

ROCKWOOD WATER, SEWER, AND GAS

2021 CMOM ANNUAL PROGRESS REPORT

NPDES PERMIT TN 0026158

Working for a
Cleaner Environment



ROCKWOOD
WATER, SEWER & GAS



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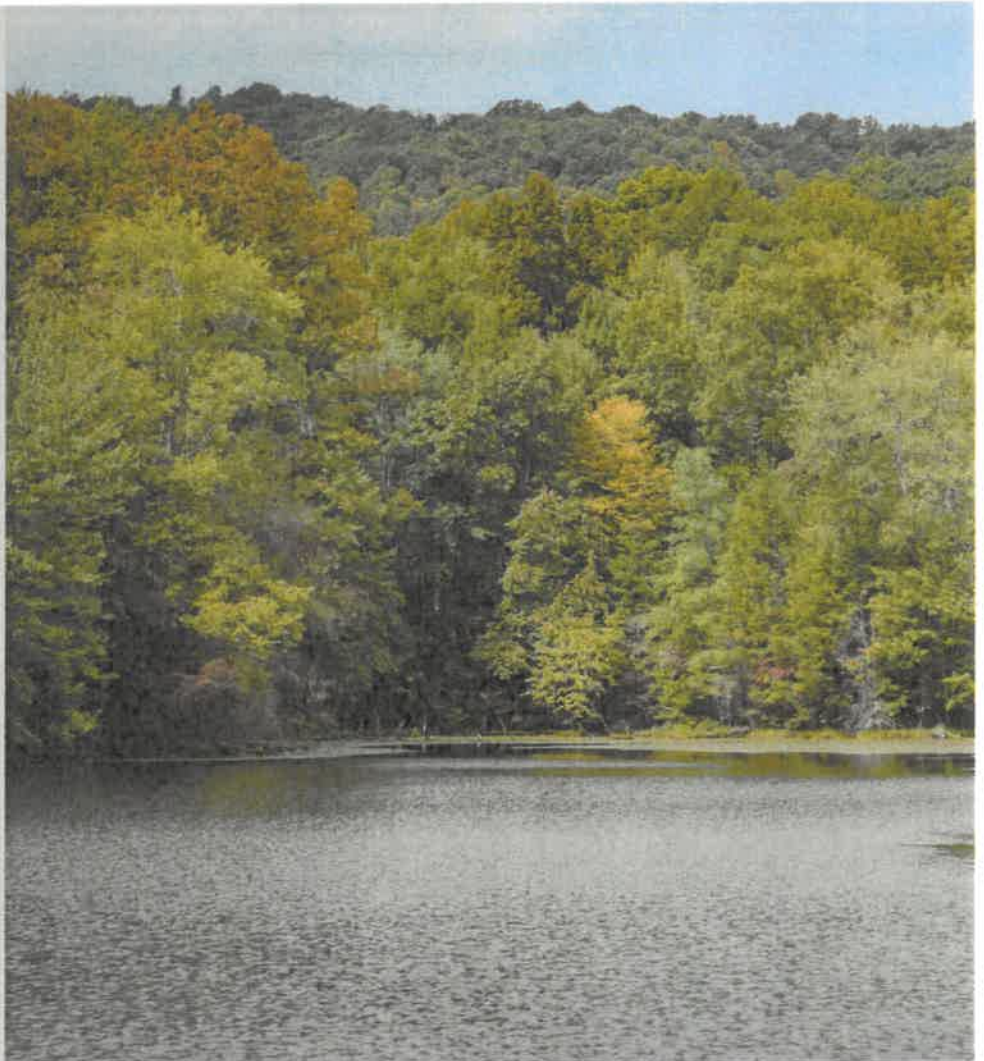


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INTRODUCTION

This Annual CMOM Report for 2021 (January 1, 2021, through December 31, 2021) provides a comprehensive review of the Capacity, Management, Operation, and Maintenance (CMOM) Programs of Rockwood Water, Sewer, and Gas (RWSG) in Rockwood, TN.

Currently, RWSG serves 1,824 customers in its approximately 4 square mile service area. The collection system consists of approximately 208,400 linear feet of sewer gravity main and approximately 600 manholes. The transmission system consists of 56,970 feet of sewer force main and eight pump stations.

In 2021 RWSG, treated 480.25 million gallons of wastewater with a daily average of 1.32 million gallons.

The yearly rainfall total for RWSG in 2021 was 56.6 inches compared to the annual average rainfall for the area is 58 inches per year.

CMOM OVERVIEW

Purpose of the CMOM Annual Report

RWSG has developed and implemented CMOM programs designed to enhance the operability of their wastewater system and in accordance with NPDES Permit No. 0026158. The Annual CMOM report fulfills the following objectives:

- 1) Provide an annual summary of the CMOM program's completed activities, planned activities, and activities currently underway;
- 2) To describe and document any changes made to the CMOM programs, which may include changes to the objectives, strategies, tactics, and performance measures; and
- 3) To continue meeting regulatory compliance standards.

The CMOM provides oversight of the programs within, allowing RWSG to make significant improvements in their wastewater system by identifying potential issues and implementing preventative, predictive, and corrective maintenance strategies as part of an overall wastewater management system.

Components of the CMOM

RWSG continues to apply, manage, and improve the CMOM. This annual progress report shows how RWSG will continue to use and update its CMOM programs in the future to better maintain our system, serve our customers, and protect our environment. The following sections provide more specific information on the CMOM activities over the course of this past year that has been highlighted in this introduction.

Management Plan -

RWSG's Management Plan ensures that employees are adequately trained, that programs are fully staffed, and that issues are handled quickly and efficiently.

As a part of RWSG's Management Plan, RWSG continues to verify asset information during the ongoing sewer inspection and construction activities. This ensures that asset information in the geographical information system (GIS) and asset management system remains accurate.

Operations & Capacity Programs -

Within the wastewater collection system, RWSG has developed an investigative program designed to monitor and document the current condition of the wastewater assets. RWSG receives a great deal of usable information from their investigation programs that shows where potential issues are located in the wastewater system.

RWSG also continues to reduce the occurrence of grease within their system by educating their customers, monitoring new and existing sources of grease, and by cleaning assets affected by grease build-up regularly.

Maintenance Programs -

Based on the information received during the investigative program, RWSG can prioritize any improvements, maintenance, and management activities that may be required within the wastewater collection or transmission system.

PROGRAMS

Sanitary Sewer Asset Management

Asset management allows RWSG to properly schedule maintenance activities and isolate potential problem-causing areas through the inspection records and observations now available for each asset within the wastewater system. The ability to view data geospatially helps crews see the bigger picture when working in a given area. This allows information to be processed in relation to surrounding assets.

The wastewater collection and transmission system's assets are managed through a GIS system and a Work Management System (WMS). The programs are used in conjunction to allow RWSG to record work completed, both Capital and O&M, schedule upcoming work, and manage asset information.

This technology is available in mobile format as well, providing on-the-go access to inspection information and previous observations. See Appendix A.

Sanitary Sewer Evaluation Survey

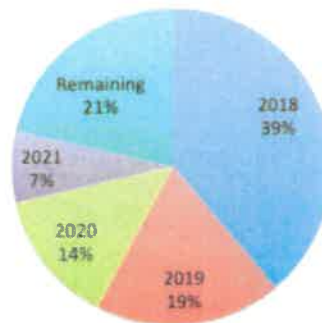
The Sanitary Sewer Evaluation Survey (SSES) program allows RWSG the ability to properly assess the condition of its gravity collection system in a stepwise approach. The SSES Program, a 5-year program, is responsible for inspecting collection system mains and manholes.

Closed Circuit Television Video (CCTV) inspections, video manhole inspections, and smoke testing are performed throughout the wastewater collection system. RWSG will provide cleaning and root-cutting activities after the initial inspection if required.

In late 2021, the fourth phase of the SSES program was completed. This completed approximately 78% of our system-wide attempted inspections. See Figure 1.

Figure 1. SSES Progress (Percentage Complete)

SSES Percentage Complete



While completing the SSES activities, the GIS system will also be updated with any findings from the investigation. These discrepancies may include finding an additional manhole or a previously mapped manhole that doesn't actually exist main line diameter changes, alignment changes, or other discrepancies. In 2021, four discrepancies were found and updated in the GIS system due to SSES inspections. Other mapping updates are performed throughout the year as required.

When a maintenance or structural issue is found during the survey, the line can be cleaned as a part of the Preventative Maintenance Program (PM) or added to the Asset Rehabilitation Program (ARP) and addressed at the appropriate time.

Closed Circuit Television Video (CCTV)

All main lines in the collection system should have an attempted inspection by CCTV every five years. Due to connectivity, structural, or mapping issues, some mains will not have a complete inspection.

A list of results and scores is produced for every attempted CCTV inspection. Mainline structural and maintenance results from CCTV may include offset joints, deformed pipe, and other structural or maintenance issues. Defects are given a severity rating to help determine the overall condition and longevity of the inspected main. Features include observations that do not get a score like lateral taps, other connections, and minor water level observations. A quality CCTV inspection provides both types of information for RWSG to use in future CMOM related activities.

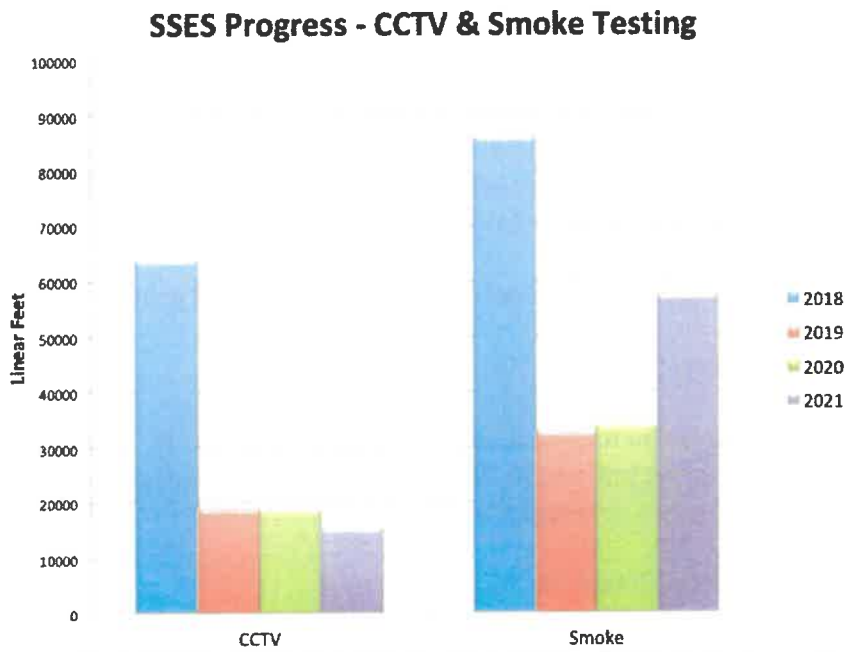
In 2021, RWSG CCTV'ed 15,404 feet of main. See Figure 2 and Appendix B.

Smoke Testing

Smoke Testing involves adding pressurized smoke to each mainline, which shows various defects that could potentially allow water to leak in or out of the sewer system. During testing, smoke will permeate defects, illicit connections, and potential direct connections to the storm system.

In 2021, RWSG Smoke Tested 57,383 linear feet of gravity main. See Figure 1 and Appendix C.

Figure 2. SSES Progress (CCTV and Smoke) 2018 -2021

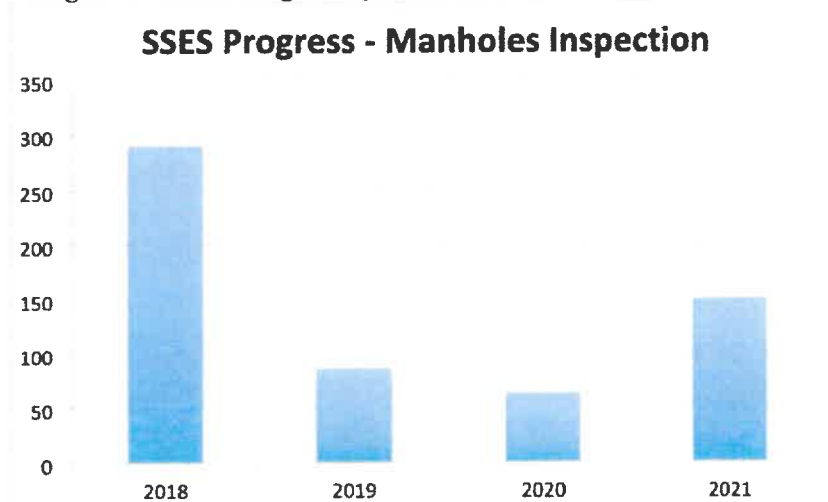


Manhole Inspections

Manhole Inspections gather data about the structural integrity and maintenance issues of each manhole in the system. The inspections show I/I sources, root growth issues, structural issues, and other problems within each manhole. Internal crews may perform wet weather inspections or dye testing during rain events to further investigate specific areas of RWSG, as required.

In 2021, RWSG inspected 150 manholes. See Figure 3 and Appendix D.

Figure 3. SSES Progress (Manhole Inspections) 2018 -2021



Preventative Maintenance

Another effort to reduce maintenance issues within the collection system is The Preventative Maintenance Program (PM). PM activities are conducted as a part of the SSES program. After inspections are completed for the current study area, the data is then analyzed to verify what type of cleaning activity, if any, is necessary. Sewer main lines may require root cutting or high-velocity cleaning depending on the concentration and type of build-up within the main line.

In 2021, RWSG cleaned or cut roots on 2,703 linear feet of gravity main.

Right of Way Maintenance

RWSG acknowledges the importance of accessible easements. Therefore, a portion of RWSG's wastewater system in the easement is maintained annually. The remaining segments are cleared as necessary to allow CMOM activities to take place.

Asset Rehabilitation Program

The main objective of the Asset Rehabilitation Program (ARP) is to address inflow and infiltration, structural, and capacity issues throughout the wastewater collection and transmission systems through rehabilitation and replacement projects.

Collection System

RWSG's ARP conducted 4 repairs in 2021 on mains and manholes.

Grease Control Program

RWSG has a multi-faceted grease program to prevent grease discharges from food service facilities (FSFs) and from residential customers. FSFs are required to install new grease collection equipment when established and conduct ongoing inspections to verify the operability of the existing facilities.

In 2021, 20 grease trap locations were inspected a total of 228 times.

Residential customers are encouraged to capture grease before releasing it into the wastewater system. Education materials are frequently made available to the customers to remind them of the importance of limiting the amount of grease released to the wastewater system.

Pump stations are also regularly inspected and cleaned to prevent grease build-up. There are 10 degreasing stations within RWSG, and a total of 230 degreasing activities were conducted.

Transmission System Monitoring

Key performance criteria for the transmission system are monitored through the Supervisory Control and Data Acquisition System (SCADA) at 100% of pump stations.

Additional inspections and maintenance activities are conducted frequently. All pump stations were inspected three times per week to ensure operability.

Sewer Overflow Response Plan

RWSG makes reasonable efforts to respond as quickly as possible to each sewer overflow. While responding to each sewer overflow, the sewer maintenance personnel will record appropriate information to report the sewer overflow within 5 days of the occurrence.

During 2021, RWSG experienced 5 overflows in the collection system; 4 in March and 1 in October.

RWSG uses mobile mapping, asset management, and mobile work order technology for sewer overflow response. This approach also allows the responder to verify recent and ongoing work for each area and record field observations.

RWSG strives to complete each sewer overflow professionally and timely, leaving our customers satisfied with the results.

The SORP is reviewed as needed, and training is conducted annually.

Flow Monitoring

Since 2012, flow monitoring has remained an integral tool to assist RWSG in assessing its wastewater system. RWSG has two permanent flow monitors in place as well as four to six temporary monitors to provide targeted information at strategic locations throughout the wastewater system.

During the flow monitoring study, R-values are determined for each area. An R-value is a ratio of the inflow and infiltration (I/I) amount received from the rainfall to the total rainfall volume. This information is valuable in determining where the next phase of investigation should occur, showing potential trouble areas for I/I.

New flow monitors were purchased and installed in late 2021. New flow monitoring data will be available in 2022.

Flow monitoring for RWSG is conducted using EPA's Storm Water Management Model, version 5 (SWMM5).

Capital Improvement Plan

RWSG annually updates the Capital Improvement Plan to outline the proposed expenditures over the next ten years. The information outlines the annual commitment to maintaining the system for the future. This list does not include the equipment purchases for use in the system and the engineering and design fees incurred each year.

RWSG was awarded a CDBG grant in 2020 for \$550,000 for sewer rehabilitation. Due to Covid-19 related delays, the work did not commence on time. However, construction did begin in December 2020, with a completion date of May 2021. RWSG added additional funds to the required match to complete approximately \$715,000 of rehabilitation work in 2021. This work focused on Basins 8 and 1, where recent SSES investigative activities occurred.

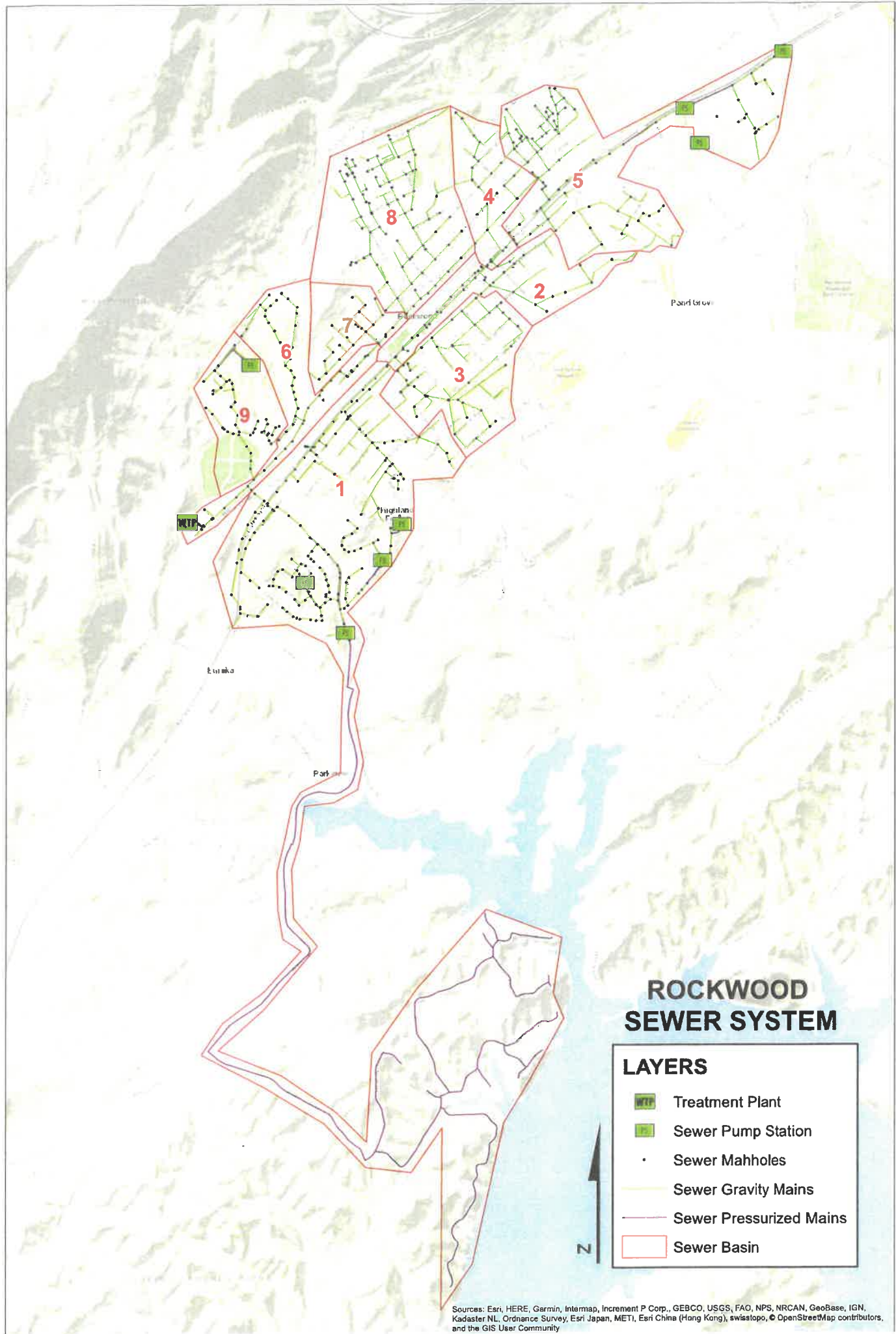
Continuing Education

Continuing education activities allow RWSG employees to learn and implement work activities safely and effectively. RWSG completed regular safety training activities in 2021.

APPENDICES







Appendix A

RWSG Wastewater System Map



ROCKWOOD SEWER SYSTEM

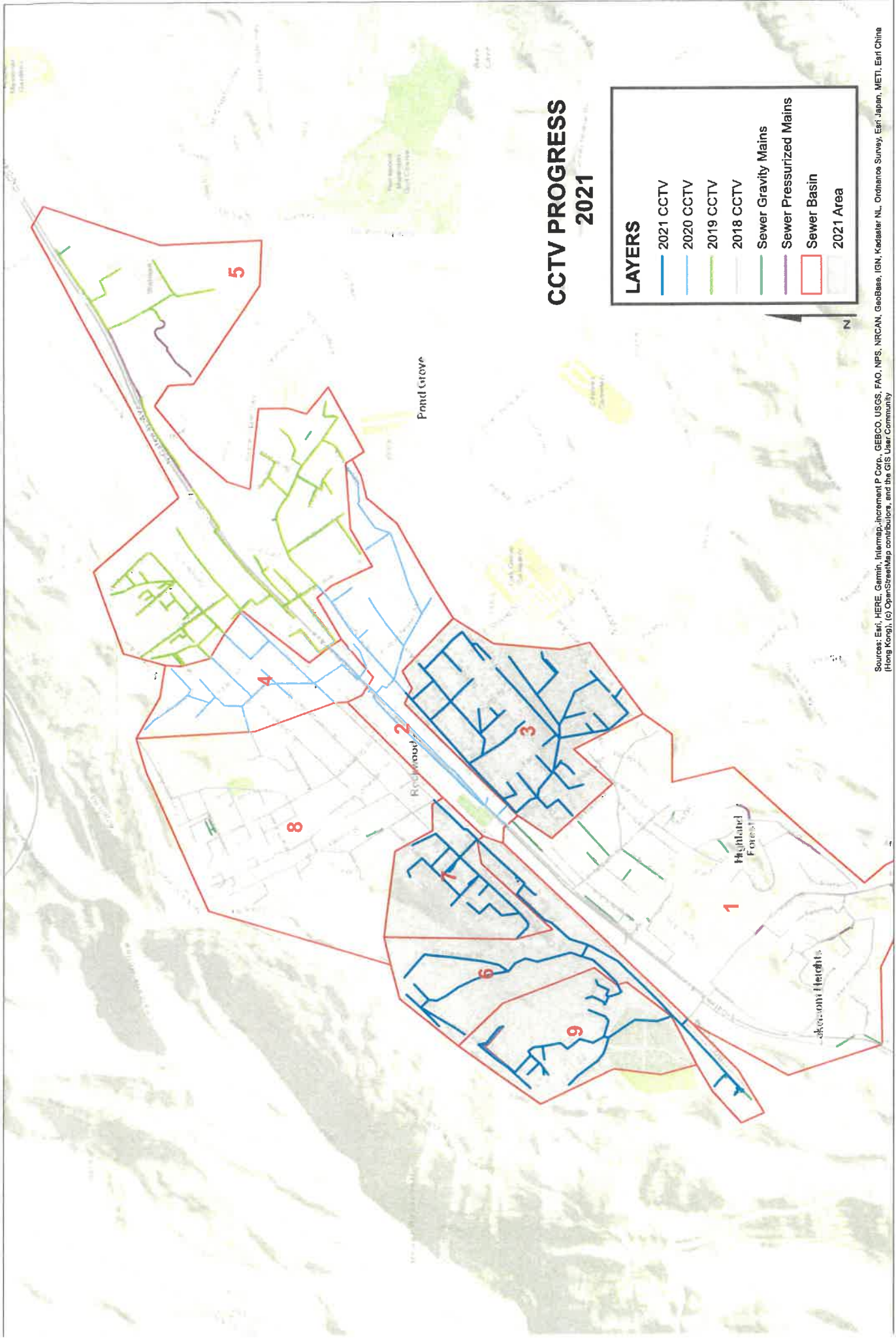
LAYERS

-  Treatment Plant
-  Sewer Pump Station
-  Sewer Manholes
-  Sewer Gravity Mains
-  Sewer Pressurized Mains
-  Sewer Basin

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Appendix B

CCTV Progress Map



CCTV PROGRESS 2021

LAYERS

- 2021 CCTV
- 2020 CCTV
- 2019 CCTV
- 2018 CCTV
- Sewer Gravity Mains
- Sewer Pressurized Mains
- Sewer Basin
- 2021 Area

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox Contributors, and the GIS User Community

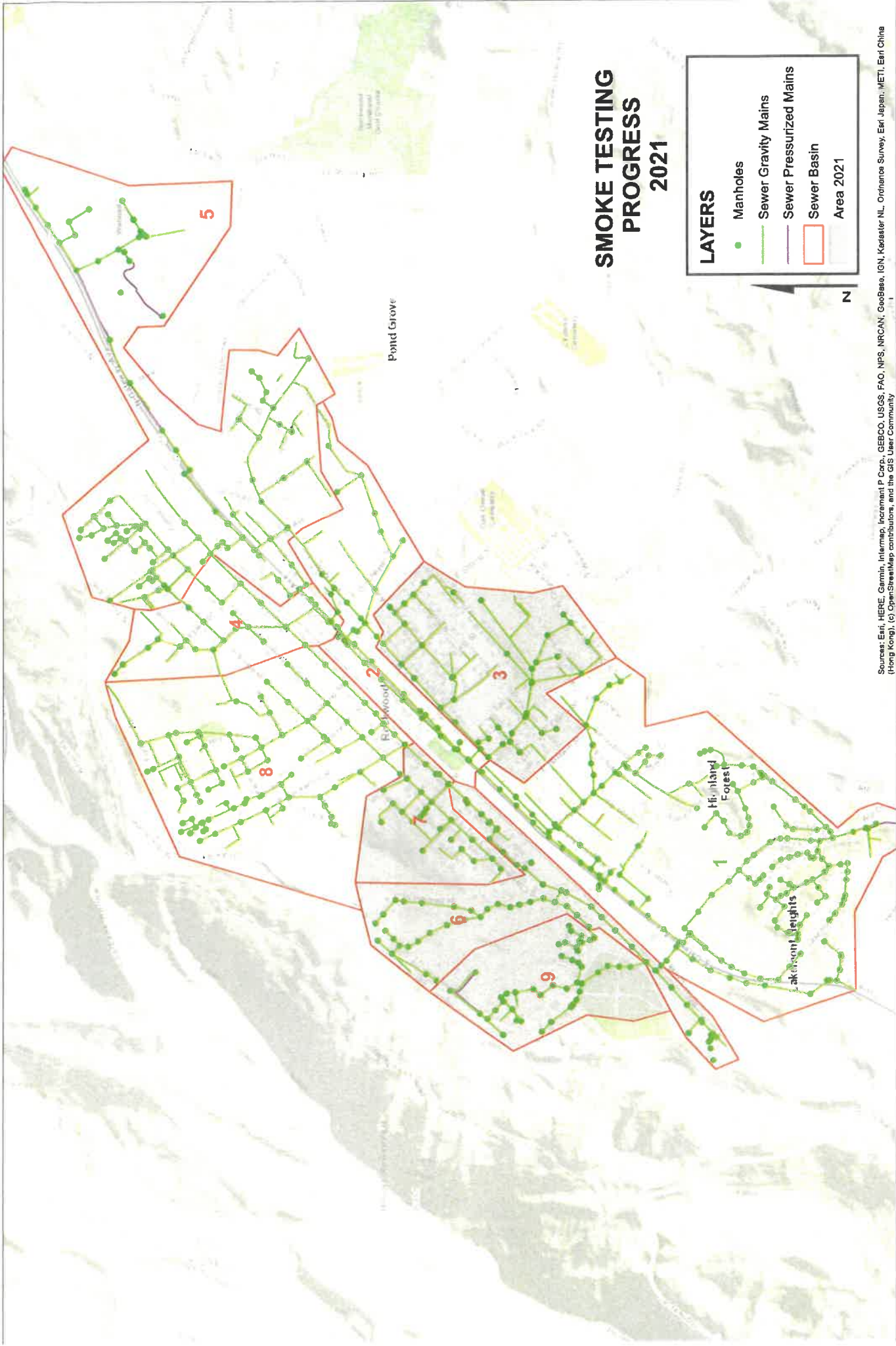
Appendix C

Smoke Testing Progress Map

SMOKE TESTING PROGRESS 2021

LAYERS

- Manholes
- Sewer Gravity Mains
- Sewer Pressurized Mains
- Sewer Basin
- Area 2021



Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBasis, IGN, Keastler NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

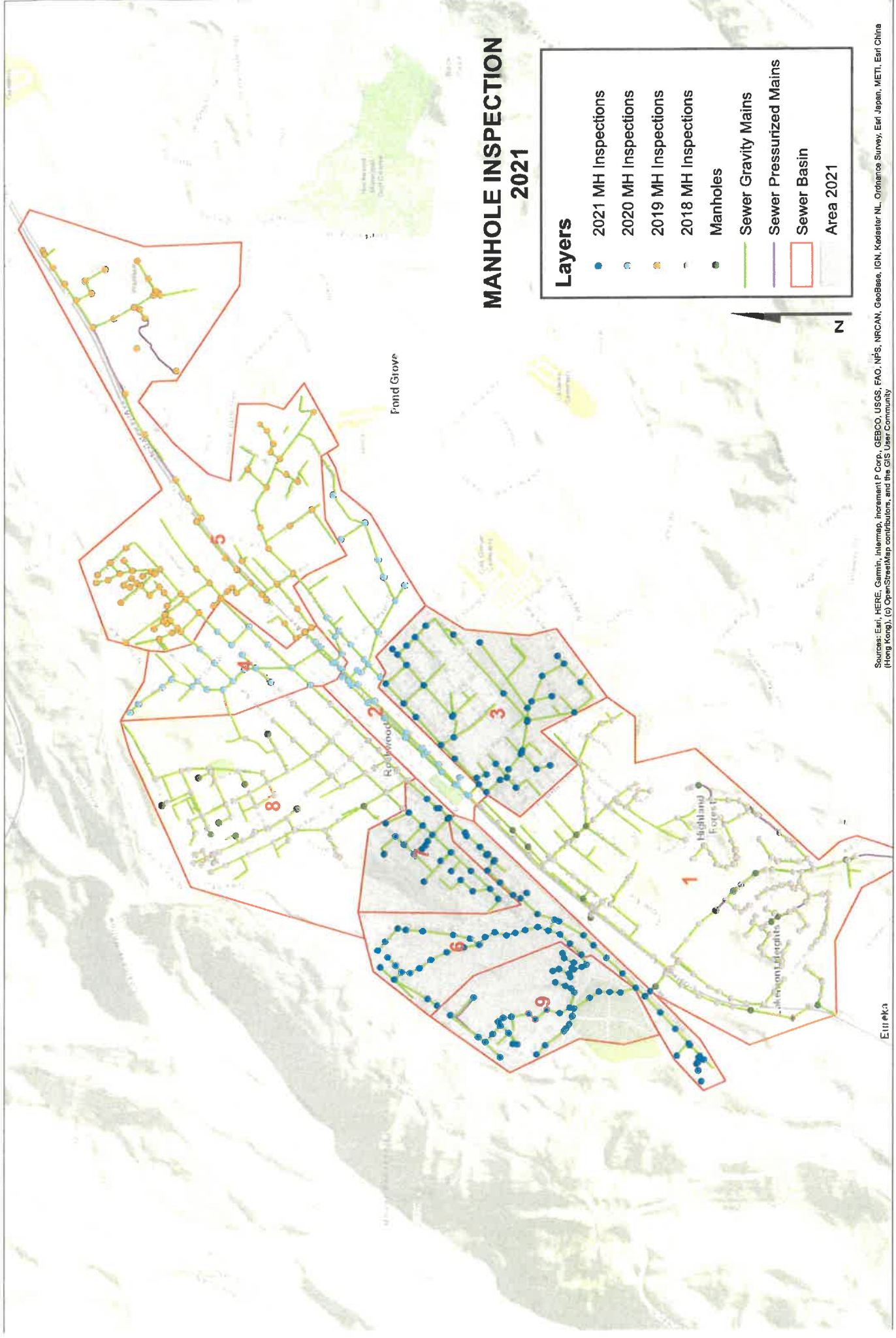
Appendix D

Manhole Inspections Progress Map

MANHOLE INSPECTION 2021

Layers

- 2021 MH Inspections
- 2020 MH Inspections
- 2019 MH Inspections
- 2018 MH Inspections
- Manholes
- Sewer Gravity Mains
- Sewer Pressurized Mains
- Sewer Basin
- Area 2021



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community