

June 15, 2011

Mr. Henry Willems  
New York State Department of Environmental Conservation  
Division of Environmental Remediation  
625 Broadway, 12th Floor  
Albany, New York 12233-7013

**Subject: Revised Remedial Investigation Work Plan Addendum (No. 3)**

**Lowes Parking Lot Boring/Well Installation  
Metropolitan Former Manufactured Gas Plant (MGP) Site, Brooklyn, NY  
NYSDEC Site No.: 224046, Order on Consent Index #: A2-0552-0606**

Dear Mr. Willems:

National Grid is submitting the following revised Remedial Investigation (RI) Work Plan Addendum for the Metropolitan former manufactured gas plant (MPG) site (the Site), located at 124 - 136 2<sup>nd</sup> Avenue in Brooklyn, New York. This addendum describes work to be performed in the Lowes parking lot on FC Gowanus property located at 118 2<sup>nd</sup> Avenue and includes the two additional soil borings requested in your May 19, 2011 conditional approval letter for the original submittal.

The former Metropolitan MGP was operated by The Brooklyn Union Gas Company (BUG), a predecessor company to National Grid, from at least the late 1880s until approximately 1938. As you are aware, the Remedial Investigation of the Site is being conducted by National Grid pursuant to a Multi-site Order on Consent and Administrative Settlement with the NYSDEC, Index # A2-0552-0606, executed on February 22, 2007 and modified on August 10, 2007, and in accordance with applicable guidelines of the NYSDEC and the New York State Department of Health (NYSDOH). Specifics of the RI scope of work are presented in the NYSDEC-approved work plan (Remedial Investigation Work Plan, Metropolitan Former MGP Works) produced by AECOM in May 2009 and in two previous Remedial Investigation Work Plan Addendums. Addendum No. 1, for off-site property located at 381/539 Smith Street, was submitted to NYSDEC in June 2010, and Addendum No. 2, for installation of two deep wells adjacent to the canal, on property owned by Hamilton Plaza Associates was submitted to NYSDEC in February 2011.

The scope of work presented in this letter supplements the May 2009 NYSDEC-approved Remedial Investigation Work Plan (the RIWP). The purpose of the work described in this RIWP Addendum (No. 3) is to advance at least five soil borings in the Lowes parking lot area for the delineation of potential MGP residuals. Monitoring wells will be installed at select locations as outlined later in this submittal. At each boring location, a deep soil boring (minimum of 90 feet deep and 10 feet into visually clean soils) will be advanced and continuously logged to delineate zones of deep soil impacts (MGP residuals) identified in various investigation and geotechnical borings installed at the Site. Specifically, the primary objective for this work is to delineate NAPL and MGP residuals observed beneath the Lowes parking lot, in borings installed near the Gowanus Canal and the 11<sup>th</sup> Street Basin, and in recovery well borings located between the Hamilton Plaza Associates and Lowes buildings. Non-Aqueous Phase Liquid (NAPL) and MGP residuals were observed during the investigation and remediation of the FC Gowanus property at 118 2<sup>nd</sup> Avenue.

A summary of previously observed subsurface conditions in the proposed investigation area is provided in attached cross-sections A-A' and B-B' (Figures 1 through 3). As shown on Figure 2, suspected MGP impacts were observed in geotechnical boring PB-5 at depths of approximately 50 to 80 feet bgs. Along cross-section B-B' (Figure 3), MGP residuals were detected at depth in two historical borings, MW-6/DP-12 and PB-5, near the 11<sup>th</sup> Street Basin, with shallower impacts also observed at MW-6/DP-12. No residuals were detected in historical borings C-3S/D and PB-7 southeast of MW-6/DP-12 towards the former gas holders. Copies of historical soil boring and geotechnical logs are included in Attachment A.

NYSDEC has indicated that borings installed by others (e.g., FC Gowanus and USEPA) may be used for delineation of NAPL and MGP residuals if they: 1) employed continuous sampling, 2) have associated real-time organic vapor monitoring, and 3) have associated laboratory soil sample analyses. Because several of the borings used to develop cross-sections A-A' and B-B' do not meet these three criteria, additional investigation work is required. The data from the proposed borings and wells will provide additional soil and groundwater information at the Metropolitan former MGP site and will be compiled with data previously collected by others at the Lowes property. Additional step-back borings may be required to fully delineate the extent of potential impacts. If required, the location of these borings will be discussed with the NYSDEC prior to borehole advancement. Potential step back locations will be cleared using geophysical techniques during the initial pre-clearing activities to allow access to these locations during the same mobilization.

## **RIWP Addendum Scope of Work**

### **Borehole Advancement and Monitoring Well Installation**

Each boring (SB/MW-21, SB/MW-22, SB/MW-23, SB-24, and SB-25) will be advanced to a minimum of 90 feet bgs, and 10 feet into visually un-impacted materials, to reach depths encountered in earlier geotechnical work and to provide the anticipated full vertical extent information. Proposed boring/well locations are shown on Figure 4. Prior to advancement, each boring location will be cleared for utilities following National Grid pre-clear protocols and low energy excavation techniques. Geophysical clearance may also be performed to identify any subsurface utilities in the proposed investigation areas. Once cleared, soil borings will be advanced by sonic drilling techniques, which allows for greater drilling efficiencies and well installation options. The actual drilling locations and screen intervals will be determined based upon field conditions encountered and subsurface utility clearance activities. Soils will be logged continuously and screened with a photoionization detector (PID) from ground surface to the terminus of the borehole. Soil borings SB-21, SB-22, and SB-23 will be converted to monitoring wells. An intermediate well is proposed at one location (SB-22) to provide additional data to support ongoing RI work at the adjacent Pathmark parcel. Soil borings SB-24 and SB-25 may be converted into monitoring wells based on field observations and discussions between National Grid and NYSDEC. Targeted screen depth intervals and rationale for MW-21, MW-22, and MW-23 are provided in Table 1. Screen depth intervals for monitoring wells at locations SB-24 and SB-25, if installed, will be agreed upon in the field with NYSDEC. Each deep monitoring well will be constructed with 2-inch-diameter riser and 0.20-inch slot well screen. Well components will be constructed of PVC, except where Dense Non-Aqueous Phase Liquid (DNAPL) is present in the soil column, at which interval(s) well materials may be constructed of stainless steel.

The annular space between the well screen and borehole wall for each monitoring well will be backfilled with chemically inert No.0-sized, or equivalent, sand. A bentonite clay seal will be constructed using bentonite chips placed above the sand pack. The bentonite clay seal will be a minimum of 2-feet thick. The remaining annular space will be filled to grade with a cement/bentonite grout that is tremied from the top of the bentonite clay seal to the surface. Each monitoring well will be fitted with a lockable cap and finished with a flush-mounted curb box secured with a cement pad.

Drilling equipment (e.g. drilling rods and casing,) will be decontaminated using a non-phosphate soap wash and/or steam cleaning between each sample location. Non-disposable soil sampling devices (split-spoon samplers, core samplers, etc.) will be decontaminated using a non-phosphate soap wash, methanol, dilute nitric acid rinse, and distilled/deionized water final rinse between each use. Soil cuttings, decontamination fluids, and other investigation derived wastes (IDW) will be contained within United States Department of Transportation (USDOT) 55-gallon drums and disposed of at an approved off-site disposal facility.

The newly installed monitoring wells will be developed no sooner than 24 hours following installation. Each monitoring well will be developed using alternative surging and pumping methods as outlined in the existing RI Work Plan.

### **Soil Sampling**

Soil sampling will be performed during soil boring advancement at each borehole. In summary, soil samples may be collected at the following depth intervals based on field observations:

- At the depth interval exhibiting the highest PID readings or visual evidence of impacts. If no impacts are noted, this sample will not be collected; and
- At the first clean interval or the base of the borehole.

Actual soil sampling depths may be adjusted based on field conditions or in consultation with NYSDEC field oversight personnel. Soil samples will be analyzed for:

- Volatile organic compounds (VOCs) by EPA Method 8260B
- Semi-volatile organic compounds (SVOCs) by EPA Method 8270C
- Resource Conservation Recovery Act (RCRA) 8 Metals, and
- Free Cyanide

If DNAPL is encountered in any borehole, a forensic sample of the material will be collected for comparison to dense non-aqueous phase liquid (DNAPL) collected at other areas of the site. The samples will be analyzed for:

- PAH and Biomarkers by EPA 8270 and Total Extractable Hydrocarbons by EPA 8015

### **Groundwater Gauging and Sampling**

The newly installed monitoring wells will be gauged and sampled following EPA's low-flow groundwater sampling procedures in accordance with the RI Work Plan. Prior to sampling, groundwater levels will be collected at high and low tides levels based upon Gowanus Canal tidal elevations. Each monitoring well will be gauged with an oil-water interface probe to detect the presence of NAPL. While not expected based on available data collected at the site, if NAPL is present, a groundwater sample will not be collected.

Field measurements will be collected during the sampling of each monitoring well. The following parameters will be monitored: salinity, pH, specific conductance, dissolved oxygen (DO), oxidation reduction potential (ORP), temperature, and turbidity.

Groundwater samples will be collected from the newly installed monitoring wells at least two weeks after well development and may be coordinated with sampling at nearby sites managed by National Grid.

Groundwater samples will be collected using low flow groundwater sampling procedures. Groundwater samples will be analyzed for:

- VOCs by EPA Method 8260B
- SVOCs by EPA Method 8270C
- RCRA 8 Metals, and
- Total cyanide by EPA Method 9012B.

### **Quality Assurance and Quality Control**

Quality assurance and quality control (QA/QC) samples of soil and groundwater will be collected and submitted in accordance with the RIWP.

### **Community Air Monitoring Plan**

A Community Air Monitoring Plan (CAMP) has been developed for this project that will be followed during all invasive fieldwork (soil borings, borings for well installations, and test pitting). The CAMP will monitor concentrations of VOCs and particulate matter less than 10 microns in size (PM-10) in accordance with NYSDEC and NYSDOH guidance. The CAMP will monitor these parameters upwind and downwind of the work area. Included in the CAMP is a description of methods that may be used to control odors during the RI if needed. The CAMP is included in the approved RI Work Plan for the site.

### **Surveying**

A survey of the investigation sampling points will be conducted at the end of the fieldwork by a licensed NY-State surveying contractor. All horizontal locations will be reported in the New York State Plane Coordinate System, Long Island Zone (NAD83) in feet. All vertical measurements will be reported in NAVD88 in feet, to the nearest 0.1 ft. and 0.01 ft. for soil borings and monitoring wells respectively.

### **Schedule**

Field work can commence following the approval of this Work Plan. AECOM and their drilling subcontractor are ready to initiate field activities as early as June 2011 pending site access. Ideally National Grid would like to coordinate the execution of the work described above with the execution of RIWP Addendum No. 1, assuming access to both properties can be obtained at approximately the same time. On completion of RIWP Addendums No. 1 and No. 3 field work, data derived from the original May 2009 RIWP and RIWP Addendums No. 1 through 3 will be presented in a single, all-inclusive RI Report.

Yours sincerely,



Donald Campbell

Cc: T. Bell (National Grid)  
A. Hecht (National Grid)  
J. Giordano (National Grid)  
C. Doroski (NYSDOH)  
P. Cox (AECOM)

## Tables

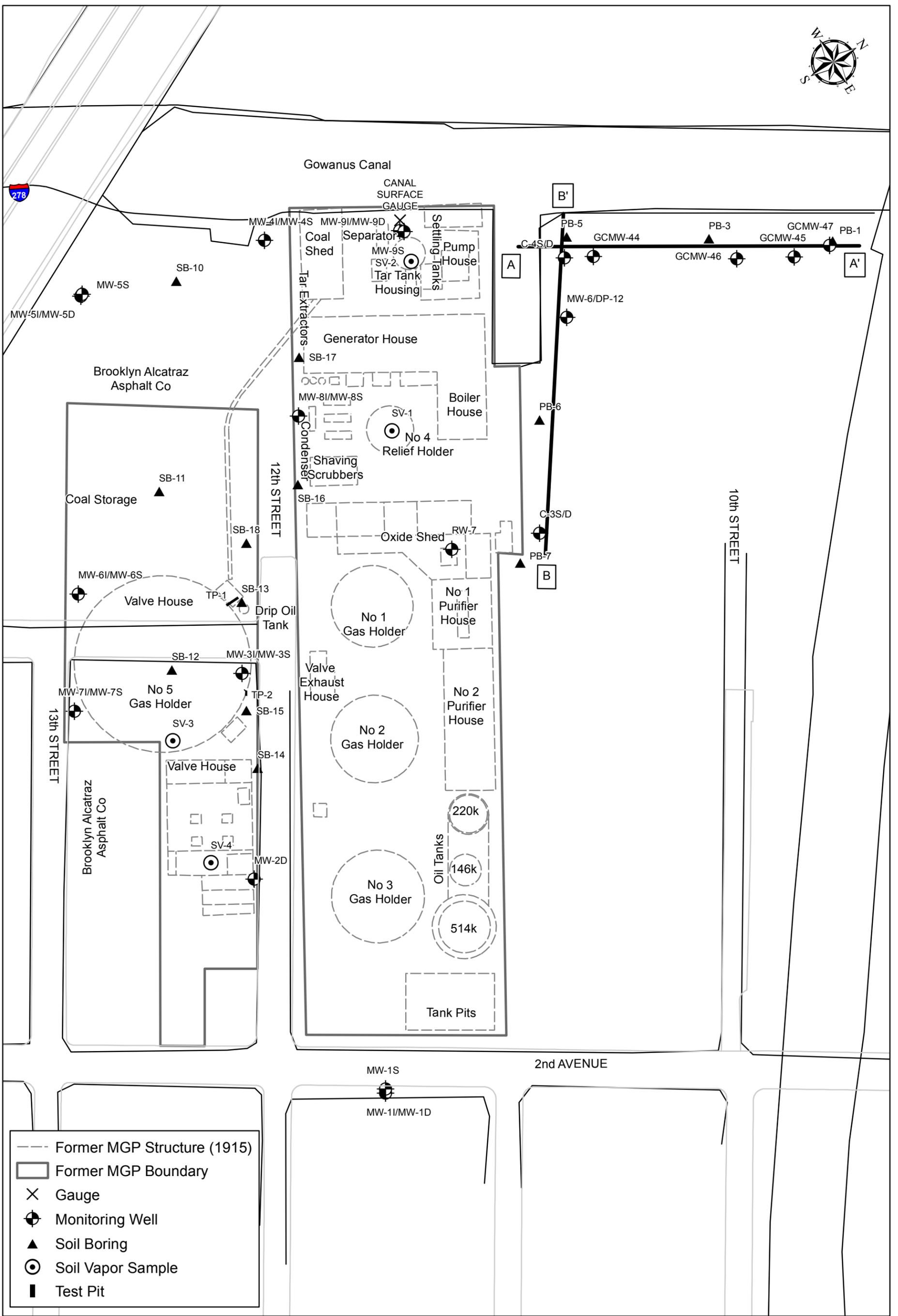
**Table 1**  
**Proposed RI Addendum at 118 2nd Avenue, Sample Location, Rationale, and Analytical Sample Summary**  
**Metropolitan Former MGP, 124-136 Second Avenue, Brooklyn, New York**

Location ID	Sample ID	Completion Depth*	Sample Depth	No. of Samples	Analyses	Rationale
<b>Surface Soil/Subsurface Soil</b>						
SB-21	SB-21 (depth)	Est. 90 feet min	Zone of worst-case impacts, and first clean or bottom	2	VOCs, SVOCs, RCRA 8 metals, and free CN	Evaluate impacts noted at RW-7 and lack of impacts noted at PB-7. Determine if MGP impacts are present north of former gas holder No. 1.
SB-22	SB-22 (depth)	Est. 90 feet min	Zone of worst-case impacts, and first clean or bottom	2	VOCs, SVOCs, RCRA 8 metals, and free CN	Evaluate soils northeast of former relief holder No. 4 and north of gas holder No. 1. Evaluate petroleum impacts noted in boring PB-6 from 70-72 feet bgs. Provide western extent of any impacts migrating from former gas holder No. 1 area towards the Gowanus Canal.
SB-23	SB-23 (depth)	Est. 90 feet min	Zone of worst-case impacts, and first clean or bottom	2	VOCs, SVOCs, RCRA 8 metals, and free CN	Evaluate soil northeast of the SB/MW-9 MGP operations area and further evaluate lack of impacts noted in existing borings PB-3 and GCMW-46. Provide data to test conceptual model: impacts to the south originating in the SB/MW-9 MGP operations area of the Metropolitan MGP and impacts to the north as originating from the Citizens MGP site .
SB-24	SB-24 (depth)	Est. 90 feet min	Zone of worst-case impacts, and first clean or bottom	2	VOCs, SVOCs, RCRA 8 metals, and free CN	Evaluate soil north/northeast of the former MGP operations area. Further evaluate lack of impacts noted in existing historical borings in the area.
SB-25	SB-25 (depth)	Est. 90 feet min	Zone of worst-case impacts, and first clean or bottom	2	VOCs, SVOCs, RCRA 8 metals, and free CN	Evaluate soil south/southeast of existing geotechnical boring PB-1. Provide data to test conceptual model: impacts observed at PB-1, CGMW-47, and CGMW-45 as originating from the Citizens MGP site to the north.
<b>Groundwater</b>						
MW-21	MW-21D (date)	D est. 70 ft	D ~ 60-70 ft.	1	VOCs, SVOCs, RCRA 8 metals, and total CN	Evaluate the presence of MGP residuals in groundwater (dissolved and possible free phase) north of former gas holder No. 1. Combine deep aquifer data with shallower data available at existing wells RW-7 and C3S/D.
MW-22	MW-22I/D (date)	I-est. 35 ft, D est. 70 ft	I ~ 25-35f ft., D ~ 60-70 ft.	2	VOCs, SVOCs, RCRA 8 metals, and total CN	Evaluate the presence of MGP residuals in groundwater (dissolved and possible free phase) northeast of former relief holder No. 4 and north of gas holder No. 1. Combine with existing data from SB/MW-8S/I on the opposite side of the Pathmark building.
MW-23	MW- 23D (date)	D est. 70 ft	D ~ 60-70 ft.	1	VOCs, SVOCs, RCRA 8 metals, and total CN	Evaluate the presence of MGP residuals in groundwater (dissolved and possible free phase) northeast of former MGP operations area at SB/MW-9. Combine intermediate aquifer data at existing well GCMW-46.

**Notes**

1. No. - number
2. ID - identification
3. SB - Soil Boring (Subsurface Soil)
4. MW - Monitoring Well (Groundwater Sample)

## Figures



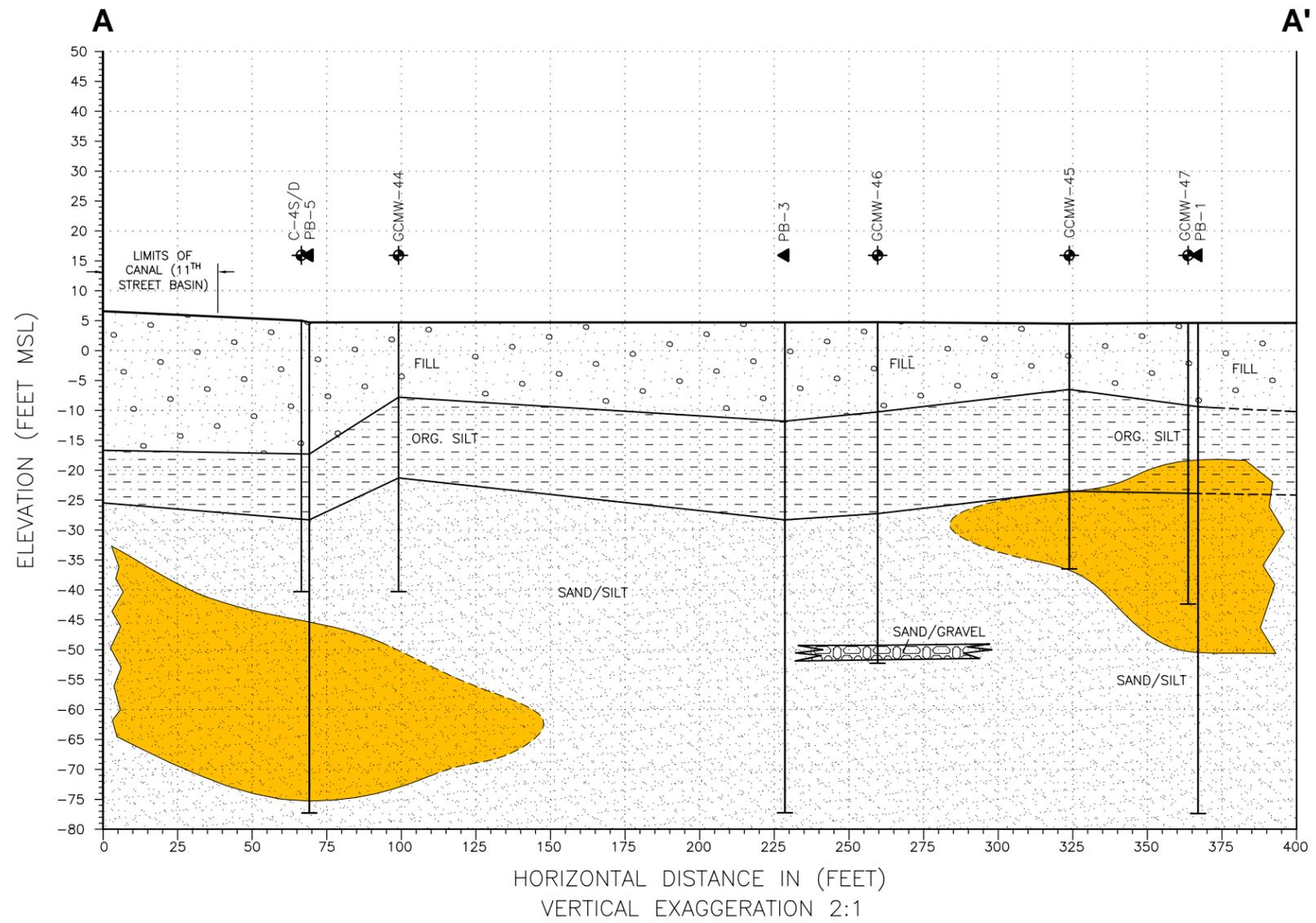
**NATIONAL GRID  
METROPOLITAN FORMER MGP SITE**

1:1200 1 Inch = 100 ft  
0 37.5 75 150 Feet

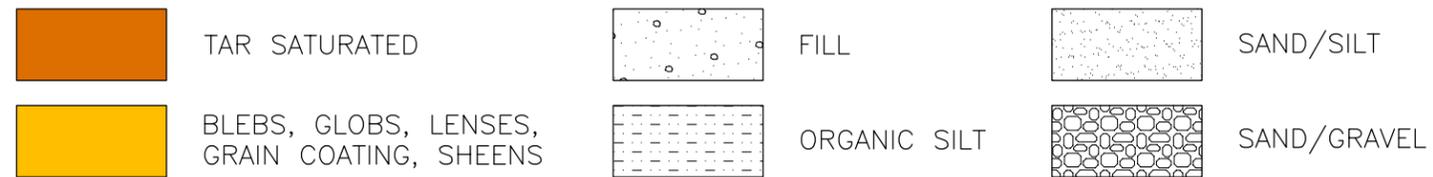
**Geologic Locations  
Cross Sections B-B', and ,D-D'**

Figure 1

File: F:\PROJECTS\National Grid\Metropolitan\CADD\60137361-X01.dwg Layout: A-A 05-12-11 User: warren Plotted: May 12, 2011 - 11:34am



LEGEND



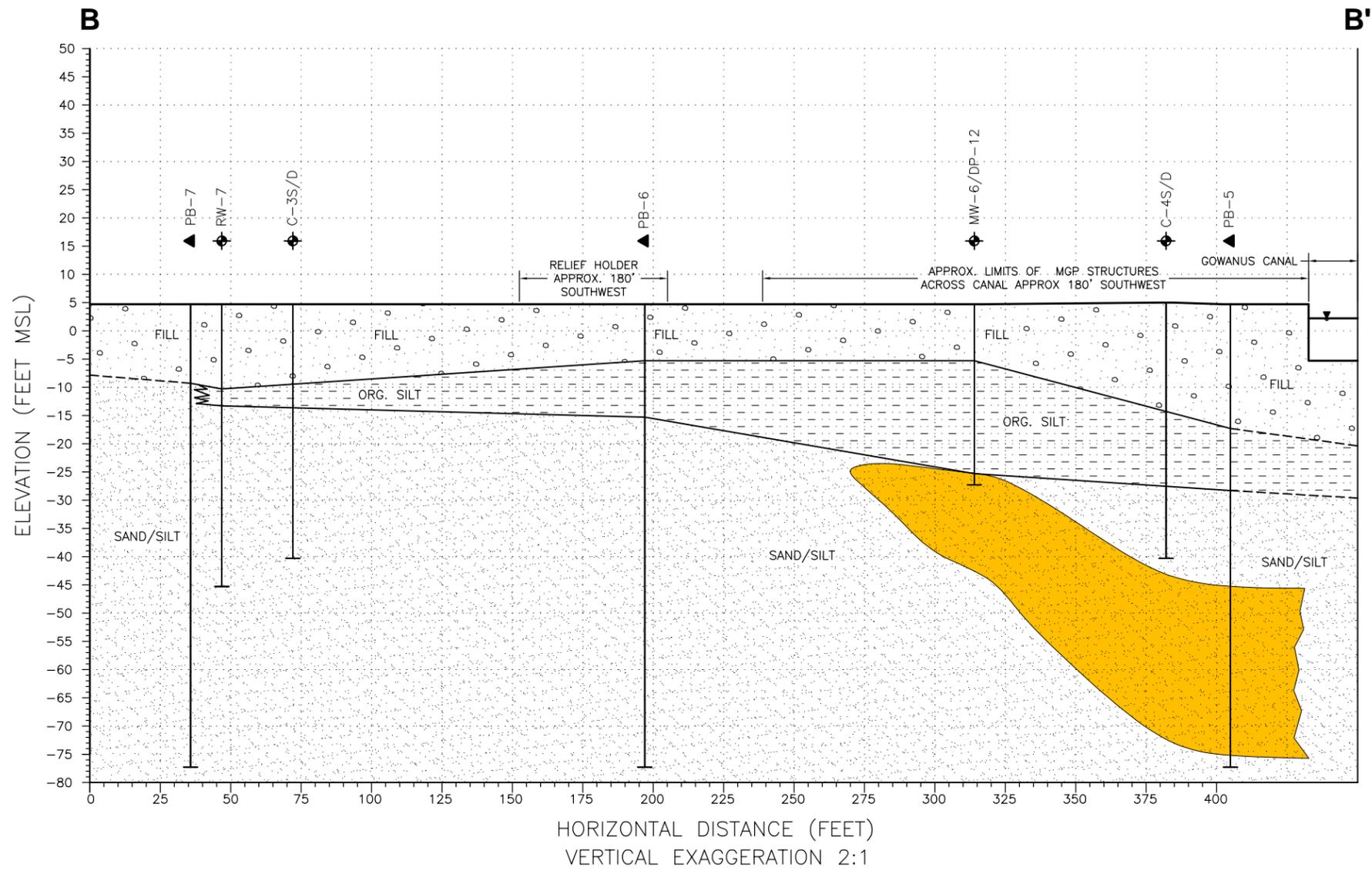
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METROPOLITAN FORMER MGP SITE  
60137361-200

GEOLOGIC CROSS SECTION A-A'

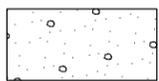
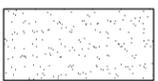
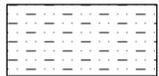
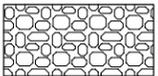
DATE: 05/12/11

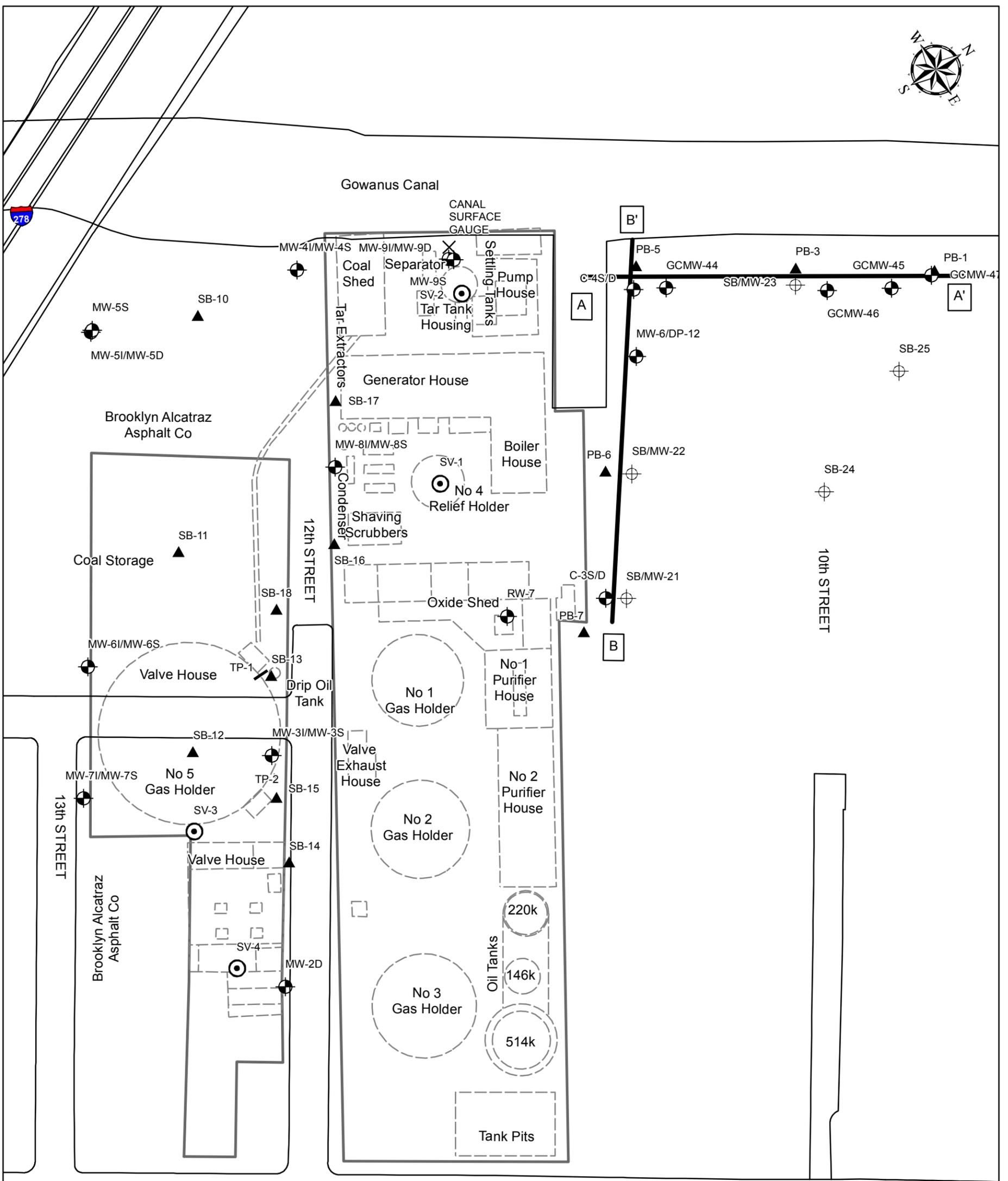
DRWN: RCW

FIGURE 2

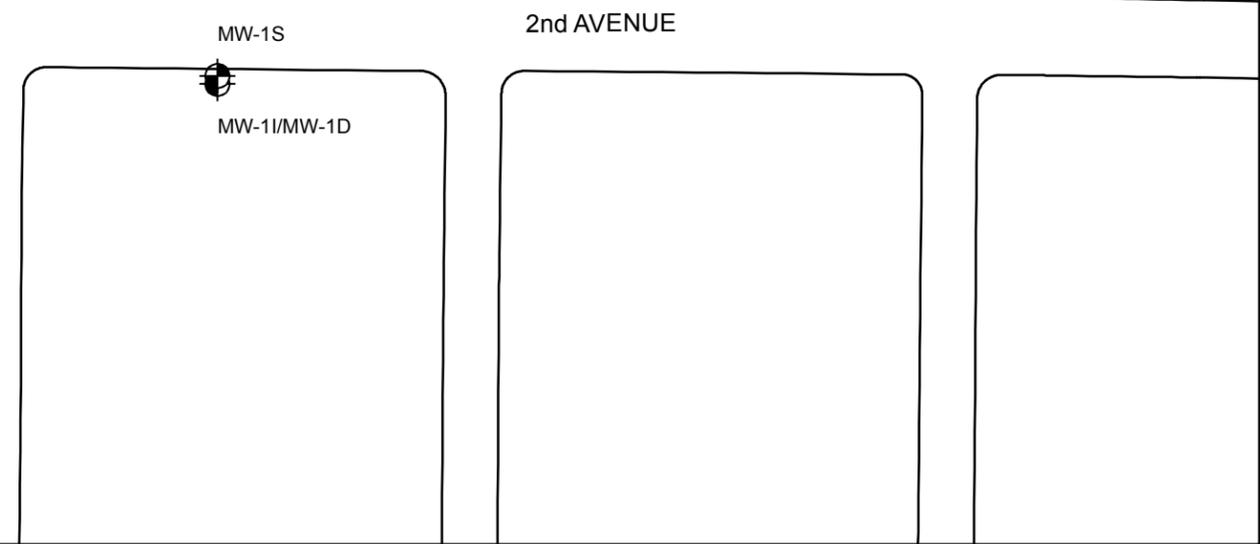


LEGEND

- |  |   |   |              |   |             |
|--|---|---|--------------|---|-------------|
|  | TAR SATURATED                               |  | FILL         |  | SAND/SILT   |
|  | BLEBS, GLOBS, LENSES, GRAIN COATING, SHEENS |  | ORGANIC SILT |  | SAND/GRAVEL |



- Former MGP Structure (1915)
- Former MGP Boundary
- ✕ Gauge
- ⊕ Monitoring Well
- ▲ Soil Boring
- ⊙ Soil Vapor Sample
- Test Pit
- ⊗ Proposed Soil Boring / Monitoring Well



**NATIONAL GRID  
METROPOLITAN FORMER MGP SITE**  
1:1200 1 Inch = 100 ft  
0 37.5 75 150 Feet

**Proposed Remedial Investigation  
Addendum Investigation Locations**

Figure 4

## **Attachment A**

### **Historical Subsurface Boring Logs and Geotechnical Logs**

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3  
 FILE NO. Q446  
 BORING NO. PB-1  
 SURFACE ELEV. \_\_\_\_\_  
 RES. ENGR. E. NUNEZ

PROJECT Lowie's Home Center

PROJECT LOCATION Brooklyn, NY

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS		
	NO.	DEPTH	BLOWS/6"							
2/24/80 RAB. KAS	1D	3	35-31	concrete (fill) (con-c)	① ② ③			Dilled - <del>ALUMINUM</del> ANNOD 3 Pcs. at surface		
		5	38-34							
	2D	5	11-17	BRN M. f SAND, silty, blk. Tr. BRICK (fill) (con)			5		R=2"	
		7	18-18					400		
	3D	7	15-14	RED-BRN silty M. f SAND, sil BRICK Tr. blk (fill) (con)						
		9	15-17							
	4D	10	4-2	BRN silty M. f SAND, sil CLAYES Tr. BRICK (fill) (con)			10		R=2"	
		12	2-1							
	5D	12	2-2	NO Recovery						
		14	2-2						WOOD IN WASH.	
	6D	15	6-4	gray org silty clay, sil f SAND, Tr. wood (OH)		④	14.5			
		17	2-2							
	7D	17	1-2							
		19	2-1							
8D	20	1-1	silty gray org silty clay, sil f SAND (OH)		20					
	22	1-1								
9D	25	1-2	DO-80, Tr. shell (OH)		25					
	27	1-1								
10D	30	7-10	gray f. c SAND, Tr. silt (sp-sm)	⑤	28.5					
	32	12-14					30			
11D	35	5-8	gray-BRN c. f SAND, Tr. silt (sp-sm)				35		Refraction in sample.	
	37	17+16								
12D	40	14-9	gray M. f SAND, Tr. silt (sp-sm)				40			
	42	22-15								
13D	45	10-11	gray f. c SAND, Tr. silt, blk (sp-sm)			45				
	47	12-14								
14D	50	7-9	DO-130 (sp-sm)			50				
	52	14-16								

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 2 OF 3  
 FILE NO. 74410  
 BORING NO. PB-1  
 SURFACE ELEV. \_\_\_\_\_

PROJECT Lowes Home CTR

PROJECT LOCATION Brooklyn, NY RES. ENGR. R. NUÑEZ

NO.	SAMPLE		SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS	
	DEPTH	BLOWS/6"						
15D	55	14-14	DO-14D (SP-SM)	⑤	55		Return to sample	
	57	13-12						
						60		
16D	60	11-20	BRN silty f-sand (SM)					
	62	18-18						
						65		
17D	65	10-15	BRN C f sand, silty, Tr. silt (SP-SM)					
	67	15-11						
						70		
18D	70	9-14	BRN C f sand, Tr. silty, silt (SP-SM)					
	72	15-12						
						75		
19D	75	12-17	BRN silty f-c sand, Tr. silty (SM)					
	77	34-14						
						80		
20D	80	10-13	BRN f-c sand, silty, Tr. silty (SM)					
	82	17-21			82		210, B @ 82 FT	

# MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. PB-1  
 SHEET 3 OF 3  
 FILE NO. 9446  
 SURFACE ELEV. \_\_\_\_\_  
 DATUM \_\_\_\_\_

PROJECT Lowe's Home Center  
 LOCATION Brooklyn NY  
 BORING LOCATION As shown

## BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG	TYPE OF FEED DURING CORING	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
TRUCK <u>ONESS</u>	MECHANICAL _____	DIA., IN. <u>4</u>	DEPTH, FT. FROM <u>0</u>	TO <u>20</u>
SKID _____	HYDRAULIC <u>X</u>	DIA., IN. _____	DEPTH, FT. FROM _____	TO _____
BARGE _____	OTHER _____	DIA., IN. _____	DEPTH, FT. FROM _____	TO _____
OTHER _____				

TYPE AND SIZE OF:	DRILLING MUD USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
D-SAMPLER <u>2" OD split spoon</u>	DIAMETER OF ROTARY BIT, IN. <u>3 7/8, 5 7/8</u>		
U-SAMPLER _____	TYPE OF DRILLING MUD <u>QUIK GEL</u>		
S-SAMPLER _____			
CORE BARREL _____	AUGER USED	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
CORE BIT _____	TYPE AND DIAMETER, IN. _____		
DRILL RODS <u>N</u>			

CASING HAMMER, LBS. <u>300</u>	AVERAGE FALL, IN. <u>21</u>
SAMPLER HAMMER, LBS. <u>140</u>	AVERAGE FALL, IN. <u>30</u>

## WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE (FEET)	DEPTH OF CASING (FEET)	DEPTH TO WATER (FEET)	CONDITIONS OF OBSERVATION
					<u>NO OBSERVATION.</u>

PIEZOMETER INSTALLED  YES  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

2.5" DIA. DRY SAMPLE BORING	LIN. FT. <u>82</u>	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 JBD Co.

DRILLER R. Lynch HELPERS E. Feliciano

REMARKS Grouted boreholes upon completion

RESIDENT ENGINEER R. NUNEZ DATE 12/29/00

- NOTES:
1. Make a separate log of each boring and each unsuccessful boring attempt. Keep a copy of all logs in the field.
  2. In daily progress column indicate depth at beginning and end of work day, calendar date, day of week, time at beginning and end of work day and weather conditions.
  3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelly tube samples S, fixed piston samples U. Assign NR to lost samples and record blows. Make another sample attempt immediately below the lost sample.
  4. Mark each U-sample with job number, boring number, sample number, depth, penetration and recovery. Indicate method by which penetration of tube sampler was obtained.
  5. Record blows on spoon sampler per six inches of penetration. Note all blows and penetrations when taken at less than six-inch interval.
  6. List changes of material in strata column and list generalized strata descriptions.
  7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount and any unusual occurrences.
  8. For rock core, the recovery and the ROD (Rock Quality Designation) should be shown in both inches and percent of run length in the blows per six inches column. All core runs shall be numbered in consecutive order. A run number is given over if recovery is zero.
  9. Include sample description by Unified Soil Classification System.
  10. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.





MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. PB-3  
 SHEET 3 OF 3  
 FILE NO. 9946  
 SURFACE ELEV. \_\_\_\_\_  
 DATUM \_\_\_\_\_

PROJECT Lucie's Home Intl.  
 LOCATION Brooklyn NY  
 BORING LOCATION As planned

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG \_\_\_\_\_ TYPE OF FEED \_\_\_\_\_ CASING USED  YES  NO  
 TRUCK ONE SS MECHANICAL \_\_\_\_\_ DIA., IN. 4 DEPTH, FT. FROM 0 TO \_\_\_\_\_  
 SKID \_\_\_\_\_ HYDRAULIC  \_\_\_\_\_ DIA., IN. \_\_\_\_\_ DEPTH, FT. FROM \_\_\_\_\_ TO \_\_\_\_\_  
 BARGE \_\_\_\_\_ OTHER \_\_\_\_\_ DIA., IN. \_\_\_\_\_ DEPTH, FT. FROM \_\_\_\_\_ TO \_\_\_\_\_  
 OTHER \_\_\_\_\_

TYPE AND SIZE OF: \_\_\_\_\_ DRILLING MUD USED  YES  NO  
 D-SAMPLER 2" dia split spear DIAMETER OF ROTARY BIT, IN. 2 1/4" 5 7/8" 3 7/8"  
 U-SAMPLER \_\_\_\_\_ TYPE OF DRILLING MUD Drill gel  
 S-SAMPLER \_\_\_\_\_  
 CORE BARREL \_\_\_\_\_ AUGER USED  YES  NO  
 CORE BIT \_\_\_\_\_ TYPE AND DIAMETER, IN. \_\_\_\_\_  
 DRILL RODS N

CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24  
 SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE (FEET)	DEPTH OF CASING (FEET)	DEPTH TO WATER (FEET)	CONDITIONS OF OBSERVATION

PIEZOMETER INSTALLED  YES  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

2.5" 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 JRD Co.  
 DRILLER M. Blegwas HELPERS D. Keith  
 REMARKS Grouted borehole upon completion  
 RESIDENT ENGINEER R. NUNEZ DATE 12/28/00

NOTES:

- Make a separate log of each boring and each unsuccessful boring attempt. Keep a copy of all logs in the field.
- In daily progress column indicate depth at beginning and end of work day, calendar date, day of week, time at beginning and end of work day and weather conditions.
- All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, Shelby tube samples S, fixed piston samples U. Assign NR to lost samples and record blows. Make another sample attempt immediately below the lost sample.
- Mark each U-sample with job number, boring number, sample number, depth, penetration and recovery. Indicate method by which penetration of tube sampler was obtained.
- Record blows on spoon sampler per six inches of penetration. Note all blows and penetrations when taken at less than six-inch interval.
- List changes of material in strata column and list generalized strata descriptions.
- List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount and any unusual occurrences.
- For rock core, the recovery and the RQD (Rock Quality Designation) should be shown in both inches and percent of run length in the blows per six inches column. All core runs shall be numbered in consecutive order. A run number is given even if recovery is zero.
- Include sample description by Unified Soil Classification System.
- Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

BORING NO. PB-3

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3  
 FILE NO. 9440  
 BORING NO. PB-5  
 SURFACE ELEV. \_\_\_\_\_  
 NUMBER \_\_\_\_\_

PROJECT LOUSE'S HOME CENTER

PROJECT LOCATION BROOKLYN NY

RES. ENGR. \_\_\_\_\_

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS	
	NO.	DEPTH	BLOWS/6"						
2/28/00 THURS. 3:40 hrs windy Clear 20°F no wind clear	10	1	6-28	TOP - WHIT F-C SAND TR. SILT (FILL) ?	Ⓣ			Safety Harness attached 1' CONC. AT SURFACE.	
		3	50-37	BOT (10') - BK. F-C SAND IN SILT TR. SILT (FILL) (SP-SM)					
	20	3	10-6"	NO RECOVERY					
		3.5							
	30	5	4-3	Rock frag. Tr. conc. (fill)			5		
		7	2-1					MUD	
	40	7	1-1	NO RECOVERY					Rock frag. in the top of the spoon.
		9	1-1						
	50	10	1-1	BK. C-F SAND TR. F-SAND SHELLS (FILL) (CINDER)			10		R=3"
		12	1-1						
60	12	2-2	Rock frag. Tr. wood (fill) ?				R=2"		
	14	3-7							
70	15	4-2	NO RECOVERY		15		Loose fill spoons have no traps		
	17	2-2							
80	17	2-4	TOP (15') - soft gray silty clay, Tr. f-sand, Tr. wood (OH)						
	19	4-3							
90	20	2-1	BOT (15') - gray silty f-sand Tr. wood (OH) (SP-SM)		20		R=1"		
	22	2-1	gray stone, Tr. org. clay (fill) (SP)						
100	25	1-1	gray silty m-f sand Tr. clay (SM)		25				
	27	1-1							
110	30	1-2	MED gray org. silty clay, Tr. f-sand, veg (OH)	Ⓢ	29.5		RP=0.75 MSIF		
	32	2-3			30				
120	35	1-12	BRN C-F SAND TR. SILT, GL (SP)	Ⓢ	33.5				
	37	16-22			35				
130	40	2-10	BRN F-C SAND TR. SILT (SP-SM)		40				
	42	13-16							
140	45	10-10	BRN C-F SAND TR. SILT (SP-SM)		45				
	47	16-19							
150	50	9-17	BRN GRAYLY C-F SAND TR. SILT (SP-SM)	Ⓣ	48.5		10 halogen in sample		
	52	18-13			50				

BORING NO. PB-5

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 2 OF 3

FILE NO. 9440

BORING NO. PB-5

SURFACE ELEV. \_\_\_\_\_

PROJECT Levee's Home CNT2

PROJECT LOCATION Brooklyn NY

RES. ENGR. R. NUÑEZ

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
	160	55 57	12-14 15-17	DO-150 (SP-SM)	3	55		Retrolon in sample
	170	60 62	11-20 20-24	DO-150 (SP-SM)		60		
	180	65 67	27-29 31-33	BN M. f. SAND, TH. SILT, (SP-SM)		65		
	190	70 72	14-17 21-23	BN M. f. SAND, TH. SILT, (SP-SM)		70		
	200	75 77	12-10 14-16	DO-150 (f. SAND, TH. SILT, (SM))		75		
1410 hrs.	210	80 82	25-45 32-36	DO-200 (SM)		80 82		E.O.B. @ 82 FT.

BORING NO. PD-5

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. PB-5  
 SHEET 3 OF 3  
 FILE NO. Q446  
 SURFACE ELEV. \_\_\_\_\_  
 DATUM \_\_\_\_\_

PROJECT Lowie's Home Cntr  
 LOCATION Brooklyn NY  
 BORING LOCATION As planned

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG \_\_\_\_\_ TYPE OF FEED \_\_\_\_\_ CASING USED  YES  NO  
 TRUCK ONE SS MECHANICAL \_\_\_\_\_ DIA., IN. 4 DEPTH, FT. FROM 0 TO 25  
 SKID \_\_\_\_\_ HYDRAULIC  DIA., IN. \_\_\_\_\_ DEPTH, FT. FROM \_\_\_\_\_ TO \_\_\_\_\_  
 BARGE \_\_\_\_\_ OTHER \_\_\_\_\_ DIA., IN. \_\_\_\_\_ DEPTH, FT. FROM \_\_\_\_\_ TO \_\_\_\_\_  
 OTHER \_\_\_\_\_

TYPE AND SIZE OF: \_\_\_\_\_ DRILLING MUD USED  YES  NO  
 D-SAMPLER 2" O.D. split spoon DIAMETER OF ROTARY BIT, IN. 2 1/4, 4 1/2, 3 7/8"  
 U-SAMPLER \_\_\_\_\_ TYPE OF DRILLING MUD Quik Gel  
 S-SAMPLER \_\_\_\_\_  
 CORE BARREL \_\_\_\_\_ AUGER USED  YES  NO  
 CORE BIT \_\_\_\_\_ TYPE AND DIAMETER, IN. \_\_\_\_\_  
 DRILL RODS N

CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24  
 SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE (FEET)	DEPTH OF CASING (FEET)	DEPTH TO WATER (FEET)	CONDITIONS OF OBSERVATION

PIEZOMETER INSTALLED  YES  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

2.5" DIA. DRY SAMPLE BORING LIN. FT. 82 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 JBD Co.  
 DRILLER R. Lynch HELPERS E. Feliciano  
 REMARKS Grouted borehole upon completion  
 RESIDENT ENGINEER T. MUNEZ DATE 12/28/00

NOTES:

1. Make a separate log of each boring and each unsuccessful boring attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, day of week, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, Shelby tube samples S, fixed piston samples U. Assign NFI to lost samples and record blows. Make another sample attempt immediately below the lost sample.
4. Mark each U-sample with job number, boring number, sample number, depth, penetration and recovery. Indicate method by which penetration of tube sampler was obtained.
5. Record blows on spoon sampler per six inches of penetration. Note all blows and penetrations when taken at less than six-inch interval.
6. List changes of material in strata column and list generalized strata descriptions.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount and any unusual occurrences.
8. For rock core, the recovery and the RQD (Rock Quality Designation) should be shown in both inches and percent of run length in the blows per six inches column. All core runs shall be numbered in consecutive order. A run number is given even if recovery is zero.
9. Include sample description by Unified Soil Classification System.
10. Obtain water level at the beginning of each day and at all other times when static water conditions exist.

BORING NO. PP-5

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3

FILE NO. 9440

PROJECT LOWE'S HOME CENTER

BORING NO. PB6

PROJECT LOCATION Brooklyn NY

RES. ENGR. R. NUÑEZ

SURFACE ELEV. \_\_\_\_\_

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
12/27/00 0630 WED RPE	10	1	2-4	BRN f-c sand, silty, Tr. sh. Brk	④			Drilled safety hammer AHEAD
		3	4-5	(fill) (sm)				
	20	3	2-3	BRN H-f sand, silty, Tr. sh. Brk, silty				
		5	4-4	Tr. sh. Brk (fill) (sm)				
	30	5	1-1	gray BRN f-c sand, silty, Tr. sh. Brk				
		7	1-1	(fill) (sm)				
	40	7	1-1	gray BRN H-f sand, silty, Tr. sh. Brk				
		9	1-1	(fill) (sm)				
				silt			9.5	
	10	1-1	gray org. silty clay, Tr. veg. f. sand (OH)	⑤	10			
	12	1-1						
60	12	2-1	silty gray org. silty clay, Tr. f. sand (OH)					
	14	2-1						
	70	15	DO-60(OH)	⑥	15			
		17						
80	17	1-2	DO-60(OH)					
		19			19.5			
	90	20	gray BRN silty f. sand, Tr. clay (sm)	⑦	20			
		22						
					25			
	100	25	BRN gray silty H-f sand (sm)	⑧				
		27						
					30			
	110	30	BRN f-c sand, Tr. silt (sp-sm)					
		32						
					35			
	120	35	DO-110 (sp-sm)					
		37						
					40			
	130	40	DO-110 (sp-sm)					
		42						
					45			
	140	45	BRN H-f sand, Tr. silt (sp-sm)					
		47						
					50			
	150	50	BRN f-c sand, Tr. silt (sp-sm)					
		52						



MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. PB-6  
 SHEET 3 OF 3  
 FILE NO. 9440  
 SURFACE ELEV. \_\_\_\_\_  
 DATUM \_\_\_\_\_

PROJECT LOWE'S HOME CENTER  
 LOCATION Brooklyn NY  
 BORING LOCATION Plot 15A NE

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG \_\_\_\_\_ TYPE OF FEED DURING CORING \_\_\_\_\_ CASING USED  YES  NO  
 TRUCK QUEST MECHANICAL \_\_\_\_\_ DIA., IN. 4 DEPTH, FT. FROM 0 TO 15  
 SKID \_\_\_\_\_ HYDRAULIC X DIA., IN. \_\_\_\_\_ DEPTH, FT. FROM \_\_\_\_\_ TO \_\_\_\_\_  
 BARGE \_\_\_\_\_ OTHER \_\_\_\_\_ DIA., IN. \_\_\_\_\_ DEPTH, FT. FROM \_\_\_\_\_ TO \_\_\_\_\_  
 OTHER \_\_\_\_\_

TYPE AND SIZE OF: \_\_\_\_\_ DRILLING MUD USED  YES  NO  
 D-SAMPLER 2" O.D. Split spoon DIAMETER OF ROTARY BIT, IN. 3 1/2, 4 1/8  
 U-SAMPLER \_\_\_\_\_ TYPE OF DRILLING MUD GLUE GEL  
 S-SAMPLER \_\_\_\_\_  
 CORE BARREL \_\_\_\_\_ AUGER USED  YES  NO  
 CORE BIT \_\_\_\_\_ TYPE AND DIAMETER, IN. \_\_\_\_\_  
 DRILL RODS N

CASING HAMMER, LBS. 360 AVERAGE FALL, IN. 24  
 SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE (FEET)	DEPTH OF CASING (FEET)	DEPTH TO WATER (FEET)	CONDITIONS OF OBSERVATION
					No observation

PIEZOMETER INSTALLED  YES  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

2.5" DIA. DRY SAMPLE BORING LIN. FT. 82 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 JBD Co.  
 DRILLER R. Lynch HELPERS E. Feliciano  
 REMARKS Grouted boreholes upon completion.  
 RESIDENT ENGINEER R. NUNOZ DATE 12/27/00

- NOTES:
1. Make a separate log of each boring and each unsuccessful boring attempt. Keep a copy of all logs in the field.
  2. In daily progress column indicate depth at beginning and end of work day, calendar date, day of week, time at beginning and end of work day and weather conditions.
  3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelly tube samples S, fixed piston samples U. Assign NR to lost samples and record blows. Make another sample attempt immediately below the lost sample.
  4. Mark each U-sample with job number, boring number, sample number, depth, penetration and recovery. Indicate method by which penetration of tube sampler was obtained.
  5. Record blows on spoon sampler per six inches of penetration. Note all blows and penetrations when taken at less than six-inch interval.
  6. List changes of material in strata column and list generalized strata descriptions.
  7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount and any unusual occurrences.
  8. For rock core, the recovery and the RQD (Rock Quality Designation) should be shown in both inches and percent of run length in the blows per six inches column. All core runs shall be numbered in consecutive order. A run number is given even if recovery is zero.
  9. Include sample description by Unified Soil Classification System.
  10. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

BORING NO. PB-6

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3

FILE NO. 9416

PROJECT LOWE'S HOME CENTER

BORING NO. PB-7

PROJECT LOCATION BROOKLYN, NY

RES. ENGR. MUESER

SURFACE ELEV. \_\_\_\_\_

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS	
	NO.	DEPTH	BLOWS/6"						
12/14/02 MHW 30'± 1435hrs	10	0	11-13	Brown f. sand, Tr. silt, qtz (sp. sm)	①		Drilled	Automatic Hammer	
		2	15-16					HEAD	
	20	2	9-26	dk gray c.f. sand, sm silt, Tr. silt, mica (sp. sm)					
		4	26-16						
	30	4	6-8	gray f.-m sand, sm silt, Tr. qtz (sp. sm)			5		
		6	7-5						
	40	6	1-1	gray f.-m sand, sm silt, Tr. qtz, mica (sp. sm)					
		8	1-1						
	50	8	1-1	DO-40 (sp. sm)					
		10	1-1				10		
1645	60	10	WOL-1	Brown f.-c sand, Tr. silt, qtz, veg. brick (sp. sm)	②				
		12	1-1						
	70	12	1-1	dk gray f.-m sand, sm silt, Tr. mica, mica (sp. sm)					2-2"
		14	1-2						
	80	14	WOL-1	Soft gray org. silty clay, Tr. mica, mica (sp. sm)			15		RP. < 0.5 T.S.F.
		16	1-1						
	90	16	WOL-1/2"	DO-80 (sp. sm)					
		18	WOL-1/2"				18-5		
12/14/02 TWS. 30'± clearing 0645 hrs	100	20	1-3	Brown f.-m sand, sm silt (sm)	③	20			
		22	2-3						
	110	25	4-7	Brown m.f. sand, Tr. silt, qtz (sp. sm)			25		
		27	7-8						
	120	30	6-5	Brown m.f. sand, sm silt (sm)			30		
		32	8-9						
	130	35	8-10	Brown m.f. sand, Tr. silt, mica (sp. sm)			35		
		37	4-3						
	140	40	5-8	Brown f.-m sand, sm silt, Tr. qtz, mica (sm)			40		
		42	11-11						
150	45	5-5	Brown m.f. sand, Tr. silt, qtz, mica (sp. sm)		45				
	47	6-5							
160	50	3-5	Brown c.f. sand, Tr. silt, qtz, mica (sp. sm)		50				
	52	5-7							

BORING NO. PB-7

**MUESER RUTLEDGE CONSULTING ENGINEERS**  
**BORING LOG**

PROJECT: LOWE'S HOME CENTER  
LOCATION: BROOKLYN, NEW YORK

BORING NO. PB-7  
SHEET 2 OF 3  
FILE NO. 9446  
SURFACE ELEV. 8.9  
RES. ENGR. RANDOLPH NUNEZ

DAILY PROGRESS	SAMPLE			SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
	NO.	DEPTH	BLOWS/6"					
Cont'd 12-19-00 Tuesday Cloudy 30°F					S1			
	17D	55.0	6-6	Brown fine to medium sand, trace silt (SP-SM)			55	
		57.0	8-7					
							58.5	
							60	
	18D	60.0	13-13	Red brown fine to medium sand, some gravel, silt, trace mica (SM)				
		62.0	12-10					
							65	
	19D	65.0	9-8	Red brown fine to medium sand, some silt, trace gravel (SM)				
		67.0	6-7					
					S2			
	20D	70.0	18-15	Red brown fine to medium sand, some gravel, silt, trace clay, mica (SM)			70	
		72.0	22-20					
							75	
	21D	75.0	18-37	Red brown fine to medium sand, some gravel, silt (SM)				
		77.0	17-16					
							80	
	22D	80.0	14-15	Do 21D, trace clay (SM)				
11:35		82.0	24-19					82
						85	pp=Pocket Penetrometer Unconfined Compressive Strength in tsf.	
						90	WC=Water Content in percent of dry weight.	
						95		
						100		

# MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. PB-7  
 SHEET 3 OF 3  
 FILE NO. 9446  
 SURFACE ELEV. 8.9  
 DATUM BOROUGH PRESIDENT OF BROOKLYN HIGHWAY

PROJECT LOWE'S HOME CENTER  
 LOCATION BROOKLYN, NEW YORK  
 BORING LOCATION SEE PLAN

**BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE**

TYPE OF BORING RIG	TYPE OF FEED DURING CORING	CASING USED	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
TRUCK <u>CME-75</u>	MECHANICAL	DIA., IN. <u>4</u>	DEPTH, FT. FROM <u>0</u>	TO <u>20</u>
SKID	HYDRAULIC <u>X</u>	DIA., IN.	DEPTH, FT. FROM	TO
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 N

DRILLING MUD USED  YES  NO  
 DIAMETER OF ROTARY BIT, IN. 3-7/8, 4-7/8  
 TYPE OF DRILLING MUD QUIK - GEL  
 AUGER USED  YES  NO  
 TYPE AND DIAMETER, IN. \_\_\_\_\_  
 CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24  
 \*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

**WATER LEVEL OBSERVATIONS IN BOREHOLE**

\*AUTOMATIC HAMMER USED.

DATE	TIME	DEPTH OF HOLE (FEET)	DEPTH OF CASING (FEET)	DEPTH TO WATER (FEET)	CONDITIONS OF OBSERVATION
12-19-00		82	20	11	MUD/WATER UPON COMPLETION.

PIEZOMETER INSTALLED  YES  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**

2.5" DIA. DRY SAMPLE BORING LIN. FT. 82 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 JERSEY BORING & DRILLING CO. INC.  
 DRILLER MIKE BLEJWAS HELPERS DENNIS KEITH  
 REMARKS BOREHOLE GROUTED UPON COMPLETION.

RESIDENT ENGINEER RANDOLPH NUNEZ DATE 12-19-00  
 BORING NO. PB-7

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: 118 2nd Ave., Brooklyn, NY

Logged By: J. Bolduc

GCMW-44S Northing (ft): 184458.534

GCMW-44S Easting (ft): 985077.566

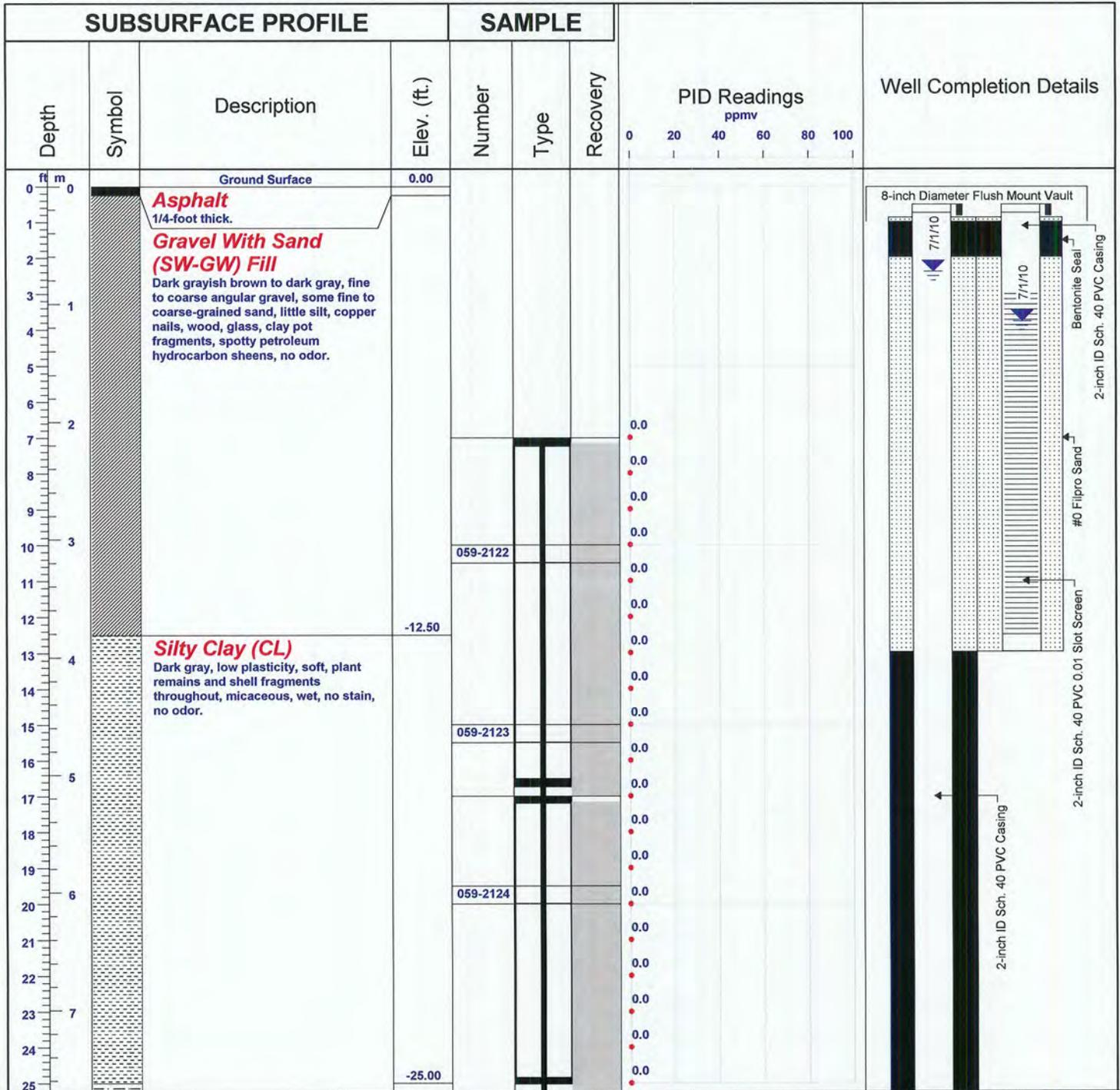
GCMW-44I Northing (ft): 184458.434

GCMW-44I Easting (ft): 985077.808

GCMW-44S Elevation (ft AMSL): 4.72

GCMW-44I Elevation (ft AMSL): 4.73

# Log of Well: GCMW-44



Drill Method: A300 Rotary Sonic

Start Date: 1300 6/8/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1630 6/8/10

Sheet: 1 of 2

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: 118 2nd Ave., Brooklyn, NY

Logged By: J. Bolduc

GCMW-44S Northing (ft): 184458.534

GCMW-44S Easting (ft): 985077.566

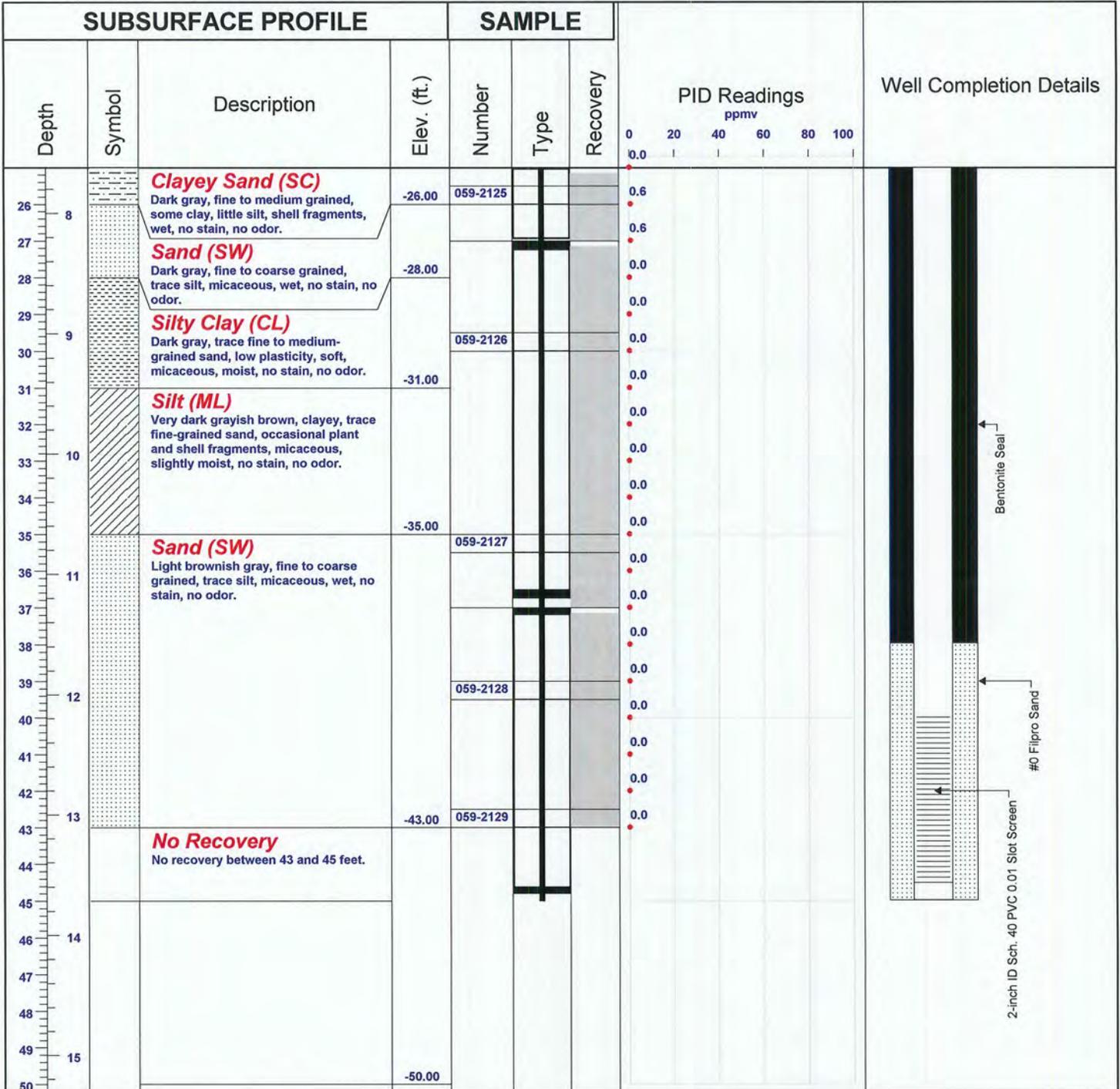
GCMW-44I Northing (ft): 184458.434

GCMW-44I Easting (ft): 985077.808

GCMW-44S Elevation (ft AMSL): 4.72

GCMW-44I Elevation (ft AMSL): 4.73

**Log of Well: GCMW-44**



Drill Method: A300 Rotary Sonic

Start Date: 1300 6/8/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1630 6/8/10

Sheet: 2 of 2

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: Lowes, Brooklyn, NY

Logged By: J. Bolduc

GCMW-45S Northing (ft): 184648.833

GCMW-45S Easting (ft): 985200.254

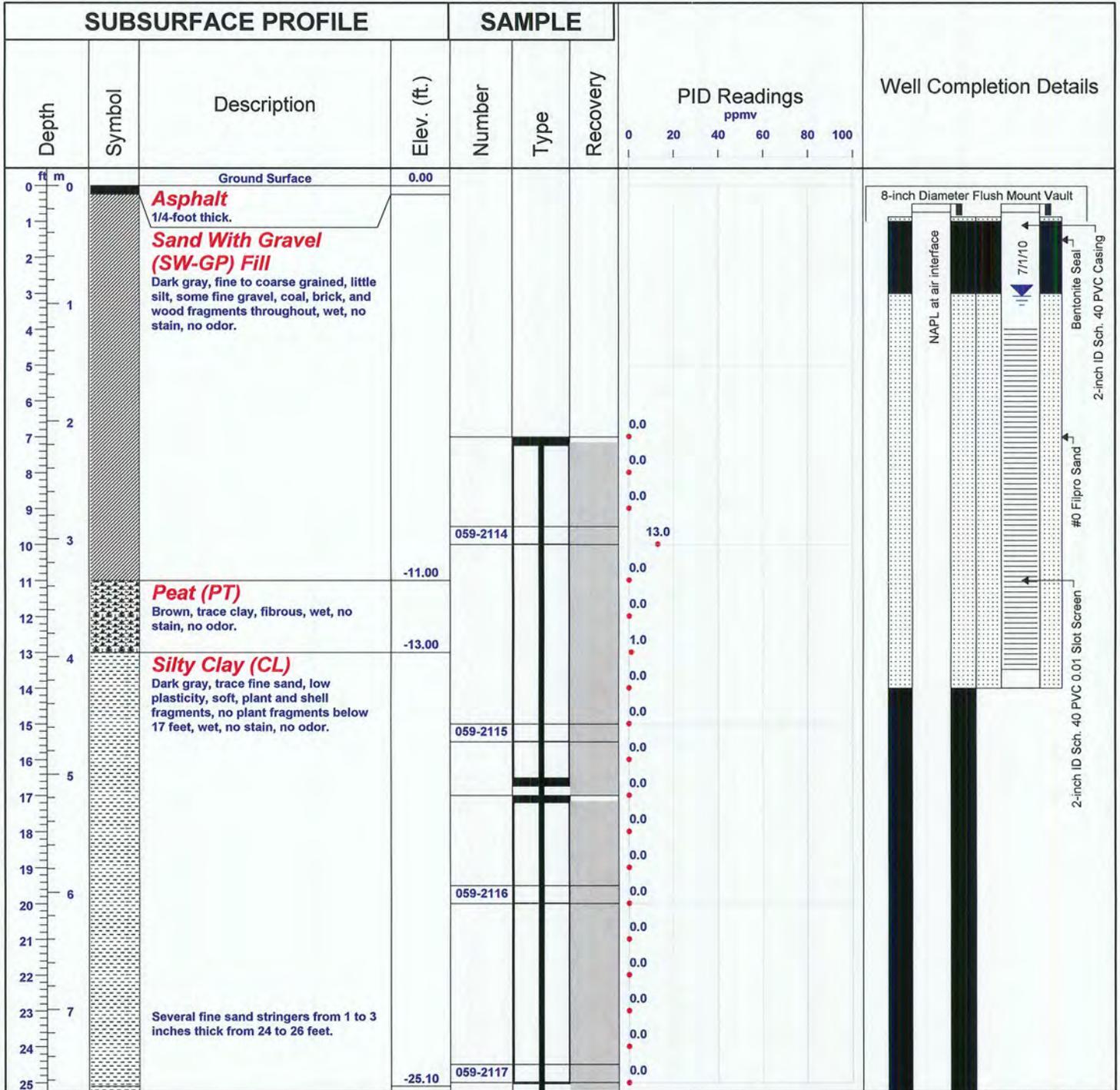
GCMW-45I Northing (ft): 184648.804

GCMW-45I Easting (ft): 985199.988

GCMW-45S Elevation (ft AMSL): 4.49

GCMW-45I Elevation (ft AMSL): 4.50

# Log of Well: GCMW-45



Drill Method: A300 Rotary Sonic

Start Date: 0813 6/8/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1025 6/8/10

Sheet: 1 of 2

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: Lowes, Brooklyn, NY

Logged By: J. Bolduc

GCMW-45S Northing (ft): 184648.833

GCMW-45S Easting (ft): 985200.254

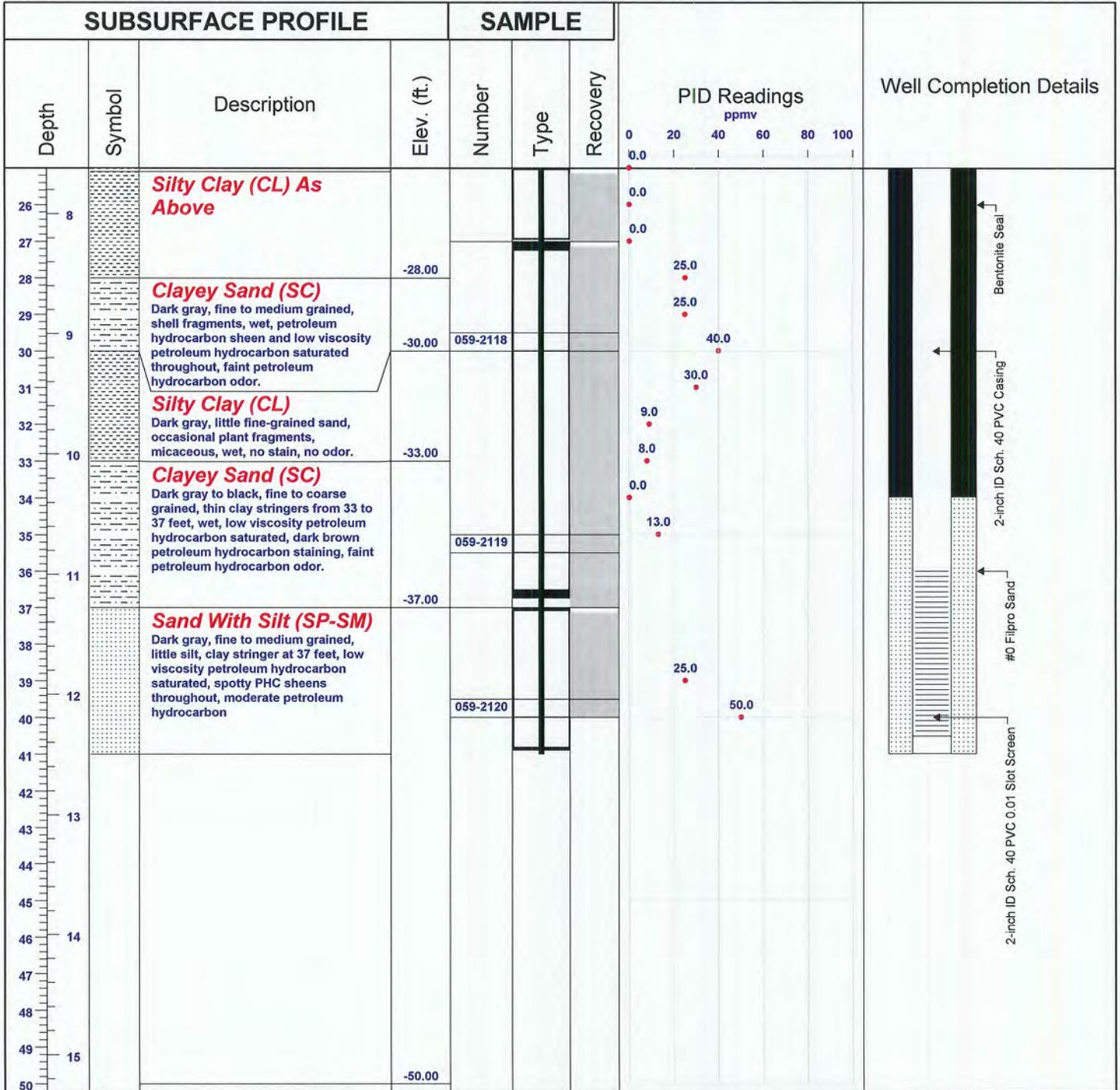
GCMW-45I Northing (ft): 184648.804

GCMW-45I Easting (ft): 985199.988

GCMW-45S Elevation (ft AMSL): 4.49

GCMW-45I Elevation (ft AMSL): 4.50

# Log of Well: GCMW-45



Drill Method: A300 Rotary Sonic

Start Date: 0813 6/8/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1025 6/8/10

Sheet: 2 of 2

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: 118 2nd Ave., Brooklyn, NY

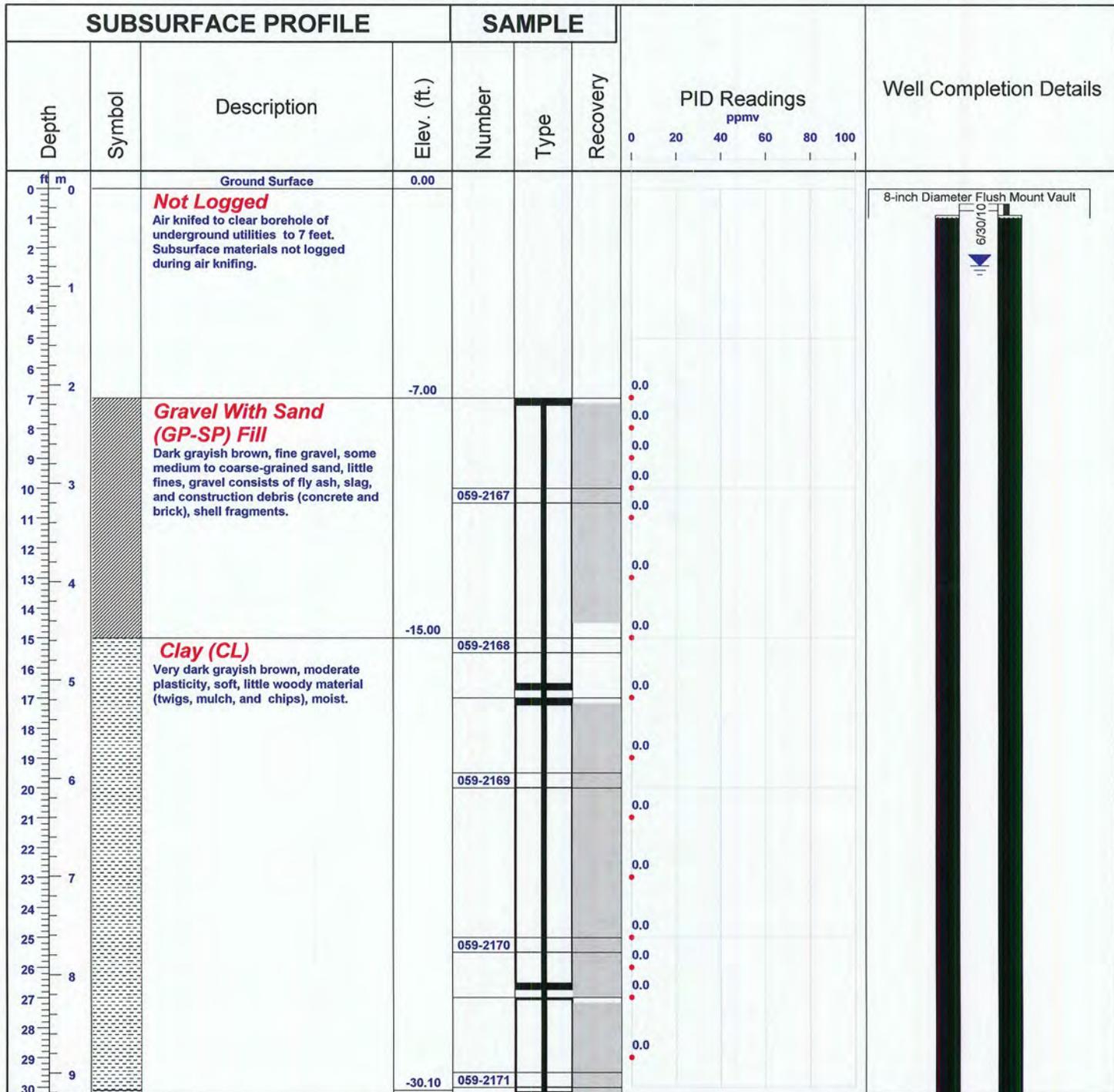
Logged By: C. Sklaney

GCMW-46I Northing (ft): 184593.888

GCMW-46I Easting (ft): 985167.173

GCMW-46I Elevation (ft AMSL): 4.76

**Log of Well: GCMW-46**



Drill Method: A300 Rotary Sonic

Start Date: 1415 6/15/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1620 6/15/10

Sheet: 1 of 2

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: 118 2nd Ave., Brooklyn, NY

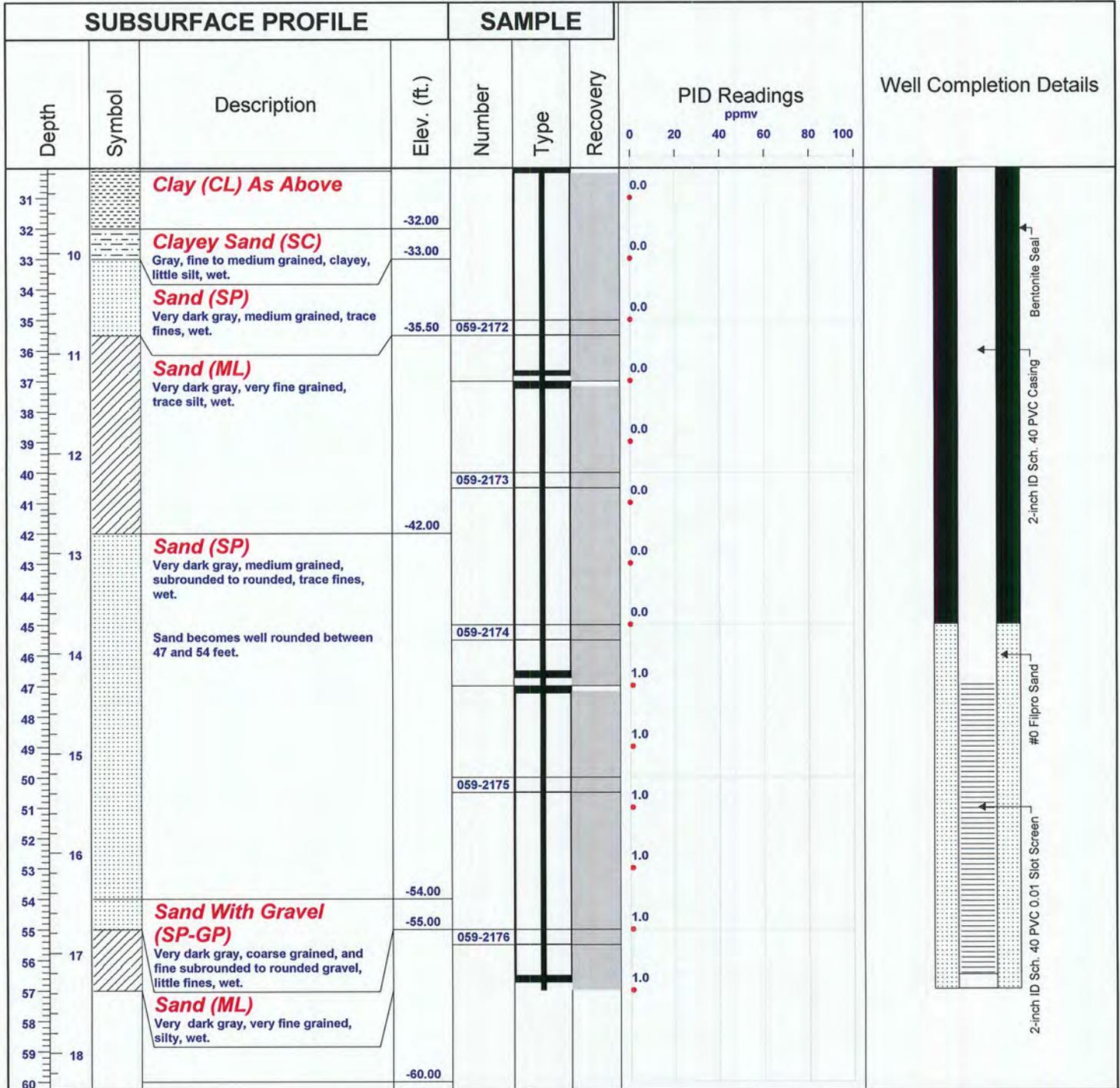
Logged By: C. Sklaney

GCMW-461 Northing (ft): 184593.888

GCMW-461 Easting (ft): 985167.173

GCMW-461 Elevation (ft AMSL): 4.76

**Log of Well: GCMW-46**



Drill Method: A300 Rotary Sonic

Start Date: 1415 6/15/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1620 6/15/10

Sheet: 2 of 2

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: 118 2nd Ave., Brooklyn, NY

Logged By: C. Sklaney

GCMW-47S Northing (ft): 184690.704

GCMW-47S Easting (ft): 985209.243

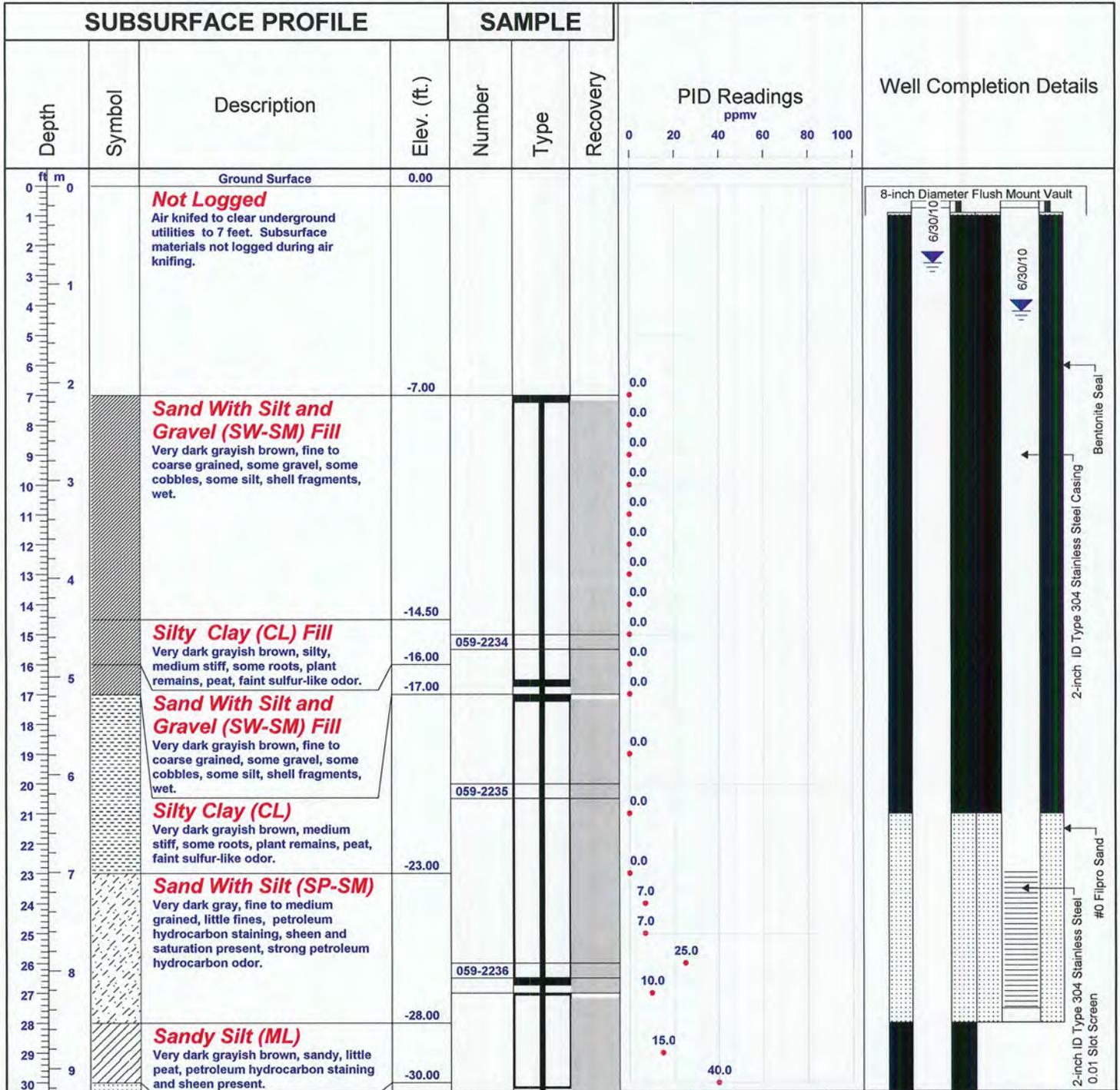
GCMW-47I Northing (ft): 184690.893

GCMW-47I Easting (ft): 985209.050

GCMW-47S Elevation (ft AMSL): 4.53

GCMW-47I Elevation (ft AMSL): 4.62

# Log of Well: GCMW-47



Drill Method: A300 Rotary Sonic

Start Date: 0935 6/28/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1430 6/28/10

Sheet: 1 of 2

Project No: SERAS-059

Project: Gowanus Canal Superfund Site

Client: EPA/ERT

Location: 118 2nd Ave., Brooklyn, NY

Logged By: C. Sklaney

GCMW-47S Northing (ft): 184690.704

GCMW-47S Easting (ft): 985209.243

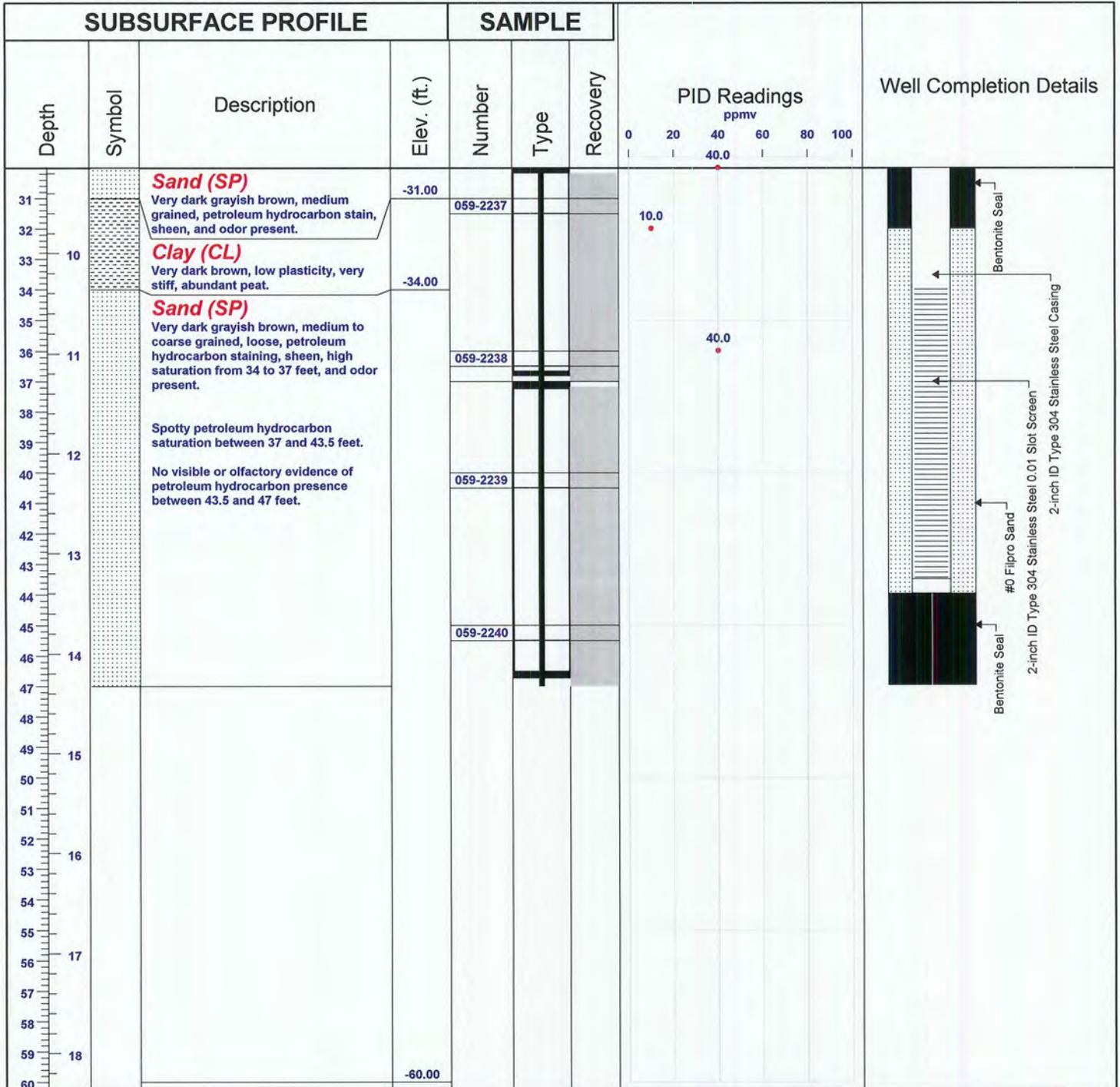
GCMW-47I Northing (ft): 184690.893

GCMW-47I Easting (ft): 985209.050

GCMW-47S Elevation (ft AMSL): 4.53

GCMW-47I Elevation (ft AMSL): 4.62

**Log of Well: GCMW-47**



Drill Method: A300 Rotary Sonic

Start Date: 0935 6/28/10

Hole Size: 8 inches

Lockheed Martin/SERAS  
2890 Woodbridge Avenue  
Building 209 Annex  
Edison, NJ 08837

Drill Company: Boart Longyear

End Date: 1430 6/28/10

Sheet: 2 of 2

**AKRF, INC.**

**Environmental Consultants**

**FIELD BOREHOLE LOG**

**BOREHOLE NUMBER**

MW-6/DP-12

PROJECT NUMBER: 80030-0002  
 PROJECT NAME: 124-136 SECOND AVENUE  
 LOCATION: BROOKLYN, NEW YORK  
 DRILLING CO: FENLEY & NICOL  
 DRILLING METHOD: HOLLOW STEM AUGER/GEOPROBE  
 FIELD PARTY: CHRIS MIGLIORE/JAY SEAL  
 GEOLOGIST: MOHAMED AHMED  
 DATE BEGUN: 12/6/2000 DATE COMPLETED: 12/6/2000

FIELD BOOK NO: 301  
 TOTAL DEPTH: 32 Feet  
 GROUND SURFACE ELEVATION: 0.0

STATIC WATER LEVEL (BLS)		
Depth (ft)	4.95	
Time	10:30	
Date	12/23/2000	

DEPTH (ft)	SAMPLE NUMBER	BLOWS COUNT	PID/ppm	REMARKS	DESCRIPTION	LITHOLOGY	WELL INSTALLATION
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