Section 4.0: Operation and Maintenance Program

4.1 Regulatory Requirements

The SSMP must include those elements listed below that are appropriate and applicable to the Enrollee's system:

a. Maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable stormwater conveyance facilities.

b. Describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system to document scheduled and conducted activities, such as work orders.

c. Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan.

4.1.a. Maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable stormwater conveyance facilities.

A comprehensive set of construction plan showing all the features of the TSD sanitary sewer system is kept at the Main office and maintenance facilities. These plans have been converted into Geographic Information System (GIS) electronic maps and are used for locating gravity lines, variable grade lines, force main lines, manholes, lift stations, and other features of the TSDs sanitary sewer system. These GIS maps are used for system management, work prioritization, and making management decisions. The GIS maps include shapefiles with jurisdictional boundaries, county assessor parcel information, roadways, water bodies, rivers, streams, and all pertinent information associated with that shapefile. The GIS shapefiles have information associated with them, (i.e., line number, size, type, material, slope, manhole number, line length, manhole depth, etc…), and other information related to the specific shapefile. These maps are updated as needed for

revisions, addition of new developments, and rehabilitated sewers. Map books have been developed to assist management in the scheduling and reporting of sanitary sewer line cleaning and video inspections, as well as identifying problem areas.

The construction plans have been scanned into PDF format and copied onto the VRSD Computer Server for remote access. The scanned as-built maps can be linked with the GIS maps at a later date.

4.1.b. Describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system to document scheduled and conducted activities, such as work orders.

The TSD PM program consists of line cleaning, video and visual inspection, lift station maintenance, and manhole rehabilitation.

The line cleaning activities include high pressure water cleaning, root sawing, and root control. A vacuum truck is utilized during these operations to collect debris generated during the cleaning process.

Inspections are conducted during the line cleaning, video and visual inspections by TSD personnel during routine operations and maintenance activities while visiting TSD facilities. Inspection observations are reported through inspection logs, e-mail correspondences, and through verbal communications with the Managers, Supervisors, or TSD Engineer. The observations are entered into the software database management system for scheduling for either short or long term rehabilitation activities.

Lift station maintenance is conducted weekly for visual observations and operational functionality. Monthly maintenance includes a safety inspection and startup of backup generators while under load. Quarterly maintenance includes mechanical and electrical safety inspections, air and generator filter replacements, pump, compressor, and generator operation verification.

The manhole rehabilitation process involves the control of infiltration and inflow (I&I) and control of sulfide attack. I&I control consists of injection of hydrophobic urethane grout to restrict any water from entering the manhole. Restoration starts with a high pressure washing to remove loose cement and impurities from the surfaces. A plywood floor is places over the channel to catch debris generated during this operation. Repairs to pipe joints, damaged areas, and cracks are made through a grout injection process. Next a layer of mortar is then applied over the cleaned surfaces by spin casting or hand troweling. Finally, a thick layer of fiber reinforced epoxy is sprayed or troweled to the surfaces.

The TSD PM scheduling has been conducted through two software database management systems, Operator Assisted Sewer Information System (OASIS) and JOB Cal. VRSD has recently purchased a new software database management system, SEMS, which will be replacing the existing OASIS and JOB Cal software. These PM software programs document all activities including preventive, proactive, predictive, scheduled, and corrective maintenance; maintenance engineering; and quality controls. Work orders are generated, tracked, and observations and activities are logged back into these software systems.

The OASIS/SEMS Collection System Software assists managers and supervisors in the scheduling of regular maintenance and cleaning activities, monitor's the frequency of sewer cleaning, inspections, and maintenance of associated equipment. Tasks and their frequency are determined based on operation and maintenance experience, past performance, manufacturer's recommendations and site-specific conditions. Scheduled and completed tasks are catalogued and tracked by work orders generated through the OASIS/SEMS PM Program.

The TSD lift stations, facilities, and equipment scheduling is conducted through the JOB Cal/SEMS software program. This software assists management and supervisors in the tracking and scheduling of the mechanical and electrical systems associated with these facilities and equipment.

Maintenance Plan Map books define the Wastewater Collection Network with vicinity, flow direction, and detailed maintenance maps identifying lift stations, chimneys, manholes, lines to be cleaned, other lines, force mains, parcel boundaries along with cleaning order numbering from the OASIS/SEMS management database. An OASIS/SEMS PM Schedule Report sheet is included which is filled out by the operators to rate the wastewater collection system. Structural identification numbers, address/location, line length, size, and type are identified along with pertinent information including the PM type, the last conducted PM, and the next due PM dates. Structural, debris, grease, roots, infiltration and inflow, vermin, and surcharge conditions are rated with 1 being sever, 2 moderate, 3 ok, and 4 not rated.

Closed Caption Television (CCTV) Line Inspection Map Books assist the managers and supervisors in the scheduling of sewer line inspections. WinCan video collection software is used by the operators in the recording, inspection rating, and reporting of the Wastewater Collection System. WinCan v8 software and TSDs staff are certified by the National Association of Sewer Service Companies (NASSCO) for standardized pipe inspection coding protocols established through the Pipeline Assessment Certification Program (PACP). The line inspection activities and observations are documented utilizing the OASIS/SEMS management database.

Hot Spot Map Books have been developed to assist in the identification of problem areas in the TSD. An Overview Map identifies all problem areas in the TSD Wastewater Collection Network. The TSD is divided into Regions with detailed information including hotspot designations, hotspot gravity, gravity, force main, and

variable grade sewer lines on project maps. Each hotspot has a separate Action Sheet with hotspot name, region, hotspot since date, cleaning interval and problem identified. Field data include possible causes, action required, recommended cleaning interval, and recommended line sections requiring additional cleaning associated with the hotspot. Each hotspot line segment has it own Hotspot Action Sheet to record pertinent information associated with that line. An OASIS/SEMS Schedule Report sheet is also included which is filled out by the operators to rate the wastewater collection system being identified as a Hotspot.

4.1.c. Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan.

The TSDs Rehabilitation and Replacement Plan are conducted through the OASIS/SEMS PM Program. As part of this Plan, structural deficiencies are identified and a necessary improvements list is developed and implemented systematically. The Rehabilitation and Replacement Plan implementation entails a variety of short- and long-term activities that ensure the sustainability of the sanitary sewer system infrastructure. The Maintenance, CCTV Line Inspection, and Hot Spot Map Books, described in section 4.1.b, have been developed to assist in the scheduling and reporting of required maintenance activities and video inspections.

Short Term

TSD staff currently performs CCTV inspections in support of operation and maintenance activities. Manhole inspections are conducted during line cleaning, TV inspections, and individually per NASSCO inspection specifications. An inspection log is filled out identifying any rehabilitation and replacement observations. The inspection log is entered into the OASIS/SEMS PM program, a corrective work order is generated, and reviewed by the supervisor, engineering, or environmental staff. Rehabilitation, replacement and/or repairs are conducted based on these reviews.

Follow-up CCTV inspections are conducted at overflow locations usually within 24 hours of overflow occurrence to identify any necessary repairs or any special maintenance needs.

Long Term

The life of the sanitary sewer infrastructure is being extended through the manhole rehabilitation program. This program accomplished several problematic issues associated with deteriorating infrastructures due to groundwater and rainwater infiltrations as well as chemical reactions in gravity and force main sewer systems.

In its PM program, the TSD conducts comprehensive and systematic inspections and assessments of all components of its sewer system. Inspections are used to identify problems requiring repair and prioritize needed improvement projects. A 10-year Capital Improvement Plan is used to identify facility improvements and costs based on the TSDs Engineers recommendations. A portion of the fee collected from system users is dedicated for long term Capital Improvements.

The TSD uses state-of-the-art CCTV equipment to inspect and assess the condition of secondary sewers. Sewer systems are cleaned and inspected based on the scheduling through the OASIS/SEMS database management system utilizing data collected on the OASIS/SEMS PM Schedule Report sheet in the Maintenance, Hot Spots, and CCTV Map Books. Currently, a complete CCTV inspection of the entire TSDs sewer system is scheduled to be completed every 9 years and line cleaning every 3 years.

References

Operator Assisted Sewer Information System (OASIS) Users Manual, Version 7, January 08, 2003

Triunfo Sanitation District Rules and Regulations for the Sewage Discharge System, June 26, 1995, Resolution No. T95-1.

Triunfo Sanitation District Rules and Regulations for the Sewage Collection System, April 24, 1989

Triunfo Sanitation District Sanitary Sewer Geographic Information System Database/Maps: CCTV Map Book; Hot Spot Map Book; Maintenance Map Book

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