ARCADIS Design & Consultancy for natural and built assets

Village of Mamaroneck

# ILLICIT DISCHARGE DETECTION AND ELIMINATION – PHASE 5 REPORT

Mamaroneck, NY

February 4, 2016

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# VERSION CONTROL

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# APPENDICES

# 1 BACKGROUND

In 2010, the Environmental Protection Agency (EPA) collected samples at three stream locations in the Village of Mamaroneck (Village). The results of these samples showed high levels of fecal and total coliform bacteria and were the basis for the issuance of an Administrative Order CWA-02-2001-3022 (Order) to the Village. This Order was the impetus for the Village to conduct a system wide Illicit Discharge Detection and Elimination program (IDDE). Malcolm Pirnie, now Arcadis, was awarded a contract in July of 2012 to assist the Village with their IDDE program and has been engaged in the work each consecutive year since then.

This report summarizes the 2015 engineering services completed for sewer system investigations in the Village of Mamaroneck to identify sources of illicit discharges.

# 2 STORMWATER OUTFALL INVENTORY AND INSPECTION

Arcadis began an inventory, inspection and GIS mapping update of outfalls in 2013. Arcadis visited the remaining eleven outfalls in 2015. Of these eleven, four outfalls were located in areas where they could not be accessed, and two outfalls could not be located. The Arcadis field team did a thorough survey in attempt to locate each outfall, but heavy vegetation or sand, may have prevented them from being identified in the field. Storm sewer manholes in the vicinity of the outfalls were inspected to confirm there was no dry weather flow in the storm sewer that drains to the outfall. In addition, the outfalls that could not be accessed or located were not part of a large drainage system, they were either private area drainage systems, or small systems consisting of a few catchbasins and drainage pipe. The six outfalls that could not be located or accessed are still shown on the GIS map as “record” locations.

Of the five outfalls inspected, only one outfall Vk 4a, had dry weather flow (<1 gpm) during the inspection. No abnormal colors or odors were observed in the discharge from this outfall. Due to the very low flow rate and lack of other indicators of illicit discharge, Arcadis did not collect a sample at this outfall. Outfall 71 is in disrepair and should be considered for repair.

A complete summary of the outfalls investigated in 2015 and their illicit discharge potentials are presented in Table 2-1, below. The inspection forms for these outfalls are included as Appendix A.

**Table 2-1. Outfall Inventory and Inspection**

| Outfall Name | Illicit Discharge Potential |
|---|---|
| 52 | Unlikely |
| 63 | Unlikely |
| 64 | Unlikely. Could not locate outfall but the upgradient catchbasin did not have dry weather flow or odors. |
| 71 | Unlikely |
| 78 | Unlikely. Could not locate, potentially covered in sand. Upgradient catchbasin did not have dry weather flow or odors. |
| 160 | Unlikely. No access to outfall. Upgradient manhole shows no signs of illicit discharge; no dry weather flow |
| Vl 1 | Unlikely |
| Vl 1a | Unlikely. No access to outfall (on private beach). Upgradient catchbasin part of large system, no odors. |
| Vk 4a | Unlikely. Trickling (< 1 gpm) |
| Vk 10e | Unlikely. No access to outfall (on private beach); Upgradient catch basin submerged with debris and sediment; Poor operating condition |
| Vk 13a | Unlikely. No access. Upgradient manhole no flow, no odor. |

### Conclusions and Recommendations

Arcadis findings do not suggest that any of the outfalls in the table above had likelihood of illicit discharge. The outfall inspection program was completed in less time than is required by the Village's municipal separate storm sewer system (MS4) General Permit. This compressed schedule was implemented to more quickly determine if there were significant illicit discharges so they could be eliminated.

The outfall program has previously identified some significant problems, which have been corrected. Section 6, Drainage Area Investigations, discusses additional outfall sampling results that were collected as part of drainage area investigations.

# 3 RYE NECK HIGH SCHOOL DYE TESTING AND SAMPLING

Water sampling from both Arcadis and Save the Sound has consistently shown elevated fecal coliform concentrations in Beaver Swamp Brook at the Village's east border. Rye Neck High School lies on the border of the Village of Mamaroneck and the City of Rye. No sampling had previously been completed with the intent of investigating for illicit discharges associated with the school. The Village wanted to rule out the school as a source of illicit discharges by completing a thorough investigation of the school and the stormwater outfalls in the surrounding area.

The Rye Neck High School sanitary sewer drains were dye tested to ensure no sewage drains to Beaver Swamp Brook. The stormwater outfalls and Beaver Swamp Brook were sampled in an attempt to isolate sections of the Brook that had high fecal coliform concentrations. Samples were also collected from a minor branch of Beaver Swamp Brook to determine if this small stream contributes to elevated fecal coliform sample results from the Brook. The location of the samples can be found in Figure 2.

## 3.1 Dye Testing

Arcadis staff met with the high school janitor at 9 am on July 28, 2015. The investigation began by opening manholes in the parking lot on the west side of the building (the back of the school). After looking in multiple manholes, Arcadis staff determined that the sanitary flow comes from both sides of the high school (A Corridor and E Corridor), and combines at a manhole located at a handicap parking spot near the middle of the building between B Corridor and D Corridor. From this manhole, flow travels towards Beaver Swamp Brook and is believed to cross under the brook and connect to the County intercepting sewer. A schematic of high school sanitary sewer system is provided as Figure 1.


**Figure 1. Rye Neck High School Sewer Schematic**

During dye testing, an Arcadis staff visited each of the bathrooms and janitor closets adjacent to each bathroom, poured sewer tracing dye, and flushed water down the drain. The locations tested are shown in Table 2-2. Two additional Arcadis staff stayed outside to monitor the downgradient sanitary sewer manhole, storm sewer manhole, and the stormwater outfalls along Beaver Swamp Brook.

**Table 2-2. Bathrooms and Drains Dye Tested**

| Dye Tested Bathrooms |
|---|
| A Corridor Bathrooms |
| A Corridor Faculty Bathrooms |
| A Corridor Faculty Bathrooms – Middle School Faculty |
| B Corridor Bathrooms |
| D Corridor Bathrooms |
| E Corridor Bathrooms |
| Kitchen Bathroom toilet |
| Administrative Building[(1)] |

Note: [(1)] Administrative Building was dye tested during follow up work on September 2, 2015

Each dye test took between 10 and 20 minutes depending on the location of the bathroom relative to the sanitary sewer manhole that receives the sewage. Arcadis staff confirmed for each dye test that dye appeared in the sanitary manhole and that the stormwater outfalls remained dry and had no signs of dye. One stormwater outfall was trickling prior to the start of the testing and continued to trickle during dye testing.

The sanitary manhole located directly outside of the A Corridor bathrooms receives flow when the toilets are flushed. At the time of the July 28, 2015 dye testing event, the next downstream manhole was half full of sewage and the inflow pipes were not visible. Arcadis notified the school of this maintenance issue and they hired a contractor to flush out the blockage.

On September 2, 2015, Arcadis returned to the school to dye test the A Corridor bathroom again and the Administration Building to confirm proper discharge. For each location, dye was visible in the sanitary manhole and no flow was observed in the storm sewer or outfalls.

## 3.2 Stream and Outfall Sampling

There are five stormwater outfalls in the vicinity of the school. All but one (BSB-03, located on the east bank of Beaver Swamp Brook) were dry during the investigation. Arcadis staff collected a sample from outfall BSB-03 during the July 28, 2015 sampling event. The fecal coliform concentration was 1200 cfu/100 ml, but the flow was less than 1 gpm.

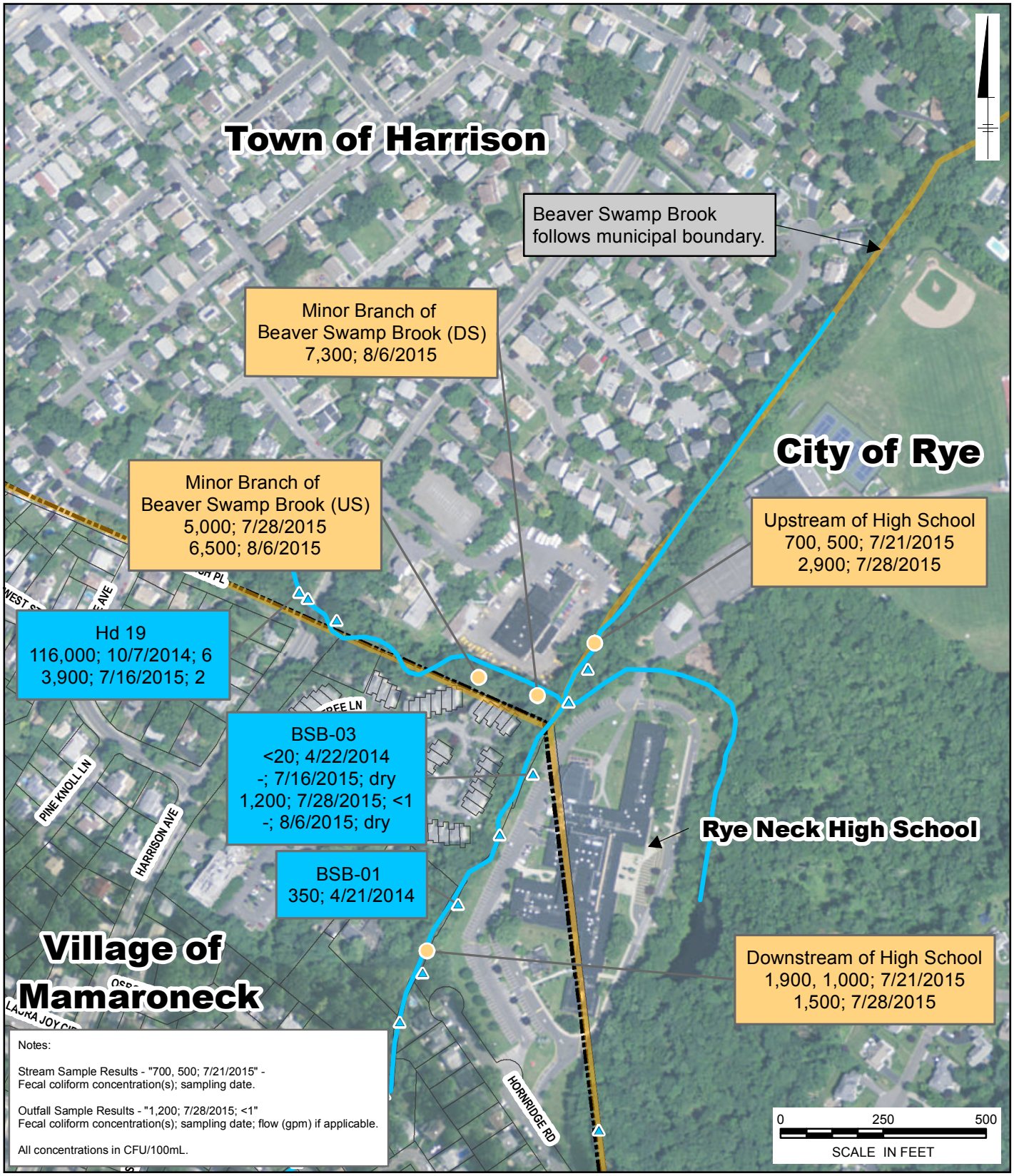
Samples were collected from Beaver Swamp Brook both upstream and downstream of the high school and from a minor branch of the brook. All results showed elevated fecal coliform concentrations, particularly the minor branch of

the Beaver Swamp Brook near Rye Neck High School. The sample results are presented on Figure 2. All sample results for this investigation are provided as Appendix B.

## Conclusions and Recommendations

Arcadis findings do not suggest that the sanitary sewer at Rye Neck High School is connected to the storm sewer or discharges to outfalls on Beaver Swamp Brook. The school has one outfall with intermittent dry weather flow with elevated fecal coliform concentrations. It is recommended that the high school complete a CCTV inspection in this storm sewer line to identify the source. The intermittent pollutant load from this outfall is currently very low and would not make a significant impact to the water quality in the Brook. However, an inspection would help determine if there is a source that could increase concentrations in the future.

There is an elevated fecal coliform concentration in both the main branch of the Beaver Swamp Brook and the minor branch that flows into the main branch across from the High School; both are upgradient of the Village border. The minor branch is located in the Town of Harrison and main branch is bordered by the Town of Harrison and the City of Rye. These communities were notified by the Village regarding the elevated fecal coliform concentrations on October 21, 2015.




**Legend**

**Stormwater Outfalls**

- ARCADIS Inspected
- Record Outfalls
- 2015 ARCADIS Stream Sampling Locations
- Streams
- Municipal Boundary
- Village Boundary
- Property Line

VILLAGE OF MAMARONECK
MAMARONECK, NY

# RYE NECK HIGH SCHOOL AND BEAVER SWAMP BROOK SAMPLE RESULTS

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FIGURE 2

CITY: ALB DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH TM:
PROJECT: VILLAGE OF MAMARONECK IDDE
PATH: G:\GIS\MOD01547034.0000\RyeNeckHSArea2015ArcResults.mxd DATE SAVED: 1/25/2016 12:52:21 PM

# 4 EAST BASIN ABANDONED SEWER LINE INVESTIGATION

Historically, there was one inverted siphon that transported sewage under the East Basin of Mamaroneck Harbor and one under the West Basin. These inverted siphons were abandoned years ago, and the sewage is now pumped to the wastewater treatment plant without crossing a water body. Arcadis staff investigated the abandoned infrastructure to confirm it was properly sealed and not discharging sewage into the Harbor. Inspections were completed by Arcadis staff on September 16, 2015 and December 7, 2015. Figure 3 shows generally where these siphons were located based on historic maps. Locations “A” and “B” are the approximate end points of the East Basin siphon and locations “C” and “D” are the approximate end points of the West Basin siphon.

## 4.1 East Basin Siphon

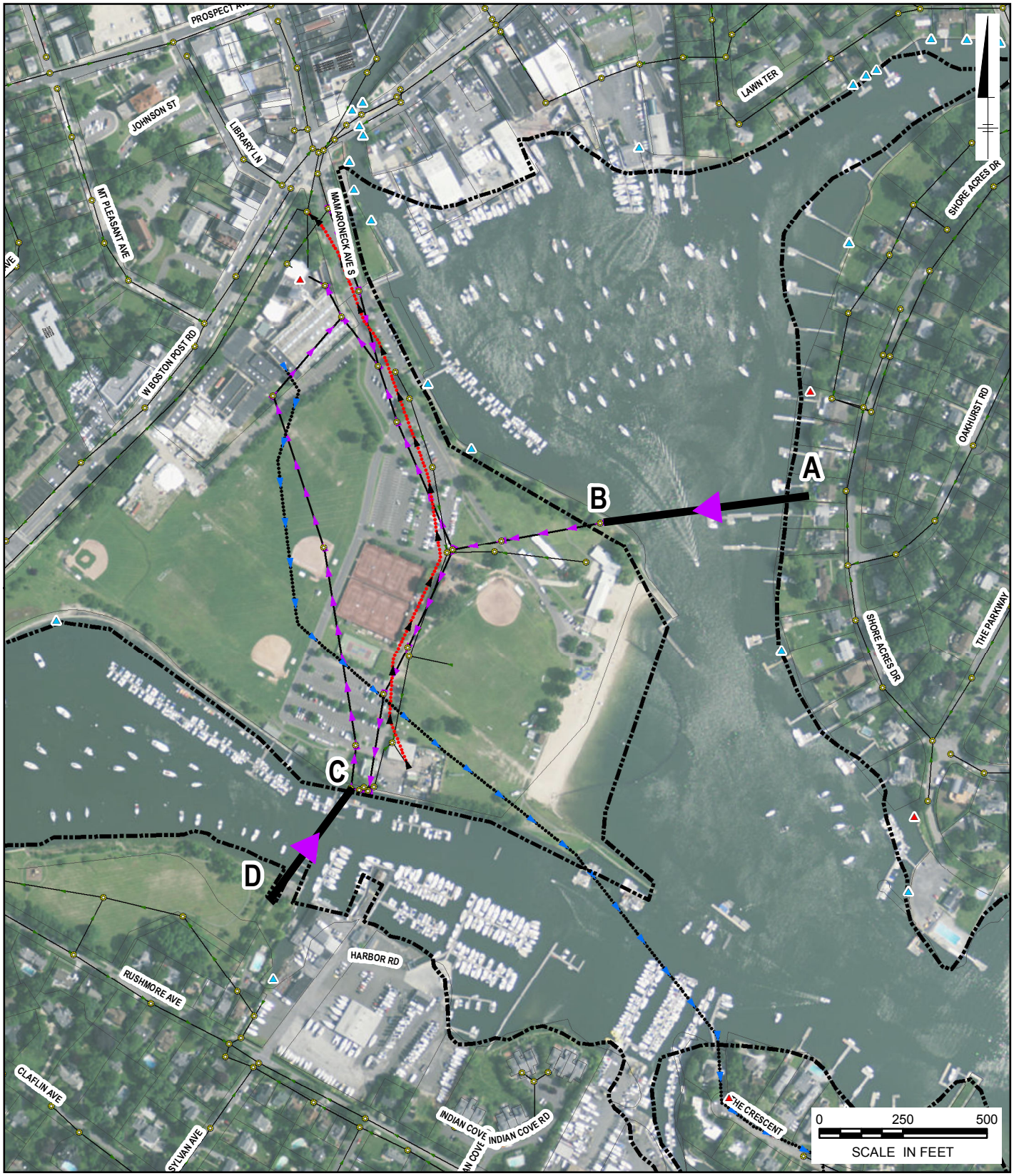
As-built drawings from 1987, titled East Basin Sewer, developed from the engineering firm O’Brien and Gere, show how the upgradient end of the siphon was abandoned and sewage redirected to the pump station located on South Barry Avenue. The reconstructed manhole, Vj 1, is located in between 600 and 604 Shore Acres Drive. This is shown as location “A” in Figure 3. The manhole was reconstructed to direct sewage from the two adjacent homes to a new gravity sewer on Shore Acres Drive, instead of discharging to a siphon located under the harbor. The opening of the 12-inch outlet pipe that lead to the siphon was abandoned by filling it with watertight non-shrink grout.

Manhole Vj 1 was inspected by Arcadis staff and found to be operating as designed. There was very little sewage flow since only two homes discharge to the manhole. The grout was still in good condition and completely covered the pipe that historically discharged to the siphon. Based on observations, there is very little chance of sewage entering the harbor from a faulty repair at this location.

The downgradient end of the historic East Basin Siphon was located at Harbor Island Park, next to what is currently the Parks and Recreation building. This is shown as location “B” on Figure 3. The abandoned sewer line runs parallel to the active Parks and Recreation building sewage line, which flows toward the parking lot adjacent to the tennis courts.

A diagram of the manholes in the Harbor Island Park is included as Figure 4.The abandoned manholes, labelled MH 1 and MH 2, were partially submerged with stagnant water. MH 1 is 7.3 feet deep and, and the water depth was 6.5 feet at the time of the inspection. The stagnant water in the manhole was murky, but a survey rod was used to probe the manhole walls and a pipe opening was discovered. This opening is oriented toward the Parks and Recreation building and agrees with historic maps. MH 2 was also partially submerged. This manhole is 14.5 feet deep and the water depth was 7.5 feet at the time of the inspection. A survey rod was again used to probe the bottom of the manhole, and another opening was discovered. MH 3, which would have been the closest manhole to the Harbor could not be located. MH 4 and MH 5, which are downgradient and closer to the wastewater treatment plant, appear to have been paved over.

Based on observations of the manholes on this abandoned sewer line, it is not likely that sewage could enter the Harbor at this location. The water in these manholes is stagnant which means the pipe is blocked at both ends. In addition, the sewer was designed to flow from the Harbor to the plant, so there would have to be significant flow or head for a discharge to travel upgradient and reach the Harbor.




**Legend**

**Stormwater Outfalls**
- ARCADIS Inspected
- Record Outfalls

**Sanitary Sewer**
- Gravity Main
- Abandoned Pipe
- Force Main
- WCDEF Mamaroneck WWTP Outfall Pipe
- Manholes
- Siphon
- Property Line
- Village Boundary

VILLAGE OF MAMARONECK
MAMARONECK, NY

# APPROXIMATE LOCATIONS OF ABANDONED SIPHONS

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FIGURE 3

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

CITY: ALB DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH TM:
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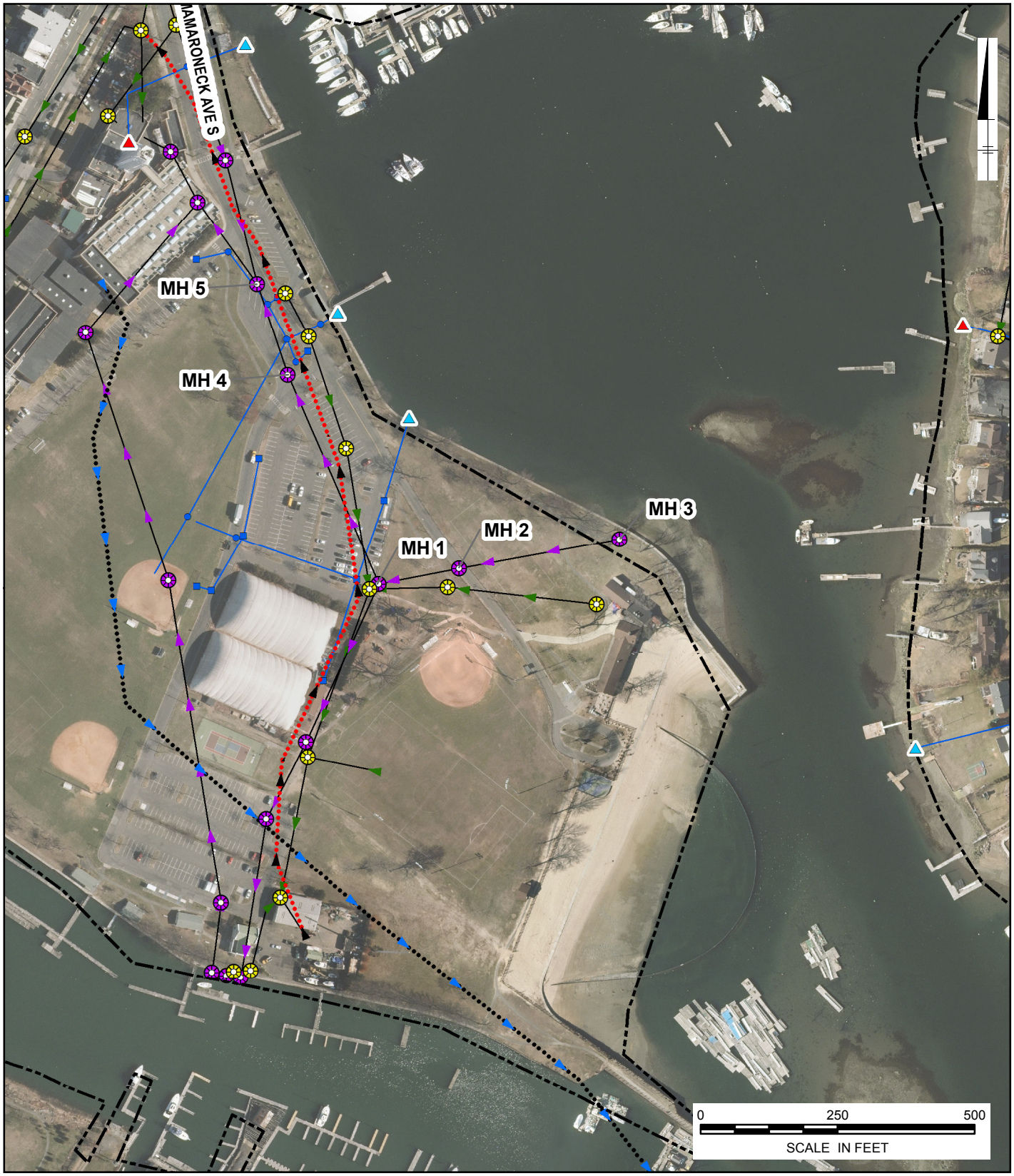


**LEGEND**

**Stormwater Outfalls**
- ARCADIS Inspected
- Record Outfalls

**Sanitary Sewer**
- Sanitary Sewer - Gravity
- ABANDONED
- Sanitary Sewer - Force Main
- WCDEF Mamaroneck WWTP Outfall Pipe
- Sanitary Manholes
- Abandoned Manholes
- Catchbasin
- Drainage Manhole
- Storm Drains
- Village Boundary

# VILLAGE OF MAMARONECK
# MAMARONECK, NY

## HARBOR ISLAND PARK
## ABANDONED MANHOLES

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FIGURE
**4**

CITY: CLIFTON PARK, NY DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH TM:
PROJECT: VILLAGE OF MAMARONECK IDDE
PATH: Path: G:\GISMOD\01547034.0000\Abandoned_Sewer_Line.mxd

## 4.2 West Basin Siphon

The West Basin Pump Station was constructed to replace the West Basin siphon. The upgradient siphon structure was located in the vicinity of what is currently Nichols Yacht Yard, at 500 Rushmore Avenue, and the downgradient structure was located on the west end of the Harbor Island Park. Locations “C” and “D” on Figure 3 show generally where the west basin siphon was located based on historic documents.

The field team searched the grounds of the marina and the west side of Harbor Island Park, but could not locate any abandoned or repurposed structures. The field team spoke with the owner of the Yacht Yard, but he did not know of any abandoned structures in the yard or in the area.

# 5 OTTER CREEK INSPECTION

Residents have contacted the Village to express concerns about debris in Otter Creek that they believed could be the result of illicit discharges. Historic records show there are six outfalls between the confluence of the Creek and the Harbor and where it originates at an upstream pool. Only five of these outfalls were located in 2014 when Arcadis performed outfall inventory and inspection in this area. There is a minimal amount of storm sewer infrastructure in the streets in this area; some of the outfalls are likely area drains for properties. Arcadis investigated Otter Creek partly on foot and partly by kayak to inspect known outfalls for dry weather flow, to locate any previously unidentified outfalls, and to look for signs of illicit discharges.

Arcadis field staff began an inspection during low tide (around 8:00 am) on August 21, 2015 with the intent to survey the entire creek for outfalls that may be submerged during high tide. The field staff launched a kayak from the bridge on South Barry Lane and paddled upstream, but quickly found that there was not enough flow at low tide to do so. The field team then attempted to walk upstream, but found themselves sinking deep into the mud. After an unsuccessful attempt to travel upstream, the field team turned around and paddled toward the outlet to the Harbor. Between the South Barry Lane bridge and the Harbor, the field team was able to identify outfall BSB-23, which was trickling. Though the field team was equipped to take a sample, this outfall could not be safely accessed from the water or by walking on the saturated mud and sand.

At Harbor Island Park, the Arcadis field team was advised that mid-tide may be the best time to paddle Otter Creek. At high tide, the bridge is impassable and at low tide there is not enough flow to make the waterway navigable. When the field team returned to the Creek at mid-tide, they were able to reach 911 Soundview Drive which is about ¾ of the way to the upstream pool. By that point, the water levels had again reached low levels that made paddling further impossible. By reaching that location, the field team should have been able to see the three outfalls located in the area: BSB-22, BSB-24, and Vj 60. The outfalls were not visible as the vegetation was very dense. The field team was not able to walk in this area to investigate further without sinking.

Analytical sampling completed in Otter Creek by Arcadis in previous years has been low. However, this year sample results were consistently elevated.

Figure 5 shows the area investigated. A photo log documenting the investigation efforts provided in Appendix C. A map showing the River sampling results is provided as Appendix F.

## Conclusions and Recommendations

Though sampling at the bridge on South Barry Lane suggests there may be an illicit discharge in Otter Creek, no distinguishable sources of fecal coliform have been identified. If Otter Creek were to be revisited in the winter, there would be less vegetation, making outfalls more visible and the ground easier to traverse during low tide. There are several homes with septic systems adjacent to Otter Creek. These septic systems should be inspected to confirm the leach fields are functioning properly.


**LEGEND**

**Stormwater Outfalls**
- ARCADIS Inspected
- Record Outfalls

**Storm Sewer**
- Storm Sewer
- Catchbasin
- Drainage Manhole

**Sanitary Sewer**
- Sanitary Sewer - Gravity

- Mamaroneck Village Streams
- Municipal Boundary
- Village Boundary

# VILLAGE OF MAMARONECK
# MAMARONECK, NY

## OTTER CREEK INVESTIGATION

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FIGURE
**5**

CITY: CLIFTON PARK, NY DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH TM:
PROJECT: VILLAGE OF MAMARONECK IDDE
PATH: Path: G:\GISMOD\01547034.0000\OtterCreekFigure.mxd Date Saved: 1/25/2016 1:36:14 PM

# 6 DRAINAGE AREA INVESTIGATIONS

Outfall inventory and inspections completed by Arcadis since 2012 have identified outfalls that flowed during dry weather conditions. This is very typical and is most often associated with groundwater infiltration in the pipes, or historic underground streams that are now conveyed through the sewer system. Most of these outfalls will have some fecal coliform bacteria from background sources, such as wild and domestic animals, but it is important to monitor them to confirm bacteria levels have not increased.

During the 2015 drainage area investigation, Arcadis revisited and sampled outfalls that have not been sampled recently and have historically had a dry weather flow greater than 1 gpm. In addition, several samples collected at the close of the of the 2014 outfall sampling program identified stormwater outfalls with elevated fecal coliform concentrations. These outfalls were resampled in 2015 to determine if the bacteria concentrations were still elevated, or if some of the historically elevated concentrations may have been isolated incidents.

Table 6-1 below presents the results of the 2015 outfall sampling program and compares it with previous sampling events. Appendix B provides a summary of all 2015 water sampling results.

**Table 6-1. Previous Outfall Sampling Results Compared to 2015**

| Outfall ID | Previous Sample Results (cfu/100 ml; flow (gpm); date) | 2015 Sample Results (cfu/100 ml; flow (gpm); date) |
|---|---|---|
| 17 (previously identified as 132) | 8,000; 13 gpm; 10/7/2014 | 1,800; >5 gpm; 10/7/2015 |
| Vd 51b | 1,600; 2 gpm; 10/7/2014 | 200; ~ 1-2 gpm; 7/16/2015 |
| Vd 70 | 3,000; 2 gpm; 9/30/2014 | 400; 1 gpm; 7/16/2015 |
| Vj 04 | 1,400; 93 gpm; 4/21/2014 | 800; ~ 30-50 gpm; 7/21/2015 |
| Vg 24 | 9,000; 1 gpm; 9/30/2014<br>1,500; -; 10/7/2014 | 3,700; 1.6 gpm; 7/21/2015<br>15,000; 3.2 gpm; 8/6/2015 |
| Vn 1 | 4,300; 1 gpm; 9/30/2014 | 700; 1.3 gpm; 7/21/2015 |
| Vj 58 | 3,950; 3 gpm; 4/21/2014<br>1,600; 4 gpm; 9/30/2014 | 800; 1.5 gpm; 7/21/2015 |
| Vf 17 | 3,000; <1 gpm; 9/30/2014 | Dry – 7/21/2015 and 10/7/2015 |
| 47 | 1,200; 2.5 gpm; 10/23/2012 | 6,000; 0.5 gpm; 10/7/2015 |
| Vg 42 | 600; 5-10 gpm; 10/23/2012 | 300; 7 gpm; 10/7/15 |
| BSB-11 | Not sampled; 8 gpm; 4/2014 | Dry – 10/8/2015 |
| 26 | 34,000; 20 gpm; 3/4/2013<br>(Repair made in 2013) | 2,000; <1 gpm; 7/28/2015<br>2,000; 1 gpm; 8/6/2015<br>1,900; 1 gpm; 9/2/2015<br>3,900; 2 gpm; 10/7/2015 |
| Ve 22 | 900; 1 gpm; 9/30/2014 | 41,000; ¼ gpm; 10/7/2015 |
| 127 | | 9,800; 1 gpm; 7/16/2015<br>200; 1 gpm; 7/28/2015 |

It is generally not beneficial or economically feasible to track down sources of fecal coliform bacteria that result in a minor pollutant load (flow multiplied by concentration) to a water body. There is often some minor concentration of fecal coliform discharging from storm water outfalls. Resources are better spent focusing on sources with greater pollutant loads. For this investigation, samples with fecal coliform concentrations below 1,000 cfu/100 ml and/or collected from outfalls with flow rates of less than one gpm were not considered to have pollutant loads substantial enough to warrant further investigation at this time. The outfalls that had elevated fecal coliform concentrations are discussed below.

- Outfall 127 – This is an outlet to a culvert with a very small drainage area. The first sample had elevated bacteria concentrations, but there was construction occurring upgradient of the culvert the day of sampling. A follow-up sample was collected after the construction was completed and the bacteria concentration was low.
- Outfall 17 (previously 132) - Arcadis field staff returned to what was thought to be outfall 132 to collect a sample. The field staff determined that the outfall previously thought to be 132 was actually outfall 17, and

was located on the Town of Harrison side of the Mamaroneck River. This was confirmed by reviewing the outfall description of the previous outfall inspection report, and photos. Outfall 17 was resampled on October 7, 2015. The outfall flow rate was estimated to be greater than 5 gpm and the concentration was 1,800 cfu/100 ml. The Village provided the sample results to the Town of Harrison and recommended that they investigate further to find the source(s).

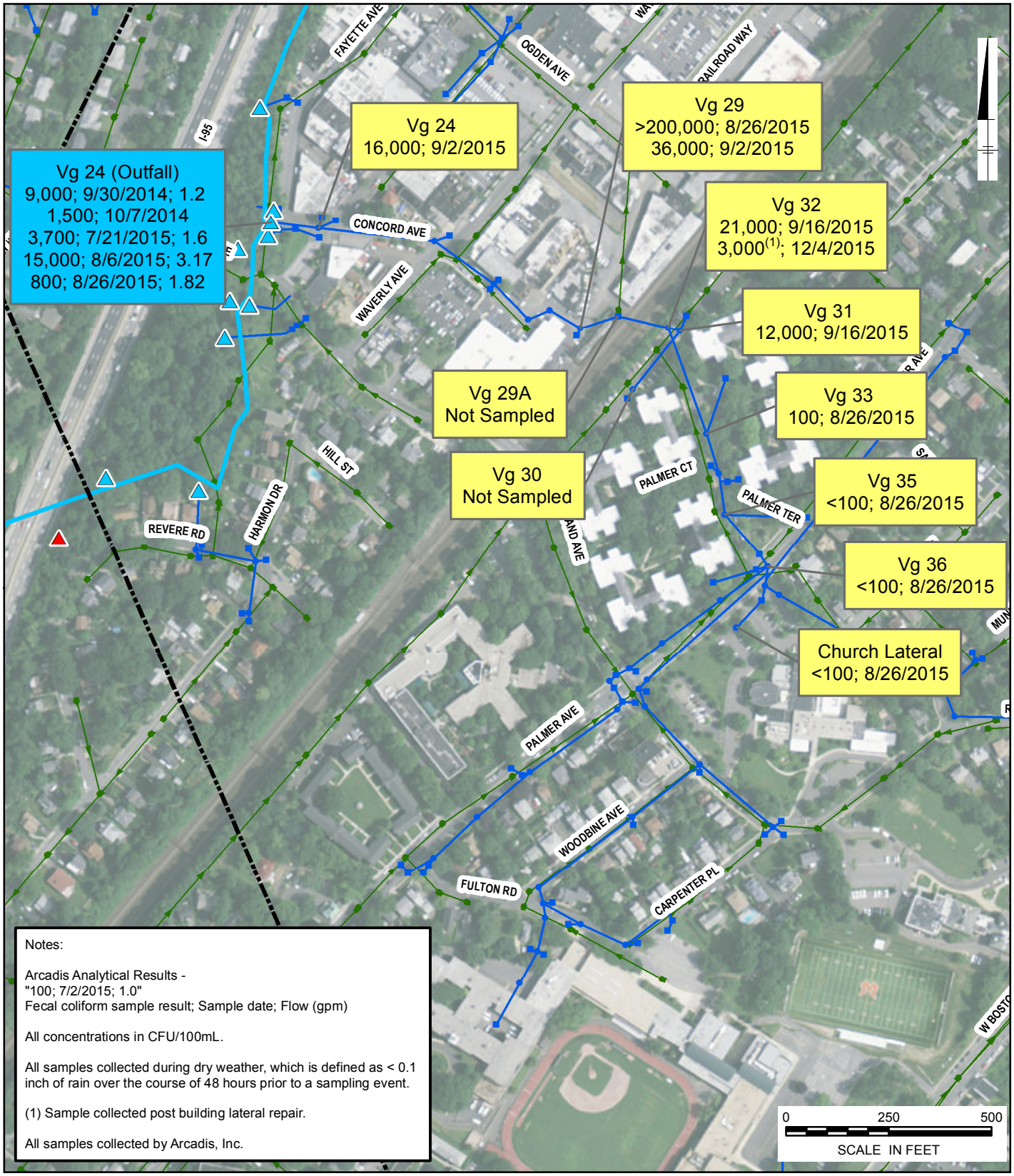
- Outfall 132 could not be located, it is suspected to be covered by rip rap along the shore. An upgradient catchbasin was discovered, and there was no dry weather flow in the catch basin at the time of the inspection.
- Outfall Ve 22 - This outfall has historically had very low flow, and during the 2015 field investigation the flow was less than a quarter of a gallon a minute. However, the fecal coliform concentration of the collected sample was high. This outfall was sampled at the end of the 2015 IDDE season and since the overall pollutant load was low, additional field investigations were not completed. This outfall will be sampled again in 2016, and if bacteria concentrations are high the sewershed will be investigated to locate the source(s) of bacteria.
- Outfall 47 – This outfall has very low flow. It is located in the vicinity of outfall Vg 24 and was sampled because dry weather flow was observed. The sample collected at the end of the 2015 field investigation had elevated fecal coliform concentrations. This outfall will be sampled again in 2016, and if bacteria concentrations are high the sewershed will be investigated to locate the source(s) of bacteria.

Two of the outfalls were selected for additional sampling and follow-up investigation, which is discussed in detail below.

## 6.1 Outfall Vg 24 Concord Avenue

This outfall was sampled on July 21, 2015. The fecal coliform concentration was 3,700 cfu/100 ml, with a flow of 1.6 gpm. Arcadis field staff began a drainage area investigation by opening manholes and catchbasins upgradient of the outfall, looking for dry weather flow, and sampling flow for fecal coliform concentration. The field team isolated the problem(s) to the sewer downgradient of manhole Vg 33. Manhole Vg 33 had a fecal coliform concentration of 100 cfu/100 ml and sample results from upgradient manholes did not show any concentration of fecal coliform. Sampling concentrations varied downgradient of the isolated area, but the highest sample was >200,000 cfu/100ml at manhole Vg 29. Sample results are shown on Figure 6.

Arcadis coordinated CCTV inspection of the storm sewer with subcontractor Fred Cook Inc. to look for illegal connections, cracks or breaks in the pipe, or signs of bacteria indicative of sewage flow. Arcadis staff added dye to sanitary manholes that either crossed or were in close vicinity of the storm sewers, to determine if sewage was entering the storm sewer from any direct or indirect connections. Televising began at Concord Avenue from manhole Vg 29. Fred Cook Inc. televised from Vg 29 to Vg 29A. The next section was televised was Vg 32 to Vg 33. Between Vg 32 and Vg 33, there were two laterals that enter the east side of the sewer and were both flowing at the time of the inspection. Upstream of these two laterals, the evidence of bacteria along the bottom of the pipe decreased dramatically. CCTV was also completed between Vg 31 and Vg 32, but there were no signs of illicit discharge in this section. Between Vg 31 and Vg 30, there was raccoon scat observed in the sewer.




Notes:

Arcadis Analytical Results -
"100; 7/2/2015; 1.0"
Fecal coliform sample result; Sample date; Flow (gpm)

All concentrations in CFU/100mL.

All samples collected during dry weather, which is defined as < 0.1 inch of rain over the course of 48 hours prior to a sampling event.

(1) Sample collected post building lateral repair.

All samples collected by Arcadis, Inc.

**LEGEND**

**Stormwater Outfalls**
- ARCADIS Inspected
- Record Outfalls

**Storm Sewer**
- Storm Sewer
- Catchbasin
- Drainage Manhole

**Sanitary Sewer**
- Sanitary Sewer - Gravity
- Mamaroneck Village Streams
- Municipal Boundary
- Village Boundary

# VILLAGE OF MAMARONECK
# MAMARONECK, NY

## OUTFALL VG 24 - CONCORD AVENUE DRAINAGE AREA INVESTIGATION RESULTS

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FIGURE
6

CITY: CLIFTON PARK, NY DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH TM:
PROJECT: VILLAGE OF MAMARONECK IDDE
PATH: Path: G:\GISMOD\01547034.0000\Vg_24_DrainageArea_post_repair.mxd Date Saved: 1/25/2016 1:45:06 PM

Based on the sampling results and the CCTV investigation, it was reasonable to ascertain there was an illicit discharge coming from the stormwater building laterals identified between manholes Vg 32 and Vg 33. The Village notified the building owner at that location that additional investigations would need to be conducted at the building.

The building owners hired a plumber to perform a video inspection of their sewer laterals. Arcadis oversaw the video inspection of the building storm and sanitary sewer laterals and inspected the sump pit where the cleanouts are located. There was evidence of toilet paper in the sump pit, which suggests there had previously been a sanitary sewer backup. The covers on both cleanout pipes were tightly secured at the time of the inspection. During the day of inspection, the plumber added a riser to the storm sewer lateral piping to bring the storm sewer lateral out of the sump pit.

The CCTV inspection of the storm lateral showed the pipe was in good condition. The inspection of the sanitary sewer lateral showed heavy root intrusion, and the camera could not pass through the roots to complete the inspection. The building owner subsequently repaired the sanitary sewer building lateral, and Arcadis collected two samples in storm sewer manhole Vg 32, downgradient of the building. The post repair fecal coliform concentrations for the two samples were both 3,000 cfu/100 ml at about 5 gpm. Previous samples from storm sewer manholes downgradient were generally above 10,000 cfu/100 ml and as high as >200,000 cfu/100 ml. The post-repair sample results indicate a considerable reduction in fecal coliform concentrations, but further investigations should be completed in 2016 to uncover the additional source(s).

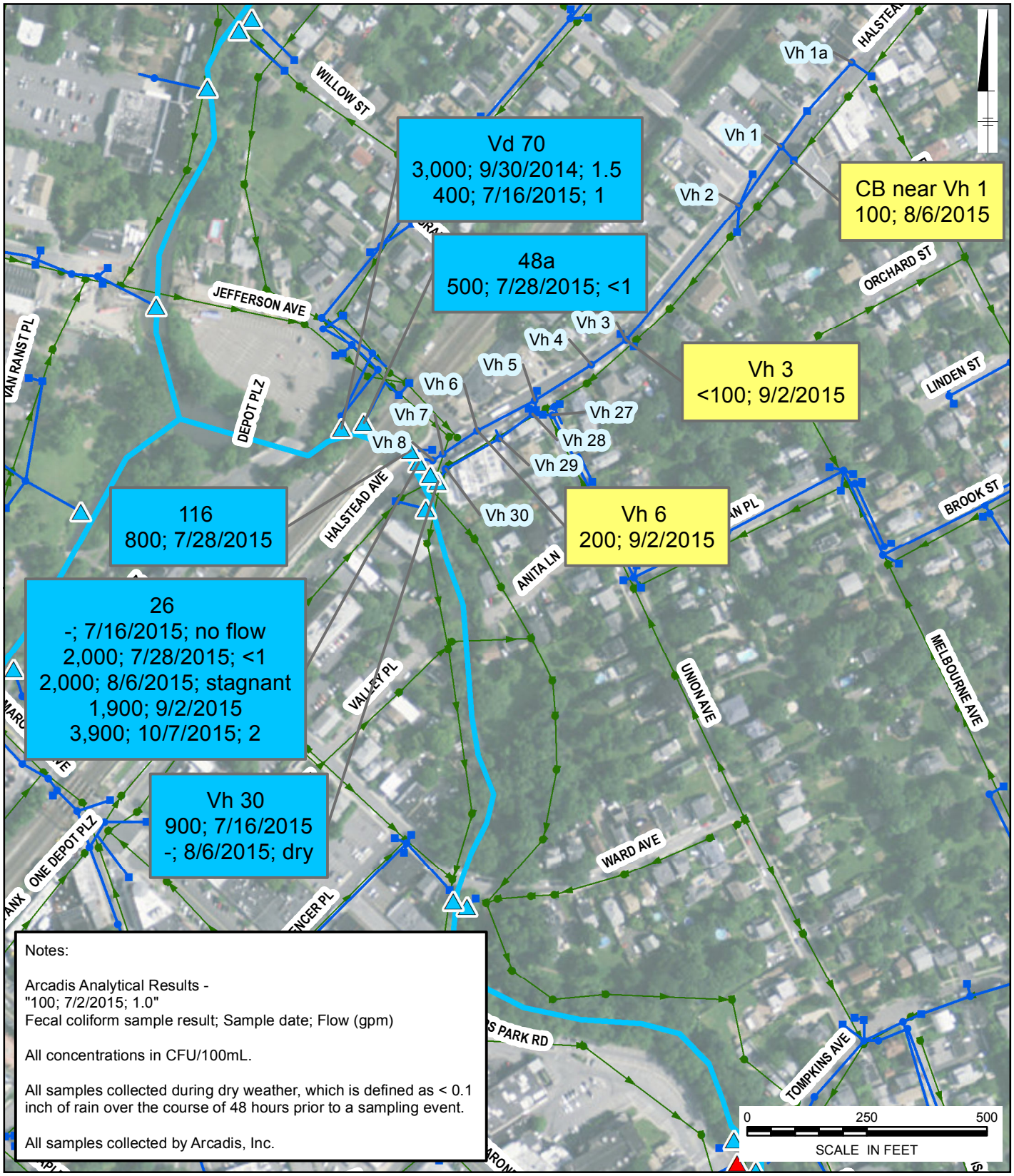
## 6.2 Outfall 26 - Halstead Ave

The drainage area that drains to outfall 26 was investigated in 2013 and a significant illicit discharge was discovered and eliminated on Union Avenue. Outfall 26 is sampled each year to monitor fecal coliform concentrations, but is often dry during dry weather. When it is flowing, the flow varies between a trickle and 2 gpm. Fecal coliform concentrations have been around 2,000 cfu/100 ml. Racoon scat was previously found in the storm sewer, so some bacteria concentrations are expected.

Arcadis investigated the storm sewer on Halstead Avenue again this year to confirm there are no new illicit discharges. Field staff inspected manholes and catchbains on Halstead Avenue for dry weather flow and visual signs of illicit discharges. Many of the structures were dry, or had flows too low to collect samples. Samples were collected from manholes Vh 6 and Vh 3 on September 2, 2015. Manhole Vh 6 had a fecal coliform concentration of 200 cfu/100 ml and manhole Vh 3 had a fecal coliform concentration of <100 cfu/100 ml. Neither of these manholes had flow, but they both had stagnant water that was collected for the samples. Based on these low results, no additional sampling was completed. Sample results from outfall 26 and the associated drainage structures are shown in Figure 7.

CCTV inspection was completed between manholes Vh 1a and Vh 1, continuing to Vh 2. At manhole Vh 2, the inspection had to be discontinued because a lateral in the storm sewer line protruded too far into the sewer to allow the camera to pass. A water main enters the storm sewer 40 feet upgradient of manhole Vh 1. None of the sections of storm sewer included in this inspection had evidence of bacteria.

The investigation did not uncover a direct illicit discharge that could be corrected. During the CCTV inspections, it was observed that ground water was infiltrating into the storm sewer at the pipe joints, as the flow in the pipe decreased slowly as the pipe moved from the downgradient sections to the upgradient sections of sewer. There was not noticeable infiltration but a slow increase in the amount of flow. The bacteria may be slowly migrating from a small leak in an adjacent sanitary sewer or lateral, or from animal scat in the storm sewer. The pollutant load from this




Notes:

Arcadis Analytical Results -
"100; 7/2/2015; 1.0"
Fecal coliform sample result; Sample date; Flow (gpm)

All concentrations in CFU/100mL.

All samples collected during dry weather, which is defined as < 0.1 inch of rain over the course of 48 hours prior to a sampling event.

All samples collected by Arcadis, Inc.

**LEGEND**

**Stormwater Outfalls**
- ARCADIS Inspected
- Record Outfalls

**Storm Sewer**
- Storm Sewer
- Catchbasin
- Drainage Manhole

**Sanitary Sewer**
- Sanitary Sewer - Gravity
- Mamaroneck Village Streams
- Municipal Boundary
- Village Boundary

# VILLAGE OF MAMARONECK
# MAMARONECK, NY

## OUTFALL 26 - HALSTEAD AVENUE DRAINAGE AREA INVESTIGATION RESULTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**7**

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

CITY: CLIFTON PARK, NY DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH TM:
PROJECT: VILLAGE OF MAMARONECK IDDE
PATH: Path: G:\GISMOD\01547034.0000\Outfall_26_Halstead_DrainageArea.mxd Date Saved: 1/25/2016 1:51:15 PM

outfall is not concerning at this time. Arcadis recommends sampling this outfall annually to monitor the fecal coliform concentrations.

# 7 AS-NEEDED ILLICIT DISCHARGE DETECTION AND ELIMINATION ASSISTANCE

Arcadis provided as-needed technical assistance in support of the Village's IDDE program. This included office and field services to investigate potential illicit discharges identified by the Village, concerned citizens, or environmental organizations, as well as assisting the Village with correspondences to regulatory agencies. Each component of this as-needed assistance is described below.

## 7.1 Responding to Observations of Citizens and Representatives

Arcadis staff investigated several concerns expressed by Village residents and representatives. The Village keeps an open line of communication with residents and as suspected sources of illicit discharge are reported, the Village instructs Arcadis to conduct CCTV inspections, water sampling, and field investigation as necessary. These as-needed field investigations are described below.

### 7.1.1 River Sampling – Surface Foam Observed

At the Village's request, Arcadis collected samples from the Mamaroneck and Sheldrake Rivers due to concerns from area residents regarding foam floating on the surface of the River in several locations. This surface foam on the Sheldrake and Mamaroneck Rivers has been observed and photographed by Arcadis, the Village residents, and Village staff. The origin and composition of the foam were not known, so the Village directed Arcadis to sample the foam and to have it analyzed for common pollutants. A detailed accounting of these sampling events is provided as Appendix D.

Arcadis collected samples of the actual foam and surface water on two occasions, April 16, 2015 and May 29, 2015. Samples were collected and analyzed for fecal coliform, oil & grease, and anionic surfactants. Fecal coliform is present in high concentrations in wastewater and anionic surfactants are present in high concentrations in detergents and foaming agents. The standard test for surfactants is methylene blue active substances assay (MBAS).

The concentrations of oil and grease and for surfactants for both sampling events were very low. The physical appearance for both events matched the appearance of naturally occurring foam presented in illicit discharge guidance documents. There could be non-point sources that are aiding in the process. For example, non-ionic surfactants are used as a wetting agent for herbicides and pesticides. It is feasible that runoff from application of these products could be contributing to a decrease in the surface tension of the water and aiding in the formation of small bubbles that constitute the foam.

The fecal coliform concentration for the April event was low, but elevated during the May event. Additional sampling completed by Arcadis in the Sheldrake and Mamaroneck rivers did not uncover any illicit discharges besides the ones discussed in this document. In addition, the results of 2015 sampling completed by Save the Sound, do not show a point source of pollution in the Village. In fact, the geometric mean of enterococcus for samples taken upstream of the Village was the same as the concentrations in the river as it enters the Mamaroneck Harbor.

### 7.1.2 River Sampling – Surface Film Observed

Arcadis responded to a resident's report of a sheen along the edge of the Mamaroneck River, near the Jefferson Avenue bridge. Two samples were collected and sent to Envirotest Laboratory for oil and grease analysis (Analytical Method 1664A). The sample results were <5.32 mg/l and <5.43 mg/l which are very low and below the labs reporting

limit. A reporting limit is the laboratory's limit of detection for the target analyst in a specific sample after adjustments have been made for dilutions or percent moisture.

There is a wholesale meat company located within 50-feet from the River shore, and where the sheen was seen. This company has received notification from the Village in the past regarding cleaning equipment on the property. The appearance of the sheen was not consistent with oil which typically has color. The sheen observed by the Village resident was more of a gray film. The field team walked the area to look for sources, including the meat company grounds, but a source was not identified.

It is recommended that the Village discuss these observations with the wholesale meat company and ask them about their best management practices. The water surface should be monitored in this location in the future to determine if it was an isolated incident or a recurring problem, and to help determine the source.

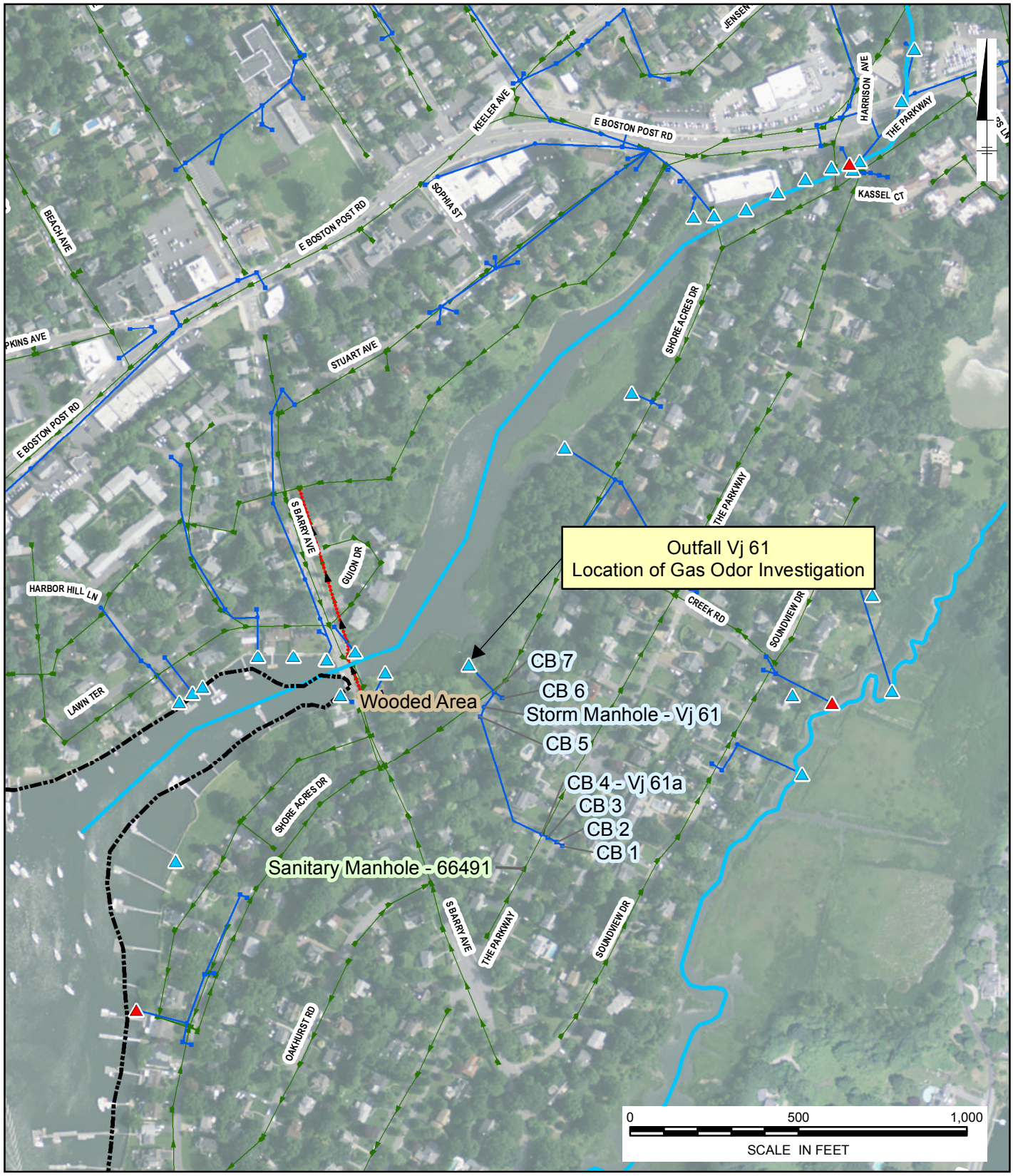
### 7.1.3 Gasoline Odor Investigation Near Creek Road

Arcadis staff visited the Vj 61 outfall drainage area at the request of the Village in response to a Village resident's detection of a gasoline odor at the outfall. Figure 8 shows the location of outfall Vj 61, to the east of Beaver Swamp Brook. A preliminary investigation of the drainage area was completed on July 16th, 2015 and samples were collected and sent to the lab for analysis on July 21st, 2015.

Vj 61 is a 12-inch diameter reinforced concrete pipe. During the first site visit, Outfall Vj 61 was wet, but no dry weather flow. There were no odors; no evidence of oil, grease, or petroleum; and no dead vegetation. All of the storm sewer structures within the Vj 61 sewershed were also inspected. This includes a total of seven catch basins and one storm manhole. Again, no evidence of oil or grease was found and no unusual smells were detected. A nearby sanitary sewer manhole was also inspected to determine if the odor could be coming from the adjacent sanitary sewer.

The field team returned on July 21st prepared for sample collection. When the samples were collected, no unusual scent or signs of oil or grease were observed by Arcadis staff. Arcadis staff also investigated a wooded area adjacent to the outfall and found no evidence of oil dumping. At the time the sample was collected it was flowing less than one gpm. There was a stagnant puddle less than one inch deep immediately outside of the outfall. It should also be noted that there was construction work being completed on Creek Road near the intersection of the Parkway and Creek Road at the time of the investigation. This is being included in this summary as a potential source for the odors originally detected.

Samples were analysed for volatile organic compounds (VOCs) (EPA method 624) and Oil/Grease (EPA Method 1664A) analysis by Envirotest Laboratory. The results did not show any evidence of gasoline, oil or grease; all parameters tested were non-detect. Based on our investigation we did not find evidence of a spill or dumping at this outfall. Photos of the investigation are included as Appendix E. Laboratory results are provided in Appendix B.




**LEGEND**

**Stormwater Outfalls**
- ARCADIS Inspected
- Record Outfalls
- Municipal Boundary
- Village Boundary
- Mamaroneck Village Streams
- Catchbasin
- Drainage Manhole

**Storm Sewer**
- Storm Sewer

**Sanitary Sewer**
- Sanitary Sewer - Gravity
- Sanitary Sewer - Force Main

# VILLAGE OF MAMARONECK
# MAMARONECK, NY

## OUTFALL VJ 61
## GASOLINE ODOR INVESTIGATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**8**

CITY: CLIFTON PARK, NY DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH TM:
PROJECT: VILLAGE OF MAMARONECK IDDE
PATH: Path: G:\GISMOD\01547034.0000\Outfall_Vj61_GasolineOdor.mxd Date Saved: 1/26/2016 11:14:55 AM

### 7.1.4 Storm Sewer Inspection – Stanley Avenue

On September 24, 2015 Arcadis responded to a call from the Village regarding sewage odor coming from catch basins on Stanley Ave near Mount Pleasant Ave. The Village had received many calls from residents expressing concern over the strong odor for several days. There had been a sewer backup in the sanitary sewer in the vicinity of Stanley Ave, but it was resolved.

Arcadis coordinated a video inspection of the storm sewer on Stanley Avenue, with Fred Cook Jr., Inc. The video inspection was completed on Stanley Avenue between Maple Avenue and Mount Pleasant Avenue. The bottom of the storm sewer had gray bacteria, which is indicative of sewage flow, but no broken or leaking pipes were observed. Upon further investigation the source of the sewage flow is believed to have been pumped to the ground surface from a home near the intersection of Stanley and Maple Avenue. The driveway and sidewalk was wet leading to a catchbasin, sewage odors were detected, and flies were present around the wet area of the driveway and sidewalk. Also, the bacteria in the storm sewer ended at the catchbasin where the flow was discharged.

When we approached the house a man came to the door and was questioned, but he did not admit to any wrongdoing. The storm sewer was flushed by the Village and this dramatically reduced the odors. The Village returned to the location several times after the event and did not see any evidence that the problem was still occurring.

## 7.2 River Sampling and DNA Testing

### 7.2.1 Fecal Coliform Samples

Water samples were collected at various locations on the Mamaroneck River, the Sheldrake River, the Beaver Swamp Brook, and Otter Creek. Samples were analyzed for fecal coliform bacteria. Perhaps the most important observation from the results of this sampling effort is that the results show there are elevated concentrations of fecal coliform in the Sheldrake River, Mamaroneck River, and Beaver Swamp Brook near the Village of Mamaroneck border, which indicates the waters are receiving fecal coliform bacteria from upgradient municipalities.

Furthermore, the sampling results from the Mamaroneck and Sheldrake Rivers and Beaver Swamp Brook did not show a significant increase in fecal coliform concentrations from the Village borders to the confluence with the harbor. This shows there are not significant sources of fecal coliform pollution discharging to the waterbodies from the Village, which has also been confirmed through the completion of outfall sampling. Some outfalls did have elevated concentrations, and further investigation is recommended, but the flow is so low that there is a low pollutant load. In addition, as with any municipality, continuing to monitor the waterbodies and outfalls is recommended to discover new illicit discharges so they can be addressed.

Otter Creek, which originates in the Village, showed elevated fecal coliform concentrations this year, so further investigations are recommended for 2016.

### 7.2.2 DNA Testing

Deoxyribonucleic acid (DNA) samples were also collected to determine if the elevated fecal coliform concentrations were from human or animal sources. DNA testing is a sensitive and specific test that can be used to determine the

presence of fecal or sewage contamination. The most promising to date has been the use of Polymerase Chain Reaction (PCR) technology, which can be used to test for total and human Bacteroides, which have proven to be highly specific and sensitive indicators for wastewater contamination. PCR is used to selectively target specific genes and amplify trace quantities from polluted waters.

Bacteroides are bacteria that are present in very large concentrations in feces and are highly specific for fecal contamination. They are anaerobic, so they cannot survive in an oxygen environment. Human Bacteroides is largely specific for human sources, although there is some cross reactivity with dog and pig feces DNA.

There are numerous PCR based assays available to characterize human fecal pollution in ambient waters. An assay is an investigative procedure for qualitatively measuring the presence or amount of a target entity, in this case DNA. Each assay employs distinct DNA or Ribonucleic acid (RNA) molecules and many target different genes and microorganisms leading to potential variations in assay performance. Many of the reported human-associated PCR-based assays target 16S rRNA genes from the Bacteroidales order.

The samples were analysed by Microbial Insight. They use three human Bacteroides assays which include, HF183, H-EPA1, and H-EPA2. In addition to human and general Bacteroides analysis, the laboratory also analyzed the samples for dog, Canadian goose, and sea gull Bacteroides.

Two samples were collected with a duplicate sample. One set was collected in the Mamaroneck River at the Jefferson Bridge and other set of samples was collected at the confluence of the Mamaroneck and Sheldrake Rivers. The predominant component in all four samples was Human Bacteroides. Dog, Canadian goose, and sea gull were not prevalent in large quantities in any of the samples.

Sample results are included as Appendix B and Appendix G.

## 7.3 Sanitary Sewer Lateral Connection - Grout Pilot Program

The 2015 West Basin Pump Station Drainage Area Inflow and Infiltration Report recommended the Village grout approximately 400 lateral connections to the mainline sewer in the in the West Basin Pump Station service area. A test and grout sealing pilot program was completed in the Village in the summer of 2015 to gain valuable information to streamline the work to be completed in 2016.

Proposals were reviewed from two firms, and Heitkamp, Inc. was selected as the contractor to perform the grout sealing. The pilot study was conducted on Rushmore Avenue between Claflin Avenue and Bleeker Avenue during the week of September 21$^{st}$, 2015. Arcadis staff met Heitkamp staff in the Village the first morning and successfully completed all required field and calibration test on the grouting equipment and began the video inspection of the sewer. There are two types of pipe on Rushmore Avenue, a 16-inch cast iron pipe and a 10-inch cast iron pipe that has been lined with a cured-in-place pipe.

Several problems arose while the contractor was attempting to complete lateral grouting. The main issue was heavy tuberculation along the main trunk. Tuberculation is localized corrosion resulting in knob-like mounds on the inside of the pipe, which make the pipe out of round and reduces the internal diameter. An example of the tuberculation observed during the grouting pilot program is shown in Photo 1 below. The 16-inch cast iron pipe was found to have

heavy tuberculation which impeded mobility of the grouting packer through the pipe. There were additional obstructions that caused the packer to get stuck in the main line. An example of a pipe obstruction is shown in Photo

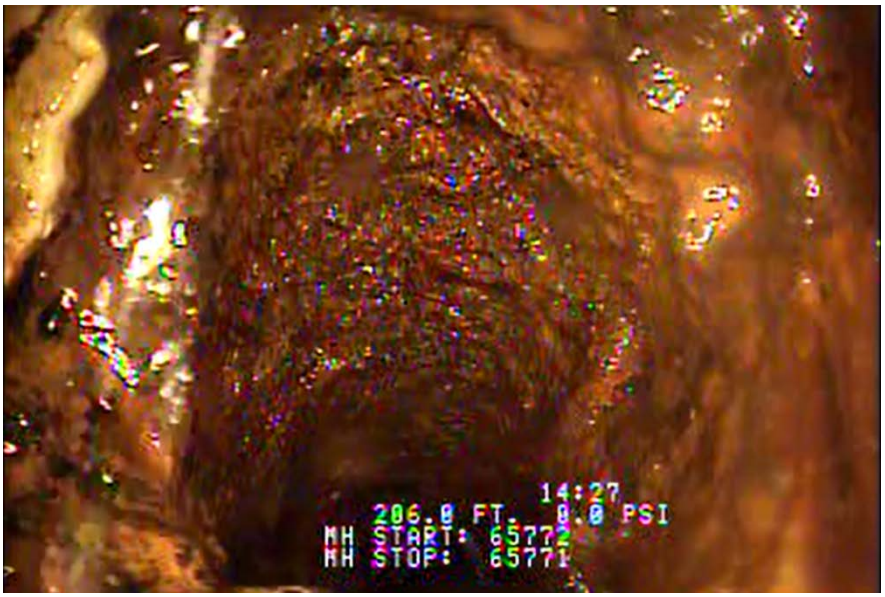



Photo 1 – Example of tuberculation with the 16-inch cast iron pipe

Photo 2 – Example of obstruction

2, above. The 10-inch cast iron line had been lined previously with a cured-in place pipe. However, this pipe was also corroded with tuberculate, so the same problems applied when attempting pass the packer through the pipe to grout the laterals.

Unfortunately since these problems prohibited the contractor from completing the work, the pilot was cut short after grouting only three laterals. An example of a lateral connection after grouting is shown in Photo 3. The pressure grouting effectively stopped the water infiltrating at the connection.


Photo 3 – Example of lateral connection - post grouting

The pilot provided valuable information for the Village for the full scale program. Attempting to grout sewer lateral pipe connections in a cast iron pipe for the full scale program is not recommended. Cast iron pipe is typically not as common a construction material in older sewer systems as vitrified clay pipes. Based on a review of the historic Village drawings, most of the pipes in the area planned to be grouted are vitrified clay pipe. Pressure testing and grouting vitrified clay pipe should not present a problem unless the pipe has structural defects or offset joints. One alternative to quickly confirm pipe material and condition would be to use a sewer zoom camera to inspect the pipe segments from the manhole surface prior to developing the final plan for pipe segments to will be grouted. One other potential problem is with pipes that have been previously lined with cured-in place liner. If the holes for the laterals were not trimmed back properly the grouting contractor may need to spend some time making the pipe condition right for air testing and grout sealing.

A CD containing the CCTV logs and videos of the pilot project are provided as Appendix H.

## 7.4 Septic System Analysis

The Village of Mamaroneck currently has 76 septic systems; several in areas that have public sewers. Section 873.727 of the Westchester County Sewer Code, states that habitable buildings may be required to connect to the public sewer system if the public sewer is within 100 feet of the property line of the habitable building. Arcadis performed a GIS desktop analysis to determine the distance of all known properties with septic systems to the public sewer. According to the data currently available in GIS, there are 76 septic tanks in the Village, 23 or fewer are within

100 feet of a public sewer.  A map of the septic tanks within the Village boundary and a table with their distances from the sanitary sewer are included as Appendix I.

## 7.5 EPA Quarterly Reports

At the request of the Village, Arcadis assisted in the preparation of quarterly reports to be submitted to the EPA. These quarterly reports are required by the EPA Administrative Order CWA-02-2011-3022. The reports include a summary of work completed and work planned for the future to address the Administrative Order. The reports submitted in 2015 summarize work completed under Phase 5 of the Village of Mamaroneck IDDE program.

# APPENDIX A

## 2015 Outfall Inspection Forms

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | 52 | Diameter (in) ..... | 24 | Outfall Type | |
| Material ..... | RCP | Waterbody ..... | Sheldrake River | Culvert | |
| Shape ..... | Culvert | Submerged in Water ..... | No | | |
| Quantity ..... | Single | Submerged in Sediment | No | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 85 | Photo Numbers..... | 52, 52 (1) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 11:30 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

**INSPECTION EVENTCOMMENTS**

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | Good |
| Operational Condition ..... | Good |
| Illicit Discharge Potential | Unlikely |

## FLOW

| | |
|---|---|
| Flow Description ..... | No Flow |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | Yes |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

**POOL QUALITY COMMENTS**

☑ Display Multiple Image

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | 57 | Diameter (in) ..... | | Outfall Type | |
| Material ..... | | Waterbody ..... | Sheldrake | NA | |
| Shape ..... | | Submerged in Water ..... | | | |
| Quantity ..... | | Submerged in Sediment | | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 85 | Photo Numbers..... | 57 |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 12:00 pm | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

Unable to locate; No upgradient MH/CB

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | |
| Operational Condition ..... | |
| Illicit Discharge Potential | |

## FLOW

| | |
|---|---|
| Flow Description ..... | |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | Vk 4a | Diameter (in) ..... | 18 | Outfall Type | |
| Material ..... | RCP | Waterbody ..... | Mamaroneck Sound | Culvert | |
| Shape ..... | Circular | Submerged in Water ..... | No | | |
| Quantity ..... | Single | Submerged in Sediment | No | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 75 | Photo Numbers..... | Vk 4a, Vk 4a (1) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 7:00 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | Good |
| Operational Condition ..... | Good |
| Illicit Discharge Potential | Unlikely |

## FLOW

| | |
|---|---|
| Flow Description ..... | Trickle |
| Flow (gpm) ..... | <1 gpm |
| Determination: ..... | eye |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | Clear | Turbidity ..... | | Flow Line ..... | Yes |
| Color Strength ..... | - | Floatables (Suds) ..... | | Abnormal Vegatation ... | No |
| Odor Type ..... | None | Floatables (Sewage) ..... | | Bacteria Growth ..... | No |
| Odor Severity ..... | - | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | Clear | Suds ..... | No |
| Color Strength ..... | - | Oil Sheen ..... | No |
| Odor ..... | None | Algae ..... | No |
| Odor Severity ..... | - | | |

## POOL QUALITY COMMENTS

Muddy

☑ Display Multiple Image

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | Vk 10e | Diameter (in) ..... | | Outfall Type | |
| Material ..... | | Waterbody ..... | Mamaroneck Sound | System Outfall | |
| Shape ..... | | Submerged in Water ..... | | | |
| Quantity ..... | | Submerged in Sediment | | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 80 | Photo Numbers..... | Vk 10e, Vk 10e (1) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 10:30 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

Private beach, fenced in property, no access to outfall. Investigated upgradient catchbasin - submerged with debris and sediment. Unlikely illicit discharge potential. Likely to have poor operating condition.

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | |
| Operational Condition ..... | |
| Illicit Discharge Potential | |

## FLOW

| | |
|---|---|
| Flow Description ..... | |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | Vk 13a | Diameter (in) ..... | | Outfall Type | |
| Material ..... | | Waterbody ..... | Mamaroneck Sound | System Outfall | |
| Shape ..... | | Submerged in Water ..... | | | |
| Quantity ..... | | Submerged in Sediment | | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 80 | Photo Numbers..... | Vk 13a, Vk 13a (1) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 10:45 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

Could not access outfall. Upgradient manhole submerged. No flow. No odor. Unlikely potential of illicit discharge.

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | |
| Operational Condition ..... | |
| Illicit Discharge Potential | |

## FLOW

| | |
|---|---|
| Flow Description ..... | |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | 63 | Diameter (in) ..... | 12 | Outfall Type | |
| Material ..... | Corrugated Metal | Waterbody ..... | Mamaroneck River | System Outfall | |
| Shape ..... | Circular | Submerged in Water ..... | Partially | | |
| Quantity ..... | Single | Submerged in Sediment | No | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 85 | Photo Numbers..... | 63, 63 (1), 63 (2), 63 |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 11:00 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

Outfall has drilled holes along piping to allow discharge to infiltrate into ground. Discharges into a puddle in a backyard. No apparent body of water.

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | Good |
| Operational Condition ..... | Good |
| Illicit Discharge Potential | Unlikely |

## FLOW

| | |
|---|---|
| Flow Description ..... | No Flow |
| Flow (gpm) ..... | |
| Determination: ..... | eye |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | No |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | No |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | No |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image




# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | 64 | Diameter (in) ..... | 12 | Outfall Type | |
| Material ..... | RCP | Waterbody ..... | Mamaroneck River | System Outfall | |
| Shape ..... | Circular | Submerged in Water ..... | No | | |
| Quantity ..... | Single | Submerged in Sediment | No | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 85 | Photo Numbers..... | 64, 64 (1), 64 (2) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 12:30 pm | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

No visible outfall present. Proposed location is higher elevation than the catchbasin. Investigated upgradient catchbasin. Outfall does not appear to be submerged in water - no flow. Found another catchbasin - marked on map.

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | |
| Operational Condition ..... | |
| Illicit Discharge Potential | |

## FLOW

| | |
|---|---|
| Flow Description ..... | |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

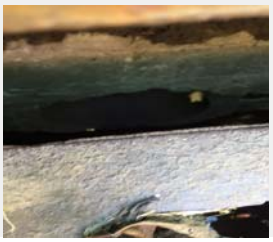
| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image



# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | 71 | Diameter (in) ..... | 12 | Outfall Type | |
| Material ..... | Corrugated Metal | Waterbody ..... | Mamaroneck Sound | System Outfall | |
| Shape ..... | Circular | Submerged in Water ..... | No | | |
| Quantity ..... | Single | Submerged in Sediment | Partially | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 75 | Photo Numbers..... | 71, 71 (1) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 8:00 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | Poor |
| Operational Condition ..... | Poor |
| Illicit Discharge Potential | Potential |

## FLOW

| | |
|---|---|
| Flow Description ..... | No flow |
| Flow (gpm) ..... | |
| Determination: ..... | eye |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

Algae growth on flowline

☑ Display Multiple Image

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | 78 | Diameter (in) ..... | 18 | Outfall Type | |
| Material ..... | RCP | Waterbody ..... | Mamaroneck Sound | System Outfall | |
| Shape ..... | Circular | Submerged in Water ..... | No | | |
| Quantity ..... | Single | Submerged in Sediment | No | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 80 | Photo Numbers..... | 78, 78 (1), 78 (2), 78 |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 10:00 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

Resident indicates that outfall exists along the wall. No evidence of outfall - could be covered by sand. Upgradient CB has no odor and is unlikely to be illicit discharge. No flow, pipe visible and not submerged in CB.

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | |
| Operational Condition ..... | |
| Illicit Discharge Potential | |

## FLOW

| | |
|---|---|
| Flow Description ..... | |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image




# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | 160 | Diameter (in) ..... | 12 | Outfall Type | |
| Material ..... | Corrugated Metal | Waterbody ..... | Mamaroneck Sound | System Outfall | |
| Shape ..... | | Submerged in Water ..... | | | |
| Quantity ..... | | Submerged in Sediment | | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 80 | Photo Numbers..... | 160, 160 (1) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 12:00 pm | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

No access to outfall, upgradient manhole has no odor and shows no sign of illicit discharge. Outfall slightly upgradient with dirt and leaves but is not submerged. No flow.

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | |
| Operational Condition ..... | |
| Illicit Discharge Potential | |

## FLOW

| | |
|---|---|
| Flow Description ..... | |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image

# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | Vl 1 | Diameter (in) ..... | 36 | Outfall Type | |
| Material ..... | RCP | Waterbody ..... | Sheldrake River | System Outfall | |
| Shape ..... | Circular | Submerged in Water ..... | No | | |
| Quantity ..... | Single | Submerged in Sediment | No | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL | Air Temperature (F) ..... | 85 | Photo Numbers..... | Vl 1, Vl 1 (1), Vl 1 (2) |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 11:30 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | Good |
| Operational Condition ..... | Good |
| Illicit Discharge Potential | Unlikely |

## FLOW

| | |
|---|---|
| Flow Description ..... | No flow |
| Flow (gpm) ..... | |
| Determination: ..... | eye |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

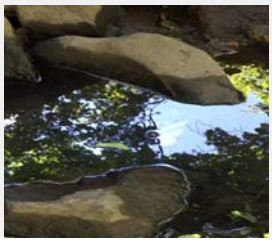
| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | Yes |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | No |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | No |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | Clear | Suds ..... | None |
| Color Strength ..... | NA | Oil Sheen ..... | Yes, very little |
| Odor ..... | none | Algae ..... | None |
| Odor Severity ..... | NA | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image



# OUTFALL INSPECTION PROGRAM

## STRUCTURE

| | | | | | |
|---|---|---|---|---|---|
| Structure ID ..... | Vl 1a | Diameter (in) ..... | | Outfall Type | |
| Material ..... | | Waterbody ..... | Mamaroneck Sound | | System Outfall |
| Shape ..... | | Submerged in Water ..... | | | |
| Quantity ..... | | Submerged in Sediment | | | |

## INSPECTION EVENT

| | | | | | |
|---|---|---|---|---|---|
| Inspector ..... | JL, MS | Air Temperature (F) ..... | 80 | Photo Numbers..... | Vl 1a |
| Date ..... | 8/13/2015 | Rainfall, Past 24 hrs (in) .. | 0 | | |
| Time ..... | 9:00 am | Rainfall, Past 48 hrs (in) .. | 1 | | |

## INSPECTION EVENTCOMMENTS

Outfall on private beach - unable to visit. Upgradient catchbasin (4' x 12') part of large system. No odor or smell coming from catchbasin. Illicit discharge unlikely.

## ASSESSMENT

| | |
|---|---|
| Structural Condition ..... | |
| Operational Condition ..... | |
| Illicit Discharge Potential | |

## FLOW

| | |
|---|---|
| Flow Description ..... | |
| Flow (gpm) ..... | |
| Determination: ..... | |

## FIELD PARAMETERS

| | |
|---|---|
| Sample Temperature (F) ... | |
| Sample pH ..... | |
| Sample Ammonia (mg/mL) | |

## DISCHARGE CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| Color ..... | | Turbidity ..... | | Flow Line ..... | |
| Color Strength ..... | | Floatables (Suds) ..... | | Abnormal Vegatation ... | |
| Odor Type ..... | | Floatables (Sewage) ..... | | Bacteria Growth ..... | |
| Odor Severity ..... | | Floatables (Oil) ..... | | | |

## POOL QUALITY

| | | | |
|---|---|---|---|
| Color ..... | | Suds ..... | |
| Color Strength ..... | | Oil Sheen ..... | |
| Odor ..... | | Algae ..... | |
| Odor Severity ..... | | | |

## POOL QUALITY COMMENTS

☑ Display Multiple Image

# APPENDIX B

## 2015 Laboratory Results

| Client Sample ID | Sample Type | Collection Date | Analysis Date | Analyte | Result | Unit | Sampling Event Notes | Flag | High Limit | Low Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Columbus Park | Stream | 4/15/2015 | 4/16/2015 | HEM | <5.21 | mg/L | River Foam Sampling | | 5.21 | 5.21 |
| Columbus Park | Stream | 4/15/2015 | 4/16/2015 | SGT-HEM | <5.21 | mg/L | River Foam Sampling | | 5.21 | 5.21 |
| Columbus Park | Stream | 4/15/2015 | 4/16/2015 | MBAS | 0 | mg/l LAS MW | River Foam Sampling | | 0.1 | 0.1 |
| Columbus Park | Stream | 4/15/2015 | 4/15/2015 | Coliform, Fecal | 130 | CFU/100mL | River Foam Sampling | | 10 | 10 |
| N Berry Bridge | Stream | 4/15/2015 | 4/16/2015 | HEM | <5.00 | mg/L | River Foam Sampling | | 5 | 5.21 |
| N Berry Bridge | Stream | 4/15/2015 | 4/16/2015 | SGT-HEM | <5.00 | mg/L | River Foam Sampling | | 5 | 5.21 |
| N Berry Bridge | Stream | 4/15/2015 | 4/16/2015 | MBAS | <0.100 | mg/l LAS MW | River Foam Sampling | | 0.1 | 0.1 |
| N Berry Bridge | Stream | 4/15/2015 | 4/15/2015 | Coliform, Fecal | 190 | CFU/100mL | River Foam Sampling | | 10 | 10 |
| SW-MAM-Halstead-S-2015-05-29 | Stream | 5/29/2015 | 5/29/2015 | MBAS | 0 | mg/L | River Foam Sampling | | 0.1 | 0.1 |
| SW-MAM-Halstead-S-2015-05-29 | Stream | 5/29/2015 | 5/29/2015 | Coliform, Fecal | 1,200 | CFU/100mL | River Foam Sampling | | 100 | 100 |
| Downstream HS | Stream | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 1,000 | CFU/100mL | High School Investigation | | 100 | 100 |
| Downstream HS 2 | Stream | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 1,900 | CFU/100mL | High School Investigation | | 100 | 100 |
| Upstream HS | Stream | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 700 | CFU/100mL | High School Investigation | | 100 | 100 |
| Upstream HS 2 | Stream | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 500 | CFU/100mL | High School Investigation | | 100 | 100 |
| US HS | Stream | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 2,900 | CFU/100mL | High School Investigation | | 100 | 100 |
| DS HS | Stream | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 1,500 | CFU/100mL | High School Investigation | | 100 | 100 |
| Outfall HS (BSB-03) | Outfall | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 1,200 | CFU/100mL | High School Investigation | | 100 | 100 |
| DPW | Stream | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 5,000 | CFU/100mL | High School Investigation | | 100 | 100 |
| DPW | Stream | 8/6/2015 | 8/6/2015 | Coliform, Fecal | 6,500 | CFU/100mL | High School Investigation | | 100 | 100 |
| DPW Enterbrook | Stream | 8/6/2015 | 8/6/2015 | Coliform, Fecal | 7,300 | CFU/100mL | High School Investigation | | 100 | 100 |
| MH Brook | Manhole | 8/6/2015 | 8/6/2015 | Coliform, Fecal | <100 | CFU/100mL | High School Investigation | | 100 | 100 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,1,1-Trichloroethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.16 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,1,2,2-Tetrachloroethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.16 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,1,2-Trichloroethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.09 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,1-Dichloroethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.12 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,1-Dichloroethene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.18 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,2-Dichloroethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.11 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,2-Dichloropropane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.19 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 2-Chloroethyl vinyl ether | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.14 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Acrolein | <2.00 | ug/L | Gasoline Odor Investigation | | 2 | 0.49 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Acrylonitrile | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.16 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,2-Dichlorobenzene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.13 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,3-Dichlorobenzene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.13 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | 1,4-Dichlorobenzene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.12 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Benzene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.12 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Chlorobenzene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.1 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Ethylbenzene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.16 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Styrene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.13 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Toluene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.12 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Xylenes, Total | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.17 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | o-Xylene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.11 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | m-Xylene & p-Xylene | <2.00 | ug/L | Gasoline Odor Investigation | | 2 | 0.17 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Bromodichloromethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.1 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Bromoform | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.11 |

| Client Sample ID | Sample Type | Collection Date | Analysis Date | Analyte | Result | Unit | Sampling Event Notes | Flag | High Limit | Low Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Bromomethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.14 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Carbon tetrachloride | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.2 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Chloroethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.17 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Chloroform | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.16 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Chloromethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.15 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | cis-1,2-Dichloroethene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.13 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | cis-1,3-Dichloropropene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.1 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Dibromochloromethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.15 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Dichlorodifluoromethane | <1.00 | ug/L | Gasoline Odor Investigation | * | 1 | 0.13 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Methylene Chloride | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.08 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Tetrachloroethene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.16 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | trans-1,2-Dichloroethene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.11 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | trans-1,3-Dichloropropene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.05 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Trichloroethene | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.16 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Trichlorofluoromethane | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.21 |
| VJ 61 | Outfall | 7/21/2015 | 7/21/2015 | Vinyl chloride | <1.00 | ug/L | Gasoline Odor Investigation | | 1 | 0.14 |
| VJ 61 | Outfall | 7/21/2015 | 7/28/2015 | HEM | <5.00 | mg/L | Gasoline Odor Investigation | | 5 | 5 |
| Ve 44 Steam | Stream | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 100 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Vd70 Stream | Stream | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 400 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Vh26 | Stream | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 1,000 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Vd70 | Outfall | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 400 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 127 | Outfall | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 9,800 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Vd51b | Outfall | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 200 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Hd19 | Outfall | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 3,900 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Vh30 (Stream) | Stream | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 900 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 113 Stream | Stream | 7/16/2015 | 7/16/2015 | Coliform, Fecal | 600 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| VG 24 | Outfall | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 3,700 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| VJ 4 | Outfall | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 800 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| VN 1 | Outfall | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 700 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| VJ 58 | Outfall | 7/21/2015 | 7/21/2015 | Coliform, Fecal | 800 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 26 DS | Stream | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 200 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 26 US | Stream | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 500 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 127 | Outfall | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 200 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 26 | Outfall | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 2,000 | CFU/100mL | Outfall Investigations | | 1000 | 1000 |
| 48A | Outfall | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 500 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 116 (Stream) | Stream | 7/28/2015 | 7/28/2015 | Coliform, Fecal | 800 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 26 | Outfall | 8/6/2015 | 8/6/2015 | Coliform, Fecal | 2,000 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| CB Near Vn1 | Catchbasin | 8/6/2015 | 8/6/2015 | Coliform, Fecal | 100 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Vg 24 | Outfall | 8/6/2015 | 8/6/2015 | Coliform, Fecal | 15,000 | CFU/100mL | Outfall Investigations | | 1000 | 1000 |
| Vg 24 | Outfall | 8/26/2015 | 8/26/2015 | Coliform, Fecal | 800 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Vg24 | Manhole | 9/2/2015 | 9/2/2015 | Coliform, Fecal | 16,000 | CFU/100mL | Outfall Investigations | | 1000 | 1000 |
| OF26 | Outfall | 9/2/2015 | 9/2/2015 | Coliform, Fecal | 1,900 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 26 Upstream | Stream | 9/2/2015 | 9/2/2015 | Coliform, Fecal | 100 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 26 Downstream | Stream | 9/2/2015 | 9/2/2015 | Coliform, Fecal | 300 | CFU/100mL | Outfall Investigations | | 100 | 100 |

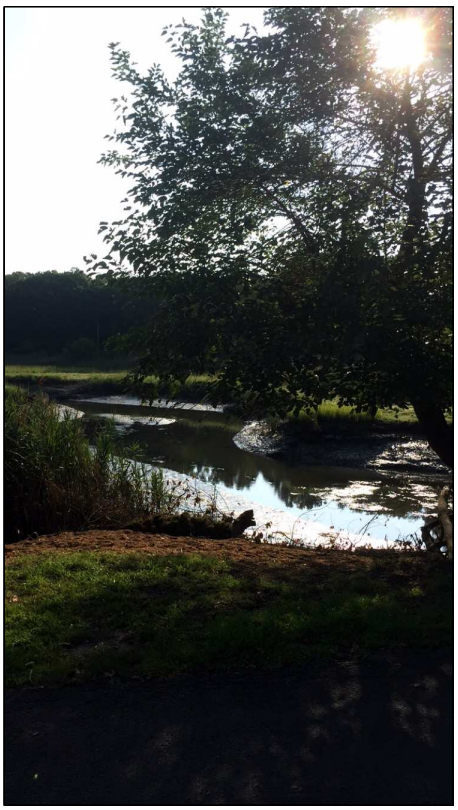
| Client Sample ID | Sample Type | Collection Date | Analysis Date | Analyte | Result | Unit | Sampling Event Notes | Flag | High Limit | Low Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| ANITA | Stream | 9/2/2015 | 9/2/2015 | Coliform, Fecal | 100 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 47 | Outfall | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 6,000 | CFU/100mL | Outfall Investigations | | 1000 | 1000 |
| Vg 42 | Outfall | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 300 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 17 | Outfall | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 1,800 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| 26 | Outfall | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 3,900 | CFU/100mL | Outfall Investigations | | 100 | 100 |
| Ve 22 | Outfall | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 41,000 | CFU/100mL | Outfall Investigations | | 1000 | 1000 |
| Vg31 (manhole) | Manhole | 9/16/2015 | 9/16/2015 | Coliform, Fecal | 12,000 | CFU/100mL | Vg 24 Area Investigation | | 1000 | 1000 |
| Vg32 (manhole) | Manhole | 9/16/2015 | 9/16/2015 | Coliform, Fecal | 21,000 | CFU/100mL | Vg 24 Area Investigation | | 1000 | 1000 |
| Vg 29 (manhole) | Manhole | 8/26/2015 | 8/26/2015 | Coliform, Fecal | >200,000 | CFU/100mL | Vg 24 Area Investigation | | 1000 | 1000 |
| Vg 33 (manhole) | Manhole | 8/26/2015 | 8/26/2015 | Coliform, Fecal | 100 | CFU/100mL | Vg 24 Area Investigation | | 100 | 100 |
| Vg 35 (manhole) | Manhole | 8/26/2015 | 8/26/2015 | Coliform, Fecal | <100 | CFU/100mL | Vg 24 Area Investigation | | 100 | 100 |
| Vg 36 (manhole) | Manhole | 8/26/2015 | 8/26/2015 | Coliform, Fecal | <100 | CFU/100mL | Vg 24 Area Investigation | | 100 | 100 |
| Church Lateral | Lateral | 8/26/2015 | 8/26/2015 | Coliform, Fecal | <100 | CFU/100mL | Vg 24 Area Investigation | | 100 | 100 |
| Vg29 (manhole) | Manhole | 9/2/2015 | 9/2/2015 | Coliform, Fecal | 36,000 | CFU/100mL | Vg 24 Area Investigation | | 1000 | 1000 |
| Palmer Ter 1 (Vg 32) | Manhole | 12/4/2015 | 12/4/2015 | Coliform, Fecal | 3,000 | CFU/100mL | Vg 24 Area Investigation | | 100 | 100 |
| Palmer Tier 2 (Vg 32) | Manhole | 12/4/2015 | 12/4/2015 | Coliform, Fecal | 3,000 | CFU/100mL | Vg 24 Area Investigation | | 100 | 100 |
| Vh6 (manhole) | Manhole | 9/2/2015 | 9/2/2015 | Coliform, Fecal | 200 | CFU/100mL | Outfall 26 Area Investigation | | 100 | 100 |
| Vh3 (manhole) | Manhole | 9/2/2015 | 9/2/2015 | Coliform, Fecal | <100 | CFU/100mL | Outfall 26 Area Investigation | | 100 | 100 |
| S. Barry DS1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 5,200 | CFU/100mL | Stream Sampling | | 100 | 100 |
| S. Barry DS2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 5,900 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Tomkins US1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 4,300 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Tomkins US2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 5,100 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Anita US1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 2,500 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Anita US2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 3,000 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Jeff US1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 2,600 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Jeff US2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 1,500 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Shel-Mam1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 3,400 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Shel-Mam2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 1,600 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Plaza 1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 1,800 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Plaza 2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 1,900 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Vg US1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 2,300 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Vg US2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 2,900 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Mr Urban1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 11,000 | CFU/100mL | Stream Sampling | | 1000 | 1000 |
| Mr Urban2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 5,100 | CFU/100mL | Stream Sampling | | 100 | 100 |
| N.Barry DS1 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 2,900 | CFU/100mL | Stream Sampling | | 100 | 100 |
| N.Barry DS2 | Stream | 10/1/2015 | 10/1/2015 | Coliform, Fecal | 2,500 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Anita 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 600 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Anita 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 800 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Jefferson Ave US1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 300 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Jefferson Ave US2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 100 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Shel-Man 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 400 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Shel-Man 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 500 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Plaza 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 200 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Plaza 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | <100 | CFU/100mL | Stream Sampling | | 100 | 100 |

| Client Sample ID | Sample Type | Collection Date | Analysis Date | Analyte | Result | Unit | Sampling Event Notes | Flag | High Limit | Low Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Vg 24 US-1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 500 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Vg 24 US-2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 300 | CFU/100mL | Stream Sampling | | 100 | 100 |
| N Barry DS-1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 900 | CFU/100mL | Stream Sampling | | 100 | 100 |
| N Barry DS-2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 1,100 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Mr Urban St 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 600 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Mr Urban St 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 700 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Tompkins Us 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 600 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Tompkins Us 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 500 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Tompkins Ds 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 600 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Tompkins Ds 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 300 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Otter Creek 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 1,100 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Otter Creek 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 1,600 | CFU/100mL | Stream Sampling | | 100 | 100 |
| S Barry 1 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | 500 | CFU/100mL | Stream Sampling | | 100 | 100 |
| S Barry 2 | Stream | 10/7/2015 | 10/7/2015 | Coliform, Fecal | <100 | CFU/100mL | Stream Sampling | | 100 | 100 |
| Jefferson | Stream | 9/16/2015 | 9/16/2015 | Coliform, Fecal | 1,100 | CFU/100mL | DNA Sampling | | 100 | 100 |
| Shel/Mam | Stream | 9/16/2015 | 9/16/2015 | Coliform, Fecal | 1,400 | CFU/100mL | DNA Sampling | | 100 | 100 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | DBACT | 4 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.80E+00 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | GenBac | 245 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.80E+00 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | H-EPA1 | 3,360 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.80E+00 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | H-EPA2 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.80E+00 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | HF183 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.80E+00 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | Gull-CAT | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.80E+00 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | CG BACT1 | 1 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.80E+00 |
| Jefferson 1 | Stream | 9/16/2015 | 9/22/2015 | CG BACT2 | 0 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.80E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | DBACT | 3 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.70E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | GenBac | 421 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.70E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | H-EPA1 | 1,710 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.70E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | H-EPA2 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.70E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | HF183 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.70E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | Gull-CAT | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.70E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | CG BACT1 | 0 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.70E+00 |
| Jefferson 2 | Stream | 9/16/2015 | 9/22/2015 | CG BACT2 | 0 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | DBACT | 2 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | GenBac | 276 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | H-EPA1 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | H-EPA2 | 37,400 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | HF183 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | Gull-CAT | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | CG BACT1 | 0 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.70E+00 |
| Shel/Mam 1 | Stream | 9/16/2015 | 9/22/2015 | CG BACT2 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.70E+00 |
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | DBACT | 4 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.80E+00 |
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | GenBac | 493 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.80E+00 |
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | H-EPA1 | 908 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.80E+00 |
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | H-EPA2 | 9,950 | gene copies/mL | DNA Sampling | = | 1.00E-01 | 4.80E+00 |

| Client Sample ID | Sample Type | Collection Date | Analysis Date | Analyte | Result | Unit | Sampling Event Notes | Flag | High Limit | Low Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | HF183 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.80E+00 |
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | Gull-CAT | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.80E+00 |
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | CG BACT1 | 1 | gene copies/mL | DNA Sampling | J | 1.00E-01 | 4.80E+00 |
| Shel/Mam 2 | Stream | 9/16/2015 | 9/22/2015 | CG BACT2 | 5 | gene copies/mL | DNA Sampling | < | 1.00E-01 | 4.80E+00 |
| Jeff Bridge 1 | Stream | 12/4/2015 | 12/9/2015 | HEM | <5.32 | mg/L | Oil Slick Investigation | | 5.32 | 5.32 |
| Jeff Bridge 2 | Stream | 12/4/2015 | 12/9/2015 | HEM | <5.43 | mg/L | Oil Slick Investigation | | 5.43 | 5.43 |

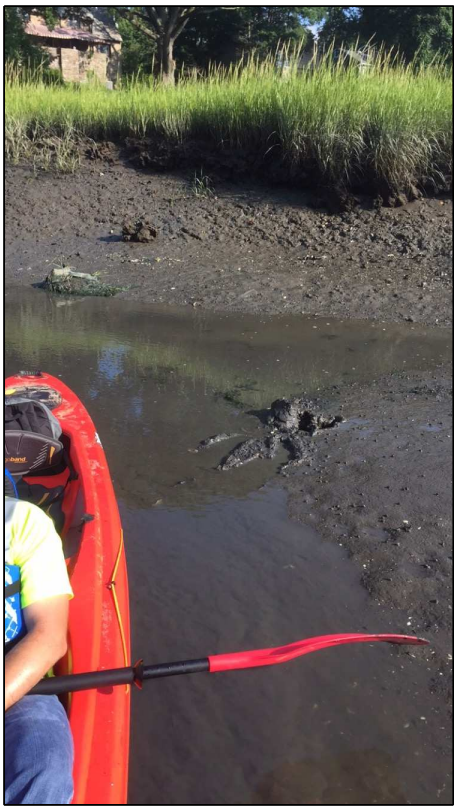
# APPENDIX C

## Otter Creek Investigation Photo Log



**1**

Photo filename (.jpg): Otter Creek (1)
Arcadis visited Otter Creek at low tide to locate outfalls to investigate potential for illicit discharges. Otter Creek is very shallow at low tide.



**2**

Photo filename (.jpg): Otter Creek (2) Bank
Arcadis paddled upstream until the creek became too shallow to continue.

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**3**

Photo filename (.jpg): Otter Creek (3) Mud
Arcadis staff were unable to walk through mud because it was soft and unstable.

**4**

Photo filename (.jpg): Otter Creek (4)
The width of the creek and dense vegetation along the shoreline prevented Arcadis staff from seeing outfalls from the kayak.

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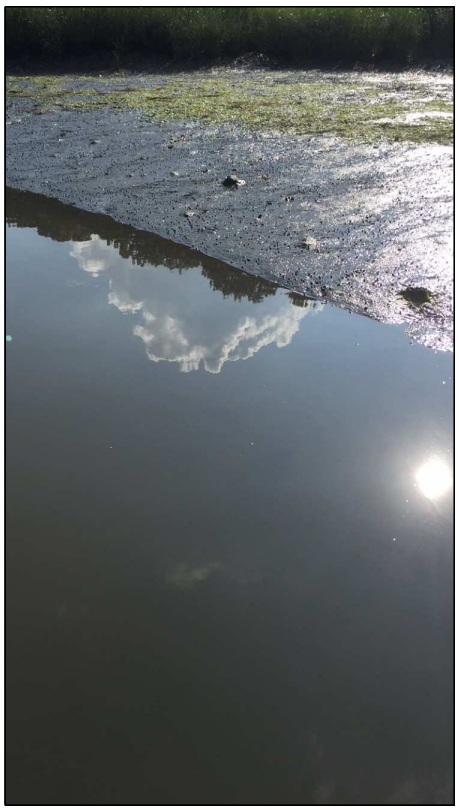

**5**

Photo filename (.jpg): Otter Creek (5)

**6**

Photo filename (.jpg): Otter Creek (6)

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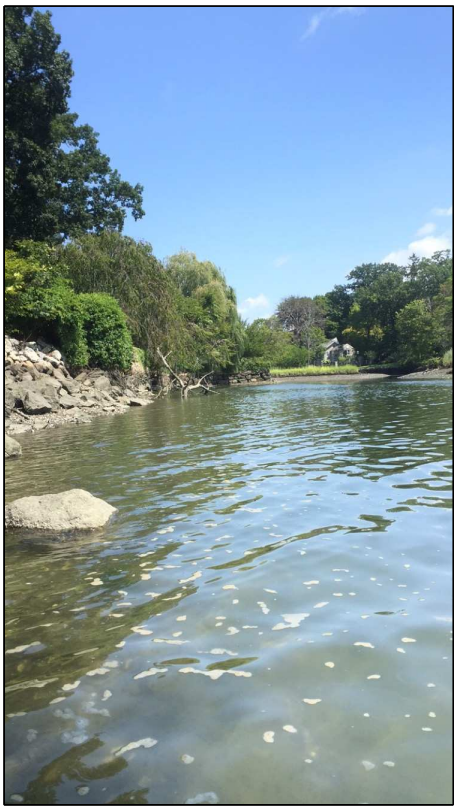
**7**

Photo filename (.jpg): Otter Creek (7)
At mid-tide, the water depth in the Creek is greater, such that Arcadis staff could travel further than at low tide.



**8**

Photo filename (.jpg): Otter Creek (8)

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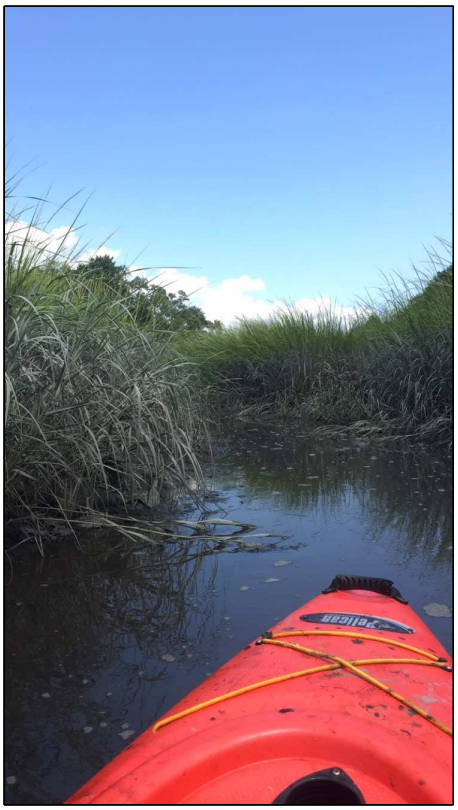
**9**

Photo filename (.jpg): Otter Creek (9)



**10**

Photo filename (.jpg): Otter Creek (10)
Even at mid-tide, Arcadis staff reached a point at which the vegetation was too dense and the water was too shallow to continue.

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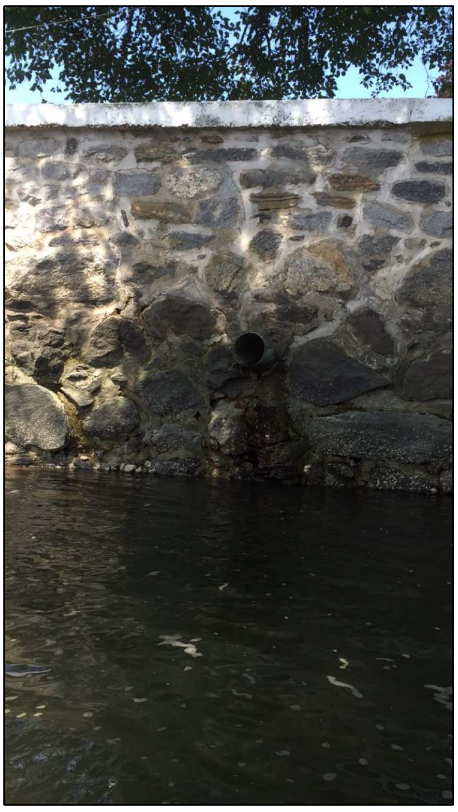
**11**

Photo filename (.jpg): Otter Creek (11)
Mud at mid-tide was too soft to walk on to investigate for outfalls on foot and vegetation was too dense to see record outfalls.



**12**

Photo filename (.jpg): BSB 23
Arcadis staff located one outfall, at the mouth of Otter Creek, close to the Harbor.

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**C**

**13**

Photo filename (.jpg): Vj 60 (not verified)
The approximate location of outfall Vj 60 was located, but the outfall could not be seen.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Photographs of Site Inspection 08−21−2015**

ARCADIS Design & Consultancy for natural and built assets

**APPENDIX**

**C**

# APPENDIX D

## River Foam Sampling Events

ARCADIS of NY, Inc.
44 South Broadway
15th Floor
Box 751
White Plains
New York 10602-0751
Tel 914 694 2100
Fax 914 694 9286
**www.arcadis-us.com**

Richard Slingerland
Village Manager
Village of Mamaroneck
123 Mamaroneck Avenue
Mamaroneck, NY 10543

Subject:
River Sampling Event – Foam in the Mamaroneck River

Water

Date:
April 20, 2015

Contact:
Kevin Hogan

Phone:
518-250-7306

Email:
Kevin.Hogan@arcadis-us.com

Dear Mr. Slingerland:

At the Village of Mamaroneck's (Village) request, ARCADIS of New York (ARCADIS) collected samples from the Mamaroneck River due to concerns from area residents regarding foam in the Mamaroneck River. The origin and composition of the foam were not known, so the Village directed ARCADIS to sample the foam and to have it analyzed for common pollutants.

ARCADIS collected samples on the River on April 16th. Two sampling locations were selected, one location where foam was prominent and one upriver location where foam was not observed. The first sampling location was located under the Jefferson Avenue bridge, on the west bank of the river. The second upriver location was located under the North Barry Extension bridge, on the east bank of the river. Foam was collected in each of the downgradient sample bottles to ensure the perceived contaminant was analyzed.

Photographs of the two sample locations are provided as Appendix A. These photos show the sampling locations and the foam that was observed at each site. One set of samples were collected at each location and analyzed for Fecal Coliform, Oil & Grease, and Anionic Surfactants. Fecal coliform is present in high concentrations in wastewater and anionic surfactants are present in high concentrations in detergents and foaming agents. The standard test for surfactants is methylene blue active substances assay (MBAS).

The samples were tested by EnviroTest Laboratories, in Newburgh, NY. The lab is certified for environmental testing in New York, New Jersey, and Connecticut. The testing results were received by ARCADIS on April 17th. The complete testing results are provided as Appendix B. Table 1 on the next page provides a summary of the testing results.

Table 1 – Summary of Analytical Results

| Parameter | Result | Reporting Limit (RL) | Water Quality Standard |
|---|---|---|---|
| Fecal Coliform | 130 cfu\100 ml<br>190 cfu\100 ml | 10 cfu\100 ml<br>10 cfu\100 ml | Geometric mean of five samples shall not exceed 200 cfu\100 ml |
| Oil and Grease | < 5.0 mg\l<br>< 5.21 mg\l | 5.0 mg\l<br>5.21 mg\l | No residue attributable to sewage, industrial wastes, or other wastes, nor visible oil film or globules of grease |
| Surfactants (MBAS) | 0.172 mg\l<br><0.1 mg\l | 0.1 mg\l<br>0.1 mg\l | No water quality standard. The limit commonly used in sampling stormwater to start performing further investigations is > 0.25 mg\l. |

In reviewing and interpreting these results, the main point to consider is that the concentrations for all three parameters were very low. In fact, the oil and grease samples and one of the surfactant samples were below the labs reporting limit, and the other surfactant sample was just above the labs reporting limit. A reporting limit is the laboratory's limit of detection for the target analyte in a specific sample after adjustments have been made for dilutions or percent moisture.

For comparison of the results above, consider the stormwater discharging from a trucking facility with a fueling station would be permitted for a limit of 30 mg/l for oils and grease. In addition, the laboratory indicated that if soap was the cause of the foam collected in the sample bottle, the MBAS result would have been well over 100 mg/l.

The foam observed on the River was likely naturally occurring. When plants and animals die the lipids rise to the surface and coat the surface of the water. When the water is agitated from wind and current the fatty acids entrain the small bubbles that constitute the foam. Naturally occurring foam usually appears white or gray, while foam caused by soap often appears white with a slight pink appearance. Articles on this subject are provided in Appendix C.

Please do not hesitate to contact me at 518-250-7306 if you have any questions or would like additional information.

Sincerely,

ARCADIS of NY, Inc.

Kevin Hogan, PE
Senior Engineer

Appendix **A**

Sampling Location Photos

1

Photo #1: Jefferson Ave. bridge facing east

2

Photo #2: Sampling of the river - Clumps of foam can be seen in the background of the photo. Foam was collected in each sample bottle.

VILLAGE OF MAMARONECK

RIVER SAMPLING EVENT – FOAM IN THE MAMARONECK RIVER

**Site #1, Jefferson Ave. Bridge**

ARCADIS

APPENDIX A

**3**

Photo #3: North Berry Ext. bridge facing west

**4**

Photo #4: Sampling location on the river - Clumps of foam can be seen on the left hand side of the photo

VILLAGE OF MAMARONECK

RIVER SAMPLING EVENT – FOAM IN THE MAMARONECK RIVER

**Site #2, North Berry Ext. Bridge**

ARCADIS

APPENDIX A

ARCADIS

Appendix **B**

Analytical Results

EnviroTest Laboratories Inc.

# ANALYTICAL REPORT

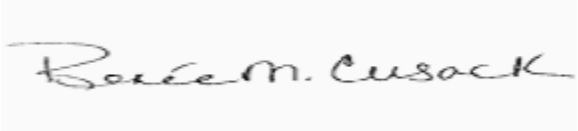
Job Number: 420-89305-1

SDG Number: Mamaraneck

Job Description: Illicit Discharge Detection

For:
Arcadis US, Inc.
855 Route 146 Suite 210
Clifton Park, NY 12065

Attention: Mr. Kevin Hogan



Renee Cusack
Lab Director
rcusack@envirotestlaboratories.com
04/17/2015

cc: Mr. A.J. Brooks



EnviroTest Laboratories, Inc. Certifications and Approvals: NYSDOH 10142, NJDEP NY015, CTDOPH PH-0554

# METHOD SUMMARY

Client: Arcadis US, Inc.

Job Number: 420-89305-1
SDG Number: Mamaraneck

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Water** | | | |
| HEM and SGT-HEM by Extraction and Gravimetry | EnvTest | 1664A 1664A | |
| HEM and SGT-HEM by Extraction and | EnvTest | | 1664A 1664A |
| Membrane Filter Technique - Fecal Coliform Procedure | EnvTest | SM18 SM 9222D-97 | |
| Anionic Surfactants as MBAS | EnvTest | SM21 SM5540C-00,11 | |

**Lab References:**

EnvTest = EnviroTest

**Method References:**

1664A = EPA-821-98-002

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

SM21 = "Standard Methods For The Examination Of Water And Wastewater", 21st Edition

## METHOD / ANALYST SUMMARY

Client: Arcadis US, Inc.

Job Number: 420-89305-1
SDG Number: Mamaraneck

| Method | Analyst | Analyst ID |
|---|---|---|
| 1664A 1664A | Vollmer, William | WB |
| SM18 SM 9222D-97 | Travis, Lyndsey | LT |
| SM21 SM5540C-00,11 | Miller, Kyle A | KAM |

## SAMPLE SUMMARY

Client: Arcadis US, Inc.

Job Number: 420-89305-1
SDG Number: Mamaraneck

| Lab Sample ID | Client Sample ID | Client Matrix | Date/Time Sampled | Date/Time Received |
|---|---|---|---|---|
| 420-89305-1 | Columbus Park | Water | 04/15/2015 1200 | 04/15/2015 1420 |
| 420-89305-2 | N Berry Bridge | Water | 04/15/2015 1245 | 04/15/2015 1420 |

Mr. Kevin Hogan
Arcadis US, Inc.
855 Route 146 Suite 210
Clifton Park, NY 12065

Job Number: 420-89305-1
Sdg Number: Mamaraneck

**Client Sample ID:** **Columbus Park**
**Lab Sample ID:** **420-89305-1**

Date Sampled: 04/15/2015 1200
Date Received: 04/15/2015 1420
Client Matrix: Water

| Analyte | Result/Qualifier | Unit | RL | Dilution |
|---|---|---|---|---|
| **Method: 1664A** | | Date Analyzed: | 04/16/2015 1000 | |
| **Prep Method: 1664A** | | Date Prepared: | 04/16/2015 1000 | |
| HEM | <5.21 | mg/L | 5.21 | 1.0 |
| SGT-HEM | <5.21 | mg/L | 5.21 | 1.0 |
| **Method: SM5540C-00,11** | | Date Analyzed: | 04/16/2015 1000 | |
| MBAS | 0.172 | mg/l LAS MW | 0.100 | 1.0 |
| **Method: SM 9222D-97** | | Date Analyzed: | 04/15/2015 1600 | |
| Coliform, Fecal | 130 | CFU/100mL | 10.0 | 10 |

Mr. Kevin Hogan
Arcadis US, Inc.
855 Route 146 Suite 210
Clifton Park, NY 12065

Job Number: 420-89305-1
Sdg Number: Mamaraneck

**Client Sample ID:** **N Berry Bridge**
**Lab Sample ID:** **420-89305-2**

Date Sampled: 04/15/2015 1245
Date Received: 04/15/2015 1420
Client Matrix: Water

| Analyte | Result/Qualifier | Unit | RL | Dilution |
|---|---|---|---|---|
| **Method: 1664A** | | Date Analyzed: | 04/16/2015 1000 | |
| **Prep Method: 1664A** | | Date Prepared: | 04/16/2015 1000 | |
| HEM | <5.00 | mg/L | 5.00 | 1.0 |
| SGT-HEM | <5.00 | mg/L | 5.00 | 1.0 |
| **Method: SM5540C-00,11** | | Date Analyzed: | 04/16/2015 1000 | |
| MBAS | <0.100 | mg/l LAS MW | 0.100 | 1.0 |
| **Method: SM 9222D-97** | | Date Analyzed: | 04/15/2015 1600 | |
| Coliform, Fecal | 190 | CFU/100mL | 10.0 | 10 |

# EnviroTest Laboratories Inc.

# CHAIN OF CUSTODY

89305

315 Fullerton Avenue
Newburgh, NY 12550
TEL (845) 562-0890
FAX (845) 562-0841

CUSTOMER NAME: ARCADIS U.S., Inc
ADDRESS: 44 South Broadway, 15th Floor
CITY, STATE, ZIP: White Plains, NY, 10601
NAME OF CONTACT: Dave Foster
PHONE NO.: (914) 641-2777
PROJECT LOCATION: Mamaroneck
PROJECT NUMBER / PO NO.: 01547036

**NOTE: SAMPLE TEMPERATURE UPON RECEIPT MUST BE 4° ± 2°C.**

**REPORT TYPE**
STANDARD ☐ ISRA ☐
NJ REG ☐
NYASP A ☐ B ☐ CLP ☐
OTHER ____

**TURNAROUND**
☐ NORMAL ____
☐ QUICK ____
☐ VERBAL ____

**REPORT # (Lab Use Only)**

SAMPLE TEMP. 10.2 C
SAMPLE REC'D ON ICE ☑ Y ☐ N
ph CHECK ☐ Y ☐ N
CHLORINE (RESIDUAL) ☐ Y ☐ N
REVIEWED BY: ____

**NY PUBLIC WATER SUPPLIES**
SOURCE ID ____
ELAP TYPE ____
FEDERAL ID ____

**Matrix**
DW = DRINKING WATER S = SOIL O = OIL
WW = WASTE WATER SL = SLUDGE GW = GROUND WATER

| ETL # | SAMPLING DATE | TIME AM PM | COMP | GRAB | MATRIX | CLIENT I.D. | Total Number of Containers | 40ml Glass HCL | Liter Amber HCL | 250ml Amber Sulfuric | Liter Amber Organic Washed | 250ml Plastic Nitric Acid | 250ml Plastic Sodium Hydroxide | Liter Plastic | 250ml Plastic Sulfuric Acid | 250ml Plastic | 125ml Plastic Sterile | 250ml Plastic NAOH/ZN ACC | 40ml Glass Sulfuric | 40ml Glass | DO | ANALYSIS REQUESTED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4/15/15 | 12:00 PM | | ✓ | | Columbus Park MBAS | 3 | | 1 | | | | | 1 | | | 1 | | | | | MBAS / surfactants |
| | 4/15/15 | 12:00 PM | | ✓ | | Columbus Park Oil/Grease | 1 | | 1 | | | | | | | | | | | | | Oil & Grease |
| | 4/15/15 | 12:00 PM | | ✓ | | Columbus Park Fecal | 1 | | | | | | | | | 1 | | | | | | Fecal coliform |
| | 4/15/15 | 12:45 PM | | ✓ | | N. Berry Bridge MBAS | 1 | | | | | | | 1 | | | | | | | | MBAS / surfactants |
| | 4/15/15 | 12:45 PM | | ✓ | | N. Berry Bridge Oil & Grease | 1 | | 1 | | | | | | | | | | | | | Oil & Grease |
| | 4/15/15 | 12:45 PM | | ✓ | | N. Berry Bridge Fecal | 1 | | | | | | | | | 1 | | | | | | Fecal coliform |

LAB USE ONLY

SAMPLES SUBMITTED FOR ANALYSIS WILL BE SUBJECT TO THE ETL TERMS AND CONDITIONS OF SALE UNLESS ALTERNATE TERMS ARE AGREED IN WRITING.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| RELINQUISHED BY: Paul O'Phillips | COMPANY: ETL | DATE: 4/14/15 | TIME: 1630 | RECEIVED BY: Paul O'Phillips | COMPANY: ETL | DATE: 4/15/15 | TIME: 1420 |
| SAMPLED BY: JAREDLEADER | COMPANY: ARCADIS | DATE: 4/15/15 | TIME: 1420 1245 | RECEIVED BY | COMPANY | DATE | TIME |
| RELINQUISHED BY | COMPANY | DATE: 4/15/15 | TIME: 1420 | RECEIVED BY | COMPANY | DATE | TIME |

COMMENTS: jared.leader@arcadis-us.com

NYSDOH 10142 NJDEP NY015 CTDOPH PH-0554 EPA NY00049



04/17/2015

ARCADIS

Appendix **C**

Natural Occurring Foam Articles

July 15, 2009 · 9:53 am

# Science of the Seasons: Bubbling curiosity — Most water foam is no cause for concern

Photo courtesy of David Wartinbee. Naturally occurring foam found in rivers and streams results from the breakdown of organic materials in and around streams and changes the surface tension of the water, causing bubbles to form.

By David Wartinbee, for the Redoubt Reporter

A few weeks ago, a friend asked me if I knew about the pollution going on in a particular stream. He had seen patches of foam and an endless stream of bubbles in a variety of places along the edge of the stream. There were masses of foam floating on the surface and large accumulations of discolored foam trapped behind a couple logs. He was certain something bad was getting into that stream.

About the same time, when launching my boat at Lower Skilak Lake Campground, I saw the entire northern shoreline outlined with a thick mass of pure white foam. The 2-inch-thick foam was blown up on shore in a swath almost a foot wide. It looked like someone spilled a giant bottle of bubble-bath soap into the water. Were these piles of bubbles the result of some untoward act, too?

The answer is simple. No pollution activity is indicated by either of these situations. Masses of bubbles floating on the surface of lakes and streams are perfectly natural. Interestingly, the natural processes that caused these bubbles to form are almost identical to those required to make soap.

People have been making and using soaps for more than 4,000 years. The needed materials haven't changed much through the years and are relatively simple. First, there needs to be a source of fatty acids. American colonists commonly used fat (tallow or lard), but fish oils or even

vegetable oils will do. Caustic lye, an alkaline solution made from wood ashes, was used to cause the fatty acids to combine with sodium or potassium ions. The resulting molecules had a nonpolar end and a polar end, which means that part of the molecule would combine with water and one part would not. These molecules change the surface tension of the water, and that causes foam or bubbles.

Lakes and streams are surrounded by living organisms, and many organisms live within the water itself. Both plants and animals produce lipids like simple fats — three fatty acids combined with a glycerol molecule. When any of these organisms die, they release fats, proteins, sugars and other molecules into the water. Nonpolar molecules like lipids float since they have a lower specific gravity than water and will not mix with water. As fats and other lipids break down, the released fatty acids also float to the surface.

Thus, the surface of the water often has a thin, completely transparent layer of lipids on it. Through reactions similar to those used to make soap, the resulting molecules change the surface tension and, just like soap, they cause bubbles to form.

Agitation of the surface layer of lipids causes bubbles to form. The thick layer of foam I saw at Skilak Lake surely resulted from the heavy wave action the day before. The associated wind then drove the foam up onto the shore where is showed up so distinctly on one side of the lake. In streams, foam collects in backwater areas and gets trapped behind floating obstacles like tree branches or emergent vegetation. As the material oxidizes and debris collects in the foam, it can take on ominous colorations. Lots of floating objects and even microorganisms get trapped within these foam masses.

The fact that foam acts as a floating debris collector has been put to good use by many different scientists. The floating pupal cast skins I use to identify Chironomids can be found by the thousands in these foam collections. My wife jokes that as a graduate student, I could recognize foam in a stream at 60 miles per hour, and then we needed to stop and collect a sample.

Other insects, like caddisflies and mayflies, can leave their pupal skins in these foam masses, too. Those who work with aquatic fungi commonly use foam collections to find representative spores. As well, within these foam masses one can find pollen, seeds, algae, moss spores, minute insects called collembola, and a variety of other minute animal, plant and fungal remains.

It has been shown that some environmentally degrading activities can cause foam to occur in streams and lakes. For example, high concentrations of detergents or faulty sewage treatment facilities are known to cause excess foam creation. Some mining activities like washing gravels or adding materials to lakes can cause extraordinary amounts of foam to be created. The foam itself is not usually the polluting activity, but rather the foam is an indication that something is going on.

Perhaps excess amounts of foam or unusual odors might raise a suspicion of human activity. Seeing lots of dead fish mixed in with the foam certainly indicates that it's time to notify the authorities. Unfortunately, it is very difficult to separate naturally occurring foam from pollution-related foam.

While huge masses of foam in a stream or around our lakes could signal a pollution situation, the vast majority of foam we see is from perfectly normal biological processes.

*David Wartinbee, Ph.D, J.D., is a biology professor at Kenai Peninsula College's Kenai River Campus. He is writing a series of columns on the ecology of the Kenai River and Cook Inlet watershed.*

BRITISH COLUMBIA
The Best Place on Earth

Ministry of Environment

# Foam on Surface Waterbodies

**Q.** Why do we see foam on our lakes and streams?

**A.** Foam is a natural phenomenon that occurs on many lakes and streams. Foam is produced when organic matter decomposes and releases fatty acids that act as surfactants or surface active agents. Smaller amounts of dissolved organic matter are also released from living organisms. These foam producing molecules have one end that repels water and another end that attracts water and work to reduce the surface tension on the water surface. These fatty acids are lighter than water so float on the surface of the water as a thin film. Turbulence from waves or currents cause the fatty acids to entrain small bubbles that constitute the foam. In lakes and large rivers the wind causes the foam to form into parallel streaks, due to wind induced surface currents (Langmuir circulation). Large amounts of foam will accumulate on downwind beaches and coves, in stream eddies or against docks, logs, and other floating objects.

**Q.** Where does the organic matter that makes the foam come from?

**A.** The organic matter in surface waters comes mostly from decomposing vegetation such as algae and terrestrial plants, but could also include other natural sources such as spawned out salmon. Anthropogenic sources of organic matter include sewage and agriculture, pulp mill and other organic discharges. In rivers, spring freshet commonly causes a lot of foam as decomposed vegetation (i.e. leaves and needles) are washed out of backchannels and small streams. Along the north coast the brown water that drains bogs and wetlands are high in organic compounds due to the high productivity and slow breakdown of plant material in these ecosystems.

**Q.** Is the foam natural or man-made?

**A.** While it is possible that humans are to blame, it is more likely the foam is just a natural phenomenon. Natural foam is generally white, breaks down relatively quickly and smells like fish or earth. If there is a lot of soil erosion the foam may be a dirty brown and contain small bits of organic matter. During periods of high pollen release, (in B.C. usually from coniferous trees), the foam may have a yellow colour. If the source of the foam is from detergents or other personal care products, then the foam may have a sweet or perfume smell. Whether the organic matter is from natural or man-made sources the main foam constituents are the same. To identify man-made sources of organics some form of tracer compound would need to be sampled, such as chlorinated compounds or the musks used as scents. Man made foam should accumulate near its source, not over large areas, will not persist, will dissipate quickly (once the discharge stops) and is generally not associated with rain storms or winds. Synthetic detergents developed after the Second World War were not biodegradable so this resulted in large accumulations of persistent foam during the 1950's and 1960's. Modern detergents must be biodegradable so they do not persist, quickly lose their ability to cause foam and are unable to produce the long-lasting foam found along some shores.

**Ministry of Environment**
Environmental Protection
Thompson Region
Mailing Address:
1259 Dalhousie Drive
Kamloops BC V2C 5Z5
Telephone: 250-371-6200
Facsimile: 250-828-4000
Website: www.gov.bc.ca/env

**Q.** Is foam hazardous?

**A.** Foam is usually harmless. The foaming agents are primarily proteinaceous or carbonaceous matter. It only takes a small amount of fatty acids or other foaming agents to produce a large amount of foam. Only about 1 % of the foam is made up of the foaming agent, the remaining 99 % being air and water. Small streams can have pockets of foam where fish hide from predators. However, foam can accumulate compounds that are repelled by water (hydrophobic), so foam can be enriched significantly with particulate organic and inorganic compounds such as nutrients (N, P, C), cations (K, Na, Ca, Mg), heavy metals (Cd, Cu, Fe, Pb, Zn) and chlorinated hydrocarbons. The organisms that inhabit the surface layer would be more exposed to these contaminants and this could form a pathway to introduce contaminants into the food web.

**Q.** Where have there been problems with excessive foam in British Columbia?

**A.** Foam complaints are infrequent but occur regularly on streams and lakes in British Columbia. Foam issues are typically more common on productive eutrophic lakes and brown tannin rich and turbid streams. However, low productivity oligotrophic lakes and relatively pristine high elevation lakes and streams have also had incidents with foam.

There have been several historical foam events that were related to specific circumstances. A recent discharge of manure contaminated runoff into Coldstream Creek created large banks of foam. A cyanobacteria bloom on Loon Lake was blown to the outlet where the thick algae mash constituted most of the flow in Loon Creek. Large banks of foam resulted from the release of algae organics downstream of turbulent reaches of the stream. Some foam complaints are blamed on discharges from pulp mills. On the Thompson River, downstream of the Kamloops pulpmill, foam was collected and analyzed for pulp tracer chemicals. No connection to the pulpmill effluent was found.

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Facsimile: 250-828-4000
Website: www.gov.bc.ca/env

## References:

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Personal communications with EIA biologists: Bob Grace, Vic Jenson, Mike Sokal, Chris Swan, Kym Keogh, Dennis Einarson and Tarik Dessouki.

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**www.arcadis-us.com**

Richard Slingerland
Village Manager
Village of Mamaroneck
123 Mamaroneck Avenue
Mamaroneck, NY 10543

Subject:
Water

Sampling Due to Foam Observed in River
Sampling Location: Halstead Avenue Bridge

Date:
June 3, 2015

Contact:
Kevin Hogan

Phone:
518-250-7306

Email:
Kevin.Hogan@arcadis-us.com

Dear Mr. Slingerland:

At the Village of Mamaroneck's (Village) request, ARCADIS of New York (ARCADIS) collected samples from the Mamaroneck River due to concerns from area residents regarding foam in the Mamaroneck River. The origin and composition of the foam were not known, so the Village directed ARCADIS to sample the foam and to have it analyzed for common pollutants.

ARCADIS staff walked and observed areas along the Mamaroneck River from the Halstead Avenue bridge to the Jefferson Avenue bridge, as well as the Sheldrake River from the confluence with the Mamaroneck River to the Mamaroneck Avenue Bridge. Natural occurring foam was observed on the surface of both the Mamaroneck River and the Sheldrake River, particularly where there was turbulence. The area with the most foam was at the confluence of the Sheldrake and Mamaroneck Rivers. A sample of the foam was collected and observed. It was grayish white in color and there were no odors.

Samples were collected by ARCADIS on Friday May 29, 2015 just downgradient of the Halstead Bridge in the Mamaroneck River. This is the location that residents most recently called the Village with observations of foam. A sample of the foam and river water was collected in each sample bottle.

Photographs of the foam observed on the surface of the Mamaroneck and Sheldrake Rivers are provided as Appendix A, along with a field sketch showing the locations the photographs were taken. The sample was analyzed for fecal coliform, oil & grease, and anionic surfactants. Fecal coliform is present in high concentrations in wastewater and anionic surfactants are present in high concentrations in detergents and foaming agents. The standard test for surfactants is methylene blue active substances assay (MBAS).

The samples were tested by EnviroTest Laboratories, in Newburgh, NY. The lab is certified for environmental testing in New York, New Jersey, and Connecticut. The testing results were received by ARCADIS on June 4th. The complete testing results are provided as Appendix B. Table 1 on the next page provides a summary of the testing results.

Table 1 – Summary of Analytical Results

| Parameter | Result | Reporting Limit (RL) | Water Quality Standard |
|---|---|---|---|
| Fecal Coliform | 1200 cfu\100 ml | 100 cfu\100 ml | Geometric mean of five samples shall not exceed 200 cfu\100 ml |
| Oil and Grease | < 5.38 mg\l | 5.38 mg\l | No residue attributable to sewage, industrial wastes, or other wastes, nor visible oil film or globules of grease |
| Surfactants (MBAS) | 0.26 mg\l | 0.1 mg\l | No water quality standard. The limit commonly used in sampling stormwater to start performing further investigations is > 0.25 mg\l. |

The oil and grease sample was below the labs reporting limit. A reporting limit is the laboratory's limit of detection for the target analyte in a specific sample after adjustments have been made for dilutions or percent moisture. The surfactants concentration was low, but above the reporting limit, and the fecal coliform concentrations were elevated.

This surface foam on the Sheldrake and Mamaroneck Rivers has been observed and photographed by ARCADIS, the Village residents, and Village staff, but a source, such as stormwater outfall discharging foam, has never been identified. The physical appearance has been the same on both Rivers and it matches the appearance of naturally occurring foam presented in illicit discharge guidance documents. As discussed in the 4/20/2015 letter from the last round of sampling, the laboratory has indicated that if soap was the cause of the foam collected in the sample bottle, the MBAS concentration would have been well over 100 mg/l.

However, nonionic surfactants are used as a wetting agent for herbicides and pesticides. This time of year the application of herbicides and pesticides is high, so it seems feasible that runoff from application of these products could be contributing to a decrease in the surface tension of the water and aiding in the formation of small bubbles that constitute the foam.

Although the foam is not believed to be coming from a point source discharge, the elevated fecal coliform concentration should be investigated further. The elevated concentration could have been an isolated incident, but additional samples should be collected to determine if there is a source of an illicit discharge. We recommend additional sampling in this area of the stream, upgradient of the Halstead Avenue bridge and at outfalls in the vicinity of the Halstead Avenue bridge.

Please do not hesitate to contact me at 518-250-7306 if you have any questions or would like additional information.

Sincerely,

ARCADIS of NY, Inc.

Kevin Hogan, PE
Senior Engineer

Appendix **A**

Notes and Photos

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 1 | 05/29/15 |

**Description:**

Mamaroneck River just north of Station Plaza (looking east). Some foam visible.

ARCADIS

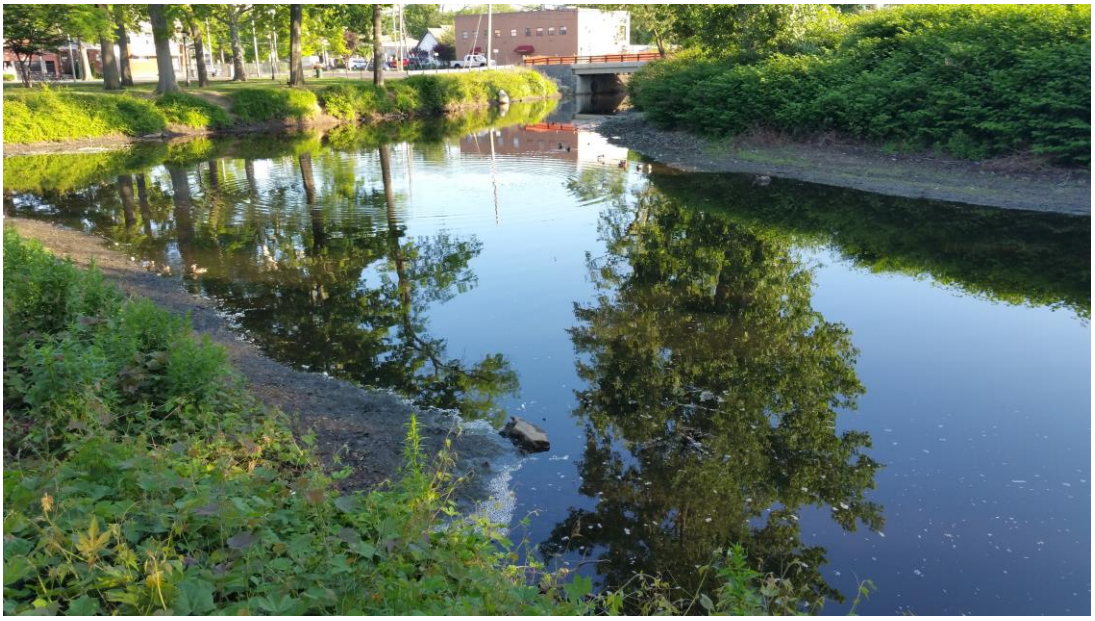
**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 2 | 05/29/15 |

**Description:**

Mamaroneck River just north of Station Plaza (looking north). Some foam visible.



ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 3 | 05/29/15 |

**Description:**

Sheldrake River at the confluence of Mamaroneck River (looking west). Heavy foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 4 | 05/29/15 |

**Description:**

Sheldrake River at the confluence of Mamaroneck River (looking east). Heavy foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 5 | 05/29/15 |

**Description:**

Mamaroneck River at Jefferson Ave. bridge (looking north). Foam visible.

ARCADIS

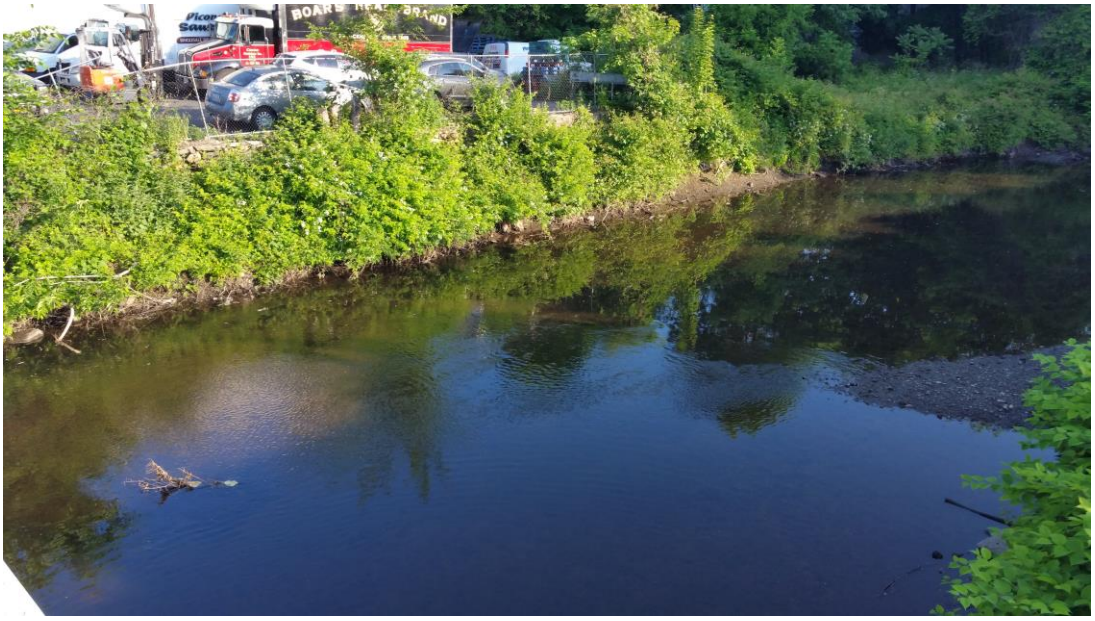
**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 6 | 05/29/15 |

**Description:**

Mamaroneck River at Jefferson Ave. bridge (looking north). Foam visible.



ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 7 | 05/29/15 |

**Description:**

Mamaroneck River at Jefferson Ave. bridge (looking north). Foam visible.

ARCADIS

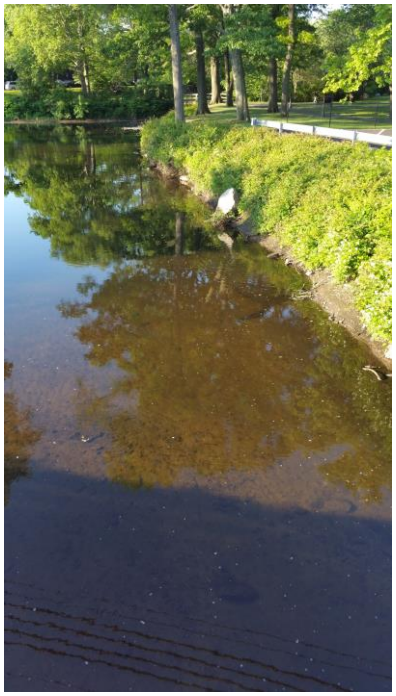
**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 8 | 05/29/15 |

**Description:**

Mamaroneck River at Jefferson Ave. bridge (looking south). Some foam visible.



ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 9 | 05/29/15 |

**Description:**

Mamaroneck River at Station Plaza bridge (looking south). Some foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 10 | 05/29/15 |

**Description:**

Mamaroneck River at Station Plaza bridge (looking southwest). Some foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 11 | 05/29/15 |

**Description:**

Mamaroneck River at Station Plaza bridge (looking north). Some foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 12 | 05/29/15 |

**Description:**

Sheldrake River at footbridge halfway to Mamaroneck Ave. (looking west). Foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 13 | 05/29/15 |

**Description:**

Sheldrake River at footbridge halfway to Mamaroneck Ave. (looking west). Foam visible.

ARCADIS

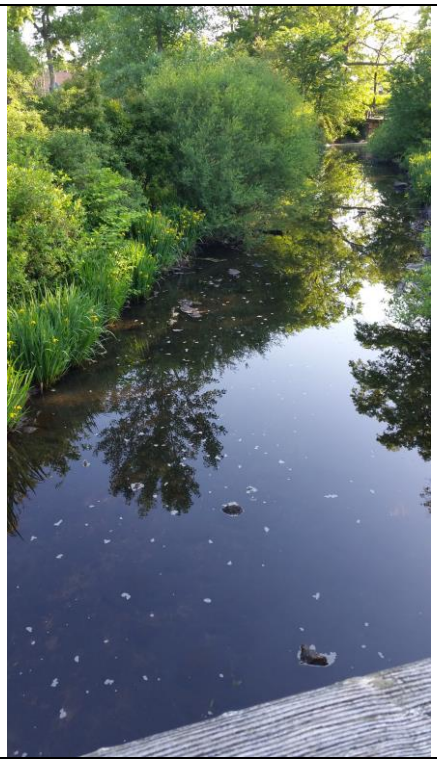
**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 14 | 05/29/15 |

**Description:**

Sheldrake River at footbridge halfway to Mamaroneck Ave. (looking east). Foam visible.



ARCADIS

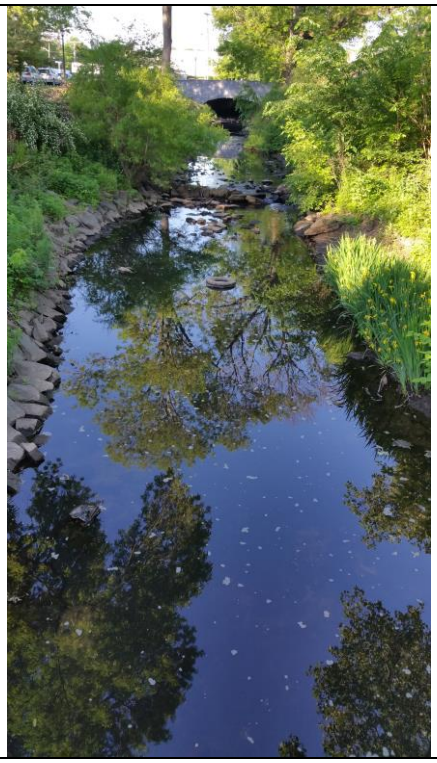
**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 15 | 05/29/15 |

**Description:**

Sheldrake River at footbridge halfway to Mamaroneck Ave. (looking west). Foam visible.



ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 16 | 05/29/15 |

**Description:**

Sheldrake River at the confluence of Mamaroneck River (looking west). Heavy foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 17 | 05/29/15 |

**Description:**

Mamaroneck River at the confluence of Sheldrake River (looking east). Heavy foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 18 | 05/29/15 |

**Description:**

Sheldrake River near Mamaroneck Ave. (looking north). Foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 19 | 05/29/15 |

**Description:**

Sheldrake River at Mamaroneck Ave. bridge (looking west). Foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 20 | 05/29/15 |

**Description:**

Sheldrake River at Mamaroneck Ave. bridge (looking north). Foam visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 21 | 05/29/15 |

**Description:**

Jefferson street, looking south under railroad bridge. Waste water from car wash flowing into storm drain. No soap observed in flow.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 22 | 05/29/15 |

**Description:**

Car Wash at intersection of Halstead Ave. and Jefferson St. (looking northeast).

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 23 | 05/29/15 |

**Description:**

Mamaroneck River at Halstead Ave. street bridge, looking south. Foam visible where turbulence in the water seems to occur.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 24 | 05/29/15 |

**Description:**

Mamaroneck River at Halstead Ave. street bridge, looking south. Foam visible where turbulence in the water seems to occur (especially in the distance).

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 25 | 05/29/15 |

**Description:**

Mamaroneck River at Halstead Ave. railroad bridge, south side, looking northeast. Minimal foam visible - not much turbulence in the moving water.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 26 | 05/29/15 |

**Description:**

Mamaroneck River at Halstead Ave. railroad bridge, south side, looking northwest. Minimal foam visible - not much turbulence in the moving water.

ARCADIS

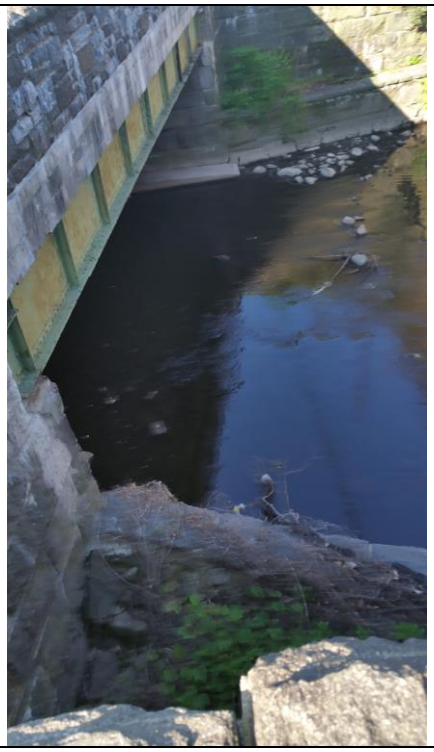
**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 27 | 05/29/15 |

**Description:**

Mamaroneck River at Halstead Ave. street bridge, north side, looking west. Minimal foam visible - not much turbulence in the moving water.



ARCADIS

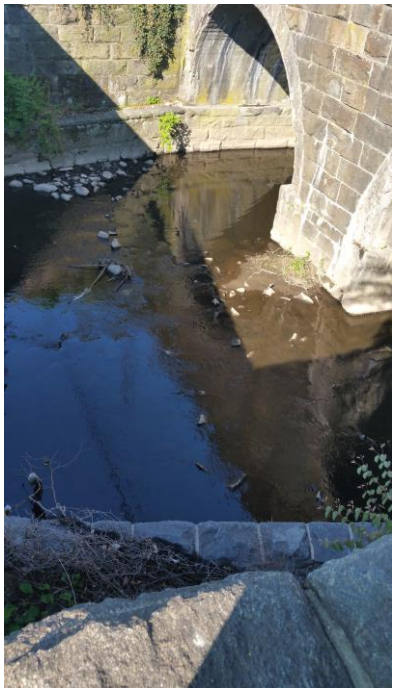
**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 28 | 05/29/15 |

**Description:**

Mamaroneck River at Halstead Ave. railroad bridge, south side, looking west. Minimal foam visible - not much turbulence in the moving water.



ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 29 | 05/29/15 |

**Description:**

Mamaroneck River just north of railroad bridge, eastern shore (looking south). Foam, organic matter visible.

ARCADIS

**MAMARONECK RIVER**

| **Project: Mamaroneck River** | **Location: Mamaroneck, NY** | **Project No.** 01547037.0000 |
|---|---|---|

| **Photo No.** | **Date:** |
|---|---|
| 30 | 05/29/15 |

**Description:**

Mamaroneck River just north of railroad bridge, eastern shore (looking south). Foam, organic matter visible.

ARCADIS

Appendix **B**

Analytical Results

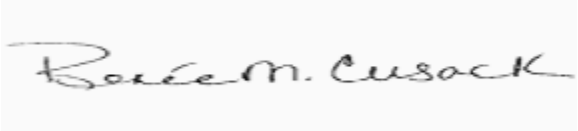
# ANALYTICAL REPORT

Job Number: 420-90859-1

Job Description: Mamaroneck

For:
Arcadis US, Inc.
855 Route 146 Suite 210
Clifton Park, NY 12065

Attention: Mr. Kevin Hogan



Renee Cusack
Lab Director
rcusack@envirotestlaboratories.com
06/05/2015

cc: Ms. Katherine Clubine



EnviroTest Laboratories, Inc. Certifications and Approvals: NYSDOH 10142, NJDEP NY015, CTDOPH PH-0554

# METHOD SUMMARY

Client: Arcadis US, Inc. Job Number: 420-90859-1

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Water** | | | |
| HEM and SGT-HEM by Extraction and Gravimetry | EnvTest | 1664A 1664A | |
| HEM and SGT-HEM by Extraction and | EnvTest | | 1664A 1664A |
| Membrane Filter Technique - Fecal Coliform Procedure | EnvTest | SM18 SM 9222D-97 | |
| Anionic Surfactants as MBAS | EnvTest | SM21 SM5540C-00,11 | |

**Lab References:**

EnvTest = EnviroTest

**Method References:**

1664A = EPA-821-98-002

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

SM21 = "Standard Methods For The Examination Of Water And Wastewater", 21st Edition

## METHOD / ANALYST SUMMARY

Client: Arcadis US, Inc. Job Number: 420-90859-1

| Method | Analyst | Analyst ID |
|---|---|---|
| 1664A 1664A | Vollmer, William | WB |
| SM18 SM 9222D-97 | Travis, Lyndsey | LT |
| SM21 SM5540C-00,11 | Miller, Kyle A | KAM |

## SAMPLE SUMMARY

Client: Arcadis US, Inc. Job Number: 420-90859-1

| Lab Sample ID | Client Sample ID | Client Matrix | Date/Time Sampled | Date/Time Received |
|---|---|---|---|---|
| 420-90859-1 | "SW-MAM-Halstead-S-2015-05-29" | Water | 05/29/2015 0945 | 05/29/2015 1230 |

Mr. Kevin Hogan
Arcadis US, Inc.
855 Route 146 Suite 210
Clifton Park, NY 12065

Job Number: 420-90859-1

**Client Sample ID:** **"SW-MAM-Halstead-S-2015-05-29"**
**Lab Sample ID:** **420-90859-1**

Date Sampled: 05/29/2015 0945
Date Received: 05/29/2015 1230
Client Matrix: Water

| Analyte | Result/Qualifier | Unit | RL | Dilution |
|---|---|---|---|---|
| **Method: 1664A** | | Date Analyzed: | 06/03/2015 1030 | |
| **Prep Method: 1664A** | | Date Prepared: | 06/03/2015 1030 | |
| HEM | <5.38 | mg/L | 5.38 | 1.0 |
| SGT-HEM | <5.38 | mg/L | 5.38 | 1.0 |
| **Method: SM5540C-00,11** | | Date Analyzed: | 05/29/2015 1000 | |
| MBAS | 0.260 | mg/L | 0.100 | 1.0 |
| **Method: SM 9222D-97** | | Date Analyzed: | 05/29/2015 1645 | |
| Coliform, Fecal | 1200 | CFU/100mL | 100 | 100 |

# EnviroTest Laboratories Inc.

# CHAIN OF CUSTODY

315 Fullerton Avenue
Newburgh, NY 12550
TEL (845) 562-0890
FAX (845) 562-0841

CUSTOMER NAME: ARCADIS
ADDRESS: 855 Route 146, Suite 210
CITY, STATE, ZIP: Clifton Park, NY 12065
NAME OF CONTACT: Kevin Hogan PHONE NO.: (518) 250 7306
PROJECT LOCATION: MAMARONECK, NY
PROJECT NUMBER / PO NO.:

**REPORT TYPE**
STANDARD ☐ ISRA ☐
NJ REG ☐
NYASP A ☐ B ☐ CLP ☐
OTHER ____

**TURNAROUND**
☐ NORMAL ____
☐ QUICK ____
☐ VERBAL ____

**REPORT # (Lab Use Only)**
90859

SAMPLE TEMP. 6.5c C
SAMPLE REC'D ON ICE ☐ Y ☐ N
ph CHECK ☐ Y ☐ N
CHLORINE (RESIDUAL) ☐ Y ☐ N
REVIEWED BY: ____

**NY PUBLIC WATER SUPPLIES**
SOURCE ID ____
ELAP TYPE ____
FEDERAL ID ____

**NOTE: SAMPLE TEMPERATURE UPON RECEIPT MUST BE 4° ± 2°C.**

**Matrix**
DW = DRINKING WATER S = SOIL O = OIL
WW = WASTE WATER SL = SLUDGE GW = GROUND WATER

**ANALYSIS REQUESTED**

| ETL # | SAMPLING DATE | TIME AM PM | COMP | GRAB | MATRIX | CLIENT I.D. | Total Number of Containers | 40ml Glass HCL | Liter Amber HCL | 250ml Amber Sulfuric | Liter Amber Organic Washed | 250ml Plastic Nitric Acid | 250ml Plastic Sodium Hydroxide | Liter Plastic | 250ml Plastic Sulfuric Acid | 250ml Plastic | 125ml Plastic Sterile | 250ml Plastic NAOH/ZN ACC | 40ml Glass Sulfuric | 40ml Glass | 1 L Amber | MBAS, Fecal, O&G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5/29/15 | 0945 | | ✓ | SW | MAM-Halstead-S-2015-05-29" | | | | | | | | | 2 | | | | | 1 | 3 | |
| | | | | | | X | | | | | X | | | | | | | | | | | |
| | | | | | | X | | | | | X | | | | | | | | | | | |

Please Call Kevin Hogan (518) 250-7306 for T/A time, Format, etc. Thank You!

SAMPLES SUBMITTED FOR ANALYSIS WILL BE SUBJECT TO THE ETL TERMS AND CONDITIONS OF SALE UNLESS ALTERNATE TERMS ARE AGREED IN WRITING.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| RELINQUISHED BY: DAVID FOSTER | COMPANY: ARCADIS | DATE: 5/29/15 | TIME: 1115 | RECEIVED BY: | COMPANY: ETL | DATE: 5/29/15 | TIME: 11:15 |
| SAMPLED BY: | COMPANY: | DATE: | TIME: | RECEIVED BY: | COMPANY: | DATE: | TIME: |
| RELINQUISHED BY: | COMPANY: ETL | DATE: 5/29/15 | TIME: 1230 | RECEIVED BY: | COMPANY: ENV. | DATE: 5/29/15 | TIME: 12:30 |

COMMENTS ____

NYSDOH 10142 NJDEP NY015 CTDOPH PH-0554 EPA NY00049

# LOGIN SAMPLE RECEIPT CHECK LIST

Client: Arcadis US, Inc.

Job Number: 420-90859-1

**Login Number:** **90859**

| Question | T/F/NA | Comment |
|---|---|---|
| Samples were collected by ETL employee as per SOP-SAM-1 | NA | |
| The cooler's custody seal, if present, is intact. | NA | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is recorded. | True | 6.5 C |
| Cooler Temp. is within method specified range.(0-6 C PW, 0-8 C NPW, or BAC <10 C | True | |
| If false, was sample received on ice within 6 hours of collection. | True | |
| Based on above criteria cooler temperature is acceptable. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | True | |
| Samples are received within Holding Time. | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | NA | |
| If necessary, staff have been informed of any short hold time or quick TAT needs | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |

# APPENDIX E

## Gasoline Odor Investigation Photo Log

1

Photo filename (.jpg): CB1
Catch basin was dry but had sediment buildup. No odors, flow, or evidence of oil or gasoline present.

2

Photo filename (.jpg): CB2
Catch basin had some stagnant water; many gas mains are near the catch basin. No odors or evidence of gasoline or odor observed.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

ARCADIS Design & Consultancy for natural and built assets

**APPENDIX**
**E**

**3**

Photo filename (.jpg): CB3
Catch basin was dry. No odors or evidence of oil or gasoilne.

**4**

Photo filename (.jpg): Recent Water Main lateral work near CB3
Recent water main lateral work near CB3.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

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**APPENDIX**
**E**

**5**

Photo filename (.jpg): Recent work near Sanitary Manhole

**6**

Photo filename (.jpg): CB4
Catch basin was dry. No odors or evidence of oil or gasoline residue.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

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**E**

7

Photo filename (.jpg): CB4.1
Catch basin 4 close up view.

8

Photo filename (.jpg): Sanitary Manhole 1
No evidence of oil or gasoline. No odd smells. Recent construction activity in vicinity of manhole.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

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**APPENDIX**
**E**

**9**

Photo filename (.jpg): CB5
Catch basin had some flowing water and sediment in the bottom, but there were no odors. There was no evidence of oil or grease.

**10**

Photo filename (.jpg): CB5.1
Flowing water in catch basin.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

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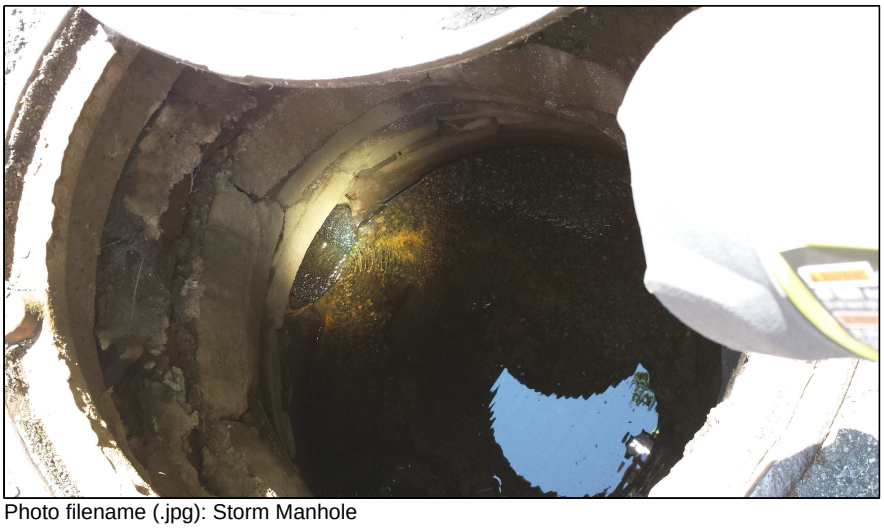
**APPENDIX**
**E**



**11**

Photo filename (.jpg): Storm Manhole
No odor and no evidence of oil, grease, or gasoline.

**12**

Photo filename (.jpg): CB6
Catch basin had some stagnant water and sediment and leaf buildup. No odors or evidence of oil or gasoline.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

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**E**

**13**

Photo filename (.jpg): CB7
Catch basin had flow, but no odors. No evidence or oil or gasoline.

**14**

Photo filename (.jpg): Outfall
Outfall was wet, but there were no signs of gasoline, oil or grease. It was very muddy and smelled like a swamp or marsh, but there were no abnormal smells.

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Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

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**07−16−2015**

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**APPENDIX**
**E**

**15**

Photo filename (.jpg): Outfall 2

**16**

Photo filename (.jpg): Vegetation near outfall
Vegetation prevented Arcadis staff from viewing water body.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

ARCADIS Design & Consultancy for natural and built assets

**APPENDIX**
**E**

**17**

Photo filename (.jpg): Wooded Area left of outfall
Vegetated area was investigated for evidence of oil dumping. Nothing was found.

**18**

Photo filename (.jpg): Wooded Area left of outfall 1
Vegetated area was investigated for evidence of oil dumping. Nothing was found.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

ARCADIS Design & Consultancy for natural and built assets

**APPENDIX**
**E**


**19**

Photo filename (.jpg): More recent Work (far)
Recent roadwork covered by metal plates.

Village of Mamaroneck
Mamaroneck, NY

**Illicit Discharge Detection and Elimination**

**Gasoline Odor Investigation**
**07−16−2015**

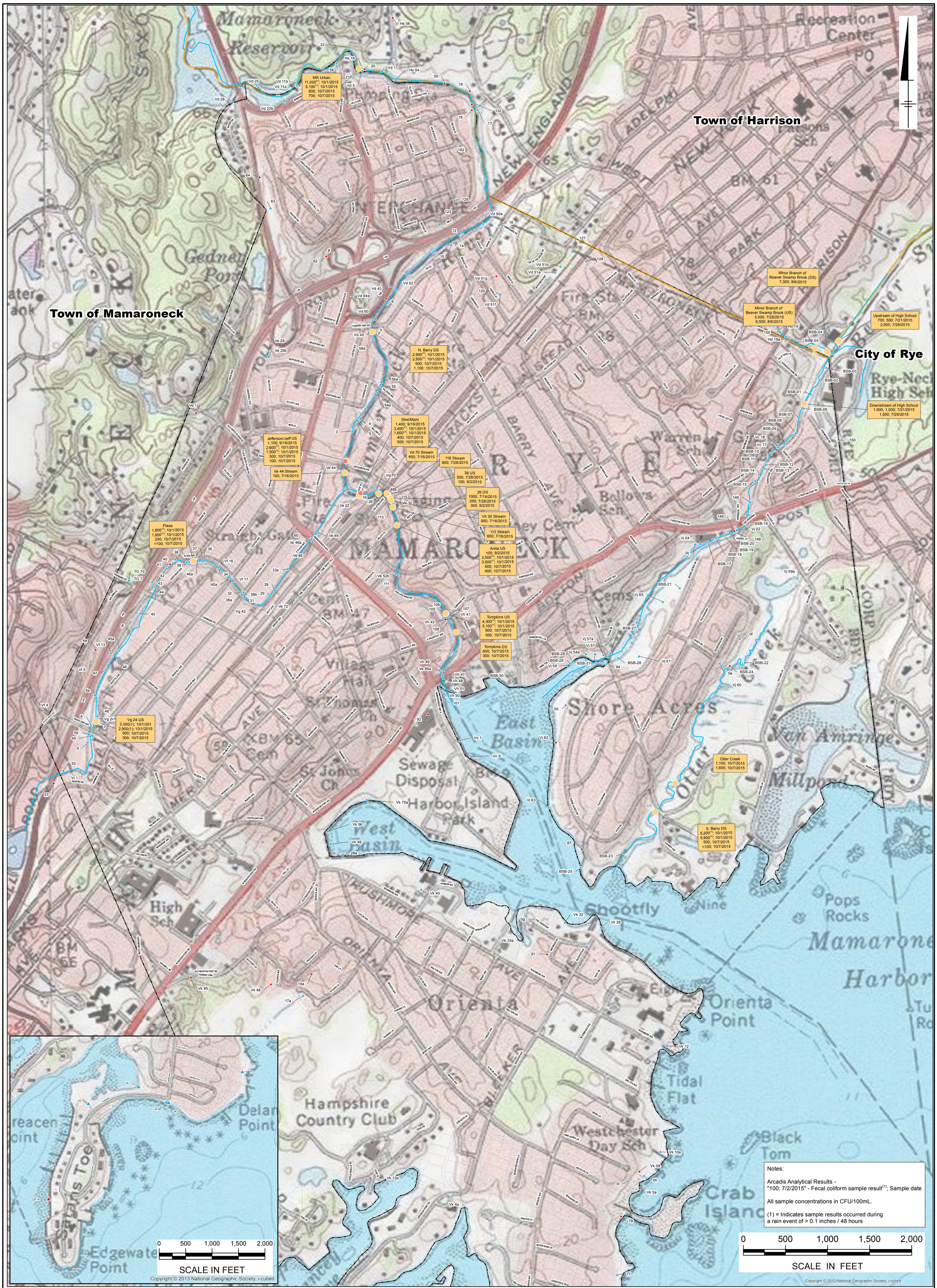
ARCADIS Design & Consultancy for natural and built assets

**APPENDIX**
**E**

# APPENDIX F

## River Sampling Results Map

CITY: CLIFTON PARK, NY DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH APM: TM:
PROJECT: VILLAGE OF MAMARONECK 2015 IDDE PATH: G:\GISMOD\01547034.0000\ArcadisRiverSampling2015.mxd




## Legend

**2015 Arcadis Stream Sampling Locations**

- Fecal Coliform Sample Locations
- DNA Sample Locations

**Stormwater Outfalls**

- Arcadis Inspected
- Record Outfalls
- Village of Mamaroneck Streams
- Municipal Boundary
- Village Boundary

VILLAGE OF MAMARONECK
MAMARONECK, NY

# RIVER SAMPLING RESULTS

ARCADIS Design & Consultancy for natural and built assets

APPENDIX
F

# APPENDIX G

## DNA Sampling Results

| Lab Name | Sample Name | Sample Date | Date Received | Sample Matrix | LIMS Identifier | Extraction Date | Analysis Date | Analysis Method | Parameter | Result | Result Qualifier | Units | Detection Limit | Report Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | DBACT | 4.1 | J | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | GenBac | 245 | = | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA1 | 3360 | = | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA2 | 5 | < | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | HF183 | 4.8 | < | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | Gull-CAT | 4.8 | < | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT1 | 0.9 | J | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-1 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT2 | 0.3 | J | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | DBACT | 3.4 | J | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | GenBac | 421 | = | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA1 | 1710 | = | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA2 | 5 | < | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | HF183 | 4.7 | < | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | Gull-CAT | 4.7 | < | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT1 | 0.3 | J | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Jefferson 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-2 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT2 | 0.3 | J | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | DBACT | 1.8 | J | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | GenBac | 276 | = | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA1 | 5 | < | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA2 | 37400 | = | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | HF183 | 4.7 | < | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | Gull-CAT | 4.7 | < | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT1 | 0.2 | J | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 1 | 9/16/2015 | 9/17/2015 | Water | 056MI-3 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT2 | 4.7 | < | gene copies/mL | 1.00E-01 | 4.70E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | DBACT | 3.8 | J | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | GenBac | 493 | = | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA1 | 908 | = | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | H-EPA2 | 9950 | = | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | HF183 | 4.8 | < | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | Gull-CAT | 4.8 | < | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT1 | 0.6 | J | gene copies/mL | 1.00E-01 | 4.80E+00 |
| MI | Shel/Mam 2 | 9/16/2015 | 9/17/2015 | Water | 056MI-4 | 9/18/2015 | 9/22/2015 | CENSUS | CG BACT2 | 4.8 | < | gene copies/mL | 1.00E-01 | 4.80E+00 |

Notes:

| | |
|---|---|
| GenBac | General Bacteroides |
| H-EPA1 | Human Bacteroides |
| H-EPA2 | Human Bacteroides |
| HF183 | Human Bacteroides |
| Gull-CAT | Sea Gull Bacteroides |
| CG BACT1 | Canadian Goose |
| CG BACT2 | Canadian Goose |
| DBACT | Dog Bacteroides |

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

**Client:** Kevin Hogan
Arcadis
855 Route 146
Suite 210
Clifton Park, NY 12065

**Phone:** 518-250-7306

**Fax:** 518-250-7301

**Identifier:** 056MI **Date Rec:** 09/17/2015 **Report Date:** 09/22/2015

**Client Project #:** 01547038.0000 **Client Project Name:** Village of Mamavoneck IDDE

**Purchase Order #:**

**Analysis Requested:** CENSUS

**Reviewed By:**

**MICROBIAL INSIGHTS, INC.**

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

**CENSUS**

**Client:** **Arcadis**
Project: Village of Mamavoneck IDDE

**MI Project Number:** **056MI**
Date Received: 09/17/2015

**Sample Information**

| **Client Sample ID:** | | **Jefferson 1** | **Jefferson 2** | **Shel/Mam 1** | **Shel/Mam 2** |
|---|---|---|---|---|---|
| Sample Date: | | 09/16/2015 | 09/16/2015 | 09/16/2015 | 09/16/2015 |
| Units: | | gene copies/mL | gene copies/mL | gene copies/mL | gene copies/mL |
| Analyst: | | JS | JS | JS | JS |
| **Phylogenetic Group** | | | | | |
| Canada Goose Bacteroidetes | CG BACT1 | **9.00E-01 (J)** | **3.00E-01 (J)** | **2.00E-01 (J)** | **6.00E-01 (J)** |
| Canada Goose Bacteroidetes | CG BACT2 | **3.00E-01 (J)** | **3.00E-01 (J)** | <4.70E+00 | <4.80E+00 |
| General Bacteroidetes | GenBac | **2.45E+02** | **4.21E+02** | **2.76E+02** | **4.93E+02** |
| Human Associated Bacteroidetes | H-EPA1 | **3.36E+03** | **1.71E+03** | <4.70E+00 | **9.08E+02** |
| Human Associated Bacteroidetes | H-EPA2 | <4.80E+00 | <4.70E+00 | **3.74E+04** | **9.95E+03** |
| Dog Bacteriodetes | DBACT | **4.10E+00 (J)** | **3.40E+00 (J)** | **1.80E+00 (J)** | **3.80E+00 (J)** |
| Human Associated Bacteroidetes | HF183 | <4.80E+00 | <4.70E+00 | <4.70E+00 | <4.80E+00 |
| Gull (Catellicoccus sp.) | Gull-CAT | <4.80E+00 | <4.70E+00 | <4.70E+00 | <4.80E+00 |

**Legend:**
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

# APPENDIX H

## Grouting Pilot - CCTV Inspection Logs and Videos on CD

**CCTV Inspection and Lateral Grouting**
**Rushmore Avenue**
**Mamaroneck, NY**
**September 2015**

**FOR:**

**Village of Mamaroneck**
**123 Mamaroneck Avenue**
**Mamaroneck, NY 10543**


Sewer System Maintenance
Rehabilitation Programs
C.C.T.V. Inspection
Flow Reduction Programs
System Surveys
Hydraulic Flow Studies
Trenchless Rehabilitation

Phone (860) 274-5469
Fax (860) 945-3219

**PRD North Division**
**HEITKAMP, Inc.**
99 CALLENDER ROAD
P.O. BOX 730
WATERTOWN CT 06795-0730


PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Project Summary

## MAMARONECK NY TK-428

| Main ID | Date | Address | Start MH | Finish MH | Pipe | Asset length | Surveyed Length |
|---|---|---|---|---|---|---|---|
| MAMARONECK-1 | 9/21/2015 | RUSHMORE AVE - LSS | 65982 | 65981 | ZZZ | | 245.0 |
| MAMARONECK-2 | 9/21/2015 | RUSHMORE AVE - LSS | 65773 | 65772 | ZZZ | 251.0 | 251.0 |
| MAMARONECK-3 | 9/21/2015 | RUSHMORE AVE - LSS | 65772 | 65771 | ZZZ | 214.0 | 214.0 |
| MAMARONECK4 | 9/21/2015 | RUCHMORE AVE - LSS | 65771 | 65770 | ZZZ | 203.0 | 203.0 |
| MAMARONECK-5 | 9/22/2015 | RUSHMORE AVE - LSS | 65769 | 65762 | ZZZ | 348.0 | 348.0 |
| MAMARONECK-6 | 9/22/2015 | RUSHMORE AVE - LSS | 65980 | 65759 | ZZZ | 264.0 | 264.0 |
| MAMARONECK-7 | 9/22/2015 | RUSHMORE AVE - LSS | 65835 | 65834 | CAS | 166.0 | 166.0 |
| MAMARONECK-8 | 9/22/2015 | RUSHMORE AVE - LSS | 65762 | 65761 | ZZZ | | 351.0 |
| MAMARONECK-10 | 9/23/2015 | RUSHMORE AVE - TV | 65829 | 65828 | CAS | 70.0 | 70.0 |

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99 Callender Road
Watertown, CT 06795
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Fax: (860) 945.3219

| Main ID | Date | Address | Start MH | Finish MH | Pipe | Asset length | Surveyed Length |
|---|---|---|---|---|---|---|---|
| MAMARONECK-11 | 9/23/2015 | RUSHMORE AVE - TV | 65828 | 65826 | CAS | 186.0 | 186.0 |
| MAMARONECK-12 | 9/23/2015 | RUSHMORE AVE - TV | 65826 | 65825 | CAS | 150.0 | 149.0 |
| MAMARONECK-13 | 9/23/2015 | RUSHMORE AVE - TV | 65825 | 65801 | CAS | 209.0 | 209.0 |
| MAMARONECK-9 | 9/23/2015 | RUSHMORE AVE - TV | 65834 | 65829 | CAS | 170.0 | 170.0 |
| Number of inspections: 13 | | | | | **Subtotal** | **2,231.0 ft** | **2,826.0 ft** |
| | | | | | **Total** | **2,231.0 ft** | **2,826.0 ft** |

PRD North Division Heitkamp, Inc.
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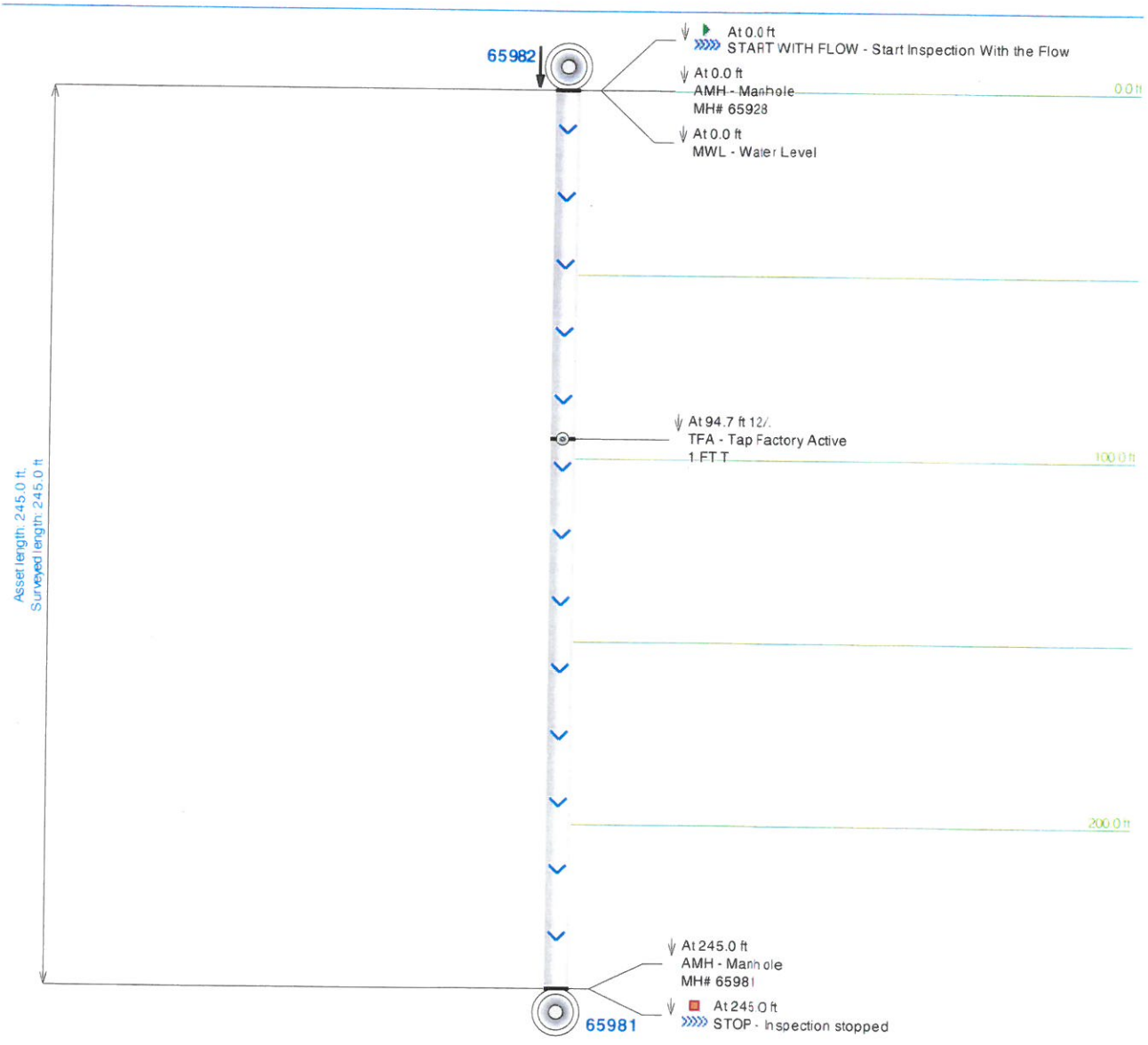
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-1 | MAMARONECK TK-428 | RUSHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/21/2015 | | 10 | ZZZ | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 245.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-1
Start date/time: 2015/09/21 08:48
Street: RUSHMORE AVE - LSS
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65982
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65981
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 10

Width:
Shape: C
Material: ZZZ
Ln. method: CP
Pipe joint length:
Total length: 245.0
Length surveyed: 245.0
Year laid:
Year renewed:
Media label:

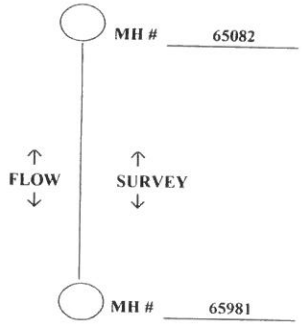
Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | 2nd | % | Joint | Circumferential Location At/From | to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 13 | AMH | | | | | | | | | | MH# 65928 |
| 0.0 | 26 | MWL | | | | | 5 | | | | | |
| 94.7 | 1122 | TFA | | | 6 | | | | 12 | | | 1 FT T |
| 245.0 | 1539 | AMH | | | | | | | | | | MH# 65981 |

# NEW ENGLAND PIPE CLEANING COMPANY DIVISION HEITKAMP, INC.

## HOUSE CONNECTION AIR TEST AND SEALING REPORT




CLIENT: MAMARONECK NY LOCATION: RUSHMORE AVE AREA:

JOB NUMBER: DATE: 9/21/2015 WEATHER:

TAPE NUMBER: VTR INDEX: INSPECTOR

PIPE TYPE: LINED SECTION LENGTH: PIPE DIAMETER 10" JOINT SPACING:

GROUT TYPE: AV-100 GROUT GEL TIME: FOREMAN: J. PEROTTI

| HOUSE CONNECTION LOCATION AND TYPE | | | | | | LEAKAGE (GPM) | HOUSE CONNECTION PROBLEMS | | | AIR TEST RESULTS | | | | CHEMICAL GROUT USAGE | | POST SEALING AIR TEST | | | | BLOCKAGE AIR TEST | | | | FLUSH TEST | | COMP-LETED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #HC INLINE | HOUSE # | DISTANCE (FT) | FROM MH# | HC TYPE | HC SIZE | RATE (GPM) | PROTRUDING TAP (IN) | ROOTS | OTHER | START | END | LOSS | TIME OF TEST (SECONDS) | STROKES | GALLONS | START | END | LOSS | TIME OF TEST IN SECONDS | START | END | LOSS | TIME OF TEST IN SECONDS | CONNECTION CLEAR | NOT AT HOME | AIR TESTED | SEALED |
| | 1 FT T | 95 | Y | F | 4 | NO TEST | N | N | N | 0 | 0 | - | 30 | - | | 6.0 | 6.0 | - | 30 | - | - | - | - | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

TOTALS: NUMBER OF SERVICES IN LINE: TOTAL AIR TESTS: 1 GALLONS: 0 # OF SEALS: 1

NUMBER OF SERVICES TESTED AND SEALED: 1 # OF SOCKS USED:

HOUSE CONNECTION ABBREVIATIONS: B BREAK IN F FACTORY

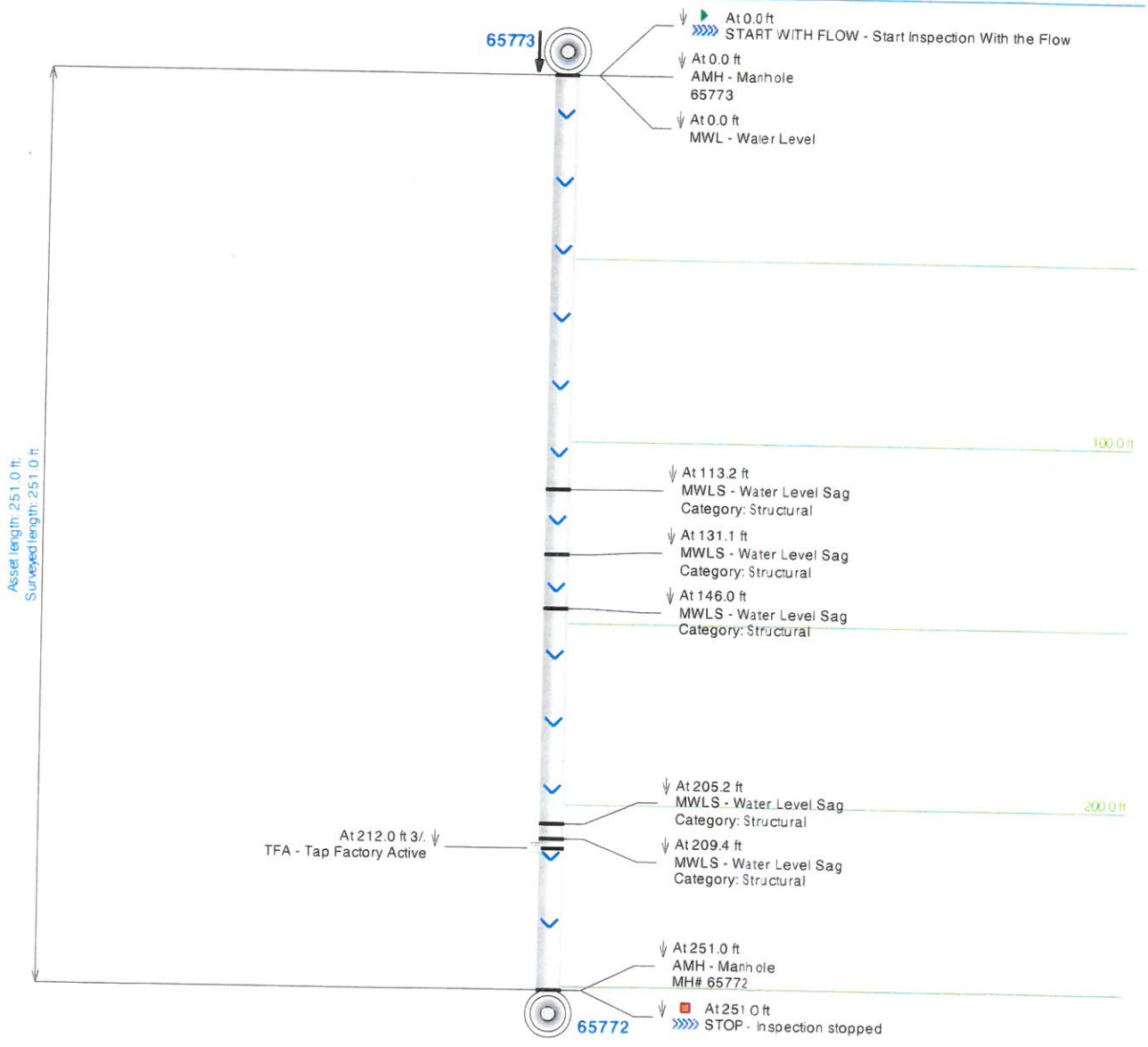
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-2 | MAMARONECK TK-428 | RUSHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/21/2015 | | 10 | ZZZ | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 251.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

HEITKAMP AN SPR COMPANY

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-2
Start date/time: 2015/09/21 10:05
Street: RUSHMORE AVE - LSS
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65773
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65772
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 10

Width:
Shape: C
Material: ZZZ
Ln. method: CP
Pipe joint length:
Total length: 251.0
Length surveyed: 251.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 2 | AMH | | | | | | | | | | 65773 |
| 0.0 | 45 | MWL | | | | | 10 | | | | | |
| 113.2 | 374 | MWL S | | | | | 30 | | | | | |
| 131.1 | 446 | MWL S | | | | | 35 | | | | | |
| 146.0 | 507 | MWL S | | | | | 50 | | | | | |
| 205.2 | 650 | MWL S | | | | | 50 | | | | | |
| 209.4 | 727 | MWL S | | | | | 80 | | | | | |
| 212.0 | 1205 | TFA | | | 6 | | | | 3 | | | |

PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

Surveyed by: J.PEROTTI

Owner:

Start date/time: 2015/09/21

Upstream manhole No: 65773

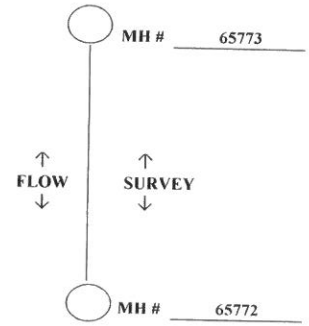
Pipeline segment ref: MAMARONECK-2

Sheet number:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Severity | Continuous Defect | S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 251.0 | 1394 | AMH | | | | | | | | | | | MH# 65772 |

# NEW ENGLAND PIPE CLEANING COMPANY DIVISION HEITKAMP, INC.

## HOUSE CONNECTION AIR TEST AND SEALING REPORT




CLIENT: MAMARONECK NY LOCATION: RUSHMORE AVE AREA:

JOB NUMBER: DATE: 9/21/2015 WEATHER:

TAPE NUMBER: VTR INDEX: INSPECTOR

PIPE TYPE: LINED SECTION LENGTH: PIPE DIAMETER 10" JOINT SPACING:

GROUT TYPE: AV-100 GROUT GEL TIME: FOREMAN: J. PEROTTI

| HOUSE CONNECTION LOCATION AND TYPE | | | | | | LEAKAGE (GPM) | HOUSE CONNECTION PROBLEMS | | | AIR TEST RESULTS | | | | CHEMICAL GROUT USAGE | | POST SEALING AIR TEST | | | | BLOCKAGE AIR TEST | | | | FLUSH TEST | | COMP-LETED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #HC INLINE | HOUSE # | DISTANCE (FT) | FROM MH# 65773 | HC TYPE | HC SIZE | RATE (GPM) | PROTRUDING TAP (IN) | ROOTS | OTHER | START | END | LOSS | TIME OF TEST (SECONDS) | STROKES | GALLONS | START | END | LOSS | TIME OF TEST IN SECONDS | START | END | LOSS | TIME OF TEST IN SECONDS | CONNECTION CLEAR | NOT AT HOME | AIR TESTED | SEALED |
| | | 212 | Y | F | 6 | N | N | N | N | 0 | 0 | - | 30 | - | 3.5 | 6.0 | 6.0 | - | 30 | - | - | - | - | Y | Y | Y | Y |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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TOTALS: NUMBER OF SERVICES IN LINE: TOTAL AIR TESTS: 1 GALLONS: 3.5 # OF SEALS: 1

NUMBER OF SERVICES TESTED AND SEALED: 1 # OF SOCKS USED:

HOUSE CONNECTION ABBREVIATIONS: B BREAK IN F FACTORY

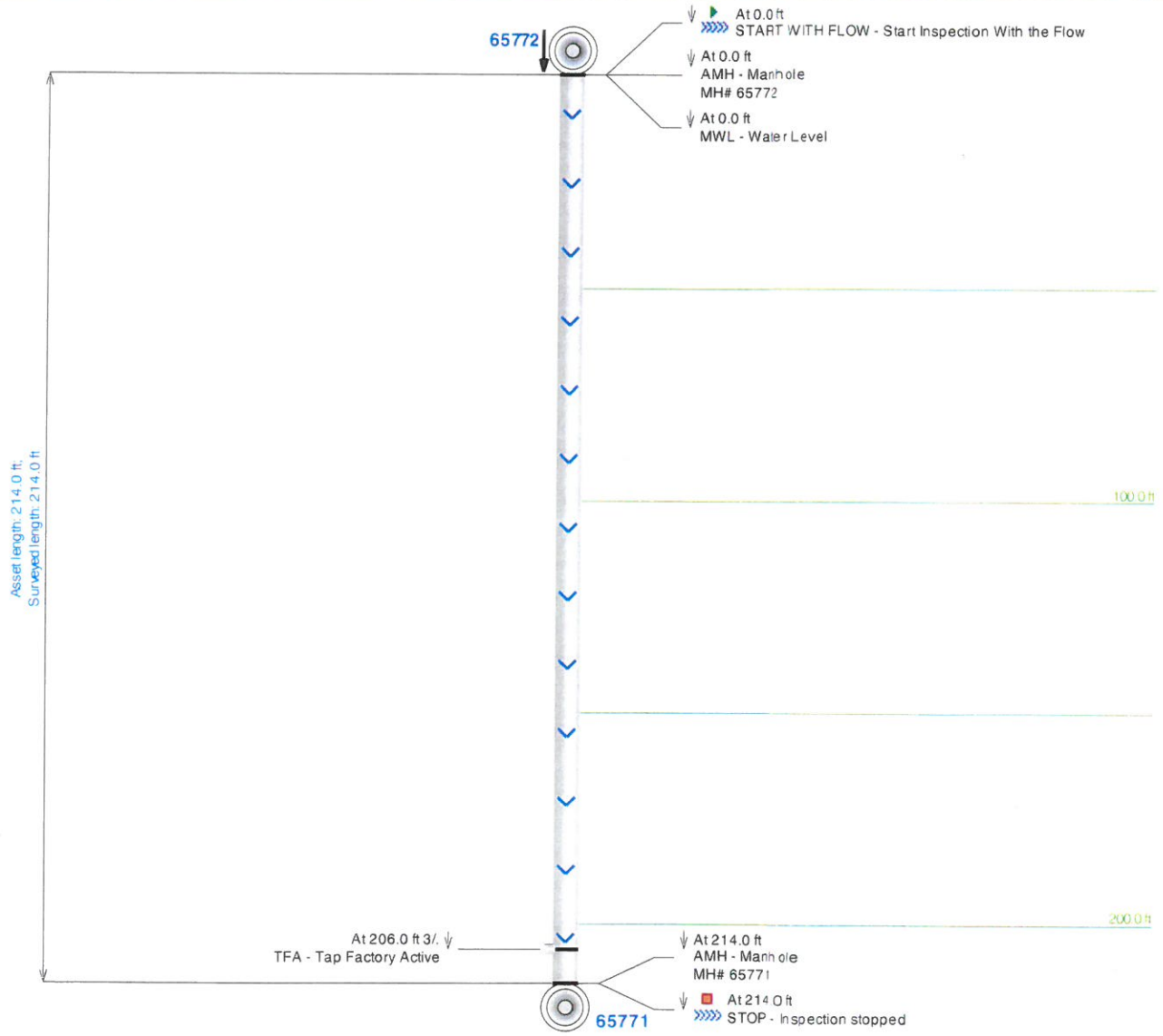
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-3 | MAMARONECK TK-428 | RUSHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/21/2015 | | 10 | ZZZ | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 214.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-3
Start date/time: 2015/09/21 14:01
Street: RUSHMORE AVE - LSS
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65772
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65771
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 10

Width:
Shape: C
Material: ZZZ
Ln. method: CP
Pipe joint length:
Total length: 214.0
Length surveyed: 214.0
Year laid:
Year renewed:
Media label:

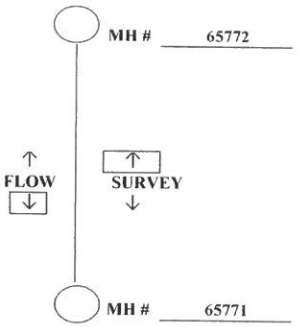
Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | 2nd | % | Joint | Circumferential Location At/From | to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 11 | AMH | | | | | | | | | | MH# 65772 |
| 0.0 | 24 | MWL | | | | | 5 | | | | | |
| 206.0 | 1253 | TFA | | | 6 | | | | 3 | | | |
| 214.0 | 1393 | AMH | | | | | | | | | | MH# 65771 |

# NEW ENGLAND PIPE CLEANING COMPANY DIVISION HEITKAMP, INC.

## HOUSE CONNECTION AIR TEST AND SEALING REPORT




CLIENT: MAMARONECK NY LOCATION: RUSHMORE AVE AREA:

JOB NUMBER: DATE: 9/21/2015 WEATHER:

TAPE NUMBER: VTR INDEX: INSPECTOR

PIPE TYPE: LINED SECTION LENGTH: PIPE DIAMETER 8" JOINT SPACING:

GROUT TYPE: AV-100 GROUT GEL TIME: FOREMAN: J. PEROTTI

| HOUSE CONNECTION LOCATION AND TYPE | | | | | | LEAKAGE (GPM) | HOUSE CONNECTION PROBLEMS | | | AIR TEST RESULTS | | | | CHEMICAL GROUT USAGE | | POST SEALING AIR TEST | | | | BLOCKAGE AIR TEST | | | | FLUSH TEST | | COMP-LETED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #HC INLINE | HOUSE # | DISTANCE (FT) | FROM MH# 65771 | HC TYPE | HC SIZE | RATE (GPM) | PROTRUDING TAP (IN) | ROOTS | OTHER | START | END | LOSS | TIME OF TEST (SECONDS) | STROKES | GALLONS | START | END | LOSS | TIME OF TEST IN SECONDS | START | END | LOSS | TIME OF TEST IN SECONDS | CONNECTION CLEAR | NOT AT HOME | AIR TESTED | SEALED |
| | | 8 | Y | F | 4 | N | N | N | N | 0 | 0 | - | 30 | - | 5 | 6.0 | 6.0 | - | 30 | - | - | - | - | Y | Y | Y | Y |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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TOTALS: NUMBER OF SERVICES IN LINE: TOTAL AIR TESTS: 1 GALLONS: 5 # OF SEALS: 1

NUMBER OF SERVICES TESTED AND SEALED: 1 # OF SOCKS USED:

HOUSE CONNECTION ABBREVIATIONS: B BREAK IN F FACTORY

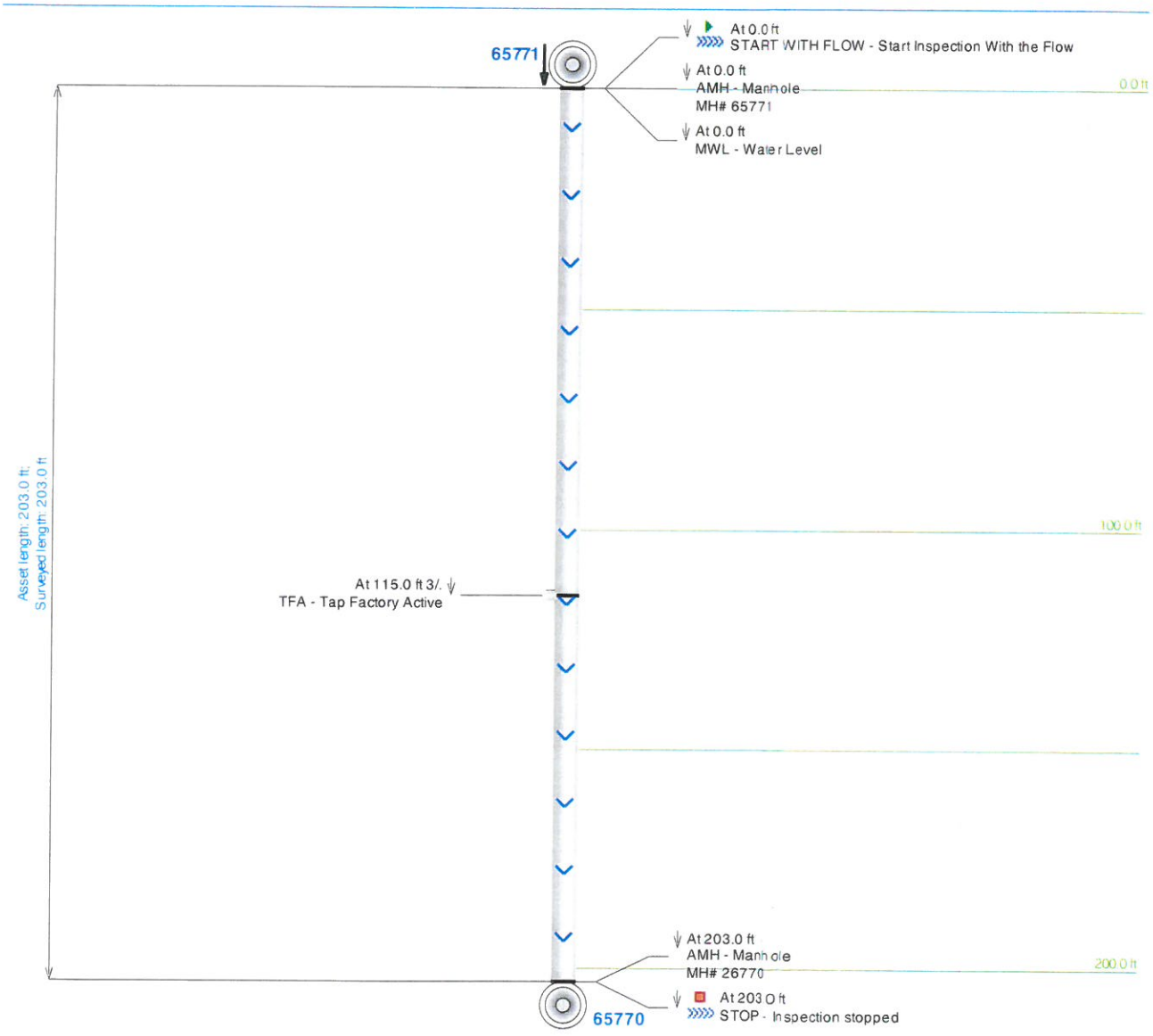
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK4 | MAMARONECK TK-428 | RUCHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/21/2015 | | 10 | ZZZ | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 203.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

HEITKAMP
AN SPR COMPANY

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK4
Start date/time: 2015/09/21 15:41
Street: RUCHMORE AVE - LSS
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65771
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65770
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 10

Width:
Shape: C
Material: ZZZ
Ln. method: CP
Pipe joint length:
Total length: 203.0
Length surveyed: 203.0
Year laid:
Year renewed:
Media label:

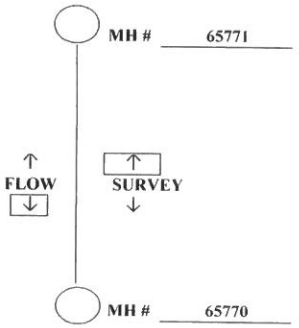
Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | 2nd | % | Joint | Circumferential Location At/From | to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 12 | AMH | | | | | | | | | | MH# 65771 |
| 0.0 | 21 | MWL | | | | | 5 | | | | | |
| 115.0 | 462 | TFA | | | 6 | | | | 3 | | | |
| 203.0 | 801 | AMH | | | | | | | | | | MH# 26770 |

# NEW ENGLAND PIPE CLEANING COMPANY DIVISION HEITKAMP, INC.

## HOUSE CONNECTION AIR TEST AND SEALING REPORT




CLIENT: MAMARONECK NY LOCATION: RUSHMORE AVE AREA:

JOB NUMBER: DATE: 9/21/2015 WEATHER:

TAPE NUMBER: VTR INDEX: INSPECTOR

PIPE TYPE: LINED SECTION LENGTH: PIPE DIAMETER 10" JOINT SPACING:

GROUT TYPE: AV-100 GROUT GEL TIME: FOREMAN: J. PEROTTI

PACKER WOULDN'T FIT

| HOUSE CONNECTION LOCATION AND TYPE | | | | | | LEAKAGE (GPM) | HOUSE CONNECTION PROBLEMS | | | AIR TEST RESULTS | | | | CHEMICAL GROUT USAGE | | POST SEALING AIR TEST | | | | BLOCKAGE AIR TEST | | | | FLUSH TEST | | COMP-LETED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #HC INLINE | HOUSE # | DISTANCE (FT) | FROM MH# 65770 | HC TYPE | HC SIZE | RATE (GPM) | PROTRUDING TAP (IN) | ROOTS | OTHER | START | END | LOSS | TIME OF TEST (SECONDS) | STROKES | GALLONS | START | END | LOSS | TIME OF TEST IN SECONDS | START | END | LOSS | TIME OF TEST IN SECONDS | CONNECTION CLEAR | NOT AT HOME | AIR TESTED | SEALED |
| | | 88 | Y | F | 6 | NO TEST | N | N | N | | | | | | | | | | | | | | | | | | |
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TOTALS: NUMBER OF SERVICES IN LINE: TOTAL AIR TESTS: 0 GALLONS: 0 # OF SEALS: 0

NUMBER OF SERVICES TESTED AND SEALED: 0 # OF SOCKS USED:

HOUSE CONNECTION ABBREVIATIONS: B BREAK IN F FACTORY

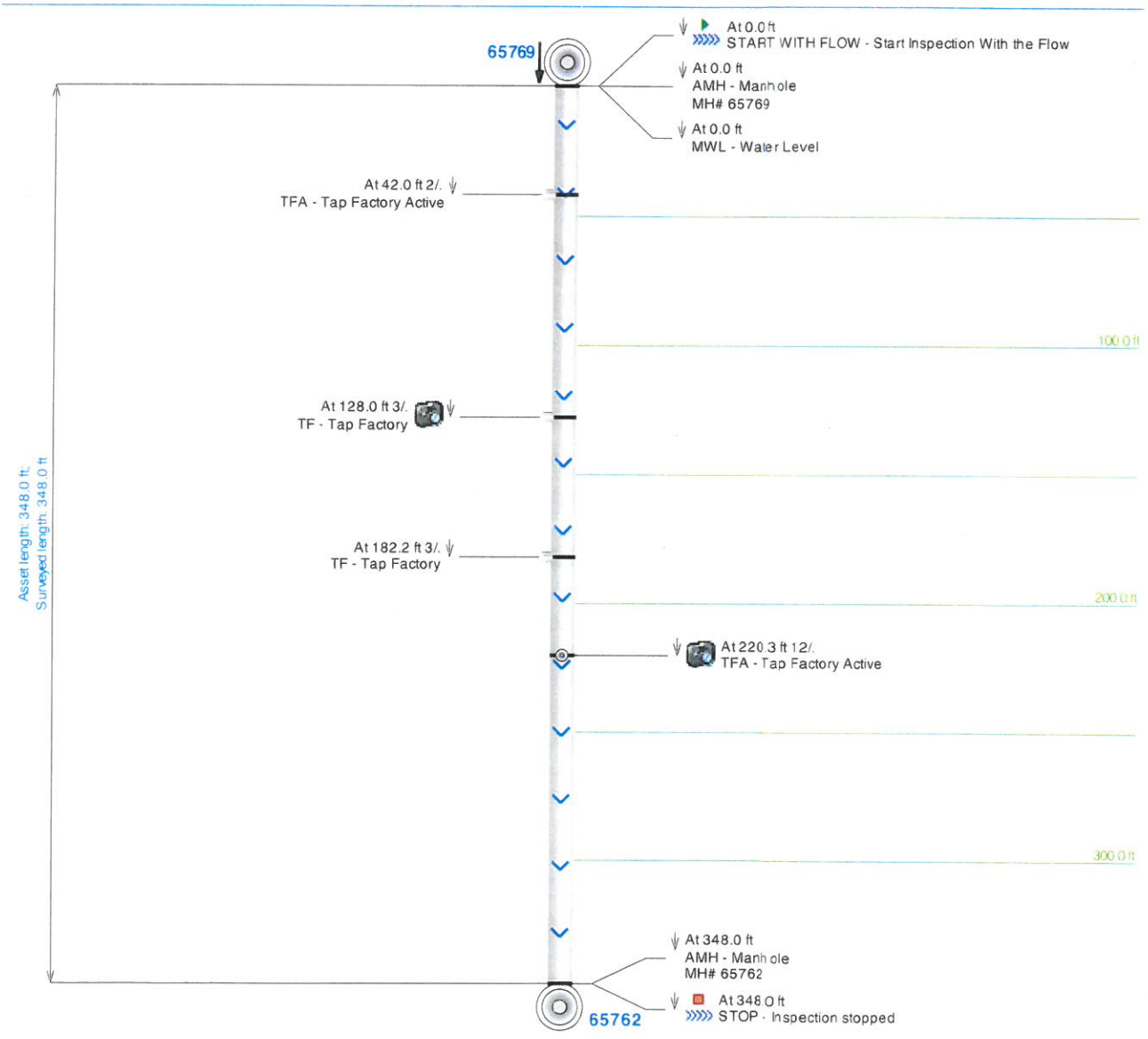
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-5 | MAMARONECK TK-428 | RUSHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/22/2015 | | 10 | ZZZ | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 348.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-5
Start date/time: 2015/09/22 07:56
Street: RUSHMORE AVE - LSS
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65769
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65762
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 10

Width:
Shape: C
Material: ZZZ
Ln. method:
Pipe joint length:
Total length: 348.0
Length surveyed: 348.0
Year laid:
Year renewed:
Media label:

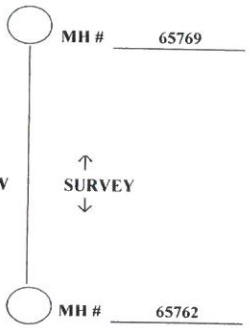
Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | 2nd | % | Joint | Circumferential Location At/From | to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 11 | AMH | | | | | | | | | | MH# 65769 |
| 0.0 | 25 | MWL | | | | | 5 | | | | | |
| 42.0 | 1109 | TFA | | | 6 | | | | 2 | | | |
| 128.0 | 1480 | TF | | | 6 | | | | 3 | | MAMARONECK NY TK-428-65769-65762 TF at 128.0 ft (D).jpg | |
| 182.2 | 1640 | TF | | | 6 | | | | 3 | | | |
| 220.3 | 1752 | TFA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65769-65762 TFA at 220.3 ft (D).jpg | |
| 348.0 | 2212 | AMH | | | | | | | | | | MH# 65762 |

# NEW ENGLAND PIPE CLEANING COMPANY DIVISION HEITKAMP, INC.

## HOUSE CONNECTION AIR TEST AND SEALING REPORT




CLIENT: MAMARONECK NY LOCATION: RUSHMORE AVE AREA:

JOB NUMBER: DATE: 9/22/2015 WEATHER:

TAPE NUMBER: VTR INDEX: INSPECTOR

PIPE TYPE: LINED SECTION LENGTH: PIPE DIAMETER 10" JOINT SPACING:

GROUT TYPE: AV-100 GROUT GEL TIME: FOREMAN: J. PEROTTI

PACKER WOULDN'T FIT

| HOUSE CONNECTION LOCATION AND TYPE | | | | | | LEAKAGE (GPM) | HOUSE CONNECTION PROBLEMS | | | AIR TEST RESULTS | | | | CHEMICAL GROUT USAGE | | POST SEALING AIR TEST | | | | BLOCKAGE AIR TEST | | | | FLUSH TEST | | COMP-LETED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #HC INLINE | HOUSE # | DISTANCE (FT) | FROM MH# 65769 | HC TYPE | HC SIZE | RATE (GPM) | PROTRUDING TAP (IN) | ROOTS | OTHER | START | END | LOSS | TIME OF TEST (SECONDS) | STROKES | GALLONS | START | END | LOSS | TIME OF TEST IN SECONDS | START | END | LOSS | TIME OF TEST IN SECONDS | CONNECTION CLEAR | NOT AT HOME | AIR TESTED | SEALED |
| | | 42 | Y | F | 6 | NO TEST | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 128 | Y | F | 6 | NO TEST | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 180 | Y | F | 6 | NO TEST | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 220 | Y | F | 6 | NO TEST | N | N | N | | | | | | | | | | | | | | | | | | |
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TOTALS: NUMBER OF SERVICES IN LINE: TOTAL AIR TESTS: 0 GALLONS: 0 # OF SEALS: 0

NUMBER OF SERVICES TESTED AND SEALED: 0 # OF SOCKS USED:

HOUSE CONNECTION ABBREVIATIONS: B BREAK IN F FACTORY

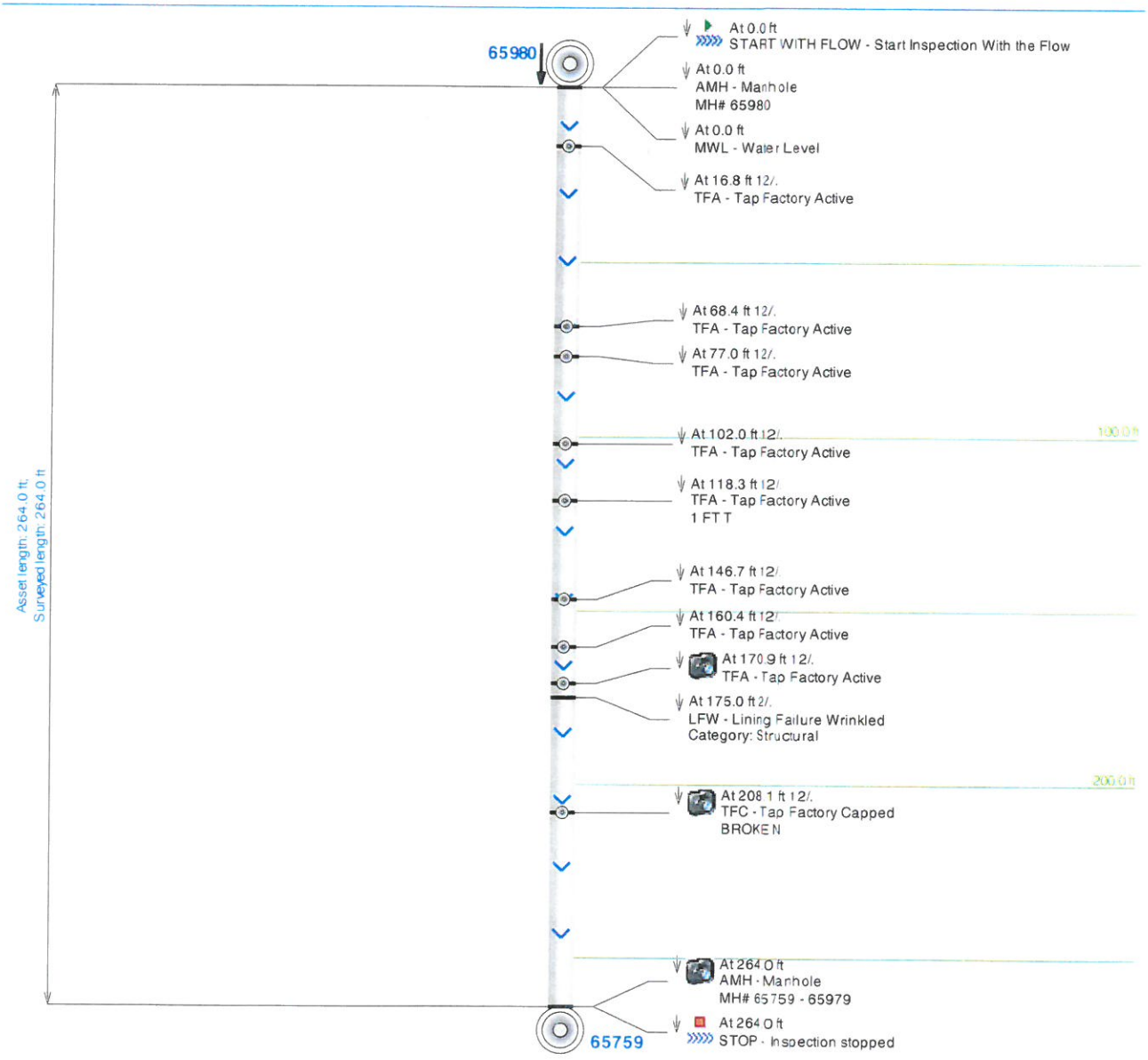
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-6 | MAMARONECK TK-428 | RUSHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/22/2015 | | 10 | ZZZ | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 264.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

HEITKAMP
AN SPR COMPANY

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-6
Start date/time: 2015/09/22 09:46
Street: RUSHMORE AVE - LSS
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65980
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65759
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 10

Width:
Shape: C
Material: ZZZ
Ln. method:
Pipe joint length:
Total length: 264.0
Length surveyed: 264.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | 2nd | % | Joint | Circumferential Location At/From | to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | AMH | | | | | | | | | | MH# 65980 |
| 0.0 | 39 | MWL | | | | | 5 | | | | | |
| 16.8 | 178 | TFA | | | 6 | | | | 12 | | | |
| 68.4 | 299 | TFA | | | 6 | | | | 12 | | | |
| 77.0 | 728 | TFA | | | 6 | | | | 12 | | | |
| 102.0 | 458 | TFA | | | 6 | | | | 12 | | | |
| 118.3 | 995 | TFA | | | 6 | | | | 12 | | | 1 FT T |
| 146.7 | 1107 | TFA | | | 6 | | | | 12 | | | |
| 160.4 | 1194 | TFA | | | 6 | | | | 12 | | | |

PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

Surveyed by: J.PEROTTI

Owner:

Start date/time: 2015/09/22

Upstream manhole No: 65980

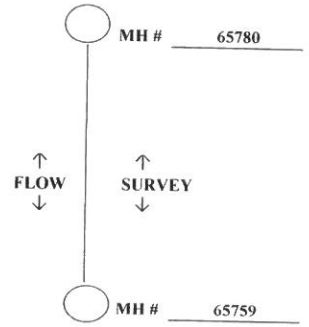
Pipeline segment ref: MAMARONECK-6

Sheet number:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Severity | Continuous Defect | S/M/L | Value Inches (mm) 1st | 2nd | % | Joint | Circumferential Location At/From | to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 170.9 | 1275 | TFA | | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65980-65759 TFA at 170.9 ft (D).jpg | |
| 175.0 | 1360 | LFW | | | | | | | | 2 | | | |
| 208.1 | 1494 | TFC | | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65980-65759 TFC at 208.1 ft (D).jpg | BROKEN |
| 264.0 | 1997 | AMH | | | | | | | | | | MAMARONECK NY TK-428-65980-65759 AMH at 264.0 ft (D).jpg | MH# 65759 - 65979 |

# NEW ENGLAND PIPE CLEANING COMPANY DIVISION HEITKAMP, INC.

## HOUSE CONNECTION AIR TEST AND SEALING REPORT




CLIENT: MAMARONECK AVE LOCATION: RUSHMORE AVE AREA:

JOB NUMBER: DATE: 9/22/2015 WEATHER:

TAPE NUMBER: VTR INDEX: INSPECTOR

PIPE TYPE: LINED SECTION LENGTH: PIPE DIAMETER 10" JOINT SPACING:

GROUT TYPE: AV-100 GROUT GEL TIME: FOREMAN: J. PEROTTI

PACKER WOULDN'T FIT TO DO REST OF LSS

| HOUSE CONNECTION LOCATION AND TYPE | | | | | | LEAKAGE (GPM) | HOUSE CONNECTION PROBLEMS | | | AIR TEST RESULTS | | | | CHEMICAL GROUT USAGE | | POST SEALING AIR TEST | | | | BLOCKAGE AIR TEST | | | | FLUSH TEST | | COMP-LETED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #HC INLINE | HOUSE # | DISTANCE (FT) | FROM MH# 65780 | HC TYPE | HC SIZE | RATE (GPM) | PROTRUDING TAP (IN) | ROOTS | OTHER | START | END | LOSS | TIME OF TEST (SECONDS) | STROKES | GALLONS | START | END | LOSS | TIME OF TEST IN SECONDS | START | END | LOSS | TIME OF TEST IN SECONDS | CONNECTION CLEAR | NOT AT HOME | AIR TESTED | SEALED |
| | WRINKLE | 17 | Y | F | 6 | N | N | N | N | 0 | 0 | - | 30 | - | 5 | 6.0 | 6.0 | - | 30 | - | - | - | - | Y | Y | Y | Y |
| | | 68 | Y | F | 6 | N | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 77 | Y | F | 6 | N | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 102 | Y | F | 6 | N | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 120 | Y | F | 6 | NO TEST | | | | | | | | | | | | | | | | | | | | | |
| | | 160 | Y | F | 6 | N | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 170 | Y | F | 6 | N | N | N | N | | | | | | | | | | | | | | | | | | |
| | | 208 | Y | F | 6 | NO TEST | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

TOTALS: NUMBER OF SERVICES IN LINE: TOTAL AIR TESTS: 1 GALLONS: 5 # OF SEALS: 1

NUMBER OF SERVICES TESTED AND SEALED: 1 # OF SOCKS USED:

HOUSE CONNECTION ABBREVIATIONS: B BREAK IN F FACTORY

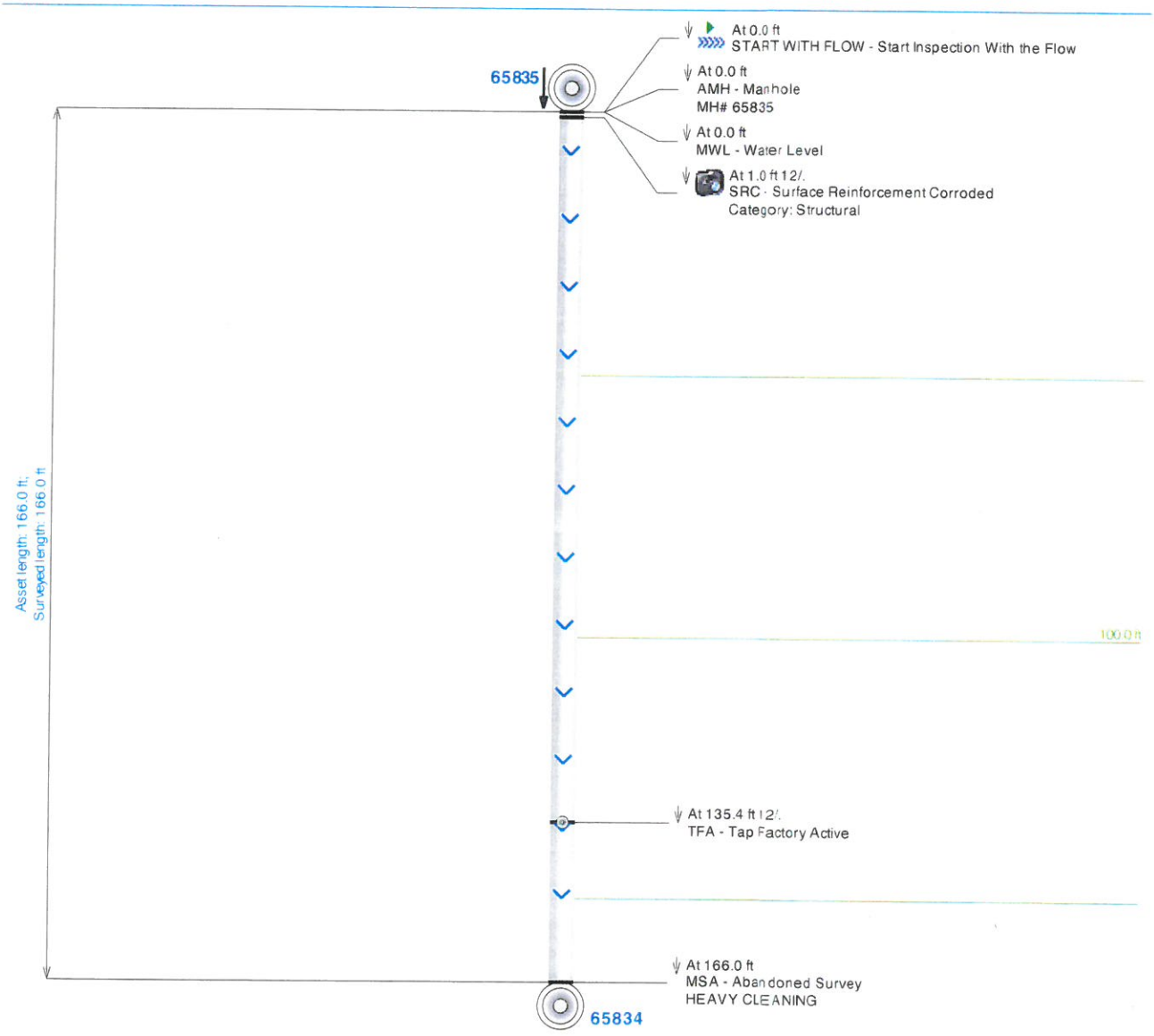
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-7 | MAMARONECK TK-428 | RUSHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/22/2015 | | 16 | CAS | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 166.0 | J.PEROTTI | |



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Watertown, CT 06795
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Fax: (860) 945.3219

HEITKAMP
AN SPR COMPANY

# PACP Sewer Report

| Surveyed by: | Certificate No: | Owner: | Survey Customer: | Drainage area: | Sheet number: |
|---|---|---|---|---|---|
| J.PEROTTI | U-1107-6007 | | | | |

| Work order: | Pipeline segment ref: | Start date/time: | | Street: | City: |
|---|---|---|---|---|---|
| | MAMARONECK-7 | 2015/09/22 | 13:32 | RUSHMORE AVE - LSS | MAMARONECK TK-428 |

| Location details: | Upstream manhole No: | Rim to invert: | Grade to invert: | Rim to grade: |
|---|---|---|---|---|
| | 65835 | | | |

| Downstream manhole No: | Rim to invert: | Grade to invert: | Rim to grade: | Sewer use: | Direction: | Flow control: | Height: |
|---|---|---|---|---|---|---|---|
| 65834 | | | | | D | | 16 |

| Width: | Shape: | Material: | Ln. method: | Pipe joint length: | Total length: | Length surveyed: | Year laid: | Year renewed: | Media label: |
|---|---|---|---|---|---|---|---|---|---|
| | C | CAS | | | 166.0 | 166.0 | | | |

| Purpose: | Sewer category: | Pre-cleaning | Date cleaned: | Weather: | Location code: | Additional info: |
|---|---|---|---|---|---|---|
| | | J | | | | |

**Starting access point:**

| Easting: | Northing: | Elevation: | Coordinate system: | GPS accuracy: |
|---|---|---|---|---|
| | | | | |

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 1 | AMH | | | | | | | | | | MH# 65835 |
| 0.0 | 29 | MWL | | | | | 5 | | | | | |
| 1.0 | 396 | SRC | | | | | | | 12 | | MAMARONECK NY TK-428-65835-65834 SRC at 10.1 ft (D).jpg | |
| 135.4 | 803 | TFA | | | 6 | | | | 12 | | | |
| 166.0 | 868 | MSA | | | | | | | | | | HEAVY CLEANING |

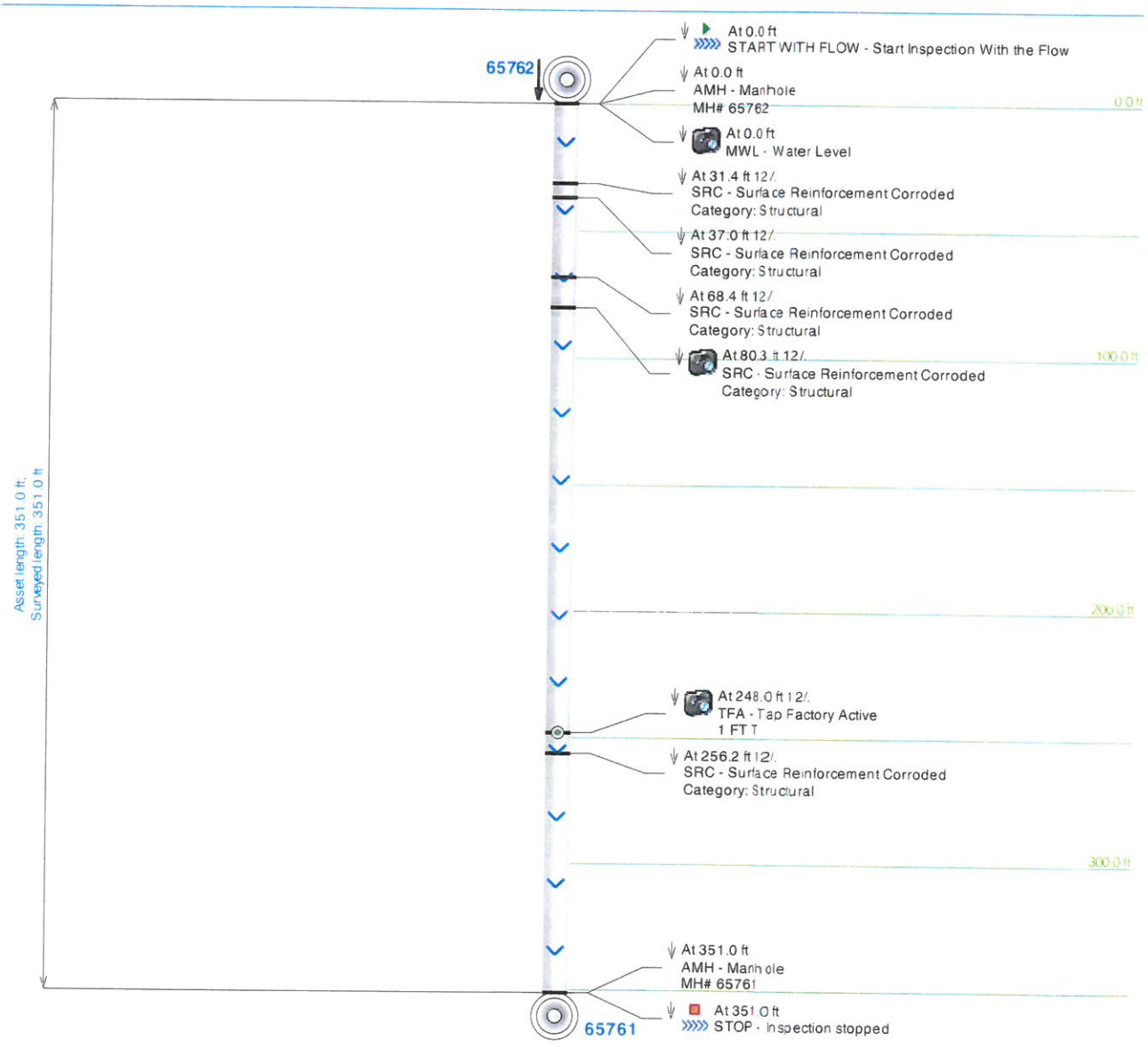
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-8 | MAMARONECK TK-428 | RUSHMORE AVE - LSS |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/22/2015 | | 10 | ZZZ | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 351.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
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# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-8
Start date/time: 2015/09/22 14:49
Street: RUSHMORE AVE - LSS
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65762
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65761
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 10

Width:
Shape: C
Material: ZZZ
Ln. method:
Pipe joint length:
Total length: 351.0
Length surveyed: 351.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Severity | Continuous Defect S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | AMH | | | | | | | | | | MH# 65762 |
| 0.0 | 17 | MWL | | | | | 10 | | | | MAMARONECK NY TK-428-65762-65761 MWL at 0.0 ft (D).jpg | |
| 31.4 | 172 | SRC | | | | | | | 12 | | | |
| 37.0 | 220 | SRC | | | | | | | 12 | | | |
| 68.4 | 301 | SRC | | | | | | | 12 | | | |
| 80.3 | 333 | SRC | | | | | | | 12 | | MAMARONECK NY TK-428-65762-65761 SRC at 80.3 ft (D).jpg | |
| 248.0 | 727 | TFA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65762-65761 TFA at 248.0 ft (D).jpg | 1 FT T |
| 256.2 | 866 | SRC | | | | | | | 12 | | | |

PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

Surveyed by: J.PEROTTI

Owner:

Start date/time: 2015/09/22

Upstream manhole No: 65762

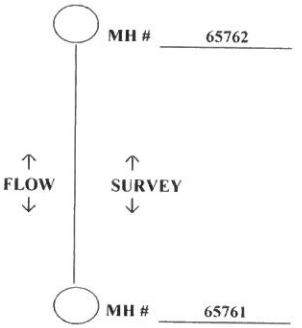
Pipeline segment ref: MAMARONECK-8

Sheet number:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Severity | Continuous Defect | S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 351.0 | 1078 | AMH | | | | | | | | | | | MH# 65761 |

# NEW ENGLAND PIPE CLEANING COMPANY DIVISION HEITKAMP, INC.

## HOUSE CONNECTION AIR TEST AND SEALING REPORT




CLIENT: MAMARONECK NY LOCATION: RUSHMORE AVE AREA:

JOB NUMBER: DATE: 9/22/2015 WEATHER:

TAPE NUMBER: VTR INDEX: INSPECTOR

PIPE TYPE: LINED SECTION LENGTH: PIPE DIAMETER 10" JOINT SPACING:

GROUT TYPE: AV-100 GROUT GEL TIME: FOREMAN: J. PEROTTI

| HOUSE CONNECTION LOCATION AND TYPE | | | | | | LEAKAGE (GPM) | HOUSE CONNECTION PROBLEMS | | | AIR TEST RESULTS | | | | CHEMICAL GROUT USAGE | | POST SEALING AIR TEST | | | | BLOCKAGE AIR TEST | | | | FLUSH TEST | | COMP-LETED | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #HC INLINE | HOUSE # | DISTANCE (FT) | FROM MH# 65762 | HC TYPE | HC SIZE | RATE (GPM) | PROTRUDING TAP (IN) | ROOTS | OTHER | START | END | LOSS | TIME OF TEST (SECONDS) | STROKES | GALLONS | START | END | LOSS | TIME OF TEST IN SECONDS | START | END | LOSS | TIME OF TEST IN SECONDS | CONNECTION CLEAR | NOT AT HOME | AIR TESTED | SEALED |
| | 1 FT T | 248 | Y | F | 6 | NO TEST | N | N | N | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

TOTALS: NUMBER OF SERVICES IN LINE: TOTAL AIR TESTS: 0 GALLONS: 0 # OF SEALS: 0

NUMBER OF SERVICES TESTED AND SEALED: 0 # OF SOCKS USED:

HOUSE CONNECTION ABBREVIATIONS: B BREAK IN F FACTORY

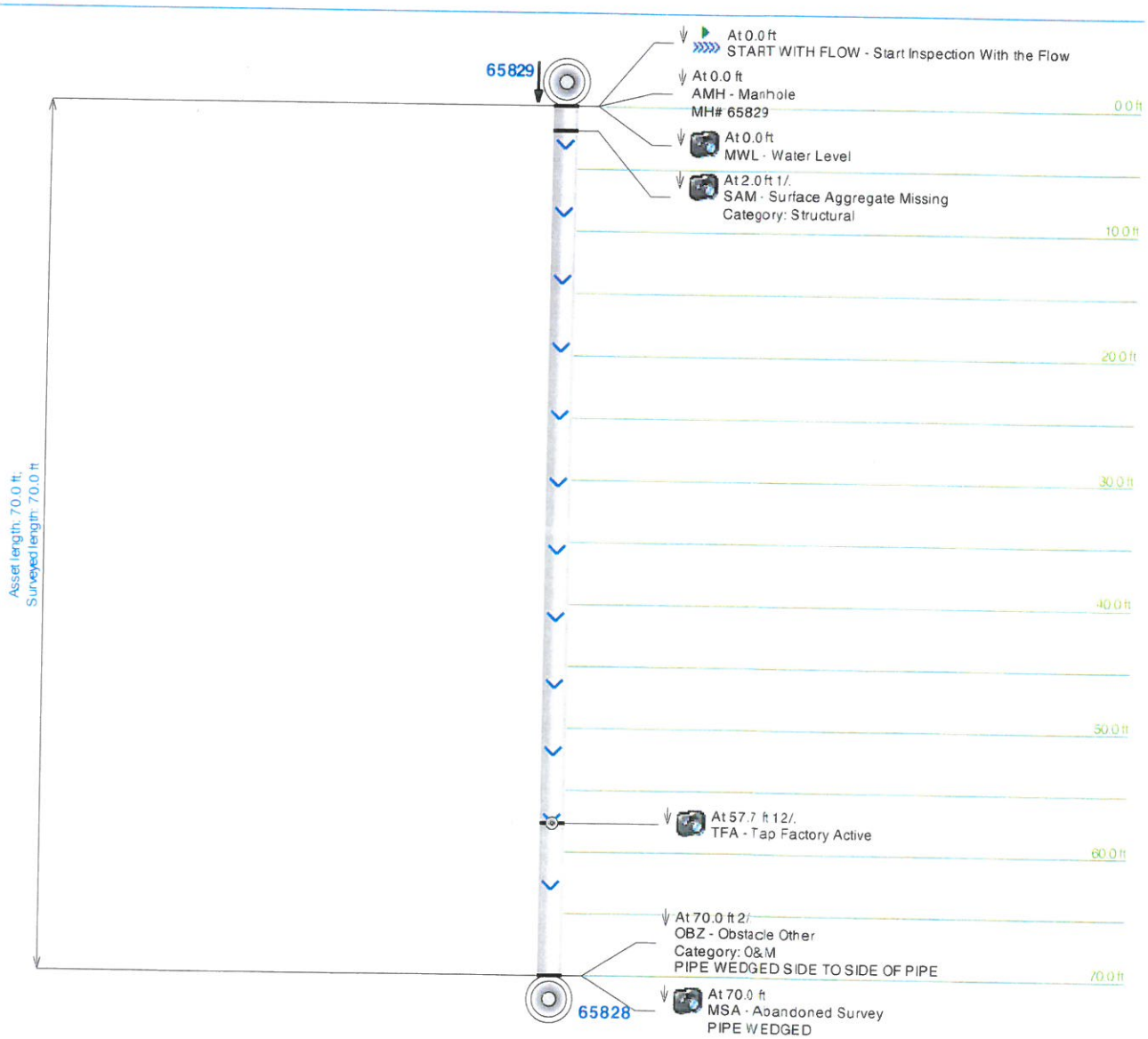
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-10 | MAMARONECK TK-428 | RUSHMORE AVE - TV |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/23/2015 | | 16 | CAS | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 70.0 | J.PEROTTI | |



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99 Callender Road
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Fax: (860) 945.3219

HEITKAMP
AN SPR COMPANY

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-10
Start date/time: 2015/09/23 08:49
Street: RUSHMORE AVE - TV
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65829
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65828
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 16

Width:
Shape: C
Material: CAS
Ln. method:
Pipe joint length:
Total length: 70.0
Length surveyed: 70.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 11 | AMH | | | | | | | | | | MH# 65829 |
| 0.0 | 21 | MWL | | | | | 15 | | | | MAMARONECK NY TK-428-65829-65828 MWL at 0.0 ft (D).jpg | |
| 2.0 | 252 | SAM | | | | | | | 1 | | MAMARONECK NY TK-428-65829-65828 SAM at 2.0 ft (D).jpg | |
| 57.7 | 497 | TFA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65829-65828 TFA at 57.7 ft (D).jpg | |
| 70.0 | 783 | OBZ | | | | | 25 | | 2 | | | PIPE WEDGED SIDE TO SIDE OF PIPE |
| 70.0 | 893 | MSA | | | | | | | | | MAMARONECK NY TK-428-65829-65828 MSA at 70.0 ft (D).jpg | PIPE WEDGED |

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Watertown, CT 06795
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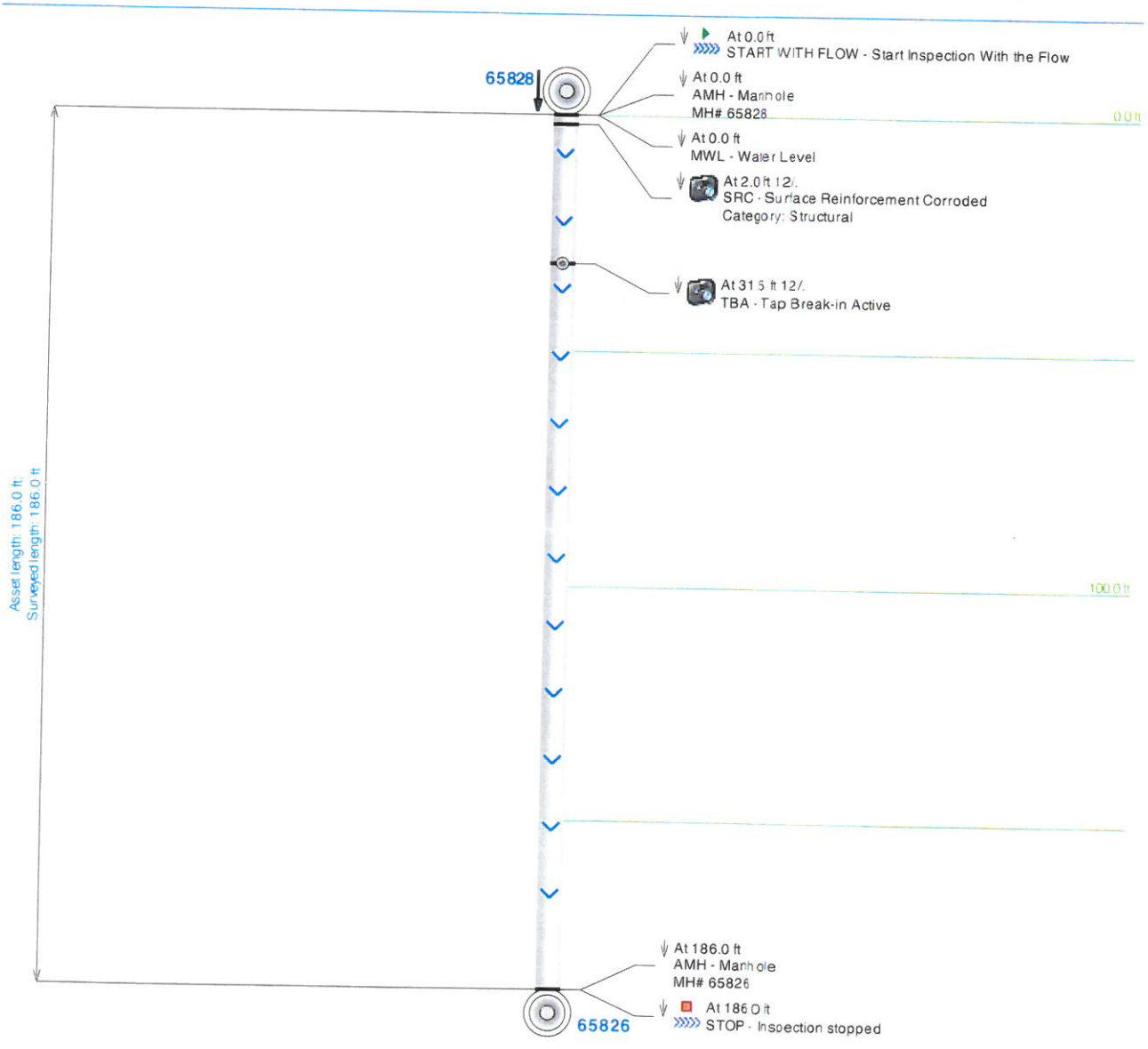
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-11 | MAMARONECK TK-428 | RUSHMORE AVE - TV |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/23/2015 | | 16 | CAS | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 186.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
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# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-11
Start date/time: 2015/09/23 10:27
Street: RUSHMORE AVE - TV
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65828
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65826
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 16

Width:
Shape: C
Material: CAS
Ln. method:
Pipe joint length:
Total length: 186.0
Length surveyed: 186.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Severity | Continuous Defect S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | AMH | | | | | | | | | | MH# 65828 |
| 0.0 | 35 | MWL | | | | | 20 | | | | | |
| 2.0 | 267 | SRC | | | | | | | 12 | | MAMARONECK NY TK-428-65828-65826 SRC at 2.0 ft (D).jpg | |
| 31.5 | 351 | TBA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65828-65826 TBA at 31.5 ft (D).jpg | |
| 186.0 | 752 | AMH | | | | | | | | | | MH# 65826 |

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99 Callender Road
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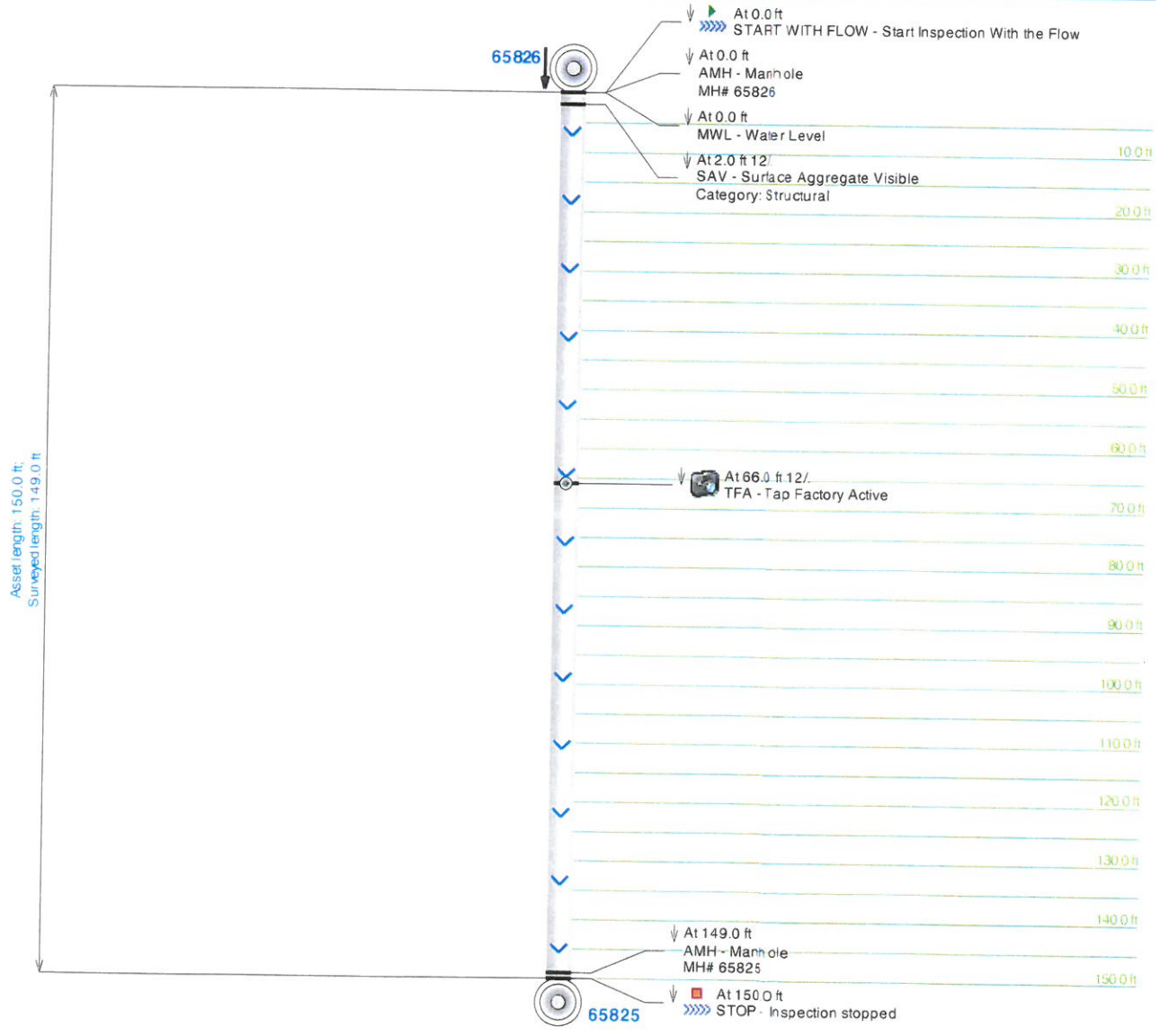
# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-12 | MAMARONECK TK-428 | RUSHMORE AVE - TV |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/23/2015 | | 16 | CAS | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 149.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
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Fax: (860) 945.3219

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-12
Start date/time: 2015/09/23 10:41
Street: RUSHMORE AVE - TV
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65826
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65825
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 16

Width:
Shape: C
Material: CAS
Ln. method:
Pipe joint length:
Total length: 150.0
Length surveyed: 149.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 29 | AMH | | | | | | | | | | MH# 65826 |
| 0.0 | 46 | MWL | | | | | 20 | | | | | |
| 2.0 | 138 | SAV | | | | | | | 12 | | | |
| 66.0 | 230 | TFA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65826-65825 TFA at 65.0 ft (D).jpg | |
| 149.0 | 562 | AMH | | | | | | | | | | MH# 65825 |

PRD North Division Heitkamp, Inc.
99 Callender Road
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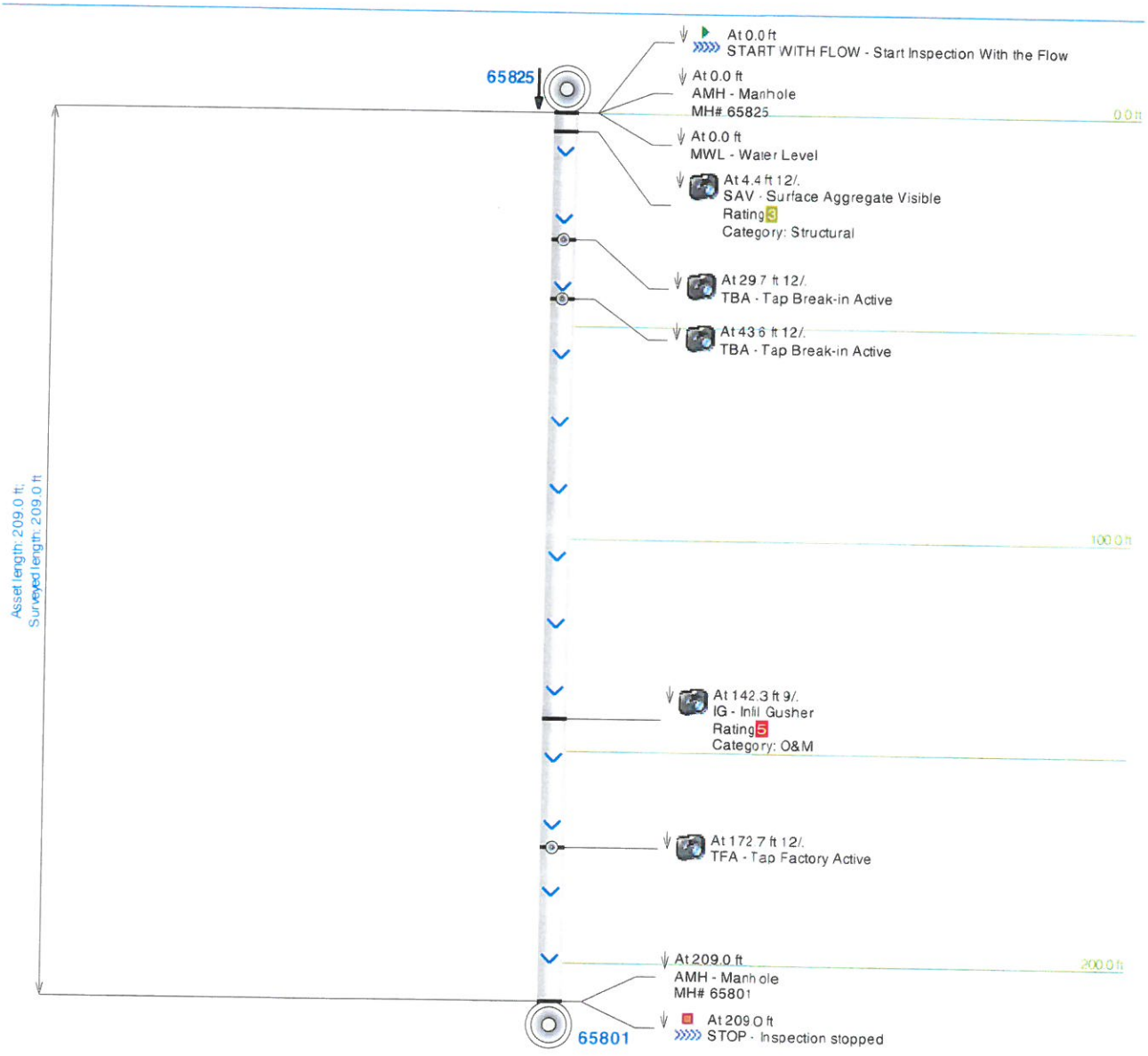
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-13 | MAMARONECK TK-428 | RUSHMORE AVE - TV |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/23/2015 | | 16 | CAS | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 209.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
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Phone: (860) 274.5469
Fax: (860) 945.3219

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-13
Start date/time: 2015/09/23 11:05
Street: RUSHMORE AVE - TV
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65825
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65801
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 16

Width:
Shape: C
Material: CAS
Ln. method:
Pipe joint length:
Total length: 209.0
Length surveyed: 209.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Continuous Defect Severity | S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0 | AMH | | | | | | | | | | MH# 65825 |
| 0.0 | 13 | MWL | | | | | 15 | | | | | |
| 4.4 | 67 | SAV | | | | | | | 12 | | MAMARONECK NY TK-428-65825-65801 SAV at 4.4 ft (D).jpg | |
| 29.7 | 241 | TBA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65825-65801 TBA at 29.7 ft (D).jpg | |
| 43.6 | 417 | TBA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65825-65801 TBA at 43.6 ft (D).jpg | |
| 142.3 | 871 | IG | | | | | | | 9 | | MAMARONECK NY TK-428-65825-65801 IG at 142.3 ft (D).jpg | |
| 172.7 | 1764 | TFA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65825-65801 TFA at 172.7 ft (D).jpg | |

PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

Surveyed by: J.PEROTTI

Owner:

Start date/time: 2015/09/23

Upstream manhole No: 65825

Pipeline segment ref: MAMARONECK-13

Sheet number:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Severity | Continuous Defect | S/M/L | Value Inches (mm) 1st | 2nd | % | Joint | Circumferential Location At/From | to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 209.0 | 2475 | AMH | | | | | | | | | | | MH# 65801 |

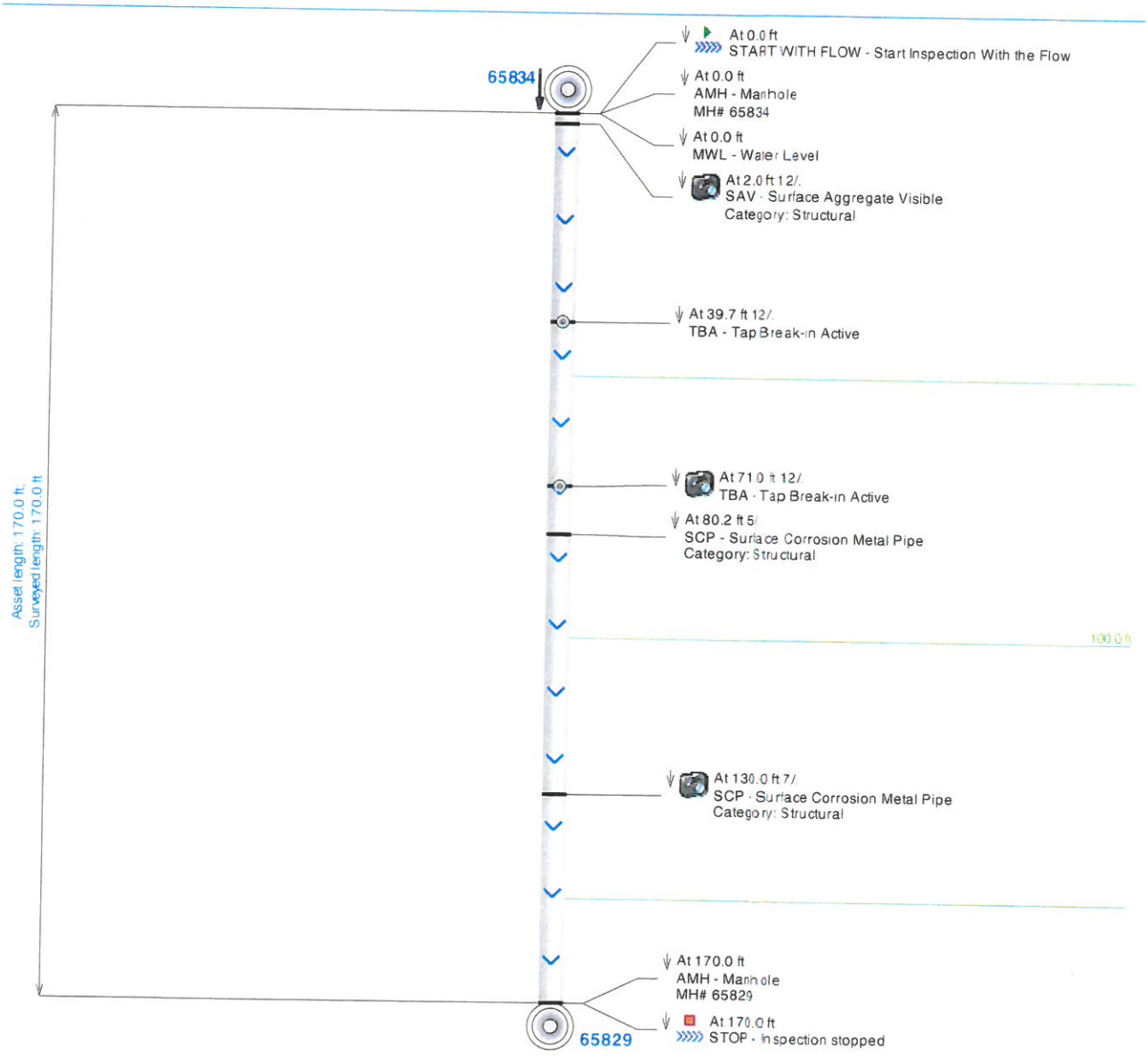
PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

# Main Inspection with Pipe-Run Graph

| Project Name: | Pipeline segment ref: | City: | Street: |
|---|---|---|---|
| MAMARONECK NY TK-428 | MAMARONECK-9 | MAMARONECK TK-428 | RUSHMORE AVE - TV |

| Start date/time: | Width: | Height: | Material: | Location code: | Weather: |
|---|---|---|---|---|---|
| 9/23/2015 | | 16 | CAS | | |

| Direction: | Length surveyed: | Surveyed by: | Additional info: |
|---|---|---|---|
| Downstream | 170.0 | J.PEROTTI | |



PRD North Division Heitkamp, Inc.
99 Callender Road
Watertown, CT 06795
Phone: (860) 274.5469
Fax: (860) 945.3219

HEITKAMP AN SPR COMPANY

# PACP Sewer Report

Surveyed by: J.PEROTTI
Certificate No: U-1107-6007
Owner:
Survey Customer:
Drainage area:
Sheet number:

Work order:
Pipeline segment ref: MAMARONECK-9
Start date/time: 2015/09/23 12:46
Street: RUSHMORE AVE - TV
City: MAMARONECK TK-428

Location details:
Upstream manhole No: 65834
Rim to invert:
Grade to invert:
Rim to grade:

Downstream manhole No: 65829
Rim to invert:
Grade to invert:
Rim to grade:
Sewer use:
Direction: D
Flow control:
Height: 16

Width:
Shape: C
Material: CAS
Ln. method:
Pipe joint length:
Total length: 170.0
Length surveyed: 170.0
Year laid:
Year renewed:
Media label:

Purpose:
Sewer category:
Pre-cleaning: J
Date cleaned:
Weather:
Location code:
Additional info:

**Starting access point:**
Easting:
Northing:
Elevation:
Coordinate system:
GPS accuracy:

| Distance (Feet) (Meters) | Video Ref. | Group/ Descriptor | Modifier/ Severity | Continuous Defect S/M/L | Value Inches (mm) 1st | Value Inches (mm) 2nd | % | Joint | Circumferential Location At/From | Circumferential Location to | Image Ref. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 1 | AMH | | | | | | | | | | MH# 65834 |
| 0.0 | 32 | MWL | | | | | 15 | | | | | |
| 2.0 | 39 | SAV | | | | | | | 12 | | MAMARONECK NY TK-428-65834-65829 SAV at 2.0 ft (D).jpg | |
| 39.7 | 224 | TBA | | | 6 | | | | 12 | | | |
| 71.0 | 326 | TBA | | | 6 | | | | 12 | | MAMARONECK NY TK-428-65834-65829 TBA at 71.0 ft (D).jpg | |
| 80.2 | 363 | SCP | | | | | | | 5 | | | |
| 130.0 | 473 | SCP | | | | | | | 7 | | MAMARONECK NY TK-428-65834-65829 SCP at 130.0 ft (D).jpg | |
| 170.0 | 548 | AMH | | | | | | | | | | MH# 65829 |

# APPENDIX I

## Septic System Distance to Sewer - Map and Table

## Parcel Boundary within 100 ft of Public Sewer

| SepticNumber | Town_ID | Village_ID | PropAddres | Owner_Name | Owner_Na_1 | Distance to Sewer Line | Notes |
|---|---|---|---|---|---|---|---|
| 1 | 155.29-1-36 | 4-65-2B | 300 Hornidge Rd | Board of Education | | 0.00 | Septic tank appears outside of Village school parcel; Sewer lines cross parcel boundary |
| 2 | 9-2-358 | 9-9-19 | 325 Stanley Ave | Barbieri, Domenic | | 0.00 | Sewer along Stanley Ave, MH65492 in front of property, additional property along parcel |
| 3 | 8-18-15 | 8-50-1-8 | 145 New St | Church Of St Vito | | 0.00 | Sewer along New St, MH65450 adjacent to property |
| 4 | 154.58-1-16 | 4-60-7A1 | 325 E Boston Post Rd | Orienta Yacht Club | | 0.00 | Sewer along E Boston Post Rd, and through parcel; MH66307 is within parcel |
| 5 | 9-42-568 | 9-89D-24 | 1107 Cove Rd North | Hampshire Recreation Llc | | 0.00 | Sewer along Cove Rd in front of property, between MH65930, 65929, 65928, 65927, and 65926. Illegal connection at this location |
| 6 | 9-1-176 | 9-20-9 | 233 Valley Pl | Yannuzzi, Jack & Michael | | 0.00 | Sewer along Valley Pl between MH 68431 and MH68430, Sewer located parallel to river between MH65071 and MH65070 on either side of property |
| 7 | 9-48-277 | 9-100-1 | 888 Orienta Ave | 888 Orienta Llc | | 4.14 | Sewer along Orienta Ave between MH65967 and MH65964 in front of property, No buildings on parcel with septic, but house in next parcel may be served by this septic tank |
| 8 | 9-52-1 | 9-98-1 | 1025 Rushmore Ave | Orienta Beach Club | | 5.04 | Sewer along Walton Ave (MH65887 to MH65855) and Rushmore Ave (MH65788 to MH65786) on either side of property (Orienta Beach Club) |
| 9 | 8-30-292 | 8-85-18A | 0 Fayette Ave | Majestic Properties Inc | | 5.96 | Sewer along Fenimore Rd (MH65592 to MH65591) and Fayette Ave (MH65596 to MH65592) adjacent to property |
| 10 | 154.28-1-38 | 4-49-62A | 1503 Rose Ln | Antolino, Rose | | 8.99 | Sewer along Rose Ln (MH72187 to MH72184) and Hunter St (MH72185 to MH72184) adjacent to property |
| 11 | 154.50-1-38 | 4-55-13B3 | 207 Union Ave | Carvalho, Orlando | | 10.99 | Sewer along Union Ave between MH65041 and MH65040 adjacent to property |
| 12 | 9-42-419 | 9-89B-18 | 1031 Cove Rd South | Shifrin, Leslie & Fran | | 12.07 | Sewer along either side of property on Cove Rd, MH65942, MH65943, MH65924 |
| 13 | 9-11-342 | 9-22-16 | 200 Fulton Rd | Paul, Elizabeth | | 14.25 | Sewer along Fulton Rd, MH VG54 |
| 14 | 154.50-1-34 | 4-55-16A | 225 Union Ave | Quadrini, Mario | | 14.88 | Sewer along Union Ave, between MH65043 and MH65041, in front of property |
| 15 | 154.75-1-17 | 4-76-1B | 519 Alda Rd | Mann, J Robert Jr | | 15.59 | Sewer along Alda Rd, between MH66447 and MH66448, in front of |
| 16 | 9-37-159 | 9-85-34B | 818 The Crescent | Ottinger, Richard | | 18.71 | Sewer along The Crescent, MH65782, adjacent to property |
| 17 | 9-26-36 | 9-64-PLOT | 347 Orienta Ave | Shanus, Sarene | | 36.33 | Sewer along Old Boston Post Rd, MH VK53, in front of property |
| 18 | 154.68-1-1 | 4-76-16A | 575 Alda Rd | Henley, Mark & Barbara | | 36.82 | Sewer along Alda Rd, MH66452, in front of property |
| 19 | 8-2-489 | 8-58-25B | 222 Highview St | Ciraco, Anne & Giovanni | | 44.55 | Sewer along Highview St, MH65527, in front of property |
| 20 | 155.29-1-33 | 4-65-9B | 1600 Harrison Ave | 1600 Harrison Llc | | 50.92 | Sewer along Harrison Ave, (MH67052) approx 150 feet from building, or along Ryewood Farm Drive (MH67153) approx 300 feet from building |
| 21 | 154.34-2-13 | 4-20-32 | 500 Halstead Ave | Remodeling Consultants Of | Westchester Inc Gj Zaccaria | 62.47 | Sewer along Halstead Ave, between MH65086 and MH65087, in front of property |
| 22 | 8-17-703.1 | 8-52-1 | 125 Gertrude Ave | Di Nota, Thomas Jr | | 81.39 | Sewer along Bradford Ave, MH65432 (pipe would have to travel along border between two parcels under paved surface) or sewer along Gertrude Ave, MH65448, sewer may be abandoned? |
| 23 | 154.68-1-17 | 4-77-35B | 506 S Barry Ave | Klein, Lawrence & Judith | | 86.78 | Address associated with septic location is 506 S Barry, MH66505 is in front of property |

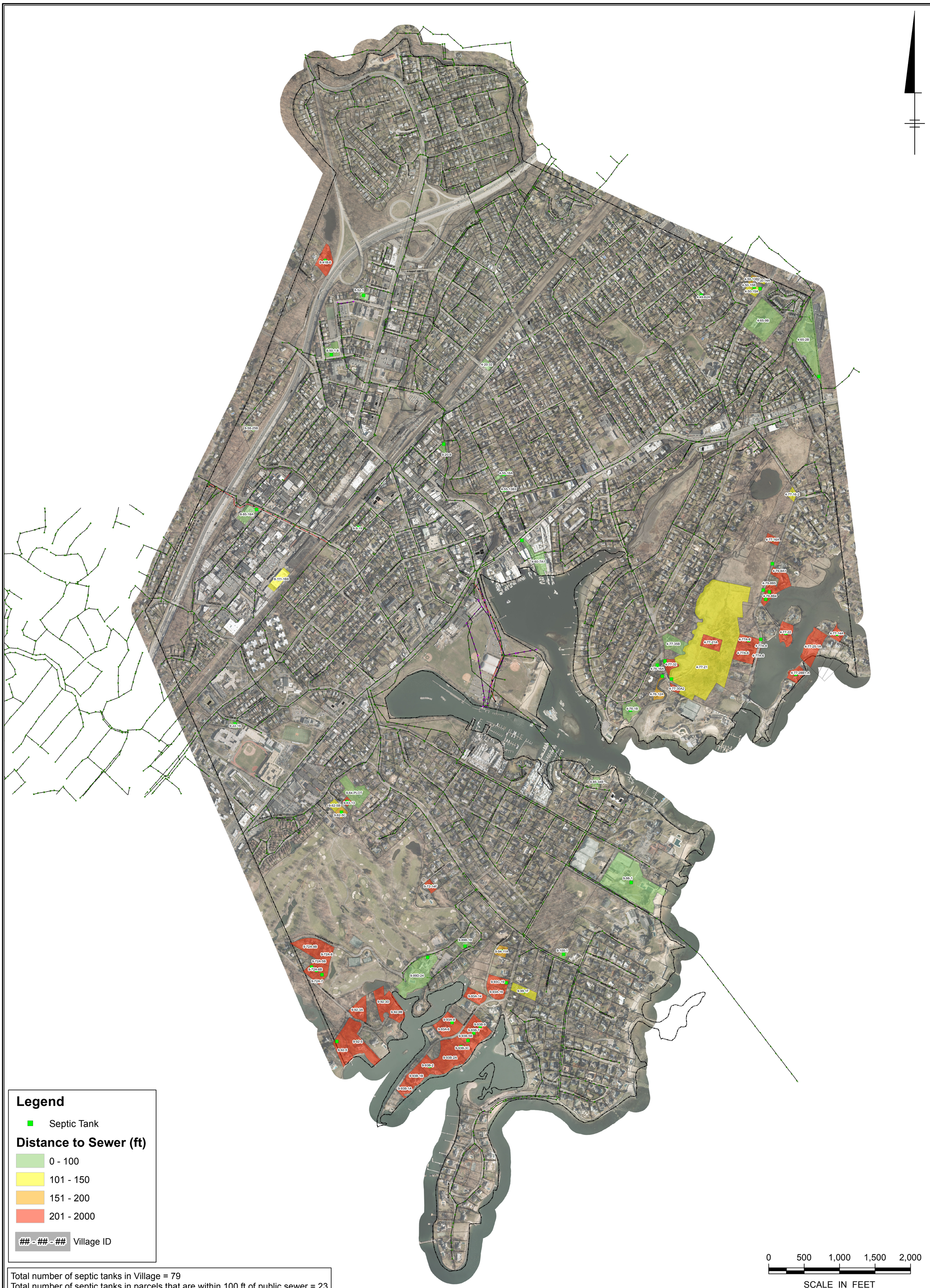
## Parcel Boundary between 100 ft and 150 ft of Public Sewer

| SepticNumber | Town_ID | Village_ID | PropAddres | Owner_Name | Owner_Na_1 | Distance to Sewer Line | Notes |
|---|---|---|---|---|---|---|---|
| 24 | 154.28-2-71 | 4-50-14A | 1634 Harrison Ave | Schlotter, Karen | | 104.51 | Sewer along Harrison Ave (MH67146) toward Tulip Tree Ln |
| 25 | 8-25-615 | 8-111-1B8 | 420 Railroad Way | Spatz Industries Inc | | 115.91 | Sewer along Bishop Ave (MH68458), 115' away from parcel on other side of railroad tracks; Sewer along Ogden Ave, MH65605, 150' away from |
| 26 | 9-27-114 | 9-62-5B | 325 Cooper Ave | Clinton, James B | | 121.31 | Sewer along Old Boston Post Rd, between MH VK55A and VK55, new line would cross other parcel or would follow Cooper Ave |
| 27 | 9-56-1 | 9-99-1F | 1010 Greacen Pt Rd | Weinstein, Pierre & Caroline | | 133.17 | Sewer along Green Meadow Ln (MH65966), new line would cross other parcel to reach closest manhole |
| 28 | 154.68-1-20 | 4-77-21 | 0 Taylors Ln | The Nature Conservancy | | 133.89 | Closest sewer is along Soundview Dr, Indicated location of septic tank is closer to Alda Rd Sewer, but a new line would have to cross several parcels or follow S Barry Ave and turn to connect with Alda Rd Sewer; Nature Conservancy Land |
| 29 | 154.28-2-69 | 4-50-15B | 1620 Harrison Ave | Figliola, Josephine | | 134.44 | Closest sewer is on Harrison Ave/Tulip Tree Ln, MH67147 or MH67146 |
| 30 | 155.45-1-2 | 4-77-16-2 | 533 Taylors Ln | O'Brien, Tracy | | 137.32 | Closest sewer is on Colonial Ct, MH66550. Could be accessed along road without crossing other parcels |
| 31 | 154.28-2-68 | 4-50-15A | 1616 Harrison Ave | Wright, Scott J | | 148.93 | Closest sewer is on Harrison Ave/Tulip Tree Ln, MH67147 or MH67146 |

## Parcel Boundary over 150 ft from Public Sewer

| SepticNumber | Town_ID | Village_ID | PropAddres | Owner_Name | Owner_Na_1 | Distance to Sewer Line | Notes |
|---|---|---|---|---|---|---|---|
| 32 | 154.28-2-73 | 4-50-13B2 | 116 Standish Pl | Ybarra, Peter Brian | | 180.54 | Sewer more than 150 feet from property line |
| 33 | 154.76-1-5 | 4-76-12A | 0 S Barry Ave - Rear | Village Of Mam'K | | 186.17 | Sewer more than 150 feet from property line |
| 34 | 9-27-87 | 9-62-5C | 329 Cooper Ave | Joyce, James | | 187.65 | Sewer more than 150 feet from property line |
| 35 | 9-49-268 | 9-94-11A | 930 Greacen Ln | Allen, Michael | | 189.43 | Sewer more than 150 feet from property line |
| 36 | 9-49-1 | 9-93A-16 | 1019 Greacen Pt Rd | Grehan, Kevin & Pamela | | 206.44 | Sewer more than 150 feet from property line |
| 37 | 154.68-1-19 | 4-77-32 | 0 S Barry Ave | The Nature Conservancy | | 207.68 | Sewer more than 150 feet from property line |
| 38 | 9-26-26 | 9-63-13 | 340 Cooper Ave | Lasagne, Robert & Lisa | | 250.14 | Sewer more than 150 feet from property line |
| 39 | 9-44-60 | 9-92-3D | 11 Oak Ln | Hinerfeld, Ruth | | 256.02 | Sewer more than 150 feet from property line |
| 40 | 9-44-81 | 9-92-9B | 10 Oak Ln | Mccance, Sean & Zsuzsanna | | 308.52 | Sewer more than 150 feet from property line |
| 41 | 9-49-12 | 9-93C-19 | 1011 Greacen Pt Rd | Bauer, John | | 311.87 | Sewer more than 150 feet from property line |
| 42 | 9-34-600 | 9-72-14F | 940 Fairway Ln | Schneiderman, Scott M | | 342.96 | Sewer more than 150 feet from property line |
| 43 | 154.76-1-2 | 4-77-30A2 | 604 S Barry Ave | 520 S Barry Llc | | 343.66 | Sewer more than 150 feet from property line |
| 44 | 9-50-410 | 9-93A-14 | 1115 Greacen Pt Rd | Cohen, Benjamin & Bella | | 387.79 | Sewer more than 150 feet from property line |
| 45 | 9-50-83 | 9-93B-9 | 1160 Greacen Pt Rd | Bernstein, Richard K Trustee | | 389.53 | Sewer more than 150 feet from property line |
| 46 | 8-4-796 | 8-41B-6 | 111 Rockridge Rd | Snyder, Thomas R | | 415.15 | Sewer more than 150 feet from property line |
| 47 | 154.68-1-21 | 4-77-21A | 600 S Barry Ave | Crosby, John P | | 448.86 | Sewer more than 150 feet from property line |
| 48 | 9-50-357 | 9-93A-8 | 1175 Greacen Pt Rd | Lieber, Constance E | | 517.92 | Sewer more than 150 feet from property line |
| 49 | 9-50-69 | 9-93B-7 | 1170 Greacen Pt Rd | Nodiff, Bradley & Pamela | | 521.10 | Sewer more than 150 feet from property line |
| 50 | 155.53-1-1 | 4-77-16A | 942 Taylors Ln | Field, Marvin J. | | 568.82 | Sewer more than 150 feet from property line |
| 51 | 9-44-1 | 9-92-3A | 3 Oak Ln | Cantwell, Paul & Sally | | 569.88 | Sewer more than 150 feet from property line |
| 52 | 9-50-337 | 9-93A-6 | 1185 Greacen Pt Rd | Bassuk,B, Kaufman,M, Tosi,J | | 596.53 | Sewer more than 150 feet from property line |
| 53 | 9-50-58 | 9-93B-5B | 1180 Greacen Pt Rd | Rosenberg, Eric M & Helen K | | 654.19 | Sewer more than 150 feet from property line |
| 54 | 9-50-1 | 9-93B-2A | 1210 Greacen Pt Rd | Lieber, Constance E | | 680.70 | Sewer more than 150 feet from property line |
| 55 | 9-50-44 | 9-93B-3C | 1190 Greacen Pt Rd | Weinberg Family Trust 2011 | | 718.77 | Sewer more than 150 feet from property line |
| 56 | 9-51-78 | 9-93B-2 | 1248 Greacen Pt Rd | Wetzel, Carroll & Bert | | 727.53 | Sewer more than 150 feet from property line |
| 57 | 155.53-1-17.1 | 4-79-8A1 | 907 Taylors Ln | Neubardt, Seth | | 836.71 | Sewer more than 150 feet from property line |
| 58 | 9-45-98 | 9-92-5 | 205 Hommocks Rd | Hoffman, Richard D | Hoffman Mills Attn: Dru Chapman | 859.04 | Sewer more than 150 feet from property line |
| 59 | 9-51-45 | 9-93B-1B | 1308 Greacen Pt Rd | Koeppel, Maureen | | 874.83 | Sewer more than 150 feet from property line |
| 60 | 155.53-1-19 | 4-79-8B5 | 843 Taylors Ln | Mawe, John & Alison | | 878.50 | Sewer more than 150 feet from property line |
| 61 | 154.68-1-24 | 4-77A-8 | 770 Taylors Ln | Bogart, Frederic & Jeannette | | 900.88 | Sewer more than 150 feet from property line |
| 62 | 155.53-1-20 | 4-79-8B4 | 841 Taylors Ln | Hackenburg, Frederick W | | 912.64 | Sewer more than 150 feet from property line |
| 63 | 154.68-1-23 | 4-77A-6 | 0 Taylors Ln | Wolff, Jesse D | Elizabeth H Wolff C/O Daniel Wolff | 923.86 | Sewer more than 150 feet from property line |
| 64 | 9-51-20 | 9-93B-1A | 1326 Greacen Pt Rd | Chapey, Fredrick J Jr | | 998.03 | Sewer more than 150 feet from property line |
| 65 | 9-35-134 | 9-72A-8 | 541 Eagle Knolls Rd | Libo, Andrew | | 1026.33 | Sewer more than 150 feet from property line |
| 66 | 9-35-65 | 9-72A-7 | 520 Hommocks Rd | Bargiuirdjian, Henri | | 1045.66 | Sewer more than 150 feet from property line |
| 67 | 9-35-56 | 9-72A-6B | 516 Hommocks Rd | 516 Hommocks Rd Llc | | 1108.03 | Sewer more than 150 feet from property line |
| 68 | 9-45-37 | 9-92-5 | 205 Hommocks Rd | Hoffman, Richard D | Hoffman Mills Attn: Dru Chapman | 1173.18 | Sewer more than 150 feet from property line |
| 69 | 9-35-47 | 9-72A-5B | 512 Hommocks Rd | 512 Hommocks Rd Llc | | 1173.80 | Sewer more than 150 feet from property line |
| 70 | 9-35-149 | 9-72A-9B | 521 Eagle Knolls Rd | Cecil, John & Celia | | 1176.54 | Sewer more than 150 feet from property line |
| 71 | 155.61-1-3 | 4-77-22 | 833 Taylors Ln | Derosa, John, Margit & Lisa | Irrevocable Trusts C/O Derosa Builders Inc | 1326.45 | Sewer more than 150 feet from property line |
| 72 | 155.61-1-12 | 4-77-14A | 14 Shore Rd | Fensterstock, Jay | | 1534.68 | Sewer more than 150 feet from property line |
| 73 | 155.61-1-9 | 4-77-25-1A | 1 Shore Rd | Friede, John A | | 1590.96 | Sewer more than 150 feet from property line |
| 74 | 155.69-1-1.1 | 4-77-28B1-A | 700 Taylors Ln | Tabaddor, Kamran Md | | 1750.96 | Sewer more than 150 feet from property line |

CITY: ALBANY DIV/GROUP: WTR DB: CMS LD: PIC: PM: KCH APM: TM:
PROJECT: MAMARONECK PATH: Document Path: G:\GISMOD\01547034.0000\SepticDistancesToSewers.mxd




## Legend

- Septic Tank

**Distance to Sewer (ft)**

- 0 - 100
- 101 - 150
- 151 - 200
- 201 - 2000
- ##-##-## Village ID

Total number of septic tanks in Village = 79
Total number of septic tanks in parcels that are within 100 ft of public sewer = 23

0 500 1,000 1,500 2,000
SCALE IN FEET

**Note:**

**Westchester County Sewer Code, Chapter 873, Article VIII. - Sewerage, Sewage and Refuse**

**Sec. 873.727. - Sewer connection required.**

The owner of any habitable building or property used for human occupancy, employment, recreation or other purpose abutting upon any street, alley or right-of-way in which there is located a public sanitary sewer may be required to install at the expense of such owner suitable toilet facilities therein and to connect such facilities directly with the public sanitary sewer, in accordance with any local regulations of the municipality owning such sewer, within 90 days after date of an order in writing issued by the commissioner to do so, provided that such sewer is within 100 feet of any property line of such premises and is otherwise accessible. Where a public sanitary sewer is available no new arrangement shall be made other than an individual connection to serve each building site.

(Added 7-19-2001, eff. 7-19-2001; amended 6-19-2008)

VILLAGE OF MAMARONECK
MAMARONECK, NY

# PARCELS WITH SEPTIC TANKS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

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