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Subject: Former Barrett Manufacturing and Mica Roofing Sites
Site Characterization Work Plan Addendum for a
Pre-Design Investigation to Characterize Grossly Contaminated Material in Soil
and Additional Forensics Samples

Dear Mr. Wu,

Pursuant to Order on Consent 2-20160111-14, please find attached a Site Characterization Work Plan Addendum for a Pre-Design Investigation to Characterize Grossly Contaminated Material in Soil and Additional Forensics Samples at the subject sites. The original draft Site Characterization Work Plan for the former Barrett Manufacturing and Mica Roofing Sites, Brooklyn, New York was submitted to the NYSDEC on April 11, 2016.

If you have any questions in regards to the information provided herein, feel free to contact me at 302-791-6738.

Regards,

Steve Coladonato

Honeywell

cc: Andrew Guglielmi, Esq., NYSDEC Office of General Counsel (letter only)
Gardiner Cross, NYSDEC Section Chief
Krista Anders, NYS Department of Health
Jeremy Karpatkin, Esq., Arnold & Porter LLP
James O'Loughlin, Parsons
Paul Feshbach-Meriney, Parsons

**Site Characterization Work Plan Addendum for Pre-Design Investigation
to Characterize Grossly Contaminated Material in Soil and Additional Forensics Samples at the
Former Barrett Manufacturing and Mica Roofing Sites
Brooklyn, New York**

This Site Characterization Work Plan (SCWP) Addendum is designed to collect data on soils that contain grossly contaminated material (GCM) to support the evaluation of NAPL (tar) mobility in the soils. The results will inform the design of the planned vertical barrier wall along the Gowanus Canal. It also contains a description of additional forensics samples.

The draft SCWP for the Former Barrett Manufacturing and Mica Roofing Sites was originally submitted to New York State Department of Environmental Conservation (NYSDEC) on April 11, 2016. The SCWP was approved by NYSDEC with modifications in a letter dated July 25, 2015 [*sic*].

Pre-Design Investigation of GCM

The Pre-Design Investigation (PDI) is designed to collect targeted subsurface soil samples that are known to contain GCM based on previous remedial investigations by Langan (2014, 2016). These targeted soil samples will be submitted for laboratory analyses to characterize the nature of the NAPL and evaluate NAPL mobility. The three areas designated for soil borings and soil sample collection are as follows:

1. Southern portion of the Site to characterize the shallow, limited occurrences of GCM in soil borings SB-14 and EB-09.
2. Northern portion of the Site to characterize the deep, limited occurrences of CGM in soil boring GB04/OW01.
3. Central-western portion of the Site to characterize GCM in soil borings MW-9 and MW-3. These borings will characterize GCM that is located within the shallow zone (less than 20 feet) as well as GCM that extends below that depth.

The locations of the proposed soil borings in these three areas are provided in **Figure 1**. A summary of the soil sampling and analyses is provided on **Table 1**.

The PDI for NAPL/tar characterization and mobility will contain the following elements:

- Mark out of drilling locations in the field and surface geophysics to identify subsurface utilities.
- Vactron / air knife clearance of the drilling locations to 5 feet below ground surface (bgs).
- Drilling of soil borings with a direct-push Geoprobe® rig and collection of soil samples using a 3-inch diameter four-or five-foot Macro-core sampler. The targeted sample intervals will be collected from 1 foot above and below the GCM target zones, as described below:
 - Southern Portion: Drilling of two soil borings (PDI-SB01 and PDI-SB02) adjacent to former borings SB-14 and EB-09. At SB-14, the sample core will be collected from 8 to 11 feet to include the 9 to 10 foot target GCM zone. At EB-09, the sample core will be collected from 9 to 14 feet to include the 10 to 13 foot target GCM zone.
 - Northern Portion: Drilling of one soil boring (PDI-SB03) adjacent to former boring GB04/OW01. At this location, one sample core will be collected from 29 to 33 feet to

include the 30 to 32 foot target GCM zone, and a second core will be collected from 39 to 47 feet to include the 40 to 46 foot target GCM zone.

- Central-Western Portion: Drilling of two soil borings (PDI-SB04 and PDI-SB05) adjacent to former borings MW-3 and MW-9. At MW-3, the sample core will be collected from 5 to 28 feet to include the 6 to 27 foot target GCM zone. At MW-9, the sample core will be collected from 7 to 13 feet to include the 8 to 12 foot target GCM zone, and a second sample core will be collected from 25 to 29 feet to include the 26 to 28 foot target GCM zone.
- Field Preparation of Macro-core samples: Upon retrieval from the bore hole, each macro-core will be immediately flash frozen using dry ice to preserve the sample and liquids in an undisturbed state.
- Laboratory analysis of targeted soil GCM zones using test parameters that will characterize the NAPL/tar and provide data to evaluate NAPL/tar mobility at PTS Laboratories, as follows:
 - Core photography (white and UV light),
 - Pore fluids (% NAPL and % Water),
 - Soil grain size analysis,
 - Residual saturation by water drive, and
 - Free product mobility (by centrifuge).
- Evaluation of the mobility of NAPL/tar based on the collective lines of evidence, including the laboratory results.

Additional Samples

- In addition to the GCM investigation, several samples for source characterization will be collected from potential source areas previously identified in historical soil samples GP-2/MW-3 (2-3ft), MW-2/SB7 (2-4 feet and 8-12 feet), EB-3 (3-5 feet and 5-6 feet), MW-8 (13-15 feet), MW-7 (21-23 feet), and SB-19 (19-20 feet). These samples will be submitted for forensic analyses (total petroleum hydrocarbons, alkylated and parent PAHs, and biomarkers). The proposed locations are from the central and northern portions of the site and include:
 - Soil boring GCMSC-01 near GP-2 and MW-3, soil samples of GCM will be collected from 2-3 feet,
 - Soil boring GCMSC-02 near EB-03, soil samples will be collected from 3-5 and 5-6 feet.
 - Soil boring GCMSC-03 near SB-7 and MW-2 and, soil samples will be collected from 2-4 feet and 8-12 feet,
 - Soil boring GCMSC-04 near MW-8, soil samples of GCM will be collected from 13-15 feet,
 - Soil boring GCMSC-05 near MW7, soil samples of GCM will be collected from 21-23 feet,
 - Soil boring GCMSC-06 near SB-19, soil samples of GCM will be collected from 19-20 feet.

Assumptions:

- Access to the Red Hook Smith Street Site will be provided, and storage of equipment/supplies and decontamination of drilling equipment can be performed on the Site.

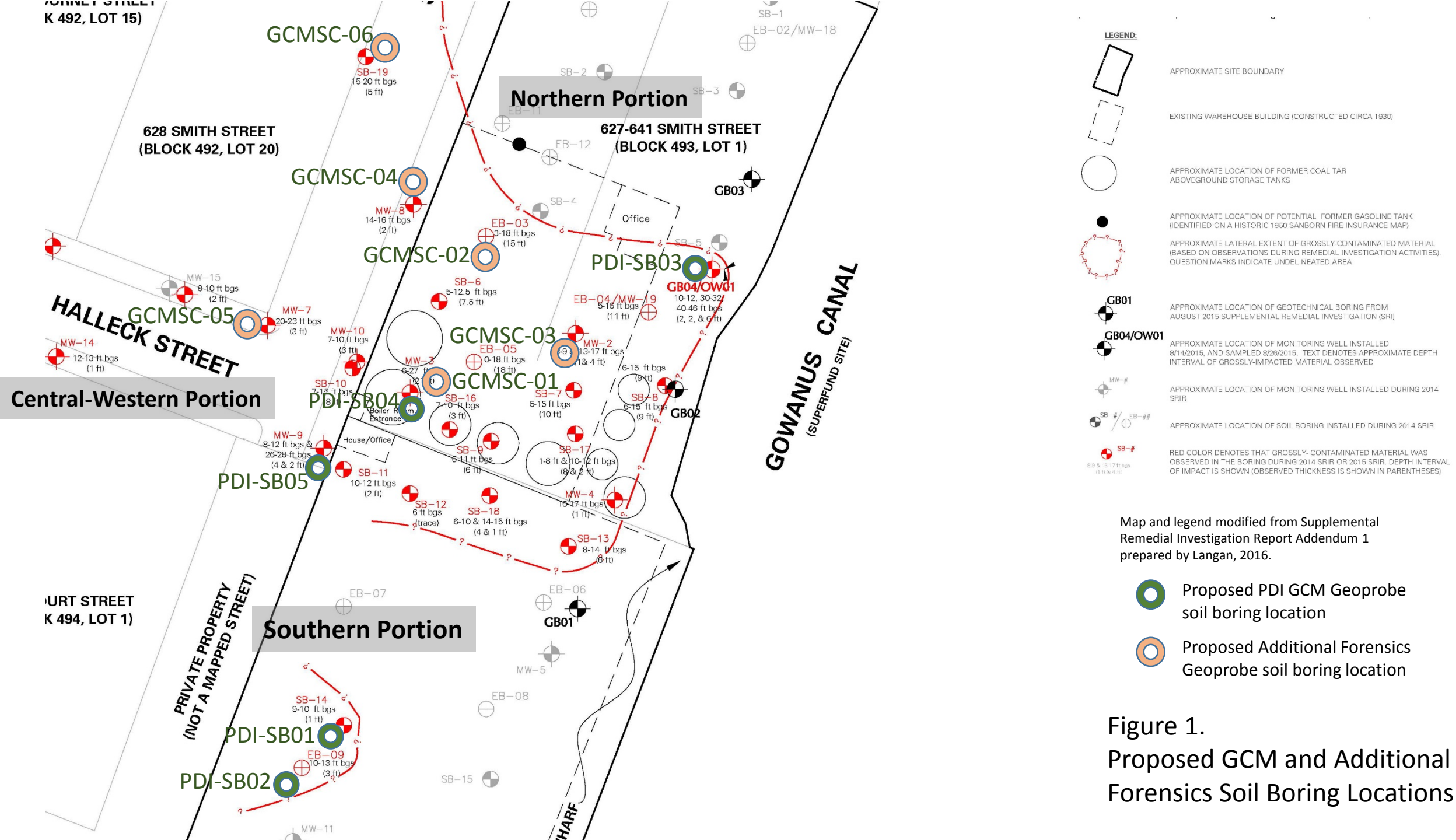


Table 1. Proposed Soil Borings and Sampling and Analyses
PDI for GCM in Soil and Additional Forensics Samples
Site Characterization Work Plan Addendum
Former Barrett Manufacturing and Mica Roofing Sites
Brooklyn, New York

Area / Portion of Site	Previous Boring ID	Existing GCM Zone(s) (ft bgs)	General Soil Type	Proposed Soil Boring ID ⁽³⁾	Proposed Interval for Continuous Macro-Core Samples (ft bgs)	Proposed Laboratory Analyses
PDI						
Southern	SB-14	9 to 10	Silt, some med. Sand	PDI-SB01	8 to 11	NAPL characterization and mobility ⁽¹⁾ Forensic analyses ⁽²⁾
	EB-09	10 to 13	fine Sand, some silt	PDI-SB02	9 to 14	NAPL characterization and mobility ⁽¹⁾ Forensic analyses ⁽²⁾
Northern	GB04 / OW01	10 to 12 30 to 32 40 to 46	fine silty sand & medium to fine sand	PDI-SB03	29 to 33 39 to 47	NAPL characterization and mobility ⁽¹⁾
Central-Western	GP-2 / MW-3	6 to 27	medium Sand	PDI-SB04	5 to 28	NAPL characterization and mobility ⁽¹⁾
	MW-9	8 to 12 26 to 28	Not Available	PDI-SB05	7 to 13 25 to 29	NAPL characterization and mobility ⁽¹⁾
Additional						
Central	GP-2 / MW-3	6 to 27	medium Sand, clay and silt	GCMSC-01	2 to 3	Forensic analyses ⁽²⁾
Northern	EB-03	3 to 18	Not Available	GCMSC-02	3 to 5 5 to 6	Forensic analyses ⁽²⁾
Central	SB-7 / MW-2	5 to 15 / 8 to 9 & 13 to 17	fine to medium Sand, silt	GCMSC-03	2 to 4 8 to 12	Forensic analyses ⁽²⁾
Northern	MW-8	14 to 16	Not Available	GCMSC-04	13 to 15	Forensic analyses ⁽²⁾
Central - Western	MW-7	20 to 23	Not Available	GCMSC-05	21 to 23	Forensic analyses ⁽²⁾
Northern	SB-19	15 to 20	fine Sand some silt	GCMSC-06	19 to 20	Forensic analyses ⁽²⁾

Notes:

- 1) NAPL characterization and mobility testing will be performed at PTS labs and includes the following: core photography, pore fluids, grain size analysis, residual saturation by water drive, and free product mobility (by centrifuge).
- 2) Forensic analyses includes total petroleum hydrocarbons, alkylated and parent PAHs, and biomarkers.
- 3) More than one boring may be performed at each location in to allow visual observation of GCM and collection of sufficient sample volume for laboratory testing.