

**Technical Memorandum
Prepared for the City of Pompano Beach
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March 25, 2019**

**Review of “Accidental Wastewater Discharge Plan - Letter Report Break of 42”
Sewer Force Main at NW 15th Street and I-95 Pompano Beach, FL” prepared by
APTIM dated April 4, 2019.**

Aptim Environmental & Infrastructure, LLC. (APTIM) submitted a Letter Report to Broward County Environmental Protection and Growth Management Department (BCEPD) on behalf of SICE, Inc. (SICE). The letter stated that it was a follow-up to the previous Comment Response letter dated March 5, 2019.

The following are specific comments regarding the various aspects of the APTIM letter.

Executive Summary

1. On Page 1, in the first paragraph of the Executive Summary, the City of Pompano Beach (CITY) is listed as a participant in the Response Action Program. While they were a participant in the repair of the ruptured pipe and did participate in discussions regarding the cleanup immediately following the spill, the CITY did not develop or approve the Response Plan.
2. On Page 1, in the second paragraph of the Executive Summary, APTIM claims “aeration successfully raised the Dissolved Oxygen (DO) concentration, allowing for accelerated organic compound and fecal coliform degradation. After active aeration was stopped, DO in the C-1 canal began decreasing to below background values. The reported fecal coliform and COD results are expected to continue improving since the reactions are continuing.” This conclusion is confusing since it took an increase in DO to degrade the contaminants, it is unlikely that the reaction would continue degradation once the DO fell below background levels.
3. On Page 2, first paragraph, the letter states “no C-1 historical background results exist”. We reviewed the Florida Department of Environmental Protection (FDEP) Impaired Waters Rule Run 56 database and identified that on April 11, 2006 a site was sampled by FDEP at the site of the accidental spill (21FLWQA 261445308008096). The DO at the surface (0.5ft), middle (1.85ft) and bottom (4.28ft) were reported as 5.22 mg/L, 5.27 mg/L, and 5.12 mg/L, respectively. Turbidity was reported as 5 NTU at the surface. While there was only one sampling event, these values could be used to represent prior conditions for the C-1 canal.
4. On Page 2, first paragraph, “In this report, C-1 results are compared against current background and historical results from locations that are from the general

area near the spill area. Many of these sites have greater and more frequent significant flows than the comparatively stagnant C-1 flows and as such, their measured values should be considered as better- or best-case relative to the C-1 values.” Given the differences among various canals, any comparison of the C-1 to others should be done with caution.

5. On Page 2, in the second paragraph, it is reported that “The C-1 turbidity results are greater than background values.” The cited reason is that the C-1 canal “turbidity is impacted by rain events and the presence of algae. The turbidity values in the higher flow rate G-16 canal are smaller than those in the C-1 canal.” The disparity in turbidity values between C-1 and G-16 cannot be explained by rainfall, given their close proximity. Therefore, the disparity may be more likely due to differences in stormwater management between the two canals.
6. On Page 2, third paragraph, the letter states that sediments in C-1 have more organic material than samples collected in the G-16 Canal. The letter further states that the low DO in the bottom waters of the C-1 canal can be attributed to low flows and the breakdown of the organic sediments. Therefore, it is imperative to identify the potential source(s) of the elevated organic sediments in the C-1 canal.
7. On Page 3, there are several statements regarding algae and chlorophyll. The mere presence of algae is of less concern than the actual mass as measured by chlorophyll. Stating that the historical presence of chlorophyll can be demonstrated by the review of historical aerials is questionable. Algae are likely present in all surface waters and what is important is the understanding of the actual amount of algae present.
8. The letter continues to state that algae was likely present in the past, since data reported near the spill site had chlorophyll a present. Recognition of the importance of the mass algae, not simply its presence, is clear given the existence of impaired water quality due to excessive chlorophyll concentration in FDEP Waterbody ID (WBID) 3271, which includes the C-1 and G-16 canals. FDEP has established a Total Maximum Daily Load (TMDL) that requires reductions in the total nitrogen and total phosphorus loadings of the WBID. The letter fails to identify the existence of this TMDL and its ramifications when developing the Accidental Wastewater Discharge Plan.
9. On Page 2, the letter identifies a dark organic layer present in the C-1 Canal extending for approximately 1,000 linear feet. The letter does not attribute the presence of this dark organic sediment to this spill. This is despite the fact, that when dried, the sediments from this layer emit a foul odor that was not observed in sediment samples collected outside the 1,000 feet. Additionally, the letter does report that the deposition pattern is closely related with the location of the floating scum removed by Lanzo.

10. On Page 3, the letter reports that remnant berm sands were observed in cores adjacent to NW 15th Street. There is no discussion of the source of these sands and whether they can be attributed to inadequate stormwater management.

Surface Water Quality in the C-1 Canal and Pompano Canal (G-16)

1. The letter on Page 3 and continuing on Page 4 makes several statements regarding water quality, specifically, regarding fecal coliform, DO, turbidity and chemical oxygen demand (COD). In the first bullet, the letter incorrectly reports the state water quality standard for bacterial contamination as being expressed as fecal coliform. Rather 62-302.530, Florida Administrative Code (F.A.C.), establishes criteria for *E. Coli* and *Enterococci*. Also, the comparison of the recent fecal coliform results to “historic and background concentrations” is limited as historic and background are ill defined.
2. The second bullet point regarding DO failed to state that the DO declined significantly when the aeration was discontinued.
3. As for bullet point 3, the standard for turbidity is different for FDEP compared to Broward County. The turbidity criterion in 62-302.530, F.A.C., for Class III waters is “< 29 above natural background conditions”.
4. Bullet 4 fails to report that COD was only evaluated on two days, therefore the conclusion that COD was declining over time is misleading.
5. On Page 4, the letter states they used the web address, “<https://www.waterqualitydata.us/portal/>” to search for historical water quality data. The address points to the National Water Quality Monitoring Council data portal. There are two more databases that should have been queried, the SFWMD DBHYDRO database or the FDEP IWR database.
6. On Page 4, the letter refers to Table 1 with background results from key historical and current sampling sites. It does not provide a sample site ID, location, and dates that are necessary to be useful. It is impossible to determine the source of the data in Table 1 or how the data was used to calculate the summary.
7. On Page 4, the letter describes the results of fecal coliform results for a series of stations that were sampled as part of the spill response. While the location of the sampling sites is described, a map should also be included.
8. On Page 4, the letter presents results of fecal coliform samples that were presumably collected by the CITY, but not clearly defined. The letter reports values too numerous to count and confluent growth values, but the CITY’s laboratory has since updated those results and the latest data should be used.
9. On Page 5, the discussion of regarding COD is oversimplified as it fails to report that COD was only evaluated on two days and therefore the conclusion that COD was declining over time is misleading.

10. On Page 5, as expected the DO levels were higher due to the aggressive effort utilizing the aerators. After aeration, the DO in the C-1 canal dropped considerably, approaching anoxic conditions. The report cites organic sediments and algae as the cause of the low DO but in the executive summary, this area was identified as having “suspect dark sediments”. These sediments may have been deposited due to the spill.
11. On Page 5, in the first paragraph, the COD was limited to the two dates which makes it impossible to determine any trends.
12. The use of aerators improved the DO in the C-1 canal, however after the removal of the aerators, the DO dropped significantly.
13. The water quality provided in Appendix B is missing the metadata, i.e. Agency ID and data qualifiers. The missing metadata makes it difficult to utilize the data.
14. There appears to be additional data in Appendix B that cannot be attributed to either the CITY or Broward County.
15. On Page 6, the “Water Quality Conclusions” may be misleading due to the general nature of the statements since this review identified several issues with the analysis.

Sediment Sampling Activities

1. On Page 6, a map of sampling locations was provided for the sediment cores collected by APTIM. No samples were collected downstream of the G-57 gate.
2. On Page 7, the first bullet under the Sediment Sample Evaluation heading states that a “consistent background bottom sediment composition is not present”. It is unclear what defines “consistent background bottom sediments”. Does this statement imply that background sediment conditions could not be found in G-16 and C-1?
3. On Page 8, in the first major bullet, the attribution of the observed sediment characteristics to the wastewater spill is limited as a more comprehensive analysis should be reported; specifically concentrations of the nutrients within the sediments should be reported.
4. On Page 8, second to last bullet, the letter describes a dark organic layer with a mean thickness of 0.49-inches, The letter does not present the methodology to determine the thickness of the suspect dark organic layer.
5. On Page 9, in the first bullet under “Sediment Sampling Conclusions”, the letter states “For gross comparison purposes only, a mass of sediment 1,000-ft long by 40-ft wide with an average of 0.5-inch (0.04167-ft) depth would equate to 1,666.7 cubic yards or 61.7 cubic yards.” First, what is of concern is the volume of sediment and not a mass. Second, there is an obvious error in the transcription that should read 1,667.8 cubic ft. Third, and most importantly, the letter fails to identify the specific cores used to define the depth of 0.5 inches.

6. On Page 9, it is unclear what “remnant berm sands” are and how are they differentiated from the other material present. Also, what is the relevance of “remnant berm sands”?

Conclusion and Recommendations

Based on the information provided in the letter “**Accidental Wastewater Discharge Plan - Letter Report Break of 42” Sewer Force Main at NW 15th Street and I-95 Pompano Beach, FL**” dated April 4, 2019, it is difficult to determine the relative influence of the magnitude and the timing of the spill, rainfall events and the effects of the aerators on the water quality response in the C-1 and G-16 Canals. The spatial extent and volume of the sediments affected by the wastewater spill are still not well defined, thus the ability to prepare a Sediment Remedial Action Plan is severely limited.

Based on this review, the following recommendations are offered:

1. A sediment survey of the area between structure G-57 and the Intracoastal Waterway should be conducted, including the finger canals along the Pompano Canal, particularly where fecal coliform sampling indicated the presence of spill material. This sampling would entail a series of cores along the canal, including the finger canals. The sediments would be characterized by both physical and chemical characteristics, which will provide the necessary information to direct remedial actions.
2. An estimation of the nutrient load from the spill should be presented.
3. A sentinel monitoring program should be instituted to identify the onset of any latent effects from the spill for a period of one year.
4. Based on our review of the Broward County spill protocols, we suggest including the *E. coli* and *Enterococci* bacterial indicators, DO profiles and nutrient sampling.
5. Given the inherent risks associated with a Sediment Remedial Action Plan that allows for a natural bio-degradation option (i.e., no removal of sediment), the nutrient load from the sediments should be quantified.