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January 31, 2019

Mr. Carlos Adoriso
Broward County Environmental Protection and Growth Management Department
Environmental Engineering and Permitting Division
1 North University Drive, Mailbox 201 • Plantation, Florida 33324

**Subject: Accidental Wastewater Discharge Restoration Plan
Break of 42" Sewer Force Main at NW 15th Street and I-95
Pompano Beach, FL**

Dear Mr. Adoriso:

On behalf of the City of Pompano Beach (COPB) and SICE, Inc. (SICE), Aptim Environmental & Infrastructure, LLC. (APTIM) is pleased to provide Broward County Environmental Protection and Growth Management Department (BCEPD) with this Discharge Restoration Plan in relation to the above referenced incident. This plan is provided in response to your letter dated January 16, 2019 (**Attachment 1**).

Background

On Friday January 4, 2019, a construction accident caused by a subcontractor working for the Florida Department of Transportation (FDOT) ruptured a 42" pressurized sewage pipe which spilled untreated sewage into the canal system from NW 15 Street east to the Intracoastal Waterway. Prince Contracting, LLC (PRINCE), SICE, and the COPB implemented immediate emergency actions to repair the damage and contain the raw sewage. On January 10, 2019, the above-grade bypass was fully installed and stopped the spillage of sewage into the canal system. On January 12, 2019, the original 42" force main pipe was permanently repaired, put back in service, and removal of the bypass began.

The damaged sewage pipe was owned and operated by COPB, PRINCE is the Prime Contractor that was awarded the FDOT roadway project, SICE is a Subcontractor to PRICE, and Arc Electric is a subcontractor to SICE. It our understanding the sewer pipe was accidentally ruptured by a directional drilling bore that was completed under the direction of Arc Electric.

Emergency Response Efforts

Emergency Response actions were put into action immediately at the direction of COPB, FDOT, Prince, and SICE. The remediation efforts included the following: repair attempt on January 5 & 6, 2019, placement of an earthen dam to hold back sewage, vacuum trucks placed at ~80 lift stations to operate system short term, installation of nine turbidity barriers in the C-1 canal between 15th Street Canal and

the Florida East Coast Railway, LLC (FECR) crossing. COPB also notified all affected residents of the discharge, posted warning signs, and distributed notices (door hangers) warning of no swimming, no irrigation from canal water and no fishing to all properties adjacent to canals impacted by the sewage spill.

On January 9, 2019, the first five (5) aerators were placed in the canals to increase the dissolved oxygen present the canals and stimulate bio-degradation of the fecal bacterial and associated wastewater nutrients. Additionally, industrial vacuum trucks were mobilized to the spill site and began a week long effort to remove all floatable solids trapped by the turbidity curtains, gate structures, & culverts located in the C-1 canal. Daily inspection and removal of dead fish both east and west of the G-57 structure also began.

A daily sampling program was put in to effect on January 7, 2019 and is handled by COPB and BCEPD. The sampling plan has since been expanded to include additional points along the Pompano Canal west of I-95 and end points of tidal "finger" canals east of the SFWMD structure G-57. Results from the analysis have been publically reported on a daily basis by COPB.

On Wednesday January 29, 2019, SICE, COPB, and LANZO Companies (LANZO) began implementation of the Surface Water Aerator Implementation & Removal Plan. As part of this plan, aerators located east of the G-57 structure were removed if the fecal coliform data showed a five (5) consecutive day trend with values below the Class II Surface Water Standard of 800 colony forming units per 100 ml (cfu) set forth in § 27-195 - Water Quality Standards and Chapter 62-302.530, Florida Administrative Code. The placement & quantity of aerators will be evaluated on a daily basis and modified according to the plan. A copy of the Surface Water Aerator Implementation & Removal Plan is included as **Attachment 2**.

Discharge Restoration Plan

In a letter dated January 16, 2018, BCEPD requested a plan from COPB describing the methods and timelines associated with the following:

1. Inventory all canal and waterways impacted by the sewage spill;
2. Determine the amount of sewage sludge/waste accumulated on the bottom of the canals and waterways as a result of the sewage spill (The City can propose sediment core sampling or any other appropriate methods to determine the accumulation of sewage sludge/waste on the bottom of the canals and waterways);
and
3. Remove all sewage sludge/waste accumulated on the bottom of the canals and waterways as a result of the sewage spill.

Inventory of impacted waterways

The maximum lateral extent of impact in the canal system can be extrapolated based the available fecal indicator bacteria and field turbidity data collected and analyzed by COPB and BCEPD. The data available to us at this time suggests that COPB began collecting daily surface water samples on 1/8/19 and BCEPD began collecting surface water samples on 1/6/19. The daily sampling data from COPB and

BCEPD is being collected, verified, evaluated, and compiled along with the results from historical surface water sampling data collected from the surrounding area. Once fully compiled, the sampling locations and data will be extrapolated and presented on a scaled figure. Based on an interpretation of the lab and field measured data, available flow velocity from gate structures (pre and post discharge), and the effects of tidal influence east of G-57 structure, the potential lateral distribution of fecal coliform and turbidity will be interpolated and presented on a scaled figure. This data may also be used to evaluate canal conditions by review of historical cfu concentrations reported in affected and non-affected canals.

In order to comply with the the timeline of this deliverable, a preliminary figure has been prepared. This figure is based only readily available surface water fecal coliform data and a rough approximation of lateral distribution (**Figure 1**).

Determine the amount of sewage sludge/waste accumulated on the bottom of the canals and waterways as a result of the sewage spill

The amount of domestic wastewater discharged onto the canal system was reported by COPB to be a total of 39 million gallons over the six day period. In order to confirm this number, the flow rates recorded in DBHYDRO at South Florida Water Management structures was evaluated by APTIM. Based on our review, the total discharge about appears to be accurate.

Based on literature review, domestic sewage contains approximately 99.9% water and the remaining part includes organic and inorganic, suspended and dissolved solids, together with microorganisms (Biological Wastewater Treatment Series, Volume One, Wastewater Characteristics, Treatment and Disposal, Marcos von Sperling, 2007).

In order to quantify the amount of solids discharged in the canals at 15th street, we must evaluate the following:

- Laboratory reports from laboratory analysis of representative domestic wastewater;
- Published literature values on size and state, chemical characteristics, and settleability of solids present in domestic wastewater;
- Physical flow barriers present in the canal system;
- Measured flow velocity of the canals from DBHYDRO;
- Published literature values for transport rates of settleable solids present in domestic wastewater;
- Total amount of floating solids (related to domestic wastewater) removed from the canals by COPB, FDOT, Prince, and SICE; and
- Total amount clean soil added and/or removed from canal by FDOT and PRINCE as a result of the sewer line repair

The intent is to develop an evidence-supported mass calculation methodology which will be used to determine the maximum amount of solids potentially discharged as a result of the line break. It is also our intent to use physical composition data to evaluate the potential distribution of those settleable solids in the system. All calculations must also be field verified to ensure accuracy. Once the data is fully verified,

the appropriate means and methods will be proposed to remove the settleable solids. Nonetheless, it can be reasonably assumed that the bulk of the settleable solids have settled in upper portions of the C-1 canal (near the spill site) due to the physical nature of the turbidity curtains, water control structures, and road culverts restricting the flow.

Potential means of field verification methods that we are currently evaluating are: bathymetric surveying, core sediment sampling, sonar, and dual frequency fathometers. Each method has pros and cons given the nature of this system that will require proof of concept testing prior to full scale implementation.

The work on this task is ongoing and once all data is obtained, compiled, and calculated, the results will be presented to BCEPD. An accurate completion timeline for this task can't be determined because we require further data from external sources and must complete several proof of concept tests. Additional proof of concept tests may be proposed based on the results of the tests presented herein.

Proof of Concept #1: C-1 Headwalls Sediment Sampling Tests:

APTIM proposes to advance sediment core samples from above surface in C-1 at the upstream headwalls of the control gates and culverts starting closest to SW 15th Street. This spot core sampling is intended to determine the whether traditional sediment sampling methods will be effective in this scenario given the following unknowns: thickness, composition, disposition, density, pre-spill canal depths, pre-spill sediment conditions, pre-spill sediment composition, post-spill stormwater depositing sand and silt into the canal and physical effects of mass aeration remediation efforts on pre-spill sediments. There is potential that sediment recovery may not be possible using this method and/or there may be no visible means to discern pre-spill sediments from post-spill sediments. Should core sampling yield no recovery, a dredge-style sampler will be attempted to see if material can be recovered.

Proof of concept sediment sampling in the upstream headwalls of the gates and/or culverts will start at NW 15th Street and move southward along the C-1 canal. The sampling location collocated with the gates and culverts identified on **Figure 1**.

Tentative start date: 1st week of February; Duration: 1-2 weeks

Proof of Concept #2: C-1 Headwalls Spot Vacuum Extraction Test:

Based on the results of the C-1 Headwalls Sediment Sampling Tests, APTIM proposes to conduct a test of submerged sediment vacuum removal. In this test, the industrial vacuum trucks that were used to remove the floating sediment south of NW 15th Street will return and attempt to remove the sediments on the bottom of the canal at the upstream headwalls. Once the vacuum truck has filled to capacity (~15 cubic yards), the holding tank will be tipped up and the liquids will be decanted to a nearby sanitary pump station. The remaining solids will be transported to Broward County Water and Sewer Department for disposal. The effectiveness of this method will be evaluated based on the water to sediment ratio of the final product going for disposal and the ability of the vacuum truck to operate effectively under these conditions.

Tentative start date: 3rd week of February*; Duration: 1-2 weeks (*contingent upon results of C-1 Headwalls Sediment Sampling Tests)

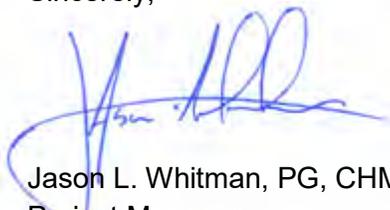
Remove all sewage sludge/waste accumulated on the bottom of the canals and waterways as a result of the sewage spill.

Full scale sediment removal at the bottoms of the canals is not feasible without information regarding the total amount, distribution, and thickness of the settleable solids. Once that data is developed, the means, methods and feasibility of sediment removal will be evaluated and presented to BCEPD for review.

COPB and SICE have authorized APTIM to begin the proof of concept tests next week. Please contact us immediately if BCEPD has objection to the proposed actions.

On behalf of all stakeholders, we request that BCEPD make every possible effort to review and return comments on this plan as quickly as possible. If you have any questions or comments concerning this document, please do not hesitate to call me directly.

Sincerely,



Jason L. Whitman, PG, CHMM
Project Manager
Aptim Environmental & Infrastructure, Inc.

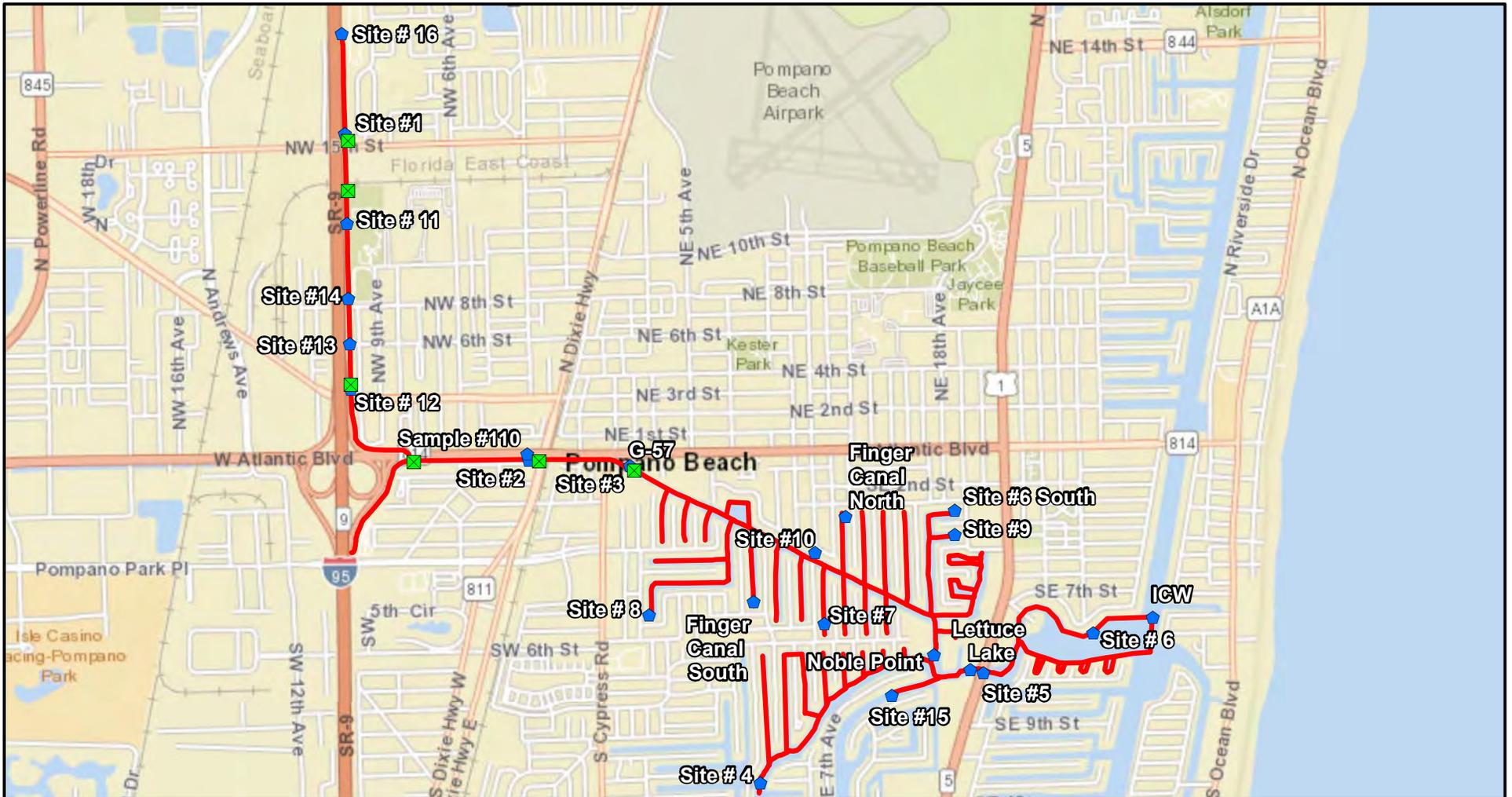
Phone: 786-299-7268

Email Address: jason.whitman@aptim.com

1st Draft for Agency Review

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FIGURE

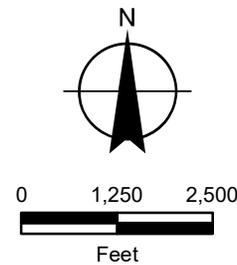


Legend:

- ◆ Surface Water Sampling Location
- Flood Gate or Culvert
- Fecal Coliform >800 colony forming units (cfu)

Notes:

1. Background imagery is ESRI World Street basemap.



SICE
14350 NW 56th Court, Suite 105
Miami, FL 33054

Fecal Coliform Accident Wastewater Spill

FIGURE
NUMBER

1

**Estimated Maximum Extent of
Fecal Indicator Bacteria
in Surface Water**



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ATTACHMENT 1



Sent via email to: randolph.brown@copbfl.com

January 16, 2019

Randolph Brown, Utilities Director
100 West Atlantic Boulevard
Pompano Beach, FL 33060

Subject: Break of 42" Sewer Force Main at NW 15th Street and I-95

Dear Mr. Brown,

This letter follows the letter sent to you on January 9, 2019, regarding the subject sewer main break. Several canals and waterways within the City of Pompano Beach (City) have been impacted by the sewage spill. In addition to the items requested in the January 9 letter, at this time we are requesting the City to submit a plan describing methods and timelines the City will implement to:

1. Inventory all canal and waterways impacted by the sewage spill;
2. Determine the amount of sewage sludge/waste accumulated on the bottom of the canals and waterways as a result of the sewage spill (The City can propose sediment core sampling or any other appropriate methods to determine the accumulation of sewage sludge/waste on the bottom of the canals and waterways); and
3. Remove all sewage sludge/waste accumulated on the bottom of the canals and waterways as a result of the sewage spill.

The plan shall be submitted for approval to the Broward County Environmental Protection and Growth Management Department (EPGMD), Environmental Engineering and Permitting Division (EPPD), no later than January 31, 2019.

The EPPD is continuing its evaluation of this case and will make a determination as to whether enforcement actions are warranted, which could include civil penalties of up to \$15,000 per day per violation.

If you have any questions regarding this matter, please contact Carlos Adorisio at 954-519-1206 (cadorisio@broward.org).

Sincerely,

A handwritten signature in cursive script that reads "Sermin Turegun".

Sermin Turegun, Director
Environmental Engineering and Permitting Division

cc: Lenny Vialpando, Deputy Department Director, EPGMD

1st Draft for Agency Review

ATTACHMENT 2

SURFACE WATER AERATOR IMPLEMENTATION & REMOVAL PLAN

Goals:

Reduce coliform levels to meet Broward County Surface Water standard of 800 colony forming units per 100 ml (cfu) using portable aerators to increase dissolved oxygen content in the canals and stimulate natural biodegradation of organic compounds and coliform.

Operate aerators in canal locations where surface water treatment is needed.

Removal aerators when treatment is no longer necessary.

Indicators:

Fecal coliform reported greater than 800 cfu may represent spill impacted surface water per Broward County Surface Water Standards. Based on historical results, cfu values greater than 800 may be the result of other activities in addition to the 2019 spill.

After five (5) consecutive days of reported fecal coliform below 800 cfu, the surface water is assumed representative of pre-spill conditions.

Continue routine testing for fecal indicator bacteria in canals both east and west of G57 to monitor water quality.

Action Steps:

Remove aerators when fecal coliform is reported below 800 cfu for five (5) consecutive days:

- East of G57: Per 1/25/19 data, fecal coliform was reported below 800 cfu at all ten (10) sampling locations for eight (8) consecutive days or longer.
- West of G57, Per 1/25/19 data, fecal coliform was reported above 800 cfu at three (3) of the seven (7) sampling locations in most recent sample.

Continue to focus aerations efforts in all canal areas with reported fecal coliform greater than 800 cfu:

- Modify aerator locations based on daily review of water quality results (as needed).
- Modify aerator quantities based on daily review of water quality results (as needed).