City of Upper Arlington
3600 Tremont Road | Upper Arlington, OH 43221
614-583-5000 | upperarlingtonoh.gov

Date: September 15, 2020

To: Jacolyn Thiel, PE, Public Service Director/City Engineer

From: John Swartzbaugh, PE
Joshua Ford, PE

Re: Summary Report on WIB Locations from 2020 Flooding Events

1.0 Executive Summary

A municipality's sanitary sewer collection system is one of its most valuable tangible assets. The proper O&M of this asset is directly connected to the health and safety of a community and can enhance a community's ability to maximize developable land for the purposes of improving economic growth.

The City of Upper Arlington owns and maintains approximately 893,830 lineal feet of sanitary sewer with over 14,000 sewer connections to single-family, multi-family, commercial, and other properties within the corporation limits. The sanitary sewer is publicly-owned and the pipe that conveys sewage from the various properties to the publicly-owned sanitary sewer is the privately-owned sanitary lateral. The City conducts an annual cleaning program where public sanitary sewers are cleaned and inspected to evaluate the structural condition of the pipe and address root intrusion, grease, sediment, obstructions and other issues that may result with water in basement (WIB). To this end, the City has steadily increased the sewers cleaned and inspected over the last five years as shown in the following table. The City also performs root foaming to address root intrusion. Root foaming is typically done on a 3-year cycle to continually address root intrusion. See Exhibit in Appendix A.

City Annual Sanitary Sewer Cleaning	
Year	Footage Cleaned
2015	59,456
2016	82,921
2017	106,478
2018	128,898
2019	128,565
2020	34,626
Total	540,944

Between January 1, 2020 and September 9, 2020 Columbus Ohio has gotten 38.97" of rainfall, which is 10.37" over where we historically on average should be for the year. Two of the storm events with significant rainfall happened on March 20 and May 19, which produced 244 WIBs for the City with a breakdown as follows:

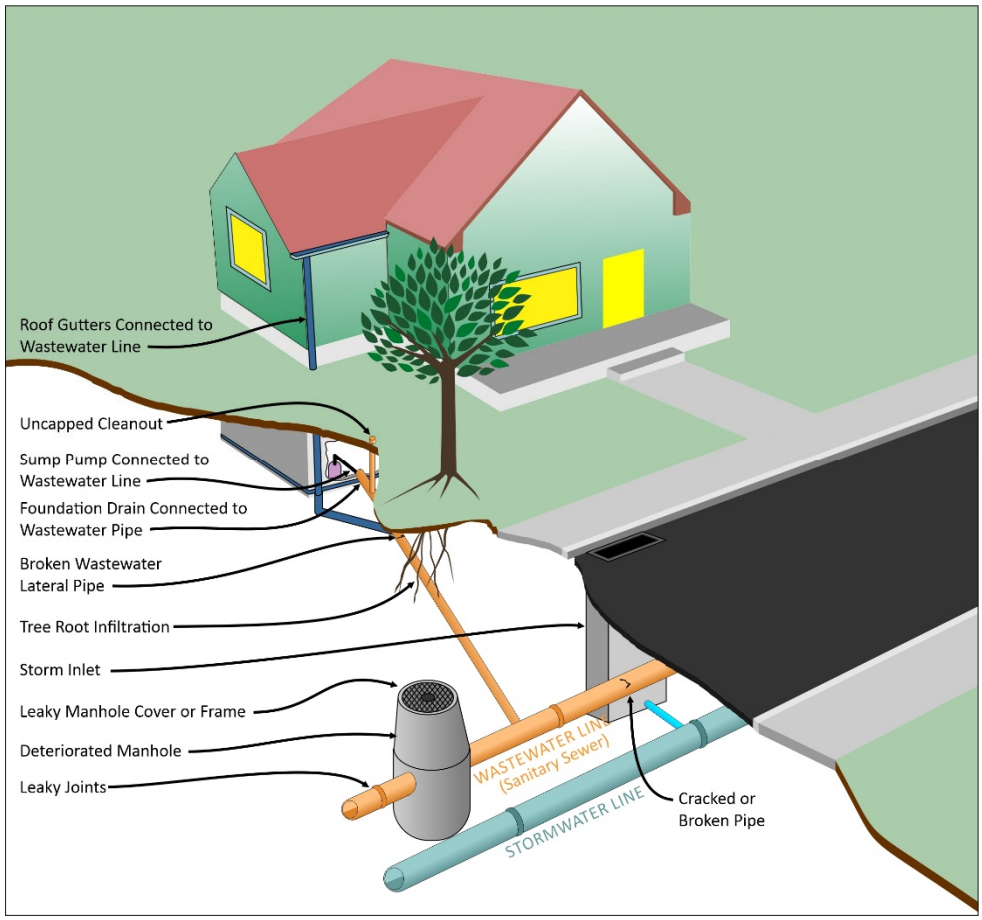
- March 20 – 182 WIBs
- May 19 – 112 WIBs
- Both events – 50 WIBs

The City began investigating the WIB reports as they came in and mobilized their own crews, which are dedicated to maintaining the City sewers. Additionally, the City also teamed with Burgess & Niple who utilized a contractor to perform cleaning and inspection of sewers after the 2020 storm events to further investigate sewers with WIB clusters or WIBs during both storm events. Evaluation of the WIB sewer inspection showed that while there are some things the City can do to further prevent WIBs it seems that WIBs may also be attributed to issues pertaining to the privately-owned infrastructure.

2.0 Introduction

Sanitary sewers are intended to receive flow produced from inside a residence or business such as from sinks, toilets, showers, washing machines, etc. Sanitary flow is conveyed to the publicly-owned sanitary sewer through a privately-owned sanitary lateral that is owned and maintained by each respective property owner. A separate, publicly-owned storm sewer is designed to handle runoff produced during rain events. Rainfall collected via the roof of a building is conveyed either to the street or directly to the publicly-owned storm sewers through the privately-owned downspout storm lateral. Connections between the storm and sanitary systems are strictly prohibited.

The City is currently in year 4 of a 12-year program called the Sustainable Sewer Solutions Design to rehabilitate the sanitary collection system in areas with high I/I. The Sustainable Sewer Solutions Design program builds on past studies and planning work identifying areas with high I/I and rehabilitates the sanitary sewers, manholes and laterals. Total cost of the program is estimated to be $19,487,737 and is on track to be completed in 2028.



To provide residents with a high level of service and effectively maintain the sewers, the City has equipment designed to clean storm and sanitary sewers with high pressure water and inspect the sewers via a closed-circuit television camera. The equipment is used to evaluate the condition of the pipe and provide inspection data to help determine the cause and resolve any issues that arise within the sanitary sewer. In addition to the specialized equipment/vehicles the City also has staff that are dedicated to

cleaning and inspecting the sewers year-round except for leaf removal during the fall and snow/ice removal during the winter.

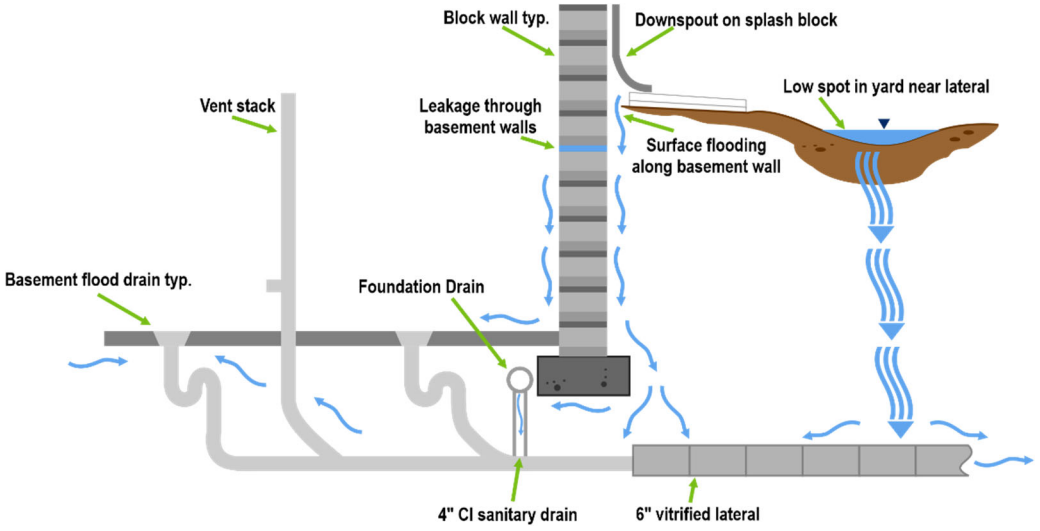
Last year Central Ohio experienced a higher than normal rainfall, and this year has been no different. Between January 1, 2020 and September 9, 2020 Columbus Ohio has gotten 38.97" of rainfall, which is 10.37" over where we historically on average should be for the year. Contributing to the excess rainfall were events that occurred on March 20 and May 19, that resulted in storms with an approximate intensity of a 25-year return period storm. Meaning, that these storms are estimated to occur once in every 25 years and as such are much more intense than a typical Central Ohio storm that is under a 2-year return period storm.

During the events that occurred on May 19 and March 20, the City experienced a high amount of calls from residents reporting water in basement (WIB). In total, the City received 244 WIB reports with a breakdown as follows (See exhibit in Appendix A):

- March 20 – 132 WIBs
- May 19 – 62 WIBs
- Both events – 50 WIBs

3.0 Potential Cause for Water in Basement

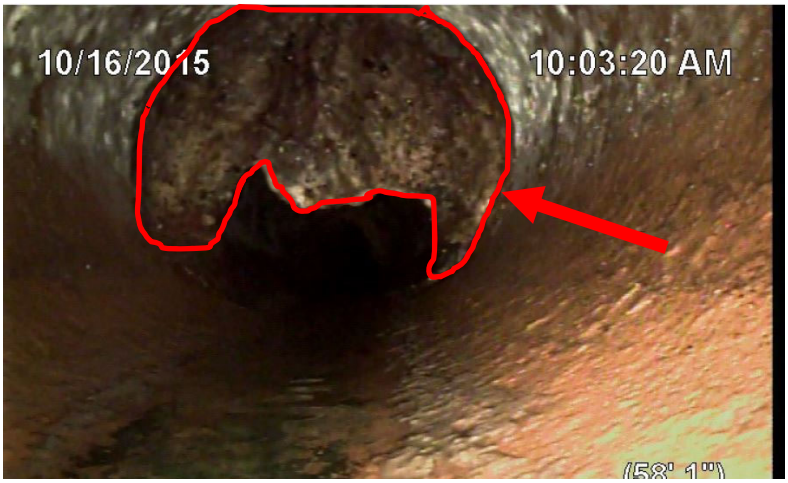
Water most commonly enters a residence through foundation drains and/or a bathroom located in the basement. While the most logical explanation for water entering via those pathways would be explained as an issue with the sanitary sewer, that is not always the case. A thorough understanding of the separate sanitary and storm systems along with ways in which the water can back up into a basement are necessary.



SANITARY

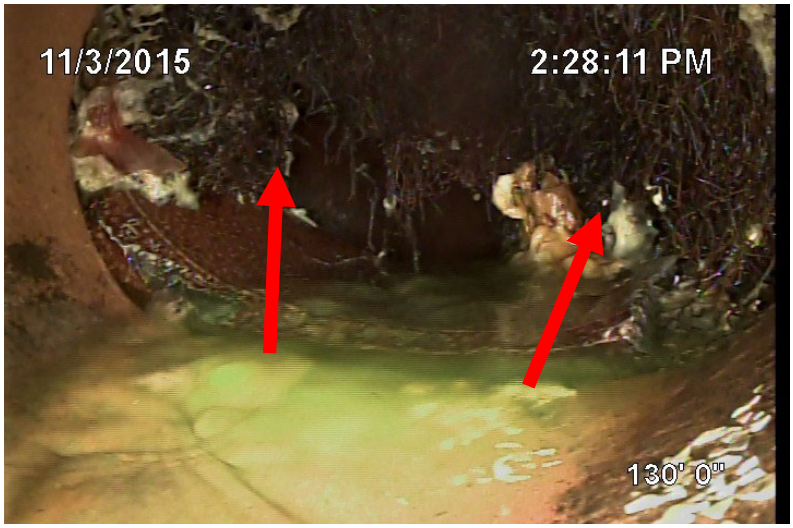
While both sanitary and storm sewers are separate systems, rainfall can and still does enter the sanitary sewer through defects/leaky joints in the sanitary mains, sanitary laterals (private) and building foundation drains. Water entering the sanitary\ system through these pathways can cause an overload to the system where the depth of flow in the sewer would rise and could eventually lead to a WIB.

Another potential sanitary sewer cause of a WIB is reduced capacity caused by hydraulic deficiency (small pipe size), roots, debris, grease, mineral deposits, or anything else that would effectively reduce the cross-section area of a pipe. During times of higher flow, such as rain events, a reduction in cross-section area has the potential to cause flow levels to increase upstream of the obstruction and backup into basements or overflow through manhole lids. The City's sanitary sewer is more commonly located in the rear yards and share the space with mature trees and landscaping that can lead to root intrusion. As discussed further in this report, the City has devoted extensive resources to cleaning and inspecting sewers therefore reducing the likelihood that these types of obstruction exist.



Mineral Deposit in Sanitary Lateral

Similarly, to how I/I can enter the public sanitary sewer via defects and leaky joints, it can and does enter via those same pathways into the private sanitary lateral. To further exacerbate the issue, sanitary laterals are not often inspected by the homeowner and therefore defects allowing water into the sewer are common and obstructions such as roots, debris, grease, etc. that reduce the capacity of the lateral often go unnoticed until issues arise that require a plumber. Root intrusion in a lateral is especially an issue with sewers located in rear yard areas that have mature trees, as is the case in the City. While cleaning efforts by the City will remove the roots in the public sanitary sewer, it does not solve the issue of roots in the private sanitary lateral.



Roots in Sanitary Lateral

STORM

Similarly, to how storm sewers are designed to convey rain water away from public/private property, downspout storm laterals collect roof rainfall and direct water towards the street and into the storm sewer per City ordinance. These storm laterals are typically very shallow and are prone to structural issues and obstructions such as roots and debris (soil/rocks). If defects exist that would reduce the capacity of a storm lateral, flow has the possibility of backing up at the connection of the downspout drop to the downspout leader, down the basement wall, into the house foundation drains and into the private sanitary lateral. Storm water has the potential of then entering the basement via floor drains.

Rear yards are commonly designed to slope towards the road and direct any runoff to the street and into the storm sewer. If it is not practical to do so, rear yards may be sloped to one side of the property and used as overland flood routing, which will ultimately be directed towards the storm sewer. Over time, the homeowners may install fencing, landscaping, and/or other obstructions that can cause ponding in the rear yards. If this ponding happens over a rear/side yard sanitary sewer and/or the sanitary lateral, then the rain water may make its way into the sanitary system as I/I.

Ponding over sanitary sewer and sanitary lateral during rainfall simulation

Other clean water connections such as downspouts, sump pumps and/or area drains may exist in the system that the City is unaware of. These connections are typically installed by the homeowner and act as a direct source for rain water to enter the sanitary system and cause flow levels to rise drastically during wet-weather resulting in a WIB.

Ponding over sanitary lateral during rainfall simulation

4.0 Response/Investigation

The City mobilized during and after the May 20th event as WIB complaints came in. Upon arrival, their first step is to open manhole lids and view from the surface to ensure the sanitary system is still flowing and immediately take action on any locations where they find the system is not flowing. The City then worked with its GIS section to map all reports of WIBs. The GIS mapping was used to focus CCTV sewer inspection on cluster and repeat locations. This CCTV inspection allows for the internal assessment of the sanitary sewer and locate any possible issues not visible from the initial manhole inspections.

Beginning on May 22nd, the City teamed with Burgess & Niple who was currently engaged on a separate project with a sewer inspection contractor FeeCorp to allow for a quicker response to cluster and repeat locations. Cleaning was performed as necessary by the City to remove obstructions. In total, the City and B&N performed inspection on sewers associated with 74 WIB properties.

5.0 Findings

The City has continued to do their due diligence in maintaining the sanitary as is evident with their cleaning program steadily increasing the amount of sanitary sewers cleaned every year for the last five years. The general guidelines for sanitary sewer maintenance operations is to completely inspect your sewer system once every ten years, at a minimum. The City has cleaned 61% of their sanitary system over the last 5 years, showing their commitment to maintain the system and provide a high level of service to their residents.

CCTV

Sewer inspection focused on areas that either had a cluster of WIBs or properties that experienced WIBs during the March 20 and May 19 events. Inspection findings summary is listed below:

- Hydraulic Deficiency – 5
- Mineral Deposit – 7
- Obstruction – 35
    - 9 instances were due to a very large rock in the sewer
    - 23 instances due to very patio paver or landscaping rock in the sewer
- Roots – 8
    - Two of which are in the private lateral
- Unknown – 20
    - Likely attributable to private issue

Refer to Appendix B for further inspection findings.

Sewer Location

A majority of sewers are located in rear/side yards which are areas that are more likely to experience flooding. These areas area also more likely to have mature trees with large root systems. Root intrusion is likely to happen in sanitary sewers, but more likely in laterals that are shallower than the sewers. The City addresses root intrusion in the sewers with their preventative cleaning and root foaming programs. Homeowners may not address their issue unless they have a problem. Roots in combination with rear yard ponding is more likely to result in a backup.

WIB Sanitary Sewer Location	
Front	55
Rear/Side	189

Sanitary Sewer Capacity

A total of 208 individual sanitary sewer segments received flow from the 244 properties that experienced a WIB on May 20 and March 19. Of the 208 sanitary sewer segments, a vast majority had over 50% available capacity during wet-weather flows. Meaning that at most, the pipes were roughly half full leaving half of the pipe available for additional flow. A small portion of the sewers had less than 25% capacity and of those a very small percent were at or exceeding their capacity. The reason pipes are exceeding 100% of their capacity is likely due to flat slope paired with I/I, meaning that the flow can only go so fast due to the grade with which the sewer was constructed. See the following table for a breakdown of sanitary sewer capacity.

Sanitary Sewer Capacity	
0% - 50%	198
51% - 75%	7
76% - 100+%	3

6.0 Recommendations

- Some sanitary sewers may need to be added to the City's annual lining program and should be considered on a case-by-case basis. The City should extend their current lining program to include sewers with root control issues. Sewers found during the investigation with roots should first be placed on the root foaming program. The City should document root intrusion in lines that are on the typical 3-year cycle. Any sewer lines with aggressive root regeneration should be added to an annual lining program.

- **Public Works Budget** - $45,000 should be budgeted for additional and continued repairs due to additional lining from repeat root intrusion and mineral deposit that is not responding to the 3-year cycle.

- Cleaning the sanitary sewers is a critical component in maintaining the sewers and preventing WIBs. The City should continue to clean the sewers as they have been and include sewers having issues with roots or mineral deposits on a more frequent inspection basis to guide the cleaning and root foaming frequency.
  - Public Works - should continue annual cleaning and televising contract in addition to the work Public Works crews do each day to maintain our CMOM requirements ($225,000).
  - **Public Works Budget** - $30,000 should be include for adding line segments to the root control program.
  - **CIP Budget** - $15,000 annually should be added to the City's CIP Sanitary Sewer and Repairs program (currently budgeted at $130,000) to cover additional cost of repairs found during routine inspection.
- Bolt Down Manholes - As previously identified, 33 WIBs occurred in the vicinity of Harwitch Rd., Kirkley Rd., Inchcliff Rd., and North Star Rd. due to very large rocks (boulders) and patio pavers. It is very likely that these obstructions were put in the sewers by individuals. To prevent this from happening in the future, the City should evaluate their system and replace existing sanitary manhole frames and lids with bolt down frames and lids in areas where large rocks and patio pavers were found and also near parks, streams and other facilities where children can play. Bolting the lids down will limit access to the sewers may not be obtained without the proper equipment. Installing bolt down lids was a successful alternative used by neighboring community Marble Cliff in locations where individuals were putting tree limbs and other debris in to the sewer causing overflows and WIBs.
  - **Public Works Budget -** $10,000 added annually to the Sanitary Sewer Surcharge Fund under materials and supplies to purchase bolt down manhole lids (these vary from $1,500 - $2,500 each)
- Backflow Preventers - Backflow preventers may be recommended on a case-by-case basis for properties with multiple sanitary WIBs and have an existing sump pump for their foundation drains, but may not be a good option for most properties. Backflow preventers are designed as a one-way valve and will allow water out but not in. If the residence in question has an issue with their privately-owned sanitary and storm infrastructure, installing a backflow preventer will not stop a WIB.
  - Homeowner should secure the services of a plumber to first inspect their sewer lateral and assure it is free of obstructions.
  - Homeowner should also determine the condition of the downspout laterals to assure they are free of obstructions and compliant with City ordinances.
  - Homeowner should perform an assessment of their property to assure that all requirements related to storm runoff are in compliance with City ordinances, no downspouts or area drains or connected to the sanitary lateral, at no time is surface runoff directed towards their house which may travel down the basement wall and into the basement through floor drains.

  A backflow prevention program should be set up to both establish qualifying requirements for a property to receive a backflow preventer and to either completely or partially cover the cost of

installing a backflow preventer assuming that the property/building meets the requirements. Potential reimbursement would be approximately $4,000 per property.

- Public Education - The City should continue to educate the public about their privately-owned infrastructure, how to maintain it and possible outcomes if it is ignored. Education should focus on identifying how WIBs occur, how the City is working to prevent them such as their cleaning and rehabilitation program and steps the property owner should take such as cleaning/inspecting the sanitary lateral and storm lateral.

- Public Education – The City should create public outreach material specifically focused on the private storm lateral and private sanitary lateral maintenance. Materials should focus on what each does and the potential impact if left ignored (WIB). Also that this infrastructure must be inspected and maintained as one of the qualifications to receive a backflow preventer.

APPENDIX A – Exhibits

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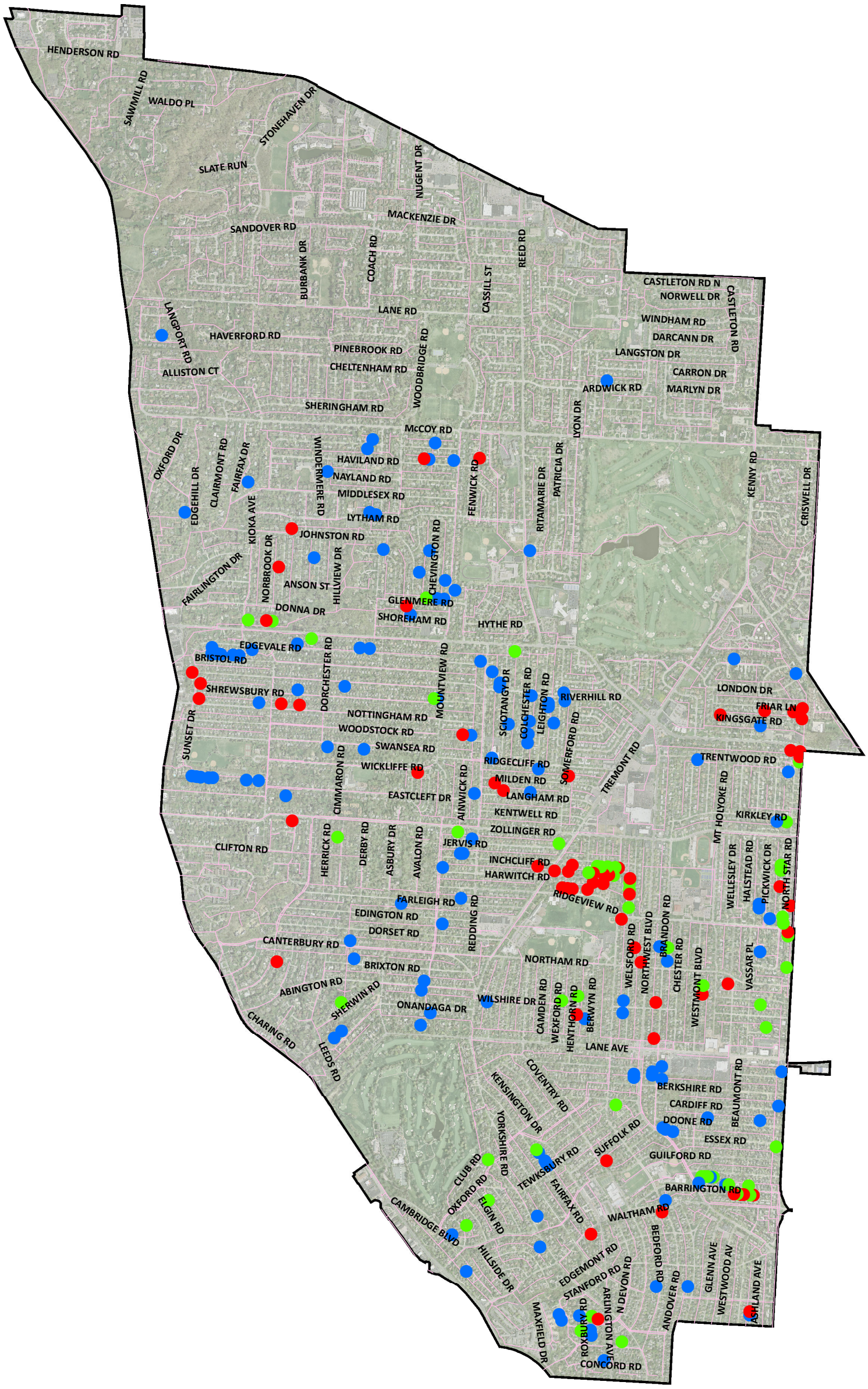

Water In Basement - 244 Total

- March 20 - 132
- May 19 - 62
- Both - 50
- Sanitary Sewer

N

0 1,100 2,200 4,400 Feet

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CITY OF UPPER ARLINGTON, OHIO
DEPARTMENT OF PUBLIC SERVICE
2020 WIB EVENTS
WIB LOCATIONS

BURGESS & NIPLE
Engineers ■ Architects ■ Planners

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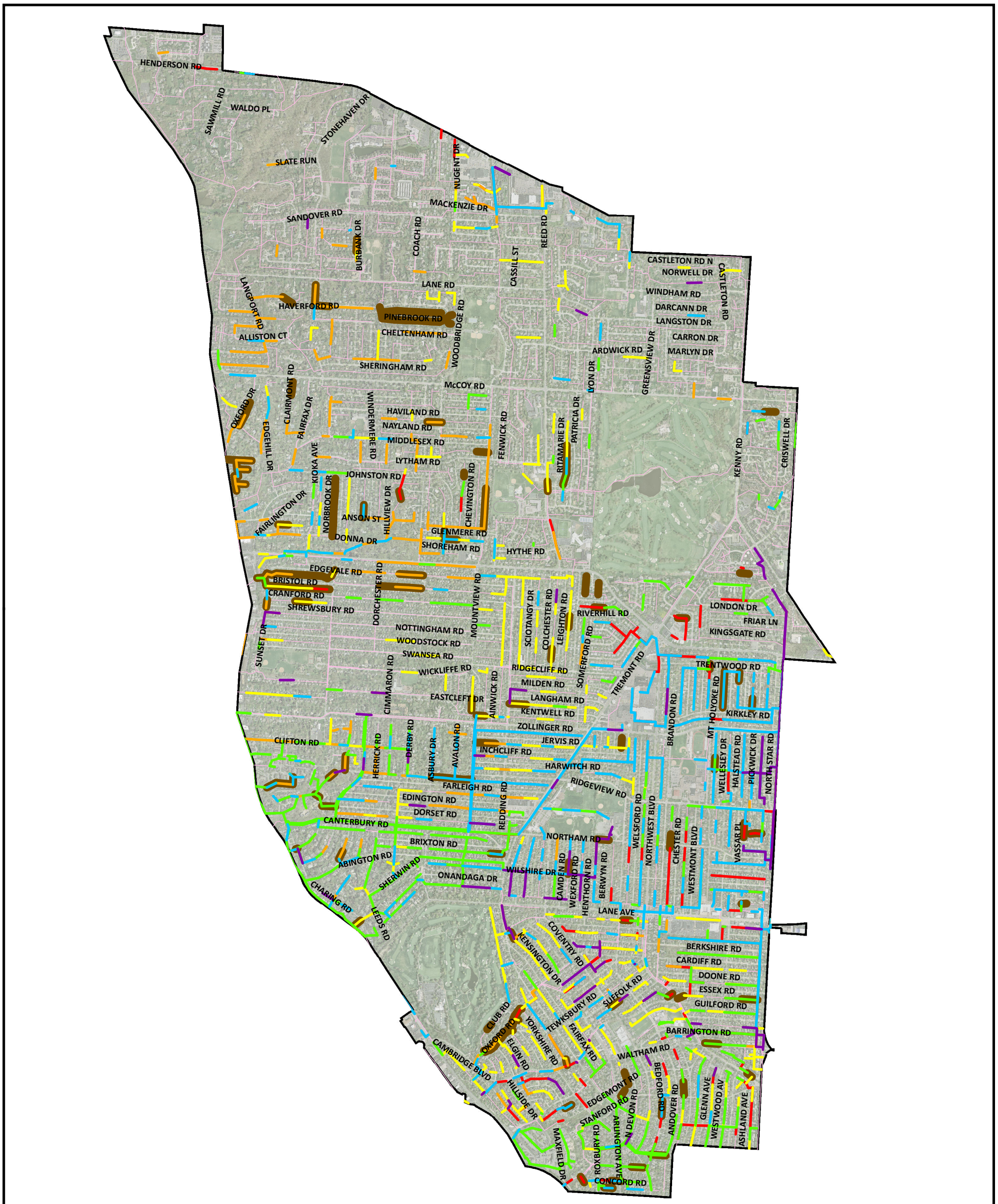

Sewer Cleaning

- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- Root Foaming
- Sanitary Sewer

N

0 1,100 2,200 4,400 Feet

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CITY OF UPPER ARLINGTON, OHIO
DEPARTMENT OF PUBLIC SERVICE
2020 WIB EVENTS
SEWER CLEANING LOCATIONS

BURGESS & NIPLE
Engineers ■ Architects ■ Planners

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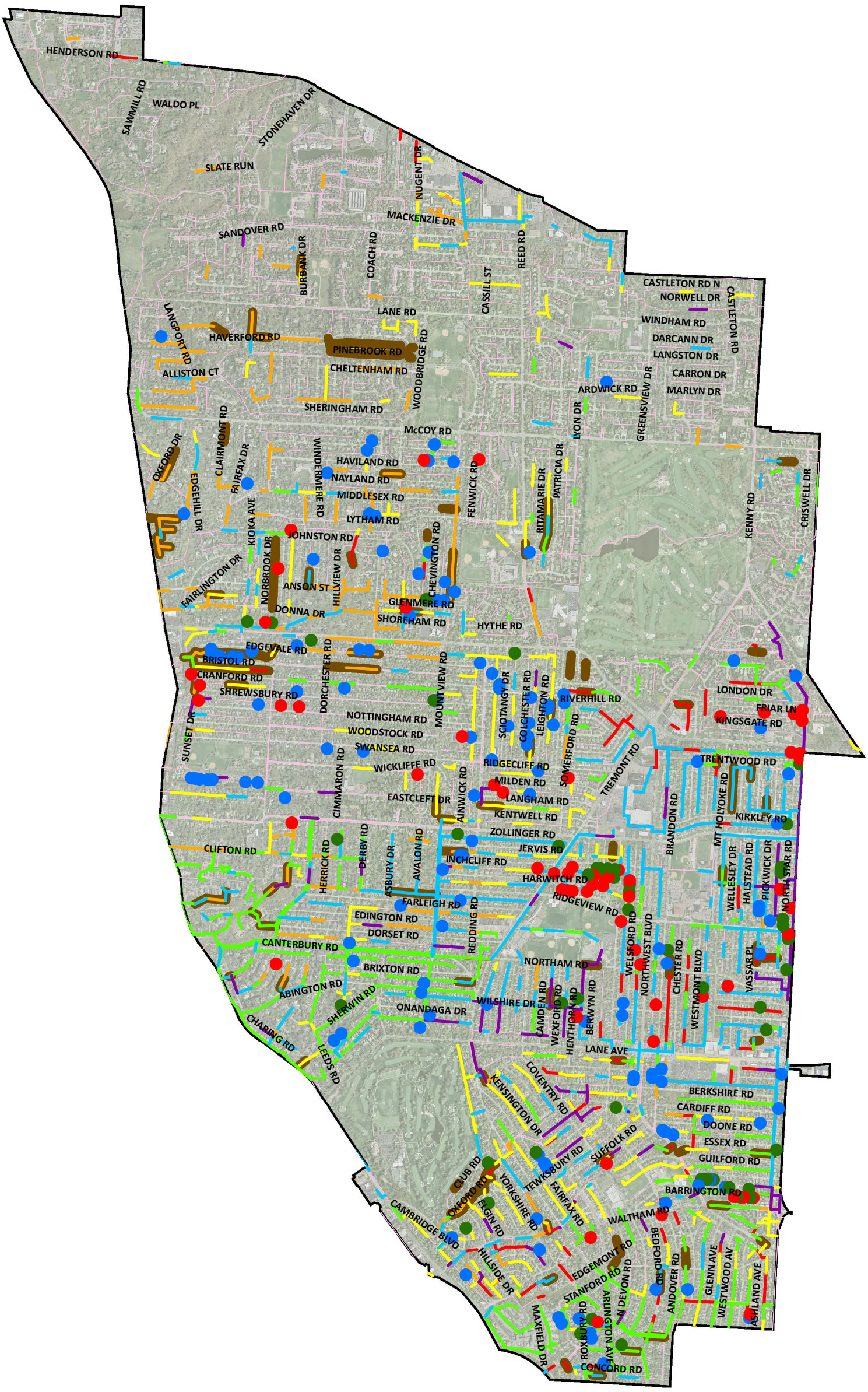

Water In Basement - 244 Total

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Sewer Cleaning

- 2015
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- 2018
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- 2020
- Root Foaming

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0 1,100 2,200 4,400 Feet

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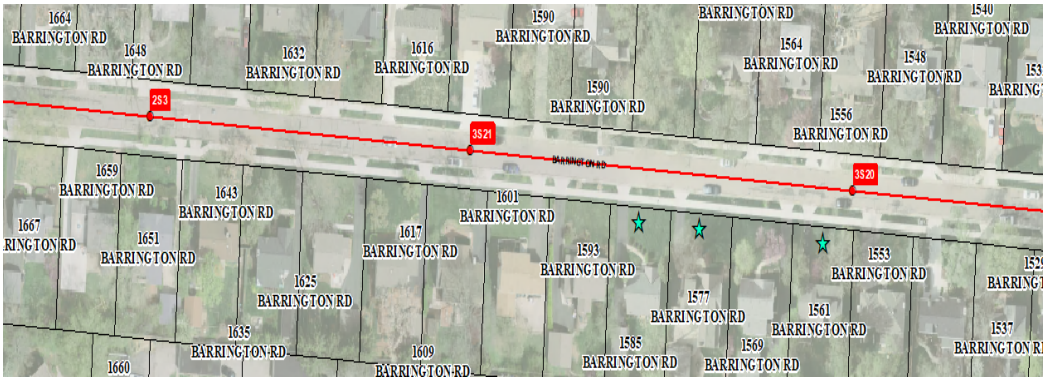
CITY OF UPPER ARLINGTON, OHIO
DEPARTMENT OF PUBLIC SERVICE
2020 WIB EVENTS
CLEANING & WIB LOCATIONS

BURGESS & NIPLE
Engineers ■ Architects ■ Planners

APPENDIX B – Sewer Inspection Results

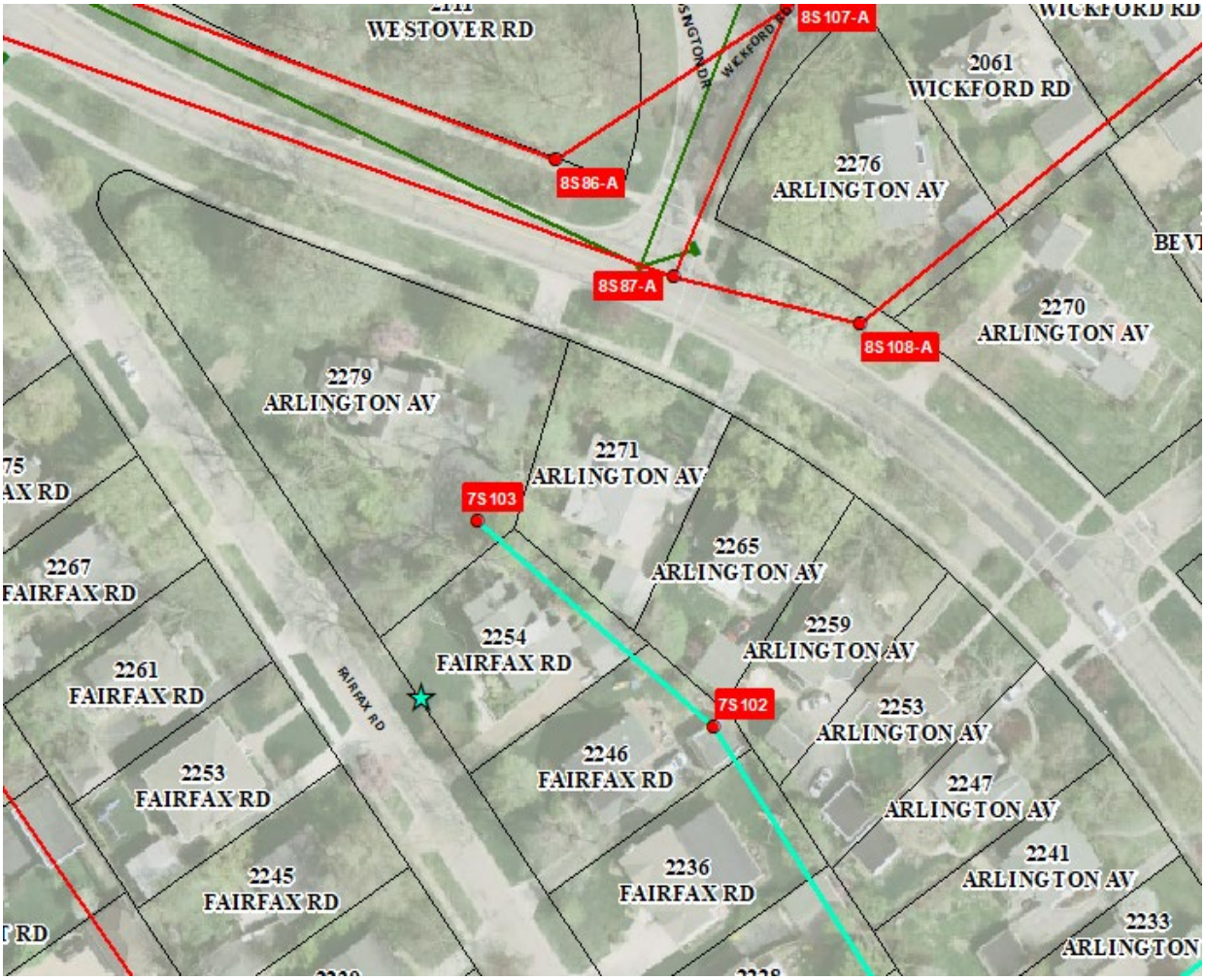
WIB Sewer Inspection Summary			
Address	WIB Date	Probable Cause	Comment
1335 Kirkley Rd	Both	Obstruction	Boulders and obstruction North Star Sewer in sewer reduced capacity
1339 Friar Ln	5/19/2020	Obstruction	Boulders & Large Rocks Removed
1460 Kingsgate Rd	5/19/2020	Unknown	Unknown / Possibly Private Lateral
1462 Osborn Rd	Both	Unknown	None Visible
1465 Westminster Dr	Both	Unknown	Minor roots and ragging in lateral
1561 Barrington Rd	Both	Hydraulic Restriction	A bad sag on 3S21:3S22 at 150' or so. Happened a couple additional times along surveyed lines, the sags seemed to coincide with where WIBs were the worst. The sags caused the pipe to go from about 20% capacity up to 50%-100% depending on location. Severely limited visibility. Resident from 1564 Barrington said that the backup appeared clear, no smell while it was in his basement. Backed up around 6”. **•cause hydraulic deficiency because of Sag and possible flat slope** **•Pipe over 100 percent capacity during wet-weather.**
1577 Barrington Rd	5/19/2020	Hydraulic Restriction	A bad sag on 3S21:3S22 at 150' or so. Happened a couple additional times along surveyed lines, the sags seemed to coincide with where WIBs were the worst. The sags caused the pipe to go from about 20% capacity up to 50%-100% depending on location. Severely limited visibility. **•cause hydraulic deficiency because of Sag and possible flat slope** **•Pipe over 100 percent capacity during wet-weather.**
1585 Barrington Rd	5/19/2020	Hydraulic Restriction	A bad sag on 3S21:3S22 at 150' or so. Happened a couple additional times along surveyed lines, the sags seemed to coincide with where WIBs were the worst. The sags caused the pipe to go from about 20% capacity up to 50%-100% depending on location. Severely limited visibility. **•cause hydraulic deficiency because of Sag and possible flat slope**
1649 Grenoble Rd	Both	Roots	•Root ball just upstream of 2-77 **•cause roots**
1665 Grenoble Rd	Both	Roots	•Root ball just upstream of 2-77 **•cause roots**
1681 GRENOBLE RD	Both	Roots	•Root ball just upstream of 2-77 **•cause roots**
1770 Harwitch Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1771 Harwitch Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1771 Roxbury Rd	Both	Unknown	•Cause unknown, main was clear with signifiant slope, lateral looked open
1787 Inchcliff Rd	5/19/2020	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1797 Inchcliff Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1804 Roxbury Rd	Both	Hydraulic Restriction	•Point Repair in segment 06-23A-24 before entering manhole 06-24. Repair has dropped and is causing a flow restriction. •Manhole 06-24 seems to be holding water. Could be because of debris and/or could be because of flat slope. •Did Public testing Here. **•cause hydraulic restriction**
1806 Harwitch Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1816 HARWITCH Rd	5/19/2020	Obstruction	Landscape Rock Removed
1817 Inchcliff Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1828 HARWITCH Rd	5/19/2020	Obstruction	Landscape Rock Removed
1833 Harwitch Rd	5/19/2020	Obstruction	Landscape Rock Removed
1833 Inchcliff Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1841 Inchcliff Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1854 Harwitch Rd	5/19/2020	Obstruction	Landscape Rock Removed
1857 Harwitch Rd	5/19/2020	Obstruction	Landscape Rock Removed
1868 Harwitch Rd	Both	Obstruction	Patio Paver Block in Sewer, Created Sewer Obstruction and reduced capacity
1873 CHATFIELD RD	Both	Unknown	None Visible
1876 Ridgeview Rd	5/19/2020	Obstruction	Landscape Rock Removed
1899 INCHCLIFF Rd	5/19/2020	Obstruction	Landscape Rock Removed
1914 Ridgeview Rd	5/19/2020	Obstruction	Landscape Rock Removed
1916 HARWITCH RD	5/19/2020	Obstruction	Landscape Rock Removed
1926 RIDGEVIEW RD	5/19/2020	Obstruction	Landscape Rock Removed
1930 JERVIS Rd	Both	Mineral Deposit	•Significant Deposits Attached downstream •3 occurrences of I/I • small deposits attached **• Deposits Attached, could reduce sewer capacity**
1940 Ridgeview Rd	5/19/2020	Obstruction	Landscape Rock Removed
1945 Fishinger Rd	Both	Unknown	None Visible
1950 HARWITCH Rd	5/19/2020	Obstruction	Landscape Rock Removed
1956 Chelsea Rd	Both	Roots	**•Root ball immediately upstram of manhole 06-39**
2150 Glenmere Rd	Both	Roots	**•medium roots, this area is in the 2023 SSSD Area.**
2176 Shrewsbury Rd	Both	Mineral Deposit	•59 occurrences of mineral deposit between 5% - 30% •Lateral enters into manhole 17-85 **•cause mineral deposit**
2183 ZOLLINGER RD	Both	Unknown	None Visible
2249 Yorkshire Rd	Both	Roots (Private)	Roots in line (20%). Heavy roots and ragging in lateral.
2254 Fairfax Rd	Both	Unknown	sewer main has been lined in 1992, home and service is located in the last upstream section of main. Would suspect this is a private lateral issue.
2370 Club Rd	Both	Unknown	None Visible
2459 FISHINGER RD	Both	Unknown	•23-27-28 MSA due to deposit. •inspections had 2 occurrences of I/I. Multiple occurrences of minor roots and minteral deposits. **•cause unknown, this home is loacted 3rd house from end manhole on the last upstream sewer section, however downstream there is the SSSD 2020, 2021, 2022 Projects**
2566 FISHINGER Rd	Both	Unknown	•Sewer Main is lined. Laterals are not. •Sewer very close proximity to stream •4 occurrence of I/I @ lateral/liner interface **•cause unknown, this area is in the 2020 SSSD Area and downstream of future SSSD improvement areas 2021, 2022 and 2023**
2600 Henthorn Rd	5/19/2020	Unknown	In progress
2624 Westmont Blvd	Both	Roots (Private)	Some Roots in Lateral
2646 Henthorn Rd	Both	Unknown	In progress
2651 N Star Rd	Both	Mineral Deposit	•Grit and heavy calcium deposits
2723 N Star Rd	Both	Mineral Deposit	•Grit and heavy calcium deposits
2731 N STAR RD	5/19/2020	Mineral Deposit	Calcium Deposits / Grit Removed
2738 Brandon Rd	Both	Mineral Deposit/Roots	Heavy deposits around lateral. Mainline has moderate deposits and roots, ~10%. BVV, doesn't affect pipe operation however.

WIB Sewer Inspection Summary			
Address	WIB Date	Probable Cause	Comment
2757 N Star Rd	Both	Unknown	In Progress
2773 N Star Rd	Both	Unknown	In Progress
2800 N Star Rd	5/19/2020	Mineral Deposit	Calcium Deposits / Grit Removed
2800 NOTTINGHAM Rd	5/19/2020	Obstruction	Pipe Collapse / Repaired
2857 N Star Rd	5/19/2020	Unknown	In Progress
2859 WELSFORD Rd	Both	Unknown	•Cause unknown, last home on the upstream end of the sewer, however is upstream of Harwitch obstruction
2889 Welsford Rd	5/19/2020	Obstruction	Landscape Rock Removed
2893 N Star Rd	Both	Unknown	In Progress
2905 N Star Rd	Both	Unknown	In progress
2927 Welsford Rd	5/19/2020	Obstruction	Landscape Rock Removed
3139 Leeds Rd	Both	Hydraulic Restriction	Some roots in lateral (15%), sags (50% by waterline) before and after lateral.
3154 N Star Rd	Both	Obstruction	Boulders and obstruction in sewer reduced capacity
3166 N Star Rd	5/19/2020	Obstruction	Boulders & Large Rocks Removed
3180 N Star Rd	5/19/2020	Obstruction	Boulders & Large Rocks Removed
3185 N Star Rd	5/19/2020	Obstruction	Boulders & Large Rocks Removed
3266 Westbury Rd	5/19/2020	Obstruction	Boulders & Large Rocks Removed
3281 WESTBURY Dr	5/19/2020	Obstruction	Boulders & Large Rocks Removed
3296 Westbury Dr	5/19/2020	Obstruction	Boulders & Large Rocks Removed
3598 SUNSET Dr	5/19/2020	Obstruction	Pipe Collapse / Repaired
3627 SUNSET DR	5/19/2020	Obstruction	Pipe Collapse / Repaired / Possible
3750 Kioka Ave	Both	Unknown	•Sewer is lined. Laterals are not. •Sewer very close proximity to stream •4 occurrence of I/I @ lateral/liner interface **•Cause unknown, this area is in the 2020 SSSD Area and downstream of future SSSD improvement areas 2021, 2022, 2023**



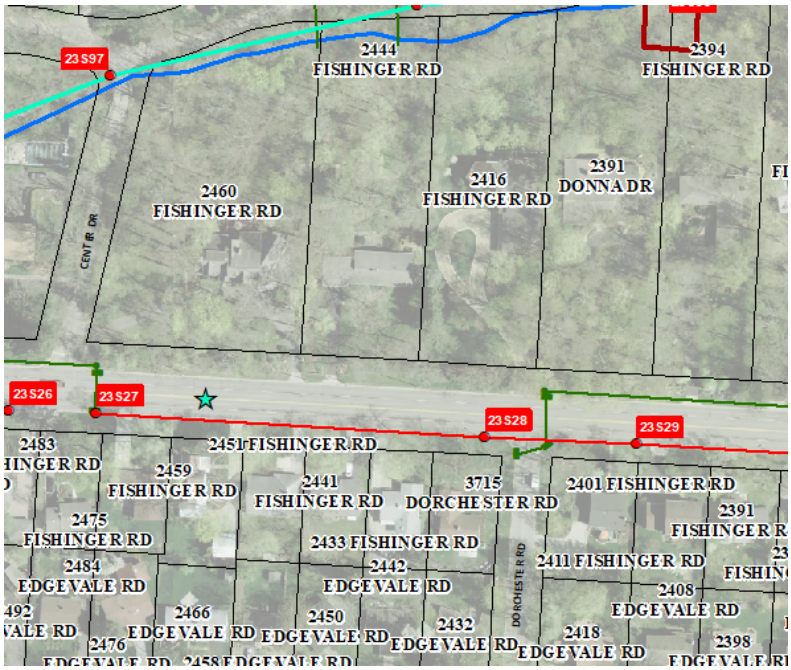
1561, 1585, 1577 Barrington

SAG 220’ downstream from manhole 3-21. **WIB cause possibly hydraulic deficiency caused by sag and flat slope.**



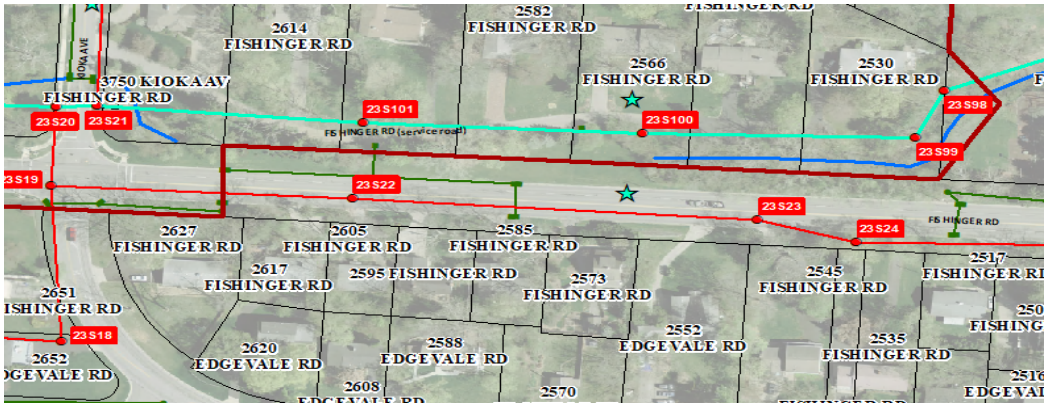
2254 Fairfax

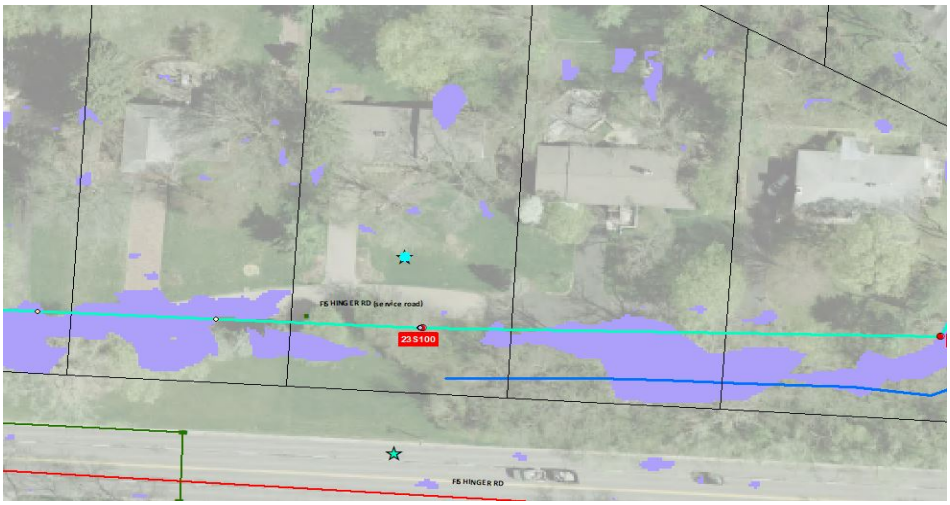
Sewer Main Rehabilitated in 1992. Last home on upstream sewer section would suspect private lateral issue.



2459 Fishinger

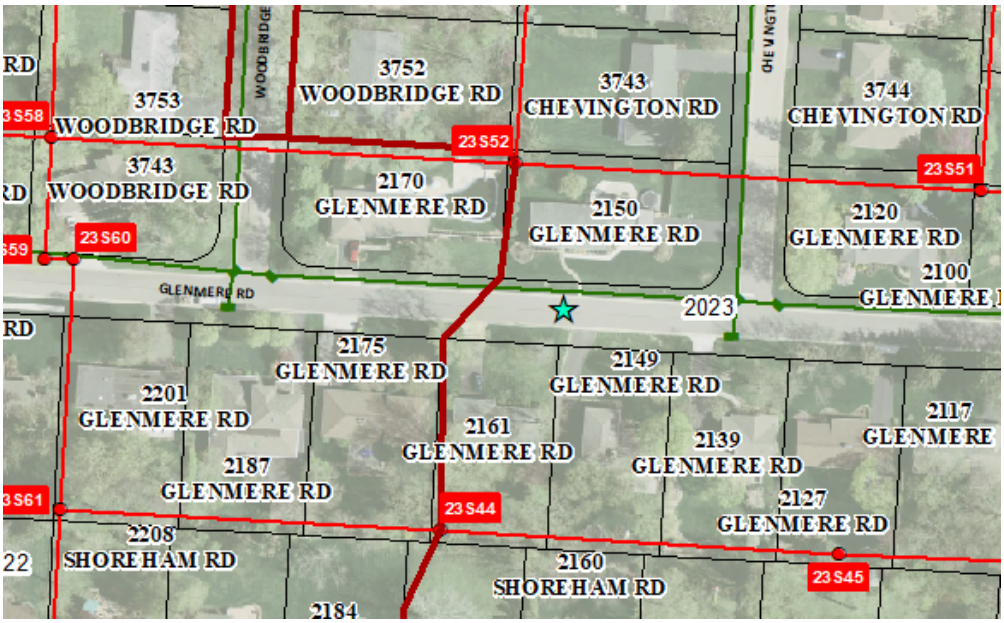
23-27-28 inspection incomplete due to minor mineral deposits. **Nothing present that would cause backup and no significant ponding on property.**





2566 Fishinger Road

Sewer very close proximity to stream with some localized ponding over sewer and lateral. Sewer main lined laterals not. 4 occurrences of I/I at tap/liner



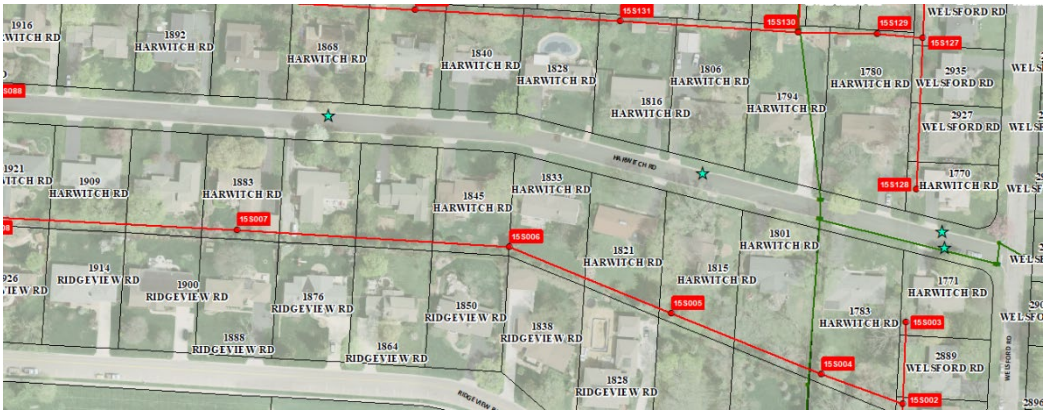
2150 Glenmere Rd.

Roots 150’ downstream from 2150 Glenmere Road.

WIB cause possibly Roots.

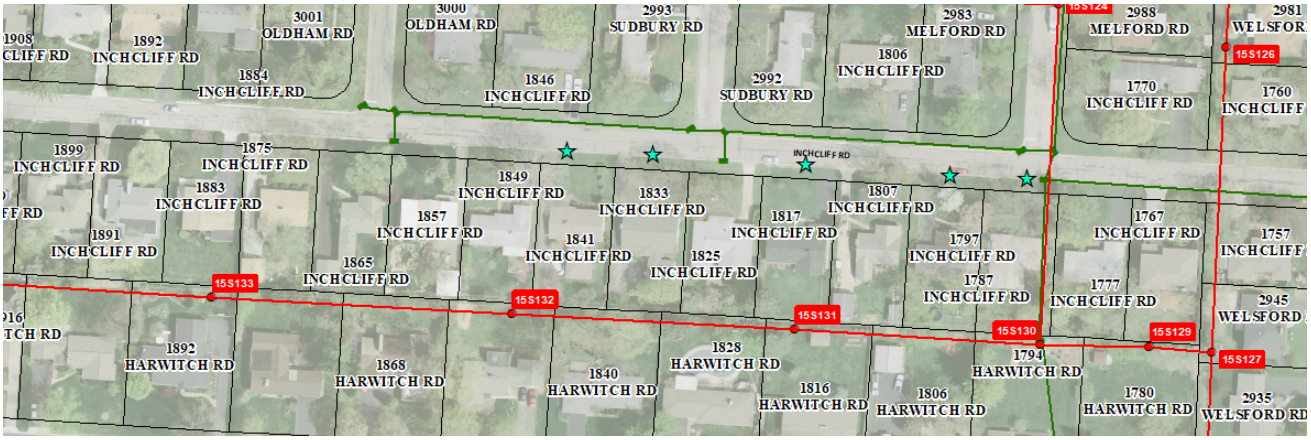
1649, 1665, 1681 Grenoble

Root ball just upstream of manhole 2-77. **WIB cause possibly root ball.**



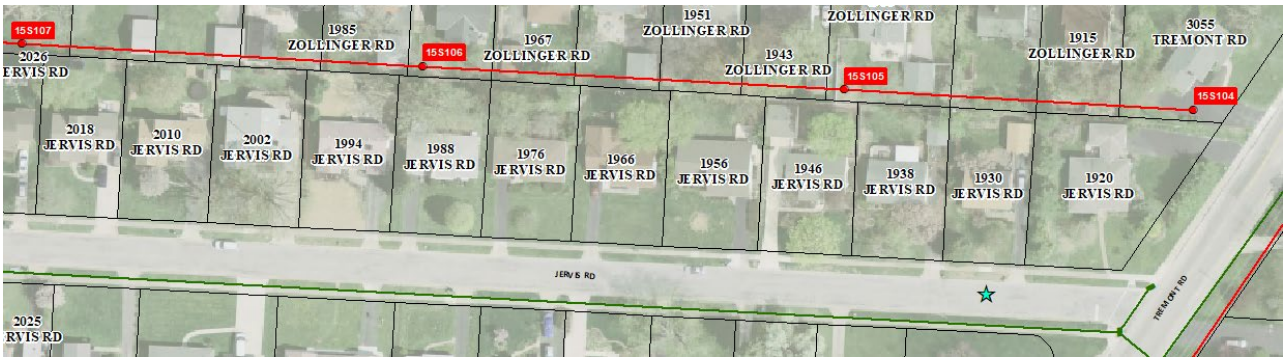
1770, 1771,1806, 1868 Harwitch Rd.

Paver block found in Tremont Sewer. **WIBs caused by paver obstruction in sewer .**



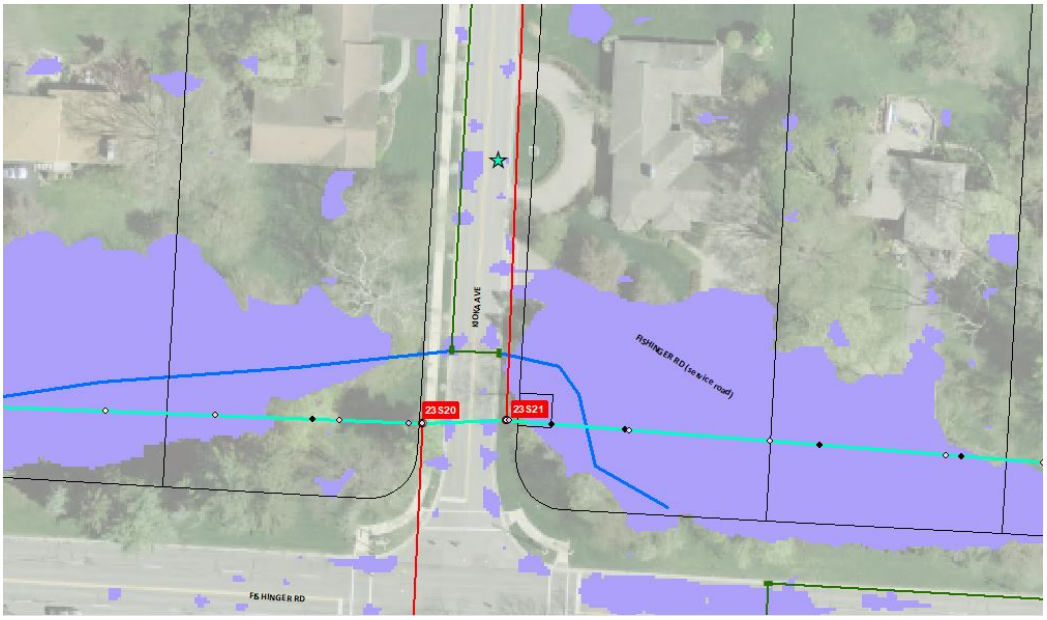
1787, 1797, 1817, 1833, 1841Inchcliff

Paver found in Tremont Sewer. **WIBs caused by paver obstruction in sewer .**

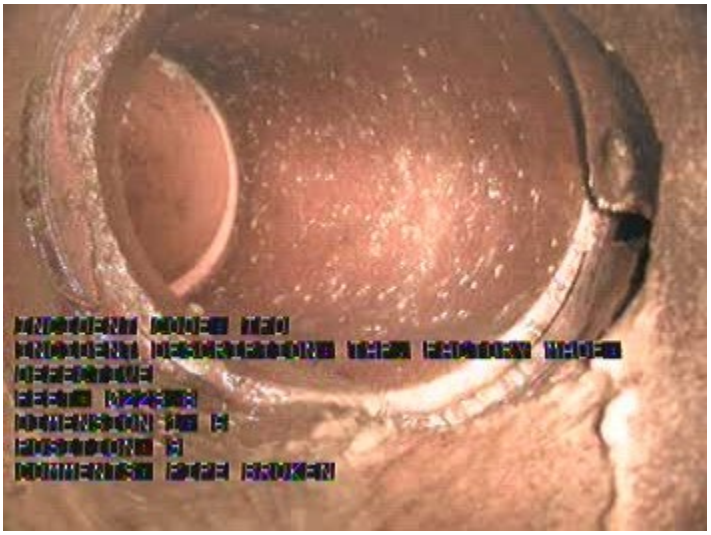


1930 Jervis

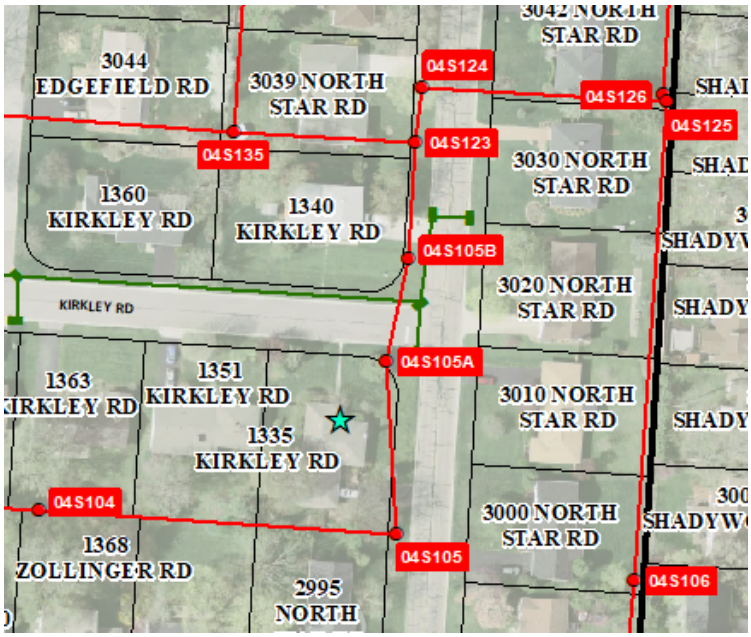
No observed issues that would cause backup 3-minor occurrences of I/I. **Downstream Encrusteacean and deposits could reduce sewer capacity.**



3750 Kioka Avenue

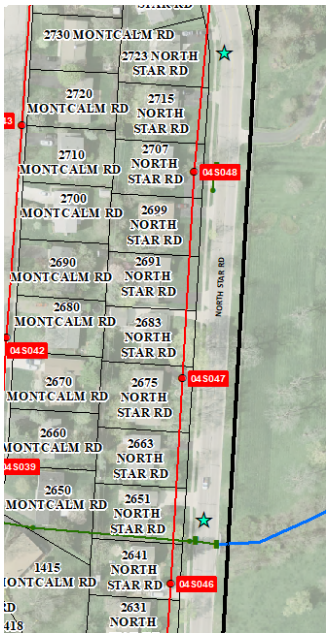


Sewer very close proximity to stream with significant surface ponding. Sewer lined laterals not. 4 occurrences of I/I at tap/liner interface. **Nothing present that would cause backup**



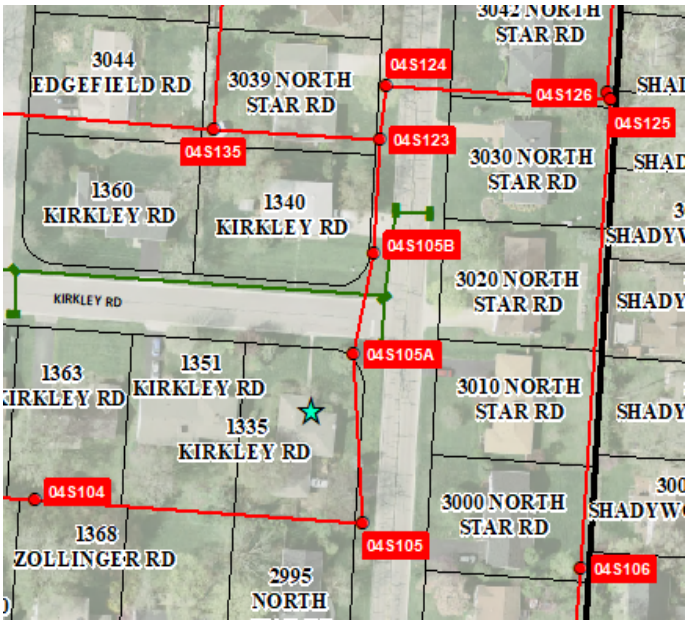
1335 Kirkley Road

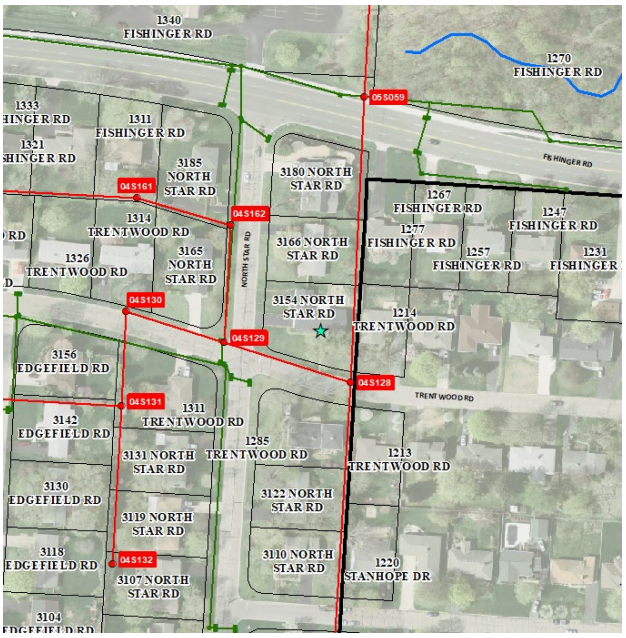
Obstruction near manhole 4S126. **WIB cause possibly rocks.**



2651, 2723 NorthStar Rd.

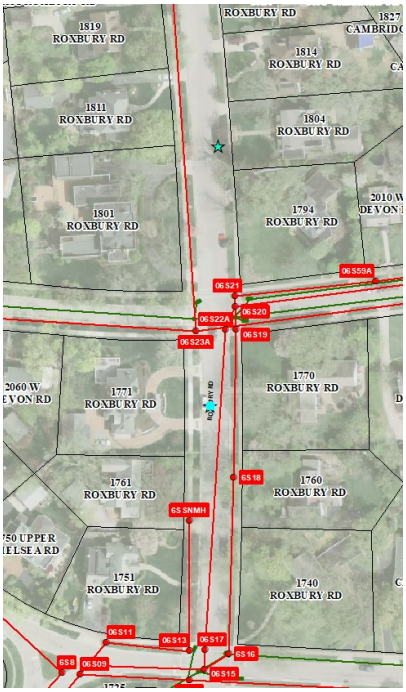
Grit and settled deposits throughout the lines see the debris line stains in the picture above. **WIB cause possibly due to obstruction due to reduced capacity. Mainlines have been rehabilitated.**





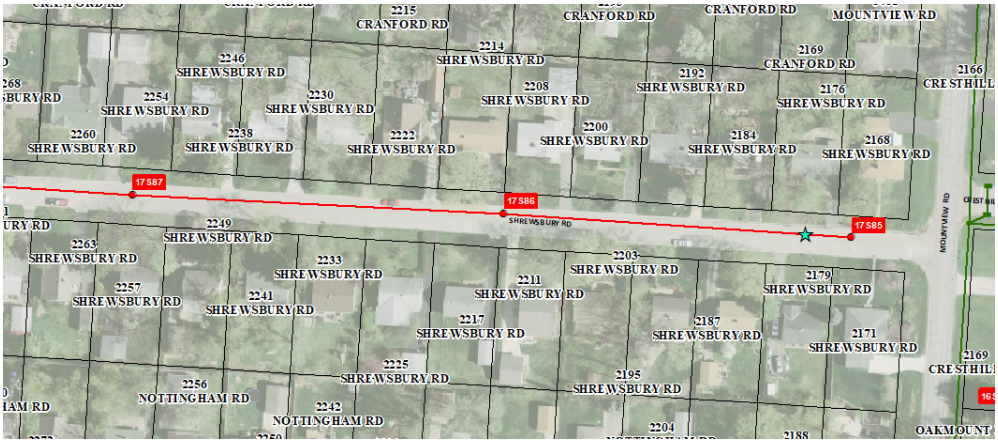
1335 Kirkley and 3154 NorthStar Rd.

Obstruction removed from 4-126:127. **WIB cause by rock obstructions.**



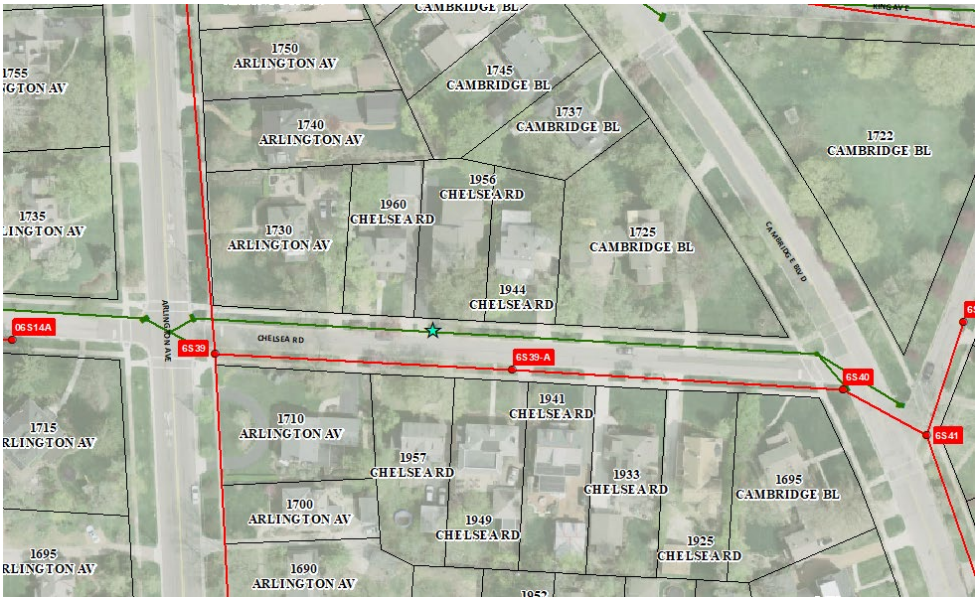
1771, 1804 Roxbury Road

Dropped repair upstream of Manhole 06-24. **WIB cause possibly hydraulic restriction**.



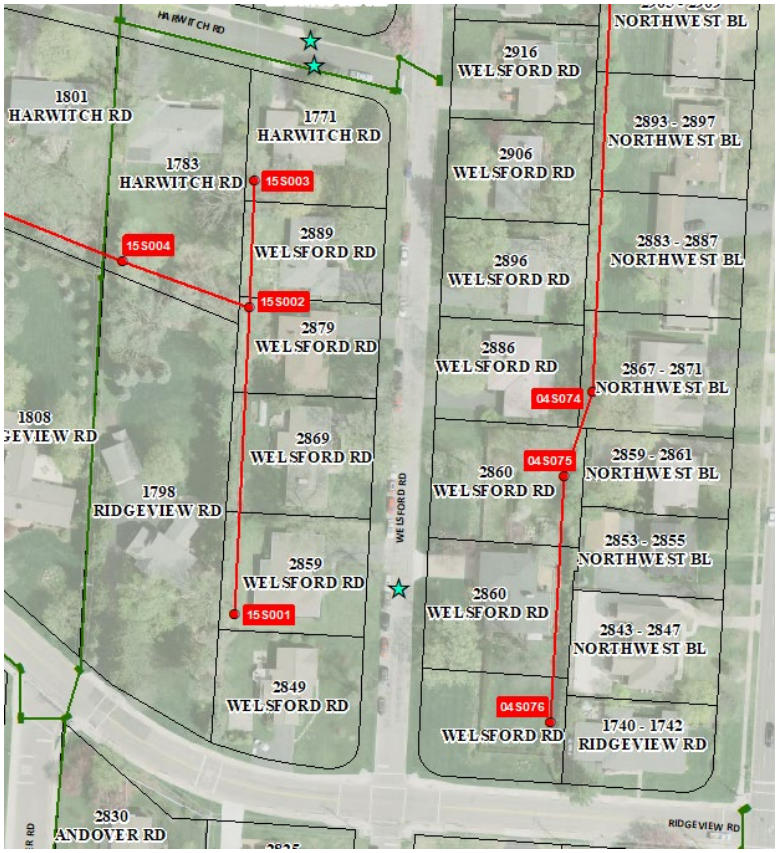
2176 Shrewsbury Road

59 occurrences of mineral deposit between 5% - 40%. **WIB cause possibly mineral deposit**.



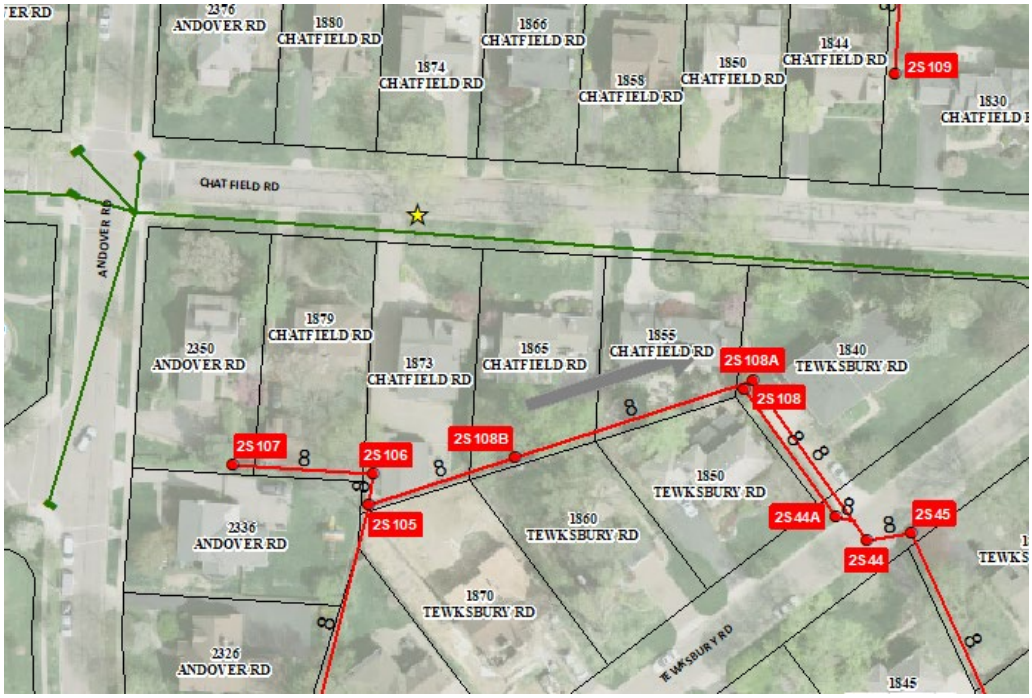
1956 Chelsea

Roots immediately upstream of manhole 6-39. **WIB caused by Roots.**



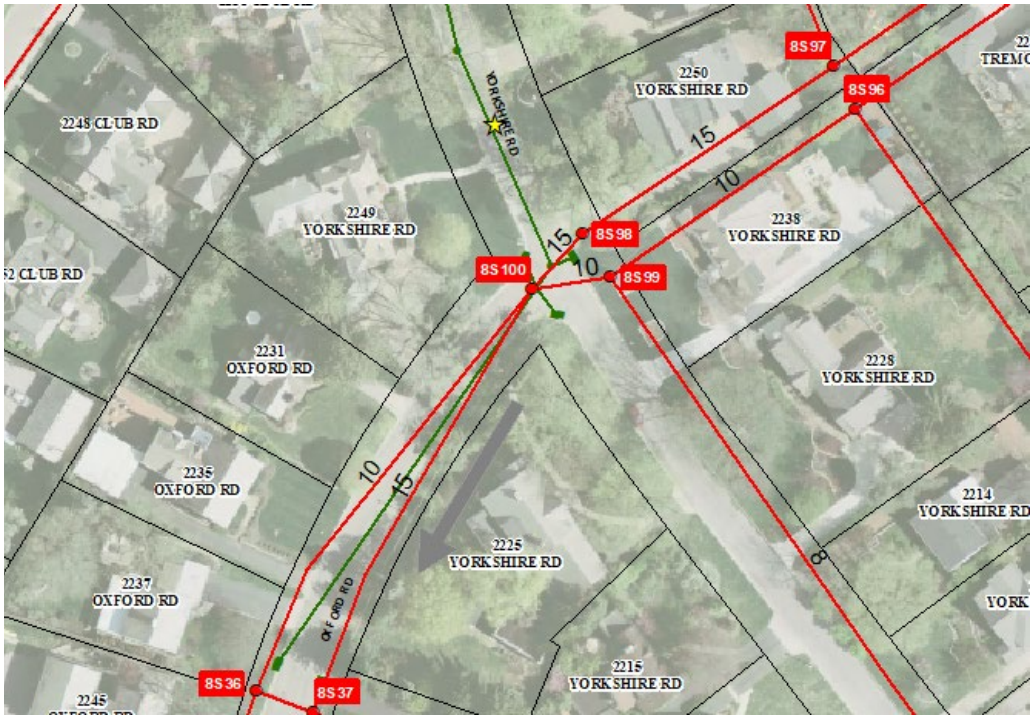
2859 Wellsford Rd.

Cause unknown, however is upstream of he Harwitch Road obstruction.



1873 Chatfield

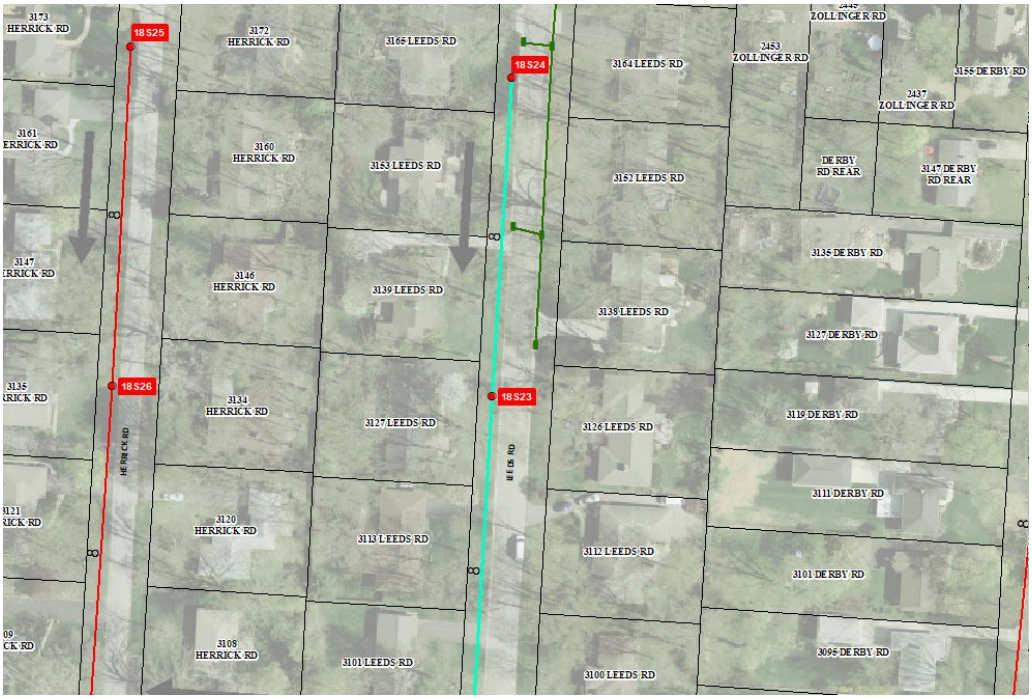
Cause unknown, no visible reason for WIB in lateral or mainline.



2249 Yorkshire Rd

Heavy roots and ragging in lateral.

WIB cause likely roots in lateral.



3139 Leeds Rd

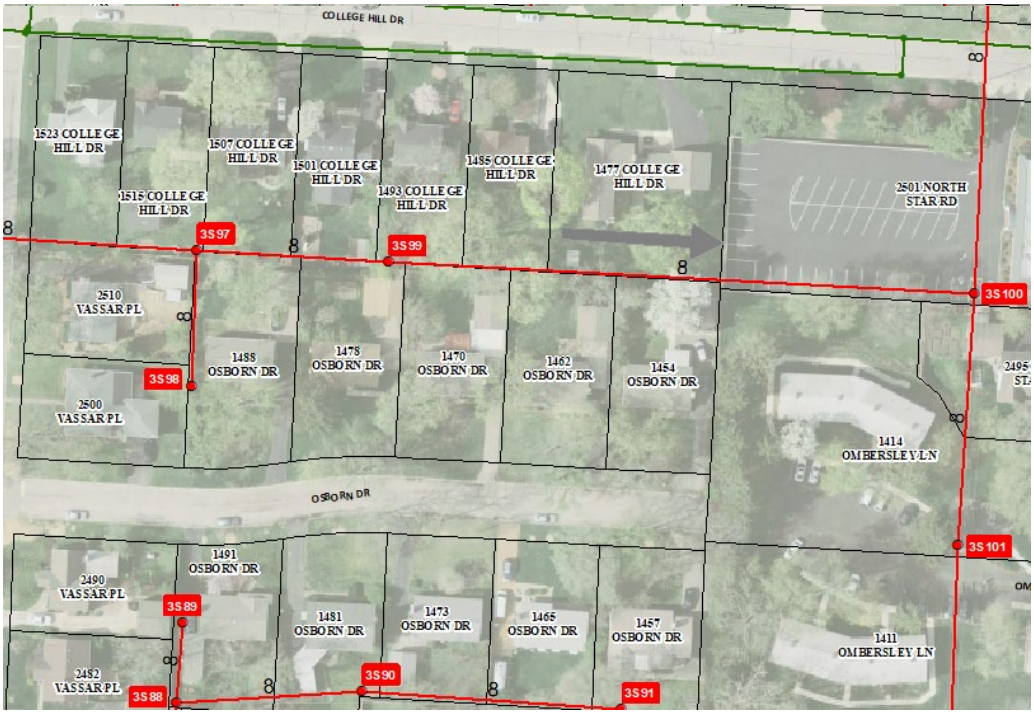
Roots in lateral, 50% full sags ahead and behind lateral. Mainline lined in 2016.

2624 Westmont Blvd

Some roots in lateral.

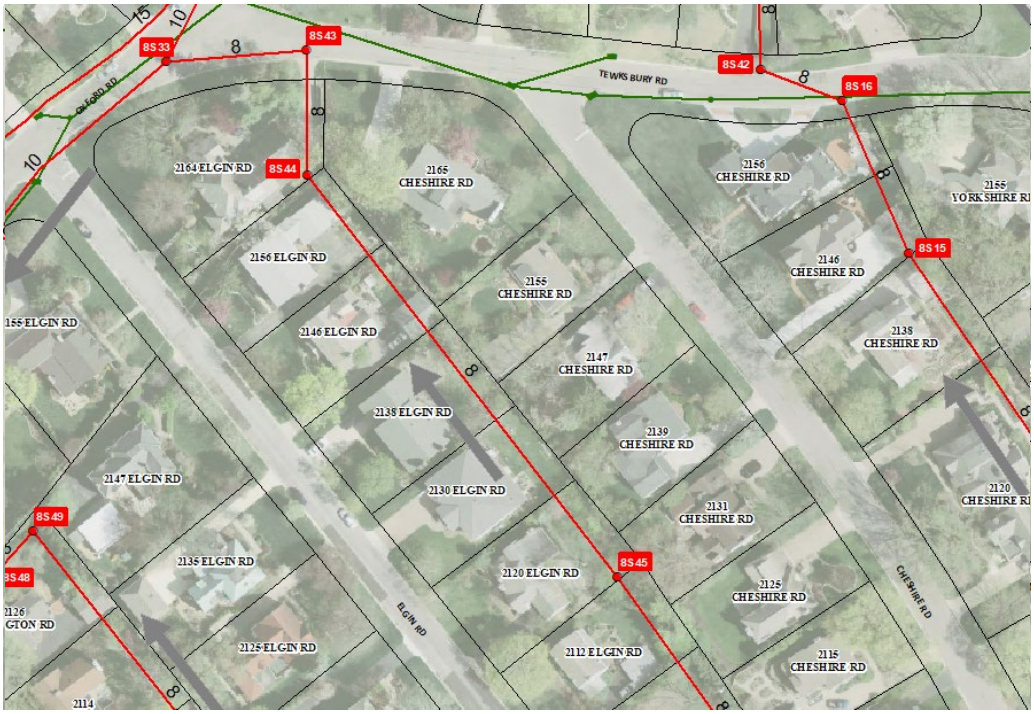
2738 Brandon Rd

Heavy deposits around lateral, mainline has moderate deposits and roots.



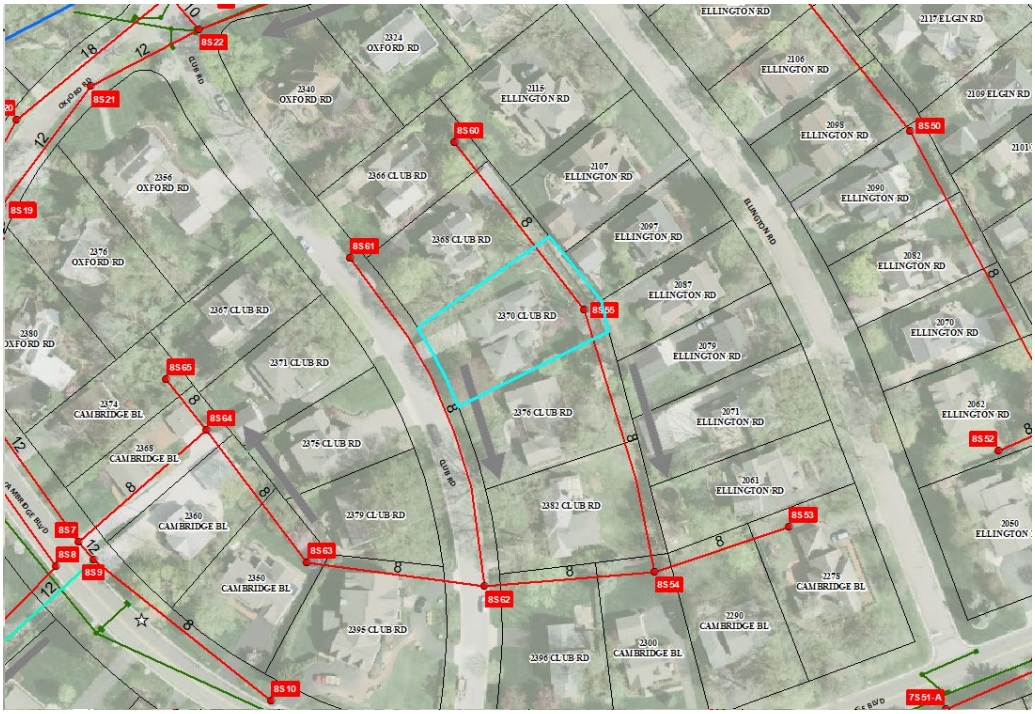
1462 Osborn Rd

Cause unknown, no reason for WIB visible in lateral or mainline.



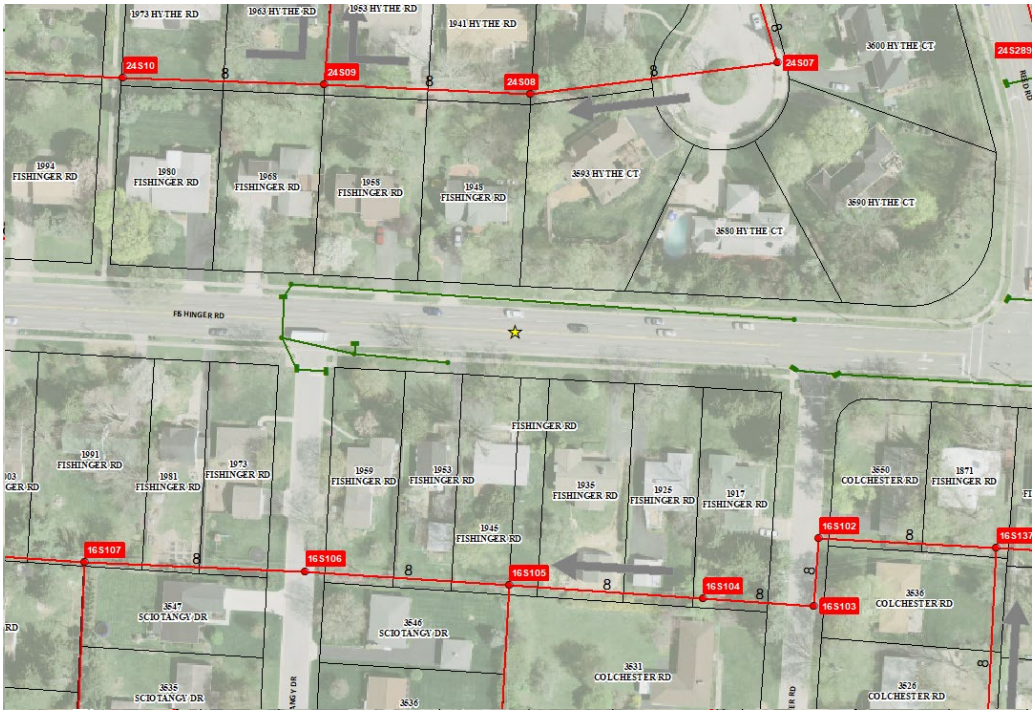
2138 Elgin Rd

Cause unknown, no reason for WIB visible in lateral or mainline.



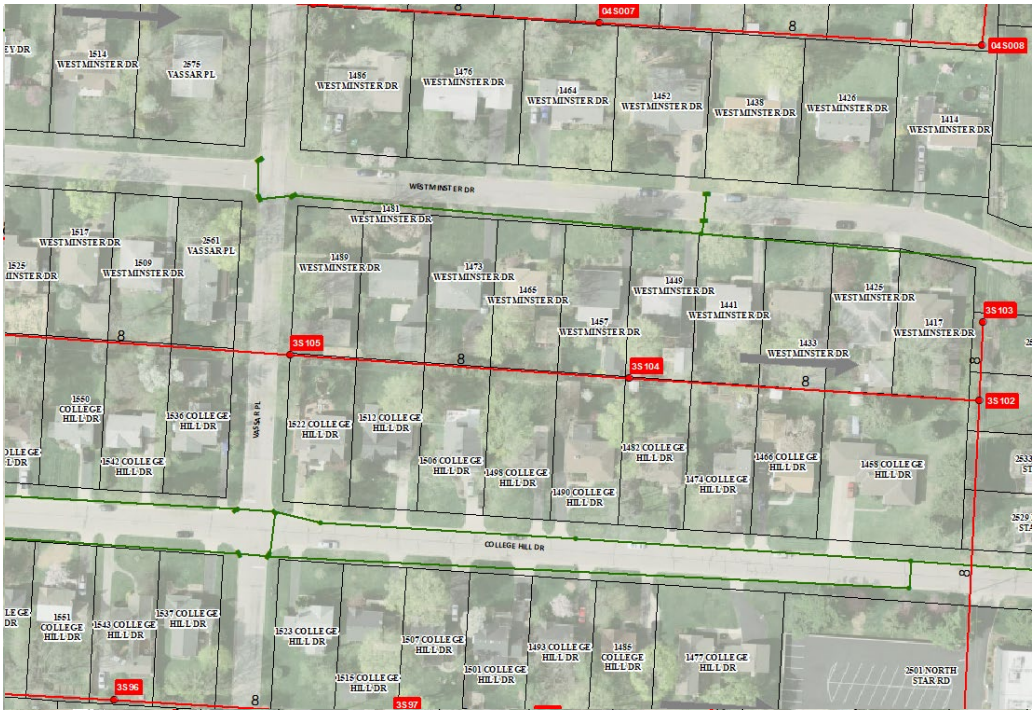
2370 Club Rd

Cause unknown, no reason for WIB visible in lateral or mainline.



1945 Fishinger Rd

Cause unknown, no reason for WIB visible in lateral or mainline.



1465 Westminster Dr

Minor roots and ragging in lateral.