

IDDE INVESTIGATION:

- **CHEESECAKE BROOK**
- **CRYSTAL LAKE**
- **EDMANDS BROOK**



TO: Ted Jerdee and Maria Rose, City of Newton Department of Public Works, Utilities Division
CC: Carol Harris and Stephanie Kaiser – Woodard & Curran
Garrett Bergey – SDE
FROM: Zach Henderson and Chelsea Durante
DATE: August 6, 2020
RE: Newton IDDE Investigation Update

This memo summarizes the key findings of the Cheesecake Brook, Crystal Lake, and Edmands Brook Illicit Discharge, Detection, and Elimination (IDDE) Investigations and recommendations for the next steps. The investigations in this report took place between November 2019 through June 2020. The scope of this work is based on the FY 2020 Illicit Discharge Detection and Elimination approach memorandum submitted to the City of Newton on August 30, 2019, provided in Attachment 1. Investigations in Cheesecake Brook were performed as a follow up to the 2019 IDDE investigations. It included Closed Circuit Television (CCTV) investigations, building inspections, and manhole sampling. In addition, rapid visual and olfactory inspection of key junction manholes were performed in sub-catchments 11-5 (Crystal Lake) and 77-4 (Edmands Brook) in attempts to locate possible illicit discharges in these areas.

Cheesecake Brook Investigations

IDDE investigations in Cheesecake Brook began in April 2018 with manhole sampling. The manhole sampling results located areas of suspected contamination within the sub-catchments. Buildings inspections in these areas followed. During the building inspection phase of the work, some illicit connections were discovered and remediated. Sources of suspected contamination in other areas were not identified as easily.

Below provides a summary of the Cheesecake Brook investigations completed this field season and the current status. Sub-catchment maps with current pipe status and contamination levels are provided in Attachment 2.

Sub-catchment 68-0: Albemarle Road

In 2018, suspected contamination was found on Albemarle Road coming from an off-street drain line between building numbers 96 and 103 Albemarle Road. In 2019, building inspections were completed on Albemarle Road, Farwell Street, and Joseph Road. The source of contamination on Albemarle Road could not be identified via building inspection. All buildings inspected in this area resulted in Legal or inconclusive results. The inconclusive result of No Dye Found was at 142 Farwell Street. Although this is an unusual test result, the field team further investigated the infrastructure at this property. It was confirmed that 142 Farwell Street is on a septic system, not City sewer. Furthermore, an as-built plan of the property was provided by the City



and reviewed. The septic system at the property is located on the west side of the house, relatively far from the storm drain of interest. Therefore, 142 Farwell Street does not appear to be contributing to the source of contamination in pipe SWM-624 but cannot be conclusively ruled out.

This field season, Closed Circuit Television Inspection (CCTV) on stormwater pipe SWM-624 was completed. Inspection observations showed that the pipe was not mapped accurately in the City's GIS. The CCTV inspection showed this pipe is over 180 linear feet. The inspection was abandoned at 183 feet as the pipe was full of water. The upstream manhole was not discovered.

Recommendations for further investigations are to identify the upstream structure associated with SWM-624 and conduct further building inspections on Joseph Road (24, 30, 36). Investigations should include inspection of building yards for structures that could potentially provide access to the pipeline.

Sub-catchment 68-1: Elm Road and Calvin Road

Elm Road

In 2018 manhole investigations, areas of suspected contamination were found in pipes on Elm Road. Buildings on Elm Road dye tested Legal, including Newton North High School. It was noted that the stormwater and sewer infrastructure in the area of the suspected contamination is not accurately reflected in GIS.

Woodard & Curran completed CCTV inspections of both stormwater and sanitary infrastructure to better document pipe network and to look for visual evidence of illicit connections. The inspections did not help to better document the pipe network due to an intruding lateral in SWM-18921 that abandoned the inspection. The upstream manhole, SWMH-2445, could not be located due to GIS inaccuracies. Inspection of pipe SWM-16220 revealed high water level stains and significant debris buildup at SWMH-2452, but no visual evidence of an illicit connection. The adjacent sewer pipe did not have significant defects.

In May 2020, resampling of the storm pipes was attempted, but there was standing water in the pipes so samples could not be taken.

It appears upgrades were made recently at Newton North High School. It would be beneficial to locate the upstream manhole at SWM-18921 and investigate the upstream portion of that pipe in efforts to identify the source of suspect contamination on Elm Street. It would also be beneficial to review any available utility plans the City has of the area.

Calvin Road

The source of contamination at Calvin Road is likely a leaking lateral at 41 Calvin Road. Dye test at 41 Calvin Road yields a Dye In Both status which is likely the result of a leaking lateral. After the illicit connection notification was sent to the homeowner, the owner requested to have another dye test. The second dye test yielded a Legal status. All other buildings in this area tested Legal.

Woodard & Curran recommends returning to the property during warmer weather to complete a plug test of the sewer lateral to confirm if the lateral is leaking. This has not been completed due to COVID-19 safety restrictions and the lack of financial efficiency to perform this single plug flow test. The plug flow test will be completed in conjunction with other necessary plug flow tests, upon determination of other location needs and as safety allows.

Sub-catchment 68-2: Dunstan Street

In 2019, buildings adjacent to the suspected contamination at Dunstan Street were inspected. These buildings all tested Legal.



This field season, CCTV inspection of both sanitary sewer and stormwater infrastructure was completed. CCTV inspection did not show evidence of sewage infiltration or illicit connections. SDE resampled and found low ammonia levels, about 0.4 mg/L and did not detect surfactants. The sample from 2018 had an ammonia level of 3.0 mg/L and surfactants was not detected.

Since level of ammonia are relatively low, and visual evidence of illicit connections were not evident in CCTV inspections, Woodard & Curran recommends focusing efforts on higher priorities.

Sub-catchment 68-3: Adams Avenue, River Street, and Henshaw Street

Adams Avenue

The suspected contamination on Adams Avenue was not identified via dye test nor CCTV inspection. However, 201 and 227 Adams Avenue were not inspected due to access issues. The residents at 227 Adams Avenue refused dye testing at their property and residents at 201 Adams Avenue were not home when the inspectors attempted access. Building inspections at these properties are highly recommended moving forward. Additionally, CCTV inspection under the separate study revealed suspect lateral connections in the vicinity of 23 and 33 Cherry Place. Buildings along Cherry Place should be inspected during dry times of year (given standing water issues in this portion of the watershed).

Woodard & Curran recommends building inspections at the buildings mentioned as safety allows due to COVID-19; alternately, the pipes could be resampled.

River Street

The suspected contamination on River Street could not be identified via building inspection dye testing. Therefore, CCTV inspection was performed, but did not show evidence of direct sewer lateral connection or sewage infiltration. The manholes that previously showed contamination on this street were resampled in May 2020 and there was no contamination found.

Henshaw Street

The suspected contamination on Henshaw Street could not be identified via building inspection dye testing. All buildings yielded Legal results, except for 33 and 59 Henshaw Street (co-located on parcel noted as 57 Henshaw Street in Figure 7), which have not yet been inspected. Inspection at 33 Henshaw Street was completed on May 15, 2019 and was found to be Legal. It is recommended to inspect 59 Henshaw Street in future work.

The CCTV inspection in storm drains on this street did not show evidence of direct sewer lateral connection or sewage infiltration. SDE resampled in May 2020 and there were low ammonia levels, about 0.1 mg/L and did not detect any surfactants. The sample from 2018 had an ammonia level of 10.0 mg/L and surfactants was not detected.

We recommend clarification if sewer upgrades have been performed in the area, if not, it is possible that the storm drains could have fluctuating flow that periodically dilutes the contamination. Both manhole sample reports from 2018 and 2020 recorded moderate flow through manhole SWMH-3130. Since level of ammonia are relatively low, and visual evidence of illicit connections were not evident in CCTV inspections, Woodard & Curran recommends focusing efforts on higher priority



Sub-catchment 68-5: Lexington Street and Maple Street

Lexington Street

The source of contamination at Lexington Street was from 377 Lexington Street, which was remediated in May 2019. Follow-up investigation of manhole sample at previously suspected pipe segments on Lexington Street showed there was standing water in the pipe. This should be re-sampled to confirm this area is cleared during dryer season.

Maple Street

In 2018 manhole sampling yield potential contamination at Maple Street. The surrounding buildings yielded Legal dye tests, except for 155 Woodland Road, which resulted in no dye found in either the sewer or the storm drain. CCTV inspection of the storm drain at the corner of Woodland Road and Maple Street was performed and did not show evidence of sewage infiltration pipe or suspect laterals. The suspect pipes were resampled in May 2020 and there was no contamination found. Since contamination levels were not detected after resampling and visual evidence of illicit connections were not evident in CCTV inspections, Woodard & Curran recommends focusing efforts on higher priority areas.

Sub-catchment 68-9: Walnut Street Easement, Minot Place, and Brookside Avenue

Walnut Street

The buildings adjacent to the stormwater pipe in the easement between Walnut Street and Linwood Avenue were inspected. In 2019, 340 Linwood Avenue tested positive for partial direct connection to the storm drain. The basement plumbing fixtures were connected to a service discharging to the storm drain. The owners of 340 Linwood Avenue were notified by the City. The defect was corrected and in May 2020, confirmatory sampling was completed and the contaminated pipes in this area were cleared.

Minot Place

In 2018, manhole sampling resulted in suspected contamination near 21 Minot Place. The suspect pipe is located adjacent to Day Middle School which tested legal during its' 2019 building inspection. CCTV inspection of the storm drain was completed in Spring 2020. CCTV of storm drain showed Infiltration staining at joints throughout pipe. Inspection of the sewer could not be completed due to the adjacent surcharged sewer nearby. Further inspection of sewer can be attempted after the surcharge issue has been resolved.

Brookside Avenue

The source of the contamination on Brookside Avenue is due to an indirect connection at the Newton Housing Authority property. In 2019, dye test inspection showed a defect in the private sewer infrastructure at the Newton Housing Authority. It was not clear whether the sewage is exfiltrating from the private manhole or the piping itself.

CCTV inspection of the outlet pipe was completed in 2020. The inspection was abandoned before reaching the upstream manhole where the defect is located due to an intruding lateral. We recommend the inspection of that pipe be completed, either using a push camera from the upstream manhole or by cutting the intruding lateral in order to complete the CCTV of the pipe segment. It is noted that the intruding lateral was observed to be AC pipe.

Table 1, below, provides a summary of the 2020 IDDE scope and results discussed above.

TABLE 1. FY 2020 CHEESECAKE BROOK SUMMARY OF SCOPE & STATUS



| Catchment | Street | Pipe | Previously Recommended Activities | 2020 Status |
|-----------|----------------|-----------|--|---|
| 68-0 | Albemarle Road | SWM-624 | CCTV Inspection of Storm Drain | <p>CCTV Inspection shows pipe is not correctly mapped. The storm drain pipe is surcharged and further inspection of the area is required.</p> <p>Next Steps:</p> <ol style="list-style-type: none"> 1. Conduct building inspections on Joseph Road (24, 30, 36) & 142 Farwell Street. 2. Investigate backyards for structures that could be potentially be access to the pipeline. Potentially conduct inspection with City using metal detectors. |
| 68-1 | Elm Road | SWM-16220 | CCTV Inspection of Storm Drain and Sewer Main | <p>CCTV observations included significant debris buildup at SWMH-2452. No sign of sewage infiltration. Resampling in this area was attempted but there was standing water.</p> <p>Next Steps:</p> <p>GIS in this area is not correct and infrastructure was not easily followed in the field. Any available utility plans of the school area should be reviewed for potential use to clarify infrastructure upstream. Upstream area should be sampled in attempts to find the source of contamination.</p> |
| 68-1 | Calvin Road | SWM-18378 | Plug Testing of Private Sewer Lateral | ON HOLD – COVID/Logistics |
| 68-2 | Dunstan Street | SWM-7873 | Manhole Sampling; CCTV Inspection of Storm Drain and Sewer Main | <p>CCTV inspection did not show evidence of sewage infiltration. SDE resampled and found low ammonia levels of 0.4 mg/L and no detection of surfactants.</p> <p>Next Steps:</p> <p>Focus efforts on areas of higher priority and monitor this area in the future.</p> |
| 68-3 | Henshaw Street | SWM-19030 | Building Inspection; CCTV Inspection of Storm Drain and Sewer Main | <p>CCTV inspection did not show evidence of sewage infiltration. SDE resampled in May 2020 and ammonia was 0.1 mg/L. There was no detection of surfactants.</p> <p>Next Steps:</p> <p>Focus efforts on areas of higher priority and monitor this area in the future.</p> |
| 68-3 | River Street | SWM-13565 | CCTV Inspection of Storm Drain and Sewer Main; Dye Testing | <p>CCTV inspection did not show evidence of sewage infiltration. SDE resampled in May 2020 and there was no contamination found.</p> |



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|------|------------------------|-----------|--|--|
| | | | | <p>Next Steps: Focus efforts on areas of higher priority and monitor this area in the future.</p> |
| 68-3 | River Street | SWM-19967 | CCTV Inspection of Storm Drain and Sewer Main; Dye Testing | <p>CCTV inspection did not show evidence of sewage infiltration. SDE resampled in May 2020 and there was no contamination found.</p> <p>Next Steps: Focus efforts on areas of higher priority and monitor this area in the future.</p> |
| 68-3 | Adams Avenue | SWM-14027 | Building Inspection; Review of CCTV & Dye Testing | <p>CCTV inspection did not show evidence of sewage infiltration.</p> <p>Next Steps:</p> <ol style="list-style-type: none"> 1.) Continue to attempt to sample 201 and 227 Adams Avenue and of 33 and 23 Cherry Place. 2.) If building inspections are not an option, consider resampling these manholes. |
| 68-3 | Henshaw Street | SWM-15148 | Building Inspection; CCTV Inspection of Storm Drain and Sewer Main | <p>CCTV inspection did not show evidence of sewage infiltration. SDE resampled in May 2020 and there was no contamination found.</p> <p>Next Steps: Focus efforts on areas of higher priority and monitor this area in the future.</p> |
| 68-3 | Derby Street | SWM-18735 | Dye Testing | ON HOLD – COVID/Logistics |
| 68-5 | Lexington Street | SWM-18036 | Confirmatory sampling at 377 Lexington Street | <p>Confirmatory sampling showed there was standing water in the pipe.</p> <p>Next Steps: Resample during dryer season.</p> |
| 68-5 | Maple Street | SWM-14084 | CCTV Inspection of Storm Drain | <p>CCTV inspection did not show evidence of sewage infiltration. SDE resampled in May 2020 and there was no contamination found.</p> <p>Next Steps: Focus efforts on areas of higher priority and monitor this area in the future.</p> |
| 68-9 | Walnut Street Easement | SWM-21444 | Abatement of illicit connection at 340 Linwood Avenue | <p>Confirmatory sampling performed. No contamination present.</p> <p>Next Steps: Focus efforts on areas of higher priority and monitor this area in the future.</p> |



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|------|------------------|-----------|---|---|
| 68-9 | Minot Place | SWM-13608 | CCTV Inspection of Storm Drain and Sewer Main | CCTV of storm drain showed Infiltration staining at joints throughout pipe. Next Steps: The adjacent sewer was surcharged sewer. After this issue is resolved, resampling of the storm drain and CCTV of the sewer should be completed. |
| 68-9 | Brookside Avenue | SWM-1 | Send notification & CCTV private infrastructure at Newton Housing Authority | The private infrastructure at the Newton Housing Authority was inspected. There was an intruding lateral in the pipe which prohibited inspection of the pipe section located at the upstream manhole where the issue is located. Next Steps: 1. Push camera inspection from the upstream manhole 2. Cut intruding lateral (could be AC) and CCTV rest of segment. |

Table 2 shows the current status of the storm drain pipes in the Cheesecake Brook sub-catchments by linear feet and percent.

TABLE 2. CHEESECAKE BROOK IDDE PIPE STATUS

| Cheesecake Brook (68) (% of Total) | Confirmed | Suspected | Upstream Contamination | Standing Water | Under Investigation | No Contamination Found | Uninvestigated/ Other |
|---------------------------------------|-----------|-----------|------------------------|----------------|---------------------|------------------------|-----------------------|
| 68-0 | 0% | 1% | 0% | 1% | 0% | 89% | 9% |
| 68-1 | 0% | 1% | 1% | 2% | 0% | 83% | 13% |
| 68-2 | 0% | 3% | 17% | 1% | 0% | 65% | 15% |
| 68-3 | 0% | 4% | 3% | 3% | 0% | 70% | 20% |
| 68-4 | 0% | 1% | 5% | 5% | 0% | 40% | 49% |
| 68-5 | 0% | 1% | 2% | 7% | 0% | 57% | 33% |
| 68-6 | 0% | 2% | 3% | 2% | 0% | 62% | 30% |
| 68-7 | 0% | 2% | 14% | 1% | 0% | 52% | 31% |
| 68-8 | 0% | 0% | 0% | 2% | 0% | 89% | 9% |
| 68-9 | 0% | 2% | 0% | 1% | 0% | 91% | 6% |
| Total/ Pipe Status | 0% | 2% | 3% | 3% | 0% | 69% | 23% |

Crystal Lake Manhole Sampling

The IDDE investigations also included Crystal Lake, sub-catchment 11-5, during this field season. Investigation field procedures included conducting rapid visual and olfactory inspection of key junction manholes in the catchment area in order to identify illicit discharges; this procedure is consistent with the 2016 MS4 General Permit and the City of Newton’s (City) IDDE Program Manual. Storm manholes located along Route 9 were not sampled as this is MassDOT jurisdiction, and the City of Newton does not own nor maintain this drainage infrastructure. The field crews did not confirm any illicit discharges (i.e. obvious visual indications of wastewater) but did identify the following pipe segments with suspected illicit discharges based on criteria identified by the U.S. Environmental Protection Agency (EPA) in the 2016 MS4 General Permit. These pipe segments and associated sampling results are listed below in Table 3.



TABLE 3. CRYSTAL LAKE (11-5) SUMMARY OF CONTAMINATED PIPES

| Pipe | Street | Ammonia (mg/l) | Surfactants (mg/l) | Comments |
|------------------|-----------------|----------------|--------------------|---|
| SWM-17239 | Centre Street | 10 | 2 | Flow behind bag has sewage odor, yellow in color. |
| SWM-21627 | Crescent Avenue | 10 | 1.5 | Flow behind bag has sewage odor. |
| SWM-14283 | Hagen Road | 2.0 | 1.0 | |
| SWM-14447 | Norwood Ave | 3 | 1 | Flow behind bag has oily sheen, is yellow in color, and has sewage odor |
| SWM-19851 | Parker Street | 2 | 0.75 | |
| SWM-22447 | Paul Street | 10 | 3.0 | Previously unmapped pipe, coming from between 24 and 32 Paul St. |
| SWM-5320 | Haynes Road | 0 | 1.5 | Sample was a yellow/brown color. Heavy flow behind bag. |

Based on the pipe results presented in Table 3, building inspections are recommended as a next step. Buildings recommended for inspection and dye test are presented in Table 4, below. The buildings are prioritized based on illicit potential and ease of inspection. High priority buildings are labeled with an asterisk.

TABLE 4. CRYSTAL LAKE RECOMMENDATIONS FOR BUILDING INSPECTIONS

| Pipe | Street | Building Number | Notes |
|------------------|---------------|-----------------|-----------------------------|
| SWM-17239 | CENTRE STREET | 1349* | Business |
| SWM-17239 | CENTRE STREET | 1345* | Business |
| SWM-17239 | CENTRE STREET | 1330-1340* | Business |
| SWM-17239 | CENTRE STREET | 1337* | Bishop Mackenzie Center - |
| SWM-21627 | CENTRE STREET | 1321* | Sacred Heart Parish |
| SWM-21627 | CRESCENT AVE | 90* | Institutional |
| SWM-14447 | NORWOOD AVE | 55-85* | Condos (Cabot Park Village) |
| SWM-14447 | NORWOOD AVE | 56 | Residential |
| SWM-14447 | NORWOOD AVE | 66 | Residential |
| SWM-14447 | NORWOOD AVE | 70 | Residential |
| SWM-14447 | CENTRE STREET | 1365 | Gas station |
| SWM-22447 | PAUL STREET | 22-24* | |
| SWM-22447 | PAUL STREET | 32* | |
| SWM-22447 | PARKER STREET | 19-21* | Community Living |
| SWM-19851 | PARKER STREET | 102 | Residential |
| SWM-19851 | PARKER STREET | 109 | Residential |
| SWM-19851 | PARKER STREET | 110 | Residential |
| SWM-19851 | PARKER STREET | 111 | Residential |
| SWM-19851 | PARKER STREET | 115 | Residential |
| SWM-19851 | PARKER STREET | 118 | Residential |
| SWM-19851 | PARKER STREET | 119 | Residential |
| SWM-19851 | PARKER STREET | 125 | Residential |
| SWM-19851 | PARKER STREET | 126 | Residential |
| SWM-19851 | PARKER STREET | 129 | Residential |



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|------------------|-----------------|----|-------------|
| SWM-14283 | HAGEN ROAD | 5 | Residential |
| SWM-14283 | HAGEN ROAD | 6 | Residential |
| SWM-14283 | HAGEN ROAD | 11 | Residential |
| SWM-14283 | HAGEN ROAD | 14 | Residential |
| SWM-14283 | HAGEN ROAD | 17 | Residential |
| SWM-14283 | HAGEN ROAD | 22 | Residential |
| SWM-5320 | OLDE FIELD ROAD | 68 | Residential |

Note: Properties labeled with “**” are considered high priority building inspections.

Table 5 shows the current status of the storm drain pipes in the Crystal Lake catchment by linear feet and percent.

TABLE 5. CRYSTAL LAKE IDDE PIPE STATUS

| Catchment 77-4 | Confirmed | Suspected | Upstream Contamination | Standing Water | Under Investigation | No Contamination Found | Uninvestigated/ Other |
|----------------|-----------|-----------|------------------------|----------------|---------------------|------------------------|-----------------------|
| Linear Feet | 0 | 638 | 0 | 1087 | 0 | 21,582 | 6,922 |
| % of Total | 0% | 2% | 0% | 4% | 0% | 71% | 23% |

Edmands Brook Manhole Sampling

The IDDE investigations also included Edmands Brook, sub-catchment 77-4, during this field season. Investigation field procedures included conducting rapid visual and olfactory inspection of key junction manholes in the catchment area in order to identify illicit discharges; this procedure is consistent with the 2016 MS4 General Permit and the City of Newton’s (City) IDDE Program Manual. The field crews did not confirm any illicit discharges (i.e. obvious visual indications of wastewater) but did identify the following pipe segments with suspected illicit discharges based on criteria identified by the U.S. Environmental Protection Agency (EPA) in the 2016 MS4 General Permit. These pipe segments and associated sampling results are listed below in Table 6.

TABLE 6. EDMANDS BROOK (77-4) SUMMARY OF CONTAMINATED PIPES

| Pipe | Street | Ammonia (mg/l) | Surfactants (mg/l) | Comments |
|------------------|----------------|----------------|--------------------|--------------------------|
| SWM-19899 | Burrage Road | 0.6 | 0.25 | |
| SWM-15944 | Kirkstall Road | 10.0 | 0.5 | Sample is slightly gray. |

Based on the pipe results presented in Table 6, building inspections are recommended as a next step. Buildings recommended for inspection and dye test are presented in Table 7, below. The buildings are prioritized based on illicit potential and ease of inspection. High priority buildings are labeled with an asterisk.



TABLE 7. EDMANDS BROOK RECOMMENDATIONS FOR BUILDING INSPECTIONS

| Pipe | Street | Building Number | Notes |
|-----------|--------------|-----------------|-------------|
| SWM-15944 | KIRKSTALL RD | 164* | Residential |
| SWM-15944 | KIRKSTALL RD | 172* | Residential |
| SWM-15944 | KIRKSTALL RD | 178* | Residential |
| SWM-15944 | KIRKSTALL RD | 179* | Residential |
| SWM-15944 | KIRKSTALL RD | 184* | Residential |
| SWM-15944 | KIRKSTALL RD | 185* | Residential |
| SWM-15944 | KIRKSTALL RD | 191* | Residential |
| SWM-15944 | KIRKSTALL RD | 192* | Residential |
| SWM-15944 | MORSE RD | 20* | Residential |
| SWM-19899 | BURRAGE RD | 8 | Residential |
| SWM-19899 | BURRAGE RD | 12 | Residential |
| SWM-19899 | BURRAGE RD | 15 | Residential |
| SWM-19899 | BURRAGE RD | 20 | Residential |
| SWM-19899 | BURRAGE RD | 21 | Residential |
| SWM-19899 | GLENDALE RD | 24 | Residential |
| SWM-19899 | GLENDALE RD | 30 | Residential |
| SWM-19899 | GLENDALE RD | 36 | Residential |
| SWM-19899 | ALDERWOOD RD | 63 | Residential |

Note: Properties labeled with “*” are considered high priority building inspections.

Table 8 shows the current status of the storm drain pipes in the Crystal Lake catchment by linear feet and percent.

TABLE 8. EDMANDS BROOK IDDE PIPE STATUS

| Catchment 11-5 | Confirmed | Suspected | Upstream Contamination | Standing Water | Under Investigation | No Contamination Found | Uninvestigated/ Other |
|----------------|-----------|-----------|------------------------|----------------|---------------------|------------------------|-----------------------|
| Linear Feet | 0 | 1903 | 1,840 | 2874 | 0 | 42,550 | 19,337 |
| % of Total | 0% | 3% | 3% | 4% | 0% | 62% | 28% |

Mapping Discrepancies

During investigations of Crystal Lake and Edmands Brook catchments, areas were identified where the City's GIS-based drainage system map information differed significantly from field conditions. Although field crews completed catchment investigations in these catchments, sampling could not be performed at all mapped pipes given these discrepancies.

Streets with discrepancies between mapped drainage and what were discovered in the field are identified below:



Crystal Lake

- Norwood Avenue at Trowbridge Street
- Centre Street at Paul Street
- Storm drains at Weeks Field
- Parker Street at Walter Street
- Jackson Street at Lantern Lane
- Off-street storm drain from Jackson Street to Boylston Street
- Duxbury Road at Lantern Lane
- Oakmont Road
- Roosevelt Road
- Drains between Truman Road and Selwyn Road

Edmands Brook

- Blake Street

Woodard & Curran recommends reviewing paper plans, to be provided by the City, to determine if some of the mapping discrepancies can be resolved or if additional field mapping or closed-circuit television (CCTV) would be required to improve the City's GIS-based maps.

IDDE Next Steps

The findings from Cheesecake Brook show that some areas were resolved by confirmatory sampling. Others showed clear when attempts to resample manholes. These areas should be monitored for seasonal issues. Other paths forward in those areas with still suspect contamination is to perform additional investigations as described above.

The findings from Crystal Lake and Edmands Brook described in this report were used to create a building inspection plan. Building plumbing facilities adjacent to contaminated pipes will be dye tested in an effort to confirm the source of illicit discharges suspected in pipe segments.

Typically building inspections would be the next step in the IDDE investigation plan. However, due to COVID-19 safety restrictions, Woodard & Curran recommends proceeding with high priority building inspections only at this time. In order to conduct the building inspections, advance appointments would need to be made and the owner would need to agree to having someone enter the facility. We recommend letters be sent to building owners to schedule the appointments. Letters will also outline COVID-19 safety regulations and any special

City requirements, as applicable. Continuing to do building inspections should be re-evaluated as they progress to assess the practicality of permitting lower priority inspections.

Concurrently with appointment-based building inspections, Woodard & Curran recommends continuing with IDDE manhole sampling investigations in Problem Catchment Areas. We recommend that manhole investigations proceed systematically through sub-catchments of the Laundry Brook Catchment area as the next phase of the project.



ATTACHMENT 1: FY 2020 IDDE MEMORANDUM





MEMORANDUM

TO: Theodore Jerdee, Director of Utilities, City of Newton Department of Public Works
 CC: Maria Rose, Environmental Engineer, City of Newton Department of Public Works
 Carol Harris, Stephanie Kaiser, Woodard & Curran
 FROM: Chelsea Durante & Zach Henderson
 DATE: August 30, 2019
 RE: FY 2020 Illicit Discharge Detection and Elimination

Woodard & Curran has prepared this memorandum to outline our recommended approach to the next steps in the Illicit Discharge Detection and Elimination (IDDE) investigation project. During FY 2020 we recommend continuation of investigations begun during the last fiscal year to close-out inspections within the Cheesecake Brook Watershed, then undertaking investigation in other problem catchment areas, specifically Crystal Lake and possibly Edmands Brook, as budget allows. The proposed work, described herein, will be completed under Contract L-6579 IDDE Investigations and Program Management.

Cheesecake Brook

Based on the initial IDDE inspections within the Cheesecake Brook watershed, several illicit connections have been identified; however, further investigation is required as the inspection results suggest there may be additional illicit connections in Cheesecake Brook but results have not yet been conclusive. The following outlines additional illicit discharge investigation activities required to complete investigation of catchments within Cheesecake Brook.

Woodard & Curran recommends the following:

TABLE 1. CHEESECAKE BROOK NEXT STEPS

| Catchment | Street | Pipe | Recommended Activities |
|-----------|----------------|-----------|--|
| 68-0 | Albemarle Road | SWM-624 | CCTV Inspection of Storm Drain |
| 68-1 | Elm Road | SWM-16220 | CCTV Inspection of Storm Drain and Sewer Main |
| 68-1 | Calvin Road | SWM-18378 | Plug Testing of Private Sewer Lateral |
| 68-2 | Dunstan Street | SWM-7873 | Manhole Sampling; CCTV Inspection of Storm Drain and Sewer Main |
| 68-3 | Henshaw Street | SWM-19030 | Building Inspection; CCTV Inspection of Storm Drain and Sewer Main |
| 68-3 | River Street | SWM-13565 | CCTV Inspection of Storm Drain and Sewer Main; Dye Testing |
| 68-3 | River Street | SWM-19967 | CCTV Inspection of Storm Drain and Sewer Main; Dye Testing |
| 68-3 | Adams Avenue | SWM-14027 | Building Inspection; Review of CCTV & Dye Testing |



| | | | |
|------|------------------------|-----------|---|
| 68-3 | Henshaw Street | SWM-15148 | Building Inspection; CCTV Inspection of Storm Drain and Sewer Main |
| 68-3 | Derby Street | SWM-18735 | Dye Testing |
| 68-5 | Lexington Street | SWM-18036 | Confirmatory sampling at 377 Lexington Street |
| 68-5 | Maple Street | SWM-14084 | CCTV Inspection of Storm Drain |
| 68-9 | Walnut Street Easement | SWM-21444 | Abatement of illicit connection at 340 Linwood Avenue |
| 68-9 | Minot Place | SWM-13608 | CCTV Inspection of Storm Drain and Sewer Main |
| 68-9 | Brookside Avenue | SWM-1 | Send notification & CCTV private infrastructure at Newton Housing Authority |

Woodard & Curran recommends the aforementioned tasks be performed at this time, such that all IDDE investigations within Cheesecake Brook are complete and only illicit connection abatement monitoring need to be addressed moving forward. We recommend conducting the Cheesecake Brook IDDE investigations concurrently with those activities proposed in Catchments 11-5, described below.

IDDE Investigations for Sub-catchments 11-5

Woodard & Curran recommends that the FY 2020 IDDE investigations focus on Sub-catchment 11-5, also known as the Crystal Lake watershed. The Crystal Lake sub-catchment is within a Problem catchment area under the City's IDDE Program Manual; the Lake also recently experienced a high-profile beach closure which further warrants advancing this catchment areas prioritization. This focus on the Crystal Lake watershed will also benefit the watershed management planning being undertaken under a separate contract.

The recommended Catchment Investigation procedure is summarized as follows:

1. Conduct a rapid visual and olfactory inspection of key junction manholes in the catchment area to attempt to identify possible illicit discharges. Inspection will begin at the "upper" portions of the stormwater drainage network within each Catchment. A visual surface structural inspection will be conducted within key junction manholes. It is anticipated that the Woodard & Curran team will utilize the City's PeopleGIS platform for investigation documentation and reporting.
2. Once potential illicit discharge segments of pipe are identified, additional downstream investigation will only be conducted on key junction manholes to determine if significant increases in indicator parameters are evident.
3. The buildings adjacent to the pipe segments with potential illicit discharge will be targeted for building inspections.
4. Woodard & Curran will coordinate and complete building inspections with their subcontractor, SDE, to help identify illicit connections from private properties.



5. If sources of contamination cannot be identified via building inspections, Woodard and Curran will complete CCTV investigations in the suspected storm drain and adjacent sewer pipes.
6. Plug flow testing will also be considered in situations where building inspections result in a status of Dye In Both sewer and storm systems. This test result is likely the outcome of a leaking sewer lateral, which can be confirmed via the plug flow test. This process involves plugging the lateral at the mainline sewer connection, filling the lateral with dye from the house, and inspecting the storm drain and any laterals adjacent to the flooded sewer lateral. If dye is observed in the drain during this process, it is confirmation that the sewer lateral is leaking sewage into the City's MS4.

IDDE Investigations for Sub-catchments 77-4

Upon completion of work identified for 11-5 (Crystal Lake sub-catchment), Woodard & Curran recommends progressing with IDDE investigations in sub-catchment 77-4, Edmands Brook. This sub-catchment is also considered a Problem catchment. The City is also considering improvements within the watershed that warrant advancing IDDE investigations. Investigations in sub catchment 77-4 would follow the same catchment investigation procedure as that of sub-catchment 11-5, described above.

Project Updates and Budgetary Projections

Woodard & Curran will provide the City with progress updates throughout the project. We will meet with the City to review progress and modify the project approach at key times, such as the completion of the Cheesecake Brook sub-catchment and the completion of manhole sampling in sub-catchment 11-5. These meetings are also anticipated to include project budget updates to further update the City and allow for adjustments in approach as needed.

Utilizing typical assumptions for IDDE field activity efforts based on total length of storm drain, Woodard & Curran has estimated the anticipated effort for manhole sampling, building inspections, etc. for this phase of the project. Based on these preliminary estimates, we anticipate completing IDDE investigations in Cheesecake Brook and within the Crystal Lake Sub-Catchment 11-5 as part of the FY 2020 work and expect to initiate the IDDE investigations in sub-catchment 77-4 within the FY 2020 work. However, depending on unknown issues which may be detected, the approach may need to be adjusted. As noted above, we will meet with the City as the project progresses to provide updates on the status of the project and budget, and any recommended modifications to the project approach.

ATTACHMENT 2: SUB-CATCHMENT MAPS – IDDE RESULTS



Pipe IDDE Investigation Status

-  Stormwater Pipe
-  Other
-  No Contamination Found
-  Standing Water
-  Suspected
-  Upstream Contamination

Building Inspection Status

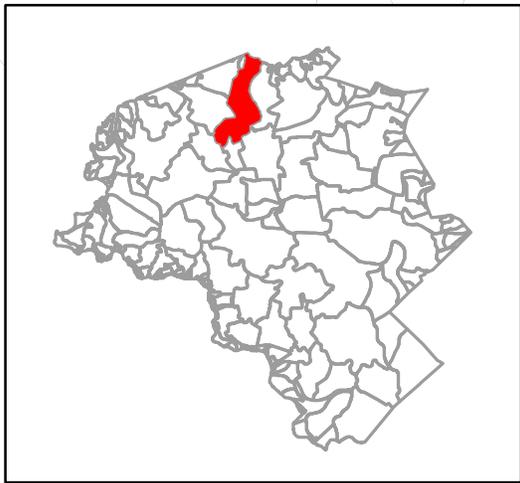
-  Not Tested
-  Not Legal
-  Legal
-  Dye in Both Systems
-  No Dye Found
-  Attempted
-  Refusal

Cheesecake Brook
Sub-Catchment 68-0



SWM-624
Ammonia: 2
Surfactant: 0

SWM-19806
Ammonia: 0.4
Surfactant: 0.25



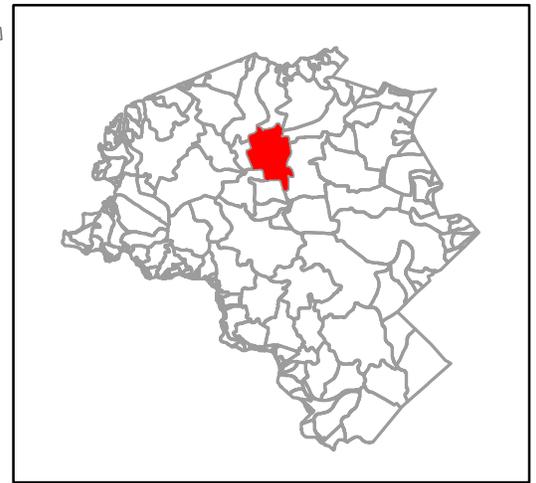
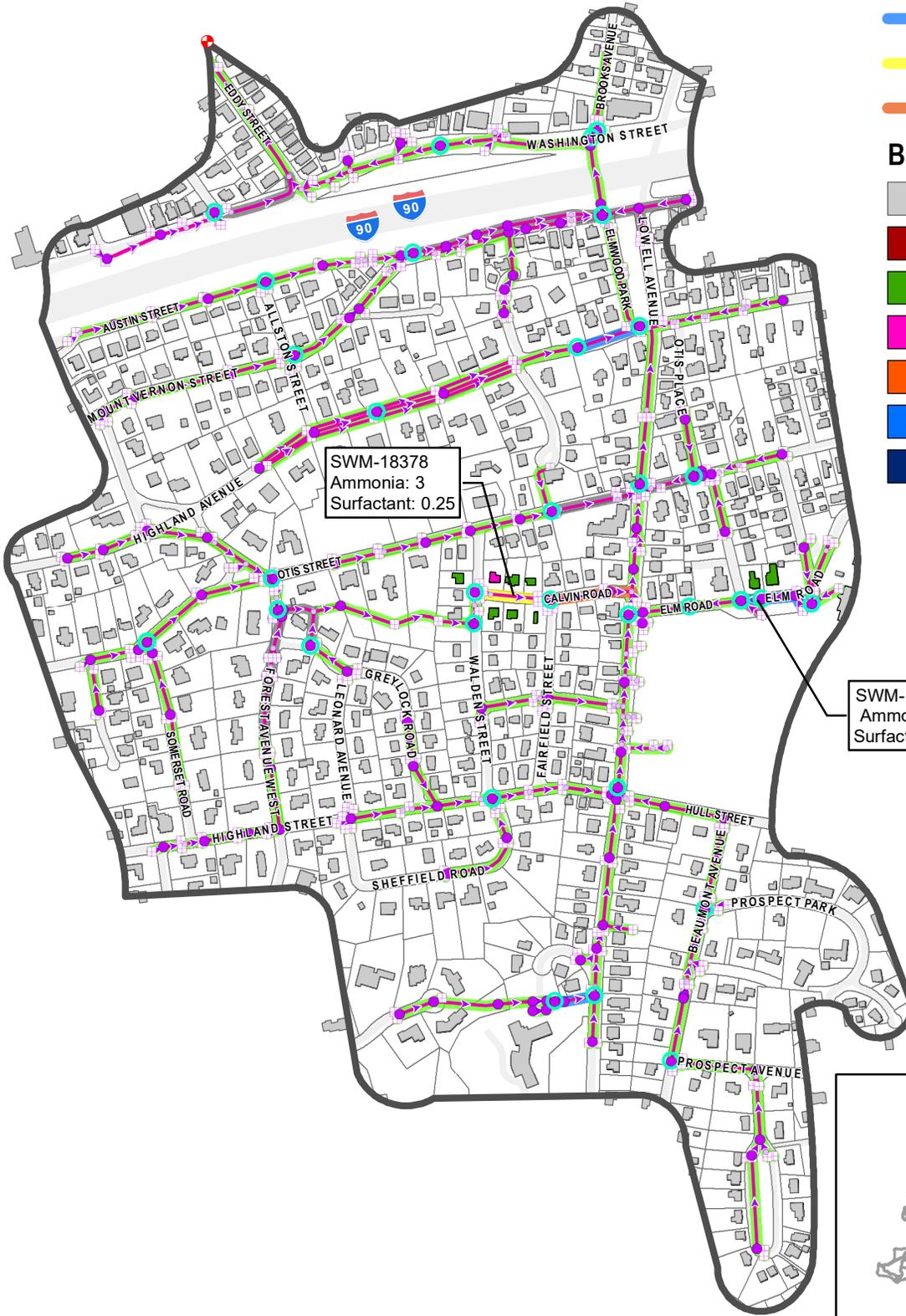
**Cheesecake Brook
Sub-Catchment 68-1**

Pipe IDDE Investigation Status

-  Stormwater Pipe
-  Other
-  No Contamination Found
-  Standing Water
-  Suspected
-  Upstream Contamination

Building Inspection Status

-  Not Tested
-  Not Legal
-  Legal
-  Dye in Both Systems
-  No Dye Found
-  Attempted
-  Refusal



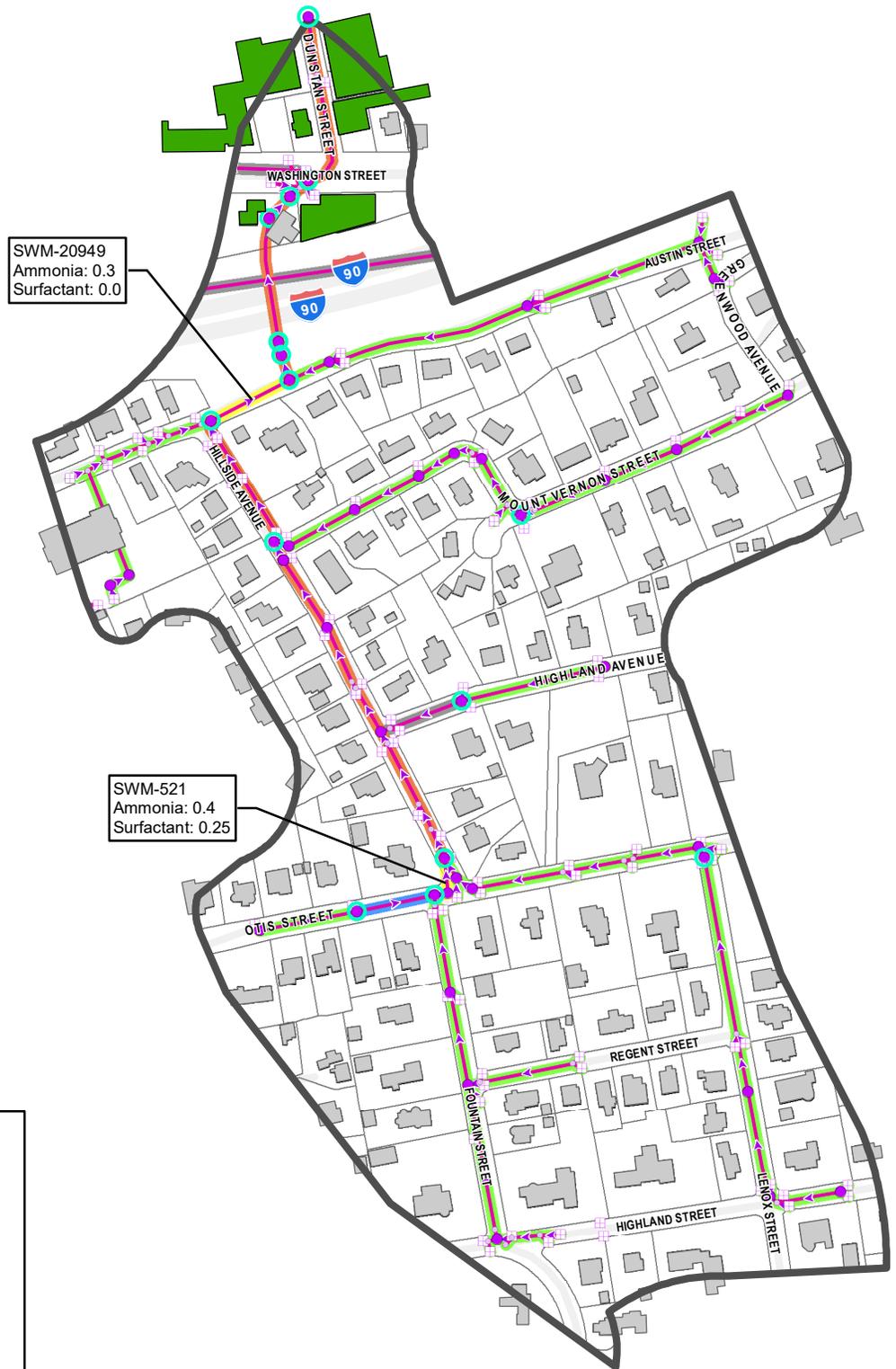
Pipe IDDE Investigation Status

-  Stormwater Pipe
-  Other
-  No Contamination Found
-  Standing Water
-  Suspected
-  Upstream Contamination

Building Inspection Status

-  Not Tested
-  Not Legal
-  Legal
-  Dye in Both Systems
-  No Dye Found
-  Attempted
-  Refusal

Cheesecake Brook
Sub-Catchment 68-2



SWM-20949
Ammonia: 0.3
Surfactant: 0.0

SWM-521
Ammonia: 0.4
Surfactant: 0.25



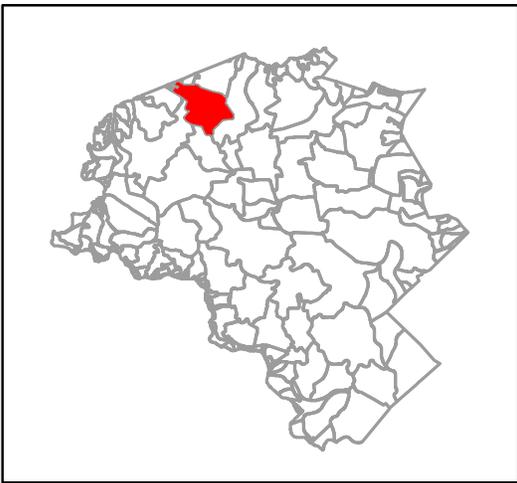
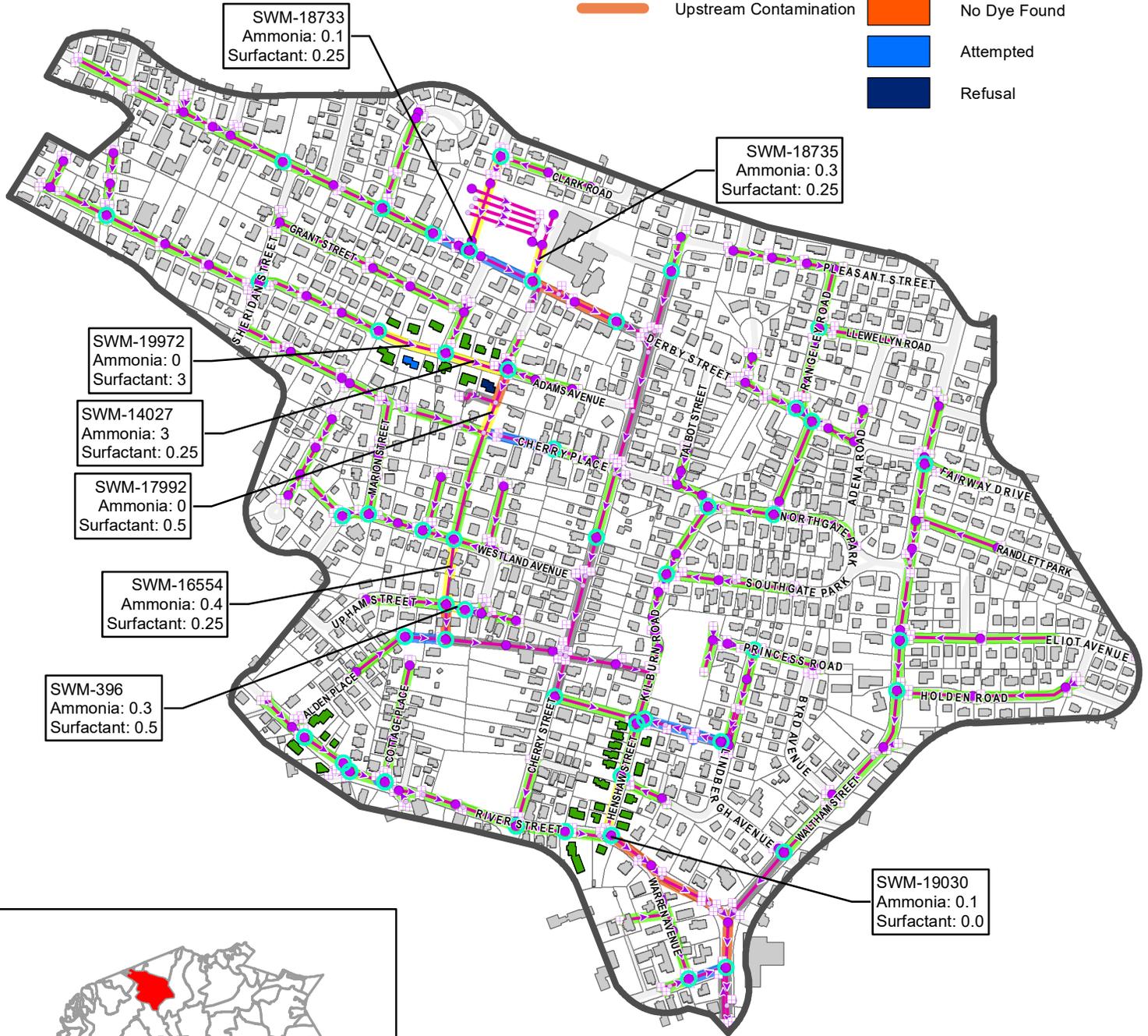
**Cheesecake Brook
Sub-Catchment 68-3**

Pipe IDDE Investigation Status

-  Stormwater Pipe
-  Other
-  No Contamination Found
-  Standing Water
-  Suspected
-  Upstream Contamination

Building Inspection Status

-  Not Tested
-  Not Legal
-  Legal
-  Dye in Both Systems
-  No Dye Found
-  Attempted
-  Refusal

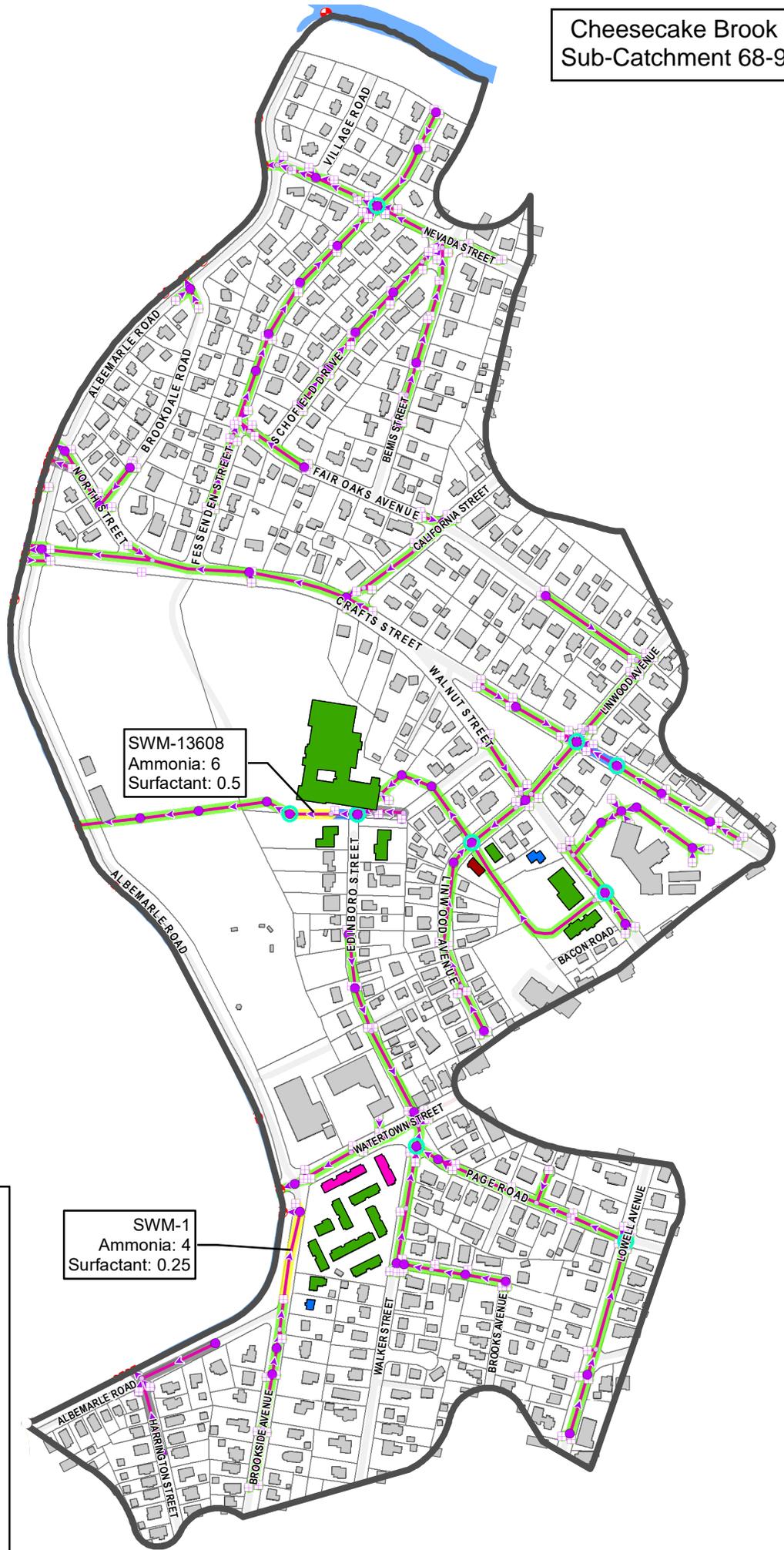


Pipe IDDE Investigation Status

-  Stormwater Pipe
-  Other
-  No Contamination Found
-  Standing Water
-  Suspected
-  Upstream Contamination

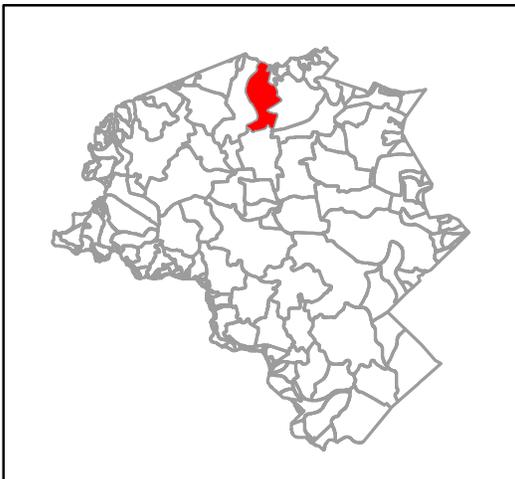
Building Inspection Status

-  Not Tested
-  Not Legal
-  Legal
-  Dye in Both Systems
-  No Dye Found
-  Attempted
-  Refusal



SWM-13608
Ammonia: 6
Surfactant: 0.5

SWM-1
Ammonia: 4
Surfactant: 0.25



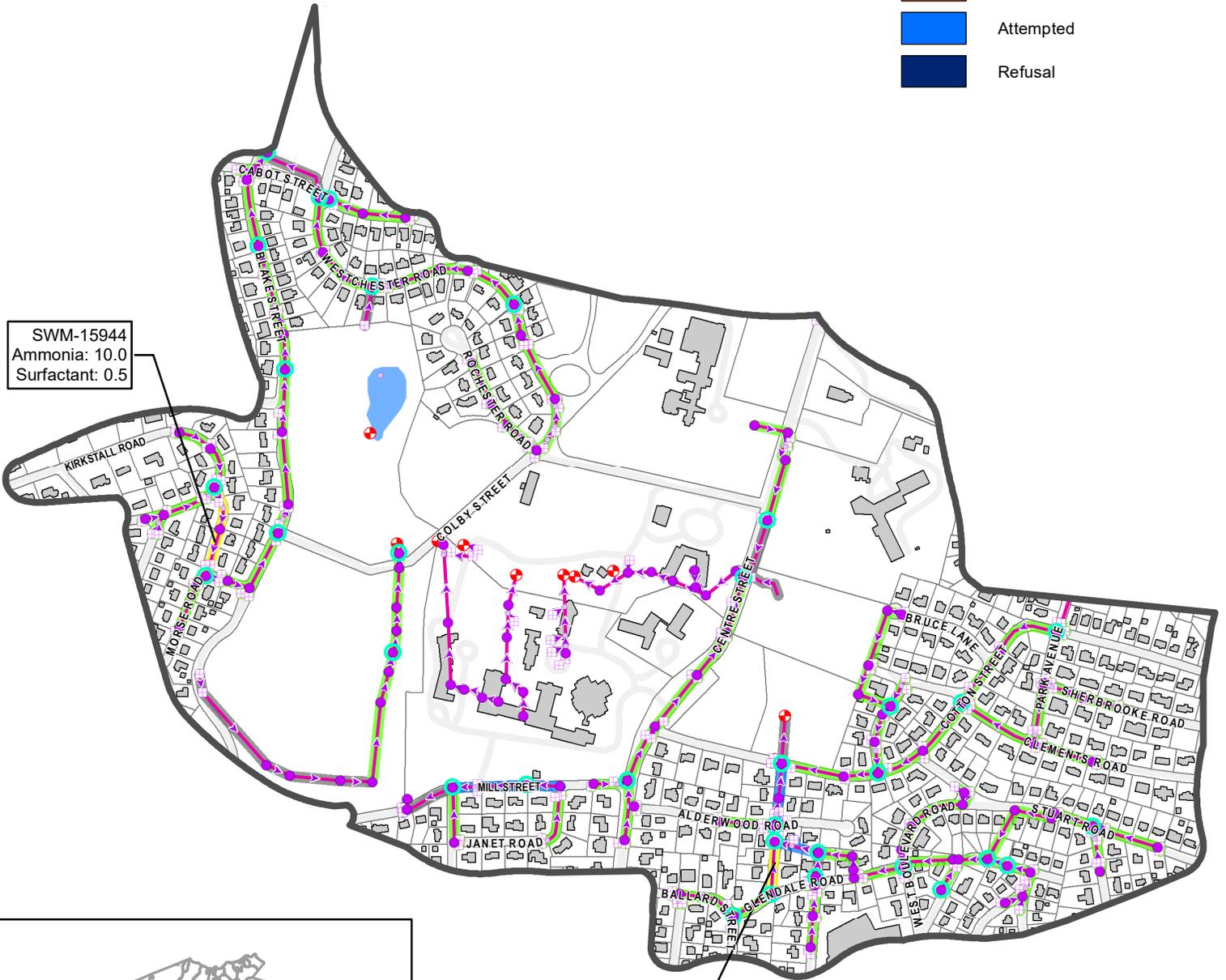
**Edmunds Brook
Sub-Catchment 77-4**

Pipe IDDE Investigation Status

-  Stormwater Pipe
-  Other
-  No Contamination Found
-  Standing Water
-  Suspected
-  Upstream Contamination

Building Inspection Status

-  Not Tested
-  Not Legal
-  Legal
-  Dye in Both Systems
-  No Dye Found
-  Attempted
-  Refusal



SWM-15944
Ammonia: 10.0
Surfactant: 0.5

SWM-19899
Ammonia: 0.6
Surfactant: 0.25



**Crystal Lake
Sub-Catchment 11-5**

SWM-22447
Ammonia: 10
Surfactant: 3.0

SWM-21627
Ammonia: 10
Surfactant: 1.5

SWM-14447
Ammonia: 3
Surfactant: 1

SWM-17239
Ammonia: 10
Surfactant: 2

SWM-19851
Ammonia: 2
Surfactant: 0.75

SWM-14283
Ammonia: 2.0
Surfactant: 1.0

SWM-5320
Ammonia: 0
Surfactant: 1.5

Pipe IDDE Investigation Status

-  Stormwater Pipe
-  Other
-  No Contamination Found
-  Standing Water
-  Suspected
-  Upstream Contamination

Building Inspection Status

-  Not Tested
-  Not Legal
-  Legal
-  Dye in Both Systems
-  No Dye Found
-  Attempted
-  Refusal

