MEMO

ARCADIS Design & Consultancy for natural and built assets

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From:
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Date:
June 16, 2020

Arcadis Project No.:
30042872.03600

Subject:
Plant 3 Storm Sewer Outfall Modifications

Arcadis of Michigan, LLC (Arcadis) has prepared this memorandum on behalf of RACER Trust (RACER) to summarize the storm sewer work completed at the RACER Lansing Plant 3 outfall located in Lansing Township, Michigan (Site), from fall of 2019 to present.

As described in the Plant 3 Storm Sewer Modifications Completion Report (Arcadis 2019), sewer modifications were completed in 2018 to mitigate discharges of water containing Perfluorooctanesulfonic acid (PFOS) at concentrations exceeding the Michigan Department of Environment, Great Lakes and Energy (EGLE) Part 201 Groundwater Surface Water Interface (GSI) criterion of 12 nanograms per liter (ng/L). This memorandum describes the follow-up storm sewer outfall inspections and summarizes the modifications conducted at the Site to mitigate the discharge of storm water exceeding criteria.

PLANT 3 OUTFALL MANHOLE INSPECTIONS AND REPAIRS

The Plant 3 storm sewer modifications completed in October 2018 included installation of two concrete monoliths and two bulkheads to mitigate discharge of Perfluorooctanesulfonic acid (PFOS) impacted water from the Plant 3 northeast outfall (P3-MH-NE). These modifications resulted in an estimated 95-98% reduction in discharge flow through the outfall. Follow-up inspections in early 2019 indicated a small amount of continued discharge. Dry weather sampling in March 2019 in P3-MH-NE confirmed concentrations exceeded the PFOS surface water criteria of 12 ng/L in into and out of the manhole. A

camera survey of the east and west mains in December 2019 identified that the storm water entering the outfall manhole was groundwater infiltration and leakage in the east and west mains, indicating that additional corrective actions were needed to eliminate discharge from the outfall.

A summary of the Plant 3 outfall sewer modifications is presented below.

- December 2019: Job Site Services (JSS) filled half of the outfall manhole with concrete to block influent flow from the east and west mains while maintaining the ability to monitor the outfall main for discharge. JSS also plugged the surficial inlet pipes with concrete.
- January 2020: Youngs Environmental (Youngs) sealed leaks within the manhole wall with hydraulic cement to mitigate groundwater infiltration. A small amount of dark liquid was observed seeping from the outfall manhole wall but did not discharge from the site and was non-detect for PCBs. JSS filled two manholes immediately upstream of P3-MH-2-1N with underwater concrete (P3-MH-2-1 and P3-MH-2-2) to further block water flow to the outfall.
- February 2020: JSS performed additional cement patching within the outfall manhole to mitigate groundwater infiltration and seepage of the dark liquid substance. JSS excavated and plugged the two surficial clarifier pipes with underwater concrete, and sealed exterior and interior of pipe penetrations into manhole with hydraulic cement to prevent infiltration.
- March 2020: JSS installed a sample jar beneath the seep location for future collection of samples of the dark liquid substance and performed additional cement patching inside the manhole.
- May 2020: The sample jar was full of brownish green tinted water with black organic material. No oil was observed, and the manhole was dry, with no evidence of groundwater infiltration, and no discharge.

No offsite discharge has been observed in the Plant 3 outfall manhole since December 2019, and based on the May inspection, the subsequent repairs completed in 2020 have eliminated groundwater infiltration into the manhole. The next quarterly visual inspection of the outfall manhole is scheduled for August 2020.

PLANT 3 OUTFALL OFFSITE SEWER MAIN CLEANING AND INSPECTION

Arcadis and Youngs performed video inspections of the 54-inch diameter Plant 3 outfall main to identify the presence of accumulated sediment that could serve as a residual source of PFOS impacts. The outfall main begins at Plant 3 outfall manhole P3-MH-NE and ends at Junction Box B at the City of Lansing Wastewater Treatment Plant (WWTP) (**Figure 1**). The results of the inspections are summarized below and on **Figure 1,** and photographs of the inspections are provided in **Attachment 1**.

- December 2, 2019: Youngs conducted a sewer video inspection beginning at the Plant 3 outfall manhole and moving north towards the WWTP.
  - Groundwater infiltration (slow drips) were observed at several locations offsite.
  - A small diameter (2-3-inch diameter) pipe penetrated the main approximately 150 feet from the manhole and contributed a slow trickle, apparently groundwater infiltration. The pipe was located approximately below the parking lot in the Lansing Board of Water and Light (BWL) electrical substation parking lot and there is no visible inlet to the pipe at the ground surface.
  - Sediment accumulation was less than 1 inch deep near the outfall and increased to more than 8-11 inches deep farther north; the inspection ended at approximately 375 feet because the camera could not continue due to sediment approximately 10-11 inches deep.

  - Youngs inspected the onsite western main and observed groundwater infiltration downstream of the monolith.
  - Youngs cleaned the outfall manhole and about 5-10 feet into the eastern, western, and outfall main pipes, but advised they could not clean the outfall main further due to the slope of the pipe.

- February 17, 2020: Arcadis staff and a representative from BWL inspected the BWL substation property north of Plant 3 for the presence of manholes or access structures for cleaning/inspection of the offsite main. No manholes or access structures were found.
- May 13, 2020: Youngs conducted a sewer video inspection of the Plant 3 outfall main beginning at the City WWTP Junction Box B access manhole and moving south towards the RACER property.
  - Approximately ¼ inch of water flow and very minimal sediment were observed. Groundwater infiltration (slow drips) were observed at several locations.
  - The inspection ended at 220 feet where the camera was blocked by what appeared to be a pile of hardened concrete.
  - The vac truck could not access the manhole for cleaning due to the distance from the access road, soft grass, and a hill blocking the manhole.

Arcadis is proposing no further cleaning work on the 54-inch line based on:

- Limited sediment observed in the northern portion of the line
- No discharge from the RACER site, the small amount of flow observed is from offsite infiltration observed in video inspections
- Challenges/feasibility of cleaning the southern portion of the line that include:
  - Need for jet/vac trucks to pull up right next to the access manhole and the potential for equipment to damage WWTP property
  - Difficulties/feasibility of pulling back the sediment over the obstruction noted in the line

Please contact me at Jackie.saling@arcadis.com or 248-994-2269 if you have any questions.

Sincerely,

Arcadis of Michigan, LLC

Jackie Saling
Technical Expert

References:

Arcadis, 2019. Plant 3 Storm Sewer Modifications Completion Report. January 25, 2019.

Enclosures:

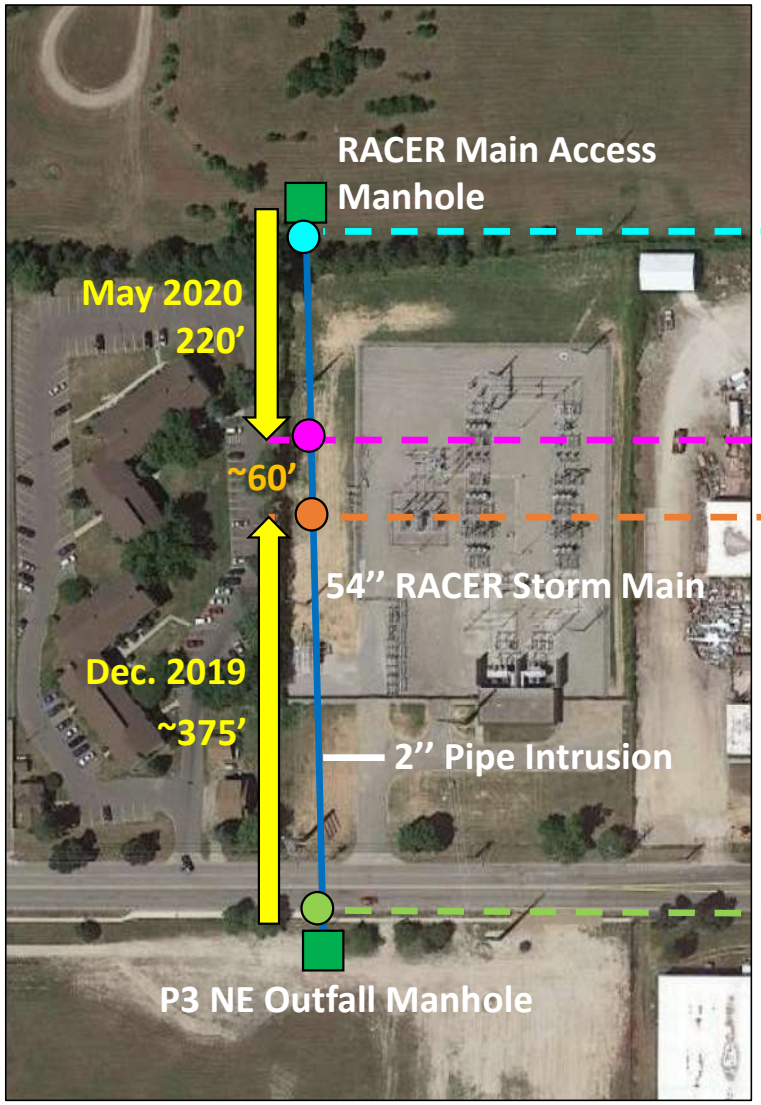
Figures

1 – Outfall Inspection Summary

Attachments

1 – Photo Log of Outfall Inspections

FIGURES



Minimal sediment, signs of minor infiltration, very little flow

Obstruction, end of May inspection

Sediment accumulation, end of December inspection

Sediment accumulation increases moving north

Figure 1
Plant 3 Outfall Storm Main Inspection Summary

ATTACHMENT 1

Sewer Inspections Photo Logs

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PLANT 3 OUTFALL MAIN INSPECTION SUMMARY

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December 2019 Inspection Begin at Plant 3 Outfall Manhole

Start of inspection at entrance to 54” outfall main. Minor water flow (pre-outfall manhole fill), minor sediment

Minor sediment accumulation, evidence of infiltration through pipe joints at ~30 feet

Tree root intrusion with groundwater infiltration, increased sediment accumulate ~80 feet north of outfall manhole

2 or 3 inch diameter pipe intrusion, ~150 feet north of outfall manhole

Heavy sediment accumulation, end of inspection, ~375 feet north of outfall manhole

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May 2020 Inspection Begin at City WWTP

Start of inspection at Junction Box B access manhole

Approximately ¼” water flow, minimal sediment, evidence of groundwater infiltration

Minimal sediment, minimal water flow, infiltration encrustation, 68 feet from manhole

Minimal sediment, minimal water flow, possible tree roots, 182 feet from manhole

Tree roots, minimal water flow, pile of hardened concrete, 211 feet from manhole

Pile of hardened concrete, end of inspection, 220 feet from manhole