Geotechnical
Environmental
Water Resources
Ecological

Data Report

Remedial Design Program

Former Citizens Gas Works
Manufactured Gas Plant Site
Brooklyn, New York
Brownfield Cleanup Program (BCP)
Site No. C224012

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Abbreviations and Acronyms

ADT	Aquifer Drilling and Testing, Inc.
ASCE	American Society of Civil Engineers
ASTM	American Society of Testing and Materials
BCP	Brownfield Cleanup Program
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene and xylenes
BUG	Brooklyn Union Gas Works
CPTs	Cone penetrometer tests
El.	Elevation
EPA	Environmental Protection Agency
ft/day	Feet per day
GEI	GEI Consultants, Inc.
HSA	Hollow-stem augers
MGP	Manufactured Gas Plan
NAD83	North American Datum of 1983
NAPL	Non-Aqueous Phase Liquid
NAVD88	North American Vertical Datum of 1988
NYCDEP	New York City Department of Environmental Protection
NYCEQR	New York City Environmental Quality Reviews
NYSDEC	New York State Department of Environmental Conservation
PAHs	Polycyclic aromatic hydrocarbons
PID	Photoionization detector
RDI	Remedial Design Investigation
RI	Remedial Investigation
RIR	Remedial Investigation Report
SPT	Standard Penetration Tests
SRI	Supplemental Remedial Investigation
SVOCs	Semi-volatile Organic Compounds
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WPA	Work Projects Administration

1. Introduction

1.1 Purpose

National Grid is preparing to remediate the former Citizens Gas Works Manufactured Gas Plant (MGP) site located at 425 Smith Street, Block 471 Lots 1, 100, and 200, in Brooklyn, New York (herein referred to as the Site), as shown in **Figure 1.** This Data Report was prepared by GEI Consultants, Inc. (GEI) to summarize the data gathered in support of the remedial design effort. The Site, as defined in Section 1.2, is being remediated under the New York State Brownfield Cleanup Program (BCP) as Site C224012 under the oversight of the New York State Department of Environmental Conservation (NYSDEC). The Site is bordered by the Gowanus Canal, which is currently a Superfund Site that is being investigated by the United States Environmental Protection Agency (EPA).

This Data Report summarizes geotechnical, environmental, and hydrologic data related to the design, as well as historical data and information regarding infrastructure on and adjacent to the area being remediated.

1.2 Project Description

The approximately 9.6-acre Site was part of the Gowanus Marsh system before the construction of the Gowanus Canal (**Figure 2**). After construction of the canal, the Site mainly operated as an MGP. However, portions of the Site were used as a fertilizer plant and for light industrial activities. The historical industrial layout of the Site is shown in **Plate 1**. Additional MGP-era drawings and photographs are included in **Appendix A**.

The former MGP property is located in a densely developed urban area of commercial, industrial, and residential land that abuts the Gowanus Canal to the east and southeast (**Plate 2**). The former MGP site is comprised of four parcels. Parcels I, II and III are being addressed under this remedial design effort. Parcel IV is a discontinuous parcel and will be addressed under a separate voluntary consent program. The parcels comprising the Site are:

- <u>Parcel I</u>: This 4.1-acre parcel is currently a vacant lot owned by the City of New York (portions are being used by Ferrara Brothers Building Materials Corporation) in the northwestern portion of the Site. This area formerly housed the majority of the structures associated with the coal and oil gasification process (**Plate 1**).
- <u>Parcel II</u>: This 1.7-acre parcel in the northeastern portion of the Site owned by the City of New York and is currently leased to the Ferrara Brothers Building Materials Corporation operating a ready-mixed concrete plant. This portion of the Site formerly housed coal hoppers, coal trestles, a condenser, engine room, settling tank, oil room, storage areas, and distribution facilities (**Plate 1**).

- Parcel III: This approximately 3.8-acre parcel comprises the southern portion of the Site and was occupied by a warehouse that has been recently demolished. This area formerly housed oil tanks, separators, tar settling tanks, tar storage tanks, and a coal storage area. The southern half of this parcel was previously occupied by a chemical fertilizer production facility, prior to the construction of the warehouse (**Plate 1**).

The main categories of contaminants associated with MGP operations are volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). The main VOC of concern in soil and groundwater is benzene. Specific SVOCs of concern in soil and groundwater are polycyclic aromatic hydrocarbons (PAHs). These PAHs are typically found in tars and asphalts.

The remediation of the Site will include the removal of source material located within the former holder foundations, excavation and removal of nominally the top 8 feet of soil, placement of an impervious hydraulic liner, and backfilling with geotechnically and environmentally acceptable fill material. A non-aqueous phase liquid (NAPL) barrier wall along the Gowanus Canal will also be installed to mitigate NAPL migration off site. In addition, a number of NAPL collection wells have been installed and are operating using mobile collection equipment. A dedicated recovery system will be installed as part of the remediation.

1.3 Data Report Components

GEI performed the following in the development of this Data Report:

- Reviewed historical documents related to construction and operation of the National Grid predecessor companies that have previously occupied the Site.
- Reviewed available documents relating to sensitive infrastructure at and adjacent to the Site.
- Obtained and reviewed geologic and historical maps and prepared site-specific summaries of geology and geomorphology.
- Reviewed and evaluated existing subsurface data available from explorations performed by others.
- Performed test borings and test pit excavations to evaluate the subsurface conditions, collected geotechnical data for preliminary geotechnical analyses, and collected soil samples for laboratory testing.
- Installed monitoring wells to measure groundwater levels.
- Summarized data collected during remedial design investigation activities.

- Summarized data collected during supplemental remedial design investigation activities in the area beneath the former warehouse on Parcel III

- Summarized data gather during a dense non-aqueous phase liquid (DNAPL) recovery wells pilot test program.

- Summarized various design calculations.

1.4 Elevation and Plane Coordinate System Datum

Elevations cited in this report and shown in drawings, figures, and other reports prepared for this project are referenced to the North American Vertical Datum of 1988 (NAVD88) in feet. Historical documents for this Site may reference other vertical datum, the relationship between these and NAVD88 are shown in **Figure 3**. U.S. State Plane coordinates are referenced to the North American Datum of 1983 (NAD83), New York East Zone (3101) in U.S. Survey Feet.

1.5 Limitations

The engineering review, associated data collection, and preparation of documents related to this report have been performed in accordance with the standard of care commonly used as the state-of-practice in the engineering profession. Standard of care is defined as the ordinary diligence exercised by fellow practitioners in the profession performing the same services under similar circumstances during the same period.

The geotechnical information presented in this report is based on a limited number of explorations and tests performed by GEI and on previous explorations performed by others. Subsurface conditions and material properties presented in this report may vary significantly between borings and locations. The nature and extent of the variations may not become evident until subsequent phases of investigation or future construction. Therefore, this study may not have revealed all adverse conditions present at the Site.

Our work was performed in accordance with generally accepted engineering practices. No warranty, expressed or implied, is made that the actual encountered subsurface and site conditions will conform exactly to the conditions described herein, or that this report's interpretations will be applicable to, or sufficient for, all future work planned at the subject Site. GEI does not attest to the accuracy, completeness, or reliability of geotechnical borings and other subsurface data by others that are included in this report. GEI did not perform independent validation or verification of data provided by others.

This report was prepared for use by and the benefit of National Grid. Use by any other party is at its own discretion and risk.

2. General Site Geology and Existing Infrastructure

2.1 Site Setting

Parcel I contains concrete wash material, construction debris, grasses, shrubs, and a few small trees. In January 2005, the City of New York retained Metcalf & Eddy, Inc. /AECOM to perform an investigation of the bermed pit on Parcel I, which was suspected to be a disposal site, and prepare a report documenting their findings. That report (Metcalf & Eddy, Inc./AECOM, 2005) is included as **Appendix K** of the Remedial Investigation (RI) report (**Appendix B**) performed by GEI for the Site in 2005 (GEI, 2005). The construction debris field (primarily concrete spoil) was crushed and spread throughout the eastern half of the parcel by the City of New York in 2008. The northwestern portion of this parcel is a relatively flat topographic high point that extends to the east to the center of the parcel. The remainder of Parcel I generally slopes down to the east, southeast, and south. **Plate 2** depicts the Site topography.

Parcels II and III are relatively flat and abut the Gowanus Canal to the east and southeast. The majority of Parcel II is covered by a layer of concrete (spoil) and is occupied by an operating ready-mixed concrete facility. Parcel III contains asphalt paving along the canal and remnants of a foundation wall from the demolished warehouse; the floor slab has been removed and the area covered with the crushed concrete from the slab.

Topographic elevations (El.) across the three parcels range from approximately El. 30 at Smith and 5th Streets to about El. 10 at the canal bulkhead. Gowanus Bay is located approximately 1 mile to the southeast of the Site, and New York Harbor is located approximately 1.2 miles to the west.

Storm water runoff generally drains to the south and east from the Site.

2.2 Site Geology

The general geology of the Site is described below beginning with the older, deeper deposits and working upward to the younger, surficial deposits.

The bedrock observed beneath the Site is the Fordam Gneiss, which is described as a metamorphosed, medium to coarse-grained igneous rock unit of Precambrian Age (P.C. Brock and P.W.G. Brock, 2001). Regional down-warping of bedrock beneath the vicinity of the Site has resulted in a southeast-dipping bedrock surface of approximately 80 feet per mile (EPA, 2003; Cartwright, R.A., 2002). Top of bedrock elevations within the vicinity of the Site range between El. -100 to El. -200 (H. T. Buxton, J Soren, A. Posner, and P. K.

Shernoff, 1981). Bedrock was observed in four test borings (CGSB-37, CGSB-45, CGSB-46, CGSB-48) at El. -127 to El. -156.

Within Kings County, bedrock is generally overlain un-conformably by unconsolidated late Cretaceous age deltaic deposits (Clay Member of the Raritan Formation), overlain by Pleistocene age channel fill (Jameco Gravel) and lagoonal marine deposits (Gardiner's Clay), overlain by Upper Pleistocene (Wisconsin) age glacial deposits and Holocene age marsh/alluvial deposits and artificial filling (Cartwright, 2002). In the vicinity of the Site, Jameco Gravel and glacial deposits lie un-conformably upon bedrock.

The majority of the unconsolidated materials within northern Kings and Queens Counties are primarily Pleistocene age deposits (Cartwright, R.A., 2002). The Late Cretaceous-aged Clay Member of the Raritan Formation lies un-conformably on bedrock to the southeast of the Site (Cartwright, 2002). The Pleistocene-aged Jameco Gravel and Gardiner's Clay un-conformably overlie bedrock beneath the Site and the Clay Member of the Raritan Formation to the southeast in the vicinity of Prospect Park section of Brooklyn (Cartwright, 2002). The Jameco Gravel is described as a channel fill deposit associated with the ancestral Hudson River channel scour of southern Kings and Queens Counties. The unit consists of dark coarse sand and gravel with cobbles and boulders and ranges in thickness from absent at some locations to approximately 200 feet thick in Queens County (Cartwright, 2002). The approximate elevation of the surface of the Jameco Gravel ranges between El. -100 and El. -150 beneath the Site and immediate vicinity then slopes toward the southeast (Buxton, Soren, Posner and Shernoff, 1981). The Gardiner's Clay is a lagoonal marine deposit and consists of greenish-gray clay and silt with interbedded sand and ranges in thickness from absent in northern Kings County to upwards of 100 feet in areas to the southeast and east (Cartwright, 2002).

The Upper Pleistocene deposits overlie the Jameco Gravel and Cretaceous age deposits in the vicinity of the Site. Glacial deposits consist of terminal moraine and ground moraine deposits, which are widely graded mixtures of clay, silt, sand, gravel, boulders, and glaciofluvial outwash deposits consisting of moderately to widely graded, sands and gravels, typically ranging in thickness between 100 and 200 feet (Cartwright, 2002). Holocene age marsh deposits consist of sand, silt, and organic material along stream channels and marshes. This material has a maximum thickness of 50 feet within limited areas of Kings and Queens County (Busciolano, R., 2002).

A mix of alluvial/marsh deposits was generally encountered beneath a layer of fill on Parcels I through IV and the adjacent properties. The alluvial/marsh deposits consist of sub-units of sand (alluvial), silt, silty sand, silt-clay, clay, and peat (marsh). A map of the area in 1849 (**Figure 2**) indicates that the Gowanus Creek formerly flowed through portions of Parcels I, II, III, and IV, forming a U-shaped creek channel and associated wetlands.

Gowanus Creek was a tidal creek that historically drained the wetlands in the western portion of Brooklyn. In the late 1860s, Gowanus Creek was dredged, channelized, and bulkheads were installed to construct the Gowanus Canal for commercial barge traffic.

2.3 Site Hydrogeology

Groundwater at the Site is present in fill and underlying units. Recent alluvial and marsh deposits (meadow mat) are present between the fill and Upper Glacial Aquifer in most areas of the Site. The Upper Glacial Aquifer is generally unconfined; however, it can be locally confined by the presence of silt and clay layers within moraine deposits. On site, where meadow mat is present, water level elevations are higher than where the mat is absent. Groundwater mounding is evident in the vicinity of the former holders on Parcel I along 5th Street. Shallow (water table) groundwater flow on site is generally toward the Gowanus Canal. Intermediate (Upper Glacial) and deep (Jameco) groundwater flow direction is generally west to southwest towards Upper New York Harbor. Groundwater on site is tidally influenced in the vicinity of the canal. Hydrologic investigation results are discussed in Section 2.3, and groundwater modeling is discussed in Section 5 and **Appendix K**. The existing monitoring well network is shown in **Figure 4**. For regional aquifer information, refer to Section 1.3.2 of the Remedial Investigation Report (RIR) (**Appendix B**).

2.4 Gowanus Canal Bulkhead

The bulkhead along the Gowanus Creek was constructed circa 1850 to mid-1860s, which effectively turned the creek into the canal that is in existence today. The location of the original creek can be seen in **Figure 2.** The bulkhead was constructed as a timber crib wall and aligned as shown in **Figure 5** (Hunter Research, Inc., Raber Associates, Inc. and Northern Ecological Associates, Inc.). A profile showing the subsurface conditions is included in **Figure 6**. Historical drawings, historical photographs, and recent photographs and video footage of the bulkhead are included in **Appendix C**.

The original structure has been upgraded and repaired multiple times; however, details of many of these repairs are not readily available. The most significant alteration or repair to the bulkhead at the Site was completed in 1922 when a large portion of the crib wall collapsed into the canal due to surcharge loading of a coal pile placed in close proximity to the edge of the canal (south end of Parcel II).

The damage was repaired by constructing a wooden deck supported on timber piles over the area of land that had slid into the canal. Subsequently, a concrete retaining wall was constructed on top of the deck to contain the coal pile. The original grade of the Site was then restored, and a wooden fender system that was also supported on timber piles was built out from the new bulkhead into the canal and faced to match the original crib wall in appearance (**Figure 5**). The fender system that extended out from the reconstructed bulkhead has since been removed, but historical records indicate that the piles which formed the basis of this system were cut off at the mud line and still remain in place today. Based on the available construction documents, the piles appear to be located up to approximately 6 feet into the canal from the concrete face of the bulkhead.

A separate fender system extending out into the canal still exists on a portion of the bulkhead northwest of the section that was repaired in 1922 (north end of Parcel II). This fender system is also supported on timber piles, which are visible during low tide.

A small portion of the original crib wall has been reinforced by steel sheet piles near the southern end of Parcel III. No records of this construction have been discovered, and the conditions behind the steel sheet piles are currently not known.

2.5 Bond-Lorraine Street Sewer

A 72-inch-inner-diameter combined sewer, known as the Bond-Lorraine Street Sewer that was originally constructed circa 1892, runs underneath northeast to southwest through portions of Parcels I, II, and III as shown in **Figure 6**. The sewer was originally constructed of brick (12 inch thick, 3 course) that gave the structure an outer diameter of 96 inches. The sewer was supported on timber pile and concrete cradle system. The approximate arrangement of the piles is shown on **Drawings 8** and **19** of the 50% Submittal Remedial Design Drawings (GEI, 2011); however, the depth of piles is unknown. Historical MGP drawings show an easement of 10 feet on either side of the centerline of the sewer. The New York City Department of Environmental Protection (NYCDEP) has stated that the sewer would require a 19-foot-wide easement on either side of the centerline if constructed present day.

Since its original construction, the sewer has undergone three major repairs at separate locations on the Site. Each of the repairs has been summarized below in order from oldest to most recent:

- 1922 Repair (Station 7+50 to 9+59) – The bulkhead failed under the surcharge of a large coal pile placed in close proximity to the edge of the canal, and resulted in damage to the sewer. The original brick sewer was removed and replaced with a 72-inch-diameter reinforced concrete culvert structure supported by piles.
- 1939 Repair (Station 1+00 to 4+74) – Under the Work Projects Administration (WPA) a portion of the sewer that is currently under the demolished warehouse on Parcel III was replaced. The new section of sewer was built of reinforced concrete and was generally similar in construction to the section that had been previously replaced in 1922, with the exception of a flat ceiling. The inner width of this new section was also 72 inches.

- 1977 Repair (11+66 to 13+04) – A portion of the original sewer partially collapsed possibly due to operations at the concrete batching facility on Parcel II. The damaged section of sewer was repaired with the insertion of a 54-inch-inner-diameter concrete section inside the original 72-inch brick pipe. It has been observed from a recent sewer inspection that the concrete repair has settled significantly along the center reach of the repair since its installation.

The location of the sewer with notes on the approximate locations of repairs and construction details is shown in **Figure 6.** **Appendix D** includes historical photos, drawings, and an inspection report of the sewer.

2.6 Gas Tunnel

During the early part of the 20th century the MGP on the Site was operated by the Brooklyn Union Gas Works (BUG). BUG wanted a more efficient and direct means of sending out their product due to an increase in demand. This necessitated the construction of a tunnel under the canal to accommodate gas conveyance lines. The construction of the tunnel was completed in 1924, and gas conveyance lines routed through it are still in use today. The location of the tunnel as well as the means and methods of construction that were used to build it were well documented in a 1924 American Society of Civil Engineers (ASCE) journal article.

The total length of the tunnel is 136 feet from center-to-center of shafts, with an oval cross section, 10 feet-8 inches in height, and 16 feet-1 inch wide. The tunnel is constructed from concrete sections encased in steal sheathing. The top of the steel sheathing for the tunnel is at approximate El. -24 and the depth of sediment over the tunnel is approximately 8 feet. Engineering drawings and the 1924 journal detailing the construction of the tunnel are included in **Appendix E**. A report prepared by Ocean Surveys, Inc., which includes canal bathymetry and an evaluation of the potential for other utility crossings are included in **Appendix F**.

2.7 Metropolitan Transit Authority New York City Transit – Culver Line Viaduct

An elevated section of the Metropolitan Transit Authority F and G Lines (Culver Viaduct) runs adjacent to the Site to the south and west. Originally constructed in 1933, the concrete viaduct is cracking and chipping and is currently wrapped with a protective netting (NYCT, 2009). The reconstruction of the viaduct began in July 2009 and will continue through 2013 (NYCT, 2009). **Appendix G** includes engineering drawings of the Culver Viaduct and a 2009 Metropolitan Transit Authority publication, *Review of F Line Operations, Ridership, and Infrastructure*.

3. Environmental and Geotechnical Investigations

3.1 General

An environmental and geotechnical investigation program was performed under an NYSDEC-approved Remedial Design Work Plan (September 14, 2007) to assess soil conditions across the Site for the purpose of planning and evaluating potential remediation options. The investigation program included the following activities:

- Review and evaluation of existing data from previous investigations performed by others.

- Installation of exploratory borings, test pits, and cone penetrometer tests to obtain subsurface environmental and geotechnical information and collect soil samples for laboratory testing.

- Installation of monitoring wells to estimate the natural groundwater level, assess the relationship between the groundwater table and the canal surface water level, and collect groundwater environmental samples for laboratory testing.

- Installation of recovery wells to monitor and measure potential recovery of DNAPL and perform a pilot test program of various pumping equipment to aid in recovery system design.

The exploration locations are shown in **Plate 2**, and the logs are included in **Appendices H** and **I**.

3.2 Previous Explorations

3.2.1 Summary of Previous Explorations and Investigations

Multiple geotechnical and environmental investigations have been performed over the years by others at the Site and within the Gowanus Canal. As part of the investigation, we reviewed documents from a number of the previous programs. Copies of boring and other exploration logs from previous investigations are provided in **Appendix H**, and the approximate exploration locations are shown in **Plate 2**.

The following provides a summary of the geotechnical data available to GEI from the previous investigations performed at or near the Site and the Gowanus Canal.

- <u>GW Series</u>: The GW series of explorations were conducted by Roux Associates in 1989. Roux drilled five test borings between 16 and 35 feet deep at the Site and installed monitoring wells in each boring. Copies of the exploratory boring and monitoring well logs are included in **Appendix H**.

- GC Series: The GC series of explorations were conducted as part of a 2003 subsurface exploration program by the U.S. Army Corps of Engineers (USACE). Four test borings were drilled in the portion of the Gowanus Canal immediately adjacent to the Site. Copies of boring logs are included in **Appendix H**.

- TP Series: The TP series of explorations were conducted by Metcalf & Eddy Inc. /AECOM in 2005. This set of explorations consisted of six test pit excavations near a suspected drum dump area on Parcel I. Copies of test pit logs are included in **Appendix H**.

3.2.2 Soil Classification from Previous Explorations

Soil descriptions provided on the exploration logs from previous investigations are based on several different classification systems, and provide different levels of detail.

A consistent method of soil classification is required for quick comparison of soil descriptions from different sources to evaluate general soil stratigraphy across the Site. We selected the Unified Soil Classification System (USCS) as the basis for comparison of these previous investigations. In general terms, the USCS separates soil types based on the relative particle size, distribution, and plasticity of the fine particles in the soil matrix. Details of the USCS are provided in American Society of Testing and Materials (ASTM) International standard D2487 Standard Practice for Classification of Soils for Engineering Purposes and in ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

GEI uses a soil classification system based on USCS and ASTM. Many of the previous investigations used soil classification systems that do not contain the required information for reclassification of the soils in accordance with the USCS. As a result, reclassification of soils from previous investigations was limited to assigning a USCS group symbol (GW, GP, SW, SP, CL, etc.) to the soil being classified

3.3 Description of Recent Field Exploration Programs

3.3.1 General

A number of exploration programs have been completed by GEI on and adjacent to the Site under programs approved by the NYSDEC. These programs were part of the RI, the Supplemental Remedial Investigation (SRI), a Gowanus Canal Investigation, and the Remedial Design Investigation (RDI) including the Supplemental Parcel III Pre-Design Investigation. The purpose, scope, and composition of these programs are summarized in the following sections. Explorations are also summarized in **Table 1**.

3.3.2 Remedial Investigation

The RI consisted of 19 test pits, 6 Geoprobe® soil borings, 47 test borings using resonant sonic drilling methods, and the installation of 20 monitoring wells. The investigation was conducted between March 2003 and March 2005. The exploration locations are shown in **Plate 2**, and the logs are included in **Appendix I**.

The exploration locations were selected to achieve the following objectives:

- Evaluate the potential presence of benzene, toluene, ethylbenzene and xylenes (BTEX), and PAHs in subsurface soil and groundwater.
- Evaluate the horizontal and vertical extent of potential NAPL.
- Obtain data regarding the extent and potential recoverability of any identified NAPL.
- Evaluate the potential for off-site migration of BTEX and PAHs.
- Evaluate the Site hydrogeology.

3.3.3 Supplemental Remedial Investigation

The SRI consisted of 9 Geoprobe® soil borings, 54 resonant sonic borings, and 1 mud rotary boring. The majority of these investigations were performed off site during May and June 2006 and continued in February, June, July, and October 2010. Two resonant sonic borings were installed in the Gowanus Canal in July 2010. Additional investigations are proposed and will be performed when access to off-site locations is granted. The SRI is intended to further delineate environmental impacts off-site. The exploration locations are shown in **Plate 2** and the logs are included in **Appendix I**.

3.3.4 Gowanus Canal Remedial Investigation

The investigation for an adjacent but separate site, the Gowanus Canal Remedial Investigation, conducted by National Grid, collected data that is pertinent to the Site. From December 2005 through January 2006, 103 sediment cores were advanced to a target depth of 20 feet below the mudline. Of the 103 sediment cores, 26 sediment cores were installed adjacent to the Site and the logs are included in **Appendix I**.

In 2010, the EPA performed a remedial investigation of the Gowanus Canal as a part of the Superfund process. Many of the sediment investigation locations mirrored the National Grid RI locations. As part of the EPA investigation, in June 2010, National Grid installed a shallow and intermediate well pair across the canal near well CGMW-16 using resonant sonic methods. Logs for this well pair are included in **Appendix I**.

3.3.5 Remedial Design Investigation

The RDI was undertaken to gather geotechnical, hydrogeologic and chemical data for the remedial design. The program that was conducted between November 2007 and August 2009 consisted of 53 soil borings, 6 cone penetrometer tests (CPTs), 7 test pits, and the installation of 8 monitoring wells and 13 recovery wells. The exploration locations are shown in **Plate 2**, and the logs are included in **Appendix I**. Soil and groundwater analytical results from RDI activities are summarized in the tables provided in **Appendix T**.

The test pit locations were selected to provide an overview of soil stratification and assist in determining the location of potential source material. Test boring and cone penetrometer locations were selected to:

- Obtain soil samples and perform standard penetration tests (SPTs) to assess the engineering parameters of the soil strata.
- Evaluate/calibrate soil classifications from historical borings.
- Provide specific subsurface information at critical design locations.

3.3.5.1 Parcel III Supplemental Pre-Design Investigation Activities

Additional Remedial Design Investigation activities on Parcel III were conducted between October 2009 and April 2010, following demolition of the warehouse that formerly occupied the property. The purpose of these activities was to characterize the extent of MGP-related impacts on Parcel III beneath the former warehouse, and to collect geotechnical and hydrogeologic data to support the remedial design program. The investigation consisted of 18 test borings using hollow-stem auger drilling methods, 11 Geoprobe® soil borings, 7 test pits, and the installation of 11 monitoring wells and 1 piezometer. The exploration locations are shown in **Plate 2**, and the logs are included in **Appendix I**. Monitoring well construction and development logs are included in **Appendix O**. Soil and groundwater analytical results are included in the tables provided in **Appendix T**.

3.4 Test borings

Test borings were installed using resonant sonic, hollow-stem auger, mud rotary, and Geoprobe® drilling methods. The boring logs are included in **Appendix I** and the boring locations are shown on **Plate 2**.

Sonic Borings

The Prosonic Drilling Corporation of Windsor, New Jersey, drilled 48 borings using resonant sonic drilling methods between March 8, 2003 and March 30, 2005. The borings were drilled to depths ranging from 2.5 to 182.0 feet below existing ground surface (bgs) with an average of about 90 feet bgs. The total drilled length was approximately 4,700 feet.

Boart Longyear of Northborough, Massachusetts drilled three borings using resonant sonic drilling methods between June and July 2010. The borings were drilled to depths ranging from 34 to 105 feet bgs. The total drilled length was approximately 204 feet.

Resonant sonic drilling method produces a continuous core sample over the entire distance of the exploration, but does not provide any SPT data on the soil.

For both drilling programs, a photoionization detector (PID) was used to measure the levels of VOCs present in each sample. A GEI field representative was on site full time to observe and document the borings and well construction, and to collect the samples.

Hollow-Stem Auger and Mud Rotary Borings

The Summit Drilling Company, Inc. of Bound Brook, New Jersey drilled a set of borings between November 2, 2007 and October 16, 2008, using a truck-mounted Mobile B-53 drill rig. The explorations were advanced using hollow-stem augers (HSA) and mud rotary wash drilling methods. A total of 53 borings were drilled to depths ranging from 6.9 to 102.0 feet bgs. The total drilled length was approximately 2,600 feet. SPTs were performed, and split-spoon samples were generally obtained at approximately 5-foot intervals.

Paragon Environmental Construction, Inc. of Brewerton, New York, also drilled a set of borings between October 28, 2009 and January 21, 2010, using truck-mounted Mobile B-48 and CME-55 drill rigs. The explorations were advanced using HSA and mud rotary wash drilling methods. A total of 18 borings were drilled to depths ranging from 40 to 114 feet bgs. Five borings were also re-drilled for well installation. The total drilled length was approximately 1,600 feet. SPTs were performed, and split-spoon samples were obtained at approximately 2-foot intervals.

For both drilling programs, a PID was used to measure the levels of VOCs present in each sample. A GEI field representative was on site full time to observe and document the borings and well construction, and to collect the samples.

Aquifer Drilling and Testing, Inc. (ADT) of New Hyde Park, New York drilled one boring to 41 feet bgs using mud rotary methods on October 14, 2010 and installed a monitoring well.

Geoprobe® Borings

The Prosonic Drilling Corporation of Windsor, New Jersey, drilled six Geoprobe® borings on April 15, 2003. The Geoprobe® method of drilling, also known as the “direct push” technique, involves using hydraulically-powered equipment to advance the core barrel that results in a continuous soil sample. The probes were pushed to depths ranging from 2.5 to 20 feet bgs. The total advanced length was approximately 90 feet. Similar to the sonic method of drilling, a Geoprobe® produces a continuous core sample over the entire distance of the exploration, but does not provide any SPT data on the soil.

Paragon Environmental Construction, Inc. of Brewerton, New York also drilled 11 Geoprobe® borings on Parcel III between November 4 and 11, 2009. The probes were pushed to depths ranging from 12 to 34 feet bgs. Several borings experienced refusal due to subsurface obstructions and were relocated. The total advanced length, excluding the refused locations, was approximately 235 feet.

Zebra Environmental of Lynbrook, New York drilled Geoprobe® borings at off-site locations between February 12 and 18, 2010. The probes were pushed to depths ranging from 46 to 62 feet bgs. The total advanced length was approximately 216 feet.

A GEI field representative was on site full time to observe and document the Geoprobe® as well as collect and tag samples.

Backfilling of Borings

After each sonic, HSA, mud rotary, and Geoprobe® boring was completed, the driller tremie-grouted the borehole with a cement-bentonite grout mix, and placed the soil cuttings into drums for disposal. For the resonant sonic borings, the casing that had been used to advance the borehole was filled with grout, and as the driller extracted the casing, the borehole was topped off with grout. A GEI field representative observed the grouting of all boreholes.

3.5 Vibracore Sediment Cores

Ocean Surveys, Inc. of Old Saybrook, Connecticut, was contracted by GEI to install 103 sediment cores using vibracore methods to assess environmental impacts within the Gowanus Canal sediment. The cores were typically advanced to a target of 20 feet below mudline, cut into 5-foot-long segments, capped, and transported to shore for processing. Each sediment core was split, continuously logged, screened with a PID and for visual and olfactory observations. Vibracore logs are included in **Appendix I** and the locations are shown on **Plate 2**.

3.6 Cone Penetrometer Tests

ConeTec, Inc. of West Berlin, New Jersey performed six cone penetrometer tests (CPTs) between January 15, 2009 and January 16, 2009. The CPTs ranged in depth from 69 to 100 feet bgs (with an average depth of 85.2 feet), for a total explored length of 511 feet. In order to avoid striking obstructions located in the layer of fill covering most of the Site, the CPT locations were pre-drilled by Summit Drilling to an average depth of approximately 20 feet bgs using HSA drilling methods. A GEI field representative was on site full time to observe and document the CPTs.

The CPT is a method of providing continuous information about the soil as the exploration is being conducted. The test consists of advancing a steel cone into the ground by pushing it continuously using a hydraulic jack. The tip of the cone is equipped with sensors which collect information about the tip and friction resistance encountered in the soil as the probe is advanced. This information can then be used to classify the strata using empirical correlations. The interpreted logs are included in **Appendix I** and the CPT locations are shown on **Plate 2**. A report regarding the CPT investigation and tabular data are located in **Appendix J**.

Boreholes created by the CPTs were grouted from the bottom up by the use of tremie rods.

3.7 Test Pits

Hallen Construction, Inc. of Island Park, New York, excavated 19 test pits between March 11 and 23, 2003 as part of the RI program. The test pits were excavated to depths ranging from 2 to 8.5 feet bgs. NY Construction, Inc. of Staten Island, New York excavated seven test pits between November 13 and 20, 2008 that ranged in depth from 3.5 to 13 feet bgs for the RDI program. For the Parcel III RDI activities beneath the former warehouse, Brookside Environmental, Inc. of Hicksville, New York excavated seven test pits between January 25 and 28, 2010. These test pits ranged in depth from 7 to 11 feet bgs.

A GEI field representative was on Site to observe and log the test pits. The locations of the test pits are shown in **Plate 2**, and the logs are included in **Appendix I**.

Test pits were excavated using an excavator or backhoe. Samples were collected from the cuttings of some of the test pits, for analytical testing. The explorations were located across the Site with the purpose of verifying the existence of historical foundations of structures that had at one time been involved in the gas manufacturing process. This information would be useful in designing the excavation program.

Test pits were backfilled after completion with excavated material. A GEI field representative observed the backfilling, grading, and compaction of all test pits.

3.8 Monitoring Wells

A monitoring well network of 39 wells or well clusters and 7 piezometers or piezometer clusters were installed during the RI and RDI activities (**Figure 4**). Wells were screened in fill, alluvial deposits, and the Upper Glacial and Jameco Aquifers. Wells were installed on site and in surrounding areas. Well construction consisted of either 2-inch-diameter schedule 40 PVC slotted screens with plastic risers, or multichannel wells with seven discrete screened sections. **Table 2** provides information on these wells, including location, depths, and groundwater levels measured at high and low tide in 2004, 2008, 2009, and 2010. The RI monitoring well network included a site-wide network of wells screened in the shallow, intermediate, and deep groundwater zones and in the Jameco Gravel. Several intermediate and deep monitoring wells, including all monitoring wells screened in the Jameco Gravel, were abandoned in 2006 after completion of the RI. As part of the RDI, twelve monitoring wells and eight piezometers were installed. The existing well network, including RDI wells and the remaining RI wells, consists of 31 monitoring wells (23 shallow, 5 intermediate, and 3 deep), 5 multi-channel monitoring wells with at least two of the channels functioning, and 8 piezometers (6 shallow and 2 intermediate).

4. Subsurface Characterization

4.1 Subsurface Soil Conditions

In general, the subsurface soil conditions encountered in the explorations performed by GEI are similar to the expected conditions based on our review of local and regional geology maps. The general stratigraphy working downward from the ground surface is summarized in the following paragraphs. The subsurface conditions are known only at the exploration locations. The subsurface conditions between exploration locations may differ from those described below and/or depicted in the subsurface profiles.

Fill – A layer of fill is present at the ground surface or immediately beneath a layer of topsoil, concrete, or asphalt on Parcels I through III. Fill consists of loose, non-cohesive silt, sand and a little gravel mixed with brick, concrete, coal, wood, metal, ash, and clinkers.

Alluvial Sand Deposits – The alluvial sand deposits are typically tan, light brown, and brown, fine to coarse sand with less than 45 percent fines, and are generally loose and cohesionless. The sand unit is often interbedded with thin lenses of silt. The alluvial sands overlie marsh deposits and were present from approximately El. 5 in boring CGSB-25 on Parcel II and CGSB-04 on Parcel I, and approximately El. 7 in boring CGSB-77B on Parcel III. In areas where the marsh deposits were absent, the alluvial sands extended to about El. -9 in boring CGSB-01 on Parcel I.

Marsh – A mix of alluvial sands or marsh deposits were generally encountered beneath a layer of fill on Parcels I through III. The marsh deposits typically include soft, cohesive, brown to greenish-gray silts overlying a moderately dense and plastic, gray clay. An organic, dark brown peat is sporadically interbedded with and underlying the silty/clayey marsh deposits. The thickness of the marsh deposits, where present, ranged from about 1 foot in boring CGSB-05 on Parcel I to about 23 feet in boring CGSB-27 on Parcel III. Marsh deposits were encountered in all the borings completed below El. 0 on Parcels I, II, and III, with the exception of CGSB-09/MW-01D and CGSB-107 at Parcel I.

Glacial Deposits – Glacial deposits were encountered beneath the alluvial/marsh deposits (where present) and above the Gardiner's Clay/Jameco Gravel on Parcels I through III. The glacial deposits can be classified into three sub-units: a predominantly sandy glacial outwash unit, glacial till, and glacial clay.

The glacial outwash sands are typically brown to red-brown, loose, cohesionless, well to narrowly graded fine to coarse sands with trace silt. The outwash sand unit was encountered at El. 3 in CGSB-09 on Parcel I and El. -138 within CGSB-46. Isolated layers of glacial till and glacial clay (possibly glaciolacusterine in origin) were encountered within the glacial outwash.

The glacial till is a dense, brown to red-brown, widely graded unit consisting of silt and fine to medium sand, little to some gravel and cobbles, and trace clay. Layers of glacial till were encountered within each of the borings on Parcels I through Parcel III with the exception of CGSB-01 and CGSB-04 on Parcel I and CGSB-63B on Parcel III.

An isolated layer of glacial clay (potentially glaciolacusterine in origin) was encountered within the south central portion of Parcel I within test borings CGSB-13, CGSB-21, and on Parcel III within test borings CGSB-24, CGSB-27, CGSB-62, CGSB-63, CGSB-66, and CGSB-76. The glacial clay ranged in thickness from approximately 4 feet thick within CBSB-24 on Parcel III to as thick as approximately 22 feet within boring CGSB-13 on Parcel I.

<u>Gardiner's Clay</u> – A layer of Gardiner's Clay was encountered beneath the glacial outwash materials and above the Jameco Gravel. The clay was gray to dark gray, very dense, with trace silt and trace shells, and was consistent with the descriptions provided by Soren in Cartwright, 2002. The clay layer was encountered from El. -110 in test boring CGSB-49/MW-19 to approximately El. -130 in boring CGSB-30/MW-15 on Parcel I. The unit was encountered within the northwestern corner of Parcel I in CGSB-09, on Parcel II in boring CGSB-12/MW-07D, and on Parcel III in boring CGSB-26. The clay layer was not encountered in the explorations performed along the eastern to central portion of the Parcel I and the northwest portion of Parcel II, thus, it does not appear to be continuous throughout the Site.

<u>Jameco Gravel</u> – The Jameco Gravel was encountered beneath the Gardiner's Clay and glacial outwash on all three parcels. The Jameco Gravel consists of loose, non-cohesive, and narrowly graded coarse sand and fine to coarse gravel and cobbles. The materials encountered at the Site are consistent with published descriptions by Soren in Cartwright, 2002. Jameco Gravel was encountered from approximately El. -112 in boring CGSB-12/MW-07D on Parcel II to approximately El. -141 in CGSB-47 on Parcel I. The unit was also encountered in boring CGSB-09/MW-01D, CGSB-37/MW-14, and CGMW-46 on Parcel I, CGSB-16/MW-04D on Parcel II, and CGSB-30/MW-15 on Parcel III.

<u>Bedrock</u> - Fordam Gneiss was encountered beneath the Jameco Gravel and Glacial Deposits on Parcels I and II. The Fordam Gneiss is a metamorphosed, medium to coarse-grained igneous rock. The bedrock encountered at the Site is consistent with published descriptions (Cartwright, 2002). The Fordam Bedrock was encountered on Parcel I at El. -127 in boring CGSB-37 and El. -159 in boring CGSB-46. On Parcel II, bedrock was encountered in boring CGMW-45 at El. -146.

4.2 Groundwater

4.2.1 Aquifer Description

Two groundwater aquifers are present beneath the Site; a shallow, unconfined/semi-confined aquifer (Upper Glacial Aquifer), and a confined/semi-confined aquifer (Jameco Aquifer). The Upper Glacial Aquifer includes the fill, alluvial/marsh deposits, and Upper Glacial outwash sand. The Upper Glacial Aquifer is bounded at depth by the Gardiner's Clay and Jameco Gravel, at approximately 120 to 140 feet bgs on site. This represents approximately 130 feet of saturated thickness. The Jameco Aquifer was measured on site to be approximately 30 feet thick. For purposes of the RI and RDI, the Upper Glacial Aquifer was subdivided into shallow, intermediate, and deep groundwater zones to evaluate the relationships between potentially different flow regimes within the aquifer.

Groundwater flow in the Upper Glacial Aquifer was mapped by USGS as being westerly toward Upper New York Bay [USGS, 2002]. On the Site, local influence from the Gowanus Canal is apparent, where flow was observed in the RI and RDI to be southerly toward the canal and Gowanus Bay. Groundwater flow in the Jameco Aquifer was measured on site to be southerly. No published regional contours have been found for the Jameco Aquifer. The Site is at the edge of the mapped Jameco aquifer, and the aquifer has been reported to be a really limited and little used [USGS 1986, 1995].

4.2.2 Groundwater Elevation Gauging

Water level elevation measurements were taken during the RI in 2004, and during the RDI at various times between 2008 and 2010. For each day of measurement, wells were gauged at both high and low tides (within 1 hour of the tidal phase). The measured static water levels are shown in **Table 2**.

Measured depths to groundwater generally ranged from 5 to 10 feet bgs near the canal and up to 30 feet bgs near the corner of 5th and Smith Streets. The static water table elevation within the fill layer ranges from El. 3 to El. 4 along the canal, to El. 12 on portions of Parcel I. On most of Parcel I and on portions of Parcels II and III, the observed static water table elevation in the fill was greater than the observed piezometric surface elevations in underlying glacial sand, indicating a mounded condition. Beneath the fill layer, potentiometric surface elevations within the Upper Glacial and Jameco Aquifers were observed at approximate El. 3 to El. 4. Observed factors that may contribute to mounding in this area include unpaved surfaces on Parcels I and III allowing more infiltration, the presence of marsh deposits serving as a semi-confining unit, and water retention in or around miscellaneous buried structures.

Plates 8 through **11** depict groundwater surface and potentiometric elevations as measured on April 28, 2010 and shallow zone (water table) contours for low and high tide, respectively. The shallow mound can be delineated approximately as the El. 5 contour, within which groundwater elevations are greater than the underlying and surrounding regional potentiometric elevations. Shallow groundwater contours indicate outward radial flow from the mound.

Intermediate zone groundwater flow was measured to be southerly toward the canal, as shown in **Plates 9** and **11**. Deep groundwater flow, where measured in the eastern portion of Parcel III (**Plates 10** and **11**), is south to southwesterly. The monitoring well network used in the RI provided a more comprehensive data set for evaluation of flow within the Jameco Aquifers and the deep zone of the Upper Glacial Aquifer (some intermediate and deep wells were abandoned after the RI). Contours from these zones can be found in **Plates 8** through **11**.

4.2.3 Tidal and Seasonal Fluctuation

A groundwater tidal response assessment, consisting of continuous measurements over a two day period, was performed in October 2004. Tidal fluctuations measured in the canal during the study were 4.5 to 6 feet. Tidal fluctuations measured in shallow zone wells within approximately 50 feet of the canal (GCMW-07S and CGMW-08S) ranged from 4 to 6 feet. Tidal fluctuations measured in shallow wells further from the canal, and in intermediate/deep zone wells, ranged from 0.1 to 0.9 feet. Measurements from the tidal assessment were presented in Figures 8 through 11 of the RI Report (**Appendix B**).

Perennial groundwater fluctuations were estimated based on elevations measured during the RI and RDI gauging events presented in **Table 2**. Fluctuations ranged up to approximately 1 foot in intermediate and deep wells, and up to 4 feet in shallow wells (not including tidal response). The April 28, 2010 measured elevations (shown in **Plates 8** through **11**) were near the high end of the recorded elevations. Contours for groundwater elevations measured in 2004 and 2005 can be found in the Plates 8 through 11 of the RI Report.

4.2.4 Effect of Buried Structures on Groundwater

The depth of the Bond-Lorraine Street sewer is at or below the observed water table. The groundwater table along the sewer ranges approximately from El. 4 to El. 8, and the top elevation of the sewer ranges from El. 4.2 to El. 5.6 (**Figure 6**). The potential for groundwater infiltration exists, based on both the relative position of the sewer below the water table, and visual indications of leakage from a video survey of the sewer. An inward pressure gradient across the wall of the sewer exists because the sewer does not normally flow full.

In 2004, NYCDEP conducted a video survey of the sewer interior. The 2004 video inspection was performed on two separate occasions at night, when sewage flow is expected to be lowest. Water was observed entering the pipe along the original brick sewer segment and the Parcel III segment repaired in 1939 (**Figure 6**). Stalactite deposits were also observed in these areas, suggesting infiltration is recurrent. Groundwater contours do not show conclusively that sewer infiltration affects shallow groundwater flow. The highest portions of the shallow groundwater mound, as defined by the El. 8 contour on **Plate 8**, are located upgradient (north and east) of the sewer. However, this trend may also be attributable to the convergence of shallow groundwater flow toward the canal.

Water level elevations measured in piezometer CGPZ-01S are considered to represent water retained in a buried holder structure and not the water table. Groundwater was observed at El. 23.6 (3 feet below the ground surface) at CGPZ-01S within Holder No. 3. The measured groundwater level within Holder No. 3 was at least 10 feet higher than measured in surrounding wells (El. 9.7 at CGPZ-2S and El. 12.78 at CGMW-14-ch1). This implies that water is potentially retained inside the structure.

4.2.5 Hydraulic Conductivity and Flow Gradients

Hydraulic conductivity was estimated using slug tests and a numerical groundwater model. Slug tests were performed in three monitoring wells as documented in the RI Report (**Appendix B**). Hydraulic conductivities calculated from the slug tests averaged 1.6 feet per day (ft/day) in the shallow zone (CGMW-02S), 1.1 ft/day in the intermediate zone (CGMW-03I), and 3.4 ft/day in the deep zone (CGMW-02D). Slug tests results are tabulated in Table 8 of the RI Report. Hydraulic conductivities based on the groundwater model are tabulated in **Appendix K**. Hydraulic conductivities used in the model range from 0.007 to 25 ft/day. A greater range was used in the model than measured in the slug tests to represent observed soil types in borings throughout the Site.

The average horizontal hydraulic gradient of the shallow, intermediate, and deep aquifer zones as documented in the RI Report ranged from 0.015 to 0.078, 0.001 to 0.003, and 0.0014 to 0.004 foot/foot, respectively. Gradients were observed to be generally consistent between the high and low tides. Vertical head potential has been observed to vary throughout the Site between negative (downward) and positive (upward) directions, except across the fill and glacial sand, where vertical head potential has been measured to be predominantly negative. Vertical head potentials are discussed in Section 3.2.3 of the RI Report (**Appendix B**).

4.3 Summary of the Nature and Extent of Environmental Impacts

The RI assessed the nature and extent of environmental impacts with the exception of off-site contaminant delineation in some locations due to access concerns and beneath the former warehouse on Parcel III. For a more detailed discussion of the preliminary nature and extent please refer to the RI Report located in **Appendix B**. Following the RI, the RDI further assessed the nature and extent of environmental impacts at the Site (including the Parcel III warehouse), as described below.

The environmental impacts are known only at the exploration locations. The environmental impacts between exploration locations may differ from what is described below and/or depicted in the subsurface profiles. Vertical and lateral extents of environmental impacts detailed in plates and figures are interpretations from the data and are not necessarily representative of actual conditions.

Cross sections of site geology and visual impacts from the RI were updated using additional data collected in the RDI and are presented in **Plates 3** and **4**. The lateral extent of visual impacts in the shallow, intermediate, and deep soil zones were also modified with the RDI data and are provided in **Plates 5** through **7**, respectively. The vertical extent of tar migration on Parcels I, II, and III is defined based on data from the RI and the RDI. The deepest observed extent of tar-related impacts was at CGSB-46, at approximate El. -138 to El. -139 (153 feet below the ground surface).

In the unsaturated soil (approximate El. 30 to El. -2) the extent of separate-phase tar is limited to the area adjacent to Holder No. 2 on Parcel I. In shallow zone soil (approximate El. 16 to El. -15) tar-saturated soil was observed at Holders Nos. 1, 2, and 3 on Parcel I, at the northwest corner of Parcel II, in the vicinity of the historical wet tar tanks and tar heaters near the center of Parcel III, and in the northeast corner of Parcel III. The lateral extent of residual tar (blebs, lenses, grain coatings) in the shallow zone covers the north-central and southwest portions of Parcel I, the southeastern portion of Parcel II adjacent to the bulkhead, and two areas in the eastern half of Parcel III (**Plate 5**). Residual tar in the shallow zone was also present in discrete borings on Parcels I through IV (located at the corner of 5th and Hoyt Streets, and not part of this remedial program).

In the intermediate zone soils (approximate El. -15 to El. -90), zones of tar saturation are present throughout the northeastern portion of Parcel I, nearly all of Parcel II, and the southeastern portion of Parcel III (**Plate 6)**.

The only tar impacts observed in the deep soil zone (approximate El. -90 to El. -135) were at the eastern property line of Parcel I. However, two borings in the southeast portion of Parcel III (CGSB-67 and CGSB-121) had observed tar impacts extending to the deep zone elevation (**Plate 7**). The RDI identified tar-saturated soil at depths above the design dredge line elevation of the Gowanus Canal (at El. -11) adjacent to the canal in the northeast corner of Parcel III, as shown on Cross Section E-E' in **Plate 3** and **Plate 6**.

The lateral extent of tar migration has been identified on the western side of Parcels I and III (Smith Street); along the north side of Parcel II; along the northwest, northeast, and southeast sides of Parcel IV; and along the northern side of Parcel I (5th Street) except for a finger of tar that appears to have migrated to the southern corner of 38 4th Street (Parcel IV). Interbedded tar was also identified to the east-northeast of Parcel II, beneath Bond Street. The extent of interbedded tar to residual tar from the southeastern corner of Parcel III, beneath Huntington

Street, has not been defined due to the lack of private property access. The eastern and southeastern extent of tar migration from Parcels II and III and the interconnection, if any, between the tar located on Parcels II and III and properties across the Canal has not been established.

Off-site tar migration from the Site has been classified as Operable Unit II. This classification makes a distinction from the extent of tar at the Site (Operable Unit I or Parcels I through III). Operable Unit II is under ongoing investigation in accordance with the SRI Work Plan Addendum, Former Citizens MGP Site and Revised Monitoring Well Installation Work Plan, Gowanus Canal Superfund Site. Initial results from the SRI investigation have been summarized in the SRI Interim Data Summary, submitted to the NYSDEC on December 23, 2009.

During the RI, measurable DNAPL was observed in some monitoring wells (2-inch inside diameter) on Parcels I, II, and III ranging in thickness from approximately 3.5 to 37.3 feet. During the RI, DNAPL was extracted from six monitoring wells. The DNAPL recovery rate was measured. A more detailed discussion and summary is available in the 2005 RI Report in **Appendix B**. Based on these data and additional RDI data, 13 recovery wells were installed across the Site. These wells were constructed of 6-inch-diameter stainless steel and screened in zones noted to have saturated tar. As part of the RDI, a DNAPL Recovery Pilot Test was performed in 2010 on the 13 recovery wells; and subsequently on 5 monitoring wells installed on Parcel III where measurable DNAPL was observed (CGMW-34S, CGMW-40D, CGMW-41I, CGMW-42I, and CGMW-43D). Measurable DNAPL was observed in the recovery wells (6 inch inside diameter) ranging in thickness from approximately 3.8 to 31.9 feet and in the monitoring wells (2 inch inside diameter) ranging in thickness from approximately 5.2 to 13 feet. Additional detail on the recovery well construction and the pilot test results are summarized and discussed further in the DNAPL Recovery Pilot Test Report (March 28, 2011) in **Appendix Q**.

The potentially recoverable tar appears to be perched on low-permeability lenses within the glacial deposits. Residual and potentially recoverable tar on Parcel I is present just below the alluvial and marsh deposits in the intermediate soil zone (approximate El. -15 to El. -35), as shown in Cross Section L-L’ (**Plate 4**). Tar in areas along the bulkhead in Parcel II has migrated deeper into the intermediate soil zone to as low as approximate El. -60, as is depicted in Cross Section E-E’ (**Plate 3**) and Cross Section L-L’ (**Plate 4**). Cross Sections E-E’ (**Plate 3**), J-J’ and K-K’ (**Plate 4**) show the tar on Parcel III has also migrated deeper within the intermediate soil zone, to approximate El. -91.

DNAPL samples collected from the areas of Huntington Street and Parcel III were found to have higher viscosity, higher ignitability temperature, and lower BTEX content than tar observed on Parcels I and II.

The RI included analytical testing of soil (surface and subsurface), groundwater, and soil vapor for contaminants of concern. The RDI activities on Parcel III included analytical testing of soil (surface and subsurface) and groundwater. Summary tables of primary contaminants of concern (total BTEX, total carcinogenic PAHs, and total non-carcinogenic PAHs) at each boring location are provided in **Plates 5** through **7**. The areal distribution of detected site contaminants was consistent with observed contamination as described above. For a detailed discussion of the RI analytical results, please refer to Section 4 of the RI report in **Appendix B**. Details of the Parcel III RDI well logs are provided in **Appendix O**. Soil and groundwater analytical results from RDI activities are summarized in the tables provided in **Appendix T**.

5. Groundwater Model

A numerical model for the Site was developed based on a conceptual flow model and calibrated to match observed static water levels. Remedial components that would prevent potential NAPL discharge to the Canal were added to the numerical model and post-remedial groundwater levels were calculated.

Conceptual NAPL barrier systems modeled included a number of configurations ranging from: sheet pile barrier along the Gowanus Canal to sheet pile barrier around the entire site (full containment). The selected configuration was a 50-foot-deep barrier along the Canal with a wing wall along Huntington Street.

The conceptual model was developed using investigation observations and regional geologic information. The aquifer modeled consists of a shallow (water table) and intermediate/deep groundwater system which are separated over most of the former MGP parcels by a semi-confining silt/peat/clay unit. Shallow groundwater flow on site is primarily affected by precipitation and discharges mainly to the Canal. Buried structures appear to influence the shallow system. Intermediate/deep groundwater flow is influenced mainly by regional groundwater flow off Long Island.

The model was calibrated to observed water levels. The NAPL barriers were then applied to the model, and resulting predicted water level elevations and gradients were evaluated. The proposed system is not predicted to adversely affect groundwater flow in the Upper Glacial Aquifer. However, with the NAPL barrier present, the water table on Parcels I and III is predicted to rise above elevation tolerances specified in the proposed post-remediation site grading plan. With an impermeable cap (or equivalent structures or impervious surfaces) over Parcels I, II, and III, the water table at the Site is predicted to be lower, and within acceptable tolerances for post-remediation development.

No significant changes to groundwater flow were predicted for the NAPL barrier/caps modeled. Therefore, no adverse effects on dissolved contaminant or NAPL migration are expected as a result. The post-remedial water table at the Site is predicted to be at a lower elevation than it is presently, and gradients that could influence shallow NAPL mobility or dissolved contamination are expected to decrease from current conditions. With a low-permeability cap present, shallow groundwater at the Site is predicted to become stagnant, and therefore have little to no effect on contaminant or NAPL migration. No numerical modeling of dissolved contaminant flow or NAPL mobility was considered to be necessary. The groundwater model report is presented in **Appendix K.**

6. Noise and Vibration Analysis

6.1 Recent Investigations

Wilson, Ihrig & Associates, Inc., of New York, New York performed a noise and vibration study at the Site in November 2008. The full report is included as **Appendix L**.

6.1.1 Airborne Noise

The report details that while the Site experiences a relatively high level of environmental noise, it is still very likely that the remediation work will generate noise impacts in excess of NYSDEC and New York City Environmental Quality Reviews (NYCEQR) thresholds. Specific activities that could cause elevated noise levels and potential methods of mitigation are detailed in the report.

6.1.2 Groundborne Vibration

The report discusses which nearby structures could be potentially damaged by construction activities. The specific actions and potential remedies are detailed, as are the recommendations for vibration monitoring. Limits on peak particle velocity for certain types of structures are also contained in this section of the noise and vibration analysis.

7. Geotechnical Laboratory Testing

7.1 Previous Investigations

Limited laboratory test data is available from previous investigations. A summary of index properties from investigations performed by others is provided in **Table 3**, and test results are contained in **Appendix M**.

7.2 Recent Investigation

Earth Remediation Services of Cheshire, Connecticut and TerraSense, LLC of Totowa, New Jersey performed laboratory tests on selected samples from the borings performed as a part of the RI and RDI. The purpose of the laboratory testing was to evaluate index properties for classification purposes, and evaluate the visual descriptions of soils classified in the field.

Soil samples were tested for gradation, moisture content, and organic content. Soil gradation tests were performed in general accordance with ASTM D422, moisture contents were determined in general accordance with ASTM D2216, and organic content was determined in general accordance with ASTM D1140. Laboratory index test results are summarized in **Table 3**, and test results are contained in **Appendix N**.

8. Remedial Design Analysis

As part of the remedial design, analyses were performed for the barrier wall, relocated Bond-Lorraine Street Sewer foundation, NAPL recovery, groundwater relief drain, hydraulic liner, and storm water drainage design components. This section provides a brief overview of these analyses. More detailed explanations and calculations are included in **Appendices P**, **Q**, **R**, and **S**.

8.1 Barrier Wall Analysis

A barrier wall constructed of sealed, interlocking sheet piles will be constructed from El. 10 to El. -40. GEI performed preliminary design analyses for the proposed sheet pile barrier walls supported by one level of either deadman anchors or drilled tieback anchors. Deadman anchors are proposed for most of the barrier wall and drilled tieback anchors are proposed for the north end of the barrier wall where the anchors must be installed below the Bond-Lorraine Street Sewer. The anchorage supports will be located at approximately El. 4 and will be tied into the wall system with wales installed behind the sheet piles. The final barrier wall configuration and design are subject to pilot test results, which will commence in late 2011. Preliminary analysis of the wall design is included in **Appendix P**.

8.2 Relocated Bond-Lorraine Street Sewer Foundation Analysis

Relocation of the Bond-Lorraine Street Sewer is required for construction of the anchors that support the proposed sheet pile barrier wall. For most of the relocated sewer section, the sewer can be supported on timber pile foundations meeting standard NYCDEP design specifications. At the north end of the relocated sewer, where drilled tieback anchors must be installed below the sewer, a customized pile foundation design is required to accommodate the anchor installation. For this section, the proposed pile foundation consists of steel pipe piles spaced at 8 feet along the sewer to match the proposed anchor spacing. Preliminary analysis of the sewer foundation design is included in **Appendix P**.

8.3 DNAPL Recovery Pilot Test and Recovery Data

A DNAPL recovery pilot test program assessed DNAPL recovery rates, evaluated the location of productive recovery zones, and DNAPL recovery methods and equipment. The pilot test concluded that recoverable tar exists at all three parcels. The pilot test report dated March 28, 2011, is included in **Appendix Q**.

An Interim DNAPL Recovery and Monitoring Program was initiated in December 2010. Monthly reports documenting the recovery and monitoring activities are also included in **Appendix Q**.

8.4 Groundwater Relief Drain Analysis

As discussed in Section 5 Groundwater Model, an impervious hydraulic liner or cap is necessary to prevent groundwater from potentially mounding behind the barrier wall. The groundwater model predicts that groundwater elevations will become stagnant and remain near their present levels after the installation of the barrier wall and impervious hydraulic liner. However, a groundwater relief drain will be installed as a precautionary measure along the bulkhead to allow for removal and treatment of groundwater should it rise to an elevation that may affect the liner. The groundwater relief drain will consist of a perforated pipe that is aligned parallel to the bulkhead. The drain will connect to a series of vaults from which groundwater can be removed and processed at an onsite treatment facility. Drain drawdown distance and flow rate estimates are included in **Appendix R**.

8.5 Impervious Hydraulic Liner and Storm Water Drainage Analysis

On-site precipitation will not infiltrate below 2 feet bgs because of the impervious hydraulic liner. Additionally, the Site may not be immediately developed after the remediation and may remain vacant for a period of time before redevelopment. Control and treatment of storm water runoff conforming to state, city, and general best management practice standards will be required during this time.

Precipitation that infiltrates the top 2 feet of fill will be conveyed on top of the liner via gravity through an interstitial space created by a geonet to a perforated drainage pipe. The drainage pipes will be linked to outfalls which discharge into the Gowanus Canal. Drainage spacing and geonet analyses are included in **Appendix S**.

Runoff in upland areas of the Site will be conveyed over dense grasses via sheet flow to a series of shallow, grassed swales which discharge into the canal. Near the canal, runoff will be treated through a filter strip and discharged to the canal. A detailed analysis of these processes is included in **Appendix S**.

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Appendices (Electronic only)

Appendix A: Historical Manufactured Gas Plant Drawings and Photos
Historical Drawings, Source: National Grid
Historical Photos, Source: National Grid
Sanborn Fire Insurance Maps, Source: National Grid

Appendix B: Final Remedial Investigation Report

Appendix C: Bulkhead Drawings and Photos
Historical Bulkhead Drawings, Source: National Grid
Historical Bulkhead Photos, Source: National Grid
2005 Bulkhead Video
2009 Bulkhead Photos and Video
Outfall Summary Table

Appendix D: Bond-Lorraine Street Sewer Drawings and Photos*
Historical Drawings, Sources: National Grid & NYCDEP
Historical Photos, Source: National Grid
1939 Sewer Replacement Survey Notes, Source: National Grid
Recent Drawings, Source: NYCDEP
Sewer Cleaning and TV Inspection Report, Source: Gannett Fleming

Appendix E: Gas Tunnel Article and Drawings
Stiles,1926*. Pipe Tunnel Under Gowanus Canal*, ASCE
Historical Drawings, Source: National Grid

Appendix F: Gowanus Canal Remote Sensing Survey
Remote Sensing Survey for Utility Crossings, Source: Ocean Surveys, Inc.

Appendix G: Metropolitan Transit Authority New York City Transit - Culver Line Viaduct
Culver Lane Viaduct Drawings, Source: MTA NYCT
Review of F Line Operations, Ridership, & Infrastructure, Source: MTA NYCT

Appendix H: Historical Exploration Logs
Boring and Monitoring Well Logs, Source: Roux Associates, Inc.
Gowanus Canal Boring Logs, Source: USACE
Test Pit Logs, Source: Metcalf and Eddy/AECOM

Appendix I: Exploration Logs

Visual Manual Description Standards, Visual Impact Key, Soil Strata Key
Remedial Investigation Exploration Logs
Supplemental Remedial Investigation Exploration Logs
Gowanus Canal Remedial Investigation Sediment Core Logs
Remedial Design Investigation Exploration Logs

Appendix J: Cone Penetrometer Data

Field Report, Source: Conetec
CPT Tabular Excel Data, Source: Conetec

Appendix K: Groundwater Model Report

Appendix L: Noise and Vibration Study

Appendix M: Historical Geotechnical Laboratory Testing Data

Grain Size Distribution Analysis, Source: Roux Associates, Inc.

Appendix N: Geotechnical Laboratory Testing Data

Grain Size Distribution Analysis
Moisture and Organics Content Analysis
Atterberg Limits and Moisture Content Analyses

Appendix O: Parcel III Remedial Design Investigation

Monitoring Well Construction Logs
Monitoring Well Development Logs
Groundwater Sampling Logs
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Table 2. Subsurface Soil Analytical Results
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Appendix P: Barrier Wall and Relocated Sewer Design Analyses

Appendix Q: DNAPL Recovery Pilot Test Report

Appendix R: Relief Drain Analysis

Appendix S: Hydraulic Liner and Storm water Design Analysis

Appendix T: Soil and Groundwater Analytical Summary

Tables

Table 1
Subsurface Exploration Data Inventory
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

Exploration ID	Type[1]	Location[2]	Northing[3], feet	Easting[3], feet	Surface Elevation[4], feet	Depth[5], feet	Termination Elevation[4], feet	Date Installed
Remedial Investigation								
CGSB-01	Sonic	C2	671942.30	631827.60	27.87	58	-30.1	03/13/2003
CGSB-02	Sonic	C5	671924.80	631935.20	27.69	109	-81.3	03/13/2003
CGSB-03	Sonic	D7	671861.50	632021.50	26.79	29	-2.2	03/15/2003
CGSB-04	Sonic	E8	671800.90	632016.30	27.93	109	-81.1	03/15/2003
CGSB-05	Sonic	E4	671836.60	631879.70	29.93	79	-49.1	03/16/2003
CGSB-06	Sonic	F1&F2	671852.40	631767.60	26.8	49	-22.2	03/17/2003
CGSB-07	Sonic	J4	671676.90	631808.50	19.53	39	-19.5	03/17/2003
CGSB-08	Sonic	G16	671606.00	632309.10	11.5	79	-67.5	03/08/2003
CGSB-09/CGMW-01D	Sonic	B1	672027.70	631798.60	29.59	157	-127.4	05/12/2003
CGSB-10	Sonic	D11	671806.90	632139.90	18.01	98	-80.0	08/24/2003
CGSB-11/CGMW02D	Sonic	F11	671726.40	632141.70	13.56	150	-136.4	03/25/2003
CGSB-12/CGMW-07D	Sonic	H16	671588.80	632273.60	11.01	138	-127.0	05/03/2003
CGSB-13/CGMW-03D	Sonic	J7	671619.80	631935.70	15.93	149	-133.1	03/28/2003
CGSB-14	Sonic	C23	671661.50	632598.40	9	67	-58.0	03/29/2003
CGSB-15	Sonic	C16	671751.90	632361.60	10.92	77	-66.1	03/29/2003
CGSB-16/CGMW-04D	Sonic	B18	671753.80	632447.70	9.87	137	-127.1	03/31/2003
CGSB-17	Sonic	B14	671850.40	632291.90	14.48	68	-53.5	04/01/2003
CGSB-18	Sonic	Parcel IV	671945.50	632209.60	21.42	67	-45.6	04/01/2003
CGSB-19/CGMW-05I	Sonic	Parcel IV	672051.80	632216.50	26.4	77	-50.6	04/02/2003
CGSB-20	Sonic	H2	671761.00	631744.70	22.72	48	-25.3	04/07/2003
CGSB-21/CGMW-10	Sonic	K10	671568.70	632018.50	12.45	48	-35.6	05/16/2003
CGSB-22	Sonic	C21	671698.40	632558.60	9	108	-99.0	04/12/2003
CGSB-23	Sonic	E18	671683.70	632387.90	11	78	-67.0	04/13/2003
CGSB-24	Sonic	M11	671472.40	632019.60	10.41	106	-95.6	04/28/2003
CGSB-25	Sonic	L13	671468.60	632106.10	10.4	98	-87.6	04/29/2003
CGSB-26/CGMW06D	Sonic	T8	671211.40	631830.10	10.54	140	-129.5	05/01/2003
CGSB-27	Sonic	N11	671412.00	632012.30	10.06	78	-67.9	05/02/2003
CGSB-28/CGMW-08D	Sonic	R11	671269.00	631968.50	9.55	138	-128.5	05/14/2003
CGSB-29/CGMW-09	Sonic	K12	671513.20	632078.20	11.28	20	-8.7	05/16/2003
CGSB-30/CGMW-15	Sonic	S1	671371.70	631553.40	17.31	148	-130.7	01/10/2005
CGSB-31	Sonic	Smith Street	671545.50	631569.80	19.4	48	-28.6	12/22/2004
CGSB-32/CGMW-17	Sonic	9th Street	671710.80	631626.90	22.51	138	-115.5	01/28/2005
CGSB-33	Sonic	Smith Street	671924.20	631699.80	28.65	48	-19.4	01/04/2005
CGSB-36/CGMW-13	Sonic	B4	671976.10	631929.00	28.18	108	-79.8	01/03/2005
CGSB-37/CGMW-14	Sonic	C9	671854.20	632109.70	18.98	146.5	-127.5	01/05/2005
CGSB-39/CGMW-18	Sonic	Hoyt Street	671912.00	632393.30	14.33	78	-63.7	02/03/2005
CGSB-40	Sonic	Parcel IV	671934.70	632267.60	23.58	59	-35.4	12/13/2004
CGSB-41	Sonic	Parcel IV	671980.60	632187.80	18.86	58	-39.1	12/08/2004
CGSB-42	Sonic	4th Street	671956.90	632462.70	16.35	58	-41.7	12/17/2004
CGSB-43/CGMW-12	Sonic	4th Street	671816.80	632686.40	9.39	108	-98.6	12/16/2004
CGSB-44/CGMW-11	Sonic	Bond Street	671670.30	632889.70	5.86	108	-102.1	12/14/2004
CGSB-45	Sonic	G14	671650.50	632224.60	12.06	158	-145.9	01/08/2005
CGSB-46	Sonic	G11	671665.90	632122.00	13.98	182	-168.0	12/21/2004
CGSB-47	Sonic	E8	671785.30	632020.90	27.74	169	-141.3	12/18/2004
CGSB-48/CGMW-16	Sonic	2nd Avenue	671286.90	632501.50	6.64	164	-157.4	01/24/2005
CGSB-49/CGMW-19	Sonic	2nd Avenue	670895.90	632365.50	8.5	128	-119.5	02/07/2005
CGSB-52/CGMW-22	Sonic	9th Street	671002.20	631973.30	6.05	108	-102.0	03/30/2005
CGSB-53/CGMW-23	Geoprobe	Nelson Street	671647.69	631427.72	24.44	36	-11.6	06/07/2006
CGSB-54	Geoprobe	Luquer Street	671886.89	631458.94	31.59	25	6.6	06/08/2006
CGSB-54/CGMW-24	Mud Rotary	Luquer Street	671869.87	631493.73	33.12	41	-7.9	10/14/2010
CGSB-54B	Geoprobe	Luquer Street (near Court Street)	671934.29	631327.62	35.31	15	20.3	06/20/2006

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Subsurface Exploration Data Inventory
Data Report
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Exploration ID	Type[1]	Location[2]	Northing[3], feet	Easting[3], feet	Surface Elevation[4], feet	Depth[5], feet	Termination Elevation[4], feet	Date Installed
CGSB-55	Geoprobe	4th Street	672154.31	631522.36	39.53	16.5	23.0	06/09/2006
CGSB-55/CGMW-25[6]	Sonic	4th Place	672157.11	631611.65	43.09	34	9.1	07/01/2010
CGSB-55B	Geoprobe	4th Street	672154.31	631522.36	39.53	20	19.5	06/15/2006
CGSB-56/CGMW-26	Geoprobe	Hoyt Street	672056.77	632429.38	21.19	31	-9.8	06/05/2006
CGSB-57/CGMW-27	Geoprobe	4th Street	671910.42	632584.24	12.55	45	-32.5	06/21/2006
CGSB-58	Sonic	Bond Street	671758.69	632970.08	7.31	69	-61.7	05/20/2006
CGSB-59/CGMW-29	Geoprobe	7th Street and 2nd Avenue	670748.59	632988.54	8.93	45	-36.1	06/09/2006
CGSB-60/CGMW-32	Geoprobe	9th Street	670721.93	632059.30	5.24	49	-43.8	06/06/2006
CGSB-94OU2	PROPOSED							
CGSB-95/CGMW-40	Geoprobe	2nd Avenue and 6th Street	670998.57	633098.00	7.59	62	-54.41	02/12/2010
CGSB-96	Geoprobe	2nd Avenue and 6th Street	671218.19	633239.91	6.97	62	-55.03	02/16/2010
CGSB-97	Geoprobe	3rd Street and Bond Street	671950.51	632974.67	11.99	46	-34.01	02/18/2010
CGSB-98	Geoprobe	3rd Street and Bond Street	671788.35	633314.37	7.41	46	-38.59	02/17/2010
CGSB-99/99A	Sonic	Gowanus Canal	671426	632180	-16	105	-121.0	7/29/2010
CGSB-100	Sonic	Gowanus Canal	671210	631965	-11.5	65	-76.5	7/30/2010
CGGP-01/CGSV-01	Geoprobe	O3	671500.60	631693.80	14.89	11	3.9	04/15/2003
CGGP-02/CGSV-02	Geoprobe	R6	671321.20	631774.50	14.89	20	-5.1	04/15/2003
CGGP-03/CGSV-03	Geoprobe	O8	671414.60	631879.00	14.59	2.5	12.1	04/15/2003
CGGP-04/CGSV-04	Geoprobe	L9	671522.60	631953.60	14.89	20	-5.1	04/15/2003
CGGP-05/CGSV-05	Geoprobe	M6	671414.60	631879.00	14.89	20	-5.1	04/15/2003
CGGP-06/CGSV-06	Geoprobe	M8	671521.30	631904.60	14.89	14.9	0.0	04/15/2003
CGTP-01A	Test Pit	B1	672000.30	631817.61	29	6	23.0	03/11/2003
CGTP-01B	Test Pit	B1	672015.83	631813.63	29	8.5	20.5	03/11/2003
CGTP-02	Test Pit	D3	671888.84	631835.11	28	6.5	21.5	03/11/2003
CGTP-03A	Test Pit	D5	671889.42	631928.74	28.5	4	24.5	03/11/2003
CGTP-03B	Test Pit	D5	671869.21	631926.14	28.5	6	22.5	03/11/2003
CGTP-04	Test Pit	E8	671816.04	632024.35	27.5	6	21.5	03/12/2003
CGTP-05	Test Pit	E9	671790.12	632044.47	25	7	18.0	03/12/2003
CGTP-06	Test Pit	E11	671774.79	632141.29	17	6	11.0	03/12/2003
CGTP-07	Test Pit	G11	671678.07	632128.44	13.5	3	10.5	03/12/2003
CGTP-08	Test Pit	E6-F6	671816.39	631929.35	29	3	26.0	03/12/2003
CGTP-09	Test Pit	F4	671809.12	631849.39	28.5	7	21.5	03/12/2003
CGTP-10	Test Pit	H1	671789.70	631736.93	23.5	4.5	19.0	03/13/2003
CGTP-11	Test Pit	I2	671742.66	631749.62	23	3.5	19.5	03/13/2003
CGTP-12	Test Pit	J6	671627.18	631874.06	19	2	17.0	03/13/2003
CGTP-13	Test Pit	K9	671572.94	632000.92	12.5	3	9.5	03/13/2003
CGTP-14	Test Pit	L11	671509.62	632030.75	11	3	8.0	03/13/2003
CGTP-15	Test Pit	M12	671456.26	632064.34	10	6	4.0	03/14/2003
CGTP-16	Test Pit	E15	671704.32	632274.98	11.5	4.5	7.0	03/16/2003
CGTP-17	Test Pit	H14	671609.49	632231.26	12	6	6.0	03/16/2003
Remedial Investigation - Surface Samples [7]								
CGSS-04	Surface Sample	F11	671730.1	632125.7	18.5	-	-	5/12 & 7/10/2003
CGSS-05	Surface Sample	D9	671832.8	632097.0	21	-	-	5/12 & 7/10/2003
CGSS-06	Surface Sample	C6	671903.7	631988.7	27	-	-	5/12 & 7/10/2003
CGSS-07	Surface Sample	E4	671868.7	631888.1	29.5	-	-	5/12 & 7/10/2003
CGSS-08	Surface Sample	B5	671995.1	631950.3	27.5	-	-	5/12 & 7/10/2003
CGSS-09	Surface Sample	A1	672033.0	631820.1	30	-	-	5/12 & 7/10/2003
CGSS-10	Surface Sample	G4	671782.7	631868.1	29	-	-	5/12 & 7/10/2003
CGSS-11	Surface Sample	R11	671263.4	631965.4	10	-	-	5/14/2003
CGSS-12	Surface Sample	J12	671591.4	632067.2	16	-	-	6/3/2003
CGSS-13	Surface Sample	H8	671684.1	631991.1	21	-	-	6/3 & 7/10/2003
CGSS-14	Surface Sample	I6	671683.2	631917.3	22.5	-	-	6/3 & 7/10/2003

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Data Report
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Exploration ID	Type[1]	Location[2]	Northing[3], feet	Easting[3], feet	Surface Elevation[4], feet	Depth[5], feet	Termination Elevation[4], feet	Date Installed
			Remedial Design Investigation Explorations					
CGSB-81/CGPZ-1I	HSA	C7	671867.20	632019.10	27.36	52.5	-25.1	11/02/2007
CGPZ-1S	HSA	C7	671871.20	632013.80	27.58	20	7.6	11/05/2007
CGSB-82/CGPZ-2I	HSA	E7	671825.30	631981.80	28.2	52.5	-24.3	11/06/2007
CGPZ-2S	HSA	E7	671829.30	631976.50	28.2	32	-3.8	11/07/2007
CGSB-83/CGPZ-3	HSA	F6	671796.20	631944.40	29.56	37	-7.4	11/07/2007
CGSB-84/CGPZ-4	HSA	H3	671761.10	631778.50	22.04	27.5	-5.5	11/08/2007
CGSB-101	HSA	C2	671952.70	631810.30	27.62	13.3	14.3	11/17/2008
CGSB-102	HSA	C5	671906.70	631939.90	27.34	26.2	1.1	11/18/2008
CGSB-103	HSA	D8	671841.60	632033.30	26.96	31	-4.0	11/19/2008
CGSB-104	HSA	D11	671790.20	632143.30	17.86	13	4.9	10/24/2008
CGSB-105	HSA	H11	671658.90	632114.00	19.5	27	-7.5	10/16/2008
CGSB-107	HSA	G1	671817.10	631719.90	24.5	41	-16.5	12/08/2008
CGSB-108	HSA	E1	671892.20	631743.30	28.25	41	-12.8	12/05/2008
CGSB-109	HSA	A1	672035.60	631803.50	29.5	42	-12.5	12/04/2008
CGSB-110	HSA	B4	671975.90	631900.50	28.77	41	-12.2	12/03/2008
CGSB-111/CGPZ-05	HSA	B5&B6	671943.70	631972.10	26.28	51	-24.7	11/24/2008
CGSB-112	HSA	C7	671888.50	632026.90	26.53	51	-24.5	11/21/2008
CGSB-113	HSA	C10	671845.70	632123.20	18.14	42	-23.9	10/21/2008
CGSB-114	HSA	D12	671798.00	632178.90	16.12	42	-25.9	10/21/2008
CGSB-115	HSA	C1	671966.20	631769.60	29.75	14	15.8	12/05/2008
CGSB-116/CGCPT-116	HSA/CPT	Q11	671318.10	631983.90	9.8	88	-78.2	11/10/2008
CGSB-117	HSA/Mud Rotary	E8	671792.50	632020.40	26.94	87	-60.1	10/23/2008
CGSB-119	HSA/Mud Rotary	E11	671757.00	632157.90	13.44	70	-56.6	10/20/2008
CGSB-120/CGCPT-120	HSA/CPT	S10	671232.50	631922.90	9.76	100	-90.2	10/31/2008
CGSB-121	HSA/Mud Rotary	Q11	671322.80	631987.00	9.78	101	-91.2	11/06/2008
CGSB-122	HSA/Mud Rotary	N12	671415.00	632048.30	9.64	100.3	-90.7	11/11/2008
CGSB-123/CGCPT-123	HSA/CPT	K13&L13	671490.90	632116.10	10.94	84	-73.1	11/13/2008
CGSB-124	HSA	I14	671551.30	632195.80	13.65	26	-12.4	12/12/2008
CGSB-125	HSA/Mud Rotary	R11	671279.30	631955.30	9.76	62	-52.2	11/04/2008
CGSB-126	HSA/Mud Rotary	H15	671584.50	632265.70	11.5	91	-79.5	12/10/2008
CGSB-127	HSA/Mud Rotary	F17	671622.90	632355.40	10.42	102	-91.6	12/17/2008
CGSB-128	HSA/Mud Rotary	E19	671649.00	632420.10	9.21	59	-49.8	01/23/2009
CGSB-129	HSA/Mud Rotary	D21	671647.60	632528.80	7.8	66	-58.2	12/13/2008
CGSB-130/CGCPT-130	HSA/CPT	D23	671651.30	632611.30	7.15	100	-92.9	12/23/2008
CGSB-131/CGCPT-131	HSA/CPT	G17&F17	671620.00	632346.70	10.56	68	-57.4	12/15/2008
CGSB-132	HSA/Mud Rotary	C22	671707.30	632568.50	7.35	101	-93.7	01/11/2009
CGSB-133/CGCPT-133	HSA/CPT	B19	671744.60	632493.10	11.21	71	-59.8	12/22/2008
CGSB-134	HSA/Mud Rotary	B16	671794.90	632352.00	11.26	101	-89.7	01/25/2009
CGSB-135	HSA	J1	671695.30	631674.40	23.75	21	2.8	11/26/2008
CGSB-136	HSA	G7	671727.50	631964.60	24.58	42	-17.4	10/29/2008
CGSB-137	HSA	H5	671709.20	631873.20	24.52	40	-15.5	11/14/2008
CGSB-138	HSA	K10	671533.30	631999.20	11.16	23	-11.8	10/31/2008
CGSB-139/CGPZ-06	HSA	K11	671521.50	632063.50	11.6	23	-11.4	11/03/2008
CGSB-140	HSA	H13	671607.70	632176.60	12.73	25	-12.3	12/18/2008
CGSB-141	HSA	I14	671575.70	632203.60	13.5	13.5	0.0	12/18/2008
CGSB-142	HSA/Mud Rotary	F11	671707.60	632136.70	19.28	79	-59.7	10/28/2008
CGP4SB-01	HSA	Parcel IV	671889.37	632325.90	15	30	-15.0	06/03/2008
CGP4SB-02	HSA	Parcel IV	671825.91	632293.16	13.5	30	-16.5	05/30/2008
CGP4SB-03	HSA	Parcel IV	671853.57	632249.95	16	37	-21.0	06/02/2008
CGP4SB-04	HSA	Parcel IV	671899.43	632170.45	19.5	40	-20.5	05/30/2008
CGP4SB-05	HSA	Parcel IV	671932.74	632142.07	22.25	50	-27.8	06/03/2008

Table 1
Subsurface Exploration Data Inventory
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

Exploration ID	Type[1]	Location[2]	Northing[3], feet	Easting[3], feet	Surface Elevation[4], feet	Depth[5], feet	Termination Elevation[4], feet	Date Installed
CGP4SB-47	HSA	Parcel IV	671967.64	632170.82	23.5	17	6.5	06/03/2008
CGP4SB-48	HSA	Parcel IV	671993.81	632250.74	21.5	15.5	6.0	06/03/2008
CGTP-101	Test Pit	H3	671741.47	631812.84	24.5	5	19.5	11/20/2008
CGTP-102	Test Pit	R11	671271.07	631960.18	9.4	8	1.4	11/18/2008
CGTP-103A	Test Pit	O12	671398.56	632040.57	9.9	8	1.9	11/13/2008
CGTP-103B	Test Pit	O11	671392.43	632007.17	10.2	5.5	4.7	11/17/2008
CGTP-104A	Test Pit	M12	671438.97	632072.36	10.1	12	-1.9	11/13/2008
CGTP-104B	Test Pit	M12	671450.82	632058.42	10.5	13	-2.5	11/14/2008
CGTP-105	Test Pit	K13	671506.27	632135.24	10.5	13	-2.5	11/12/2008
CGTP-107	Test Pit	D22	671657.60	632583.98	8	10.5	-2.5	02/21/2009
CGTP-108	Test Pit	C4	671935.41	631890.09	27.5	12	15.5	11/19/2008
National Grid Gowanus Canal Remedial Investigation								
GC-SED-34B	Vibracore	C29	671590.30	632841.90	-7.67	6.8	-14.5	01/13/2006
GC-SED-35	Vibracore	D29	671562.40	632818.30	-11	18.3	-29.3	01/13/2006
GC-SED-36	Vibracore	E29	671539.00	632798.60	-8.36	20	-28.4	01/16/2006
GC-SED-37B	Vibracore	D23	671625.50	632606.30	-9.22	8	-17.2	12/22/2005
GC-SED-38	Vibracore	E23	671596.50	632599.60	-10.1	6.1	-16.2	12/22/2005
GC-SED-39	Vibracore	F24	671566.90	632604.40	-11.74	13.7	-25.4	01/08/2006
GC-SED-40	Vibracore	F19	671614.70	632417.30	-8.4	7.6	-16.0	01/17/2006
GC-SED-41	Vibracore	G21	671588.50	632427.70	-14.55	9	-23.6	01/17/2006
GC-SED-42B	Vibracore	G20	671558.00	632442.70	-12.68	7.5	-20.2	01/05/2006
GC-SED-43	Vibracore	H17	671572.50	632327.20	-13.94	10.4	-24.3	01/23/2006
GC-SED-44	Vibracore	H18	671549.50	632342.40	-16.02	13.9	-29.9	01/23/2006
GC-SED-45C	Vibracore	I18	671521.10	632360.80	-15.5	6.2	-21.7	01/23/2006
GC-SED-46C	Vibracore	L14	671464.60	632159.80	-14.46	10.9	-25.4	01/23/2006
GC-SED-47	Vibracore	L15	671441.70	632175.90	-16.45	12.9	-29.4	01/24/2006
GC-SED-48	Vibracore	L15	671418.40	632197.80	-14	12.7	-26.7	01/24/2006
GC-SED-49	Vibracore	O13	671365.80	632060.70	-13.82	12.1	-25.9	01/24/2006
GC-SED-50B	Vibracore	O13	671343.60	632090.90	-17.6	16	-33.6	01/26/2006
GC-SED-51	Vibracore	O14	671321.80	632122.80	-13.4	14.2	-27.6	01/26/2006
GC-SED-52	Vibracore	S12	671241.20	631977.00	-12.44	16.7	-29.1	01/20/2006
GC-SED-53	Vibracore	S12	671209.80	632002.10	-14.46	13.4	-27.9	01/20/2006
GC-SED-54B	Vibracore	Gowanus Canal	671177.30	632022.40	-12.7	13.7	-26.4	01/20/2006
GC-SED-98	Vibracore	C27	671604.40	632747.10	-8.94	16.8	-25.7	01/27/2006
GC-SED-99B	Vibracore	E21	671610.40	632512.00	-13.5	12.2	-25.7	12/22/2005
GC-SED-100	Vibracore	G18	671595.40	632383.30	-12.7	10.6	-23.3	01/28/2006
GC-SED-101	Vibracore	M13	671417.50	632111.80	-14.36	14.1	-28.5	01/28/2006
GC-SED-102	Vibracore	Q12	671299.60	632015.30	-13.66	15.7	-29.4	01/28/2006
USEPA Gowanus Canal Remedial Investigation								
GCMW-23S	Sonic	2nd Avenue	671276.44	632487.09	12.03	39	-27.0	06/29/2010
GCMW-23I	Sonic	2nd Avenue	671280.82	632494.23	12.08	13	-0.9	06/30/2010
Remedial Design Investigation - Parcel III								
CGSB-62/CGPZ-42S/CGMW-42I	HSA/Mud Rotary	L8	671525.84	631945.83	15.36	86	-70.64	12/21/2009
CGSB-63	Geoprobe	Location not surveyed; approximately 5 ft east of CGSB-63B.				13		11/4/2009
CGSB-63B	Geoprobe	M7	671518.6	631892.14	14.72	81	-66.28	11/6/2009
CGSB-64/CGMW-34S	HSA/Mud Rotary	N8	671462.97	631918.3	14.7	86	-71.3	11/3/2009
CGSB-64B/CGMW-34I	HSA	N9	671454.78	631925.23	15.1	62	-46.9	11/4/2009
CGSB-65	HSA	N6	671497.27	631812.96	14.38	46	-31.62	11/12/2009
CGSB-66	HSA/Mud Rotary	O9	671399.31	631933.79	14.24	86	-71.76	12/15/2009
CGSB-67/CGMW-40D	HSA/Mud Rotary	R7	671337.14	631820.11	15.07	114	-98.93	11/30/2009
CGSB-68/CGMW-35	Geoprobe/HSA	L5	671578.64	631817.58	15	34	-19	11/9/2009
CGSB-69/CGMW-36	HSA	O5	671478.97	631781.02	14.62	35	-20.38	12/2/2009

Table 1
Subsurface Exploration Data Inventory
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

Exploration ID	Type[1]	Location[2]	Northing[3], feet	Easting[3], feet	Surface Elevation[4], feet	Depth[5], feet	Termination Elevation[4], feet	Date Installed
CGSB-70	HSA	O2	671488.68	631674.1	14.4	42	-27.6	12/3/2009
CGSB-71/CGMW-37	HSA	L1	671619.83	631668.41	15.2	40	-24.8	11/5/2009
CGSB-72/CGMW-38	HSA	O1	671518.56	631627.59	14.4	40	-25.6	11/10/2009
CGSB-73	HSA	Q1	671452.28	631605.15	14.42	40	-25.58	11/11/2009
CGSB-74	HSA/Mud Rotary	S2	671343.3	631612.94	14.42	90	-75.58	12/30/2009
CGSB-75/CGMW-39	HSA/Mud Rotary	S4	671319.76	631678.17	14.1	92.8	-78.7	1/21/2010
CGSB-76	HSA/Mud Rotary	Location not surveyed; approximately 10 ft south of CGSB-76B location				104		12/9/2009
CGSB-76B/CGMW-43D	HSA/Mud Rotary	S7	671291.9	631795.81	15.9	96	-80.1	1/14/2010
CGSB-77	Hand clearance	Location not surveyed, moved after hand clearance to accommodate rig			14.26	6	8.26	10/28/2009
CGSB-77B/CGMW-41I	HSA	S9	671254.04	631886.44	15.22	114	-98.78	1/7/2010
CGSB-78	HSA	R3	671365.96	631646.63	15.04	36	-20.96	12/28/2009
CGSB-79	HSA	98 4th Street	671652.2	632684.6	6.42	64	-57.58	12/22/2009
CGSB-79B	HSA	98 4th Street	671652.19	632689.56	6.42	16	-9.58	12/22/2009
CGSB-86	Geoprobe	R1	671404.37	631568.71	17.96	12	5.96	11/13/2009
CGSB-87	Geoprobe	P1	671471.13	631592.37	19.2	9.5	9.7	11/13/2009
CGSB-88	Geoprobe	N1	671565.02	631626.5	20.72	12	8.72	11/13/2009
CGSB-89	Geoprobe	K1	671661.76	631659.92	22.14	12	10.14	11/13/2009
CGSB-90	Geoprobe	J1	671695.45	631679.83	22.61	10.5	12.11	11/11/2009
CGSB-91	Geoprobe	I1	671761.78	631698.24	23.83	18	5.83	11/10/2009
CGSB-92	Geoprobe	E1	671884.54	631751.07	26.95	22	4.95	11/10/2009
CGSB-93	Geoprobe	G1	671828.33	631728.36	24.15	10.5	13.65	11/11/2009
CGSB-94	HSA	C10	671842.63	632135.9	17.99	30	-12.01	12/17/2009
CGTP-18	Test Pit	L6-L7	671549.7	631872.0	15.5	9.5	6	1/26/2010
CGTP-19	Test Pit	M6	671515.2	631849.7	15.3	7	8.3	1/26/2010
CGTP-20	Test Pit	O7	671444.1	631850.6	16.1	8	8.1	1/27/2010
CGTP-21	Test Pit	L10-M10	671489.9	631989.3	15.6	9	6.6	1/25/2010
CGTP-22	Test Pit	O4	671489.8	631733.0	15.2	11	4.2	1/27/2010
CGTP-23	Test Pit	K5-L6	671585.5	631848.1	19.1	11	8.1	1/28/2010
CGTP-24	Test Pit	M1-N1	671583.3	631642.6	18.1	4	14.1	1/27/2010
Remedial Design Investigation - Parcel III - Surface Samples [8]								
CGSS-15	Surface Sample	L3	671588.5	631731.4	-	-	-	10/30/2009
CGSS-16	Surface Sample	L7	671541.8	631885.9	-	-	-	10/30/2009
CGSS-17	Surface Sample	O2	671524.2	631662.1	-	-	-	10/30/2009
CGSS-18	Surface Sample	N9	671445.4	631941.8	-	-	-	10/30/2009
CGSS-19	Surface Sample	O5	671457.0	631791.7	-	-	-	10/30/2009
CGSS-20	Surface Sample	R2	671390.2	631603.5	-	-	-	11/6/2009
CGSS-21	Surface Sample	R5	671364.1	631754.0	-	-	-	11/6/2009
CGSS-22	Surface Sample	R10	671309.4	631891.4	-	-	-	11/6/2009

Notes:

1) Type
   - Sonic - Resonant Sonic Soil Boring
   - HSA - Hollow Stem Auger Soil Boring
   - Mud Rotary - Rotary Soil Boring
   - CPT - Cone Penetrometer Test
   - Test Pit - Test Pit Excavation
   - Vibracore - Vibracore Sediment Core
2) Location refers to on site grid system or nearest street
3) Northing and Easting is relative to North American Datum of 1983 (NAD83), New York State Plane Coordinate System, East Zone (3101)
4) Elevation is relative to the North American Vertical Datum of 1988 (NAVD88)

Table 2
Summary of Monitoring and Recovery Well Data
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

									Screened Interval (ft bgs)		Date	10/1/2004	4/11/2005	4/11/2005	4/4/2005	4/4/2005	1/9/2008	3/5/2008	3/6/2008	3/6/2008	3/7/2008	3/18/2009	6/3/2009	2/22/2010	2/22/2010	3/16/2010	3/16/2010	4/19/2010	4/19/2010	4/28/2010	4/28/2010	7/26/2010	8/23/2010	9/29/2010	10/22/2010	11/22/2010
											Tide		Low	High	Low	High	Low-2Hrs	Low	High	Low	High	Low-2Hrs	Low+2Hrs	Low+2Hrs	High+1.5Hrs	High	Low	High	Low	High	Low	High	Low	High	Low	Low
Well Name		Northing (Y)	Easting (X)	Inner Well Diameter, inch	Investigation	Status	Screen (S I D)	Historic Reference Elevation, feet	Top of Screen	Bottom of Screen	Center of Screen Elevation, feet	Tide Signature	Groundwater Elevation, feet																							
CGMW-01	CGMW-01D	672027.7	631798.6	2	RI	Functional	D	31.56	126	136	-101.41	0.1	2.62	2.61	2.45	2.49	--	2.36	2.58	2.61	2.59	--	--	--	--	--	--	--	--	3.41	3.44	2.86	2.84	2.60	2.58	--
	CGMW-01I	672020.9	631796.6	2	RI	Functional	I	31.58	74	84	-49.33	0.1	2.59	2.58	2.4	2.43	2.59	2.38	2.55	2.58	2.57	--	3.18	--	--	--	--	--	--	3.43	3.42	2.82	2.77	2.56	2.55	--
	CGMW-01S	672023.0	631801.8	2	RI	Functional	S	31.64	28	38	-3.39	0.2	2.65	2.54	2.46	2.47	2.65	2.44	2.61	2.64	2.64	2.46	3.74	--	--	--	--	--	--	3.52	3.47	2.88	2.83	3.62	3.61	--
CGMW-02	CGMW-02D	671726.4	632141.7	2	RI	Abandoned	D	15.55	138	148	-129.44	0.2	2.81	3	2.68	2.87	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-02I	671721.3	632136.0	2	RI	Abandoned	I	15.42	56	66	-47.60	0.3	1.92	2.57	2.23	2.51	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-02S	671719.1	632142.2	2	RI	Functional	S	19.58	11	21	-2.54	No Effect	10.74	10.78	11.1	11.06	9.63	9.8	10.03	10.08	10.04	9.56	10.48	--	--	--	--	--	--	11.10	11.11	9.46	9.36	9.40	10.15	--
CGMW-03	CGMW-03D	671619.8	631935.7	2	RI	Abandoned	D	18.56	137	147	-126.07	0.3	2.81	3.01	2.66	2.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-03I	671614.2	631936.9	2	RI	Abandoned	I	17.68	66	76	-55.11	0.4	2.08	2.45	1.95	2.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-03S	671618.5	631940.8	2	RI	Abandoned	S	18.58	11	21	-0.03	--	7.6	7.48	7.55	7.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGMW-04	CGMW-04D	671753.8	632447.7	2	RI	Abandoned	D	9.57	125	135	-120.13	0.2	2.86	2.02	2.19	2.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-04I	671749.7	632442.3	2	RI	Abandoned	I	9.27	57	67	-52.35	0.1	1.92	1.43	2.43	2.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-04S	671757.2	632442.7	2	RI	Functional	S	9.67	8	18	-3.01	No Effect	4.48	4.5	4.42	4.43	--	4.33	4.32	4.33	4.32	4.14	4.52	--	--	--	--	--	--	--	4.37	4.07	4.02	4.08	4.37	--
CGMW-05	CGMW-05I	672051.8	632216.5	2	RI	Functional	I	26.14	54	64	-32.60	--	2.77	2.77	2.57	2.64	--	2.83	2.92	2.74	2.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-05S	672046.6	632221.5	2	RI	Functional	S	25.68	25	35	-3.90	--	3.01	2.96	2.91	2.89	--	3.48	3.41	3.38	3.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGMW-06	CGMW-06D	671211.4	631830.1	2	RI	Abandoned	D	9.94	120	130	-114.46	--	1.6	1.87	1.42	1.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-06I	671214.8	631819.7	2	RI	Abandoned	I	10.31	60	70	-54.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-06S	671213.1	631824.4	2	RI	Functional	S	10.07	10	20	-4.43	--	3.79	3.73	--	3.31	1.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.78	--	3.01	--
CGMW-07	CGMW-07D	671588.8	632273.6	2	RI	Abandoned	D	10.69	118	128	-111.99	--	2.64	2.87	2.45	2.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-07I	671591.5	632278.4	2	RI	Abandoned	I	10.52	61	71	-55.10	0.9	2.2	2.72	2.01	2.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-07S	671594.4	632273.5	2	RI	Functional	S	10.71	16	26	-9.93	5.1	-2.6	2.39	-3.01	1.73	--	-2.9	2.95	2.61	2.78	--	--	--	--	--	--	--	--	--	--	1.63	-0.80	2.38	-3.23	--
CGMW-08	CGMW-08D	671269.0	631968.5	2	RI	Abandoned	D	9.09	120	130	-115.45	0.1	1.89	2.3	1.9	2.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-08I	671273.2	631971.2	2	RI	Abandoned	I	9.21	60	70	-55.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-08S	671277.3	631973.7	2	RI	Abandoned	S	9.27	9	19	-4.37	4.5	-3.03	1.89	-2.94	1.56	--	-3.29	1.93	-3.39	2.45	-0.3	0.82	--	--	--	--	--	--	--	--	--	--	--	-2.91	2.05
CGMW-09	CGMW-09	671513.2	632078.2	2	RI	Functional	S	10.90	8	18	-1.72	--	1.74	1.66	--	--	--	0.8	0.64	0.69	0.69	0.61	0.97	--	--	--	--	--	--	--	--	--	2.33	1.97	1.7	--
CGMW-10	CGMW-10	671568.7	632018.5	2	RI	Functional	S	16.69	9	19	-1.55	0.2	7.19	7.13	7.11	7.13	4.77	5.8	5.88	4.76	5.82	6.06	6.38	--	--	--	--	--	--	8.7	8.57	7.31	7.07	5.12	6.6	--
CGMW-11	CGMW-11	671670.3	632889.7	2	SRI	Abandoned	I	5.48	58.58	68.58	-57.72	--	1.96	2.57	1.88	2.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGMW-12	CGMW-12	671816.8	632686.4	2	SRI	Functional	S	9.09	8.08	18.08	-3.69	--	3.64	3.67	3.39	3.62	3.43	3.56	2.2	3.1	3.24	--	--	--	--	--	--	--	--	3.55	3.53	2.44	0.97	0.92	1.15	--
CGMW-13	CGMW-13	671976.1	631929.0	2	SRI	Functional	S	30.49	23.58	33.58	-0.40	--	13.58	13.5	13.21	13.4	--	8.2	8.36	8.42	8.38	5.81	7.48	--	--	--	--	--	--	9.33	9.31	5.06	4.48	3.94	3.76	--
CGMW-14	CGMW-14 CH1	671854.2	632109.7	0.5	SRI	Inaccessible	ch1	18.46	9.97	10.22	8.89	--	12.54	12.45	13.14	13	--	11.13	10.9	11.06	10.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-14 CH2	671854.2	632109.7	0.5	SRI	Inaccessible	ch2	18.46	20.04	20.29	-1.19	--	11.05	11.02	11.33	11.17	--	10.01	9.8	9.84	9.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-14 CH3	671854.2	632109.7	0.5	SRI	Inaccessible	ch3	18.46	28.08	28.33	-9.23	--	2.91	3.01	2.8	2.8	--	4.57	2.69	4.14	4.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-14 CH4	671854.2	632109.7	0.5	SRI	Inaccessible	ch4	18.46	65.04	65.29	-46.19	--	2.71	2.69	2.33	2.49	--	2.97	2.79	2.78	2.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-14 CH5	671854.2	632109.7	0.5	SRI	Inaccessible	ch5	18.46	125.05	125.3	-106.20	--	2.79	2.77	2.77	2.67	--	3.14	3.11	3.12	3.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-14 CH6	671854.2	632109.7	0.5	SRI	Inaccessible	ch6	18.46	135.05	135.3	-116.20	--	2.73	2.88	2.7	2.68	--	3.11	3.09	3.03	3.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-14 CH7	671854.2	632109.7	0.5	SRI	Inaccessible	ch7	18.46	136.05	136.3	-117.20	--	2.74	2.89	2.64	2.56	--	3.03	--	2.89	3.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGMW-15	CGMW-15 CH1	671371.7	631553.4	0.5	SRI	Functional	ch1	16.91	22.01	22.26	-4.83	--	6.09	6.07	5.95	6.05	--	5.57	5.65	5.7	5.64	--	--	--	--	--	--	--	--	7.22	7.18	5.93	5.84	9.62	6.36	--
	CGMW-15 CH2	671371.7	631553.4	0.5	SRI	Functional	ch2	16.91	NA	NA	NA	--	--	--	3.88	2.35	--	--	--	--	--	--	--	--	--	--	--	--	--	3.2	2.98	3.46	3.38	2.23	2.67	--
	CGMW-15 CH3	671371.7	631553.4	0.5	SRI	Functional	ch3	16.91	34.71	34.96	-17.53	--	1.9	2.11	1.84	2.09	--	2.06	2.08	--	2.01	--	--	--	--	--	--	--	--	2.83	2.51	2.30	2.37	8.83	2.03	--
	CGMW-15 CH4[1]	671371.7	631553.4	0.5	SRI	Non-functional	ch4	16.91	58.84	59.09	-41.66	--	2.06	2.15	2.35	2.03	--	2	1.99	--	--	--	--	--	--	--	--	--	--	9.32	9.33	9.16	9.03	2.09	12.63	--
	CGMW-15 CH5	671371.7	631553.4	0.5	SRI	Functional	ch5	16.91	68.84	69.09	-51.66	--	1.96	1.97	1.96	2.03	--	1.91	1.88	1.93	1.89	--	--	--	--	--	--	--	--	2.26	2.25	2.35	2.32	1.88	2.06	--
	CGMW-15 CH6	671371.7	631553.4	0.5	SRI	Functional	ch6	16.91	131.05	131.3	-113.87	--	1.51	1.53	1.51	1.44	--	--	1.33	1.54	1.32	--	--	--	--	--	--	--	--	2.16	2.11	1.92	1.71	5.83	1.92	--
	CGMW-15 CH7	671371.7	631553.4	0.5	SRI	Functional	ch7	16.91	146.95	147.2	-129.77	--	3	2.76	2.83	2.84	--	3.16	3.12	2.89	3.15	--	--	--	--	--	--	--	--	3.73	3.73	--	3.39	4.32	2.98	--
CGMW-16	CGMW-16 CH1	671286.9	632501.5	0.5	SRI	Inaccessible	ch1	6.64	12.01	12.26	-4.92	--	3	2.92	3.13	3.12	--	--	1.85	2.17	1.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-16 CH2	671286.9	632501.5	0.5	SRI	Inaccessible	ch2	6.64	18.01	18.26	-10.92	--	1.34	1.15	1.98	1.32	--	--	2.21	2.2	2.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-16 CH3	671286.9	632501.5	0.5	SRI	Inaccessible	ch3	6.64	29.05	29.3	-21.96	--	1.19	2.33	1.22	2.42	--	--	2.97	2.79	2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-16 CH4	671286.9	632501.5	0.5	SRI	Inaccessible	ch4	6.64	48.13	48.38	-41.04	--	1.52	2.73	1.73	2.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-16 CH5	671286.9	632501.5	0.5	SRI	Inaccessible	ch5	6.64	68.9	69.15	-61.81	--	2.22	1.72	3.13	0.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-16 CH6	671286.9	632501.5	0.5	SRI	Inaccessible	ch6	6.64	122.13	122.38	-115.04	--	4.51	4.35	4.21	4.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	CGMW-16 CH7	671286.9	632501.5	0.5	SRI	Inaccessible	ch7	6.64	140.03	140.28	-132.94	--	3.14	3.14	2.74	2.88	--	--	3.48	3.19	3.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGMW-17	CGMW-17 CH1	671710.8	631626.9	0.5	SRI	Functional	ch1	22.11	16.74	16.99	5.65	--	7.51	7.46	7.05	7.16	--	--	--	--	--	--	--	--	--	--	--	--	--	8.61	8.61	--	--	16.1	6.44	--
	CGMW-17 CH2	671710.8	631626.9	0.5	SRI	Functional	ch2	22.11	27.15	27.4	-4.77	--	7.49	7.39	6.98	7.12	--	--	--	--	--	--	--	--	--	--	--	--	--	8.47	8.46	--	--	5.96	6.37	--
	CGMW-17 CH3	671710.8	631626.9	0.5	SRI	Functional	ch3	22.11	34.23	34.48	-11.85	--	2.04	2.08	2.12	2.31	--	--	--	--	--	--	--	--	--	--	--	--	--	3.15	3.01	--	--	2.41	2.38	--
	CGMW-17 CH4	671710.8	631626.9	0.5	SRI	Functional	ch4	22.11	74.35	74.6	-51.97	--	2.29	2.25	2.18	2.11	--	--	--	--	--	--	--	--	--	--	--	--	--	3.27	3.23	--	--	2.56	2.61	--
	CGMW-17 CH5	671710.8	631626.9	0.5	SRI	Functional	ch5	22.11	84.15	84.4	-61.77	--	2.42	2.42	2.25	2.32	--	--	--	--	--	--	--	--	--	--	--	--	--	3.16	3.66	--	--	2.57	2.6	--
	CGMW-17 CH6	671710.8	631626.9	0.5	SRI	Functional	ch6	22.11	124.35	124.6	-101.97	--	2.32	2.3	2.1	2.22	--	--	--	--	--	--	--	--	--	--	--	--	--	3.14	3.60	--	--	2.45	2.56	--
	CGMW-17 CH7	671710.8	631626.9	0.5	SRI	Functional	ch7	22.11	137.35	137.6	-114.97	--	--	2.29	2.81	2.82	--	--	--	--	--	--	--	--	--	--	--	--	--	3.66	3.66	--	3.26	3.19	3.15	--
CGMW-18	CGMW-18 CH1	671912.0	632393.3	0.5	SRI	Functional	ch1	14.07	13.1	13.35	1.11	--	5.33	5.28	5.12	5.14	--	4.74	4.56	4.61	4.62	--	--	--	--	--	--	--	--	4.79	4.85	3.87	5.45	4.92	5.15	--
	CGMW-18 CH2	671912.0	632393.3	0.5	SRI	Functional	ch2	14.07	22.1	22.35	-7.90	--	2.54	2.57	2.34	2.45	--	2.57	2.55	2.34	2.64	--	--	--	--	--	--	--	--	3.28	3.19	2.82	2.96	2.88	2.61	--
	CGMW-18 CH3	671912.0	632393.3	0.5	SRI	Functional	ch3	14.07	30.11	30.36	-15.91	--	2.23	2.38	1.96	2.43	--	2.5	2.57	2.25	2.67	--	--	--	--	--	--	--	--	3.38	3.05	2.97	2.89	2.84	2.51	--
	CGMW-18 CH4	671912.0	632393.3	0.5	SRI	Functional	ch4	14.07	13.1	13.35	1.11	--	5.32	5.25	5.14	5.16	--	4.71	4.54	4.6	4.63	--	--	--	--	--	--	--	--	4.97	4.84	4.80	5.46	4.45	5.37	--
	CGMW-18 CH5	671912.0	632393.3	0.5	SRI	Functional	ch5	14.07	55.11	55.36	-40.91	--	2.75	2.65	2.67	2.78	--	2.93	2.91	2.87	3	--	--	--	--	--	--	--	--	3.77	3.65	3.25	3.22	3.07	3.03	--
	CGMW-18 CH6	671912.0	632393.3	0.5	SRI	Functional	ch6	14.07	70.26	70.51	-56.06	--	2.72	2.84	2.7	2.73	--	2.92	2.96	2.85	2.99	--	--	--	--	--	--	--	--	3.76	3.62	3.16	3.20	3.09	2.97	--
	CGMW-18 CH7	671912.0	632393.3	0.5	SRI	Functional	ch7	14.07	77.11	77.36	-62.91	--	2.8	2.85	2.65	2.78	--	3.02	2.95	2.9	3	--	--	--	--	--	--	--	--	3.78	3.66	--	3.13	2.99	--	--
CGMW-19	CGMW-19 CH1	670895.9	632365.5	0.5	SRI	Functional	ch1	8.25	10.6	10.85	-2.23	--	1.63	1.91	1.47	1.99	--	1.43	--	--	2.44	--	--	--	--	--	--	--	--	--	--	--	1.85	1.39	1.45	--
	CGMW-19 CH2	670895.9	632365.5	0.5	SRI	Functional	ch2	8.25	23.59	23.84	-15.22	--	1.1	2.16	1.13	2.23	--	1.5	--	0.77	2.24	--	--	--	--	--	--	--	--	--	--	1.98	2.11	2.46	1.22	--

GEI Consultants

Table 2
Summary of Monitoring and Recovery Well Data
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

Well Name		Northing (Y)	Easting (X)	Inner Well Diameter, inch	Investigation	Status	Screen (S I D)	Historic Reference Elevation, feet	Screened Interval (ft bgs) Top of Screen	Bottom of Screen	Center of Screen Elevation, feet	Tide Signature (Date 10/1/2004)	4/11/2005	4/11/2005	4/4/2005	4/4/2005	1/9/2008	3/5/2008	3/6/2008	3/6/2008	3/7/2008	3/18/2009	6/3/2009	2/22/2010	2/22/2010	3/16/2010	3/16/2010	4/19/2010	4/19/2010	4/28/2010	4/28/2010	7/26/2010	8/23/2010	9/29/2010	10/22/2010	11/22/2010
											Tide		Low	High	Low	High	Low-2Hrs	Low	High	Low	High	Low-2Hrs	Low+2Hrs	Low+2Hrs	High+1.5Hrs	High	Low	High	Low	High	Low	High	Low	High	Low	Low
													Groundwater Elevation, feet																							
	CGMW-19 CH3	670895.9	632365.5	0.5	SRI	Functional	ch3	8.25	30.65	30.9	-22.28	--	1.91	2.19	1.88	2.41	--	2.87	--	1.78	2.49	--	--	--	--	--	--	--	--	--	--	2.61	2.41	2.51	1.88	--
	CGMW-19 CH4	670895.9	632365.5	0.5	SRI	Functional	ch4	8.25	74.6	74.85	-66.23	--	2.57	2.56	2.64	2.66	--	2.69	--	2.7	2.7	--	--	--	--	--	--	--	--	--	--	--	2.62	2.54	2.57	--
	CGMW-19 CH5	670895.9	632365.5	0.5	SRI	Functional	ch5	8.25	84.6	84.85	-76.23	--	2.67	2.66	2.82	2.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.41	5.4	3.33	--
	CGMW-19 CH6	670895.9	632365.5	0.5	SRI	Functional	ch6	8.25	115.6	115.85	-107.23	--	3.21	3.24	3.38	3.37	--	3.41	--	3.21	3.22	--	--	--	--	--	--	--	--	--	--	--	3.37	3.29	3.35	--
	CGMW-19 CH7	670895.9	632365.5	0.5	SRI	Functional	ch7	8.25	116.6	116.85	-108.23	--	3.6	3.37	3.66	3.59	--	3.22	--	3.11	3.35	--	--	--	--	--	--	--	--	--	--	--	3.40	3.38	3.07	--
CGMW-22	CGMW-22 CH1	671002.2	631973.3	0.5	SRI	Functional	ch1	5.57	11.73	11.98	-5.81	--	0.5	1.57	0.63	1.38	--	0.46	1.47	0.25	1.7	--	--	--	--	--	--	--	--	1.49	0.42	1.35	1.05	1.36	0.26	--
	CGMW-22 CH2	671002.2	631973.3	0.5	SRI	Functional	ch2	5.57	27.8	28.05	-21.88	--	1.29	1.49	1.47	1.65	--	1.7	1.37	1.12	1.35	--	--	--	--	--	--	--	--	2.29	2	1.84	1.86	1.97	1.49	--
	CGMW-22 CH3	671002.2	631973.3	0.5	SRI	Functional	ch3	5.57	39.78	40.03	-33.86	--	1.2	2.3	1.2	2.21	--	1.48	1.41	0.98	2.34	--	--	--	--	--	--	--	--	2.62	1.59	2.37	1.92	2.40	1.19	--
	CGMW-22 CH4	671002.2	631973.3	0.5	SRI	Functional	ch4	5.57	51.89	52.14	-45.97	--	1.47	2.18	1.45	2.06	--	1.52	2.08	1.31	2.21	--	--	--	--	--	--	--	--	2.62	1.99	2.29	2.09	2.27	1.5	--
	CGMW-22 CH5	671002.2	631973.3	0.5	SRI	Functional	ch5	5.57	63.9	64.15	-57.98	--	1.51	2.18	1.58	2.11	--	--	--	--	--	--	--	--	--	--	--	--	--	2.61	2.5	2.54	2.41	3.27	1.21	--
	CGMW-22 CH6	671002.2	631973.3	0.5	SRI	Functional	ch6	5.57	81.83	82.08	-75.91	--	1.68	2.1	1.62	2.03	--	1.22	2.26	1.76	2.33	--	--	--	--	--	--	--	--	2.87	2.47	2.44	2.31	2.44	1.89	--
	CGMW-22 CH7	671002.2	631973.3	0.5	SRI	Functional	ch7	5.57	96.83	97.08	-90.91	--	1.64	2.88	1.34	1.95	--	0.77	2.06	1.53	2.13	--	--	--	--	--	--	--	--	-4.33	2.29	--	2.15	2.15	1.7	--
CGMW-23	CGMW-23	671647.7	631427.7	2	SRI	Functional	S	24.12	17	27	2.44	--	--	--	--	--	--	--	--	5.26	5.5	--	--	--	--	--	--	--	--	6.86	6.9	7.05	5.21	4.87	5.2	--
CGMW-24	CGMW-24	671869.9	631493.7	2	SRI	Functional	S	33.12	18	28	10.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGMW-25[3]	CGMW-25	672157.1	631611.7	2	SRI	Functional	S	42.75	22	32	15.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGMW-26	CGMW-26	672056.8	632429.4	2	SRI	Destroyed	S	20.97	15	25	1.19	--	--	--	--	--	--	2.86	2.83	2.77	2.85	--	--	--	--	--	--	--	--	3.7	3.62	5.47	--	--	--	--
CGMW-27	CGMW-27	671910.4	632584.2	2	SRI	Functional	S	12.32	3	13	4.55	--	--	--	--	--	--	4.56	4.43	4.42	4.46	--	--	--	--	--	--	--	--	4.84	4.81	8.97	4.72	4.16	8.87	4.32
CGMW-29	CGMW-29	670748.6	632988.5	2	SRI	Functional	S	8.51	3	13	0.93	--	--	--	--	--	--	2.05	1.89	1.88	0.86	--	--	--	--	--	--	--	--	2.35	2.32	2.43	2.94	6.10	3.57	--
CGMW-32	CGMW-32	670721.9	632059.3	2	SRI	Functional	S	4.97	2	12	-1.76	--	--	--	--	--	3.24	3.07	3.35	3.33	3.34	--	--	--	--	--	--	--	--	3.59	3.62	3.37	3.85	2.73	3.39	--
CGMW-34	CGMW-34I	671454.8	631925.2	2	RDI	Functional	I	17.17	50	60	-39.9	--	--	--	--	--	--	--	--	--	--	--	--	1.49	1.87	2.86	2.30	3.75	2.20	--	1.97	2.53	2.04	2.21	1.56	--
	CGMW-34S	671457.3	631917.8	2	RDI	Functional	S	17.51	11	21	-1.28	--	--	--	--	--	--	--	--	--	--	--	--	2.08	2.21	6.29	5.66	6.36	6.33	6.36	5.92	3.08	2.41	2.18	2.95	--
CGMW-35	CGMW-35	671578.6	631817.6	2	RDI	Functional	S	17.27	6	16	4	--	--	--	--	--	--	--	--	--	--	--	--	6.39	7.43	9.87	9.86	9.02	8.99	9.06	9.05	7.22	6.92	6.05	6.59	--
CGMW-36	CGMW-36	671479.0	631781.0	2	RDI	Functional	S	17.10	4	14	5.62	--	--	--	--	--	--	--	--	--	--	--	--	6.85	6.90	9.39	9.42	8.58	8.52	8.52	8.53	6.78	6.58	5.88	6.44	--
CGMW-37	CGMW-37	671619.8	631668.4	2	RDI	Functional	S	17.20	4	14	6.2	--	--	--	--	--	--	--	--	--	--	--	--	7.58	7.61	9.86	9.91	9.20	9.17	9.38	9.58	7.01	6.76	6.28	6.79	6.31
CGMW-38	CGMW-38	671518.1	631634.2	2	RDI	Functional	S	17.37	4	14	5.4	--	--	--	--	--	--	--	--	--	--	--	--	7.66	7.76	10.92	10.99	8.96	8.93	10.1	10.2	7.06	7.34	6.76	7.76	--
CGMW-39	CGMW-39	671314.2	631681.8	2	RDI	Functional	S	18.38	8	18	1.1	--	--	--	--	--	--	--	--	--	--	--	--	5.06	5.11	10.06	9.96	7.12	7.06	7.41	7.41	4.67	4.86	4.53	5.83	--
CGMW-40	CGMW-40	670998.6	633098.0	2	RI	Functional	S	7.59	10	20	-7.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.66	1.29	1.19	0.69	--
CGMW-40D	CGMW-40D	671336.8	631820.2	2	RDI	Functional	D	17.52	92	102	-81.93	--	--	--	--	--	--	--	--	--	--	--	--	2.41	2.55	3.31	3.05	3.37	3.12	3.43	3.06	2.80	2.72	2.71	2.39	--
CGMW-41	CGMW-41	671254.0	631886.4	2	RDI	Functional	I	17.29	50	60	-39.78	--	--	--	--	--	--	--	--	--	--	--	--	1.27	1.67	2.65	1.92	2.49	1.79	2.6	1.54	1.94	1.59	1.94	1.03	--
CGMW-42I	CGMW-42I	671525.8	631945.8	2	RDI	Functional	I	17.77	34	44	-23.64	--	--	--	--	--	--	--	--	--	--	--	--	1.67	2.07	2.66	2.56	2.56	2.50	2.72	2.46	2.01	2.19	1.96	1.87	--
CGMW-43D	CGMW-43D	671291.9	631795.8	2	RDI	Functional	D	17.75	84	94	-73.1	--	--	--	--	--	--	--	--	--	--	--	--	1.67	1.90	2.81	2.39	2.64	2.27	2.79	2.17	1.83	1.63	1.85	1.33	--
CGPZ-42S	CGPZ-42S	671525.8	631945.8	1	RDI	Functional	S	17.77	13	23	-2.64	--	--	--	--	--	--	--	--	--	--	--	--	6.77	6.80	8.99	9.02	8.49	8.50	8.56	8.54	7.12	5.55	4.12	4.62	--
CGRW-01	CGRW-01	671807.3	631993.3	6	DRWPT	Functional	I	31.66	32.5	67.5	-18.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.55	3.38	--	--	--	--	--
CGRW-02	CGRW-02	671767.9	632130.3	6	DRWPT	Functional	I	21.42	33.5	48.5	-19.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.75	2.72	--	--	--	--	--
CGRW-03	CGRW-03	671621.4	632347.0	6	DRWPT	Functional	I	9.95	22.0	52.0	-26.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGRW-04	CGRW-04	671595.3	632271.2	6	DRWPT	Functional	I	10.88	27.0	67.0	-35.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.77	-0.53	--	--	--	--	--
CGRW-05D	CGRW-05D	671327.2	631989.7	6	DRWPT	Functional	D	12.59	82.5	102.5	-81.18	--	--	--	--	--	--	--	--	--	--	--	--	1.86	1.83	--	--	2.56	1.98	2.86	1.92	--	--	--	--	--
CGRW-05I	CGRW-05I	671343.1	632002.4	6	DRWPT	Functional	I	12.62	41.0	71.0	-44.12	--	--	--	--	--	--	--	--	--	--	--	--	2.03	2.05	--	--	2.84	1.98	3.21	2.17	--	--	--	--	--
CGRW-05S	CGRW-05S	671334.6	631992.9	6	DRWPT	Functional	S	12.22	10.0	20.0	-2.12	--	--	--	--	--	--	--	--	--	--	--	--	1.68	1.86	--	--	3.17	2.91	3.33	2.98	--	--	--	--	--
CGRW-06D	CGRW-06D	671284.4	631952.1	6	DRWPT	Functional	D	12.74	82.5	92.5	-75.10	--	--	--	--	--	--	--	--	--	--	--	--	1.89	1.89	--	--	2.67	2.11	2.93	2	--	--	--	--	--
CGRW-06I	CGRW-06I	671273.6	631946.0	6	DRWPT	Functional	I	12.95	35.0	65.0	-37.18	--	--	--	--	--	--	--	--	--	--	--	--	1.83	1.84	--	--	2.67	1.96	2.91	1.81	--	--	--	--	--
CGRW-06S	CGRW-06S	671267.3	631935.5	6	DRWPT	Functional	S	12.68	9.5	19.5	-2.00	--	--	--	--	--	--	--	--	--	--	--	--	3.47	3.46	--	--	5.11	4.98	5.26	5.1	--	--	--	--	--
CGRW-07D	CGRW-07D	671412.5	632046.5	6	DRWPT	Functional	D	12.48	83.5	93.5	-76.38	--	--	--	--	--	--	--	--	--	--	--	--	1.98	2.08	--	--	2.88	2.33	3.27	2.49	--	--	--	--	--
CGRW-07I	CGRW-07I	671413.1	632035.1	6	DRWPT	Functional	I	11.97	52.5	62.5	-45.44	--	--	--	--	--	--	--	--	--	--	--	--	1.59	1.70	--	--	2.47	1.62	2.83	1.92	--	--	--	--	--
CGRW-07S	CGRW-07S	671406.2	632039.8	6	DRWPT	Functional	S	12.04	8.5	23.5	-1.28	--	--	--	--	--	--	--	--	--	--	--	--	0.24	1.18	--	--	2.26	0.64	2.39	1.19	--	--	--	--	--
CGPZ-1	CGPZ-1I	671867.2	632019.1	1	RDI	Functional	I	29.35	45	50	-20.14	--	--	--	--	--	2.8	2.59	2.71	2.71	2.74	--	2.7	--	--	--	--	--	--	3.6	3.51	2.97	2.96	3.77	1.37	--
	CGPZ-1S[2]	671871.2	632013.8	1	RDI	Functional	S	29.25	10	20	12.58	--	--	--	--	--	23.6	23.57	23.83	23.85	23.87	--	22.88	--	--	--	--	--	--	23.35	23.33	21.67	21.12	20.72	21.31	--
CGPZ-2	CGPZ-2I	671825.3	631981.8	1	RDI	Functional	I	30.48	45	50	-19.30	--	--	--	--	--	2.49	2.38	2.27	2.24	2.24	--	--	--	--	--	--	--	--	--	--	1.62	--	--	--	--
	CGPZ-2S	671829.3	631976.5	1	RDI	Abandoned	S	30.73	22	32	1.20	--	--	--	--	--	9.71	11.55	11.34	11.42	11.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CGPZ-3	CGPZ-3	671796.2	631944.4	1	RDI	Functional	S	31.83	25	35	-0.44	--	--	--	--	--	8.62	10.43	10.28	10.34	10.32	--	--	--	--	--	--	--	--	10.51	10.55	8.63	8.11	7.46	8.12	--
CGPZ-4	CGPZ-4	671761.1	631778.5	1	RDI	Functional	S	24.28	25	35	2.04	--	--	--	--	--	7.16	8.38	8.04	8.04	8.13	7.26	--	--	--	--	--	--	--	9.72	9.73	7.67	7.30	6.65	7.16	--
CGPZ-05	CGPZ-05	671944.5	631973.1	1	RDI	Functional	S	29.56	35	45	-0.44	--	--	--	--	--	--	--	--	--	--	2.53	2.6	--	--	--	--	--	--	3.48	3.42	2.89	2.85	4.08	2.58	2.64
CGPZ-06	CGPZ-06	671521.5	632063.5	1	RDI	Functional	S	11.16	3	13	3.16	--	--	--	--	--	--	--	--	--	--	1.05	1.45	--	--	--	--	--	--	--	--	2.23	--	--	--	--
Canal	Canal	671557.0	632254.5	NA	NA	NA	Tide	6.78	NA	NA	NA	5.60	-2.87	1.87	-2.02	1.33	--	-3.16	3.01	-3.17	4.58	--	--	--	--	--	--	--	--	--	--	1.58	-1.00	2.51	-3.40	--

Notes:

bgs = below ground surface

NA = Not applicable

NM = Not measured

S I D = Shallow/Intermediate/Deep as defined in Remedial Investigation Report

CH1-7 = multichannel well (higher numbers are deeper)

RI = Remedial Investigation (2003)

SRI = Remedial Investigation (2004-2006 and 2010)

RDI = Remedial Design Investigation (2008-2010)

DRWPT = DNAPL Recovery Well Pilot Test (2009)

Northing and Easting is relative to North American Datum of 1983 (NAD83), New York State Plane Coordinate System, East Zone (3101)

Elevation is relative to the North American Vertical Datum of 1988 (NAVD88)

Tide signature measured October 28-29, 2004. Value shown is maximum observed fluctuation over a tide cycle.

[1]CGMW-15 CH4 water level increase in 2010 may be caused by plugging of the channel.

[2]CGPZ-1S is screened in Holder No. 3 and represents water within the holder structure, not the groundwater table.

[3]CGMW-25 was screened within a perched system near the actual water table and has subsequently gone dry.

Table 3
Geotechnical Laboratory Testing Results
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

Boring ID	Sample ID	Depth Interval, feet	Moisture Content, %	Organic Material	USCS	Grain Size Analysis			Atterburg Limit Analysis		
						Gravel, %	Sand, %	Fines, %	Liquid Limit, % MC	Plastic Limit, % MC	Plastic Index, % MC
Roux Associates - 1989											
GW-3	--	5-7	--	--	SP-SM	43.0	49.0	8.0	--	--	--
GW-4	--	30-32	--	--	ML	0.0	7.0	93.0	--	--	--
GW-5	--	15-17	--	--	ML	0.0	37.0	63.0	--	--	--
GEI Consultants - 2003											
CGSB-28	--	35-37	--	--	SM	0.2	79.1	20.7	--	--	--
GEI Consultants - 2008/2009											
CGSB-81/CGPZ-01I	S15	42-44	--	--	SM	3.3	75.3	21.4	--	--	--
CGSB-82/CGPZ-02I	S14	39-41	--	--	SP	3.3	75.3	21.4	--	--	--
CGSB-105	S7	17-19	--	--	SP-SM	1.0	91.0	8.0	--	--	--
CGSB-107	S6	15-17	--	--	SP-SM	7.0	84.0	9.0	--	--	--
CGSB-108	S4	11-13	--	--	SP-SM	20.0	68.0	12.0	--	--	--
CGSB-110	S5	33-35	--	--	SP-SM	34.0	58.0	8.0	--	--	--
CGSB-110	S6	39-41	--	--	SW	5.0	92.0	3.0	--	--	--
CGSB-111E	S13	34-36	--	--	SW	16.0	81.0	4.0	--	--	--
CGSB-111E	S16	49-51	--	--	SW	0.0	95.0	5.0	--	--	--
CGSB-112R2	S13	30-32	--	--	SW-SM	17.0	73.0	10.0	--	--	--
CGSB-114	S9	24-26	285	75.5	OH	--	--	--	--	--	--
CGSB-117	S4	11-13	--	--	SW-SM	7.0	87.0	6.0	--	--	--
CGSB-117	S19	45-47	--	--	SP-SM	0.5	87.4	12.1	--	--	--
CGSB-117	S15	33-35	130	26.5	OL	--	--	--	--	--	--
CGSB-119	S2	7-9	--	--	SP	29.0	66.0	5.0	--	--	--
CGSB-119	S10	35-37	--	--	SM	0.0	58.3	41.7	--	--	--
CGSB-120	T-1	15.2	--	--	MH	--	--	--	65	37	28.0
CGSB-121R	S13	44-46	--	--	SP-SM	0.0	93.0	7.0	--	--	--
CGSB-121	T-1	21	57.4	--	MH	--	--	--	70	36	34.0
CGSB-122	S16	54-56	--	--	SP-SM	27.7	58.7	13.6	--	--	--
CGSB-122	S23	89-91	--	--	SM	17.4	66.7	16.0	--	--	--

Table 3
Geotechnical Laboratory Testing Results
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

Boring ID	Sample ID	Depth Interval, feet	Moisture Content, %	Organic Material	USCS	Grain Size Analysis			Atterburg Limit Analysis		
						Gravel, %	Sand, %	Fines, %	Liquid Limit, % MC	Plastic Limit, % MC	Plastic Index, % MC
GEI Consultants - 2008/2009 (continued)											
CGSB-123	T-1	18.2	91.5	--	MH	--	--	--	84	51	33.0
CGSB-125	S11	40-42	--	--	SP-SM	0.0	93.0	7.0	--	--	--
CGSB-125	S12	45-47	--	--	SP-SM	1.9	91.7	6.4	--	--	--
CGSB-125	S15	60-62	--	--	SM	4.2	59.4	36.4	--	--	--
CGSB-126	S10	39-41	--	--	SM	10.0	49.0	41.0	--	--	--
CGSB-127	S14	45-47	46.7	--	ML	0.0	32.5	67.5	--	--	--
CGSB-127	S15	50-52	--	--	SM	0.0	55.1	44.9	--	--	--
CGSB-128	S7a	25-26	--	--	SM	4.0	79.0	16.0	--	--	--
CGSB-128	S9b	36-37	107.4	--	ML	3.4	39.1	57.5	--	--	--
CGSB-129	S6	15-17	--	--	SW	41.0	57.0	2.0	--	--	--
CGSB-129	S17	59-61	--	--	SM	0.0	77.0	23.0	--	--	--
CGSB-130	S4	24-26	--	--	SP-SM	39.0	56.0	5.0	--	--	--
CGSB-132	T-1	19.2	65.7	--	MH	--	--	--	80	45	35.0
CGSB-132	S17	59-61	--	--	SM	0.0	81.0	19.0	--	--	--
CGSB-133	T-1	17.2	96.1	--	MH	--	--	--	90	49	41.0
CGSB-134	T-1	20.2	75.7	--	MH	--	--	--	114	60	54.0
CGSB-134	S10	34-36	--	--	SP-SM	2.0	85.0	13.0	--	--	--
CGSB-135	S6	15-17	--	--	SP-SM	2.0	88.0	10.0	--	--	--
CGSB-136	S1	5-7	--	--	GW	59.0	38.0	3.0	--	--	--
CGSB-137	S13	32-34	164	35.1	ML	--	--	--	--	--	--
CGSB-137	T-1	36.2	21.3	--	ML	--	--	--	27	22	5.0
CGSB-138	S5	13-15	--	--	SP-SM	5.0	87.0	8.0	--	--	--
CGSB-138	T-1	21.3	70.0	--	CH	--	--	--	85	36	49.0
CGSB-139	T-1	21.3	19.6	--	CL-ML	--	--	--	22	17	5.0
CGSB-140	T-1	23.5	43.6	--	MH	--	--	--	82	42	40

Notes:
"--" Indicates no test performed

Table 4
Summary of NAPL Recovery Well Construction
Data Report
Carroll Gardens/Public Place
Brooklyn, New York

Recovery Well ID	Northing, ft	Easting, ft	Top of Riser Elevation, ft	Location	Total Depth of Well, ft btor	Screen Length, ft	Top of Screen Interval, ft btor	Bottom of Screen Interval, ft btor	Bottom of Sump Elevation, ft	Top of Screen Interval Elevation, ft	Bottom of Screen Interval Elevation, ft	Screen Slot Size, in
CGRW-01	671807.28	631993.28	31.66	E7	72.5	35	32.5	67.5	-40.8	-0.8	-35.8	0.02
CGRW-02	671767.90	632130.27	21.42	E11	53.5	15	33.5	48.5	-32.1	-12.1	-27.1	0.02
CGRW-03	671621.38	632346.98	9.95	F17	57.0	30	22.0	52.0	-47.1	-12.1	-42.1	0.02
CGRW-04	671595.34	632271.16	10.88	H16	72.0	40	27.0	67.0	-61.1	-16.1	-56.1	0.02
CGRW-05S	671334.61	631992.93	12.22	P11	25.0	10	10.0	20.0	-12.8	2.2	-7.8	0.02
CGRW-05I	671343.12	632002.39	12.62	P11	76.0	30	41.0	71.0	-63.4	-28.4	-58.4	0.02
CGRW-05D	671327.24	631989.71	12.59	P11	107.5	20	82.5	102.5	-94.9	-69.9	-89.9	0.03
CGRW-06S	671267.28	631935.51	12.68	R10	24.5	10	9.5	19.5	-11.8	3.2	-6.8	0.02
CGRW-06I	671273.58	631945.95	12.95	R11	70.0	30	35.0	65.0	-57.1	-22.1	-52.1	0.02
CGRW-06D	671284.41	631952.12	12.74	R11	97.5	10	82.5	92.5	-84.8	-69.8	-79.8	0.03
CGRW-07S	671406.20	632039.76	12.04	N12	28.5	15	8.5	23.5	-16.5	3.5	-11.5	0.02
CGRW-07I	671413.13	632035.06	11.97	N12	67.5	10	52.5	62.5	-55.5	-40.5	-50.5	0.02
CGRW-07D	671412.47	632046.49	12.48	N12	98.5	10	83.5	93.5	-86.0	-71.0	-81.0	0.03

Notes:

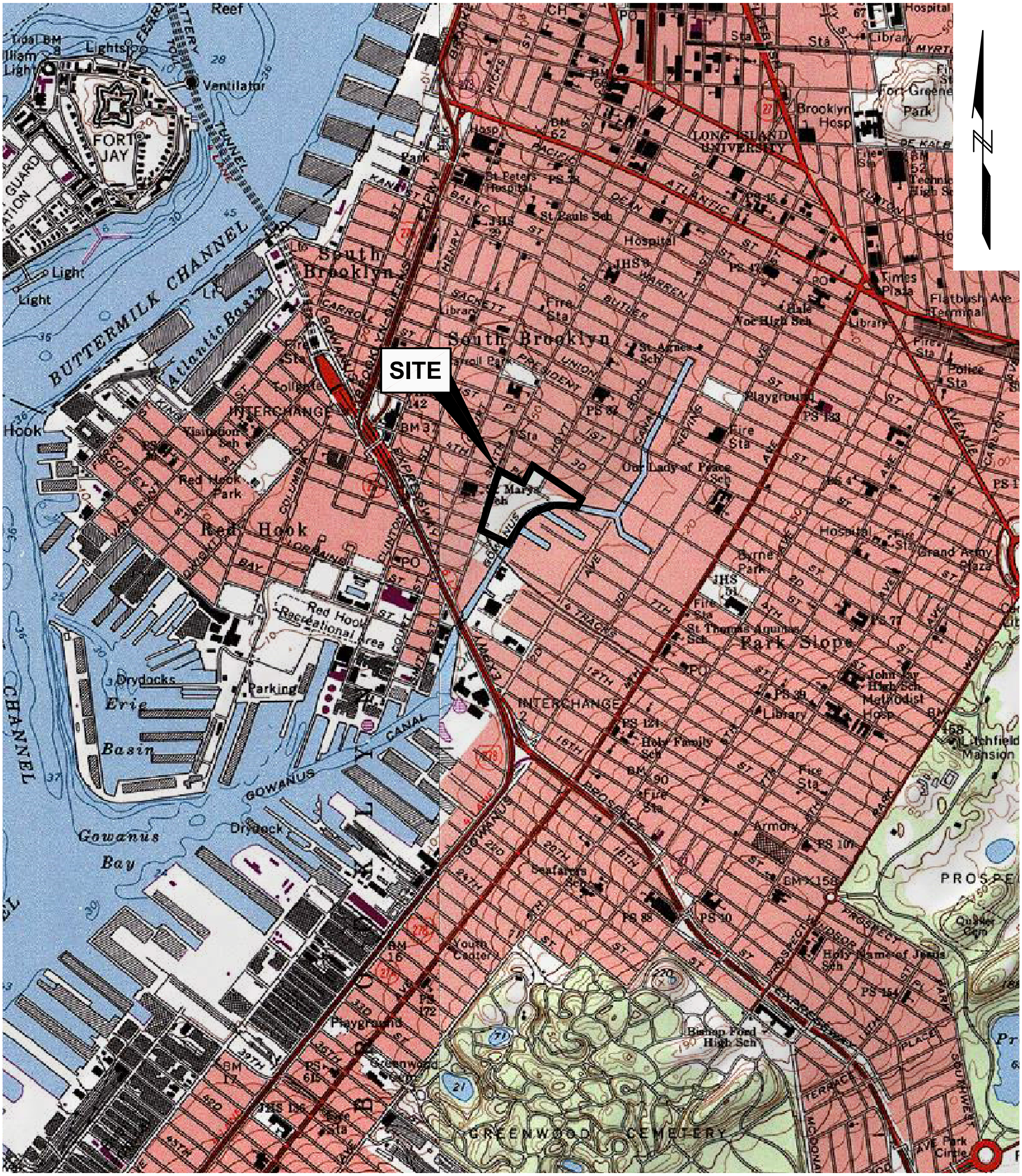
Location refers to on site grid system

Northing and Easting is relative to North American Datum of 1983 (NAD83), New York State Plane Coordinate System, East Zone (3101)

Elevation is relative to the North American Vertical Datum of 1988 (NAVD88)

Depth is relative to feet below ground top of riser (btor)

Figures



NOTES:
MAP CREATED WITH TOPO! ® ©2001 NATIONAL GEOGRAPHIC (www.nationalgeographic.com/topo)

DATA REPORT CARROLL GARDENS/PUBLIC PLACE BOROUGH OF BROOKLYN, NEW YORK	GEI Consultants	**PROJECT LOCATION**
nationalgrid	Project 093250-1-1106	October 2011 Figure 1

I:\Project\National Grid\CITIZENS\Data Report\DRAWINGS\10-2011\Figures\ Citizens-Project Location.dwg \Oct 06, 2011

SOURCE:
MAP OF THE CITY OF BROOKLYN, AS LAID OUT BY COMMISSIONERS AND CONFIRMED BY ACTS OF THE LEGISLATURE OF THE STATE OF NEW YORK, PUBLISHED BY J.H. COLTON, NEW YORK, 1849.

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

nationalgrid

GEI Consultants

Project 093250-1-1106

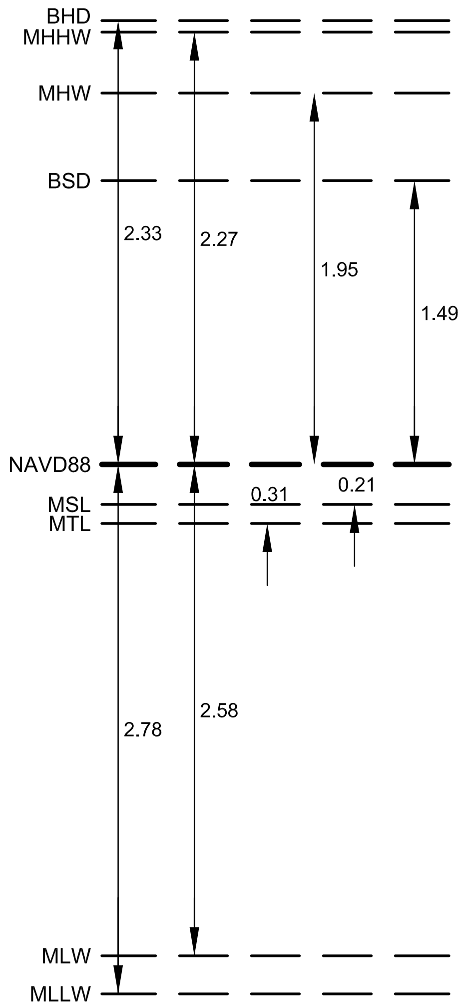
GOWANUS CREEK
HISTORICAL LAYOUT

October 2011

Figure 2

KEYSPAN\CITIZENS\SUPPLEMENTAL INV\FIGURES\CIT-1849 MAP

VERTICAL DATUM RELATIONSHIPS



DATUM ABBREVIATIONS

BHD	BROOKLYN BOROUGH HIGHWAY DATUM
BSD	BROOKLYN BOROUGH SEWER DATUM
MHHW	MEAN HIGHER-HIGH WATER
MHW	MEAN HIGH WATER
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
MSL	MEAN SEA LEVEL DATUM
MTL	MEAN TIDE LEVEL
MLW	MEAN LOW WATER
MLLW	MEAN LOWER-LOW WATER

NOTES:

1. TIDAL DATUMS REFERENCED TO THE BATTERY TIDAL STATION ON THE 1983-2001 TIDAL EPOCH.
2. PROJECT VERTICAL DATUM IS NAVD 88.
3. HORIZONTAL LINES SHOW THE RELATIONSHIP BETWEEN EL. 0 FOR EACH DATUM.

EXAMPLE:

TO CONVERT AN ELEVATION FROM MLLW TO NAVD 88, ADD 2.78 FEET.

DATA REPORT CARROLL GARDENS/PUBLIC PLACE BOROUGH OF BROOKLYN, NEW YORK nationalgrid	GEI Consultants Project 093250-1-1106	**VERTICAL DATUM RELTIONSHIPS** October 2011 Figure 3

LEGEND:

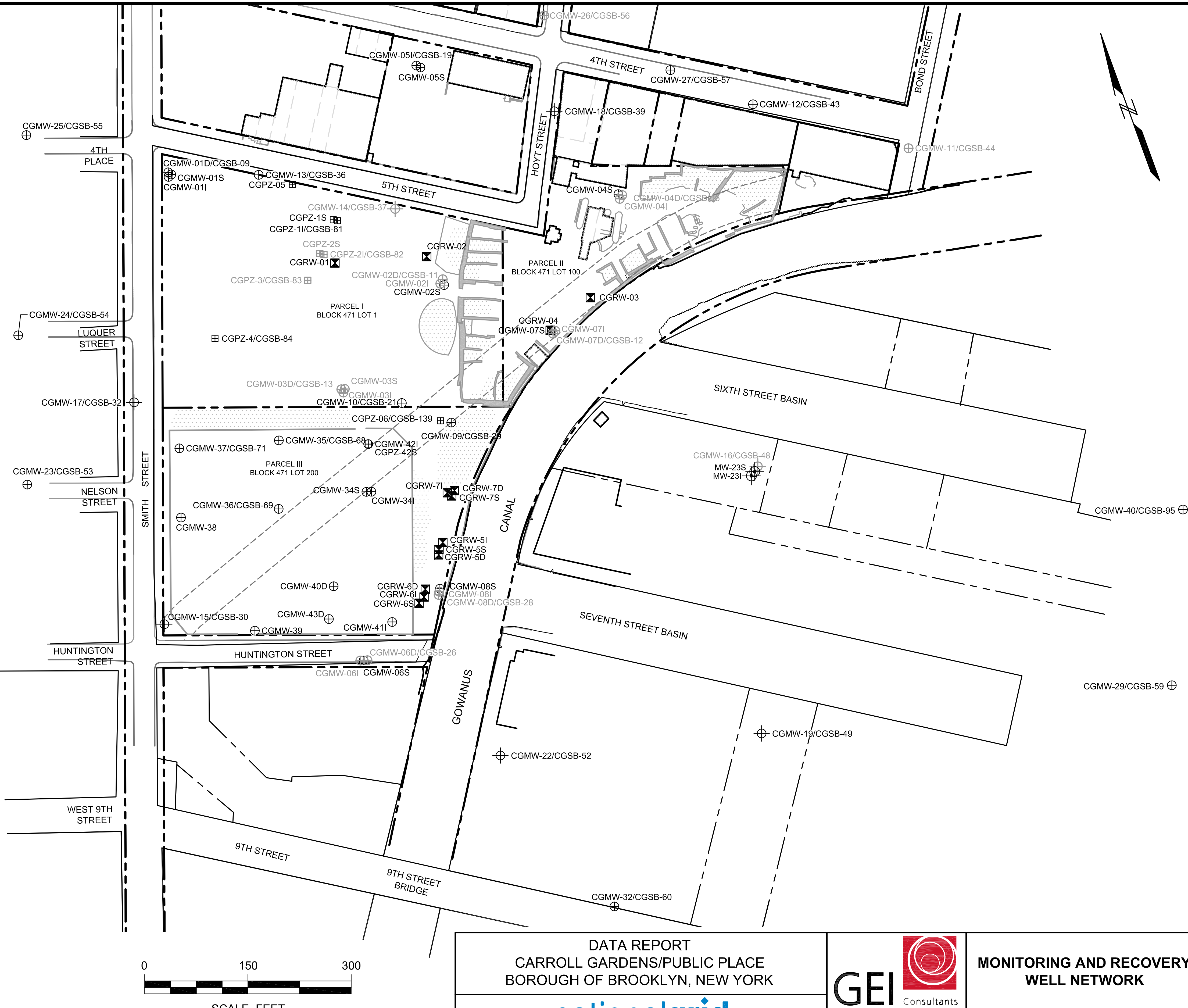
- PARCEL BOUNDARY
- APPROXIMATE PROPERTY LINE
- HISTORICAL BOND LORRAINE ST. SEWER EASEMENT 20'
- BUILDING
- ROOF LINE
- CONCRETE WALL/ AGGREGATE BIN
- REMAINING WAREHOUSE WALL
- APPROXIMATE AGGREGATE PILE LOCATION (GROUND SURFACE OBSCURED)

INVESTIGATION LEGEND:

CGMW-13/CGSB-36	MONITORING WELL, GEI, REMEDIAL INVESTIGATION & REMEDIAL DESIGN INVESTIGATION, 2003-2005, 2008-2009, 2009-2010
CGMW-03I	ABANDONED OR DESTROYED MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005
CGMW-17/CGSB-32	MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005
CGMW-14/CGSB-37	ABANDONED OR INACCESSIBLE MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005
CGPZ-05	PIEZOMETER, GEI, REMEDIAL DESIGN INVESTIGATION, 2008-2009, 2009-2010
CGPZ-2S	DESTROYED PIEZOMETER GEI, REMEDIAL DESIGN INVESTIGATION, 2008-2009, 2009-2010
CGRW-01	RECOVERY WELL, GEI, DNAPL PILOT TEST, 2009
MW-23S	MONITORING WELL, GEI, EPA GOWANUS CANAL REMEDIAL INVESTIGATION, 2010

A. SURVEY NOTES:

1. "BOUNDARY & TOPOGRAPHIC SURVEY, BLOCK 471, LOTS 1, 100 & 200, BLOCK 468, LOT 25, BOROUGH OF BROOKLYN, KINGS CO., CITY AND STATE OF NEW YORK", PREPARED FOR GEI CONSULTANTS, INC, BY GEOD CORPORATION, PHOTOGRAMMETRIC SCIENCES - SURVEY TECHNOLOGIES, 24 KANOUSE ROAD, NEWFOUNDLAND, N.J.
2. PROPERTY KNOWN AS BLOCK 471, LOT 1 (PARCEL 1), BLOCK 471, LOT 125 (PARCEL 2), BLOCK 471, LOT 200 (PARCEL 3) AND BLOCK 468, LOT 25 AS SHOWN ON THE OFFICIAL TAX MAPS OF THE BOROUGH OF BROOKLYN, KINGS COUNTY, CITY AND STATE OF NEW YORK.
3. COORDINATE AND HORIZONTAL REFERENCE BASED ON NEW YORK EAST ZONE (3101) NORTH AMERICAN DATUM OF 1983 (NAD 83). VERTICAL DATUM IS BASED UPON USC&G DATUM (NAVD 88) OBTAINED BY DIFFERENTIAL LEVELING AND STATIC GPS METHODS.
4. SURVEY OF EXPLORATION LOCATIONS CONDUCTED BY GEI CONSULTANTS, INC. BY NEW YORK STATE-LICENSED LAND SURVEYOR NO. 050146.



DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

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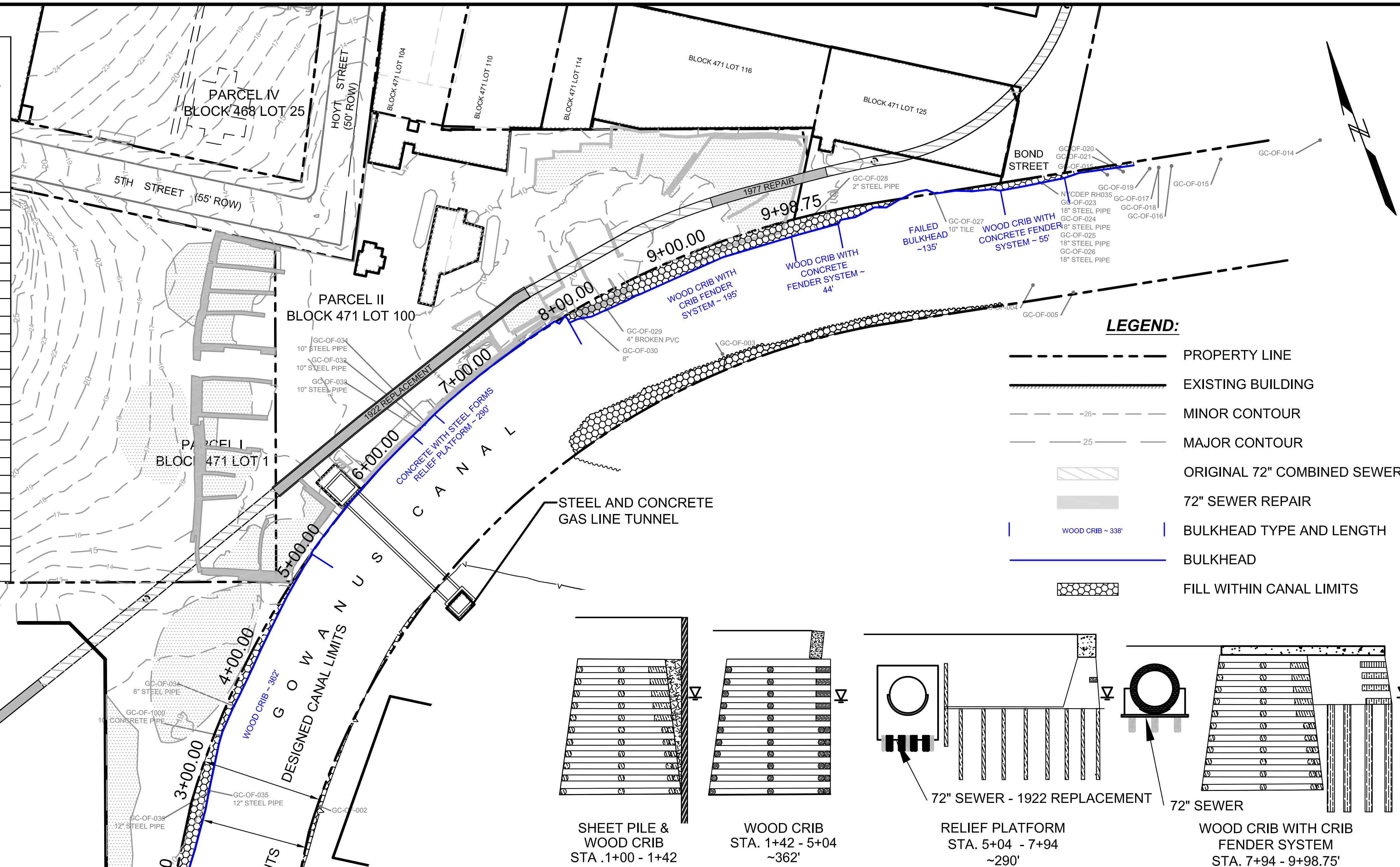
MONITORING AND RECOVERY WELL NETWORK

Project 093250-1-1106 | October 2011 | Figure 4

I:\Project\National Grid\CITIZENS\Data Report\DRAWINGS\10-2011\Figures\ Citizens MWell & RWell Network.dwg \Oct 06, 2011

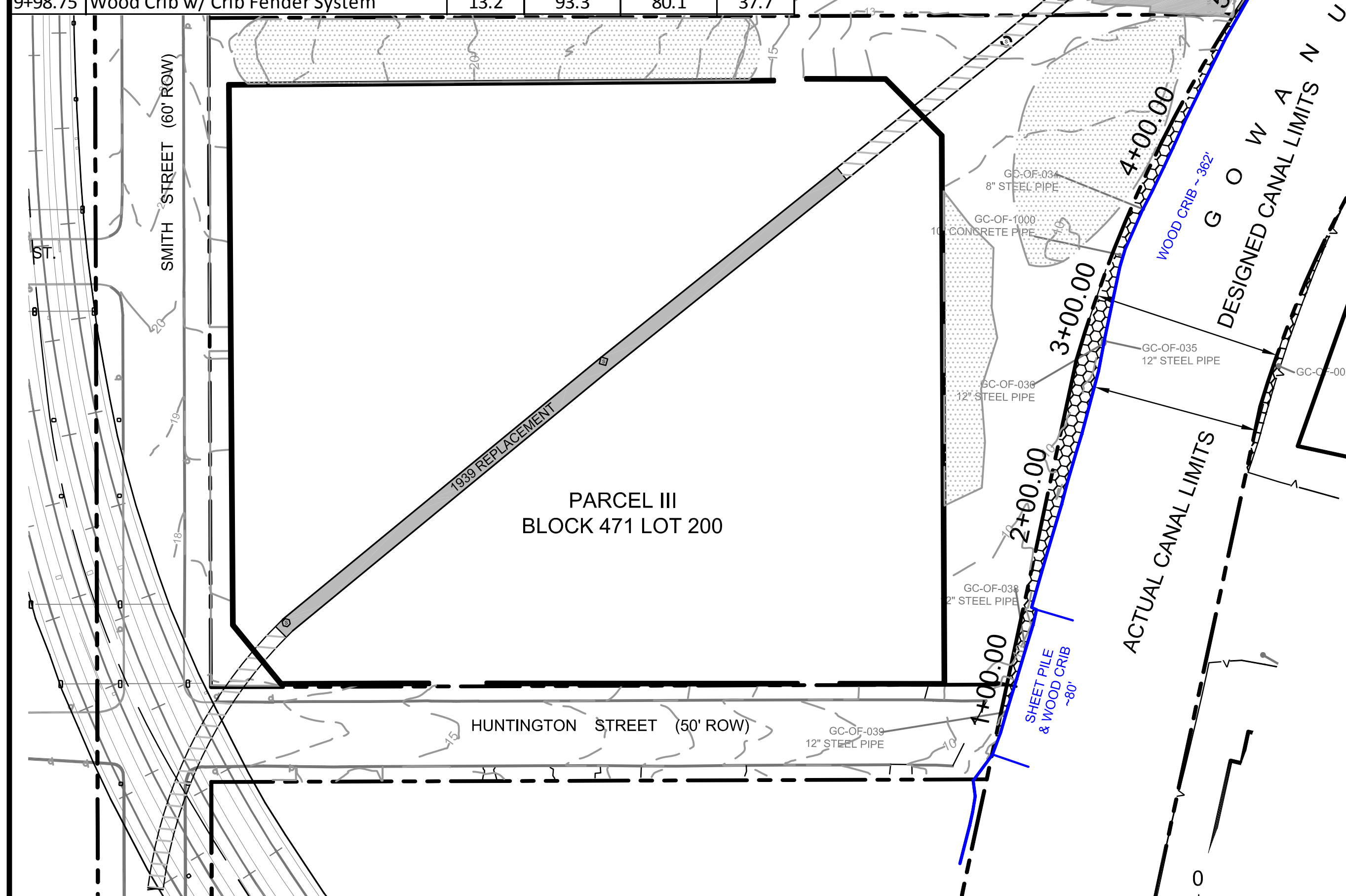
BULKHEAD SUMMARY TABLE

Station (Along Legal Canal Limit)	Bulkhead Type	Offset Distance to Western Bulkhead Face, ft	Offset Distance to Eastern Bulkhead Face, ft	Canal Width, ft	Offset Distance to Centerline of Sewer, ft
1+00	Sheet Pile & Wood Crib	4.0	101.5	97.5	>100
1+42	Wood Crib	4.2	NA - Basin	NA - Basin	>100
1+50	Wood Crib	4.7	NA - Basin	NA - Basin	>100
2+00	Wood Crib	8.4	NA - Basin	NA - Basin	>100
2+50	Wood Crib	11.6	102.5	90.9	>100
3+00	Wood Crib	10.0	103.7	93.7	>100
3+50	Wood Crib	5.8	102.7	96.9	>100
4+00	Wood Crib	6.7	101.1	94.4	>100
4+50	Wood Crib	4.0	98.4	94.4	78.6
5+00	Wood Crib	1.1	96.8	95.7	61.0
5+04	Relief Platform	0.0	96.9	96.9	59.9
5+50	Relief Platform	-0.2	100.6	100.8	47.9
6+00	Relief Platform	0.5	NA - Basin	NA - Basin	38.9
6+50	Relief Platform	0.8	NA - Basin	NA - Basin	39.9
7+00	Relief Platform	0.5	NA - Basin	NA - Basin	30.5
7+50	Relief Platform	-0.3	84.4	84.7	31.8
7+94	Wood Crib w/ Crib Fender System	6.8	84.5	77.7	32.8
8+00	Wood Crib w/ Crib Fender System	7.6	85.4	77.8	32.8
8+50	Wood Crib w/ Crib Fender System	13.7	87.1	73.4	33.9
9+00	Wood Crib w/ Crib Fender System	14.2	90.3	76.1	33.8
9+50	Wood Crib w/ Crib Fender System	13.3	93.0	79.7	35.4
9+98.75	Wood Crib w/ Crib Fender System	13.2	93.3	80.1	37.7



A. BULKHEAD NOTES:

1. BULKHEAD SECTIONS BASED ON VISUAL INSPECTION, TEST PIT AND BORING DATA COLLECTED DURING THE REMEDIAL INVESTIGATION AND REMEDIAL DESIGN INVESTIGATION, CITIZENS GAS WORKS DRAWINGS *CRIB BULKHEAD* DATED 04/19/1922, G-11 DATED 06/06/1912, 7-46 *DEPTH OF WATER AT DOCK* DATED 10/18/1913, 2-A-73 *PROPOSED DOCK REPLACEMENT* DATED 05/10/1922, 9-W-37 *PROPOSED DOCK REPLACEMENT* DATED 05/1922, AND US ARMY CORPS OF ENGINEERS' DOCUMENT *FINAL REPORT NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY EVALUATION AND CULTURAL RESOURCES ASSESSMENT FOR THE GOWANUS CANAL ETC...* DATED MAY 2004.



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0 100 200
SCALE, FEET

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

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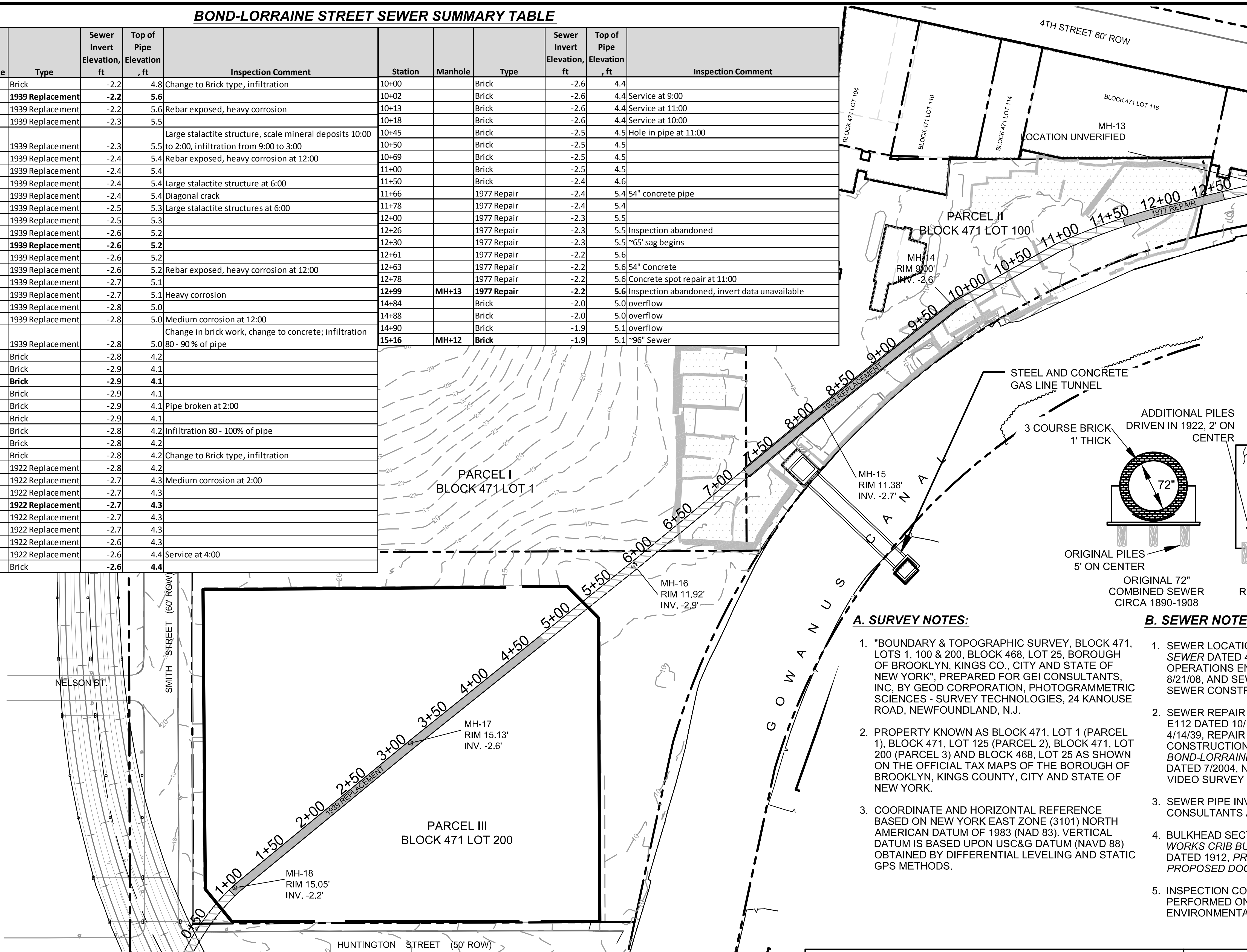
BULKHEAD SUMMARY

Project 093250-1-1106 | October 2011 | Figure 5

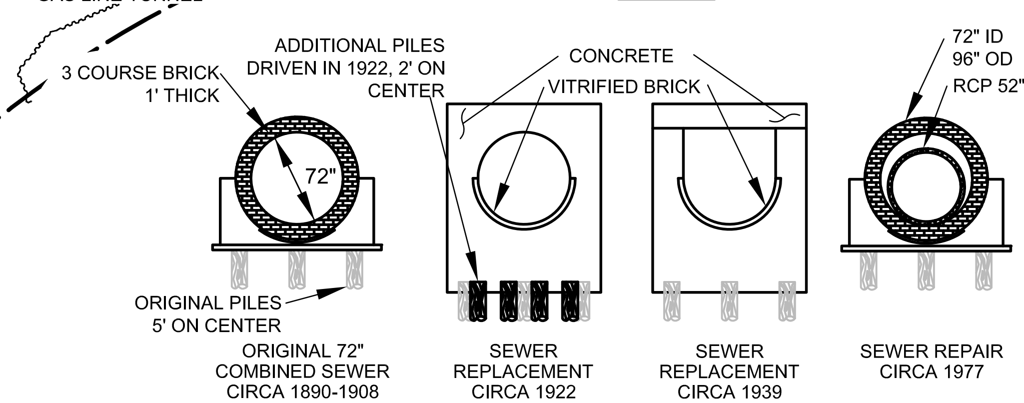
BOND-LORRAINE STREET SEWER SUMMARY TABLE

Station	Manhole	Type	Sewer Invert Elevation, ft	Top of Pipe Elevation , ft	Inspection Comment
0+95		Brick	-2.2	4.8	Change to Brick type, infiltration
1+00	**MH-18**	**1939 Replacement**	**-2.2**	**5.6**	
1+27 to +133		1939 Replacement	-2.2	5.6	Rebar exposed, heavy corrosion
1+50		1939 Replacement	-2.3	5.5	
1+61		1939 Replacement	-2.3	5.5	Large stalactite structure, scale mineral deposits 10:00 to 2:00, infiltration from 9:00 to 3:00
1+79		1939 Replacement	-2.4	5.4	Rebar exposed, heavy corrosion at 12:00
2+00		1939 Replacement	-2.4	5.4	
2+07		1939 Replacement	-2.4	5.4	Large stalactite structure at 6:00
2+17to 2+23		1939 Replacement	-2.4	5.4	Diagonal crack
2+38 to 2+43		1939 Replacement	-2.5	5.3	Large stalactite structures at 6:00
2+50		1939 Replacement	-2.5	5.3	
3+00		1939 Replacement	-2.6	5.2	
3+17	**MH+17**	**1939 Replacement**	**-2.6**	**5.2**	
3+50		1939 Replacement	-2.6	5.2	
3+48 to 3+76		1939 Replacement	-2.6	5.2	Rebar exposed, heavy corrosion at 12:00
4+00		1939 Replacement	-2.7	5.1	
4+18 to 4+28		1939 Replacement	-2.7	5.1	Heavy corrosion
4+50		1939 Replacement	-2.8	5.0	
4+64 to 4+69		1939 Replacement	-2.8	5.0	Medium corrosion at 12:00
4+77		1939 Replacement	-2.8	5.0	Change in brick work, change to concrete; infiltration 80 - 90 % of pipe
5+00		Brick	-2.8	4.2	
5+50		Brick	-2.9	4.1	
5+88	**MH+16**	**Brick**	**-2.9**	**4.1**	
6+00		Brick	-2.9	4.1	
6+21		Brick	-2.9	4.1	Pipe broken at 2:00
6+50		Brick	-2.9	4.1	
6+87 to 8+17		Brick	-2.8	4.2	Infiltration 80 - 100% of pipe
7+00		Brick	-2.8	4.2	
7+26		Brick	-2.8	4.2	Change to Brick type, infiltration
7+50		1922 Replacement	-2.8	4.2	
7+65		1922 Replacement	-2.7	4.3	Medium corrosion at 2:00
8+00		1922 Replacement	-2.7	4.3	
8+17	**MH+15**	**1922 Replacement**	**-2.7**	**4.3**	
8+50		1922 Replacement	-2.7	4.3	
9+00		1922 Replacement	-2.7	4.3	
9+50		1922 Replacement	-2.6	4.3	
9+59		1922 Replacement	-2.6	4.4	Service at 4:00
9+81	**MH+14**	Brick	**-2.6**	**4.4**	
10+00		Brick	-2.6	4.4	
10+02		Brick	-2.6	4.4	Service at 9:00
10+13		Brick	-2.6	4.4	Service at 11:00
10+18		Brick	-2.6	4.4	Service at 10:00
10+45		Brick	-2.5	4.5	Hole in pipe at 11:00
10+50		Brick	-2.5	4.5	
10+69		Brick	-2.5	4.5	
11+00		Brick	-2.5	4.5	
11+50		Brick	-2.4	4.6	
11+66		1977 Repair	-2.4	5.4	54" concrete pipe
11+78		1977 Repair	-2.4	5.4	
12+00		1977 Repair	-2.3	5.5	
12+26		1977 Repair	-2.3	5.5	Inspection abandoned
12+30		1977 Repair	-2.3	5.5	~65' sag begins
12+61		1977 Repair	-2.2	5.6	
12+63		1977 Repair	-2.2	5.6	54" Concrete
12+78		1977 Repair	-2.2	5.6	Concrete spot repair at 11:00
12+99	**MH+13**	**1977 Repair**	**-2.2**	**5.6**	Inspection abandoned, invert data unavailable
14+84		Brick	-2.0	5.0	overflow
14+88		Brick	-2.0	5.0	overflow
14+90		Brick	-1.9	5.1	overflow
15+16	**MH+12**	**Brick**	**-1.9**	5.1	~96" Sewer



LEGEND:

- PROPERTY LINE
- EXISTING BUILDING
- MINOR CONTOUR
- MAJOR CONTOUR
- ORIGINAL 72" COMBINED SEWER
- 72" SEWER REPAIR



A. SURVEY NOTES:

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B. SEWER NOTES:

1. SEWER LOCATION BASED ON MANHOLES, *CITIZENS WORKS SURVEY OF CITY SEWER* DATED 4/14/39, NYCDEP BUREAU OF WATER AND SEWER OPERATIONS ENGINEERING DRAWING BROOKLYN *SEWER MAP* DATED 8/21/08, AND SEWER REPAIR DRAWING FROM THE BROOKLYN DIVISION OF SEWER CONSTRUCTION DATED 4/28/77.
2. SEWER REPAIR LOCATIONS BASED ON BROOKLYN UNION GAS DRAWING 2 E112 DATED 10/15/72, *CITIZENS WORKS SURVEY OF CITY SEWER* DATED 4/14/39, REPAIR DRAWING FROM THE BROOKLYN DIVISION OF SEWER CONSTRUCTION DATED 4/28/77, NYCDEP REPORT *GOWANUS BOND-LORRAINE SEWER SYSTEM SEWER CLEANING AND TV INSPECTION* DATED 7/2004, NYCDEP ACCOUNTS OF A VISUAL INSPECTION ON 3/09, AND VIDEO SURVEY PERFORMED ON 4/28/04 AND 10/2/04.
3. SEWER PIPE INVERTS OBTAINED FROM FIELD MEASUREMENTS BY GEI CONSULTANTS AND GEOD CORPORATION.
4. BULKHEAD SECTIONS BASED ON NATIONAL GRID DRAWINGS *CITIZENS WORKS CRIB BULKHEAD* 15-B-99 DATED 1922, UNTITLED DRAWING G-12 DATED 1912, *PROPOSED DOCK REPLACEMENT* 2-A-73 DATED 05/10/1922, *PROPOSED DOCK REPLACEMENT* 9-W-37 DATED 05/1922.
5. INSPECTION COMMENTS IN SUMMARY TABLE ARE BASED ON VIDEO SURVEY PERFORMED ON 4/28/04 AND 10/2/04 VIEWED AT NEW YORK DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE.

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

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BOND-LORRAINE STREET SEWER SUMMARY

Project 093250-1-1106 | October 2011 | Figure 6

I:\Project\National Grid\CITIZENS\Data Report\DRAWINGS\10-2011\Figures\ Citizens-BL Sewer Summary.dwg \Oct 06, 2011

Plates

CONSTRUCTION OF HOLDER 5 OVER HOLDER 1 FOUNDATION, NATIONAL GRID PHOTO 24898, 08/13/30 (4/1)

INLET CONNECTINO OF HOLDER 5, NATIONAL GRID PHOTO 25717, 10/17/30 (5/1)

HEAVY OIL DEWATERING PLANT, NATIONAL GRID PHOTO 29286, 11/13/33 (6/1)

HEAVY OIL DEWATERING PLANT, NATIONAL GRID PHOTO 29286, 11/13/33 (7/1)

FORMER MGP CIRCA 1922-1933, PUBLIC PLACE SITE ECO-GOWANUS URBAN REMEDIATION BY DESIGN (1/1)

TAR SEPARATOR, NATIONAL GRID PHOTO 29532, 11/15/33 (3/1)

FORMER MGP FROM SMITH AND 9TH STREET MTA STATION - NATIONAL GRID PHOTO 1115901 UNDATED (2/1)

LEGEND:

- MGP STRUCTURE CIRCA 1969
- MGP STRUCTURE DEMOLISHED OR REMOVED PRIOR TO 1969
- FORMER TAR OR OIL PRODUCING OR HANDLING STRUCTURE
- FORMER CHEMICAL FERTILIZER PLANT STRUCTURE CIRCA 1886-1915

A. HISTORICAL CONDITIONS NOTES:

1. HISTORICAL SITE GRADE HAS BEEN RAISED WITH FILL APPROXIMATELY 5 TO 10 FEET TO THE EXISTING GRADE. BASED ON BORINGS AND TEST PITS, SIGNIFICANT PORTIONS OF THE STRUCTURES (GAS HOLDERS, BUILDINGS WALLS AND FOUNDATIONS) AND PIPING REMAIN BELOW THE EXISTING GRADE.
2. HISTORICAL CONDITIONS SHOWN REPRESENT A COMPILATION OF FORMER SITE CONDITIONS SPANNING FROM 1886 TO 1969 AND ARE COMPILED FROM FROM NATIONAL GRID DRAWINGS B-40 *CITIZENS WORKS PROPERTY PLAN* DATED 10/1937 AND CORRECTED 05/1964, UNTITLED DRAWING DATED 10/23/1920, DRAWING OA3 *PLAN OF CITIZENS WORKS* DATED 01/11/1915 AND SANBORN FIRE INSURANCE MAPS DATED 1886, 1904, 1915, 1922, 1928, 1938, 1950, AND 1969.
3. GAS HOLDER 5 WAS CONSTRUCTED WITHIN THE FOOTPRINT OF GAS HOLDER 1 IN 1930.
4. HISTORICAL PHOTOGRAPH OBTAINED FROM NATIONAL GRID AND PLUNZ AND CULLIGAN, 2007, EDO-GOWANUS URBAN REMEDIATION BY DESIGN, P.32.

0 40 80
SCALE, FEET

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

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PROJECT 093250-1-1106

GEI Consultants
1 GREENWOOD AVENUE
SUITE 210
MONTCLAIR, NJ 07042

HISTORICAL MANUFACTURED GAS PLANT LAYOUT

October 2011

Plate 1

I:\Project\National Grid\CITIZENS\Data Report\DRAWINGS\10-2011\ Citizens-Historical Conditions.dwg \Oct 06, 2011

LEGEND:

- PROPERTY LINE
- HISTORICAL BOND LORRAINE ST. SEWER EASEMENT 20'
- 30 MAJOR CONTOUR
- 29 MINOR CONTOUR
- BUILDING
- ROOF LINE
- CONCRETE WALL/ AGGREGATE BIN
- REMAINING WAREHOUSE WALL
- APPROXIMTE AGGREGATE PILE LOCATION (GROUND SURFACE OBSCURED)
- SEWER MANHOLE
- MTA RAIL
- MTA TRACK CENTERLINE
- MTA SUPPORT COLUMN
- CHAIN-LINK FENCE
- FORMER GAS HOLDER
- GC-OF-033 10" STEEL PIPE — OUTFALL
- FORMER MGP STRUCTURE

INVESTIGATION LEGEND:

CGSB-02	ROTOSONIC SOIL BORING, GEI, REMEDIAL INVESTIGATION 2003-2005 AND 2009-2010
CGMW-13/CGSB-36	MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
CGMW-03I	ABANDONED MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
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CGMW-14/CGSB-37	DESTROYED MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
CGRW-7D	RECOVERY WELL, GEI, DNAPL RECOVERY PILOT TEST, 2009
CGSB-142	MUD ROTARY SOIL BORING, GEI, REMEDIAL DESIGN INVESTIGATION, 2008-2009
CGSB-130/CGCPT-130	CONE PENETROMETER SOUNDING, GEI REMEDIAL DESIGN INVESTIGATION, 2008-2009
CGPZ-05	PIEZOMETER, GEI, REMEDIAL DESIGN INVESTIGATION, 2008
CGPZ-2S	DESTROYED PIEZOMETER GEI, REMEDIAL DESIGN INVESTIGATION, 2008
CGTP-103A	TEST PIT, GEI, REMEDIAL INVESTIGATION AND REMEDIAL DESIGN INVESTIGATION, 2003-2005, 2008-2009, 2010
GC-SED-49	VIBRACORE SEDIMENT CORE, GEI, GOWANUS CANAL REMEDIAL DESIGN INVESTIGATION, 2006
TP-6	TEST PIT, METCALF & EDDY, TEST PIT SOIL SAMPLING AND DRUM CLASSIFICATION, 2005
GW-6	PREVIOUS MONITORING WELL, ROUX ASSOCIATES, 1989
CGSS-14	SURFACE SOIL SAMPLE, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
CGGP-01	GEOPROBE SOIL BORING, GEI REMEDIAL INVESTIGATION 2003-2005 AND 2009-2010
CGSV-01	GEOPROBE SOIL BORING AND SOIL VAPOR SAMPLE, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
SS-1	SURFACE SOIL SAMPLE, ROUX ASSOCIATES, 1989
7	SHALLOW SOIL SAMPLE (WITHIN 3' OF GROUND SURFACE), TRC ENVIRONMENTAL CONSULTANTS, 1985
CGSS-15	PARCEL III SURFACE SOIL SAMPLE (LOCATION APPROXIMATE)
SV-30	SOIL VAPOR SAMPLE, ROUX ASSOCIATES, 1988

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0 40 80
SCALE, FEET

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

nationalgrid

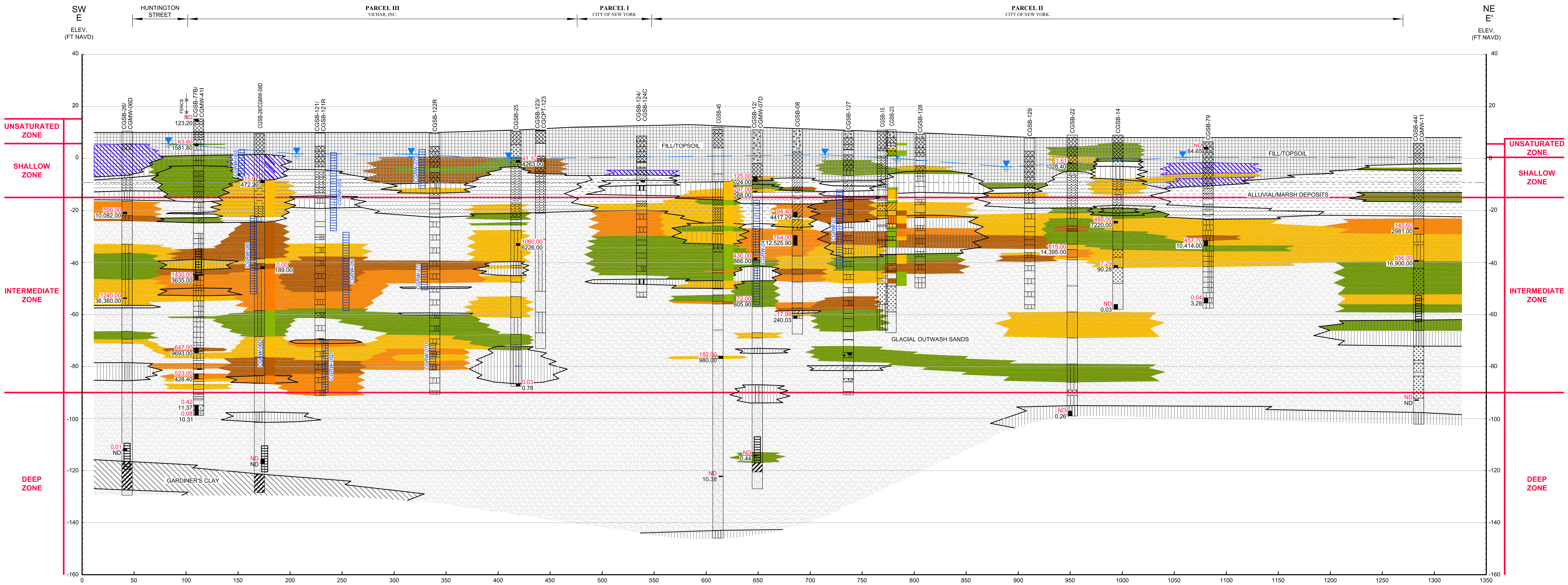
PROJECT 093250-1

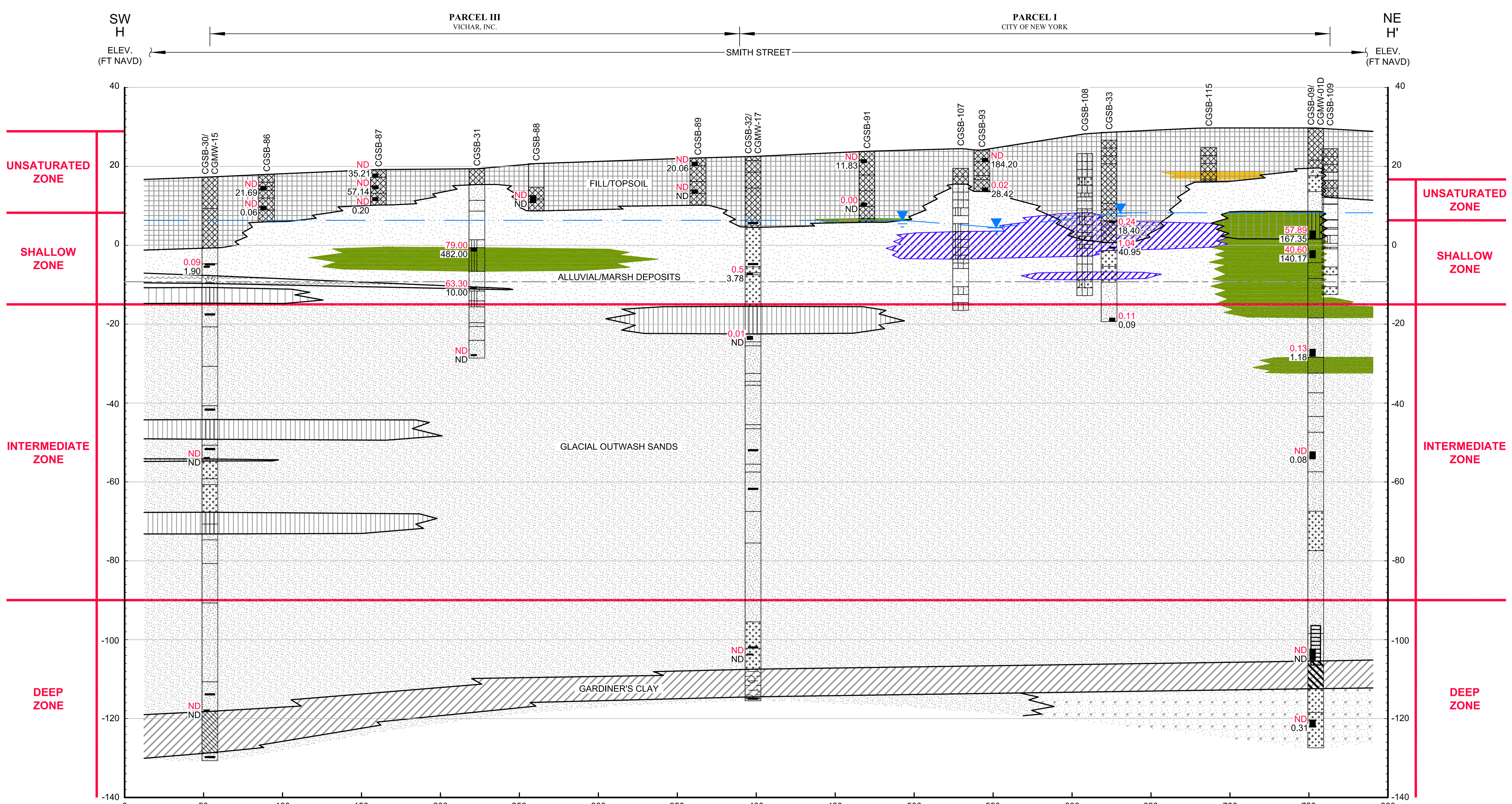
GEI Consultants
1 GREENWOOD AVENUE
SUITE 210
MONTCLAIR, NJ 07042

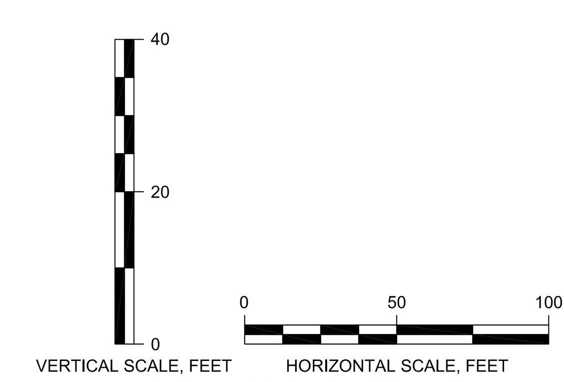
EXPLORATION PLAN

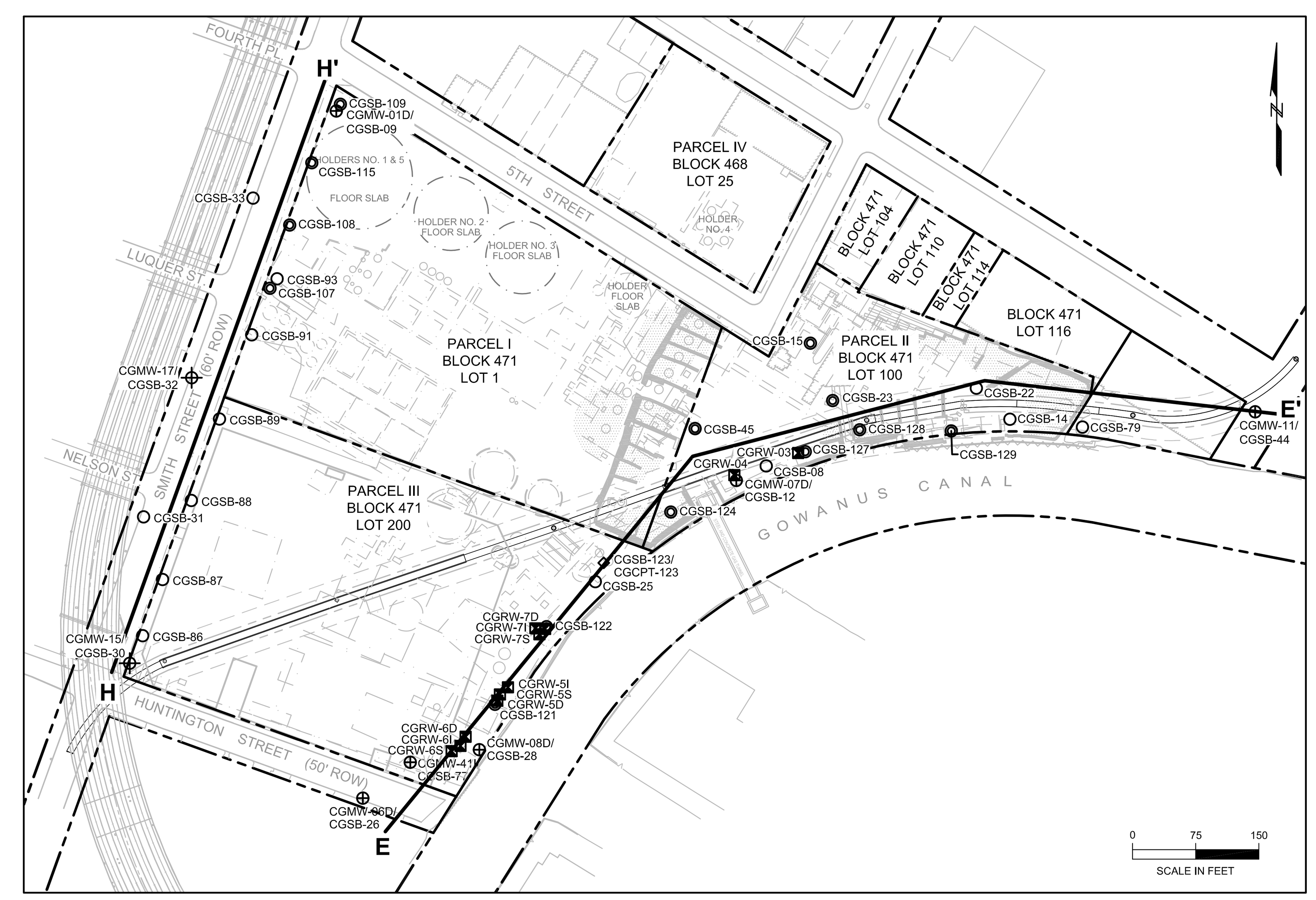
October 2011

Plate 2









CROSS SECTION LOCATION MAP

SCALE: 1" = 150'

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LEGEND

GENERALIZED SOIL TYPES - ALLUVIAL/MARSH DEPOSITS

- SAND (shallow)
- SILT (shallow)
- SILT-CLAY
- CLAY (shallow)
- PEAT

GENERALIZED SOIL TYPES - GLACIAL DEPOSITS

- SILT (deep)
- SILT-SAND
- TILL
- CLAY (deep)
- SAND (deep)

GENERALIZED SOIL TYPES - PRE-GLACIAL DEPOSITS

- GARDINER'S CLAY
- GRAVELLY-SAND (JAMECO GRAVEL)

GENERALIZED SOIL TYPES - FILL

- FILL

GENERALIZED SOIL TYPES - BEDROCK

- GNEISS

VISUAL IMPACTS

- TAR SATURATED
- TAR STAINING AND SHEEN
- LENSES WITH TAR SATURATION
- BLEBS, GLOBS, LENSES, COATINGS AND SHEENS
- PETROLEUM SHEEN/STAINING
- SOLID TAR
- PURIFIER MATERIAL

USCS SOIL TYPES - LOGS

- CONCRETE
- FILL
- LOW PLASTICITY CLAY
- POORLY-GRADED SAND
- WELL-GRADED SAND
- BOULDERS AND COBBLES
- ASPHALT
- PEAT
- SILTY SAND
- LOW PLASTICITY ORGANIC SILT OR CLAY
- SILT
- CLAYEY SAND
- MODERATE TO HIGHLY PLASTICITY ORGANIC SILTS AND CLAYS
- FAT CLAY
- ELASTIC SILT
- CLAYEY GRAVEL
- SILTY GRAVEL, SILTY GRAVEL WITH SAND
- POORLY GRADED GRAVEL, POORLY GRADED GRAVEL WITH SAND
- WELL GRADED GRAVEL, WELL GRADED GRAVEL WITH SAND

CGSB-09/ CGMW-01D — SOIL BORING/ MONITORING WELL IDENTIFICATION

0.13 — BTEX mg/kg
1.18 — PAH mg/kg

ANALYTICAL SOIL SAMPLE INTERVAL

WELL SCREEN INTERVAL

ND — NOT DETECTED

CGRW-06D — RECOVERY WELL SCREEN INTERVAL

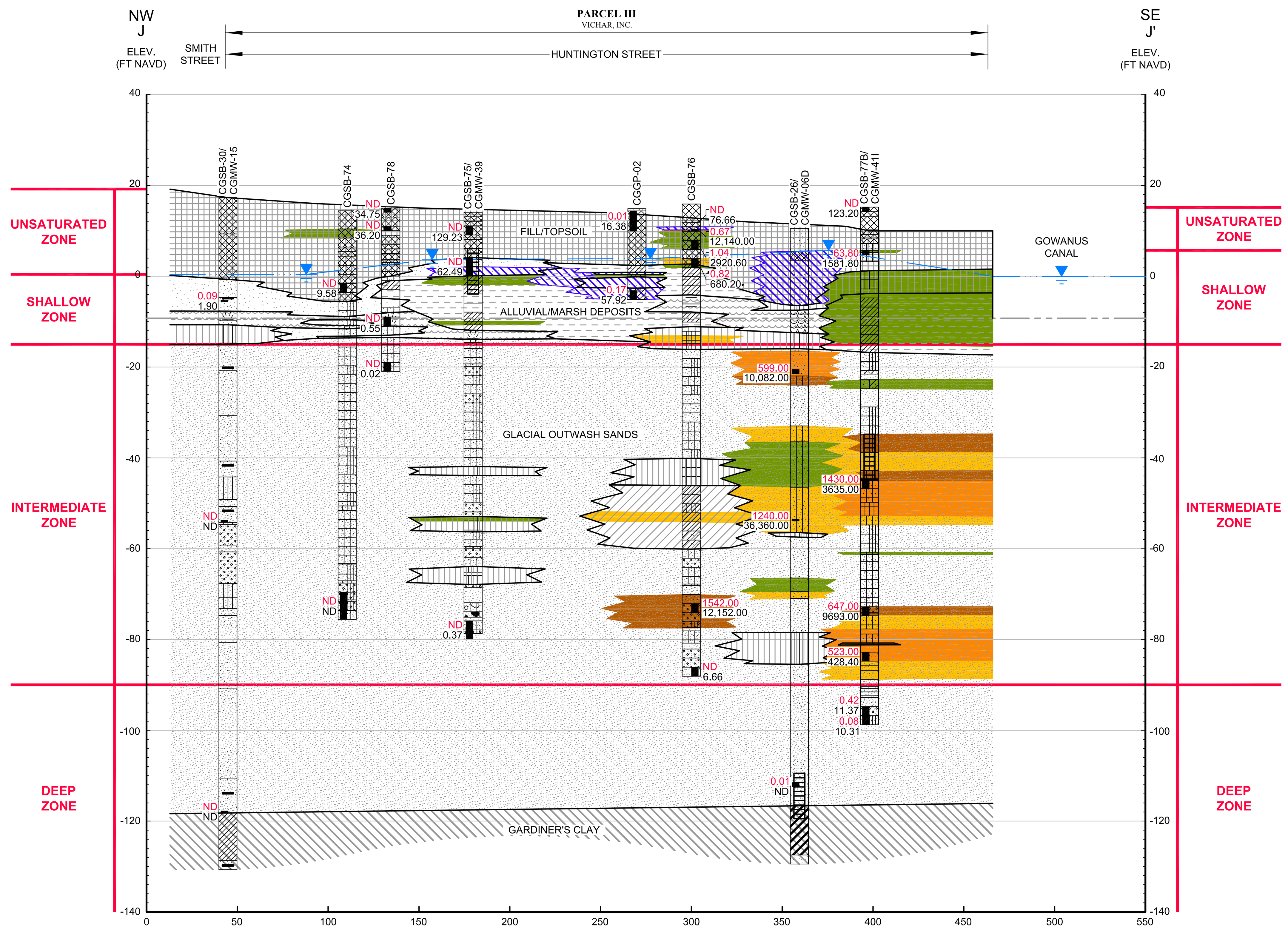
APPROXIMATE MUDLINE ELEVATION

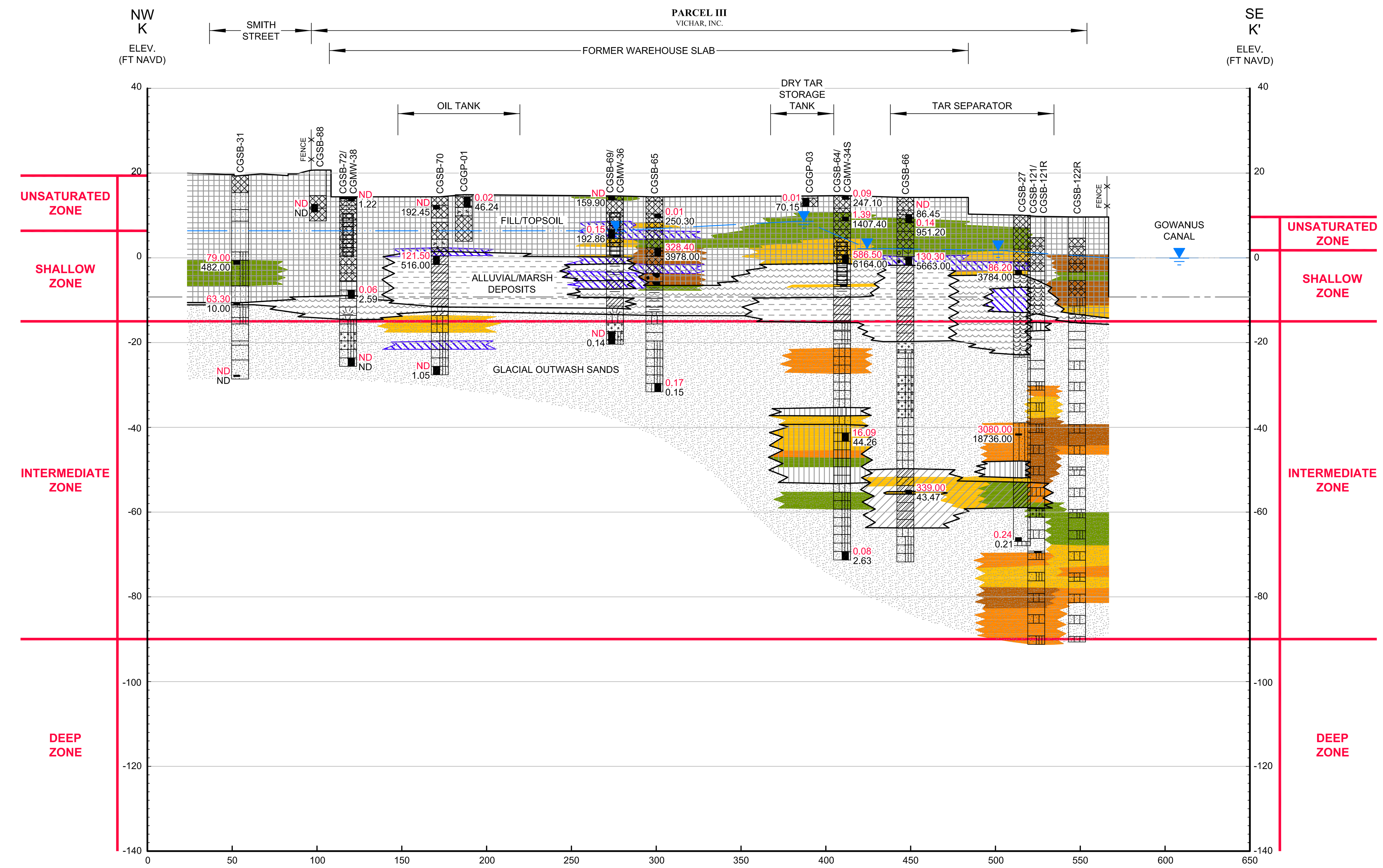
CONTACT

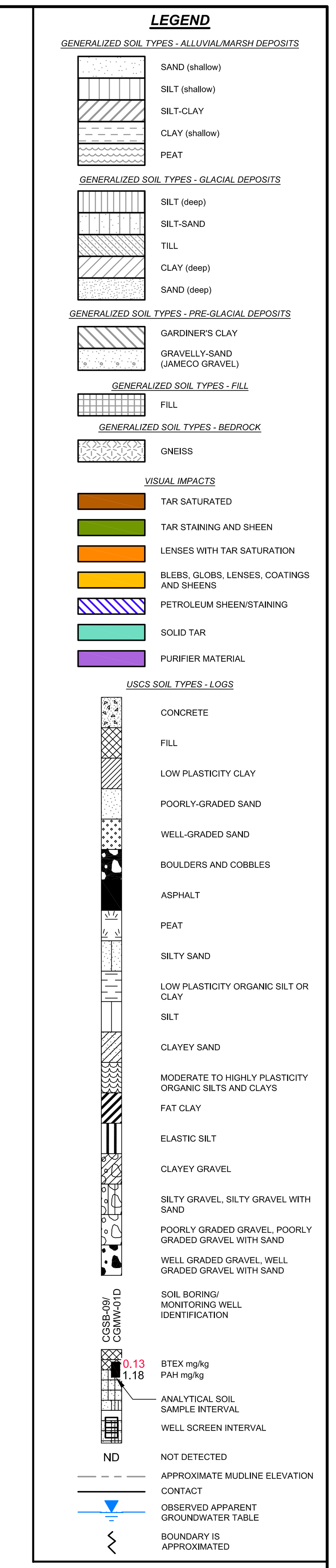
OBSERVED APPARENT GROUNDWATER TABLE

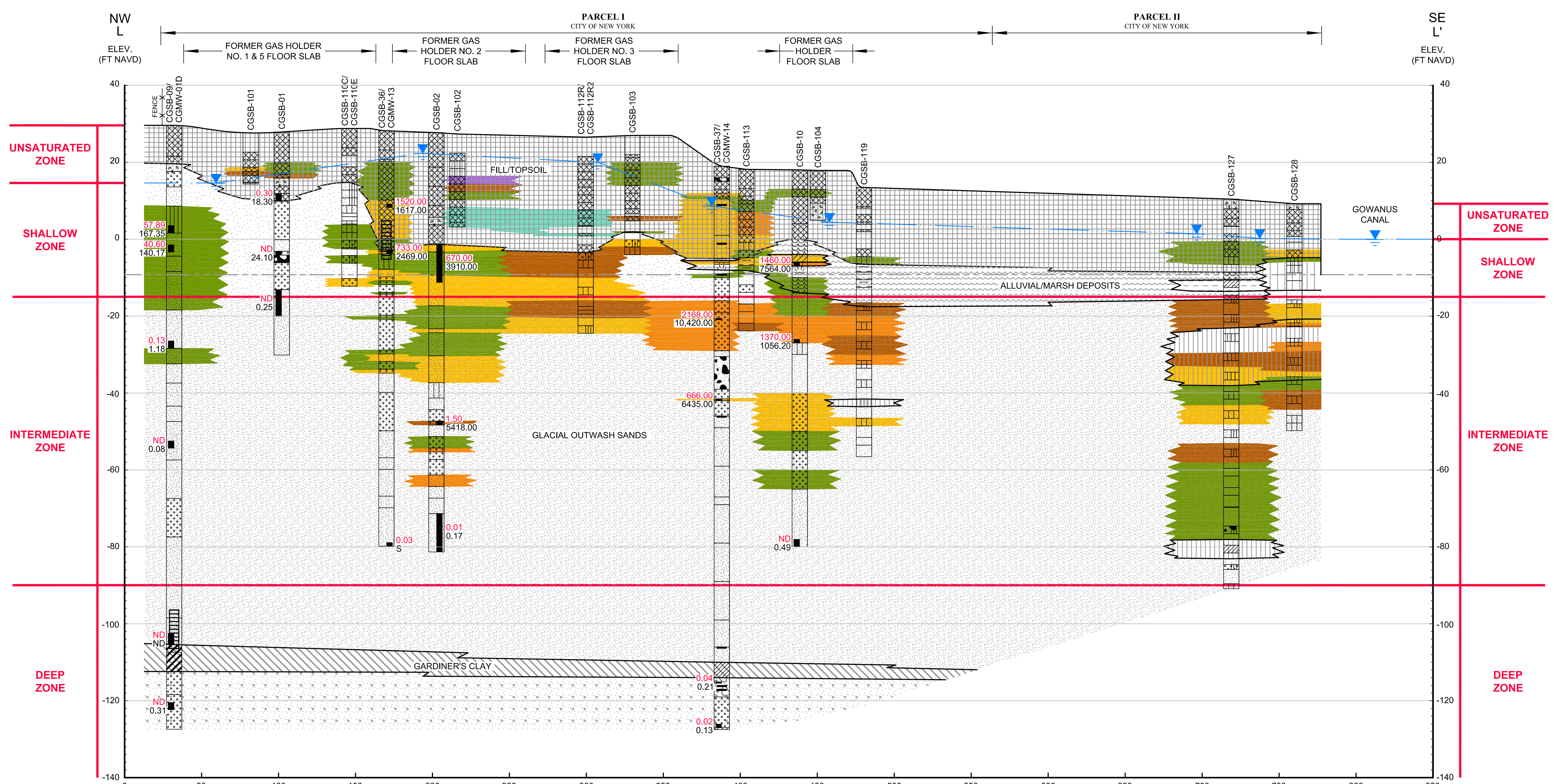
BOUNDARY IS APPROXIMATED

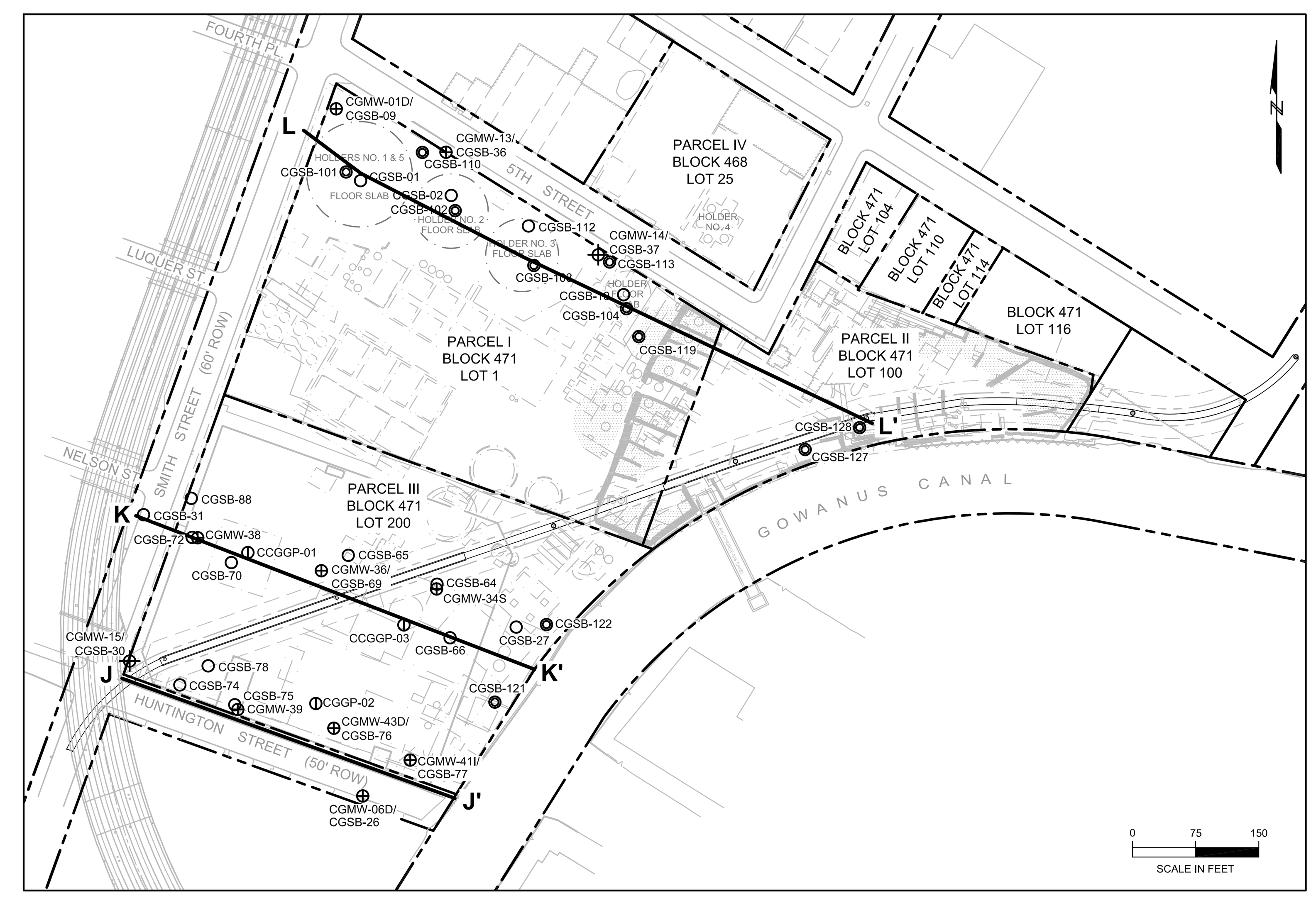
DATA REPORT CARROLL GARDENS/PUBLIC PLACE BOROUGH OF BROOKLYN, NEW YORK	GEI Consultants 1 GREENWOOD AVENUE SUITE 210 MONTCLAIR, NJ 07042	GEOLOGIC CROSS SECTIONS E-E' AND H-H'	
nationalgrid			
PROJECT 093250-1-1106		October 2011	Plate 3





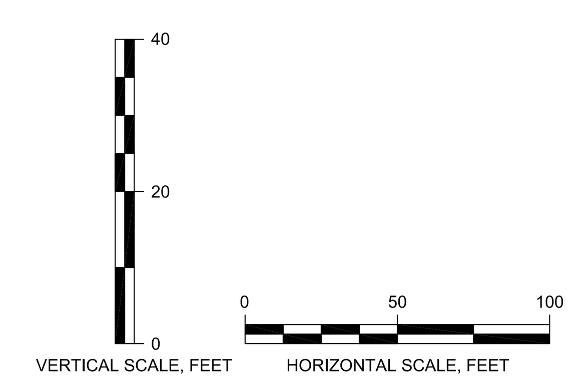






CROSS SECTION LOCATION MAP

SCALE: 1" = 150'



A. SURVEY NOTES:

1. *BOUNDARY & TOPOGRAPHIC SURVEY, BLOCK 471, LOTS 1, 100 & 200, BLOCK 468, LOT 25, BOROUGH OF BROOKLYN, KINGS CO., CITY AND STATE OF NEW YORK,* PREPARED FOR GEI CONSULTANTS, INC, BY GEOD CORPORATION, PHOTOGRAMMETRIC SCIENCES - SURVEY TECHNOLOGIES, 24 KANOUSE ROAD, NEWFOUNDLAND, N.J.
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4. SURVEY OF SAMPLE LOCATIONS CONDUCTED BY GEI CONSULTANTS, INC. BY NEW YORK STATE-LICENSED LAND SURVEYOR NO. 050146.

DATA REPORT CARROLL GARDENS/PUBLIC PLACE BOROUGH OF BROOKLYN, NEW YORK	GEI Consultants 1 GREENWOOD AVENUE SUITE 210 MONTCLAIR, NJ 07042	**GEOLOGIC CROSS SECTIONS J-J', K-K', AND L-L'**
nationalgrid PROJECT 093250-1-1106		October 2011 Plate 4

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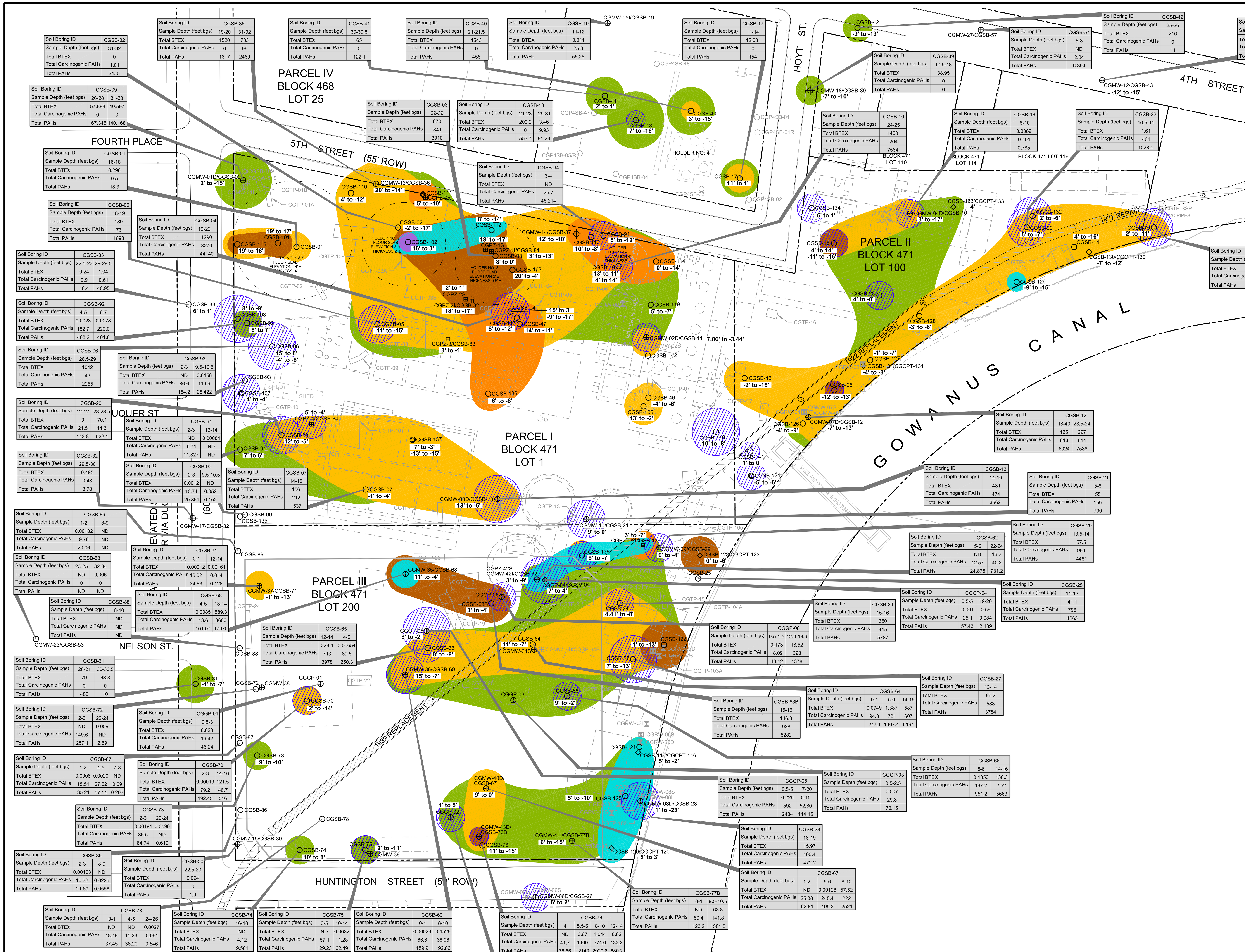

LEGEND

APPROXIMATE BOUNDARY OF FORMER MGP SITE
SEA WALL
CURRENT STRUCTURE
EXISTING CHAIN LINK FENCE
FORMER GAS HOLDER
FORMER MGP STRUCTURE
TAX ASSESSOR'S BOUNDARIES
PARCEL BOUNDARIES
PARCEL I — PARCEL NUMBER
CITY OF NEW YORK — OWNER

INVESTIGATION LEGEND:

CGSB-02 — SOIL BORING, GEI, REMEDIAL INVESTIGATION AND REMEDIAL DESIGN INVESTIGATION, 2003-2005, 2008-2009, AND 2009-2010.
CGMW-13/CGSB-36 — MONITORING WELL, GEI, REMEDIAL INVESTIGATION AND REMEDIAL DESIGN INVESTIGATION, 2003-2005, 2008-2009, AND 2009-2010
CGMW-17/CGSB-32 — MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005
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CGTP-103A — TEST PIT, GEI, REMEDIAL INVESTIGATION AND REMEDIAL DESIGN INVESTIGATION, 2003-2005, 2008-2009, 2010
CGGP-01 — GEOPROBE SOIL BORING, GEI REMEDIAL INVESTIGATION 2003-2005

PHYSICAL OBSERVATIONS

TAR SATURATED
LENSES WITH TAR SATURATION
BLEBS, GLOBS, LENSES, COATINGS, SHEENS
TAR STAINING, SHEEN
PETROLEUM SHEEN/ STAINING
SOLID TAR

-1' to -12' — ELEVATION NAVD OF VERTICAL EXTENT OF OBSERVED TAR IMPACTS
CGSB-02 / CGMW-03D/CGSB-13 — SAMPLE LOCATION USED FOR DELINEATION

Soil Boring ID	CGSB-28
Sample Depth (feet bgs)	18-19
Total BTEX	15.97
Total Carcinogenic PAHs	100.4
Total PAHs	472.2

SUMMARY OF SOIL ANALYTICAL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)

BTEX — BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
PAHs — POLYCYCLIC AROMATIC HYDROCARBONS
ft bgs — FEET BELOW GROUND SURFACE
ND — NOT DETECTED

A. SURVEY NOTES:

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0 50 100
SCALE, FEET

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

nationalgrid

PROJECT 093250-1-1106

GEI Consultants
1 GREENWOOD AVENUE
SUITE 210
MONTCLAIR, NJ 07042

LATERAL EXTENT AND SOIL ANALYTICAL SUMMARY IN THE SHALLOW SOIL ZONE (TO ELEVATION APPROXIMATELY -15 FT NAVD)

October 2011

Plate 5

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Soil Boring ID	Sample Depth (feet bgs)	Total BTEX	Total Carcinogenic PAHs	Total PAHs
CGSB-02	75-76	1.5	369	5418
CGSB-02	99-109	0.007	0	0.167
CGSB-36	107-108	0.0026	0	0.13
CGSB-41	38-38.5	59.74	0	148.40
CGSB-41	56-56.5	0.003	0	0.203
CGSB-40	39-40	620	10	579
CGSB-40	58-59	0.0182	0	0.444
CGSB-19	57-58	0.015	0	0.491
CGSB-19	63-64	0.006	0	0.558
CGSB-17	37-38	2070	82	2721
CGSB-17	60-62	0.01	0	0.442
CGSB-42	40-40.5	0.0061	0	0.53
CGSB-42	55.5-56	0	0	0
CGSB-57	25-28	0.0016	0	ND
CGSB-39	27-27.5	3470	0	980
CGSB-39	77-78	0.036	0	0.095
CGSB-43	57-57.5	0.03	0	1.315
CGSB-58	34.5-36	12.34	19.9	181.3
CGSB-58	67.5-69	ND	0	ND
CGSB-09	56-58	0.128	0	1.1814
CGSB-09	82-84	0	0.6	0.84
CGSB-37	39.5-40	2168	0	10420
CGSB-37	60.5-61	666	325	6435
CGSB-18	65-67	0.015	0	0.369
CGSB-16	24-26	509.6	676	8270
CGSB-16	74-77	0.159	0	0.19
CGSB-22	44-44	815	1287	14395
CGSB-44	32.5-33	145.6	172	2981
CGSB-44	45-45.5	656	1170	16900
CGSB-01	41-48	0.0014	0	0.254
CGSB-04	44-49	940	847	11966
CGSB-04	106-07	0.0067	0	0.444
CGSB-33	47-48	0.108	0	0.091
CGSB-06	45-49	0.002	0	0
CGSB-05	48-49	145.8	107	1920
CGSB-05	77-78	0.0057	0	0.431
CGSB-20	46-48	0.005	0	0
CGSB-79	38-40	457.7	971	10414
CGSB-79	60-62	0.0378	0.398	3.281
CGSB-15	34-36	166	650	12178
CGSB-15	42-43	1450	221	4269
CGSB-15	73-75	6.59	0	2.185
CGSB-14	33-34	488	522	7220
CGSB-14	50-51	7.29	7.09	90.28
CGSB-14	65-67	0.001	0	0.027
CGSB-23	36-37	589	712	10306
CGSB-23	38.5-39.5	413	410	5866
CGSB-23	67-70	0.477	0.045	1.764
CGSB-10	44-45	1370	46	1056.2
CGSB-10	96-98	0.004	0	0.487
CGSB-11	41-44	1747	370	7247
CGSB-11	63-65	850	169	2582
CGSB-08	32-34	94.4	437.29	4417.29
CGSB-08	41-45	764	1160.9	12525.9
CGSB-08	72-73	17.99	25.126	240.026
CGSB-12	49-50	2430	2676	30866
CGSB-12	66-66	72	81.8	805.9
CGSB-32	45.5-46.5	0.0104	0	0
CGSB-13	73-74	65.9	229	1934
CGSB-07	37-39	0.001	0	0.143
CGSB-68	33-34	0.561	ND	0.148
CGSB-21	37-38	33.87	203	2041
CGSB-21	45-48	3.6	0	0
CGSB-62	38-40	286.9	1.123	6.283
CGSB-62	82-86	0.463	0.469	5.371
CGSB-71	38-40	0.01086	ND	ND
CGSB-63B	80-81	0.0378	0.018	1.004
CGSB-25	43-44	1060	336	6226
CGSB-25	97-98	0.03	0.093	0.783
CGSB-72	38-40	0.0035	ND	ND
CGSB-65	44-46	0.174	ND	0.153
CGSB-24	83-85	2550	4370	47070
CGSB-64	56-58	16.09	4.09	44.26
CGSB-64	84-86	0.0833	0.46	2.634
CGSB-31	47-47.5	0	0	0
CGSB-70	40-42	0.0012	0.346	1.053
CGSB-69	32-35	ND	ND	0.137
CGSB-27	51.5-52	3080	1676	18736
CGSB-27	76-77	0.24	0	0.212
CGSB-73	38-40	0.0066	ND	ND
CGSB-66	69-70	339	1.684	43.471
CGSB-66	84-86	0.0229	0.0091	0.4491
CGSB-30	71-71.5	0.0029	0	0
CGSB-28	51-52	2010	1931	26189
CGSB-78	34-36	0.00018	ND	0.019
CGSB-74	84-89	ND	ND	ND
CGSB-75	90-94	0.0018	ND	0.368
CGSB-76	88-90	1542	897	12152
CGSB-76	102-104	0.00414	0.808	6.663
CGSB-26	31-32	599	995	10082
CGSB-26	64-64.5	1240	3130	36360
CGSB-77B	60-62	1430	262	3635
CGSB-77B	88-90	647	720	9693
CGSB-77B	98-100	523	54.3	428.4
CGSB-67	80-84	0.0389	ND	0.44
CGSB-67	86-92	241	470	7113
CGSB-67	102-104	1410	733	8666

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Soil Boring ID	CGSB-09	
Sample Depth (feet bgs)	132-135	150-152
Total BTEX	0	0
Total Carcinogenic PAHs	0	0.087
Total PAHs	0	0.313

Soil Boring ID	CGSB-47	
Sample Depth (feet bgs)	142-143	161-161.5
Total BTEX	805	0
Total Carcinogenic PAHs	346	0
Total PAHs	6506	0.676

Soil Boring ID	CGSB-37	
Sample Depth (feet bgs)	134-134.5	145-146
Total BTEX	0.0044	0.0022
Total Carcinogenic PAHs	0	0
Total PAHs	0.212	0.13

Soil Boring ID	CGSB-16
Sample Depth (feet bgs)	135-136
Total BTEX	0.006
Total Carcinogenic PAHs	0
Total PAHs	0.15

Soil Boring ID	CGSB-43
Sample Depth (feet bgs)	101.5-102
Total BTEX	0
Total Carcinogenic PAHs	0
Total PAHs	0

Soil Boring ID	CGSB-22
Sample Depth (feet bgs)	106-108
Total BTEX	0.0029
Total Carcinogenic PAHs	0.046
Total PAHs	0.257

Soil Boring ID	CGSB-44
Sample Depth (feet bgs)	98.5-99
Total BTEX	0.0037
Total Carcinogenic PAHs	0
Total PAHs	0.645

Soil Boring ID	CGSB-46	
Sample Depth (feet bgs)	113-113.5	157-157.5
Total BTEX	1780	0
Total Carcinogenic PAHs	770	0
Total PAHs	16830	0.183

Soil Boring ID	CGSB-11	
Sample Depth (feet bgs)	127 -129	143-145
Total BTEX	134	0.0439
Total Carcinogenic PAHs	97.1	0
Total PAHs	1617	1.057

Soil Boring ID	CGSB-45
Sample Depth (feet bgs)	134-134.5
Total BTEX	0
Total Carcinogenic PAHs	1.367
Total PAHs	10.381

Soil Boring ID	CGSB-12
Sample Depth (feet bgs)	125-125.5
Total BTEX	0.003
Total Carcinogenic PAHs	0.073
Total PAHs	0.444

Soil Boring ID	CGSB-13
Sample Depth (feet bgs)	140-142
Total BTEX	0.002
Total Carcinogenic PAHs	0.101
Total PAHs	0.66

Soil Boring ID	CGSB-32
Sample Depth (feet bgs)	126-126.5
Total BTEX	0.0021
Total Carcinogenic PAHs	0
Total PAHs	0

Soil Boring ID	CGSB-24
Sample Depth (feet bgs)	103-106
Total BTEX	0.004
Total Carcinogenic PAHs	0
Total PAHs	0

Soil Boring ID	CGSB-28
Sample Depth (feet bgs)	125-127
Total BTEX	0.001
Total Carcinogenic PAHs	0
Total PAHs	0

Soil Boring ID	CGSB-30
Sample Depth (feet bgs)	135-135.5
Total BTEX	0
Total Carcinogenic PAHs	0
Total PAHs	0

Soil Boring ID	CGSB-77B	
Sample Depth (feet bgs)	110-112	112-114
Total BTEX	0.424	0.075
Total Carcinogenic PAHs	1.486	1.328
Total PAHs	11.365	10.312

Soil Boring ID	CGSB-67	
Sample Depth (feet bgs)	102-104	112-114
Total BTEX	1410	ND
Total Carcinogenic PAHs	733	0.763
Total PAHs	8666	2.495

Soil Boring ID	CGSB-26
Sample Depth (feet bgs)	122-123
Total BTEX	0.013
Total Carcinogenic PAHs	0
Total PAHs	0

LEGEND

APPROXIMATE BOUNDARY OF FORMER MGP SITE
SEA WALL
CURRENT STRUCTURE
EXISTING CHAIN LINK FENCE
FORMER GAS HOLDER
FORMER MGP STRUCTURE
TAX ASSESSOR'S BOUNDARIES
PARCEL BOUNDARIES

PARCEL I — PARCEL NUMBER
CITY OF NEW YORK — OWNER

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PHYSICAL OBSERVATIONS

TAR SATURATED
LENSES WITH TAR SATURATION
BLEBS, GLOBS, LENSES, COATINGS, SHEENS
TAR STAINING, SHEEN
PETROLEUM SHEEN/ STAINING
SOLID TAR

-1' to -12'	ELEVATION NAVD OF VERTICAL EXTENT OF OBSERVED TAR IMPACTS
-90.7'	FINAL ELEVATION NAVD OF BORING
CGSB-02 CGMW-03D/CGSB-13	SAMPLE LOCATION USED FOR DELINEATION

Soil Boring ID	CGSB-28
Sample Depth (feet bgs)	125-127
Total BTEX	0.001
Total Carcinogenic PAHs	0
Total PAHs	0

SUMMARY OF SOIL ANALYTICAL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)

BTEX	BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
PAHs	POLYCYCLIC AROMATIC HYDROCARBONS
ft bgs	FEET BELOW GROUND SURFACE
ND	NOT DETECTED

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DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

nationalgrid

PROJECT 093250-1-1106

GEI Consultants
1 GREENWOOD AVENUE
SUITE 210
MONTCLAIR, NJ 07042

LATERAL EXTENT AND SOIL ANALYTICAL SUMMARY IN THE DEEP SOIL ZONE (BELOW ELEVATION APPROXIMATELY -90 FT NAVD)

October 2011

Plate 7

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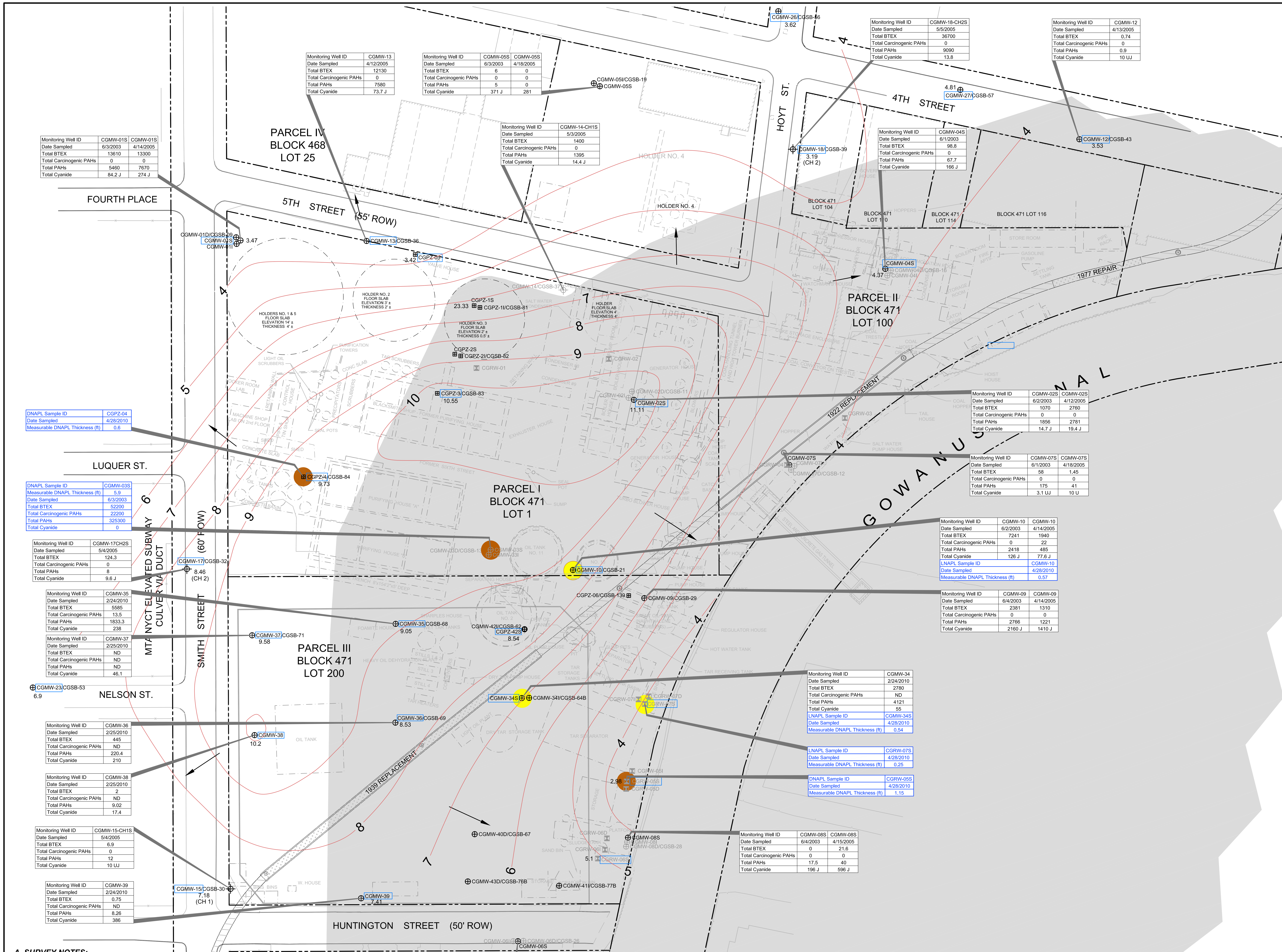

Monitoring Well ID	CGMW-01S	CGMW-01S
Date Sampled	6/3/2003	4/14/2005
Total BTEX	13610	13300
Total Carcinogenic PAHs	0	0
Total PAHs	5460	7670
Total Cyanide	84.2 J	274 J

Monitoring Well ID	CGMW-13
Date Sampled	4/12/2005
Total BTEX	12130
Total Carcinogenic PAHs	0
Total PAHs	7580
Total Cyanide	73.7 J

Monitoring Well ID	CGMW-05S	CGMW-05S
Date Sampled	6/3/2003	4/18/2005
Total BTEX	6	0
Total Carcinogenic PAHs	0	0
Total PAHs	5	0
Total Cyanide	371 J	281

Monitoring Well ID	CGMW-14-CH1S
Date Sampled	5/3/2005
Total BTEX	1400
Total Carcinogenic PAHs	0
Total PAHs	1395
Total Cyanide	14.4 J

Monitoring Well ID	CGMW-18-CH2S
Date Sampled	5/5/2005
Total BTEX	36700
Total Carcinogenic PAHs	0
Total PAHs	9090
Total Cyanide	13.8

Monitoring Well ID	CGMW-12
Date Sampled	4/13/2005
Total BTEX	0.74
Total Carcinogenic PAHs	0
Total PAHs	0.9
Total Cyanide	10 UJ

Monitoring Well ID	CGMW-04S
Date Sampled	6/1/2003
Total BTEX	98.8
Total Carcinogenic PAHs	0
Total PAHs	67.7
Total Cyanide	166 J

DNAPL Sample ID	CGPZ-04
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	0.6

DNAPL Sample ID	CGMW-03S
Measurable DNAPL Thickness (ft)	5.9
Date Sampled	6/3/2003
Total BTEX	52200
Total Carcinogenic PAHs	22200
Total PAHs	325300
Total Cyanide	0

Monitoring Well ID	CGMW-17CH2S
Date Sampled	5/4/2005
Total BTEX	124.3
Total Carcinogenic PAHs	0
Total PAHs	8
Total Cyanide	9.6 J

Monitoring Well ID	CGMW-35
Date Sampled	2/24/2010
Total BTEX	5585
Total Carcinogenic PAHs	13.5
Total PAHs	1833.3
Total Cyanide	238

Monitoring Well ID	CGMW-37
Date Sampled	2/25/2010
Total BTEX	ND
Total Carcinogenic PAHs	ND
Total PAHs	ND
Total Cyanide	46.1

Monitoring Well ID	CGMW-36
Date Sampled	2/25/2010
Total BTEX	445
Total Carcinogenic PAHs	ND
Total PAHs	220.4
Total Cyanide	210

Monitoring Well ID	CGMW-38
Date Sampled	2/25/2010
Total BTEX	2
Total Carcinogenic PAHs	ND
Total PAHs	9.02
Total Cyanide	17.4

Monitoring Well ID	CGMW-15-CH1S
Date Sampled	5/4/2005
Total BTEX	6.9
Total Carcinogenic PAHs	0
Total PAHs	12
Total Cyanide	10 UJ

Monitoring Well ID	CGMW-39
Date Sampled	2/24/2010
Total BTEX	0.75
Total Carcinogenic PAHs	ND
Total PAHs	8.26
Total Cyanide	386

Monitoring Well ID	CGMW-02S	CGMW-02S
Date Sampled	6/2/2003	4/12/2005
Total BTEX	1070	2760
Total Carcinogenic PAHs	0	0
Total PAHs	1856	2781
Total Cyanide	14.7 J	19.4 J

Monitoring Well ID	CGMW-07S	CGMW-07S
Date Sampled	6/1/2003	4/18/2005
Total BTEX	58	1.45
Total Carcinogenic PAHs	0	0
Total PAHs	175	41
Total Cyanide	3.1 UJ	10 U

Monitoring Well ID	CGMW-10	CGMW-10
Date Sampled	6/2/2003	4/14/2005
Total BTEX	7241	1940
Total Carcinogenic PAHs	0	22
Total PAHs	2418	485
Total Cyanide	126 J	77.6 J
LNAPL Sample ID		CGMW-10
Date Sampled		4/28/2010
Measurable DNAPL Thickness (ft)		0.57

Monitoring Well ID	CGMW-09	CGMW-09
Date Sampled	6/4/2003	4/14/2005
Total BTEX	2381	1310
Total Carcinogenic PAHs	0	0
Total PAHs	2766	1221
Total Cyanide	2160 J	1410 J

Monitoring Well ID	CGMW-34
Date Sampled	2/24/2010
Total BTEX	2780
Total Carcinogenic PAHs	ND
Total PAHs	4121
Total Cyanide	55
LNAPL Sample ID	CGMW-34S
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	0.54

LNAPL Sample ID	CGRW-07S
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	0.25

DNAPL Sample ID	CGRW-05S
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	1.15

Monitoring Well ID	CGMW-08S	CGMW-08S
Date Sampled	6/4/2003	4/15/2005
Total BTEX	0	21.6
Total Carcinogenic PAHs	0	0
Total PAHs	17.5	40
Total Cyanide	196 J	596 J

Monitoring Well ID	CGMW-06S	CGMW-06S
Date Sampled	6/4/2003	4/15/2005
Total BTEX	1200	1118
Total Carcinogenic PAHs	0	0
Total PAHs	221.9	154
Total Cyanide	3.9 UJ	10 UJ

LEGEND

	APPROXIMATE BOUNDARY OF FORMER MGP SITE
	SEA WALL
	CURRENT STRUCTURE
	EXISTING CHAIN LINK FENCE
	FORMER GAS HOLDER
	FORMER MGP STRUCTURE
	TAX ASSESSOR'S BOUNDARIES
	PARCEL BOUNDARIES
PARCEL I	PARCEL NUMBER
CITY OF NEW YORK	OWNER
CGMW-13/CGSB-36	MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
CGMW-03I	ABANDONED MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
CGMW-17/CGSB-32	MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
CGMW-14/CGSB-37	DESTROYED MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
CGRW-07D	RECOVERY WELL, GEI, DNAPL RECOVERY PILOT TEST, 2009
CGPZ-05	PIEZOMETER, GEI, REMEDIAL DESIGN INVESTIGATION, 2008
CGPZ-2S	DESTROYED PIEZOMETER GEI, REMEDIAL DESIGN INVESTIGATION, 2008
	WELL USED FOR CONTOURING
	APPROXIMATE EXTENT OF SHALLOW CLAY
1.0	GROUNDWATER ELEVATION CONTOUR (FEET NAVD)
	INFERRED GROUNDWATER FLOW DIRECTION
3.52	LOW TIDE GROUNDWATER ELEVATION (FT NAVD)
	DNAPL (DENSE NON-AQUEOUS PHASE LIQUID) PRESENT IN APRIL 2005 AND/OR APRIL 2010
	LNAPL (LIGHT NON-AQUEOUS PHASE LIQUID) PRESENT IN APRIL 2005 AND/OR APRIL 2010

DNAPL Sample ID	CGMW-03S
Measurable DNAPL Thickness (ft)	5.9
Date Sampled	6/3/2003
Total BTEX	52200
Total Carcinogenic PAHs	22200
Total PAHs	325300
Total Cyanide	0

SUMMARY OF DNAPL ANALYTICAL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)

Monitoring Well ID	CGMW-17CH2S
Date Sampled	5/4/2005
Total BTEX	124.3
Total Carcinogenic PAHs	0
Total PAHs	8
Total Cyanide	9.6 J

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN MICROGRAMS PER LITER (ug/L)

BTEX	- BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
PAHs	- POLYCYCLIC AROMATIC HYDROCARBONS
J	- ESTIMATED CONCENTRATION
NA	- NOT ANALYZED
ND	- NOT DETECTED
U	- NOT DETECTED TO THE REPORTING LIMIT OR METHOD DETECTION LIMIT

NOTE:

1. WELLS CGMW-10, CGMW-34S, AND CGRW-07S WERE NOT INCLUDED IN CONTOURING DUE TO THE PRESENCE OF LNAPL. CGPZ-01S WAS NOT INCLUDED BECAUSE IT IS SCREENED IN HOLDER 3. CGMW-13 WAS NOT INCLUDED DUE TO HIGH VARIABILITY BETWEEN WATER LEVEL MEASUREMENTS.

A. SURVEY NOTES:

1. "BOUNDARY & TOPOGRAPHIC SURVEY, BLOCK 471, LOTS 1, 100 & 200, BLOCK 468, LOT 25, BOROUGH OF BROOKLYN, KINGS CO., CITY AND STATE OF NEW YORK", PREPARED FOR GEI CONSULTANTS, INC, BY GEOD CORPORATION, PHOTOGRAMMETRIC SCIENCES - SURVEY TECHNOLOGIES, 24 KANOUSE ROAD, NEWFOUNDLAND, N.J.
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4. SURVEY OF SAMPLE LOCATIONS CONDUCTED BY GEI CONSULTANTS, INC. BY NEW YORK STATE-LICENSED LAND SURVEYOR NO. 050146.

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

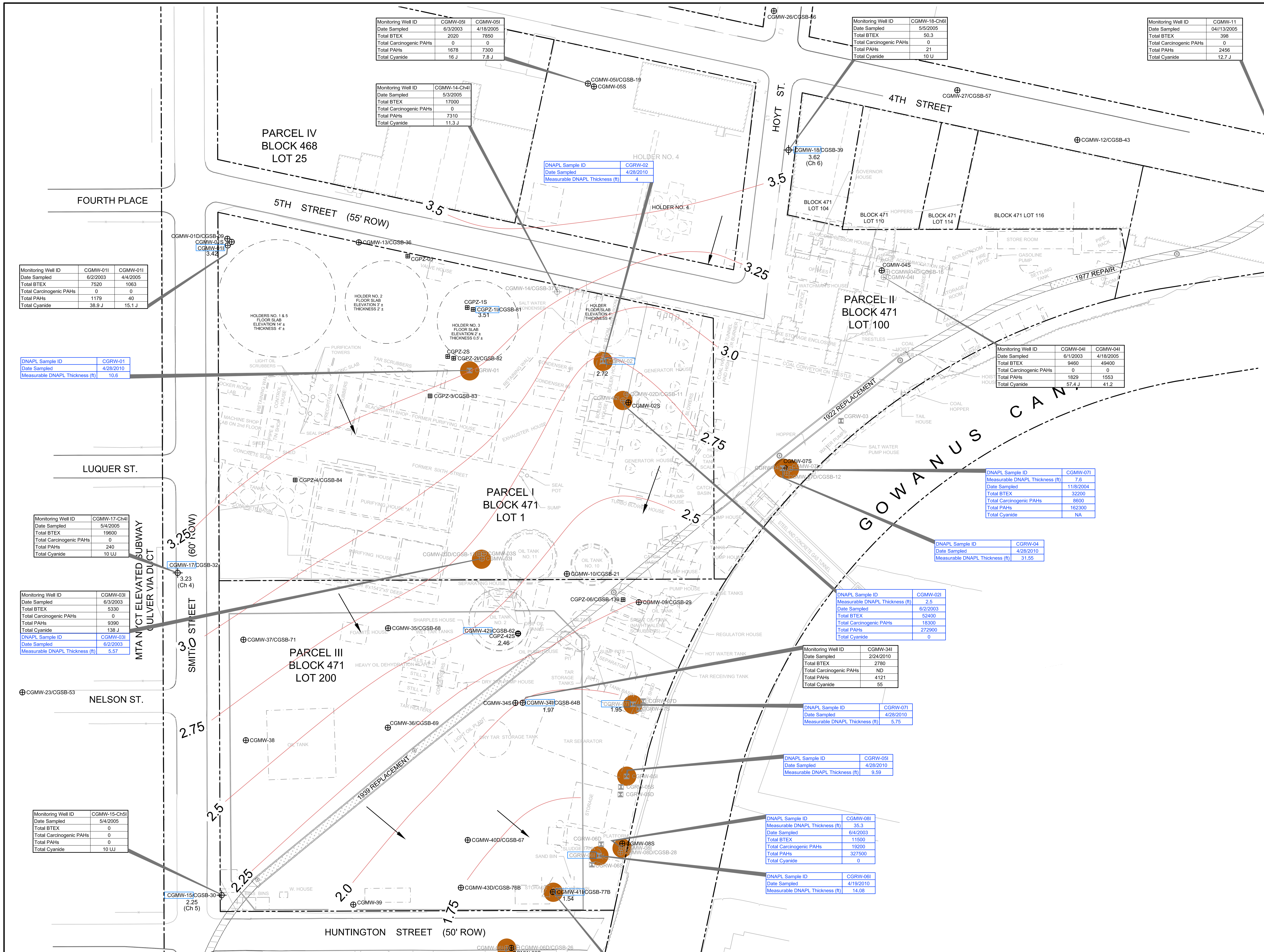
nationalgrid

PROJECT 093250-1-1106

GEI Consultants
1 GREENWOOD AVENUE
SUITE 210
MONTCLAIR, NJ 07042

LOW-TIDE SHALLOW GROUNDWATER CONTOURS AND HISTORIC DISSOLVED PHASE GROUNDWATER ANALYTICAL SUMMARY (ug/L) - APRIL 28, 2010

October 2011 Plate 8



Monitoring Well ID	CGMW-05I	CGMW-05I
Date Sampled	6/3/2003	4/18/2005
Total BTEX	2020	7850
Total Carcinogenic PAHs	0	0
Total PAHs	1678	7300
Total Cyanide	16 J	7.8 J

Monitoring Well ID	CGMW-14-Ch4I
Date Sampled	5/3/2005
Total BTEX	17000
Total Carcinogenic PAHs	0
Total PAHs	7310
Total Cyanide	11.3 J

Monitoring Well ID	CGMW-18-Ch6I
Date Sampled	5/5/2005
Total BTEX	50.3
Total Carcinogenic PAHs	0
Total PAHs	21
Total Cyanide	10 U

Monitoring Well ID	CGMW-11
Date Sampled	04//13/2005
Total BTEX	398
Total Carcinogenic PAHs	0
Total PAHs	2456
Total Cyanide	12.7 J

DNAPL Sample ID	CGRW-02
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	4

Monitoring Well ID	CGMW-01I	CGMW-01I
Date Sampled	6/2/2003	4/4/2005
Total BTEX	7520	1063
Total Carcinogenic PAHs	0	0
Total PAHs	1179	40
Total Cyanide	38.9 J	15.1 J

DNAPL Sample ID	CGRW-01
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	10.6

Monitoring Well ID	CGMW-04I	CGMW-04I
Date Sampled	6/1/2003	4/18/2005
Total BTEX	9460	49400
Total Carcinogenic PAHs	0	0
Total PAHs	1829	1553
Total Cyanide	57.4 J	41.2

DNAPL Sample ID	CGMW-07I
Measurable DNAPL Thickness (ft)	7.6
Date Sampled	11/8/2004
Total BTEX	32200
Total Carcinogenic PAHs	8600
Total PAHs	162300
Total Cyanide	NA

DNAPL Sample ID	CGRW-04
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	31.55

Monitoring Well ID	CGMW-17-Ch4I
Date Sampled	5/4/2005
Total BTEX	19600
Total Carcinogenic PAHs	0
Total PAHs	240
Total Cyanide	10 UJ

DNAPL Sample ID	CGMW-02I
Measurable DNAPL Thickness (ft)	2.5
Date Sampled	6/2/2003
Total BTEX	52400
Total Carcinogenic PAHs	18300
Total PAHs	272900
Total Cyanide	0

Monitoring Well ID	CGMW-03I
Date Sampled	6/3/2003
Total BTEX	5330
Total Carcinogenic PAHs	0
Total PAHs	9390
Total Cyanide	138 J
DNAPL Sample ID	CGMW-03I
Date Sampled	6/2/2003
Measurable DNAPL Thickness (ft)	5.57

Monitoring Well ID	CGMW-34I
Date Sampled	2/24/2010
Total BTEX	2780
Total Carcinogenic PAHs	ND
Total PAHs	4121
Total Cyanide	55

DNAPL Sample ID	CGRW-07I
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	5.75

DNAPL Sample ID	CGRW-05I
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	9.59

Monitoring Well ID	CGMW-15-Ch5I
Date Sampled	5/4/2005
Total BTEX	0
Total Carcinogenic PAHs	0
Total PAHs	0
Total Cyanide	10 UJ

DNAPL Sample ID	CGMW-08I
Measurable DNAPL Thickness (ft)	35.3
Date Sampled	6/4/2003
Total BTEX	11500
Total Carcinogenic PAHs	19200
Total PAHs	327500
Total Cyanide	0

DNAPL Sample ID	CGRW-06I
Date Sampled	4/19/2010
Measurable DNAPL Thickness (ft)	14.08

DNAPL Sample ID	CGMW-06I
Measurable DNAPL Thickness (ft)	10.55
Date Sampled	11/5/2004
Total BTEX	1900
Total Carcinogenic PAHs	2850
Total PAHs	43380
Total Cyanide	NA

DNAPL Sample ID	CGMW-41
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	6.69

LEGEND

- APPROXIMATE BOUNDARY OF FORMER MGP SITE
- SEA WALL
- CURRENT STRUCTURE
- EXISTING CHAIN LINK FENCE
- FORMER GAS HOLDER
- FORMER MGP STRUCTURE
- TAX ASSESSOR'S BOUNDARIES
- PARCEL BOUNDARIES
- PARCEL I — PARCEL NUMBER
- CITY OF NEW YORK — OWNER
- CGMW-13/CGSB-36 — MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-03I — ABANDONED MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-17/CGSB-32 — MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-14/CGSB-37 — DESTROYED MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGRW-07D — RECOVERY WELL, GEI, DNAPL RECOVERY PILOT TEST, 2009
- CGPZ-05 — PIEZOMETER, GEI, REMEDIAL DESIGN INVESTIGATION, 2008
- CGPZ-2S — DESTROYED PIEZOMETER GEI, REMEDIAL DESIGN INVESTIGATION, 2008
- WELL USED FOR CONTOURING
- 1.0 — GROUNDWATER ELEVATION CONTOUR (FEET NAVD)
- INFERRED GROUNDWATER FLOW DIRECTION
- 3.52 — LOW TIDE GROUNDWATER ELEVATION (FT NAVD)
- DNAPL (DENSE NON-AQUEOUS PHASE LIQUID) PRESENT IN APRIL 2005 AND/OR APRIL 2010

DNAPL Sample ID	CGMW-02I
Measurable DNAPL Thickness (ft)	2.5
Date Sampled	6/2/2003
Total BTEX	52400
Total Carcinogenic PAHs	18300
Total PAHs	272900
Total Cyanide	0

SUMMARY OF DNAPL ANALYTICAL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)

Monitoring Well ID	CGMW-34I
Date Sampled	2/24/2010
Total BTEX	2780
Total Carcinogenic PAHs	ND
Total PAHs	4121
Total Cyanide	55

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN MICROGRAMS PER LITER (ug/L)

- BTEX - BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- PAHs - POLYCYCLIC AROMATIC HYDROCARBONS
- J - ESTIMATED CONCENTRATION
- NA - NOT ANALYZED
- ND - NOT DETECTED
- U - NOT DETECTED TO THE REPORTING LIMIT OR METHOD DETECTION LIMIT

NOTE:

1. WELLS CGRW-01, CGRW-04, AND CGRW-05I WERE NOT INCLUDED IN CONTOURING BECAUSE THEY SCREENED MULTIPLE LAYERS. CGRW-06I WAS NOT INCLUDED BECAUSE DNAPL COVERED THE ENTIRE THICKNESS OF THE WELL SCREEN.

A. SURVEY NOTES:

1. "BOUNDARY & TOPOGRAPHIC SURVEY, BLOCK 471, LOTS 1, 100 & 200, BLOCK 468, LOT 25, BOROUGH OF BROOKLYN, KINGS CO., CITY AND STATE OF NEW YORK", PREPARED FOR GEI CONSULTANTS, INC. BY GEOD CORPORATION, PHOTOGRAMMETRIC SCIENCES - SURVEY TECHNOLOGIES, 24 KANOUSE ROAD, NEWFOUNDLAND, N.J.
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4. SURVEY OF SAMPLE LOCATIONS CONDUCTED BY GEI CONSULTANTS, INC. BY NEW YORK STATE-LICENSED LAND SURVEYOR NO. 050146.

0 50 100
SCALE, FEET

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

nationalgrid

PROJECT 093250-1-1106

GEI Consultants
1 GREENWOOD AVENUE
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MONTCLAIR, NJ 07042

LOW-TIDE INTERMEDIATE GROUNDWATER CONTOURS AND HISTORIC DISSOLVED PHASE GROUNDWATER ANALYTICAL SUMMARY (ug/L) - APRIL 28, 2010

October 2011

Plate 9

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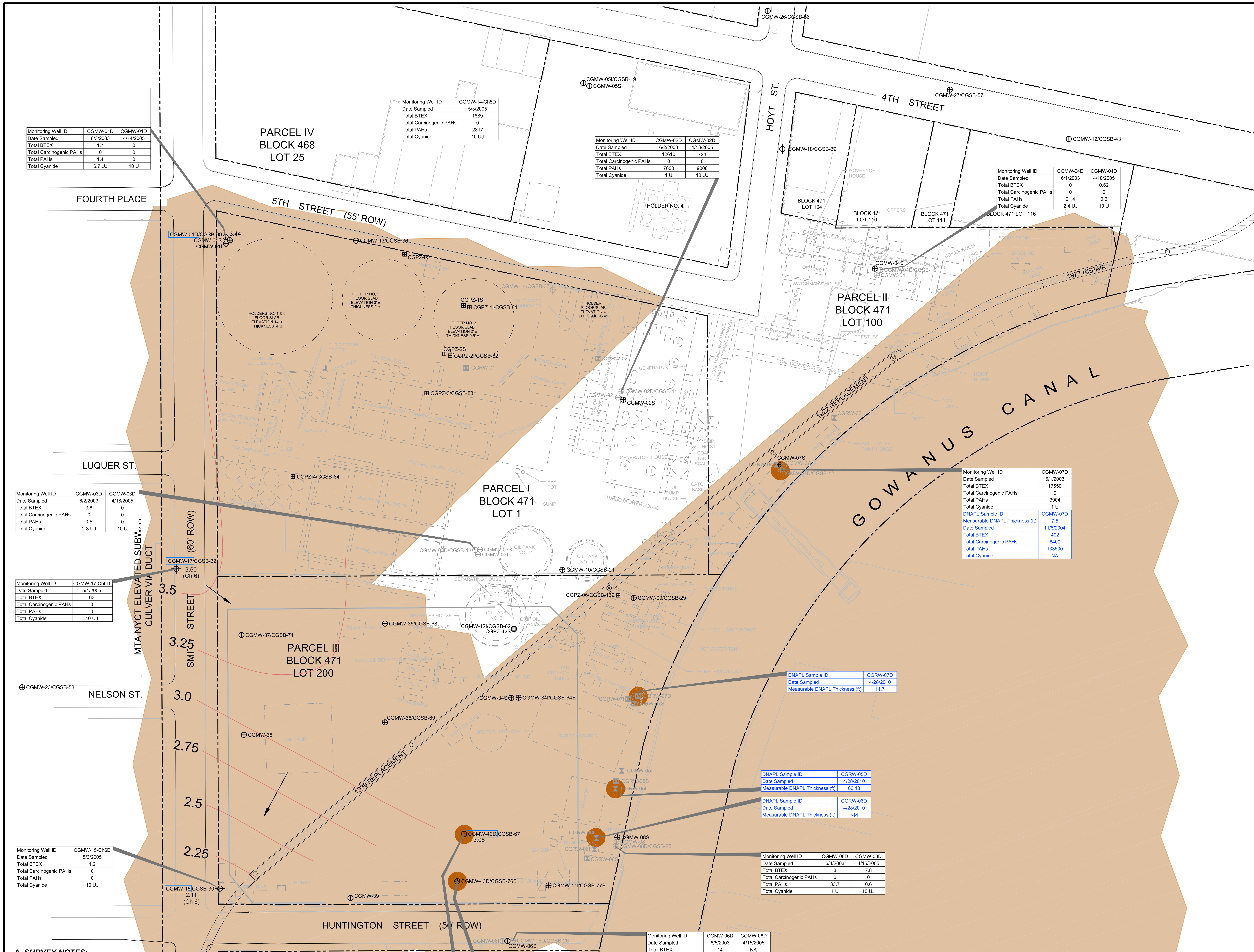

Monitoring Well ID	CGMW-01D	CGMW-01D
Date Sampled	6/3/2003	4/14/2005
Total BTEX	1.7	0
Total Carcinogenic PAHs	0	0
Total PAHs	1.4	0
Total Cyanide	6.7 UJ	10 U

Monitoring Well ID	CGMW-14-Ch5D
Date Sampled	5/3/2005
Total BTEX	1889
Total Carcinogenic PAHs	0
Total PAHs	2817
Total Cyanide	10 UJ

Monitoring Well ID	CGMW-02D	CGMW-02D
Date Sampled	6/2/2003	4/13/2005
Total BTEX	12610	724
Total Carcinogenic PAHs	0	0
Total PAHs	7600	9000
Total Cyanide	1 U	10 UJ

Monitoring Well ID	CGMW-04D	CGMW-04D
Date Sampled	6/1/2003	4/18/2005
Total BTEX	0	0.62
Total Carcinogenic PAHs	0	0
Total PAHs	21.4	0.6
Total Cyanide	2.4 UJ	10 U

Monitoring Well ID	CGMW-03D	CGMW-03D
Date Sampled	6/2/2003	4/18/2005
Total BTEX	3.6	0
Total Carcinogenic PAHs	0	0
Total PAHs	0.5	0
Total Cyanide	2.3 UJ	10 U

Monitoring Well ID	CGMW-07D
Date Sampled	6/1/2003
Total BTEX	17550
Total Carcinogenic PAHs	0
Total PAHs	3904
Total Cyanide	1 U
DNAPL Sample ID	CGMW-07D
Measurable DNAPL Thickness (ft)	7.5
Date Sampled	11/8/2004
Total BTEX	402
Total Carcinogenic PAHs	6400
Total PAHs	133500
Total Cyanide	NA

Monitoring Well ID	CGMW-17-Ch6D
Date Sampled	5/4/2005
Total BTEX	63
Total Carcinogenic PAHs	0
Total PAHs	0
Total Cyanide	10 UJ

DNAPL Sample ID	CGRW-07D
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	14.7

DNAPL Sample ID	CGRW-05D
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	66.13

DNAPL Sample ID	CGRW-06D
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	NM

Monitoring Well ID	CGMW-08D	CGMW-08D
Date Sampled	6/4/2003	4/15/2005
Total BTEX	3	7.8
Total Carcinogenic PAHs	0	0
Total PAHs	33.7	0.6
Total Cyanide	1 U	10 UJ

Monitoring Well ID	CGMW-15-Ch6D
Date Sampled	5/3/2005
Total BTEX	1.2
Total Carcinogenic PAHs	0
Total PAHs	0
Total Cyanide	10 UJ

Monitoring Well ID	CGMW-06D	CGMW-06D
Date Sampled	6/5/2003	4/15/2005
Total BTEX	14	NA
Total Carcinogenic PAHs	0	0
Total PAHs	42.6	0.6
Total Cyanide	2.4 UJ	10 UJ

DNAPL Sample ID	CGMW-43D
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	10.75

DNAPL Sample ID	CGMW-40D
Date Sampled	4/28/2010
Measurable DNAPL Thickness (ft)	4.54

LEGEND

- APPROXIMATE BOUNDARY OF FORMER MGP SITE
- SEA WALL
- CURRENT STRUCTURE
- EXISTING CHAIN LINK FENCE
- FORMER GAS HOLDER
- FORMER MGP STRUCTURE
- TAX ASSESSOR'S BOUNDARIES
- PARCEL BOUNDARIES
- PARCEL I — PARCEL NUMBER
- CITY OF NEW YORK — OWNER
- CGMW-13/CGSB-36 — MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-03I — ABANDONED MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-17/CGSB-32 — MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-14/CGSB-37 — DESTROYED MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGRW-07D — RECOVERY WELL, GEI, DNAPL RECOVERY PILOT TEST, 2009
- CGPZ-05 — PIEZOMETER, GEI, REMEDIAL DESIGN INVESTIGATION, 2008
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- WELL USED FOR CONTOURING
- 1.0 — GROUNDWATER ELEVATION CONTOUR (FEET NAVD)
- INFERRED GROUNDWATER FLOW DIRECTION
- APPROXIMATE EXTENT OF GARDINER'S CLAY
- 3.52 — LOW TIDE GROUNDWATER ELEVATION (FT NAVD)
- DNAPL (DENSE NON-AQUEOUS PHASE LIQUID) PRESENT IN APRIL 2005 AND/OR APRIL 2010
- SUMMARY OF DNAPL ANALYTICAL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)
- SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN MICROGRAMS PER LITER (ug/L)
- BTEX - BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- PAHs - POLYCYCLIC AROMATIC HYDROCARBONS
- J - ESTIMATED CONCENTRATION
- NA - NOT ANALYZED
- ND - NOT DETECTED
- U - NOT DETECTED TO THE REPORTING LIMIT OR METHOD DETECTION LIMIT

NOTE:

1. WELLS CGMW-43D, CGRW-05D, CGRW-06D, AND CGRW-07D WERE NOT INCLUDED IN CONTOURING BECAUSE DNAPL COVERED THE ENTIRE THICKNESS OF THE WELL SCREEN.

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0 50 100
SCALE, FEET

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

nationalgrid

PROJECT 093250-1-1106

GEI Consultants
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LOW-TIDE DEEP GROUNDWATER CONTOURS AND HISTORIC DISSOLVED PHASE GROUNDWATER ANALYTICAL SUMMARY (ug/L) - APRIL 28, 2010

October 2011

Plate 10

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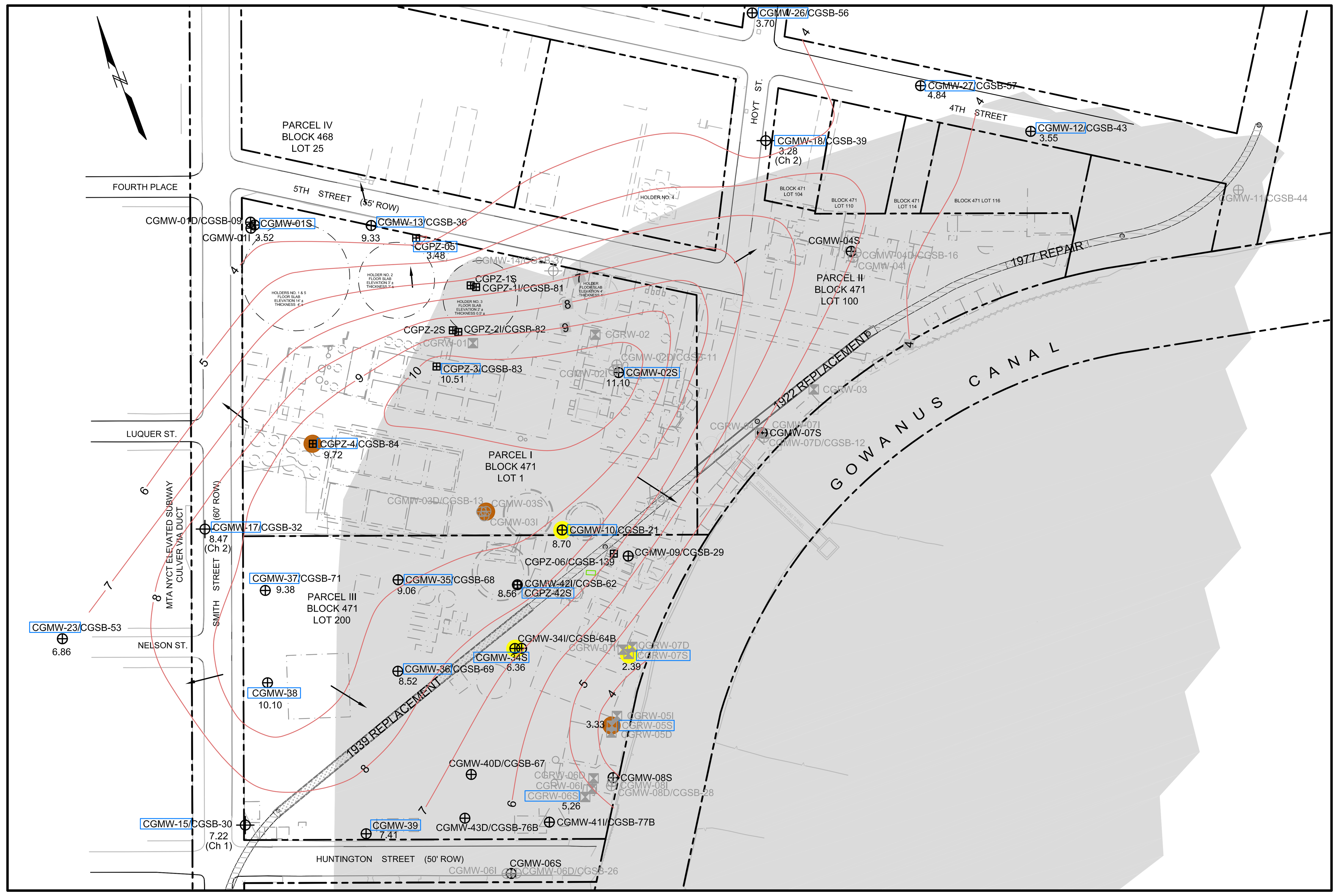
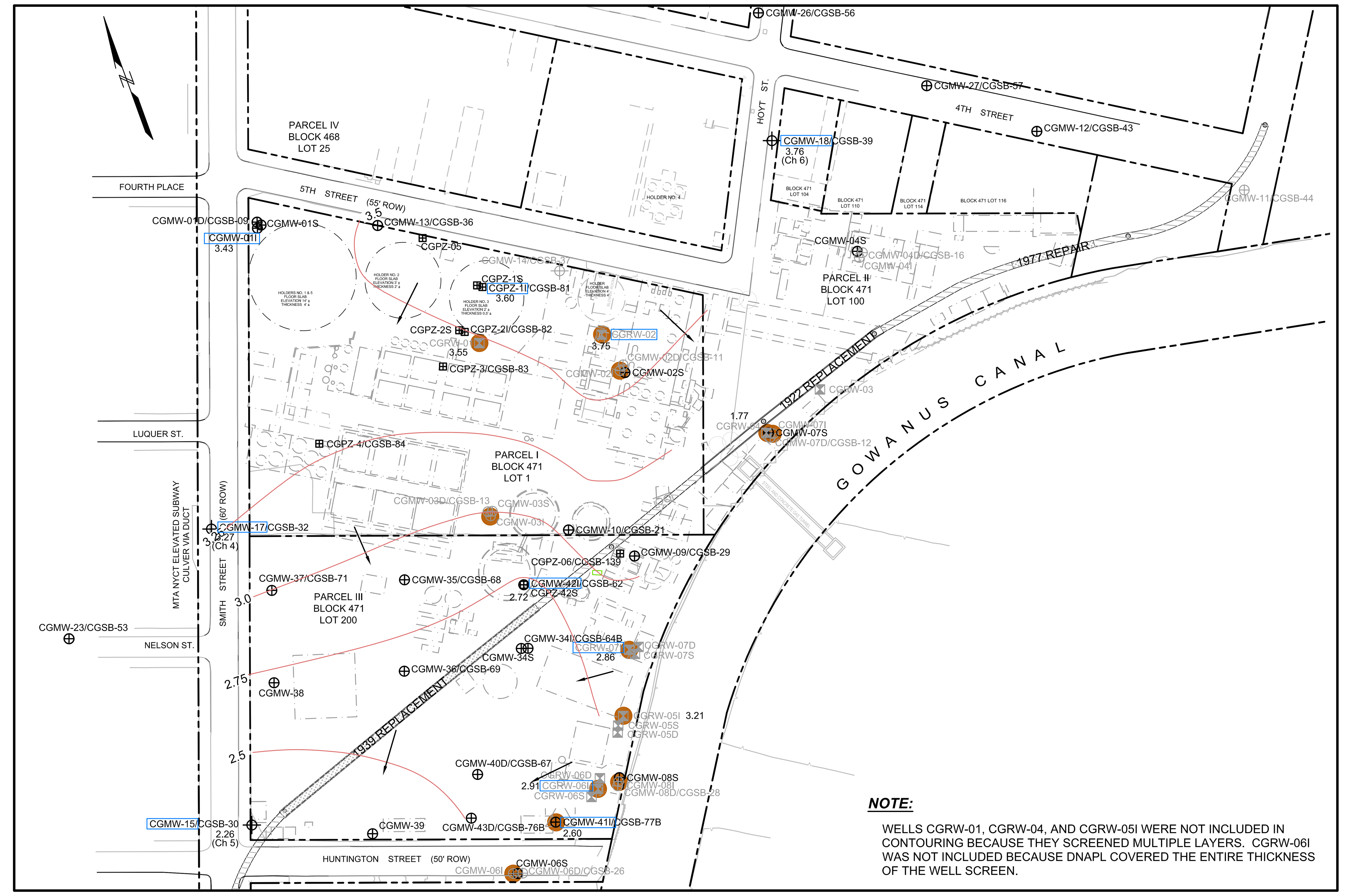
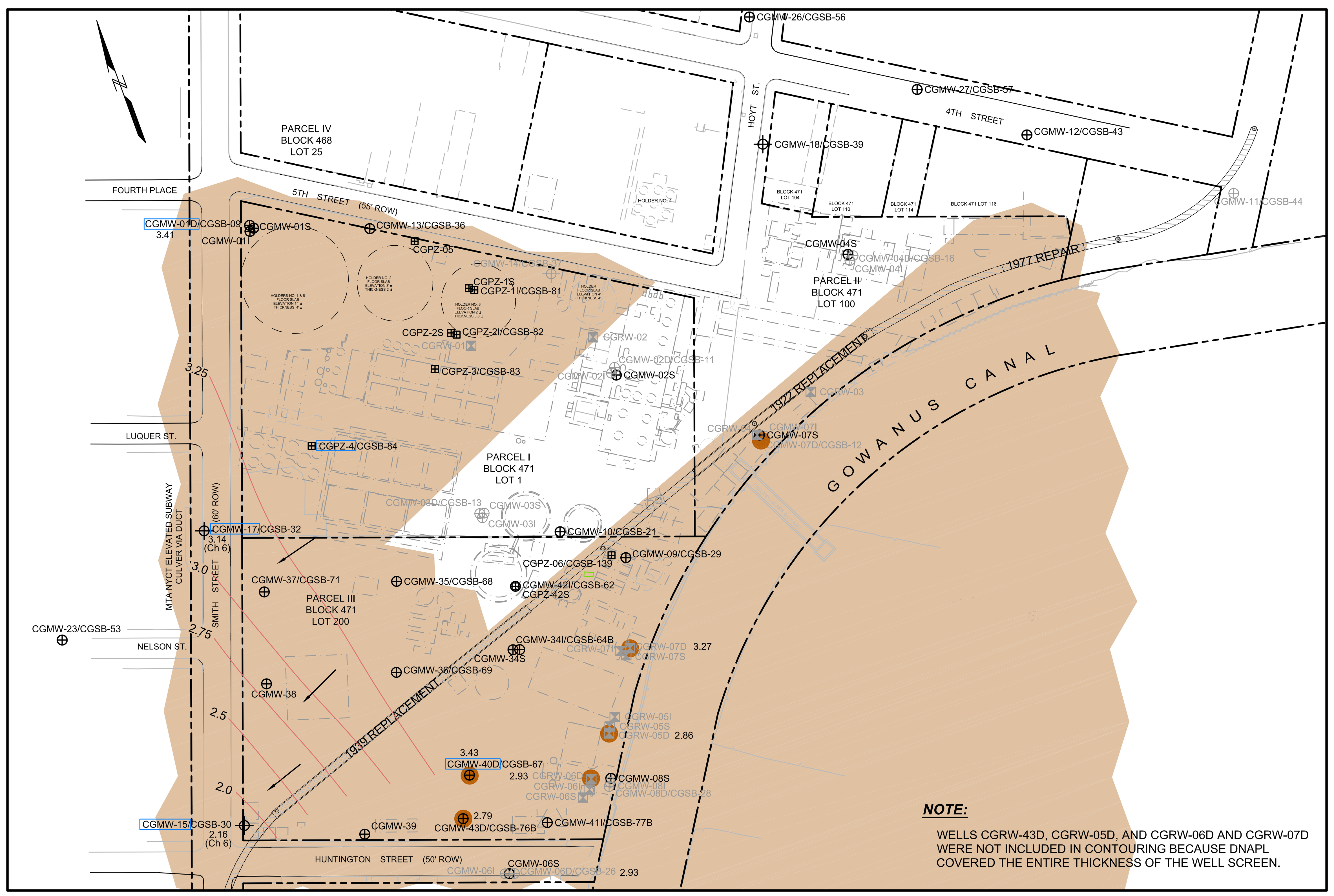


SHALLOW HIGH TIDE



INTERMEDIATE HIGH TIDE



DEEP HIGH TIDE

LEGEND

- APPROXIMATE BOUNDARY OF FORMER MGP SITE
- SEA WALL
- CURRENT STRUCTURE
- EXISTING CHAIN LINK FENCE
- FORMER GAS HOLDER
- FORMER MGP STRUCTURE
- TAX ASSESSOR'S BOUNDARIES
- PARCEL BOUNDARIES
- PARCEL I — PARCEL NUMBER
- CITY OF NEW YORK — OWNER
- CGMW-13/CGSB-36 — MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-03I — ABANDONED MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-17/CGSB-32 — MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGMW-14/CGSB-37 — DESTROYED MULTICHANNEL MONITORING WELL, GEI, REMEDIAL INVESTIGATION, 2003-2005 AND 2009-2010
- CGRW-07D — RECOVERY WELL, GEI, DNAPL RECOVERY PILOT TEST, 2009
- CGPZ-05 — PIEZOMETER, GEI, REMEDIAL DESIGN INVESTIGATION, 2008
- CGPZ-2S — DESTROYED PIEZOMETER GEI, REMEDIAL DESIGN INVESTIGATION, 2008
- USED FOR CONTOURING
- 1.0 — GROUNDWATER ELEVATION CONTOUR (FEET NAVD)
- APPROXIMATE EXTENT OF SHALLOW CLAY
- APPROXIMATE EXTENT OF GARDINER'S CLAY
- INFERRED GROUNDWATER FLOW DIRECTION
- 3.52 — HIGH TIDE GROUNDWATER ELEVATION (FT NAVD)
- DNAPL (DENSE NON-AQUEOUS PHASE LIQUID) PRESENT IN WELL IN APRIL 2005 AND/OR APRIL 2010
- LNAPL (LIGHT NON-AQUEOUS PHASE LIQUID) PRESENT IN WELL IN APRIL 2005 AND/OR APRIL 2010

A. SURVEY NOTES:

1. "BOUNDARY & TOPOGRAPHIC SURVEY, BLOCK 471, LOTS 1, 100 & 200, BLOCK 468, LOT 25, BOROUGH OF BROOKLYN, KINGS CO., CITY AND STATE OF NEW YORK", PREPARED FOR GEI CONSULTANTS, INC. BY GEOD CORPORATION, PHOTOGRAMMETRIC SCIENCES - SURVEY TECHNOLOGIES, 24 KANOUSE ROAD, NEWFOUNDLAND, N.J.
2. PROPERTY KNOWN AS BLOCK 471, LOT 1 (PARCEL 1), BLOCK 471, LOT 125 (PARCEL 2), BLOCK 471, LOT 200 (PARCEL 3) AND BLOCK 468, LOT 25 (PARCEL 4) AS SHOWN ON THE OFFICIAL TAX MAPS OF THE BOROUGH OF BROOKLYN, KINGS COUNTY, CITY AND STATE OF NEW YORK.
3. COORDINATE AND HORIZONTAL REFERENCE BASED ON NEW YORK EAST ZONE (3101) NORTH AMERICAN DATUM OF 1983 (NAD 83). VERTICAL DATUM IS BASED UPON USC&G DATUM (NAVD 88) OBTAINED BY DIFFERENTIAL LEVELING AND STATIC GPS METHODS.
4. SURVEY OF SAMPLE LOCATIONS CONDUCTED BY GEI CONSULTANTS, INC. BY NEW YORK STATE-LICENSED LAND SURVEYOR NO. 050146.

0 100 200
SCALE, FEET

DATA REPORT
CARROLL GARDENS/PUBLIC PLACE
BOROUGH OF BROOKLYN, NEW YORK

nationalgrid

PROJECT 093250-1-1106

GEI Consultants
1 GREENWOOD AVENUE
SUITE 210
MONTCLAIR, NJ 07042

HIGH-TIDE SHALLOW, INTERMEDIATE AND DEEP GROUNDWATER CONTOURS APRIL 28, 2010

October 2011 — Plate 11

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