Operations, and Maintenance Program for Sewers

Borough of Macungie
Lehigh County, Pennsylvania

A member of the:
Western Lehigh Sewerage Partnership

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1.0 INTRODUCTION

1.1 O&M Regulatory Initiators

The Borough of Macungie, by extension of the City of Allentown's NPDES permit, is a satellite system and is subject to the same rules. Additionally, the Lehigh County Authority (LCA) and the Western Lehigh Sewer Partners (WLSP), including the Borough of Macungie are subject to action by Pennsylvania Department of Environmental Protection (PADEP) under Chapter 94 and by the United States Environmental Protection Agency (USEPA) Compliance Order CWA-03-2009-0313DN (Administrative Order) to all municipal dischargers to the City's Kline's Island Treatment Plant. These regulatory actions were initially addressed in the 2009 WLSP Sewer Capacity Assurance and Rehabilitation Program (SCARP) Program Approach Outline. Included in the SCARP Program Approach Outline was a requirement for a Long-term Asset Management Plan.

1.2 Macungie O&M Program Goals

This O&M program outline describes the various components, organization, and programs comprising Macungie's wastewater collection operations, maintenance, design, delivery, and management functions.

The goal of the Macungie O&M Program is to 1) prevent sanitary sewer overflows within Macungie's sanitary sewer system, 2) mitigate the impact of sanitary sewer overflows when they do occur, 3) provide customer-driven levels of service across all aspects of the wastewater collection operation, 4) to achieve these goals in the most economically efficient and sustainable manner possible and 5) prevent wet weather flows from exceeding the dry weather flows by a factor of 3 so that Macungie would not be held accountable for any sanitary sewer overflows that may occur in the LCA Interceptor or at the City's Kline's Island Treatment Plant.

To achieve these goals, the following practices are accepted as self-evident best wastewater utility management practices.
- Improving the efficiency of the administration and operation of the sanitary sewer system while providing acceptable levels of service to the sewer service customers.

- Proactively maintaining and upgrading the conveyance systems to minimize failure of critical system components.

- Funding a routine infrastructure rehabilitation and replacement program to sustain Macungie's inventory investments.

- Providing adequate capacity to convey base flows and peak flows by:
  
  - Improving the efficiency of the existing sewer system by increasing available capacity through the reduction of infiltration and inflow of storm water, groundwater, and illicit discharges into the sewer system network

1.3 **Macungie O&M Program Purpose**

The purpose of this O&M Program is to document Macungie's plans and practices that optimize delivery and cost of sewer collection.

The proper and efficient management, operation, and maintenance of the sewer infrastructure are essential to Macungie's mission to protect public health and the environment. Macungie must take reasonable measures necessary to eliminate or minimize Sewer System Overflows (SSOs) and to provide adequate system capacity. Inadequate collection system operation and maintenance practices, particularly those that lead to SSOs, violate these permit conditions.

This program documents some of Macungie's sewer programs and demonstrates how Macungie's Public Works Department works to achieve their business goals and objectives.

Macungie's O&M Program serves as an operational guide for Macungie's sanitary sewer collection system. Macungie will periodically conduct a review of this O&M Program to
review performance, identify needed program improvements, and reflect changing business and customer realities.

1.4 Macungie Service Area Description

Macungie owns and operates a sewage collection system which serves the Borough of Macungie and some minor areas in Lower Macungie Township which adjoin the Borough. Figure 1-1 shows the zoning districts and the overall Macungie Sanitary Sewer System.

There are 1,654 residential, 83 commercial and 3 industrial customers being served by the Borough of Macungie’s sewage collection system which consists of approximately 60,330 feet or 11.4 miles of pipeline that discharge flows directly to the Lehigh County Authority conveyance system and flows through the Allentown sewer system to the Allentown wastewater treatment facility. Roughly 96.0% of the mainline sewers is eight inches (8") pipe and 4% is ten inches (10") pipe. The system is 54.5% VCP, 43.3% is PVC and 2.1% is CIP or DIP.

Customers’ connections consist of a service line (lateral), typically six inches (6") or four inches (4") in diameter, which carries wastewater by gravity flow to the sewer main.

In Macungie’s system, the Borough owns and is responsible for the physical condition of the lateral from the property line to the sewer main. It is estimated that this includes about 8 miles of sanitary sewer laterals. The property owner is responsible for the building sewer which runs from the house or building to the property line.
1.4.1.1 Borough of Macungie

![Zoning and Sewer Map](image)

**Figure 1-1: Zoning and Sewer Map**

1.5 O&M Definitions

**Applicable standards and limitations** – all State, interstate, and federal standards and limitations to which a “discharge,” a “sewage sludge use or disposal practice,” or a related activity is subject under the Clean Water Act (CWA), including “effluent imitations,” water quality standards, standards of performance, toxic effluent standards or prohibitions, “best management practices,” pretreatment standards,
and "standards for sewage sludge use or disposal" under sections 301, 302, 303, 304, 306, 307, 308, 403 and 405 of CWA.

**Average monthly discharge limitation** – the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

**Average weekly discharge limitation** – the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week.

**Best management practices ("BMPs")** – schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

**Borough** – The Borough of Macungie, Lehigh County, Pennsylvania

**CCTV** – Closed Circuit Television Inspection.


**COA** – City of Allentown

**CWA and regulations** – the Clean Water Act (CWA) and applicable regulations promulgated thereunder. In the case of an approved State program, it includes State program requirements.
**INTRODUCTION**

**Daily discharge** – the “discharge of a pollutant” measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the “daily discharge” is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the “daily discharge” is calculated as the average measurement of the pollutant over the day.

**Direct discharge** – the “discharge of a pollutant.”

**Discharge** – when used without qualification means the “discharge of a pollutant.”

**Discharge of a pollutant** –

- Any addition of any “pollutant” or combination of pollutants to “waters of the United States” from any “point source,” or
- Any addition of any pollutant or combination of pollutants to the waters of the “contiguous zone” or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation.

This definition includes additions of pollutants into waters of the United States from surface runoff collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person, which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any “indirect discharger.”

**Environmental Protection Agency (EPA)** – the United States Environmental Protection Agency.

**Hazardous substance** – any substance designated under 40 CFR part 116 pursuant to section 311 of CWA.
Indirect discharger – a non-domestic discharger introducing "pollutants" to a “publicly owned treatment works."

KPI – Key Performance Indicator

Lagging Indicator – An incident or condition which requires prompt corrective measures in order to eliminate an occurrence of a sanitary sewer system non-conformance.

Leading Indicator – An incident or condition which requires preventive measures to be taken before an imminent sanitary sewer system non-conformance occurs.

Efficiency Indicator - An activity intended to restore the sanitary sewer system components to a condition that performs to original design functionality.

LCA – Lehigh County Authority.

Municipal separate storm sewer system – is defined at § 122.26 (b)(4) and (b)(7).

New source – any building, structure, facility, or installation from which there is or may be a "discharge of pollutants," the construction of which commenced:

- After promulgation of standards of performance under section 306 of CWA which are applicable to such source, or

- After proposal of standards of performance in accordance with section 306 of CWA, which are applicable to such source, but only if, the standards promulgate in accordance with section 306 within 120 days of their proposal.

Operation and Maintenance (O&M) – A program to maintain design functionality (capacity and integrity) and/or to restore the system components to the original condition and thus functionality.

Permit – an authorization, license, or equivalent control document issued by EPA or an "approved State" to implement the requirements of this part and parts 123 and 124.
"Permit" includes a NPDES "general permit" (§ 122.28). Permit does not include any permit which has not yet been the subject of final agency action, such as a "draft permit" or a "proposed permit." Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

**Point source** – any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill-leachate collection system, vessel, or other floating craft from which pollutants discharge. This term does not include return flows from irrigated agriculture or agricultural storm water runoff. (See § 122.3).

**Pollutant** – dredged spoil, solid waste, incinerator residue, filter back- wash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

- Sewage from vessels; or
- Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well-used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

**Program Manuals** - Documents that relate to the Macungie’s C&M Program, but are incorporated into Macungie’s O&M Program Document by reference rather than directly contained in the Program Document. These are often stand-alone documents outlining procedures and metrics of specific programs (i.e., Pretreatment Program Manual, Gravity Lines Operations and Maintenance Manual).
Process wastewater – any water, which, during manufacturing or processing, comes into direct contact with, or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Public Works Department (PWD) – The Macungie Public Works Department consists of a crew of four (4) employees which are responsible for the operation and maintenance of the Borough’s public works facilities including the sanitary sewers, storm sewers, public drinking water system, public streets and public buildings.

Schedule of compliance – a schedule of remedial measures included in a “permit”, including an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the CWA and regulations.

Septage – the liquid and solid material pumped from a septic tank, cesspool, similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Site – the land or water area where any “facility or activity” is physically located or conducted, including adjacent land used in connection with the facility or activity.

Sanitary Sewer Operator - The Public Works Department crew member assigned the responsibility to operate the Macungie Sanitary Sewer System with assistance from other members of the Public Works Department.

Sanitary Sewer Overflow (SSO) - any spill of raw or untreated sewage out of manholes, pump stations, or any other sewage-conveyance system component onto public or private property, including waterways.

Sanitary Sewer Overflow (SSO) Response – Action taken when notification of the occurrence of an SSO.

SLRAT – Sewer Line Rapid Assessment Tool.
Standards for sewage sludge use or disposal – the regulations promulgated pursuant to section 405(d) of the CWA which govern minimum requirements for sludge quality, management practices, and monitoring and reporting applicable to sewage sludge or the use or disposal of sewage sludge by any person.

Toxic pollutant – any pollutant listed as toxic under section 307(a)(1) or, in the case of “sludge use or disposal practices,” any pollutant identified in regulations implementing section 405(d) of the CWA.

Variance – any mechanism or provision under section 301 or 316 of CWA or under 40 CFR part 125, or in the applicable “effluent limitations guidelines” which allows modification to or waiver of the generally applicable effluent limitation requirements or time deadlines of CWA. This includes provisions, which allow the establishment of alternative limitations based on fundamentally different factors or on sections 301(c), 301(g), 301(h), 301(i), or 316(a) of CWA.

Wetlands – those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
2.0 Operation and Maintenance Programs

This section describes the programs necessary to operate and maintain the Macungie sanitary sewer system. Some programs are described in general terms and reference their program specific plans, O & M manuals, work plans, etc. for details. Others are described entirely herein.

2.1 Operations and Maintenance Program

This section describes the O&M. Some programs are described in general terms and reference their program specific plans, O & M manuals, work plans, etc. for details. Others are described entirely herein.

2.1.1 Purpose

The purpose of operation and maintenance (O&M) programs is to maintain design functionality (capacity and integrity) and/or to restore the system components to the original condition and thus functionality in order to minimize negative impacts to Macungie customers and environmental releases from the gravity sewer. The PWD is responsible for this program.

2.1.2 Overview

PWD operates the gravity sewer system, performs routine maintenance and cleaning, conducts ongoing routine assessments of the condition of the system, and performs corrective maintenance when required to keep the system operational. This program is driven by the goal to prevent SSOs before they occur. PWD operates and maintains 11.4 miles of gravity sanitary sewers (4" through 10"), 315 sanitary sewer manholes, and approximately 1,740 sanitary sewer laterals. These are shown in Figure 2-1.
Figure 2-1 Gravity Sewer System Map
# 2.1.3 Goals and Performance Measures

## 2.1.3.1 Lagging Indicator KPIs

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<tr>
<th>INDICATOR</th>
<th>METRIC</th>
<th>RESPONSIBILITIES</th>
<th>GOAL</th>
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<td><strong>When Measured</strong></td>
<td><strong>How Measured and Recorded</strong></td>
<td><strong>Who Measures and Records</strong></td>
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<td>Total SSOs</td>
<td>Each Occurrence</td>
<td>Program Manual and Photos</td>
<td>PWD</td>
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### 2.1.3.2 Leading Indicator KPIs

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<td><strong>How Measured and Recorded</strong></td>
<td>Program Manual &amp; Videos</td>
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<td>Program Manual &amp; Photos</td>
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<td><strong>Mainline Pipe &amp; Cleaning Costs</strong></td>
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<td><strong>Lateral Root Balls</strong></td>
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<td><strong>Laterals Inspected (CCTV)</strong></td>
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### 2.1.3.3 Efficiency Indicator KPIs

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<td>Program Manual &amp; Actual Costs</td>
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2.1.4 Preventative Maintenance (PM)

The Borough of Macungie owns and maintains the gravity sanitary sewer collection system and the portion of laterals in their rights of way and easements serving residents and businesses. Fats, Oils and Grease (FOG) accumulation and root intrusion can be a problem for the sewage collector pipes. Accordingly, practices vary by both diameter and pipe material.

PWD conducts preventative maintenance activities on the gravity system and appurtenances on a proactive basis to identify and resolve problems before they result in failures that can cause overflows. Defined preventative maintenance schedules rest on past system performance and experience.

2.1.4.1 Routine Cleaning

Gravity pipe cleaning programs fall into six categories:

1. Category 1 is strictly reactive maintenance. Pipes are cleaned (often only rodded) to remove chokes identified by customers. Some hotspot preventative cleaning is done.

2. Category 2 is a systemic sweep of the entire system. Known as gymnasium cleaning, sewers are cleaned using map books without prioritization, and no varying cleaning efforts are assigned.

3. Category 3 is a systemic sweep of the system on a recurring basis, with identified hot spot cleaning for some segments on a more frequent basis.

4. Category 4 identifies cleaning demand by the subdivision based on operational knowledge of cleaning history, choke or SSO history, pipe age, and/or pipe material.

5. Category 5 is a segment by segment cleaning based on an operational knowledge of cleaning history, choke or SSO history, slope, root likelihood, FOG history, pipe age, and/or pipe material. Known as presumptive basis cleaning, it assumes cleaning based on pipe characteristics,
6. Category 6 is a segment-by-segment cleaning based on observed cleaning need. Known as hotel cleaning, it relies on observed pipe operational conditions (primarily delta between depth of flow upstream and downstream) using cameras, acoustical tools, or other methods to determine cleaning need. (Category 6a is a refinement whereby these observations are used to establish Basis of O&M (BOOM), which dictates the tools, pressures, volumes, pullback rate, and step vs. linear cleaning approaches for each segment).

In the past the Category 1 cleaning was performed at various locations in the Borough. Also, cleaning was performed as a prerequisite to CCTV inspections performed by LCA on an annual basis.

In 2020, PWD will begin transitioning to a Category 6 cleaning approach. Ramp-up will include a pilot program using closed circuit television inspections or SLRAT acoustical tools to assess Clean or Pass criteria for various pipe types. LCA will perform cleaning operations on an as-needed basis as requested by the Borough and contracted services using SLRAT acoustical tools may be used in the event CCTV cannot be performed.

2.1.4.1.1 Frequency and Schedule

PWD has had a cleaning frequency 20% of the system cleaned annually (5-year return frequency, or about 2 miles per year), not including currently inaccessible segments and not including segments cleaned more than once during the cleaning cycle. This pace will be maintained throughout the Category 1 to Category 6a transition.

Mileage cleaned goals under the Category 6a program will continue at about 2 miles per year through the first round of Category 6a cleaning and the amount of pipe assessed annually is expected to remain at 2 miles per year or a once every 5 years cleaning assessment of the entire system. It is expected that by the time the Category 6a work is started, a future Easement Maintenance Program will be allowed access to all gravity pipe sufficient to support cleaning.
2.1.4.2 Closed Circuit Television (CCTV) Inspection

CCTV operators certified in the Nation Association of Sewer Service Companies (NASSCO) Pipeline Assessment Condition Program (PACP) use the PACP rating system to identify the severity of the defects found during the inspection process. The PACP defect coding provides a level of consistency in the defect rating; therefore, Engineering Department staff and others reviewing the inspection records can understand and use the information accordingly.

CCTV inspection is a non-destructive, proactive approach to evaluate the Macungie sanitary sewer infrastructure and used when observed data is necessary to assess the condition of the pipeline interior. CCTV inspection functions include:

- Inspecting pipeline condition and determining the location of problem areas such as pipe or joint separations, drops, ruptures, obstructions, deterioration, pipe misalignment, and root intrusions
- Locating infiltration and inflow sources during rain events
- Looking for damage to sewers caused by excavation and construction
- Searching for unrecorded connections, such as illegal or unauthorized tap-ins
- Evaluating effectiveness of pipeline repairs, replacement, and/or rehabilitation within the sewer system
- Assessing pipeline condition of new installation before the warranty period ends

2.1.4.2.1 Frequency and Schedule

The long-term CCTV program has a goal of inspecting all gravity sewer more than 25 years old (or rehabilitated more than 20 years ago) on a ten-year cycle. However, these goals adjust according to the condition of the pipe. Portions of the gravity system that may be more subject to problems such as inverted siphons are inspected every five years.
Pipes inspected and found to have defects, but that have not yet been replaced or rehabilitated, receive inspections at 5-10 year frequency, depending on the nature and number of defects. The rubric for the re-inspection frequency for these type of pipes is shown in Table 2-1.

Table 2-1 – Rubric for Reinspection Rate for Pipes with Defects

<table>
<thead>
<tr>
<th>Sewer Description</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Failing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewer Main VCP</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Main VCP – CIPP Lined</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Main PVC</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Main PVC – CIPP Lined</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Main DIP</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Lateral VCP</td>
<td>G</td>
<td>I</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Lateral VCP – CIPP Lined</td>
<td>H</td>
<td>G</td>
<td>I</td>
<td>J</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Lateral PVC</td>
<td>G</td>
<td>I</td>
<td>D</td>
<td>J</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Lateral PVC – CIPP Lined</td>
<td>H</td>
<td>G</td>
<td>I</td>
<td>J</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Lateral CIP</td>
<td>G</td>
<td>I</td>
<td>D</td>
<td>J</td>
<td>F</td>
</tr>
<tr>
<td>Sewer Lateral CIP – CIPP Lined</td>
<td>H</td>
<td>G</td>
<td>I</td>
<td>J</td>
<td>F</td>
</tr>
</tbody>
</table>

A – Pipe shall be re-inspected within 10 years  
B – Pipe shall be re-inspected within 20 years  
C – Pipe shall be re-inspected within 5 years  
D – Pipe shall be re-inspected within 3 years  
E – Pipe shall be placed on schedule to be replaced or rehabilitated  
F – Pipe shall be immediately replaced of rehabilitated on an emergency basis  
G – Pipe shall be re-inspected whenever property is sold unless it was inspected within 5 years  
H – Pipe shall be re-inspected whenever property is sold unless it was inspected within 10 years  
I – Pipe shall be re-inspected whenever property is sold unless it was inspected within 2 years  
J – Pipe shall be replaced or rehabilitated before property may be sold

Although one of the Borough’s goals for this program is to assess all gravity segments, some segments may be inaccessible due to steep slopes, vegetative growth in easements, or other conditions. If the Borough identifies any such segment, crews assess the upstream and downstream segments (as they can) to determine if there are any issues.
2.1.4.3 Root Control

Root intrusion can be a major problem. CCTV inspections assess the condition of the pipes and determine the location of any root intrusion. If roots are present in the system and have the potential to cause an obstruction to the flow, the Borough will contract services for chemical root control on an as-needed basis.

2.1.4.3.1 Frequency and Schedule

Chemical root control is used to de-root root-impacted sewers on an as-needed basis annually. The demand for chemical root treatment is estimated to be less than 1/2 mile per year.

2.1.4.4 Fats, Oils, and Grease Control

The Borough is aware of a location where FOG is a re-occurring problem. The FOG comes from a strip mall where there are a couple restaurants; therefore, the strip mall owner cleans the affected lines twice each year. In the event FOG is discovered elsewhere in the sewer system, the Borough will evaluate the situation and attempt to identify the customer responsible so that appropriate measures can be taken. Until the responsible customer is identified, the Borough will have LCA or a Contractor clean the sewer main on an as-needed basis.

2.1.4.4.1 Frequency and Schedule

FOG cleaning, where reoccurring chronically FOG is identified is performed on a semi-annual basis.

2.1.5 SOPs

PWD personnel periodically review any SOPs and revise as necessary. PWD staff occasionally meets to discuss any issues and concerns that may arise. These meetings allow for a discussion of any problems arising from implementing any specific SOP.
2.1.6 Reactive Maintenance

Reactive maintenance takes place when an unanticipated problem occurs in the system because of a break, blockage, construction activities, or an act of vandalism. Reactive maintenance utilizes the same equipment and techniques used in the preventative maintenance activities. If the problem results in a release from the collection system, the PWD can follow steps outlined in the SSO Response Plan. PWD records the locations of overflows to document causes and patterns of failures that may require additional investigation and preventative maintenance activities.

PWD, from time to time, may request that certain capital improvements be constructed, in which case, the request is forwarded to the Borough Engineer for a recommendation. If the Borough Engineer recommends that the requested capital improvement be constructed, the request will be presented to Borough Council for budgeting consideration. Once authorized, the work will be scheduled when the required funding is in place.

2.1.6.1 Response to Complaints

Typically, the Borough Administrative Staff receives complaints. These complaints are then relayed to the PWD. A PWD staff member responds either during normal work hours or after hours. After hours, weekends and holidays the Borough has an answering machine so that messages may be recorded and any complaints are forwarded to the PWD supervisor.

2.1.6.2 Root Cause Analysis

PWD either calls LCA or a Contractor to cut roots as they are discovered in sewer mains or in sewer laterals in the public right-of-way. Whenever roots are found in private laterals, the property owner(s) is notified and advised that they should hire a qualified contractor to remove the roots.
2.1.7 Equipment and Spare Parts

PWD has numerous vehicles used in maintaining the gravity sewer system including pickup trucks and heavy equipment required to excavate and replace any malfunctioning line, manhole, valve, or other appurtenances. In the event bypass pumping is necessary, the Borough will engage the services of a local Contractor.

PWD utilizes the service of the Lehigh County Authority who can provide cleaning equipment, IBak CCTV equipment, CCTV data capture software.

The Borough’s Engineer can also provide services relative to video inspection of laterals or short isolated sections of sanitary sewer mains on a case by case basis.

Spare gravity sewer parts such as manhole covers, barrels and cones, and pipe of various materials and diameters are stored at Borough Garage. Spare parts inventory is logged on a computer spreadsheet.

2.1.8 Staffing

There are four (4) staff positions in the Borough’s Public Works Department with one individual assigned as the Sewer System Operator; typically, all positions are filled. The Sewer System Operator has the other PWD staff members available to work on the sanitary sewer system as the needs arise. Likewise, the Sewer System Operator is available to assist in other areas such as drinking water, road crew etc. Whenever, a project is too large to be done with the Borough’s PWD staff, the work can be contracted to a local Utility Contractor.

2.1.8.1 Outsourcing

PWD outsources major repairs and bypasses. Chemical root control is outsourced to a Root Control specialist. Any bypass pumping is outsourced. Emergency excavation and replacement are outsourced as needed.
2.1.8.2 Required Credentials, Training Programs, and Staff Development

PWD entry positions require a valid driver's license. Newly hired staff are required to pass their Class B CDL within one year of start of employment.

All PWD positions require that employees responsible for gravity sewer operations and maintenance complete safety and training. Equipment-specific training is provided on an as-needed basis.

PWD crew supervisor is responsible for providing training for new hires. The PWD supervisor is responsible for providing training for crew members and for identifying any skills that are lacking in the crew members. Vendor and equipment training is provided on an as-needed basis.

Training programs and corresponding certifications available to PWD crew members are:

- Collection system PAWPCOA certification
- Confined space entry certification
- Flagger Training
- Commercial driver's license

PWD employees responsible for gravity sanitary sewer operations and maintenance complete required safety and training. Employees train while on-the-job and in the classroom training when necessary.

2.1.9 Information Management

PWD is in the process of implementing software that will enable the recording and tracking of maintenance records to assist staff in identifying what transpired in response to problems, identifying normal maintenance, and scheduling needed maintenance. Inventory capability will be part of this system.

Each CCTV evaluation inspection yields reports and videos. Camera crews file reports and videos by line segment number and corresponding manhole numbers.
Daily, these videos, report, and jpegs are downloaded to the PWD’s computer as well as backed up on storage devices. Reports are saved indefinitely; whereas, inspection videos are kept until the sewer main is re-inspected. Along with reports and most recent inspection videos, crews keep an updated record of progress made against the normal inspection schedule.

2.2 Sanitary Sewer Lateral Maintenance

The Borough does not have a formal sanitary sewer lateral maintenance program, but it is in the process of being developed. Lateral work/maintenance is reactive upon receiving a complaint, as Borough does have lateral responsibilities to the edge of the easement/right-of-way.

2.2.1 Overview

The Borough owns and maintains that part of the gravity sanitary sewer system service laterals that runs from the sewer main to the property line; there are approximately 1,740 sanitary sewer laterals in the Borough’s inventory. These laterals can be a source of significant ground water infiltration into the sanitary sewer system, especially in areas with deep sewers, areas that have seasonally elevated groundwater table, or pipes backfilled with crushed stone. Maintaining these laterals up to the easement/right-of-way can reduce infiltration, while providing the customer with better service. The PWD is responsible for these activities.

2.2.2 Goals and Performance Measures

The primary goal of the sanitary sewer lateral maintenance program is to eliminate basement and house backups due to blockages in the service. A secondary goal is to reduce ground water infiltration into the sanitary sewer system. Beginning in 2018 and continuing into 2019, the Borough plans to closely inspect the sanitary sewer laterals in the sewer system and rehabilitate those in need of repair. Once this intensive undertaking is completed, the Borough will identify additional laterals that may need reparations as discovered during routine CCTV inspections of the sanitary sewer system or from complaints received from property owners.
Additionally, the Borough has recently purchased three portable sanitary sewer flow meters; the Borough will move these flow meters around the collection system from time to time. Whenever, the flow meters reveal serious I&I issues in any basin, further investigations will zero in on that area.

2.2.3 Program Description / Components

This section identifies lateral maintenance tasks performed and frequency of performance, including cleaning, blockage identification and removal, and inspection. In the past, the Borough used contractors to rehabilitate deficient laterals. Utilization of these contractors is ongoing, but the Borough's Engineer recently purchased a new lateral camera that has the capability to inspect sewer laterals. This allows the Borough to investigate where rehabilitation may be necessary. For more all-encompassing sewer lateral investigations, the Borough will contract the services of a Contractor specializing in CCTV lateral inspections as may be required.

2.2.4 Preventative Maintenance (PM)

No preventive maintenance or inspection is currently conducted for the Borough's laterals. Beginning in 2018, the Borough will implement a lateral inspection program in their Source Reduction Program Priority Areas to identify laterals that are leaking. Cleaning, where required, will be conducted in these laterals. Preventive maintenance or inspection for laterals is not currently being considered by the Borough because of the limited risk and the high cost of universal lateral maintenance.
2.2.5 Reactive Maintenance

Reactive maintenance takes place when an unanticipated problem occurs in the lateral because of a break, blockage, or construction activities. If the problem results in a release from the collection system, the responding PWD employee can follow steps outlined in the SSO Response Plan. PWD records the locations of overflows to document causes and patterns of failures that may require additional investigation and preventative maintenance activities.

The Borough Engineer assists the PWD in developing a corrective action plan and a recommendation for capital improvements based on known problems, equipment obsolescence, or known improvement opportunities. They collect and analyze data using an established set of criteria to establish the relative priority of each proposed item.
2.2.5.1 Cleaning

Cleaning is typically done from the property line-mounted cleanout using snakes, jettters, and cutters mounted on small diameter sewer cleaning jets or rocs. The Borough does not have the capability of cleaning laterals from the main line sewer; therefore, the Borough engages the services of a Contractor specializing in this work.

2.2.5.2 Closed Circuit Television (CCTV) Inspection

LCA, at the request of the Borough, conducts lateral inspections following removal of any chokes. CCTV operators certified in the National Association of Sewer Service Companies (NASSCO) Lateral Assessment Condition Program (LACP) use the LACP rating system to identify the severity of the defects found during the lateral inspection process. The LACP defect coding provides a level of consistency in the defect rating; therefore, Engineering Department staff and others reviewing the inspection records can understand and use the information accordingly.

LCA also has the capability of inspecting laterals from the cleanout using a minicamera and from the main line sewer using a side launched mainline transported camera for laterals that do not have exterior cleanouts.

CCTV inspection is a non-destructive approach to evaluate the laterals and used when observed data is necessary to assess the condition of the pipeline interior. CCTV inspection functions include:

- Locating sources of chokes and blockages
- Inspecting pipeline condition and determining the location of problem areas such as pipe or joint separations, drops, ruptures, obstructions, deterioration, pipe misalignment, and root intrusions
- Locating infiltration and inflow sources during rain events
- Looking for damage to laterals caused by excavation and construction
• Searching for unrecorded connections, such as illegal or unauthorized tap-ins

• Evaluating effectiveness of pipeline repairs, replacement, and/or rehabilitation within the sewer system

• Assessing lateral condition of new installation before the warranty period ends

2.2.5.3 Root Control

The Borough has no lateral chemical root control program. Any roots found are removed mechanically.

2.2.5.4 Response to Complaints

Typically, the Borough Office receives complaints. These complaints then go to the PWD. The PWD responds either during normal work hours or after hours, as circumstances require. The Borough maintains an answering machine for nights and weekends which includes instructions for reporting emergency situations. All complaints are recorded and forwarded to the PWD. A staff member will respond to complaints promptly. The PWD crew is available 24-hours a day to respond to any problem requiring immediate maintenance action.

2.2.5.5 Root Cause Analysis

PWD utilizes root control protocol for all reactive maintenance issues on laterals. The protocol is implemented by first identifying the location and responsible party. If the problem is located on private property, the property owner is promptly notified and advised that a qualified plumber should be hired in order to clear the line. If the problem is found to be within the public right-of-way, the Borough will engage the services of LCA to remove the blockage or hire a plumber or contractor to do so. Findings of root intrusions are used to identify areas where root obstructions or blockage are more likely to occur.
3.0 Support Programs

3.1 Engineering Design and Construction

3.1.1 Purpose

The Borough Engineer ensures that the design of new or improved Sewer System infrastructure is in accordance with applicable standards, codes, and guidelines, and is inspected and built to the specified standards.

3.1.2 Goals and Performance Measures

The general goal of the Engineering Design and Construction program is to minimize repair costs to the utility by ensuring the assets will meet all necessary functions over their lifetime. To achieve this, the Borough’s Engineer identified the following specific goals:


- Perform new and rehabilitation projects in an effective and efficient manner that protects the environment during construction

- Create a prioritized CIP based on a comprehensive set of criteria to support capital planning and spending.
3.1.3 Standards

The Borough's Standard Specifications and the DEP Sewer Manual Engineering Manual will establish the engineering procedures, design standards, and technical specifications for the design and construction of the Borough's water and wastewater systems. These documents contain the core of the design standards program and design standards, standard tech specs, standard steps for a design review, and forms for submittals. These documents include specifications and design information for gravity systems, pump stations, and force mains.

Supervision and inspection of the Borough's construction and rehabilitation projects usually occur through an arrangement with the Borough's engineer. In-house staff inspects smaller construction and rehabilitation projects. As part of the plans and specifications for new projects, the design engineer, the Borough Engineer, the PWD and the inspector implement strict procedures for testing the facilities.
The Borough has the authority to ensure the proper installation, inspection, and testing of new and rehabilitated sewers in all parts of their system.

3.1.4 Sizing Sanitary Sewers

The Borough may require a developer to construct facilities of such size, length, and/or depths to not only serve the proposed development, but serve the areas of anticipated growth; however, due to limiting real estate for development, it is unlikely that this option will be imposed.

3.2 Pennsylvania One Call/ Pennsylvania811

3.2.1 Purpose

This section identifies the legal requirements and basis for the Borough of Macungie to locate sewer lines for construction projects conducted by others, enforcement of this program, and the identification of responsibility of the workers to repair lines if damaged due to mis-locating or failure to locate.

State law (Section 5 of Act 287) specifies the legal responsibility for damage to the utilities. If an entity does not call for locates or damage occurs from a properly marked utility, the entity causing the damage is responsible for the repairs and subsequent impacts. If the utility is mismarked, the marker is responsible for repair costs and subsequent impacts. If information supplied to the marker was incorrect, the supplier of the information is responsible for repairs and subsequent impacts. PWD performs locate responsibilities.

This program exists to ensure that third parties doing work unrelated to the Borough’s system do not damage Borough assets and are responsible for adequate repairs if they do.

The Borough participates in PA One Call to prevent damage to its underground assets by locating and marking underground lines prior to construction or other excavations that may occur. The Borough follows PA One Call standards, which use Common Ground Alliance Best Practices 14.0 for Temporary Marking (ANSI standard Z535). PA One Call provides educational opportunities for Borough employees regarding excavation laws and
responsibilities and prevents and/or reduces damage-interruption of service to the Borough’s as well as other utilities lines and/or customers.

### 3.2.2 Goals and Performance Measures

The goal of this program is to provide that no damage occurs to Borough assets by third parties. Responsibilities of repairs lie with the Borough if there are no line locates delineated. Metrics include number of calls responded to, turnaround time for standard calls, turnaround time for emergency calls, turnaround time for design calls, and number of assets damaged due to inaccurate mark outs.

The Borough has the goal of accurately marking the underground lines to ensure that no damage occurs to Borough facilities. The Borough responds to several types of PA One Call (KARL) tickets within the designated time required by the program.

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Goals</th>
<th>Performance Measures</th>
<th>Target Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent damage to underground utility lines.</td>
<td>To prevent damage to underground lines, the location of the utilities must be marked in a timely manner due to the issuance of a PA One Call ticket.</td>
<td>(No. of PA One Call “no shows”/ Total number of tickets received)</td>
<td>0</td>
</tr>
</tbody>
</table>

### 3.2.3 Components

Pennsylvania state law requires that the Borough, as a utility owner, to participate in PA One Call. Anyone preparing to excavate must place a call to PA One Call (KARL) to have all underground utilities located and marked before digging. Pennsylvania 811 coordinates the calls and notifies all utilities of possible conflicts. Pennsylvania 811 issues a ticket depending on the type of job or excavation. Pennsylvania 811 designates tickets as designer, regular, update, emergency, meeting, or special project tickets.
The Borough is required to respond to all tickets received and is typically required to mark its utilities within 3-10 business days (or sooner depending on the type of ticket) of the notification. If the project is under design and someone requests a physical survey of the utilities, this "designer" ticket allows the Borough up to 10 working days to mark the utilities in conflict and/or provide record drawings. The marking crew utilizes record drawings, tracer wire, line of sight, and other location technologies to provide the location of the underground utility.

3.2.3.1 Standards

Standards, set by legislation, include minimum notice between mark out request and work, maximum response time, requirements for "emergency" excavation and excavation priority and required action by contractor if line is damaged.

3.2.3.2 SOPs

Procedures for the Line Location Program focus on field procedures and include responding to calls, identifying where no field work is needed, marked out lines, special situations, emergency excavations and locating and marking lines.

3.2.3.3 Enforcement Program

If a contractor works near Borough facilities and the Borough did not receive the proper notification, the contractor must stop working.

The contractor, while performing work, is liable for any repairs to damaged Borough infrastructure, if the work was improperly marked or not called in to PA One Call. The Borough may file an insurance claim to recover repair expenses not assumed by the contractor.

3.2.3.4 Line Location for Third Parties

The Borough may own pipes in areas where the PA One Call does not apply or a contractor may be working on or near a plant or pump station and request that underground utilities be marked. Upon request, the Borough may mark the utilities in these areas. This service ensures the integrity of Borough pipelines and structures.
3.3 Flow Acceptance

This section identifies the legal requirements and basis for control of flow contents, peak volume, and normal volume from satellite systems. It cites the authority by which the Borough monitors these flows and, if necessary, prohibit flows and/or enforce compliance.

3.3.1 Purpose

The Borough has developed a flow acceptance process for reviewing proposed new connections or major modifications to existing connections to their sanitary sewer system. The process allows for the orderly and consistent review of new service requests and coordinates the review process between the Borough's water and sewer departments. These new flows primarily consist of new developments (usually sub-divisions); but, can be from existing larger customers or re-use of a property.

3.3.2 Goals and Performance Measures

No goals or performance measures identified at the current time. However, the below goals could be used for the program. The proposed goals of the Flow Acceptance Program are to:

- Allow for adequate long-term capacity planning in the system
- Track new connections and provide for adequate planning
- Provide an opportunity for the Borough to ensure developments meet the Borough's design criteria, which are in their standard specifications.
Table 3-3: Flow Acceptance Program Goals

<table>
<thead>
<tr>
<th>Metric</th>
<th>Goal</th>
<th>Performance Measure</th>
<th>Target Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Acceptance</td>
<td>To allow for adequate long term capacity planning in the system, all approved flow applications must be consistent with LCA's design criteria</td>
<td>Number of flow applications processed</td>
<td>Monitor Trend</td>
</tr>
</tbody>
</table>

3.3.3 Components

The Borough has the legal authority to accept, reject, and control flows from satellite systems. It is the Borough’s responsibility to maintain an effective flow acceptance process.

There are two classifications of sanitary sewer flow acceptance: single service connections and system extension. Single service connections encompass new individual meters and service lines. System extensions encompass new sources of large flow, usually housing sub-divisions.

3.4 Service Connection/Disconnection

3.4.1 Purpose

The Borough inspects connections and disconnections to make sure there are not any illegal connections, improper connections, and lapses in recording connections/disconnections.

The purpose of the Borough’s Service Connection/Disconnection Program is to:

- Prepare accurate and detailed records of new work
To ensure Borough qualified and approved contractors perform work on service connects/disconnects

Provide information to the Billing Department on new service connections/disconnections

3.4.2 Goals and Performance Measures

The Borough Engineer inspects connections and disconnections to make sure there are no illegal connections, improper connections, and lapses in recording connections/disconnections. The overall goal of the Service Connection/Disconnection Program is to eliminate clear water and structural problems arising from poor connections.

Accomplishment of this overall goal is by the Borough providing:

- Installation of all new residential connections to ensure Borough standards are met
- Inspection of all new industrial connections to ensure Borough standards are met
- Efficient turnaround time for new tap installations
### Table 3-4: Service Connection/Disconnection Program Goals

<table>
<thead>
<tr>
<th>Metric</th>
<th>Goals</th>
<th>Performance Measures</th>
<th>Target Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Residential Connections - Installation</td>
<td>Install all new residential development connections to make sure they meet LCA standards.</td>
<td>(No. of approved new direct residential connections installed per year/No. of new residential connections made to system per year) X 100%</td>
<td>100%</td>
</tr>
<tr>
<td>New Industrial Connections - Inspection</td>
<td>Inspect all new commercial development connections to make sure they meet LCA standards.</td>
<td>(No. of approved new direct industrial connections inspected per year/No. of new industrial connections made to system per year) X 100%</td>
<td>100%</td>
</tr>
<tr>
<td>New tap installation request</td>
<td>Provide efficient turnaround time for new tap installation requests.</td>
<td>Install new taps within 1 week of initial request.</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 3.4.3 Components

The Service Connection/Disconnection Program is responsible for projects that connect to an existing Borough sewer line, projects that require a new tap connection, or projects with proposed gravity connections. For all scenarios, the Borough oversees the new connection processes. Responsibility lies with the property owner and/or their contractor to provide the Borough with proper notification. A designated inspector, assigned by the Borough Engineer, is required to be present at the location of the connection. All materials used in constructing the service must be new and meet Borough standards. Connections to the Borough’s gravity main sanitary sewer system must meet all Borough standards.
These procedures allow the Borough to control the connection process, to preserve system integrity, and to practice due diligence while supporting appropriate service inspection.

3.4.2.1 Standards

Standards for the Service Connection/Disconnection Program typically focus on legal connections to the system and appropriate material standards. Connection standards (including enforcement provisions) are now legal code. The Borough’s Standard Specifications and the Building Code contain piping material standards and mirrors the plumbing code. Should enforcement action be required, the Borough’s solicitor will be involved.

3.4.2.2 SOPs

Procedures for the Service Connection/Disconnection Program typically focus on field methods and can include tapping into a manhole by core drilling or drop connections, tapping into main and inspection of new taps.

4.0 Sanitary Sewer Overflow (SSO) Response, Reporting, and Recordkeeping Program

4.1 Purpose

The Borough has the responsibility under State law to respond, report, and keep records on releases from their sanitary sewer system. The purpose of the SSO Response, Reporting, and Recordkeeping Program is to prevent or reduce the environmental and/or public health impact of SSOs by providing structured guidance for release response, compliant reporting of SSOs, and accurate recordkeeping of SSOs. The Borough ensures program compliance by:

- Correctly identifying overflows

- Responding, tracking, documenting, and resolving overflows
- Reporting to the appropriate governmental agencies and other affected groups
- Properly training employees who respond, report, and record SSO's
- Providing emergency operations
- Meeting reporting and recordkeeping requirements

The Borough shall report all unauthorized releases or spills of untreated wastewater or treated wastewater where endangerment of public health or the environment is likely, as soon as practical, but no later than 24 hours from the time of discovery of the discharge. The Borough shall notify the DEP if the volume of spill is greater than 10,000 gallons, or if the spill reaches any body of water.

### 4.2 Goals and Performance Measures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Goals</th>
<th>Performance Measures</th>
<th>Target Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSO Response</td>
<td>Respond to Sanitary Sewer Overflows for public and environmental protection.</td>
<td>Respond within 2 hours. (No. of SSO responses meeting goal / No. of SSO events per year) (%)</td>
<td>100%</td>
</tr>
<tr>
<td>SSO Release</td>
<td>Meet regulatory reporting requirements of the PADEP for SSOs.</td>
<td>Provide initial notice within 24 hours. (No. of reports meeting requirement / Total No. of reports per year) x 100%</td>
<td>100%</td>
</tr>
<tr>
<td>Reporting</td>
<td></td>
<td>Provide training to all involved personnel. (No. of employees trained annually / No. of employees involved) x100%</td>
<td>100%</td>
</tr>
<tr>
<td>SSO Response</td>
<td>Train employees who respond, report, and record SSOs.</td>
<td>(No. of SSOs added to ESRI GIS per year/Total # of SSOs) x 100%</td>
<td>100%</td>
</tr>
<tr>
<td>Mapping</td>
<td>Input all SSOs into ESRI GIS for tracking and analysis.</td>
<td>(No. of SSOs added to ESRI GIS per year/Total # of SSOs) x 100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
4.3 Methods for Calculating Spill Volumes

The PDW or the Borough Engineer shall calculate an approximate volume of any spill by estimating the rate of spill and multiply that by the duration of the spill. For example, if a spill is estimated to be at a rate of 2 gpm and the duration is 6 hours, the volume of the spill can be calculated as follows: 2 gal/min x 6 hours x 60min/hr = 720 gallons.

The PWD shall maintain a record of all spills including the nature and origin of the spill, the method or methods used to remediate the spill, the characteristics of the area receiving the spill, the operational data available, and actual observations of the spill.

4.4 Methods for Tracking Spills and Complaints

The PWD’s record shall include specific details of an SSO. Once the SSO has been neutralized, PWD crew will complete the SSO Compliance Report. The report will then be forwarded to the Borough Office and LCA. LCA reviews the SSO Compliance Report and submits the final document to PADEP. The Borough retains the SSO Compliance Reports for record keeping purposes.
BOROUGH OF MACUNGIE
SANITARY SEWER OVERFLOW REPORT

The Borough of Macungie shall report all unauthorized releases or spills of untreated wastewater where public health or the environment may be endangered as soon as practical, but no later than the next business day from the time that the Borough becomes aware of the discharge.

1. Date of discharge: __________________________ Time: _________________ hrs (24-hour format)

2. Name of person reporting spill:

3. Location or address of the discharge: (MH number, Street address, otherwise describe location)

4. Status of discharge: □ ceased □ongoing Anticipated duration (if ongoing) ____________

5. Duration of discharge: _____ hrs _____ mins Est. volume of discharge _______________ gallons
   Volume estimated by: □ flowmeter □ area/depth measurements □ visual estimation

6. Cause of discharge □ sewer main blockage □ Excessive Flow (I & I)

7. Discharge contained to local area □ yes □ no

8. Description of area affected □ on the ground □ into storm drain □ in the street □ into stream □ other ____________

9. Location of blockage if different than location of discharge:

10. Clean up actions: date & time ___________________________________________
    □ vacuumed up discharge □ washed down area □ applied disinfectant (list chemical) ____________

11. Corrected Action □ cleared blockage □ other ____________

12. Person or agencies notified (include date and time & method)
   □ Borough Office ___________________________
   □ Engineer ___________________________
   □ DEP ___________________________

13. Comments

__________________________________________________

__________________________________________________

__________________________________________________
4.5 Spill Responses/Remediation Practices

The response and remediation taken in response to a SSO are dependent on several factors. To the extent possible, the Borough’s collection system receives back any captured discharged wastewater resulting from an SSO. Hand tools, such as rakes and shovels, and vacuum trucks (operated by either the Borough or the Borough’s contractor) are used to return the discharged wastewater to the collection system. After every gravity system SSO, PWD crew will inspect, or have inspected, the sewer mains using a closed circuit television (CCTV) camera within 14 days to determine the root cause or underlying exacerbating cause for the wet/dry weather SSO. These results are used to determine if additional cleaning is needed or if any other remedial or corrective actions should be taken, and by whom. Other procedures developed by the sewer maintenance staff specific to SSO’s are:

1. Sewer Main and Sewer Service Blockage

2. SSO Investigation

These SOP’s are maintained by PWD.

Disinfection of the spill area occurs using powered lime. Other products approved by PADEP include Neutra-Dis (liquid) and San-O-128 (liquid).

In the event an SSO response is beyond the in-house capabilities for the Borough to respond and handle, a local contractor will be hired to provide emergency assistance on an as-needed basis.

Failure Impact Evaluation and Risk Management

Assessment of potential impacts from potential sanitary sewer failures, and subsequent SSOs to identify the areas of the system that will have the greatest impact if a failure occurs and focus asset management resources to minimize the risk. The Borough relies on LCA’s KISS hydraulic model for their sanitary sewer system. While the purposes of this model are manifold, the model is used to identify which areas have current hydraulic
capacity limited sections and are likely to experience wet weather SSOs. Knowing the locations of hydraulic capacity limited sections allows the delegation of appropriate resources, which can mitigate any possible SSOs.

### 4.6 Scheduled Flow Control Plan

When the Borough has a pending construction project that has the potential to trigger an overflow or potential problem, a contingency flow control plan is developed and implemented by the Borough’s Engineer. When implementing the diversion plan, the appropriate personnel are notified of the temporary changes to the collection system.

### 4.7 SSO Performance Data

Table 4-2 through ee provide a quick, but thorough, summary of pertinent LCA SSO data over a ten-year period. This summary allows for the identification and review of multi-year trends. Table 4-2 contains the physical characteristics of the Borough sanitary sewer collection system. Table 4-3 provides evaluation metrics for the collection system. Table 4-4 presents data on the number and causes of SSOs. Table 4-5 lists data pertaining to the volume of overflows by cause.

#### Table 4-2: SSO Performance Assessment Report Part 1

<table>
<thead>
<tr>
<th>Sanitary Sewer System Characteristics</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length of gravity sewers (ft.)</td>
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<tr>
<td>Total length of force mains (ft.)</td>
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<tr>
<td>Total number of manholes</td>
<td></td>
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<tr>
<td>Total number of pump stations</td>
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</table>
### Table 4-3: SSO Performance Assessment Report Part 2

<table>
<thead>
<tr>
<th>Sanitary Sewer System Metrics</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
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</thead>
<tbody>
<tr>
<td>Total sewer main inspected by CCTV (lf.)</td>
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<tr>
<td>Total number of sewer main point repairs (ea.)</td>
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<tr>
<td>Total sewer main rehabilitated (lf.)</td>
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<td>Total sewer main replaced (lf.)</td>
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<td>Total number of manholes inspected (ea.)</td>
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<tr>
<td>Total force main inspected (lf.)</td>
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<tr>
<td>Total number of force main point repairs (ea.)</td>
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<tr>
<td>Total force main rehabilitated (lf.)</td>
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<tr>
<td>Total force main replaced (lf.)</td>
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<td>Total number of Utility Tickets issued (ea.)</td>
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<tr>
<td>SSOs (# or %) caused by:</td>
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<tr>
<td>Maintenance – Roots</td>
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<tr>
<td>Maintenance – Debris</td>
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<tr>
<td>Maintenance – Grease</td>
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<tr>
<td>Power Loss</td>
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<tr>
<td>Damage by others (third party actions)</td>
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<tr>
<td>Capacity – wet weather related</td>
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<tr>
<td>Infrastructure – gravity main failure</td>
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<tr>
<td>Infrastructure – force main failure</td>
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<td>Infrastructure – pump station failure</td>
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<tr>
<td>Total Number of SSOs:</td>
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<tr>
<td>Overflow volume (gal.) by:</td>
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<tr>
<td>Maintenance – Roots</td>
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