APPENDIX L

ARCHAEOLOGICAL MONITORING REPORT (DRAFT)

ARCHAEOLOGICAL MONITORING REPORT

30% FIELD ACTIVITIES, RESTORATION OF FIRST STREET TURNING BASIN GOWANUS CANAL

BOROUGH OF BROOKLYN, NEW YORK

JANUARY 2018

Prepared for

NYC DDC Department of Design and Construction

Project ID: PW77GOWAN
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Submitted by:

AKRF | KSE
The AKRF-KSE JV

Tables

Figures

List of Acronyms

bgs	below ground surface
CAG	Community Advisory Group
CEQR	City Environmental Quality Review
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C §§ 9601-9675
CFR	Code of Federal Regulations
CSO	combined sewer overflow
EPA	U.S. Environmental Protection Agency
FROGG	Friends & Residents of Greater Gowanus
LPC	New York City Landmarks Preservation Commission
MLLW	mean lower low water
MRCE	Mueser Rutledge Consulting Engineers
NAVD88	North American Vertical Datum of 1988
NPL	National Priorities List
NPS	National Park Service
NR	National Register of Historic Places
NYAC	New York Archaeological Council
NYC	New York City
NYCDDC	New York City Department of Design and Construction
RA	remedial action
RAO	remedial action objectives
RD	remedial design
ROD	Record of Decision
SHPO	State Historic Preservation Office
SOW	Statement of Work
USACE	U.S. Army Corps of Engineers

1. Introduction

1.1 Project Overview

This Archaeological Monitoring Report ("the Monitoring Report") describes the archaeological field and analytical tasks completed during ground surface disturbing activities associated with the 30% Field Activities performed for developing a remedial design for the excavation and restoration of the former First Street Turning Basin located in Brooklyn, New York ("former basin" or "Site"). A location map of the former basin is provided as Figure 1.

The selected remedy was described in the Record of Decision (ROD) issued by the United States Environmental Protection Agency (EPA) on September 27, 2013 under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) for the Gowanus Canal Superfund Site (EPA 2013). This Monitoring Report was prepared in accordance with the Administrative Order for Remedial Design ("the Order") issued to New York City (NYC) by the EPA on May 28, 2014, which included a Statement of Work (SOW) further defining the selected remedy and remedial action (RA) (EPA 2014).

NYC procured a contractor (AKRF-KSE Joint Venture) for the remedial design for the excavation and restoration of the filled-in former First Street Turning Basin. The objective of the remedial design (RD) is to collect data, design various components for the selected remedy, and prepare drawings, specifications, and project plans for implementation of the remedial action (RA) achieving the criteria identified in the ROD, Order, and associated SOW for implementation of the selected remedy.

1.2 Monitoring Report Organization

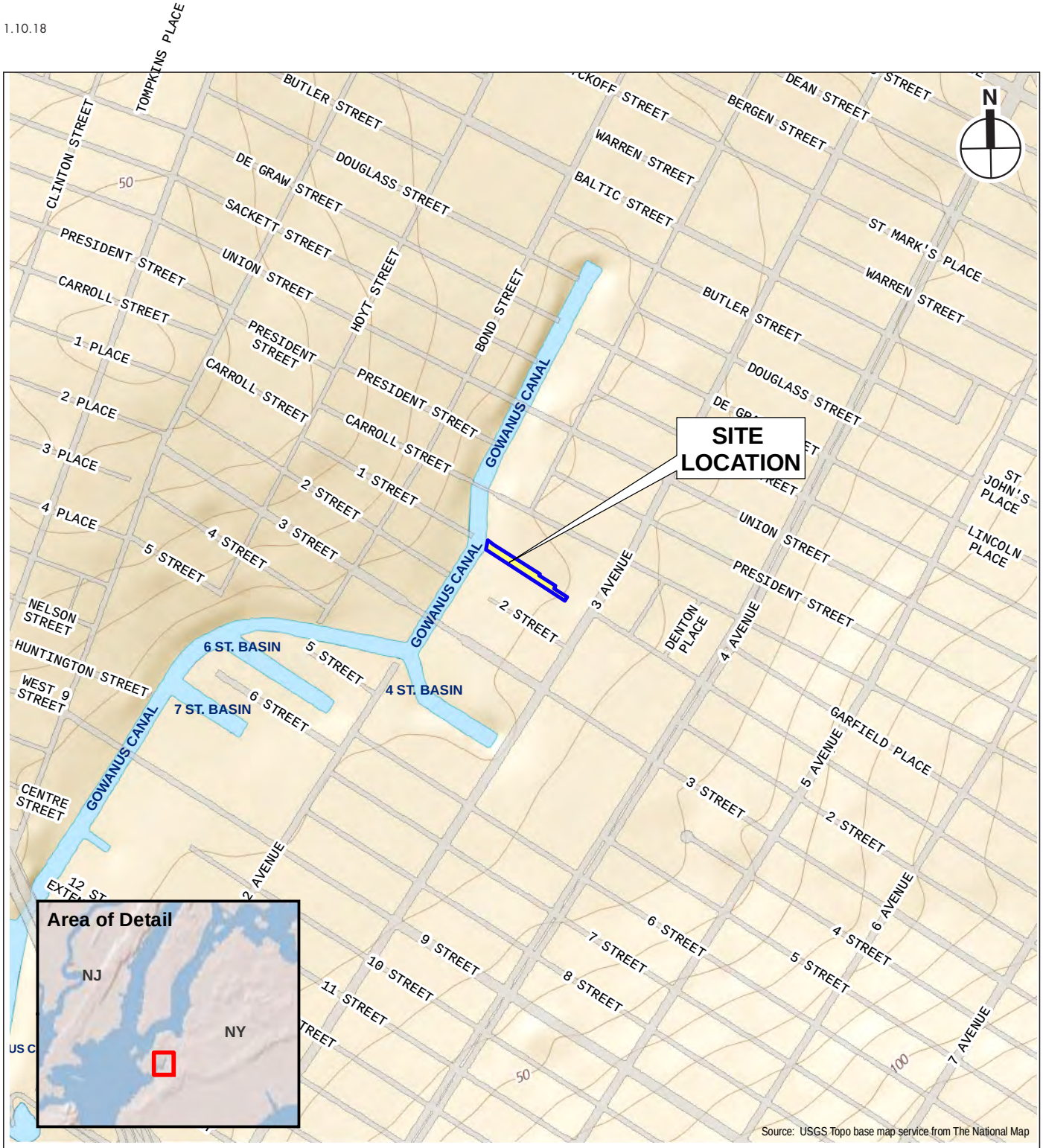
This Monitoring Report was prepared in accordance with relevant EPA guidance (EPA 2003) and to satisfy the requirements set forth in the ROD (EPA 2013) and Order SOW (EPA 2014). This report has been organized into sections as described below.

- **Section 1–Introduction**: Provides an overview of this Monitoring Report, the regulatory framework, and a description of the selected remedy.

- **Section 2–Methods**: Provides a description of the monitoring methods followed during the 30% Field Activities.

- **Section 3–Site Description and History**: Provides background information on the Gowanus Canal (canal), its historic development, previous cultural resource investigations, and a description of the types of archaeological and historic resources that could be affected by the 30% Field Activities and implementation of the RA.

- **Section 4–Results of Survey**: Provides a description of the results of monitoring the excavated test pits, a review of the bulkhead inspection report, and a review of the geotechnical and environmental soil boring logs.



CAPITAL PROJECT: PW77GOWAN
PRELIMINARY AND FINAL DESIGN SERVICES
FOR EXCAVATION AND CAPPING OF FILLED
FIRST STREET TURNING BASIN GOWANUS CANAL

0 800 1,600
Feet

Site Location

- **Section 5–Conclusions and Recommendations**: This final section provides conclusions of the monitoring effort and recommendations for future monitoring and consultation that will be incorporated into the archaeological monitoring procedures followed during the RA.

- **Section 6–References**: Provides a list of references used in preparation of this Monitoring Report.

1.3 Regulatory Framework

EPA is the lead regulatory agency for the First Street Turning Basin and the Gowanus Canal Superfund Site. This federal agency will review and approve plans, drawings, reports, and schedules submitted for the 30% Field Activities, RD, and RA as documented in the Order and SOW (EPA 2014). This Monitoring Report has been prepared for the review of the New York State Historic Preservation Office (SHPO), the New York City Landmarks Preservation Commission (LPC), and the Archaeology Committee of the Community Advisory Group (CAG)[1].

1.4 Remedial Action Objectives

Performance standards include the cleanup standards, Remedial Action Objectives (RAOs), and other measures of achievement of the goals of the remedy selected in the ROD (EPA 2013). The RD will be developed pursuant to the SOW such that the RA will achieve compliance with the Performance Standards (EPA 2014). The RD Work Plan does not address reduction of combined sewer overflow (CSO) solids to the canal, remediation of contaminated sediments in the canal itself, nor the remediation of upland sources of contamination from the three former Manufactured Gas Plant (MGP) sites and other sites adjacent to the canal (referred to as the upland sites).

As stated in the ROD, the selected remedy for the former basin is "excavation and restoration of approximately 475 linear feet of the filled-in former First Street Turning Basin" (EPA 2013).

The selected remedy substantially consists of the following elements:

- Removal of soil and buried sediment to a presumptive depth of approximately 26 feet below ground surface (bgs) at approximately -18 feet (North American Vertical Datum of 1988 [NAVD88]).

- Installation of a cap on the exposed surface at the excavation bottom.

- Restoration/installation of three sides of the perimeter of the restored basin (north, south, and east) with a bulkhead and/or wetland vegetation.

- Restoration of the fourth side of the perimeter (west) such that the former basin is again open to the canal.

[1] The SHPO, LPC, and Archaeology Committee will also be consulted as necessary during the course of completing the RA.

2. Methods

The monitoring methods followed were previously described in a Monitoring Plan dated May 2017 prepared in coordination with EPA and approved by NYC Department of Design and Construction (DDC) in July 2017. All archaeological work followed the rules and regulations established by Section 106 of the National Historic Preservation Act, 36 CFR 800—Protection of Historic Properties, and was undertaken in keeping with the current guidelines of SHPO, LPC, and the New York Archaeological Council (NYAC). The State and National Register of Historic Places (S/NR)-eligible Gowanus Canal Bulkhead and potential sunken ships were the primary focus of this Monitoring Plan. Since the entirety of the former basin is sensitive for the presence of these two resource types, a field archaeologist was present to monitor all excavation activities. This section describes the types of ground surface disturbing activities that occurred during the 30% Field Activities and details the field methods followed during the course of the monitoring effort.

2.1 Objectives and Research Goals of Monitoring

The objectives of this monitoring program were to (1) ascertain the presence or absence of archaeological resources in the ground surface disturbed areas; (2) to determine the integrity of encountered archaeological resources; (3) to assess the likelihood of the RA to affect additional archaeological resources; and (4) provide guidance regarding archaeological monitoring activities to be completed during the RA. The specific goals of the field investigation are to document encountered resources; identify functional characteristics, construction technology, and materials used; and to document and/or sample artifacts in the fill present in the former basin or contained within the timber cribwork associated with the bulkhead to attempt to establish the composition and possibly the origin of the fill.

2.2 Ground Surface Disturbing Activities

Ground surface disturbing activities consisted of the advancement of soil borings, installation of groundwater monitoring wells (or piezometers), and the excavation of test pits. As part of these activities, a non-invasive geophysical survey (e.g., ground penetrating radar) was conducted to attempt to locate any underground utilities or sub-surface obstructions/structures that may interfere with soil borings advancement and/or test pit excavation in a safe manner.[2]

Soil borings were performed to assess the nature and quality of the fill/soil material and support the RD, as well as to confirm the presence or absence of coal tar-related MGP contamination.

A total of six test pits were excavated by a track-mounted excavator. The test pits ranged in length from 10 to over 30 feet and were all excavated to at least 8 feet bgs.

[2] Due to the presence of large quantities of metallic refuse in the fill the geophysical survey was unsuccessful.

2.3 Archaeological Monitoring

A field archaeologist was on-site to monitor the excavation activities. The field archaeologist was positioned in close proximity to the excavations, within the limits of acceptable worker safety (29 CFR 1926, Subpart P–Excavations) and ensured that the excavator operator was aware of the types of resources that may be encountered during excavation. During monitoring, the field archaeologist periodically requested that excavation pause to allow the archaeologist to enter the test pit to inspect and document the test pit, when possible. When it was not possible to enter the test pit due to its depth or other reason, all observations were made from the ground surface adjacent to the excavation. The archaeologist collected artifacts from the excavated soil and took photographs as necessary.

Each test pit was documented using standard nomenclature and its location was established using measuring tapes and an on-site datum. Artifacts were noted but were not systematically collected do to their lack of archeological significance, recent origin, and the disturbed context of the soils within which they were observed.

2.4 Artifact Processing

The artifacts observed during excavation of the test pits were encountered within mixed soil layers of unknown origin that were used to incrementally and informally fill in the basin during the 1960s and 1970s. These materials consisted almost exclusively of modern refuse such as plastic packaging material, demolition debris, and automotive parts such as car tires. Due to the total lack of archaeological research value and context, artifacts were not systematically collected and analysis was unnecessary.

3. Site Description and History

3.1 Site Description

The Gowanus Canal is a brackish, tidal arm of the New York-New Jersey Harbor Estuary, extending approximately 1.8 miles through Brooklyn, New York (Figure 1). The approximately 100-foot-wide channel runs southwest from Butler Street to Gowanus Bay and Upper New York Bay. Based on historical aerial photographs, the former First Street Turning Basin was approximately 475 to 560 feet long by 50 to 60 feet wide, and part of the Gowanus Canal surface waterway system until between 1954 and 1966, when it was filled in by unknown party(s). The approximate boundaries of the former basin project area are illustrated on Figure 2.

3.2 Site History

According to the ROD, the former basin was originally utilized, among other purposes, to deliver coal via barges to an adjacent electric generating station ("the Powerhouse") originally built to provide power to the former Brooklyn Rapid Transit Authority subway system, which was later incorporated into the NYC's Transit system in 1940. The Powerhouse began operation in 1904. During operations, it consumed large quantities of coal, fed from coal piles which surrounded the building and were located adjacent to the canal. Based on a review of aerial photographs, the former basin was filled during the 1950s and 1960s, after the Powerhouse became obsolete and was removed from service, although additional filling may have occurred during more recent decades. The Powerhouse itself was dismantled over the years, and by 1969, the currently extant section of the Powerhouse was the only part of the complex still standing. In 2012, the Powerhouse was purchased for potential re-development as non-profit artist studios and display space.

3.3 Previous Cultural Resource Investigations

The archaeological sensitivity of the canal and its immediate vicinity has been the subject of the following comprehensive surveys:

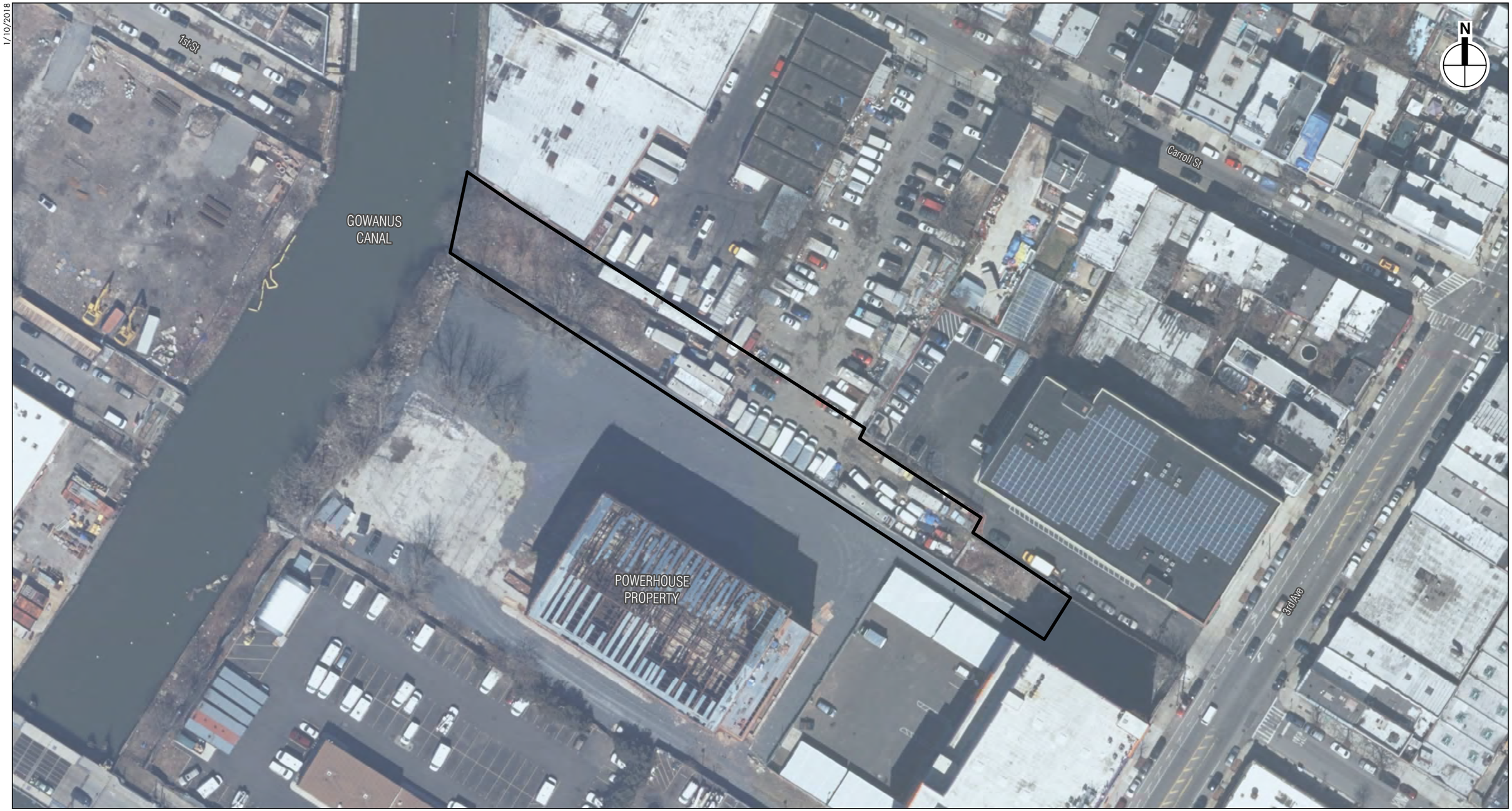
- *National Register of Historic Places Eligibility Evaluation and Cultural Resources Assessment for the Gowanus Canal*[3], prepared for the United States Army Corps of Engineers (USACE) by Hunter Research, Inc., Raber Associates, and Northern Ecological Associates, Inc. (Hunter et al. 2004);

- *Archaeological Sensitivity Study, Gowanus Canal*[4], prepared for the United States Environmental Protection Agency (USEPA) by Hunter Research, Inc. (Hunter et al. 2011); and

[3] Conducted as part of an ecosystem restoration study of the Gowanus Canal.

[4] Conducted as part of EPA's process of assessing the feasibility and alternatives for remediating environmental contamination associated with the Gowanus Canal.

1/10/2018



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Approximate Site Boundary

0 180 FEET

ARCHAEOLOGICAL MONITORING REPORT

Site Plan
Figure 2

- *Gowanus Canal Area Historic Resources Inventory and Limited Phase 1A Documentary & Archaeological Sensitivity Report*[5], prepared for Friends & Residents of Greater Gowanus (FROGG) by Gregory Dietrich Preservation Consulting and Chrysalis Archaeological Consultants, Inc. (Chrysalis) (Loorya and Dietrich 2012).

In addition to the above studies, several smaller project sites in the vicinity of canal have been the subject of various levels of archaeological survey and the Archaeology Committee of the CAG has compiled information concerning the likely pre-canal activities/uses associated with areas in close proximity to the former basin.

The Sensitivity Study specifically identifies two classes of "sites of potential archaeological interest": sites with a "very low to low" likelihood of being intact and sites with a "greater certainty" of being intact (Hunter Research, Inc. 2011). The *Sites of Low Archaeological Potential* identified in the report located in the general vicinity of the basin consist of the following:

- *Prehistoric Archaeological Potential*–An area of prehistoric archaeological sensitivity was identified in the vicinity of the canal between Douglass Street and 3rd Street.

- *Tide Mill Complex Sensitivity*–This complex was located on the east side of the canal between Sackett Street and 3rd Street.

- *Revolutionary War Burial Sensitivity*–Two potential sites of Revolutionary War burials have been identified, one on the east side of the canal between 1st and 3rd Streets and the second in the vicinity of 7th Street and 8th Street on Third Avenue, approximately 500 feet east of the canal.

The *Sites of High Archaeological Potential* identified in the report consist of:

- *Canal Bulkhead Sensitivity*–The canal's bulkheads and associated cribbing and fill extend the entire length of the approximately 2-mile canal, including the former basin.

- *Sunken Ship Sensitivity*–At least four sunken ships have been identified within the canal and there is a potential that several additional ship hulls have survived within the former basin fill.

[5] Conducted to support the establishment of the Gowanus Canal National Register Historic District.

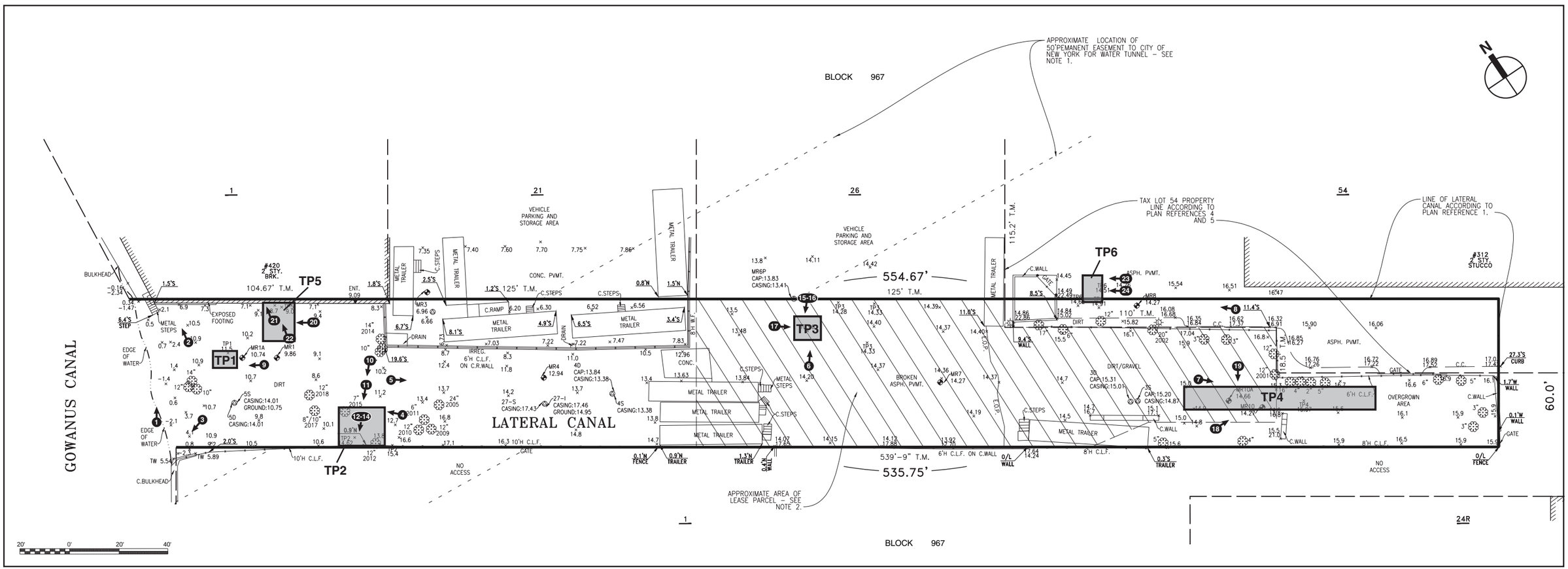
4. Results of Survey

The project area consists of a partially paved and partially undeveloped, roughly 475-feet long (east-west) and 60-feet wide (north-south) strip of land extending from the canal on the west, along an undeveloped area behind a modern brick building, through an active parking lot in the center of the former basin, to another undeveloped area and another paved area to the east (Figure 3). Photographs 1, 2, and 3 depict the western end of the former basin at the point where it adjoins the open water of the canal. Photograph 1 shows the former basin's loose fill material and large quantity of modern refuse spilling into the open canal and is indicative of the informal nature of the former basin's fill. The northern and southern corners of the western end are depicted in Photographs 2 and 3, where the boundaries of the former basin appear to be comprised of concrete, wooden fenders, and scattered cobble riprap. The undeveloped western portion of the former basin is depicted in Photographs 4 and 5. The topography undulates and rises gradually to the east from the canal and there are a number of trees and abandoned cars across the area. As can be seen in Photograph 6, the central portion of the former basin is paved and is currently being used as an active parking lot. A portion of the eastern end of the former basin is undeveloped (Photograph 7) and a portion is being used as a parking lot for a storage facility (Photograph 8).

The following is a summary of the primary survey components: test pit excavation monitoring, review of the bulkhead inspection report, and review of geotechnical and environmental boring logs.

4.1 Results of Test Pit Excavation Monitoring

Fieldwork consisted of monitoring the excavation of six test pits that were located across the extent of the former basin. Table #4-1 below provides a summary of the location and results of each test pit and their locations are depicted on Figure 3. All of the test pits were excavated during the course of several days in August 2017. Three of the test pits (Test Pits 2, 5, and 6) were positioned in locations with the objective of encountering remains of the bulkhead, if present. The other three test pits were positioned entirely within the filled-in portion of the basin, at the conceptual boundaries of the RD, and would not be expected to encounter the bulkhead. Of the three test pits that could have encountered the bulkhead, only one of them, Test Pit 2, encountered the bulkhead. None of the test pits were excavated deeply-enough to encounter the former basin bottom, deeply-buried resources that could be lying on the buried former basin bottom such as ship hulls, or the possibly natural marsh deposits located at deeper depths. Aside from the portion of the bulkhead encountered in Test Pit 2, no archaeological resources, features, or artifact concentrations were encountered during test pit excavation.



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1 *Photograph View Direction and Reference Number*

TP1 *Test Pit Location*

Source: *Base drawing taken from survey drawing by B. Thayer Associates dated October 10, 2017*

Test Pit Locations and Photo Key
Figure 3

Table 4-1
Geotechnical Test Pits

Test Pit Number	Location (see Figure 3)	Dimensions (length, width, depth [feet, bgs])	Results
1	West end of basin at midpoint between northern and southern sides	10 x 7 x 8	Loose sandy fills and modern refuse to 8 feet bgs
2	Western end of basin along southern side	10 x 10 x 9	Below 5 feet of loose sandy fill, encountered a deteriorating portion of a concrete and timber bulkhead
3	Paved area at the approximate center of basin, several feet south of the northern side	11 x 9 x 12	Gravelly fill, brick and concrete demolition debris, and modern refuse to over 12 feet bgs
4	Eastern end of basin at midpoint between northern and southern sides	38 x 6 x 8	Mixed fills, demolition debris, and modern refuse to over 12 feet bgs
5	Western end of basin along the northern side, adjacent to modern brick building	12 x 12 x 6	Mixed fills and modern refuse to over 6 feet below ground surface. The adjacent modern brick building is supported by a concrete foundation and a concrete footer supported by timber piles
6	Eastern end of the basin and extending across original location of basin's northern side	10 x 6 x 13	Mixed fill, demolition debris, and utility lines to over 10 feet bgs

4.1.1 Test Pit 1

Test Pit 1 was excavated at the western end of the former basin, close to where it formerly adjoined the canal (Figure 3 and Photograph 4). The soils of this 8-foot bgs test pit consisted entirely of loose sandy fills and a high concentration of modern refuse including plastic sheeting, furniture, rugs, car parts, and modern packaging material (Photograph 9). No archaeological resources were observed in Test Pit 1.

4.1.2 Test Pit 2

Test Pit 2 was excavated in the western portion of the former basin adjacent to the chain-link fence aligned with boundary between the former basin and the Powerhouse property to the south (Figure 3 and Photograph 10). Below an approximately 5-foot-thick layer of loose brown sandy fill, the excavation encountered a 1-foot-thick slab of decomposing concrete. The concrete slab was encountered below and parallel to the chain-link fence. Below the concrete slab, careful hand and mechanized excavation revealed a bulkhead comprised of a series of horizontally-oriented squared timbers (Photograph 11). At this point the test pit was widened to the west to a total width of 10 feet and excavation proceeded to a total depth of 9 feet bgs. The test pit sloped upward to the ground surface to the north and west to allow access to the bulkhead. An approximately 8-foot-long portion of the bulkhead was exposed, which consisted of a series of three courses of squared timbers (two of which had a diameter of 12 inches and one had a diameter of 9 inches), though the bulkhead likely continues deeper; the timbers were held together with a series of 1-inch diameter iron spikes (Photographs 12 through 14).

The condition of the exposed timbers was poor and they exhibit moderate to severe rot. The concrete slab is in similarly poor condition. Despite the fragile condition of the bulkhead it appears to be structurally intact and its burial beneath several feet of soil will likely protect it from further decay.

According to the site supervisor overseeing remediation efforts at the Powerhouse Site immediately to the south of the former basin, excavations to a depth of 15 feet bgs were conducted approximately 5 feet south of the chain-link fence in the vicinity of Test Pit 2. According to the site supervisor, this deep excavation encountered sandy fills but did not encounter timber cribbing or cobble fill. This suggests that either the former basin bulkhead was constructed in this area without a supporting cribbing system or that it has been previously removed. No other archaeological resources were observed in Test Pit 2.

4.1.3 Test Pit 3

Test Pit 3 was excavated in a paved area used for car and truck parking in the approximate center of the former basin, a few feet south northern boundary (Figure 3 and Photograph 6). This test pit was initially excavated as a 5-foot wide pit but its width was doubled to 9 feet when excavation encountered substantial deposits of loose construction debris collapsing into the pit. Excavation extended to a depth of 12 feet bgs, and the encountered soils consisted of mixed sandy fills and a substantial quantity of construction debris consisting of brick and concrete (Photographs 15 through 17). A plastic *Bic* ballpoint pen was recovered from soils excavated from the bottom of this test pit. No archaeological resources were observed in Test Pit 3.

4.1.4 Test Pit 4

Test Pit 4 was excavated towards the eastern end of the former basin at the approximate mid-point between the expected location of the northern and southern bulkhead walls (Figure 3 and Photograph 5). This was the first test pit to be excavated and it was much larger than any of the other pits, reaching a length of approximately 38 feet. This test pit was excavated to a depth of 8 feet bgs and the excavated soils consisted of mixed sandy fills and demolition debris (Photograph 18), including large chunks of concrete and brick, and a variety of modern refuse such as plastic sheeting, fuel tanks, and car tires (Photograph 19). No archaeological resources were observed in Test Pit 4.

4.1.5 Test Pit 5

Test Pit 5 was excavated towards the western end of the former basin adjacent to the expected location of the northern bulkhead, at the base of a modern brick building (Figure 3 and Photographs 4 and 20). This large 12-foot-square test pit encountered loose sandy fills and modern refuse such as automobile parts to a depth of 6 feet bgs. Though the field archaeologist observed no evidence of the bulkhead, they did encounter the brick building's foundation, which consisted of a 3-foot thick concrete slab supported by a 2.5 foot-wide by 2.5 foot-deep concrete footer, which was supported by at least one timber pile (Photographs 22 and 23). The soils adjacent to the concrete footer beneath the foundation consisted of loose mixed fill containing modern refuse including plastic. No archaeological resources were observed in Test Pit 5.

4.1.6 Test Pit 6

Test Pit 6 was excavated in the parking lot of a storage facility at the eastern end of the former basin and it was positioned at the anticipated location of the northern bulkhead wall (Figure 3 and Photograph 8). This test pit extended several feet beyond the anticipated bulkhead location to the area where timber cribbing filled with cobbles has been encountered along other portions of the canal. The field archaeologist observed no evidence of the bulkhead or timber cribbing. The encountered soils consisted of layers of loose, mixed sandy fills and thick layers of demolition debris (Photographs 23 and 24) to a maximum depth of 13 feet bgs, deeper than any of the other test pits. Excavation encountered three north-south oriented utility lines with diameters of 2 to 6 inches at a depth of 5 to 6 feet bgs. The utility lines had been abandoned but appear to be in their original location. No archaeological resources were observed in Test Pit 6.

4.2 Bulkhead Inspection

On May 9, 2017, Moffatt & Nichol Engineering, P.C was contracted by the AKRF-KSE Joint Venture to perform a detailed visual inspection of bulkheads along the eastern shore of the canal at the former basin. The objective of the inspection was to assess the condition of the bulkheads in support of the RD. The inspection was performed by a diver walking and swimming within close proximity of the shoreline. Approximately 350 feet of the canal bulkhead line was inspected, including the property to the north of the former basin (420 Carroll Street), the mouth of the former basin itself, and the property to the south of the former basin (323 Third Avenue).

The following is a summary of the results of the bulkhead inspection by property, as presented in Moffatt & Nichol's inspection report (2017):

4.2.1 420 Carroll Street (Property to the North)

At the 420 Carroll Street retaining wall or bulkhead to the north of the former basin, approximate 50 percent of the top course of timber beams are missing, allowing for erosion of soil above and behind the wall. The missing timbers are resting on the canal mudline. The remaining timber elements typically exhibit moderate to severe rot. Where the top course of timber beams are missing, there are voids due to rot on top of the timber beams that are now exposed. The upland building located on 420 Carroll Street, which is located approximately 7 feet away from the bulkhead, was observed to have undermining, approximately 2 to 3 feet in height and 3 feet deep, exposing the foundation.

4.2.2 Mouth of the First Street Turning Basin

The earth embankment of the former basin is not an engineered slope and appears to have been constructed by placing fill material until it reached its natural angle of repose. The surface is littered with stones, concrete debris, trash, and unmaintained vegetation. In general, the earth embankment appears to be stable and is considered to be in fair condition. Below water, the mudline is soft consisting of a mud and gravel mix. The mudline depth was observed to be shallow, essentially at mean lower low water (MLLW) at the bulkhead line and approximately 4 feet below MLLW approximately 5 feet offshore of the bulkhead line. In comparison,

the water depth at the timber crib retaining wall to the south is 5 feet below MLLW at the bulkhead line. No large obstructions were observed below water within the first 5 to 8 feet of the bulkhead line.

4.2.3 323 3rd Avenue (Property to the South)

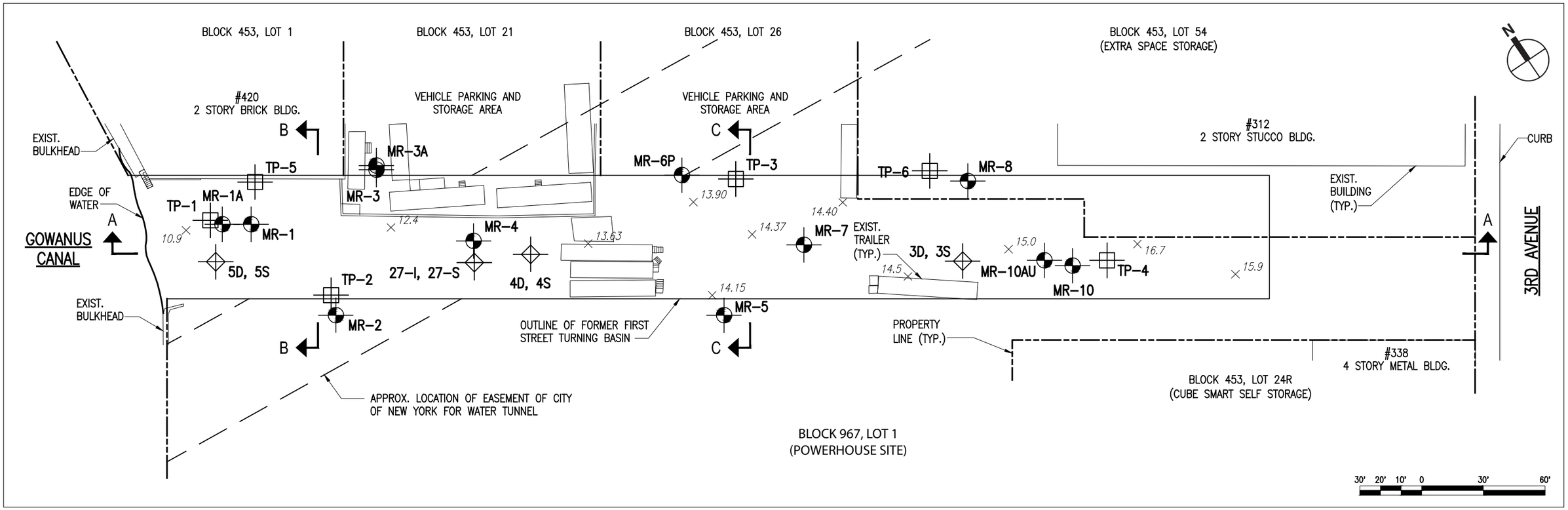
The timber crib retaining wall or bulkhead at 323 3rd Avenue (the Powerhouse Site) supports a concrete seawall, which has large voids due to erosion and spalls. This area of severe deterioration extends from the southern extent of the former basin to approximately 50 feet south. Several missing pieces of concrete were observed along the base of the structure on the mudline. The observed timber crib elements at 323 3rd Avenue are in better condition than the timber crib at 420 Carroll Street. The missing timber members at the top of the 323 3rd Avenue retaining structure do not expose the upland fill as seen at 420 Carroll Street, however does expose the base of the concrete seawall. The remaining timber beams still typically exhibit moderate to severe rot similar to those at 420 Carroll Street.

Both retaining wall structures (420 Carroll Street and 323 3rd Avenue) were observed to return into the former basin and appear to maintain the same type of construction. The retaining walls are only exposed for approximately 10 feet then are buried by the upland fill material.

4.3 Results of Geotechnical Borings

A total of nine geotechnical soil borings were performed in August and September 2017 during the project's associated geotechnical investigation under the oversight of Mueser Rutledge Consulting Engineers (MRCE), who was contracted by the AKRF-KSE Joint Venture. Four of the borings (MR-1, MR-4, MR-7, and MR-10) were within the boundary of the anticipated former basin, while three (MR-3, MR-6P, and MR-8) were along the former basin boundary, and two (MR-2 and MR-5) were just outside the boundary, as shown on Figure 4. Three borings (MR-1, MR-3, and MR-10) had to be offset, since their initial boring was obstructed by inclusions at a shallower depth, in order to reach the terminal depth. The borings extended to a depth of over 67 feet bgs or to an elevation of -53.5 feet (NAVD88). Table 4-2 below provides a summary of the observations included in MRCE's boring logs that could pertain to the possible depth of "fill" and natural marsh deposits that would have pre-dated construction of the canal and former basin. The geotechnical boring logs themselves are provided as Appendix A.

The boring logs only provide a brief description of the MRCE's resident engineer's observations and rarely, if ever, include interpretive nomenclature such as "fill", "natural", or "native". In order to distill possibly helpful archaeological information from the boring logs, they were examined for terms such as "brick", "cinders", or "concrete" which likely indicate a soil layer intentionally deposited as "fill". "Wood" could also indicate "fill" or structural debris associated with the use or operation of the former basin. Additionally, soil descriptions could help to identify natural marsh deposits.



Source: *Mueser Rutledge Consulting Engineers*

MR–6P
- MRCE BORING DRILLED IN 2017
- "P" INDICATES PIEZOMETER
- "A" INDICATES OFFSET
- "U" INDICATES UNDISTURBED SAMPLES

TP1
- MRCE TEST PIT PERFORMED IN 2017

3S, 3D
- MONITORING WELL CLUSTER INSTALLED BY OTHERS (SEE APPENDIX E)
- "S" SHALLOW MONITORING WELLS SET IN THE FILL STRATUM
- "D" DEEP MONITORING WELLS SET IN THE UPPER SAND STRATUM

10.9 – GROUND SURFACE SPOT ELEVATION

Geotechnical Borings Location Map
Figure 4

Table 4-2
Summary of Geotechnical Borings

Boring	Depth (feet bgs)	Elevation (NAVD88)	Observation
MR-1	14	-4.14	Brick and concrete
	15	-5.14	Wood debris
	32	-21.26	Wood and "trace debris"
	60	-49.26	Brick
	32 to over 80	-21.26 to over -69.26	Brown fine to coarse sands with silt and gravel
MR-2	0 to 21	13.5 to -7.5	"Fill"
	32	-18.5	Brick
	25 to 30	-11.5 to -16.5	Several inches of wood
	19 to 67	-5.5 to -53.5	Brown fine to coarse sands with silt and gravel
MR-3	7	-0.04	Wood
	17	-10.04	"Trace wood"
	22 to 77	-15.04 to -70.04	Brown fine to coarse sands with silt and gravel
MR-4	10 and 17	2.94 and -4.06	Brick
	25 to 27	-12.06 to -14.06	Soft black organic silty clay, fine to coarse sand, peat, and wood
	32 to 75	-19.06 to -62.06	Brown fine to coarse sands with silt and gravel
MR-5	10	6	Intermittent brick
	20	-4	Black organic silty wood with peat silt and organics
	35 to 37	-19 to -21	Gray silty clay and "some clay layer"
	45 to 77	-29 to -61	Brown fine to coarse sands with silt and gravel
MR-6P	5	8.41	Trace brick
	21 and 25	-7.17 and -11.17	Trace clay and wood
	27	-13.17	Trace black "silt seams"
	32 to 77	-18.17 to -63.17	Brown fine to coarse sands with silt and gravel
MR-7	15 and 20	-0.73 and -5.73	Brick
	20 to 30	-5.73 to -15.73	Some wood
	35 to 77	-20.73 to -62.73	Brown fine to coarse sands with silt and gravel
MR-8	7	7.27	Brick
	7 and 17	7.27 and -2.73	Some cinder
	27	-12.73	Soft black organic silty clay with a trace of fine sand
	30 to 77	-15.73 to 62.73	Brown to red brown fine to coarse sands with silt and gravel
MR-10	10 and 17	4.27 and -2.73	Brick
	37 and 42	-22.34 and -27.34	Brick
	42 to 97	-27.34 to -82.34	Brown fine to coarse sands with silt and gravel

Fill Layer

Most of the borings encountered brick (8 of the 9 borings) and it was predominately encountered (7 of the 8 borings that encountered brink) at the ground surface to an elevation of -6 feet (NAVD88). Brick was also identified at deeper elevations of -18.5, -22 to -27, and -49 feet (NAVD88). The observance of brick indicates that the associated material was likely intentionally deposited as "fill". For the borings within the former basin, the "fill" was likely intentionally deposited within the former basin when it was filled-in after

its period of active use. For the borings located just outside the former basin, the fill was likely intentionally deposited when the canal and/or the former basin was constructed.

"Wood", "wood debris," or "trace wood" were encountered in most of the borings (7 of the 9 borings). The borings located along and just outside the anticipated boundary noted wood as shallow as an elevation of 0 feet (NAVD88) and as deep as an elevation of -16.5 feet (NAVD88). This wood may be associated with the former bulkhead located along the boundary of the former basin and the adjacent properties, supporting the upland soil or "fill". Interestingly, two of the four borings located within the former basin describe wood at an elevation between -10 and -14 feet, while one of the borings also observed wood at a deeper elevation of -15 feet (NAVD88). Since the bottom of the canal is comprised of silt and/or clay and has no structural component, this wood layer could be the accumulation of timber associated with the use of the former basin for shipping that dropped into the former basin over time. It is also possible that this wood is associated with the barges that used the former basin or pieces of the bulkheads that fell into the former basin. Wood was also identified at a shallower elevation of -5 feet (NAVD88) in two of the borings located within the former basin, which may be associated with the "fill" that was intentionally deposited within the former basin when it was filled-in.

Native Organic Silty or Clayey Layer

In three of the borings, the MRCE resident engineer described an organic silty or clayey layer at an elevation of -7 to -14 feet and in one boring at a deeper elevation of -19 to -21 feet (NAVD 88). This layer is variously described as soft, black, and organic or as containing peat. It is possible that this layer represents vegetation that developed within the former basin during its years of operation or the remains of the marsh deposits that pre-date construction of the canal and could also be considered native soils. In either case that layer appears to be shallow in three of the four borings and absent in the remaining five borings.

Native Sand Layer

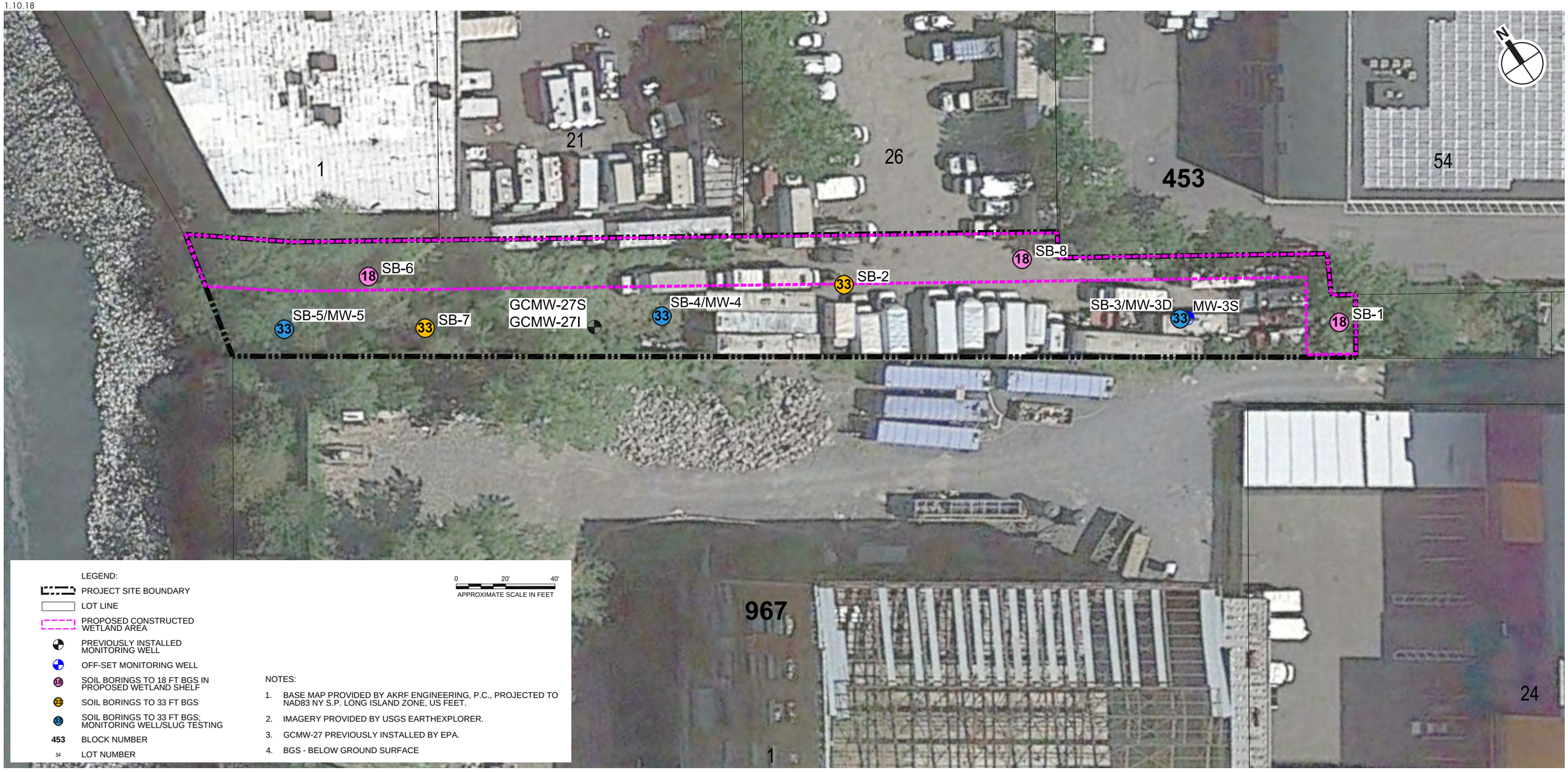
All of the borings encountered layers of brown or gray-brown, fine to coarse sands, sometimes with traces of silt and/or gravel. These sands were predominately encountered (8 of the 9 borings) at an elevation beginning at between -15 to -29 feet (NAVD 88). In one boring these sands were also identified beginning at a shallower elevation of -5.5 feet (NAVD88). These sands are likely quite old and probably pre-date development of the Gowanus Marsh and could be considered native soils.

4.4 Results of Environmental Borings

A total of nine environmental soil borings were performed in August 2017 by Preferred Environmental Services, who was contracted by the AKRF-KSE Joint Venture. All of these borings were performed within the boundary of the former basin. Each of the borings extended to a depth of either 18 or 33 feet bgs. Table 4-3 below provides a summary of the observations included in Preferred Environmental Services' boring logs that could pertain to the possible depth of fill and natural marsh deposits that would have pre-dated construction of the canal and the former basin; their location is depicted on Figure 5. The environmental boring logs themselves are provided as Appendix B.

Once again the boring logs only provide a brief description of the resident engineer's observations and do not include interpretive nomenclature such as "natural" or "native". Most of the soils are described as "Fill"

1.10.18



Environmental Borings Location Map
Figure 5

containing "construction and demolition debris" or simply "debris" to at least 16 feet bgs and in several cases to a depth of over 20 feet bgs (SB-3, SB-3/MW-3S, SB-4, and SB-5). Presumably natural silts, clays, and sands were encountered below a depth of 20 feet bgs, though often with hydrocarbon-like odor and/or staining.

Table 4-3
Summary of Environmental Borings

Boring	Depth (feet bgs)	Observation
SB-1	5 to 18	Fill with wood, demolition debris, and hydrocarbon-like odor
	18	End of boring
SB-2	5 to 16	Fill with wood, demolition debris, and petroleum odor
	20 to 33	Mixed sands with gravel
	33	End of boring
SB-3	10 to 23	Fill with wood and demolition debris
	23 to 33	Gravels, sands, and clay layers with hydrocarbon-like odor and staining
	33	End of boring
SB-3/ MW-3S	5 to 20	Fill with demolition debris with hydrocarbon-like odor and staining
	20	End of boring
SB-4	5 to 22	Fill with wood, demolition debris, and hydrocarbon-like odor
	22 to 33	Gravels, sands, and clay layers with hydrocarbon-like odor and staining
	33	End of boring
SB-5	5 to 15	Fill with demolition debris
	15 to 26	Fill, black silty clay with chemical odor and staining
	26 to 28	Fill, sand with demolition debris (brick)
	33	End of boring
SB-6	10 to 14	Fill, brown/black mixed sands
	14 to 18	Fill, demolition debris (wood/debris)
	18	End of boring
SB-7	0 to 15	Fill with wood, demolition debris, and hydrocarbon-like odor
	33	End of boring
SB-8	5 to 18	Fill with wood, demolition debris, and hydrocarbon-like odor
	18	End of boring

5. Conclusions and Recommendations

Previous research efforts have determined that the filled-in former First Street Turning Basin has a high sensitivity for the presence of bulkheads and associated cribbing and fill associated with the S/NR-eligible Gowanus Canal and historic ship hulls buried within the filled-in basin. Ground-surface disturbing activities associated with the 30% Field Activities consisted of the excavation of six test pits and a number of geotechnical and environmental borings across the extent of the former basin. Archaeological fieldwork consisted of monitoring the test pit excavation. Additionally, this Monitoring Report also includes a review of the bulkhead inspection reported prepared by Moffatt & Nichol Engineering, P.C. and a review of the soil boring logs (included as Appendices A and B). Three of the six test pits were positioned in the anticipated location of the former basin's bulkheads, while the remaining three test pits were positioned entirely within the basin along the conceptual RD boundaries (Figure 3). The test pits were excavated to depths of between 8 and 13 feet bgs.

5.1 Conclusions of Test Pit Monitoring

The soils encountered in the six test pits consisted of mixed sandy fills with modern refuse and demolition debris. The field archaeologist observed low-to-high-density concentrations of modern refuse and demolition debris, including the following: architectural materials such as bricks, concrete, cinder block, window glass, and fasteners; modern packaging material such as plastic food packaging and bottles; automotive parts such as tires, car body parts, and electronics (several abandoned vehicles are present on the ground surface in the project area); and a range of other miscellaneous objects such as plastic sheeting, cloth, unidentified metal, and a plastic *bic* ballpoint pen observed at a depth of 11 feet bgs. The field archaeologist also observed, intermixed with the above items, small quantities of household waste such as tableware and food waste.

Of the three trenches that were excavated in a location that would be expected to encounter the bulkhead, only one, Test Pit 2, excavated along the southern boundary of the filled-in basin at its western end, encountered an intact portion of the bulkhead. The approximately 8-foot-long portion of bulkhead was encountered at a depth of five feet below the current ground surface and consisted of a 1-foot-thick slab of decomposing concrete on top of a series of deteriorating, horizontally-oriented squared timbers with metal fasteners (Photographs 11 through 14). None of the test pits were excavated to a sufficient depth to address the potential for historic ship hulls buried within the filled-in former basin.

The following conclusions are provided based on the results of monitoring the six test pits:

- The chaotic and variable nature of the fills, both within individual test pits and across the length of the *former* basin, and the modern refuse contained within the fill, indicates an informal and incremental filling process that occurred during the mid-twentieth century.

- Due to their lack of archaeological context or research value and recent origin, the observed artifacts have no *archaeological* significance.

- The portion of intact bulkhead encountered in Test Pit 2 is in poor condition but supports the sensitivity of the First Street Turning Basin for the presence of the bulkhead. The absence of the bulkhead in Test Pits 5 and 6 (which were excavated in locations that would have encountered the bulkhead had it been present) indicate that portions of the bulkhead either deteriorated prior to the basin's being filled in or may have been removed over the past several decades.

- The intact portion of bulkhead encountered in Test Pit 2 was in poor condition. This observation suggests that other intact portions of the bulkhead present within the basin may also be in poor condition.

- One of the test pits, Test Pit 6, extended beyond the anticipated location of the bulkhead to the anticipated location of the wooden cribbing that supports the bulkhead along other portions of the canal. However, no timber cribbing was observed in this area. Additionally, according to the site supervisor overseeing remediation efforts at the Powerhouse Site immediately to the south of the former basin, excavations to a depth of 15 feet bgs were conducted approximately 5 feet south of the chain-link fence, the likely location of the bulkhead along the southern side of the basin. According to the site supervisor, this deep excavation encountered sandy fills but did not encounter cribbing or cobble fill. This suggests that either the turning basin bulkhead was constructed in this area without a supporting bulkhead system or that it has been subsequently removed in locations.

5.2 Conclusions of Review of Soil Boring Logs

An archaeologist reviewed the logs of the geotechnical and environmental soil borings for information related to the depths of fill, native marsh deposits, and older stratigraphy predating the formation of Gowanus Marsh. The following conclusions are provided based on this review:

- "Wood", "wood debris," or "trace wood" was identified in many of the borings from just below ground surface to as deep as 30 feet bgs. This wood may be associated with fill material, the former bulkhead, or the accumulation of timber associated with the use of the basin for shipping that dropped into the basin over time. It is also possible that this wood is associated with the barges that used the basin or pieces of the bulkheads that fell into the basin.

- An organic silty or clayey layer is present at elevations ranging from -7 to as deep as -21 feet (NAVD88). This layer is variously described as soft, black, and organic or as containing peat and may have developed within the basin during its years of operation or before as remains of the marsh deposits that pre-date construction of the canal.

- All of the deeper borings encountered layers of brown or gray-brown, fine to coarse sands, sometimes with traces of silt and/or gravel at a depth of -15 (NAVD 88). These sands are likely quite old and probably pre-date development of the Gowanus Marsh and could be considered native soils.

5.3 Recommendations

Based on the conclusions stated above, the First Street Turning Basin retains its sensitivity for the presence of historic ship hulls and structural components of the canal itself such as the bulkhead but the

soils used to fill-in the basin to a depth of approximately 8 to 13 feet bgs have no archaeological sensitivity.

It is recommended that archaeological monitoring occur during implementation of the RA to document any buried ship hulls present on the bottom of the filled-in basin. However, due to the poor condition of the portion of bulkhead observed within the basin during this monitoring effort and its similarity to extant bulkheads to the north and south of the basin along the canal, consultation with SHPO and LPC is recommended to determine the need for documentation and relevant research questions.

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APPENDIX A

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-1
SHEET 1 OF 2
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +9.90
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:30	1D	0.0	2-2	Brown fine sand, some silt, trace medium to			DRILLED	PID=0.0
08-31-17		2.0	2-2	coarse sand, gravel (SM)			AHEAD	REC=5"
Thursday	2D	2.0	1-1	Brown fine sand, some silt, trace medium to			4"	PID=0.0
81°F		4.0	1-1	coarse sand, gravel (SM)				REC=4"
	3D	4.0	6-6	Top 4": Brn silty f-c sand, sm brick, gravel (SM)		**5**		Soft dig to 5'.
		6.0	11-5	Bot 3": Gray si f-m sand, sm cl, tr c sa, gvl (SM)				3D Top: PID=0.0
	4D	6.0	1-1	Brown fine to medium sand, some silt, brick,				3D Bot: PID=0.0
		8.0	3-5	gravel, black silt pockets (SM)				4D: PID=0.0
					F	**10**		
	5NR	10.0	4-4	No recovery				PID=0.0
		12.0	2-2					Plastic debris in tip
	6D	12.0	3*-5*	Brown fine to coarse sand, some brick, concrete,				5NR: 3" Split spoon.
		14.0	5*-6*	trace silt, gravel (SP-SM)				6D: 3" Split spoon.
						15		6D: PID=0.0
	7D	15.0	5*-4*	Wood debris, some brown medium to coarse				Concrete piece in tip.
		17.0	2*-7*	sand, trace silty gravel (SP)				7D: PID=35.1
								3" Split spoon.
								REC=4"
15:30						**19.5**		Wood; loosing water;
								mix mud.
								Borehole terminated
								due to obstruction
								at 19.5'.
						25		*3" Split spoon blow
								counts.
								PID=Photoionization
								Detector.
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-1
SHEET 2 **OF** 2

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +9.90
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED	X YES		NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	20
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-05-17	07:45	27	20	5	OVERWEEKEND MUD LEVEL READING.
09-07-17	07:30	57	50	8	OVERNIGHT MUD LEVEL READING.
09-08-17	07:00	82	80	6	OVERNIGHT MUD LEVEL READING.

5*-4*
2*-1*

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 09-01-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-1A
SHEET 1 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** 10.7
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:15							DRILLED	Offset 10' west from
09-01-17							AHEAD	Boring MR-1.
Friday							4"	
Sunny								
70°F						**5**		
					F	**10**		
						15		
								Color change black.
						19.5		Loosing water.
	8D	20.0	4*-3*	Black organic silty clay, some wood, organics,				WC=116, PID=6.2
		22.0	1*-2*	trace fine sand (OH)				2" & 2nd attempt 3"
	9UNR	22.0	PUSH=24"	No recovery				split spoon; no
		24.0	REC=0"					recovery.
						25		
	10D	25.0	4*-5*	Black organic silty clay, some fine sand, wood,	**O**			WC=101, PID=18.7
		27.0	4*-4*	organics (OH)				
14:30						**30**		11D-24D: 3" Split
07:30	11D	30.0	3*-3*	Black organic silty clay, some gravel, wood,				spoon.
09-05-17		32.0	3*-3*	trace debris (OH)		**32**		11D: PID=19; clean
Tuesday	12UD	32.0	PUSH=24"	Black medium to coarse sand, some medium				black silt towards tip.
Sunny		34.0	REC=0"	to coarse gravel, trace silt (SP-SM)				12D: PID=0.0
85°F						**35**		Cobble in tip of tube;
	13D	35.0	8*-7*	Black coarse to fine sand, some silt, gravel				tube bent; 3" split spoon.
		37.0	7*-6*	(SM)				Mix mud at 34'.
								13D: PID=0.0
						40		
	14D	40.0	12*-8*	Brown gravelly coarse to medium sand, trace				PID=0.0
		42.0	6*-6*	fine sand, silt (SP)	**S1**			
						45		
	15D	45.0	7*-6*	Do 14D (SP)				PID=0.0
		47.0	7*-7*					
						50		
	16D	50.0	24*-10*	Do 14D (SP)				PID=0.0
		52.0	7*-6*				▼	

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-1A
SHEET 2 OF 3
FILE NO. 12541
SURFACE ELEV. 10.7
RES. ENGR. ARI ESLAMINEJAD

PROJECT: FIRST STREET TURNING BASIN
LOCATION: BROOKLYN, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							DRILLED	
09-05-17					S1		AHEAD	
Tuesday							4"	
Sunny						**53.5**		
15:00						**55**		
07:30	17D	55.0	10*-27*	Top 8": Dark gray fine to coarse sand, trace				17D Top: PID=20.8
09-07-17		57.0	34*-29*	gravel, silt (SP)				17D Bot: PID=0.0
Thursday				Bot 8": Brown gravelly fine to coarse sand, trace				Loosing mud.
Sunny				silt (SP)				
74°F						**60**		
	18D	60.0	24*-21*	Brown fine to coarse sand, some gravel, brick,				PID=3.0
		62.0	19*-20*	trace silt (NAPL) (SP-SM)				
						65		
	19D	65.0	17*-19*	Brown medium to fine sand, some gravel, trace				PID=0.0
		67.0	22*-25*	cobble, silt (SP)				2.5" Cobble top of
								3" spilt spoon.
								4" Cobble at 67'.
						70		
	20D	70.0	30*-45*	Brown gravelly fine to coarse sand, trace silt	S2			PID=0.0
		72.0	35*-46*	(SP-SM)				
								Gravel in tip; wash.
								Rig chatter from 72' to
						75		75'.
	21D	75.0	6*-25*	Brown gravelly fine to coarse sand, trace silt				PID=0.0
		77.0	39*-48*	(SP-SM)				
								Loosing mud.
						80		
	22D	80.0	24*-28*	Brown gravelly coarse to fine sand, trace silt				PID=0.0
		82.0	30*-28*	(SP-SM)				
15:30						**85**		
06:30	23D	85.0	23*-27*	Do 22D (SP-SM)				PID=0.5
09-08-17		87.0	31-31					
Friday								
Sunny						**88.5**		*3" Split spoon blow
77°F						**90**		counts.
	24D	90.0	33*-36*	Brown fine to medium sand, some silt, gravel,				PID=0.0
		92.0	56*-55*	trace coarse sand (SM)	T			
								Rig chatter from 93' to
								94'.
10:45						**95**		Hard drilling from 94' to
								95'.
								End of Boring at 95'.
								WC=Water Content
								in percent of dry
						100		weight.
								PID=Photoionization
								Detector.

MRCE Form BL-1

BORING NO. MR-1A

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-1A
SHEET 3 **OF** 3

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. 10.7
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		[X] YES [ ] NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO 85
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO
OTHER								

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED [X] YES [ ] NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED [ ] YES [X] NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-05-17	07:45	27	20	5	OVERWEEKEND MUD LEVEL READING.
09-07-17	07:30	57	50	8	OVERNIGHT MUD LEVEL READING.
09-08-17	07:00	82	80	6	OVERNIGHT MUD LEVEL READING.

PIEZOMETER INSTALLED [ ] YES [X] NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 09-01-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-2
SHEET 1 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** 13.5
RES. ENGR. K. BARBAGIANIS/A. ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:15							DRILLED	Slight water loss from
08-21-17							AHEAD	1' to 23'.
Monday							4"	
Partly Cloudy								
80°F						**5**		Rig chatter & hard
	1NR	5.5	100/1"	Wash, wood				drilling from 4.5' to 5.5'.
		5.6						1NR: PID=0.7
								Wood observed in
	2D	8.0	100/5.5"	Black fine to coarse sand, trace silt, gravel				wash.
		8.5		(Fill) (SP-SM)		**10**		Hard drilling from 5.7'
								to 6.3'.
								2D: PID=0.0
								REC=5.5"
								Hard drilling & rig
	3D	14.0	17-84	Wood, trace fine to coarse sand, silt (Fill)		**15**		chatter from 11' to 14'.
		15.5	100/4"					3D: PID=0.0
					F			Rig chatter from 15.5'
								to 17.5'.
	4D	19.0	11-7	Dark brown fine to coarse sand, some gravel,		**20**		PID=0.0
		21.0	10-10	silt, trace wood (Fill) (SM)				
	5NR	21.0	20-19	No recovery				PID=0.0
15:40		23.0	50-38					
07:15								
08-22-17						**25**		Water loss.
Tuesday	6D	25.0	16-14	Top 5": Wood				Introduce mud at 27'.
Sunny		27.0	15-14	Bot 8": Brown fine to coarse sand, some silt,				
88°F				gravel (SM)				
						30		
	7D	30.0	14-12	Top 2": Wood				
		32.0	12-9	Bot 5": Brown fine to coarse sand, some gravel,				7D Bot: PID=0.0
				trace silt, brick (SP-SM)		**32.5**		
						35		
	8D	35.0	6/12"	Brown coarse to fine sand, some gravel, trace				PID=0.0
		37.0	2-3	silt (SP)				No positive head.
						40		
	9D	40.0	4-4	Do 8D (SP)				PID=5.9
		42.0	5-6					
					S1			
						45		
	10D	45.0	7-5	Brown fine to medium sand, trace silt, gravel,				PID=0.0
		47.0	7-6	coarse sand (SP-SM)				
						50		
	11D	50.0	5-4	Brown fine to coarse sand, trace silt, gravel				PID=0.0
		52.0	4-4	(SP)				

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-2
SHEET 2 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** 13.5
RES. ENGR. K. BARBAGIANIS/A. ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd								
08-22-17								
Tuesday								
Sunny								
						55		
	12D	55.0	5-5	Top 7": Brown fine sand, trace silt (SP-SM)				12D Top: PID=0.0
15:15		57.0	7-8	Bot 8": Brown fine to medium sand, trace silt (SP-SM)				12D Bot: PID=0.0
06:45								
08-23-17					**S1**			
Wednesday						**60**		
Partly Cloudy	13D	60.0	11-8	Brown fine to coarse sand, some gravel, trace				PID=0.0
84°F		62.0	9-9	silt (SP-SM)				Mud loss.
								Rig chatter from 64' to
						65		65'.
	14D	65.0	13-13	Brown fine to coarse sand, trace gravel, silty				No recovery 1st
10:00		67.0	11-12	gravel (SP-SM)		**67**		attempt.
								2nd attempt, REC=4".
								14D: PID=0.0
						70		End of Boring at 67'.
								PID=Photoionization
								Detector.
						75		
						80		
						85		
						90		
						95		
						100		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-2
SHEET 3 **OF** 3

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. 13.5
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED	X YES		NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	23
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD SUPER GEL-X

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
08-22-17	07:30	27	23	12	OVERNIGHT MUD LEVEL READING.
08-23-17	06:45	57	23	14	OVERNIGHT MUD LEVEL READING.

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS WOOD FOUND IN CASING AT 17' ON 08-21-17; AFTER IT HAD BEEN DRILLED OUT.
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 08-23-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-3
SHEET 1 OF 2

PROJECT: FIRST STREET TURNING BASIN
FILE NO. 12541

LOCATION: BROOKLYN, NEW YORK
SURFACE ELEV. +7.0

RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
07:10							DRILLED	Concrete & reinforced
09-21-17							AHEAD	concrete to 4.5'.
Thursday					**CONC**		4"	
Sunny								
80°F						**4.5**		
	1D	5.0	3-2	Brown coarse to fine sand, trace gravel, silt	**F**	**6**		PID=0.0; liner.
		7.0	8-50/3"	(SP)				
	2D	7.0	11-29	Wood, trace medium to coarse sand, silt	**WOOD**			PID=0.0
09:15		9.0	14-13			**9**		Bottom 5" wood.
						10		
								Borehole terminated
								due to 4" casing not
								plumb.
						15		End of Boring at 9'.
								PID=Photoionization
								Detector.
						20		
						25		
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-3
SHEET 2 **OF** 2

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +7.0
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		[X] YES [ ] NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM		TO
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO
OTHER								

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED [X] YES [ ] NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED [ ] YES [X] NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 09-22-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-3A
SHEET 1 OF 4
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +7.0
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
07:10							DRILLED	Offset 2' north from
09-21-17							AHEAD	Boring MR-3.
Thursday					**CONC**		4" 3"	
80°F							↓	
						4.5	↓	
						10		
	3D	10.0	3-6	Brown silty fine to medium sand, some gravel				PID=0.0; liner.
		12.0	7-8	(SM)				Wash color white.
					F			Wash color brown.
						15		
	4D	15.0	10-10	Gray brown fine to coarse sand, some gravel,				PID=0.0; liner.
		17.0	12-15	silt, trace wood (SM)				
						19.5		
	5NR	20.0	11-12	No recovery				PID=0.0
		22.0	11-12					2 Attempts; REC=0".
	6D	22.0	6-11	Gray fine to coarse sand, some silt, gravel (SM)				Loosing water.
		24.0	12-15					6D: PID=0.0
						25		Gravel in shoe.
	7D	25.0	10-10	Brown fine to coarse gravelly medium to coarse				REC=5"
		27.0	10-17	sand, trace silt, pyrite (GP)				7D: PID=0.0
						30		
	8D	30.0	7-7	Gray brown gravel, trace coarse to fine sand,				PID=0.0; liner.
		32.0	10-8	silt (GP)				1st Attempt; REC=0".
	9D	32.0	10-8	Gray brown gravel, trace coarse to fine sand,				2nd Attempt; REC=3".
		34.0	9-15	silt (GP-GM)				9D: PID=0.0; liner.
14:30						**35**		REC=5"
09:20	10D	35.0	8-4	Brown fine to medium sand, some gravel, trace	**S1**			PID=0.0; liner.
09-22-17		37.0	5-5	silt (SP)				REC=4"
Friday								
80°F								
						40		
	11D	40.0	3-4	Brown fine to coarse sand, trace gravel, silt				PID=0.0; liner.
		42.0	3-4	(SW)				
						45		
	12D	45.0	4-4	Brown fine to coarse sand, trace gravel, silt				PID=0.0; liner.
		47.0	5-5	(SP)				REC=4"
						50		
	13D	50.0	3-4	Brown fine to coarse sand, trace silt (SP)				PID=0.0; liner.
		52.0	4-6				↓	REC=5"

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-3A
SHEET 2 OF 4
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +7.0
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd 09-22-17 Friday							DRILLED AHEAD 3"	
						55		
	14D	55.0	5-8	Brown fine to coarse sand, trace gravel, silt				PID=0.0; liner.
		57.0	10-8	(SP)				REC=5"
						60		
	15D	60.0	5-6	Brown fine to medium sand, trace silt, coarse				PID=0.0; liner.
		62.0	6-7	sand (SP-SM)				REC=6"
					S1	**65**		
	16D	65.0	5-10	Top 3": Brown coarse to fine sand, trace gravel,				PID=0.0; liner.
		67.0	7-5	silt (SP)				
				Bot 6": Brown fine to medium sand, trace silt,				
				gravel (SP-SM)		**70**		
	17D	70.0	6-9	Brown fine to medium sand, trace silt, gravel,				PID=0.0; liner.
		72.0	10-10	coarse sand (SP-SM)				REC=6"
						75		
	18D	75.0	7-10	Brown fine to medium sand, some silt, trace				PID=0.0; liner.
14:30		77.0	8-9	coarse sand (SM)		**77**		REC=6"
								End of Boring at 77'.
						80		PID=Photoionization Detector.
						85		
						90		
						95		
						100		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-3A
SHEET 4 **OF** 4

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +7.0
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO	
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	5
SKID		HYDRAULIC	X	DIA., IN.	3	DEPTH, FT. FROM	0	TO	70
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-22-17	09:30	30	30	5	OVERNIGHT MUD LEVEL READING.

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 09-22-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-4
SHEET 1 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +12.9
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:00							DRILLED	
09-11-17	1D	1.0	3-3	Brown silty fine to coarse sand, some gravel,			AHEAD	PID=0.0
Monday		3.0	8-12	trace brick (SM)			4" 3"	
Sunny	2D	3.0	8-8	Brown silty fine to coarse sand, some gravel,	F			PID=0.0
75°F		5.0	2-8	brick (SM)		5		
	3D	5.0	6-5	Brown gravelly fine to coarse sand, some silt,				PID=0.0
		7.0	5-7	brick (SM)		7		2" Split spoon; no
	4D	7.0	24-47	Do 3D (SM)		8.1		recovery.
		9.0	50/2"		OBSTR.	9		3" Split spoon; REC=6".
						10		3D: Cobble in tip.
	5D	10.0	10*-18*	Brown gravelly coarse to fine sand, some brick,				4D-7D: 3" Split spoon.
		12.0	27*-18*	trace silt (SP)				4D: PID=0.0
								5D: PID=0.0
						15		
	6D	15.0	10*-6*	Top 2": Brown coarse to fine sandy gravel,	F			6D Top: PID=0.0
		17.0	12*-11*	some brick, trace silt (GP-GM)				6D Bot: PID=15.4
				Bot 6": Black gravel, some coarse sand, silt				Wood from 17' to 17.5';
				(GM)				loosing water.
						20	▼	
	7D	20.0	WH/6"*-4*	Black coarse to fine sand, some silt, wood,		21		PID=7.2
		22.0	50/3"*	trace brick, debris metal (SM)				Loosing water.
					WOOD			
								*3" Split spoon blow
						25		counts.
	8D	25.0	4-3	Soft black organic silty clay, some fine to	O			WC=54
14:00		27.0	3-5	medium sand, trace coarse sand, peat, wood				PID=6.7
08:00				(OH)		28.5		
09-12-17								
Tuesday						30		
Sunny	9D	30.0	5-8	Top 10": Black fine to medium sand, trace silt				9D Top: PID=2.0;
81°F		32.0	9-10	(SP-SM)				liner.
				Mid 3": Brown fine to medium sand, some silt				
				(SP-SM)				
				Bot 3": Brown silty fine sand (SM)		35		9D Bot: WC=24
	10D	35.0	3-5	Soft brown silty clay, trace fine sand (CL)				PID=0.0
		37.0	7-6					10D: WC=33, pp=0.7
					S1	40		Loosing water.
	11D	40.0	4-5	Brown fine to medium sand, some silt & black				PID=16.8
		42.0	6-8	fine to medium sand, trace silt, (NAPL) (SM)				
						45		
	12D	45.0	6-6	Brown fine to coarse sand, some gravel, trace				PID=0.0
		47.0	5-5	silt (SP-SM)				
						50		
	13D	50.0	5-6	Brown fine to coarse sand, trace silt (SP-SM)				PID=0.0; liner.
		52.0	7-7				▼	

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-4
SHEET 2 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +12.9
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
							DRILLED	
09-12-17							AHEAD	
Tuesday							3"	
Sunny								
81°F						55		
	14D	55.0	4-2	Brown fine to coarse sand, trace silt, gravel (SP)				PID=0.0; liner.
		57.0	4-8					
					S1	60		
	15D	60.0	7-8	Brown coarse to fine sand, trace gravel, silt				PID=0.0; liner.
		62.0	7-8	(SP)				
						65		
	16D	65.0	3-4	Brown fine to coarse sand, some gravel, silt				PID=0.0; liner.
15:15		67.0	5-5	(SP)				
07:30								
09-13-17						68.5		
Wednesday						70		
Sunny	17D	70.0	14-13	Brown fine to coarse sand, trace silt, gravel				PID=0.0; liner.
83°F		72.0	14-14	(SP)				
					S2			
						75		
	18D	75.0	13-21	Brown fine to medium sand, trace gravel,				PID=0.0; liner.
08:30		77.0	25-27	coarse sand, silt (SP-SM)		77		End of Boring at 77'.
								WC=Water Content
						80		in percent of dry
								weight.
								pp=Pocket
								Penetrometer
						85		Unconfined Compres-
								sive Strength in tsf.
								PID=Photoionization
								Detector.
						90		
						95		
						100		

MRCE Form BL-1

BORING NO. MR-4

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-4
SHEET 3 **OF** 3

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +12.9
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		[X] YES [ ] NO			
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	20
SKID		HYDRAULIC	X	DIA., IN.	3	DEPTH, FT. FROM	0	TO	70
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD

AUGER USED [ ] YES [X] NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-12-17	06:30	27	25	14	OVERNIGHT MUD LEVEL READING.
09-13-17	07:10	67	65	9	OVERNIGHT MUD LEVEL READING.

PIEZOMETER INSTALLED [ ] YES [X] NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 09-13-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-5
SHEET 1 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +16
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
13:30	1HA	0.0	HAND	Brown fine to coarse sand, some silt, gravel,			DRILLED	PID=0.0
08-23-17		3.0	AUGER	trace wood (SM)			AHEAD	Soft dig to 4'.
Monday							4" 3	Hand auger from 0' to
Sunny								3'.
84°F						5		Hand clear to 5'.
	2D	5.0	4-5	Brown coarse to fine sand, some brick, gravel,				PID=0.0
		7.0	5-4	trace silt (SP-SM)				
	3D	7.0	11-15	Top 6": Brown fine to coarse sand, some				3D Top: PID=0.0
		9.0	9-8	gravel, silt (SM)				3D Bot: PID=0.0
				Bot 4": Red brick	F	10		Wash color black.
	4D	10.0	4-4	Black fine to coarse sand, some silt, brick,				PID=0.0
		12.0	2-1	gravel (SM)				3" spoon, REC=2";
								loosing water.
								Wash color reddish
						15		brown at 12'.
						17.2		
					O			
						20		
	5D	20.0	17-2	Top 3": Black organic silty wood, some peat,		20.5		5D Top: PID=17.8
16:00		22.0	5-10	silt, organics (OH)				5D Bot: PID=3.0
06:30				Bot 6": Gray fine sand, trace silt (SP-SM)				5D Bot: Petroleum
08-24-17								odor.
Tuesday						25		Rig chatter from 23' to
Sunny	6D	25.0	5-7	Top 12": Brown fine to medium sandy silt (ML)				Rig chatter 23' to 24'.
83°F		27.0	9-11	Bot 6": Black silty fine sand (SM)				6D Top: WC=18,
	7D	27.0	9-8	Brown fine sandy silt, trace to black silty fine				PID=5.5
		29.0	9-10	to medium sand (SP-SM&SM)				6D Bot: WC=20,
						30		PID=0.5
								7D: WC=22, PID=6.1
						35		
	8D	35.0	6-7	Top 8': Medium Gray silty clay, some fine to				8D Top: WC=31,
		37.0	7-9	medium sand, trace gravel (CL)	S1			PID=0.0
				Bot 16": Medium Brown fine clayey sand, trace				8D Bot: WC=28,
				medium sand (SC)				PID=0.0
						40		Mix mud.
	9D	40.0	10-12	Brown fine to medium sand, trace silt, coarse				PID=0.0
		42.0	14-15	sand (SP)				
						45		
	10D	45.0	8-8	Brown coarse to fine sand, trace silt, gravel				PID=0.0
		47.0	9-8	(SW-SM)				3" Split spoon.
						50		
	11D	50.0	5-4	Brown gravelly coarse to fine sand (GP)				11D: PID=0.0
		52.0	6-8					Loosing mud.

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-5
SHEET 2 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +16
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							DRILLED	
08-24-17							AHEAD	
Tuesday							3"	
Sunny								
83°F						**55**		
	12D	55.0	6-6	Top 3": Brown fine to coarse sand, trace gravel,				12D Top: PID=0.0
		57.0	7-7	silt (SP)				12D Bot: PID=0.0
				Bot 9": Brown fine to coarse sand, trace gravel,				
				silt (SP)				
						60		
	13D	60.0	6-8	Brown fine to coarse sand, trace gravel, silt				PID=0.0
		62.0	9-11	(SP-SM)	**S1**			Running sands 4'.
						65		
	14D	65.0	10-10	Brown fine to medium sand, trace silt, coarse				PID=0.0
		67.0	13-15	sand (SP-SM)				
						70		
	15D	70.0	9-9	Brown fine to medium sand, trace silt (SP)				PID=0.0
		72.0	10-12					
						73.5		
						75		
	16D	75.0	11-13	Top 7": Brown fine sand, some silt, trace	**S2**			16D Top: PID=0.0
15:15		77.0	15-21	gravel (SM)		**77**		
				Bot 10": Brown fine to coarse sand, trace silt,				16D Bot: PID=0.0
				gravel (SP-SM)				End of Boring at 77'.
						80		
								WC=Water Content
								in percent of dry
								weight.
						85		PID=Photoionization
								Detector.
						90		
						95		
						100		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-5
SHEET 3 **OF** 3

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +16
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	35
SKID		HYDRAULIC	X	DIA., IN.	3	DEPTH, FT. FROM	0	TO	62
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED X YES NO

TYPE AND DIAMETER, IN. HAND AUGER

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
SAMPLER HAMMER, LBS. AVERAGE FALL, IN.
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
08-24-17	06:30	22	20	17	OVERNIGHT MUD LEVEL READING.

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER: HAND AUGER	3'

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS MRCE OFFICE DIRECTED TO SAMPLE AT 10' INCREMENTS IN THE FILL.
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 08-24-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-6P
SHEET 1 OF 4
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +13.8
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:45	1HA	0.0	HAND	Brown gravelly fine to coarse sand, some silt,			DRILLED	Hand auger from 0' to
08-17-17		5.0	AUGER	trace brick (SM)			AHEAD	5'.
Thursday							4"	1HA: PID=0.0
Sunny								
84°F						**5**		
	2D	5.0	2-20	Brown fine to coarse sand, some silt, gravel	**F**			PID=0.0; brick.
		7.0	22-10	(SM)				
	3NR	7.0	2-2	No recovery				Gravel in 3" split spoon,
		9.0	3-1					REC=6"
						10		
	4NR	10.0	4-2	No recovery				3" Split spoon; no
		12.0	1-1			**12**		recovery.
					WOOD	**15**		*3" Split spoon blow
								counts.
						17		
	5D	17.0	2-2	Top: Dark gray silty clay, sm wood, tr f sand (ML)				5D Top: WC=34,
		19.0	2-3	Bot: Gray fine sandy silt, trace clay (ML)				PID=8.8
	6NR	19.0	9-4	No recovery		**20**		5D Bot: WC=15,
		21.0	3-4		**F**			PID=1.6
	7D	21.0	5-2	Gray silty fine sand, trace clay, wood (SM)				Loosing water.
		23.0	3-5					2" & 2nd Attempt 3"
	8D	23.0	4-9	Gray fine to medium sand, trace silt, coarse				split spoon; no
		25.0	8-7	sand, clay, wood (SM)		**25**		recovery.
	9D	25.0	6-8	Medium Brown fine to medium sandy clay, trace				Macro core; REC=5".
16:00		27.0	8-15	black silt seams, gravel (CL)				6NR: 2" & 2nd Attempt
07:30								3" split spoon; no
08-18-17								recovery.
Friday						**30**		Macro core; no
Rain	10D	30.0	6-7	Top: Brown fine to coarse sand, trace silt,				recovery.
84°F		32.0	7-7	gravel (SP)				7D: WC=17, PID=0.0
				Bot: Brown fine to medium sand, trace silt,				REC=6"
				coarse sand (SM)				Smell; black wash.
						35		8D: PID=0.0
	11NR	35.0	2-3	No recovery				9D: WC=16, PID=0.0
		37.0	5-5					10D Top: PID=0.0
	12D	37.0	7-6	Brown coarse to fine sand, some gravel, trace				10D Bot: PID=0.0
		39.0	5-4	silt (SP)	**S1**			11NR: Wash; 2" & 2nd
						40		attempt 3" split spoon;
	13D	40.0	14*-8*	Brown coarse to fine sand, trace gravel, silt				no recovery.
		42.0	6*-7*	(SP)				Gravel in tip.
								12D: PID=0.0
								REC=4"
						45		13D-15D: 3" Split
	14NR	45.0	12*-7*	No recovery				spoon.
		47.0	8*-8*					13D: PID=0.0
								14NR: PID=0.0
								Gravel in tip; wash.
						50		
	15D	50.0	10-5	Brown fine to coarse sand, trace silt, gravel				PID=0.0
14:30		52.0	5-5	(SP-SM)			▼	Wash.

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-6P
SHEET 2 OF 4
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +13.8
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
12:30							DRILLED	
08-25-17							AHEAD	
Friday							4"	
Sunny							↓	
83°F						**55**	↓	
	16D	55.0	5-7	Brown fine to medium sand, trace gravel, coarse				PID=0.0
		57.0	10-10	sand (SP)	**S1**			
						60		
	17D	60.0	9-10	Top: Brown fine to coarse sand, trace silt (SP)				17D Top: PID=0.0
		62.0	10-12	Mid: Coarse to fine sand, some gravel, trace				17D Mid: PID=0.0
				silt (SP)				17D Bot: PID=0.0
				Bot: Brown fine to coarse sand, trace silt (SP)		**63.5**		
						65		
	18D	65.0	12-13	Brown fine to medium sand, trace silt, coarse				PID=0.0
		67.0	16-19	sand (SP)				
						70		
	19D	70.0	10-11	Brown fine to coarse sand, trace gravel, silt	**S2**			PID=0.0
		72.0	14-12	(SP)				
						75		
	20D	75.0	26-36	Brown coarse to fine sand, some gravel, trace				PID=0.0
15:30		77.0	33-26	silt (SP-SM)		**77**		End of Boring at 77'.
								WC=Water Content
						80		in percent of dry
								weight.
								PID=Photoionization
								Detector.
						85		
						90		
						95		
						100		

MRCE Form BL-1

BORING NO. MR-6P

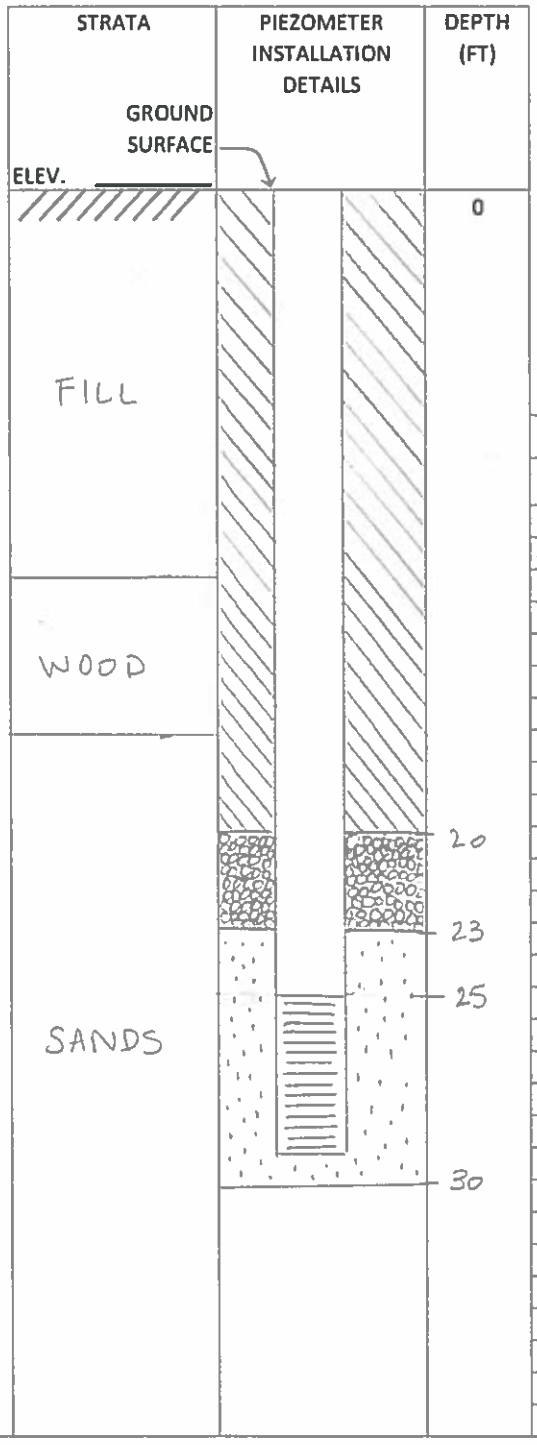
Mueser Rutledge Consulting Engineers
14 Penn Plaza - 225 West 34th Street
New York, NY 10122
T: 917 339-9300 F: 917 339-9400
www.mrce.com

PIEZOMETER RECORD

PIEZOMETER OR BORING NO. MR-6P
SHEET 3 OF 4
FILE NO. 12541
INSTALLATION DATE 9/13/17
RES ENGR. A. Eslamingad

PROJECT: First Street Turning Basin
LOCATION: Brooklyn, NY
PIEZOMETER LOCATION:

☐ SEE SKETCH ON BACK



PIEZOMETER TYPE Stand Pipe

INTAKE POINT
depth to bottom, ft = 30
depth to top, ft = 25
length, ft = 5 = L
diameter, in = 2", ft = .083 = 2R

STANDPIPE/RISER
elevation of rim, ft = 13.41
diameter, in = 2, ft = .17 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
9/18/17	0710	10.73	+2.67	
9/18/17	0955	10.88	+2.52	
9/19/17	1056	10.71	+2.69	
9/19/17	1359	11.08	+2.32	
9/20/17	1455	11.01	+2.39	
9/21/17	1452	11.03	+2.37	
9/22/17	0635	10.87	+2.53	
9/22/17	1840	10.93	+2.47	

SAND
GRAVEL
BENTONITE
GROUT

GROUND SURFACE ELEV. +13.8

PIEZOMETER NO. MR-6P

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-6P
SHEET 4 **OF** 4

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +13.8
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED	X YES		NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	55
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED X YES NO
TYPE AND DIAMETER, IN. HAND AUGER

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
08-18-17	07:30	27	24	4	OVERNIGHT READING.
08-28-17	08:00	77	50	12	OVER THE WEEKEND READING.

PIEZOMETER INSTALLED X YES NO **SKETCH SHOWN ON** SEE SHEET NO. 3

STANDPIPE:	TYPE	PVC	ID, IN.	2	LENGTH, FT.	30	TOP ELEV.		
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	2	LENGTH, FT.	5	TIP ELEV.		
FILTER:	MATERIAL	FILTER SAND	OD, IN.	4	LENGTH, FT.	7	BOT. ELEV.		

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER: HAND AUGER	5'

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS PIEZOMETER INSTALLED.
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 08-25-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-7
SHEET 1 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +14.3
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
13:00							DRILLED	Soft dig to 5'.
09-14-17							AHEAD	
Thursday							4" 3"	
Cloudy								
85°F						**5**		
	1D	5.0	25-25	Brown fine to medium sand, some silt, gravel,				PID=0.0
		7.0	7-9	brick, trace coarse sand (SM)				
	2D	7.0	10-5	Brown gravelly fine to coarse sand, some silt	**F**			PID=0.0; liner.
		9.0	7-8	(SM)				REC=5"
						10		
	3D	10.0	5-9	Brick, fine to coarse sandy gravel, some silt (SM)				PID=0.0; liner.
		12.0	5-8					3" Split spoon.
								REC=5"
						14		Boulder from 14' to
15:00					**BLDR**	**15**		15'.
08:00	4D	15.0	6-5	Brick, gravel (Fill)				PID=0.0; liner.
09-15-17		17.0	4-12					3" Split spoon.
Friday								REC=3"
Sunny								
Partly Cloudy						**20**		
80°F	5D	20.0	7-2	Wood, some brick, coarse to fine sand, trace				PID=8.9; liner.
		22.0	27-16	silt (Fill)				
	6D	22.0	9-12	Black gravelly fine to coarse sand, some silt	**F**			PID=8.9
		24.0	18-16	(NAPL) (SM)				
						25		
	7D	25.0	5-2	Black fine sandy silt, some wood, gravel				PID=10.3; liner.
		27.0	3-3	(SM)				
						30		
	8D	30.0	6-9	Top 4": Black silty fine sand, some wood (SM)		**30.5**		8D Top: PID=10.5
		32.0	10-10	Bot 6": Brown fine to medium sand, trace silt,				
				schnene (SP-SM)				
12:00						**35**		
08:50	9D	35.0	4-5	Brown fine to medium sand, trace silt, coarse				PID=0.0; liner.
09-18-17		37.0	6-5	sand (SP)				
Monday								
Cloudy								
75°F						**40**		
	10D	40.0	5-5	Brown fine to coarse sand, trace gravel, silt				PID=0.0; liner.
		42.0	6-6	(SP)	**S1**			
						45		Mix mud.
	11D	45.0	5-8	Brown medium to fine sand, trace silt (SP-SM)				PID=0.0; liner.
		47.0	7-6					
						50		
	12D	50.0	7-10	Brown fine to medium sand, trace silt (SP-SM)				PID=0.0; liner.
		52.0	11-11					

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-7
SHEET 2 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +14.3
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							DRILLED	
09-18-17							AHEAD	
Monday							3"	
Cloudy								
75°F						**55**		
	13D	55.0	6-9	Top 6": Brown fine to coarse sand, some silt				13D Top: PID=0.0;
		57.0	10-11	(SM)				liner.
				Bot 10": Brown silty fine to medium sand (SM)				
					S1	**60**		
	14D	60.0	6-7	Brown fine to coarse sand, trace gravel, silt				PID=0.0; liner.
		62.0	8-7	(SP)				
						65		
	15D	65.0	7-9	Brown fine to coarse sand, trace silt (SP)				PID=0.0; liner.
		67.0	10-11					
						68.5		
						70	▼	
	16D	70.0	14-17	Brown fine to coarse sand, trace silt (SP-SM)				PID=0.0; liner.
		72.0	19-18					
					S2			
						75		
	17D	75.0	11-18	Top 12": Brown fine to coarse sand, trace				17D Top: PID=0.0
13:45		77.0	20-22	gravel, silt (SP)		**77**		End of Boring at 77'.
				Bot 4": Brown fine sand, some silt, trace				
				medium sand (SP-SM)				PID=Photoionization
						80		Detector.
						85		
						90		
						95		
						100		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-7
SHEET 3 **OF** 3

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +14.3
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	20
SKID		HYDRAULIC	X	DIA., IN.	3	DEPTH, FT. FROM	0	TO	70
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 09-18-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-8
SHEET 1 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** 14.3
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
07:20							DRILLED	Soft dig to 5'.
09-19-17	1D	1.0	8-4	Brown fine to coarse sand, some silt, gravel,			AHEAD	PID=0.0; liner.
Tuesday		3.0	1-1	brick (SM)			4" 3"	
Cloudy	2D	3.0	2-1	Brown fine to coarse sand, trace silt, brick				PID=0.0; liner.
82°F		5.0	1-1	(SP-SM)	F	5		REC=5"
	3D	5.0	2-2	Brown medium to coarse sand, some silt,				PID=0.0; liner.
		7.0	5-8	gravel, trace brick (SM)				
	4D	7.0	7-11	Brown coarse to fine sand, gravel, some cinder,				PID=0.0; liner.
		9.0	8-8	trace silt (SP)		9		REC=4"
					BLDR	10		Obstruction at 10'.
	5D	10.0	2-1	Tan gravelly fine to coarse sand, some silt				PID=0.0
		12.0	1-5	(SM)				REC=4"; liner.
						15		
	6D	15.0	10-4	Tan fine to medium sand, some gravel, trace				PID=0.0; liner.
		17.0	4-1	silt, cinder (SP-SM)	F			
						20		
	7D	20.0	6-3	Black gravelly fine to coarse sand, some silt				PID=10.7
		22.0	10-8	(SM)				REC=4"
						23.5		3" Split spoon; gravel;
					O			liner.
						25		
	8D	25.0	8-13	Top 6": Soft black organic silty clay, trace fine		26		8D Top: WC=50,
		27.0	24-25	sand, gravel (OH)				PID=8.8
				Bot 10": Brown fine to medium sand, trace silt				8D Bot: PID=14.8;
				(SP)				NAPL
						30		
	9D	30.0	12-16	Brown fine to medium sand, some silt, trace				PID=2.0; liner.
		32.0	19-20	coarse sand, gravel (SM)				
						35		
	10D	35.0	11-14	Red brown fine to coarse sand, trace silt				PID=0.0; liner.
		37.0	15-16	(SP-SM)				
								Mixed mud.
					S1	40		
	11D	40.0	10-13	Do 10D (SP-SM)				PID=0.0; liner.
		42.0	12-12					
						45		
	12D	45.0	6-8	Red brown fine to medium sand, some silt,				PID=0.0; liner.
		47.0	9-8	trace coarse sand, gravel (SM)				
						50		
	13D	50.0	7-8	Do 12D (SM)				PID=0.0; liner.
		52.0	9-8					

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-8
SHEET 2 OF 3
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** 14.3
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							DRILLED	
09-19-17							AHEAD	
Tuesday							3"	
Cloudy								
82°F						**55**		
	14D	55.0	5-6	Brown medium to fine sand, some silt, trace				PID=0.0; liner.
		57.0	6-6	coarse sand, gravel (SW)				
					S1	**60**		Loosing mud.
	15D	60.0	3-4	Gravel, some coarse to fine sand, trace silt				PID=0.0
13:30		62.0	6-5	(GP)				
9:55								
09-20-17								
Wednesday						**65**		
Cloudy	16D	65.0	7-8	Brown fine sand, trace silt, coarse to medium				PID=0.0; liner.
81°F		67.0	7-10	sand (SP-SM)				
						68.5		
						70		
	17D	70.0	13-14	Brown fine sand, trace silt (SP-SM)				PID=0.0; liner.
		72.0	15-16					
					S2			Loosing mud.
						75		
	18D	75.0	10-11	Brown fine to medium sand, trace silt (SP-SM)				PID=0.0; liner.
11:20		77.0	14-13			**77**		
								End of Boring at 77'.
						80		WC=Water Content
								in percent of dry
								weight.
								PID=Photoionization
						85		Detector.
						90		
						95		
						100		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-8
SHEET 3 **OF** 3

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. 14.3
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	20
SKID		HYDRAULIC	X	DIA., IN.	3	DEPTH, FT. FROM	0	TO	70
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 09-20-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-10
SHEET 1 OF 2
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +14.3
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
12:30	1D	0.0	4-5	Brown fine to coarse sand, some silt, brick,			DRILLED	PID=0.0
08-16-17		2.0	6-3	gravel (Fill) (SM)			AHEAD	Soft dig to 5'.
Wednesday	2D	2.0	5-5	Top 8": Red brown f-c sand, tr silt, gvl (SP-SM)			4"	PID=0.0
Sunny		4.0	37-37	Bot 9": Brown f-c sand, sm silt, gravel (SP-SM)				
88°F	3D	4.0	12-11	Red brown gravel, some silty fine to coarse		**5**		PID=0.0
		6.0	19-29	sand (GM)				REC=5"
	4D	6.0	15-10	Top: Gravel & brick, trace silty f-c sand (GP)				
		8.0	7-4	Bot: Black silty fine to coarse sand, trace gravel				
				(SM)				
						10		
	5D	10.0	4-5	Gravel & brick, trace coarse to fine sand (GP)				
		12.0	2-2		**F**			
						15		
	6D	15.0	9-3	Black fine to medium sand, some silt, trace				PID=0.0
		17.0	2-1	gravel, brick (SM)				REC=3"
						20		Wash color black.
	7NR	20.0	1-7	No recovery				Loosing water.
15:30		22.0	15-11			**22**		Spin shoe & 5' of
								casing lost. Hole
								abandoned.
						25		abandoned.
								End of Boring at 22'.
								PID=Photoionization
								Detector.
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-10
SHEET 2 **OF** 2

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +14.3
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO	
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	20
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 08-16-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-10AU
SHEET 1 OF 4
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +14.7
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
							DRILLED	Offset west from
							AHEAD	Boring MR-10.
							4" 3"	
						5		
						10		
					F	15		
						20		
10:15								
08-28-17								
Tuesday								
Sunny								
76°F						25		
		25.0	WH/24"					2" & 2nd Attempt 3"
		27.0						split spoon; no
	8D	27.0		Black organic silty clay, gravel, trace fine sand				recovery. Macro core
		29.0		(OH)				from 25' to 29'; smell.
						30		8D: WC=63, PID=42
	9U	30.0	PUSH=24"	Black organic silty clay, gravel, trace fine sand	O			WC=46, PID=13.1
		32.0	REC=24"	(OH)				Smell.
	10D	32.0	4-3	Black organic silty clay, some fine to coarse				WC=46, PID=11.3
		34.0	4-7	sand, gravel (OH-CL)				3" Split spoon; smell.
15:15						35		Rig chatter from 33' to
07:30	11D	35.0	14-15	Black fine to coarse sand, some silt, trace				34'.
08-29-17		37.0	8-9	gravel, brick (SM)	S1			11D: PID=0.0
Wednesday						38.5		3" Split spoon.
Cloudy								
70°F						40	▼	
	12D	40.0	3-7	Top 3": Brown fine to coarse sand, trace silt,				12D Top: PID=0.0
		42.0	6-7	brick (SP)				
				Bot 4": Brown coarse to fine sand, trace gravel,				
				silt (SP)				
						45		
	13NR	45.0	3-5	No recovery	S2			2" & 2nd Attempt 3"
		47.0	6-5					split spoon; no
								recovery; Macro core
								no recovery.
						50		14D: PID=0.0
	14D	50.0	6-6	Brown fine to medium sand, trace coarse				Casing moving.
		52.0	7-6	sand, silt (SW-SM)			▼	

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-10AU
SHEET 2 OF 4
PROJECT: FIRST STREET TURNING BASIN **FILE NO.** 12541
LOCATION: BROOKLYN, NEW YORK **SURFACE ELEV.** +14.7
RES. ENGR. ARI ESLAMINEJAD

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							DRILLED	
08-29-17							AHEAD	
Wednesday							3"	
Cloudy								
70°F						**55**		
	15D	55.0	7-6	Do 14D (SW-SM)				PID=0.0
		57.0	7-8					
						60		
	16D	60.0	5-7	Brown fine to medium sand, trace silt, mica				PID=0.0
		62.0	8-9	(SP-SM)				
					S1	**65**		
	17D	65.0	7-8	Brown fine to medium sand, trace silt, mica				PID=0.0
14:15		67.0	9-9	(SP-SM)				
08:30								
08-30-17								
Thursday						**70**		
Sunny	18D	70.0	7-8	Brown fine to medium sand, trace silt, trace				PID=0.0
80°F		72.0	11-12	coarse sand, mica (SP-SM)				
						75		
	19D	75.0	11-10	Do 18D (SP-SM)				PID=0.0
		77.0	12-14					
						78.5		
						80		
	20D	80.0	10-11	Brown silty fine sand, trace mica (SM)				PID=0.0
		82.0	17-20					
						85		
	21D	85.0	10-12	Top 12": Do 20D (SM)				21D Top: PID=0.0
		87.0	10-16	Bot 4": Brown silty fine sand, trace clay (SM)	**S2**			21D Bot: PID=0.0
								PID=Photoionization
						90		Detector.
	22D	90.0	7-11	Brown silty fine sand, trace clay (SM)				PID=0.0
		92.0	13-19					WC=Water Content
								in percent of dry
						93.5		weight.
						95		Obstruction from 94.5'
	23D	95.2	31-37	Brown silty coarse to fine sand, some gravel,				to 95.2'.
		97.2	62-55	trace mica (SM)				Gravel in tip of spoon.
					T			Hard from 97.2' to
								100'.
						100		Loosing water.
	24D	100.0	94-100/3"	Do 23D (SM)				
12:30		102.0				**102**		End of Boring at 102'.

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-10AU
SHEET 4 **OF** 4

PROJECT FIRST STREET TURNING BASIN
FILE NO. 12541
LOCATION BROOKLYN, NEW YORK
SURFACE ELEV. +14.7
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED	X YES		NO		
TRUCK	DIETRICH D120	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	40
SKID		HYDRAULIC	X	DIA., IN.	3	DEPTH, FT. FROM	0	TO	60
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF

D-SAMPLER	2" & 3" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN.
TYPE OF DRILLING MUD CETCO

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*HAMMER TYPE (DONUT/SAFETY/AUTOMATIC): AUTOMATIC

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
08-17-17	08:00	22	20	14.5	OVERNIGHT MUD LEVEL READING.
08-29-17	07:45	35	30	3.5	OVERNIGHT MUD LEVEL READING.
08-30-17	08:30	67	60	5	OVERNIGHT MUD LEVEL READING.

PIEZOMETER INSTALLED YES X NO **SKETCH SHOWN ON**

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	1
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR ASSOCIATED ENVIRONMENTAL SERVICES LTD.
DRILLER CHRIS SANCHEZ **HELPERS** JOSE GARCIA JR.
REMARKS
RESIDENT ENGINEER ARI ESLAMINEJAD **DATE** 08-30-17
CLASSIFICATION CHECK: CHERYL J. MOSS **TYPING CHECK:** ARI ESLAMINEJAD

APPENDIX B

PROJECT: PW77GOWAN

LOCATION: First-Street Turning Basin

DATE: 8/7/17

SOIL BORING LOG

Soil Boring ID: SB-1

SHEET 1 OF 1

BORING LOCATION: 40.6765809°; -073.9877102°

LOGGED BY: Bryan Comey, Preferred Environmental Services

GROUND SURFACE ELEVATION:

MEASURING POINT ELEVATION: N/A

START DATE: 8/7/17

DRILLING CO.: TWS

FINISH DATE: 8/7/17

DRILLERS NAME: Steve E.

SAMPLING METHOD: Continuous

DRILLING METHOD AND RIG TYPE: Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5		0.0	N/A	Soft dug to 5 feet below grade surface prior to drilling.
5	5-7	3	0.0		Fill: Gray, poorly graded fine to medium sand with gravel and construction and demolition debris, no staining or odors.
	7-8				Fill: Tan and black poorly graded fine to medium sand and gravel with glass, no staining or odors.
10	8-10				Fill: Black ash, construction and demolition debris, no staining or odors.
	10-12	1.5	0.0		Fill: Dark gray poorly graded fine to medium sand and silt with wood, no staining or odors.
	12-13		4.3		
	13-14	4.5	18.3		Fill: Concrete, wood, and debris with staining and heavy petroleum odors. Wet at 13 feet below grade surface.
15	14-15		79.8		Fill: Black, poorly graded fine to coarse sand and silt with gravel and debris.
	15-16		80.3		
	16-17		11.2		Fill: Brown and gray poorly graded fine to coarse sand and silt with gravel and debris, petroleum odor and staining.
18	17-18		35.8		Fill: Gray brown poorly graded fine to coarse sand and gravel with wood, heavy petroleum odor and non-aqueous phase liquid present.
					End of Boring at 18 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material
PT	Peat, Humus, Swamp Soils with High Organic Contents

Notes: Composite samples collected from SB-1: (0'-10'); (10'-18'). Grab samples collected from SB-1: (9.5'-10'); (14'-14.5').

PROJECT: PW77GOWAN

LOCATION: First-Street Turning Basin

DATE: 8/8/17

SOIL BORING LOG

Soil Boring ID: SB-2

SHEET 1 OF 1

BORING LOCATION: 40.6769160° -073.9882869°

LOGGED BY: Bryan Comey, Preferred Environmental Services

GROUND SURFACE ELEVATION: N/A

MEASURING POINT ELEVATION: N/A

START DATE: 8/8/17

DRILLING CO.: TWS

FINISH DATE: 8/8/17

DRILLERS NAME: Steve E.

SAMPLING METHOD: Continuous

DRILLING METHOD AND RIG TYPE: Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5		0.0	N/A	Soft dug to 5 feet below grade surface prior to drilling, no odors or staining.
5					
	5-10	2.5	0		Fill: Brown to gray poorly sorted fine to medium sand and silt with construction and demolition debris, no odors or staining.
10					
	10-11	1	1.8		Fill: Brown/Black construction and demolition debris with silt and wood, chemical odor, no staining. Wet at 11 feet below grade surface.
	11-12	4.5	3.6		
	12-13		4.5		
	13-14		59.8		Fill: Black wood with fine sand and silt, chemical odor, no staining.
15	14-15		10.3		
	15-16		8.3		
	16-20		N/A		No Recovery
20					
	20-20.5	5	21.3		OL: Black clay with trace organics, chemical odor, no staining.
	20.5-21		11.6		GW: Black well graded coarse sand with gravel, chemical odor, no staining.
	21-22		186		OL: Black clay with trace organics, chemical odor and staining.
	22-23		205		
	23-24		287		
25	24-25		187		
	25-26.5		119		
	26.5-27	3	143		OL: Black poorly graded fine to coarse sand with gravel and silt, heavy petroleum odor and staining.
	27-28		81.3		GM: Gray poorly graded fine to coarse sand and gravel with silt, heavy petroleum odor and staining, non-aqueous phase liquid present.
	28-29	4.5	80.6		
30	29-30		60.2		
	30-31		25.4		GM: Gray poorly graded fine to coarse sand and gravel with silt, heavy petroleum odor and staining.
	31-32		7.0		
	32-33		3.2		
					End of boring at 33 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material

Notes: Composite samples collected from SB-2: (0'-10'); (10'-20'); (20'-33'). Grab samples collected from SB-2: (7.5'-8'); (13.5'-14'); (23'-23.5').

PROJECT: PW77GOWAN

LOCATION: First-Street Turning Basin

DATE: 8/8/17

SOIL BORING LOG

Soil Boring ID: SB-3

SHEET 1 OF 1

BORING LOCATION: 40.6766820° -073.9879056°

LOGGED BY: Bryan Comey, Preferred Environmental Services

GROUND SURFACE ELEVATION: N/A

MEASURING POINT ELEVATION: N/A

START DATE: 8/8/17

DRILLING CO.: TWS

FINISH DATE: 8/8/17

DRILLERS NAME: Steve E.

SAMPLING METHOD: Continuous

DRILLING METHOD AND RIG TYPE: Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5		0.0		Soft dug to 5 feet below grade surface prior to drilling, no odors or staining.
5	5-10		N/A		No Recovery.
10	10-13	5	0.0		Fill: Construction and demolition debris (crushed brick), no odors or staining.
	13-15				Fill: Construction and demolition debris (crushed gray concrete), no odors or staining.
15	15-18	2.5	4.3		Fill: Construction and demolition debris (crushed brick), no odors or staining.
	18-20		5.7		Fill: Construction and demolition debris (crushed gray concrete), no odors or staining, wet at 18 feet below grade surface.
20	20-21	3	2.3		Fill: Black clay with organics and glass, chemical odor, no staining.
	21-22		35.7		
	22-23		29.6		
	23-23.5	5	80.7		GW: Black well graded coarse sand with gravel, chemical odor, no staining.
	23.5-24		53.6		OL: Black, low plasticity clay with wood and organics, heavy petroleum odor and staining.
25	24-25		35.8		
	25-26		24.3		
	26-27		25.8		
	27-28		14.6		
	28-29	5	18.8		OH: Black medium plasticity clay, heavy petroleum odor and staining, non-aqueous phase liquid present.
30	29-30		11.7		
	30-31		8.2		
	31-32		2.4		GM: Gray poorly graded fine to medium sand with silt and gravel, heavy petroleum odor and staining.
	32-33		2.2		GM: Gray poorly graded fine to medium sand with silt and gravel, heavy petroleum odor and staining.
					End of boring at 33 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material

Notes: Composite samples collected from SB-3: (10'-20'); (20'-33'). Grab samples collected from SB-3: (18'-18.5'); (23'-23.5'). Soil boring SB-3 completed as MW-3D and MW-3S. MW-3S was unable to be utilized as a monitoring well due to collapse of the screen. MW-3S was re-drilled approximately 3 feet east of MW-3D.

PROJECT: PW77GOWAN

LOCATION: First-Street Turning Basin

DATE: 8/18/17

SOIL BORING LOG

Soil Boring ID: SB-3/MW-3S

SHEET 1 OF 1

BORING LOCATION: 40.6766693° -073.9879169°	**LOGGED BY:** Dan Prisco-Buxbaum, Preferred Environmental Services
GROUND SURFACE ELEVATION: N/A	**MEASURING POINT ELEVATION:** N/A
START DATE: 8/18/17	**DRILLING CO.:** TWS
FINISH DATE: 8/18/17	**DRILLERS NAME:** Steve E.
SAMPLING METHOD: Continuous	**DRILLING METHOD AND RIG TYPE:** Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5	3	0.7		Fill: Brown poorly sorted fine to medium sand with silt and construction and demolition debris, chemical odors, no staining.
5	5-6	0.5	0.6		Fill: Brown poorly sorted fine to medium sand with silt and construction and demolition debris, chemical odors, no staining.
	6-7	0.5	0.5		
	7-8	0.5	0.6		
	8-9	0.5	0.8		
10	9-10	0.5	0.5		
	10-15	3	0.4		Fill: Brown poorly sorted fine to medium sand with silt and construction and demolition debris, chemical odors, no staining.
15					
	15-20	1	0.5		SM: Gray/brown sandy silt with construction and demolition debris, chemical odors, no staining. Wet at 16 feet below grade surface.
20					End of boring at 20 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material

Notes: Composite sample collected from SB-3: (0'-10'). Grab sample collected from SB-3: (8.5'-9'). Soil boring SB-3 completed as MW-3S.

	PROJECT: PW77GOWAN **LOCATION:** First-Street Turning Basin **DATE:** 8/09/17	**SOIL BORING LOG** **Soil Boring ID:** SB-4 **SHEET** 1 **OF** 1

BORING LOCATION: 40.6770076° -073.9885535°	**LOGGED BY:** Bryan Comey, Preferred Environmental Services
GROUND SURFACE ELEVATION: N/A	**MEASURING POINT ELEVATION:** N/A
START DATE: 8/09/17	**DRILLING CO.:** TWS
FINISH DATE: 8/09/17	**DRILLERS NAME:** Steve E.
SAMPLING METHOD: Continuous	**DRILLING METHOD AND RIG TYPE:** Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5			N/A	Soft dug to 5 feet below grade surface prior to drilling, no odors or staining.
5					
	5-7	3.5	0.0		Fill: Brown poorly graded fine to coarse sand with silt and construction and demolition debris, no odors or staining.
	7-8				Fill: Construction and demolition debris (crushed brick), no odors or staining.
10	8-10				Fill: Brown poorly graded fine-coarse sand with gravel with construction and demolition debris, (crushed concrete), no odors or staining.
	10-11	4.5	1.4		Fill: Brown poorly graded fine to coarse sand and gravel with construction and demolition debris (brick), no odors or staining.
	11-14		0.0		Fill: Brown poorly graded fine to coarse sand with silt, no odors or staining.
15	14-15				Fill: Construction and demolition debris (crushed concrete with wood), no odors or staining.
	15-16	5	1.8		Fill: Brown poorly graded fine to coarse sand with silt and wood, no odors or staining. Wet at 15 feet below grade surface.
	16-17		6.8		
	17-18		13.4		Fill: Gray clay and fine sand and crushed rock, no odors or staining.
	18-19		2.4		
20	19-20		206.3		Fill: Construction and demolition debris (wood) with chemical odor and staining.
	20-21	4.5	36.2		Fill: Construction and demolition debris (bricks).
	21-22		103.7		
	22-23		55.4		GC: Black poorly graded fine to coarse sand silt, chemical odor and staining.
	23-24		78.6		GC: Black poorly graded fine to medium sand with gravel, petroleum odor and staining, non-aqueous phase liquid present.
25	24-25		192.7		
	25-26	3	204.3		OH: Black low plasticity clay with organics, chemical odor and staining.
	26-27		190.6		
	27-28		76.8		
	28-29	5	45.6		GC: Black poorly graded fine to coarse sands with clay, chemical odor and staining, non-aqueous phase liquid present.
30	29-30		47.7		
	30-31		34.3		OH: Gray high plasticity clay, chemical odor and staining, non-aqueous phase liquid present.
	31-32		76.8		SP: Gray poorly graded fine to medium sands, chemical odor and staining, non-aqueous phase liquid present.
	32-33		19.4		
					End of boring at 33 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART		
	GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
	GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
	GM	Silty Gravels, Gravel - Sand - Silt Mixtures
	GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
	SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
	SM	Silty Sands, Sand - Silt Mixtures
	SC	Clayey Sands, Sand - Clay Mixtures
	ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
	CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
	OL	Organic Silts and Organic Silty Clays of Low Plasticity
	MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
	CH	Inorganic class of High Plasticity
	OH	Organic Clays of Medium to High Plasticity, Organic Silts
	PT	Peat, Humus, Swamp Soils with High Organic Contents
	FILL	Fill Material

Notes: Composite samples collected from SB-4: (0'-10'); (10'-20'); (20'-33'). Grab samples collected from SB-4: (5.5'-6'); (19.5'-20'); (25.5'-26'). Soil boring SB-3 as MW-4S and MW-4D.

	PROJECT: PW77GOWAN **LOCATION:** First-Street Turning Basin **DATE:** 8/10/17	**SOIL BORING LOG** **Soil Boring ID:** SB-5 **SHEET** 1 **OF** 1

BORING LOCATION: 40.6772239° -073.9888338°	**LOGGED BY:** Bryan Comey, Preferred Environmental Services
GROUND SURFACE ELEVATION:	**MEASURING POINT ELEVATION:**
START DATE: 8/10/17	**DRILLING CO.:** TWS
FINISH DATE: 8/10/17	**DRILLERS NAME:** Steve E.
SAMPLING METHOD: Continuous	**DRILLING METHOD AND RIG TYPE:** Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5		0.0	N/A	Soft dug to 5 feet below grade surface prior to drilling, no odors or staining.
5	5-10	2	0.0		Fill: Brown poorly graded fine to medium sand with silt, construction and demolition debris and trash, no odors or staining.
10	10-11	4	0.0		Fill: Brown poorly graded fine to medium sand with silt, construction and demolition debris and trash, no odors or staining. Wet at 11 feet below grade surface.
	11-13				
15	13-15				Fill: Brown/gray poorly sorted fine to medium sand with silt, gravel and construction and demolition debris (brick), no odors or staining.
	15-16	5	4.5		Fill: Black silt with fine sand, and organics (plant matter), sheen noted on groundwater, organic odor.
	16-17		9.6		
	17-18		29.6		Fill: Black silty low plasticity clay, chemical odor and staining.
	18-19		113.6		
20	19-20		38.5		
	20-21	5	84.6		
	21-22		46.5		
	22-23		73.6		Fill: Black silty clay with poorly graded fine to medium sand, chemical odor and staining.
	23-24		86.5		
25	24-25		58.3		
	25-26	3	13.8		Fill: Black silt with poorly graded fine to coarse sand, sheen noted on groundwater and chemical odor.
	26-27		9.6		Fill: Black poorly graded fine to coarse sand with silt, gravel and C&D (brick).
	27-28		6.7		
	28-29	N/A	N/A		No recovery from 28-33 feet below grade surface.
30	30-31				
	31-32				
	32-33				
					End of boring at 33 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material

Notes: Composite samples collected from SB-5: (0'-10'); (10'-20'); (20'-33'). Grab samples collected from SB-5: (7.5'-8'); (18.5'-19'); (23'-23.5'). Soil boring SB-5 as MW-5S and MW-5D.

PROJECT: PW77GOWAN

LOCATION: First-Street Turning Basin

DATE: 8/11/17

SOIL BORING LOG

Soil Boring ID: SB-6

SHEET 1 **OF** 1

BORING LOCATION: 40.6772117° -073.9888628°	**LOGGED BY:** Bryan Comey, Preferred Environmental Services
GROUND SURFACE ELEVATION: N/A	**MEASURING POINT ELEVATION:** N/A
START DATE: 8/11/17	**DRILLING CO.:** TWS
FINISH DATE: 8/11/17	**DRILLERS NAME:** Steve E.
SAMPLING METHOD: Continuous	**DRILLING METHOD AND RIG TYPE:** Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT.)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5		0.0	N/A	Soft dug to 5 feet below grade surface prior to drilling, no odors or staining.
5	5-10		0.0	N/A	No Recovery.
10	10-11	5	0.0		Fill: Brown poorly graded fine to medium sand with gravel, no odor or staining.
	11-12				
	12-13		7.8		Fill: Brown/black poorly graded fine to medium sands with silt, sheen noted on groundwater, no odors. Wet at 13 feet below grade surface.
	13-14		20.8		Fill: Black poorly graded fine to coarse sand with silt, no odors or staining.
15	14-15		31.6		Fill: Black construction and demolition debris (trash/wood), no odors or staining.
	15-16	2	56.8		
	16-17		84.0		Fill: Black silty high plasticity clay, no odors or staining.
18	17-18		104.0		Fill: Black silt with construction and demolition debris (wood/debris), no odors or staining.
					End of boring at 18 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material

Notes: Composite samples collected from SB-6: (10'-18'). Grab samples collected from SB-6: (17.5'-18').

PROJECT: PW77GOWAN

LOCATION: First-Street Turning Basin

DATE: 8/18/17

SOIL BORING LOG

Soil Boring ID: SB-7

SHEET 1 OF 1

BORING LOCATION: 40.6771292° -073.9888345°

LOGGED BY: Dan Prisco-Buxbaum, Preferred Environmental Services

GROUND SURFACE ELEVATION: N/A

MEASURING POINT ELEVATION: N/A

START DATE: 8/18/17

DRILLING CO.: TWS

FINISH DATE: 8/18/17

DRILLERS NAME: Steve E.

SAMPLING METHOD: Continuous

DRILLING METHOD AND RIG TYPE: Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5	3	0.3		Fill: Brown/black poorly sorted fine to medium sand with silt and construction and demolition debris, no odors or staining.
5	5-6	0.5	9.6		Fill: Brown/black poorly sorted fine to medium sand with silt and construction and demolition debris, chemical odor, no staining.
	6-7	0.5	10.8		
	7-8	0.5	94.8		
	8-9	0.5	81.2		
10	9-10	0.5	76.4		Fill: Brown/black poorly sorted fine to medium sand with silt and construction and demolition debris (wood), chemical odor, no staining.
	10-11	3	70.3		Fill: Brown/black poorly sorted fine to medium sand with silt and construction and demolition debris, chemical odor, no staining.
	11-12		62.4		
	12-13		19.5		Fill: Gray/black poorly sorted sand with silt, cobbles and construction and demolition debris (wood), chemical odor, no staining. Wet at 12 feet below grade surface.
	13-14		32.5		
15	14-15		29.3		
	15-33		N/A		No recovery from 15 to 33 feet below grade surface.
33					End of boring at 33 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material

Notes: Composite sample collected from SB-7: (0'-10'); (10'-15'). Grab sample collected from SB-7: (7.5'-8'); (11'-11.5'). SB-7 was re-drilled after hitting refusal atapproximately 12 feet below grade surface.

PROJECT: PW77GOWAN

LOCATION: First-Street Turning Basin

DATE: 8/14/17

SOIL BORING LOG

Soil Boring ID: SB-8

SHEET 1 OF 1

BORING LOCATION: 40.6768319° -073.9880485°	**LOGGED BY:** Bryan Comey, Preferred Environmental Services
GROUND SURFACE ELEVATION: N/A	**MEASURING POINT ELEVATION:** N/A
START DATE: 8/14/17	**DRILLING CO.:** TWS
FINISH DATE: 8/14/17	**DRILLERS NAME:** Steve E.
SAMPLING METHOD: Continuous	**DRILLING METHOD AND RIG TYPE:** Roto-Sonic

DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE REC. (FT.)	SAMPLE PID (PPM)	GRAPHIC LOG	MATERIAL DESCRIPTION
1	0-5		N/A	N/A	Soft dug to 5 feet below grade surface prior to drilling, no odor or staining.
5	5-10	4	0.0		Fill: Brown poorly sorted fine to medium sand and silt with construction and demolition debris (bricks), no odor or staining.
10	10-12	4	5.0		Fill: Red construction and demolition debris (crushed brick) with poorly sorted fine to medium sand, silt and clay, no odor or staining. Wet at 11 feet below garade surface.
	12-13		7.8		
	13-14		12.9		Fill: Black/gray construction and demolition debris (concrete) with poorly sorted fine to medium sand and silt, petroleum odor, no staining.
15	14-15		14.8		
	15-16	3	10.2		
	16-17		0.4		Fill: Red/brown poorly graded fine to medium sand with silt and construction and demolition debris, no odor or staining.
18	17-18		0.0		
					End of boring at 18 feet below grade surface.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

GW	Well-Graded Gravels, Gravel - Sand Mixtures, Little or No Fines
GP	Poorly-Graded Gravels, Gravel- Sand Mixtures, Little or No Fines
GM	Silty Gravels, Gravel - Sand - Silt Mixtures
GC	Clayey Gravels, Gravel- Sand- Clay Mixtures
SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
SP	Poorly-Graded Sands, Gravelly Sand, Little or no Fines
SM	Silty Sands, Sand - Silt Mixtures
SC	Clayey Sands, Sand - Clay Mixtures
ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
CL	Inorganic Clays of Low Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
OL	Organic Silts and Organic Silty Clays of Low Plasticity
MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Sands
CH	Inorganic class of High Plasticity
OH	Organic Clays of Medium to High Plasticity, Organic Silts
PT	Peat, Humus, Swamp Soils with High Organic Contents
FILL	Fill Material

Notes: Composite samples collected from SB-8: (0'-10'); (10'-18'). Grab samples collected from SB-8: (7.5'-8'); (12.5'-13').

APPENDIX C

Photograph Captions

Photograph 1 - Facing north along the western edge of the filled-in First Street Turning Basin showing accumulated debris, loose soils spilling into the canal, and the absence of a retaining wall.

Photograph 2 - Facing northwest towards the foundation of a brick building located adjacent to the northern edge of the former basin at its western-end. The brick building is supported by a concrete foundation with a wooden fender.

Photograph 3 - Facing southwest towards the chain-link fence along the southern edge of the former basin at its western-end. The fence rests on a concrete foundation with a wooden fender.

Photograph 4 - Facing west towards western portion of in the former basin. The former basin originally extended from approximately the brick building on the right to the chain-link fence on the left.

Photograph 5 - Facing east along former basin from western half. The topography is irregular in this area. CubeSmart Self Storage on 3rd Avenue is visible in the background.

Photograph 6 - Facing north from paved central portion of filled-in basin used for parking. Test Pit 3 is located in the center of photograph. The parking area continues to the north to Carroll Street.

Photograph 7 - Facing east from the eastern un-paved portion of the filled-in basin. Test Pit 4 was excavated in this area.

Photograph 8 - Facing west from within the Extra Space storage facility parking lot located northeast of the filled-in basin. The northern edge of the basin was likely located somewhere between the front of the excavator and the curb line.

Photograph 9 - Facing west showing completed excavation of Test Pit 1. Note loose sandy fill and extensive modern refuse. The canal is in the background.

Photograph 10 - Facing southwest showing excavation of Test Pit 2 at base of chain-link fence extending along southern edge of the former basin.

Photograph 11 - Facing south into Test Pit 2 showing portion of the wooden bulkhead beneath concrete wall approximately 5 feet below base of fence.

Photograph 12 - Facing south in Test Pit 2 showing portion of wooden bulkhead and fasteners beneath decomposing concrete wall approximately 5 feet below base of fence. Three separate horizontal squared timbers are visible. Base of trench is approximately 9 feet below ground surface.

Photograph 13 - Facing south in Test Pit 2 showing portion of wooden bulkhead and fasteners beneath decomposing concrete wall approximately 5 feet below base of fence. Three separate horizontal squared timbers are visible.

Photograph 14 - Detail of metal fasteners extending into wooden bulkhead in Test Pit 2, immediately below decomposing concrete wall.

Photograph 15 - Facing south into partially excavated Test Pit 3. Note multiple layers of fill and brick demolition debris.

Photograph 16 - Facing south into Test Pit 3. Note multiple layers of fill and loose sandy fill at bottom.

Photograph 17 - Test Pit 3 at completion. Bottom of test pit is approximately 10 feet below the parking lot ground surface.

Photograph 18 - Facing east showing partially excavated Test Pit 4. Note loose sandy fills and modern refuse.

Photograph 19 - Modern refuse and car tire encountered in Test Pit 4.

Photograph 20 - Facing west towards the canal showing the excavation of Test Pit 5 at base of the brick building on right.

Photograph 21 - Facing northwest at the building foundation at the northern side of Test Pit 5. The brick building is resting on a concrete foundation supported by a concrete footer within a matrix of mixed fill. Remains of the wooden form used to pour the concrete footer are still present.

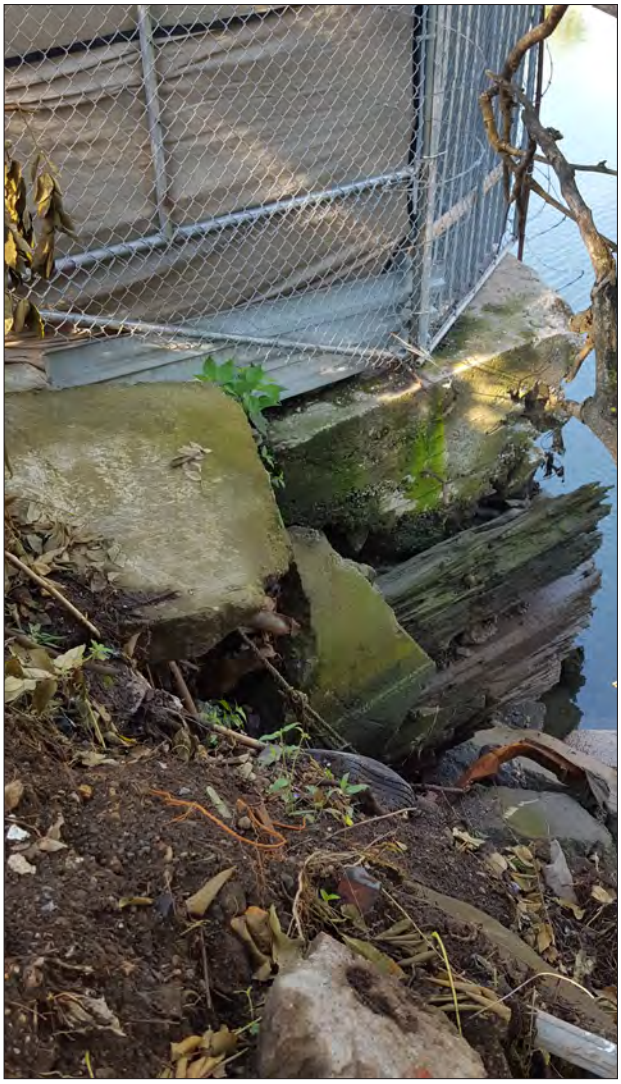
Photograph 22 - Facing northwest at building foundation at northern side of Test Pit 5 showing timber pile that is supporting the concrete footer. Soils at bottom of photo are approximately 6.5 feet below base of brick building.

Photograph 23 - Facing west showing upper portion of western wall of Test Pit 6. Note multiple layers of loose fill and demolition debris. A 2-inch diameter pipe is located at the bottom of the photo.

Photograph 24 - Facing west showing lower portion of western wall of Test Pit 6. Note multiple layers of loose fill and demolition debris. Note 6-inch diameter pipe extending into the test pit from the left. Base of trench is approximately 10 feet below ground surface in this photo.

Facing north along the western edge of the filled-in 1st Street Turning Basin showing accumulated debris, loose soils spilling into the canal, and the absence of a retaining wall. **1**

Facing northwest towards foundation of brick building located adjacent to northern edge of basin at its western end. Building is supported by a concrete foundation with a wooden fender. **2**



Facing southwest towards chainlink fence lining the southern edge of the basin at its western end. The fence rests on a concrete foundation with a wooden fender. **3**

Facing west towards western portion of filled-in basin. The former turning basin originally extended from approximately the brick building on the right to the chainlink fence on the left. **4**

Facing east along filled-in turning basin from western half. Topography is irregular in this area. CubeSmart Self Storage on 3rd Avenue is visible in the background. **5**

Facing north from paved central portion of filled-in basin used for parking. TP3 is located in the center of photograph. The parking area continues to the north to Carroll Street. **6**

Facing east from the eastern un-paved portion of the filled-in basin. TP4 was excavated in this area. **7**

Facing west from within the Extra Space Storage storage facility parking lot located north-east of the filled-in basin. The northern edge of the basin was likely located somewhere between the front of the excavator and the curb line. **8**

Facing west showing completed excavation of TP1. Note loose sandy fill and extensive modern refuse. The Gowanus Canal is in the background. **9**

Facing southwest showing excavation of TP2 at base of chain-link fence extending along southern edge of turning basin. **10**

Facing south into TP2 showing portion of wooden bulkhead beneath concrete wall approximately 5 feet below base of fence. **11**

Facing south in TP2 showing portion of wooden bulkhead and fasteners beneath decomposing concrete wall approximately 5 feet below base of fence. Three separate horizontal squared timbers are visible. Base of trench is approximately 9 feet below ground surface. **12**

Facing south in TP2 showing portion of wooden bulkhead and fasteners beneath decomposing concrete wall approximately 5 feet below base of fence. Three separate horizontal squared timbers are visible. **13**

Detail of metal fasteners extending into wooden bulkhead in TP2, immediately below decomposing concrete wall. **14**

Facing south into partially excavated TP3. Note multiple layers of fill and brick demolition debris. **15**

Facing south into TP3. Note multiple layers of fill and loose sandy fill at bottom. **16**

TP3 at completion. Bottom of trench is approximately 10 feet below the parking lot ground surface. **17**

Facing east showing partially excavated TP4. Note loose sandy fills and modern refuse. **18**

Modern refuse and car tire encountered in TP4. **19**

Facing west towards Gowanus Canal showing excavation of TP5 at base of brick building on right. **20**

Facing northwest at building foundation at northern side of TP5. Brick building is resting on a concrete foundation supported by a concrete footer within a matrix of mixed fill. Remains of the wooden form used to pour the concrete footer are still present. **21**

Facing northwest at building foundation at northern side of TP5 showing timber pile that is supporting the concrete footer. Soils at bottom of photo are approximately 6.5 feet below base of brick building. **22**

Facing west showing upper portion of western wall of TP6. Note multiple layers of loose fill and demolition debris. A 2-inch diameter pipe is located at the bottom of the photo. **23**

Facing west showing lower portion of western wall of TP6. Note multiple layers of loose fill and demolition debris. Note 6-inch diameter pipe extending into trench from the left. Base of trench is approximately 10 feet below grade in this photograph. **24**