Baruch Houses, Manhattan (Superblock 323 Lot 1)
Phase 1A Archaeological Report

Oracle No. 8320
Builder No. 201
Contract No. GR1508592

Google Maps with APE added

Prepared for the New York City Housing Authority (NYCHA)
Through Nelligan White Architects
By Joan H. Geismar, Ph.D., LLC
January 2018

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ABSTRACT

This report presents a Phase 1A archaeological assessment related to the introduction of new utilities and other construction at the New York City Housing Authority's (NYCHA) Baruch Houses on Manhattan's Lower East Side. The planned site work comprises new utilities and construction associated with recovery from Superstorm Sandy that struck in November 2012. Joan H. Geismar, Ph.D., LLC prepared the report for NYCHA through Nelligan White Architects.

The approximately 27-acre site is defined by Houston Street to the north, the FDR Drive to the east, Delancey Street to the south and Columbia Street to the west and comprises twelve entire and three partial former city blocks consolidated in about 1952 as Superblock 323 Lot 1. The research goal was to determine if the proposed undertaking will impact archaeological resources listed or eligible for listing in the National Register of Historic Places. Research determined that the potential archaeological issues are backyard features associated with site development that includes land reclaimed from the East River, the creation of streets and slips in the late 18th- to mid-19th-century by water lot grantees on the eastern part of the APE, and mid-19th-century domestic and commercial development within the area of potential effect (APE).

Research identified six (6) areas to be tested and five 5 (5) areas to be monitored, the former for 19th-century backyard sanitary features, the latter for landfill features (mainly wharves erected as street foundations) associated with land reclamation. In addition, the recommendation was made to establish protocols regarding work stoppage in case of an unanticipated find and time to assess and document the find as necessary. It was also recommended that the archaeological protocol established for site work at NYCHA's Gowanus Houses in Brooklyn be adapted to this undertaking.

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Report Research, Writing, and Production: Joan H. Geismar, Ph.D.
Research Assistant: Shelly Spritzer
Graphics: Amy Geller
Photos/Images (unless noted otherwise): Joan H. Geismar, Ph.D.

INTRODUCTION

This report presents a Phase 1A archaeological assessment related to the introduction of new utilities and other construction at the New York City Housing Authority‘s (NYCHA) Baruch Houses on Manhattan’s Lower East Side (Figures 1and 2).[1] The site comprises twelve entire and three partial former city blocks consolidated in about 1952 as Superblock 323 Lot 1. The planned site work is associated with recovery from Superstorm Sandy that struck in November 2012. Joan H. Geismar, Ph.D., LLC prepared the report for NYCHA through Nelligan White Architects, the project architect. The goal was to determine if the proposed undertaking could adversely impact archaeological resources listed in or eligible for listing in the National Register of Historic Places in the area of potential effects (APE). Here the APE comprises the site of eighteen multi-story brick apartment buildings, most of them erected between 1952 and 1962 (Buildings 1 to 17) and Building 18 constructed in 1975 (Figure 3).

The project APE, which comprises both fast and reclaimed land in almost equal parts, is bounded north by East Houston Street, east by the FDR Drive, south by Delancey Street, and west by Columbia Street (see Figure 3). According to the project’s civil engineers, Langan Engineers, and architects, Nelligan White, the proposed undertaking entails introducing landscaping and new gas and electric lines c. 2 to 4 feet [0.6 to 1.2 m] deep) as well as a floodwall that will encompass the western portion of the site (foundation depth c. 5 feet [1.5 m]).

At this writing, nine new structures erected on piles and slab, as are all the Baruch site structures, require excavations up to 4 feet (1.2 m) deep. Among them are six that address mechanical/electrical (M.E.A.) needs while another is a Pressure Reduction Valve Station (PRV). The PRV will replace and partially be founded on an underground coal storage/boiler room attached to Building 7. In addition, 12 -foot (3.7 m) deep excavations are planned in former Rivington and Stanton Streets to replace manholes and conduct sewer work (some sewer-related work also will occur elsewhere on site) (Tuffs 2017:personal communication; Gonzalez 2018: personal communication; Langan 2017; see Figure 4).

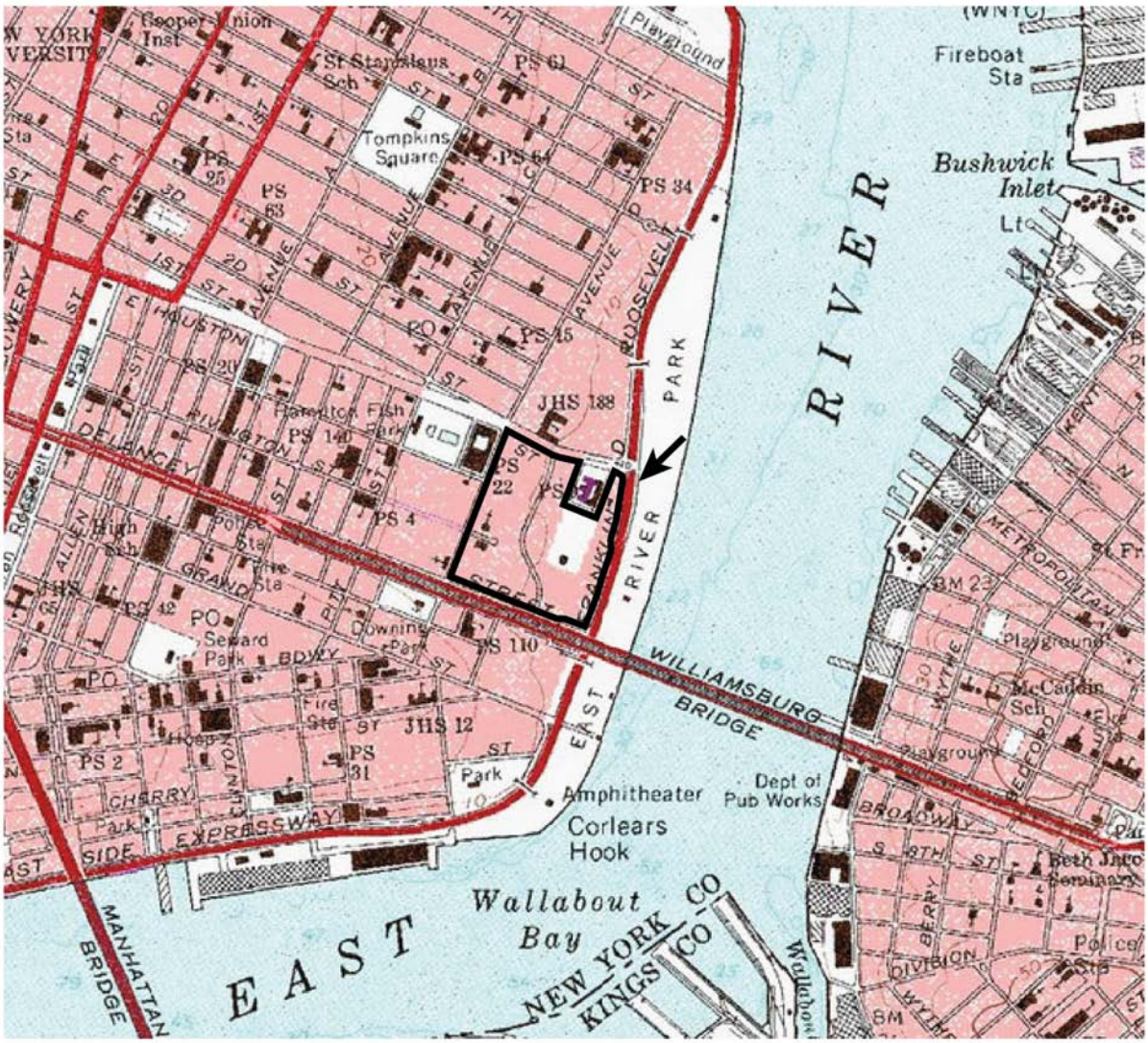
The archaeological assessment entailed researching pre-development conditions in the APE and its subsequent development history. The possibility of encountering evidence of prehistoric or early historic-era Native American and historic-era European resources was considered. However, given the site’s original terrain and development history, evidence of extensive late-18th- to mid-19th-century land reclamation efforts and 19th-century domestic and commercial development became the focus of concern.

Information was obtained by researching the map and digital collections of the New York Public Library Map Division, the New York Historical Society Library, the Topographical Bureau of the Manhattan Borough President’s Office, Manhattan’s Municipal Archives, the Internet, and the author’s private collection. In addition, consultation with Kelly Tuffs at Langan Engineers was essential as was Langan’s 2015 Geotechnical report.

The research methods and findings are presented in the following sections.

[1] Oracle Number 8320; E-builder # 201; Contract Number: GR1508592

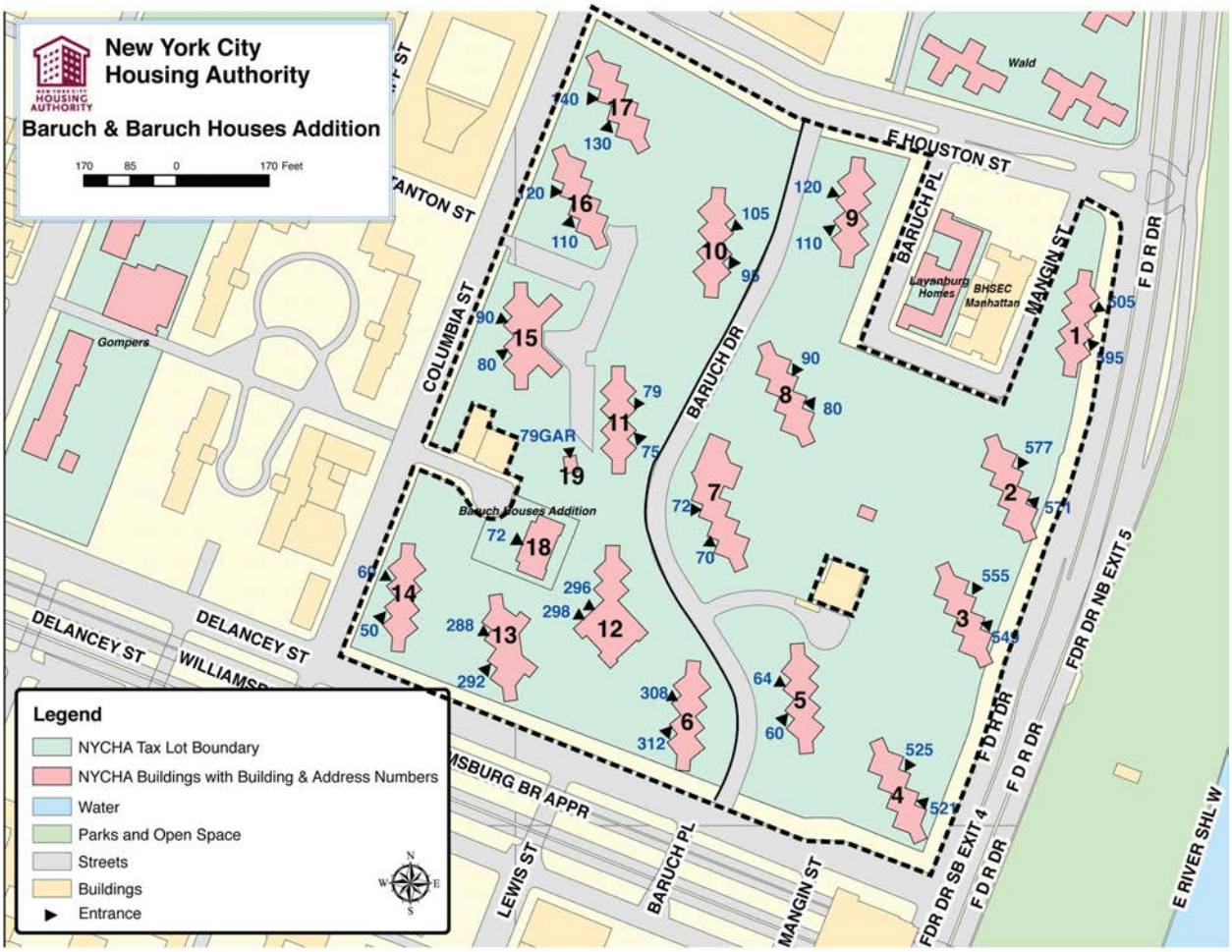
BARUCH HOUSES 1A Project Location and APE (USGS Brooklyn Quad, detail) **1**



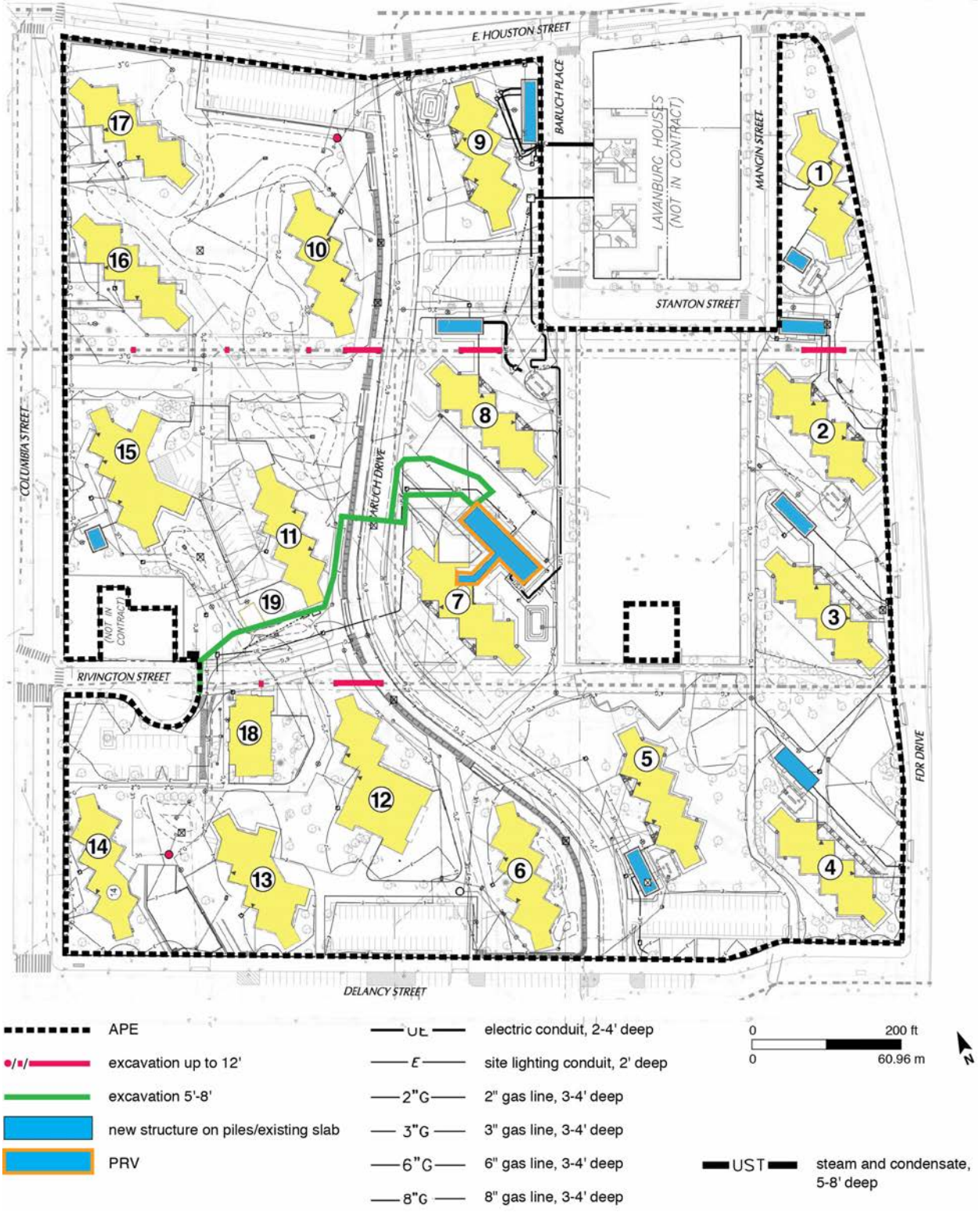
BARUCH HOUSES 1A Project Site and APE (Google Maps) **2**

project APE

BARUCH HOUSES 1A Baruch Houses with APE (NYCHA n.d.) | 3



BARUCH HOUSES 1A Proposed Utility Work in APE (Langin 2017:C-400) 4



SITE DESCRIPTION

Creation of the Superblock that now comprises the project site was initiated in 1950 when the city began to acquire fifteen previously developed city blocks[2] to erect public housing. When consolidation was finalized in 1952 (Damages Map 1951/52; Figure 5), development in the APE mostly comprised tenement buildings dating from just before or just after the turn of the 20th century (compare Bromley and Bromely1897 and Hyde 1912; Figures 6 and 7) and city-owned facilities just east of the APE, near the river, mainly for storage and sanitation purposes. Located on the original fifteen blocks of the Baruch site but not included in the APE are the Dewitt Church, according to a plaque initially erected in 1880 and reconstructed 1957 (Photo 1); Public School 97, built in 1915 and now Bard High School Early College Manhattan (Photo 2); and the Lavanburg Homes constructed as model living accommodations for low income families in 1920 and currently a homeless shelter (Photo 3).[3] The Rivington Bathhouse, erected by the city in 1901 and long vacant, still stands (Photo 4) but it, too, is not included in the APE.

When the city officially acquired the Baruch Houses site in 1952, neighboring housing projects were under development. Among them were NYCHA's Lillian Wald Houses to the north and union-sponsored housing to the west and south. Following the city's land acquisition, standing structures were episodically demolished to make way for the Baruch Houses designed by Emery Roth & Sons that, according to Wikipedia, now offers "2,194 apartments that house an estimated 5,397 people." Building 18, the 1973 addition to the complex, is a 23-story senior living facility (Wikipedia 2017). These buildings are mainly if not entirely founded on slab and piles.

The Baruch Houses, NYCHA's largest project, is separated from the East River by the FDR Drive, a roadway initiated in the 1930s by Robert Moses and then called the East River Drive. The second and longest of the Drive's sections, constructed in segments from 92nd Street to the Battery, runs beyond the APE and separates it from East River Park, another Robert Moses undertaking, that borders the river.

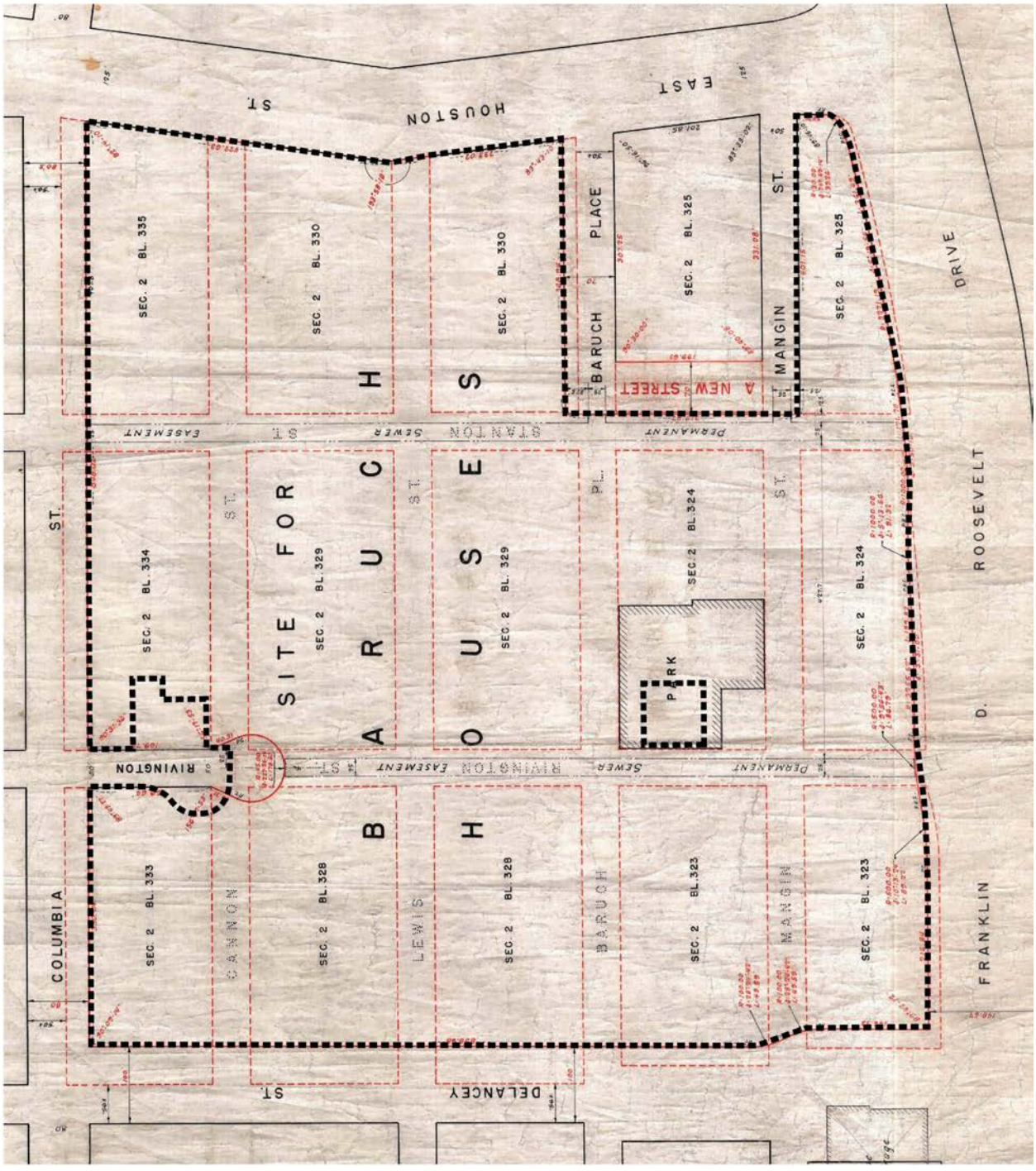
ARCHAEOLOGICAL POTENTIAL OF THE APE

Research to determine prehistoric and other archaeological site potential typically entails documenting known sites within a mile radius (1.6 km) of the project area (see Appendix A). However, this tends to accomplish little when assessing the archaeological potential of most Manhattan project sites.[4] Comparison of pre- and post-development conditions has proved a more reliable indicator.

The transformation of the island of Manhattan from its original bucolic state, that is, its original configuration and terrain (e.g., Sanderson 2013), to the mainly uniform terrain found today began not long after the first European settlers arrived in 1626 and has continued at an increasingly accelerated pace over time. That said, Reginald Bolton's research into Native American life on the island, most notably *Indian Paths in the Great Metropolis* (1921) and *Indian Life of Long Ago in the City of New York* (1934), offers useful information about what can no longer be found. He bemoans the lack of interest in documenting evidence of local Native

[2] Former Blocks 323 [x2], 324 [x2], 325 [x2], 328 [x2], 329 [x2], 330 [x2], 333 [1], 334 [1], 335 [1])
[3] Now the Urban Family Center run by the Henry Street Settlement (Survana 2014).
[4] See Appendix A for sites listed in the New York State CRIS system.

BARUCH HOUSES 1A Damages Map 1951/52 with APE (Damages Map 1951/52) **5**



(Note revised Rivington St entrance to accommodate construction of building 18 in 1973).

BARUCH HOUSES 1A Project APE 1897 ((Bromley G.W. and Walter S. 1897:Plate 7) | **6**

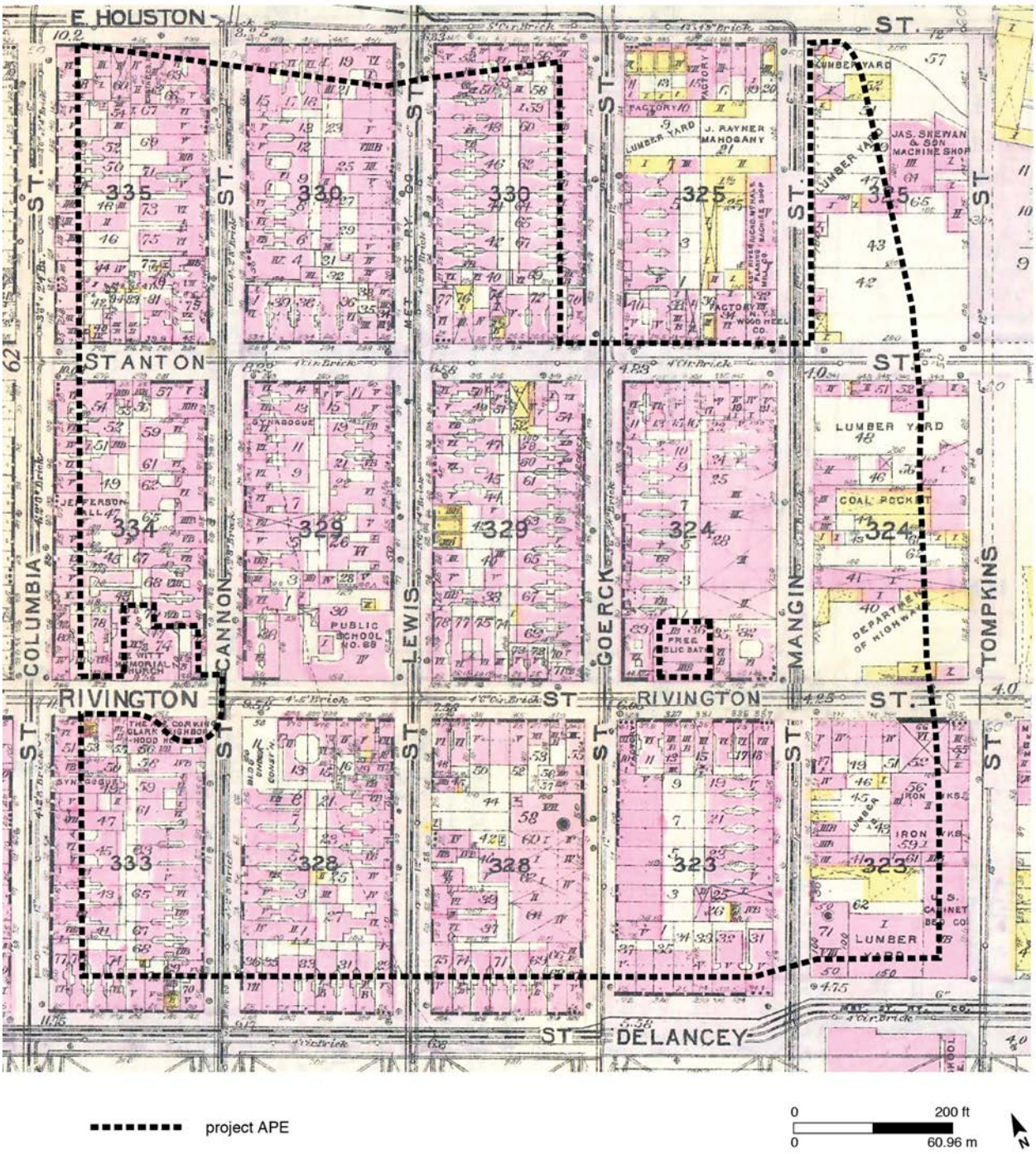

E. HOUSTON ST.
STANTON ST
RIVINGTON ST
DELANCEY ST
COLUMBIA ST.
CANNON ST.
LEWIS ST.
GOERCK ST.
MANGIN ST.
TOMPKINS ST.
335
330
325
334
329
324
333
328
323
project APE
0 200 ft
0 60.96 m
N

Photo 1. The DeWitt Reform Church, not included in the APE, is located on the north side of the Rivington Street entrance to the Baruch Houses. The view is west toward Columbia Street in the background and with another housing project beyond it (11-29-17). A plaque on the church facade indicates it was erected in 1880 and reconstructed in 1987.

Photo 2. Former Public School 97, erected on the south side of Houston Street in 1915, is also not included in the APE. It is now Bard High School Early College Manhattan (BHSEC Manhattan). The view is southwest from Houston Street. The building's northern façade is under renovation. (11-29-17)

Photo 3. Former Lavanburg Homes, a model, E-shaped, multifamily dwelling for low-income families, was erected in 1920 on the south side of Houston Street. It is currently a homeless shelter under the auspices of the Henry Street Settlement and not part of the APE. The view is southeast from Houston Street with BHSEC Manhattan to the far left behind it. (11-29-17)

Photo 4. The long-vacant Rivington Street Bathhouse (arrow), within but not included in the APE, was erected by the city in 1901. The view is northeast from the east side of Baruch Drive. Building 2 is in the left background and Building 3 is to the right behind the bathhouse. (11-29-17)

American life while it existed, and noted in 1922 that, "the long, sheltered shore-line with its desirable fishing facilities, from Corlears hook (sic) [south of the APE] to 105th Street [well to the north], is devoid of definite native associations" (Bolton 1922:67). This, of course, includes the APE.

Using historical records and information from his early 20th century explorations and those of his colleagues, mainly in Upper Manhattan, Bolton documented Manhattan's known Indian sites. None, however, are in or in close proximity to the APE (e.g., Bolton 1934; Figure 8). Pre-development site conditions, which included wetlands as discussed in an 1865 Sanitary report (see below) and land reclaimed from the East River as documented in maps and evidenced by water lot grants, clearly suggest the site was not amenable to Native American or early historic-era use. Given the location and history of the APE this is not surprising.

In its natural state, the western portion of the APE was fast land with an East River shoreline that theoretically could offer food procurement and transportation opportunities to both prehistoric and early historical populations. However the APE was low ground that rendered it inhospitable to settlement by either population. This is suggested not only by fill introduced to reclaim land from the East River but also by fill documented throughout the APE both before construction of the Baruch Houses. Therefore it is more than likely that Native American resources that might be found in the western part of the APE would be ephemeral at best, perhaps an isolated hunting implement more than likely buried under deep fill. However, 19th-century development occurred throughout this filled and reclaimed land (see below).

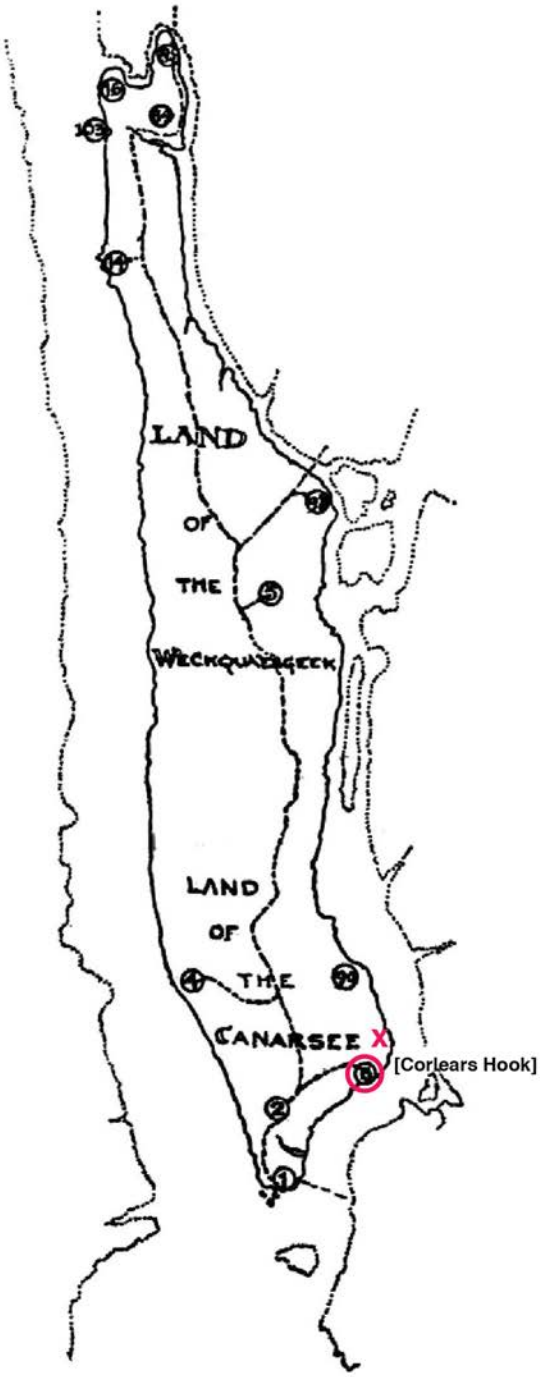
SITE CONDITIONS PRIOR TO BARUCH/SOIL BORING DATA

Available data indicate that more than the eastern half of the APE originally comprised land under water with fast and reclaimed land separated today approximately by Baruch Drive (e.g., Viele 1865; Figure 9). Based on historical maps, construction of the Baruch Houses in the 1950s entailed demolition, mainly of tenements, mostly built between 1897 and 1912 (see Figures 6 and 7). However, initial site development comprised smaller structures from the 1850s (Perris 1852/1853; Figure 10) that persisted at least into the late 1860s (Dripps 1867; Figure 11).

A soil boring program conducted in anticipation of the current undertaking, which comprised 43 borings, documents between 4 feet (1.2 m)--somewhat of an anomaly--and 14 feet (4.2 m) of fill in the APE (Table 1; boring logs from the 43 borings are found in Appendix B this report). Given development in the APE, it is not surprising that the logs indicate the site fill includes demolition debris (brick, glass, etc.) from buildings then standing on the site.

The cultural material described in the upper strata of the soil borings is typical of fill before the 1960s when demolition debris was no longer permitted to remain on site. However, the age and type of cultural material in the fill can often distinguish between a fill associated with reclaimed land and fill associated with demolition. In addition, dating artifactual material in landfill often makes it possible to reconstruct an undocumented fill sequence (e.g., Geismar 1980).

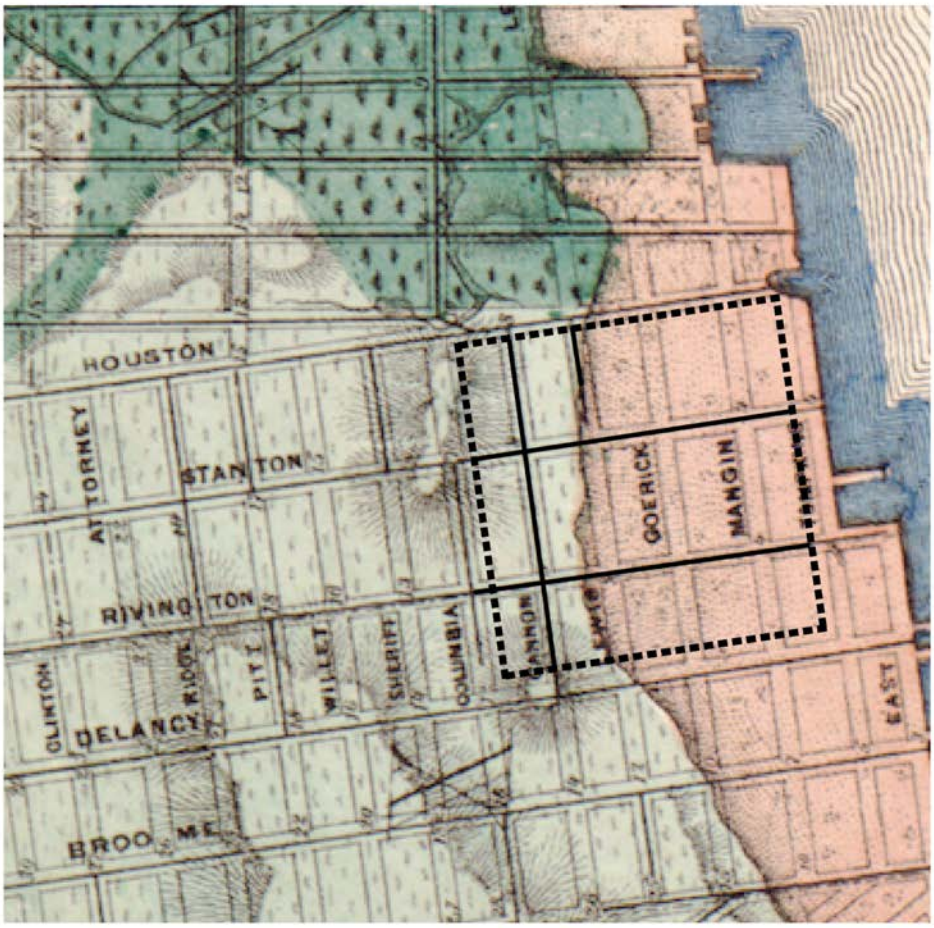
As for earlier soil borings, those drilled in the 1940s in anticipation of construction of the Baruch Houses were sampled at 5-foot (1.5-m) intervals, a sequence that often blurs potential details and available boring logs are virtually illegible. That said, those that are decipherable, suggest deep fill throughout the site. Boring logs from 43 soil borings associated with the current project (Langan 2015) offer information to assess current subsurface conditions, and here too, fill is a component of both fast and reclaimed land throughout the APE (see Table 1).



X project area, approx.

Indian site 3 ("Rechtank," a village site)

no scale



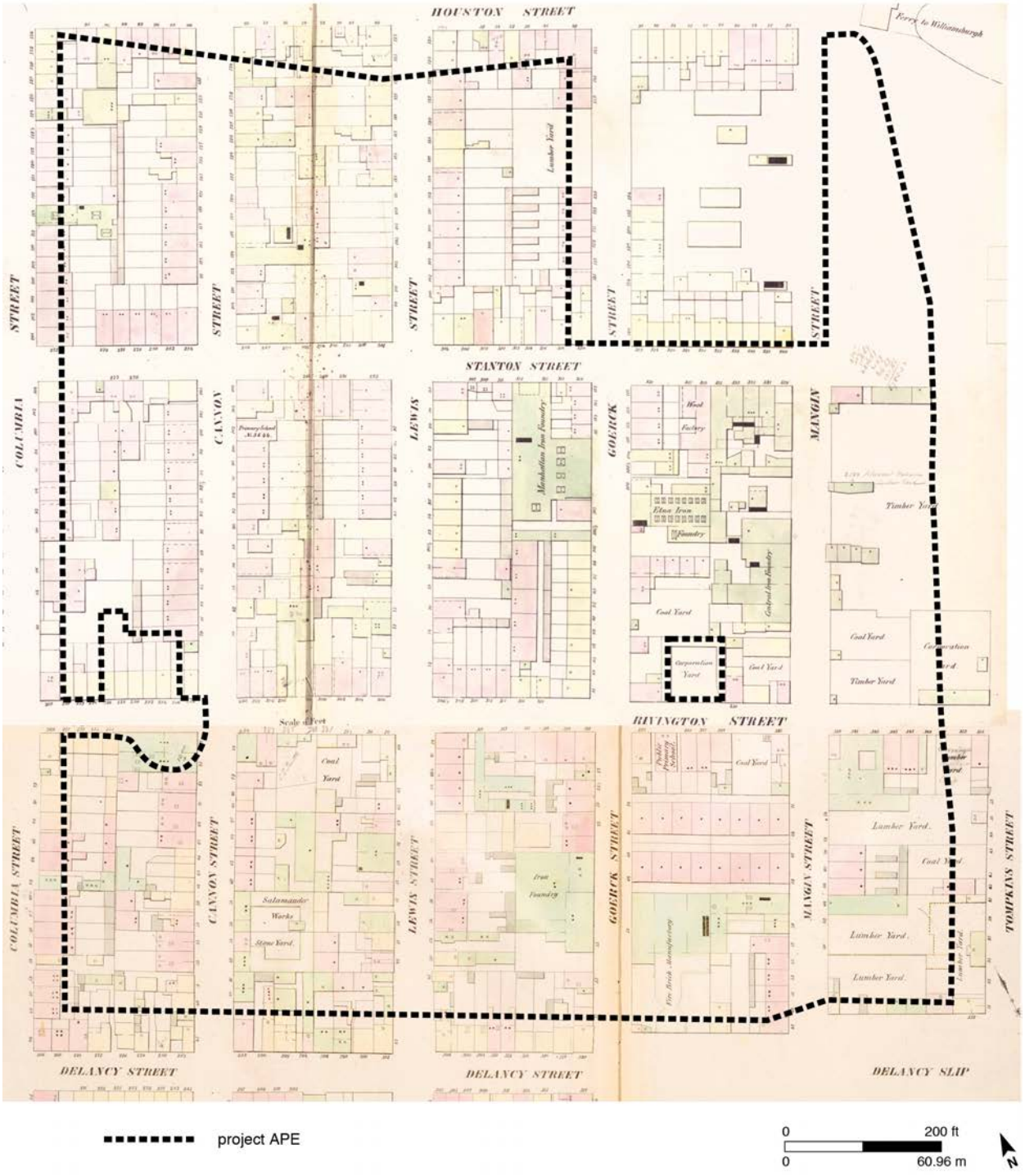
project site, approx.

sewers in project site enhanced

0 400 ft
0 121.9 m

N

BARUCH HOUSES 1A Project APE 1852/53 (Perris 1852:Plate 19; Perris 1853:Plate 39, details) **10**



BARUCH HOUSES 1A Project APE in 1867 (Dripps 1867, detail) **11**

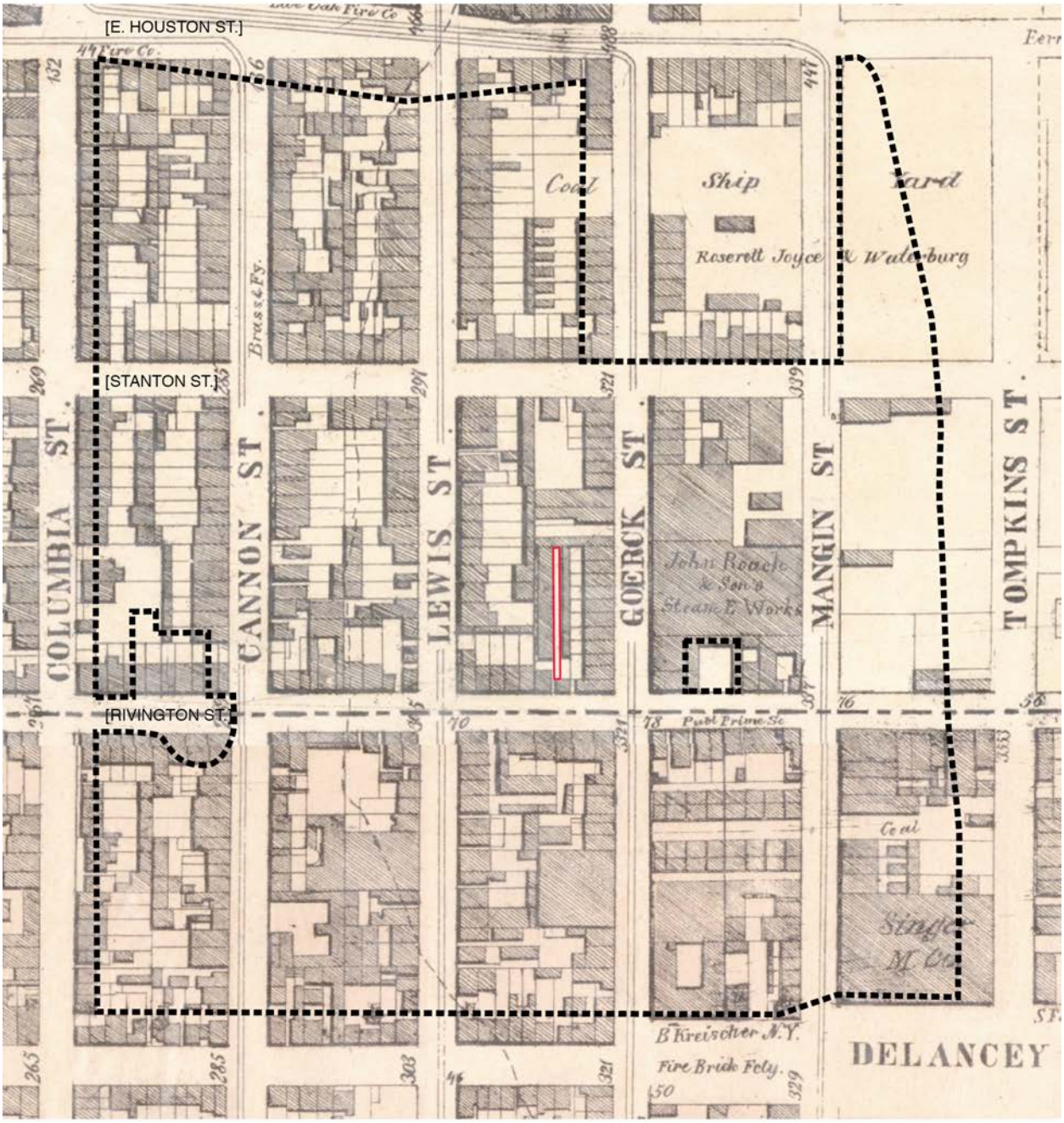


Table 1. BARUCH HOUSES Soil Boring Information (Langan 2015; see Appendix B and Figure B1)

Boring No.	Location	Fill Depth (ft.)	Soil Immediately Below Fill	Remarks
LB-1	N side of Delancey, btwn Columbia and former Cannon	8.5	Br m-c sand, tr gravel, wet	
LB-2	N side of Delancey, on former Cannon	9.25	Br fine sand, silt, wet	
LB-3	" , E of former Cannon	5.0	Or-Br m-f sand, silt, f gravel, wet	Fill ID to 5 ft; fill material to 7 ft ?
LB-4*	" , W of former Lewis	7.5	Or-Br m-f sand, some silt, wet	Wood @ base of fill @ 7.5 ft
LB-5*	N side of Delancey, at former Lewis	7.5	Lt Br silty sand, wet	Wood bottom of fill @ 7.25 ft
LB-6*	N of Delancey, just E of former Lewis	11.0	Or-Br silty sand:wet @ 16 ft	wood @ 11 ft, bottom of fill
LB-7	" , E of former Lewis	9.0	Br silty sand, wet	
LB-8	" , W of former Goerck	10.0	Gr m-f sand, tr silt, wet	
LB-9	**"** , in/E of former Goerck	**14.0**	Br silty sand, wet	**Deepest fill**
LB-10	" , in/E of former Goerck	11.0	Dk Br m-f sand, some silt, tr clay, tr f gravel, wet	
LB-11	" , in former Goerck	7.0	Gravel, some sand, wet	
[LB-12]	--	--	--	*[No Boring]*
LB-13	S of former Rivington, E of former Lewis	8.0	Or-Br c-f sand, tr f gravel, tr silt, wet	
LB-14*	On or just E of former Lewis, S of former Rivington	8.0	No recovery followed by f Gr sand, some silt, wet	Poss deeper fill; wood-covered telephone lines @ 4 ft
[LB-15, 16]	--	--	--	*[No Boring]*
LB-17	Intersection of former Rivington and Lewis	7.0	Ol-Gr f sand, tr silt, wet	
LB-18	N of former Rivington, W of former Lewis	8.0	Gr-Br m-f sand, some silt, wet	
LB-19	" " " "	9.0	Gr-Br fine sand, some silt, wet	
LB-20	Btwn former Stanton and Rivington, just W of former Lewis	8.0	Lt Br m-f sand, tr silt, tr clay, wet	
LB-21	" " " "	10.0	Tan-Br f sand, some silt	
LB-22 (OW)	**S of former Stanton, in or just W of former Lewis**	**4.0?**	**Br silty sand, wet**	**Shallowest fill?**
LB-23	Intersection of former Lewis and Stanton	7.0	Br m-f sand, some silt, wet	
LB-24*	N of former Stanton in or just W of former Lewis	7.0?	Gr sandy m-f gravel followed by Gr-Br f sand, tr silt , wet	Wood in drill tip at 6 ft; unid fill appears to continue to c 7 ft
LB-25	Just S of Houston on former Lewis	7.0	Or-Br c-f sand, some silt, tr f gravel, wet	
LB-26	S of Houston, W of former Lewis	7.0	Br silty sand, tr clay, wet	
LB-27*	S of Houston btwn former Cannon and Lewis	11.0	Br-Gr silty sand, tr clay, wet	Wood in 3 lowest fill samples
LB-28	S of Houston in or just E of former Cannon	9.0	Ol-Br m-f sand, tr silt, tr clay, wet	
LB-29	S of Houston just W of former Cannon	9.0	Br silty sand, tr organics (root fibers), wet	
LB-30	S of Houston mid-way between Columbia and former Cannon	10.0	Br sandy silt, tr organics, wet	
LB-31	S of Houston E of Columbia (NW corner of APE)	10.0	Br fine sandy organic, clay, wet	
LB-32	E of Columbia btwn Houston and former Stanton	9.0	No recovery, followed by Br m-f gravel (limited recovery)	
LB-33	S edge of former Rivington btwn former Cannon and Lewis	7.0-8.0	Br c-f sand, tr silt, some c-f gravel, wet	

(continues)

Table 1. BARUCH HOUSES Soil Boring Information (Langan 2015; see Appendix B and Figure B1) (continued)

Boring No.	Location	Fill Depth (ft.)	Soil Immediately Below Fill	Remarks
LB-34*	N of Rivington btwn former Lewis and Cannon	11.0	Gr-Br silty sand, tr c-f gravel, wet	Wood in fill @ 6 ft
LB-35	Btwn and Houston and former Stanton on W edge of former Lewis	10.0	Br m-f sand, tr silt, tr gravel, wet	
LB-36	" " " "	8.0	Br m-f sand, tr silt, tr gravel, wet	
LB-37	N of Delancey, btwn former Lewis and Goerck	13.5	Br m-f sand, tr silt, wet	
LB-38	S of Rivington, btwn former Lewis and Goerck	8.0	Br f sand, tr silt, tr gravel, wet	
LB-39	N of former Stanton E of former Lewis	13.5+?	Gr-Or Br m-f sand, tr silt, wet	
LB-40	S of Houston, W of former Goerck	10.0	Br m-f sand, tr silt, wet	
LB-41	" " " "	8.0	Br c-f sand, tr organics, tr silt, wet	
LB-42	N of Delancey, E of former Goerck	9.0	Or-Br c-f sand, some silt, tr m-f gravel, wet	
LB-43	N of Delancey. W of FDR, E of former Mangin	10.0	Br c-f gravelly sand, tr silt, wet	
LB-44	Btwn Delancey and former Rivington in or just E of former Mangin	7.0-10.0?	Br m-f sand, tr silt, tr m-f gravel, wet	
[*LB-45, 46]*	--	--	--	*[No Boring]*
LB-47	W of FDR Drive, E of intersection of former Stanton and Mangin	10.0	Br m-f sand, tr silt, wet	
LB-48*	W of FDR Drive, just N of former Stanton at former Mangin	8.0	Gr-Bl silty sand, tr m-f gravel, tr organics	Tr wood and organics @ 8 ft (bottom of fill)

* 8 of 43 borings, or 19%, produced evidence of wood (in one, LB-14, wood was associated with telephone lines ["modern"])

Bl = black; Br = brown; c-f = course to fine; Dk = dark; f = fine; Gr = gray; ID = identified; Lt = light; m-c = medium-course; m-f = medium-fine; Ol = olive; Or = orange; OW = observation well; poss = possibly; tr = trace; unid = unidentified

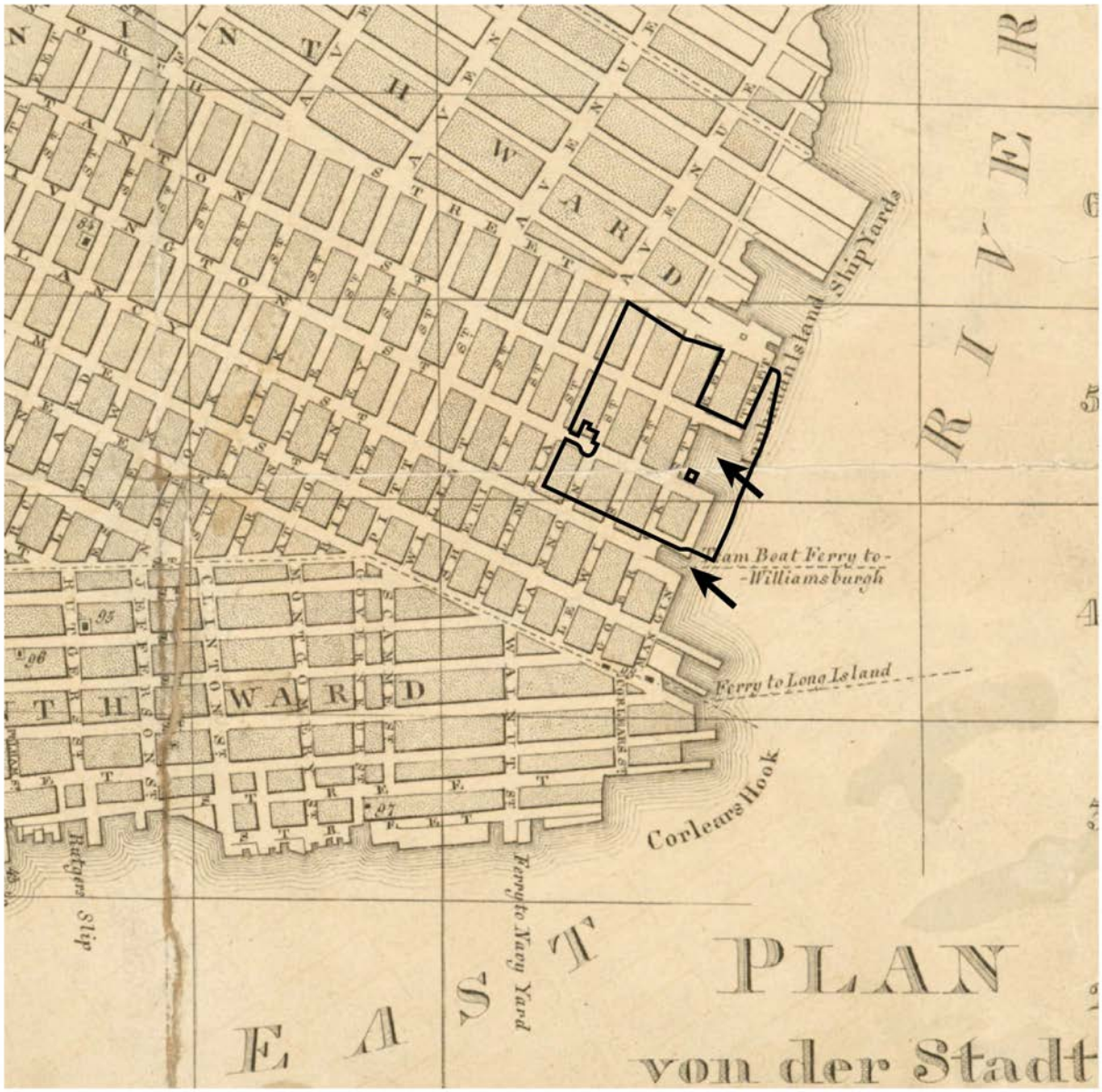
A plan of the city created by or for Prince Karl Bernhard, the Duke of Saxe-Weimar-Eisenach, when he traveled through North America between 1825 and 1826, shows most of the streets in the APE then in place. This was also true of slips off Delancey Street east of Goerck Street and between Rivington and Stanton Streets (Bernhard 1828; Figure 12). To this point, several recent borings document wood where wharves to create streets and/or slips were stipulated in Water Lot grants (see below). However, the wood also could be random fragments in the fill material, so their significance is at present unknown. Proposed deep excavations along former Rivington and Stanton Streets (Langan 2017) potentially could provide information to refine this assessment (see Figure 4).

HISTORIC-ERA CONSIDERATIONS

The project site is situated on the western edge of land that, in colonial times, belonged to James De Lancey (thus the name Delancey Street on the southern edge of the APE; Ratzer 1766; Figure 13). A Loyalist, De Lancey was in England when the Revolutionary War was imminent. Realizing that his family, his standing, and his land holdings were in danger, he sent for his family before his property, which included the APE, was confiscated. Beginning in 1783, confiscated land was redistributed by representatives of the new Republic. However, given site conditions at the time—lowlands bordering a pristine portion of the East River—no early historic-era resources are documented within the APE.

While prehistoric, early Native American, or early-historic site potential within the APE virtually is non-existent, as noted, evidence of mid-19th-century development is an identified issue.

BARUCH HOUSES 1A Project APE Sometime Between 1825 and 1826 (Bernhard 1828, detail) **12**




Salt Meadows
James Delancy Esq.
Delancy's Square
Th. Jones Esq.
Ship Yards
Corlaer's Hook or Crown Island
project area, approx.
James Delancy [DeLancey]
0
c. 1000 ft
0
c. 304.8 m
N

This is based on map data mainly from the aforementioned mid-19th-century Perris insurance maps that indicate brick and frame structures throughout the APE (Perris 1852/53; see Figure 10). It is also based on the grants of land under water housed in the Topographical Bureau of the Manhattan Borough President's Office.

The earliest water lot grant the city issued within the APE was to Alexander Macomb(e) in 1791 (Grant of Land Under Water [hereafter, GLUW] 1791:D 639; Figure 14). Located on the north side of Delancey Street east of Columbia Street, that is, in the southwestern corner of the APE, it was a logical progression northward of land reclamation along the East River. The last water lot grant issued in the APE,[5] to Adam Brown and Noah Bell in 1846, was south of Houston Street between former Mangin and Tompkins Streets (GLUW 1807:E 389; see Figure 14).

Water lot grants identify the 19th century grantees in the APE who were mainly members of the merchant elite of the time. Among them are Frederick DePeyster[6] from an illustrious colonial family (an uncle was an early mayor of New York) and John Jacob Astor, once the wealthiest man in America.

The water lot grants all include stipulations to construct wharves to create streets or slips. Some grants extended a short distance eastward from the river's low water mark approximately between former Cannon and Lewis Streets while others continued further into the river to what became Tompkins Street, just east of the APE (see Figure 14). As noted earlier, the blocks located approximately between Columbia and Lewis Streets from Delancey to Houston Streets comprised lowlands associated with the East River while the APE to the east is entirely reclaimed land. Based on soil boring data and on mid-19th-century accounts (see below), both fast and reclaimed land in the APE required filling prior to development.

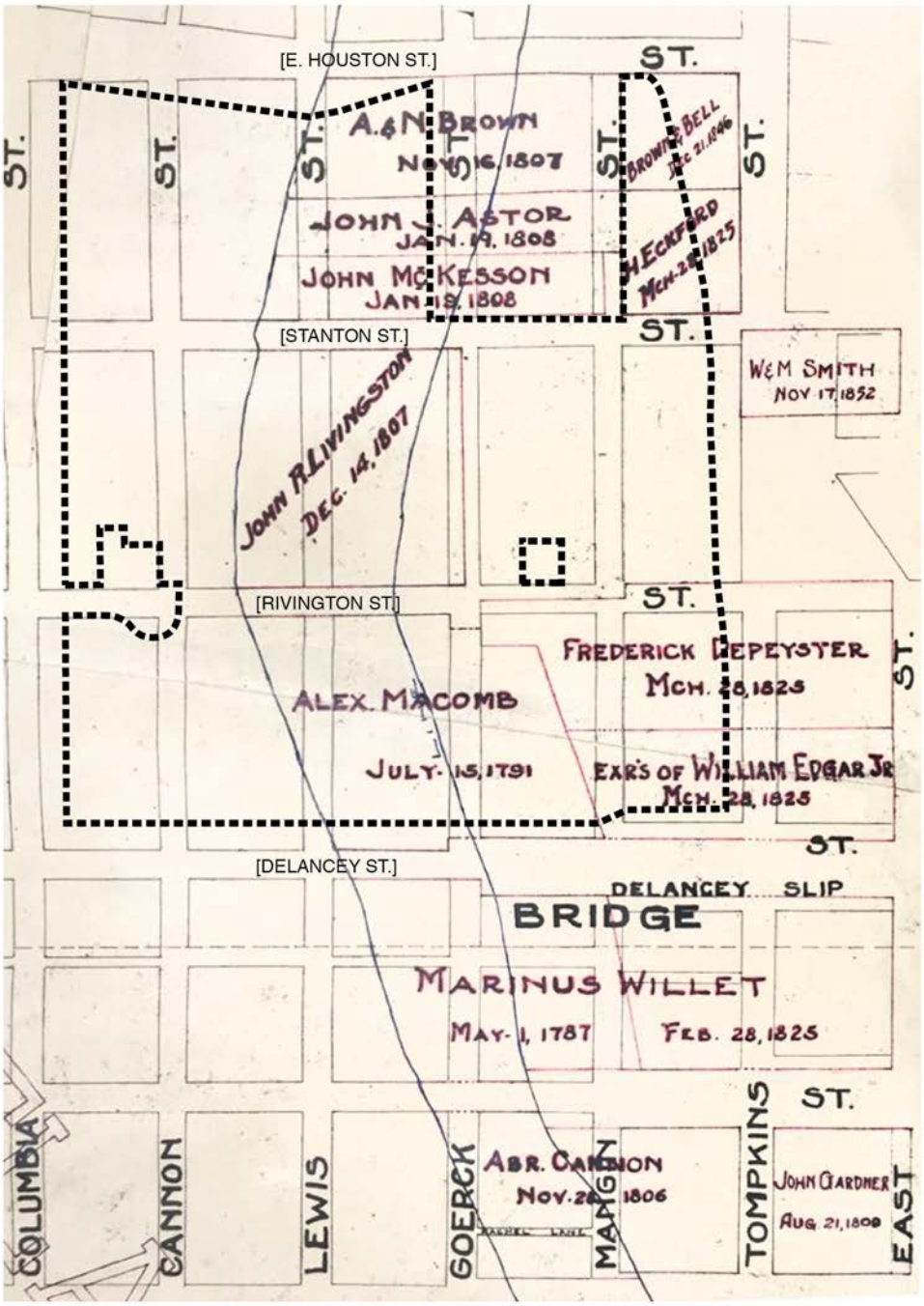
Development included the mid-19th-century domestic structures and the few commercial buildings documented on the maps in the 1850s and 1860s (see Figures 10 and 11) as well as the tenements and additional commercial buildings mainly located closer to the river over time (e.g., Robinson 1884; Figure 15). Between 1897 and 1912, buildings in the APE were mainly those that persisted through 1934 (Bromley 1934:Figure 16; compare with Figures 6 and 7) and, as mentioned previously, were demolished to make way for the Baruch Houses.[7]

1860s CONDITIONS IN THE APE

Conditions in and around the APE are described in the 1865 Citizens' Sanitary Report, a watershed study recording sanitary and health conditions in the then developed city. The report is divided into twenty inspection districts, some described in more detail than others. The Tenth and Fifteenth Sanitary Districts, the two that include the APE, are very telling.

Dr. John C. Acheson, the inspector for the Tenth Sanitary Inspection District that included the APE from Delancey to Rivington Streets (Sanitary Report 1865:110-115), describes a flat

[5] An 1852 grant was for land under water east of Tompkins, beyond the APE (see Figure 14).
[6] Based on the water lot grant and deed information, it appears that DePeyster resold at least part of this grant to Henry Eckford that same day (LD 195:119) and later to others as well. However, the grant's stipulations may not have been met by any of these owners as there is a notation on the original grant indicating it was reissued in 1851 (GLUW J:162 [actual grant not available]).
[7] Because the Baruch buildings were erected on piles and slabs rather than foundations, minimal site disturbance is documented in construction photos reviewed at the NYCHA archive at LaGuardia Community College.

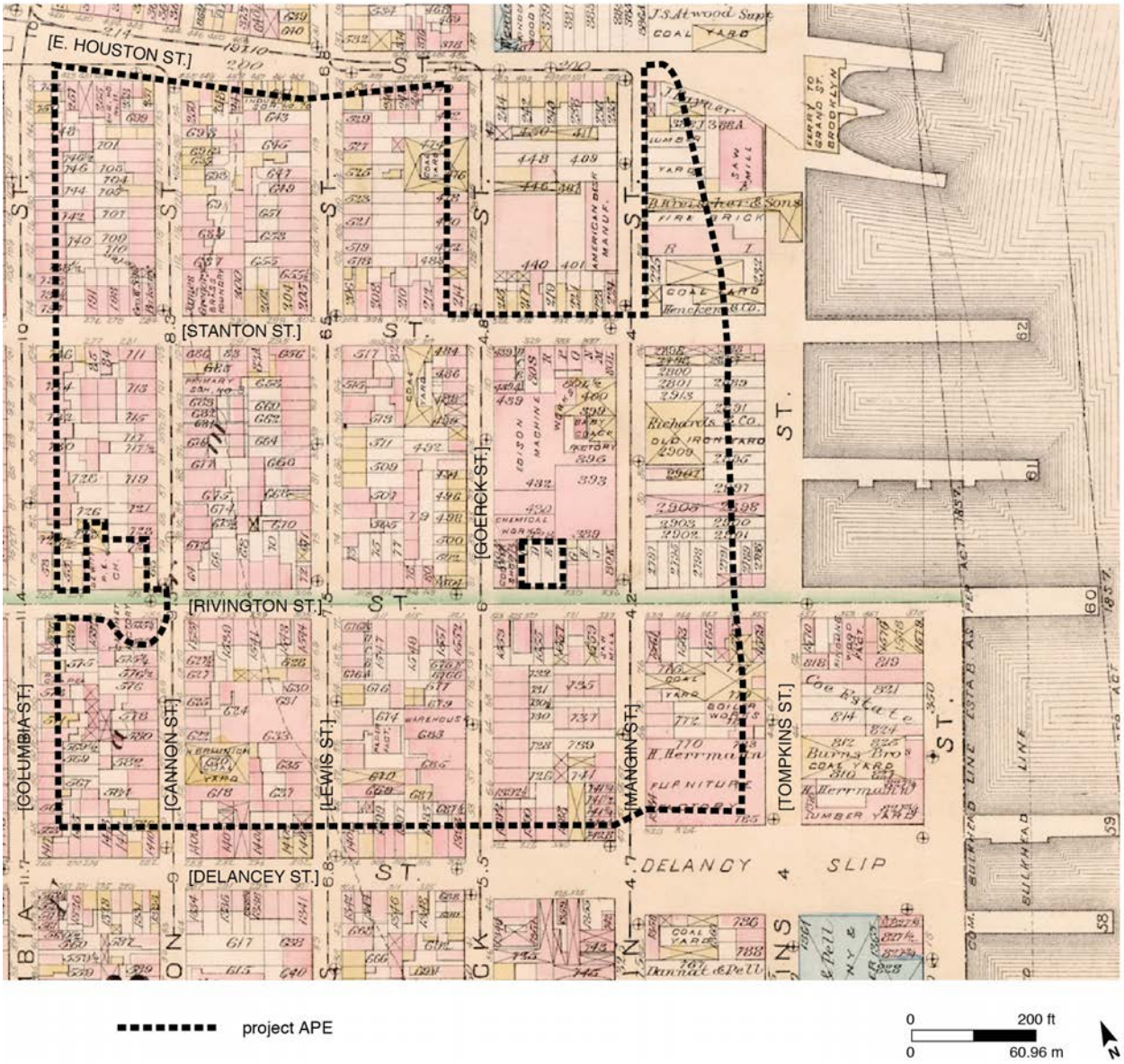


project APE

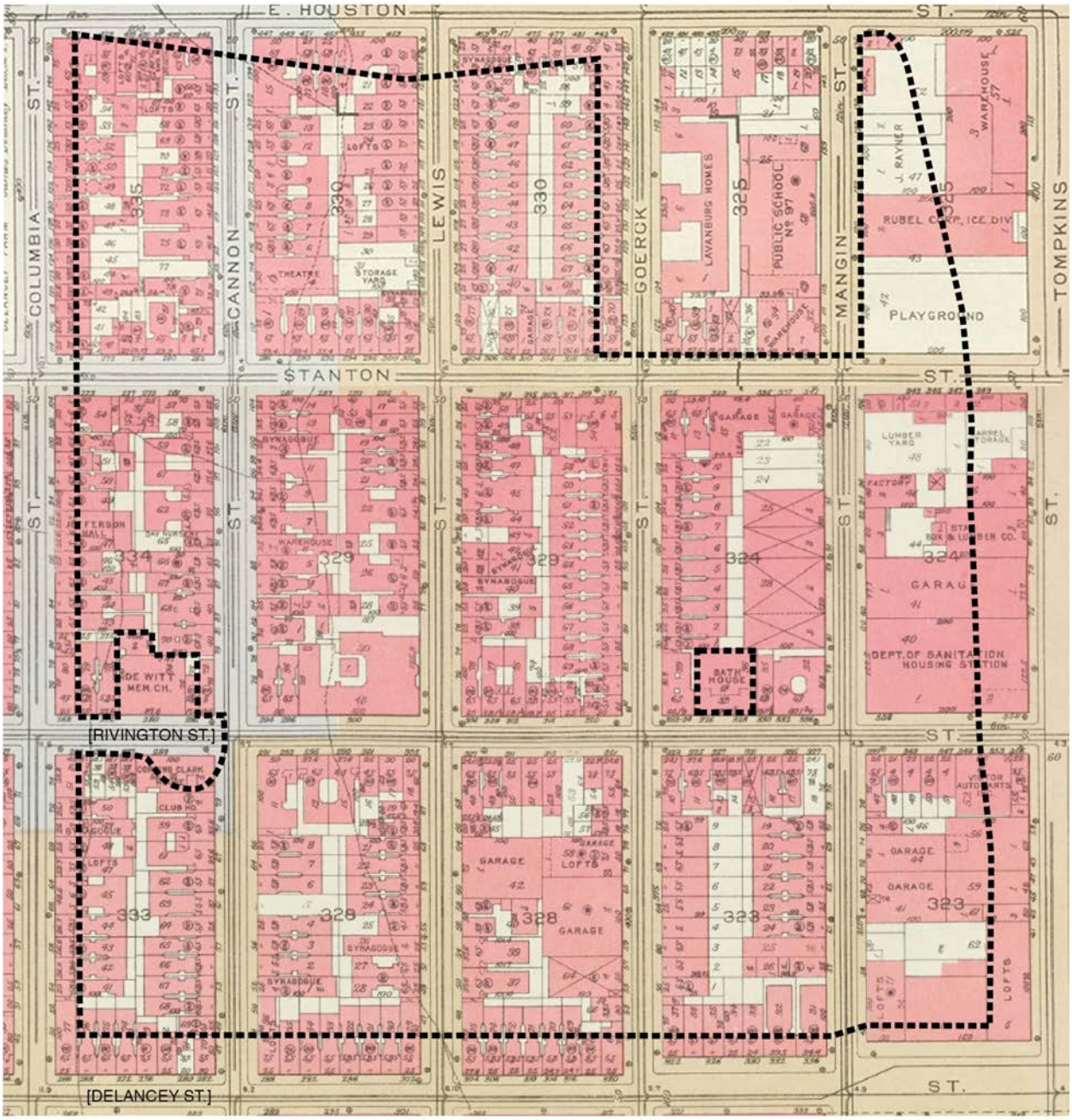
0 200 ft
0 60.96 m

N

BARUCH HOUSES 1A Project APE in 1884 (Robinson 1884:Plate 6, detail) **15**



BARUCH HOUSES 1A Project APE 1934 (Bromley 1934, detail) **16**



terrain in the project area "scarcely sufficient…to carry off the surface drainage," noting that a ridge of hills in the district southwest of the APE (the highest point was at Grand Street to the south where Revolutionary War-era forts had been erected) had been "cut down" to create a conforming terrain. "This process of 'filling in' created…a "good straight water front…with a depth of water capable of accommodating the largest vessels." So in addition to the benefits of creating new, saleable land, the early-to mid- 19th century merchant grantees apparently found the prospect of deeper dockage that could accommodate larger vessels an impetus to obtain water lot grants in the APE much as it was the impetus in the South Street Seaport to the south in the 18th century (e.g., Geismar 1983:675).

Acheson notes there are no records of streams or collections of water in the district, though he presumes the whole district was once covered by the river since, with the exception of those on the hills beyond the APE, wells "furnished" brackish, salty water. The streets, which included Delancey to Rivington Streets in the APE, were paved with cobblestones[8] but were generally in a "filthy and unwholesome condition…especially in front of the tenant-houses." This despite the fact that about half the district was "provided with capacious brick sewers" (Sanitary Report 1865:111).

It seems this was the situation at least in Columbia and Cannon Streets in the APE where city sewer records indicate 4.5-foot (1.4 m) egg-shaped brick sewers in place as early as 1861 (Sewer Records; Croton Aqueduct 1857). [9] Unfortunately, this information is lacking in city sewer records for other streets in the APE, but Viele documents sewers on his map to accompany the Sanitary Report (see Figure 8). However, Acheson notes that a very small proportion of the dwelling houses were connected to the sewers. Undoubtedly this is at least in part because the majority of the houses were tenanted rather than owner occupied (see RESIDENTS below). But while sewers may not have improved conditions in the houses, Acheson remarks that they did improve street drainage.

Acheson describes a mainly working class neighborhood with the majority of the men of "the laboring class" but with some tradesmen and mechanics and "a large number of females who earn their living as operatives in factories in this and in the lower parts of the city." The population was mainly Irish, "followed by Germans, then Americans." In this sanitary district, which as noted included the southern part of the APE, private buildings were mostly brick (although some were frame or frame faced with brick) and in the early 1860s were at least twenty years old. While they mainly lacked

> "…the conveniences and comforts of dwellings of more modern date, such as baths, gas, and sewer-connections, etc. in their appointments for health, such as capacity, size of apartments and dormitories, ventilation, drainage, heating, etc., they present few objectionable features, and indeed are, in some respects, superior to many buildings of more recent date" (Sanitary Report 1865:112).

On the other hand, he goes on to note:

> "Their general character as regards location, age, size, drainage, water supply, etc., is bad. They generally occupy too much of the lots on which they are built [and] are not connected with the sewers…Many have an insufficient supply of water, sometimes from 20 to 40 families depending upon a single hydrant in the yard. Many are densely crowded" (Sanitary Report 1865:112).

[8] Not to be confused with Belgian Block.
[9] Apparently many of these mid-19th-century sewers, now lined, are still in use in the project area.

He finds the worst area for diseases is between Broome and Rivington Streets and the East River, that is, within the southern part of the APE. He describes it as the "poorest part of the district, having the lowest ground, the filthiest streets, and most dense population."[10]

Dr. James Ross reported on the Fifteenth Sanitary District (Sanitary Report 1865:171-181), which included the APE from Stanton Street to East Houston Street. He notes that two thirds of the district, once covered by the water of the East River and low salt marshes, was filled by grading down the bordering sand hills (although he neglects to mention land reclamation). He describes former streams in the district, but none in the APE. However, because of the dampness of the ground, some houses apparently were built on stilts.

Ross notes that, like the neighboring Tenth Sanitary District, all the avenues were by then sewered and, with only a few exceptions, so were the streets. The street sewers were (and, as noted, apparently are often still) egg-shaped "with outlets below tide-water…[that force] back the contents of the sewers throughout the lower level of the district, and thereby cause a noxious reflux of sewer gases." Columbia and Houston Streets in the district were paved with "trap-rock Belgian pavement," the others with cobblestone. Ross notes,

> "This district probably has a greater number of artisans, workers in wood and metals, than any other district in the city, and nearly the whole water-front as well as several entire blocks are occupied by the extensive manufactories by which they are employed. The shipyards, iron, lead, and copper works here, give employment to many thousand hands to whom a residence near is a great necessity. Hence the excessive crowding in this locality"

Citing his notes, Ross describes blocks in the APE as "Ground filled in, and so level as to render the natural drainage imperfect." While there were sewers on Lewis, Stanton, and Rivington Streets, houses were not connected to them. He notes that privies in the district were "carelessly attended." Using the example of Rivington Place, an alleyway located in the APE at the rear of 316 and 318 Rivington Street (Dripps 1867; Figure 11), he says they were "always in a filthy condition" with its small houses overcrowded. He indicates that the 30 families who reside in the alley's five houses,

> "…have no other water supply than… two hydrants… in the exterior courtyard; while for this population of nearly 200 persons of all ages there are but two privy vaults, and, at the time of last inspection of the quarters, these vaults were filled nearly to the surface."

He goes on to describe the privy in "Cat Alley," a group of dilapidated tenant houses also in the APE. Located on Cannon Street between Stanton and Houston Streets, "The privy is a small and broken-down structure, covering only a part of the vault, which is now full almost to overflowing."

So the inspectors of the two districts that include the APE describe insalubrious conditions. While sewers were present, houses apparently were rarely connected to them and backyard hydrants provided household water. The houses then in the APE are indicated on the 1867 Dripps map (see Figure 11). It should be noted that this map also documents two successful

[10] Reflecting the prejudices of the time, Acheson equates these conditions not only with the physical conditions of the district, the economic conditions of its inhabitants, and concomitant population density and overcrowding but also with national character.

commercial enterprises within the APE, the Balthezar Kreischer clay brick manufactory and a Singer Sewing Machine factory. Kreischer maintained a Manhattan presence from the 1840s till his death in 1884 even though, beginning in 1850, his brick and clay products mainly were produced at Kreischerville, his company town on Staten Island (Geismar 2016a). Singer Sewing Machines are manufactured elsewhere to this day.

MID- TO LATE 19th-CENTURY RESIDENTS IN THE APE

Available data analyzed to determine the make-up of the mid-century residents of the APE include city directories, a very helpful resource in this regard as well as in determining the length of a residency or a resident's occupation. In Manhattan, however, the 1851 Street Directory (Doggett 1851) is a singular and invaluable resource since it provides the name and occupation of what appears to be the head of each listed household or principal in a business by address and block. Other invaluable data are tax assessment records.

Based on both the Perris insurance maps and the Doggett directory, it appears that the APE was developed with frame and brick structures by the early 1850s. Based on tax assessments, as mentioned earlier, it also seems that all but a few were tenanted rather than owned.

The 1851 street directory identifies a minimum number of approximately between 1,446 and 1,466 possible households and/or businesses then in the APE while the tax records indicate that very few of those listed in the directory were property owners. This was found in two blocks researched for this analysis. On the APE's most southwesterly block, that is a block on fast land bounded by Delancey, Columbia, Rivington, and Cannon Streets, two of 41 occupants (0.05%) were owners. Further east, on a landfill block nearer the river bounded by Delancey, Goerck, Rivington, and Mangin Streets, where only 21 residents are documented, the percentage of owners (1 of 21 or 0.05%) was the same as the more densely occupied block to the west. Not surprisingly, the directory also indicates that those living or working nearest the river were more likely to be involved in trades or occupations associated with the seaport (Doggett 1851; see Table 2).

POTENTIAL ARCHAEOLOGICAL FEATURES

As stated earlier, of concern in regard to the archaeological potential of the APE are the former backyards of houses documented on the1852/53 Perris maps (see Figure 10). However, these mid-19th-century structures mainly were replaced throughout the APE by brick tenements by 1912. That said, while the 1850s structures were erected prior to the introduction of sewers, based on the Sanitary Inspectors' reports discussed above, even when sewers were available, tenanted houses likely were not connected to them. Therefore, houses documented in the APE through1867 undoubtedly utilized the outhouse in one form or another as a toilet facility and also may have depended on cisterns to provide household water.

With Lower East Side tenements as an example, later tenements utilized water-cleansed versions of the privy known as a "school sink" rather than the ubiquitous dry-laid stone privy pit as a sanitary facility. This was the case at 97 Orchard Street. Here the owner/builder of a tenement provided this multiple compartmented, brick-vault connected to a newly available sewer in 1863, the year the tenement was erected. It is noteworthy that this was decades before sewer connections were mandated by law (e.g., Geismar 2010).

Table 2. BARUCH HOUSES Occupations of Residents on Two Former APE Blocks (Delancey, Columbia, Rivington, Cannon [Block 393] and Delancey, Goerck, Rivington, Mangin [Block 323])

FORMER BLOCK 323			FORMER BLOCK 393		
Occupation	**Category**	**No.**	**Occupation**	**Category**	**No.**
Baker	T	3	Boilermaker	T	1
Barber	A	1	Bookmaker	A	1
Blacksmith/Smith	A	6	Bootmaker	A	2
Blindmaker	A	1	Bording	--	1
Bookbinder	A	1	Bricks	T	1
Bootmaker	A	1	Butcher	T	1
Bording (sic)	--	1	Carman	A	4
Butcher	T	4	Carpenter	A	3
Cabinetmaker	A	1	Coal	T	1
Carman	T	4	Engineer	S?	1
Carpenter	A	11	Grocer	T	7
Carver	A	1	Laundress	--	1
Clerk	--	1	Machinist	A	4
Coal	T	1	Moulder	A	2
Cooper	A	1	Printer	A	1
Druggist	T	1	Sailmaker	S	1
Drygoods	T	2	Ships Carpenter/Joiner	S	3
Grocer	T	7	Stage Driver	--	1
Hatter	T	1	Turner	A/S	1
Machinist	A	8	Variety	T	1
Mason	A	3	Weaver	A	1
Moulder	A	2	Wheelwright	A	1
Oils	T	1	Whitesmith/Tinware	A	1
Oysters	T	1			
Pedler (sic)	--	1			
Printer	A	1			
Ropes	S	1			
Segars	T	2			
Shipmaster	S	1			
Shoemaker/Shoes	A/T	6			
Soaps	T	5			
Sparmaker	S	1			
Tailor/Tailoress	A	8			
Threads & Needles	T	1			
Tinsmith	A	1			
Turner	A	1			
No Occupation Listed	--	67	No Occupation Listed	--	7
TOTAL		160			49

93 of 160 (58%) Identified Occupations 42 of 49 (86%) Identified Occupations

A = artisan; S = seaport related; T = trade

Whether a dry-laid stone privy pit or a brick-vaulted school-sink, once abandoned and filled, these backyard features become archaeological resources with the potential to reveal unprecedented aspects of every day life in the APE. They also can provide markers for the introduction and/or adoption of municipal utilities. These backyard features are among the archaeological concerns in the project APE.

While privy pits or vaults of several types are a potential archeological issue in former backyards in the APE, as mentioned, so possibly are water cisterns. Unlike the privy, which was located as far from the building as the yard configuration would allow,[11] cisterns usually associated with earlier, smaller buildings were located close to the building to collect rainwater from roof drains. Therefore, cisterns were more than likely obliterated by construction of the larger tenement buildings documented in the APE (e.g., Hyde 1912; see Figure 7). For this reason, backyard features that might be encountered include the stone-lined privy pits associated with the earliest buildings in the APE as well as multiple privy facilities similar to the water cleansed "school sink" documented in the yard of the Lower East Side Tenement Museum. There was also evidence in the yard of a hydrant, perhaps similar to those mentioned in the 1865 Citizens' Sanitary Report. And given ground conditions in much of the APE, sumps to manage backyard water accumulation also may be encountered. These might be similar to the stone feature uncovered at NYCHA's Gowanus Houses in Brooklyn erected in former wetlands (Geismar 2016b), or those documented at the 175 Water Street site in the South Street Seaport area, where land reclamation was a factor (Geismar 1982).

Stipulations to construct wharves and piers as foundations for streets and slips documented in the water lot grants suggest that landfill structures, perhaps in the form of log wharves or log and stone landfill retaining features, exist within the APE, most particularly in the vicinity of former streets and slips. And then there is always the possibility of an unanticipated find.

FINDINGS AND RECOMMENDATIONS

Development of the APE entailed grading and filling lowlands as well as extensive land reclamation. To eliminate the lowlands, nearby hills were graded; to reclaim land from the East River, wharves were constructed to create streets that defined new blocks and rendered the land developable. As an interim step in this development, wharf construction also created slips for dockage, an economically advantageous undertaking. Therefore, potential archaeological issues in the APE not only include evidence of mid-19th-century domestic and commercial development—more specifically, the sanitary features located in backyards that followed land preparation and creation—but also the landfill-retaining structures required to reclaim land from the East River that comprise more than half of the APE.

As noted in the introduction, proposed site work includes relatively shallow landscaping, new gas and electric lines c. 2 to 4 feet (0.6 to 1.2 m) deep, and an encompassing floodwall around the western part of the site with a foundation c. 5 feet (1.5 m) deep. It also includes deep excavations associated with sewer work and, at this writing, nine structures erected on piles and slabs are also planned (see Figure 4). This information was coordinated with map data that document early and subsequent development in relation to the current project configuration (see Figure 17 for the former and Figure 18 for the latter that also shows the location of late 18th- and

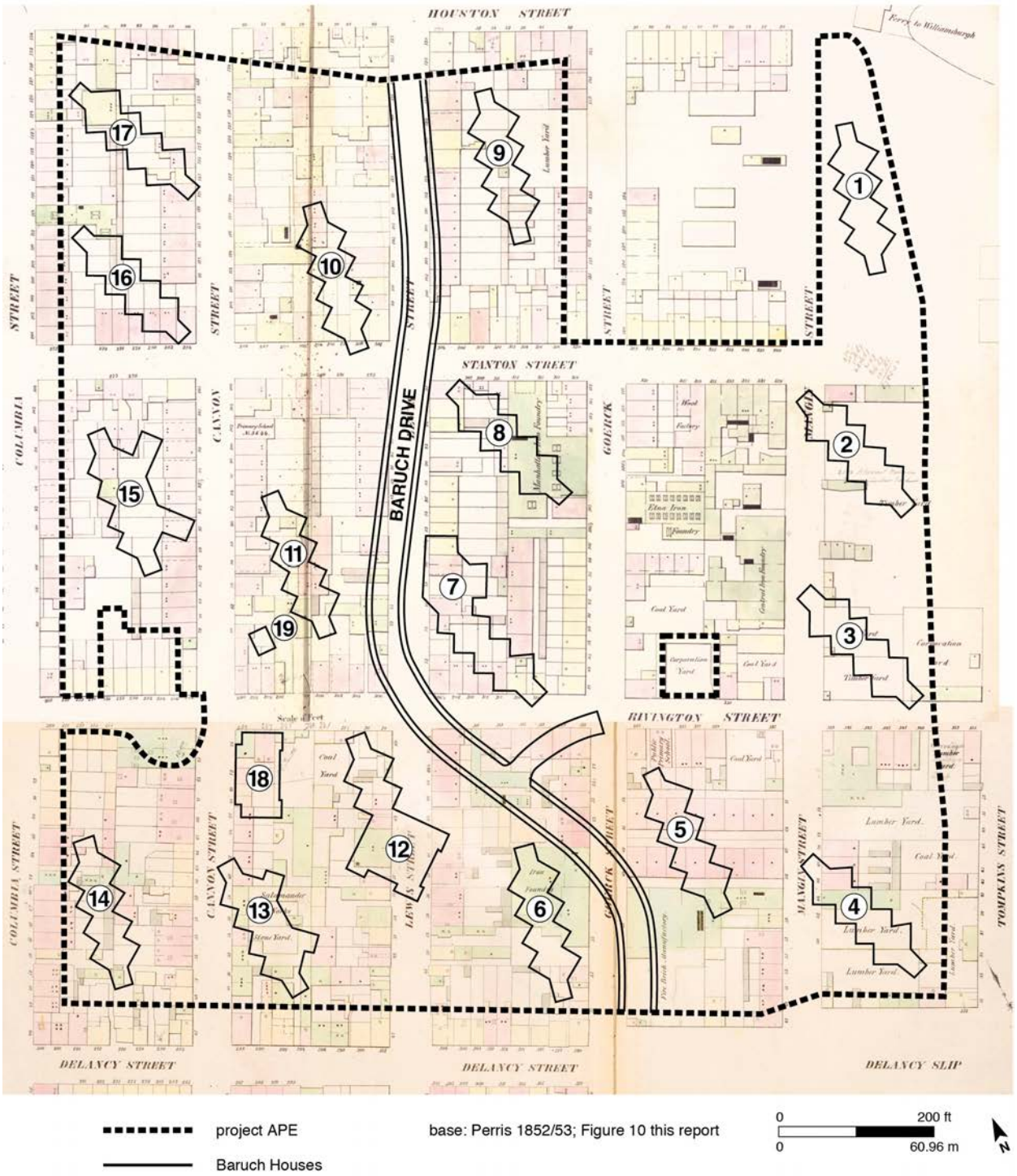
[11] By law, the dry-laid stone or brick privy pit was to be 2-feet from the rear property line (e.g., NYC By-Laws 1845:356). Also, any constructed south of 14th Street were to be 10 feet deep (NYC By-Laws 1845:355)

early- to mid-19th-century water lot grants; also see Photo 5 for a view of the site area just east of the APE in 1931). This information suggests six (6) locations with possible archaeological potential. All are where new utility lines will require 2- to 4-foot (0.6 to 1.2 m) deep excavations. The six locations indicated on the 2017 utility plan (Figure 19) are recommended for testing.

In addition, monitoring is recommended at five locations where deep excavations are planned to replace manholes and conduct sewer work on former Rivington and Stanton Streets (see Figure 19). This is where wharves and piers apparently served as landfill structures and where sewer-related excavation could reach depths of 12 feet (3.7 m) BGS, that is, deeper than wood recorded in recent soil boring logs (see Table 1 and Appendix B Figure B1 *re* locations of wood inclusions in soil borings). However, it is recommended that the monitoring program be revisited once manhole and sewer excavations are underway to adjust the monitoring effort as warranted. In addition, protocols should be in place to address the issue of potential finds during testing/monitoring and unexpected finds during any site work. This includes protocols regarding work stoppage in an unanticipated area of sensitivity and time to assess and document the find as necessary. It is also recommended that the archaeological protocol established for site work at NYCHA's Gowanus Houses in Brooklyn be adapted to this undertaking.

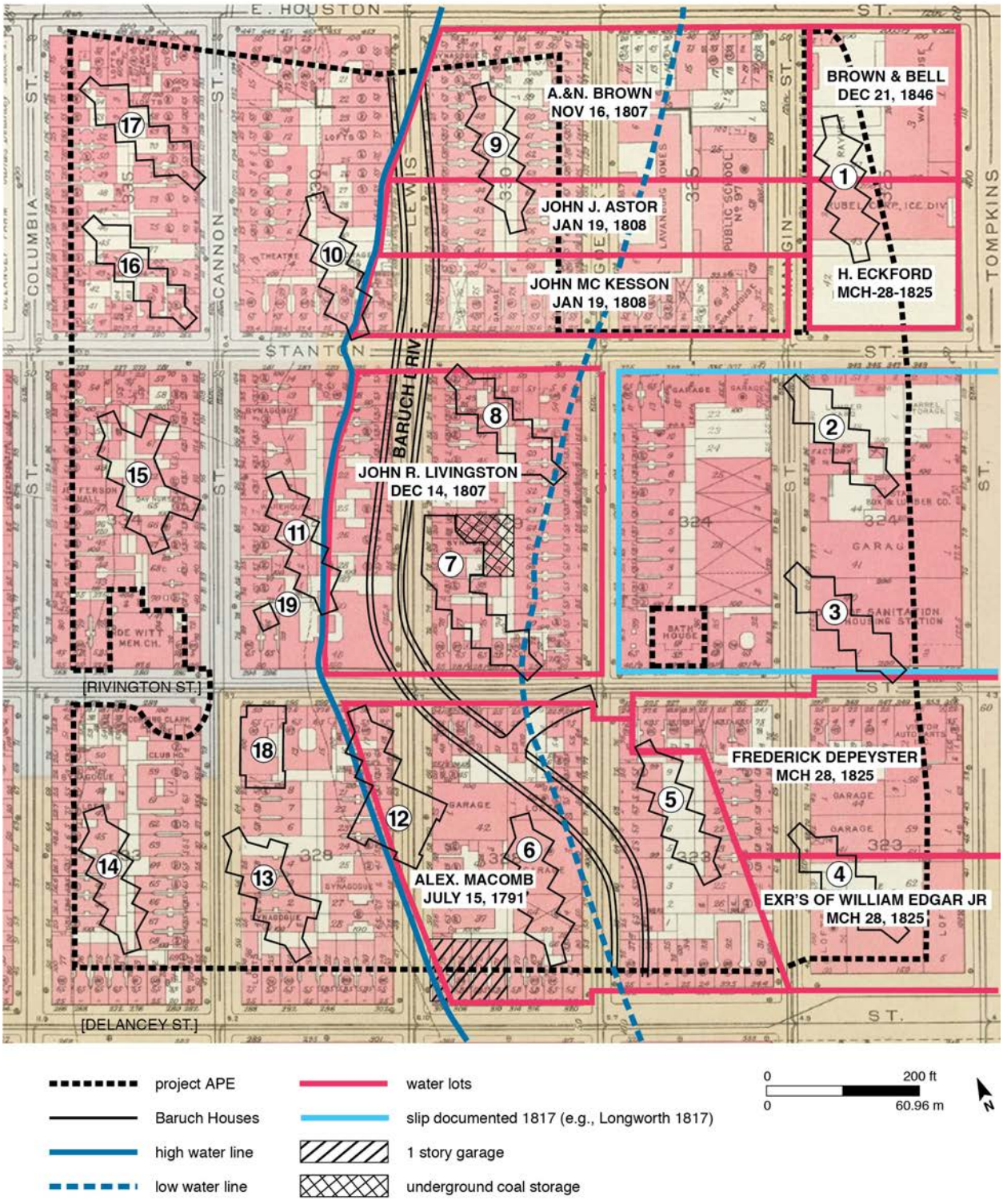
Photo 5. Looking south along East Street (just beyond the APE) from Houston Street in 1931. The Williamsburg Bridge is in the far background and beyond the tenement to the right are New York City storage buildings. (Municipal Archives bpm_0405-b1.jpg)

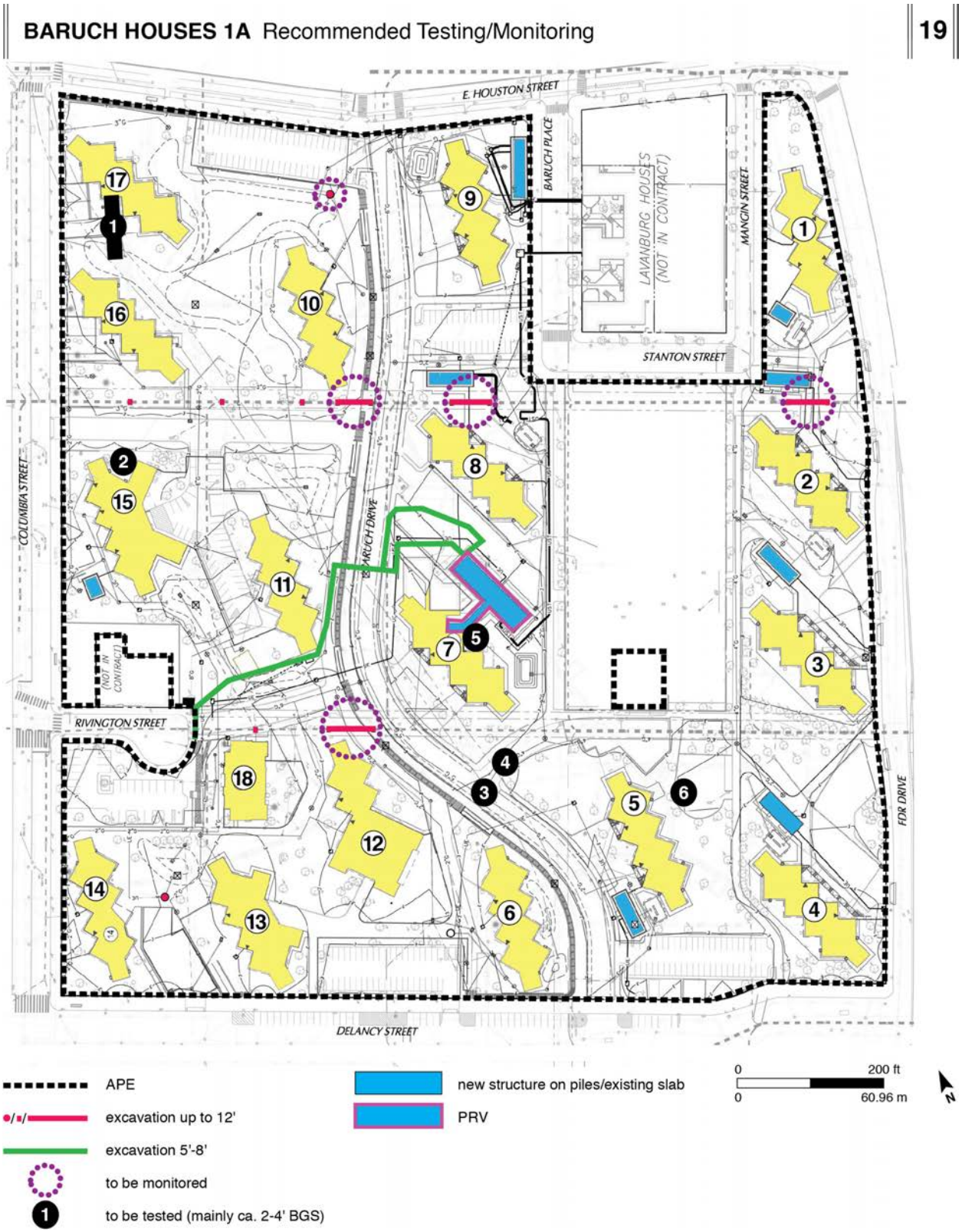
BARUCH HOUSES 1A Project APE 1852/53 with Baruch Houses 17



BARUCH HOUSES 1A Project APE 1934 with Later Additions, Water Lot Grants, and Baruch Houses (Bromley 1934 and Tracts and Farms 1917:R.D. 357 Plate 7, detail)

18




BARUCH HOUSES 1A Recommended Testing/Monitoring
19
E. HOUSTON STREET
BARUCH PLACE
LAVANBURG HOUSES (NOT IN CONTRACT)
MANGIN STREET
STANTON STREET
COLUMBIA STREET
BARUCH DRIVE
RIVINGTON STREET
(NOT IN CONTRACT)
DELANCY STREET
FDR DRIVE
APE
excavation up to 12'
excavation 5'-8'
to be monitored
to be tested (mainly ca. 2-4' BGS)
new structure on piles/existing slab
PRV
0
200 ft
0
60.96 m
N

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APPENDIX A. Archaeological Sites Listed in the NY State Cultural Resources Information System (CRIS) within 1-Mile (1.6 km) of APE

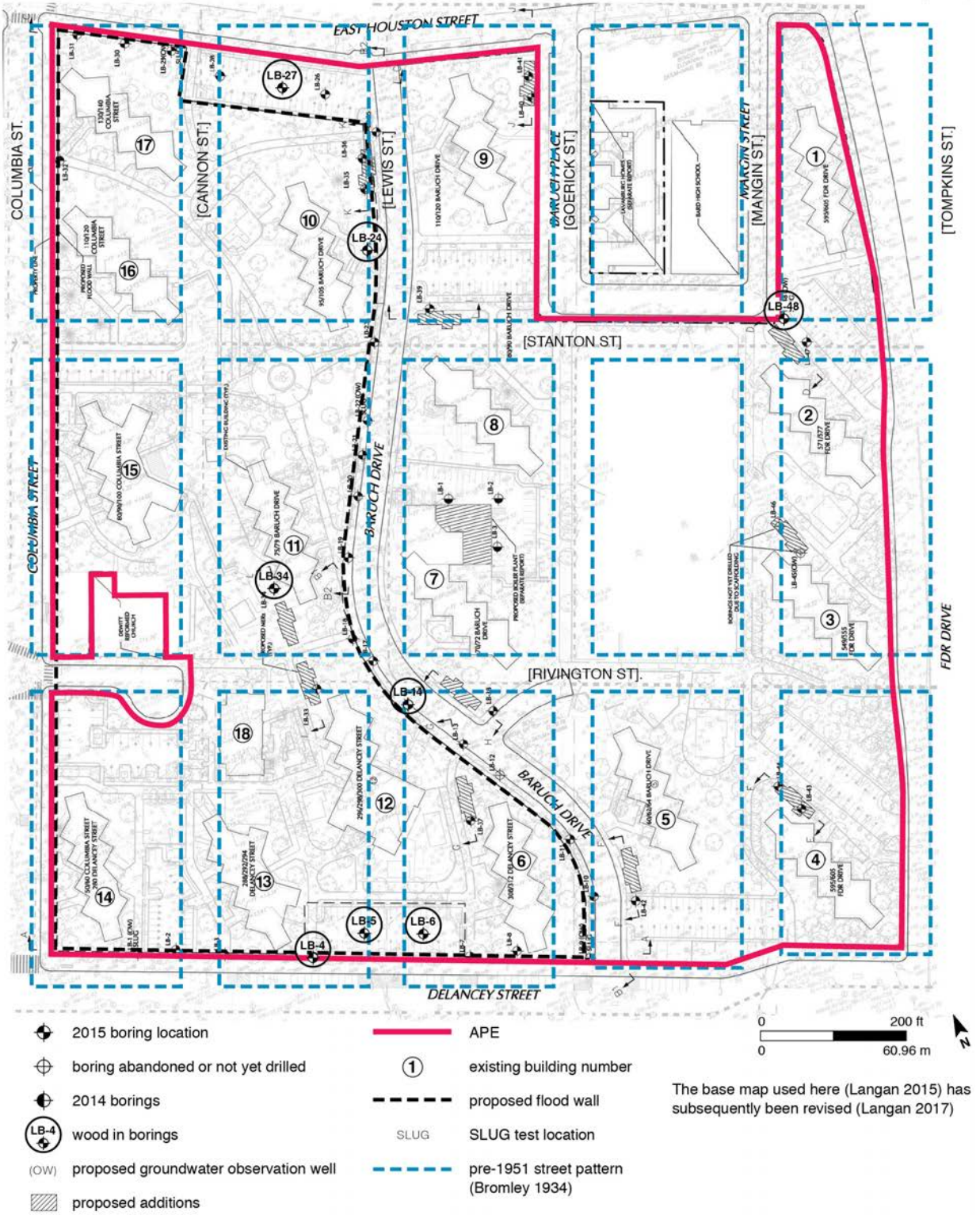
BARUCH APPENDIX A. Archaeological Sites Listed in the NY State Cultural Resources Information System (CRIS) within 1-Mile (1.6 km) of APE

SHPO Site No./ /Site Name	Distance from APE/Borough	Site Type/ Time Period	Description	Source
A06101.017933/34 Lower East Side Girls Club	0.27 & 0.30 miles (0.44 &.0.48 km)/ Manhattan	Historical/19th C.	Scatter/small 19th C. artifact assemblage; mortared brick foundation, oyster shell concentration, one intact/one partial dry-laid stone privy	Historical Perspectives (2008, 2009)
A06101.018336/ PSA4 Pre-Civil War Cistern [?] NYSM 11653 – undetermined	0.43 miles (0.69 km)/ Manhattan	Historical/18th- 20th C.	Late 18th-20th C glass & ceramics, animal bone, organic material, clothing-related artifacts, coins, game pieces	Joel Grossman Assoc. (1994)
A06101.015708/ Lower East Side Tenement Museum	0.53 miles (0.85 km)/ Manhattan	Historical/19th C.	Former church site (1828) then a tenement (c.1863); the Lower East Side Tenement Museum since the late 1980s; "school sink" and site drainage documented	Geismar (1999)
A06101.018564/ St. Philip's Cemetery	0.66 miles (1.1) km)/ Manhattan	Historical/19th-20th C.	Historic fill including human remains	Historical Perspectives (2006)
A04701.015660/ Continental Iron Works	0.90 miles (1.5 km)/Manhattan	Historical/19th C.	The *Monitor*, an Iron-clad Civil War-era vessel constructed here	Greenpoint Monitor Museum
A06101.016117/ Columbus Park Pavilion Cistern	0.99 miles (1.6 km)/Manhattan	Historic/19th C.	Cistern exposed; not excavated	Chrysalis (2007)

*From OPRHP's on-line Cultural Research Information System (CRIS)

APPENDIX B. Soil Boring Plan and Logs (Langan 2015)

BARUCH HOUSES 1A APPENDIX B Soil Boring Plan (2014 and 2015) with APE and Pre-1950 Street Pattern (Langan 2015 and Bromley 1934) **B1**



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Log of Boring **LB-1 (OW)** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 12± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/22/15 — Date Finished: 4/22/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 26 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 8 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First ▽ 5.9 — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+12.0				0					10 20 30 40	4/22/15
	+11.7		CONCRETE (4")		1						Drill through 4" concrete sidewalk
			Brown f-c SAND, trace f-c gravel boulders (rounded) [FILL]		2						
					3						
		Class 7		PUSH	4						Hand clear to 4'
					5						Tale S-1
			Orange brown f-c SAND, some silt, trace f-c gravel (wet) [FILL]		6	S-1	SS	11	4 2 1 3	3	
					7						Take S-2
			Brown m-c SAND, trace silt, trace f-c gravel (wet) [SP]		8	S-2	SS	13	4 3 2 1	5	
	+3.0				9						Clean out hole to 9'
			Orange brown fine SAND, some silt (wet) [SM]		10	S-3	SS	12	1 WOH 1 1		Brown wash Rig chatter
					11						Take S-3
			Brown f-m SAND, some silt (wet) [SM]		12	S-4	SS	22	2 2 4 4	6	Take S-4
		Class 6			13						
					14						
					15						Drill to 15'
			Gray silty SAND (wet) [SM]		16	S-5	SS	9	2 3 3 3	6	Easy drilling Brown wash
					17						Take S-5
					18						
					19						
					20						

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Log of Boring **LB-1 (OW)** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 12± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Gray brown silty SAND (wet) [SM]		20	S-6	SS	10	2, 3, 5, 6	8	Drill to 20' Easy drilling Gray/brown wash
	-10.0				21						Take S-6
		Class 3b			22	S-7A	SS	20	5, 5, 7, 10	12	Take S-7A & S-7B Clean out hole with 3 7/8" roller bit
	-11.6				23	S-7B					
		Class 5b	Gray fine sandy SILT [ML]		24	S-8	SS	16	8, 6, 5, 3	11	Take S-8
	-14.0		E.O.B. @ 26.0 ft bgs		25						Install well
					26						
					27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-2** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 11.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/22/15 — Date Finished: 4/22/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+11.5									10 20 30 40	4/22/15 Start at 7:15 AM
	+11.3		ASPHALT (3")		0						Roller bit through 3" asphalt
	+10.9		CONCRETE (4")		1						Roller bit through 4" concrete
			Brown f-c SAND, some f-c gravel	PUSH	2						
					3						
					4						
		Class 7			5	S-1	SS	6	2 8 34 32	42	Hand clear to 5'
			Gray f-c GRAVEL, trace f-c sand, trace brick, concrete and crushed rock (wet) [FILL]	136	6						Take S-1
				138	7	S-2	SS	15	20 9 12 7	21	Take S-2
			Brown f-c SAND, some silt, trace f-m gravel, trace brick, trace fibers (wet) [FILL]	45	8						Install casing to 8.5' Clean out hole with 3 7/8" roller bit Bricks in wash
	+2.0				9	S-3	SS	16	4 2 1 1	3	Gray wash
			Brown fine SAND, some silt (wet) [SM]		10						Take S-3
					11	S-4	SS	20	3 5 4 6	9	Take S-4
			Brown silty SAND, trace clay (wet) [SM]		12						Add quikgel
					13						
					14						
		Class 6			15	S-5	SS	0	4 4 3 5	7	Drill to 15' with 3 7/8" roller bit
			Gray brown silty SAND (wet) [SM]		16						Take S-5 (no recovery) Take S-5 with 3" split spoon
					17						
					18						
					19						
					20						

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Log of Boring **LB-2** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 11.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Gray brown silty SAND, trace medium sand (wet) [SM]		20	S-6	SS	15	2 2 5 4	7	Drill to 20' Easy drilling Gray wash Take S-6
	-11.5		? ? ? ?		21						
		Class 6			22						
					23						
					24						
					25	S-7	SS	21	6 5 1 2	6	Drill to 25' Easy drilling Gray brown wash Take S-7
	-15.5		Gray SILT, some fine sand (wet) [ML]		26						
			E.O.B. @ 27.0 ft bgs		27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-3** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 11.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/21/15 — Date Finished: 4/21/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 31 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 8 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 23.5'	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+11.5				0						4/21/15 Start at 11:00 AM
		Class 7	Brown f-c SAND, trace silt, trace f-c gravel, bricks, concrete, asphalt [FILL]		1						Hand clear to 5'
					2						
					3						
					4						
	+6.5			31	5				8 5 3 6	8	
			Brown m-f SAND, some silt, trace f-m gravel, concrete, asphalt, brick (wet) [SP]	7	6	S-1	SS	12			Take S-1
				18	7				13 2 1 2	3	
			Orange brown m-f SAND, some silt, trace fine gravel (wet) [SP]	15	8	S-2	SS	7			Take S-2 Install casing to 8.5' Clean out hole with 2 7/8" roller bit Gray/brown wash Rig chatter
					9						
			Brown f-m SAND, trace fine gravel, trace silt (wet) [SP]	PUSH	10	S-3	SS	0	WOH WOH 3 3		Take S-3 (no recovery) Take S-3 with 3" split spoon
					11						
		Class 6	Olive brown silty SAND (wet) [SM]	114	12	S-4	SS	9	2 4 5 7	9	Take S-4
				57	13						
				105	14						Install casing to 13.5'
				74	15				3 3 5 5	8	Drill to 15'
			Tan brown silty SAND (wet) [SM]	49	16	S-5	SS	15			Take S-5
				27	17						
					18						
					19						
					20						

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Log of Boring **LB-3** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 11.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Gray brown silty SAND (wet) [SM]	PUSH	20–22	S-6	SS	11	1, 2, 4, 2	6	Drill to 20' Brown wash Rig chatter Take S-6 Push casing to 23.5'
	-13.5		? ? ? ?		23–25						
		Class 6	Gray CLAY, some silt (wet) [CL]		25–26	S-7	SS	15	WOH, WOH, 3, 7		Drill to 25' Brown gray wash Easy drilling Take S-7
			Gray CLAY, some silt, trace fine sand (wet) [CL]		27–28	SH-1	SH	16			Clean out hole to 27' Take SH-1 at 1:02 PM Pull SH-1 at 1:25 PM q_u=1.0 tsf
	-17.5	Class 4c	Gray silty CLAY (wet) [CL-ML]		29–30	S-8	SS	22	1, 1, 3, 3	4	Take S-8
	-19.5		E.O.B. @ 31.0 ft bgs		31–45						

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Log of Boring **LB-4** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/23/15 — Date Finished: 4/23/15
Drilling Equipment: CME 75 Truck Mount	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 6 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Kieth Parent
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+10.5				0					10 20 30 40	
		Class 7	8" CONCRETE								4/23/2015 11:00 AM Start roller bit through 8" concrete sidewalk
	+9.7	Class 7	Brown c-f SAND, trace silt, bricks, glass, concrete, some c-f gravel [FILL]		1 2 3 4						
			BRICK, wood, trace c-f sand, schist in tip [FILL]	40 305	5 6	S-1	SS	10	24 25 70 20/1"	95	Hand clear to 5' Take S-1 (refusal) Schist in tip Hammer casing down through obstruction 5' to 8'
	+3.0			46 PUSH	7 8						Clear hole to 8' Brown wash
		Class 6	Orange brown m-f SAND, some silt (wet) [SM]		9	S-2	SS	13	1 1 1 1	2	Take S-2
			Brown m-f SAND, some silt (wet) [SM]	PUSH	10 11	S-3	SS	24	2 4 3 5	7	Take S-3
					12 13						Install casing to 13.5' Drill to 15' Brown wash Easy drilling
			Gray brown silty SAND (wet) [SM]		14 15 16	S-4	SS	12	4 5 2 4	7	Take S-4
	-8.0	Class 4c			17 18 19 20						Drill to 20' Brown wash Easy drilling

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Log of Boring **LB-4** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					20						
			Gray silty CLAY, some fine sand (wet) [CL-ML]		21	S-5	SS	18	2 2 2 5	4	Take S-5
					22						
		Class 4c			23						Drill to 25' Gray/brown wash Easy drilling
					24						
					25						
	-16.5		Gray silty CLAY, trace fine sand, trace clay (wet) [CL-ML]		26	S-6	SS	18	4 2 5 4	7	Take S-6
			E.O.B. @ 27.0 ft bgs		27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-5** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/15/15 — Date Finished: 4/15/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 31 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 8 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+10.0				0					10 20 30 40	4/16/15 Start at 8:00 AM Roller bit through 3" asphalt and 5" concrete
	+9.8		ASPHALT (3")								
	+9.3		CONCRETE (5")		1						
			Light brown f-c SAND, some silt, some f-c gravel, trace bricks, concrete, asphalt [FILL]	PUSH	2						
		Class 7			3						
					4						
					5						Hand clear to 5' Take S-1
			Gray brown and black f-c SAND, some f-m gravel, some silt, trace brick, asphalt, glass, wood (moist) [FILL]	35	6	S-1	SS	14	8 13 7 6	20	
	+2.6			26	7						
			Light brown silty SAND (wet) [SM]	23	8	S-2	SS	12	7 4 3 5	7	Take S-2 Install casing to 8.5' Push 0'-5.5' Hammer 5.5'-8.5' Clean out hole to 9' Light brown wash
		Class 6			9						
			Brown silty SAND (wet) [SM]		10	S-3	SS	15	2 3 4 7	7	Take S-3
	-1.0			PUSH	11						
		Class 3b	Mottled brown and black m-f SAND, trace silt (wet) [SP]		12	S-4	SS	16	6 7 7 6	14	Take S-4
	-4.0				13						
					14						Push casing to 13.5' Add mud
					15						
			Brown m-f SAND, trace silt (wet) [SP]		16	S-5	SS	13	3 4 4 5	8	Drill to 15' Brown wash Slight rig chatter Take S-5
		Class 6			17						
	-10.0				18						
					19						
					20						

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Log of Boring **LB-5** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Tan brown m-f SAND, trace silt (wet) [SP]		20–21	S-6	SS	16	5, 5, 5, 8	10	Drill to 20' Brown wash Take S-6
	-14.0		? ? ? ?		22–24						
		Class 5b	Gray SILT, trace fine sand, trace clay (wet) [ML]		25–26	S-7	SS	21	1, 5, 6, 6	11	Drill to 25' Easy drilling Brown gray wash Take S-7
	-17.0		? ? ? ?		27	SH-1	SH	0			Clean out hole to 27' Gray wash Take SH-1 at 9:30 AM Pull at 9:52 AM Sand observed seeping out of tube when pulling out
		Class 3b	Brown m-f SAND (wet) [SP]		28–29						
			Maroon gray brown fine SAND, some silt, trace clay (wet) [SM]		30	S-8	SS	22	7, 7, 11, 14	18	Take S-8
	-21.0		E.O.B. @ 31.0 ft bgs		31–45						

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Log of Boring **LB-6** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/16/15 — Date Finished: 4/23/15
Drilling Equipment: CME 75 Truck Mount	Completion Depth: 30 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 9 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Kieth Parent
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40
	+9.0			PUSH	0					
					1					
					2					
					3					
					4					
		Class 7	Mottled gray brown f-c SAND, some f-m gravel, trace silt, trace wood, brick, asphalt [FILL]	26	5	S-1	SS	16	5 12 43 15	55
				88	6					
			Black GRAVEL, some f-c sand (wet) [SP]	28	7	S-2	SS	10	24 20/2"	20/2"
				21	8					
				70	9					
			Black brown SAND, trace wood, trace silt [FILL]	56	10	S-3	SS	2	7 5 7 6	12
	-2.0			51	11					
			Orange brown silty SAND [SM]	63	12	S-4	SS	20	6 4 5 7	9
		Class 6		30	13					
					14					
					15					
			Brown silty SAND (wet) [SM]		16	S-5	SS	13	3 3 3 3	6
	-9.5				17					
		Class 3b			18					
					19					
					20					

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

4/16/2015 10:30 AM
Drill through 3" Asphilt, and 4" Concrete

Hand clear to 3.5'
Concrete obstruction
Move hole 3.5' to the West

Start LB-6A
Hand clear to 3.5'
3" split spoon to 5' (14 blows)
Take S-1, Take S-2
Bouncing hammer at 8'
Wood in tip

4/23/2015
8:00 AM
Move hole slightly
Drill through asphalt, concrete
Take S-1
Take S-2
Install casing to 8.5'
Clean out hole
Add bentonite
Tough drilling
Gravel in wash
Heavy rig chatter
Casing unscrewed down hole
Reconnect

Clean out hole to 15'
Take S-5

Drill to 20'
Brown gray wash
Easy drilling
Take S-6

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Log of Boring **LB-6** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		Class 3b	Brown m-f SAND, trace silt (wet) [SP]
			Gray fine SAND, some silt (wet) [SM]
	-15.0		
		Class 4c	Gray CLAY, some silt [CL]
			Gray CLAY, some silt [CL]
	-21.0		
			E.O.B. @ 30.0 ft bgs

Casng blws/ ft

Depth Scale: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-6	SS	14	4 5 8 8	13
S-7	SS	24	8 9 11 11	20
S-8	SS	24	4 4 1 3	5
SH-1	SH	16		
S-9	SS	24	WOH 3 2 3	5

N-Value (Blows/ft): 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Take S-7

Clean out hole to 24'
Gray wash
Take S-8

Clean out hole to 26'
Take SH-1
Drop 10:05 AM
Pull 10:25 AM

Take S-9

End of Drilling

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Log of Boring **LB-7** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/15/15 — Date Finished: 4/15/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 72 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 21 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+8.5									10 20 30 40	(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+7.8		CONCRETE (8")		0						4/15/15 Start at 7:30 AM Drill through 8" concrete sidewalk
		Class 7	Brown f-c SAND, some silt, some f-c gravel, brick, concrete, building material [FILL]	PUSH	1						
					2						
					3						
				39	4						
				30	5	S-1	SS	10	10 6 8 10	14	Hand clear 8" to 5' Take S-1
			Brown f-m SAND, some silt, trace fine gravel, trace asphalt, brick [FILL]	19	6						
				13	7	S-2	SS	1	11 4 2 1	6	Take S-2 Take water level with tape 6.1'
			Brown f-c SAND, trace silt, trace f-m gravel, trace brick [FILL]	3	8						
	-0.5			PUSH	9						Install casing to 8.5' Push 0' to 4' Hammer 4' to 8.5' Add mud (quikgel) Clean out hole to 9' Brown wash Rig chatter
		Class 6	Brown silty SAND (wet) [SM]		10	S-3	SS	10	1 3 4 5	7	
	-2.5			31	11						
		Class 3b	Brown silty SAND, trace fine gravel (wet) [SM]	24	12	S-4	SS	8	7 7 11 10	18	Take S-3 Take S-4 (no recovery) Take S-4 with 3" split spoon
				31	13						
	-5.5				14						Install casing to 13.5'
					15						
			Gray brown silty SAND (wet) [SM]		16	S-5	SS	11	3 3 3 4	6	Drill to 15' Brown wash Rig chatter Take S-5
		Class 6			17						
					18						
					19						
					20						

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Log of Boring **LB-7** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Tan brown fine SAND, trace silt (wet) [SP]	20–21	S-6	SS	10	2 2 2 2	4	Drill to 20' Easy drilling Take S-6
	-15.5			21–24						
		Class 4c	Gray CLAY, trace silt, trace fine sand (wet) [ML]	25–27	S-7	SS	23	3 3 4 3	7	Drill to 25' Brown wash Easy drilling Take S-7
	-19.0			28–30	S-8	SS	18	5 6 5 6	11	Drill to 28' Gray wash Take S-8
		Class 3b	Marron gray brown silty SAND, trace clay, trace m-f sand (wet) [SM]	31–32						
			Maroon gray brown silty SAND, trace clay, trace fine sand (wet) [SM]	33	S-9	SS	10	7 8 11 11	19	Take S-9
	-25.5			34						Drill to 34' Easy drilling
		Class 5b	Maroon gray brown varved SILT, some fine sand (wet) [ML]	35	S-10	SS	16	12 11 15 17	26	Take S-10
			Mottled black gray brown varved SILT, seams of fine sand (wet) [ML]	36–38	S-11	SS	17	1 4 9 11	13	Drill to 37' Brown wash Easy drilling Take S-11
			Maroon brown gray varved SILT, seams of fine sand, trace clay (wet) [ML]	39–41	S-12	SS	18	5 7 6 4	13	Drill to 40' Easy drilling Take S-12
	-34.5			42–43						
		Class 4b	Maroon gray CLAY, some silt, trace fine sand (wet) [CL]	44	S-13	SS	19	3 4 5 6	9	Drill to 43' Easy drilling Take S-13
				45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-7** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 4b			45						
	-38.0				46						
			Maroon gray varved CLAY, seams of silt 9wet) [CL]		47	S-14	SS	24	2 2 2 3	4	Drill to 47' Easy drilling Take S-14
					48						
					49						
			Maroon gray varved CLAY, seams of silt (wet) [CL]		50	S-15	SS	24	2 3 4 3	7	Drill to 50' Easy drilling Take S-15
					51						
					52						
			Gray brown varved CLAY, seams of silt (wet) [CL]		53	S-16	SS	24	2 3 5 5	8	Drill to 53' Easy drilling Add mud Take S-16
		Class 4c			54						
					55						
			Gray brown varved CLAY, seams of silt (wet) [CL]		56	S-17	SS	24	2 3 1 4	4	Drill to 57' Gray wash Easy drilling Take S-17
					57						
					58						
			Gray brown varved CLAY, seams of silt (wet) [CL]		59	S-18	SS	24	2 2 3 4	5	Drill to 60' Take S-18
					60						
					61						
			Gray brown silty CLAY, some m-f sand, trace fine gravel (wet) [CL-ML]		62	S-19	SS	24	2 3 5 6	8	Drill to 63' Easy drilling Gray wash Take S-19
					63						
					64						
	-57.0		? ? ? ?		65						
					66						Drill to 66'
			Brown gray silty f-m SAND, trace clay (wet) [SM]		67	S-20	SS	16	5 12 9 17	21	Take S-20
		Class 3b			68						
					69						
					70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-7** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-63.5	Class 3b	Gray silty SAND, some c-f sand, trace f-c gravel [SM] (wet)		70	S-21	SS	6	8 7 12 21	19	Drill to 70' Brown wash Rig chatter Add mud Take S-21
			E.O.B. @ 72.0 ft bgs		71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95						

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Log of Boring **LB-8** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/13/15 — Date Finished: 4/13/15
Drilling Equipment: CME 55 ATV	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 6 — Undisturbed 0 — Core 0
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 15'	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Rene Silvestre
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5			0						4/13/15
				1						Hand cleared to 5'
			Brown f-c SAND, trace silt, trace concrete, some brick (moist) [FILL]	2						
				3						
				4						Install casing to 5'
		Class 7		5						Clean out hole with roller bit to 6'
				6						
			Brown f-c SAND, trace silt, some brick, trace f-c gravel (wet) [FILL]	7	S-1	SS	3	2 12 4 4	16	Take S-1
				8						
			BRICK FRAGMENTS [FILL]	9	S-2	SS	1	2 2 3 5	5	Take S-2
	-1.5			10						Install casing to 10'
				11	S-3	SS	6	1 10 3 4	13	Clean out hole with roller bit to 10'
		Class 3b	Gray m-f SAND, trace silt (wet) [SP-SM]	12						Brown wash
				13						Smooth drilling
	-5.0			14						Take S-3
				15						Drive casing to 15'
		Class 6	Brown m-f SAND, trace silt (wet) [SP-SM]	16	S-4	SS	13	3 3 4 4	7	Clean out hole with roller bit to 15'
				17						Brown wash
				18						Smooth drilling
	-10.0			19						Take S-4
		Class 3b		20						

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Log of Boring **LB-8** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		Class 3b	Brown m-f SAND, trace silt (wet) [SP-SM]
	-15.0		
		Class 6	Brown m-f SAND, trace silt (wet) [SP-SM]
	-18.5		E.O.B. @ 27.0 ft bgs

Depth Scale: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-5	SS	15	4 5 5 6	10
S-6	SS	12	4 3 4 4	7

N-Value (Blows/ft): 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Advance with roller bit to 20'
Brown wash
Smooth drilling

Take S-5

Advance with roller bit to 25'
Brown wash
Smooth drilling

Take S-6

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Log of Boring **LB-9 (OW)** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 7.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/24/15 — Date Finished: 4/24/15
Drilling Equipment: CME 75 Truck Mount	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 7, Undisturbed 0, Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 10'	Water Level (ft.): First ▽ 4.5, Completion ▼ -, 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Kieth Parent
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+7.5										4/25/2015 Drill through 4" concrete sidewalk Hand auger to 5'
	+7.1	Class 7	CONCRETE	PUSH	0						
			Brown m-c SAND, some brick and concrete, trace silt, trace f-c gravel (moist) [FILL]	12	1						
				15	2						Install casing to 5' Clean out with roller bit to 5' Brown wash Smooth drilling
				13	3						
				10	4						
					5						
			BRICK and CONCRETE fragments, trace m-c sand (moist) [FILL]		6	S-1	SS	8	8 9 7 7	16	Take S-1
		Class 7			7						
			BRICK and GRAVEL, trace m-c sand (wet) [FILL]		8	S-2	SS	2	17 13 6 3	19	Take S-2
					9						Advance with roller bit to 9' Brown wash Smooth drilling
			Brown m-f GRAVEL, trace brick, trace m-f sand (wet) [FILL]		10	S-3	SS	1	4 3 3 2	6	Take S-3
					11						
			Gray CLAYEY SILT, trace brick (wet) [FILL]		12	S-4	SS	2	5 3 1 1	4	Take S-4
	-6.5				13						
					14						Push casing to 10' Advance with roller bit to 15' Brown wash Smooth drilling
					15						
			Brown silty SAND (wet) [SM]		16	S-5	SS	10	2 2 2 2	4	Take S-5
		Class 6			17						
					18						Advance with roller bit to 20' Brown wash Smooth drilling
					19						
					20						

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Log of Boring **LB-9 (OW)** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 7.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Brown fine SAND, some silt (wet) [SM]		20	S-6	SS	15	4 3 4 4	7	Take S-6
	-16.0				21						Advance with roller bit to 25'
					22						Brown wash
					23						Smooth drilling
					24						
		Class 6			25	S-7	SS	20	2 4 4 4	8	
	-19.5		Gray SILT, trace fine sand (wet) [ML]		26						Take S-7
					27						End of Drilling
			E.O.B. @ 27.0 ft bgs		28						Install observation well
					29						20'
					30						10' riser
					31						10' screen
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

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Log of Boring **LB-10** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/13/15 — Date Finished: 4/13/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 31 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 8 — Undisturbed 2 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.0				0					10 20 30 40	4/13/15 Start at 10:00 AM Drill through concrete sidewalk Hand clear 0' to 2.5'
	+7.7		CONCRETE		1						
				PUSH	2						Encountered wood at 2.5' Break through wood
			WOOD		3						
				24	4						
				34	5						Penetrate to 5' with 3" split spoon
		Class 7	Light brown m-c SAND, trace silt, trace building material, m-f gravel, brick, concrete (moist) [FILL]	36	6	S-1	SS	7	9 6 10 5	16	Take S-1
				32	7						
			Brown m-c SAND, some silt, trace clay, trace f-m gravel, trace brick (wet) [FILL]	6	8	S-2	SS	10	8 5 4 3	9	Take S-2 Push casing to 4' Hammer casing to 8.25' Clean out hole to 9' Brown wash Rig chatter
					9						
	-3.0		Brown, black f-c GRAVEL, some m-c sand [FILL] (wet)	86	10	S-3	SS	1	5 2 3 2	5	
		Class 3b	Dark brown m-f SAND, some silt, trace clay, trace fine gravel (wet) [SM]		11						
					12	S-4	SS	10	8 6 6 3	12	Take S-4
	-6.0		? ? ? ?		13						Hammer casing to 13.5'
					14						
		Class 6	Gray brown silty SAND, trace clay (wet) [SM]		15						Drill to 15' Brown wash Rig chatter
					16	S-5	SS	19	WOH WOH 4 2		Take S-5
	-9.3		? ? ? ?		17						
					18						Clean out hole to 18' Take SH-1
		Class 6	Brown silty SAND (wet) [SM]		19	SH-1	SH	13			
					20						

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Log of Boring **LB-10** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Brown m-f SAND, some silt (wet) [SM]		20–45	S-6	SS	24	3 4 4 5	8	Take S-6
	-16.0		? ? ? ?								
		Class 4c	Gray CLAY, some silt, trace fine sand (wet) [CL]			S-7	SS	22	2 2 2 3	4	Drill to 25' Black brown wash Easy drilling Take S-7
						SH-2	SH	0			Take SH-2 (no recovery)
	-21.0										
		Class 4b	Varved gray CLAY, some silt, trace silty fine sand (wet) [CL]			S-8	SS	24	4 5 5 9	10	Take S-8
	-23.0		E.O.B. @ 31.0 ft bgs								

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-11** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/24/15 — Date Finished: 4/24/15
Drilling Equipment: CME 75 Truck Mount	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Kieth Parent
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5										4/24/2015 10:15 AM Drill through 4" concrete sidewalk Hand clear 0' to 4' 3" split spoon sample 4' to 5'
	+8.1	Class 7	CONCRETE		0						
		Class 7	Brown m-c SAND, trace silt, some c-f gravel, bricks, concrete [FILL]	PUSH	1 2 3 4 5	S-1	SS	3	1 1 3 3	4	Take S-1
	+1.5		Black brown silty SAND, some gravel [FILL]		6 7	S-2	SS	13	3 3 1 WOH	4	Take S-2 Install casing to 8.5' Clean out hole to 9'
		Class 6	Tan brown c-f SAND, trace silt, trace fine gravel (wet) [SP]		8 9	S-3	SS	1	5 1 6 11	7	Take S-3
	-2.5		Gray c-f SAND, some m-f gravel, trace silt (wet) [SP]		10 11	S-4	SS	1	9 6 3 1	9	No recovery Take S-4 with 3" split spoon
		Class 6	GRAVEL, some c-f sand (wet) [GP]		12 13						Install casing to 13.5' (push)
	-5.5		? ? ? ?		14 15						
		Class 6	Gray silty SAND, trace fine sand (wet) [SP]		16 17	S-5	SS	9	2 2 3 5	5	Take S-5
					18 19 20						Advance with roller bit to 20' Brown wash Smooth drilling

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Log of Boring **LB-11** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Brown silty SAND, trace fine sand (wet) [SP]		20–21	S-6	SS	13	3, 4, 6, 8	10	Take S-6
	-15.0				22–23						Advance with roller bit to 25' Brown wash Smooth drilling
		Class 6	Gray varved CLAY with some fine sand (wet) [ML]		24–26	S-7	SS	15	1, 2, 3, 4	5	Take S-7
	-18.5		E.O.B. @ 27.0 ft bgs		27						End of Drilling
					28–45						

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Log of Boring **LB-13** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 5/6/15 — Date Finished: 5/6/15
Drilling Equipment: CME 75 Truck Mount	Completion Depth: 31.5 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 7 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5	Water Level (ft.): First ▽ — Completion ▼ — 24 HR. ▼
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Mike Gorski
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5	Class 7	ASPHALT and CONCRETE		0						5/6/2015 Start at 8:00 am Drill through Concrete and Asphalt road Hand clean 1.2'-4'
	+7.3	Class 7	Brown c-f SAND, trace silt, trace concrete, trace asphalt, trace bricks (wet) [FILL]	Push	1–5						Take 3" split spoon 4-6'
	+0.5	Class 7	Gray-Brown m-f GRAVEL, some c-f sand, trace brick, trace concrete	72	6–7	S-1	SS	2	6, 5, 4, 6	9	Take S-1 6-8' Install casing to 8.5' Clean out, gray wash
		Class 6	Orange-Brown c-f SAND, trace fine gravel, trace silt (wet) [SP]		8–9	S-2	SS	5	4, 4, 4, 5	8	Take S-2 8'-10'
		Class 6	Orange-Brown c-f SAND, trace fine gravel, trace silt (wet) [SP]	Push	10–12	S-3	SS	7	6, 2, 2, 4	4	Take S-3 10'-12' Push casing to 13.5' Drill to 15' with 3 7/8" Roller, easy drill Gray wash
	-10.0	Class 3b	Olive brown fine SAND, trace silt (wet) [SP-SM]		13–16	S-4	SS	8	3, 4, 4, 3	8	Take S-4 15-17'
					17–20						Drill to 20" Easy drilling Gray-Brown wash

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Log of Boring **LB-13** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Olive brown fine SAND, trace silt (wet) [SP-SM]		20–45	S-5	SS	12	4 5 6 5	11	Take S-5 20-22'
											Drill to 25' Easy drilling Gray-Brown wash
	-17.5					S-6	SS	10	5 3 3 2	6	Take S-6 Clan out to 27.5'
		Class 6	Gray SILT, trace clay, trace fine sand (wet) [ML]								
			Gray fine sandy SILT [ML]			SH-1	SH	20			Take SH-1 27.5-29.5' Drop 9:50, Pull 10:12 Top 2 tsf, Bottom 1.5 tsf
	-21.0	Class 6	Gray silty fine SAND [SM]			S-7	SS	15	4 3 4 6	7	Take S-7 29.5-31.5'
	-23.0		E.O.B. @ 31.5 ft bgs								End of Drilling

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-14** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/9/15 — Date Finished: 4/9/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 31 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 8 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casing blws/ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+8.5				0						4/9/15 Start at 8:20 AM Drill through 3" sidewalk with 12" concrete cutter
		Class 7		PUSH	1						
					2						
					3						
					4						Hand clear to 4' Wooden covered telephone lines exposed at 4' Move hole North
					5						
				44	6	S-1	SS	14	23 9 11 8	20	Take S-1
			Light brown m-f SAND, some silt, trace c-f gravel, trace construction debris, brick [FILL]	37	7						
				24	8	S-2	SS	0	6 5 3 6	8	Take S-2 (no recovery)
	+0.5		? ? ? ?	25							
			No recovery		9						Install casing to 8.5' Clean out hole to 9' Add bentonite
		Class 6			10	S-3	SS	10	2 4 5 5	9	Take S-3
	-2.5		Dark gray fine SAND, some silt (wet) [SM]		11						
					12	S-4	SS	24	5 7 8 8	15	Take S-4
		Class 3b	Tan brown fine SAND, trace silt, trace clay (wet) [SP-SM]		13						
					14						
	-6.5				15						Drill to 15' Brown wash Easy drilling
					16	S-5	SS	16	3 2 4 5	6	Take S-5
		Class 6	Brown fine SAND, some silt, trace clay (wet) [SM]		17						
	-10.0				18						
		Class 3b			19						
					20						

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Log of Boring **LB-14** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Brown fine SAND, some silt, trace clay (wet) [SM]		20–21	S-6	SS	15	5, 6, 5, 5	11	Drill to 20' Brown wash Easy drilling Take S-6
					21–22						
					22–23						
					23–24						
					24–25						
		Class 3b			25–26	S-7	SS	19	2, 5, 7, 6	12	Drill to 25' Take S-7
			Gray silty SAND, some clay (moist) [SM]		26–27						Silt/clay in tip Take SH-1 Start 10:20 AM Pull 10:40 AM
			Gray silty SAND, trace clay (wet) [SM]		27–28	SH-1	SH				q_u=1.5 tsf
					28–29						
					29–30	S-8	SS	24	3, 5, 7, 11	12	Take S-8
	-22.5		Gray brown m-f SAND, some silt, trace clay (wet) [SM]		30–31						
			E.O.B. @ 31.0 ft bgs		31–45						

N-Value (Blows/ft) axis: 10 20 30 40

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Log of Boring **LB-17** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/27/15 — Date Finished: 4/27/15
Drilling Equipment: CME 75 Truck Mount	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Mike Gorski
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5				0						4/27/2015 Start at 11:50 AM Drill through 3" concrete sidewalk
	+8.2	Class 7	3" CONCRETE		1						
			Brown f-c SAND, trace f-c gravel, trace cobbles, boulders		2						
		Class 7			3						
				PUSH	4						Hand clear to 4' 3" split
			Brown f-c SAND, some silt, trace f-m gravel (wet) [FILL]		5	S-1	SS	16	5 3 6 5	9	
	+1.5				6						
			Olive gray fine SAND, trace silt (wet) [SP-SM]		7	S-2	SS	15	7 10 11 6	21	Take S-2
					8						
		Class 3b	Gray brown m-f SAND, some silt (wet) [SM]		9	S-3	SS	22	21 13 13 12	26	Install casing to 8.5' Clean out hole with 2 7/8" roller bit Gravel in wash Hard drilling Rig chatter Take S-3
					10						Take S-4 Gravel in tip Omitted from sample Drill bit stuck in casing
			Gray brown m-f SAND, some silt (wet) [SM]		11	S-4	SS	9	8 7 7 5	14	
	-5.5				12						
					13						
		Class 6	Brown m-f SAND, trace silt (wet) [SP-SM]		14						
					15	S-5	SS	10	4 2 4 2	6	Drill to 15' Brown wash Take S-5
	-10.0				16						
		Class 3b			17						
					18						
					19						
					20						

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Log of Boring **LB-17** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					20						
					21	S-6	SS	14	9 6 4 4	10	Take S-6 No recovery Take S-6 with 3" split spoon
		Class 3b	Brown m-f SAND, trace silt (wet) [SP-SM]		22						
	-15.0				23						Drill to 25' Brown wash Easy drilling Take S-7
					24						
		Class 6			25						
	-18.5		Gray silty SAND (wet) [SM]		26	S-7	SS	5	8 4 3 6	7	
			E.O.B. @ 27.0 ft bgs		27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-18** Sheet 1 of 3

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/24/15 — Date Finished: 5/5/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 46 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 11 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5'	Water Level (ft.): First ▽ 6 — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40
	+9.0				0					
	+8.8		3" CONCRETE		1					
			Brown f-c SAND, some f-c gravel, bricks, boulders, glass, concrete [FILL]	PUSH	2					
				22	3					
		Class 7		62	4	S-1	SS	9	8 11 7 8	18
			Brown c-f SAND, trace silt, trace asphalt, brick, concrete (wet) [FILL]	58	5					
				47	6	S-2	SS	10	10 15 10 16	25
			Brown c-f SAND, trace silt, trace f-c gravel, trace gneiss rock fragments (wet) [FILL]	61	7					
	+1.0			35	8	S-3	SS	9	7 3 12 7	15
			Gray brown m-f SAND, some silt (wet) [SM]	PUSH	9					
				58	10	S-4	SS	3	7 3 9 6	12
			Gray brown fine SAND, some silt (wet) [SM]	60	11					
				73	12					
		Class 3b		17	13					
					14					
					15	S-5	SS	8	6 7 6 8	13
			Brown silty SAND (wet) [SM]		16					
					17					
					18					
					19					
					20					

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

4/25/2015
Start at 8:00 AM
Drill through 3" concrete sidewalk

Hand clear to 4'
3" split spoon 4' to 5'
Take S-1
Concrete in tip of spoon
Stop drilling
4/27/2015
Start at 10:45 AM
Roller bit through 3' concrete
Hand clear to 4'
5/4/2015
Set up over previously hand cleared LB-18A
Take S-2
Take S-3
Install casing to 8.5'
Add mud
Clean out hole to 10'
Brown wash
Take S-4

Install casing to 13.5'

Drill to 15' with 3 7/8" roller
End of day at 3:00 PM

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Log of Boring **LB-18** Sheet 2 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		Class 3b	Gray brown fine SAND, some silt (wet) [SM]
	-15.0	Class 4b	Gray fine sandy SILT (wet) [ML]
	-20.0	Class 3b	Gray maroon brown silty SAND (wet) [SM]
	-24.0	Class 6	Gray SILT, trace fine sand (wet) [ML]
	-30.0	Class 4c	Gray varved CLAY with seams of silty sand (wet) [CL]
	-35.0	Class 6	

Casng blws/ ft

Depth Scale: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-6	SS	8	6 7 6 8	13
S-7	SS	20	4 5 6 10	11
S-8	SS	4	6 4 6 7	10
S-9	SS	10	3 3 3 5	6
S-10	SS	24	1 2 3 5	5
SH-1	SH	24		
S-11	SS	24	1 WOH	

N-Value (Blows/ft) 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

5/5/2015
Start at 7:00 AM
Take S-6

Drill to 25'
Easy drilling
Gray wash
Take S-7

Drill to 30'
Take S-8

Take S-9

Drill to 40'
Easy drilling
Gray wash
Take S-10

Clean out hole to 42'
Gray wash
Push SH-1 at 8:00 AM
Pull SH-1 at 8:25 AM
q_u=0.5 tsf

Take S-11

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Log of Boring **LB-18** Sheet 3 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9± NAVD88

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-37.0	Class 6	Gray varved CLAY with seams of silty sand (wet) [CL]		45	S-11	SS	24	1 3		
			E.O.B. @ 46.0 ft bgs		46						
					47						
					48						
					49						
					50						
					51						
					52						
					53						
					54						
					55						
					56						
					57						
					58						
					59						
					60						
					61						
					62						
					63						
					64						
					65						
					66						
					67						
					68						
					69						
					70						

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Log of Boring **LB-19** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/23/15 — Date Finished: 4/23/15
Drilling Equipment: CME 75 Truck Mount	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Kieth Parent
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.5										4/23/2015 Start at 1:00 Pm Drill through 3" concrete sidewalk
	+9.2	Class 7	3" CONCRETE		0						
				PUSH	1						
					2						
					3						Hand cleat to 4' 3" split spoon 4' to 5'
		Class 7			4						
				22	5	S-1	SS	8	15 3 4 3	7	
			Gray brown f-c SAND, trace f-c gravel, trace brick, trace concrete, trace silt (wet) [FILL]	20	6						Take S-1
				18	7	S-2	SS	14	3 2 3 2	5	Take S-2
			Light brown f-c SAND, some silt, trace f-m gravel (wet) [FILL]	9	8						
	+0.5				9						Install casing to 8.5' Clean out hole to 9' Brown/gray wash Add quik gel Take S-3 no recovery0 Take S-3 with 3" split spoon
			Gray brown fine SAND, some silt (wet) [SM]		10	S-3	SS	8	4 1 3 3	4	
					11						
			Gray brown fine SAND, trace silt (wet) [SP-SM]		12	S-4	SS	14	1 3 3 5	6	Take S-4
		Class 6			13						
					14						Drill to 15' Add mud Rig chatter Brown wash Hard drilling Take S-5
					15						
			Olive brown fine SAND, trace silt (wet) [SP-SM]		16	S-5	SS	16	3 3 3 3	6	Take S-5
					17						
					18						Drill to 20' Brown wash Easy drilling Take S-6
					19						
					20						

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Log of Boring **LB-19** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Gray silty SAND, trace c-f sand (wet) [SM]		20–21	S-6	SS	14	3, 4, 4, 7	8	Take S-6
	-14.0				21–22						
					22–23						Drill to 25' Easy drilling
					23–24						
		Class 5b			24–25						
			Marron gray SILT, some clay, trace fine sand (wet) [ML]		25–26	S-7	SS	12	4, 7, 6, 10	13	Take S-7
	-17.5				26–27						
			E.O.B. @ 27.0 ft bgs		27–45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-20** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/8/15 — Date Finished: 4/8/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.5				0						4/8/15 Start at 1:00 PM Drill through sidewalk with 12" concrete cutter
	+9.3		CONCRETE (3")		1						
		Class 7		PUSH	2						
					3						
					4						
			Mottled gray black orange brown c-f SAND, trace m-f gravel, trace brick, glass and concrete (moist) [FILL]		5	S-1	SS	12	7 5 5 4	10	Hand clear to 5' Take S-1
					6						
	+1.5		? ? ? ?		7	S-2	SS	9	3 3 3 3	6	Take S-2
			Light brown m-f SAND, trace silt, trace clay (wet) [SP-SM]		8						
		Class 6			9	S-3	SS	9	2 2 4 4	6	Install casing to 8.5' Take S-3
			Gray fine SAND, some silt, trace clay (wet) [SM]		10						
	-1.5				11	S-4	SS	0	8 8 8 8	16	Take S-4
			No recovery (gravel in tip)		12						
		Class 3b			13						
					14						
					15	S-5	SS	9	5 5 6 6	11	Drill to 15' Easy drilling Take S-5
			Tan brown fine SAND, trace silt, trace clay (wet) [SP-SM]		16						
	-8.5				17						
		Class 6			18						
					19						
					20						

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Log of Boring **LB-20** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Gray varved fine SAND and clayey SILT, trace fine sand (wet) [SP-ML]		20–22	S-6	SS	22	2, 4, 5, 8	9	Drill to 20' Brown wash Easy drilling Take S-6
	-14.0				22–25						
		Class 3b	Varved maroon brown fine SAND, clayey silt, trace fine sand (wet) [SP-ML]		25–26	S-7	SS	15	10, 10, 8, 10	18	Drill to 25' Easy drilling Take S-7
	-17.5		E.O.B. @ 27.0 ft bgs		26–27						
					27–45						

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Log of Boring **LB-21** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/28/15 — Date Finished: 4/28/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 42 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 10 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+9.0				0						4/28/2015 Roller bit through 4" concrete Hand clear 0' to 4'
			Light brown f-c SAND, some f-c gravel	PUSH	1 2 3 4						3" split spoon sample 4' to 5'
		Class 7			5	S-1	SS	22	8 4 3 14	7	Take S-1
			Dark brown silty SAND (wet) [SM-FILL]	56	6						
				43	7	S-2	SS	24	6 4 10 26	14	Take S-2
			Brown c-f SAND, trace f-m gravel, some silt (wet) [SW-FILL]	45	8						
	-1.0				9						Install casing to 8.5' Add mud Clean out hole to 9' Brown wash
			Tan brown fine SAND, some silt [SM]		10	S-3	SS	4	1 3 7 7	10	Take S-3
				PUSH	11						Take S-4
			BrownM-f SAND, trace silt [SP-SM]		12	S-4	SS		6 6 8 9	14	
		Class 3b			13 14						
					15	S-5	SS	15	7 7 8 7	15	Drill to 15' Brown wash Easy drilling Take S-5
			Brown m-f SAND, trace silt (wet) [SP-SM]		16 17						
	-10.0		? ? ? ?		18 19						
		Class 6			20						

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Log of Boring **LB-21** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					20						Drill to 20' Brown wash Easy drilling Take S-6
			Gray brown silty f-m SAND (wet) [SM]		21	S-6	SS	17	3 4 3 9	7	
		Class 6			22						
					23						
	-15.0				24						
					25						Drill to 25' Brown wash Easy drilling Take S-7
			Light maroon brown f-m SAND, trace silt (wet) [SP]		26	S-7	SS	16	12 13 12 7	25	
					27						
					28						
					29						
					30						Drill to 30' Brown wash Add mud Take S-8
					31	S-8	SS	9	9 9 12 11	21	
		Class 3b			32						
					33						
					34						
					35						Drill to 35' Casing dropping in hole Add 5' of casing Add mud
			Brown m-f SAND, trace silt [SP]		36	S-9	SS	12	6 6 7 6	13	
					37						
					38						
					39						
					40						Drill to 40' Hard drilling Gravel and sand Rig chatter Take S-10 (no recovery) Take S-10 with 3" split spoon Note: Hole abandoned because of parking restrictions were about to finish across the road Rig was also having problem drilling beyond 40'
					41	S-10	SS	0	10 7 8 7	15	
	-33.0				42						
			E.O.B. @ 42.0 ft bgs		43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-22 (OW)** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/16/15 — Date Finished: 4/16/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 25 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 7, Undisturbed 1, Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5'	Water Level (ft.): First ▽ 6, Completion ▼ -, 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+9.0	Class 7		PUSH	0–4						4/16/15 Start at 12:00 PM Hand clear to 5'
	+5.0	Class 6	Brown silty SAND (wet) [SM]	20 / 13	5–6	S-1	SS	9	6, 5, 3, 3 (8)		Take S-1
			Brown silty SAND, trace fine gravel (wet) [SM]	12 / 20	7–8	S-2	SS	13	4, 2, 1, 2 (3)		Take S-2 Install casing to 8.5' 4.5' push, 8.5' hammer Clean out hole to 9' Brown wash Slight rig chatter
			No recovery	PUSH	9–11	S-3	SS	0	14, 3, 5, 5 (8)		Take S-3 (no recovery) Take S-3 with 3" split spoon (no recovery)
			Tan brown fine SAND, trace silt (wet) [SP-SM]		12–13	S-4	SS		5, 4, 5, 7 (9)		Take S-4
					14						Install casing to 13.5' (push)
	-6.0				15						Drill to 15'
		Class 6	Gray SILT, some fine sand (wet) [ML]		16	S-5	SS	6	2, 4, 1, 1 (5)		Take S-5
	-8.0				17						Drop SH-1 at 1:05 PM Pull SH-1 at 1:25 PM
		Class 3b	Brown gray fine SAND, some silt (wet) [SM]		18	SH-1	SH	28			
					19	S-6	SS	9	WOH, 5 (12)		Take S-6
					20						

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Log of Boring **LB-22 (OW)** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Light brown m-f SAND, trace silt (wet) [SP]		20	S-6	SS	9	7 8	12	
					21						
					22						
					23	S-7	SS	14	10 10 10 12	20	Drill to 23' Brown wash Easy drilling Take S-7
	-16.0		Orange brown m-f SAND, trace silt (wet) [SP]		24						
			E.O.B. @ 25.0 ft bgs		25						
					26						
					27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-23** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/17/15 — Date Finished: 4/17/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 90.5 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 20 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5'	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5				0						4/17/15 START 7:50 Drill through 4.5" concrete sidewalk Hand clear to 5' Expose pipe at 4' Move hole 4' North Drill through 4.5" concrete Hand clear to 5'
		Class 7		PUSH	1 2 3 4 5						
			Brown/black f-m SAND, some silt, trace asphalt [SP-SM] [FILL]	53	6	S-1	SS	9	5 3 2	7 10	Take S-1
	+1.5			42	7						
			Brown m-f SAND, some silt (wet) [SM]	38	8	S-2	SS	20	1 2 2	2 4 2	Take S-2
		Class 6			9						Install casing to 8.5' Push 5.5' Drive 8.5' Clean out hole to 9'
			Brown M-f SAND, trace silt (wet) [SP-SM]		10	S-3	SS	1	5 3 3	5 6 5	brown wash, rig chatter Take S-3 (No recovery) Take S-3 with 3" SS Push casing to 11'
	-2.5			PUSH	11						
			Tan brown fine SAND, trace silt (wet) [SP]		12	S-4	SS	12	3 4 6	7 10 7	Take S-4
					13						
					14						Push casing to 13.5' Drill to 15' Easy drilling, brown wash
		Class 3b			15						
			Tan brown fine SAND, trace silt (wet) [SP]		16	S-5	SS	12	6 7 5	12 6	Take S-5
					17						
					18						Drill to 20' Easy drilling, brown/gray wash
					19						
					20						

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Log of Boring **LB-23** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Orange brown m-f SAND, trace silt (wet) [SP]		20	S-6	SS	14	6 6 8 10	14	Take S-6
	-15.0				21						
					22						
					23						Drill to 25' with 3 7/8 in roller bit
					24						
		Class 6	Orange brown m-f SAND, trace silt (wet) [SP]		25	S-7	SS	9	5 3 5 5	8	Take S-7
	-20.0				26						
					27						
					28						Add quik gel Drill to 30' Easy drilling, brown wash
					29						
		Class 3b	Brown m-f SAND, trace silt (wet) [SP]		30	S-8	SS	12	5 7 8 7	15	Take S-8
	-25.0				31						
					32						
					33						Drill to 35' Easy drilling, brown wash
					34						
		Class 6	Orange brown m-f SAND, trace silt (wet) [SP]		35	S-9	SS	13	4 5 4 4	9	Take S-9
	-30.0		? ? ? ?		36						
					37						
					38						Drill to 40' Brown/gray wash, easy drilling
					39						
		Class 4b	Maroon grey brown varved CLAY, seams of silt and fine sand (wet) [CL]		40	S-10	SS	24	6 8 6 10	14	Take S-10
					41						
					42						
					43						Drill to 43'
			Maroon grey brown varved CLAY, seams of silt and fine sand 9wet) [CL]		44	S-11	SS	20	2 4 4 3	8	
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-23** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			No recovery		45	SH-1	SH	0			Take S-11
					46						
					47						Clean out hole to 45' Drop SH-1 at 10:24 am Pull SH-1 at 10:49 am Shelby tube stuck in the hole Push 2" SS into tube to retrieve Drill to 50' Easy drilling, grey wash
					48						
					49						
					50						
			Maroon grey brown varved CLAY, some silt, some fine sand (wet) [ML-CH]		51	S-12	SS	24	3 4 6 11	10	Take S-12
		Class 4b			52						
					53						Drill to 55' Easy drilling, grey wash
					54						
					55						
			Maroon grey brown varved CLAY, some silt, some fine sand (wet) [ML-CH]		56	S-13	SS	24	12 12 8 13	20	Take S-13
					57						
	-50.0				58						Drill to 60' Easy drilling, grey wash
					59						
					60						
		Class 4a	Grey silty CLAY, trace fine sand (wet) [CH]		61	S-14	SS	21	8 13 17 14	30	Take S-14
					62						
	-55.0				63						Drill to 65' Rig chatter, grey wash
					64						
					65						
		Class 4b	Maroon grey brown varved CLAY, some silt, some fine sand (wet) [ML-CH]		66	S-15	SS	12	5 8 8 11	16	Take S-15
					67						
	-60.0				68						Drill to 70' Grey wash, slight rig chatter
		Class 6			69						
					70						

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Log of Boring **LB-23** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Grey varved CLAY, seams of silt and fine sand (wet) [CL]		70	S-16	SS	24	1 1 1 2	2	Take S-16
	-65.0				71						
		Class 4b	Grey varved CLAY, seams of silt and fine sand (wet) [CL]		72						Drill to 75' Grey wash, easy drilling
					73						
	-70.0				74						
		Class 6	Grey varved CLAY, seams of silt and fine sand (wet) [ML-CH]		75	S-17	SS	24	7 8 3 7	11	Take S-17
					76						
	-76.5				77						Drill to 80' Grey wash, easy drilling
		Class 3b	Grey silty f-m SAND, some fine gravel (wet) [SM]		78						
	-80.5				79						
		Class 1d	Decomposed rock		80	S-18	SS	24	WOH 1 2 5	3	Take S-18
	-82.0				81						
			E.O.B. @ 90.5 ft bgs		82						Drill to 85' Grey wash, easy drilling
					83						
					84						
					85	S-19	SS	20	1 11 16 19	27	Take S-19
					86						
					87						Drill to 90' Grey/brown wash (mica), heavy rig chatter
					88						
					89						
					90	S-20	SS	4	70/5"	70/5"	Take S-20
					91						
					92						
					93						
					94						
					95						

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Log of Boring **LB-24** Sheet 1 of 3

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/8/15 — Date Finished: 4/8/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 52 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 11 — Undisturbed 1 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.5				0						4/8/15
	+9.3		ASPHALT PAVERS								Remove asphalt pavers (8"x8"x2")
	+8.7		ASPHALT	PUSH	1						
					2						
				HAMMER	3						
					4						
				PUSH	5						
		Class 7		28	6						
			Mottled red gray c-f GRAVEL, building material, brick, concrete, wood in tip [GP]	80		S-1	SS	11	8 3 2 3	5	Hand clear to 5' Take S-1 (wood in tip)
			Brown m-f SAND, trace silt, red brick [SP]	136	7						Take S-2 Obstruction at 7'
				26	8						
			Gray sandy m-f GRAVEL [GP]			S-2	SS	2	3 2 4 9	6	Install casing to 8.5'
	-0.5			PUSH	9						
					10						Take S-3
			Gray brown fine SAND, trace silt (wet) [SP-SM]	36	11	S-3	SS	19	11 10 13 14	23	
				38	12						
				19	13						
					14						Install casing to 13.5'
		Class 3b			15						
			Brown fine SAND, some silt (wet) [SM]		16	S-4	SS	6	2 4 6 9	10	Drill to 15' with 3 7/8" roller bit Gray wash Slight rig chatter Take S-4
					17						
					18						
					19						
					20						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-24** Sheet 2 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				20						Drill to 20'
				21	S-5	SS	10	5 7 7 10	14	Slight rig chatter Gray wash Take S-5
				22						
				23						
				24						
		Class 3b		25						Drill to 25'
			Orange brown m-f SAND, trace silt [SP-SM]	26	S-6	SS	12	4 6 7 7	13	Easy drilling Take S-6
				27						
				28						
				29						
	-20.5		? ? ? ?	30						Take S-7
			Brown fine SAND, some silt (wet) [SM]	31	S-7	SS	12	2 4 3 6	7	
				32						
				33						
				34						
		Class 6		35						Take S-8
			Brown m-f SAND, trace silt (wet) [SP-SM]	36	S-8	SS	10	3 4 5 7	9	
				37						
				38						
				39						
	-30.5			40						Drill to 40'
		Class 4b	Varved gray CLAY, trace silt, seams of silty sand [CL]	41	S-9	SS	12	4 4 6 9	10	Easy drilling Gray wash Take S-9
	-33.5			42						
		Class 4c		43						
				44						
				45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-24** Sheet 3 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale
		Class 4c	Gray brown varved CLAY, seams of silty sand [CL]		45–46–47–48–49
	-39.5				
		Class 4b	Maroon gray varved CLAY, seams of silty sand (wet) [CL]		49–50–51
	-42.5		E.O.B. @ 52.0 ft bgs		52–53–54–55–56–57–58–59–60–61–62–63–64–65–66–67–68–69–70

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-10	SS	24	1, 3, 4, 4	7
SH-1	SH			
S-11	SS		2, 6, 8, 13	14

N-Value (Blows/ft) scale: 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Drill to 45'
Easy drilling
Gray brown wash
Take S-10

q_u=1.5 tsf

Take S-11

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Log of Boring **LB-25** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/22/15 — Date Finished: 4/22/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 8 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.0				0					10 20 30 40	4/22/15 Start at 10:00 AM
	+8.8		CONCRETE (3")		1						
		Class 7			2						Hand clear to 4'
					3						
				33	4						
				39	5	S-1	SS	16	4 4 5 4	9	Take S-1 with 3" split spoon
			Brown m-f SAND, some silt, trace fill material, concrete (wet) [FILL]	24	6						
	+2.0			10	7						
				10	8	S-2	SS	15	4 2 1 1	3	Take S-2 Install casing to 8.5' Clean out hole with 2 7/8" roller bit Brown wash Casing spinning in hole
		Class 6	Orange brown c-f SAND, some silt, trace fine gravel (wet) [SM]		9						
			Gray brown silty SAND (wet) [SP]		10	S-3	SS	12	WOH 2 2 3	4	Take S-3
	-2.0			PUSH	11						
		Class 3b	No recovery		12	S-4	SS	0	9 7 5 7	12	Take S-4 (no recovery) Fix casing Push to 13'
	-4.0				13						
		Class 6	Gray silty SAND (wet) [SM]		14	S-5	SS	18	3 2 2 8	4	Take S-5 Clean out hole Brown wash
	-6.0				15						
			Brown m-f SAND, trace silt (wet) [SP-SM]		16	S-6	SS	14	11 13 12 14	25	Take S-6
		Class 3b			17						
					18						
					19						
					20						

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Log of Boring **LB-25** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					20						Drill to 20'
					21						Brown wash
											Easy drilling
			Orange brown c-f SAND, trace silt, trace fine gravel (wet) [SP-SM]		22	S-7	SS	16	9, 8, 9, 8	17	Take S-7
		Class 3b			23						
					24						
					25						
	-18.0		Gray orange brown m-f SAND, trace silt (wet) [SP-SM]		26	S-8	SS	14	5, 6, 5, 8	11	Take S-8
			E.O.B. @ 27.0 ft bgs		27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-26** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/8/15 — Date Finished: 4/8/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5				0					10 20 30 40	4/8/15 Start at 10:10 AM Drill through
		Class 7		PUSH	1						
					2						Hand clear to 5'
					3						
					4						
				40	5						
			Brown m-f SAND, some m-f gravel, brick [SP] [FILL]	10	6	S-1	SS	8	5 5 4 4	9	Take S-1
	+1.5				7						
		Class 6	Brown silty SAND, trace clay (wet) [SM]	10	8	S-2	SS	9	1 1 WOH 1		Take S-2 Install casing to 8.5' Clean out hole Brown, black, orange wash
	-0.5			2	9						
			Brown gray silty SANDtrace clay (wet) [SM]		10	S-3	SS	1	4 6 9 11	15	Take S-3 Sample in tip only
					11						
			Brown gray fine SAND, trace silt, trace clay (wet) [SP-SM]		12	S-4	SS	24	9 10 9 9	19	Take S-4
		Class 3b			13						
					14						
					15						Drill to 15'
			Light maroon brown m-f SAND, trace silt (wet) [SP-SM]		16	S-5	SS	15	7 11 15 22	26	Take S-5
					17						
					18						
					19						
					20						

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Log of Boring **LB-26** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					20					10 20 30 40	
					21	S-6	SS	14	5 6 9 9	15	Drill to 20' Brown wash Easy drilling Take S-6
		Class 3b	Tan brown m-f SAND, trace silt (wet) [SP-SM]		22						
					23						
					24						
					25						Drill to 25' Easy drilling
	-18.5		Orange brown m-f SAND, trace silt, trace clay (wet) [SP-SM]		26	S-7	SS	20	5 8 12 11	20	Take S-7
			E.O.B. @ 27.0 ft bgs		27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

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Log of Boring **LB-27** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/8/15 — Date Finished: 4/8/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 29 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 8 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5'	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casing blws/ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.0				0						4/8/15 Start at 7:30 AM Drill through asphalt & concrete to 6"
	+8.8		ASPHALT (2")								
	+8.3		CONCRETE (6")		1						
				PUSH	2						
					3						
					4						
					5						Hand clear to 5' Clean out hole with 3' split spoon Take S-1
		Class 7	Black gray m-f SAND, brick, trace gravel, wood [FILL]	163	6	S-1	SS	15	10 12 34 21	46	
				92	7						Take S-2
			Yellow WOOD, fresh [FILL]	62	8	S-2	SS	16	18 13 11 9	24	Push casing to 5' Hammer casing to 8.5' Clean out hole Gray wash Rig chatter Brick & wood in return wash
					9						
			Yellow WOOD, fresh [FILL]		10	S-3	SS	15	7 4 4 8	8	Take S-3
	-2.0				11						
			Brown gray silty SAND trace clay (wet) [SM]		12	S-4	SS	14	7 8 7 10	15	Take S-4
					13						
					14						
		Class 3b			15						Drill to 15' Brown wash Easy drilling
			Gray silty SAND, trace clay, trace wood (wet) [SM]		16	S-5	SS	10	7 7 6 8	13	Take S-5 (no recovery) Take S-5 with 3" split spoon
					17						
					18						
					19						
					20						

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Log of Boring **LB-27** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Orange brown m-f SAND, trace silt (wet) [SP-SM]		20–22	S-6	SS	14	10, 9, 9, 10	18	Drill to 20' Brown/gray wash Easy drilling Take S-6
		Class 3b	Orange brown m-f SAND, trace silt (wet) [SP-SM]		23–25						
	-17.0				25–26	S-7A	SS	19	8, 10, 6, 10	16	Drill to 25' Brown wash Easy drilling Take S-7A & S-7B
	-17.5	Class 4b	Brown CLAY, trace silt, trace fine sand (wet) [CL]		26–27	S-7B					
		Class 4b	Varved maroon brown CLAY, trace silt(wet) [CL]		27–28	S-8	SS	24	11, 10, 13, 13	23	Take S-8
	-20.0		E.O.B. @ 29.0 ft bgs		29–45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-28** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/7/15 — Date Finished: 4/7/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+9.5				0					10 20 30 40	4/7/15 Start at 11:30 AM
	+9.3		ASPHALT (2")								Drill through 2" of asphalt
	+8.8		CONCRETE (6")		1						Drill through 6" concrete
					2						
				PUSH	3						Hand clear to 5'
					4						
		Class 7			5						
				33		S-1	SS	9	6 8 10 30/4"	18	
			Mottled red, black, brown m-f SAND, some silt, trace building material, brick, asphalt, concrete (dry) [FILL]	80	6						Take S-1
				54	7	S-2	SS	5	17 5 3 4	8	Take S-2
			Dark brown m-f SAND, some silt, trace brick, gravel (wet) [FILL]	6	8						Push casing to 5'
	+0.5				9						Hammer casing to 8.5' Clean out the hole Brick in return Rig chatter Brown wash
		Class 6	Olive brown m-f SAND, trace silt, trace clay (wet) [SP-SM]		10	S-3	SS	16	2 5 4 5	9	
	-1.5			PUSH	11						Take S-3
		Class 3b	Gray brown fine SAND, trace silt, trace clay (wet) [SP-SM]		12	S-4	SS	24	5 5 7 7	12	Take S-4 Driller threw out sample (No sample obtained in jar)
	-4.0				13						Push casing to 13.5'
					14						
					15						
		Class 6	Gray silty SAND, trace clay (wet) [SM]		16	S-5	SS	11	4 3 3 4	6	Take S-5
	-9.0				17						
		Class 3b			18						
					19						
					20						

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Log of Boring **LB-28** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Orange brown c-f SAND, trace silt, trace fine gravel (wet) [SP]		20	S-6	SS	10	11 10 9 11	19	Drill to 20' Gray wash Easy drilling Take S-6
	-14.0		? ? ? ?		21						
		Class 4b			22						
					23						
					24						
			Maroon brown CLAY, trace silt, trace fine sand (wet) [CL]		25	S-7	SS	24	4 5 6 10	11	Drill to 25' Brown wash Easy drilling Take S-7
	-17.5				26						
			E.O.B. @ 27.0 ft bgs		27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-29(OW)** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/16/15 — Date Finished: 4/16/15
Drilling Equipment: CME 55 ATV	Completion Depth: 82 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 6 — Undisturbed 0 — Core 0
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 15'	Water Level (ft.): First ▽ 6 — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Rene Silvestre
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+10.0			0					10 20 30 40	4/16/15 9:30 - Start augering complete at 5.5'
		Class 7	Brown c-f SAND,trace c-f gravel, trace silt, some concrete, trace brick [FILL] (moist)	6	S-1	SS	8	2 3 5 6	8	Install casing to 5' Take S-1: 6-8'
			Brown c-f SAND, trace m-f gravel, trace silt, some concrete, trace brick [FILL] (moist)	8	S-2	SS	9	2 6 8 7	14	Take S-2": 8-10'
	+1.0		Brown silty SAND, trace organics (root fibers) [SM] (wet)	10	S-3	SS	18	3 2 1 2	3	Take S-3: 10-12'
		Class 6		12						
	-3.5			14						Install casing to 15' Clean out with roller bit Brown wash, smooth drilling
			Gray silty SAND [SM] (wet)	15	S-4	SS	4	4 5 5 4	10	Take S-4: 15-17'
		Class 3b		17						
				20						

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Log of Boring **LB-29(OW)** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10± NAVD88

Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Class 3b	Brown c-f SAND, some fine gravel, trace silt [SP-SM] (wet)	20–22	S-5	SS	5	6 5 5 5	10	Take S-5: 20-22' Advance with roller bit to 25' Brown wash, smooth drilling
-13.5									
	Class 6	Brown m-f SAND, trace silt [SP-SM] (wet)	25–27	S-6	SS	12	3 4 5 6	9	Take S-6: 25-27' Advance with roller bit to 30' Brown wash, smooth drilling
-18.5									
	Class 3b	Brown silty SAND [SM] (wet)	30–32	S-7	SS	12	2 4 6 5	10	Take S-7: 30-32' Advance with roller bit to 35' Brown wash, smooth drilling
		Brown silty SAND [SM] (wet)	35–37	S-8	SS	15	4 6 6 6	12	Take S-8: 35-37' Advance with roller bit to 40' Brown wash, smooth drilling
-28.5									
	Class 6	Brown SILT, trace fine sand [ML] (wet)	40–42	S-9	SS	20	2 1 2 5	3	Take S-9: 40-42' Advance with roller bit to 45' Brown wash, smooth drilling
-33.5									
	Class 4c								

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-29(OW)** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 4c	Brown-gray varved CLAY, seams of silt [CL] (wet)	45–70	S-10	SS	12	1 2 2 3	4	Take S-10: 45-47' Advance with roller bit to 50' Brown wash, smooth drilling
	-38.5									
		Class 6	Brown silty SAND (wet) [SM]		S-11	SS	12	1 3 5 5	8	Take S-11: 50-52' Advance with roller bit to 55' Brown wash, soft drilling
	-43.5									
			Brown-gray varved CLAY with seams of silt (wet) [CL]		S-12	SS	20	WOH 1 2 4	3	Take S-12: 55-57' Advance with roller bit to 60' Brown wash, soft drilling
		Class 6	Brown-gray varved CLAY with seams of silt (wet) [CL]		S-13	SS	18	1 1 1 1	2	Take S-13: 60-62' Advance with roller bit to 65' Brown wash, soft drilling
			Brown-gray varved CLAY with seams of silt (wet) [CL]		S-14	SS	20	WOH WOH WOH 2		Take S-14: 65-67' Advance with roller bit to 70' Brown wash, soft drilling

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-29(OW)** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		Class 6	Brown-gray varved CLAY with seams of silt (wet) [CL]
	-63.5	Class 4c	Brown-gray varved CLAY with seams of silt (wet) [CL]
			S-17A: Brown and gray varved CLAY with seams of silt and fine sand (wet) [CL]
	-71.5	Class 3b	S-17B: Brown c-f GRAVEL, trace c-f sand, trace silt, trace clay [GW]
	-72.0		E.O.B. @ 82.0 ft bgs

Depth Scale: 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-15	SS	24	WOH WOH 2 4	
S-16	SS	24	WOH 1 3 3	4
S-17	SS	24	3 2 10 36	12

N-Value (Blows/ft): 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Take S-15: 70-72'

Advance with roller bit to 75'
Brown wash, soft drilling

Take S-16: 75-77'

Advance with roller bit to 80'
Brown wash, soft drilling

Take S-17: 80-82'

End of drilling

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Log of Boring **LB-30** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/16/15 — Date Finished: 5/16/15
Drilling Equipment: CME 55 ATV	Completion Depth: 37 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 9 — Undisturbed 0 — Core 0
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 15'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Rene Silvestre
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+10.5				0					10 20 30 40	5/16/15
					1						9:30 - Hand augering to 4' on 5/15/15
			Brown c-f SAND, trace c-f gravel, some brick and concrete [FILL] (moist)	PUSH	2						
					3						
			Brown c-f SAND, trace silt, some brick [FILL] (moist)		4						
		Class 7			5	S-1	SS	12	10 9 10 6	19	Install casing to 4'
			Brown c-f SAND, trace silt, some brick [FILL] (moist)		6						Take S-1: 4-6'
					7	S-2	SS	6	3 4 5 5	9	Take S-2": 6-8'
					8	S-3	SS	3	3 4 70/2"		Take S-3: 8-10'
				DRIVE	9					70/2"	Refusal at 9'-2"
	+0.5				10						Install casing to 10'
		Class 6	S-4A: Brown sandy SILT, some organics (wet) [ML]		11	S-4	SS	22	WOH WOH 2 3		Clean out with roller bit Brown wash, light rig chatter
	-0.5		S-4B: Brown silty SAND, trace organics (wet) (11'-12') [SM]		12						Take S-4: 10-12' Install casing to 15'
					13						Clean out with roller bit to 15' Brown wash, smooth drilling
					14						
					15						
		Class 6			16	S-5	SS	10	2 4 3 5	7	Take S-5: 15-17'
			Gray silty SAND (wet) [SM]		17						Advance with roller bit to 20' Brown wash, smooth drilling
					18						
					19						
					20						

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Log of Boring **LB-30** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Gray-brown fine SAND, trace silt (wet) [SP-SM]		20–21	S-6	SS	12	3 3 6 6	9	Take S-6: 20-22' Advance with roller bit to 25' Brown wash, smooth drilling
					22–25						
			Brown m-f SAND, trace silt (wet) [SP-SM]		25–26	S-7	SS	12	2 2 4 4	6	Take S-7: 25-27' Advance with roller bit to 30' Brown wash, smooth drilling
		Class 6			26–30						
			Brown m-f SAND, trace silt (wet) [SP-SM]		30–31	S-8	SS	12	3 3 5 5	8	Take S-8: 30-32' Advance with roller bit to 35' Brown wash, smooth drilling
					32–35						
			Brown m-f SAND, trace silt (wet) [SP-SM]		35–36	S-9	SS	12	3 4 5 6	9	Take S-9: 35-37' End of drilling
	-26.5		E.O.B. @ 37.0 ft bgs		37–45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-31** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 11± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/15/15 — Date Finished: 4/15/15
Drilling Equipment: CME 55 ATV	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 6 — Undisturbed 0 — Core 0
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 15'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Rene Silvestre
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+11.0				0						4/15/15 10:20am - Start hand augering for utility-clearing
				PUSH	1						
					2						
					3						
					4						
		Class 7	Brown c-f SAND, trace brick and concrete, some c-f gravel, trace silt [FILL] (moist)		5						
					6						
			Brown c-f SAND, trace silt, trace brick, trace metal fragments [FILL] (moist)		7	S-1	SS	1	1 12 12 10	24	Take S-1: 6-8'
			Brown c-f SAND, trace silt, trace brick, trace metal fragments [FILL] (moist)	DRIVE	8	S-2	SS	4	8 4 3 3	7	Take S-2: 8-10'
	+1.0	Class 6	S-3A:Brown c-f SAND, some c-f gravel, trace silt (wet) [SW]		9	S-3	SS	6	2 3 5 3	8	Take S-3: 10-12'
	0.0	Class 6	S-3B: Brown fine sandy organic CLAY (wet) [OH]		10						Install casing to 10' Clean out to 12;' with roller bit Brown wash, smooth drilling
	-2.0				11	U-1	ST	0			Take U-1: 12-14' No recovery
					12						
					13						
					14						
					15	S-4	SS	15	2 3 2 3	5	Install casing to 15' Clean out to 15' with roller bit Bown wash smooth drilling
		Class 6	No recovery		16						Take S-4: 15-17'
			Olive silty SAND (wet) [SM]		17						Advance with roller bit to 20' Brown wash, smooth drilling
					18						
					19						
					20						

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Log of Boring **LB-31** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 11± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Brown silty SAND (wet) [SM]		20	S-5	SS	6	1 WOH 4 4		Take S-5: 20-22' Advance with roller bit to 25' Brown wash, smooth drilling
	-12.5		? ? ? ?		21						
		Class 6	Brown-gray varved CLAY with seams of silt (wet) [ML]		22						
					23						
					24						
					25	S-6	SS	16	2 3 3 4	6	Take S-6: 25-27' End of drilling
	-16.0		E.O.B. @ 27.0 ft bgs		26						
					27						
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-32** Sheet 1 of 2

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 12± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/7/15 — Date Finished: 4/7/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 27 ft — Rock Depth: Not Encountered
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 7 — Undisturbed 0 — Core 0
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 23.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+12.0	Class 7		PUSH	0						4/7/15 8:20 - Begin drilling Drill through 5.5" of concrete sidewalk with 12" concrete cutter hand clear to 5' Observed red brick and concrete Obstruction at 4' use 3" SS to advance
				32	1						
				40	2						
					3						
					4						
			Red brown grey m-f SAND, some m-f gravel, trace brick, concrete, glass, trace silt [SP] [FILL]	29	5	S-1	SS	11	3 8 6 8	14	Take S-1: 9:55am
				27	6						
			Brown f-m SAND, some silt, trace m-f gravel [SM] [FILL]	15	7	S-2	SS	9	8 7 3 4	10	Take S-2
	+3.0				8						
			No recovery		9	S-3	SS	0	5 3 1 1	4	Push casing to 3.5' Drive casing to 8' Clean out hole to 9' Brown wash
		Class 6		PUSH	10						
			Brown sandy m-f GRAVEL (limited recovery - gravel in tip)		11	S-4	SS	1	6 3 3 4	6	Take S-3 (no recovery) Take S-3 with 3" spoon (no recovery, possible void) Take S-4
	-1.5		? ? ? ?		12						
					13						
					14						
			No recovery 3" SS - Gray silty SAND (wet) [SM]		15	S-5	SS	0	6 7 7 8	14	Push casing to 13.5 Drill to 15' Add quik gel Rig chatter, brown wash Take S-5 (No recovery) Take S-5 with 3" SS (no recovey) retry pushing 3" SS
		Class 3b			16						
					17						
	-6.5				18						
		Class 6			19						Drill to 20' easy drilling Gray wash
					20						

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Log of Boring **LB-32** Sheet 2 of 2

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 12± NAVD88

MATERIAL SYMBOL	Elev. (ft)		Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Grey SILT with sand (wet) [SM]		20						
		Class 6			21	S-6	SS	24	1 1 WOH 3		Take S-6
	-11.5				22						
					23						Drill to 25' Brown wash easy drilling
					24						
		Class 6	Orange brown f-m SAND, trace silt (wet) [SP]		25	S-7	SS	11	2 3 3 5	6	
	-15.0				26						Take S-7
			E.O.B. @ 27.0 ft bgs		27						END OF HOLE at 10:50
					28						
					29						
					30						
					31						
					32						
					33						
					34						
					35						
					36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
					45						

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Log of Boring **LB-33** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 11± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/22/15 — Date Finished: 4/23/15
Drilling Equipment: CME 55 ATV	Completion Depth: 90 ft — Rock Depth: 85 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 16 — Undisturbed 0 — Core 5'
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 15'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Abdulhusain Ben Nakhi
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+11.0			DRIVE	0						4/22/15 Hand auger to 5'on 4/10/15 Start drilling at 12:50 pm Install casing to 5' Add hole plug around the casing Add quik gel to mud tub Clean out with roller bit to 6' Brown wash, smooth
		Class 7	Brown c-f SAND, trace gravel, some brick (moist) [FILL]	PUSH	1 2 3 4 5						
			No recovery (possible fill)		6 7	S-1	SS	0	12 18 13 10	31	Take S-1 (6'-8')
	+3.0				8						
			Brown c-f SAND, trace silt, some c-f gravel (wet) [SM]		9	S-2	SS	3	3 3 4 3	7	Take S-2 (8'-10')
			Brown c-f SAND, trace silt, some c-f gravel (wet) [SM]	DRIVE	10 11	S-3	SS	8	5 3 6 4	9	Take S-3 (10'-12')
		Class 6			12						Install casing to 15' Clean out with roller bit to 15' Brown-gray wash, rig chatter
	-4.0				13 14 15						
			Brown m-f SAND, trace silt (wet) [SP-SM]		16	S-4	SS	17	4 5 5 5	10	Take S-4
		Class 3b			17 18						
	-7.5										Advanced with roller bit to 20' Brown wash, smooth
		Class 6			19 20						

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Log of Boring **LB-33** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 11± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Brown m-f SAND, trace silt (wet) [SP-SM]		20	S-5	SS	6	3 5 6 6	11	Take S-5 End of day at 2:45 pm
					21						
					22						4/23/15 Start drilling at 7:25 am Advance with roller bit to 25' Brown wash, smooth
					23						
		Class 6			24						
			Brown-gray m-f SAND, trace silt (wet) [SP-SM]		25	S-6	SS	13	2 2 5 4	7	Take S-6
					26						
					27						
	-17.5				28						Advance with roller bit to 30' Brown wash, smooth
					29						
					30	S-7	SS	11	4 8 11 11	19	Take S-7
		Class 3b	Brown m-f SAND, trace silt (wet) [SP]		31						
					32						
	-22.5				33						Advance with roller bit to 35' Brown wash, smooth
					34						
					35	S-8	SS	14	4 3 3 3	6	Take S-8
			Brown m SAND, trace silt, trace mica (wet) [SP]		36						
					37						
		Class 6			38						Advance with roller bit to 40' Brown wash, smooth
					39						
					40	S-9	SS	20	4 4 5 5	9	Take S-9
			Brown silty SAND (wet) [SM]		41						
					42						
	-32.5				43						Advance with roller bit to 45' Brown wash, smooth
					44						
		Class 3b			45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-33** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 11± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		Class 3b	Brown silty SAND, trace mica (wet) [SM]
	-37.5		
		Class 6	Brown SILT, trace sand (wet) [ML]
	-42.5		
		Class 4c	Brown CLAY, trace silt (wet) [CL]
	-47.5		
		Class 6	Brown CLAY (wet) [CL]
			Brown-gray CLAY, trace silt (wet) [CL]
	-57.5		
		Class 6	

Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	45						
	46	S-10	SS	20	4 4 7 6	11	Take S-10
	47						
	48						Advance with roller bit to 50' Brown wash, smooth
	49						
	50						
	51	S-11	SS	24	2 2 3 3	5	Take S-11
	52						
	53						Advance with roller bit to 55' Brown wash, smooth
	54						
	55						
	56	S-12	SS	24	1 2 3 1	5	Take S-12
	57						
	58						Advance with roller bit to 60' Brown wash, smooth
	59						
	60						
	61	S-13	SS	24	WOH 1 2 3	3	Take S-13
	62						
	63						Advance with roller bit to 65' Brown gray wash, smooth
	64						
	65						
	66	S-14	SS	24	3 1 1 1	2	Take S-14
	67						
	68						Advance with roller bit to 70' Brown gray wash
	69						
	70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-33** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 11± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		Class 6	TOP & BOTTOM: Brown SILT, trace fine sand, trace clay (wet) [ML]
			Brown SILT, trace fine sand, trace clay (wet) [ML]
	-65.5		
		Class 3a	Brown c-f SAND, trace rock fragments, trace silt (wet) [SW]
	-72.0		
		Class 1d	DECOMPOSED ROCK
	-74.0		
		1a	Gray m-f grained; hard; quartz-biotite-garnet-feldspar GNEISS; slightly weathered to unweathered; slightly fractured. [NYCBC Class 1a]
	-79.0		
			E.O.B. @ 90.0 ft bgs

Casng blws/ ft
Coring (min)

Depth Scale: 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
U-1	SH	24		
S-15	SS	24	WOH 1 2 3	3
S-16	SS	12	7 11 22 24	33
C-1	NX	REC=60"/60" =100%	RQD=52"/60" =87%	

N-Value (Blows/ft): 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Take U-1 at 70'

Take S-15

Take S-15

Advance with roller bit to 80'
Brown wash, smooth

Take S-16

Advance with roller bit to 85'
Brown gray wash, rig chatter at 82'-83'
Hard drilling at 83'5" (possible top of rock)

Start coring C-1 at 85'

Brown wash, smooth

Complete C-1 at 90'

END OF DRILLING at 90'

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Log of Boring **LB-34** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/6/15 — Date Finished: 4/6/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 92 ft — Rock Depth: 87 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 19 — Undisturbed 1 — Core 5'
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 14'	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+10.5				0					10 20 30 40	4/6/15 START 8:00 Drill through concrete sidewalk Hand clear to 5'
		Class 7	Gray brown m-f SAND, some silt, trace f-m gravel, trace brick, wood, asphalt, concrete [SM] [FILL]	PUSH	1	S-1	SS	6	3 3 2 1	5	Take S-1
					2						Take S-2
					3						
					4						
				84	5						
			Brown m-f SAND, trace silt, trace brick [SP] [FILL]		6	S-2	SS	2	4 3 3 4	6	Install casing to 9' Backfill around the casing Clean out hole with roller bit to 9'
					7						
			Gray brown m-f SAND, some silt, trace gravel, trace brick (wet) [SP] [FILL]	PUSH	8	S-3	SS	5	4 3 6 6	9	brown wash, rig chatter Take S-3
	-0.5				9						
			Gray brown silty SAND, trace c-f gravel (wet) [SM]		10	S-4	SS	6	10 7 5 6	12	Take S-4 Silt at tip
				57	11						
					12						
					13						Hammer casing to 14' Add quik gel Drill to 15' Rig chatter, brown wash
					14						
		Class 3b	Brown gray silty SAND (wet) [SP]		15	S-5	SS	14	5 6 6 5	12	Take S-5
					16						
					17						
					18						Drill to 20' Easy drilling, brown/gray wash
					19						
					20						

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Log of Boring **LB-34** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				20						
				21	S-6	SS	12	5 6 6 7	12	Take S-6
				22						
		Class 3b		23						Drill to 25' Easy drilling, grey wash
			Brown pink silty SAND, trace fine gravel [SM]	24						
				25						
	-15.5			26	S-7A S-7B	SS	24	4 5 5 8	10	Take S-7
			Dark brown gray CLAY, some silt, trace fine sand [CL]	27						
				28						Drill to 30' Easy drilling, grey brown wash
		Class 4b		29						
			Pink brown gray CLAY, trace fine sand (wet) [CL]	30						
				31	S-8	SS	24	6 7 6 10	13	Take S-8
	-23.0			32						
				33						Drill to 35' Easy drilling, brown wash
				34						
		Class 3b	Pink brown gray silty SAND (wet) [SM]	35						
				36	S-9	SS	15	5 6 8 9	14	Take S-9
	-28.0			37						
				38						Drill to 40' Brown/gray wash, easy drilling
				39						
				40						
			Pink brown gray CLAY, trace fine sand (wet) [CL]	41	S-10	SS	20	5 4 3 4	7	Take S-10
		Class 4c		42						
				43						Drill to 45' Easy drilling, grey brown wash
				44						
				45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-34** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Gray pink brown CLAY, trace silt (wet) [CL]		45	S-11	SS	24	WOH 2 3 2	5	Take S-11
		Class 4c			46						
					47						
					48						Drill to 50' Easy drilling, grey wash
					49						
			Grey brown varved CLAY with seams of silt (wet) [CL]		50	S-12	SS	24	1 2 2 2	4	Take S-12
					51						
					52						
	-43.0		? ? ? ?		53						Drill to 55' Easy drilling, brown grey wash
					54						
			Grey brown varved CLAY with seams of silt [CL]		55	S-13	SS	24	WOH 1 WOH 2		Take S-13
					56						
					57						
					58						Drill to 60' Easy drilling, grey wash
					59						
			Grey varved CLAY with seams of silt (wet) [CL]		60	S-14	SS	24	WOR WOH 1 1		Take S-14
		Class 6			61						
					62						Drill to 63' Easy drilling, grey wash
					63						
					64	SH-1	SH	24			Take SH-1 Push at 11:24 am Pull at 11:53 am
					65						
			Grey varved CLAY with seams of silt (wet) [CL]		66	S-15	SS	24	WOH WOH 1 2		Take S-15
					67						
					68						Drill to 70' Grey wash, easy drilling
	-58.0				69						
		Class 4b			70						

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Log of Boring **LB-34** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					70					10 20 30 40	
		Class 4b	Grey varved CLAY with seams of silt (wet) [CL]		71	S-16	SS	24	2 5 7 7	12	Take S-16
					72						
					73						Drill to 75' Grey brown wash, smooth drilling
			Grey CLAY, some silt, trace fine sand (wet) [CL]		74						
	-65.5				75						
					76	S-17A	SS	24	1 5 5 10	10	Take S-17
		Class 3b	Grey silty SAND (wet) [SM]		77	S-17B					
	-68.5				78						Drill to 80' Grey wash, smooth drilling
					79						
		Class 4c	Grey CLAY, some fine sand (wet) [CL]		80	S-18	SS	20	2 2 4 5	6	Take S-18
					81						
	-73.0				82						
					83						Drill to 85' Rig chatter, grey brown wash
		Class 1d	Weathered rock		84						
					85	S-19	SS	2	16 50/2"	50/2"	Take S-19 Spoon refusal at 85'8" Drill to 87'
	-76.5				86						
				3:00	87	C-1	NX	REC=60"/60" =100%	RQD=60"/60" =100%		
		Class 1a	Grey-white f-m grained GNEISS, slightly jointed, mod dipping, strong	5:00	88						Start C-1 at 87' 87-88 Rig chatter 88-89 Rig chatter 89-90 Smooth 90-91 Smooth 91-92 Smooth
				3:00	89						
				3:00	90						
				4:00	91						
	-81.5				92						
			E.O.B. @ 92.0 ft bgs		93						END OF LB-34 @ 92 FT
					94						
					95						

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Log of Boring **LB-35** Sheet 1 of 5

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/17/15 — Date Finished: 4/21/15
Drilling Equipment: CME 55 ATV	Completion Depth: 105 ft — Rock Depth: 100 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 19 — Undisturbed 1 — Core 9'
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 20'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Larry Caldwell
Sampler: 2" Split Spoon	Inspecting Engineer: Rene Silvestre
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.5				0						4/17/15 Hand augered for utility clearing to 5' on 4/10/15 8:20 am - Set up complete.
				PUSH	1						
					2						Install casing to 5'
					3						Clean out to 6' with roller bit Brown wash, smooth
					4						
		Class 7	Brown m-c SAND, trace f-c gravel, some brick and construction debris (moist) [FILL]		5						
					6						
			Brown c-f SAND, some c-f gravel, trace silt, some brick (wet) [FILL]		7	S-1	SS	12	7 5 7 9	12	Take S-1: 6-8'
			Brown gravelly c-f SAND, trace silt, trace brick (wet) [FILL]		8						
	-0.5				9	S-2	SS	4	18 18 7 5	25	Take S-2: 8-10'
			Brown m-f SAND, trace silt, trace gravel (wet) [SW]		10	S-3	SS	6	5 4 6 7	10	Take S-3: 10-12'
				DRIVE	11						
					12						
					13						
					14						Install casing to 15' Clean out with roller bit Brown wash, smooth drilling
		Class 3b			15						
			Brown silty SAND [SM] (wet)		16	S-4	SS	12	3 4 6 9	10	Take S-4: 15-17'
					17						
					18						Install casing to 20' Clean out with roller bit to 20' Brown wash, light rig chatter
					19						
					20						

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Log of Boring **LB-35** Sheet 2 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Brown c-f SAND, trace silt (wet) [SW]		20–45	S-5	SS	12	5, 6, 7, 8	13	Take S-5: 20-22' Advance with roller bit to 25' Brown wash, smooth drilling
	-14.0										
		Class 6	Brown silty SAND (wet) [SM]			S-6	SS	12	3, 3, 4, 4	7	Take S-6: 25-27' Advance with roller bit to 30' Brown wash, smooth drilling
			Brown silty SAND (wet) [SM]			S-7	SS	10	3, 4, 4, 5	8	Take S-7: 30-32' Advance with roller bit to 35' Brown wash, smooth drilling
	-24.0		? ? ? ?								
		Class 6	Brown SILT with 1-in-thick seams of gray clay (wet) [ML]			S-8	SS	18	4, 4, 4, 8	8	Take S-8: 35-37' Advance with roller bit to 40' Brown wash, smooth drilling
			Brown SILT with 1-in-thick seams of gray clay (wet) [ML]			S-9	SS	24	2, 3, 4, 3	7	Take S-9: 40-42' Advance with roller bit to 45' Brown wash, smooth drilling
	-34.0	class 5b									

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-35** Sheet 3 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		class 5b	Brown SILT with 1-in-thick seams of gray clay [ML] (wet)
	-39.0		
		Class 4c	Brown and gray varved CLAY with seams of silt (wet) [CL]
			Brown and gray varved CLAY (wet) [CL]
			Brown and gray varved CLAY with seams of silt (wet) [CL]
			Brown and gray varved CLAY (wet) [CL]
	-59.0	Class 3b	? ? ? ?

Coring (min)

Depth Scale: 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-10	SS	24	3 5 5 7	10
S-11	SS	24	1 3 2 2	5
S-12	SS	24	1 2 2 3	4
S-13	SS	24	1 2 2 2	4
U-1	SH	24		
S-14	SS	24	WOH 2 2 2	4

N-Value (Blows/ft): 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Take S-10: 45-47'

Advance with roller bit to 50'
Brown wash, smooth drilling

Take S-11: 50-52'

Advance with roller bit to 55'
Brown wash, soft drilling

Take S-12: 55-57'

Advance with roller bit to 60'
Brown wash, smooth drilling

Take S-13: 60-62'

Advance with roller bit to 62'
Brown wash, smooth and soft drilling

Take U-1: 62-64'

Take S-14: 64-66'

Advance with roller bit to 70'
Brown wash, smooth drilling

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Log of Boring **LB-35** Sheet 4 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Cobble fragment at tip of spoon		70	S-15	SS	1	21 12 13 31	25	Take S-15: 70-72' Advance with roller bit to 75' Brown wash, hard drilling at 72' Light rig chatter
	-64.0		? ? ? ?		71						
					72						
					73						
					74						
			Brown and red c-f SAND, trace silt, trace gravel (glacial till) 9wet) [SW]		75	S-16	SS	12	26 44 56 37	100	Take S-16: 75-77' Advance with roller bit to 80' Brown wash, hard drilling, rig chatter
					76						
					77						
					78						
					79						
			Brown c-f SAND, trace silt, trace gravel (glacial till) (wet) [SW]		80	S-17	SS	14	38 19 24 22	43	Take S-17: 80-82' Advance with roller bit to 85' Brown wash, hard drilling, rig chatter
					81						
					82						
		Class 3a			83						
					84						
			Brown c-f SAND, trace silt, trace gravel (glacial till) (wet) [SW]		85	S-18	SS	10	24 28 28 28	56	Take S-18: 85-87' Advance with roller bit to 90' Brown wash, hard drilling, rig chatter
					86						
					87						
					88						
					89						
			Brown c-f SAND, trace silt, trace gravel (glacial till) (wet) [SW]		90	S-19	SS	7	18 100/4"	100/4"	Take S-19: 90-92' Spoon refusal at 90'10" Advance with roller bit to 95' Brown wash, hard drilling, heavy rig chatter at 93' Very hard drilling at 94' (Possible top of rock) 2:50 pm End of day
					91						
					92						
					93						
	-84.5				94						
		Class 1d			95						

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Log of Boring **LB-35** Sheet 5 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40
		Class 1d	C-1: Gray m-f grained; moderately hard to hard; quartz-biotite-feldspar-garnet GNEISS; severely fractured; moderately to highly weathered [NYCBC Class 1d]	6:00 12:00 17:00 7:00	95–100	C-1	NX	REC=24"/48" =50%	RQD=5"/48" =10%	
	-90.5	Class 1a	C-2: Gray m-f grained; hard; quartz-biotite-feldspar-garnet GNEISS; slightly fractured; unweathered; foliated at 40-50 degrees; joints at 102', 103.5', 104' and 104.5' [NYCBC Class 1a]	4:00 4:00 5:00 6:00 3:00	100–105	C-2	NX	REC=60"/60" =100%	RQD=54"/60" =90%	
	-95.5		E.O.B. @ 105.0 ft bgs		105–120					

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

4/20/15
Install casing to 40'. Rig broke down

4/21/15
10:10 Rig repaired. Set up complete
Clean out w roller bit to 96'
Heavy chattering at 95', hard drilling

Start coring C-1 at 96'
Brown wash, rig chatter
Core barrel blocks up at 100'
Complete C-1 at 100'
C-1 fractures might be affected by core bit defects (worn out)
Change of core bit

Start coring C-2 at 100'
Brown wash, smooth
Complete C-2 at at 105'
END OF DRILLLING

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Log of Boring **LB-36** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 9.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/21/15 — Date Finished: 4/22/15
Drilling Equipment: CME 55 ATV	Completion Depth: 85 ft — Rock Depth: 80 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 17 — Undisturbed 0 — Core 5'
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 20'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Abdulhusain Ben Nakhi
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.5			PUSH	0						4/21/15 Hand auger to 5'on 4/10/15 Start drilling at 1:55 pm Install casing to 5' Clean out to 6'
		Class 7	Brown c-f SAND, some brick and construction debris, trace gravel (moist) [FILL]	DRIVE	1 2 3 4						
				PUSH	5						
			Brown c-f SAND, trace silt, trace gravel (wet) [FILL]		6 7	S-1	SS	10	6 20 47 19	67	Take S-1 (6'-8')
	+1.5				8						
		Class 3b	Brown m-f SAND, trace silt, trace gravel (wet) [SP]		9	S-2	SS	10	4 8 5 3	13	Take S-2 (8'-10')
	-0.5				10						
			Brown m-f SAND, trace silt (wet) [SP-SM]		11	S-3	SS	20	3 2 2 3	4	Take S-3 (10'-12')
				DRIVE	12 13						Install casing to 15' Clean out with roller bit to 15' Brown wash, smooth
		Class 6			14						
			Brown m-f SAND, trace silt (wet) [SP-SM]		15 16	S-4	SS	10	2 3 2 6	5	Take S-4
	-9.0				17 18						Install casing to 20' Clean out with roller bit to 20' Grey wash, smooth Add quik gel to mud tub
		Class 3b			19 20						

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Log of Boring **LB-36** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Brown m-f SAND, trace silt (wet) [SP-SM]		20–21	S-5	SS	12	4 4 7 7	11	Take S-5
	-14.0				22–23						Advance with roller bit to 25' Brown wash, smooth
		Class 6	Brown m-f SAND, trace silt (wet) [SP-SM]		24–26	S-6	SS	10	3 3 6 6	9	Take S-6
	-19.0				27–28						Advance with roller bit to 30' Brown wash, smooth END OF DAY
		Class 3b	Brown m-f SAND, some silt (wet) [SM]		29–31	S-7	SS	12	4 6 8 8	14	4/22/15 Start drilling at 7:30 am Take S-7
	-24.0				32–33						Add quik gel Drill to 30' Easy drilling, brown wash
			Brown silty SAND (wet) [SM]		34–36	S-8	SS	15	3 4 4 5	8	Take S-8
		Class 6			37–39						Advance with roller bit to 40' Brown wash, smooth
			Brown silty SAND (wet) [SM]		40–41	S-9	SS	19	2 5 2 3	7	Take S-9
					42–45						Advance with roller bit to 45' Brown wash, smooth

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-36** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Brown silty SAND 9wet) [SM]	45–70	S-10	SS	24	2, 3, 6, 5	9	Take S-10
		Class 6								Advance with roller bit to 50' Gray wash, smooth
			Brown silty SAND (wet) [SM]		S-11	SS	12	1, 2, 2, 2	4	Take S-11
	-44.0									Advance with roller bit to 55' Brown gray wash, smooth
			Brown SILT (wet) [ML]		S-12	SS	24	1, 1, 2, 2	3	Take S-12
		Class 6								Advance with roller bit to 60' Brown wash, smooth
			Gray SILT, trace fine sand (wet) [ML]		S-13	SS	22	1, 2, 2, 3	4	Take S-13
	-54.0									Advance with roller bit to 65' Brown gray wash, smooth
			Brown-gray CLAY, trace silt (wet) [CL]		S-14	SS	24	WOH, 1, 2, 1	3	Take S-14
		Class 6								
	-59.0									Advance with roller bit to 70' Brown gray wash Rig chatter at 72'-73'
		Class 4c								

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-36** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 9.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 4c	Brown CLAY (wet) [CL]		70	S-15	SS	24	1, 2, 4, 10	6	Take S-15
	-64.0		? ? ? ?		71						
					72						Advance with roller bit to 75' Gray wash, hard drilling at 72'-73'
		Class 3a	Brown c-f SAND, trace gravel (wet) [SP]		73						
					74						
					75	S-16	SS	16	25, 21, 36, 25	57	Take S-16
					76						
					77						
					78						Advance with roller bit to 80' Brown gray wash
			Brown c-f SAND, trace silt, trace gravel (wet) [SP]		79						
	-70.5				80	S-17	SS	3	100/3"	100/3"	Take S-17 Spoon refusal at 80'3"
		Class 1b	Gray m-f grained; hard; quartz-biotite-garnet-feldspar GNEISS; moderately weathered; sound. [NYCBC Class 1b]		81	C-1	NX	REC=32"/60" =53%	RQD=32"/60" =53%		Start coring C-1 at 80' Brown wash, smooth
					82						
					83						Complete C-1 at 85'
	-75.5				84						END OF DRILLING at 85'
			E.O.B. @ 85.0 ft bgs		85						
					86						
					87						
					88						
					89						
					90						
					91						
					92						
					93						
					94						
					95						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-37** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10± NAVD88
Drilling Company: Craig Drilling	Date Started: 4/23/15 — Date Finished: 4/24/15
Drilling Equipment: CME Truck Rig	Completion Depth: 75 ft — Rock Depth: 70 ft
Size and Type of Bit: 3-7/8" I.D. steel	Number of Samples: Disturbed 14 — Undisturbed — Core
Casing Diameter (in): 4" O.D. steel casing — Casing Depth (ft)	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Doller
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Abdulhusain Ben Nakhi
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+10.0		Brown m-f SAND, trace gravel, some brick (moist) [FILL]	PUSH	0						4/23/15
				3	1						Start at 12:30
				3	2						Hand augured for utility clearing
				4	3						Install casing to 5'
				4	4						End of drilling at 12:50pm
					5						4/24/15 Started at 1:30am fixing the rig. Install casing to 10' Clear out with roller bit Brown wash, smooth drilling
		Class 7	Brown c-f SAND, some gravel, trace silt (wet) [FILL]	PUSH	6 7	S-1	SS	10	10 5 5 4	10	Take S-1: 6-8'
			Brown c-f SAND, trace organics, trace silt (wet) [FILL]		8 9	S-2	SS	7	3 5 5 5	10	Take S-2: 8'-10'
			Brown c-f SAND, trace brick (wet) [FILL]	4	10						
				8	11	S-3	SS	10	7 5 5 4	10	Take S-3: 10-12'
				16	12						
				22	13						
	-3.5			34	14						
		Class 3b	Brown m-f SAND, trace silt (wet) [SP]		15 16	S-4	SS	12	5 5 5 4	10	Take S-4: 15-17'
	-8.5				17 18						
		Class 6			19 20						

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Log of Boring **LB-37** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Brown m-f SAND, trace silt (moist) [SP-SM]		20–45	S-5	SS	3	3 4 5 4	9	Take S-5: 20-22' Advance roller bit to 25' Brown wash, smooth
			Brown fine SAND, trace silt (wet) [SP-SM]			S-6	SS	20	3 4 3 4	7	Take S-6: 25-27' Advance roller bit to 30' Brown wash, smooth
	-18.5	Class 5b	Brown gray CLAY, trace silt (wet) [CL]			S-7	SS	24	7 9 11 12	20	Take S-7: 30-32' Advance roller bit to 35' Brown wash, smooth
			Brown gray CLAY, trace silt (wet) [CL]			S-8	SS	24	3 6 7 7	13	Take S-8: 35-37' Advance roller bit to 40' Brown wash, smooth
	-28.0	Class 4c	Brown-gray varved CLAY with seams of silt (wet) [CL]			S-9	SS	24	3 4 4 5	8	Take S-9: 40-42' Advance roller bit to 45' Brown wash, smooth

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-37** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10± NAVD88

Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Class 4c	Brown-gray varved CLAY with seams of silt (wet) [CL]	45						
-37.5			46	S-10	SS	24	3 4 4 5	8	Take S-10: 45-47' Advance roller bit to 50' Brown wash, smooth
	Class 4a	Brown-gray varved CLAY with seams of silt (wet) [CL]	47						
			48						
			49						
			50	S-11	SS	6	8 21 21 22	42	Take S-11: 50-52' Advance roller bit to 55' Brown wash, smooth
			51						
-43.5			52						
			53						
			54						
	Class 3a	Brown c-f SAND, trace gravel, trace silt (wet) [SP]	55	S-12	SS	20	19 60 50 49	110	Take S-12: 55-57' Advance roller bit to 60' Brown wash, heavy chatter
			56						
			57						
			58						
			59						
		Brown m-f SAND, trace gravel, trace silt (wet) [SP]	60	S-13	SS	12	10 33 21 18	54	4" split spoon Take S-13: 60-62' Advance roller bit to 65' Brown wash, chatter
			61						
-53.5			62						
			63						
			64						
	Class 3b	Brown c-f SAND, trace silt (wet) [SP]	65	S-14	SS	8	9 12 8 7	20	Take S-14: 65-67' Advance roller bit to 70' Brown wash, chatter
			66						
-58.0		? ? ? ?	67						
	Class 1a	DECOMPOSED ROCK	68						
-60.0			69						
			70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-37** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10± NAVD88

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 1b	Gray m-f grained, moderately hard to hard; quartz biotite granite GNEISS, slightly weathered; slightly fractured. [Class 1b]	5 5 5 4 5	70 71 72 73 74 75	S-15	NX CORE BARREL	REC=56"/60" =93%	RQD=50"/60" =83%		Top of rock at 68' Start coring at 70' Brown wash, smooth Take C-1: 70' End of boring
	-65.0		E.O.B. @ 75.0 ft bgs		76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95						

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Log of Boring **LB-38** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/29/15 — Date Finished: 4/30/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 72.5 ft — Rock Depth: 67.5 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 15 — Undisturbed 2 — Core 1
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 13.5	Water Level (ft.): First ▽ 5 — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5										
	+8.2		4" CONCRETE		0						4/28/2015 Hand clear 0' to 6' after drilling through 4" concrete
			Brown c-f SAND, trace silt, bricks, concrete		1						
				PUSH	2						
					3						
		Class 7			4						
					5						
			Concrete obstruction at 5'-4"	54	6						Obstruction at 5'-4" 3" split spoon from 5'-4" to 6' Take S-1
				43	7	S-1	SS	12	6 5 6 7	11	
			Light brown c-f SAND, some silt, trace gravel, trace brick (wet) [FILL]	31							
	+0.5			11	8						Take S-2
			Brown-f SAND, trace silt, trace gravel (wet) [SP]		9	S-2	SS	11	2 2 1 1	3	Install casing to 8.5' Add mud
		Class 6			10						
			Brown c-f SAND, some silt (wet) [SM]	PUSH	11	S-3	SS	2	4 1 1 1	2	Clean out hole to 10' Brown wash Slight rig chatter Take S-3
	-4.5		? ? ? ?		12						
					13						Push casing to 13.5'
		Class 6			14						
			Gray SILT, some fine sand [ML]	PUSH	15				WOH		Drill to 15' Take S-4
	-7.5				16	S-4A	SS	18	WOH 2		
			Gray fine SAND, trace silt [SP]		17	S-4B			2		
		Class 6		47	18						
	-11.5				19						
					20						

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Log of Boring **LB-38** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Brown fine SAND, trace silt [SP]	20–22	S-5	SS	12	3 5 5 6	10	Drill to 20' Easy drilling Gray brown wash Take S-5
	-16.5	Class 6	Gray varved SILT with seams of fine sand [ML]	25–26	S-6	SS	20	WOH 2 5 5	7	Drill to 25' Easy drilling Brown wash Take S-6
	-18.5	Class 5b	Gray varved SILT with seams of fine sand [ML]	27–29	S-7	SS	21	7 8 9 11	17	Clean out hole to 27' Take S-7
	-21.5	Class 4c	Gray varved CLAY with seams of sand [CL]	30–32	S-8	SS	22	5 5 6 7	11	Drill to 30' Gray wash Take S-8
			Gray varved CLAY with seams of fine sand	35–36	S-9	SS	22	5 5 6 3	11	Drill to 35' Easy drilling Gray wash Take S-9
				37–38	SH-1	SH	23			Clean out hole to 37' q_u=0.25 tsf
			Gray varved CLAY with seams of m-f sand (wet) [ML]	39–40	S-10	SS	20	2 3 2 5	5	Clean out hole to 39' Take S-10

Casng blws/ ft

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-38** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description
		Class 4c	Gray brown varved CLAY with seams of fine sand [CL-ML]
	-40.5	Class 3b	Gray c-f SAND, trace silt, trace fine gravel (wet) [SP]
	-44.5	Class 3a	Gray c-f SAND, some m-f gravel, trace silt (wet) [SP]
			Gray m-f SAND, some silt (wet) [SM]
	-59.0	Class 1b	Gray m-f SAND, trace silt, trace m-f gravel (wet) [SP]
			Gray slightly jointed, strong, f-m grained GNEISS, slightly dipping joints

Casng blws/ ft

Depth Scale: 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-11	SS	24	2 2 4 5	6
SH-2	SH	23		
S-12A	SS	19	6 19 10 11	29
S-12B				
S-13	SS	1	13 17 29 31	46
S-14	SS	20	24 24 24 38	48
S-15	SS	9	22 50 52 100/2"	102
C-1	NX CORE	REC=43"/60" =72%	RQD=43"/60" =72%	

N-Value (Blows/ft): 10 20 30 40

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Drill to 45'
Easy drilling
Gray/brown wash
Take S-11

q_u=1.5 tsf

Take S-12A & S-12B

Drill to 53'
Gray wash
Rig chatter

Drill to 58'
Rig chatter
Brown/gray wash
Take S-14

Slight rig chatter 60' to 62'

Rig chatter 62' to 65'

Take S-15
End of the day

4/30/2015
Start coring at 8:20 AM

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Log of Boring **LB-38** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-64.0	Class 1b			70	C-1	NX CORE				
			E.O.B. @ 72.5 ft bgs		71						
					72						
					73						
					74						
					75						
					76						
					77						
					78						
					79						
					80						
					81						
					82						
					83						
					84						
					85						
					86						
					87						
					88						
					89						
					90						
					91						
					92						
					93						
					94						
					95						

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Log of Boring **LB-39** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/28/15 — Date Finished: 5/1/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 91 ft — Rock Depth: 87 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 18, Undisturbed 3, Core 2
Casing Diameter (in): 3" & 4" I.D. Steel — Casing Depth (ft): 8.5	Water Level (ft.): First ▽ -, Completion ▼ -, 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.0				0						4/28/2015 Set up on hole
				PUSH	1						
					2						
					3						
			BRICKS AND CONCRETE		4						Hand clear to 4'
					5						4/30/2015 Obstruction at 5' 3" split spoon to try to penetrate 300+ blows, brick and concrete Drill to 6' with 3 7/8" roller bit, scraping Take S-1 Refusal at 6' Drill to 8' Rig chatter Take S-2 Install casing to 8.5' Add mud Clean out hole to 10' Take S-3
				19	6	S-1	SS	2	150/2"	150/2"	
		Class 7		26	7						
			CONCRETE	18	8				8 5		
				PUSH	9	S-2	SS	1	2 4	7	
			Gray brown m-f GRAVEL, some c-m sand [FILL]	44	10				3 5		
				34	11	S-3	SS		6 5	11	
			Gray c-f GRAVEL, some c-f sand [FILL]	48	12						
	-5.0		? ? ? ?	30	13						
					14						
					15				4 6		Drill to 15' Rig chatter, scraping Gray wash Take S-4
		Class 3b	Gray orange brown m-f SAND, trace silt (wet) [SP]		16	S-4	SS	15	8 11	14	
					17						
					18						
					19						
					20						

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Log of Boring **LB-39** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					20						Drill to 20' Easy drilling Brown wash Take S-5
			Orange brown m-f SAND, trace silt (wet) [SP]		21	S-5	SS	14	10 11 12 11	23	
					22						
					23						
					24						
					25						Drill to 25' Easy drilling Brown wash Take S-6
			Orange brown m-f SAND, trace silt (wet) [SP]		26	S-6	SS	12	8 7 8 8	15	
					27						
					28						
					29						
		Class 3b			30						Drill to 30' Easy drilling Brown wash Take S-7
			Gray silty SAND, trace clay 9wet) [SM]		31	S-7	SS	21	3 5 8 6	13	
					32						
					33						
					34						
					35						Drill to 35' Brown wash Easy drilling Take S-8
			Orange brown silty SAND [SM]		36	S-8	SS	15	2 5 6 6	11	
					37						
					38						
	-31.0		? ? ? ?		39						
					40						Drill to 40' Easy drilling Gray wash Take S-9
		Class 5b	Brown fine sandy SILT [ML]		41	S-9	SS	24	5 5 5 7	10	
					42						Drop SH-1 at 12:35 Pull SH-1 at 12:55
			Gray brown SILT, some fine sand [ML]		43	SH-1	SH	20			
	-35.5				44						Clean out hole to 44' Take S-10
		Class 4b			45	S-10	SS	22	4 4	9	

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-39** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Gray brown CLAY, some fine sand [CL]		45	S-10	SS	22	5 6	9	
					46						
					47						
					48						
					49						
		Class 4b			50	S-11	SS	22	4 5 4 4	9	Drill to 50' Easy drilling Gray brown wash
			Marron gray CLAY, some fine sand [CL]		51						
					52						
					53						
					54	SH-2	SH	24			q_u=0.75 tsf
	-47.0				55						
					56	S-12	SS	24	WOH 3 5 3	8	
			Gray varved CLAY with seams of fine sand (wet) [CL]		57						
		Class 4b			58						
					59						
	-52.0				60						
					61	S-13	SS	24	1 1 1 3	2	Drill to 60' Easy drilling Take S-13
			Gray varved CLAY with seams of fine sand (wet) [CL]		62						
		Class 6			63						
					64	SH-3	SH	24			Drill to 63' Take SH-3 q_u=1.25 tsf
	-57.0		Gray CLAY		65						
					66	S-14	SS		WOH WOH 5 5		
			Gray varved CLAY with seams of fine sand (wet) [CL]		67						End of the day
		Class 4c			68						
					69						
					70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-39** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					70						5/1/2015 Start at 7:30 AM Add mud Take S-15
		Class 4c	Gray varved CLAY with seams of fine sand (wet) [CL-ML]		71	S-15	SS	24	1 2 2 3	4	
					72						
					73						
					74						
					75	S-16	SS		2 1 2 4	3	Drill to 75' Easy drilling Gray wash Take S-16
			Gray varved CLAY with seams of fine sand (wet) [CL-ML]		76						
					77						
	-70.0				78						
		Class 3a	Gray c-f SAND, trace gravel, trace silt (wet) [SP]		79	S-17	SS		25 40 23	63	Drill to 78.5' Slight rig chatter Take S-17 Bent tip of spoon
	-72.0				80						Drill to 80' to confirm bedrock Very hard drilling Gray wash From 83' to 85' quick drilling Penetrated boulder
				5:00	81	C-1	NX CORE	REC=20"/60" =33%	RQD=18"/60" =30%		
				5:00	82						
		Class 1a	Gray m-f grained, strong GNEISS BOULDER, slightly jointed	5:00	83						
				0:30	84						
					85						Take S-18
			Mottled gray, white , black m-f SAND [WEATHERED GNEISS]		86	S-18	SS	11	20 20 22 50/3"	42	
	-79.0				87						Drill to 87' Add mud Heavy rig chatter at 82' Drilled through boulder Add mud at 85' Water loss 84' to 85' Add more mud Start coring at 87' Hard drilling at 87' Water loss No return at 87.5' 5/4/2015 Start at 7:30 AM Push 3" casing 0' to 45' Hammer 3" casing 45' to 50' hole collapsed at 45' Drill from 45' to 87' with 3 7/8" roller bit Push casing to 80' Hammer casing 80' to 87' Start core at 87'
				7:00	88	C-2	NX CORE	REC=40"/48" =83%	RQD=28"/48" =58%		
		Class 1b	Gray, white f-m grained, slightly weathered, moderately jointed, moderate dipping GNEISS	10:00	89						
				9:00	90						
	-83.0			9:00	91						
			E.O.B. @ 91.0 ft bgs		92						
					93						
					94						
					95						

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Log of Boring **LB-40** Sheet 1 of 5

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10.5± NAVD88
Drilling Company: Craig Drilling	Date Started: 4/28/15 — Date Finished: 4/29/15
Drilling Equipment: CME Truck Rig	Completion Depth: 95 ft — Rock Depth: 90 ft
Size and Type of Bit: 3-7/8" I.D. steel	Number of Samples: Disturbed 14 — Undisturbed — Core
Casing Diameter (in): 4" O.D. steel casing — Casing Depth (ft)	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Doller
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Abdulhusain Ben Nakhi
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+10.5				0						4/28/2015 - Start at 9:45am
			Hand augered to 5' for utility clearing	3	1						
			Brown c-f SAND, some c-f gravel, some brick [FILL] (wet)	8	2						Hand augered to 5' for utility clearing
				12	3						Obstruction at 3' (concrete slab)
				13	4						Move 5' west and 4' north
		Class 7		14	5						Install the casing to 5'
					6						
			Brown c-f SAND, some c-f gravel, some brick [FILL] (wet)	PUSH	7	S-1	SS	24	4 3 14 5	17	Take S-1 with 3" split spoon
					8						
			Brown m-c SAND, some m-c gravel, some brick [FILL] (wet)		9	S-2	SS	7	2 7 5 4	12	Take S-2
	+0.5				10						
			Brown m-f SAND, trace silt [SP-SM] (wet)	15	11	S-3	SS	12	3 2 1 2	3	Take S-3
				12	12						Install casing to 15'
				12	13						Clean out with roller bit to 15'
				10	14						Add quik gel
		Class 6		16	15						Brown-gray wash, smooth drilling
				12	16	S-4	SS	24	8 WOH 2 4		Take S-4
			Gray m-f SAND, trace silt [SP-SM] (wet)	10	17						Install casing to 20'
				10	18						Clean out with roller bit to 20'
	-8.0			30	19						Brown-gray wash, smooth drilling
		Class 3b		47	20						

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Log of Boring **LB-40** Sheet 2 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Brown m-f SAND, trace silt [SP-SM] (wet)	20–21	S-5	SS	11	8, 8, 12, 11	20	Take S-5 Advanced with roller bit to 25' Brown wash, smooth drilling
				21–22						
				22–23						
				23–24						
				24–25						
			Brown m-f SAND, trace silt [SP-SM] (wet)	25–26	S-6	SS	12	4, 7, 6, 7	13	Take S-6 Advanced with roller bit to 30' Add quik gel Brown wash, smooth drilling
				26–27						
				27–28						
	-18.0			28–29						
		Class 6	Brown m-f SAND, trace silt [SP-SM] (wet)	29–30						
				30–31	S-7	SS	10	2, 3, 5, 5	8	Take S-7 Advanced with roller bit to 35' Brown wash, smooth drilling
				31–32						
	-23.0			32–33						
		Class 3b	Brown m-f SAND, trace silt [SP-SM] (wet)	33–34						
				34–35						
				35–36	S-8	SS	17	6, 6, 7, 7	13	Take S-8 Advanced with roller bit to 40' Brown wash, smooth drilling
				36–37						
	-28.0		? ? ? ?	37–38						
				38–39						
			Brown and gray varved CLAY with seams of silt [CL]	39–40						
				40–41	S-9	SS	24	3, 2, 2, 4	4	Take S-9 Advanced with roller bit to 45' Brown wash, smooth drilling
		Class 4c		41–42						
				42–43						
				43–44						
				44–45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-40** Sheet 3 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			Brown and gray varved CLAY with seams of silt [CL]		45	S-10	SS	20	2, 2, 3, 3	5	Take S-10
					46						Advanced with roller bit to 47'
					47						Brown wash, smooth drilling
					48						Take U-1/Take S-11
		Class 4c			49	U-1/S-11	SH/SS	0/12			Advanced with roller bit to 50'
					50						Brown wash, smooth drilling
			Brown and gray varved CLAY with seams of silt [CL]		51	S-12	SS	24	1, 2, 2, 2	4	Take S-12
					52						
					53						Advanced with roller bit to 55'
	-43.0				54						Brown wash, smooth drilling
			Brown and gray varved CLAY with seams of silt [CL]		55	S-13	SS	24	1, 1, 2, 1	3	Take S-13
					56						
					57						Advanced with roller bit to 60'
					58						Brown wash, smooth drilling
					59						
					60						
			Brown and gray varved CLAY with seams of silt [CL]		61	S-14	SS	24	1, 2, 1, 1	3	Take S-14
		Class 6			62						Advanced with roller bit to 62'
					63	U-2	SH	24			Brown wash, smooth drilling
					64						Take U-2
					65	S-15	SS	24	WOH, 1, 1, 8	2	Take S-15
			Brown and gray varved CLAY with seams of silt [CL]		66						Advanced with roller bit to 70'
					67						Add quik gel
					68						Brown-gray wash, smooth drilling
					69						
					70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-40** Sheet 4 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Brown CLAY, trace silt [CL] (wet)	70–72	S-16	SS	24	1, 1, 2, 4	3	Take S-16 Advanced with roller bit to 75' Brown wash, smooth drilling
	-63.5		? ? ? ?	73–74						
		Class 3b	Brown silty SAND, trace m-f gravel [SM] (wet)	75–77	S-17	SS	24	3, 7, 15, 12	22	Take S-17 Advanced with roller bit to 80' Brown wash, rig chatter
	-68.0			78–79						
		Class 3a	Brown silty SAND, trace m-f gravel [SM] (wet)	80–82	S-18	SS	20	18, 27, 29, 18	56	Take S-18 Advanced with roller bit to 85' Brown wash, smooth drilling
	-73.0			83–84						
		Class 3b	Brown m-f SAND, trace silt [SP] (wet)	85–87	S-19	SS	14	6, 5, 12, 8	17	Take S-19 Advanced with roller bit to 90' Add quik gel Brown wash, heavy rig chatter at 90'
	-79.5			88–89						
		Class 1b	Gray m-f grained; moderately hard, quartz-biotite-garne-GNEISS; moderately weathered, slightly fractured [Class 1b]	90–95	C-1	NX CORE BARREL	REC=58"/60" =97% RQD=45"/60" =75%			Start coring C-1 End of boring at 10:45
	-84.5									

Casng blws/ ft

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-40** Sheet 5 of 5

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
			E.O.B. @ 95.0 ft bgs		95						
					96						
					97						
					98						
					99						
					100						
					101						
					102						
					103						
					104						
					105						
					106						
					107						
					108						
					109						
					110						
					111						
					112						
					113						
					114						
					115						
					116						
					117						
					118						
					119						
					120						

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Log of Boring **LB-41** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 10.5± NAVD88
Drilling Company: Craig Drilling	Date Started: 4/27/15 — Date Finished: 4/28/15
Drilling Equipment: CME Truck Rig	Completion Depth: 85 ft — Rock Depth: 80 ft
Size and Type of Bit: 3-7/8" I.D. steel	Number of Samples: Disturbed 14 — Undisturbed — Core
Casing Diameter (in): 4" O.D. steel casing — Casing Depth (ft)	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Doller
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Abdulhusain Ben Nakhi
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+10.5		Brown c-f SAND, trace c-f gravel, some brick (wet) [Fill]	PUSH	0						4/27/15
				3	1						Start at 10:00
				2	2						Hand augured to 5' for utility clearing
				5	3						
		Class 7		11	4						Clean out to 6'
				15	5						
				17	6	S-1	SS	14	3 4 5 6	9	Take S-1: 6-8'
	+2.5		Brown c-f SAND, some gravel, trace brick [FILL] (wet)	19	7						
				20	8	S-2	SS	20	4 3 3 5	6	Take S-2: 8-10'
			Brown c-f SAND, trace organics, trace silt [SP] (wet)	27	9						
				26	10	S-3	SS	18	9 7 2 4	9	Take S-3: 10-12'
			Brown m-f SAND, trace silt [SP-SM] (wet)	20	11						Install the casing to 15' Clean out with roller bit to 15'
		Class 6		24	12						
				39	13						Brown wash, chatter at 14'
				8	14						
					15	S-4	SS	20	3 3 5 4	8	Take S-4: 15-17'
			Brown m-f SAND, trace silt [SP-SM] (wet)		16						Advance roller bit to 20' Brown wash, smooth
	-7.5		? ? ? ?		17						
		Class 3b			18						
					19						
					20						

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Log of Boring **LB-41** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					20						
			Brown-red m-f SAND, trace silt [SP-SM] (moist)		21	S-5	SS	14	7 10 9 11	19	Take S-5: 20-22' Advance roller bit to 25' Brown wash, smooth
					22						
					23						
		Class 3b			24						
					25						
			Brown fine SAND, trace silt [SP-SM] (wet)		26	S-6	SS	10	5 6 8 8	14	Take S-6: 25-27' Advance roller bit to 30' Brown wash, smooth
	-17.5				27						
					28						
					29						
					30						
			Brown m-f SAND, trace silt [SP-SM] (wet)		31	S-7	SS	16	2 2 4 4	6	Take S-7: 30-32' Advance roller bit to 35' Brown wash, smooth
		Class 6			32						
					33						
					34						
					35						
			Brown c-m SAND, trace silt [SP-SM] (wet)		36	S-8	SS	14	3 3 6 5	9	Take S-8: 35-37' Advance roller bit to 40' Brown wash, smooth
	-27.5		? ? ? ?		37						
					38						
					39						
					40						
			Brown gray silty CLAY [CL] (wet)		41	S-9	SS	20	3 3 3 3	6	Take S-9: 40-42' Advance roller bit to 45' Brown wash, smooth
		Class 4c			42						
					43						
					44						
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-41** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 4c	Brown and gray varved CLAY with seams of silt [CL] (wet)		45–70	S-10	SS	20	1 1 3 3	4	Take S-10: 45-47' Advance roller bit to 50' Brown wash, smooth
	-38.0										
			Brown and gray varved CLAY with seams of silt [CL] (wet)			S-11	SS	24	WOH 1 1 3	2	Take S-11: 50-52' Advance roller bit to 55' Brown wash, smooth
			Brown and gray varved CLAY with seams of silt [CL] (wet)			S-12	SS	24	1 1 2 2	3	Take S-12: 55-57' Advance roller bit to 60' Brown wash, smooth
		Class 6	Brown and gray varved CLAY with seams of silt [CL] (wet)			S-13	SS	24	1 1 2 2	3	Take S-13: 60-62' Advance roller bit to 65' Brown wash, smooth
			Brown and gray varved CLAY with seams of silt [CL] (wet)			S-14	SS	24	WOH 1 2 1	3	Take S-14: 65-67' Advance roller bit to 70' Brown wash, smooth

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-41** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 10.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					70					10 20 30 40	
			Brown and gray varved CLAY with seams of silt [CL] (wet)		71	S-15	SS	24	WOH 1 1 2 2	2	Take S-15: 70-72'
					72						Advance roller bit to 75' Brown wash, smooth
		Class 6			73						
					74						
					75	S-16	SS	24	WOH 1 1 2 5	2	
			Brown and gray varved CLAY with seams of silt [CL] (wet)		76						Take S-16: 75-77'
					77						Advance roller bit to 80' Brown wash, smooth
	-67.5				78						
			DECOMPOSED ROCK		79						
	-69.5				80						Start coring C-1 at 80' Brown wash, smooth drilling
				1:42	81						4/28/15 Start at 7:30am Clean out with roller bit to 85'
			Gray m-f grained, moderately hard to hard; quartz biotite granite GNEISS, moderately to hard weathered [Class 1c]	1:44	82	C-1	NX CORE BARREL	REC=31"/60" =52%	RQD=20"/60" =33%		Add quick gel to the mud Brown wash, rig chatter
		Class 1c		1:43	83						
				1:46	84						
				1:51	85						Start coring C-2 at 85'
	-74.5		E.O.B. @ 85.0 ft bgs		86						Couldn't drill any deeper because of the hole's angle
					87						End of Drilling
					88						
					89						
					90						
					91						
					92						
					93						
					94						
					95						

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Log of Boring **LB-42** Sheet 1 of 4

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/14/15 — Date Finished: 4/15/15
Drilling Equipment: CME 75 Truck Mounted Rig	Completion Depth: 79 ft — Rock Depth: 74 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 17 — Undisturbed 1 — Core 5'
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 18'	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Keith Parent
Sampler: 2" Split Spoon	Inspecting Engineer: Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)		Sample Description	Casing blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5		0.5" asphalt + 8.5" concrete		0						4/14/15 Roller bit through 1/2" of asphalt
			Brown c-f SAND, some silt, some fine gravel, bricks and concrete [FILL] (moist)	PUSH	1						Roller through 8.5" concrete Hand clear to 5'
		Class 7		34	2						
			Red orange brown c-f SAND, some silt, some m-f gravel, some brick and concrete (moist) [SM] [FILL]	37	3						
				32	4	S-1	SS	10	7 5 5 8	10	Take S-1
			Brown gray C-f SAND, some silt, some m-f gravel, trace brick and concrete (moist) [SM] [FILL]	26	5						Take S-2
	-0.5			33	6	S-2	SS	7	6 7 8 8	15	Push casing 0-4' Hammer casing 4-8' Add mud(quik gel)
		Class 3b	Orange brown c-f SAND, some silt, trace m-f gravel (wet) [SM]	20	7						Clean out hole with 3-7/8" roller bit Rig chatter Gray wash with gravel and bricks
	-2.5			30	8	S-3	SS	6	10 6 4 3	10	
			Brown silty SAND, trace c-f gravel (wet) [SM]	52	9						Drill bit lifting up casing due to heavy rig chatter
				18	10	S-4	SS	6	3 5 3 4	8	Water observed coming out of aspalt near car park entrance Pull casing and reinstall Roller bit back down to 9' Cobble in bottom of hole Take S-3 Take S-4
		Class 6		PUSH	11						
			Light grey brown silty SAND, trace fine gravel (wet) [SM]	78	12						Case to 13' (hammer) Add mud
				44	13	S-5	SS	8	10 3 5 7	8	Drill to 15' rig chatter Gray-brown wash Take S-5
	-10.0			31	14						Case to 18' (Push 13-15') Case spinning (hammer 15-18') Add mud Drill to 20'
		Class 3b			15						
					16						
					17						
					18						
					19						
					20						

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Log of Boring **LB-42** Sheet 2 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Grey silty SAND (wet) [SM]		20						Brown wash, rig chatter
					21	S-6	SS	3	12 12 6 6	18	Take S-6
					22						Drill to 25' Driller observed change at 23' sand to silt
					23						
					24						
					25						
			Grey brown silty SAND (wet) [SM]		26	S-7	SS	10	13 10 9 11	19	Take S-7
					27						Drill to 30' Gray wash
	-20.0				28						
					29						
					30						
			Grey maroon brown SILT, some fine sand, trace clay (wet) [ML]		31	S-8	SS	16	7 8 10 10	18	Take S-8
					32						
			Grey SILT, some fine sand, trace clay (wet) [ML]		33	S-9	SS	19	10 14 13 18	27	Take S-9
		Class 5b			34						Drill to 35'
					35						
			Maroon grey brown SILT, some clay, trace fine sand (wet) [ML]		36	S-10	SS	22	6 7 6 8	13	Take S-10
					37						Drill to 40' Gray-brown wah Easy drilling
	-30.0				38						
					39						
					40						
			Maroon gray varved CLAY with seams of silt (wet) [CL]		41	S-11	SS	21	6 5 7 9	12	Take S-11
		Class 4b			42						Clean out hole to 42'
			Grey varved CLAY (wet) [CL]		43	SH-1	SH	28			Take SH-1 at 42' pp = 2.5tsf Start 1:15 Pull 1:35
			Maroon gray brown CLAY with seams of silt (wet) [ML-CL]		44	S-12	SS	24	6 6	11	
					45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-42** Sheet 3 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 4b			45	S-12	SS	24	5 10	11	Take S-12 Drill to 50' Gray wash Easy drilling
	-40.0		? ? ? ?		46						
					47						
					48						
					49						
					50						
			Grey m-f SAND, some silt, trace clay (wet) [SM]		51	S-13	SS	10	10 11 9 15	20	Take S-13 Drill to 55' Heavy rig chatter, possible boulder Gray wash
					52						
		Class 3b			53						
					54						
					55						
			Grey m-f SAND, some silt, trace gravel (wet) [SM]		56	S-14	SS	10	20 8 11 22	19	Take S-14 Drill to 60' Rig chatter Gray wash
					57						
	-50.0				58						
					59						
					60						
			Grey m-f SAND, some silt, trace gravel (wet) [SM]		61	S-15	SS	12	36 30 31 25	61	Take S-15 Drill to 60'
					62						
					63						
		Class 3a			64						
					65						
			Grey m-f gravelly c-f SAND, some silt (wet) [SM]		66	S-16	SS	7	24 22 15 37	37	Take S-16 End of day at 67'
					67						
					68						
					69						4/15/15 - Start at 12:00 Push 5' casing to 23.5' Push casing to 38.5'
	-61.5				70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-42** Sheet 4 of 4

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)		Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 1d	Grey c-f GRAVEL and gneiss fragments (weathered rock)		70	S-17	SS	1	50/4"	50/4"	Roller bit to 70' with 2-7/8" Rig chatter Brown-gray wash Change to 3-7/8" roller bit Rig chatter, brown wash Take S-17 Drill to 74' Gray wash, heavy rig chatter Slow drilling, rock chips in wash Start C-1 at 1:2 74-75: Smooth, slight rig chatter 75-76: Rig chatter, smooth the rest 76-77: Smooth 77-78: Smooth 78-79: Smooth End of LB-42
	-65.5				71						
					72						
					73						
					74	C-1	NX	REC=59"/60" =98%	RQD=59"/60" =98%		
		Class 1a	Grey f-m grained GNEISS; strong; moderately to steeply dipping joints; fresh to slightly weathered; biotite/chalco pyrite staining NYCBC [Class 1a]	3:00	75						
				3:00	76						
				3:00	77						
				3:00	78						
	-70.5			3:00	79						
			E.O.B. @ 79.0 ft bgs		80						
					81						
					82						
					83						
					84						
					85						
					86						
					87						
					88						
					89						
					90						
					91						
					92						
					93						
					94						
					95						

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Log of Boring **LB-43** Sheet 1 of 3

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/14/15 — Date Finished: 4/14/15
Drilling Equipment: CME 55 ATV	Completion Depth: 51.5 ft — Rock Depth: 41.5 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 9 — Undisturbed 1 — Core 10'
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 25'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Rene Silvestre
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5				0					10 20 30 40	4/14/15 8:30 am Start hand augering for utility clearing to 5' Fill material retrieved 9:10 am Augering complete
		Class 7	Brown c-f SAND, trace gravel, trace brick (moist) [FILL]	PUSH	1						
					2						
					3						
					4						
					5						
					6						
			Brown c-f SAND, trace gravel, trace silt, trace brick and concrete [FILL] (moist)		7	S-1	SS	12	3 4 5 3	9	Take S-1: 6-8'
			Brown c-f SAND, trace fine gravel, trace silt, trace coal tar, trace glass [FILL] (moist)		8						
	-1.5				9	S-2	SS	1	4 5 10 5	15	Take S-2: 8-10'
			Brown c-f gravelly c-f SAND, trace silt [SW] (wet)	DRIVE	10	S-3	SS	4	3 3 2 2	5	Take S-3: 10-12'
					11						
					12						
					13						
		Class 6			14						Install casing to 15' Clean out with roller bit Brown wash, smooth drilling
					15						
			Brown c-f SAND, trace gravel, trace silt [SW] (wet)		16	S-4	SS	3	3 3 3 2	6	Take S-4: 15-17'
					17						
	-10.0				18						Install casing to 20' Clean out with roller bit to 20' Brown wash, light rig chatter
		Class 3b			19						
					20						

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Log of Boring **LB-43** Sheet 2 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Brown m-c SAND, trace f-m gravel, trace silt, trace clay [SW] (wet)		20	S-5	SS	5	4 8 5 7	13	Take S-5: 20-22' Install casing to 25'. Very hard driving at 23' Clean out with roller bit to 25' Brown wash, light rig chatter Very hard drilling at 23' Steel fragments in wash. Move offset 3' east to LB-43A.
	-15.0		? ? ? ?		21						
		Class 4b	Olive CLAY, trace silt [CL] (wet)		22						
					23						
					24						
					25	S-6	SS	13	4 6 7 10	13	Hand auger to 5' Install casing to 25' Clean out to 25' Take S-6: 25-27'
	-20.0				26						Advance with roller bit to 30' Brown wash, smooth drilling
		Class 4b	Olive silty CLAY [CL] (wet)		27						
					28						
					29						
					30	S-7	SS	13	3 5 7 6	12	Take S-7: 30-32' Advance with roller bit to 32' Brown wash, smooth drilling
			Top: Olive silty CLAY [CL] (wet) Bottom: Brown silty SAND [SM] (wet)		31						
	-24.5				32	U-1	SH	24			Take U-1: 32-34'
					33						
		Class 6	Brown SILTY SAND [SM] (wet)		34	S-8	SS	11	1 2 5 7	7	Take S-8: 34-36' Advance with roller bit to 40' Brown wash, light rig chatter at 37'
					35						
					36						
	-30.0				37						
					38						
					39						
		Class 3b	Brown c-f SAND, trace silt, rock fragments in tip of spoon [SP] (wet)		40	S-9	SS	3	11 70/5"	70/5"	Take S-9: 40-42' Spoon refusal at 40'11" (Possible bedrock)
	-32.5				41						
	-33.0		WEATHERED ROCK								
				3:00	42	C-1	NX	REC=40"/60" =67%	RQD=34"/60" =57%		Advance with roller bit to 42' Brown wash, very hard drilling at 41'
		Class 1b	C-1: Gray and white m-f grained; medium hard to hard; quartz-biotite-feldspar-garnet GNEISS; sound; unweathered (highly weathered at 43'-44', 45.5'-46.4'. No recovery) [NYCBC Class 1b]	1:00	43						Start coring C-1 at 41.5' Brown wash, smooth
				3:00	44						
					45						

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Log of Boring **LB-43** Sheet 3 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
				0:00	45	C-1	NX				Complete C-1 at 46.5'
				3:00	46						
				2:00	47	C-2	NX	REC=44"/60" =73%	RQD=42"/60" =70%		Start coring C-2 at 46.5' Brown wash, smooth
		Class 1b	C-2: Gray and white m-f grained; medium hard to hard; quartz-biotite-feldspar-garnet GNEISS; sound; unweathered (highly weathered at 46.5'-47.8'. No recovery) [NYCBC Class 1b]	3:00	48						
				4:00	49						
				5:00	50						Complete C-2 at 51.5' END OF DRILLING
	-43.0			5:00	51						
			E.O.B. @ 51.5 ft bgs		52						
					53						
					54						
					55						
					56						
					57						
					58						
					59						
					60						
					61						
					62						
					63						
					64						
					65						
					66						
					67						
					68						
					69						
					70						

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Log of Boring **LB-44** Sheet 1 of 3

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 8.5± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 4/13/15 — Date Finished: 4/14/15
Drilling Equipment: CME 55 ATV	Completion Depth: 62 ft — Rock Depth: 57 ft
Size and Type of Bit: 3 7/8" Tricone Roller Bit	Number of Samples: Disturbed 11 — Undisturbed 0 — Core 5'
Casing Diameter (in): 4" O.D. Steel — Casing Depth (ft): 25'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Dollar
Sampler: 2" Split Spoon	Inspecting Engineer: Rene Silvestre
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5				0					10 20 30 40	4/13/15 Hand augered for utility clearing to 5' on 4/10/15 10:50 am - Set up complete.
				PUSH	1						
					2						Install casing to 5'
			Brown c-f SAND, some c-f gravel, some brick, trace concrete (moist) [FILL]		3						Clean out to 6' with roller bit Brown wash, smooth
				DRIVE	4						
		Class 7			5						
				PUSH	6						
			Brown c-f SAND, trace c-f gravel, trace silt, trace brick [FILL] (wet)		7	S-1	SS	6	5 8 5 4	13	Take S-1: 6-8'
			Cobble fragments at tip of spoon		8						
					9	S-2	SS	2	3 3 3 2	6	Take S-2: 8-10' Install casing to 10' Clean out to 10' Brown wash, smooth
	-1.5				10	S-3	SS	4	2 2 5 4	7	Take S-3: 10-12'
			Brown m-f SAND, trace silt, trace m-f gravel [SW] (wet)		11						
					12						
				DRIVE	13						
					14						Install casing to 15' Clean out with roller bit Brown wash, light rig chatter
		Class 6			15						
			Brown c-f SAND, some c-f gravel, trace silt [SW] (wet)		16	S-4	SS	7	5 5 4 5	9	Take S-4: 15-17'
					17						
					18						Dirve casing to 20' Clean out with roller bit to 20' Brown wash, light rig chatter
					19						
					20						

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Log of Boring **LB-44** Sheet 2 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Brown c-f SAND, trace silt [SW] (wet) (20'-21')	20						Take S-5: 20-22'
	-12.5		Brown CLAY, trace fine sand, trace silt [CL] (wet) 921'-22')	21	S-5	SS	15	3 2 4 6	6	Advance with roller bit to 25' Brown wash, smooth drilling
				22						
	-15.0			23						
				24						
			Brown and gray varved CLAY with seams of silt [CL] (wet)	25						
		Class 4b		26	S-6	SS	12	3 5 7 7	12	Take S-6: 25-27' Advance with roller bit to 30' Brown wash, smooth drilling
				27						
				28						
				29						
			A; Brown silty CLAY [CL] (wet) (30'-30.5')	30						
	-22.0		B: Brown fine SAND, trace silt [SP] (wet) (30.5'-32')	31	S-7	SS	24	9 10 11 11	21	Take U-1: 30-32' Tube stuck in the hole Take S-7: 30-32' inside of shelby tube to retrieve it. Advance with roller bit to 35' Brown wash, smooth drilling
				32						
				33						
				34						
				35						
			Brown m-f SAND, trace silt [SP] (wet)	36	S-8	SS	10	3 4 6 7	10	Take S-8: 35-37' Advance with roller bit to 40' Brown wash, smooth drilling
		Class 3b		37						
				38						
				39						
				40						
			Brown m-f SAND, trace silt, trace fine gravel [SP] (wet)	41	S-9	SS	3	5 6 6 5	12	Take S-9: 40-42' Advance with roller bit to 45' Brown wash, smooth drilling
				42						
				43						
				44						
				45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-44** Sheet 3 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 8.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Coring (min)
		Class 3b	Brown m-f SAND, trace silt, trace m-f gravel [SP] (wet)	
	-40.0	Class 3a	Brown c-f SAND, trace silt, trace c-f gravel [SW] (wet)	
	-44.5		WEATHERED ROCK	
	-48.5	Class 1b	C-1: White and brown m-f grained; medium hard to hard; quartz-biotite-feldspar-garnet GNEISS; slightly fractured; unweathered (highly weathered at 60'-61'. No recovery) [NYCBC Class 1b]	3:00 3:00 3:00 2:00 3:00
	-53.5		E.O.B. @ 62.0 ft bgs	

Depth Scale: 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-10	SS	12	9 7 7 7	14
S-11	SS	12	21 22 35 24	57
C-1	NX	REC=45"/60" =75%	RQD=41"/60" =68%	

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Take S-10: 45-47'

Advance with roller bit to 50'
Brown wash, light rig chatter

Take S-11: 50-52'

Advance with roller bit to 55'
Brown wash, light rig chatter
Very hard and slow drilling at 53' (possible top of rock)
Drill to 57'. Moderately hard drilling.
END OF DAY

4/14/15
7:30 Start coring C-1 at 57'

Complete C-1 at 62'
END OF DRILLING

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Log of Boring **LB-47** Sheet 1 of 3

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 7.5± NAVD88
Drilling Company: Craig Drilling	Date Started: 4/29/15 — Date Finished: 4/30/15
Drilling Equipment: CME Truck Rig	Completion Depth: 59 ft — Rock Depth: 54 ft
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 11 — Undisturbed — Core
Casing Diameter (in): 4" O.D. steel casing — Casing Depth (ft)	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Rob Doller
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Abdulhusain Ben Nakhi
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+7.5				0						4/29/15 - Start at 11:45am Hand augured to 5' for utility clearing
				DROP	1						
					2						
					3						
				10	4						
		Class 7		16	5						
				15	6						
			Brown-black c-f SAND, some asphalt, trace organics [FILL] (wet)	23	7	S-1	SS	24	4 4 6	8	Take S-1 with 3" split spoon
			Brown-black c-f SAND, some organic, trace asphalt [FILL] (wet)	12	8						
				17	9	S-2	SS	24	5 3 10 7	13	Take S-2
	-2.5			20	10						
		Class 6	Brown m-f SAND, trace silt [SP] (wet)	16	11	S-3	SS	24	4 2 1 2	3	Take S-3 Install casing to 15' Clean out to 15' Add quik gel Black-brown wash, smooth drilling
	-6.0		? ? ? ?	8	12						
				12	13						
					14						
					15						
		Class 3b	4" spoon, no recovery		16	S-4	SS	0	12 11 6 3	17	Take S-4 with 4" split spoon Advance with roller bit to 20' Black wash, smooth drilling
	-11.0		? ? ? ?		17						
		Class 6			18						
					19						
					20						

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Log of Boring **LB-47** Sheet 2 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 7.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	Black silty SAND [SM] (wet)		20–45	S-5	SS	20	1 1 2 4	3	Take S-5 Advance with roller bit to 25' Black wash, smooth drilling
	-16.0		? ? ? ?								
		Class 4b	Brown and gray varved CLAY with seams of silt [CL] (wet)			S-6	SS	16	4 4 6 6	10	Take S-6 Advance with roller bit to 30' Black wash, smooth drilling
	-21.0										
		Class 4c	Brown and gray varved CLAY with seams of silt [CL] (wet)			S-7	SS		WOH 2 4 4	6	Take S-7 Advance with roller bit to 35' Black wash, smooth drilling
			Brown and gray varved CLAY with seams of silt [CL] (wet)			S-8	SS	24	WOH 2 4 4	6	Take S-8 Advance with roller bit to 40' Black wash, smooth drilling
	-31.5		? ? ? ?								
		Class 3b	Brown c-f SAND, trace mica [SP] (wet)			S-9	SS	20	4 5 5 5	10	Take S-9 Advance with roller bit to 45' Black wash, smooth drilling
	-36.0										
		Class 6									

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-47** Sheet 3 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 7.5± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
					45					10 20 30 40	
			Brown c-f SAND, trace mica, trace silt, trace gravel [SP] (wet)		46	S-10	SS	8	2 2 2 4	4	Take S-10 Advance with roller bit to 50' Black wash, rig chatter
		Class 6			47						
					48						
					49						
					50						
			Brown-gray c-f SAND, some m-f gravel, trace mica [SP] (wet)		51	S-11	SS	10	15 1 1 100/1"	2	Take S-11 Advance with roller bit to 55' Brown-gray wash, rig chatter
	-46.5				52						
					53						
				2	54						
				4	55						
		Class 1b	Gray m-f grained, moderately hard to hard, feldspar quartz-biotite, garnet GNEISS, slightly fractured, weathered [Class 1b]	4	56	C-1	NX	REC=46"/60" =77%	RQD=42"/60" =70%		Start coring at 54' C-1: 54-59' End of drilling
				3	57						
				3	58						
	-51.5				59						
			E.O.B. @ 59.0 ft bgs		60						
					61						
					62						
					63						
					64						
					65						
					66						
					67						
					68						
					69						
					70						

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Log of Boring **LB-48(OW)** Sheet 1 of 3

Project: Baruch Houses, NYCHA	Project No.: 170334001
Location: Baruch Drive, Manhattan New York	Elevation and Datum: Approx. 7± NAVD88
Drilling Company: Craig Geotechnical Drilling	Date Started: 5/6/15 — Date Finished: 5/6/15
Drilling Equipment: CME 75 Truck Rig	Completion Depth: 55 ft — Rock Depth: 50 ft
Size and Type of Bit: 3-7/8" Tricone Roller	Number of Samples: Disturbed 13 — Undisturbed 1 — Core 1
Casing Diameter (in): 3" & 4" O.D. steel casing — Casing Depth (ft): 23.5'	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Mike Gorski
Sampler: 2" O.D. Split Spoon	Inspecting Engineer: Abdulhusain Ben Nakhi/Nick Kerr
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+7.0				0						5/6/2015 Start at 11:30 AM Drill through
				PUSH	1						
					2						
					3						
		Class 7			4						
					5						Hand clear to 5'
				20	6						Take S-1
			Black and brown m-f SAND, some silt, trace wood, organics [FILL]	42	7	S-1	SS	3	5 5 8 7	13	
	-1.0			19	8						Take S-2
			Gray black silty SAND, trace m-f gravel, trace organics [SM]	PUSH	9	S-2	SS	7	10 8 10 8	18	Install casing to 8.5'
					10						Clean out hole to 10' Rig chatter Brown wash
			Gray brown m-f SAND, trace fine gravel, trace silt, trace pyrite	40	11	S-3	SS	2	10 6 4 3	10	Take S-3
				47	12						
		Class 3b		23	13						
					14						Install casing to 13.5' Drill to 14' Gray wash Gravel in wash Add gel
			No recovery	PUSH	15	S-4	SS	0	6 2 WOH 1		Take S-4
					16						Take S-5
			Coarse gravel in tip		17	S-5	SS	1	7 7 7 8	14	
	-11.0		? ? ? ?	36	18						Clean out hole to 18' Take S-6 Install casing to 18.5'
		Class 6	Orange brown m-f SAND, trace silt (wet) [SP-SM]		19	S-6	SS	7	2 2 4 9	6	
					20						

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Log of Boring **LB-48(OW)** Sheet 2 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 7± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 6	No recovery	PUSH	20–21	S-7	SS	0	8 6 6 8	12	Clean out hole to 20' Rig chatter Gray wash Take S-7
	-15.5				21–22						
			Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		22–23						
					23–24	S-8	SS	24	4 3 4 5	7	Drill to 23' Gravel in wash Add gel Take S-8 Push casing to 23.5'
				PUSH	24–25						
		Class 4c	Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		25–26						
					26–27	SH-1	SH	24			Drill to 26' Drop SH-1 at 2:00 PM Pull SH-1 at 2:20 PM
			Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		27–28						
					28–29	S-9	SS	21	3 5 2 5	7	Clean out hole to 28' Take S-9 Push casing to 28.5'
			Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		29–30						
					30–31	S-10	SS	9	3 3 3 3	6	End of day at 30' 5/7/2015 Start at 7:30 AM Take S-10
	-25.0		Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		31–32						
					32–33						
			Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		33–34						
					34–35						
					35–36	S-11	SS	24	WOH 1 1 2	2	Advance with roller bit to 35' Brown wash Smooth drilling Take S-11
			Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		36–37						
		Class 6			37–38						
					38–39						
					39–40						
					40–41	S-12	SS	24	1 1 1 2	2	Advanced with roller bit to 40' Brown gray wash Smooth drilling Take S-12
			Gray maroon varved CLAY with seams of silt, trace fine sand [CL]		41–42						
	-36.5				42–43						
		Class 3b			43–44						
					44–45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-48(OW)** Sheet 3 of 3

Project	Project No.
Baruch Houses, NYCHA	170334001
Location	**Elevation and Datum**
Baruch Drive, Manhattan New York	Approx. 7± NAVD88

Material Symbol	Elev. (ft)	Building Code	Sample Description	Casng blws/ ft Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Class 3b	Brown silty SAND, trace m-f gravel (wet) [SM]		45–70	S-13	SS	12	10, 7, 7, 6	14	Advance with roller bit to 45' Brown gray wash Smooth drilling Take S-13
	-43.0										
		Class 1a	Gray m-f grained, hard quartz-biotite-garnet GNEISS, slightly fractured	7:00 6:00 8:00 4:00 6:00		C-1	NX CORE	REC=60"/60" =100%	RQD=58"/60" =97%		Advanced with roller bit to 50' Brown wash Rig chatter at 48'-5" Start coring at 50'
	-48.0		E.O.B. @ 55.0 ft bgs								End of drilling at 55' Install 25' (OW)

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