Coplay-Whitehall Sewer Authority
Sewer Collection System Maintenance, Operations, and Management Plan
and
Inflow/Infiltration Source Reduction Plan
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1. COLLECTION SYSTEM MANAGEMENT

a. Goals

Coplay-Whitehall Sewer Authority’s (CWSA) Maintenance, Operations, and Management (MOM) Plan covers the assets we manage in our wastewater collection system. The MOM combines preventive, predictive and corrective maintenance strategies with our best management practices, and combined with our Source Water Reduction Plan, the Authority can effectively manage its wastewater collection system and achieve the following goals:

**Goals**

- Prevent public health hazards
- Protect the environment
- Comply with regulations
- Minimize the frequency of SSOs
- Mitigate the impact of SSOs
- Minimize disruptions in service
- Minimize complaints
- Provide quick response to any disruption in service that occurs
- Protect Coplay Whitehall Sewer Authority’s large investment in the sewer collection system by maintaining maximum capacity and extending the useful life of the associated assets
- Prevent unnecessary damage to public/private property
- Efficiently use the funds available for the maintenance of the infrastructure and the operation of services
- Reduce expenditures for emergency maintenance
- Convey wastewater to the City of Allentown Waste Water Treatment facility with a minimum of infiltration, inflow and exfiltration
- Provide adequate capacity to convey peak flow
- Provide immediate, responsive, and efficient service to all emergency calls
- Provide a safe work environment for employees, employers, and residents in Whitehall Township and the Borough of Coplay
- Perform all operations in a safe manner to prevent personal injury
- Utilize evolving technology to increase our effectiveness and efficiency
- Provide reliable service now and into the future
b. Organization

Coplay-Whitehall Sewer Authority is responsible for the operation and maintenance of all aspects of the wastewater collection system. Contractors are used for some maintenance activities and emergency support when needed. Figure 1 shows the organizational structure of the CWSA.

The Authority has 7 full time employees assigned to the operation of the sewer system and operates under the following organizational structure:

- Board of the Coplay-Whitehall Sewer Authority
- Authority Manager
  - Business Manager
  - Operations Manager
  - Consulting Engineer
  - Administrative Staff (2)
  - Field Foreman
  - System Maintenance Staff (4)

**Figure 1 - Coplay-Whitehall Sewer Authority Organization Chart**

Board of the Coplay-Whitehall Sewer Authority – Establishes policy, approves budgets, approves and pays invoices.
**Authority Manager** – Plans strategy, leads staff and delegates responsibility, allocates resources, authorizes outside contractors to perform services, and serves as the liaison to the member municipalities. Also represents the Authority to other public agencies and utility companies.

**Operations Manager** – Responsible for the daily operation and management of the sewer system and leadership of staff. Prepares and implements contingency plans, leads emergency response, investigates and reports SSOs, and trains field crews. Engages outside contractors to perform services. Provides input for the operations and maintenance budget.

**Business Manager** – Responsible to lead the administrative staff and oversee the payment of invoices approved by the Authority Board. Manages customer invoices and payments and prepares budgets reports and account reconciliations.

**Consulting Engineer** – Provides assistance to the Authority Manager and staff in operating and maintaining the sewer system. Prepares wastewater collection system planning and construction documents, provides input for the capital improvement delivery system, documents new and rehabilitated assets, and coordinates development and implementation of MOM Plan. The Engineer is required to have a Professional Engineer’s License.

**Field Foreman** – responsible for the direct oversight and planning of work performed by the Utility Staff. Advises the Operations Manager of system conditions that require maintenance and repair.

**System Maintenance Staff** – Conduct staff operations and preventive maintenance activities, mobilize and respond to notification of stoppages and SSOs (e.g., mobilize sewer cleaning equipment, by-pass pumping equipment, and portable generators).

**Administrative Staff** – Support staff operations and preventive maintenance activities, assist with data entry and quality control, handle billing, dispatch, payroll, customer response, outreach, education, and other support functions as needed.

**Relation to Other Municipal Functions**

Many activities of the Coplay-Whitehall Sewer Authority sewer collection system are supported by the following departments within the Authority:

- Collection system mapping is maintained on a GIS platform by the Authority Manager. The Manager is responsible for maintaining and updating the GIS existing sewer infrastructure mapping system.
- Resources and budget are overseen by the Authority’s finance committee.
- Training for collection system staff is provided through training partners approved by the PA Department of Environmental Protection.
- Design and Construction Standards for installation, rehabilitation and repair are overseen and reviewed by the Authority Manager with input from the Operations Manager and the consulting engineer.
- Standards for inspection and testing are developed by the Authority with input from the consulting engineer.
- Requirements for grease interceptors/separators are enforced by Whitehall Township
c. Training

CWSA’s training program provides a mechanism for educating employees and establishing their technical competence through the USEPA, EPWPCOA, PA-AWWA, PA DEP, and NASSCO certification programs. CWSA utilizes a combination of in-house skill training and the purchase of specialized training through state and national associations, conferences and vendor training programs to enhance skills for performing daily work duties and provide certified operators continuing education hours. Skills training for CWSA’s employees includes, but is not limited to:

- Routine Line Maintenance
- Heavy Equipment Operation
- Maintenance Equipment Operation
- Line Testing and Inspection
- Infrastructure Installation
- Meter Station Operation and Maintenance
- Electrical and Instrumentation
- Emergency Response
- Public Relations
- Safety

Safety training is obtained from training agencies including EPWPCOA, PA-AWWA, PA DEP, and PA Rural Water Association. Coplay-Whitehall Sewer Authority expects employee adherence to the following safety policies and procedures.

- Confined Space Entry
- Hard Hat Policy
- Vehicle Operation and Seat Belt Policy
- Respiratory Protection Program
- Excavation Safety Policy and Program
- Injury Reporting Policy
- Post-Accident Drug and Alcohol Testing Policy
- Safety Teams and Committee Policy
- Personal Protective Equipment (provided for the employee)
- First Aid, CPR and AED (First aid supplies are available in office areas and vehicles)
- Flaggers
- Hazard Communication Program (Safety Data Sheets)
- Monthly Safety Meetings
- Defensive Driving Program (employees who are required to maintain a commercial driver’s license must complete a four (4) hour defensive driving course)
- CDL Random Drug and Alcohol Testing Policy
Training records are maintained for each employee. The Authority maintains appropriate safety equipment including: protective clothing, safety glasses, hard hats, gloves, respirators, filters, harnesses, tripods, hoists, and fire extinguishers. The CWSA also maintains and calibrates atmospheric testing equipment. Lights, barricades, signage and exhaust fans are also available.

d. Customer Service

1. Complaint Management Program

Complaints and requests are received by various means (e.g., phone calls, e-mail, and occasionally in person). Regardless of the nature or means of receipt, all complaints and requests are logged. Entries include the following detailed information about the complaint/request:

- Receiver of complaint / dispatcher
- Time and date of request
- Form number (Work Order)
- Complainant information (Name, address, call back phone number)
- Location of the problem
- Type of complaint (Codes, e.g. home back up, odor, manhole overflow, etc.)
- Specific request
- Personnel assigned to complaint
- Findings type, including cause of problem
- Complaint closeout information
- Date complaint closed

Once a complaint is assigned, our field personnel perform an investigation. If the problem cannot be immediately resolved, the Authority will generate a work order to take appropriate action for permanent correction of the problem. If Coplay-Whitehall Sewer Authority is not responsible for correcting the problem, it will provide the complainant with guidance on a recommended course of action. Once an investigation has been completed the complaint is closed-out.

2. Public Information and Education Program

Coplay-Whitehall Sewer Authority uses a variety of outlets for providing information and education to customers. The outlet(s) used to disseminate information is often based on the type of information and the targeted audience. Coplay-Whitehall Sewer Authority routinely uses the outlets listed below to provide its citizens with the most up-to-date information possible:

- Authority Website
- Local Media (TV and Newspaper)
- Coplay-Whitehall Sewer Authority Meeting Agenda
- Personal Visits / Phone Calls
- Door Hangers
- Sign Postings
• Customer Mailings

Coplay-Whitehall Sewer Authority has had good community relations regarding issues with the operation and maintenance of the collection system. Types of information and education provided to our customers are as follows:

Information and Education Programs
Sewer System Evaluation Survey Work
Major Repairs and Rehabilitation
New Construction
Complaint Procedures
Customer Emergency Response
Service Connection Requirements
Wastewater Collection
Clear Water Home Inspections

e. Information Management and Geographic Information Systems

Coplay-Whitehall Sewer Authority uses ARC GIS to manage information on its collection system. The following Table shows the information that is included in the GIS of the collection system.

**Table 1 Collection System Map Information included in CWSA’s GIS System**

<table>
<thead>
<tr>
<th>Manholes Basic Map Information</th>
<th>Manholes Additional Map Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>- ID number or other unique identifier</td>
<td>- Date built</td>
</tr>
<tr>
<td>- Location, with reference to streets and property lines</td>
<td>- Rim elevation</td>
</tr>
<tr>
<td>- GPS coordinates</td>
<td>- Invert elevation</td>
</tr>
<tr>
<td>- Size</td>
<td>- Material Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pipe Basic Map Information</th>
<th>Pipes Additional Map Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>- ID number or other unique identifier</td>
<td>- Slope</td>
</tr>
<tr>
<td>- Location, with reference to streets, surface waters, property lines and manholes</td>
<td>- Pipe invert elevations</td>
</tr>
<tr>
<td>- Size</td>
<td>- Plan or as-built ID number</td>
</tr>
<tr>
<td>- Direction of flow</td>
<td>- Service laterals</td>
</tr>
<tr>
<td>- Length</td>
<td>-</td>
</tr>
<tr>
<td>- Material type</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meter Stations Basic Map Information</th>
<th>Pump Stations Additional Map Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>- ID number</td>
<td>- Record drawings of each meter station</td>
</tr>
<tr>
<td>- Location</td>
<td>-</td>
</tr>
<tr>
<td>- Service Area</td>
<td>-</td>
</tr>
</tbody>
</table>
General System information is managed in various software programs and includes:

**General**
- Parts inventory
- Equipment and tools
- Purchase orders
- Revenue

**Collection System**
- Continuous Sewer System Assessment
- Collection system mapping
- Collection system inventory
- Flow monitoring
- SSO/Emergency response

**Personnel**
- Department staff
- Safety incidents
- Training
- Job performance

**Maintenance Program**
- Routine and Priority Planned maintenance (cleaning, etc.)
- Inspection scheduling and tracking
  - Manhole
  - Pipeline (Closed Circuit Television (CCTV), camera)
  - Sewer main root cutting
  - Sewer main chemical root treatment (vaporooter)
  - Sewer main grease control
- Meter Station
- Work Orders
- Monitoring/Sampling scheduling for suspected excessive strength wastewater customers
- Vehicle maintenance
- Easement Maintenance
Customer service program

- Complaints
- Customer service response
- Billing information

f. Legal Authorities and Controls

1. Sewer Rules and Regulations

Coplay-Whitehall Sewer Authority has established and implemented regulations regarding the use of the wastewater collection system. The Authority has a comprehensive set of Rules and Regulations, adopted by resolution, and complimentary to the standards required by the City of Allentown’s wastewater treatment plant. As regulations and requirements have changed, the Authority has passed additional resolutions to address those issues. The Rules and Regulations are kept up-to-date and are available electronically at the Authority’s website.

The items addressed through the Rules and Regulations include: sewer use and standards, access to pipelines and structures, service connections, user rates, permitting of flows into the system, inflow/infiltration control, enforcement of proper design, installation, and testing standards, and inspection requirements for new and rehabilitated sewers. The Finance Committee, the Authority Manager, and the Authority Board review the adequacy of user rates annually.

2. Joint Sewer System Agreement

The CWSA has entered into Inter-Municipal Agreements with neighboring South Whitehall Township (SWT) and North Whitehall Township (NWT), which provide for the connection to CWSA’s system for conveyance of effluent originating from sections of each of these Townships through the CWSA system for treatment at the KIWWTP. SWT and NWT each have (2) connections to the CWSA System. SWT connects to the CWSA system at SWT’s Jonathan and Quail Metering Stations and then utilize CWSA’s Jordan Creek Interceptor. NWT connects to the CWSA System at the Quarry and Omrod Metering Stations and then discharge to CWSA’s Coplay Creek Interceptor.

Coplay-Whitehall Sewer Authority has had an agreement with the City of Allentown for treatment of its wastewater since the 1960’s. The latest agreement is dated 1981. Coplay-Whitehall Sewer Authority has purchased capacity rights for 3.76 million gallons per day of wastewater treatment.
2. GENERAL INFORMATION ABOUT THE Coplay-Whitehall Sewer Authority SANITARY SEWER SYSTEM

a. Wastewater Treatment and Collection System Description

The Coplay Whitehall Sewer Authority (CWSA) is a Pennsylvania Municipal Authority created in 1963 by Whitehall Township and the Borough of Coplay under the Pennsylvania Municipal Authorities Act of 1945, as amended. The sole purpose for the CWSA’s creation is to provide public sanitary sewer service to the customers (currently 13,850) located within the Whitehall Township / Coplay Borough service area. The CWSA’s system is a collection and conveyance system which by Inter-municipal Agreements connects to the City of Allentown’s conveyance system for treatment of its effluent at the Kline’s Island Wastewater Treatment Plant (KIWWTP). The Authority is governed by a 7 member Board, 4 members appointed by Whitehall Township and 3 members appointed by Coplay Borough.

The CWSA’s original system was constructed during 1965 and 1966 and for the most part consisted of 8” diameter vitrified clay (VCP) collection mains and reinforced concrete pipe (RCP) interceptors. Since completion of the original system in 1966 there have been system additions constructed by the CWSA through Act 537 Plans, and main extensions by Developers, which were then turned over to the CWSA for future maintenance and repair as required. CWSA’s system currently includes 3,311 manholes, 1 pumping station, and 124.80 miles of pipe ranging in size from 6” to 36” in diameter. Sewer pipe type includes vitrified clay, reinforced concrete, polyvinyl chloride (schedule 40, SDR 35 and SDR 26, cast iron, ductile iron and reinforced concrete cylinder pipe.

In addition to the typical 8” VCP and 8” PVC collector mains, the CWSA’s system includes the following key conveyance components:

- Jordan Creek Interceptor &
Metering Station

- Coplay Creek Interceptor
- Lehigh River Interceptor & Metering Station consisting of different sections as follows
  - Lehigh River Relief Interceptor
  - Lehigh River Interceptor
  - Upper Lehigh River Interceptor
- Eberhart Pump Station & Force Main

The CWSA has entered into Inter-Municipal Agreements with neighboring South Whitehall Township (SWT) and North Whitehall Township (NWT), which provide for the connection to CWSA’s system for conveyance of effluent originating from sections of each of these Townships through the CWSA system for treatment at the KIWWTP. SWT and NWT each have (2) connections to the CWSA System. SWT connects to CWSA at the SWT’s Jonathan and Quail Metering Stations and then utilize CWSA’s Jordan Creek Interceptor. NWT connects to the CWSA System at the Quarry and Omrod Metering Stations and then discharge to CWSA’s Coplay Creek Interceptor.

The Eberhart Pump Station is located midway along the Lehigh River Interceptor. The Coplay Creek Interceptor and Upper Lehigh River Interceptor flows are tributary to the Eberhart Pump Station; these flows are then pumped and discharged to the Lehigh River and Lehigh River Relief Interceptor and connect to the COA’s Lehigh River Trunk line and ultimately to the KIWWTP. The second CWSA connection to the COA is through the CWSA’s Jordan Creek Interceptor to the COA’s Jordan Creek Trunkline and then to the KIWWTP. The CWSA does not utilize any section of the Western Lehigh Interceptor or any other facilities owned by others that service the western portion of Lehigh County.

b. Collection System Details

- Service Area: 25 Square miles
- Customers Served in primary community: 13,850
- System Inventory owned by Coplay-Whitehall Sewer Authority, below:

<table>
<thead>
<tr>
<th>Miles of gravity sewer</th>
<th>Miles of force main</th>
<th>Number of pump stations</th>
<th>Number of siphons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>124.8</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

- Wastewater Flow Characteristics in MGD

<table>
<thead>
<tr>
<th>Annual Average Daily System Flow</th>
<th>Average Daily Dry Weather Flow</th>
<th>Peak Wet Weather Flow</th>
<th>Treatment Plant Allocation (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 MGD</td>
<td>1.8 MGD</td>
<td>3.2 MGD</td>
<td>Average: 3.76</td>
</tr>
</tbody>
</table>
c. **Age Distribution of Collection System**

Coplay-Whitehall Sewer Authority conducts an ongoing program to assess the structural condition and maintenance needs of the collection system as a part of our Cleaning, CCTV Inspection and Assessment program (NASSCO) and our capital planning. The oldest portions of the system date to the 1960’s.

d. **Length of Pipe by Diameter (Mains)**

<table>
<thead>
<tr>
<th>Pipe Diameter (inches)</th>
<th>Pipe Length (Feet)</th>
<th>Pipe Length (Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>345</td>
<td>0.065</td>
</tr>
<tr>
<td>8</td>
<td>551,105</td>
<td>104.376</td>
</tr>
<tr>
<td>10</td>
<td>18,610</td>
<td>3.525</td>
</tr>
<tr>
<td>12</td>
<td>7,925</td>
<td>1.501</td>
</tr>
<tr>
<td>15</td>
<td>3,113</td>
<td>0.590</td>
</tr>
<tr>
<td>16</td>
<td>4,938</td>
<td>0.935</td>
</tr>
<tr>
<td>18</td>
<td>31,974</td>
<td>6.056</td>
</tr>
<tr>
<td>20</td>
<td>4,388</td>
<td>0.831</td>
</tr>
<tr>
<td>24</td>
<td>8,695</td>
<td>1.647</td>
</tr>
<tr>
<td>27</td>
<td>9,415</td>
<td>1.783</td>
</tr>
<tr>
<td>30</td>
<td>14,353</td>
<td>2.718</td>
</tr>
<tr>
<td>36</td>
<td>4,082</td>
<td>0.773</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>658,943</strong></td>
<td><strong>124.800</strong></td>
</tr>
</tbody>
</table>

e. **Sanitary Sewer Overflow History**

The Authority has not experienced any sanitary sewer overflows (SSOs) caused by lack of pipe capacity in the last 5 years. The following table describes the overflow dates, locations, quantities and causes of any such SSOs.
Table 2: Sanitary Sewer Overflow History - **NONE**

<table>
<thead>
<tr>
<th>SSO date</th>
<th>Location</th>
<th>Volume released</th>
<th>Cause of release</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To assure sewer capacity the Authority has developed programs to address capacity, inflow/infiltration, and the condition of our collection system.

**f. System Map**

A current version of the Authority’s sewage collection system map is attached to this plan. The map is updated on an as-needed basis to reflect revisions, additions and upgrades to the sewage collection system.
3. CLEANING, INSPECTION AND ASSESSMENT PROGRAM

The Coplay-Whitehall Sewer Authority has consistently used a preventive maintenance plan (PMP) since the 1980’s. This includes a Cleaning, Inspection, and Assessment program to determine the maintenance needs and structural condition of the entire collection system. The goal of this program is to completely televise the entire system within a 5 to 6 year period. Once the entire system has been televised, we then start from the beginning and re-inspect the system in a round robin 5-6 year cycle.

The Authority’s cleaning, inspection and assessment program focuses on the known problem areas. The entire collection system is broken down into sub-basins that align with the original construction contracts for each portion of the system. All data is recorded by drainage basin. The results from the cleaning, inspection and assessment program are used to categorize the cleaning frequency and the repair or replacement needs for each component. Critical infrastructure components will also be identified and assessed. Previous knowledge of the condition of the sewer system has also been used to establish more frequent cleaning schedules for identified problem areas.

The cleaning, inspection and assessment efforts are performed by the Authority staff. All data is entered into the GIS system.

As previously mentioned, all work is performed on a drainage area basis, with the goal of completing the cleaning and inspection of approximately 15 to 20% of the entire collection system each year, such that 100% of the system is televised after a 5 to 6 year period. The drainage basins are each metered and labeled for the purpose of recording the data. All sub-basins are eventually tied to either of the Authority’s two major drainage basins:

- Jordan Creek Interceptor Basin
- Lehigh River Interceptor Basin

The cleaning, inspection and assessment program includes: sewer cleaning, CCTV inspection of piping, visual inspection and classification of the manhole structures and their flow channels, and an evaluation of the condition of the pipes and manholes. Results from the assessment program are used to categorize the cleaning and inspection frequencies for both the sub-areas and problem pipe-sections.

The cleaning and CCTV schedules are closely coordinated. As the Authority’s goal is to have a complete cleaning, inspection and system assessment every 5 years, approximately 20 percent of the system is reviewed by CCTV each year. Approximately 20 percent of the system is cleaned annually: the cleaning performed each year includes the priority cleaning plus the remaining parts of the collection system, factoring in the intermediate and long term interval cleaning schedules. All of the system cleaning is for gravity lines.

Information from cleaning and inspections (see Inspection section, below), including any findings, is entered into an EXCEL database, and incorporated into the maintenance software for scheduled maintenance and capital improvement. This information is also used to update this long term Preventive Maintenance Plan (PMP). Televised and cleaned lines are also recorded in the GIS system.
a. Cleaning

Our primary sewer maintenance activity is sewer line cleaning.

The cleaning of sewer lines, manholes and other appurtenances is categorized as: priority (annual or more frequent cleaning); intermediate (2-5 year interval); or long term (6 or more year interval).

Areas of the system with higher concentrations of restaurants are typically targeted for priority cleanings. Other priority areas include known structural defect areas, such as sagged lines or lines with minimal slope.

All cleaning records are kept in a spreadsheet that tracks the following:

- date, time and location of cleaning activity;
- specific lines cleaned;
- equipment used;
- identity of cleaning crew;
- number of passes needed to clean the line;
- presence of root, grease, or debris; and
- problems identified or other follow up actions necessary.

Each line segment cleaned is identified by an upstream and downstream manhole number. A log is submitted for each day of work completed. Support from outside contractors is also occasionally used for cleaning and repairs, and for emergencies during non-business hours.

Manhole deficiencies are also noted in cleaning logs. Information about manholes requiring attention is provided to the Operations Manager and either a repair work order is issued or it is added to the capital repair schedule.

b. Pipe and Manhole Inspection

Planned manhole and pipe inspections are coordinated with the cleaning program and generally follow the cleaning schedule. Coplay-Whitehall Sewer Authority uses television inspections to document:

- the structural condition of the pipe
- root intrusion
- grease
- protruding taps
- evidence of inflow and infiltration (I/I) or surcharging
- manhole pave-overs, and
- other deficiencies that factor into condition assessment

Planned video inspections are generally scheduled to follow the planned cleaning schedule. However, in the event of a blockage, a video inspection assesses the cause of the blockage.
All newly constructed sewer lines are required to be cleaned and CCTV inspected by the contractor or developer to verify as-built drawings and ensure the line has no construction defects. Additionally, all new pipes and manholes are required to be pressure tested to ensure tightness and prevent release of sewer odors and future infiltration of storm water. This inspection and testing process must be completed before the Authority will accept the infrastructure from the developer.

Manhole inspections help keep the asset inventory up to date and are used not only to update collection system maps, but to determine structural condition. During manhole inspections, field crews take a complete inventory of each manhole including construction materials, ring size, depth to invert, flow conditions and evidence of problems.

Manhole inspection results are reviewed for condition rating. Those needing repair are placed on a priority schedule, and routine repairs are coordinated with re-paving work when possible. When repairs are recommended, as described below, work orders are created.

Authority staff are responsible for completing minor structural repairs to manholes when needed. Repairs include invert work, frame and cover grade adjustment, and frame and cover replacement. More comprehensive repairs, such as complete relining of the manhole structure, are performed by outside contractors.

c. Assessment

Pipe condition information is used to determine short and long term maintenance strategies including increased cleaning, root treatment, sewer line repair, or replacement. The condition assessment is used to establish cleaning frequency and inform the Authority’s capital planning. As more condition assessment information becomes available, the priority of capital projects may change. Sewer line repair or replacement projects are also coordinated with re-paving schedules.

All Authority staff are NASSCO certified to perform CCTV inspections and provide a condition rating assessment.

Condition assessments document the following details and deficiencies:

1. Characteristics including pipe diameter, and age and type of material
2. Dips in line
3. Grease build-up
4. Root intrusion
5. Sediment accumulation and encrustation
6. Structural condition, including cracks, corrosion and erosion
7. Joint alignment and movement
8. Reverse slope
9. Obstructions
10. Deformations in line
## Condition Rating

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Condition Description</th>
<th>Maintenance Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>New</td>
<td>Normal</td>
</tr>
<tr>
<td>1</td>
<td>Excellent Condition</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>Minor Defects Only</td>
<td>Minor</td>
</tr>
<tr>
<td>3</td>
<td>Backlog Maintenance</td>
<td>Significant</td>
</tr>
<tr>
<td>4</td>
<td>Requires Major Renewal</td>
<td>Renew</td>
</tr>
<tr>
<td>5</td>
<td>Almost Unserviceable</td>
<td>Replace</td>
</tr>
</tbody>
</table>

### d. Staffing and Equipment

Coplay-Whitehall Sewer Authority has multiple staff trained for cleaning, inspection and assessment of sanitary sewers, and they are deployed in two-person crews for year-round cleaning and inspection activities. Inspection work is coordinated with appropriate Municipal officials if traffic control will be needed.

Crews are assigned a specific area of the collection system with an associated map and are responsible for cleaning all lines (or, in the case of preliminary evaluation, determining if cleaning is needed) within the assigned area within the specified time frame. Crews receive training on use of equipment and how to address problems that might be encountered while cleaning the collection system (roots, fats, oils and grease, and protruding laterals), including when to call in outside contract services.

Crews report back on a daily basis on progress and problems including any inconsistencies between the map and the actual sewer lines which are noted and submitted with their log for entry into the database and correction of mapping or location errors. As the crews perform cleaning and evaluation, the long term cleaning schedule for the entire sub-area is reviewed to determine if any lines designated for long term cleaning need to be cleaned before the crew moves to a new area.

Cleaning crews perform manhole inspections during cleaning and approximately 15% of manholes are inspected in the average year.

The following equipment is available for cleaning:

- High pressure jet nozzle for light cleaning
- High pressure jet nozzle for heavy cleaning
- Root saw
- Degreaser
4. **GRAVITY LINE PREVENTIVE MAINTENANCE**

a. **Fats, Oils and Grease (FOG)**

The discharge of fats, oils and grease (FOG) is regulated through our High Strength Waste program. The High Strength Waste Ordinance sets specific limits on the strength of sewage that can be discharged to the collection system, and establishes penalties for those customers that are out of compliance with the requirements.

The Authority works in concert with a testing consultant to collect wastewater samples from commercial and industrial customers. Protocols have been established for following up with customers that exceed the discharge limits. In the case of FOG, establishments that serve food are required to comply with International Plumbing Code requirements for the use of grease traps or grease interceptors to prevent grease from entering the collection system.

b. **Root Control**

Coplay-Whitehall Sewer Authority currently uses mechanical root removal for sewer lines with chronic root problems. Root saw attachments are standard equipment on cleaning trucks. When a crew encounters roots during routine cleaning, a hydraulic saw is attached to the jetter and used to cut and remove the roots. The severity of the problem is recorded on the daily log, and if necessary, the pipe section is placed on the list for priority cleaning. Root control is also a major part of easement maintenance.

c. **Service Laterals**

The Authority maintains service laterals from the property line to the sewer main (portions in the public right-of-way); the service lateral from the building to the property line is the owner’s responsibility. The Authority will repair laterals that are located in the public right-of-way when responding to service complaints. If a complaint is received and the field crew determines that the problem is limited to the section of the lateral between the property line and the main, the “lower” lateral will be rodded out if needed (at no cost to the customer) if a cleanout is available at the property line. The Authority also televises this portion of the lateral if needed.

If service lateral problems are found to be the result of blockage or a collapse in the portion of the lateral under the property owner’s responsibility, the property owner is responsible for the repair.

d. **Grease Control Program**

The CWSA has implemented a grease control program to address areas of the system that are subject to grease accumulations. Known areas are targeted for more frequent cleaning and include pipe sags and pipes with flat slopes.
e. Television Inspection

Television inspection is the backbone of the PMP to identify system defects and anomalies. Coplay-Whitehall Sewer Authority uses television inspections to document:

- the structural condition of the pipe
- root intrusion
- grease
- protruding taps
- evidence of inflow and infiltration (I/I) or surcharging
- manhole pave-overs, and
- other deficiencies that factor into condition assessment

Planned video inspections are generally scheduled to follow the planned cleaning schedule. However, in the event of a blockage, a video inspection assesses the cause of the blockage.
5. EASEMENTS and PAVING: MAINTENANCE AND ACCESS

a. Maintenance of Right of Way and Easements

Easements are important to operate and maintain the collection system. The Authority’s goal is that all easements remain clear of any fences, buildings, gardens, trees, shrubs and extensive landscaping, to allow equipment access for maintenance of the collection system. The Authority is not liable to repair or replace any such items that are removed in the process of completing repairs or maintenance on the collection system. Crews are, however, instructed to work with the property owner whenever possible.

Maintenance of easements is accomplished in various ways. Easements on privately-owned parcels are often maintained by the owner. The Authority patrols all of its easements at least annually to ensure that they are clear and accessible. Additionally, the Authority utilizes its farm tractor with PTO and Brush Hog Rotary Cutter to cut all cross-country easements five to six times per year to maintain access.

b. Street Paving Coordination

The Authority works closely with Whitehall Township, the Borough of Coplay, and the PA Department of Transportation to be fully aware of street reconstruction schedules that could be affected by sanitary sewer repair projects. If the Authority determines that a sewer line or manhole must be repaired, it will contact the appropriate regulatory agency to obtain a street opening permit and pay the appropriate fees. If extensive sewer main construction is required (that is not an emergency), the Authority will include the project in its long-term capital program so that engineering and planning for the project can be performed.

As sewer lines are inspected and assessed under the Cleaning, Inspection and Assessment program, repairs are scheduled in conjunction with street repaving schedule whenever possible. Sometimes work is performed on a priority basis so that repairs are completed on the highest priority street, working in coordination with the paving schedule of the host municipality.
6. PUMP STATION/FORCE MAIN MAINTENANCE

CWSA owns and operates one wastewater pumping station – the Eberhart Road Pumping Station. The collection system also includes a few residential grinder pumps that service homes in various locations throughout the CWSA service area. These grinder pumps are owned by the customer and are not the responsibility of the CWSA for operation and maintenance. The pump station owned and operated by CWSA are routinely checked by trained personnel.

The performance of the CWSA pump station is monitored through daily inspections. During these inspections, a utility technician reviews pump run hours, totalized flow, wet well levels and alarms. The back-up generator is exercised weekly. On an annual schedule, or more frequently if needed, a contractor calibrates the flow meter, cleans the wet well, removes grease build up, and calibrates the floats, and performs other maintenance functions as needed.

Inspection, maintenance and repairs are recorded in log sheets. If a problem or maintenance issue is encountered, personnel must also report it directly to the Operations Manager for resolution. Repairs are a higher priority than routine maintenance.

CWSA has a remote alarm system for the pumping station. It remotely monitors pump station operations, and sends alarms to the on-call staff and Managers in the event of a malfunction or emergency. The following information can be monitored:

- Number of pumps in operation
- Status of pumps (including operational alarms)
- Power status (including power failure alarms)
- Personnel status (entry / exit alarms)

Manufacturer’s Operation and Maintenance (O&M) manuals for equipment are located in the offices of the Authority.

Pump rebuilding, motor rewinds, and HVAC repairs for the pump stations are contracted to outside vendors. Repairs to motor control centers, flow meters, remote monitoring equipment, valves, and macerators are typically repaired by authorized manufacturer vendors or outside contractors. In general, any replacement parts that are difficult to acquire are kept in stock on site. Other parts are obtained from local vendors or the manufacturer’s service center (See Spare Parts Inventory).

The Authority maintains one spare pump motor and one complete comminutor unit on site at the pumping station.

Whether repairs are made by local vendors or by Authority staff, all repairs are recorded and tracked.

a. Mechanical and Electrical Maintenance

The size of the pump station and its related equipment determine its specific mechanical and electrical maintenance needs. The Operations Manager is responsible for planning the routine maintenance of each pump located within the pump station. The Operations Manager uses manufacturers’ Operation and Maintenance manuals to establish action items for pump station
A general description of weekly and bi-annual maintenance performed on pump stations is listed as follows:

<table>
<thead>
<tr>
<th>Mechanical Maintenance/Inspections</th>
<th>Electrical Maintenance/Inspections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daily</strong></td>
<td></td>
</tr>
<tr>
<td>Review pump run hours</td>
<td>Ensure all breakers are on</td>
</tr>
<tr>
<td>Review totalized flow</td>
<td>Ensure that all switches and controls are in the correct position</td>
</tr>
<tr>
<td>Check wet well levels, check for debris, turbulence or unusual noise</td>
<td></td>
</tr>
<tr>
<td>Check alarms</td>
<td></td>
</tr>
<tr>
<td>Ensure that all switches, controls and valves are in the correct position</td>
<td></td>
</tr>
<tr>
<td>Pick up litter, general housekeeping</td>
<td></td>
</tr>
<tr>
<td>Record findings in log book</td>
<td></td>
</tr>
<tr>
<td><strong>Weekly</strong></td>
<td></td>
</tr>
<tr>
<td>Log pump hours</td>
<td>Check chart recorder</td>
</tr>
<tr>
<td>Check hydraulic levels</td>
<td>Check Motor Control Centers (MCC)</td>
</tr>
<tr>
<td>Operate each pump</td>
<td>Check level controllers</td>
</tr>
<tr>
<td>Check drive belt</td>
<td>Check electrical service feed</td>
</tr>
<tr>
<td>Check bearings and packing</td>
<td>Check remote monitoring equipment</td>
</tr>
<tr>
<td>Check for pump vibrations, unusual noise, and excessive heat</td>
<td>Check indicator and alarm lamps</td>
</tr>
<tr>
<td>Check pump and pump base connections</td>
<td>Check general electrical items (lighting, etc.)</td>
</tr>
<tr>
<td>Check chart recorder for routine pump performance</td>
<td>Check and release intrusion alarm</td>
</tr>
<tr>
<td>Check valve operations and signs of leakage</td>
<td></td>
</tr>
<tr>
<td>Lube and grease equipment (as required by manufacturer)</td>
<td></td>
</tr>
<tr>
<td>Check, clean and maintain property</td>
<td></td>
</tr>
<tr>
<td>Exercise Generator (done automatically)</td>
<td></td>
</tr>
<tr>
<td><strong>Monthly</strong></td>
<td>Check backup generator</td>
</tr>
<tr>
<td></td>
<td>Exercise under load</td>
</tr>
<tr>
<td>Semi-Annual</td>
<td>Annual</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Replace hydraulic fluids and oils (as required by manufacturer)</td>
<td>Inspect internal Motor Control Center components</td>
</tr>
<tr>
<td>Inspect pumps (oil levels, seals, packing, bearings, etc.)</td>
<td>Check insulation resistance</td>
</tr>
<tr>
<td>Replace packing</td>
<td>Inspect &amp; grease electrical contacts</td>
</tr>
<tr>
<td>Inspect pump impellers and clearances</td>
<td>Inspect electrical pump cables</td>
</tr>
<tr>
<td>Inspect discharge piping</td>
<td>Inspect electrical breakers</td>
</tr>
<tr>
<td>Check outflow pressure</td>
<td>Perform amperage readings on equipment</td>
</tr>
<tr>
<td>Calibrate gauges (including pressure gauges used in monitoring)</td>
<td>Check MCC for proper operations</td>
</tr>
<tr>
<td>Check for corrosion problems</td>
<td>Check Generator:</td>
</tr>
<tr>
<td>Exercise check valves</td>
<td>oil level</td>
</tr>
<tr>
<td>Check air release valves</td>
<td>water level</td>
</tr>
<tr>
<td>Check floats/bubbler system (clean and/or replace)</td>
<td>inspect hoses and belts</td>
</tr>
<tr>
<td>Inspect building and grounds</td>
<td>check piping for leaks</td>
</tr>
<tr>
<td>Check operation of building heat and fans</td>
<td>check battery condition</td>
</tr>
<tr>
<td>Inspect HVAC equipment</td>
<td></td>
</tr>
<tr>
<td>Check building security</td>
<td></td>
</tr>
</tbody>
</table>

Capacity and discharge head in the pump stations are reviewed annually, following confirmation that the pumps are in good working order. Changes in capacity and discharge head are evaluated to determine whether cleaning of the force main is warranted.

All mechanical and electrical maintenance activities are recorded on a log sheet at the station. Any problems or maintenance issues noted by crews are reported to the Operations Manager for resolution.
b. Force Main Maintenance

CWSA currently has three (3) force mains in the collection system – one force main for each of the three (3) pumps in the Eberhart pump station. The three force mains are each approximately 1,500 feet long and were designed and constructed with a uniform positive slope to the junction box discharge point, and therefore air release valves were not warranted.

The pressure on the discharge side of the pump is used to determine the need for force main cleaning. If the backpressure is more than 25% greater than the expected total operating head, the discharge pipe will be cleaned. Pressure gauges are inspected during routine maintenance inspections.

c. Private Pump Stations

The CWSA has no responsibility for any privately owned pumping stations, whether they are commercial or residential.

d. Corrosion control

The dissolved oxygen content of the wastewater is often depleted in the wetwell of the pumping station. This wastewater passing through the force main not only lacks oxygen, but often contains sulfides. These sulfides can lead to corrosion. Frequent turn-over of the wet well at the Eberhart Road pumping station prevents the formation of H2S in the force main.
7. GENERAL EQUIPMENT AND TOOL SUMMARY

a. Essential Day-to-Day Items

The Authority provides operations and maintenance crews with the essential work related items they use on a day-to-day routine basis. Should new or replacement equipment or tools be needed, the Field Foreman is authorized to obtain replacements as needed. For non-stocked items, the Operations Manager will request a purchase order for the needed item(s). The Field Foreman will then procure the requested items through the local vendor in an “in-stock” format.

b. Spare Equipment and Tools

The Authority maintains a reasonable supply of spare equipment and tools for personnel.

A generalized inventory of the equipment and tools used by the Authority to maintain the wastewater collection system is provided. A list of supplies and essential spare parts necessary to be kept on site for normal and emergency use is included. Specialized attachments are often used with these tools to perform specialized maintenance tasks.

<table>
<thead>
<tr>
<th>Description</th>
<th>Use</th>
<th>Typical Useful Life, yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Tractor</td>
<td>Easement Clearing</td>
<td>15</td>
</tr>
<tr>
<td>Flushing Truck (Jetter)</td>
<td>Sewer flushing</td>
<td>10</td>
</tr>
<tr>
<td>Service Trucks</td>
<td>Transportation</td>
<td>10</td>
</tr>
<tr>
<td>Service Truck (Stand-by)</td>
<td>Transportation</td>
<td>10</td>
</tr>
<tr>
<td>Compactor/Rammer</td>
<td>Sewer trench compaction</td>
<td>10</td>
</tr>
<tr>
<td>Gas Generator</td>
<td>Portable power for hand tools and lighting</td>
<td>10</td>
</tr>
<tr>
<td>Natural Gas Generator</td>
<td>Pump Station Emergency Generator</td>
<td>15</td>
</tr>
<tr>
<td>Root Cutters</td>
<td>Sewer pipe cleaning</td>
<td>10</td>
</tr>
<tr>
<td>CCTV Video Camera</td>
<td>Televising sewer laterals and mains</td>
<td>10</td>
</tr>
<tr>
<td>Centrifugal Pump</td>
<td>Sewer bypass pump</td>
<td>10</td>
</tr>
<tr>
<td>Gas Detection Monitor</td>
<td>Confined space entry</td>
<td>5</td>
</tr>
<tr>
<td>Safety Tripod</td>
<td>Confined space entry</td>
<td>20</td>
</tr>
<tr>
<td>Pump Motor</td>
<td>Pump Station</td>
<td>20</td>
</tr>
<tr>
<td>Comminutor</td>
<td>Pump Station</td>
<td>10</td>
</tr>
</tbody>
</table>
8. CAPACITY MANAGEMENT

a. Sewer Capacity Certification/ Connection Policy

The Sewer Capacity Certification is a process where any new development requiring the connection of its sanitary sewer service to the Authority’s sewer system is reviewed to determine whether adequate sewer system capacity exists to convey the new wastewater flow from the proposed development to the City of Allentown’s wastewater treatment facility. A capacity certification analysis is required for all developments, or any existing customer that requires an increase in its sewer allocation. The certification process also assigns the development capacity within the Authority’s current treatment allocation within its Agreement with the City of Allentown.

This process aligns with the processing of Sewage Facilities Planning Modules with the PA Department of Environmental Protection.
9. RESOURCES AND BUDGET

a. Budget Process

The budget is a part of the Authority’s overall budget cycle. Specific items related to the operation of the sewage collection system are identified under separate categories within the budget. Authority staff works with the Finance Committee to present a budget to the complete Authority Board for approval. For the Collection System operations and maintenance budget, the process begins with last year’s numbers and projected needs for the next budget year. The Authority maintains a multi-year budget process to manage anticipated expenses.

b. Rate Review

The current sewer rate structure is based on metered water usage. Customers are billed quarterly for wastewater services based on 100% of the metered water use. In addition to flow charges, customers are also assessed a base charge to recover fixed costs. Rates are examined and adjusted as needed based on anticipated O & M and Capital expense for the sewer system.

c. Operating and Maintenance Expense

Operating and maintenance expenses include:

- Employee salary and compensation
- Operating supplies
- Utilities
- Repair and maintenance
- Professional services
- Routine capital outlay
- Debt service expenses for repair and replacement

Professional Services includes planning and engineering studies for replacement projects and daily operations.

Contractor Services includes contractual work for cleaning sewer lines and manholes, CCTV, and improvements to the collection system map.

Routine Capital Outlay includes items that are considered capital assets and are purchased from annual operating revenue rather than through bonds or the capital reserve fund. Items such as vehicles, specialized maintenance equipment, pumps, motors, office equipment and other smaller items.

Debt service is the annual principle and interest payments for bonds, loans and other fiduciary instruments owed by. The debt service supports capital improvement projects.

d. Capital Improvement Program Overview

The Authority has prepared a 5-Year Capital Improvements Plan to address the implementation of projects that are essential to the long-term successful operation of the sanitary sewer system. The 5-year Plan addresses the following types of projects:
• Excavation repairs to replace defective pipe segments
• Trenchless repair of isolated pipe defects
• Lining of existing sanitary sewers
• Replacement of sanitary sewers and sewer laterals
• Manhole rehabilitation
• Continuous sewer televising and cleaning
• Updates and improvements to flow measurement facilities

The 5 year budget is intended to be a fluid document that can be adjusted as necessary to meet the Authority’s needs. The plan will be reexamined each year and projects will be added, adjusted, or revised as necessary as work is completed and new work is identified.
10. SEWER SYSTEM PREVENTIVE MAINTENANCE PLAN UPDATES

a. Plan Update Process

Coplay-Whitehall Sewer Authority will complete reviews of its Preventive Maintenance program annually. This will be done in conjunction with the preparation of its annual “Chapter 94 Report” that is prepared for review by the Department of Environmental Protection. The review will consider the progress that has been made in implementing its Preventive Maintenance Program, the results of monitoring programs, and will incorporate updates to this Plan including:

- Changes to organizational structure, information management, contacts, and system maps,
- Changes to information on the collection system, such as the size and age of pipes, to incorporate information on repairs completed during the year,
- Incorporation of successful cleaning, inspection and assessment program improvements during the past year,
- Changes to the Sewer Use Rules and Regulations
- Budget and Capital Planning updates

b. Monitoring, Measurement, and Program Modifications for Infiltration and Inflow Source Reduction

The Authority will maintain records of key information to continually assess improvements to the collection system.

The information will measure the effectiveness of the Maintenance program by tracking various parameters related to service calls and maintenance and inspection activities. Comparison of trends from previous years and identifying system defects are key components. Tracking the following parameters will measure the effectiveness of the Plan and its effectiveness in reducing Inflow and Infiltration:

- Number and cause of SSOs per year
- Length of gravity sewers cleaned annually
- Home clear water inspections
- Manhole Inflow Prevention Inserts Installation
- Manhole and manhole chimney rehabilitation
- Actual versus scheduled cleaning dates for gravity sewers
- Length of gravity sewers CCTV inspected annually
- Percent of system rehabilitated (repaired or upgraded) each year
- Improvements in capacity due to reductions in I/I
- Safety history/incidents
- Continuous tracking of average and peak flows within each metered drainage basin to determine the effectiveness of repair and maintenance activities.
The Authority has been implementing an aggressive maintenance and capital improvements plan for over 30 years. These programs are well into their maturity stage, as the Authority has replaced or updated a number of its major system components within the last 20 years as identified below:

1. Jordan Creek Interceptor Replacement Project .......................................................... Final Completion 2009
2. Collection System Repairs ......................................................................................... Final Completion 2011
3. RT-22 Crossing ............................................................................................................ Final Completion 2012
4. Coplay Creek Interceptor Replacement ...................................................................... Final Completion 2013
5. Lehigh River Interceptor Relocation – LSB ................................................................. Final Completion 2013
6. Ruch Street Replacement ............................................................................................ Final Completion 2013
7. SR 22 Section 400 Replacement .................................................................................. Final Completion 06-30-2015
8. Lehigh Meter Station & Pipe Replacement .................................................................. Final Completion 11-11-2016
9. Front Street Coplay Replacement ................................................................................ Substantial Completion 11-11-2017
10. Front Street Coplay Improvements ............................................................................ Work in process

Since 2008 the Authority has spent close to 15 million dollars on upgrades, replacements, and improvements to its wastewater collection system.

Following the completion of its Capital Program between 2008 and 2013, the CWSA performed an analysis to determine the effectiveness of the completed work. The following results were obtained:

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>PRE CONSTRUCTION (2009)</th>
<th>POST CONSTRUCTION (2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow to Allentown</td>
<td>2.037 MGD</td>
<td>1.927 MGD</td>
</tr>
<tr>
<td>Connections</td>
<td>13,470</td>
<td>13,735</td>
</tr>
<tr>
<td>Flow per EDU</td>
<td>146 gpd</td>
<td>136 gpd</td>
</tr>
<tr>
<td>Average daily flow reduction</td>
<td></td>
<td>110,000 gpd</td>
</tr>
<tr>
<td>Peak Flow Reduction</td>
<td></td>
<td>789,000 gpd*</td>
</tr>
</tbody>
</table>

* Variable depending on type and intensity of precipitation.

These results demonstrate the effectiveness of the Authority’s previous efforts, and more importantly show that maintenance of the programs in place will continue to yield similar, if not better results.

The CWSA will continue to implement its 5-year television inspection/cleaning program over its entire collection system and implement repair and replacement projects as system defects are identified. Continuous monitoring of Lehigh River and Jordan Creek Interceptor basins will show the CWSA the effectiveness of all work performed via the monitoring of peak flows, total daily flows, and precipitation.