 miles of City and State roads that the City maintains.

The Department of Parks & Recreation de-ices 35 miles of Park roads, including but not limited to B.F. Parkway Lincoln Drive, Kelly Drive and Martin Luther King Drive. Snow and ice removal on the remaining 2,490 miles of City streets is the responsibility of the Streets Department. The Highway

Division maintains general responsibility for the organization and deployment of City forces during winter storm operations. In storms of large accumulation, the Sanitation Division will be mobilized to supplement the snow removal effort with vehicles outfitted with plows. Finally, private contractors supplement City forces in storms of significant magnitude.

In order to provide effective service during winter storms, the City's street system is divided into primary, secondary, and tertiary route systems. The primary route system encompasses 665 miles, including 110 miles of Snow Emergency Routes. The secondary route system includes another 700 miles of streets (both systems exclude the roadway maintained by the Department of Parks & Recreation). The balance of City streets falls into the tertiary street system, covering approximately 1,125 miles of streets, 25 miles of which are private streets where the residents or Home Owner Associations contract for private snow removal.

Route Priority

When a Snow Emergency is declared, Snow Emergency and *Primary* Routes become the first priority for snow removal efforts. **The Snow Emergency Route System is clearly marked and consists of the major street network within the City.** Primary routes include major access roads through the central business district, and in and out of neighborhoods. Most primary routes encompass major and minor arterials, which serve the highest traffic volumes and distribute traffic throughout the City.

The secondary route system, which includes other streets that primarily convey traffic within neighborhoods, is the second focus of snow removal efforts. Most SEPTA routes fall within the boundaries of the primary and secondary route system.

The tertiary system includes most local residential streets. These streets are cleared based upon storm type as defined in this document.

The primary and secondary route systems are salted as soon as significant moisture has accumulated on roadways, thereby minimizing travel conditions that are potentially dangerous. Certain roads may also be pre-treated with salt brine when conditions warrant. Plowing begins when there is such a sufficient build-up of snow that salting is no longer effective. Plowing and salting will occur on local and residential streets as defined in this document.

Residential streets that are inaccessible for snow and ice removal efforts due to illegally parked or abandoned vehicles cannot be treated until those vehicles are removed by the owner or ticketed and subsequently towed.

Snow Emergency Declaration

The Mayor, Managing Director, Deputy Managing Director of Emergency Management (DMD-EM) and the Commissioner of Streets will consult to determine if a declaration of a Snow Emergency is necessary.

A snow emergency declaration allows curb to curb plowing on designated snow emergency routes (see: Section 2 for Snow Emergency Route Listings). No parking is allowed on snow emergency routes during a snow emergency. The Philadelphia Parking Authority and Police Department are responsible for ticketing and towing vehicles parked on snow emergency routes.

Signs are posted on the Snow Emergency Routes by the Traffic Engineering Division. The signs are MUTCD approved accept for the 686-SNOW phone number. This number is answered by the Police Communications. 311 is also notified.

WINTER WEATHER ACTION OUTLINE

SNOW AND ICE REMOVAL OPERATIONS ARE DIVIDED INTO THREE ELEMENTS:

Planning

The Deputy Commissioner for Transportation, the Chief Highway Engineer and the Deputy Commissioner of Sanitation, under direction of the Streets Commissioner, are responsible for developing a comprehensive winter response plan. The planning activity will include all other support departments such as Fleet, Parks and Recreation, Water and others. Planning will encompass continuing communications with the Office of Fleet Management to ensure that vehicles are properly maintained and outfitted for salting and snow removal. Further, the plan includes periodic reviews of the Snow and Ice Operations and the route structures.

During this phase, responsibilities are outlined, key positions are identified, and crews are trained. In addition, materials are requisitioned, received, and stockpiled; equipment is repaired and readied, and snow routes and route maps are reviewed and revised as needed.

Operations

The operations phase begins when the forecast is for temperatures consistent with snow, ice, sleet or freezing rain, with at least a 50 percent chance of precipitation. The Highway Division supervisors, the Residential Snow Coordinator, Fleet Management, Water Dept, & Dept of Parks & Rec are notified of the possibility of precipitation and possible plan.

The Chief Highway Engineer is made aware of “Special Events” and major closures. The De-icing crews will be forwarded this information, so the appropriate actions can be taken.

The Highway Division directs all anti-icing and de-icing efforts undertaken by the Streets Department. The Division operates under the supervision of the Chief Highway Engineer, and is divided into six regional Highway Districts, supervised by District Highway Engineers. The District Highway Engineers and the Residential Snow Coordinator, in consultation with the Snow Headquarters, located at the Bridge Maintenance Office at Whitaker Avenue and Luzerne Street, direct the winter weather operations.

The 6 Highway District yards are at the following locations:

Highway District 1	48th Street and Parkside Avenue
Highway District 2	63rd Street and Essington Avenue
Highway District 3	22nd Street and York Street
Highway District 4	Stenton Avenue and Sylvania Street
Highway District 5	Whitaker Avenue and Luzerne Street
Highway District 6	State Road and Ashburner Street

The 6 Residential District Headquarters are at the following locations:

District 1	Belmont & Concourse Dr. – Carousel house
District 2	3033 63rd St. (63rd St & Essington). Trailer next to dome
District 3	Gustine Lakes Rec. Center 4700 Ridge Ave.
District 4	4501 G St. (G & Ramona Ave.) Street Lighting Shop
District 5	4040 Whitaker Ave. (Whitaker & Luzerne) 2nd Floor
District 6	8401 State Road (State & Ashburner) – Training Center

Resources are deployed as needs dictate, however, operations generally follow a set pattern. Once the storm arrives and precipitation is falling creating icy or snow-covered streets, salting operations begin. Certain roads may also be pre-treated with salt brine when conditions warrant. In additions, some trucks are equipped with a pre-wet system that will brine the salt before it is spread Salt trucks are deployed to cover the route structure. Salting will continue until it is no longer necessary or has become ineffective.

As snow continues to fall and build up on the streets, plows are deployed to the routes. Plowing will continue until the streets are passable and safe for use by vehicular traffic.

Once this is complete, individual complaints are addressed. 311 is notified by the Streets Dept, Public Relations Unit as to how to handle snow & ice complaints.

Cleanup and Assessment

Following each storm, the snow removal equipment is cleaned (including the brine equipment); spreaders and plows are removed and stored; personnel are released from snow duty; and final reports are submitted. At this time, after action reviews are undertaken. If contractors are used, all paperwork will be submitted and prepared for billing before the shift is over and Managers are released. All vehicles are post-checked and reported to Fleet for repairs.

All Highway Districts shall notify the Assistant Chief Highway Engineer as to how much salt so replenishment orders can be made following the event. An assessment of the salt dome at Domino Lane will also be done.

PARTICIPATING ORGANIZATIONS– ASSIGNMENTS & RESPONSIBILITIES

Assignments and Reporting Structure

All personnel involved in winter weather operations will be under the direction of Streets Department. **Once deployed to snow operations, they will be relieved from their respective daily assignments and will not be released, except for emergency, to their respective operating departments without approval of Streets Department snow headquarters. It is the responsibility of the employee to notify their supervisor that they will be working snow operations.**

Streets Department

The Streets Commissioner is the incident commander for all winter weather operations The Highway Division coordinates the citywide program for snow removal from the City street system and is directly responsible for salting and plowing the primary, secondary, and tertiary route structures. In addition, the Chief Highway Engineer is responsible for the supervision and organization of all de-icing efforts. With the approval of the Streets Commissioner, the Chief Highway Engineer is responsible for mobilizing necessary plowing and lifting operations. These operations may require the suspension of normal Sanitation Division operations under certain conditions, and the conversion of Sanitation vehicles for plow operations. However, the Department's goal is to minimize the impact on Sanitation operations and avoid the delay or interruption of curbside collection services. In addition, private contractors may be called in to supplement the de-icing efforts as conditions dictate. Sanitation personnel, Highway personnel, other Departmental personnel and contractors are responsible for de-icing under the direction of the Highway Division.

Department of Parks and Recreation

The Department of Parks and Recreation maintains a portion of the roadways in and around the Park system. The Benjamin Franklin Parkway, Kelly Drive, MLK Drive, Lincoln Drive, & Strawberry Mansion Bridge are the primary routes that are de-iced in all events. When full residential is deployed, they are assigned some residential grids.

In addition, they are responsible for the trail system and for treating the sidewalks and parking lots at the parks and recreation centers. The Leadership of the Dept of Parks & Rec will decide the priorities. In the event equipment has to be taken from the roadway de-icing operation, the Parks & Rec Coordinator will communicate with the Chief Highway Engineer. Since the residential program uses two of their facilities (Carousel House and Gustine Lakes), the residential manager will have those parking lots treated. The Chief Highway Engineer & the Parks & Rec winter coordinator will discuss and communicate prior to and throughout the event.

If a circumstance occurs where the winter event may cause trees to or limbs to fall and block roadways, the Chief Highway Engineer and Parks & Rec winter coordinator will communicate the concerns and report back to the appropriate staffing (both field and administrative). If the EOC is activated, they will be notified as well.

Office of Fleet Management

The Office of Fleet Management is responsible for the maintenance and repair of all vehicles in the City's fleet is responsible for opening fuel sites (see: Fuel Site Locations Table) during winter weather events, providing and installing chains, and where necessary, assisting with the installation of plows, except for the Sanitation Division, which installs chains and plows on compactors. The Chief Highway Engineer and Fleet Management Liaison will discuss the event. This discussion will include Brine, Salt, Plow, shifts, shop openings, and post event issues.

FUEL SITE LOCATION

SITE #	OPERATING HOURS	DEPARTMENTS	SITE NAME	STREET ADDRESS	ZIP	CONTACT #	FUEL TYPE	UNLEADED TANK CAP	DIESEL TANK CAP
01	24/7	Police Department	24th & Wolf	2301 S. 24th Street	19145	686-3010	U	10,000	N/A
02	24/7	Police Department	11th & Wharton	1100 Wharton Street	19147	686-3030	U	10,000	N/A
03	MON – FRI 7:30 – 3:00	Philadelphia Water Department	8200 Enterprise	8200 Enterprise Avenue	19153	685-4047	U/D	2,500	2,500
04	MON – FRI 7:30 – 3:00	Commerce/ Division of Aviation	International Airport	8500 Essington Avenue	19153	492-3056	U/D	8,000	8,000

	05	24/7	Streets Department	51st & Grays	5014 Grays Avenue	19143	685-2612	D	N/A	10,000
	06	24/7	Police Department	55th & Pine	5524-30 Pine Street	19143	686-3180	U	10,000	N/A
	07	24/7	Police Department	61st & Thompson	6059 Haverford Avenue	19151	686-3190	U/D	6,000	N/A
	08	MON – FRI 7:00 – 3:30	Office of Fleet Management	25th & Tasker	2500 Tasker Street	19145	952-6201	U/D	20,000	10,000
	09	24/7	Police Department	Girard & Montgomery	611-17 E. Girard Avenue	19125	686-3260	U	10,000	N/A
R	10	24/7	Police Department	21st & Pennsylvania	401 N. 21st Street	19130	686-3090	U	10,000	N/A
	11	MON – FRI 7:00 – 10:00	Streets Department	26th & Glenwood	2601 Glenwood Avenue	19121	685-3978	U/D	10,000	10,000
	12	MON – FRI 7:00 – 3:00	Philadelphia Water Department	7800 Penrose	7800 Penrose Ferry Road	19145	685-4068	U/D	10,000	20,000
	13	MON – FRI 7:00 – 3:00	Philadelphia Water Department	3900 Richmond	3899 Richmond Street	19137	685-1336	U/D	6,000	4,000
	14	MON – FRI 7:00 – 3:00	Streets Department	Delaware & Wheatsheaf	3101 Castor Avenue	19134	685-1364	U/D	2EA/1,500	10,000
	15	24/7	Office of Fleet Management	Front & Hunting Park	100 East Hunting Park Avenue	19124	685-9100	U/D	10,000	10,000
	16	MON – FRI 8:00 – 4:30	Philadelphia Water Department	29th & Cambria	2900 N. 29th Street	19132	685-9633	U/D	20,000	10,000
	17	24/7	Police Department	22nd Hunting Park	2201 W. Hunting Park Avenue	19124	686-3390	U	10,000	N/A
	18	24/7	Police Department	Harbison & Levick	2809 Levick Street	19149	686-3150	U	10,000	N/A
	19	24/7	Police Department	Broad & Champlost	5960 N. Broad Street	19141	685-2862	U	10,000	N/A
	20	24/7	Police Department	Germantown & Haines	39-43 Haines Street	19126	686-3140	U	10,000	N/A
	21	24/7	Police Department	Ridge & Cinnaminson	6666 Ridge Avenue	19128	686-3050	U	6,000	N/A
	22	MON – FRI 7:00 – 11:00	Streets Department	Domino & Umbria	200 Domino Lane	19128	685-2580	U/D	10,000	10,000
	23	MON – FRI 7:00 – 11:00	Office of Fleet Management	State & Ashburner	8401 State Road	19136	685-8977	U/D	10,000	20,000

24	24/7	Fire Department	Germantown & Carpenter	6800 Germantown Avenue	19119	685-2225	U/D	600	2,500
25	24/7	Fire Department	3rd & Spring Garden	276 Spring Garden Street	19123	686-1372	U	6,000	N/A
26	MON – FRI 7:00 – 5:00	Philadelphia Water Department	Fox & Abbottsford	3201 Fox Street	19129	685-2054 685-2024	U/D	10,000	10,000
27	MON – FRI 6:00 – 11:00	Streets Department	4040 Whitaker	4040 Whitaker	19124	685-9800	U/D	6,000	10,000
28	24/7	Fire Department	28th & Thompson	1301 N. 28th Street	19121	685-3889	D	N/A	1,000
29	24/7	Fire Department	Cottman & Loretta	1900 Cottman Avenue	19111	685-0591	D	N/A	1,000
30	24/7	Fire Department	Pennypack Circle	8205 Roosevelt Blvd	19152	685-8891	D	N/A	1,000
31	24/7	Fire Department	Broad & Fitzwater	711 S. Broad Street	19147	685-6897	D	N/A	1,000
32	24/7	Fire Department	4th & Snyder	414 Snyder	19148	685-1792	D	N/A	1,000
33	MON – FRI 7:00 – 3:30	Parks and Recreation	Chamounix (Parks/ Recreation)	715 Chamounix Drive	19131	685-0110	U/D	10,000	10,000
34	24/7	Fire Department	63rd & Lancaster	1913 N. 63rd Street	19151	685-0068	D	N/A	1,000
35	MON – FRI 7:00 – 6:00	Streets Department	48th & Parkside	4804-48 Parkside Avenue	19131	685-0164	D	N/A	2,000
36	24/7	Fire Department	10th& Cherry	133 N. 10th Street	19107	686-1350	D	N/A	1,000
37	24/7	Fire Department	4th & Girard	400-08 Girard Avenue	19123	686-1349	D	N/A	1,000
38	24/7	Fire Department	82nd & Tinicum	8201 Tinicum	19153	492-3393	D	N/A	1,000
39	24/7	Fire Department	52nd & Willows	783 S. 52nd Street	19143	685-1987	D	N/A	2,000
40	24/7	Fire Department	Foulkrod & Darrah	1652-54 Foulkrod Street	19124	685-1295	D	N/A	1,000
41	24/7	Fire Department	Bustleton & Bowler	1701 Bowler Street	19115	685-0387	D	N/A	3,000
42	24/7	Fire Department	Bustleton & Hendrix	812 Hendrix Street	19116	685-0388	D	N/A	1,000
43	24/7	Fire Department	Chelten & Baynton	300 E. Chelten Avenue	19144	685-2227	D	N/A	1,000

	44	24/7	Fire Department	30th & Grays Ferry	3023-45 Grays Ferry Avenue	19146	685-1790	D	N/A	1,000
	45	24/7	Fire Department	Belgrade & Ontario	2520 E. Ontario Street	19134	685-9849	D	N/A	1,000
	46	24/7	Fire Department	13th & Shunk	2600 S. 13th Street	19148	685-1783	D	N/A	1,000
	47	24/7	Fire Department	24th & Ritner	2301 S. 24th Street	19145	685-1793	D	N/A	600
R	48	MON – FRI 7:00 – 3:30	Commerce/ Division of Aviation	Northeast Airport	3001 Grant Avenue	19114	685-0311	D	N/A	4,000
	49	24/7	Fire Department	Academy & Comly	11650 Academy Road	19154	685-9374	D	N/A	600
	50	24/7	Fire Department	Ridge & Cinnaminson	6666 Ridge Avenue	19128	685-2555	D	N/A	600
R	51	24/7	Police Department	Dungan Road	7790 Dungan Road	19111	685-5101	U	8,000	N/A
	52	24/7	Fire Department	Park & Cambria	1325 W. Cambria Street	19132	685-9773	D	N/A	600
	53	24/7	Fire Department	Old York Road	5931 Old York Road	19141	685-2881	D	N/A	600
	54	24/7	Fire Department	43rd & Market	4299 Market Street	19104	685-7699	D	N/A	600
	55	24/7	Fire Department	Belgrade & Huntington	2601 Belgrade Street	19125	685-9847	D	N/A	600
	56	24/7	Fire Department	Rising Sun	5332 Rising Sun Avenue	19120	685-9197	D	N/A	600
	57	24/7	Office of Fleet Management	3033 S. 63 Rd	3033 South 63rd Street	19125	685-4250	D	N/A	10,000
R	58	MON – FRI 6:00 – 3:00	School District of Philadelphia	Shallcross	Byberry & Woodhaven	19154	281-2617	D	N/A	10,000
R	59	MON – FRI 6:00 – 3:00	School District of Philadelphia	Broad & Lehigh	2600 N. Broad Street	19132	215-227-4430	D	N/A	10,00

Total number of sites is fifty-nine
“R”= restricted to vehicles assigned to the department only

Managing Director's Office

The Managing Director, in consultation with the Mayor, has the authority to declare a snow emergency and if necessary, close City offices. This plan should limit, if not eliminate, the need to enforce any closures during snow events.

When a snow emergency is declared the Managing Director's Office is responsible for coordinating the citywide response to the emergency. Streets Department personnel, along with personnel from other departments, participate in the staffing of the Emergency Operations Center, located at 3rd and Spring Garden Streets in the Fire Administration Building, and in other coordinated efforts as necessary

Police Department

Police Department support is required to support existing parking regulations. Police will ticket vehicles identified as impeding snow removal efforts including, but not limited to, vehicles parked on corner radii and double-parked vehicles. Police officers will stop all private entities placing snow in previously cleared streets. During declared snow emergencies, Police support will ensure snow emergency routes are clear. The Police Department is responsible for performing de-icing activities in their facilities. The Police Department will coordinate with the Philadelphia Parking Authority for towing.

As Routes are cleared of vehicles, the Police will notify both the EOC and Snow Headquarters, so the appropriate de-icing can occur.

Other City Departments

The tertiary route structure is maintained by the following City Departments under the direction of the Residential Snow Coordinator.

Streets Department
Public Property
Managing Director's Office (CLIP)
Prisons Department
Free Library
Water Department
Parks & Recreation
Licenses & Inspections
Revenue Department
Health Department

SNOW FIGHTING EQUIPMENT INVENTORY

Streets Department 2019 – 2020 Fleet Summary

Listed below is the Streets Department's fleet inventory for snow operations. Due to the age of the fleet and the challenges facing the Office of Fleet Management, we (the City) have concerns about the reliability of the equipment. Winter operations place a great strain on aging vehicles, and equipment availability will have a significant impact on the Department's ability to effectively respond to weather events. With projected downtime, the City will be challenged to field a full complement of equipment to cover all routes.

The result of insufficient equipment will be slow response time, particularly on residential streets. To address this issue, in part, the Streets Department has snow contract agreements to provide supplemental equipment for both large and residential streets. The Department also continues to work closely with the Managing Director's Office to identify interdepartmental equipment that can supplement the inventory.

All departments are required to provide a full complement of necessary vehicles for snow operations for clearing the roadway system.

AVAILABLE SNOW VEHICLES

100	HIGHWAY SALT
13	LOADERS, HIGHWAY, ARTICULATED
14	SANITATION SKID STEER
144	COMPACTORS
8	BRINE VEHICLES
2	SNOW TRAILERS FOR ROOSEVELT BLVD
75	CITY SNOW VEHICLES ASSIGNED TO RESIDENTIAL

ROUTE DESIGNATIONS AND TREATMENT

The primary and secondary route systems are divided into 148 specific routes. Salting and/or plowing of these routes will continue until the routes are deemed passable and safe for vehicular traffic.

The tertiary street system is covered in a grid pattern determined by each District Highway Engineer and the Residential Snow Coordinator. These streets are salted/plowed as storm type dictates (see Chart A, page 3). Grids are assigned, and the plows attempt to clear all streets in that grid. Streets that are blocked by parked cars or other obstructions will not be treated until the obstruction is removed. Double-parked vehicles or vehicles parked on corner radii will be ticketed and towed by Police to permit snow removal efforts.

All tertiary grids will not be treated during every storm. The City's topography will primarily dictate the specific areas that will be treated during every storm type. Storm severity will dictate the expansion of treatment in the tertiary network. Regional commerce, public health, mass transit issues, sporting & special events and time of year will guide these decisions.

Snow and ice on the tertiary street system will be cleared to provide one passable lane for each direction that the specific streets can accommodate. Residential efforts are designed to allow access to the primary and secondary route system and mass transit.

Use of Salt and Other De-icing Materials

Salt (sodium chloride) or a brine solution of the same chemical, or in extreme situations, sand or other abrasives, will be spread on Philadelphia's roadway network to ensure safety for the traveling public.

Salt brine is a liquid containing a 23 per cent sodium chloride solution. Applied at rates of 30 gallons per lane mile, this treatment should effectively melt the first 2 inches of snow before re-application is necessary. The treatment can also be applied before storms begin. The Department will utilize this program in the Northwest and Northeast sections of the city, areas that typically have higher evaluations. In addition, the department may Brine the sports complex if there is an event. This should provide greater service delivery at a reduced cost, especially in the higher elevation areas of the City. The decision to Brine will be made 72 hours in advance. Brine is primarily used to pre-treat the roadway, so snow does not bind to roadway. As conditions permit, brine trucks may be re-filled and used on some routes or parking lots during the event. This is most effective when there is less than 2 inches of snow, temperatures are greater than 20 degrees and no rain.

STORM TYPES AND RESPONSE

There are eight (8) basic storm types that require different responses as outlined below.

POST STORM FORECAST

ABOVE FREEZING TEMPERATURES

	Storm Type	Deployment of Fleet
1	Sleet/ Freezing Rain	City salt truck deployment and primary and secondary routes only.
2	1 to 3 inches of snow	City salt truck deployment on primary and secondary routes. Partial residential deployment in limited areas of higher elevation. If cold temperatures are forecast, limited plowing may occur. (No contractors).
3	3 to 5 inches of snow	City and contractor salt truck deployment on primary and secondary Routes. Partial residential deployment in limited areas of higher elevation. A snow lifting may be deployed in the central business district.
4	Above 5 inches of snow*	As above, plus the declaration of a "snow emergency." Sanitation compactors will plow the primary and secondary route system. Additional contractor equipment will be deployed. Full residential will be deployed.

BORDERLINE AND BELOW FREEZING TEMPERATURES

	Storm Type	Deployment of Fleet
5	Sleet/ Freezing Rain	City salt trucks deployed on primary and secondary routes only. Possible partial residential deployment in limited areas of higher elevation.
6	1 to 3 inches of snow	City salt truck contractor deployment on primary and secondary routes. Salting Operation for tertiary streets may occur once the primary and secondary network is complete. This operation will be performed by primary and secondary route vehicles that can navigate smaller streets. Partial residential deployment in limited areas of higher elevation. If cold temperatures are forecast, limited plowing may occur.
7	3 to 5 inches of snow	As above, plus a snow lifting may be deployed in the central business district.
8	Above 5 inches of snow*	As above, plus the declaration of a snow emergency. Sanitation compactors will plow the primary and secondary route system. Additional contractor vehicles will help clear snow. Full residential will be deployed.

*Full deployment may be deployed when the National Weather Service issues a winter storm warning.
Lifting snow from other sections of the City will only occur when directed by the Chief Highway Engineer.

Weather Forecasting Services

The City of Philadelphia will, in addition to monitoring local national weather forecasts for our metropolitan region, contracts with an independent private weather service to ensure that forecasts are made specific to our needs. The City recognizes that there are unique geographic differences within our boundaries and expects detail in our contracted services to assist in deployment decisions.

STORM OPERATIONS

Storm Conditions

Philadelphia's geographic position contributes substantially to the forecasting uncertainties that it faces. Due to our location, with the mountains to our west and the Atlantic Ocean to our east, forecasters usually must watch storm systems for as long as possible before determining if they are going to hit Philadelphia or be deflected to the east or west. In addition, there are literally thousands of types of winter storms - each storm combines a number of factors that lends to its uniqueness.

The Streets Department must be prepared to deal with these planning uncertainties, as well as uncertainties that occur during the storm. For example, the Blizzard of March 1993 was originally forecasted as a 3" storm. It mushroomed into a major storm of upwards of 12 inches, including sleet and freezing rain. In early December 2013, a forecasted 1" storm during an Eagles game turned into a 9-inch winter event. The unexpected changes in forecasts made it more difficult for the Streets Department to mobilize the most effective response to react to a storm of such magnitude. The Blizzard of January 2016 (Winter Storm Jonas) was supposed to start at 10PM and started at 7PM. In March 2017 (Winter Storm Stella) was forecasted for over 12 inches of snow, about 4 inches of snow fell followed by a couple of inches of sleet and below freezing temperatures.

In March 2018, 3 different Nor-Easter storms effected the City of Philadelphia with temperatures at freezing. This caused many trees to block the roadways and parks. These storms had all available equipment to remove trees and de-ice the streets, so crews can perform the necessary work.

There are several other variables that affect the Department's timely response to storm events. These variables are briefly outlined below. Each of the variables listed may have a significant impact on the Department's response. Proper planning and the development of appropriate procedures, combined with some level of operational flexibility is a priority to develop the most appropriate, effective response possible, given the existing conditions. Communication through Snow Headquarters is the key to success.

- Storms may fail to materialize at the forecasted hour. Conversely, storms may stall, thereby increasing the duration of the event and the amount of accumulation. These factors increase the expense associated with responding to a storm and the chance of work force fatigue.
- During a storm, the type of precipitation may change. Different types of precipitation require different responses. For example, plowing may be hampered as ice accumulates on the top of the snow, creating a hard crust.
- The time of the year also impacts the Department's response to storms. In the late fall and early spring months when the temperature is warmer, it may be possible to fight a storm of four to five-inch accumulation with salt alone. In colder months, plowing would be necessary.
- If two or more severe storms occur in rapid succession, the Department's response may be affected. Response to the initial event may be expanded in anticipation of the subsequent storm. For example, in 2015, we had 2 storms within 36 hours at accumulations of 12 inches and 5 inches respectively with 8 hours in between.
- Low temperatures increase the amount of salt necessary to melt off precipitation.
- Winds can create havoc during storms. Although light breezes help to dry roadways following storms, stronger winds may hamper snow fighting efforts by drifting snow across cleared roadways.
- Significant elevation differences exist between the southern portion of the City and the areas in the northeast and northwest. In the northeast and northwest, snow frequently accumulates to greater depths.
- The city has developed micro-climates along the rivers creating black ice.
- Other Department's core services may impact equipment and personnel (ie: Water main breaks or down trees due to ice and wind)

The Department's Snow and Ice Operations Plan presents a flexible framework providing effective response to all types of storms.

It is the goal of the City of Philadelphia that for the majority of the winter weather events that typically affect this city, that we will have, depending on storm type and response protocol, all routes identified in these response protocols passable within 24 to 48 hours of the fall of the last flake. Storms outside of the protocol upper limits may lead to significant adjustments in this timeline.

STORM TYPES 1, 2 & 3

DEPLOYMENT

Streets Department

Chief Highway Engineer

— Will develop the operations plan for approval by the Streets Commissioner
— Once the plan is approved, The Chief & Assistant Chief Highway Engineers will notify as listed below:

- Notifies District Highway Engineers, Central Maintenance Unit (CMU), Bridge Maintenance Unit (BMU) of mobilization time and plan
- Notifies the yard supervisors
- Notifies Residential Snow Coordinator of mobilization time
- Notifies Highway Division Snow Headquarters, located at the Bridge Maintenance Yard – 4040 Whitaker Avenue, personnel to report at specified deployment time
- Notifies OIT
- Notifies Office of Fleet Management of mobilization decision
- Notifies SEPTA
- Notifies Sanitation
- Notifies maintenance supervisors
- Notifies Parks and Recreations
- Notifies Unified Dispatch
- Notifies Water Department
- Notifies the Streets Department, Public Affairs
  — Will coordinate with 311
- An email notification will be sent out to all involved. The Streets Commissioner will be included so it can be shared with the MDO or Mayor's Office at his discretion. This is a follow-up to phone calls.
- Establish communication with the EOC (if activated).

Highway District Engineers

— Notify spotters to report at specified deployment time

Highway District Maintenance Supervisors

— Notify personnel to report at specified deployment time

Residential Snow Coordinator

— Notifies residential snow operations personnel of partial residential deployment (if needed)

Office of Fleet Management

— Will determine which garages for Fleet maintenance support and fueling sites for duration of event at determined times. This will be coordinated with Snow Headquarters

Parks and Recreation

— Responsible to activate operation for salting Park road system including Benjamin Franklin Parkway, MLK, Kelly, Lincoln Drive. Report times will be coordinated with the Chief Highway Engineer.

OPERATIONS

Highway Districts

Spotters monitor street conditions. Salt trucks are loaded and positioned at the start of an assigned route. As street surfaces accumulate sufficient moisture for effective salting, spotters notify Maintenance Supervisors to begin salting activity. Spotters will provide route condition reports to their district headquarters on intervals as directed. District headquarters will compile this data and forward to Highway Division Snow Headquarters.

The Highway Yard Districts will work with the Sanitation yards to ensure the Citizen Drop off centers are de-iced.

Residential Districts

Spotters monitor street conditions. Trucks are positioned at the start of an assigned route. Treatment of the street surface begins upon notification from the Residential Snow Coordinator. Spotters will provide route condition reports to their district headquarters on three (3) hour intervals. District headquarters will compile this data and forward it to the Residential Snow Coordinator, who in turn summarizes the information and forwards it to Highway Division headquarters.

Highway Division Snow Headquarters

Snow Headquarters will:

— Inform Highway Districts of weather forecasts
— Monitor, through Highway Districts, the status of all salting operations
— Maintain a log of all service calls for snow and ice related activities
— Monitor weather conditions and forecasts
— Analyze the data and forward it to the appropriate parties
— Analyze reports from the field and make changes to future operations where required
— Forward emergency calls from Police and Fire Departments to Highway Districts
— Maintain Snow Route Status Report
— Order commodities as required to maintain an adequate supply at all Districts
— Take calls from the EOC
— View PennDOT, Police and Streets Department cameras.
— Monitor GPS

Office of Fleet Management

— Repair vehicles as necessary
— Report vehicle down time to Snow Headquarters

Parks and Recreation

— Treat Park road system, trails, and parks & recreation facilities

CESSATION OF OPERATIONS

Highway Districts

— District Engineers release spotters to regularly assigned duties.
— District Engineers collect route inspection information

Residential Districts

— Release spotters and drivers to their respective departments
— Forward all reports to Residential Snow Coordinator who, in turn, forwards them to Highway Division Snow Headquarters
— Supervise the cleaning and redeployment of residential snow equipment

Highway Division Snow Headquarters

— Compile final report on personnel, equipment utilized and material usage and forward to Streets Commissioner.
— Estimate cost of event

Office of Fleet Management

— Compile final report on equipment costs and return to normal Fleet repair activities
— Prepare for the next event

Parks and Recreation

— Compile final report on personnel and equipment utilized
— Return to normal Park maintenance activities

STORM TYPES 6, 7 & 8

DEPLOYMENT | Same as response 1, 2 & 3, except the following additions:
Streets Department

Chief Highway Engineer

— Notifies District Highway Engineers and Residential Snow Coordinator of decision to salt/plow tertiary system (Note: Storm type 6 only, partial to full residential deployment depending on event specifics).
— Will advise everyone for potential of multiple shifts

Residential Snow Coordinator

— Notifies residential snow operations personnel of partial to full residential deployment

STORM TYPES 4 & 8

DEPLOYMENT | Same as 1, 2 & 3, but also includes:
Streets Department

Chief Highway Engineer

— Notifies District Highway Engineers of initial mobilization time for salting operations and subsequent mobilization time for plowing operation
— Advises district that Sanitation, contractor equipment and residential roadway treatment will occur
— Notifies Highway Division Snow Headquarters, personnel to report at specified deployment time
— Notifies Snow Contractor Liaison to order contractor support equipment at specified time
— Notifies Residential Snow Coordinator of mobilization time
— Notifies Deputy Commissioner for Sanitation for full deployment of Sanitation resources, both for plowing primary and secondary routes
— Notifies Office of Fleet Management of mobilization decisions
— Advises all involved of anticipated number of shifts
— Notifies SEPTA
— Notifies Sanitation
— Notifies Water

Snow Contractor Liaison

— Contact private sector vendors and orders equipment for each highway district.
— Advises of deployment time and likelihood of deployment duration
— Advises contractors of lifting set (if any) requirements

Highway District Engineers

— Notify Maintenance Supervisors to deploy their staff at specified time
— Notify spotters to report at specified time
— Notify inspection staff for contracted equipment to report at specified time
— Are advised that residential street system snow removal has been activated

Residential Snow Coordinator

— Notifies residential snow operations personnel of residential deployment

Highway District Maintenance Supervisors

— Notify personnel to report at specified deployment time

Streets Department — Sanitation Division

Deputy Commissioner — Sanitation

— Mobilizes plows for primary/secondary route system at six Sanitation yards at specified time.
— Notify Chief of Operations to designate a Sanitation representative for Highway Division Snow Headquarters
— Notify division management of deployment times and subsequent suspension of curbside collections

Office of Fleet Management

— Will deploy sufficient resources to support fleet maintenance activities for duration of winter weather event
— Will open fuel sites and staff appropriate garages for duration of event
— Will support Sanitation Division of Streets Department during plow and chain mounting for Sanitation compactors and support equipment

Parks and Recreation

— Responsible to activate operations for salting/plowing road system and trail system. The Leadership of Parks & Rec will create a plan for treating the trails and recreation centers

Office of the Managing Director

— Will issue declaration of snow emergency
— Will activate the city's Emergency Operations Center located at the Fire Administration Building 3rd and Spring Garden Streets.

OPERATIONS

Streets Department

Highway Division

— Spotters monitor street conditions
— District Highway Engineers assign inspection staff to contact salting vehicles
— Salt trucks are loaded & positioned at the start of an assigned route. As street conditions accumulate sufficient moisture for salt to be effective, spotters notify districts to begin salting operation. Salt will be applied prior to plowing operations or until no longer effective
— Plowing operations will begin at 2"-3" accumulation and continue until routes are clear
— Chief Highway Engineer directs Residential Snow Coordinator to begin Tertiary Street plowing/salting when needed
— Highway District Engineers direct Sanitation plowing commencement
— All spotters & inspectors will provide route condition reports on three (3) hour intervals. Each district headquarters will compile this information & forward to Highway Division Snow Headquarters
— Highway District Engineers will ensure that all routes are salted upon completion of plowing efforts
— Highway District Engineers will direct snow lifting/melting operations within their respective district

Residential Snow Districts

- Spotters monitor street conditions. Trucks are positioned at the start of an assigned route. Treatment of the street surface begins upon notification from the Residential Snow Coordinator
- Spotters will provide route condition reports to their district headquarters on three (3) hour intervals. District headquarters will compile this data and forward it to the Residential Snow Coordinator, who in turn summarizes the information and forwards it to Highway Division Snow Headquarters

Sanitation Division

- Sanitation Assistant Chiefs of Operation and District Managers direct Sanitation Operations and report progress to Highway District Engineers
- At the Highway District Engineers direction, they will adjust on-street operations for specified route assignments
- Progress reports are to be provided at two (2) hour intervals to Highway District Sanitation Coordinator
- Managers will ensure that all vehicles are manned at shift change
- Personnel will not be released without replacement
- Sanitation and Highway Yard Liaison will coordinate completion of the routes so a salt truck can follow behind.
    - Sanitation will support the Residential program by treating the small streets with the skid steers.

Highway Division Snow Headquarters

Snow Headquarters will:

- Inform Highway Districts of weather forecasts
- Monitor, through Highway Districts, the status of all salting operations
- Maintain a log of all service calls for snow and ice related activities
- Monitor weather conditions & forecasts. Analyze the data & forward it to the appropriate parties
- Analyze reports from the field & make changes to future operations where required
- Forward emergency calls from Police and Fire Departments to Highway Districts
- Maintain Snow Route Status Report
- Order commodities as required to maintain an adequate supply at all Districts
- Provide Emergency Operations Center (EOC) reports route conditions, weather updates and identified trouble spots

Office of Watersheds (Division of PWD)

- Office of Watersheds will de-ice the porous streets when a conditional deployment is called. During a full deployment, they will appropriately treat those streets. If they are not treated by the Office of Watersheds, then the residential program will treat the porous streets. As of October 2019, there are 6 porous blocks within the City.

Office of Fleet Management (OFM)

— OFM will provide necessary manpower & garage space as need to support storm type
— OFM will supply vehicle status reports to Highway Division Snow Headquarters, the Managing Director's Office and Emergency Operations Center on an hourly basis

Parks and Recreation

— Treat Park road system and Benjamin Franklin Parkway as required by conditions
— Clear all sidewalks around recreation centers
— All trails will be treated

CESSATION OF OPERATIONS

Streets Department

Highway Division

— Highway District Engineers will release all equipment to their respective departments for regularly assigned duties
— Highway District Engineers will release all personnel to their regularly assigned duties
— District Maintenance Supervisors will ensure salt truck operators return unused material to stockpiles and wash truck beds, augers and spinners.
— Highway District Engineers will compile final contractor billing information
— All storm related information on personnel, equipment deployed, contract support & material used will be compiled by each district and forwarded to Snow Headquarters

Residential Districts

— Release spotters and drivers to their respective departments.
— Forward all reports to Residential Snow Coordinator who in turn forwards them to Highway Division Snow Headquarters
— Supervise the cleaning and redeployment of residential snow equipment

Sanitation Division

— Sanitation Division will dismount plows, remove chains and ready fleet for return to normal collection/cleaning activities

Highway Division Snow Headquarters

— Compile final report on all elements deployed for specific storm type
— Forward report to Streets Commissioner and EOC
— Compile cost estimate for event
— Direct highway districts post storm clean up deployment

Office of Fleet Management (OFM)

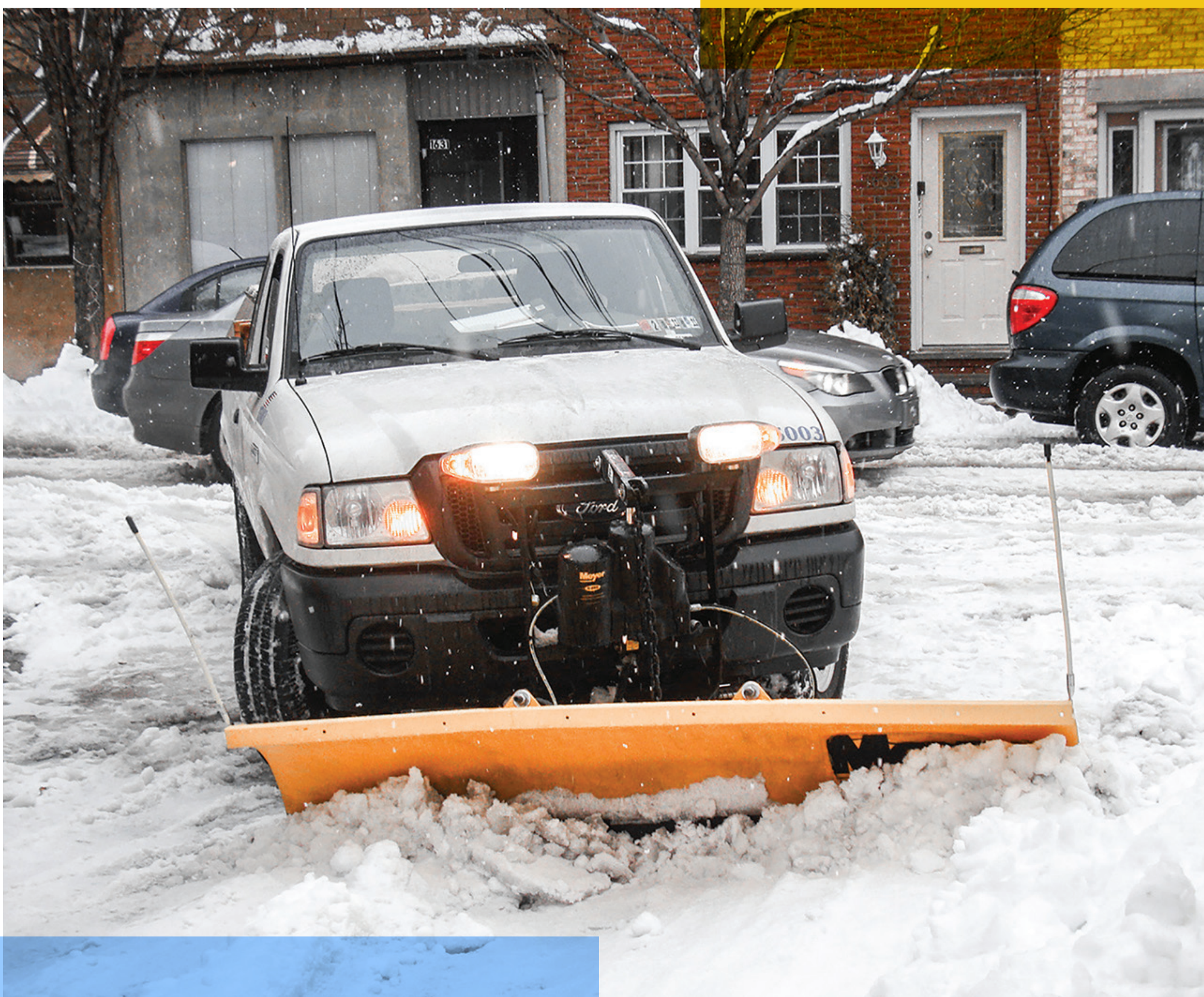
— OFM to compile final report on equipment repair costs and vehicle status and return to normal fleet repair activities
— Prepare for next event

Parks and Recreation

— Compile final report on personnel and equipment utilized
— Return to normal Park maintenance activities

Office of the Managing Director

— End snow emergency declaration and close EOC
— Effective in 2015, the 686-SNOW phone number has been permanently changed to inform citizens of their responsibilities of parking on a Snow Emergency Route. It is routinely checked to make sure it is active.



DE-ICING SUPPORT PERSONNEL ASSIGNMENTS

The following functions will be performed by Streets Department and other City agencies personnel not directly involved with the operation of snow fighting equipment:

Bridge Maintenance Unit

The Bridge Maintenance Unit will perform anti-icing activities on the sidewalks of the City's vehicle bridges & pedestrian bridges as well as removing snow from the 15 stairways in Manayunk. Highway maintenance district yard personnel and Sanitation area personnel will be called to assist with this effort as dictated by storm type.

Highway Maintenance District Personnel and Sanitation Area Personnel

Highway maintenance district personnel and Sanitation area personnel, as dictated by storm type, will be provided hand snow removal equipment and will clear snow from curb ramps and open city inlets. This is to allow melting snow access to the drainage system and provide pedestrian accessibility. Snow may also be cleared from areas surrounding fire hydrants. Efforts will be made to keep select bike lanes clear of snow & ice. All bike lanes will be attempted to receive de-icing treatment.

SWEEP Support (Streets & Walkways Education and Enforcement Program)

SWEEP Officers will, beginning in commercial corridors, enforce sidewalk clearance — Ordinance 10-719. Upon completion, enforcement will expand to schools, hospitals, etc., culminating in residential inspection.

All City Departments

- Dry salting Will NOT be practiced.
- Sidewalks & ADA ramps: All City departments will be responsible for removing snow on the sidewalks abutting their facilities. Salt can be requested through snow HQ. In addition, bagged salt & Calcium Chloride is available on a Citywide contract for all Departments to Purchase
- Parking Lots: All Departments are responsible for treating & salting their respective parking lots.
    - The Police Department will coordinate with the Chief Highway Engineer for salt needed to salt all Police parking lots & driveways. The Streets Dept will treat the Round House ramp and the Traffic Police ramp on Erie Ave.
    - No Department will be supplied salt for the purposes of dry salting

- Dilworth Park is the responsibility of Center City District
- Dilworth Plaza is the responsibility of Public Property. Note: It is not recommended to drive heavy equipment on Dilworth Plaza.
- Sanitation will provide salting & plowing vehicles to treat the citizen's drop off areas.

Highway Division Support Personnel

Highway Division support personnel will continue snow removal support functions as part of their daily work activities after Sanitation workers return to regular collections. Snow removal equipment will supplement these efforts as it becomes available.

Small Streets

As part of the City's responsibility of making streets passable, the Sanitation Division will be de-icing several miles of streets that are less than 10 feet in width. These are known as Gator Routes. These will be treated when a full deployment is called. The crew chief in charge of this operation will report to the residential manager.

PWD Support (Philadelphia Water Department)

During major events, PWD crews will be dispatched to clear snow at inlets to prevent intersection flooding (if appropriate)

Bus Stops

OTIS has contracted with Intersection to de-ice all bus stops. This contract includes access to the bus stops and ADA ramp. In addition, they will be clearing the snow at the Direct Bus Stops along Roosevelt Blvd.

Police Department Support

The Philadelphia Police Department will enforce existing ordinance/regulations prohibiting the discharge of snow back onto city streets. Private plow contractors caught in the act of plowing snow from private property onto city streets risk fine and/or forfeiture of equipment.

Bicycle Facilities

The City of Philadelphia is becoming one of the most bicycle friendly City in the United States. As doing so, the de-icing plan shall include bike facilities. However, in certain events, the treatment may not occur until 24 hours after the final snowflake has fallen.

- The City (OTIS) has permitted bicycle corrals to be installed within the parking lanes. The private sponsor of the bike corral is responsible for clearing snow and de-icing. Note, throwing snow into the travel lane is not permitted. The City does not take on any responsibility for damage done by de-icing operations.
  - No bike corrals are permitted on snow emergency routes during winter months.
  - The INDEGO bike share program is privately owned and coordinated with OTIS. INDEGO is responsible for snow removal and de-icing. Snow shall not be placed in the treated street.
  - As part of the Streets Department's Deicing and snow removal program, an effort will be placed on bike lanes where it is feasible.
    - Salting the bike lanes can occur with the salting of the travel lanes.
    - If the bike lane is next to the curb, efforts will be made to push the snow as close to the curb as possible. As the snow begins to melt, additional plowing and salting may be performed to expedite the snow melting
    - The City will be treating protected bike lanes. Each protected bike lane will be treated in a different manner:
      - The bike lanes in the 5th St Tunnel are being treated by DRWC. Since most of it is in the tunnel, salt should be applicable.
      - Frankford Ave, south of Ashburner. The Streets Department will be removing the delineators prior to the first plowable event and then returned in April. This will allow Streets Department crews to push the snow to the curb.
      - Ryan Ave from Rowland to Lexington has a protected bike lane with over 100 delineators. This was installed in the fall of 2016. The Highway Division has determined a method to treat the bike lane with plows.
      - South St, west of 27th. As of this update to the snow manual, the protected bike lane has been installed but not maintained by CHOP. Once re-installed, the Highway Division will treat.
      - Chestnut St from 44th to 33rd has a protected bike lane with over 150 delineators. In addition, some of the intersections delineators in the crosswalk that provide protection to pedestrians. This was installed in the summer of 2017. The Highway Division has determined the most effective way of treating the bike lane is manually. Snow blower will be used when salt is not effective. Part of the challenge is the property owners placing the snow from the parking lots and sidewalks in the bike lane. UCD has committed not to do this. Other property owners will be asked to remove the snow prior to the City removing.
      - Parkside Ave from Girard/40th to 52nd St. A proposed protected bike lane has not yet been installed. It was striped in November 2017. The time of this publication, the physical protected bike lane has not been installed, when it is, the Highway Division will experiment with different methods of treating. This includes the islands installed at 42nd St. During the winter of 2017-18, it was determined standard plow trucks cannot maneuver through the island at 42nd St. Therefore, a smaller truck (F-350) will need to plow Parkside Ave at the island. Once completed, the 1st Highway will deploy staff to clear the ADA ramps.

- Market & JFK from 15th to 20th had protected bike lanes during the Summer of 2018. Different types of practices will be tried during the winter of 2019 and 20 to see what the best method is. It is unclear as to how the lifting operation will affect this protected bike lane.
- 22nd St from BF Parkway to Spring Garden St had a protected bike lane installed in September 2018. Different types of practices will be tried during the winter of 2019 and 20 to see what the best method is.
- 13th St between Girard and C.B. Moore. A parking protected bike lane was installed in January 2019. The Highway Division has determined the method to treat the bike lane with a small truck.
- 27th from Lombard to South, South 27th to 21st. had a protected bike lane installed in Spring. During the wither of 2019 and 20, the appropriate method of treatment will be determined.
- 11th St from Reed to Bainbridge had a two-way parking protected bike lane installed, along the west side in the summer/fall of 2019. During the wither of 2019 and 20, the appropriate method of treatment will be determined. Note, it is NOT part of the plane to clear the angle parking stalls.
- 6th St from Spring Garden to Callowhill had a parking protected bike lane installed. During the wither of 2019 and 20, the appropriate method of treatment will be determined.
- 2nd St from Spring Garden to Callowhill has two small sections of protected bike lane installed. During the wither of 2019 and 20, the appropriate method of treatment will be determined.

PUBLIC RELATIONS AND EDUCATION

Major Media Notification

The City will use the local major media and community newspapers to ensure that notification of the Department's plan is timely as well as effective.

Key communications tools include:

— Issuing of press releases/advisories. This will be done by or coordinated with the Mayor's press office.
— Social Media
— Nextdoor Social Site

— Posting information on Streets Department's website including list of FAQs, snow tips and status of departmental services as appropriate. Suggested snow tips will include:
  - "Park car as far away from the corner as possible. Cars parked too close to the corner limit the turning radius of snow equipment."
  - "Obstructions, such as, illegally parked cars affect our ability to plow effectively."
  - For effective snow and ice management partnership, City and citizens need to work together.
  - Do not throw snow into the street or bike lanes.
  - Posting information on community websites/list serves
  - Utilizing OIT to distribute announcements email

Notification System

The Department uses a voice mail messaging system to reach out to residents to inform them of important updates during snow events. The system is used when needed for this purpose. Through OEM, The ReadyPhilly system may also be utilized.

311/Streets Department Communication Protocols for Snow Events

During storm events, all snow related inquiries will be accepted by 311, however, formal service requests will not be taken until 311 is notified by the Streets Department Public Relations that the event is officially declared over. During the event, 311 will advise the public of the level of deployment and let citizens know if their street is to be serviced depending on the level of service. After the event is ended, 311 will resume taking complaints from the public and the requests will be forwarded to the Streets Department for response within a reasonable time.

Responding to Citizens' Complaints

— **Delegation** — Service requests are, as always, delegated from the centralized system to operational units for appropriate action.

— **Tabulation** — Information can be gathered from the Public Relation's computerized system to provide a post-storm picture of complaints.

— **Planning** — This information can be further utilized to plan appropriately and change plans for future snow events.

School Closure Policy

When inclement weather is present or anticipated that may impact schools opening or closing early, Streets, SDP, Archdiocese, MDO, and MDO/OEM will conference to determine appropriate action relating to storm conditions.

POST SEASON SURVEY/SPRING MAINTENANCE

Beginning on or about March 1 of each year and continuing through April 30th, weather conditions permitting, sweeps will be made of Philadelphia road network, identifying defects for the upcoming spring repair season. Streets Department personnel, as well as those involved with residential inspection, may be asked to perform this task.

OPERATIONAL GUIDELINES — FIGHTING SNOW & ICE IN PHILADELPHIA

Material Resources

Salt inventory is dictated by several factors: storage capacity (including salt domes at secure, satellite locations throughout the city), availability of product, and environmental concerns. A salt dome is located at the six Highway District Yards and Domino Lane, Area 4. The City has the capacity to store over 50,000 tons of salt. Note, Anti-skid may be added to the salt if the inventory starts to run low or if the temperatures are cold where the salt may not be as effective. The Sanitation will sweep the street as conditions permit.

The Department orders salt as the inventory is depleted to maintain maximum capacity throughout the winter. Initial salt orders are placed against purchase orders cut from a blanket purchase order under the Commonwealth of Pennsylvania's contract. The City of Philadelphia has a secondary salt contract in place

Subsequent product is obtained from the City of Philadelphia's citywide rock salt contract. This contract provides for a primary and secondary vendor, and has language that includes the product specification, testing procedures, delivery locations, quantities and requirements, and weight certifications, and liquidated damages.

Requisitioning

The District Supervisor keeps an up-to-date inventory of the materials used for snow and ice removal during the winter months. S/he notifies the Administrative Officer (AO) and Assistant Chief Highway Engineer as orders need to be placed. An overall salt inventory for all six Districts & Domino Lane is maintained by the Assistant Chief Highway Engineer.

At the end of the winter season, the Chief Highway Engineer, AO, the Director of Planning & Analysis, and the Budget Officer review the remaining salt inventory to determine the necessary amount of salt needed to meet the following year's requirements. Accordingly, the State is notified of our estimated quantities, as is the Procurement Department for use in developing contracts for the following year.

Salting Policy

The Highway Division endeavors to maximize every application of de-icing to maintain the safest roads possible in the most economical way while protecting the environment. This also puts the City of Philadelphia in compliance with the MS-4 permit, this is maintained by PWD. The policy includes:

DRY SALTING WILL NOT BE PRACTICED.
This is not an effective way of treating streets and is a waste of material.

Personnel Training: The Streets Department is committed to providing continuing personnel training to ensure that staff is well equipped to perform their jobs effectively.

Equipment: The Streets Department and Office of Fleet Management should update and replace equipment in an economically responsible manner.

Calibration of Spreaders: Regardless of whether automatic or manual controls are used, they should be calibrated before the snow season starts. Poorly maintained and un-calibrated controls are responsible for excessive salt use.

Use of Automatic Controls: The use of automatic controls is recommended for spreaders to make sure the correct amount of salt is being spread at all times.

Adequate Covered Storage: Storage facilities are vital to any winter operation. They must have sufficient capacity and good cover preferably under roof. Stock piles that are stored unprotected should be covered to prevent loss of materials and to protect the environment.

Proper maintenance procedures should be followed around storage areas. Outside stockpiles should be properly shaped and should be on impermeable pads. There must also be proper drainage to keep the salt dry and protect the surrounding area. A method for disposal or retention of the leached salt should be in place. Any salt that is stored outside of a protected area, may be temporarily tarped. This shall occur not only while deliveries are being made, but also if it is stored in areas outside of the designated salt storage areas (i.e.: Parking lots)

The 7 salt storage locations are domes or sheds. This will protect the salt from the weather.

The Street's Department is committed to work with the MDO, Clean Water task force & GSI initiatives.

Safeguarding the Environment: Salt and de-icing materials should be used in a manner that safeguards the environment. If misused, de-icing can pollute. If improperly used or stored it can get into wells or ground water. Excessive salt use can be damaging to certain plants and trees when runoff leaves sodium chloride in the soil. This practice makes the City of Philadelphia in compliance with the MS-4 permit.

Application: The application of salt alone depends on the type of precipitation, temperature, and snowfall intensity. When there is adequate frozen precipitation on the pavement (non-plowable depth), and the temperature is above 25 degrees Fahrenheit, straight salt is optimized. Below 25 degrees Fahrenheit, a mixture of salt and abrasives will be used. The initial treatment of the roadway before plowing operations begin is to reduce ice or snow bonding to the pavement. Salt application rates range from 200 to 800 pounds per two-lane mile, depending on the storm conditions. Salt can be applied in a windrow or full width, which is sometimes necessary. Brine, formed by salt and water, will run to other parts of the road and be spread by traffic. Plowing operations should be timed to allow maximum melting. Salt reaction time is usually 20 to 30 minutes. (Reaction time increases as temperature decreases.)

Operation of Equipment:

Within the City of Philadelphia, there are many bridges with weight restrictions. The drivers are not to drive crew cabs or tri-axles loaded with salt over bridges with low weight restrictions. These bridges include but not limited to:

FALLS BRIDGE
MARTIN LUTHER KING DRIVE
15TH ST, NORTH OF CALLOWHILL
MONTGOMERY AVE, BETWEEN 29TH AND 31ST
CALUMET, EAST OF WISSAHICKON

In addition, the following bridges are closed or will be closed during the winter of 2019–20:

MARGIE ST BRIDGE, WEST OF GLENWOOD
CHESTNUT ST BRIDGE, CROSSING THE SCHUYLKILL RIVER
15TH ST, SOUTH OF SPRING GARDEN

In addition, drivers who are responsible for driving vehicles with “dumps” need to be aware of the height restrictions so to avoid low clearance bridges, wires and tree limbs.

Equipment Resources

Certain specialized equipment is required to support the snow and ice removal plan; specifically, snowplows, salt spreaders, and snow loaders. Much of this equipment is available within the Department. Additional equipment is obtained through contract and is provided by other operating departments.

- **Spreaders:** Spreaders including tailgate and V-box spreaders are used to apply salt or sand, which are the primary de-icing chemicals used for fighting winter storms. Application rates are set for various conditions following Salt Institute guidelines.
- **Plows:** Plows are mounted on Highway Division trucks and Sanitation Division compactors of the Streets Department, as well as equipment in supporting departments for residential plowing once accumulation predictions are for 4" or more snow (or as conditions permit)
- **Contract Equipment:** City equipment is supplemented using private sector contracted equipment for significant weather events. This equipment is used to assist clearing snow and ice from the primary/secondary network, as well as hauling snow from the CBD to a predetermined snow field.
- **Footbridge/Sidewalk Clearance Protocol:** Bridge Maintenance employees of the Streets Department are dispatched after each event ends to clear snow and de-ice from pre-determined footbridges and from the sidewalks of bridges. Other personnel may be asked to clear of sidewalks as conditions permit.
- **Bus Stops & Kiosks:** In 2017 and 2018, OTIS entered into a contract with Intersection to maintain the Bus Stops & Kiosks. As part of the maintenance agreement, they are to shovel and treat the sidewalks around the Bus Stops & Kiosks. This also includes the upgraded bus stops along Blvd Connect.
- **Communication:** All vehicles will be equipped with either radios or cell phones for communication during the events. GPS units are installed on most vehicles.
- **Winter Maintenance Facilities:** The six Highway Division maintenance facilities serve, along with Snow Headquarters, located in the Bridge Maintenance Yard, as the bases of all de-icing operations. During significant events, they are supplemented by Sanitation area and residential facilities. Salt is stored at the six Highway Division yards and Domino Lane.
- **Operation and Safety:** Equipment will be operated in a safe, effective manner by trained, properly licensed, operators. Winter is the season when equipment fails to start, personnel take shortcuts, traction is poor, visibility is poor, and other motorists may not see the operators of other vehicles. All drivers and crews should make required checks prior to and during the use of equipment to ensure safe operations are maintained. Pre and post trip inspections are mandatory.

Usage of Snow Melters

If the amount of snow in a single event or multiple events combine warrant a large-scale removal, the City may invest in the rental of snow melting equipment. The Streets Dept will work with Fleet Management and the Airport in arranging for this equipment to be delivered to a pre-determined location. The location will be approved by the Water Dept so that MS-4 permit will not be violated. In addition, the inlets will be cleared so not to produce flooding from a choked inlet.

Personnel Resources

All Streets Department personnel are subject to reporting to duty during snow and ice storms. Failure to notify the supervisor of the inability to work during a storm is grounds for disciplinary action. Please see the Essential Staff Policy in Section 1, page 6.

The Highway Division is responsible for overall coordination of snow and ice control preparations. Supervisors are responsible for providing the direction required for effective snow and ice control.

- **Clothing:** The lack of proper clothing is a direct cause of most frostbite occurrences, falls, and in many cases, is a factor in equipment accidents. All crews are urged to dress for the possibility that they may be stranded without heat for several hours. It is contemplated that within two hours assistance will be provided to any crew having trouble.
- **Communications:** On street communications are maintained by inspectors and spotters, who are in constant communication with the Highway and Sanitation Districts and Snow Headquarters.

Personnel Notification Lists (and equipment and other assignments) will be provided to required personnel. Phone trees are to be initiated as necessary at the beginning of a snow alert.

Reporting Procedures

Status Reports: District Highway Engineers will be responsible for maintaining contact with all supervisors and operators in their districts and reporting on the progress of the field personnel to the Snow Headquarters. District Highway Engineers or their designee will make their first report one hour after notification of the snow alert and will continue to make reports as needed throughout the duration of the snow removal operations.

Accident Reports: The following are the responsibilities of the driver if an accident should occur during snow removal operations:

- Check for injury to persons, never admit liability, call 911 immediately for medical emergencies and state that there is a medical emergency;
- Obtain identification of the other vehicle and driver;

- Notify Police immediately either through radio dispatcher or by telephone. Do not leave the scene of an accident except in cases where physical harm is threatened. If physical harm is threatened, relocate then notify the police;
- Notify supervisor by radio or telephone immediately. All accident should be reported to Snow Headquarters.
- Forms 77-501 (Employee Accident/Incident Information) and 77-502 (Citizen Accident Information) should be carried in every vehicle and thoroughly completed at the scene of any accident then forwarded to either a supervisor or directly onto Form 82-S-87 (Traffic Accident Report);
- Employee should not sign statements, suggest any settlement or volunteer information about the accident except as noted above. All other requests for statements or signatures should be forwarded to the City of Philadelphia's Risk Management Department;
- The Safety Office shall be notified. Also, Email sent to the Safety Office.

Non-Municipal Employees contracted for snow removal operations should follow all of the directives listed above except completion of Form 82-S-7 which should be completed by the City on duty supervisor. The contractor is responsible for their own equipment.

Training

Requirements and Timelines: Training will be held for all personnel involved in snow removal as needs determine. Snowplow training for Highway Division and Sanitation Division personnel is part of on-going CDL training. Residential training is an intensive effort that will take place in November of each year for required personnel.

Field Inspection Procedure

Spotters/inspectors- will report on actual roadway condition. Reports will include surface condition, material application, plow progress, and problem locations. Conditions which have prevented the removal of snow and ice, such as illegally parked cars, abandoned cars, vehicles stuck in snow, etc. will be noted for follow-up removal efforts. Spotters/inspectors will file field reports with their respective coordinators after each event.

- **Primary/Secondary:** Spotters/inspectors are to report on the condition of the network, with a focus on identifying areas that are particularly troublesome for immediate follow-up.
- **Residential:** Spotters/inspectors, as well as the residential navigators, are to report on residential conditions, noting streets that will require follow-up work due to problems encountered during the initial effort.

- **Frequency of Report & Detail:** Reports are to be made as needed to the district managers and forwarded to Snow Headquarters. Detail to include whether road is passable, snow covered, salted, plowed or bare pavement. Conditions are coded and noted on inspector's reports.
- **Expectations:** It is the City's expectation that the road network be l passable, no longer than 12 hours after the last flake has fallen. Additionally, it is the City's goal to have all routes identified in this manual's response protocols clear within 24 hours of the fall of the last flake.

Policy on Snow Plowed into Streets and Bike Lanes

As noted in the Philadelphia Code, Chapter 9, Section 601 (4) (f), Chapter 9, Section 404 and Chapter 10, Section 720, snow is not permitted to be plowed or shoveled onto City streets. Enforcement and penalties are described in the respective chapters.

Police Department Responsibility: Police Department personnel are to stop private contractors from plowing snow off of parking lots and driveways into city streets.

Streets Department Responsibility: SWEEP Officers will be dispatched to warn residents about throwing snow in the streets, as well as enforcing the 6-hour timeline to have your sidewalk shoveled to a minimum of a 36-inch path.

Communication

Internal: Communication of on-street activity during winter weather events will occur as needed. Spotters and inspectors will report to their respective coordinators route conditions and any identified trouble spots on their assigned routes. Operators will report any mechanical problems to both their headquarters and the Office of Fleet Management. All district coordinators will forward the updates to Highway Division Snow Headquarters, where the information will be compiled.

External: Highway Division Snow Headquarters will disseminate all information concerning winter weather events to external sources. Route progress reports, street conditions, equipment and personnel deployed, and materials used will be included in these reports. For major events, this information will be forwarded to the Streets Commissioner. He will then forward this information. Snow Headquarters will communicate to the Emergency Operations Center.

SECTION 2
SNOW EMERGENCY ROUTES

VISIT PHILADELPHIA®

SNOW EMERGENCY ROUTES

2.1 Snow Declaration

The Mayor, through the Managing Director, has the authority to issue a Snow Emergency Declaration for significant events. This declaration implements parking regulations on dedicated snow emergency routes.

2.2 Citizen Responsibility

Citizens are required to remove their vehicles from snow emergency routes.

2.3 Inspector Responsibility

Inspectors are required to report locations where cars have not been moved and to ensure that designated routes are plowed completely curb to curb.

2.4 Police/Parking Authority Support and Timelines

Police Tow Squad and Parking Authority tow vehicles will remove vehicles from snow emergency routes. Towing will begin at the designated snow emergency starting time and continue as necessary until the declaration is lifted.

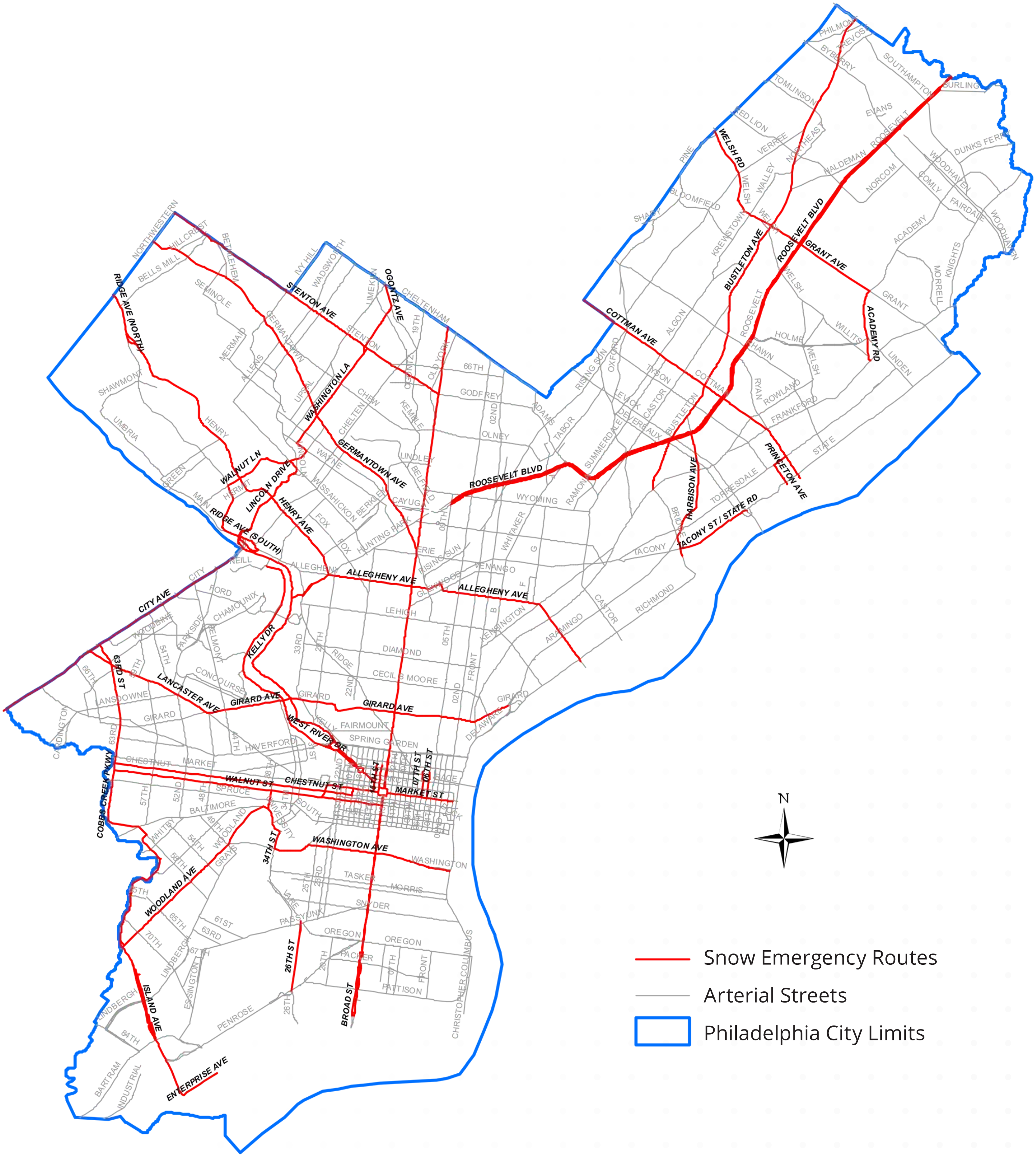
2.5 Record Keeping

Police Department and the Parking Authority personnel will keep records of the location of the relocated vehicles.

2.6 Snow Emergency Routes

Reference Map and Route Table

CITY OF PHIADEPHIA
SNOW EMERGENCY ROUTES



ON	FROM	FROM HUNDRED	TO	TO HUNDRED
06TH ST	I-676 OFF RAMP	300 N	MARKET ST	UNIT BLOCK
07TH ST	MARKET ST	UNIT BLOCK	I-676 ON RAMP	300 N
15TH ST	I-676 OFF RAMP	300 N	MARKET ST	UNIT BLOCK
16TH ST	MARKET ST	UNIT BLOCK	I-676 ON RAMP	300 N
20TH ST	CHESTNUT ST	UNIT BLOCK	MARKET ST	UNIT BLOCK
26TH ST	I-676 ON/OFF RAMPS	2500 S	PENROSE AVE	3800 S
34TH ST	UNIVERSITY AVE	1100 S	GRAYS FERRY AVE	1100 S
38TH ST	WALNUT ST	200 S	UNIVERSITY AVE	200 S
63RD ST	CITY AVE	2100 N	WALNUT ST	100 S
ACADEMY RD	FRANKFORD AVE	9100	GRANT AVE	9400
ALLEGHENY AVE	HUNTING PARK AVE	2900 W	I-95 ON/OFF RAMPS	2800 E
BEN FRANKLIN PKWY	ART MUSEUM CIRCLE	2300	16TH ST	1600
BRIDGE ST	HARBISON AVE	2100	I-95 ON RAMP	2300
BROAD ST	CHELTENHAM AVE	7200 N	I-95 ON/OFF RAMPS	3800 S
BUSTLETON AVE	FRANKFORD AVE	5200	ROOSEVELT BLVD	6300
BUSTLETON AVE	ROOSEVELT BLVD	UNIT BLOCK	COUNTY LINE	UNIT BLOCK
CHESTNUT ST	COBBS CREEK PKWY	6200	20TH ST	2000
CITY AVE	CITY BOUNDARY	7700	I-76 ON RAMPS	3800
COBBS CREEK PKWY	WALNUT ST	200	WOODLAND AVE	2100
COTTMAN AVE	I-95 OFF RAMP	5000	FILLMORE ST	UNIT BLOCK
ENTERPRISE AVE	ISLAND AVE	8400	I-95 ON/OFF RAMPS	8200
GIRARD AVE	LANCASTER AVE	4700W	I-95 ON/OFF RAMPS	800 E
GERMANTOWN AVE	BROAD ST	UNIT BLOCK	NORTHWESTERN	UNIT BLOCK
GRANT AVE	WELSH RD	1300 E	ACADEMY RD	3000 E
GRAYS FERRY AVE	34TH ST	3300	WASHINGTON AVE	2600
HARBISON AVE	BRIDGE ST	5200	ROOSEVELT BLVD	6500
HENRY AVE	CATHEDRAL RD	8500	HUNTING PARK AVE	3000
HUNTING PARK AVE	HENRY AVE	3000 W	KELLY DR	3300
ISLAND AVE	WOODLAND AVE	2200	ENTERPRISE AVE	4000
KELLY DR	LINCOLN DR	4600	ART MUSEUM CIRCLE	2300
LANCASTER AVE	CITY AVE	6300	GIRARD AVE	4800
LINCOLN DRIVE	RIDGE AVE	3600	WISSAHICKON AVE	5900
MARKET ST	SCHUYLKILL AVE	2300	I-95 ON RAMP	100
OGONTZ AVE	WASHINGTON LN	7400	CHELTENHAM AVE	8000
POPLAR ST	WEST COLLEGE AVE	2500	GIRARD AVE	2400
PRINCETON AVE	TORRESDALE AVE	4700	I-95 ON/OFF RAMPS	5000
RIDGE AVE (NORTH)	NORTHWESTERN AVE	9100	CATHEDRAL RD	8600

ON	FROM	FROM HUNDRED	TO	TO HUNDRED
RIDGE AVE (SOUTH)	WALNUT LN	5600	CITY AVE ON RAMP	4500
ROOSEVELT BLVD	09TH ST	800 W	CITY BOUNDARY	16000 E
SCHUYLKILL AVE	MARKET ST	UNIT BLOCK	WALNUT ST	100
SEDGLEY AVE	ALLEGHENY AVE	1000 W	ALLEGHENY AVE	900 W
STENTON AVE	NORTHWESTERN AVE	9600	BROAD ST	1400
TACONY ST/STATE RD	BRIDGE ST	5200	TACONY-PALMYRA BRIDGE	6300
TORRESDALE AVE	COTTMAN AVE	7200	PRINCETON AVE	7100
UNIVERSITY AVE	38TH/39TH ST	300/400	34TH ST	600
WALNUT LN	WAYNE AVE	400 W	RIDGE AVE	500
WALNUT ST	BROAD ST	1400	COBBS CREEK PKWY	6200
WASHINGTON AVE	GRAYS FERRY AVE	2600	CHRISTOPHER COLUMBUS BLVD	UNIT BLOCK
WASHINGTON LN	WAYNE AVE	200 W	OGONTZ AVE	2000 E
WAYNE AVE	WALNUT LN	6100	WASHINGTON LN	6200
WELSH RD	CITY BOUNDARY	UNIT BLOCK	GRANT AVE	1100
WEST COLLEGE AVE	POPLAR ST	900	GIRARD AVE	900
WEST RIVER DRIVE	ART MUSEUM CIRCLE	2300	FALLS BRIDGE	2700
WISSAHICKON AVE	LINCOLN DR	6000	WALNUT LN	6000
WOODLAND AVE	COBBS CREEK PKWY	7200	UNIVERSITY AVE	3800


57 RISING SUN-OLNEY
7461
5619
SEPTA

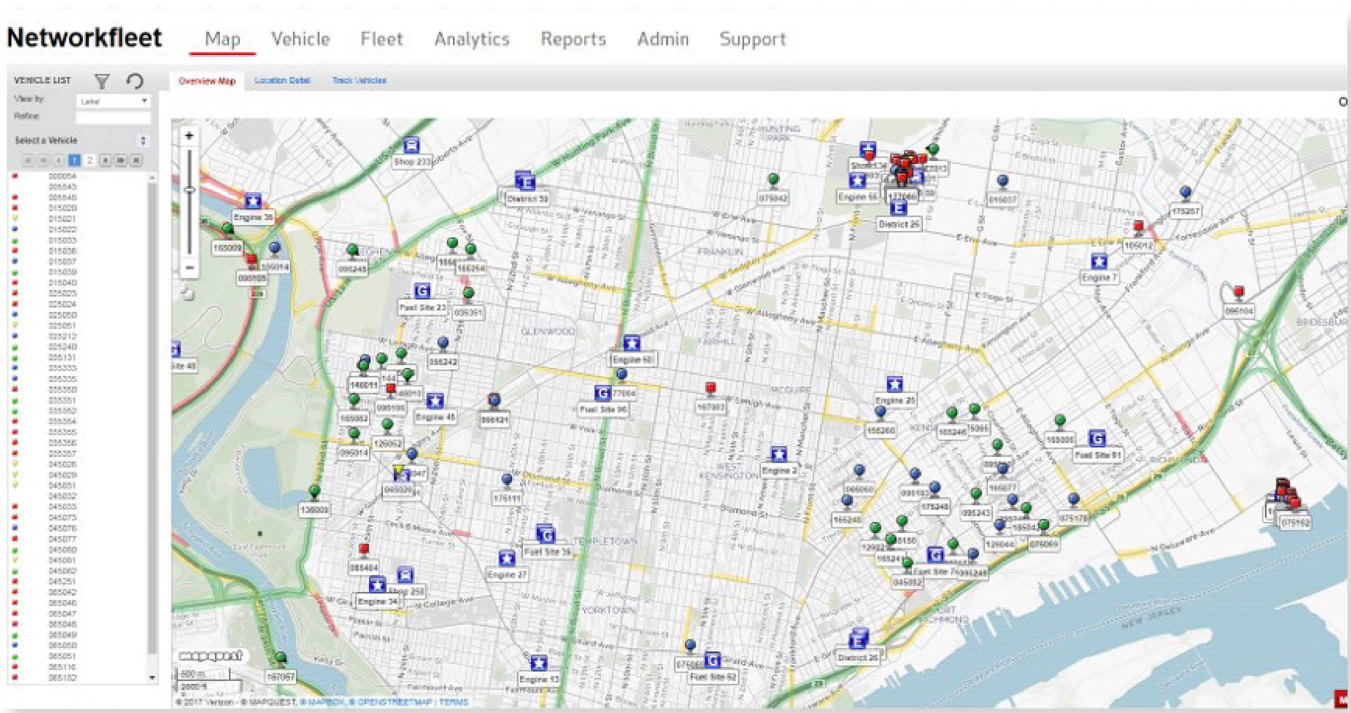
SECTION 3
TECHNOLOGY

NEW TECHNOLOGY TOOLS

GPS Tracking

In 2018, the Streets Department began using GPS in all its snow vehicles (city and contractors). The goal was to integrate the software with operations as a method to track completion of snow routes. Using automated dashboards and real-time reporting, the Department can track the number of times a route has been cleared and record historical information that allow the snow operations teams to review past performance on snow removal and if need be adjust their responses based on the severity of each storm.

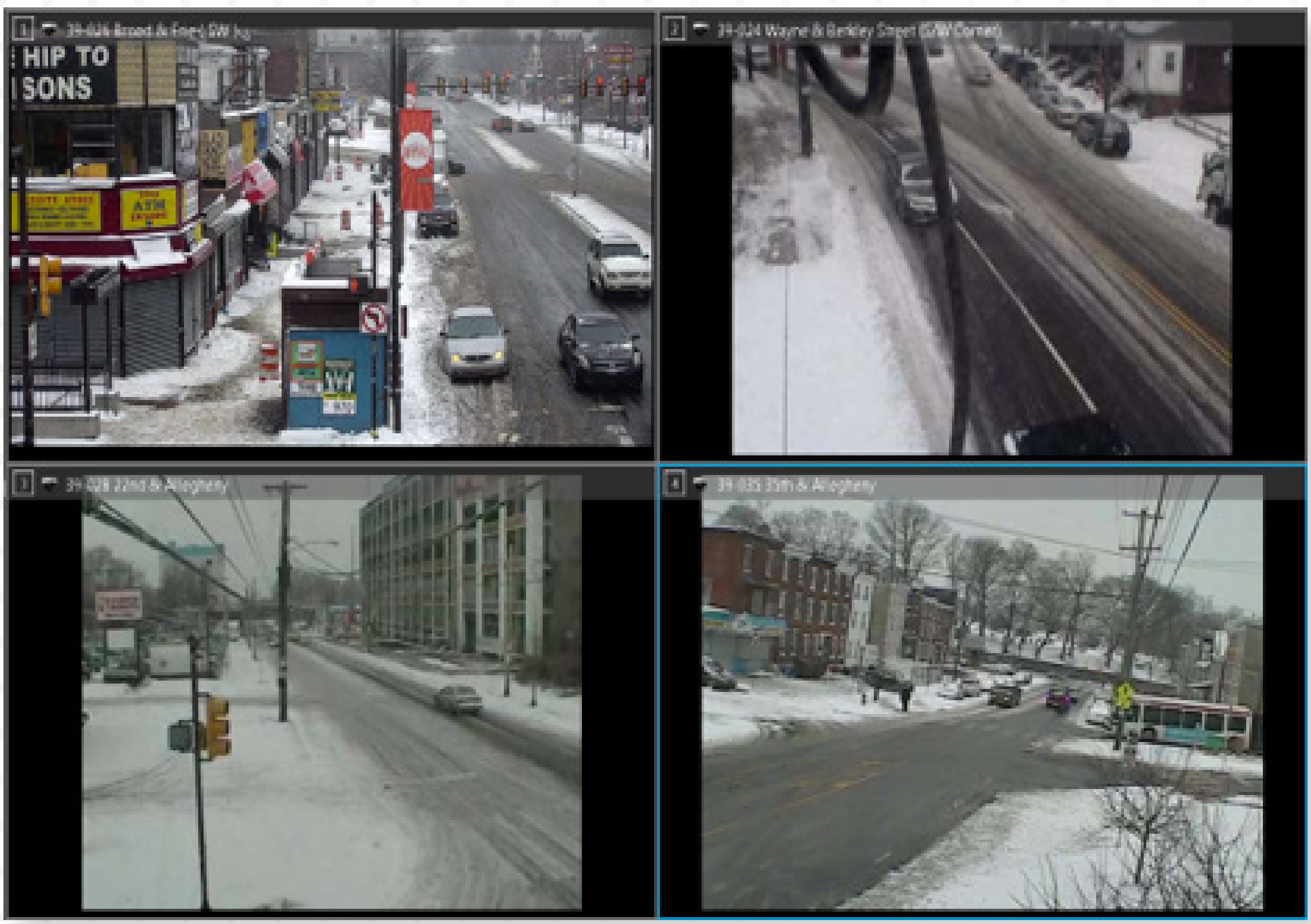
To complement the tracking, Streets Department Field Supervisors and Navigators input three-hour route data updates on run numbers, sequences completed, salt fills and missed location sequences. The data is used to generate a Route Status Map to assess progress. The routes are then inspected and determined if passable.

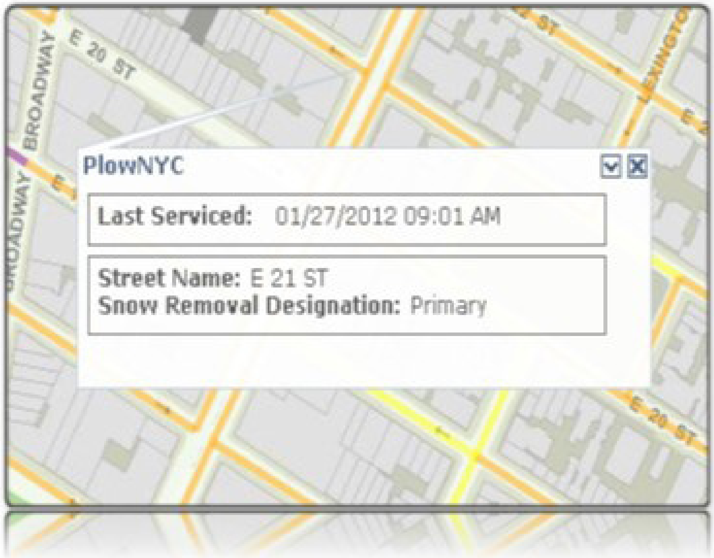


Cameras

The Streets Department also began using mobile visual monitoring to view snow operations in real-time. Video footage from cameras installed at the Department's Transportation Operations Center, Police Department and PennDOT are used to track and document progress of route completion. The cameras allow "live" visual viewing to determine which streets have already been plowed and which streets may still require snow removal. Visual monitoring provides real-time data of the location of vehicles as they navigate through a storm, and it helps to improve route completion by providing drivers advance warning of any traffic delays and any potential safety hazards on the road.

Each of the tools allow the Snow Operations Teams to provide more effective and efficient service to residents. They also provide valuable insight into how the snow fleets are being used and improves communication between operation teams while out in the field.





PlowPHL

In 2019, the Streets Department unveiled StreetSmartPHL which answers the question, "Are you Street Smart?" by connecting residents and stakeholders to real-time information related to permits, paving, snow plowing, and trash and recycling collections. StreetSmartPHL is the City's first online "smart" tool designed to give residents, visitors and businesses direct access to the Streets Department's core services. The fourth component on the StreetSmartPHL platform is PlowPHL. PlowPHL will be released in 2020 and will be a public facing web map designed to provide residents with real-time status of their street during a snowstorm.

SnowCat

As part of its snow operations on residential streets the Streets Department acquired 14 new Bobcats or "SnowCats" as part of its snow operations to service small/narrow streets. The "SnowCats" are also equipped with GPS to provide status updates of treated routes every three hours.

SECTION 4
SNOW/PLOW ROUTES

Highway Snow Operations (Map Location)

Go to the Streets Department's Intranet site
http://streetsweb.city.phila.local/

Select "Streets GIS"
http://streetsweb.city.phila.local/streets_gis.html

Select "Divisional Maps"
ftp://streetsweb.city.phila.local/Maps/

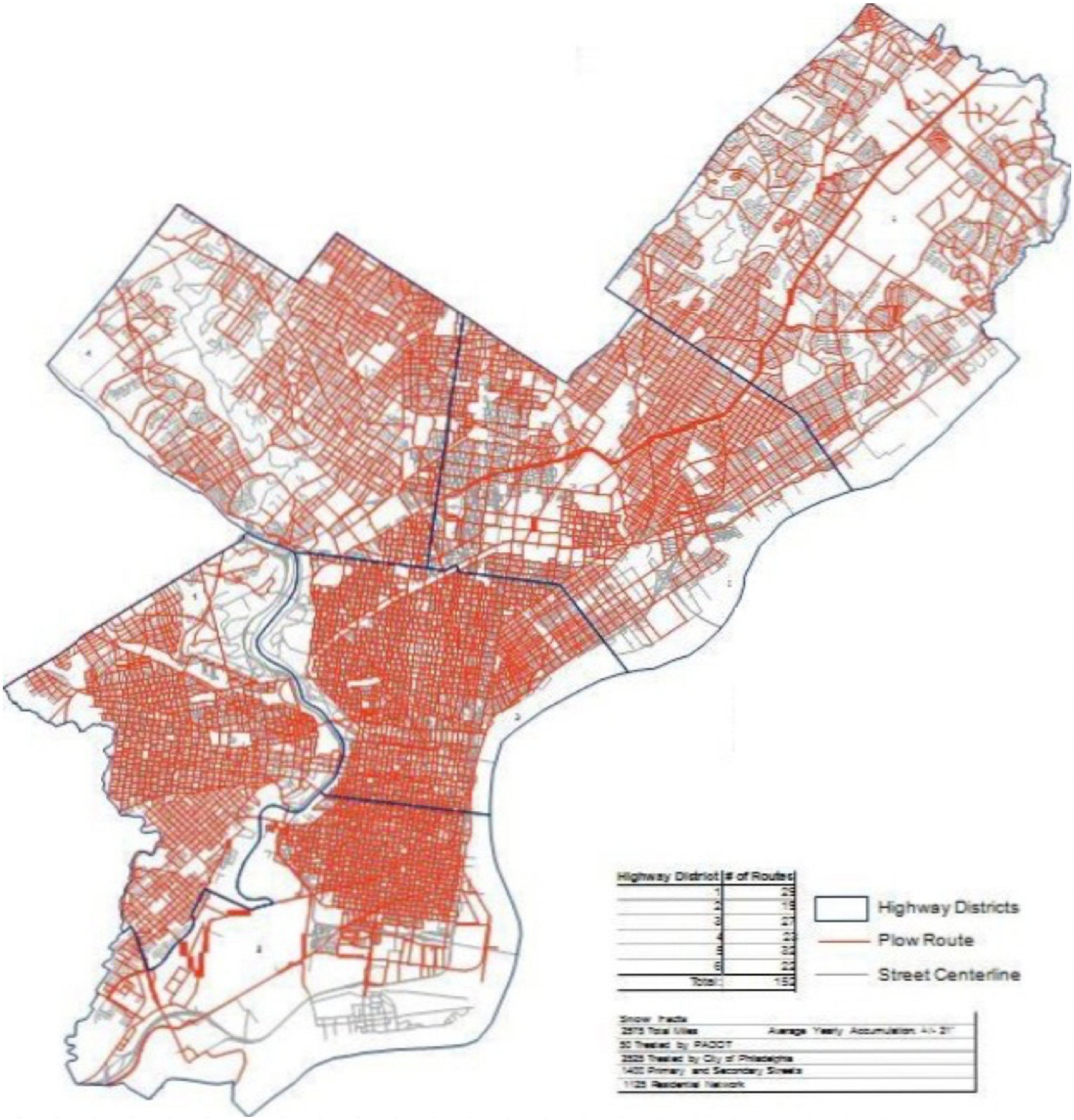
Select "Highways"
ftp://streetsweb.city.phila.local/Maps/Highways/

Select "Snow"
ftp://streetsweb.city.phila.local/Maps/Highways/Snow/

Select "Snow Maps"
ftp://streetsweb.city.phila.local/Maps/Highways/Snow/Snow%20Maps/

Select:
"Directory Overviews"
"Directory Plow Trip Packs"

PRIMARY AND SECONDARY SNOW PLOW ROUTES



SECTION 5
KEY INFORMATION

SECTION 6 RESIDENTIAL STREET SYSTEM

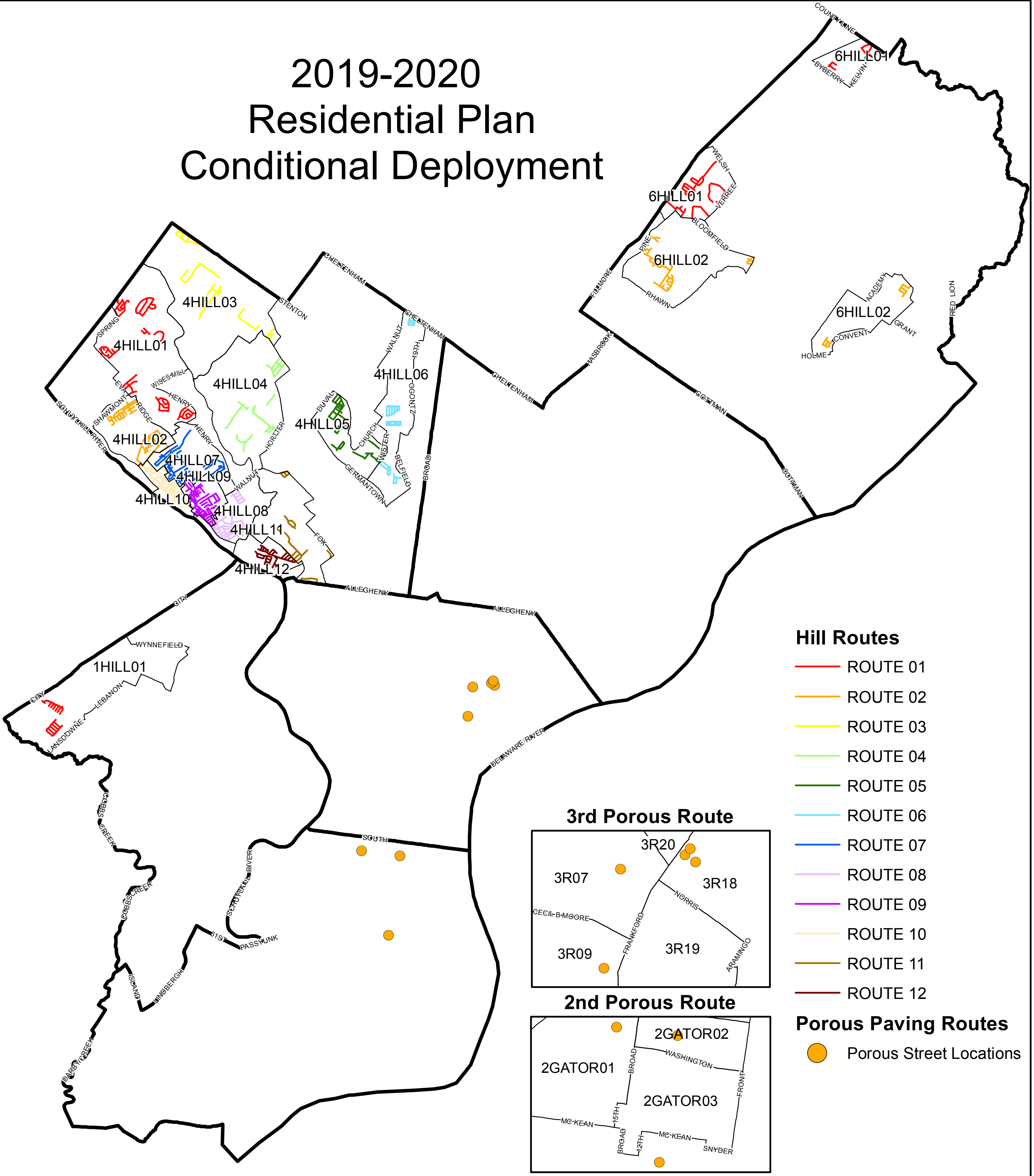
Deployment Maps

- Conditional Hill – Deployment Route Summary
- Conditional Hill – Deployment by Department
- Full – Deployment Route Summary
- Full – Deployment by Department

Office Location & Phone List

Support Departments – Manager Contacts

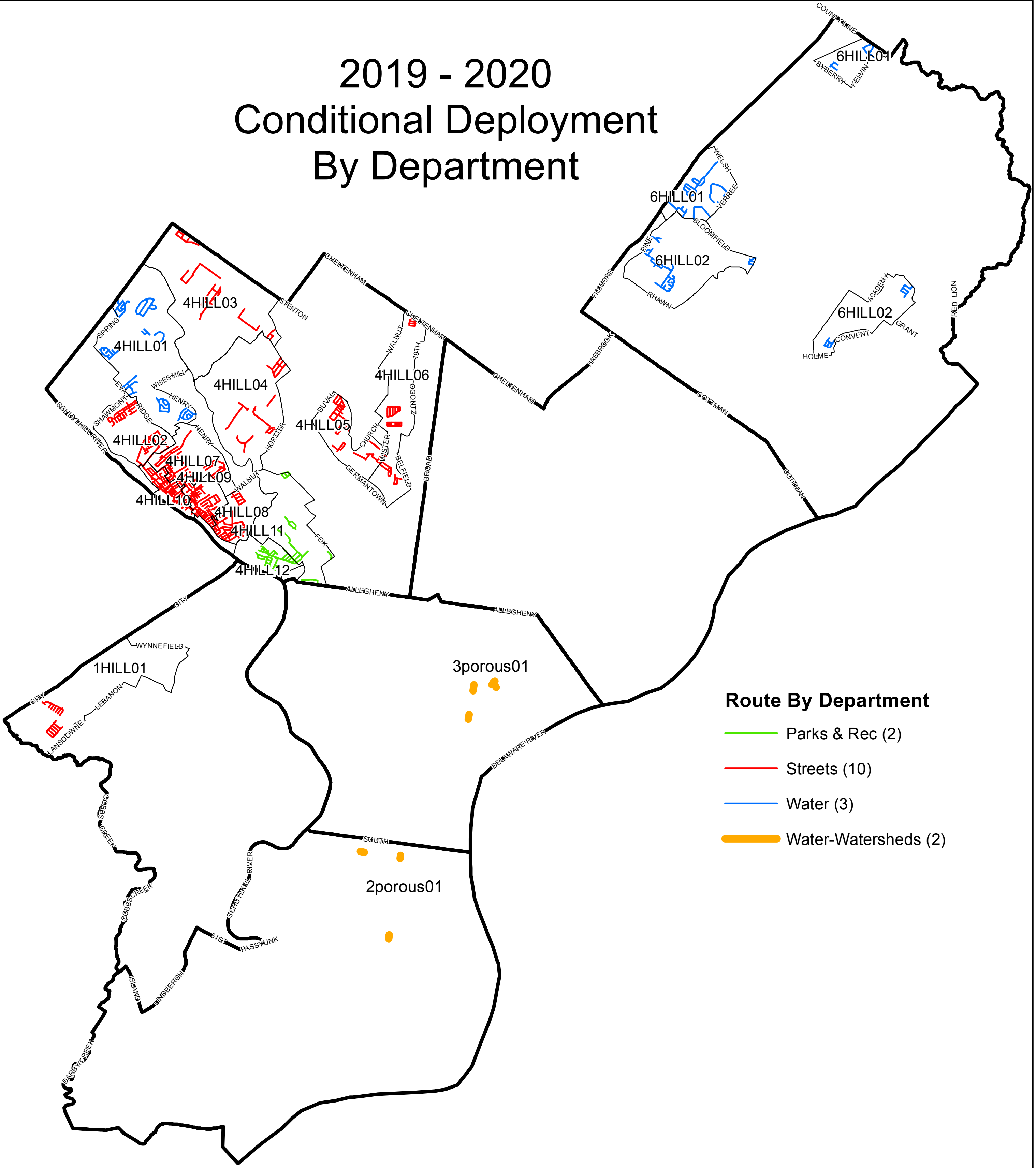
2019-2020 Residential Plan Conditional Deployment



Operaton	District	Deployment	Miles Serviced	
Hill	1st	1 Route	2.42	72.06
	4th	12 Routes	59.53	
	6th	2 Routes	10.11	
Porous Streets	2nd	1 Route	0.18	0.45
	3rd	1 Route	0.27	

Map Created: 10/10/2019 - MxS

2019 - 2020
Conditional Deployment
By Department

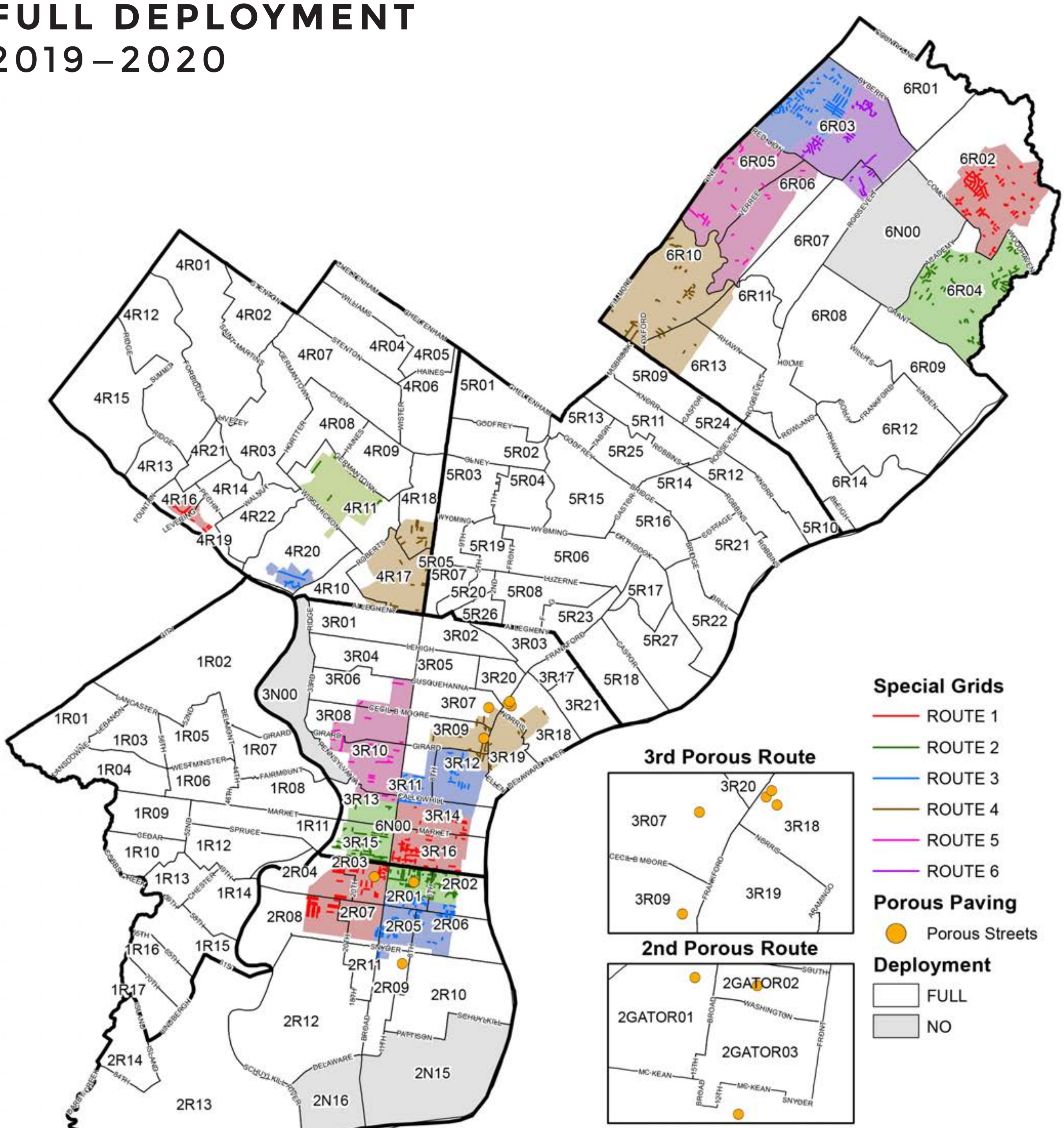


Route By Department

- Parks & Rec (2)
- Streets (10)
- Water (3)
- Water-Watersheds (2)

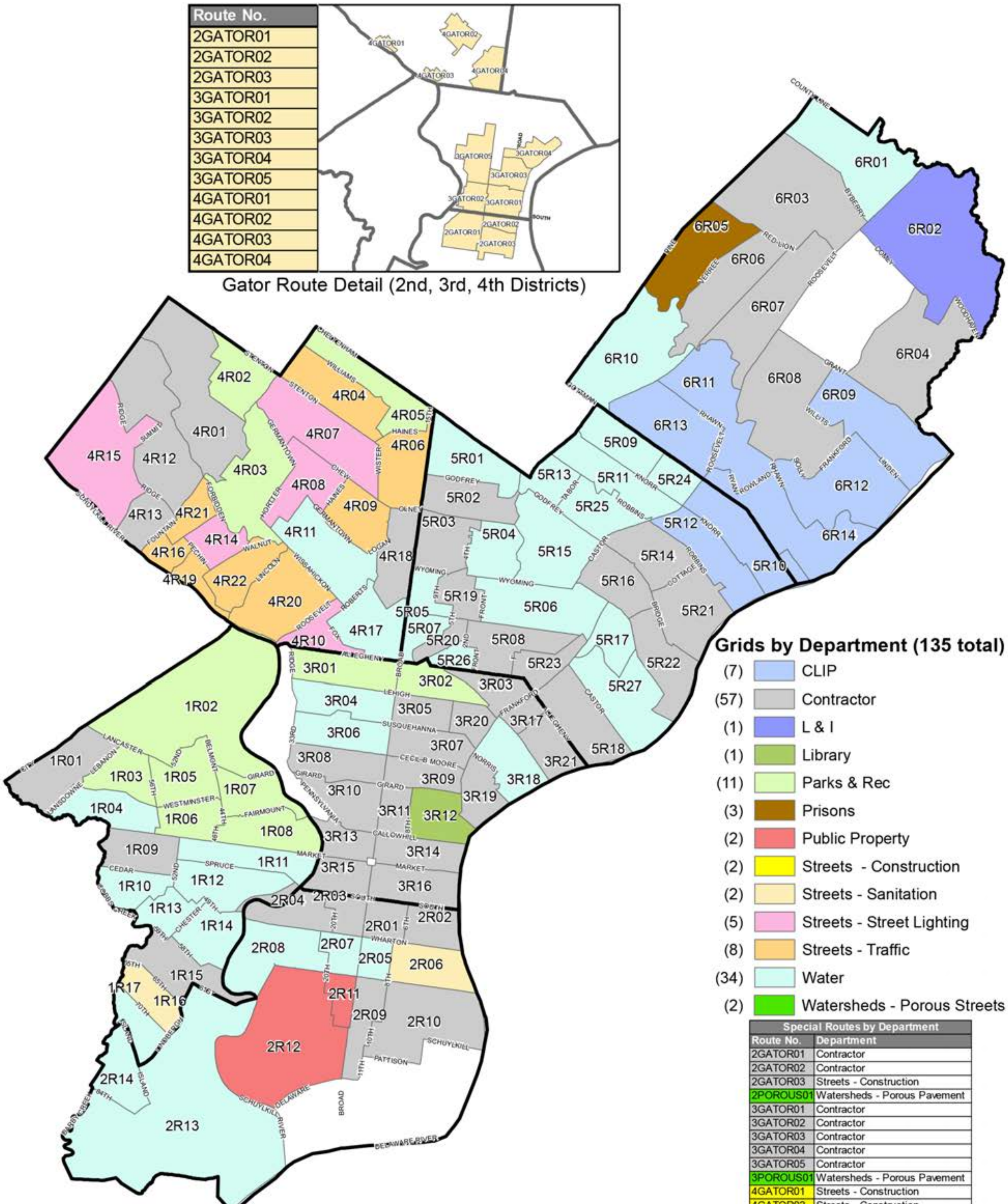
Map Created: 10/10/2019 - MxS

RESIDENTIAL PLAN FULL DEPLOYMENT
2019–2020



Operaton	District	Deployment	Miles Serviced	
Full	1st	17 grids	144.1	1132.8
	2nd	14 grids + 3 special	117.9	
	3rd	21 grids + 5 special	197.2	
	4th	22 grids + 4 special	206.3	
	5th	27 grids	253.8	
	6th	14 grids + 6 special	213.5	
	Summary	133 Routes		
Porous Streets	2nd	1 Route	0.18	0.45
	3rd	1 Route	0.27	
	Summary	2 Routes		

FULL DEPLOYMENT BY DEPARTMENT
2019–2020



Special Routes by Department	
Route No.	Department
2GATOR01	Contractor
2GATOR02	Contractor
2GATOR03	Streets - Construction
2POROUS01	Watersheds - Porous Pavement
3GATOR01	Contractor
3GATOR02	Contractor
3GATOR03	Contractor
3GATOR04	Contractor
3GATOR05	Contractor
3POROUS01	Watersheds - Porous Pavement
4GATOR01	Streets - Construction
4GATOR02	Streets - Construction
4GATOR03	Contractor
4GATOR04	Contractor
6PICKUP01	Contractor
6PICKUP02	Water Department
6PICKUP03	Prisons
6PICKUP04	Contractor
6PICKUP05	Contractor
6PICKUP06	Prisons

SECTION 7
SNOW LIFTING ACCOUNTING PROCEDURES

SNOW LIFTING RECORDS

1. Forms Required

a. Streets Department Spreadsheet 77-298

2. Snow Equipment Rental Form (77-298)

a. The District Engineer will be responsible for recording the following information for each piece of equipment assigned to their location.
   1. Highway District
   2 Contractor
   3. Who notified you
   4. Day of the week
   5. Time called
   6. Type of equipment ordered
   7. Operation to be performed by the equipment
   8. Where the equipment is to be assigned

b. The contractor will assign the equipment and the operator as directed by the Streets Department, and record the license number of the equipment, and the name and address of the operator on the 77-298 form. The form will be given to the contractor operator to be used as his assignment and time record.

c. The District Engineer will give the 77-298 form to his inspector assigned to the operation. The inspector will be told to report at the designated time and location for the start of operations. The inspector will sign-in the equipment assigned to him on the 77-298 form, recording the following information:
   1. Equipment license number
   2. Contractor's employee name
   3. Contractor's employee address
   4. Starting time
   5. Phone number

The contractor's operator will indicate on the 77-298 form the Time Started.

d. The inspector will call his District Engineer at hourly intervals and inform him of the progress being made. When the assignment is completed the inspector and the contractor's operator will each note **Time Stopped** on their form.

e. The City of Philadelphia will pay only for the operating time for the contractor's equipment. Stand-by time or lost time will be entered under "Penalty Time" and an explanation of the cause under "Penalty Remarks". When additional assignments are given to the inspector, he will complete "Location From To" on form 77-298. He will give this information to the contractor's operator, who will note this added assignment on his copy of form 77-298.

f. Whenever the contractor replaces a piece of equipment, or replaces an operator, the contractor will initiate a new form 77-298. The inspector at the worksite will then prepare a new form 77-298 to cover the replacement. Procedures will then proceed as previously outlined.

g. When a form 77-298 is completed, the city inspector will sign his copy and the contractor's operator copy. The inspector's copy of the form will be returned at the end of his tour of duty to his District Engineer.

h. When a form 77-298 is completed, the contractor's operator will sign his copy and the city inspector's copy. The operator's copy of the form will be returned to his employer.

i. The reverse side of form 77-298 can be used for remarks or explanations of unusual situations. On forms 77-298 containing the time record for dump trucks the city inspector will note on the reverse side the following information:
   1. The time the dump truck leaves the work location to unload
   2. The time the dump truck returns to the work location from unloading.

j. When the District Engineer receives the city inspector's forms, his personnel will enter on each line the "Total Working Hours". This is the number of hours at the site (start-finish) less the "penalty time" lost. Appropriate travel time will be added for each piece of equipment.

k. The District Engineer will check the city inspector's form and will then forward them to the Snow Contractor Liaison of Department of Streets. The contractor will use his copies of the form 77-298 to prepare his invoice, in triplicate, will be drawn on the Accounting Division, Office of the Director of Finance, Room 1330 Municipal Services Building, and sent directly to Administrative Office, Highway Division, Department of Streets for pre-auditing. The invoice will contain the following information and will be submitted for each 24-hour period:
   1. Contractor's name and address
   2. Snow Event
   3. Number of pieces, kind and class of equipment in operation
   4. Location of operations, i.e.: streets on which equipment operated
   5. Dates and hours of work at specified rate per hour for
      a. Equipment with operator
         - Regular Time
         - Premium Time
      b. Foreman
         - Regular Time
         - Premium Time
      c. Laborers
         - Regular Time
         - Premium Time
      d. Travel time for equipment only (rate times the standard level travel time allowed)

l. The Snow Contractor Liaison, Highway Division, Department of Streets will summarize the form 77-298 and prepare a receiving report (form 71-20) in the usual manner for each 24-hour period. The receiving report and supporting form 77-298 will be forwarded to the Accounting Division.

m. Time calculations for equipment and personnel will be based on full 15- minute periods. For example, a piece of equipment operating for 4 hours and 27 minutes will be paid for 4½ hours.

3. Contractor Labor-Snow Emergency Form (77-298)

a. Procedures applicable to “Snow Equipment Rental”, form 77-298 are also applicable to “Contract Labor – Snow Emergency”, form 77-298 except as indicated below.

b. The contractor’s foreman will maintain the contractor’s time record for the foreman and the labor crew.

4. The Chief Highway Engineer will terminate Snow lifting operations.

5. This procedure will also be included with the rental of loaders for the salt domes if needed.

SECTION 8
SNOW REMOVAL COST ACCOUNTING PROCEDURE

SNOW AND SALTING COST ACCOUNTING PROCEDURES

A. Purpose

The Purpose of this procedure is to (1) provide a means for determining the cost of plowing and salting city streets and legislative routes within the city street system, and (2) provide a method for allocating these costs to both legislative routes and city streets. Most of this data is kept in the SSIS. Hard copies are not necessary to be kept.

B. Scope

The use of the forms described in this procedure shall apply to ALL agencies involved during snow and salting operations. Since the methods of attaching snow and ice storms vary, the accounting for costs will be compiled separately. The Department of Parks & Recreation shall report to the Department of Streets the cost of plowing and salting the Kelly Drive (Legislative Route #67292).

C. Definitions

1. Light snow requiring only de-icing techniques shall be considered **Salting Operations**
2. Snow operations shall include storms of such magnitude that plowing and de- icing operations are necessary.
3. The Snow Season will extend from October to April of the following year.

D. Cost Accounting Policies

1. The cost of snow emergency headquarters and agencies outside the Department of Streets (other than Department of Parks & Recreation) shall be allocated to snow. Snow headquarters is normally opened when storm conditions require plowing operations. Even though there is preliminary salting, the entire cost will be allocated to Snow Operations. However, if only salting is required, the cost of snow headquarters and that of other agencies will be allocated to Salting Operations.
2. The ratio of State and City costs shall be calculated by comparing the sum of the City and State plow miles in Snow Operations. For salting, the ratio shall be computed by applying the percentage of City and State salt route miles to the tons of salt required for each route. Plow miles and salt route miles shall be the product of the linear mileage and the number of cuts or passes made by the vehicle.
3. For Streets Department, the labor cost will be the actual hourly labor cost for each employee. The vehicle cost will be the average hourly operational cost of a vehicle by type as determined by PennDOT/FEMA. Fleet Managements will supply these costs.

4. Standby time prior to plowing or salting will be charged at the district City - State ratio of the actual storm.
   a. In the event that standby personnel are not used, the cost will be shared in the ratio of existing City-State miles or roadway.
   b. For snow, this ratio shall be City 58.6%, State 41.4%; for salting operations City 66.5%, State 33.5%. These ratios are subject to change when snow and salt routes are revised.

5. The cost of snow removal on legislative routes is not chargeable to PennDOT since $2.5 million is paid to the City on an annual basis for this service.

E. Forms

The following forms will be used in conjunction with this procedure. Instructions for the use of these forms are described in the body of the procedures.

77-307 Rev. 4/71, 77-307A – Report on Snow Plowing/Salting
77-360 = Salting Report

Time and Costing Snow and Salting Operations, formerly recorded on forms 77-308 Rev. 8/98 and 77-308A, are now recorded in the Snowstorm Information System (SSIS), a MS Access database designed by the IT unit of the Streets Department.

F. Snow Operations

All personnel reporting for snow duty will sign in on the approved time sheet for their department or agency. Prior to leaving the yard the inspector will receive Form # 77-307 Rev. 4/71 which will delineate the route.

Each District prior to the snow season will type on Form 77-307 Rev. 4/71 the following information:

1. Legislative route number if the street segment is part of the State highway system.
2. The street that is to be plowed or salted.
3. The "from – to" limits of plowing or salting.
4. The mileage of the street segment.
5. The route number or letter.

The inspector (plowing) or the truck driver (salting) will complete the following items:

6. The date and day of the week.
7. The operation, plowing or salting, day or night
8. Driver's name
9. Truck number
10. The number of cuts or passes required
11. Time reported for duty
12. Time started plowing/salting
13. Time finished plowing/salting

If the inspector/driver works on more than one route, items (12) and (13) are to be completed for the time spent on the route – **NOT THE TOTAL TIME**. Item (11) is time reported for duty and will not change even though the route may change.

14. Any delays in route
15. Cause of delay
16. The inspector/driver will sign his name to the report

The inspector supervisor in district will calculate item (17) Total Miles plowed for each segment, total all miles plowed and determine the City and State shares, item (18).

19. Will be used during salting operations

The Highway district office will then determine the ratio of City and State plow miles for each route, and by summing the routes, the district ratio.

The time of ALL personnel combating a storm will be accounted for in the SSIS (previously tracked on form 77-308 rev. 8/72).

The District or Area Office completes this information as follows:

1. Organization – 5th Highway, Area 2, Water Department, etc.
2. Condition
3. Date personnel called in and released
4. Time personnel called in and released
5. Employee name
6. Employee number
7. Function – the particular function the person was performing (e.g.: plow driver, inspector plow, auto repair, install chains, etc.)
8. Vehicle number – if applicable
9. Hours – the district office will enter the actual number of hours worked in the appropriate column (regular, time and a half, double time)
10. Vehicle cost – the hourly operating cost multiplied by the operating hours. The Accounting Section will supply these costs.

The Sanitation Area office will complete items #1 through #10.

During severe storms when contractor personnel are called to augment City personnel, it is the responsibility of the Highway District Engineers to ensure that the contractors submit the following necessary information required when invoicing the City:

1. Number of pieces, kind and class of equipment in operation
2. Number of foremen, operators, laborers, regular hours worked, premium hours worked, hourly rates
3. Location of operations (e.g.: streets on which equipment operated)
4. Dates and hours of work at specified hourly rates

At the time invoices are received by Highway District Offices it will be the responsibility of each Highway District Engineer to call and discuss with the Snow Contractor Liaison cost applicable to the State as per existing agreements between the Commonwealth of Pennsylvania and the City of Philadelphia with respect to snow plowing and salting operations.

G. Salting Operations

Since the rate of salt expended on a street varies by such factors as the type of spreader and size and speed of vehicle, the use of miles salted by itself is not an indication of the labor required to complete a route. Therefore, for Salting Operations, the City - State ratio will be used and defined in Section “D”.

Personnel called-in to combat an ice storm will sign in on the authorized sign-in sheet for the Highway yard. The streets repair supervisor will issue the salt truck operator Form # 77-307 rev. 4/71, which delineates the route. The equipment operator will complete the form as described under Snow Operations and will note in column (10) the number of passes necessary for each street segment. Upon completion of the route the operator will sign the form and return it to the streets repair supervisor.

The streets repair supervisor will perform the following tasks:

1. Complete SSIS information as described under Snow Plowing for each person in his district.

H. Responsibilities

1. Accounting Section Streets Department
    a. The Accounting Section will determine the average fringe rates to be applied to labor, retrieve PennDOT vehicle rates, and distribute the information to all divisions of the Streets Department.

b. SSIS will accumulate the cost of each snow and ice storm. The Accounting Section will prepare any cost reports required by PennDOT on a schedule determined by PennDOT.

2. Sanitation Division Streets Department
    a. Each Sanitation District will be responsible for accurately entering all necessary data in SSIS and marking the storm data complete. All data must be in the system within 24 hours of the close of each storm.
    b. Time sheets and supporting data will be kept in the Area office. These will be filed chronologically by date of storm for every snow season. Records will be kept for four (4) years after the snow season.
    c. Sanitation Headquarters will summarize the payroll cost of each storm and submit these costs to the Budget Officer within two (2) days after the storm.

3. Highway District Offices
    a. For Snow Operations the Highway district office will calculate the plow miles for each route on Form # 77-307 rev. 4/71 and determine the City / State ratio for each route and the district as a whole.
    b. For Snow Operations the District Office and Yards will be responsible for accurately entering all necessary data in SSIS and marking the storm data complete. All data must be in the system within 24 hours of the close of each storm.
    c. For Salting Operations, the street repair supervisor will forward form 77-360 and form 77-307 to the office of the Assistant Chief Engineer Maintenance.
    d. After Salting Operations, the office of the Assistant Chief Engineer will be responsible for making sure all data is entered into SSIS and marking the storm data complete. All data must be in the system within 24 hours of the close of each storm and inform the Chief Highway Engineer and the Accounting Officer of the information available.
    e. The Assistant Chief Engineer will submit the report out of the SSIS system

4. Other Agencies
    a. When other agencies are involved in snow or salting operations, they will submit the required SSIS information to the Chief Highway Engineer immediately after the storm. The labor cost for these agencies will be the actual wage rates for the employees assigned to snow duty. SSIS will add fringe benefits and overhead.

CONCLUSION

The system described herein provides a standard system for allocating the cost of snow and salting operations. Deviations from the system will be authorized only when the Chief Highway Engineer, the Accounting Officer and Budget Officer agree to the change.

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Appendix N – Sanitary Infiltration Events

Report Date	Report Time	Problem Location	Spill Notes	Affected Outfall	Abatement Date	Abatement Time	Abatement
06/22/2020	12:00 PM	8500 FRONTENAC	FOUND CHOKED SANITARY SEWER ON 8500 FRONTENAC. SEWAGE WENT TO STORM, THEN OUTFALL.	P-099-03	06/22/2020	4:00 PM	FLUSHED OPEN & REMOVED DEBRIS FROM SANITARY SEWER. FLUSHED STORM SEWER WITH DECHLORINATION TABLETS.
04/28/2020	02:45 PM	GREENMOUNT RD & TELFAIR	FOUND CHOCKED SANITARY SEWER & WAS DISCHARGING AT OUTFALL Q107-01	Q-107-01	04/29/2020	12:00 PM	USED FLUSHER TO RELIEVE CHOKED SEWER.
04/15/2020	08:00 AM	7201 WISSAHICKON AVE	FOUND CHOKED SEWER WITH SEWAGE DISCHARGING FROM OTUFALL.	W-067-06	04/15/2020	01:30 PM	SEWER WAS FLUSHED AND CLEAENED.
04/14/2020	12:00 PM	W Mount AIRY AVE AND MOUNT AIRY TERR	FOUND SANITARY MANHOLE W067-06-S0020 DISCHARGING SEWAGE	W-067-06	04/14/2020	3:00 PM	FLUSHED AND BROKE CHOKE IN SANITARY SEWER.
04/04/2020	05:41 PM	HOG ISLAND PUMP STATION	PUMPS RUNNING BUT CLOGGED WITH WIPES, AROUND 20 LBS. OF MATERIAL IN EACH PUMP. SEWAGE EXITED THE WET WELL AND SPILLED ONTO THE ROADWAY.	N/A	04/04/2020	10:00 PM	A PUMP STATION CREW DISASSEMBLED THE PUMPS AND REMOVED THE CLOGS. PUMPS BACK IN SERVICE BY 10PM, THEN WET WELL DRAINED.
04/01/2020	01:00 PM	ROOSEVELT BLVD & WINCHESTER	CHOKED SEWER	N/A	04/02/2020	11:00 AM	SET UP BYPASS PUMPING TO STOP DISCHARGE, BROKE CHOKE IN SEWER.
03/12/2020	12:30 AM	4000 NEILL DRIVE, PUMP STATION	POINT REPAIR MADE TO SANITARY FORCE MAIN ON 03/11/2020 FAILED, SEWAGE LEAKING FROM FORCE MAIN TO EXCAVATION.	N/A	03/12/2020	04:45 PM	PUMP SUT DOWN WHILE REPAIRS MADE, BACKFILLED EXCAVATION TO PROVIDE SUPPORT.

Report Date	Report Time	Problem Location	Spill Notes	Affected Outfall	Abatement Date	Abatement Time	Abatement
03/07/2020	04:00 PM	4000 NIELL DRIVE, PUMP STATION	SEWAGE OBSERVED IN PARKING LOT OF NEILL DRIVE PUMP STATION ON 3/7.	N/A	03/11/2020	01:00 PM	THE PUMP STATION WAS SHUT DOWN AND CONTRACTOR EXCAVATED TO FAILURE. THEN REPAIRED PIPE. STATION BYPASSED DURING REPAIR.
03/02/2020	10:30 AM	604 W CLIVEDEN ST	SANITARY SEWER CHOKED, DISHCARGING INTO BASEMENT OF 604 W. CLIVEDEN. 1/2 GAL/MIN	N/A	03/02/2020	03:00 PM	USED FLUSHER O RELIEVE CHOKE SEWER.
02/05/2020	09:25 AM	SCHOOL HOUSE & FOUNDERS	SEWAGE DISCHAGE FROM MANHOLE ON STREET TO STORM INLET	W-052-02	02/05/2020	01:40 PM	RELIEVED CHOKE SEWER WITH FLUSHER & MANUALLY REMOVED BLOACKAGE IN MANHOLE.
01/24/2020	01:00 PM	2900 HUNTING PARK	CHOKED SEWER, FOUND SMALL AMOUNT OF DRIED UP TOILET PAPER IN BASEMENT	N/A	01/24/2020	03:30 PM	USED GLUSHER TO RELIEVE CHOKED SEWER
12/23/2019	12:45 PM	195 KRAMS AVE	CHOKED SEWER, SWEAGE IN BASEMENT AT 195 KRAMS AND OVERFLOWED INTO STORM INLET.	S-059-04	12/23/2019	02:15 PM	USED FLUSHER TO RELIEVE CHOKED SEWER.
12/04/2019	10:00 AM	3202 MANTUA AVE	CHOKED SEWER, FLUSHING BROUGH BACK RAGS IN SEWER CAUSING CHOKE.	N/A	12/04/2019	1:00 PM	CLEARED CHOKE, FOUND RAGS ON NOZZLE. CCTV IS INVESTIGATING.
12/01/2019	05:30 PM	2955 POPLAR ST	SEWER WAS CHOKED AT MANHOLE EAST OF WELLHOLE S05-002435. SEWAGE IN BASEMENT	N/A	12/01/2019	09:20 PM	SEWER FLUSHED. PROPERTY DYE TEST WAS POSITIVE. 1 IN. OF SEWAGE IN BASEMENT. UNABLE TO ACCESS THAT NIGHT DUE TO LANDLORD.

Report Date	Report Time	Problem Location	Spill Notes	Affected Outfall	Abatement Date	Abatement Time	Abatement
11/20/2019	10:30 AM	4137 RIDGE AVE	CHOKED SEWER. SEWAGE DISCHARGING INTO BASEMENT OF 4137 RIDGE AVE.	N/A	11/20/2019	03:00 PM	USE FLUSHER TO RELIEVE CHOKE.
11/16/2019	04:30 PM	2635 WEBSTER ST	FOUND SEWER CHOKED.	N/A	11/22/2019	10:20 AM	SEWER FILLED WITH CONCRETE, CAN'T BREAK WITH FLUSHER. VAC DOWN SEWER UNTIL REPAIRS DONE.
11/15/2019	12:00 PM	FAIRDALE & KNIGHTS	FOUND CHOKED SEWER	Q-107-01	11/15/2019	02:30 AM	FLUSHED OPEN CHOKED SEWER & REMOVED DEBRIS
11/01/2019	09:00 AM	2955 POPLAR ST	SEWAGE IN BASEMENT OF 2955, CHOKED SEWER	N/A	11/01/2019	09:45 AM	USED FLUSHER TO RELIEVE CHOKED SEWER.
09/05/2019	09:50 AM	5057 COPELY RD	FOUND CHOKED SANITARY SEWER DISCHARAGING INTO STORM SEWER	S-046-06	09/05/2019	11:25 AM	USED FLUSHER TO RELIEVE CHOKED SEWER.
08/23/2019	10:30 AM	4400 MAIN ST	FOUND CHOKED SANITARY SEWER ON 4400 BLOCK, FOUND 3 PROPERTIES SEWAGE IN BASEMENT.	N/A	08/23/2019	05:10 PM	SET UP BYPASS PUMPING TO TEMPORARILY RELIEVE CHOKE, EXCAVATED TO RELIEVE CHOKE SEWER.
08/19/2019	11:30 AM	HOLME & LONGFORD	FOUND SANITARY SEWER CHOKED AT MANHOLE P100-14-S0015.	P-100-14	08/19/2019	03:30 PM	FLUSHED OPEN CHOKED SEWER & REMOVED DEBRIS & GREASE.

Report Date	Report Time	Problem Location	Spill Notes	Affected Outfall	Abatement Date	Abatement Time	Abatement
07/17/2019	11:40 PM	HOLME & LANGFORD AVE	FOUND SEWER MANHOLE CHOKED ON HOLME AVE	P-100-14	07/17/2019	01:30 PM	FLUSHED OPEN SANITARY SEWER & REMOVED DEBRIS WITH FUSHER.
07/03/201	10:50 AM	152 KALOS	CHOKED SEWER. TOILET PAPER ON FOOTWAY, SANITARY SEWER NO FLOW, STORM SEWER FLOW	S-052-05	07/03/2019	01:10 PM	FLUSHER RELIEVE CHOKED SANITARY SEWER

Appendix O – Pollution Migration / Infiltration

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
07/01/2019 08:43 AM	07/02/2019 15:00 PM	5359 W Oxford St		Unfounded		Trash present in inlet but is inconsistent with trash dumping scenario in type and volume.
07/01/2019 11:43 AM	07/01/2019 15:23 PM	Schuylkill River Segment Sch_Ms07	Foam	Other - Unusual Appearance Of River Surface	Direct To Receiving Stream	Foam on river appears heavier and more persistent downstream than typically encountered. Analyses for presence of surfactants or like compounds were negative.
07/02/2019 14:06 PM	07/02/2019 16:40 PM	128 S 7Th St	Food Waste	Spill | Slug Discharge	Overland To Inlet	Apparent spill of waste cooking oil that migrated from the alley to the street and to the inlet. Minor quantity observed in inlet. No confirmed responsible party.
07/03/2019 13:18 PM	07/03/2019 15:14 PM	S 47Th St & Windsor St	Water	Illegal Discharge | Dumping	Overland To Inlet	Cement wash water from construction site accidentally dumped into inlet while attempting to dump the material into a sink hole next to the inlet. NOV to be issued.
07/05/2019 09:12 AM	07/05/2019 13:59 PM	3935 Stevenson St	Chemical	Illegal Discharge | Dumping	Spill To Ground Only	Homeowner applied herbicide to kill grass. No discharge to inlet detected.
07/10/2019 10:45 AM	07/11/2019 12:00 PM	1500 E Lycoming St	Food Waste	Spill | Slug Discharge	Other	
07/10/2019 14:56 PM	08/07/2019 12:00 PM	3065 Tulip St	Water	Illegal Discharge | Dumping	Spill To Ground Only	Spoke a renter at the resident. He told me they had a leaking roof and the water from the leak is poured out on the street. He said the owner of the property is Linda Berry.
07/10/2019 17:04 PM	11/14/2019 16:41 PM	2552 Grant Ave	Food Waste	Spill | Slug Discharge	Drain To Sewer	Evidence of grease on the grass by the inlet, inlet walls are stained with grease and heavy accumulation of grease in the inlet
07/10/2019 17:16 PM		6821 Norwitch Dr				
07/12/2019 18:10 PM	07/19/2019 13:18 PM	4698 Bermuda St	Chemical	Spill | Slug Discharge	Drain To Sewer	Minor sheen cleanup at M Sewer. No impact on the NEWPCP
07/12/2019 18:33 PM	07/13/2019 08:30 AM	2431 Fairmount Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	
07/15/2019 12:05 PM	07/15/2019 13:14 PM	Proctor Rd & Lawler St	Sewage	Illegal Discharge | Dumping	Other	Plumbing contractor working behind Bustleton Somerton shopping center performed unauthorized discharge of groundwater/sewage to sanitary sewer and had unpermitted

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
						fire hydrant hook-up without backflow prevention. NOV for unauthorized discharge to be issued.
07/15/2019 15:02 PM	08/01/2019 12:00 PM	1405 Frankford Ave	Solid	Illegal Discharge | Dumping	Overland To Inlet	Contractor dumping/hosing down concrete to street and inlet.
07/16/2019 16:31 PM	07/18/2019 07:17 AM	16Th & Mount Vernon	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Drain To Sewer,Spill To Ground Only	67 gallons of oil from transformer spill. <1 gal made it to the drain.
07/17/2019 10:47 AM	07/17/2019 11:08 AM	Holme Ave & Longford St	Sewage	Discharge At Outfall	Direct To Receiving Stream	Tan colored discharge from outfall to Wooden Bridge Run tributary of Pennypack Creek. Possibility of choke to be confirmed and resolved by Sewer Maintenance.
07/17/2019 12:01 PM	08/12/2019 12:00 PM	4010 Cottman Ave	Drywall Compound/Plaster	Spill | Slug Discharge	Overland To Inlet	Inlet has white residue on chain and on flotsam and is otherwise unremarkable.
07/25/2019 12:19 PM	10/15/2019 16:54 PM	N 24Th St & Brown St	Oil Stain Either Petroleum Or A Cooking Oil.	Illegal Discharge | Dumping	Overland To Inlet	IWBC receive a report of cooking oil being dumped on N 24th Street and Brown St. IWBC inspector found oil staining on Bucknell. Half way down the block on Bucknell on the other side of the road there was staining from a house renovation. No layer was observed in the inlet. Warning letters sent to the restaurant and construction company.
07/25/2019 16:08 PM	07/26/2019 11:20 AM	2400 E Butler St	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Spill To Ground Only	IWBC responded to an NRC notice reporting 4 drums outside a Advance Auto Parts Store that were leaking black used motor oil. IWBC inspector met PFD HMAU at the scene. There were 4 drums plus smaller containers of oil. Some oil was on the ground. No oil migrated 75' to the inlet. HMAU called L&I who will contact ACV Enviro to pick up the drums. 7/26/2019 IWBC conducted a follow up inspection conformed that the drums were picked up.
07/25/2019 19:47 PM	07/29/2019 09:55 AM	S 2Nd St & Catharine St		Unfounded		311 anonymous call reporting an oil spill flowing to the inlet at 2nd and Catherine. Call unfounded. IWBC inspector arrived at the location and did not observe any signs of an oil spill at the inlets at 2nd and Catherine and 3rd and Catherine. No further action was taken.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
07/27/2019 10:00 AM		8001 E Roosevelt Blvd	Food Waste	Spill | Slug Discharge	Overland To Inlet	Grease spill observed on 7/28/19 had finally been cleaned up after multiple requests
07/31/2019 10:49 AM		3600 Conshohocken Ave				
07/31/2019 10:49 AM	01/14/2020 10:16 AM	3600 Conshohocken Ave	Water	Discharge At Outfall	Drain To Sewer	dye was dropped in dry storm manhole. However, storm made it impossible to observe outfall.
07/31/2019 14:00 PM	08/02/2019 12:30 PM	Rear Alley Behind N. Broad And Stenton Ave	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Overland To Inlet	some heating oil in inlet. CVCC/ACV in route to perform cleanup.
07/31/2019 20:15 PM	08/01/2019 00:00 AM	2000 Block Of Lardner St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	oil was being cleaned up in a thorough manor
08/02/2019 13:20 PM	08/07/2019 12:28 PM	3629 N Bouvier St	Sewage	Choke	Overland To Inlet	The FAI at 3629 was backed up. Waste had been dumped in the rear of the bldg.
08/06/2019 12:11 PM	08/08/2019 16:00 PM	Cotton St & Station St	Food Waste	Illegal Discharge | Dumping	Spill To Ground Only	Trash truck crashed into SOMO restaurant oil drum. Oil collected in puddle, vacuumed by Eden Green Energy, no impact to sewer.
08/08/2019 08:36 AM	08/09/2019 12:00 PM	3899 Richmond St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	
08/13/2019 08:59 AM	09/05/2019 09:30 AM	2025 W Hagert St	Food Waste	Illegal Discharge | Dumping	Other	Unidentified accumulation of material on grated inlet that may have been legacy grease accumulation from dumping. Obvious fresh oily material observed on surface of water in inlet. Inlet flushed. Alleged dumper denied ever dumping.
08/13/2019 09:35 AM	08/13/2019 14:22 PM	601-61 N Delaware Ave		Unfounded		Alleged dumping of construction debris into river. No evidence of said allegations observed.
08/16/2019 01:58 AM	08/16/2019 15:20 PM	3057 Holme Ave		Unfounded		Complainant suspects the dumping of hauled septage at residence. The concern is that it might be a scam where someone pays for septage to be hauled and properly disposed of, but the service providers pockets the money, doesn't pay for proper disposal, and dumps to drain. No signs

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
						of dumping were observed at residence, although a small tote tank wagon is parked on property as described. Further monitoring warranted.
08/21/2019 13:45 PM	08/29/2019 12:00 PM	6913 Chelwynde Ave	Sewage	Other - Sewage Overflow At Drain	Spill To Ground Only	
08/21/2019 14:35 PM	08/22/2019 16:00 PM	S 13Th St & Sansom St		Unfounded		Investigation by Lagredelle showed less impact that previous. Suspected uncleaned residual from prior episode.
08/26/2019 09:41 AM	09/30/2019 12:00 PM	1340 Stewarts Way	Chemical	Illegal Discharge | Dumping	Overland To Inlet	A citizen report to IWBC that he observed painters washing chemicals in a inlet at Northbrook Apts. IWBC inspector observed two painters washing painting equipment over a storm drain on the apartments property. They workers ceased the discharge. The creek was clear. No PWD structures were impacted. PADEP was notified. 8/30/3019--Inlet cleaned out and creek was clear.
08/27/2019 12:15 PM		Megargee St & Glenloch Pl	Water	Hydrant	Overland To Inlet	Illegal fire hydrant connection at construction site resulting in unauthorized discharge to storm inlet.
08/30/2019 17:36 PM	11/26/2019 09:18 AM	11726 Colman Rd	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet,Spill To Ground Only	
09/05/2019 08:06 AM	11/26/2019 09:19 AM	4600 Worth St	Chemical	Odor	Air Emissions	
09/07/2019 15:08 PM	09/13/2019 00:00 AM	2635 Webster St	Sewage	Illegal Discharge | Dumping	Overland To Inlet	A coiled up garden hose was next to the basement window. No evidence of sewage in street. No pumping observed during my investigation. Slight odor detected when knocking on door of residence.
09/10/2019 21:30 PM	09/13/2019 12:00 PM	2925 E Ontario St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	approximately 55 gallons of a vegetable oil based product spilled when the load of drums fell over during transport. Truck parked next to inlet and ~50 gallons spilled to inlet and street.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
09/11/2019 08:05 AM	09/13/2019 13:00 PM	4201 Henry Ave	Sewage	Spill | Slug Discharge	Overland To Receiving Stream	
09/12/2019 13:29 PM	09/18/2020 14:00 PM	155 N 9Th St	Food Waste	Choke	Drain To Sewer	Grease complaint @ Arch and 9th. Several grease inspections performed. No real issues found.
09/16/2019 14:05 PM	09/16/2019 16:15 PM	1020 Locust St	Food Waste	Illegal Discharge | Dumping	Other	Caller reported that an employee was caught on camera earlier in the day attempting to pour used fryer oil into carboys for disposal without a funnel. The employee then poured the remainder into the drain in the loading dock area. The residual oil and large portion of the 3-5 gallons of oil that entered the drain was manually removed with oil-absorbing pads. Caller was informing us and also wanted to find out what could be used to remove the residual oil from the loading dock drain. PWD spoke to who is in charge of Oil and Grease inspections. He suggested that the caller not use an enzymatic drain cleaner, but rather a grease cutter. Caller was mainly concerned about the impact the oil might have on his facility's lateral. PWD did not physically inspect the facility as caller reported that there was no remaining evidence of the spill at the loading dock.
09/17/2019 09:39 AM	09/18/2019 13:40 PM	7800 Winston Rd	Food Waste	Other - Grease Discovery	Other	Survey of area around grease complaint sewer showed the area to be residential. Grease odor was detected in sewer. Observed stagnant flow in short section of sewer line.
09/17/2019 11:07 AM		709 N 2Nd St		Illegal Discharge | Dumping	Overland To Inlet	Contractor allowing run off from masonry/concrete into inlet.
09/18/2019 17:09 PM		3850 Coral St	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Overland To Inlet,Spill To Ground Only	Oil/gasoline from junkyard to inlet
09/19/2019 11:21 AM		E York St & E Cabot St	Petroleum (Oil | Fuel)	Other - Fire Hazmat Reported A	Overland To Inlet	Water main break disturbed soil containing some gasoline, releasing it into the street and into inlet.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
				Sheen And Odor Of Gasoline On Water Flowing From Street		
09/19/2019 13:33 PM	09/30/2019 14:17 PM	State Rd And Ashburner St	Water	Discharge At Outfall	Direct To Receiving Stream	High dry weather flow at P-083-04 outfall.
09/20/2019 08:36 AM		121 S. 16Th Street		Unfounded		No evidence of dumping at any inlet; no inlet at 1530 Sansom that caller reported.
09/20/2019 11:35 AM		1500 Deal St	Petroleum (Oil | Fuel)	Odor	Overland To Inlet	PWD unit reported a chemical odor, at the scene a storm inlet was found to contain what looks like motor oil. Did not reach the outfall at the creek.
09/20/2019 12:30 PM	10/15/2019 13:56 PM	F-11	Sewage	Discharge At Outfall	Direct To Receiving Stream	Crew was working to resolve issue. Tire appeared to have come in through the tide gate. Tire removed while I was onsite
09/20/2019 13:40 PM		412 S 18Th St	Concrete/Masonry Washwater	Illegal Discharge | Dumping	Overland To Inlet,Other	Inlet has concrete residue and wash water in and around it.
09/20/2019 23:58 PM	09/24/2019 10:45 AM	1143-47 N 3Rd St	Groundwater	Illegal Discharge | Dumping	Drain To Sewer	Groundwater pumped into nearby drain.
09/22/2019 09:32 AM	09/22/2019 11:54 AM	3423 Weymouth St	Petroleum (Oil | Fuel)	Fire	Overland To Inlet	Fire water containing gasoline entered PWD inlet and gave moderate levels of VOC in sewer well below explosive levels.
09/22/2019 16:40 PM	09/22/2019 20:40 PM	3900 Woodland Ave	Chemical	Spill | Slug Discharge	Other	Disinfectant spill in disinfection rooms resulting in no escape from facility
09/23/2019 13:00 PM	10/04/2019 15:55 PM	S-059-03	Water	Illegal Discharge | Dumping	Direct To Receiving Stream	Gray discoloration from outfall S-059-03 was traced to a home renovation job at 4680 Canton Street, where a worker was observed dumping cement and cement wash water to the street and inlet during IWBC's investigation.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
09/23/2019 15:45 PM		8000 Pine Rd	Sewage	Spill | Slug Discharge	Overland To Inlet	No discharge from FAI during inspection. Evidence of discharge from FAI remained on the sidewalk and along gutter leading to corner stormwater inlet.
09/25/2019 15:48 PM	09/27/2019 14:30 PM	S 42Nd St & Chestnut St	Water	Illegal Discharge | Dumping	Overland To Inlet	On-going pumping from construction site occurring during investigation. Inlet is properly protected for normal storm water runoff from a construction site.
09/26/2019 15:49 PM	09/27/2019 07:23 AM	1836 E York St	Water	Illegal Discharge | Dumping	Overland To Inlet	On-going reports of pumping from excavation to street. Pumping apparatus is in place, but no pumping was observed.
09/26/2019 16:39 PM	09/26/2019 20:39 PM	8901 Ridge Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	Report of gasoline UST to underground at 20 gpm rate. No evidence of infiltration to surrounding PWD structures at this time
09/27/2019 23:00 PM	09/28/2019 23:55 PM	6061 Chester Ave	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Other	No dumping found
09/30/2019 15:30 PM	10/01/2019 12:50 PM	2809 W Oxford St		Illegal Discharge | Dumping	Drain To Sewer	Inlet with trash and debris creating odor. S05-00305.
10/01/2019 09:25 AM	10/01/2019 15:45 PM	2715 W Berks St	Sewage	Choke	Drain To Sewer	In response to a complaint of a sewer backup seeping sewage into a residential house, PWD conducted an investigation according to IWBC procedures. Inspector John Hickey and I arrived at 13:15 at 2715 w Berks St. PWD examined manhole upstream from residence, S05-002105 - heavy flow. Downstream manhole of residence S05-002100 - slower flow, less volume. FAI of residence appeared stagnant, dropping dye into FAI did not appear in downstream manhole after 45 minutes. PWD contacted Sewer maintenance to request inspection of sewer in between manholes as well as residential lateral. Notified resident citizens that case was made with emergency desk and sewer maintenance work at 15:45.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
10/02/2019 17:30 PM	10/04/2019 12:00 PM	4956 Fitler St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Drain To Sewer,Spill To Ground Only	In response to a complaint of oil leaking from a motor vehicle in a residential driveway, PWD conducted an investigation according to IWBC procedures. Inspector Evan Scott and I arrived at 9:50 am at 4958 Fitler St. PWD observed a green pick up truck in driveway that sloped downhill to a drain against residential structure, sloping down away from the street. Oil droplets observed around resident drain, but unable to trace back to underneath of truck, and unable to determine if drain was sanitary or storm. Knocked and rang bell of residential units, no answers. PWD left a business card. PWD disembarked at 10:30am. At 12:30pm spoke to Fire Dept Lt. He spoke to neighbors but could not get a hold of pickup truck owner. He referred matter to L&I and CLIP, as it is a private residence. He confirmed no impact to street storm inlet.
10/07/2019 09:32 AM	10/15/2019 16:55 PM	8876 Rising Sun Ave	Water	Illegal Discharge | Dumping	Overland To Inlet	IWBC received a report of a neighbor dumping cement at 8876 Rising Sun Ave. IWBC inspector observed a white staining on the gutter. The inlet had no material in it. The inlet was cleaned the next day. IWBC inspector talked to the complainant who said she was away over the weekend and returned and saw the white stain. Her neighbor in the past had dumped tool washing water, which IWBC sent a warning letter. IWBC inspector spoke to the resident at 8876 Rising Sun who said that they washed cars over the weekend. There was no direct evidence on the property. The Pennypack Creek was clear.
10/08/2019 10:08 AM	10/31/2019 00:00 AM	304 Master St	Water	Illegal Discharge | Dumping	Overland To Inlet	Citizen reported that construction company was dumping to the sewer at 304 Master St. IWBC inspector found that the construction company was pumping ground water from the excavation for a basement across Master St. to an inlet at the NEC of Cadwallader St. Silt protection was being employed. The IWBC inspected instructed the foreman that the

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
						discharge was not permitted. The foreman stopped the discharge. The contractor will contact IWBC engineering for details to obtain a groundwater discharge permit. IWBC will issue an NOV.
10/10/2019 17:29 PM	10/21/2019 15:39 PM	8400 Mansfield Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	HMAU requested IWBC to inspect an inlet that may have been impacted with diesel fuel from a dump truck that leaked fuel to Gowen St. south of Mansfield St. IWBC inspector found no evidence of diesel fuel in the inlet or sanitary sewer.
10/12/2019 09:33 AM	10/12/2019 12:00 PM	915 Walnut St	Water	Spill | Slug Discharge	Drain To Sewer	Water estimate od 2 million gallons was off. Actual amount pumped~100,000. No sheen. On site area drain in combined sewer area available for discharge.
10/15/2019 12:25 PM	11/26/2019 09:17 AM	7525 Frankford Ave	Soap/Water/Detailing Chemical	Spill | Slug Discharge	Drain To Sewer	Actively discharging waster water into the street
10/18/2019 12:16 PM	10/21/2019 10:00 AM	1771 Tomlinson Rd		Spill | Slug Discharge	Overland To Receiving Stream	PWD investigated a brown discharge entering Walton's Run where outfall Q-113-09 normally ponds. The flow was traced to mulch piles on Tomlinson Road. Referred to PADEP.
10/18/2019 13:23 PM		3123 Jefferson St	Water	Illegal Discharge | Dumping	Overland To Inlet	Contractor pumping groundwater to storm inlet.
10/21/2019 14:07 PM		125 Leverington Ave	Food Waste	Illegal Discharge | Dumping	Overland To Inlet	Oil from pizza shop dumped into storm inlet. Owner says no oil was ever dumped, but admitted to dumping mop water to the street. Floating grease material, grease odor from inlet and staining on street around inlet suggests that material had been dumped into inlet. NOV will be issued.
10/22/2019 01:45 AM	10/25/2019 12:02 PM	1312 South St	Water	Illegal Discharge | Dumping	Overland To Inlet	Restaurant washes floor and sends water to street and storm inlet.
10/23/2019 10:59 AM		4925R Fort Mifflin Rd				

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
10/23/2019 15:16 PM	10/25/2019 12:01 PM	3701 Haverford Ave	Sewage	Illegal Discharge | Dumping	Other	potential for impact. Educated customer on housekeeping and mop water disposal
10/23/2019 15:16 PM	10/25/2019 12:01 PM	3701 Haverford Ave	Sewage	Illegal Discharge | Dumping	Overland To Inlet,Other	Possible mop water dumping. No grease dumping. Performed customer educational outreach concerning inlets and rain gardens.
10/25/2019 18:12 PM		S 16Th St & Sansom St				
10/28/2019 14:17 PM	10/28/2019 16:45 PM	3899 Richmond St	Grey White Oil With Suds	Odor	Other	In response to a complaint of petroleum oil / diesel odor in the Northeast Wastewater Pollution Control Plant, I conducted an investigation according to IWBC procedures. Inspector Evan Scott and I arrived at NEWPCP at 15:00. PWD met with Crew Chief. He explained that the odor was strong in the bar screen areas and grit basin when he called it in. PWD went to the bar screen areas and the odor was very faint. He explained it may have passed on already. In the grit basin area, there was a faint fleeting odor and a visible grey/white sheen with suds on the water, he also explained that was stronger earlier. PWD went to the set two primary tank areas. Sheen was less, but odor was faint to moderate and fleeting due to the wind as we were outdoors. PWD took oil and grease samples from the primary tanks at 15:25 and from the grit basin at 15:40. PWD dropped off the samples at
10/29/2019 00:23 AM	11/02/2019 07:38 AM	4324 Tackawanna St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	Non PCB Transformer oil spilled to ground.
10/30/2019 12:18 PM		100 Oregon Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	Leaking some amount of ethanol
11/02/2019 17:07 PM	11/03/2019 09:45 AM	W-067-01	Unknown	Illegal Discharge | Dumping	Other	Report of milky white discharge to Gorgas Run. No discharge occurring at time of investigation. Suspect a short term dumping event may have occurred.
11/05/2019 13:08 PM	11/05/2019 16:25 PM	S 23Rd St & Chestnut St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	Diesel fuel spill to ground resulted in unknown quantity in combined system inlet. Material was contained to inlet and did not enter sewer system.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
11/05/2019 19:27 PM	11/06/2019 15:15 PM	5726 Baltimore Ave	Food Waste	Spill | Slug Discharge	Spill To Ground Only	Grease stain on Checkers property from spills of containers in the drive-thru lane and additional leakage from grease storage areas. Possible impact on private GSWI from leakage. No impact on PWD.
11/07/2019 06:26 AM	11/07/2019 13:11 PM	851 Red Lion Rd	Solid	Illegal Discharge | Dumping	Direct To Receiving Stream	Build up of leaves and pine needles at two points in the cement channel portion of Paul's Run at Ambassador Apartments. Mounds are much larger than can be expected from natural depositing.
11/08/2019 08:42 AM	11/08/2019 11:43 AM	960 N Randolph St		Unfounded		Complainant reported sewage leakage to back of house that flows out onto street. No signs of any sewage-related discharges were observed. A resident renter said that there was no such leak. The only problem was a loose rainwater downspout.
11/08/2019 12:30 PM	11/09/2019 09:41 AM	1812 S 8Th St	Solid	Illegal Discharge | Dumping	Other	Ketchup like material on the ground in front of NW inlet and heavy grease on the walls of the SW inlet. Significant amount of trash in both inlets. None of the trash appeared coated with material. Owner says that no one from his store dumped any material into either inlet.
11/13/2019 12:18 PM		3899 Richmond St	Petroleum (Oil | Fuel)	Other -	Other	Kerosene odors at NEWPCP. Unfounded at time of investigation.
11/14/2019 14:30 PM	11/15/2019 12:00 PM	1629 S 53Rd St	Sewage	Choke	Overland To Inlet	
11/15/2019 16:35 PM		S Juniper St & Shunk St	Sewage	Spill | Slug Discharge	Overland To Inlet	Trash was present in the inlet. There were 2 blue bags visible that could contain dog waste. There were numerous other trash items in the inlet including bottles, banana peel, cans, cups.
11/16/2019 10:30 AM		Rt. 95 S Overass At Rt 13				
11/22/2019 12:20 PM	12/05/2019 12:00 PM	2620 Webster St	Solid	Choke	Drain To Sewer	IWBC was requested at 2600 block of Webster by PWD sewer maintenance to inspect a lateral and sections of the sewer that were completely blocked by cement. The choke cause sewage backups on the block since Sept. 2019. New construction of residential dwellings is next to the blockage.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
						The dwellings have cement basements. The site in 2018 was a parking lot. The RCP sewer was fully blocked with cement and had to be removed with jack hammer. The choke interfered with department operations and an SNC will be sent with a fine and cost recovery to the owner of the parcel.
11/25/2019 09:54 AM	11/25/2019 10:55 AM	5101 Walnut St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	No discharge found.
11/25/2019 12:51 PM	01/15/2020 11:00 AM	2900 Island Ave	Sewage	Illegal Discharge | Dumping	Spill To Ground Only	IWBC investigated a report of grease spill to an inlet. Trail of grease staining was observed. A warning letter to be issued.
11/26/2019 06:35 AM	11/26/2019 12:00 PM	4300 S 26Th St	Sewage	Spill | Slug Discharge	Overland To Receiving Stream	IWBC investigated a sewage over flow upstream of PS648. The pumps were not running correctly. Some sewage migrated to storm inlets. The inlets were cleaned The Industrial Waste Inspector did not observe an impact on the river.
11/27/2019 11:30 AM		7400 Brewster Ave	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Spill To Ground Only	2 large blue 55 gallon style barrels filled with suspected petroleum liquid observed across from 7400 Brewster Ave near storm drain. Staining on road, however no evidence of substance in storm drain was observed. Shortly after, police arrived on scene because of a complaint regarding the barrels. Police called in Fire Dept who then covered impacted areas thoroughly with absorbent. Fire Dept then called Hazmat who arrived on scene and placed call with Clean Venture to dispose of barrels.
12/01/2019 21:55 PM	12/03/2019 19:00 PM	100 Manton St	Petroleum (Oil | Fuel)	Odor	Air Emissions	No odors detected as verified by complainant.
12/06/2019 15:45 PM	12/09/2019 10:00 AM	N 42Nd St & Haverford Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	No sheen or odor in drains or inlets.
12/09/2019 13:11 PM	12/09/2019 14:00 PM	1 Washington Ave				
12/10/2019 04:19 AM		6310 W Passyunk Ave				

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
12/12/2019 23:45 PM	01/06/2020 09:52 AM	25 Pattison Ave	Foam	Spill | Slug Discharge	Drain To Sewer	Foam at SEWPCP. No evidence of foam observed at Inolex or Ineos.
12/13/2019 16:10 PM	12/16/2019 15:00 PM	N 55Th St & W Oxford St	Food Waste	Illegal Discharge | Dumping	Overland To Inlet,Spill To Ground Only	Grease storage area behind Chan's was cleaner that last inspection, however signs of suspected old grease were seen training into W. Oxford St. This could be from prior backup incident, as grease did not look fresh. Stormwater inlet downstream at Oxford and Allison St was blocked by mud and debris, however no grease sheen in inlet. Grease inspection of Chan's conducted.
12/16/2019 13:47 PM	12/16/2019 15:52 PM	6850 Essington Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Direct To Receiving Stream	Oil sheen on river at PBF Logistics from existing problem area. fast moving vessel caused oil behind boomed area to splash out into the river beyond the boom.
12/17/2019 05:31 AM	12/19/2020 12:00 PM	2955 Market St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	At approximately 1:00 AM on December 17, 2019, an Amtrak worker identified a lube oil release had occurred from lube oil piping. Spill was contained by Amtrak and did not reach river most likely, as stormwater drain was plugged. PWD visually confirmed this onsite with Wastewater Operator on Dec 18th 2019 at 10am.
12/24/2019 10:30 AM	12/24/2019 11:45 AM	240 Spring Garden St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	No sheen or odor found in PWD structures. PID Meter reading stayed at 0 in all manholes and inlets.
01/02/2020 12:21 PM	02/14/2020 18:50 PM	3123 N Front St	Food Waste	Illegal Discharge | Dumping	Overland To Inlet	IWBC received a call from PWD call center that a citizen reported that a business at 3123 N. Front Street dumping oil to an inlet at Lee St. & E. Lippincott St. IWBC inspector found some staining on the inlet walls and some oil adsorbent on top of the open mouth inlet. The inlet is scheduled to be cleaned in January. The inspector spoke to the manager who said that they collected their waste oil. A drum is on the side of the building. She thought that a new employee may have dumping wash water with oil to the inlet. She said it will not happen again. (The managers did not speak English. A friend of hers interpreted what was said.) A warning letter will be sent in English and Spanish.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
01/06/2020 09:57 AM	01/11/2020 08:18 AM	2040 Bennett Rd	Chemical	Illegal Discharge | Dumping	Overland To Inlet	No evidence of antifreeze in inlet or at outfall.
01/06/2020 11:27 AM	01/06/2020 14:45 PM	1617 S 8Th St	Solid	Illegal Discharge | Dumping	Overland To Inlet	Litter is seen in inlet.
01/07/2020 17:40 PM	01/08/2020 10:05 AM	135 W 65Th Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Drain To Sewer	Oil and oil straining on property driveway to property drain. No sheen at outfall. Warning letter will be sent.
01/10/2020 10:20 AM	01/22/2020 12:00 PM	3899 Richmond St	Color	Spill | Slug Discharge	Other	A sample was taken of the pink color at the Primary effluent. A qual test was performed and it noted the presence of Fluorescein and a mineral called goslarite. At time of inspection there was no color in the primary tanks. Abbey Dye did give notification of discharge. C. Lever was also producing a red colored pigment at the time. United Color Manufacturing was also investigated. At the time of notification, since there was no color coming into the plant, a trackback could not be preformed.
01/11/2020 14:14 PM	02/18/2020 14:09 PM	292 Parker Ave	Groundwater	Illegal Discharge | Dumping	Drain To Sewer	Illegal discharge documented with pictures.
01/13/2020 09:00 AM		700 Arch St				
01/13/2020 09:10 AM	01/13/2020 14:00 PM	1165 S 11Th St		Illegal Discharge | Dumping	Overland To Inlet	
01/13/2020 14:45 PM	01/14/2020 13:00 PM	2900 Island Ave	Sewage	Illegal Discharge | Dumping	Overland To Inlet	Greasy stains and gray liquid behind store.
01/14/2020 12:00 PM	01/14/2020 15:30 PM	7301 Castor Ave	Lint	Other -	Drain To Sewer	some lint getting past inadequate screens.
01/14/2020 16:15 PM	01/15/2020 12:00 PM	8201 State Rd		Discharge At Outfall	Drain To Sewer	rust like substance on OF pipe.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
01/15/2020 10:00 AM	01/28/2020 12:58 PM	3351 Grant Ave	Water	Hydrant	Other	No discharge observed or hydrant in use
01/16/2020 17:10 PM	01/17/2020 16:00 PM	4163 N 9Th St	Food Waste	Illegal Discharge | Dumping	Other	Unfounded
01/20/2020 12:19 PM		9748 Red Rambler Run Creek				
01/23/2020 18:28 PM	02/29/2020 08:35 AM	N 19Th St & Wood St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	No spill found
01/23/2020 21:31 PM	01/24/2020 15:25 PM	3899 Richmond St	Chemical	Odor	Other	No odor detected at the time of inspection.
01/24/2020 12:54 PM		4300 Ford Rd	Chemical	Spill | Slug Discharge	Spill To Ground Only	1-2 gallons of Ferric Chloride spilled to ground only at Belmont.
01/25/2020 15:21 PM		Pothouse Road, Phoenixville, Pa				
01/27/2020 16:34 PM	01/28/2020 17:00 PM	3600 N 18Th St	Sewage	Spill | Slug Discharge		Human waste dumping to inlet
01/30/2020 08:50 AM	02/24/2020 15:00 PM	1800 Conlyn St	Petroleum (Oil | Fuel)	Other - Suspected Ust Leak	Other	Fuel oil odors detected from inlets on Conlyn St. Fuel oil in sewer confirmed with oil absorbent wipes and laboratory analysis. The most likely responsible party is the Joseph Pennell School, with admitted boiler issues and a UST scheduled to be replaced this year.
02/03/2020 14:30 PM	02/07/2020 13:32 PM	8201 State Rd				
02/04/2020 15:30 PM	08/13/2020 14:33 PM	Mingo Creek Pumping Station	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Receiving Stream	Pinkish/Reddish liquid on the Mingo Pump Basin
02/04/2020 18:40 PM	02/05/2020 12:00 PM	51 N 39Th St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	Spill was contained and cleaned up on site from the previous day.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
02/06/2020 09:40 AM	02/14/2020 16:08 PM	2110 E Norris St	Solid	Illegal Discharge | Dumping	Drain To Sewer	Photos shows concrete dumped and staining on sidewalk and street near inlet.
02/06/2020 09:45 AM	02/06/2020 11:30 AM	3601 N Delaware Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	No sheen seen on the river.
02/06/2020 10:30 AM		2021 Watkins St				
02/08/2020 21:15 PM	02/14/2020 12:30 PM	153-59 Jefferson St	Solid	Illegal Discharge | Dumping	Spill To Ground Only	IWBC responded to an NRC notice that stated that lead paint was being dumped to a sewer. The actual compliant is that a resident was concerned with the residue from sandblasting in the house next to him. The residue was on the street and in his house. IWBC inspector did not observe any liquid paint on the street or in the inlets. There was a reddish sandy like residue material in the gutter. The reddish material looked like residue from the brick. IWBC did speak to the complainant He said that he was concerned about lead poisoning. She told him that there was no impact to PWDs system and that I would pass his concerns to Air Management. No further action is required by IWBC.
02/11/2020 11:15 AM	06/16/2020 12:00 PM	S 16Th St & Samson St	Food Waste	Illegal Discharge | Dumping	Overland To Inlet	IWBC received a 311 call reporting someone dumping grease at 16th and Samson. It was raining at the time of the inspection. The IWBC inspector observed a small amount of white particles near the inlet at the corner of 16th and Sansom and 16th and Moravian. No odors or other signs of oil were observed at either site. The inspector spoke to the manager on duty. He told her that they collect the grease in the back and it is picked up. He did not have the records on site. The area around the grease collation drum was relatively clean. The inspector asked how mop water was disposed of. The manager replied that they dump to the inlet. The inspector explained that only Stormwater is permitted in the inlet. They have to dispose the mop water to an inside drain. An NOV will be sent.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
02/12/2020 13:43 PM	02/14/2020 13:19 PM	Pine Rd & N Kings Oak Ln	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	Fire Department reported a car accident at Pine Rd. and Kings Lane where some gas may have entered the water system. When IWBC arrived on site, the PFD had already left the scene. In the bushes at the NWC, there was a front end grille left from the accident. The inlet is 20 ft. away. There was a slight odor of gasoline in the air. The LEL readings were 0 at the inlet and the surrounding area. There was no impact at the outfall and creek. It was raining and rained through the night. The next day the odor was negligible and 0% LEL in the area. No further action required.
02/13/2020 14:45 PM	02/19/2020 14:00 PM	701 E Willard St	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Overland To Inlet	In an 311 report to IWBC, a citizen reported that there is a leak in the sewer causing a steady stream in his basement from the inlet. His neighbor dumps oil and grease into the inlet. He only gave an email address and did not responded to the request for further information. IWBC inspector inspected the sewer on Willard St and found no issues. The NWC inlet had some black staining on the side walk and street. The water in inlet had an organist tinge and a slight sheen. No one was home at the given address. The inspector spoke to some one parked at the corner. He said he would pass the information to his friend. He said that his friend works in cars in the garage and the neighbors complain. I told him not to dump any thing into the inlet. IWBC passed the complaint to sewer maintenance who confirmed that there were no issues with the sewer by dye testing the NEC and the NWC inlets.
02/16/2020 18:03 PM	02/24/2020 16:35 PM	2300 Frankford Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	Inlet at Trenton and Dauphin cleaned out by AC Auto at my request. Sidewalk and street cleaning started before my arrival. Owners were very cooperative.
02/18/2020 14:15 PM		Crow Creek Confluence With Schuylkill				

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
		Is Near Route 23				
02/20/2020 08:05 AM	02/20/2020 12:00 PM	N 19Th St & Brown St	Solid	Illegal Discharge | Dumping	Overland To Inlet	Material was mostly on ground and around inlet. No choke.
02/20/2020 08:30 AM	02/20/2020 15:00 PM	7333 Oxford Ave	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Spill To Ground Only	oil contaminated patch approximately 6' x 11'. also non leaking jugs of waste oil tossed onto CSX property by customers.
02/24/2020 03:52 AM	02/24/2020 10:00 AM	6748 Martins Mill Rd	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Other	Heating oil was contained in the basement of 6748 Martins Mill Rd. Clean Venture was on site to vactor out the oil and clean the scene. No oil was released from the building.
02/24/2020 10:12 AM		2942 Master St	Solid	Illegal Discharge | Dumping	Overland To Inlet	There was a significant amount to sand/dirt.rock runoff from nearby construction sites. 2940 Master appeared to be the most like contributor. Construction engineer will send out an inspector to have contractor use sediment control.
02/24/2020 15:24 PM	02/27/2020 10:00 AM	675 Dupont St	Horse Waste	Illegal Discharge | Dumping	Spill To Ground Only	Horse waste dumped on hill behind 239R / 241R Dupont St. Due to amount of vegetated area, possibility of runoff entering sewer or creek is unlikely.
02/25/2020 13:27 PM	02/27/2020 11:00 AM	1100 Leopard St	Hydraulic Fluid	Spill | Slug Discharge	Overland To Inlet	Small amount of fluid in inlet. Absorbent pads were put in inlet and removed by PGW. Inlet appeared normal at follow up inspection (2/27).
02/27/2020 14:47 PM	03/04/2020 12:00 PM	1939 S 19Th St	Food Waste	Illegal Discharge | Dumping	Drain To Sewer	Heavy grease residue observed on and inside of inlet directly in front of Los Materos Food Market (1939 S 19th St. Philadelphia Pa 19145). NOV sent.
02/27/2020 16:24 PM	02/28/2020 11:00 AM	6218 Trotter St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	There are several areas of motor oil stains along the street. The origin of the stains could not be determined. Three inlets at the bottom of the block were inspected and there was no evidence of automotive fluids in any of the inlets. The inspection of the rear of the property did not show any polluntant discharge. The rear yard of 6218 was tarped and there was not much visible.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
02/27/2020 20:13 PM	02/28/2020 10:00 AM	9891 Frankford Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	Due to it being dark, there was no impact observed on the stream. The inlet was full of water, but there was no gasoline smell. Follow up inspection the next morning showed no impact on stream or structure.
02/28/2020 13:26 PM	03/02/2020 11:00 AM	Columbus Blv & Christian St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	Approximately 20 to 30 gallons of jet fuel was spilled on sidewalk during unloading operations. Some fuel went into the inlet and a small amount of sheen (<1gallon) was observed by US Coast guard on site. Oil dry was used on spill and inlet was diked. The area returned to normal by 3/2/20 11am.
02/28/2020 15:25 PM	02/29/2020 13:20 PM	2325 E Fletcher St	Water	Illegal Discharge | Dumping	Other	Cement wash water from construction site being dumped to inlet. Contractor admitted to doing so, claiming that it was just colored water.
03/05/2020 08:34 AM	03/05/2020 11:30 AM	1432 N 54Th St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	Aluminum baking pans full of used motor oil in alleyway behind houses and showed signs of spillage, which caused no impact on PWD structures or operations.
03/09/2020 11:45 AM	03/10/2020 11:00 AM	7627-31 Germantown Ave	Unknown	Spill | Slug Discharge	Direct To Receiving Stream	Creek was inspected on 3/9/20 at 2pm and 3/10 at 10am. There was no signs of the spill/discharge. Flow in creek on both sides of Germantown Ave was clear. Inspection of parcel 7619-25 showed no signs of dumping or runoff. No one was present at the site to interview, but the scope of work from the outside appeared to be building of a deck. Location will be reinspected as the area is enroute to a routine IWBC location.
03/09/2020 17:31 PM	03/12/2020 13:00 PM	Neill Drive Pumping Station	Sewage	Spill | Slug Discharge	Overland To Receiving Stream,Direct To Receiving Stream	16" force main broke and pump station is directly discharging into adjacent creek. Creek was inspected up to culvert and there are no signs of dead fish, animals or other species. The creek's influence to the Schulkill is difficult to access. Observations from the Falls bridge yielded nothing unusual. Spill apron is visible from Lincoln Drive off ramp of I-76. Both Belmont inake (downstream) and Queen Lane (slighltly upstream and across from spill) appeared normal. Reinspection needed after spill is resolved.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
03/10/2020 17:30 PM	03/11/2020 11:00 AM	2900 Island Ave	Food Waste	Spill | Slug Discharge	Spill To Ground Only	There are several grease dumpsters at various location behind the shopping center. Most of the dumpsters had oil staining around the dumpsters. No dumpsters had fresh spills except for the dumpster behind the Jamaica Way restaurant. The grease seems to have a little bit of accumulation and appeared to be from spillage. The inlets in the parking lot were inspected and all appeared normal. There was at least 100' between any dumpsters and the inlets.
03/11/2020 15:40 PM	03/11/2020 17:00 PM	7350 Oxford Ave	Petroleum (Oil | Fuel)	Illegal Discharge | Dumping	Spill To Ground Only	Area behind parking spaces 9 to 11 along fence were saturated with oil. 7th parking space has oil in space and was covered with oil dry. The entire area is strewn with trash. There are no nearby inlets. Store manager stated they have oil dry for spills, they take used oil to recycle. The property manager was asked to clean the area and put up no dumping signage along fence. Store manager was also asked to put signage up at fence asking people not to work on car and the oil can be taken into the store for recycling.
03/11/2020 19:15 PM		Gaul St & E Madison St	Sewage	Illegal Discharge | Dumping	Overland To Inlet	Inlet 10541 on the SE corner of Madison and Gaul appeared to have toilet paper and sewage dumped into it. The trail of waste begins at the FAI ifo 3253 Gaul St. A neighbor stated they saw the property owner snaking out the lateral and dumping the contents from the clog into the inlet. Outside of the inlet had caked up paper products. The inlet was filled with grey water and some trash. Refer to IWBC engineering support for warning letter.
03/18/2020 08:30 AM	03/19/2020 12:24 PM	1343 Kerper St	Sewage	Choke	Spill To Ground Only	Paper and sewage residue at curb. Reported to emergency desk for further investigation. Sewer and lateral WO: 2540582
03/20/2020 08:15 AM	04/06/2020 12:00 PM	56 And Vine St	Sewage	Spill | Slug Discharge	Overland To Inlet	Drain in the dumpster area of McDonalds was overflowing, traveling through the parking lot into a drain approximately 200ft away in parking lot. Drain was cleaned.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
03/20/2020 08:30 AM	03/20/2020 13:00 PM	Delaware And E Allegheny Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	On Delaware Avenue between the fence line and the sidewalk, there is an accumulation on the grass. It appears to be contaminated sediment that was deposited from run off. There are no signs that the inlets were impacted. In the parking lot on the other side of the fence, there are large dark spots in the parking lot. It appears to be clear puddles (could be on top of a legacy stain which makes puddle appear darker). At time of inspection the business appeared to be closed and there was no access possible.
03/23/2020 13:34 PM	03/27/2020 13:17 PM	8201 State Rd	Orange Substance	Spill | Slug Discharge	Spill To Ground Only	IWBC was notified by EPA of an orange substance on the Pennypack Trail. In front of the benches that are located about 225' S of the gate the inspector observed the orange substance that was diluted. It was on side walk not in water on top of sidewalk. No signs of spillage or dumping were observed. 3/24/2020 at 9 AM. The rain had stopped. The path was drying out except in front of the bench. The orange color was no longer obvious but there was an iridescent metallic sheen on the puddle. Not unlike the sheen that sometimes you see along a creek. When I broke it a apart it not join back together like an oil sheen. No odors either day. There also is no impact on the river. Two residents walking their dogs told the inspector the area is always wet. The sources was determined to be seepage
03/27/2020 07:30 AM		1462 Lardner St				
03/28/2020 12:47 PM	03/30/2020 11:44 AM	8500 Essington Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	~3 gallons of jet fuel spilled to storm inlet at the airport. Due to the heavy rain, the 3 gallons of fuel was immediately washed out. No visible impacts remained at the inlet. The airport has booms already in place at their storm water transition chamber.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
04/01/2020 09:22 AM	04/03/2020 13:52 PM	1500 W Passyunk Ave	Groundwater	Illegal Discharge | Dumping	Drain To Sewer	Groundwater pumped out from cellar to the street into the drain.
04/06/2020 08:05 AM	04/17/2020 09:09 AM	Hog Island Rd	Solid	Choke	Other	Gloves caused pump jam and sewage overflow to receiving stream. UPS with its large workforce is the only user in the area capable of discharging enough gloves to cause a clog. No direct observations of the overflow were made by IWBC.
04/06/2020 18:52 PM	04/07/2020 15:00 PM	1852 S Rosewood St		Unfounded		No evidence of dumping to inlet or FAI overflow to inlet was observed. Complainant failed to respond to calls for more information.
04/15/2020 18:00 PM	04/20/2020 16:01 PM	N 59Th St & W Columbia Ave		Unfounded		PECO reported a hydraulic oil spill. Unfounded.
04/15/2020 20:45 PM	04/20/2020 15:54 PM	Brill St & Torresdale Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	PECO oil spill to inlet. Inlet was vacced out.
04/17/2020 11:30 AM	04/17/2020 14:00 PM	2450 Wakeling St				
04/17/2020 14:30 PM		4300 S 26Th St	Sewage	Choke	Other	Choke at pump station 648. SM cleared choke prior to investigation. Wipes observed in upstream manholes
04/17/2020 22:50 PM		Pier 5				
04/20/2020 10:45 AM	05/01/2020 12:00 PM	2225 Spring Garden St	Water	Illegal Discharge | Dumping	Overland To Inlet	A citizen reported to IWBC that construction site was pumping groundwater through a pipe to 23rd St. IWBC inspector found the site to be unmanned and no discharge. There was a silt trail leading from the pipe to an inlet. IWBC called the contractor and informed him that no discharge is allowed to an inlet except rainwater. The contractor said they were half way through a basement excavation and had to pump the water the main the integrity of the adjacent building. On Friday during a rain storm IWBC inspector re-inspected the site. There was groundwater being pump. A silt sock was installed in front of the inlet. The inlet was taking water. An NOV is requested.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
04/24/2020 10:50 AM	04/30/2020 11:02 AM	2701 Poplar St	Chemical	Illegal Discharge | Dumping	Overland To Inlet	IWBC received email from PADEP reporting that a citizen suspected that employees from a tire shop on Popular St. dumped used antifreeze to the inlet (date and time unknown). IWBC inspector found no evidence of the dumping. It had rained that previous 12 hours. The owner of the tire shop said that only tires were serviced. IWBC inspector remined the owner that no liquids can be dumped to the inlet.
04/24/2020 14:00 PM	04/30/2020 11:29 AM	3023 N Orianna St	Sewage	Choke	Spill To Ground Only	PA DEP forwarded a report of sewage on a side walk on Oriana St. IWBC inspector verified the sewage and reported it to PWD Emergency Desk. A Leak Investigation was conducted and an NOD was issued.
04/25/2020 10:06 AM		Rt 663 Layfield Rd				
04/26/2020 09:00 AM	04/26/2020 12:00 PM	13000 Mc Nulty Rd	Chemical	Illegal Discharge | Dumping	Other	Unknown material was dumped in the vicinity of an inlet. Material posed a potential threat. The material was cleanup by a contractor.
04/29/2020 23:30 PM	04/29/2020 12:40 PM	Wayne And E Johnson St		Unfounded		black grime on ground. No sheen leaving property at the time of my inspection.
04/30/2020 23:00 PM	05/01/2020 03:00 AM	I-95 And Ashburner State Rd	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	rain had flushed between 80-100 gallons of diesel to storm drain. No sheen detected on Pennypack Creek or a tributary of it near Ashburner. The highway was sanded as it was very slick.
05/01/2020 04:30 AM	05/01/2020 07:30 AM	6400 City Line Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	inlet had 30 gallons of waste oil. There was also oil staining along the curbline which had been sanded by PennDot. No impact on City sewer.
05/06/2020 05:17 AM	05/07/2020 12:00 PM	Sweetbriar Dr And Lansdowne Dr	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	A tractor trailer flipped on the highway and diesel fuel pilled to the ground and migrated to a highway inlet. The river was checked in various points. A boom was upstream at the Falls. No sheen was observed on the river.
05/09/2020 22:53 PM	05/09/2020 23:30 PM	2450 Wakeling St				

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
05/11/2020 16:56 PM	05/18/2020 07:00 AM	1335 S Newkirk St	Sewage	Illegal Discharge | Dumping	Overland To Inlet	Sewage overflow/dumping to inlet reportedly occurred a week prior to IWBC involvement. No sign of dumping or overflow observed during IWBC inspection. Offending resident had lateral work performed to correct issues.
05/12/2020 12:08 PM	05/13/2020 10:00 AM	5554 Whitby Ave	Sewage	Illegal Discharge | Dumping	Spill To Ground Only	Staining and bits of paper shreds on sidewalk from broken downspout next to property show a sewage overflow had occurred. There was no evidence of said overflow impacting the inlet.
05/12/2020 16:26 PM	05/20/2020 13:00 PM	Mayfair St & E Roosevelt Blvd	Water	Spill | Slug Discharge	Spill To Ground Only	Stain on Mayfair St. from a vehicle antifreeze leak on the J&M Window property that resulted in no observed impact on PWD structure.
05/13/2020 08:36 AM		1145 S 61St St				
05/13/2020 19:25 PM	05/13/2020 20:30 PM	Cresheim Valley Dr & Germantown Ave	Suspected Paint	Color	Other	White discoloration passed through/faded before my arrival. Pictures provided by complainant show solid white color and opaque stream. No staining was left behind in MS4s most proximate to complaint area. No responsible party has been determined.
05/26/2020 05:35 AM	05/28/2020 12:00 PM	3215 Englewood St		Unfounded		Citizen reported odors in his house that were making him ill. He thought his neighbor had dumped heating oil from an old boiler. IWBC inspector found no odors in the area. PID readings in the sewer were 0 PPM. The next the complainant reported that the odors were coming from an over turned snow blower in his garage. No impact to PWD structures.
05/26/2020 07:20 AM	05/27/2020 12:00 PM	4211 Germantown Ave	Food Waste	Illegal Discharge | Dumping	Other	311 report of grease dumping to outlets on Germantown Ave. in front of a Chinese take out restaurant. IWBC inspector found no evidence of dumping on the sidewalk of any nearby inlets. Restaurant phone is disconnected.
05/26/2020 10:00 AM	05/26/2020 14:00 PM	2111 S Simpson St		Unfounded		There was no sign of sewage outside the property. Complainant was contacted and confirmed there was no sewage out the property. She also claimed a PGW worker told her about the sewage in the basement. She did claim her water smelled like rotten eggs when she would turn it on

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
						in the morning. She was given the number for Taste and Odor complaints.
05/26/2020 20:23 PM		Schuylkill Ave & Reed St				
05/27/2020 08:52 AM		S 11Th St & Jackson St	Food Waste	Illegal Discharge | Dumping	Overland To Inlet	IWBC received a 311 call concerning someone dumping into the inlet at 11th and Jackson. IWBC inspector observed trash and some staining on the cement and grate of the inlet. No floating layer was observed. She talked to the owner of the restaurant who said that he knew not to put any thing in the inlet. He said he would remind his employees. No inside inspection was conducted due the COVID-19 crisis. A warning letter will be sent.
05/27/2020 18:55 PM	05/28/2020 16:00 PM	Schuylkill Expy Ramp A	Chemical	Spill | Slug Discharge	Overland To Inlet	HMAU requested IWBC at an accident at SCHUYLKILL EXPY RAMP A. A tote was leaking a non-hazardous (pH 7.2-7.8) acrylic resin to the highway and non-PWD inlet. The inlet is interconnected with other highway inlets. It is assumed that it eventually flows to the river. No product was observed in the river. Owner of the truck called for a contractor to clean the inlet and the highway. Owner called the NRC, IWBC reported the incident to PADEP.
05/28/2020 09:12 AM	05/28/2020 16:00 PM	8301 Castor Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	PGW reported a 15 gallon gasoline spill in their driveway. A PGW truck's gas line ruptured spilling gasoline to the ground. The gas migrated towards a storm drain 15' away. PGW environmental pumped out the storm drain and place adsorbents in the drain. No impact was observed in the sewer or at the outfall. PGW reported the incident to the PADEP.
05/29/2020 10:58 AM	06/05/2020 12:00 PM	T-088-01	Chemical	Illegal Discharge | Dumping	Overland To Inlet	Solvent odors, white discharge, and white sheen at 7th and Cheltenham outfall. Booms were placed. Discharge ceased. No source was located. No adverse impact observed on aquatic life in the stream.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
06/03/2020 15:35 PM	06/03/2020 17:00 PM	4236 Aldine St	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Spill To Ground Only	No oil observed in inlet old oil stain in street from a car that went from a parking spot until it trailed off around the corner. No oil to cleanup.
06/03/2020 21:00 PM	06/04/2020 00:00 AM	7216 Valley Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	Inlet cleaned. Heavy rain prior to cleaning. No odors or oil sheen at @-67-01.
06/04/2020 09:35 AM	06/05/2020 13:15 PM	5800 Chew Ave	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	oil spill cleanup was completed during return visit
06/05/2020 04:20 AM	06/05/2020 08:20 AM	Whitaker Ave & E Roosevelt Blvd	Petroleum (Oil | Fuel)	Spill | Slug Discharge	Overland To Inlet	Some oil in an inlet. A couples of puddles along the gutter. HAZMAT working to contain spill. ACV to do cleanup.
06/05/2020 11:15 AM	06/05/2020 19:00 PM	9001 State Rd	Chemical	Spill | Slug Discharge	Drain To Sewer	Leak could not be stopped. Material flowing to sump and pumped to sanitary sewer. Tank being pumped back into tanker
06/05/2020 17:38 PM	06/12/2020 12:00 PM	7701 E Roosevelt Blvd	Chemical	Spill | Slug Discharge	Spill To Ground Only	Spill did not enter the inlet or nearby outfall.
06/08/2020 09:39 AM	06/24/2020 08:58 AM	118 W Girard Ave	Food Waste	Illegal Discharge | Dumping	Drain To Sewer	
06/11/2020 14:14 PM	06/15/2020 14:38 PM	2556 N 24Th St	Food Waste	Illegal Discharge | Dumping	Drain To Sewer	There is significant grease impact on the walls of the inlet.
06/16/2020 14:36 PM	06/25/2020 15:06 PM	2450 Wakeling St				
06/17/2020 10:14 AM	06/17/2020 12:50 PM	3939 Germantown Ave	Chemical	Illegal Discharge | Dumping	Drain To Sewer	Chemical manufacturer under EPA-CID search warrant for reported illegal dumping inside facility. Drain was clogged so there was probably no escape of material. IU was not in LINKO.
06/17/2020 11:16 AM	06/26/2020 14:15 PM	9001 State Rd	Foam	Spill | Slug Discharge	Direct To Receiving Stream	Foam at Baxter intake and along the Delaware River. Source could not be determined.

Date Reported	Date Completed	Location	Pollutant	Incident Type	Destination	Observation
06/24/2020 13:15 PM		7600 Germantown Ave				
06/25/2020 14:03 PM		5400 Master St	Solid	Illegal Discharge | Dumping	Overland To Inlet	Contractor debris dumped to inlet at 54th and Master.
06/29/2020 12:40 PM	06/29/2020 17:30 PM	2839 E Tioga St	Hydraulic Equipment	Illegal Discharge | Dumping	Other	An anonymous caller reported to the NRC that someone was burying hydraulic equipment at 2839 E. Tioga. The site is a tool shop. Behind the building is a cement driveway. No hydraulic equipment or oil was on the site. Across the street in front of 2910 E. Tioga St. there a piece of construction equipment laying the side. There were piles of dirt on the site. No hydraulic oil was observed.

Appendix P – Defective Lateral Quarterly Report FY20

STORM WATER MANAGEMENT PROGRAM
NPDES PERMIT NO. PA0054712

DEFECTIVE LATERAL CONNECTION STATUS REPORT
(Covering Period from July 1, 2019 to September 30, 2019)

Submitted to

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER QUALITY MANAGEMENT

By

CITY OF PHILADELPHIA
PHILADELPHIA, PA

November 15, 2019

DLC Program Update
3rd Quarter 2019

I. INTRODUCTION

This Defective Lateral Connection Status Report is submitted to the Pennsylvania Department of Environmental Protection (PADEP) as part of the reporting requirements of the City of Philadelphia NPDES Storm Water Management Permit No. PA 0054712. The report covers the three-month period beginning July 1, 2019 and ending September 30, 2019.

The body of this report will describe the recent activities of the City during the past quarter within the 1998 COA Priority Outfall areas and at other significant outfalls on the Stormwater Outfall Priority Score list. Additionally, goals for the next quarter will be listed.

Table 1 provides a summary of the program with respect to Complete tests, Cross-connections identified, and Abatements performed. Table 2 provides a listing of all laboratory analyses of samples taken at stormwater outfalls or within the stormwater system during the previous quarter. Table 3 provides a listing of properties with cross-connections outstanding greater than 120 days. Finally, Table 4 provides a listing of reported wastewater spills to the stormwater system or receiving streams.

II. PAST QUARTER REVIEW

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

DLC program activities have performed 2,831 Complete tests in this sewershed, identifying 134 Cross-connections, all but one of which have been Abated.

Eight (8) sites intercepting flow are listed below.

1.	CFD-01	Plymouth St. west of Pittsville St.
2.	CFD-02	Pittsville St. south of Plymouth St.
3.	CFD-03	Elston St. east of Bouvier St.
4.	CFD-04	Ashley St. west of Bouvier St.
5.	CFD-05	Cheltenham Ave. east of 19th St.
6.	CFD-06	Verbena St. south of Cheltenham Ave.
7.	CFD-07	Cheltenham Ave. east of 7th St.
8.	CFD-08	7th St. south of Cheltenham Ave.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	14	1	0
CFD-02	14	1	0
CFD-03	12	1	0
CFD-04	10	0	0
CFD-05	7	0	0
CFD-06	10	0	0
CFD-07	29	4	0
CFD-08	28	0	0

The most recent fecal sample value was 11,199 MPN per 100 ml. at the outfall on July 22, 2019.

2. Monastery Ave. Outfall (W-060-01)

DLC program activities have performed 611 Complete tests in this sewershed, identifying 16 Cross-connections, all of which have been Abated.

Two (2) sites intercepting flow are listed below.

1. MFD-01 Jannette St. west of Monastery Ave.
2. MFD-02 Green La. north of Lawnton St.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
MFD-01	6	0	0
MFD-02	7	0	0

The most recent fecal sample value was 980.4 MPN per 100 ml. at the outfall on July 22, 2019.

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

DLC program activities have performed 2,750 Complete tests in these sewershed areas, identifying 94 Cross-connections, all of which have been Abated. The majority of the efforts have been in the W-068-05 sewershed area which is by far the largest in terms of drainage area and properties served.

The most recent fecal sample value was 8,164 MPN per 100 ml. at the W-068-05 outfall on July 22, 2019.

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

DLC program activities have performed 2,479 Complete tests in these sewershed areas, identifying 62 Cross-connections, all of which have been Abated. The majority of the efforts have been in the S-059-04 sewershed area.

The most recent fecal sample values on July 2, 2019 at each outfall were:

- >24,196 MPN per 100 ml. at the S-058-01 outfall.
- >2419.6 MPN per 100 ml. at the S-059-01 outfall.
- >2419.6 MPN per 100 ml. at the S-059-02 outfall.
- 1,119.9 MPN per 100 ml. at the S-059-03 outfall.
- 360.9 MPN per 100 ml. at the S-059-04 outfall.
- 920.8 MPN per 100 ml. at the S-059-05 outfall.
- S-059-07 outfall was dry.
- >2419.6 MPN per 100 ml. at the S-059-09 outfall.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

DLC program activities have performed 5,834 Complete tests in this sewershed, identifying 87 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. PFD-01 Sandyford Run (Brous and Lexington Aves.)

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
PFD-01	29	4	0

The most recent fecal sample value was 143.9 MPN per 100 ml. at the outfall on July 22, 2019.

2. Franklin and Hasbrook Outfall (T-089-04)

DLC program activities have performed 1,021 Complete tests in this sewershed, identifying 46 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. CFD-01 Franklin and Hasbrook Aves.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	30	1	0

The outfall was found dry on September 30, 2019.

3. A current summary of additional outfalls from the Stormwater Outfall Priority Score list that the City has performed complete testing or abatements this quarter is as follows.

Outfall #	Complete Tests	Cross-Connections	Abatements
D-093-01	1	0	0
P-083-03	6	1	3
P-091-09	3	0	0
P-108-02	(4)	0	0
P-108-03	4	0	0
P-116-02	1	0	0
Q-109-07	1	0	0
Q-110-09	1	0	0
R18	232	54	0
W-086-04	1	0	0
D-056-09	0	0	1
S-052-04	0	0	5

III. NEXT QUARTER GOALS

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

2. Monastery Ave. Outfall (W-060-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

Goals for the Quarter

- Continue sampling at outfall W-068-05 with dry-weather flow.

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

Goals for the Quarter

- Continue sampling at the outfalls with dry-weather flow.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

2. Franklin and Hasbrook Outfall (T-089-04)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

3. Continue to perform abatements of identified cross-connections within the following outfalls.

- D-056-09
- D-093-01
- P-083-03
- P-100-04
- Q-109-07
- Q-110-09
- Q-121-05
- R18
- S-052-03
- S-052-04
- S-052-05
- T-080-02
- W-067-01
- W-086-02

4. Continue to perform property testing within the following outfalls.

- D-093-01

- P-083-03
- P-091-09
- P-116-02
- Q-109-07
- R18
- T-056-08

Table 1
DLC Program Summary
July 1, 2019 to September 30, 2019

Complete Tests:

- 63,596 Complete tests have been performed under the DLC program
- **246 Complete tests were performed this past quarter**
- 1 Complete test was performed in outfall D-093-01
- 6 Complete tests were performed in outfall P-083-03
- 3 Complete tests were performed in outfall P-091-09
- (4) Complete tests were performed in outfall P-108-02
- 4 Complete tests were performed in outfall P-108-03
- 1 Complete test was performed in outfall P-116-02
- 1 Complete test was performed in outfall Q-109-07
- 1 Complete test was performed in outfall Q-110-09
- 232 Complete tests were performed in outfall R-18
- 1 Complete test was performed in outfall W-086-04

Cross-Connections Found:

- 1,752 Cross-connections have been identified under the DLC program
- **56 Cross-connections were identified this past quarter**
- 1 Cross-connection was identified in outfall P-083-03
- 54 Cross-connections were identified in outfall R-18
- 1 Cross-connection was identified in outfall W-067-01

Abatements:

- 1,553 Abatements have been performed under the DLC program
- **9 Abatements were performed this past quarter**
- 1 Abatement was performed in outfall D-056-09
- 3 Abatements were performed in outfall P-083-03
- 5 Abatements were performed in outfall S-052-04

Outfall/Manhole Screening and Sampling:

- 14 outfall inspections were made as part of the **Priority Outfall Inspection Program** this past quarter
- 10 outfall samples were taken due to observed dry-weather flow during the above inspections

- 17 outfall inspections were made as part of the **Permit Inspection Program** this past quarter
- 5 outfall samples were taken due to observed dry-weather flow during the above inspections

Table 2

Lab Analysis of Water at Outfalls and/or in the Storm Sewers

July 1, 2019 to September 30, 2019

Outfall	Date	Time	Location	Sewer Size (in)	Flow (gph)	Fluoride (mg/l)	Fecal Count (MPN per 100 ml)	Comments
A. Priority Outfalls								
T-088-01	7/22/2019	11:00	Outfall: Cheltenham Ave. & 7th St.	84	3000	0.117	11199	Flow from both sides
W-060-01	7/22/2019	12:20	Outfall:Monastery & Jeanette	5'0" x 4'0"	720	0.109	980.4	Plunge pool more cloudy than usual.
W-068-05	7/22/2019	12:45	Outfall:Lincoln & Morris	90	7200	0.214	8164	Clear
S-058-01	7/2/2019	10:50	Outfall:Umbria St. & Domino Lane	54	7200	0.291	>24196	Partially submerged outfall
S-059-01	7/2/2019	11:10	Outfall:Towpath & Fountain St.	42	3600	0.215	>2419.6	Clear and no odors
S-059-02	7/2/2019	11:22	Outfall:Towpath & Fountain St.	42	6	<0.1	>2419.6	Clear and no odors
S-059-03	7/2/2019	11:30	Outfall:Towpath & Wright St.	42	NR	0.15	1119.9	Clear flow. Algae present.
S-059-04	7/2/2019	11:40	Outfall:Towpath & Leverington Ave. Bridge	51	NR	0.181	360.9	Outfall submerged - cannot determine flow
S-059-05	7/2/2019	11:42	Outfall:Towpath & Leverington Ave. Bridge	4'0" x 2'8"	NR	0.19	920.8	Outfall submerged - unable to determine flow
S-059-07	7/2/2019	11:50	Outfall:Towpath & Green Ln.	15	0	NS	NS	Terra cotta coming out of canal wooden retaining wall ~15" dry
S-059-08	7/2/2019	11:55	Outfall:Towpath & Green Ln.	25	NA	NS	NS	Does Not Exist
S-059-09	7/2/2019	12:05	Outfall:Main St. & Green Lane	36	120	0.544	>2419.6	Used 40mL bottle on string to sample between board walk slats
S-059-10	7/2/2019	12:15	Outfall:Main St. & Green Lane	0	NA	NS	NS	Outfall does not exist at location.
S-059-11	7/2/2019	12:16	Outfall:Main St. & Carson St.	0	NA	NS	NS	Outfall does not exist at location.
B. Permit Inspection Program								
W-086-04	7/2/2019	9:15	Outfall: Anderson & Woodbrook	42	0	NS	NS	Bottom of outfall was wet, but no flow.
P-090-02	7/22/2019	11:30	Outfall:Brous & Lexington Aves. @ Roosevelt Blvd.	156	600	0.53	143.9	Most flow from P-090-01
P-099-03	8/19/2019	11:36	Outfall:Bustleton & Tustin	7'0" x 6'6"	600	0.631	>2419.6	Heavy scum in plunge pool, active construction nearby
P-100-14	8/19/2019	10:51	Outfall:Holme & Longford	42	720	NS	NS	Cloudy with slight solids. Sanitary sewer is on a regular sewer maintenance cleaning schedule to clear chokes.
P-083-04	9/20/2019	11:20	Outfall:State Rd @ Police Academy Riffle Range	72	NM	0.61	2	Emergency Response: Unable to measure elevated flow. Clear water, no sheen or odors
D-026-04	9/23/2019	11:25	Manhole D-026-04-0010, 0015	4'0" x 4'0"	0	NS	NS	Outfall Submerged. Manholes D-026-04-0010, 0015 Dry no flow.
D-026-03	9/23/2019	11:30	Manhole D-026-03-0020, 0010	4'0" x 4'0"	0	NS	NS	Outfall submerged. Manholes D-026-03-0010, 0020 both Dry
D-026-02	9/23/2019	11:40	Outfall:Delaware & Catherine	5'0' x 4'0"	0	NS	NS	Outfall Submerged. No contributing manholes upstream to inspect according to SERV. Inaccessible.
D-026-01	9/23/2019	11:45	Manhole: D-026-01-005 Delaware & Catherine	4'0" x 4'0"	0	NS	NS	Outfall Submerged. Manhole D-026-005 stagnant no flow.
D-031-02	9/23/2019	12:00	Manhole: D-031-02-0010	24	0	NS	NS	Outfall Submerged. MH D-031-02-0010 Stagnant, no flow.
D-031-03	9/23/2019	12:20	Outfall: Delaware and Spruce	15	0	NS	NS	Outfall submerged or inaccessible under boardwalk. Upstream manholes are labeled as D58-000114 - stagnant, no flow, oil sheen.
D-031-01	9/23/2019	12:45	Outfall: Delaware and Market	36	0	NS	NS	Outfall inacessible / submerged. Manholes D-031-01-0015,0020 do not exist. MH in traffic lane (in notes) is actually D53-SWB060
D-036-01	9/23/2019	13:20	Outfall: Delaware and Spring Garden	15	0	NS	NS	Outfall does not exist - SERV places it in middle of parking lot. Only a storm inlet is in lot. No MH's upstream, no branches of sewer line upstream
D-036-02	9/23/2019	13:25	Manhole: D-036-02-0010	24	0	NS	NS	Current construction has manhole cover and collar removed. D-036-02-0010 Dry, no flow
D-036-03	9/23/2019	13:30	Outfall D-036-03	1'0" x 1'0"	0	NS	NS	Outfall submerged or does not exist according to construction crews. MH D-036-03-B-0045 Dry No flow.
M-005-01	9/24/2019	12:15	Outfall:SW WPCP	72	0	<0.1	>24196	Outfall is an open channel, unable to determine flow rate.
D-074-01	9/24/2019	11:20	Outfall:Bleigh St. & Delaware Ave.	66	0	<0.1	199	Outfall experiences tidal river influence. No sheen or odors observed. Closeest manhole found D-074-01-0020 No flow, stagnant.

Table 3
Residential Cross Connections Not Abated Within 120 Days

A. Properties Abated & Confirmed Prior to Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Abatement Confirmation Date	Comments

B. Properties Active As Of Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Comments
00015 Osborn St	S-052-05	01-17-2018		
01941 Kentwood St	Q-109-07	01-19-2018		
03411 W Penn St	S-052-04	02-13-2018		
03400 W Penn St	S-052-04	02-16-2018		
03423 W Penn St	S-052-04	02-17-2018		
03404 W Penn St	S-052-04	02-17-2018		
03424 W Penn St	S-052-04	02-17-2018		
03433 W Penn St	S-052-04	02-21-2018		
03338 W Penn St	S-052-04	02-24-2018		
03324 W Penn St	S-052-04	02-24-2018		
03331 W Penn St	S-052-04	02-24-2018		
03333 W Penn St	S-052-04	02-26-2018		
03332 W Penn St	S-052-04	02-26-2018		
03425 Conrad St	S-052-04	03-01-2018		
03530 Henry Ave	S-052-04	03-03-2018		
03340 W Penn St	S-052-04	03-03-2018		
03301 W Penn St	S-052-04	03-16-2018		
03424 Osmond St	S-052-04	03-17-2018		
03305 Tilden St	S-052-04	03-24-2018		
03313 Tilden St	S-052-04	03-24-2018		
03329 Tilden St	S-052-04	03-27-2018		
03316 Tilden St	S-052-04	03-28-2018		
03333 Tilden St	S-052-04	03-29-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address				Outfall Code	Complete Date	Admin. Action	Comments
03461		Sunnyside	Ave	S-052-04	04-02-2018		
03434	W	Penn	St	S-052-04	04-07-2018		
03411		Osmond	St	S-052-04	04-28-2018		
03452		Crawford	St	S-052-04	05-02-2018		
03449	W	Penn	St	S-052-04	05-03-2018		
03323		Conrad	St	S-052-04	05-09-2018		
03446		Crawford	St	S-052-04	05-17-2018		
03467		Indian Queen	La	S-052-04	05-26-2018		
03433		Crawford	St	S-052-04	05-26-2018		
03317	W	Penn	St	S-052-04	06-02-2018		
03448	W	Queen	La	S-052-04	06-23-2018		
00032	W	Gowen	Ave	W-086-02	06-28-2018		
03419	W	Queen	La	S-052-04	07-02-2018		
03335	W	Queen	La	S-052-04	07-02-2018		
03417	W	Queen	La	S-052-04	07-05-2018		
03326	W	Queen	La	S-052-04	07-12-2018		
03452	W	Queen	La	S-052-04	07-13-2018		
03469	W	Queen	La	S-052-04	07-17-2018		
03414	W	Queen	La	S-052-04	07-20-2018		
03440	W	Queen	La	S-052-04	07-21-2018		
03333	W	Queen	La	S-052-04	07-21-2018		
03474		Tilden	St	S-052-04	07-21-2018		
03435	W	Queen	La	S-052-04	07-30-2018		
03464	W	Queen	La	S-052-04	07-30-2018		
03429	W	Queen	La	S-052-04	08-02-2018		
01340		Downs	Pl	Q-121-05	08-14-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address	Outfall Code	Complete Date	Admin. Action	Comments
03459 W Queen La	S-052-04	08-16-2018		
03434 W Queen La	S-052-04	08-17-2018		
03460 W Queen La	S-052-04	08-24-2018		
02612 Woodward St	P-100-04	09-12-2018		
04437 Riverview La	S-052-03	09-19-2018		
04456 Riverview La	S-052-03	09-26-2018		
04423 Driftwood Dr	S-052-03	09-27-2018		
04433 Riverview La	S-052-03	09-29-2018		
04439 Riverview La	S-052-03	09-29-2018		
04406 Driftwood Dr	S-052-03	09-29-2018		
04433 Driftwood Dr	S-052-03	09-29-2018		
04520 Aberdale Rd	P-083-03	10-06-2018		
03235 Comly Pl	Q-110-09	10-06-2018		
04410 Driftwood Dr	S-052-03	10-06-2018		
04415 Driftwood Dr	S-052-03	10-12-2018		
04433 Aberdale Rd	P-083-03	10-13-2018		
04402 Driftwood Dr	S-052-03	10-13-2018		
04312 Ashburner St	P-083-03	10-20-2018		
03454 W Penn St	S-052-04	10-24-2018		
04425 Driftwood Dr	S-052-03	10-27-2018		
04431 Driftwood Dr	S-052-03	10-27-2018		
04404 Driftwood Dr	S-052-03	10-31-2018		
04412 Driftwood Dr	S-052-03	11-09-2018		
04417 Driftwood Dr	S-052-03	11-17-2018		
08731 Cottage St	P-083-03	11-27-2018		
04435 Aberdale Rd	P-083-03	12-04-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address			Outfall Code	Complete Date	Admin. Action	Comments
03413	Osmond	St	S-052-04	12-07-2018		
03005	Comly	Rd	Q-110-09	12-10-2018		
03700	Falls	Cir	S-052-03	12-15-2018		
04256	Neilson	St	R18	12-22-2018		
08726	Cottage	St	P-083-03	12-22-2018		
03021	Comly	Rd	Q-110-09	12-22-2018		
03702	Falls	Cir	S-052-03	12-24-2018		
04702	Almond	St	D-056-09	12-26-2018		
03482	Tilden	St	S-052-04	01-07-2019		
04611	Ashburner	St	P-083-03	01-16-2019		
09524	State	Rd	D-093-01	01-16-2019		
03704	Falls	Cir	S-052-03	01-17-2019		
04408	Driftwood	Dr	S-052-03	01-19-2019		
03706	Falls	Cir	S-052-03	01-19-2019		
04712	Ashburner	St	P-083-03	01-22-2019		
02629	Pratt	St	D-056-09	01-26-2019		
04416	Ashburner	St	P-083-03	02-02-2019		

Table 4

Spills to Storm Sewers and/or Receiving Waters

July 1, 2019 to Septemper 30, 2019

Date	Outfall	Address	Source Code	Material Involved	Completion Date	Remarks
07/03/19	S052-05	152 Kalos St Schuylkill River	3008	Sewage	07/03/19	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 52 gpm discharge through manhole. No clean up needed.
07/15/19	P-113-04	10801-75 Bustleton Ave Pennypack Creek	3010	Sewage	07/15/19	Industrial Waste unit investigated an unauthorized discharge of groundwater/sewage to sanitary sewer and unpermitted fire hydrant hook-up without backflow prevention from plumbing contractor. NOV to be issued.
07/17/19	P100-14	Holme Ave & Longford St Wooden Bridge Run	3009	Sewage	07/17/19	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 3 gpm discharge through manhole and removed debris. Flushed storm sewer with dechlorination tablet. No fish kill. Refered to Waterways for minor clean up.
07/28/19	P-90-02	8001 E Roosevelt Blvd Pennypack Creek	3009	Sewage	07/31/19	Industrial Waste unit investigated a report of grease spill to private inlet. Inlet had been cleaned up. NOV issued. Refered to Health Department.
08/19/19	P100-14	Holme Ave & Longford St Wooden Bridge Run	3009	Sewage	08/19/19	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 3 gpm discharge through manhole and removed debris & grease. Flushed outfall with dechlorination tablet. No fish kill. No clean up needed.
08/23/19	S051-05	4400 Main St Schuylkill River	3008	Sewage	08/23/19	Sewer Maintenance unit set up bypass pumping and excavated to relieve choke sewer. Discharge was approcimately 225 gpm. Customer service cleaned basements. No clean up at river needed.
08/27/19	P-083-03	Glenloch Pl & Megargee St Pennypack Creek	3009	Sewage	08/27/19	Industrial Waste unit investigated an illegal fire hydrant connection at construction site resulting in unauthorized discharge to storm inlet. NOV to be issued.
09/05/19	T14	5057 Copley Rd Schuylkill River	3009	Sewage	09/05/19	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 26 gpm discharge through manhole. No clean up needed.
09/11/19		3243 W School House Ln Wissahickon Creek	3009	Sewage	09/13/19	Industrial Waste unit investigated a report of sewage flowing from hill into storm sewer on Lincoln Drive. Discharge was approcimately 5 gpm. Added Philadelphia University as responsible party under callers in the service request.
09/23/19	S-059-03	4680 Canton St Schuylkill River	3009	Sewage	09/23/19	Industrial Waste unit investigated a report of dumping cement and cement wash water to the street and inlet causing gray discoloration in outfall S-059-03. NOV to be issued.

Source Codes:

3008 - Spill to Ground Only **3010 - Spill to Sanitary Sewer**

3009 - Spill to Storm Sewer **3011 - Spill to Receiving Stream**

STORM WATER MANAGEMENT PROGRAM
NPDES PERMIT NO. PA0054712

DEFECTIVE LATERAL CONNECTION STATUS REPORT
(Covering Period from October 1, 2019 to December 31, 2019)

Submitted to

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER QUALITY MANAGEMENT

By

CITY OF PHILADELPHIA
PHILADELPHIA, PA

February 6, 2020

DLC Program Update
4th Quarter 2019

I. INTRODUCTION

This Defective Lateral Connection Status Report is submitted to the Pennsylvania Department of Environmental Protection (PADEP) as part of the reporting requirements of the City of Philadelphia NPDES Storm Water Management Permit No. PA 0054712. The report covers the three-month period beginning October 1, 2019 and ending December 31, 2019.

The body of this report will describe the recent activities of the City during the past quarter within the 1998 COA Priority Outfall areas and at other significant outfalls on the Stormwater Outfall Priority Score list. Additionally, goals for the next quarter will be listed.

Table 1 provides a summary of the program with respect to Complete tests, Cross-connections identified, and Abatements performed. Table 2 provides a listing of all laboratory analyses of samples taken at stormwater outfalls or within the stormwater system during the previous quarter. Table 3 provides a listing of properties with cross-connections outstanding greater than 120 days. Finally, Table 4 provides a listing of reported wastewater spills to the stormwater system or receiving streams.

II. PAST QUARTER REVIEW

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

DLC program activities have performed 2,831 Complete tests in this sewershed, identifying 134 Cross-connections, all but one of which have been Abated.

Eight (8) sites intercepting flow are listed below.

1.	CFD-01	Plymouth St. west of Pittsville St.
2.	CFD-02	Pittsville St. south of Plymouth St.
3.	CFD-03	Elston St. east of Bouvier St.
4.	CFD-04	Ashley St. west of Bouvier St.
5.	CFD-05	Cheltenham Ave. east of 19th St.
6.	CFD-06	Verbena St. south of Cheltenham Ave.
7.	CFD-07	Cheltenham Ave. east of 7th St.
8.	CFD-08	7th St. south of Cheltenham Ave.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	10	0	0
CFD-02	11	0	0
CFD-03	8	0	0
CFD-04	3	0	0
CFD-05	6	0	0
CFD-06	8	0	0
CFD-07	22	2	0
CFD-08	21	0	0

The most recent fecal sample value was 1,565 MPN per 100 ml. at the outfall on November 4, 2019.

2. Monastery Ave. Outfall (W-060-01)

DLC program activities have performed 628 Complete tests in this sewershed, identifying 17 Cross-connections, 16 of which have been Abated.

Two (2) sites intercepting flow are listed below.

1. MFD-01 Jannette St. west of Monastery Ave.
2. MFD-02 Green La. north of Lawnton St.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
MFD-01	5	1	0
MFD-02	5	0	0

The most recent fecal sample value was 109 MPN per 100 ml. at the outfall on November 4, 2019.

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

DLC program activities have performed 2,750 Complete tests in these sewershed areas, identifying 94 Cross-connections, all of which have been Abated. The majority of the efforts have been in the W-068-05 sewershed area which is by far the largest in terms of drainage area and properties served.

The most recent fecal sample value was 24,196 MPN per 100 ml. at the W-068-05 outfall on November 4, 2019.

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

DLC program activities have performed 2,479 Complete tests in these sewershed areas, identifying 62 Cross-connections, all of which have been Abated. The majority of the efforts have been in the S-059-04 sewershed area.

The most recent fecal sample values on October 7, 2019 at each outfall were:

- 537 MPN per 100 ml. at the S-058-01 outfall.
- 1,259 MPN per 100 ml. at the S-059-01 outfall.
- >24,196 MPN per 100 ml. at the S-059-02 outfall.
- >24,196 MPN per 100 ml. at the S-059-03 outfall.
- 2,282 & 1,541 MPN per 100 ml. at the S-059-04 outfall.
- 1,187 MPN per 100 ml. at the S-059-05 outfall.
- >24,196 MPN per 100 ml. at the S-059-09 outfall.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

DLC program activities have performed 5,836 Complete tests in this sewershed, identifying 87 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. PFD-01 Sandyford Run (Brous and Lexington Aves.)

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
PFD-01	22	0	0

The most recent fecal sample value was 133.4 MPN per 100 ml. at the outfall on November 4, 2019.

2. Franklin and Hasbrook Outfall (T-089-04)

DLC program activities have performed 1,021 Complete tests in this sewershed, identifying 46 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. CFD-01 Franklin and Hasbrook Aves.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	21	1	1

The outfall was found dry on November 4, 2019.

3. A current summary of additional outfalls from the Stormwater Outfall Priority Score list that the City has performed complete testing or abatements this quarter is as follows.

Outfall #	Complete Test	Cross Connection	Abatement
P-083-03	2	1	1
P-090-02	2	0	0
P-091-06	(43)	0	0
P-091-09	6	1	0
P-108-11	11	0	0
P-113-04	20	0	0
P-113-06	8	0	0
P-116-02	1	0	0
Q-107-06	6	0	0
Q-110-14	32	0	0
R18	58	9	10
S-046-06	1	1	0
S-051-03	(1)	0	0
S-052-04	0	0	4
S-052-05	1	0	0
T-056-08	14	0	0
T-097-01	23	0	0
T01	(23)	0	0
W-060-05	1	0	0

III. NEXT QUARTER GOALS

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

2. Monastery Ave. Outfall (W-060-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

Goals for the Quarter

- Continue sampling at outfall W-068-05 with dry-weather flow.

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

Goals for the Quarter

- Continue sampling at the outfalls with dry-weather flow.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

2. Franklin and Hasbrook Outfall (T-089-04)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

3. Continue to perform abatements of identified cross-connections within the following outfalls.

- D-056-09
- D-093-01
- P-083-03
- P-091-09
- P-100-04
- Q-109-07
- Q-110-09
- Q-121-05
- R18
- S-046-06
- S-052-03
- S-052-04
- S-052-05

- T-080-02
- W-067-01
- W-086-02

4. Continue to perform property testing within the following outfalls.

- P-083-03
- P-090-02
- P-091-06
- P-091-09
- P-113-04
- P-113-06
- P-116-02
- Q-107-06
- Q-110-14
- R18
- S-046-06
- S-052-05
- T-056-08
- T-097-01
- T01
- W-060-05

Table 1
DLC Program Summary
October 1, 2019 to December 31, 2019

Complete Tests:

- 63,732 Complete tests have been performed under the DLC program
- **136 Complete tests were performed this past quarter**
- 2 Complete tests were performed in outfall P-083-03
- 2 Complete tests were performed in outfall P-090-02
- (43) Complete tests were performed in outfall P-091-06
- 6 Complete tests were performed in outfall P-091-09
- 11 Complete tests were performed in outfall P-108-11
- 20 Complete tests were performed in outfall P-113-04
- 8 Complete tests were performed in outfall P-113-06
- 1 Complete test was performed in outfall P-116-02
- 6 Complete tests were performed in outfall Q-107-06
- 32 Complete tests were performed in outfall Q-110-14
- 58 Complete tests were performed in outfall R18
- 1 Complete test was performed in outfall S-046-06
- (1) Complete test was performed in outfall S-051-03
- 1 Complete test was performed in outfall S-052-05
- 1 Complete test was performed in outfall S-059-03
- (1) Complete test was performed in outfall S-059-04
- 14 Complete tests were performed in outfall T-056-08
- 23 Complete tests were performed in outfall T-097-01
- (23) Complete tests were performed in outfall T01
- 17 Complete tests were performed in outfall W-060-01
- 1 Complete test was performed in outfall W-060-05

Cross-Connections Found:

- 1,765 Cross-connections have been identified under the DLC program
- **13 Cross-connections were identified this past quarter**
- 1 Cross-connection was identified in outfall P-083-03
- 1 Cross-connection was identified in outfall P-091-09
- 9 Cross-connections were identified in outfall R-18
- 1 Cross-connection was identified in outfall S-046-06
- 1 Cross-connection was identified in outfall W-060-01

Abatements:

- 1,568 Abatements have been performed under the DLC program
- **15 Abatements were performed this past quarter**
- 1 Abatement was performed in outfall P-083-03
- 10 Abatements were performed in outfall R18
- 4 Abatements were performed in outfall S-052-04

Outfall/Manhole Screening and Sampling:

- 10 outfall inspections were made as part of the **Priority Outfall Inspection Program** this past quarter
- 10 outfall samples were taken due to observed dry-weather flow during the above inspections

- 14 outfall inspections were made as part of the **Permit Inspection Program** this past quarter
- 5 outfall samples were taken due to observed dry-weather flow during the above inspections

Table 2

Lab Analysis of Water at Outfalls and/or in the Storm Sewers

October 1, 2019 to December 31, 2019

Outfall	Date	Time	Location	Sewer Size (in)	Flow (gph)	Fluoride (mg/l)	Fecal Count (MPN per 100 ml)	Comments
A. Priority Outfalls								
T-088-01	11/4/2019	11:30	Outfall: 7th and Cheltenham	84	3000	0.134	1565	Regular flow, no odors, no suspended solids, regular trash on banks.
W-060-01	11/4/2019	12:05	Outfall: Monastery & Jeanette	5'0" x 4'0"	180	0.104	109	Clear, no sheen, no odors.
S-058-01	10/7/2019	11:45	Outfall:Umbria St. & Domino Lane	54	7200	0.285	537	Outfall submerged. Plunge Pool murky.
S-059-01	10/7/2019	12:05	Outfall:Towpath & Fountain St.	42	3600	0.208	1259	Orange filamentis rust in of. Plunge Pool murky geenish very cloudy.
S-059-02	10/7/2019	12:15	Outfall:Towpath & Fountain St.	42	1800	0.355	>24196	Plunge pool looks grey and green cloudy.
S-059-03	10/7/2019	12:25	Outfall:Towpath & Wright St.	42	3600	0.195	>24196	Looked like previous choke conditions.
S-059-04	10/7/2019	12:35	Outfall:Towpath & Leverington Ave. Bridge	51	NR	0.171	2282	Clear at arrival (observed prior to a plume coming out of OF).
S-059-04	10/7/2019	12:45	Outfall:Towpath & Leverington Ave. Bridge	51	NR	0.167	1541	2nd sampe taken. Observed active plume of orange sediment and foam.
S-059-05	10/7/2019	12:40	Outfall:Towpath & Leverington Ave. Bridge	4'0" x 2'8"	NR	0.179	1187	Flow from S-059-04 mixing/influence.
S-059-09	10/7/2019	12:55	Outfall:Main St. & Green Lane	36	720	0.548	>24196	Outfall under boardwalk difficult to observe.
B. Permit Inspection Program								
T-089-04	11/4/2019	11:00	Outfall: Franklin & Hasbrook	3'0' x 6'6"	0	NS	NS	Township side flow, no flow city side.
W-068-05	11/4/2019	11:35	Outfall: Lincoln & Morris	90	10800	0.224	24196	No sheen, no odors, no suspended solids.
W-067-01	11/7/2019	12:05	Outfall: Gorgas Lane	6'0" x 6'0"	5400	<0.1	1145	-
W-095-05	11/18/2019	11:15	Outfall: Stenton & Newton	30	NR	0.128	21.6	-
W-086-06	11/18/2019	11:45	Outfall: Stenton & Woodbrook	48	NR	0.1	2419.6	Partially submerged outfall.
P-090-02	11/4/2019	12:00	Outfall: Sandyford	156	60	<0.1	133.4	Clear, regular flow, no sheen, no odors, no suspended solids. Flow from P-090-01 also.
S-024-01	11/18/2019	12:00	Outfall:University Ave. & 34th St.	4'0" x 4"0"	0	NS	NS	Unable to observe directly. Observed from bank.
S-030-01	11/18/2019	12:45	Outfall:Race & Bonsall Sts.	18	0	NS	NS	Outfall does not exist at location.
S-030-02	11/18/2019	12:45	Outfall:Race & Bonsall Sts.	24	0	NS	NS	Outfall does not exist at location.
M-005-13	12/20/2019	11:00	Outfall: Mingo Creek	7'6" x 14'6'	0	NS	NS	No flow, M-005-13 includes flow from outfalls on the airport property.
M-002-01	12/20/2019	11:00	Outfall: Island & Enterprise Aves.	-	-	-	-	Not on maps.
M-002-02	12/20/2019	11:00	Outfall: Island & Enterprise Aves.	-	-	-	-	Not on maps.
M-002-03	12/20/2019	11:00	Outfall: Air Force Service Rd. & Island Ave.	66	0	NS	NS	On PHL airport property. See results of M-005-13 which includes the flow from outfall.
M-002-04	12/20/2019	11:00	Outfall: Island & Enterprise Aves.	-	-	-	-	Not on maps.

Table 3
Residential Cross Connections Not Abated Within 120 Days

A. Properties Abated & Confirmed Prior to Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Abatement Confirmation Date	Comments

B. Properties Active As Of Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Comments
00015 Osborn St	S-052-05	01-17-2018		
01941 Kentwood St	Q-109-07	01-19-2018		
03411 W Penn St	S-052-04	02-13-2018		
03400 W Penn St	S-052-04	02-16-2018		
03423 W Penn St	S-052-04	02-17-2018		
03424 W Penn St	S-052-04	02-17-2018		
03433 W Penn St	S-052-04	02-21-2018		
03324 W Penn St	S-052-04	02-24-2018		
03331 W Penn St	S-052-04	02-24-2018		
03333 W Penn St	S-052-04	02-26-2018		
03332 W Penn St	S-052-04	02-26-2018		
03425 Conrad St	S-052-04	03-01-2018		
03530 Henry Ave	S-052-04	03-03-2018		
03340 W Penn St	S-052-04	03-03-2018		
03301 W Penn St	S-052-04	03-16-2018		
03424 Osmond St	S-052-04	03-17-2018		
03305 Tilden St	S-052-04	03-24-2018		
03313 Tilden St	S-052-04	03-24-2018		
03329 Tilden St	S-052-04	03-27-2018		
03316 Tilden St	S-052-04	03-28-2018		
03333 Tilden St	S-052-04	03-29-2018		
03461 Sunnyside Ave	S-052-04	04-02-2018		
03434 W Penn St	S-052-04	04-07-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address			Outfall Code	Complete Date	Admin. Action	Comments
03411		Osmond St	S-052-04	04-28-2018		
03449	W	Penn St	S-052-04	05-03-2018		
03323		Conrad St	S-052-04	05-09-2018		
03446		Crawford St	S-052-04	05-17-2018		
03467		Indian Queen La	S-052-04	05-26-2018		
03433		Crawford St	S-052-04	05-26-2018		
03317	W	Penn St	S-052-04	06-02-2018		
03448	W	Queen La	S-052-04	06-23-2018		
00032	W	Gowen Ave	W-086-02	06-28-2018		
03419	W	Queen La	S-052-04	07-02-2018		
03335	W	Queen La	S-052-04	07-02-2018		
03417	W	Queen La	S-052-04	07-05-2018		
03326	W	Queen La	S-052-04	07-12-2018		
03452	W	Queen La	S-052-04	07-13-2018		
03469	W	Queen La	S-052-04	07-17-2018		
03414	W	Queen La	S-052-04	07-20-2018		
03440	W	Queen La	S-052-04	07-21-2018		
03333	W	Queen La	S-052-04	07-21-2018		
03474		Tilden St	S-052-04	07-21-2018		
03435	W	Queen La	S-052-04	07-30-2018		
03464	W	Queen La	S-052-04	07-30-2018		
03429	W	Queen La	S-052-04	08-02-2018		
01340		Downs Pl	Q-121-05	08-14-2018		
03459	W	Queen La	S-052-04	08-16-2018		
03434	W	Queen La	S-052-04	08-17-2018		
03460	W	Queen La	S-052-04	08-24-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address				Outfall Code	Complete Date	Admin. Action	Comments
02612		Woodward	St	P-100-04	09-12-2018		
04437		Riverview	La	S-052-03	09-19-2018		
04456		Riverview	La	S-052-03	09-26-2018		
04423		Driftwood	Dr	S-052-03	09-27-2018		
04433		Riverview	La	S-052-03	09-29-2018		
04439		Riverview	La	S-052-03	09-29-2018		
04406		Driftwood	Dr	S-052-03	09-29-2018		
04433		Driftwood	Dr	S-052-03	09-29-2018		
04410		Driftwood	Dr	S-052-03	10-06-2018		
03235		Comly	Pl	Q-110-09	10-06-2018		
04415		Driftwood	Dr	S-052-03	10-12-2018		
04433		Aberdale	Rd	P-083-03	10-13-2018		
04402		Driftwood	Dr	S-052-03	10-13-2018		
04312		Ashburner	St	P-083-03	10-20-2018		
03454	W	Penn	St	S-052-04	10-24-2018		
04425		Driftwood	Dr	S-052-03	10-27-2018		
04431		Driftwood	Dr	S-052-03	10-27-2018		
04404		Driftwood	Dr	S-052-03	10-31-2018		
04412		Driftwood	Dr	S-052-03	11-09-2018		
04417		Driftwood	Dr	S-052-03	11-17-2018		
08731		Cottage	St	P-083-03	11-27-2018		
04435		Aberdale	Rd	P-083-03	12-04-2018		
03005		Comly	Rd	Q-110-09	12-10-2018		
03700		Falls	Cir	S-052-03	12-15-2018		
04256		Neilson	St	R18	12-22-2018		
03021		Comly	Rd	Q-110-09	12-22-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address			Outfall Code	Complete Date	Admin. Action	Comments
08726	Cottage	St	P-083-03	12-22-2018		
03702	Falls	Cir	S-052-03	12-24-2018		
04702	Almond	St	D-056-09	12-26-2018		
03482	Tilden	St	S-052-04	01-07-2019		
04611	Ashburner	St	P-083-03	01-16-2019		
09524	State	Rd	D-093-01	01-16-2019		
03704	Falls	Cir	S-052-03	01-17-2019		
04408	Driftwood	Dr	S-052-03	01-19-2019		
03706	Falls	Cir	S-052-03	01-19-2019		
04712	Ashburner	St	P-083-03	01-22-2019		
02629	Pratt	St	D-056-09	01-26-2019		
04416	Ashburner	St	P-083-03	02-02-2019		

Table 4

Spills to Storm Sewers and/or Receiving Waters

October 1, 2019 to December 31, 2019

Date	Outfall	Address	Source Code	Material Involved	Completion Date	Remarks
07/10/19	P-105-11	2552 Grant Ave	3010	Sewage	11/14/19	Industrial Waste unit investigated a report of dumping used cooking oil to the inlet. Grease stained and heavily accumulated inside the inlet. IWBC group will follow up.
09/23/19	S-059-03	4680 Caton St	3011	Sewage	10/04/19	Industrial Waste unit investigated a report of dumping cement and cement wash water to the street and inlet. Gray discoloration foud in outfall. NOV issued.
10/18/19	Q-113-09	1711 Tomlinson Rd Poquessing Creek	3011	Sewage	10/21/19	Industrial Waste Unit investigated a brown discharge entering Walton's Run where outfall Q-113-09 ponds. The flow was traced back to Tomlinson Road. Refered to PADEP.
11/01/19	S-05	2955 Poplar St	3008	Sewage	11/01/19	Sewer Maintenance unit flushed 12" diameter combined sewer causing less than 1 gpm discharge. Customer service was called for the cleanup and assessment of damages to 2955 Polar basement.
11/15/19	Q-107-02	Fairdale & Knights Rd Poquessing Creek	3009	Sewage	11/15/19	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 6 gpm discharge and removed debris. Storm sewer was flushed with dechlorination tablets.
11/16/19	S-25	2635 Webster St	3008	Sewage	11/22/19	Sewer Maintenance unit flushed 18" diameter combined sewer causing less than 1 gpm. Replaced all sections of sewer with concrete inside.
11/20/19	S-052-04	4137 Ridge Ave	3008	Sewage	11/20/19	Sewer Maintenance unit flushed 12" diameter sanitary sewer and manhole causing approximate 156 gpm discharge. Basement cleaning was sent to customer service.
11/26/19	S-10-53	4300 S 26th St	3009	Sewage	11/26/19	Industrial Waste Unit investigated a sewage overflow migrated from Pump Station 648 to storm inlet. The inlets were cleaned. No impact on the river
12/01/19	S-05	2955 Poplar St	3008	Sewage	12/01/19	Sewer Maintenance unit flushed 12" diameter combined sewer causing approximate 13 gpm discharge. Property dye tested and positive in sewer. CCTV will follow up to check the cause of choke.
12/04/19	S-01	3202 Mantua Ave	3010	Sewage	12/04/19	Sewer Maintenance unit flushed 12" diameter combined sewer causing less than 1 gpm discharge. CCTV will investigate the rages on nozzle. Hosed street surface down to clean up and vaccumed down effected inlet.
12/23/19	S-059-04	195 Krams Ave Schuylkill Cannal	3009	Sewage	12/23/19	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 67 gpm discharge. No cleanup needed.

Source Codes:

3008 - Spill to Ground Only

3009 - Spill to Storm Sewer

3010 - Spill to Sanitary Sewer

3011 - Spill to Receiving Stream

STORM WATER MANAGEMENT PROGRAM
NPDES PERMIT NO. PA0054712

DEFECTIVE LATERAL CONNECTION STATUS REPORT
(Covering Period from January 1, 2020 to March 31, 2020)

Submitted to

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER QUALITY MANAGEMENT

By

CITY OF PHILADELPHIA
PHILADELPHIA, PA

May 7, 2020

DLC Program Update
1st Quarter 2020

I. INTRODUCTION

This Defective Lateral Connection Status Report is submitted to the Pennsylvania Department of Environmental Protection (PADEP) as part of the reporting requirements of the City of Philadelphia NPDES Storm Water Management Permit No. PA 0054712. The report covers the three-month period beginning January 1, 2020 and ending March 31, 2020.

The body of this report will describe the recent activities of the City during the past quarter within the 1998 COA Priority Outfall areas and at other significant outfalls on the Stormwater Outfall Priority Score list. Additionally, goals for the next quarter will be listed.

Table 1 provides a summary of the program with respect to Complete tests, Cross-connections identified, and Abatements performed. Table 2 provides a listing of all laboratory analyses of samples taken at stormwater outfalls or within the stormwater system during the previous quarter. Table 3 provides a listing of properties with cross-connections outstanding greater than 120 days. Finally, Table 4 provides a listing of reported wastewater spills to the stormwater system or receiving streams.

II. PAST QUARTER REVIEW

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

DLC program activities have performed 2,831 Complete tests in this sewershed, identifying 134 Cross-connections, all but one of which have been Abated.

Eight (8) sites intercepting flow are listed below.

1. CFD-01 Plymouth St. west of Pittsville St.
2. CFD-02 Pittsville St. south of Plymouth St.
3. CFD-03 Elston St. east of Bouvier St.
4. CFD-04 Ashley St. west of Bouvier St.
5. CFD-05 Cheltenham Ave. east of 19th St.
6. CFD-06 Verbena St. south of Cheltenham Ave.
7. CFD-07 Cheltenham Ave. east of 7th St.
8. CFD-08 7th St. south of Cheltenham Ave.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	7	0	0
CFD-02	9	0	0
CFD-03	9	0	0
CFD-04	9	0	0
CFD-05	8	0	0
CFD-06	7	0	0
CFD-07	17	0	0
CFD-08	16	0	0

The most recent fecal sample value was >2,419.6 MPN per 100 ml. at the outfall on February 21, 2020.

2. Monastery Ave. Outfall (W-060-01)

DLC program activities have performed 632 Complete tests in this sewershed, identifying 17 Cross-connections, 16 of which have been Abated.

Two (2) sites intercepting flow are listed below.

1. MFD-01 Jannette St. west of Monastery Ave.
2. MFD-02 Green La. north of Lawnton St.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
MFD-01	6	0	0
MFD-02	6	0	0

The most recent fecal sample value was 235.9 MPN per 100 ml. at the outfall on January 28, 2020.

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

DLC program activities have performed 2,750 Complete tests in these sewershed areas, identifying 94 Cross-connections, all of which have been Abated. The majority of the efforts have been in the W-068-05 sewershed area which is by far the largest in terms of drainage area and properties served.

The most recent fecal sample value was 17,329 MPN per 100 ml. at the W-068-05 outfall on January 28, 2020.

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

DLC program activities have performed 2,479 Complete tests in these sewershed areas, identifying 62 Cross-connections, all of which have been Abated. The majority of the efforts have been in the S-059-04 sewershed area.

The most recent fecal sample values on January 2, 2020 at each outfall were:
- 214.3 MPN per 100 ml. at the S-058-01 outfall.
- 2,419.3 MPN per 100 ml. at the S-059-01 outfall.
- 2,419.3 MPN per 100 ml. at the S-059-02 outfall.
- 64,880 MPN per 100 ml. at the S-059-03 outfall.
- 1,119.9 MPN per 100 ml. at the S-059-04 outfall.
- 727 MPN per 100 ml. at the S-059-05 outfall.
- 2,419.6 MPN per 100 ml. at the S-059-09 outfall.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

DLC program activities have performed 5,836 Complete tests in this sewershed, identifying 87 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. PFD-01 Sandyford Run (Brous and Lexington Aves.)

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
PFD-01	16	0	0

The most recent fecal sample value was 14.4 MPN per 100 ml. at the outfall on January 29, 2020.

2. Franklin and Hasbrook Outfall (T-089-04)

DLC program activities have performed 1,021 Complete tests in this sewershed, identifying 46 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. CFD-01 Franklin and Hasbrook Aves.

The number of inspections, blockages cleared and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	18	0	0

The outfall was found dry on February 21, 2020.

3. A current summary of additional outfalls from the Stormwater Outfall Priority Score list that the City has performed complete testing or abatements this quarter is as follows.

Outfall #	Complete Test	Cross Connection	Abatement
P-083-03	1	0	0
P-091-01	(26)	0	0
P-091-06	(10)	2	0
P-091-09	2	0	0
P-105-13	1	0	0
P-113-04	3	0	0
P-113-06	3	0	0
P-116-02	1	0	0
Q-106-21	7	0	0
Q-109-07	1	0	0
Q-110-14	2	0	0
Q-120-03	18	0	0
R18	24	3	17
S-052-03	0	0	2
S-052-04	0	0	7
T-056-08	7	0	0
W-077-02	(11)	0	(1)

III. NEXT QUARTER GOALS

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

2. Monastery Ave. Outfall (W-060-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

Goals for the Quarter

- Continue sampling at outfall W-068-05 with dry-weather flow.

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

Goals for the Quarter

- Continue sampling at the outfalls with dry-weather flow.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

2. Franklin and Hasbrook Outfall (T-089-04)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

3. Continue to perform abatements of identified cross-connections within the following outfalls.

- D-056-09
- D-093-01
- P-083-03
- P-091-06
- P-091-09
- P-100-04
- Q-109-07
- Q-110-09
- Q-121-05
- R18
- S-046-06
- S-052-03
- S-052-04
- S-052-05
- T-080-02
- W-067-01

- W-077-02
- W-086-02

4. Continue to perform property testing within the following outfalls.

- P-083-03
- P-091-01
- P-091-06
- P-091-09
- P-105-13
- P-113-04
- P-113-06
- P-116-02
- Q-106-21
- Q-109-07
- Q-120-03
- R18
- T-056-08

Table 1
DLC Program Summary
January 1, 2020 to March 31, 2020

Complete Tests:

- 63,759 Complete tests have been performed under the DLC program
- **27 Complete tests were performed this past quarter**
- 1 Complete test was performed in outfall P-083-03
- (26) Complete tests were performed in outfall P-091-01
- (10) Complete tests were performed in outfall P-091-06
- 2 Complete tests were performed in outfall P-091-09
- 1 Complete test was performed in outfall P-105-13
- 3 Complete tests were performed in outfall P-113-04
- 3 Complete tests were performed in outfall P-113-06
- 1 Complete test was performed in outfall P-116-02
- 7 Complete tests were performed in outfall Q-106-21
- 1 Complete test was performed in outfall Q-109-07
- 2 Complete tests were performed in outfall Q-110-14
- 18 Complete tests were performed in outfall Q-120-03
- 24 Complete tests were performed in outfall R18
- 7 Complete tests were performed in outfall T-056-08
- 4 Complete tests were performed in outfall W-060-01
- (11) Complete test was performed in outfall W-077-02

Cross-Connections Found:

- 1,770 Cross-connections have been identified under the DLC program
- **5 Cross-connections were identified this past quarter**
- 2 Cross-connections were identified in outfall P-091-06
- 3 Cross-connections were identified in outfall R-18

Abatements:

- 1,593 Abatements have been performed under the DLC program
- **25 Abatements were performed this past quarter**
- 17 Abatements were performed in outfall R18
- 2 Abatements were performed in outfall S-052-03
- 7 Abatements were performed in outfall S-052-04
- (1) Abatement was performed in outfall W-077-02

Outfall/Manhole Screening and Sampling:

- 9 outfall inspections were made as part of the **Priority Outfall Inspection Program** this past quarter
- 9 outfall samples were taken due to observed dry-weather flow during the above inspections

- 9 outfall inspections were made as part of the **Permit Inspection Program** this past quarter
- 8 outfall samples were taken due to observed dry-weather flow during the above inspections

Table 2

Lab Analysis of Water at Outfalls and/or in the Storm Sewers

January 1, 2020 to March 31, 2020

Outfall	Date	Time	Location	Sewer Size (in)	Flow (gph)	Fluoride (mg/l)	Fecal Count (MPN per 100 ml)	Comments
A. Priority Outfalls								
T-088-01	2/21/2020	9:20	Outfall:Cheltenham Ave. & 7th St.	84	NR	0.125	>2419.6	Clear flow from both chambers. No odor, color or sheen.
W-060-01	1/28/2020	11:25	Outfall Monastery and Jeanette	5'0" x 4'0"	900	0.11	235.9	Blue Green tint in plunge pool.
S-058-01	1/2/2020	11:30	Outfall:Umbria St. & Domino Lane	54	3600	0.274	214.3	Outfall submerged. Plunge Pool murky.
S-059-01	1/2/2020	11:50	Outfall:Towpath & Fountain St.	42	1800	0.298	2419.3	Orangecolor in OF and plunge pool.
S-059-02	1/2/2020	12:00	Outfall:Towpath & Fountain St.	42	1200	0.497	2419.3	Plunge pool slight cloudy grey.
S-059-03	1/2/2020	12:05	Outfall:Towpath & Wright St.	42	1800	0.218	64880	heavy sewage odor, grey bacteria in OF and rocks.
S-059-04	1/2/2020	12:15	Outfall:Towpath & Leverington Ave. Bridge	51	NR	0.187	1119.9	Outfall submerged, tan plume & suds in OF.
S-059-05	1/2/2020	12:18	Outfall:Towpath & Leverington Ave. Bridge	4'0" x 2'8"	NR	0.192	727	Flow from S-059-04 mixing/influence.
S-059-09	1/2/2020	12:30	Outfall:Main St. & Green Lane	36	600	0.571	2419.6	Outfall under boardwalk difficult to observe.
B. Permit Inspection Program								
T-089-04	2/21/2020	9:00	Outfall: Franklin & Hasbrook	3'0' x 6'6"	NF	NS	NS	No discharge from city side outfall. Minor clear flow from Cheltenham township. No unusual color, sheen, or odor.
W-068-05	1/28/2020	10:55	Outfall Lincoln and Morris	90	7200	0.225	17329	No sheen, no odors, no suspended solids.
P-090-02	1/29/2020	10:45	Outfall Sandyford	156	180	0.487	14.4	Chlorine Odor.
P-116-02	3/9/2020	11:10	Outfall Tomlinson Rd (Valley Swim Club)	60"	300	<0.1	>2419.6	Clear.
P-116-01	3/9/2020	11:30	Outfall Tomlinson & Rennard	54"	60	<0.1	>2419.6	Clear flow not coming out of outfall but rather from underneath OF apron, possible groundwater. No odors.
S-052-05	3/9/2020	12:35	Outfall: Sumac and Rochelle	72"	60	0.172	461.1	Clear with no odors.
S-051-08	3/9/2020	12:50	Outfall: Main & Shurs	9'0' by 7'0"	60	0.284	>24196	Clear with sligh suspended solids and a slight musty odor.
D-017-01	3/11/2020	11:00	Outfall: Delaware & Packer	54"	300	0.49	<10	Accessible Low Tide. Thorns above outfall with a slight sewage odor.
D-050-01	3/11/2020	11:40	Outfall: Delware & Lewis	36"	<5	0.40	41	Not Permitted Trash in outfall apron cage. Clear with no odors.

Table 3
Residential Cross Connections Not Abated Within 120 Days

A. Properties Abated & Confirmed Prior to Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Abatement Confirmation Date	Comments

B. Properties Active As Of Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Comments
00015 Osborn St	S-052-05	01-17-2018		
01941 Kentwood St	Q-109-07	01-19-2018		
03411 W Penn St	S-052-04	02-13-2018		
03423 W Penn St	S-052-04	02-17-2018		
03424 W Penn St	S-052-04	02-17-2018		
03433 W Penn St	S-052-04	02-21-2018		
03331 W Penn St	S-052-04	02-24-2018		
03332 W Penn St	S-052-04	02-26-2018		
03425 Conrad St	S-052-04	03-01-2018		
03530 Henry Ave	S-052-04	03-03-2018		
03340 W Penn St	S-052-04	03-03-2018		
03305 Tilden St	S-052-04	03-24-2018		
03313 Tilden St	S-052-04	03-24-2018		
03329 Tilden St	S-052-04	03-27-2018		
03316 Tilden St	S-052-04	03-28-2018		
03333 Tilden St	S-052-04	03-29-2018		
03461 Sunnyside Ave	S-052-04	04-02-2018		
03411 Osmond St	S-052-04	04-28-2018		
03449 W Penn St	S-052-04	05-03-2018		
03446 Crawford St	S-052-04	05-17-2018		
03467 Indian Queen La	S-052-04	05-26-2018		
03433 Crawford St	S-052-04	05-26-2018		
03317 W Penn St	S-052-04	06-02-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address				Outfall Code	Complete Date	Admin. Action	Comments
03448	W	Queen	La	S-052-04	06-23-2018		
00032	W	Gowen	Ave	W-086-02	06-28-2018		
03419	W	Queen	La	S-052-04	07-02-2018		
03335	W	Queen	La	S-052-04	07-02-2018		
03417	W	Queen	La	S-052-04	07-05-2018		
03326	W	Queen	La	S-052-04	07-12-2018		
03452	W	Queen	La	S-052-04	07-13-2018		
03469	W	Queen	La	S-052-04	07-17-2018		
03414	W	Queen	La	S-052-04	07-20-2018		
03440	W	Queen	La	S-052-04	07-21-2018		
03333	W	Queen	La	S-052-04	07-21-2018		
03474		Tilden	St	S-052-04	07-21-2018		
03435	W	Queen	La	S-052-04	07-30-2018		
03464	W	Queen	La	S-052-04	07-30-2018		
03429	W	Queen	La	S-052-04	08-02-2018		
01340		Downs	Pl	Q-121-05	08-14-2018		
03459	W	Queen	La	S-052-04	08-16-2018		
03434	W	Queen	La	S-052-04	08-17-2018		
03460	W	Queen	La	S-052-04	08-24-2018		
02612		Woodward	St	P-100-04	09-12-2018		
04437		Riverview	La	S-052-03	09-19-2018		
04456		Riverview	La	S-052-03	09-26-2018		
04423		Driftwood	Dr	S-052-03	09-27-2018		
04406		Driftwood	Dr	S-052-03	09-29-2018		
04433		Driftwood	Dr	S-052-03	09-29-2018		
04410		Driftwood	Dr	S-052-03	10-06-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address				Outfall Code	Complete Date	Admin. Action	Comments
03235		Comly	Pl	Q-110-09	10-06-2018		
04415		Driftwood	Dr	S-052-03	10-12-2018		
04433		Aberdale	Rd	P-083-03	10-13-2018		
04402		Driftwood	Dr	S-052-03	10-13-2018		
04312		Ashburner	St	P-083-03	10-20-2018		
03454	W	Penn	St	S-052-04	10-24-2018		
04425		Driftwood	Dr	S-052-03	10-27-2018		
04431		Driftwood	Dr	S-052-03	10-27-2018		
04404		Driftwood	Dr	S-052-03	10-31-2018		
04412		Driftwood	Dr	S-052-03	11-09-2018		
04417		Driftwood	Dr	S-052-03	11-17-2018		
08731		Cottage	St	P-083-03	11-27-2018		
04435		Aberdale	Rd	P-083-03	12-04-2018		
03005		Comly	Rd	Q-110-09	12-10-2018		
03700		Falls	Cir	S-052-03	12-15-2018		
04256		Neilson	St	R18	12-22-2018		
03021		Comly	Rd	Q-110-09	12-22-2018		
08726		Cottage	St	P-083-03	12-22-2018		
03702		Falls	Cir	S-052-03	12-24-2018		
04702		Almond	St	D-056-09	12-26-2018		
03482		Tilden	St	S-052-04	01-07-2019		
04611		Ashburner	St	P-083-03	01-16-2019		
09524		State	Rd	D-093-01	01-16-2019		
03704		Falls	Cir	S-052-03	01-17-2019		
04408		Driftwood	Dr	S-052-03	01-19-2019		
03706		Falls	Cir	S-052-03	01-19-2019		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address			Outfall Code	Complete Date	Admin. Action	Comments
04712	Ashburner	St	P-083-03	01-22-2019		
02629	Pratt	St	D-056-09	01-26-2019		
04416	Ashburner	St	P-083-03	02-02-2019		

Table 4

Spills to Storm Sewers and/or Receiving Waters

January 1, 2020 to March 31, 2020

Date	Outfall	Address	Source Code	Material Involved	Completion Date	Remarks
01/07/20	T-079-01	135 W 65th Ave	3010	Sewage	01/08/20	Industrial Waste unit investigated a report of dumping motor oil to the drain pipe. Dicharge quantity was appproximate 0.5 gallon. Warning letter requested.
01/11/20	S-059-01	292 Parker Ave Schuylkil River	3009	Sewage	02/18/20	Industrial Waste unit investigated a report of illegal discharge of groundwater to storm sewer. Holder's GW discharge permit is to sanitary sewer. NOV sent.
01/24/20	S-046-06	2900 Hunting Park	3008	Sewage	01/24/20	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 8 gpm discharge. Sent referral to customer service for clean up of basement 2901 W Allegheny.
02/05/20	W-052-02	School House & Founders Pl Wissahickon Creek	3009	Sewage	02/05/20	Sewer Maintenance unit flushed 10" diameter sanitary sewer causing approximate 2 gpm discharge and removed blockage in manhole. Cleaned street and storm inlet.
03/02/20	W-068-05	604 W Cliveden St Monoshone Creek	3009	Sewage	03/02/20	Sewer Maintenance unit flushed 12" diameter sanitary sewer causing approximate 13 gpm discharge. No clean up needed.
03/07/20	Pump Station Emergency Overflow	4000 Neill Drive Roberts Run Creek	3011	Sewage	03/11/20	Failure of Neill Drive forcemain liner outside of station caused leak. Pump station was shut down. Contractor excavated to point & failure and repaired the pipe. Dicharge quantity was appproximate 3.3 MG.
03/12/20	Pump Station Emergency Overflow	4000 Neill Drive Roberts Run Creek	3011	Sewage	03/12/20	The point repair made on 3/11/2020 failed. Pump station was shut down. Contractor made second repair and backfilled excavation to provide support to repaired pipe. Dicharge quantity was appproximate 0.6 MG.
03/28/20	M-005-13	8500 Essington Ave Schuylkil River	3009	Sewage	03/30/20	Industrial Waste unit investigated a report of jet fuel spill to storm inlet. Dicharge quantity was appproximate 3 gallons. No visible impacts remained at the inlet due to heavy rain washout. Airport has booms in place at storm water transition chamber.

Source Codes:

3008 - Spill to Ground Only **3010 - Spill to Sanitary Sewer**

3009 - Spill to Storm Sewer **3011 - Spill to Receiving Stream**

STORM WATER MANAGEMENT PROGRAM
NPDES PERMIT NO. PA0054712

DEFECTIVE LATERAL CONNECTION STATUS REPORT
(Covering Period from April 1, 2020 to June 30, 2020)

Submitted to

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER QUALITY MANAGEMENT

By

CITY OF PHILADELPHIA
PHILADELPHIA, PA

July 22, 2020

DLC Program Update
2nd Quarter 2020

I. INTRODUCTION

This Defective Lateral Connection Status Report is submitted to the Pennsylvania Department of Environmental Protection (PADEP) as part of the reporting requirements of the City of Philadelphia NPDES Storm Water Management Permit No. PA 0054712. The report covers the three-month period beginning April 1, 2020 and ending June 30, 2020.

The body of this report will describe the recent activities of the City during the past quarter within the 1998 COA Priority Outfall areas and at other significant outfalls on the Stormwater Outfall Priority Score list. Additionally, goals for the next quarter will be listed.

Table 1 provides a summary of the program with respect to Complete tests, Cross-connections identified, and Abatements performed. Table 2 provides a listing of all laboratory analyses of samples taken at stormwater outfalls or within the stormwater system during the previous quarter. Table 3 provides a listing of properties with cross-connections outstanding greater than 120 days. Finally, Table 4 provides a listing of reported wastewater spills to the stormwater system or receiving streams.

II. PAST QUARTER REVIEW

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

DLC program activities have performed 2,831 Complete tests in this sewershed, identifying 134 Cross-connections, all of which have been Abated.

Eight (8) sites intercepting flow are listed below.

1. CFD-01 Plymouth St. west of Pittsville St.
2. CFD-02 Pittsville St. south of Plymouth St.
3. CFD-03 Elston St. east of Bouvier St.
4. CFD-04 Ashley St. west of Bouvier St.
5. CFD-05 Cheltenham Ave. east of 19th St.
6. CFD-06 Verbena St. south of Cheltenham Ave.
7. CFD-07 Cheltenham Ave. east of 7th St.
8. CFD-08 7th St. south of Cheltenham Ave.

The number of inspections, blockages cleared, and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	7	0	0
CFD-02	7	0	0
CFD-03	5	0	0
CFD-04	4	0	0
CFD-05	3	0	0
CFD-06	3	0	0
CFD-07	17	2	0
CFD-08	17	1	0

The most recent fecal sample value was 7701 MPN per 100 ml. at the outfall on May 14, 2020

2. Monastery Ave. Outfall (W-060-01)

DLC program activities have performed 632 Complete tests in this sewer shed, identifying 17 Cross-connections, with only 1 Abatement awaiting completion.

Two (2) sites intercepting flow are listed below.

1. MFD-01 Jannette St. west of Monastery Ave.
2. MFD-02 Green La. north of Lawnton St.

The number of inspections, blockages cleared, and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
MFD-01	4	0	0
MFD-02	4	0	0

The most recent fecal sample value was 122 MPN per 100 ml. at the outfall on May 14, 2020

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

DLC program activities have performed 2,750 Complete tests in these sewershed areas, identifying 94 Cross-connections, all of which have been Abated. The majority of the efforts have been in the W-068-05 sewershed area which is by far the largest in terms of drainage area and properties served.

The most recent fecal sample value was 9804 MPN per 100 ml. at the W-068-05 outfall on May 14, 2020

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

DLC program activities have performed 2,479 Complete tests in these sewershed areas, identifying 62 Cross-connections, all of which have been Abated. Majority of the efforts have been in the S-059-04 sewer shed area.

The most recent fecal sample value for the sites above is:

- 520 MPN per 100 ml. at the S-058-01 outfall on May 19, 2020.
- 2430 MPN per 100 ml. at the S-059-01 outfall on May 15, 2020.
- 19863 MPN per 100 ml. at the S-059-02 outfall on May 15, 2020.
- 86640 MPN per 100 ml. at the S-059-03 outfall on May 15, 2020.
- 72700 MPN per 100 ml. at the S-059-04 outfall on May 15, 2020.
- 2180 MPN per 100 ml. at the S-059-05 outfall on May 15, 2020.
- 5760 MPN per 100 ml. at the S-059-09 outfall on May 19, 2020.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

DLC program activities have performed 5,836 Complete tests in this sewershed, identifying 87 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. PFD-01 Sandyford Run (Brous and Lexington Aves.)

The number of inspections, blockages cleared, and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
PFD-01	17	0	0

The most recent fecal sample value was <1 MPN per 100 ml. at the outfall on May 14, 2020.

2. Franklin and Hasbrook Outfall (T-089-04)

DLC program activities have performed 1,021 Complete tests in this sewershed, identifying 46 Cross-connections, all of which have been Abated.

One (1) site intercepting flow is listed below.

1. CFD-01 Franklin and Hasbrook Aves.

The number of inspections, blockages cleared, and discharges noted during this quarter are listed below.

Flap Gate	Inspections	Blockages	Discharges
CFD-01	19	0	1

The outfall was inspected but found to be clean, so the outfall was not sampled during Quarter 2.

3. A current summary of additional outfalls from the Stormwater Outfall Priority Score list that the City has performed complete testing or abatements this quarter is as follows.

Outfall #	Complete Tests	Cross-Connections	Abatements
P-083-03	0	0	2
P-091-01	2	0	0
P-091-06	(17)	0	0
P-100-11	(1)	(1)	(1)
Q-106-21	1	0	0
Q-109-07	3	0	0
Q-110-09	0	0	1
Q-121-05	0	0	1
R-18	2	0	18
S-052-04	1	0	0
W-076-01	13	0	0
W-077-02	2	0	0

III. NEXT QUARTER GOALS

A. Priority Outfalls

1. 7th & Cheltenham Outfall (T-088-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

2. Monastery Ave. Outfall (W-060-01)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatuses.
- Continue sampling at the outfall with dry-weather flow.

3. Monoshone Creek Outfalls (W-060-04, W-060-08, W-060-09, W-060-10, W-060-11, W-068-04 and W-068-05)

Goals for the Quarter

- Continue sampling at outfall W-068-05 with dry-weather flow.

4. Manayunk Canal Outfalls (S-051-06, S-058-01, S-059-01 through S-059-11)

Goals for the Quarter

- Continue sampling at the outfalls with dry-weather flow.

B. Other Outfalls

1. Sandyford Run Outfall (P-090-02)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

2. Franklin and Hasbrook Outfall (T-089-04)

Goals for the Quarter

- Continue to monitor the operation of the diversion apparatus.

3. Continue to perform abatements of identified cross-connections within the following outfalls.

- D-056-09
- D-093-01
- P-083-03
- P-091-06
- P-091-09
- P-100-04
- Q-109-07
- Q110-09
- R18
- S-046-06
- S-052-03
- S-052-04
- S-052-05
- T-080-02
- W-077-02
- W-086-02

4. Continue to perform property testing within the following outfalls.

- P-091-01
- P-091-06
- Q-106-21
- Q-109-07
- R18
- S-052-04

Table 1
DLC Program Summary
April 1, 2020 to June 30, 2020

Complete Tests:

- 63,765 Complete tests have been performed under the DLC program
- **6 Complete tests were performed this past quarter**
- 2 Complete tests were performed in outfall P-091-01
- (17) Complete tests were performed in outfall P-091-06
- (1) Complete test was performed in outfall P-100-11
- 1 Complete test was performed in outfall Q-106-21
- 3 Complete tests were performed in outfall Q-109-07
- 2 Complete tests were performed in outfall R18
- 1 Complete test was performed in outfall S-052-04
- 13 Complete tests were performed in outfall W-076-01
- 2 Complete tests were performed in outfalls W-077-02

Cross-Connections Found:

- 1,769 Cross-connections have been identified under the DLC program
- **(1) Cross-connection was identified this past quarter**
- (1) Cross-connection was identified in outfall P-100-11

Abatements:

- 1,614 Abatements have been performed under the DLC program
- **21 Abatements were performed this past quarter**
- 2 Abatements were performed in outfall P-083-03
- (1) Abatement was performed in outfall P-100-11
- 1 Abatement was performed in outfall Q110-09
- 1 Abatement was performed in outfall Q-121-05
- 18 Abatements were performed in outfall R18

Outfall/Manhole Screening and Sampling:

- 13 outfall inspections were made as part of the **Priority Outfall Inspection Program** this past quarter
- 10 outfall samples were taken due to observed dry-weather flow during the above inspections

- 12 outfall inspections were made as part of the **Permit Inspection Program** this past quarter
- 5 outfall samples were taken due to observed dry-weather flow during the above inspections

Table 2

Lab Analysis of Water at Outfalls and/or in the Storm Sewers

April 1, 2020 to June 30, 2020

Outfall	Date	Time	Location	Sewer Size (in)	Flow (gph)	Fluoride (mg/l)	Fecal Count (MPN per 100 ml)	Comments
A. Priority Outfalls								
T-088-01	5/14/2020	10:40	Outfall: 7th and Cheltenham	84"	1800	0.114	7701	Grey Green algae/bacteria on rocks beneath surface
T-088-01	6/23/2020	11:45	Outfall: 7th and Cheltenham	84"	NF	NS	NS	Clear, No sheen/odors
T-088-01	6/24/2020	11:16	Outfall: 7th and Cheltenham	84"	NF	NS	NS	Clear, No sheen/odors
W-060-01	5/14/2020	11:15	Outfall: Monastery & Jeanette	5'0" x 4'0"	1800	0.102	122	Flow coming from beneath outfall apron
W-060-01	5/21/2020	9:50	Outfall: Monastery & Jeanette	5'0" x 4'0"	NR	NS	NS	trickle flow. Dried paper scraps in OF
W-068-05	5/14/2020	11:50	Outfall: Lincoln & Morris	90	3600	0.215	9804	Little grey filamentous bacteria below surface
S-058-01	5/19/2020	11:43	Outfall:Umbria St. & Domino Lane	54"	6000	0.19	520	grey cloudy
S-059-01	5/15/2020	11:44	Outfall:Towpath & Fountain St.	42"	3600	0.188	2430	Slight sewage odor
S-059-02	5/15/2020	11:55	Outfall:Towpath & Fountain St.	42"	30	0.334	19863	Slight sewage odor
S-059-03	5/15/2020	12:14	Outfall:Towpath & Wright St.	42"	300	0.247	86640	slight musty odor
S-059-04	5/15/2020	12:29	Outfall:Towpath & Leverington Ave. Bridge	51"	1	0.197	72700	scum, suspended solids
S-059-05	5/15/2020	12:34	Outfall:Towpath & Leverington Ave. Bridge	4'0" x 2'8"	6000	0.172	2180	scum, suspended solids
S-059-09	5/19/2020	13:13	Outfall:Main St. & Green Lane	36"	NR	0.521	5760	clear
B. Permit Inspection Program								
P-090-02	5/14/2020	9:55	Outfall: Sandyford	156"	1200	0.517	<1	Clear, No sheen No odors. More trash in outfall
P-099-03	6/23/2020	11:35	Outfall: Bustleton and Tustin	6'6" x 7'0"	90000	NS	NS	Sewer maintenance actively flushing sewer with fire hydrant. Flow heavily influenced by hydrant run off. Dechlor applied.
P-099-03	6/24/2020	11:45	Outfall: Bustleton and Tustin	6'6" x 7'0"	1200	0.47	>241960	Lots of Grey filamentous bacteria in OF mo0unt and apron. Able to see today with reduced flow compared to yesterday with sewer maintenance flushing the sewer.
P-100-14	5/29/2020	12:00	Outfall: Holme and Longford	42"	NR	NS	NS	small trickle from rain earlier.
T-056-08	6/15/2020	10:05	Outfall:Richmond and Lewis (aka Richmond and Roxbourough)	36"	0	NS	NS	No Flow. No safe access to outfall.
T-089-04	5/14/2020	10:20	Outfall: Franklin & Hasbrook	3'0" x 6'6"	0	NS	NS	No Flow city side. Flow township side. Algae and duckweed.
T-089-04	6/23/2020	12:00	Outfall: Franklin & Hasbrook	3'0" x 6'6"	NF	NS	NS	Clear, No sheen/odors. Flow township side.
T-089-04	6/24/2020	11:05	Outfall: Franklin & Hasbrook	3'0" x 6'6"	NF	NS	NS	Clear, No sheen/odors. Flow township side.
T-096-01	5/27/2020	11:13	Outfall:Gowen and Cheltenham	42"	6000	0.644	<10	Clear. No sheen/odors
W-067-01	5/20/2020	11:41	Outfall: Gorgas Lane	72" x 72"	NR	NS	NS	routine inspection
W-086-01	6/30/2020	12:23	Outfall: Cresheim Valley and Germantown	6'6" x 7'6"	1800	0.378	4352	Clear. No sheen/odors
W-086-02	6/30/2020	12:30	Outfall:Cresheim Valley and Germantown	42"	900	0.634	>241960	Slgiht sewage odor. Heavy suspended solids.

Table 3
Residential Cross Connections Not Abated Within 120 Days

A. Properties Abated & Confirmed Prior to Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Abatement Confirmation Date	Comments

B. Properties Active As Of Reporting:

Address	Outfall Code	Complete Date	Admin. Action	Comments
00015 Osborn St	S-052-05	01-17-2018		
01941 Kentwood St	Q-109-07	01-19-2018		
03411 W Penn St	S-052-04	02-13-2018		
03423 W Penn St	S-052-04	02-17-2018		
03424 W Penn St	S-052-04	02-17-2018		
03433 W Penn St	S-052-04	02-21-2018		
03331 W Penn St	S-052-04	02-24-2018		
03332 W Penn St	S-052-04	02-26-2018		
03425 Conrad St	S-052-04	03-01-2018		
03530 Henry Ave	S-052-04	03-03-2018		
03340 W Penn St	S-052-04	03-03-2018		
03305 Tilden St	S-052-04	03-24-2018		
03313 Tilden St	S-052-04	03-24-2018		
03329 Tilden St	S-052-04	03-27-2018		
03316 Tilden St	S-052-04	03-28-2018		
03333 Tilden St	S-052-04	03-29-2018		
03461 Sunnyside Ave	S-052-04	04-02-2018		
03411 Osmond St	S-052-04	04-28-2018		
03449 W Penn St	S-052-04	05-03-2018		
03446 Crawford St	S-052-04	05-17-2018		
03467 Indian Queen La	S-052-04	05-26-2018		
03433 Crawford St	S-052-04	05-26-2018		
03317 W Penn St	S-052-04	06-02-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address				Outfall Code	Complete Date	Admin. Action	Comments
03448	W	Queen	La	S-052-04	06-23-2018		
00032	W	Gowen	Ave	W-086-02	06-28-2018		
03419	W	Queen	La	S-052-04	07-02-2018		
03335	W	Queen	La	S-052-04	07-02-2018		
03417	W	Queen	La	S-052-04	07-05-2018		
03326	W	Queen	La	S-052-04	07-12-2018		
03452	W	Queen	La	S-052-04	07-13-2018		
03469	W	Queen	La	S-052-04	07-17-2018		
03414	W	Queen	La	S-052-04	07-20-2018		
03440	W	Queen	La	S-052-04	07-21-2018		
03474		Tilden	St	S-052-04	07-21-2018		
03333	W	Queen	La	S-052-04	07-21-2018		
03435	W	Queen	La	S-052-04	07-30-2018		
03464	W	Queen	La	S-052-04	07-30-2018		
03429	W	Queen	La	S-052-04	08-02-2018		
03459	W	Queen	La	S-052-04	08-16-2018		
03434	W	Queen	La	S-052-04	08-17-2018		
03460	W	Queen	La	S-052-04	08-24-2018		
02612		Woodward	St	P-100-04	09-12-2018		
04437		Riverview	La	S-052-03	09-19-2018		
04456		Riverview	La	S-052-03	09-26-2018		
04423		Driftwood	Dr	S-052-03	09-27-2018		
04406		Driftwood	Dr	S-052-03	09-29-2018		
04433		Driftwood	Dr	S-052-03	09-29-2018		
04410		Driftwood	Dr	S-052-03	10-06-2018		
03235		Comly	Pl	Q-110-09	10-06-2018		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address			Outfall Code	Complete Date	Admin. Action	Comments
04415	Driftwood	Dr	S-052-03	10-12-2018		
04402	Driftwood	Dr	S-052-03	10-13-2018		
04312	Ashburner	St	P-083-03	10-20-2018		
03454 W	Penn	St	S-052-04	10-24-2018		
04425	Driftwood	Dr	S-052-03	10-27-2018		
04431	Driftwood	Dr	S-052-03	10-27-2018		
04404	Driftwood	Dr	S-052-03	10-31-2018		
04412	Driftwood	Dr	S-052-03	11-09-2018		
04417	Driftwood	Dr	S-052-03	11-17-2018		
04435	Aberdale	Rd	P-083-03	12-04-2018		
03005	Comly	Rd	Q-110-09	12-10-2018		
03700	Falls	Cir	S-052-03	12-15-2018		
04256	Neilson	St	R18	12-22-2018		
08726	Cottage	St	P-083-03	12-22-2018		
03702	Falls	Cir	S-052-03	12-24-2018		
04702	Almond	St	D-056-09	12-26-2018		
03482	Tilden	St	S-052-04	01-07-2019		
04611	Ashburner	St	P-083-03	01-16-2019		
09524	State	Rd	D-093-01	01-16-2019		
03704	Falls	Cir	S-052-03	01-17-2019		
04408	Driftwood	Dr	S-052-03	01-19-2019		
03706	Falls	Cir	S-052-03	01-19-2019		
04712	Ashburner	St	P-083-03	01-22-2019		
02629	Pratt	St	D-056-09	01-26-2019		
04416	Ashburner	St	P-083-03	02-02-2019		
04312	M	St	R18	03-13-2019		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address			Outfall Code	Complete Date	Admin. Action	Comments
04300	M	St	R18	03-15-2019		
04422	Ashburner	St	P-083-03	03-22-2019		
04337	Glendale	St	R18	03-23-2019		
04232	O	St	R18	03-28-2019		
04254	O	St	R18	04-06-2019		
00223	Stearly	St	T-080-02	04-06-2019		
04310	Glendale	St	R18	04-13-2019		
02095	Red Lion	Rd	Q-109-07	04-16-2019		
00215	Stearly	St	T-080-02	04-20-2019		
05930	Newtown	Ave	T-080-02	04-22-2019		
04250	Neilson	St	R18	04-25-2019		
05922	Newtown	Ave	T-080-02	04-26-2019		
04215	Castor	Ave	R18	04-27-2019		
04219	Castor	Ave	R18	05-02-2019		
04249	Neilson	St	R18	05-04-2019		
04242	Castor	Ave	R18	05-11-2019		
08336	Ditman	St	P-083-03	05-18-2019		
04244	Castor	Ave	R18	05-25-2019		
01434 E	Bristol	St	R18	05-28-2019		
04224	Neilson	St	R18	05-31-2019		
04236	Neilson	St	R18	06-01-2019		
04404	Carwithan	Rd	P-083-03	06-04-2019		
04245	Ormond	St	R18	06-08-2019		
04307	Glendale	St	R18	06-10-2019		
04309	Glendale	St	R18	06-15-2019		
04227	Maywood	St	R18	06-15-2019		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address			Outfall Code	Complete Date	Admin. Action	Comments
04122	M	St	R18	07-06-2019		
08635	Ditman	St	P-083-03	07-10-2019		
04146	Markland	St	R18	07-27-2019		
04144	M	St	R18	07-29-2019		
04144	Markland	St	R18	07-30-2019		
04142	Markland	St	R18	08-03-2019		
04122	Markland	St	R18	08-05-2019		
01433 E	Lycoming	St	R18	08-12-2019		
01409 E	Lycoming	St	R18	08-13-2019		
04120	Markland	St	R18	08-17-2019		
04114	Markland	St	R18	08-17-2019		
04143	Markland	St	R18	08-17-2019		
01413 E	Lycoming	St	R18	08-20-2019		
04134	M	St	R18	08-26-2019		
01452 E	Lycoming	St	R18	08-26-2019		
01447 E	Lycoming	St	R18	08-26-2019		
01453 E	Lycoming	St	R18	08-27-2019		
04025	Castor	Ave	R18	08-29-2019		
01404 E	Lycoming	St	R18	08-31-2019		
04013	Castor	Ave	R18	08-31-2019		
04023	Castor	Ave	R18	09-04-2019		
04034	Castor	Ave	R18	09-06-2019		
04051	Castor	Ave	R18	09-11-2019		
04026	Castor	Ave	R18	09-13-2019		
04224	Markland	St	R18	09-14-2019		
01455 E	Lycoming	St	R18	09-14-2019		

Table 3
Residential Cross Connections Not Abated Within 120 Days

Address				Outfall Code	Complete Date	Admin. Action	Comments
04024		Castor	Ave	R18	09-17-2019		
01444	E	Lycoming	St	R18	09-19-2019		
04143		M	St	R18	09-21-2019		
04215		M	St	R18	09-24-2019		
04038		Castor	Ave	R18	09-28-2019		
07331		Hill	Rd	W-067-01	09-30-2019		
04028		Castor	Ave	R18	09-30-2019		
04138		M	St	R18	10-01-2019		
02623	W	Allegheny	Ave	S-046-06	10-05-2019		
04033		Castor	Ave	R18	10-08-2019		
04014		Castor	Ave	R18	10-08-2019		
04030		Castor	Ave	R18	10-12-2019		
01405	E	Lycoming	St	R18	10-12-2019		
03063		Winchester	Ave	P-091-09	10-19-2019		
04259		Castor	Ave	R18	10-22-2019		
04261		Castor	Ave	R18	10-26-2019		
01431	E	Lycoming	St	R18	11-02-2019		
08820		Cottage	St	P-083-03	11-06-2019		
04259		Neilson	St	R18	12-02-2019		
00531		Roxborough	Ave	W-060-01	12-14-2019		
02320		Benson	St	P-091-06	01-06-2020		
01352	E	Hunting Park	Ave	R18	01-08-2020		
04123		Markland	St	R18	02-06-2020		
02306		Benson	St	P-091-06	02-10-2020		
01441	E	Hunting Park	Ave	R18	02-29-2020		

Table 4

Spills to Storm Sewers and/or Receiving Waters
April 1, 2020 to June 30, 2020

Date	Outfall	Address, Water System	Source Code	Material Involved	Completion Date	Remarks
04/01/20	Saintary to Creek	Roosevelt Blvd & Winchester, Pennypack Creek	3011	Sewage	04/02/20	Choke in sanitary pipe, sewage coming from manhole to creek. Sewer Maintenance crew set up bypass system to stop discharge, choke cleared.
04/04/20	Pump Station SSO	Hog Island Pump Station, Delaware River	3009	Sewage	04/04/20	2 pumps were found to be clogged with ragging. Pumps were disassembled and clogs removed. Sewer Maintenance was on site to clean up spill, and flush storm sewer.
04/14/20	W-067-06	W Mount Airy Ave and Mount Airy Terr, Wissahickon Creek	3009	Sewage	04/14/20	Found sanitary manhole up with sewage from choke. Waterways team cleaned up around outfall and affected areas. Sewer Maintenance cleaned the sewer and CCTV will be inspecting.
04/15/20	W-067-06	7201 Wissahickon Ave, Wissahickon Creek	3009	Sewage	04/15/20	Found sanitary manhole up with sewage from choke. Waterways team cleaned up around outfall and affected areas. Sewer Maintenance cleaned the sewer and CCTV will be inspecting.
04/26/20	Q-115-19	13000 McNulty Rd, Poquessing Creek	3009	Chemical	04/26/20	Unknown material was dumped in the vicinity of an inlet. Material posed a potential threat The material was cleanup by a contractor.
04/28/20	Q-107-01	Greenmount Rd & Telfair, Poquessing Creek	3009	Sewage	04/29/20	Found sanitary manhole up with sewage from choke. Sewer Maintenance flushed and cleaned sewer. Waterways did clean up.
04/30/20	Non-Contributing	I-95 and Ashburner/State Rd, Pennypack Creek	3009	Petroleum	05/01/20	Rain had flushed between 80-100 gallons of diesel to storm drain. No sheen detected on Pennypack Creek or a tributary of it near Ashburner. The highway was sanded as it was very slick.
05/06/20	Non-Contributing	Sweetbriar Dr and Lansdowne Dr., Schuylkill River	3009	Petroleum	05/07/20	A tractor trailer flipped on the highway and diesel fuel pilled to the ground and migrated to a highway inlet. The river was checked in various points. A boom was upstream at the Falls. No sheen was observed on the river.
05/13/20	W-086-01/ W-086-02	Cresheim Valley Dr. & Germantown Ave, Cresheim Creek	3011	Suspected Paint	05/13/20	White discoloration passed through/faded before my arrival. Pictures provided by complainant show solid white color and opaque stream. No staining was left behind in MS4s most proximate to complaint area. No responsible party has been determined.
05/27/20	Non-Contributing	Schuylkill Expy Ramp A, Schuylkill River	3009	Chemical	05/28/20	HMAU requested IWBC at an accident at SCHUYLKILL EXPY RAMP A. A tote was leaking a non hazardous (pH 7.2-7.8) acrylic resin to the highway and non-PWD inlet. The inlet is interconnected with other highway inlets. It is assumed that it eventually flows to the river. No product was observed in the river. Owner of the truck called for a contractor to clean the inlet and the highway. Owner called the NRC, (#128221) IWBC reported the incident to PADEP.
05/28/20	P-091-06	8301 Castor Ave, Pennypack Creek	3009	Petroleum	05/28/20	PGW reported a 15 gallon gasoline spill in their driveway. A PGW truck's gas line ruptured spilling gasoline to the ground. The gas migrated towards a storm drain 15' away. PGW environmental pumped out the storm drain and place adsorbents in the drain. No impact was observed in the sewer or at the outfall. PGW reported the incident to the PADEP.
05/29/20	T-088-01	W Cheltenham Ave, Tacony Creek	3009	Chemical	06/05/20	Solvent odors, white discharge, and white sheen at 7th and Cheltenham outfall. Booms were placed. Discharge ceased. No source was located. No adverse impact observed on aquatic life in the stream.
06/03/20	W-067-01	7216 Valley Ave, Wissahickon Creek	3009	Petroleum	06/04/20	Inlet cleaned. Heavy rain prior to cleaning. No odors or oil sheen at W-067-01.
06/05/20	P-090-02	7701 E Roosevelt Blvd, Pennypack Creek	3008	Chemical	06/12/20	Spill did not enter the inlet or nearby outfall.
06/17/20	D-092-05	9001 State Road, Delaware River	3011	Foam	06/12/20	Foam at Baxter intake and along the Delaware River. Source could not be determined.
06/22/20	P-099-03	8500 Frontenac, Pennypack Creek	3009	Sewage	06/22/20	Found sanitary manhole up with sewage from choke. Sewer Maintenance flushed and cleaned sewer.

Source Codes:	
3008 - Spill to Ground Only	3010 - Spill to Sanitary Sewer
3009 - Spill to Storm Sewer	3011 - Spill to Receiving Stream