



Cleveland Heights
Fats, Oil and Grease (FOG)
and Root Intrusion Problem
Analysis

Final

August 14, 2017

1.0 Introduction

This document describes the analysis of fats, oil and grease (FOG) and tree root intrusion problems from available information for the Cleveland Heights Sewer Department as required under the Interim Management, Operations and Maintenance (MOM) Measures in Appendix B (A.4.c.) of the Consent Decree between Cleveland Heights and the USEPA. According to the Consent Decree, the intent of the analysis is to provide a common understanding regarding the degree to which FOG and tree root intrusion cause or contribute to sanitary sewer overflows (SSOs) and basement/property backups in the sewer system.

The analysis is based on a review on available sewer maintenance records and other relevant information including input from the Sewer Department staff. In most cases, relevant information for the past three years was used, but older information was considered if there was a history of reoccurring issues. The analysis also updated the high frequency cleaning list based on historical maintenance calls or frequent customer complaints. The high frequency cleaning list includes locations where recurrent problems have been identified in the collection system so they can be addressed prior to resulting in a non-structural SSO or basement/property backup.

1.1 Background

The Cleveland Heights Sewer Department's public and private sewer maintenance records and construction logs date back to 2007. Although the older records were reviewed and catalogued, the analysis focused mainly on records from 2015 to 2017. This information, along with operations and maintenance issues flagged during the Northeast Ohio Regional Sewer District's Heights Hilltop Interceptor Local Sewer System Evaluation Study (HHI-LSSSES), formed the basis of the FOG and root problem analysis, and was reviewed in detail with the sewer supervisor. The Cleveland Heights Sewer Department also had a previous high frequency cleaning list that was maintained by a consultant. This list was also reviewed with the Sewer Supervisor and updated with the primary cause based on results of the analysis. The updated high frequency cleaning list and associated maps are located in **Attachment A** of this document. This list will be updated, as appropriate, when field investigations ramp up during the required Integrated Overflow Control Monitoring Plan (IOCMP) and follow up SSES activities.

This analysis focused on public right-of-way issues in mainline sewers. The Cleveland Heights Sewer Department performs maintenance of private sewer laterals as a courtesy to the residents and documents grease and root problems, if known. However, these problems were not considered in this report. The CMOM program details steps for addressing private sewer laterals in the future. The following sections described FOG issues, tree root intrusion issues, SSOs related to FOG and tree root intrusion, and the high frequency cleaning list and monitoring in more detail.

2.0 Fats, Oil and Grease (FOG)

Fats, oil and grease can be generated by residential or commercial properties in Cleveland Heights. The Sewer Department has identified that most of their high frequency cleaning locations are caused by residential grease issues rather than commercial. Only two locations are associated with commercial discharge. **Table 1** shows the high frequency cleaning locations caused by FOG. A map of these locations can be found in **Attachment A** of this report.

Table 1. High Frequency Cleaning Locations Caused by FOG

Location	Residential/Commercial
Eloise in north section	Residential
Randolph intersecting Woodview	Residential
Quilliams (from Noble to Lowell)	Residential
Sylvanhurst at Henderson	Residential
Mayfield from Noble to Warrensville Center	Commercial
Coventry at Avondale	Residential
Superior and Euclid Heights Blvd	Residential
Superior and Lee	Residential
Euclid Heights at Edgehill	Residential
Nottingham Lane	Residential
Kildare (lower)	Residential
Tullamore	Residential

Location	Residential/Commercial
North Park (Shelburne to City Line)	Residential
943 Elbon to Noble	Residential
Dresden Road	Residential
Shannon at Maple	Residential
2195 Lee Road	Commercial
Eddington Road	Residential
1714 Coventry Road	Residential
2684 Euclid Heights Blvd	Residential
Superior between Redwood and Goodnor	Residential
3390 Winsford Road	Residential
Bolton Road and Monticello Blvd	Residential
2520 - 2334 Ardleigh Drive	Residential
3244 Cedarbrook Road	Residential

These locations are checked at least twice a year to make sure flow is not being impeded by FOG. If there is a problem, the Sewer Department will take measures to clear any blockage. The HHI-LSES field inspections identified one additional location in which grease was observed. This location has been noted and if additional problems or residential complaints are received, this location may be added to the high frequency cleaning list.

3.0 Root Intrusion

Root intrusion has occurred less commonly than FOG in the mainline sewers in Cleveland Heights. Five of the locations on the high frequency cleaning list have been noted as caused by root intrusion as shown in **Table 2**.

Table 2. High Frequency Cleaning Locations Caused by Root Intrusion

Location
Coleridge - Stratford - Corydon
North Park (Shelburne to City Line)
North Park btw Coventry and Arlington
Henderson Road
Pembrook Road

Additional review of construction and cleaning logs for the last three years showed one location in which root intrusion was observed. The HHI-LSSSES field inspections identified four locations in which root intrusion was observed. These locations have been noted and if additional problems or residential complaints are received, these locations may be added to the high frequency cleaning list.

4.0 SSOs and Basement Backups caused by FOG and Root Intrusion

Cleveland Heights has not recorded any SSOs as directly attributed to FOG or root intrusion in the last three years. There are tracking and notification systems in place in the Sewer Overflow Response Plan, approved by USEPA on May 30, 2017, to report all SSOs by completing a 5-Day Follow-Up Report. In this report, there are sections to report the cause of the overflow and steps taken to eliminate and prevent additional occurrences. These reports will provide a reference to any problems that have occurred in the system and are a useful resource to sewer maintenance crews that have to deal with a potential SSO. If FOG or root intrusion causes an SSO or basement/property backup, the location and details will be tracked in the new GIS within the Information Management System (IMS) software once it is up and running.

Cleveland Heights performs house calls related to residential basement backups or other sewer problems. Records of house call locations and maintenance performed are kept by the Sewer Department. Comments indicate the sources of problems found during service. These comments were reviewed for the last three years and few problems were reported as the result of a mainline

FOG or root intrusion. Reports of mainline maintenance issues were resolved by the Sewer Department in a manner that mitigated basement backup effects in a timely fashion.

Currently, Cleveland Heights uses maintenance personnel reports from house calls to characterize if mainline FOG or roots issues from the high frequency cleaning areas are causing basement backups. The new Information Management System and GIS will allow for tracking of house calls and any local SSOs compared with locations and timing of high frequency cleaning. This will help the City better characterize the effect of high frequency cleaning on minimizing basement backups and SSOs.

5.0 Updating High Frequency Cleaning List

Before this analysis of FOG and root intrusion, the Cleveland Heights Sewer Department maintained a high frequency cleaning list that consisted of 14 locations. Through review of maintenance and construction records, the HHI-LSES and discussions with Sewer Department personnel, an additional 15 locations were added to the high frequency cleaning list. All locations have been classified by the need of high frequency cleaning. One location, North Park from Shelburne to the Shaker Heights City Line appears on both the FOG and root intrusion list. Sewer Department personnel were also able to categorize the probable cause of the blockage at each location. Identifying the probable cause assists crews when doing their semiannual checks of these locations to have the proper equipment in case cleaning is required. These locations are currently maintained on paper maps at the Sewer Department, and will be imported and tracked in GIS once Cleveland Heights' new IMS system is in place.

6.0 FOG and Root Intrusion CMOM Activities

Based on further findings during the IOCMP, SSES activities under CMOM and the requirements of the Consent Decree, Cleveland Heights will better understand the extent of FOG and root intrusion problems in their collection system. This understanding will support the extent to which additional activities are to be performed as described in Sections G and H in Appendix B of the Consent Decree. Currently, the Cuyahoga County Board of Health provides many of the

services mentioned in Section G including maintaining a list of FOG generators, recordkeeping systems of FOG generators, and public education for commercial FOG generators.

Cleveland Heights has created a Standard Operating Procedure, which addresses many of the requirements of Section H in Appendix B of the Consent Decree, for Root Control Maintenance, as provided in **Attachment B** to this report.

The extent of additional FOG and root control program measures will be determined by documented field investigations.

Attachment A – High Frequency Cleaning List and Maps

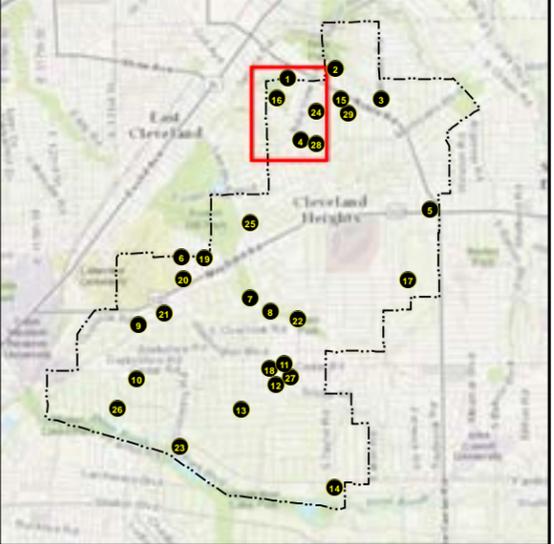


Map Sheet 1

Legend

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Map Key	High Frequency Cleaning Locations	Length (LF)	Identified From	Cause
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2	Randolph intersecting Woodview	200	From CMOM March 2016	Pump Station
3	Quilliams (from Noble to Lowell)	850	From CMOM March 2016	Residential Grease
4	Sylvanhurst at Henderson	460	From CMOM March 2016	Residential Grease
5	Mayfield (south side) from Noble to Warrensville Center	510	From CMOM March 2016	Commercial Grease
6	Coventry at Avondale	200	From CMOM March 2016	Residential Grease
7	Superior and Euclid Heights Blvd	200	From CMOM March 2016	Residential Grease
8	Superior and Lee	200	From CMOM March 2016	Residential Grease
9	Euclid Heights at Edgehill	600	From CMOM March 2016	Residential Grease
10	Nottingham Lane	1,400	From CMOM March 2016	Residential Grease
11	Kildare (lower)	200	From CMOM March 2016	Residential Grease
12	Tullamore	200	From CMOM March 2016	Residential Grease
13	Coleridge - Stratford - Corydon	1,200	From CMOM March 2016	Roots
14	North Park Lane (Shelburne to City Line)	900	From CMOM March 2016	Residential Grease and Roots
15	943 Elbon to Noble	400	2007 Sewer Cleaning Report	Residential Grease
16	Dresden Road	1000		Residential Grease
17	Shannon at Maple	750	2007 Sewer Cleaning Report	Residential Grease
18	2195 Lee Road	330	2007 Sewer Cleaning Report	Commercial Grease
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21	2684 Euclid Heights Blvd	570	2009 Sewer Cleaning Report	Residential Grease
22	Superior between Redwood and Goodnor	250	2009 Sewer Cleaning Report	Residential Grease
23	North Park btw Coventry and Arlington	2,800		Roots
24	3390 Winsford Road	250	Cleaning Reports	Residential Grease
25	Bolton Road & Monticello Blvd	220	Cleaning Reports	Residential Grease
26	2520 - 2334 Ardleigh Drive	460	Cleaning Reports	Residential Grease
27	3244 Cedarbrook Road	200	Cleaning Reports	Residential Grease
28	Henderson Road	1,000	Identified during HHI LSSES	Roots
29	Pembroke Road	1,700	Identified during HHI LSSES	Roots





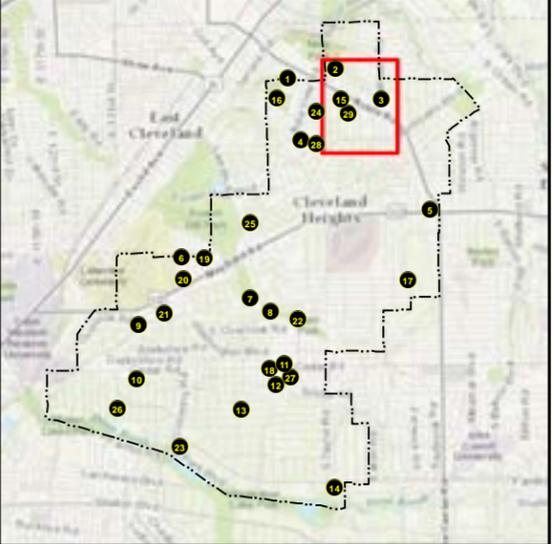
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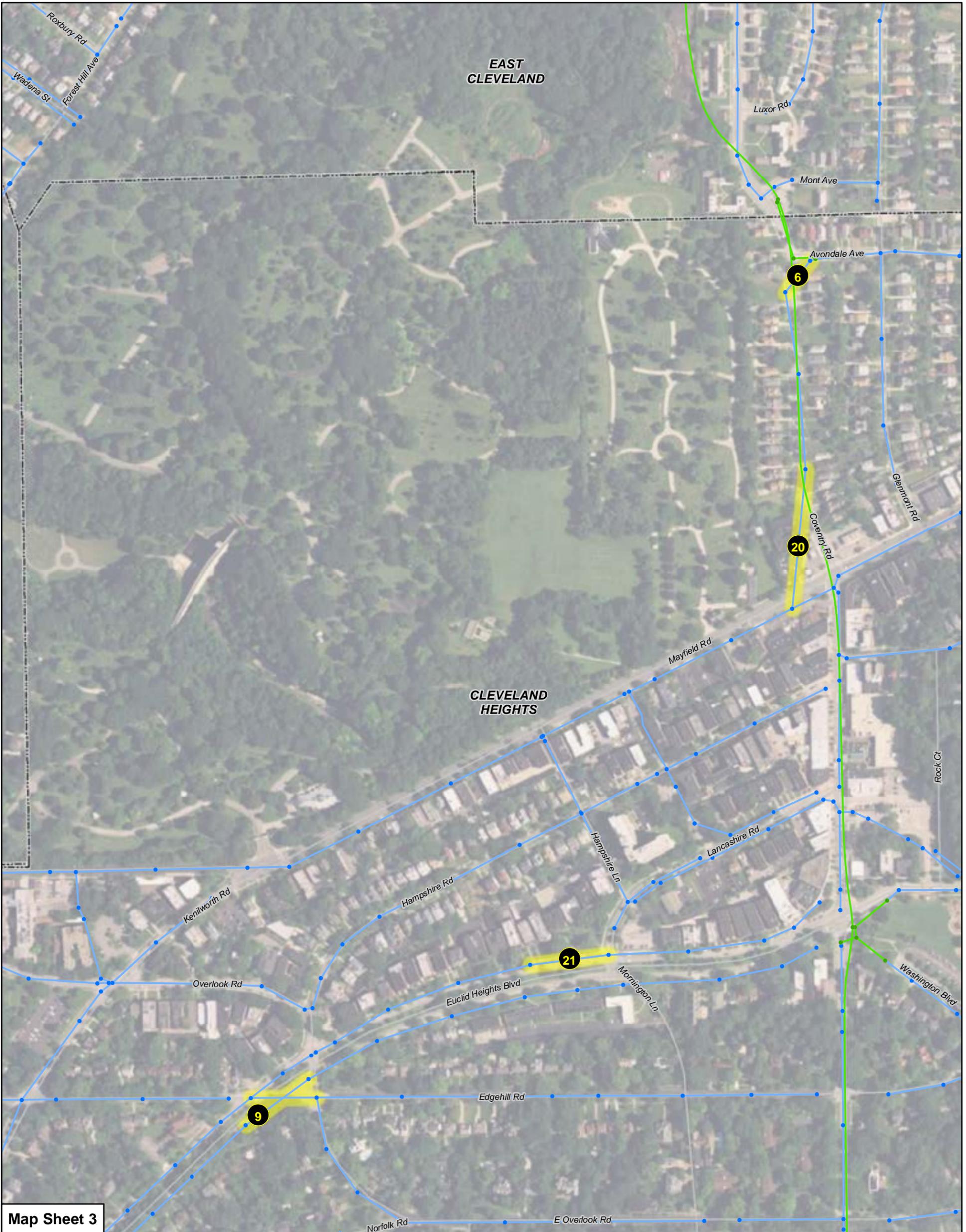
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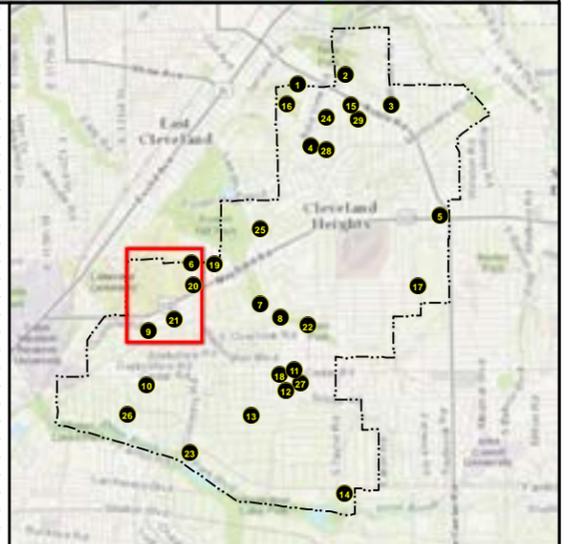
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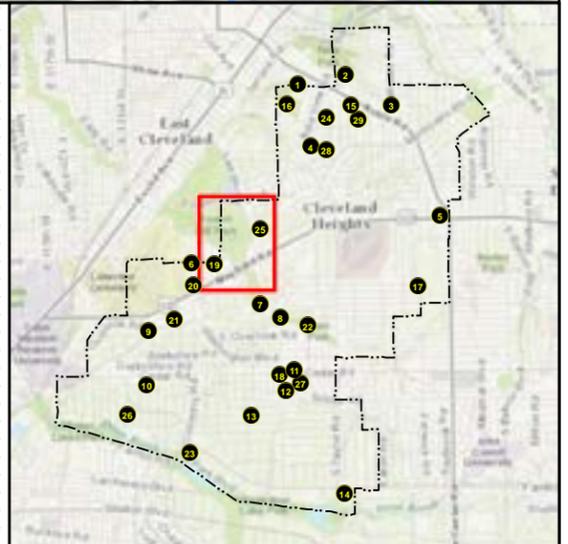
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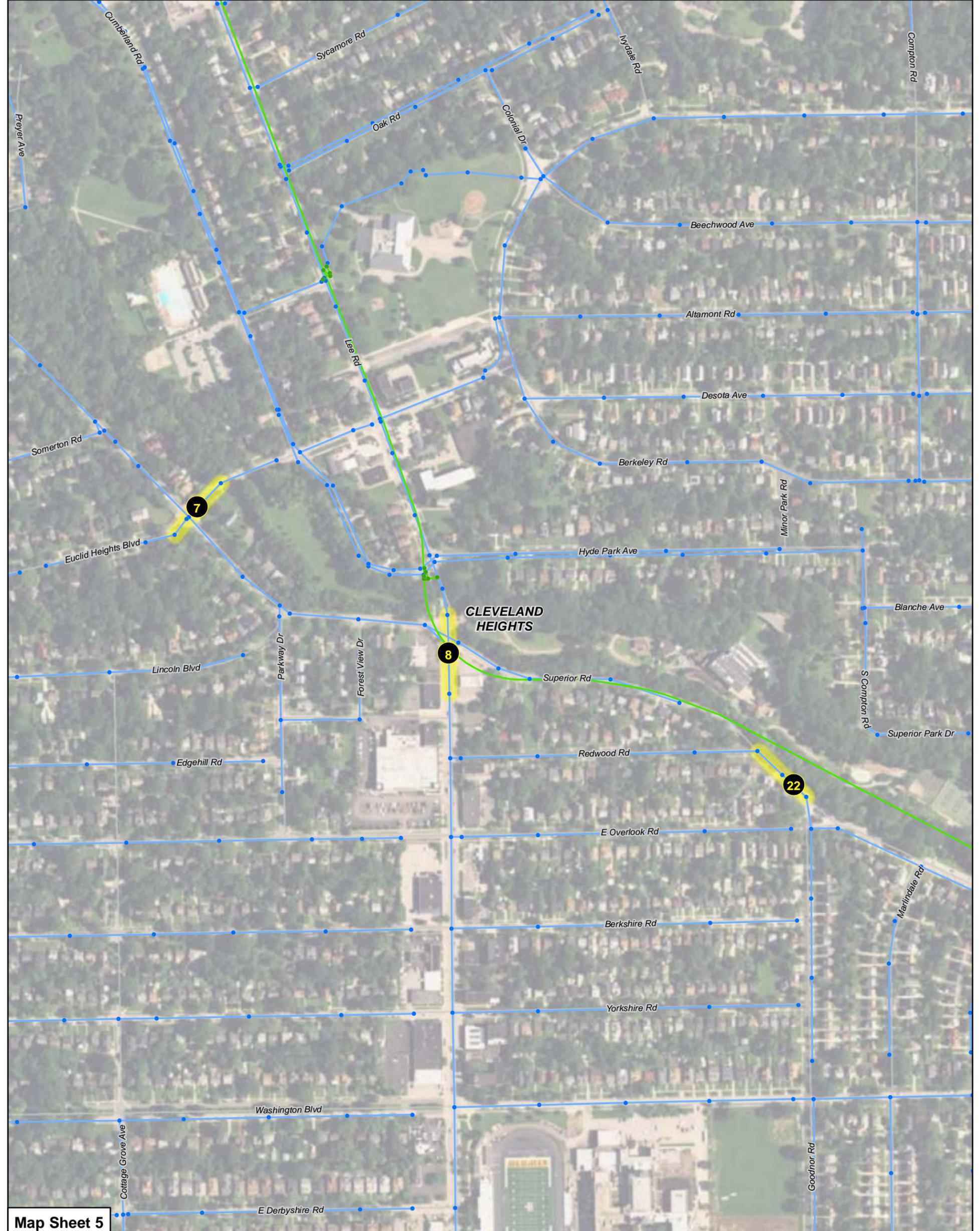
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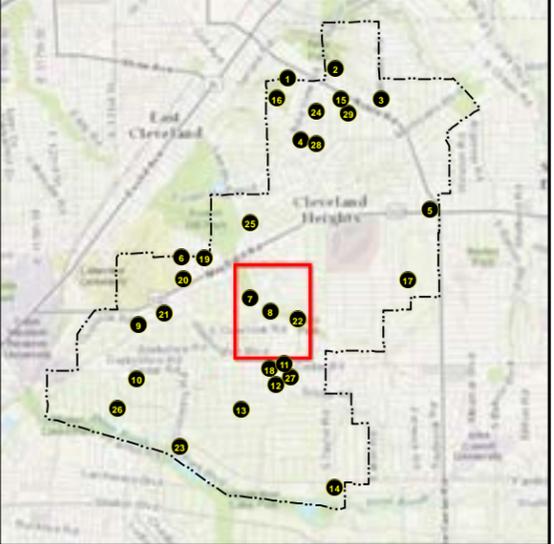
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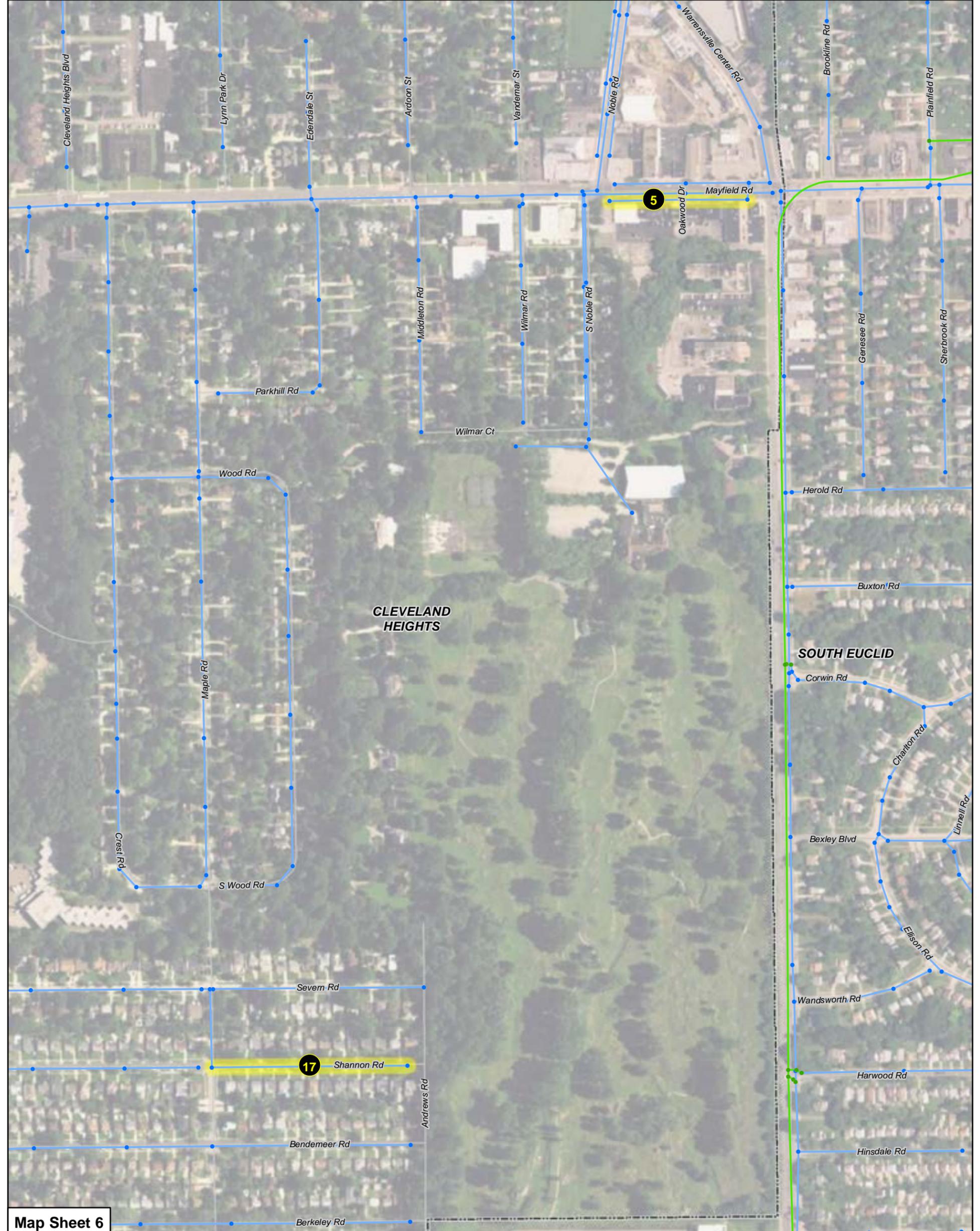
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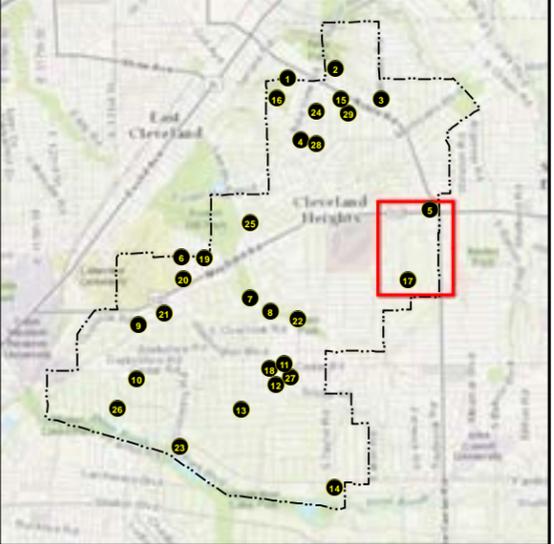


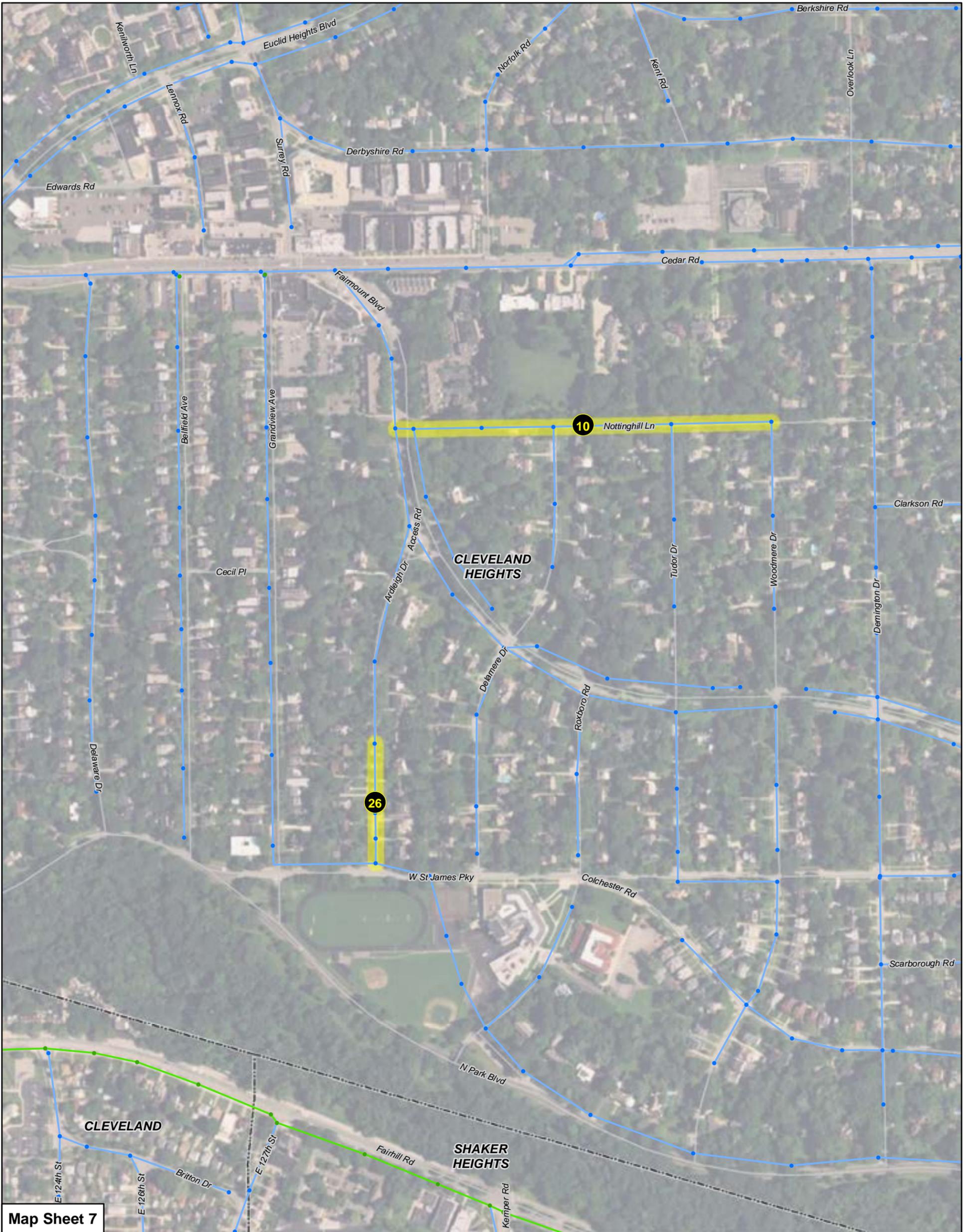
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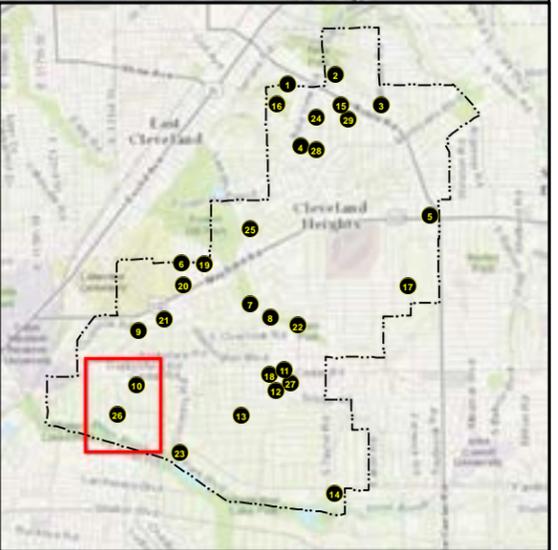
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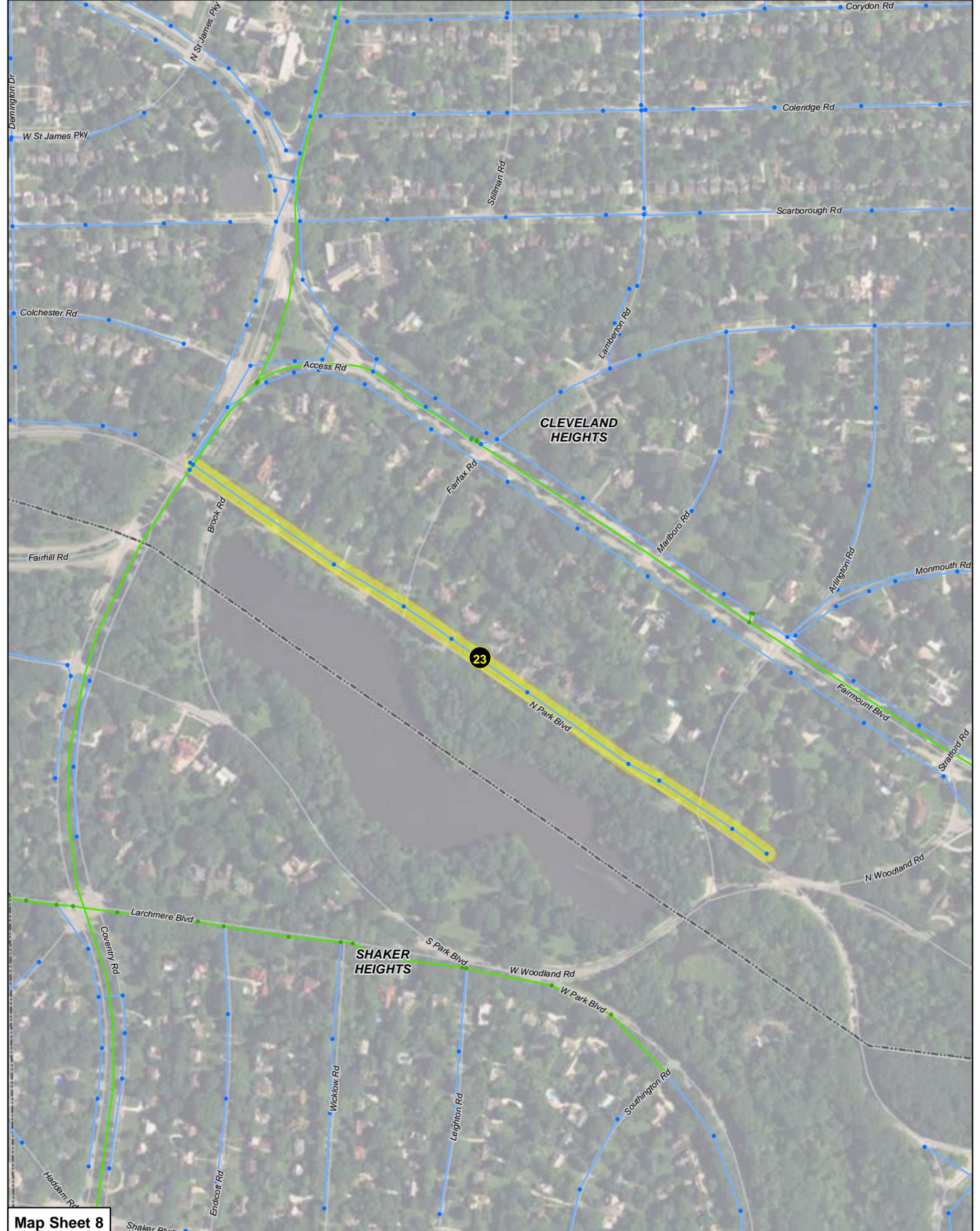
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11	Kildare (lower)	200	From CMOM March 2016	Residential Grease
12	Tullamore	200	From CMOM March 2016	Residential Grease
13	Coleridge - Stratford - Corydon	1,200	From CMOM March 2016	Roots
14	North Park Lane (Shelburne to City Line)	900	From CMOM March 2016	Residential Grease and Roots
15	943 Elbon to Noble	400	2007 Sewer Cleaning Report	Residential Grease
16	Dresdon Road	1000		Residential Grease
17	Shannon at Maple	750	2007 Sewer Cleaning Report	Residential Grease
18	2195 Lee Road	330	2007 Sewer Cleaning Report	Commercial Grease
19	Eddington Road	730	2007 Sewer Cleaning Report	Residential Grease
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21	2684 Euclid Heights Blvd	570	2009 Sewer Cleaning Report	Residential Grease
22	Superior between Redwood and Goodnor	250	2009 Sewer Cleaning Report	Residential Grease
23	North Park btw Coventry and Arlington	2,800		Roots
24	3390 Winsford Road	250	Cleaning Reports	Residential Grease
25	Bolton Road & Monticello Blvd	220	Cleaning Reports	Residential Grease
26	2520 - 2334 Ardleigh Drive	460	Cleaning Reports	Residential Grease
27	3244 Cedarbrook Road	200	Cleaning Reports	Residential Grease
28	Henderson Road	1,000	Identified during HHI LSSES	Roots
29	Pembroke Road	1,700	Identified during HHI LSSES	Roots



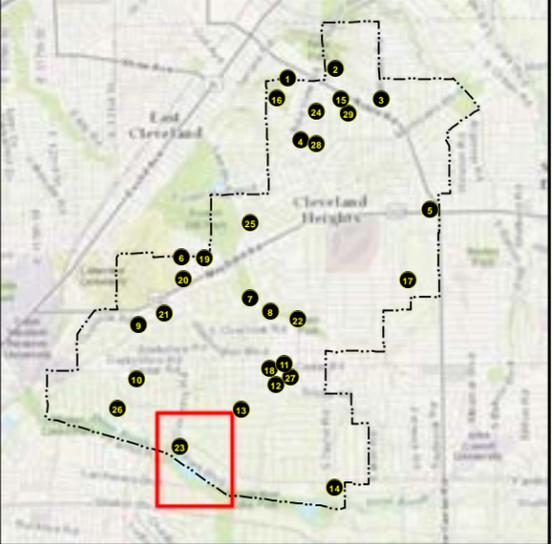


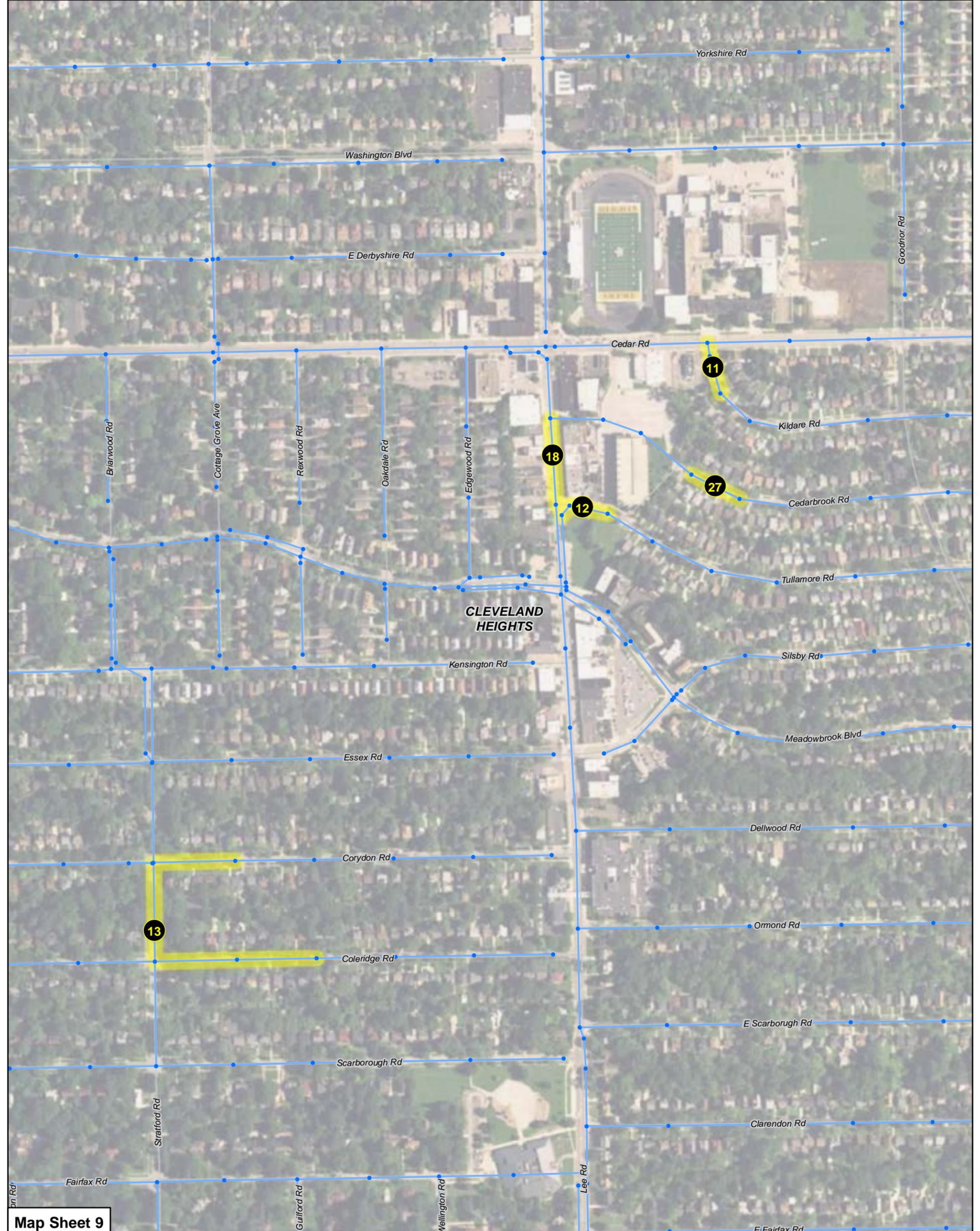
Map Sheet 8

Legend

- Community Border
- District_Manhole
- Local_Manhole
- District_Pump_Station
- Local_Pump_Station
- District Gravity Main
- District Pressure Main
- Local Gravity Main
- Local Pressure Main
- HFC Locations

Map Key	High Frequency Cleaning Locations	Length (LF)	Identified From	Cause
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2	Randolph intersecting Woodview	200	From CMOM March 2016	Pump Station
3	Quilliams (from Noble to Lowell)	850	From CMOM March 2016	Residential Grease
4	Sylvanhurst at Henderson	460	From CMOM March 2016	Residential Grease
5	Mayfield (south side) from Noble to Warrensville Center	510	From CMOM March 2016	Commercial Grease
6	Coventry at Avondale	200	From CMOM March 2016	Residential Grease
7	Superior and Euclid Heights Blvd	200	From CMOM March 2016	Residential Grease
8	Superior and Lee	200	From CMOM March 2016	Residential Grease
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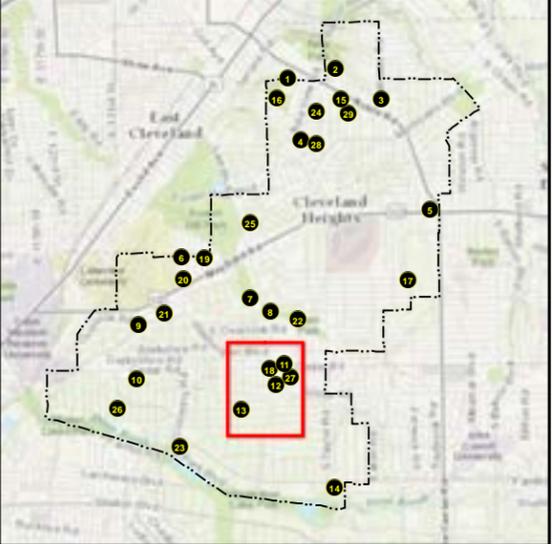


Map Sheet 9

Legend

- Community Border
- District_Manhole
- Local_Manhole
- District_Pump_Station
- Local_Pump_Station
- District Gravity Main
- District Pressure Main
- Local Gravity Main
- Local Pressure Main
- ① HFC Locations

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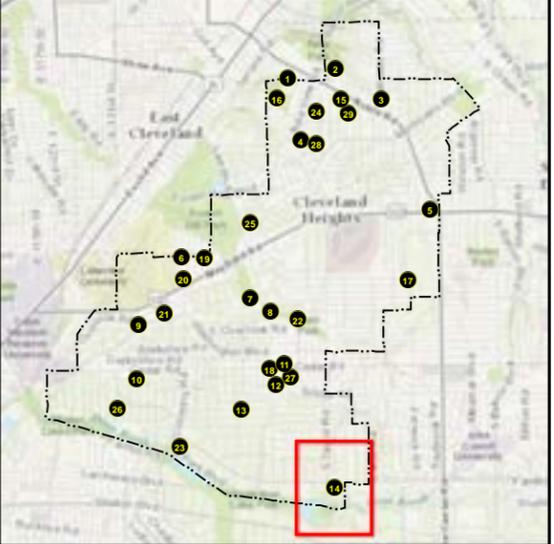


Map Sheet 10

Legend

- Community Border
- District_Manhole
- Local_Manhole
- District_Pump_Station
- Local_Pump_Station
- District Gravity Main
- District Pressure Main
- Local Gravity Main
- Local Pressure Main
- ① HFC Locations

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Attachment B – Root Control Maintenance SOP

SEWER MAINTENANCE STANDARD OPERATING PROCEDURE (SOP)



Administrative Support Field Operations

Area: Sewer Maintenance **SOP No.:** SM-01

Title: Root Control Maintenance

Status: Draft Final **Original Date:** 07/11/17 **Revision Date:** _____

Reviewers: _____

Author: Wade Trim / Brown and Caldwell **Revision Number:** 0

INTRODUCTION / PURPOSE:

The purpose of this procedure is to provide instructions on how to remove blockages in the sanitary sewer due to root intrusion using a jet root saw. This will minimize root intrusion into the sanitary sewer within the collection system.

GENERAL FREQUENCY:

All known root hotspots will be inspected at least twice a year.

RESOURCES:

Crew

- 1 – Equipment Operator
- 1 – Utility Person
- 2 – Traffic Control (as needed)

MATERIALS:

Water

EQUIPMENT:

- 1 – Mongoose Jetter Truck
- 1 – Debris Basket
- 1 – Back-up truck with overhead arrow for traffic control (as needed)
- PPE (gloves, hardhat, safety glasses, rain gear, rubber boots, hearing protection)
- Laptop, charger and Sewer Cleaning Log

GENERAL WORK METHOD:

1. Sewer Maintenance Supervisor identifies area to be inspected by studying the video inspection data.
2. Clean pipe if accumulated sediment/roots are 20% or more of the pipe. (Refer to Gravity Sewer Line Cleaning and Routine Maintenance SOP)
3. Supervisor prepares work schedule and dispatches staff.
4. Place traffic control signs and safety devices as required at jobsite.
5. Use proper PPE.
6. Operator and laborer work together to remove manhole lid and position equipment.
7. Choose the appropriate nozzle for the root cutting to be performed.

SEWER MAINTENANCE STANDARD OPERATING PROCEDURE (SOP)

8. Hydro jet with root cutter the line as needed to clean out debris, roots, etc.
9. During the jetting operations, capture any material with the appropriately size debris basket. Do not allow significant debris to travel downstream in the pipe which could result in another blockage.
10. While root cutting a sanitary sewer main use a higher pressure between about 1500-1800 psi dependent on the density of the roots that are being cut. Monitoring of cutting progression is through the vibration of the hose. When the hose is vibrating, it is cutting. When the hose is static, the head is stuck and not rotating the saw blade head.
11. Observe the conditions in the working manhole to identify if water is backing up into the manhole, to note the color of the flow during pull back and attempt to identify the type of material being flushed back to the manhole.
12. If additional resources are needed, such as heavy cleaning, contact Supervisor, for mobilization of Cuyahoga County Public Works or private contractor.
13. Collect large debris during cleaning or screening.
14. Remove equipment, including debris basket.
15. Spray out structure.
16. If additional cleaning of the structure is needed, staff cleans all areas within structure so that base of manhole is exposed. Remove debris from sanitary manhole. Clean all surfaces, walls, brick, concrete, inlet and outlet.
17. Inspect condition of inlet, outfall, and brick/concrete structure.
18. Replace and secure lid to avoid noise from traffic driving over it.
19. Clean up jobsite, tools and truck.
20. Remove traffic control signs and safety devices as required at jobsite.
21. Make notes about any further work that is needed.
22. Decant debris in appropriate location.
23. Accurately report mains and manholes cleaned in computer and on Sewer Cleaning Log.