HISTORICAL PERSPECTIVES

Final
Phase IA Archaeological Documentary Study

Astoria Park Proposed Sanitary Sewer
Astoria, Queens County, New York

City of New York, Parks and Recreation Project Q004-216M
LPC # NYC Dept. of Parks and Recreat / LA-CEQR-Q

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EXECUTIVE SUMMARY

The City of New York, Department of Parks and Recreation (DPR) is proposing the construction of a sanitary sewer line to serve the north playground comfort station and the Astoria Pool concession building in Astoria Park, located off of Shore Boulevard between 23rd Terrace and 23rd Drive, in the Borough of Queens, New York (Figures 1-4). All of Astoria Park is known as Block 898, Lot 1 and has an official address of 24-02 19th Street. Currently, there is no sanitary sewer for the pool concession building and comfort station. Both were connected to existing storm sewers that drain into the adjacent East River. The proposed project will involve hooking up both the pool concession building and the comfort station to new sanitary sewer connections, which would then run northwest within the park towards Shore Boulevard. A force main then would run northeast beneath the pedestrian pathway southeast of Shore Boulevard and connect to the existing sanitary sewer at the intersection of Shore Boulevard and Ditmars Boulevard. The Area of Potential Effect (APE) is the area that could be affected by project development. The APE for the proposed project includes the connections to the pool concession building and comfort station, as well as the length of the proposed force main sewer along Shore Boulevard to Ditmars Boulevard.

The Astoria Park Pool and Play Center is a designated New York City Landmark (LP-2196). The majority of the project site falls within this area (the southwestern and northeastern ends of the proposed sewer lines are outside the official boundary (Figure 5). The Astoria Play Center also is eligible for the State/National Register of Historic Places (S/NRHP). The project site runs underneath the Hell Gate Bridge, completed in 1917, which is also eligible for the S/NRHP. The nearby Triborough/RFK Bridge, completed in 1936, is also eligible for the S/NRHP.

The New York City's Landmarks Preservation Commission's (LPC) review of archaeological sensitivity models and historic maps of the area indicates that there is a potential for the recovery of remains from Native American occupation on the project site (Santucci 2016). DPR is following LPC's recommendation that an archaeological documentary study be performed for this site, and retained Historical Perspectives, Inc. (HPI) to clarify these initial findings and provide the threshold for the next level of review, if such review becomes necessary. This Phase IA Archaeological Documentary Study has been prepared to satisfy the requirements of the City Environmental Quality Review (CEQR), and to comply with the standards of the LPC (LPC 2002; CEQR 2014).

The entire length of the project site, from the comfort station and pool concession building along the park pathways northeast to Ditmars Boulevard, appears to be significantly disturbed. Historic photographs from the 1920s and 1930s, reproduced in this report, show massive earthmoving associated with construction of the present Astoria Pool complex. Construction of Hell Gate Bridge, although not represented in historic photographs here, would also have required very substantial excavation for the concrete tower, which is immediately adjacent to the project site. Subsequent to the 1930s, there have been multiple episodes of park renovations, including earthmoving associated with landscaping and utility work. Not surprisingly, the soil borings reflect disturbance as well, indicating strata of fill overlying subsoil or decomposing bedrock. There is no evidence to suggest any buried soil strata containing precontact period archaeological resources remain extant within the project site.

Overwhelming evidence exists that Native Americans exploited the natural resources along the East River in Queens – for thousands of years before the arrival of Europeans. Archaeologists recorded precontact period sites in the vicinity of the project site along the East River as late as the 1920s. However, based on the very significant level of disturbance within the project site, it is highly unlikely that any precontact period archaeological sensitivity could still exist.

LPC has indicated that there should be no historic period archaeological sensitivity for the project site.

Based on the previous conclusions, HPI recommends that no additional archaeological investigations are warranted for the project site.

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I. INTRODUCTION

The City of New York, Department of Parks and Recreation (DPR) is proposing the construction of a sanitary sewer line to serve the north playground comfort station and the Astoria Pool concession building in Astoria Park, located off of Shore Boulevard between 23rd Terrace and 23rd Drive, in the Borough of Queens, New York (Figures 1-4). All of Astoria Park is known as Block 898, Lot 1 and has an official address of 24-02 19th Street. Currently, there is no sanitary sewer for the pool concession building and comfort station. Both were connected to existing storm sewers that drain into the adjacent East River. The proposed project will involve hooking up both the pool concession building and the comfort station to new sanitary sewer connections, which would then run northwest within the park towards Shore Boulevard. A force main then would run northeast beneath the pedestrian pathway southeast of Shore Boulevard and connect to the existing sanitary sewer at the intersection of Shore Boulevard and Ditmars Boulevard. The Area of Potential Effect (APE) is the area that could be affected by project development. The APE for the proposed project includes the connections to the pool concession building and comfort station, as well as the length of the proposed force main sewer along Shore Boulevard to Ditmars Boulevard.

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II. METHODOLOGY

The present study entailed review of various resources.

- Primary and secondary sources concerning the general precontact period and history of Queens County and Astoria and specific events associated with the project site and vicinity were reviewed.
- Historic maps and photographs were reviewed using materials available at the New York Public Library, the DPR Olmsted Center Archives, the New York City Municipal Archives, the library of HPI, and various online websites. These maps and photographs provided an overview of the topography and a chronology of land usage for the project site. A selection of these maps and photographs has been reproduced for this report.
- Because potential archaeological sensitivity focused on the prehistoric era, standard resources normally consulted as part of a documentary study, such as deeds, tax assessment records, city directories, and federal census records, were not relevant for this site.
- Information about previously recorded archaeological sites and surveys in the area was compiled from data available at the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP), the LPC, and the library of HPI.
- A geotechnical report for the project site was prepared in December 2016 and included data from two soil borings (Oweis Engineering Inc. 2016). These soil borings are included as Appendix A.
- Last, a site visit was conducted by David C. Martin of HPI on January 23, 2017 to assess any obvious or unrecorded subsurface disturbance (Photographs 1-8; Figure 2).

III. CURRENT CONDITIONS AND ENVIRONMENTAL SETTING

A. Current Conditions

The project site, or APE, extends from the Astoria Pool concession building and the north playground comfort station northwest along an existing pathway within the park toward the East River (Photographs 1-3). It then continues northeast along the existing paved pedestrian pathway, roughly paralleling Shore Boulevard, until it reaches Ditmars Boulevard (Photographs 4-8). There is a slight slope along the connection from the two park buildings down to the pedestrian path, but otherwise the area is mostly level. There are mature trees bordering both sides of the pathways. From the area that passes underneath the Hell Gate Bridge to Ditmars Boulevard, the pathway abuts Shore Boulevard, with a railing marking the edge of the roadway.

B. Topography and Hydrology

The project site is located at the edge of the East River shoreline. Historic maps made during the nineteenth century indicate that no portion of the project site was under the East River (Colton 1836; U.S. Coast Survey 1848, Figure 7; 1851, 1858). The maps also indicate that at least by the early nineteenth century, there was a roadway along the riverfront, in the approximate location where Shore Boulevard is today. The topography of the project site was shown to be generally level, with the landform sloping upward inland to the southeast. Elevations of the project site in its original condition were likely less than 10 feet above sea level along the waterfront and perhaps a few feet higher near the present pool concession building and comfort station. Sanborn maps from 1898 indicate elevations of 8-9 feet above sea level along the waterfront roadway, noted then simply as a "boulevard." Today, the project site is approximately 12 feet above sea level along the pathway paralleling Shore Boulevard, and rising to 16-18 feet above sea level near the two park buildings (Figure 2). Historically, there was a pond just southeast of the project site and northeast of the present Astoria Pool.

C. Geology

The prehistory and history of New York City was in part shaped by the topography, ecology, and economic conditions that prevailed at various times. Understanding the city's geologic history aids in understanding the land-use history. During the Pleistocene period, ice advanced in North America four times. In the last 50,000 years, the Wisconsonian period, ice was 1,000 feet thick over the region. Gravel and boulders deposited at the ice sheet's melting margin formed Long Island about 15,000 years ago (Kieran 1982:26).

The project area is within the embayed section of the Coastal Plain which extends along the Atlantic Coast and ranges from 100 to 200 miles wide. The Manhattan prong, which includes southwestern Connecticut, Westchester County and New York City, is a small eastern projection of the New England uplands, characterized by 360 million year old highly metamorphosed bedrock (Schuberth 1968:11).

D. Soils

According to the soil survey for New York City, the majority of the project site falls within soil mapping unit 165, or Montauk-Foresthills complex, 8 to 15 percent slopes, described as:

> Strongly sloping areas of till plains and moraines that have been only partially filled for parks; a mixture of gneissic till soils and anthropogenic soils; located from the terminal moraine northward in Brooklyn and Queens (USDA 2008:13).

The Montauk and Foresthills soil series are further described in the table, below.

Project Site Soils

Name	Soil Horizon Depth	Color	Texture, Inclusions	Slope %	Drainage	Landform
Montauk series	A: 0-2 in Bw: 2-27 in 2Cd1: 27-40 in 3Cd2: 40-65 in	Br YelBr Br RdBr	SaLo FiSaLo SaLo LoSa	0-8	Well	Outwash plains
Foresthills series	A: 0-2 in Bw: 2-15 in Ab: 15-17 in BAb: 17-28 in Bwb: 28-42 in Cd: 42-60 in	VDkGryBr Br/YelRd/Bl Bl Br RdBr YelRd	Lo Lo Lo Lo Lo Lo	0-8	Well	Anthropogenic urban fill plains

Key: Colors Br-Brown, Gry-Gray, Yel-Yellow, Rd-Red, Bl-Black
Soils: Lo-Loam, Sa-Sand, Si-Silt
Other: Fi-Fine, V-Very, Dk-Dark

Two soil borings recently were completed within the project site boundaries (Oweis Engineering Inc. 2016; Appendix A). Soil boring B-1 was located between the concession stand and comfort station and soil boring B-2 was located within Astoria Park near the intersection of Shore Boulevard and Ditmars Boulevard.

The soil borings recorded three soil strata and bedrock. Stratum 1 was a fill layer, extending to two feet below grade in boring B-1 and eight feet below grade in boring B-2. It was described as brown, yellow brown and reddish brown sand, with silt and gravel. Below the fill in boring B-1 was a stratum described as gray medium to fine sand with silt and gravel, recorded to a depth of 21 feet below grade. In boring B-2, the sand layer was absent. The third stratum was a layer of dark gray glacial till with decomposed bedrock. It was recorded beneath the gray sand in boring B-1 and beneath the fill in boring B-2. Bedrock was recorded at 23 feet below grade in boring B-1 and at 16 feet below grade in boring B-2. No groundwater was recorded in either boring. The borings were halted at 25 feet below grade for boring B-1 and 20 feet below grade for boring B-2.

IV. BACKGROUND RESEARCH/HISTORICAL OVERVIEW

A. Precontact Summary

The precontact era in the coastal New York region can be divided into three time periods, based on human precontact adaptation to changing environmental conditions. These are generally known as the Paleo-Indian (c.12,000 to 10,000 years ago), the Archaic (c.10,000 to 2,700 years ago) and the Woodland (c.2,700 to 300 years ago). In order to be able to assess the project site's potential for precontact exploitation, it is first necessary to review these time periods and their associated settlement patterns.

Paleo-Indian Period (c.12,000 y.a. - 10,000 y.a.)

Toward the end of the Wisconsin Glaciation, during the Late Pleistocene Epoch, humans wandered across the exposed land bridge which connected Siberia and Alaska. These small groups of hunters were probably following the roaming herds of megafauna which were their chief prey. The distinctive weapon in their chipped stone tool kit was the fluted point, which has been found in association with mammoth, mastodon, bison and horse remains at various sites in the southwestern United States. Although none of these “kill sites” is located east of the Mississippi, the discovery of campsites such as that at Port Mobil, Staten Island, suggest a scattered, highly mobile population in bands of approximately 20 individuals, who ranged across a vast area necessary to support lifeways organized around the hunting of migratory game (Ritchie 1980:1-3, 13).

The fluted, lanceolate points, two to five inches in length with concave bases and channelled or fluted faces, presumably to facilitate hafting, exhibit a considerable range in shape and size. They were usually made from a high-grade silicious stone, often exotic to the region in which they are recovered, a function of their makers'

seasonal migrations. Other artifacts in the Paleo-Indian tool kit include scrapers, knives, borers and gravers, tools which indicate extensive handiwork in wood, bone and leather (Ritchie 1980:3, 6).

From the locations of recorded sites in the Northeast, Paleo-Indians exhibited a marked preference for well-elevated situations. However, 30% of sites were found on or near the margins of swampy ground. Environmental characteristics which appear to have been attractive to Paleo-Indians include the proximity of major waterways, large fertile valleys and the coastal plain, where the densest population of desired food animals was supported (Ritchie 1980:7). However since 10,000 years ago, the rise in sea level estimated to be from 75 to 80 feet, has submerged large numbers of these sites.

The retreat of ice from the project area vicinity approximately 18,000 years ago and a global warming trend ca. 14,000 years before present, encouraged Paleo-Indian settlement in the Northeast. The post-glacial environment of spruce and pine underwent a gradual modification in favor of deciduous hardwoods such as oak and hickory, which have greater importance in terms of nutritional value to both animals and humans than do conifers. By 8,000 B.C., these deciduous species dominated forests along the eastern seaboard. In addition, the megafauna on which Paleo-Indian diet was based "were rapidly becoming extinct, and were being replaced by the temperate-climate fauna that are indigenous today" (Gwynne 1982:190-191).

Archaic Period (c.10,000 y.a. - 2,700 y.a.)

The warming trend at the end of the last glaciation completely transformed the northeastern coastal environment from tundra and conifer-dominated forests, to the present deciduous woodlands with generally modern distributions of fauna. Due to the dwindling contribution of meltwater from disappearing glaciers, the reduced flow of streams and rivers promoted the formation of swamps and mudflats. These wetlands created a congenial environment for migratory waterfowl, and a host of edible plant species and shellfish. The new mixed hardwood forests of oak, hickory, chestnut, beech and elm attracted such mast-eating fauna as white-tailed deer, wild turkey, moose and beaver.

Although the Archaic diet was still based on hunting and gathering, due to the greater variety of plants available and exploited, excavated Archaic sites yield a wide array of plant processing tools, including grinding stones, mortars and pestles. The diagnostic tool was the grooved axe. In the coastal areas of New York, have been found numerous, small "nearly always multi-component sites variously situated on tidal inlets, coves and bays, particularly at the heads of the latter, and on fresh-water ponds" (Ritchie 1980:143). By the Late Archaic, these areas provided shellfish, small game, fish, salt hay and tuberous grasses, making larger more permanent settlements possible. Semi-nomadic life is still indicated, but wandering occurred within well-defined territorial limits, with seasonal movements between camps near exploitable resources. A dietary shift to shellfish in coastal New York near the end of the Archaic suggests a scarcity of large game, and a change from the early Archaic inland adaptation of forest hunting. Coastal sites show a principal reliance upon shellfish, especially oysters, hard and soft shell clams and bay scallops, which were readily available in the waters of the East River and Long Island Sound. Characteristic of the Late Archaic were "fish-tailed" projectile points and soapstone bowls (Ritchie 1980:142,166, 167, 171). In contrast to conditions during the Paleo-Indian, Early and Middle Archaic, "by Late Archaic times sea level was so close to present levels that its subsequent small rise has failed to obliterate much of what remains on Long Island from that period" (Gwynne 1982:192). Hence the Late Archaic Wading River complex, four sites on the north shore of Suffolk County, was found at the edge of a salt marsh, on dry ground ranging only two to seven feet above mean high water (Wyatt 1982:71).

Woodland Period (c.2,700 y.a. - 300 y.a.)

From approximately 3,000 years ago until the arrival of the first Europeans, Native Americans of southern New York shared common attributes of the Woodland Stage: the advent of horticulture, extensive trade networks, large permanent or semi-permanent villages, pipe smoking, the bow and arrow and the production of clay vessels. The habitation sites of the Woodland Indians increased in size and permanence as they became ever more efficient in extracting food from their environment. The archaeological evidence from Woodland Period sites indicates a strong preference for large-scale habitation sites to be in close proximity to a major fresh water source, e.g., a river, a lake or an extensive wetland; and smaller scale sites for extractive operations, e.g., butchering stations, shell gathering loci and quarrying sites, to be situated at other resource locales. Late Woodland Stage sites of the East River

Tradition in southern New York have been noted on the "second rise of ground above high water level on tidal inlets," and situated on "tidal streams or coves" and "well-drained sites" (Ritchie 1980:16). Carlyle S. Smith, who studied and analyzed the distribution of precontact ceramics in coastal New York, stated that "village sites" are found on the margins of bays and tidal streams" (Smith 1950:130).

Woodland Period tool kits show some minor variations as well as some major additions from previous Archaic tool kits. Plant processing tools became increasingly common and their presence seems to indicate an intensive harvesting of wild plant foods that may have approached the efficiency of horticulture, which itself appeared during the second half of the Woodland Period. The advent of horticulture is tied in with the introduction of ceramic containers which allowed for more efficient cooking of certain types of food and may also have functioned as storage for surplus food resources. Despite the advent of agriculture, shellfish and small game remained an important component of the Woodland diet. Shellfish refuse heaps, termed "middens," reached immense proportions, covering from one to over three acres. Deer, turkey, raccoon, muskrat, ducks and other game were stalked with bow and arrows, replacing the spear and javelin, while dug-out boats, bone hooks, harpoons and nets with pebble sinkers were employed in fishing (Ritchie 1980:179-180,267).

Historical narratives written by European travelers and settlers provide us with our only first-hand descriptions of Native American daily life and customs during the seventeenth century. Johannes de Laet, in his *New World, or Description of West India*, published in Holland in 1625, wrote that the Native Americans:

> are divided into many nations and languages, but differ little in manners. They dress in the skins of animals. Their food is maize, crushed fine and baked in cakes, with fish, birds and wild game. Their weapons are bows and arrows, their boats are made from the trunks of trees hollowed out by fire.
>
> Some lead a wandering life, others live in bark houses, their furniture mainly mats and wooden dishes, stone hatchets, and stone pipes for smoking tobacco (Bolton 1972:16).

By the seventeenth century when the first Europeans arrived western Long Island was inhabited by Native Americans of the Delaware group, speaking a Munsee dialect,. The impact of the European colonization of Long Island drastically altered the lifestyles of Native Americans.

B. Previously Recorded Archaeological Sites and Surveys

Records on file at the NYSOPRHP, the NYSM, and the LPC (Boesch 1997) indicate that there are several precontact archaeological sites within one mile of the project site (within Queens). These sites are summarized in the table, below.

Archaeological Sites within One Mile of the Project Site

Site #	Location	Time Period	Site Type
NYSOPRHP 08101.000099 Hallets Point Parker 12	ca. 0.6 mile southwest	Unknown precontact	Shell midden
NYSOPRHP 08101.000101 Parker 14	ca. 0.9 mile south	Unknown precontact	Burial site
NYSM 4532	ca. 0.9 mile east, large vaguely mapped area	Unknown precontact	Burial site
NYSM 4535	ca. 0.4 mile southeast, large vaguely mapped area	Unknown precontact	Shell midden
NYSM 4539	Abutting on northeast, large vaguely mapped area	Unknown precontact	Traces of occupation
NYSM 8217	ca. 0.2 mile southwest, large vaguely mapped area	Unknown precontact	Camp

The East River shoreline in Queens was known to have had precontact era occupation in the form of camps and shell middens, but only limited information about these sites is available, and it is assumed that most have been destroyed by subsequent development. There are no mapped precontact sites within the project site itself. However, based on proximity to previously recorded archaeological sites, both the NYSOPRHP GIS and the Boesch sensitivity study of Queens indicate that the project site is within an area of archaeological sensitivity.

There have been several archaeological studies conducted within a one mile radius of the project site (e.g. HPI 1988, Bergoffen 2013, Archaeological Resources Services 2013), but none of these investigations resulted in the identification of any archaeological resources.

C. Historic Period Summary

As noted in the Introduction, LPC review of this project indicated a potential sensitivity for precontact archaeological resources only. The following discussion therefore is intended to give a general history of the project site, primarily as it relates to land modification over time that may have affected potential precontact archaeological resource survival.

The project site was part of the vast 2200-acre tract purchased from Native Americans by William Hallett in 1664, which included all of modern Astoria and Steinway. Hallett's Point, to the southwest of the project site, was named for the family. The Hallett family owned much of the area over multiple generations. In 1752, the project site was part of the large holdings of Samuel Hallett II, the grandson of William Hallett. Over the ensuing decades, however, the land was divided up and sold to other buyers (Seyfried 1984). The project site is within land later purchased by members of the Lawrence family in the 1780s (Topo Bureau 1935).

Many of the tracts of land along the East River in Astoria were oblong-shaped, with a frontage along the river and acreage extending inland and onto higher ground. By the nineteenth century, the stretch of the East River shoreline including the project site had become the location of a number of estates of wealthy residents, fronting the water, which were connected by a roadway along the waterfront that was the precursor to modern Shore Boulevard.

The northeastern most parcel, located south of what is now Ditmars Boulevard, belonged to Henry Barclay. His mansion was constructed in 1840, several hundred feet back from the shoreline. It is shown, albeit unlabeled, on the 1848 U.S.C.S. map (Figure 7), and on the 1852 Conner map. The portion of the Barclay estate containing the project site did not have any structures; rather it appears to have been adjacent to an orchard. Henry Barclay died in 1865; his land is shown on the 1874 Dripps map as the Barclay estate (Figure 8), and on the 1891 Wolverton map (Figure 9) as simply "Barclay." His sons eventually sold the property and house to the family of Horatio Southgate, who owned the tract until the land was taken for construction of the railroad and Hell Gate Bridge. The mansion was demolished in 1914 (Seyfried 1984:38-39).

Southwest of the Barclay estate was another oblong tract owned by Howard Potter. Again, the Potter mansion house was located several hundred feet inland from the river, on a raised landform. The project site portion of the tract was undeveloped. The house burned down in 1866 and was never rebuilt; rather the grounds containing lawns and exotic trees were maintained by a caretaker for a number of years. The house is shown on the 1848 U.S.C.S. map (Figure 7) but not on the subsequent 1874 Dripps map (Figure 8) or the 1891 Wolverton map (Figure 9), although the family name is indicated on the parcel through the end of the century. The estate was purchased by the City of New York when Astoria Park (then East River Park) was created (Seyfried 1984: 39).

The remainder of the project site falls within a large parcel that extended nearly to the current alignment of the Triborough/RFK Bridge. The tract was owned by the Lawrence family during the early eighteenth century, who built the first house on the land. From 1726-1768 the house and tract were occupied by Joris Rapalye, after which the house burned down. The Lawrence family returned and constructed a new house after that period, which endured into the nineteenth century. In 1777 the Woolsey family purchased the Lawrence estate and constructed a new house just south of the older home. Historic maps suggest that the different houses were all located well southwest of the project area, closer to the curve of Shore Boulevard near the current Triborough/RFK bridge alignment (U.S.C.S. 1848 [Figure 7], 1851, 1858; Conner 1852; Wolverton 1891 [Figure 9]). The project site portion of the tract was undeveloped. Both the manor house and the earlier homestead burned down during the 1890s (Seyfried 1984: 39).

The next chapter in the history of the project site and vicinity began in the 1910s. In 1912, construction began on the massive Hell Gate Bridge, which was designed by Gustav Lindenthal and built to carry the New York Connecting Railroad across the East River. It was completed in 1917. A portion of the project site runs adjacent to the concrete tower on the Queens side of the span. Meanwhile, in 1913, the City of New York acquired ca. 56 acres of land along the East River to create a new park. It was first called William J. Gaynor Park, after the most recent New York City mayor, but for a time was known simply as East River Park, and finally Astoria Park. The new park contained two playgrounds, six tennis courts, an athletic field, three baseball diamonds, a wading pool, bandstand, comfort station and associated walkways (Presa 2006). Figure 10, an aerial photograph from 1924, shows the recently completed Hell Gate Bridge and Astoria Park. Although the land for the park had been obtained more than a decade earlier, the aerial photograph suggests that development of the park facility was still a work in progress. The project site was within the undeveloped portion of the site.

Work completing the facilities of Astoria Park continued through the 1920s. A number of historic photographs illustrate the progress of the activities. Three images from 1927 (Photographs 9, 10, and 11) show conditions at that time, including the construction of a new seawall along the East River and a new "driveway" along the waterfront, which would eventually be known as Shore Boulevard. As noted above, the area along the waterfront has been raised several feet in elevation from its natural state; it is likely that occurred at about this time.

Construction began on the Triborough Bridge in 1929; it was completed in 1936. Images taken during its construction often afforded a vantage point of Astoria Park and the project site in the background. Photographs 12 and 13 show that the area now containing the project site was, in 1932, covered by a series of tennis courts and a walking path. Photograph 14, from 1934, gives a similar view from an aerial perspective, and indicates an earlier wading pool north of the present Astoria Pool complex. A portion of the project site overlapped this earlier pool.

Figures 11a-b, from February 1935, illustrate the topography and features of Astoria Park and the project site just prior to the next significant construction episode in the park. That year, work began on the construction of the present Astoria Pool complex, which in addition to the pool itself included the bath house, wading pool, diving pool, filter house, bleachers, brick perimeter walls, piers and cast iron fencing, stairways to bath house roof-top observation decks, comfort station, and connecting pathways (Presa 2006:1).

Historic photographs taken during the transformation of Astoria Park in 1935-1936 (Photographs 15-21) show the very substantial amount of earthmoving that occurred during that period in order to create the pool complex and other park amenities. The photographs clearly illustrate that the project site was subjected to extreme amounts of excavation, grading and filling during that period. Photographs 23-26, from the summer of 1936, show the pool complex soon after its completion.

Since the mid-1930s, there have been a number of renovations and improvements within Astoria Park. According to Presa (2006:10) and the DPR's Astoria Park webpage these include:

- 1946: the surrounding playgrounds were reconstructed.
- 1948: new gutters were installed in the pool.
- ca. 1950s: a one-story, brick rooftop addition containing concession stands was constructed on the filter house.
- 1963: the pool was rehabilitated. The work included the installation of new light weight concrete decks on the upper and lower promenades, as well as replacement of some window sash, and new paint throughout. The original glass pylons over the main entryway were resurfaced with brick.
- 1979-82: the playground to the southwest of the pool was removed and replaced with ball courts and the south comfort station in that area was demolished.
- 1983-1987: much of Astoria Park was reconstructed, in three phases. Phase one rehabilitated the playground in the park's southern section, the park fields, and the drainage system. Phase two restored the comfort station and installed new play equipment, swings, drinking fountains, and game tables. Phase three focused on restoration of the park's northeast section and included repaving all the roads and walkways, rerouting pedestrian entrances, installing new benches, and planting trees, shrubs, and groundcover. The seawall was reconstructed during this era as well.

- 1991: the main swimming pool was reconstructed, including the replacement of the pool floor, drains, supply islands and gutters.
- 1998-1999: the main swimming pool was again reconstructed, receiving a major systems upgrade, including new lights, pumps, piping, electric lines, filter system, showers, and improved chlorination and security systems. Also, an accessibility ramp was installed in the main pool and the supply islands in that pool were removed for safety reasons and replaced with bottom supply inlets.
- 1996- 2001: the north playground was rebuilt, the comfort station restored, and the park itself was the subject of a large erosion control and re-landscaping project. At this time, some replacement of the curbing and paving on the east entry ramps to the bath house took place, but there were no changes to the configuration of the ramps and walks.
- 2000-2004: additional minor site work and erosion control projects took place around the pool complex.

V. CONCLUSIONS

A. Disturbance Record

The entire length of the project site, from the comfort station and pool concession building along the park pathways northeast to Ditmars Boulevard, appears to be significantly disturbed. Historic photographs from the 1920s and 1930s, reproduced in this report, show massive earthmoving associated with construction of the present Astoria Pool complex. Construction of Hell Gate Bridge, although not represented in historic photographs here, would also have required very substantial excavation for the concrete tower, which is immediately adjacent to the project site. Subsequent to the 1930s, there have been multiple episodes of park renovations, including earthmoving associated with landscaping and utility work. Not surprisingly, the soil borings reflect disturbance as well, indicating strata of fill overlying subsoil or decomposing bedrock. There is no evidence to suggest any buried soil strata containing precontact period archaeological resources remain extant within the project site.

B. Precontact Archaeological Sensitivity

Overwhelming evidence exists that Native Americans exploited the natural resources along the East River in Queens – for thousands of years before the arrival of Europeans. Archaeologists recorded precontact period sites in the vicinity of the project site along the East River as late as the 1920s. However, based on the very significant level of disturbance within the project site, it is highly unlikely that any precontact period archaeological sensitivity could still exist.

B. Historic Period Archaeological Sensitivity

LPC has indicated that there should be no historic period archaeological sensitivity for the project site.

VI. RECOMMENDATIONS

Based on the previous conclusions, HPI recommends that no additional archaeological investigations are warranted for the project site.

VII. REFERENCES

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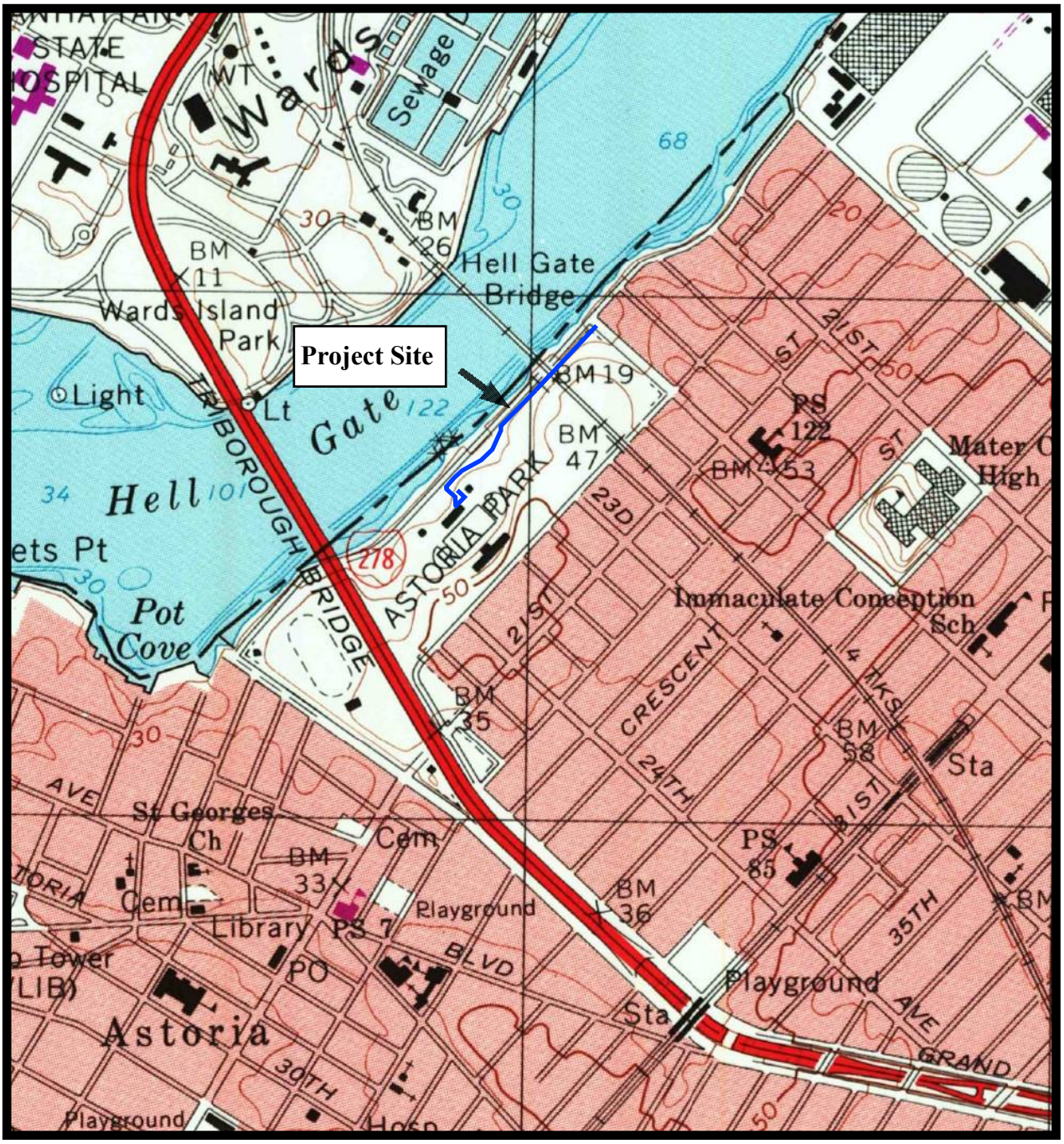


Phase IA Archaeological Documentary Study
Astoria Park Proposed Sanitary Sewer
Astoria, Queens County, New York

N

Figure 1: Project site on *Central Park, N.Y-N.J.* topographic quadrangle (U.S.G.S. 1995).

500 0 500 1000 1500 2000 FEET

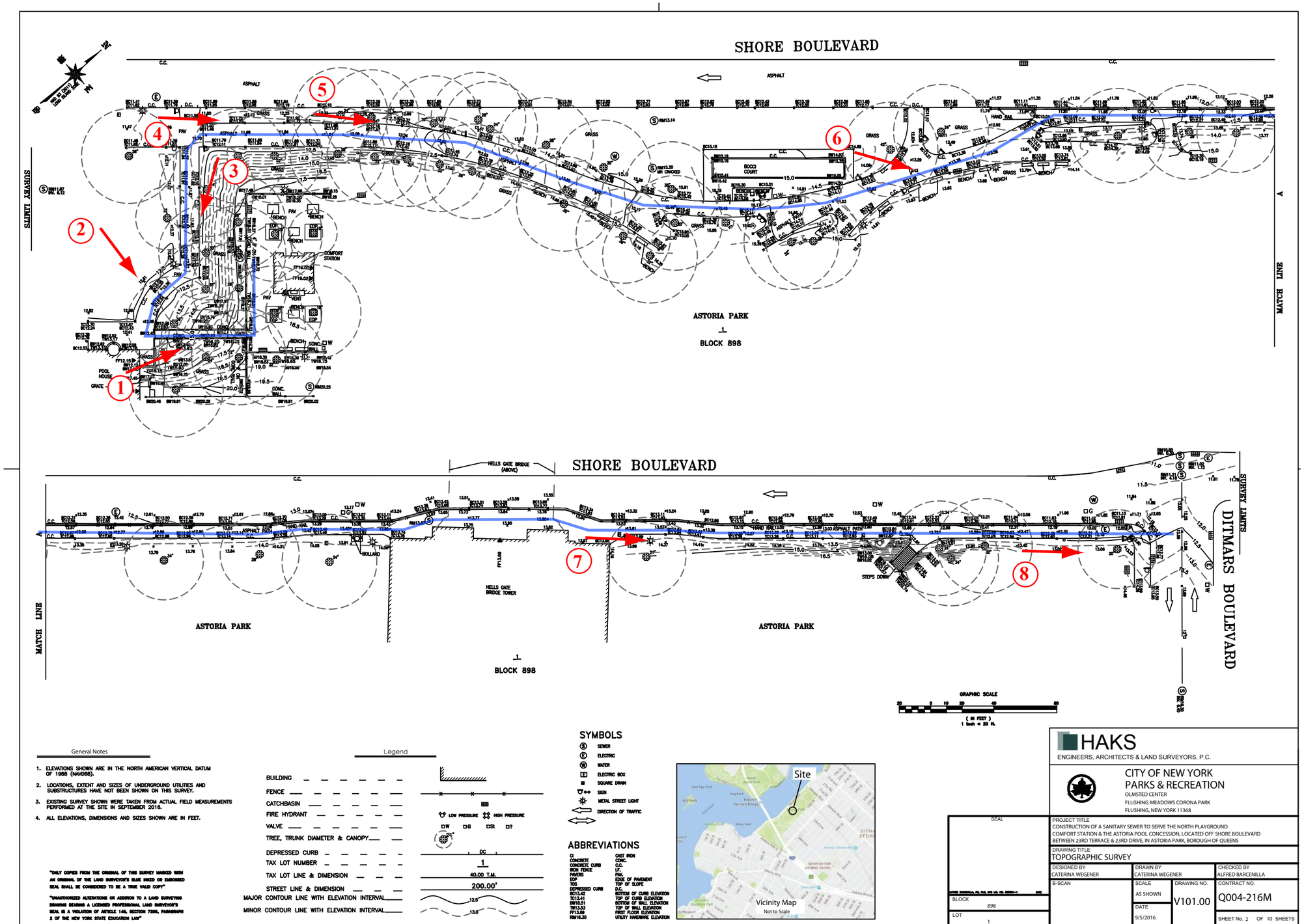
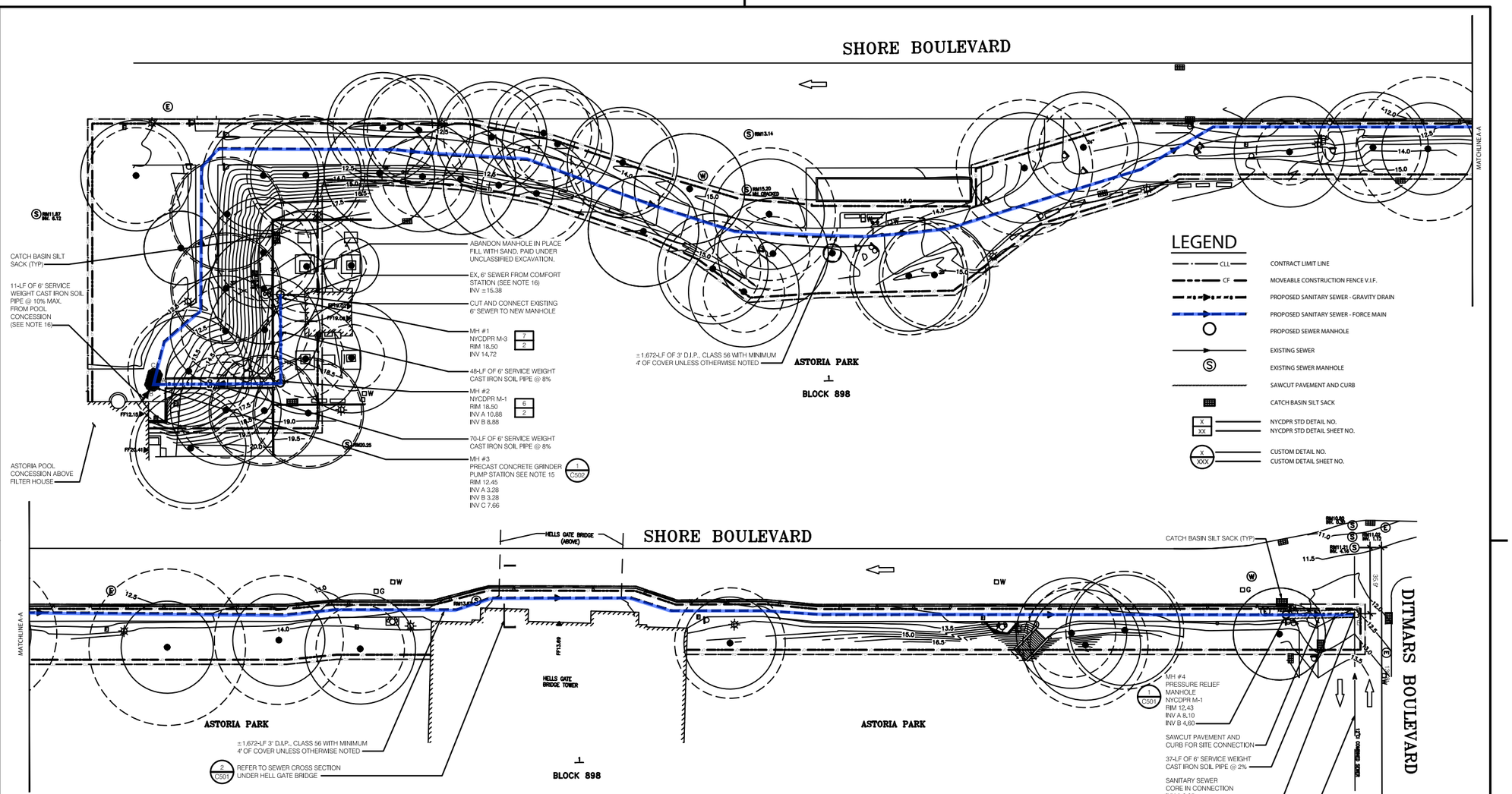


Figure 2: Project site and modern photograph locations on Topographic Survey [in blue] (HAKS 2016).



UTILITY PLAN

SCALE: 1" = 20'-0"

NOTES

1. ALL EXISTING SURVEY AND TOPOGRAPHICAL DATA TAKEN FROM SURVEY BY HAKS, DATED SEPTEMBER 2016. ALL ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM, 1988 (NAVD 88). SEE SURVEY SHEET V101.00 FOR SURVEY LEGEND.
2. THE CONTRACTOR SHALL VERIFY ALL EXISTING TOPOGRAPHIC INFORMATION. ANY DISCREPANCIES BETWEEN THE SURVEY AND EXISTING CONDITIONS, BETWEEN PLANS AND SPECIFICATIONS, OR BETWEEN DIFFERENT PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE RESIDENT ENGINEER AND DPR IN WRITING PRIOR TO COMMENCING WORK.
3. ALL PAVEMENTS SHALL BE INSTALLED TO SMOOTH EVEN GRADE WITH NO PATCHING, IRREGULARITIES, OR BIRDBATHS. ALL NEW PAVEMENTS SHALL MEET EXISTING PAVEMENTS AND GRADES FLUSH AND EVENLY. ALL CURBS SHALL BE INSTALLED TO SMOOTH EVEN GRADES AS INDICATED WITH NO PATCHING OR IRREGULARITIES.
4. THE CONTRACTOR SHALL USE EXTREME CARE TO PROTECT EXISTING TREES AND THEIR ROOTS. EXCEPT AS NOTED, ELEVATIONS AROUND EXISTING TREES SHALL REMAIN THE SAME. MODIFY TRENCHES OR CHANNELS TO AVOID REMAINING TREES AND THEIR ROOTS. ONLY HAND EXCAVATE AS NECESSARY WITHIN THE DRIP LINES OF TREES AS DIRECTED BY THE RESIDENT ENGINEER.
5. NO ROOTS SHALL BE CUT WITHOUT THE WRITTEN AUTHORIZATION OF THE DIRECTOR OF LANDSCAPE CONSTRUCTION.
6. THE CONTRACTOR SHALL EXERCISE EXTREME CARE DURING EARTHWORK OPERATIONS, TO AVOID DISTURBING ADJACENT FACILITIES AND OR SUBGRADE STRUCTURES. ALL DAMAGE RESULTING FROM CONSTRUCTION SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE REPAIRED AT NO EXPENSE TO PARKS & RECREATION OR THE CITY OF NEW YORK. ALL REPAIR WORK SHALL BE DONE TO THE SATISFACTION OF THE RESIDENT ENGINEER AND/OR AGENCY HAVING JURISDICTION.
7. INFORMATION SHOWING EXISTING UTILITY LINES MAY BE INCOMPLETE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATIONS OF ANY UTILITY LINES THEY MAY ENCOUNTER AND TO PROTECT SAID LINES.
8. LOCATIONS OF ALL UTILITIES ARE SHOWN DIAGRAMMATICALLY. THE CONTRACTOR SHALL MAKE PRELIMINARY INVESTIGATIONS, INCLUDING ANY NECESSARY EXCAVATION, TO DETERMINE IF THE WORK CAN BE DONE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE RESIDENT ENGINEER.
9. THE CONTRACTOR SHALL EXERCISE EXTREME CARE DURING EXCAVATION/GRADING OPERATIONS TO PROTECT EXISTING FACILITIES TO REMAIN. SAID FACILITIES SHALL BECOME THE RESPONSIBILITY OF THE CONTRACTOR AND, IF DAMAGED, SHALL BE RESTORED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE RESIDENT ENGINEER.
10. DRAINAGE LINES WHICH HAVE BEEN ABANDONED ARE TO BE REMOVED AS NECESSARY TO FACILITATE THE INSTALLATION OF NEW WORK. ALL ABANDONED PIPES LARGER THAN FOUR (4) INCHES SHALL BE PLUGGED WITH CONCRETE AT BOTH ENDS.
11. THE CONTRACTOR SHALL REMOVE ALL DEBRIS AND SILT FROM EXISTING DRAINAGE STRUCTURES AND PIPING AS INDICATED ON PLAN FOR POSITIVE FLOW TO STREET SEWER SYSTEM.
12. ALL CATCH BASINS SHALL BE LOCATED AT THE LOW POINT WITHIN SURROUNDING AREA.
13. PROPOSED SANITARY SEWER FORCE MAIN PIPE IS 3" D.I.P. CLASS 56 WITH 4' MINIMUM COVER UNLESS OTHERWISE NOTED.
14. EXISTING POOL CONCESSION DRAIN AND NORTHERN PLAYGROUND COMFORT STATION DRAIN SIZES, LOCATIONS AND DEPTHS WERE OBTAINED ON A SITE VISIT ATTENDED BY NYC DPR AND HAKS ON JULY 19, 2016. CONTRACTOR SHALL VERIFY INFORMATION AND ANY DISCREPANCIES BROUGHT THE ATTENTION OF THE RESIDENT ENGINEER AND DPR IN WRITING PRIOR TO COMMENCING WORK.
15. PRECAST GRINDER PUMP STATION AND DETAILS ARE PER MODEL NUMBER RC509 AS MANUFACTURED BY OLDCASTLE PRECAST, OR APPROVED EQUAL.
16. CONTRACTOR SHALL CLEAR EXISTING COMFORT STATION SEWER AND POOL CONCESSION SINK DRAINS AS REQUIRED AND AS DIRECTED BY THE ENGINEER.

PRELIMINARY (60%) DESIGN SUBMISSION
NOT FOR CONSTRUCTION
PROGRESS PRINT

HAKS
ENGINEERS, ARCHITECTS & LAND SURVEYORS, P.C.

CITY OF NEW YORK
PARKS & RECREATION
OLMSTED CENTER
FLUSHING MEADOWS CORONA PARK
FLUSHING, NEW YORK 11368

SEAL

PROJECT TITLE
CONSTRUCTION OF A SANITARY SEWER TO SERVE THE NORTH PLAYGROUND COMFORT STATION & THE ASTORIA POOL CONCESSION, LOCATED OFF SHORE BOULEVARD BETWEEN 23RD TERRACE & 23RD DRIVE, IN ASTORIA PARK, BOROUGH OF QUEENS

DRAWING TITLE
UTILITY PLAN

DESIGNED BY	DRAWN BY	CHECKED BY
LISA PRUGNO, P.E.	LISA PRUGNO, P.E.	DAVID NICKLE, P.E.

B-SCAN	SCALE	DRAWING NO.	CONTRACT NO.
	AS SHOWN	C201.00	Q004-216M
	DATE 1/31/2017		SHEET No. 7 OF 10 SHEETS

BLOCK 898
LOT 1

Figure 3: Project site on Utility Plan [in blue] (HAKS 2016).

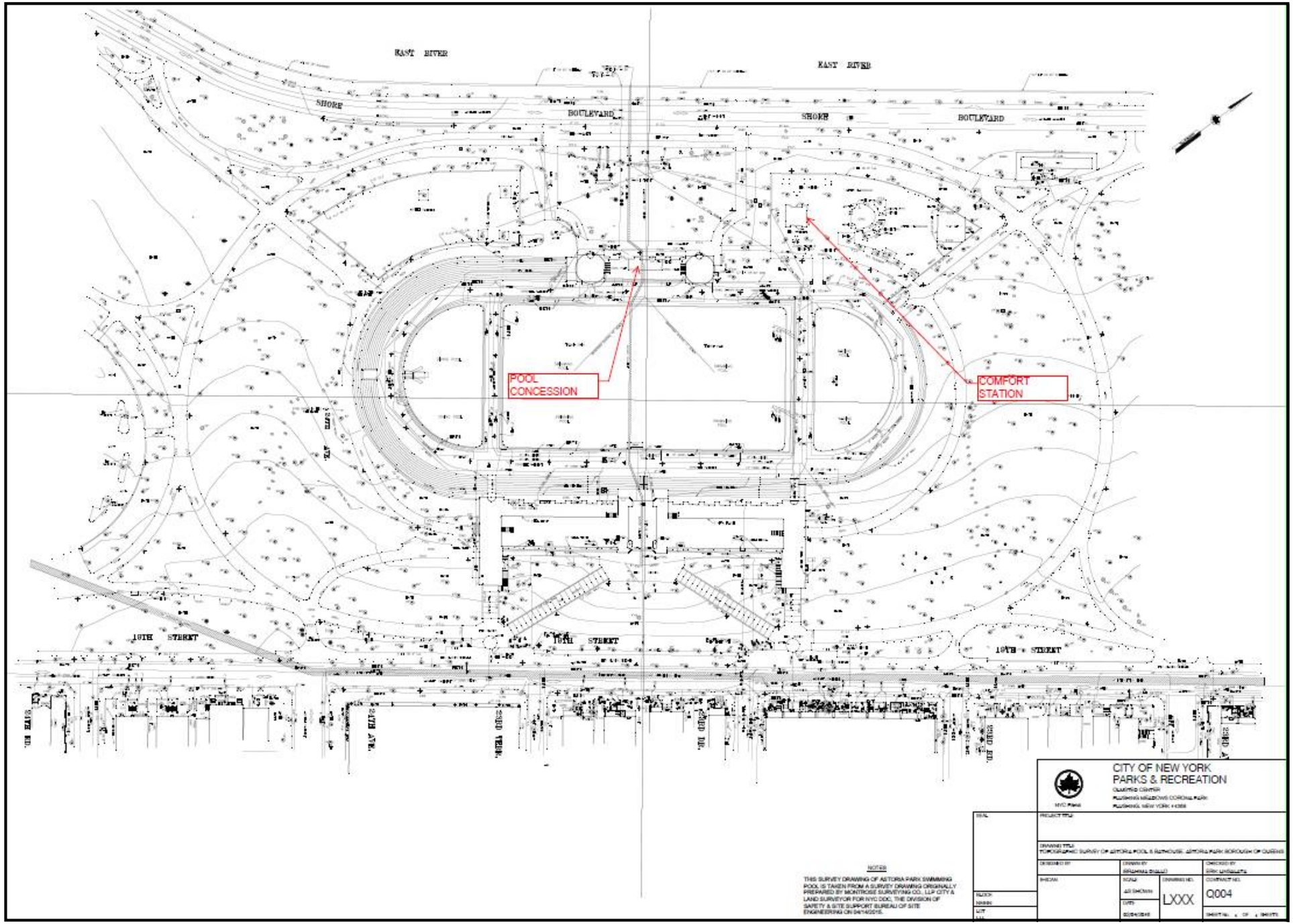
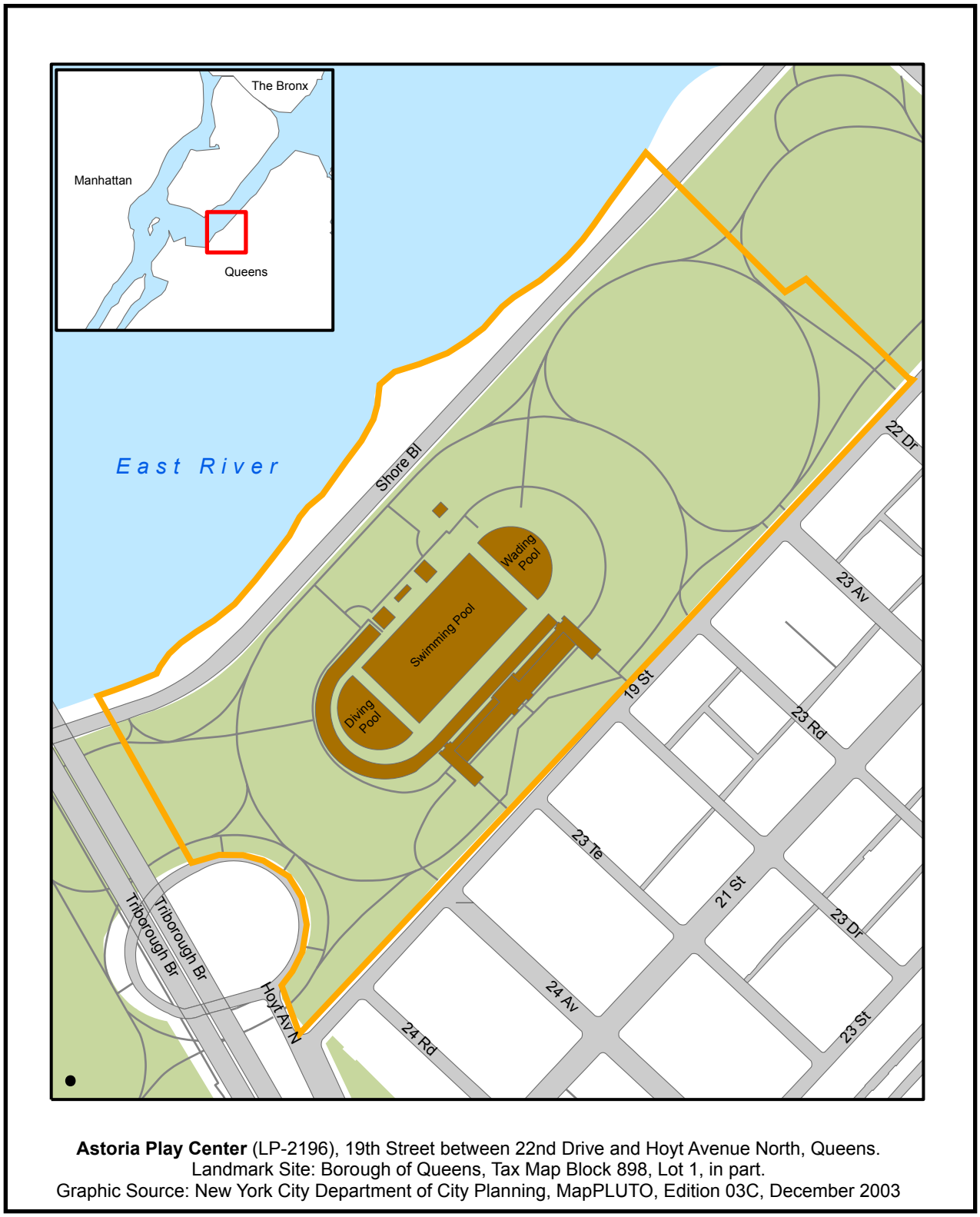
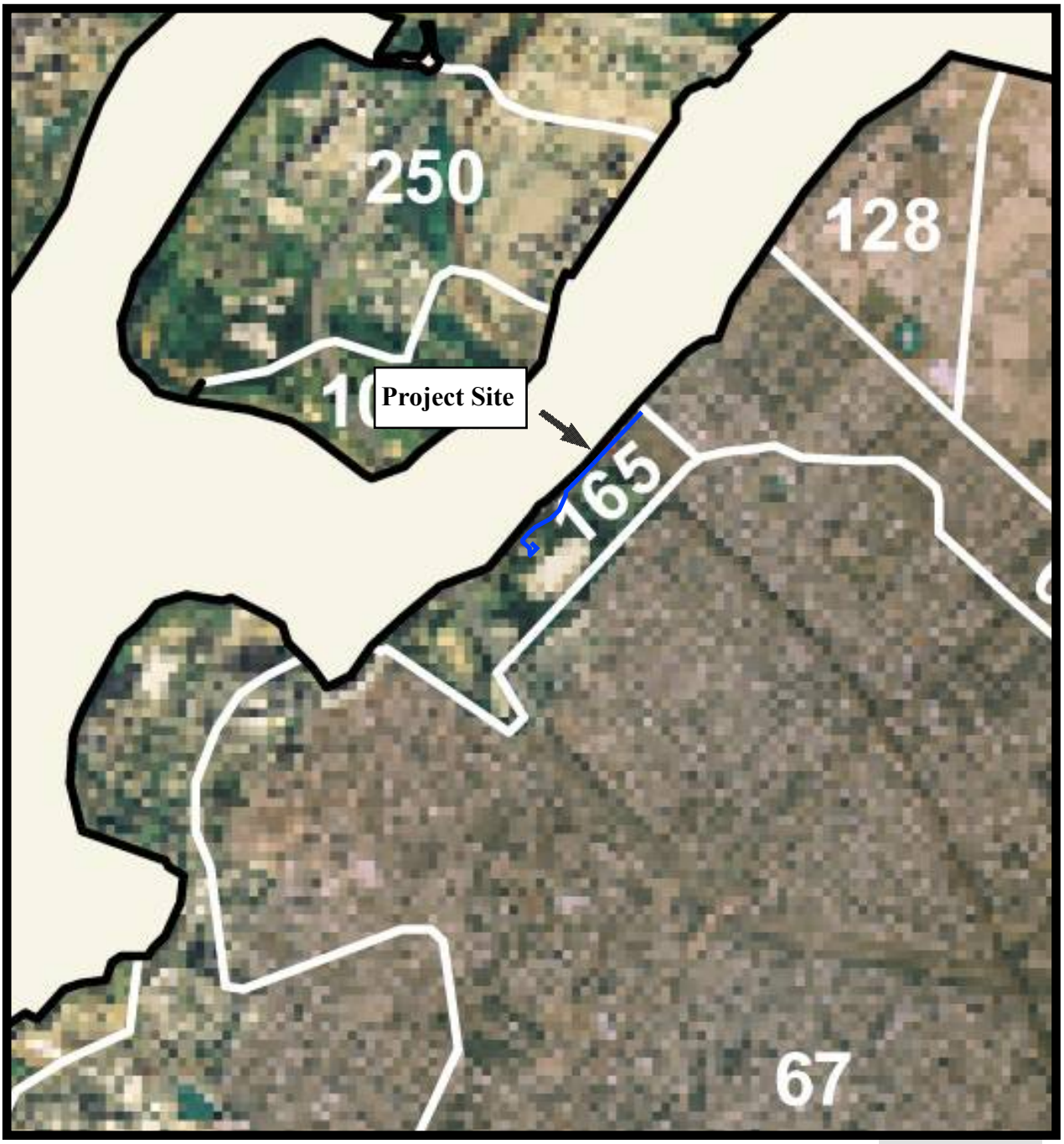


Figure 4: Detail of Astoria Park Pool, Pool Concession Building, and North Playground Comfort Station (HAKS 2016).



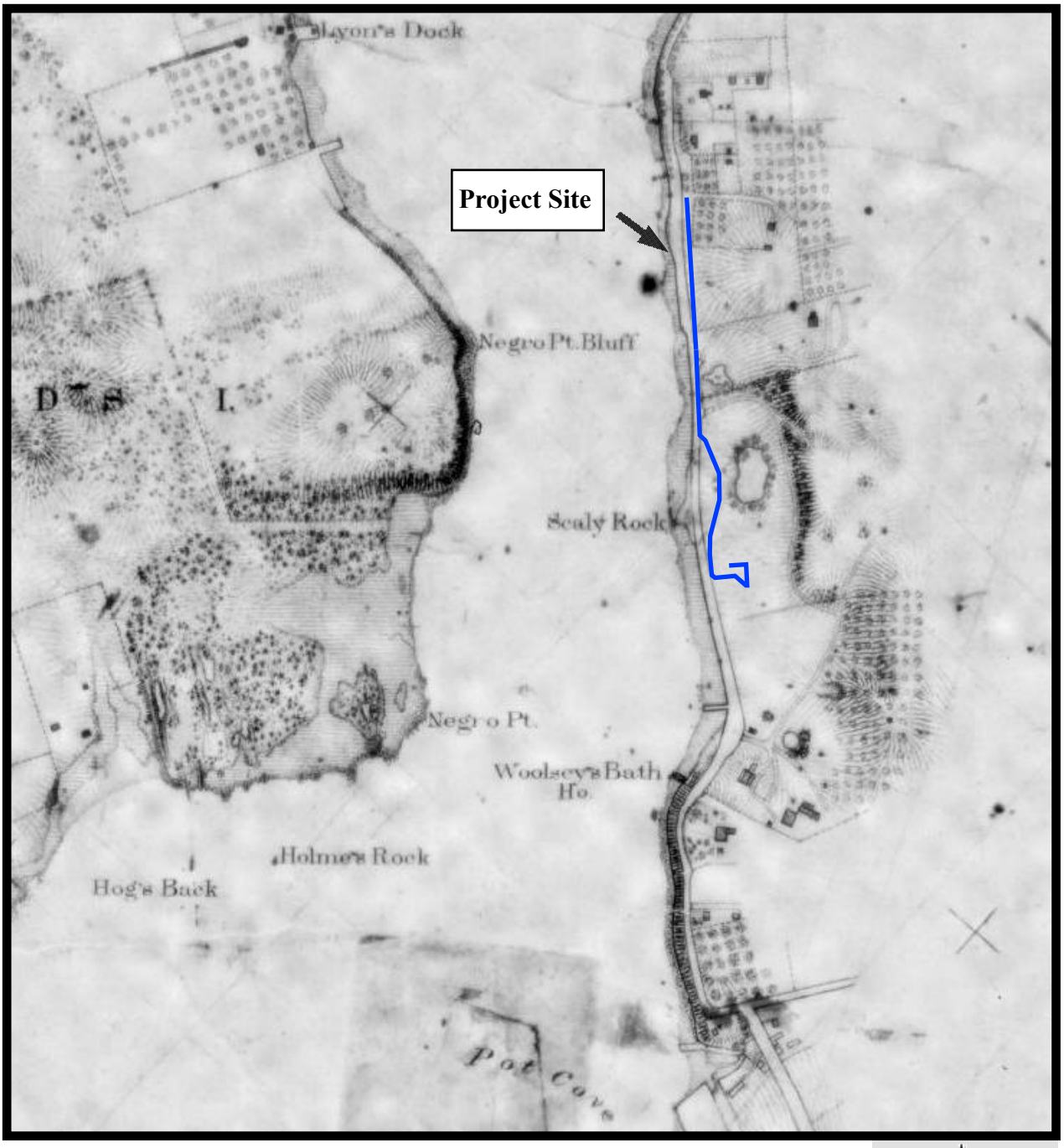
Astoria Play Center (LP-2196), 19th Street between 22nd Drive and Hoyt Avenue North, Queens.
Landmark Site: Borough of Queens, Tax Map Block 898, Lot 1, in part.
Graphic Source: New York City Department of City Planning, MapPLUTO, Edition 03C, December 2003

Figure 5: Astoria Park Pool and Play Center New York City Landmark boundaries (Presa 2006).



Phase IA Archaeological Documentary Study
Astoria Park Proposed Sanitary Sewer
Astoria, Queens County, New York

Figure 6: Project site on *New York City Reconnaissance Soil Survey* (U.S.D.A. 2006).



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Astoria Park Proposed Sanitary Sewer
Astoria, Queens County, New York

Figure 8: Project site on *Map of Hell-Gate and Vicinity* (U.S.C.S. 1848).

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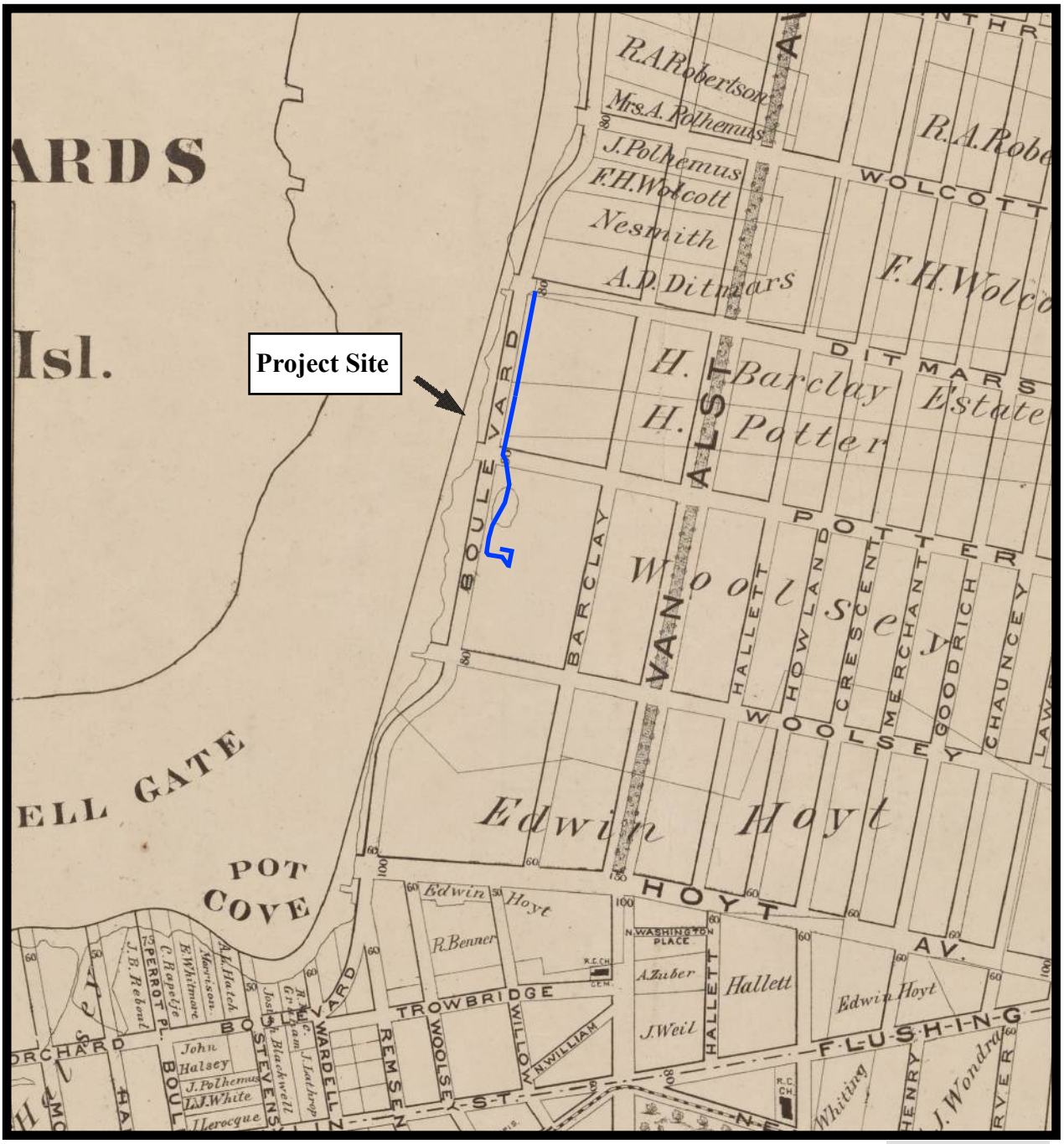

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Astoria Park Proposed Sanitary Sewer
Astoria, Queens County, New York

Figure 8: Project site on *Map of Long Island City, Queens Co., N.Y.* (Dripps 1874).

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Phase IA Archaeological Documentary Study
Astoria Park Proposed Sanitary Sewer
Astoria, Queens County, New York

Figure 9: Project site on *Atlas of Queens County, Long Island, New York* (Wolverton 1891).

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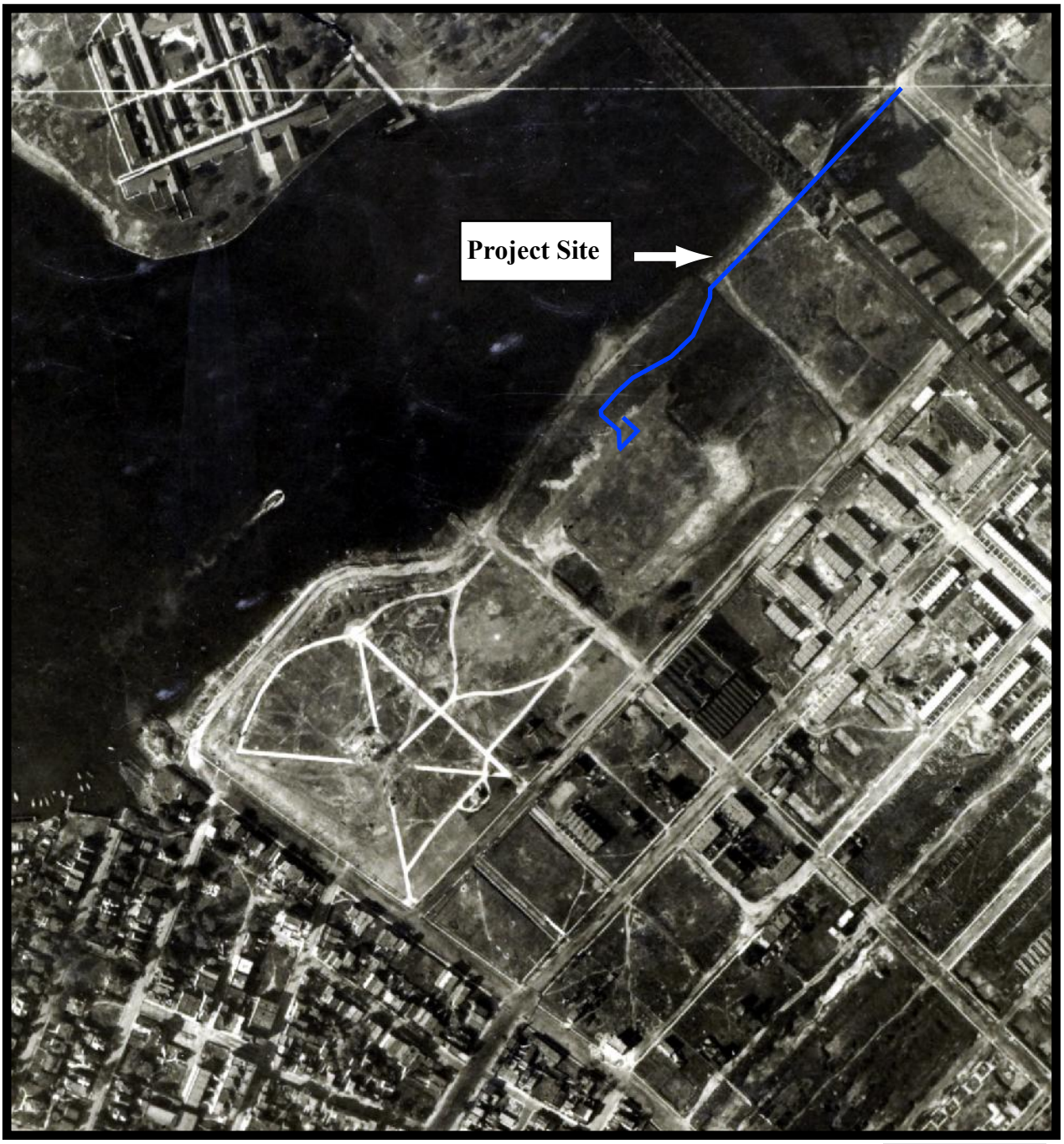

Phase IA Archaeological Documentary Study
Astoria Park Proposed Sanitary Sewer
Astoria, Queens County, New York

N

Figure 10: Project site on *Sectional Aerial Maps of the City of New York* (N.Y. Bureau of Engineering 1924).

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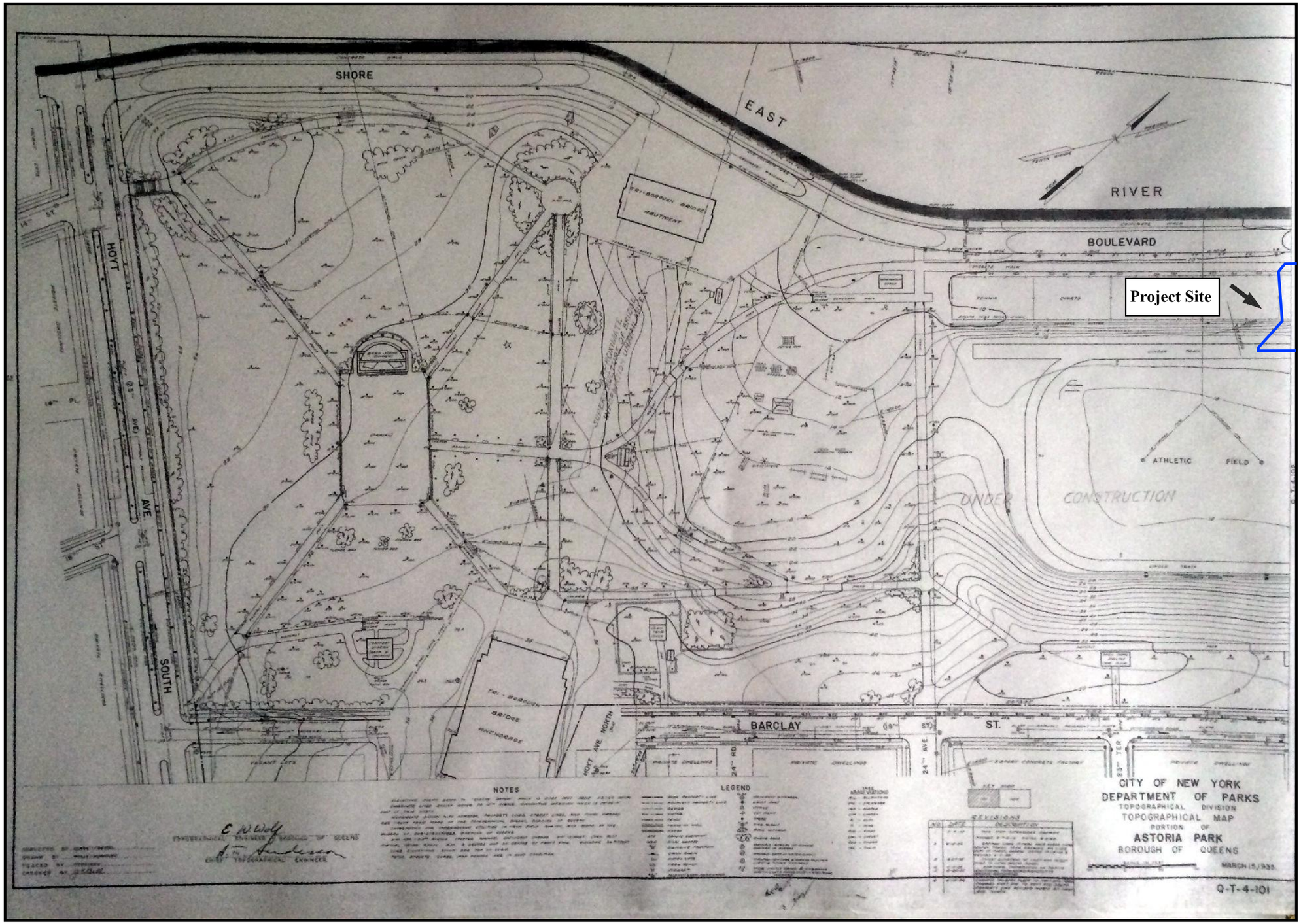


Figure 11a: Project site on *Topographical Map, Portion of Astoria Park, Borough of Queens* (Department of Parks 1935).

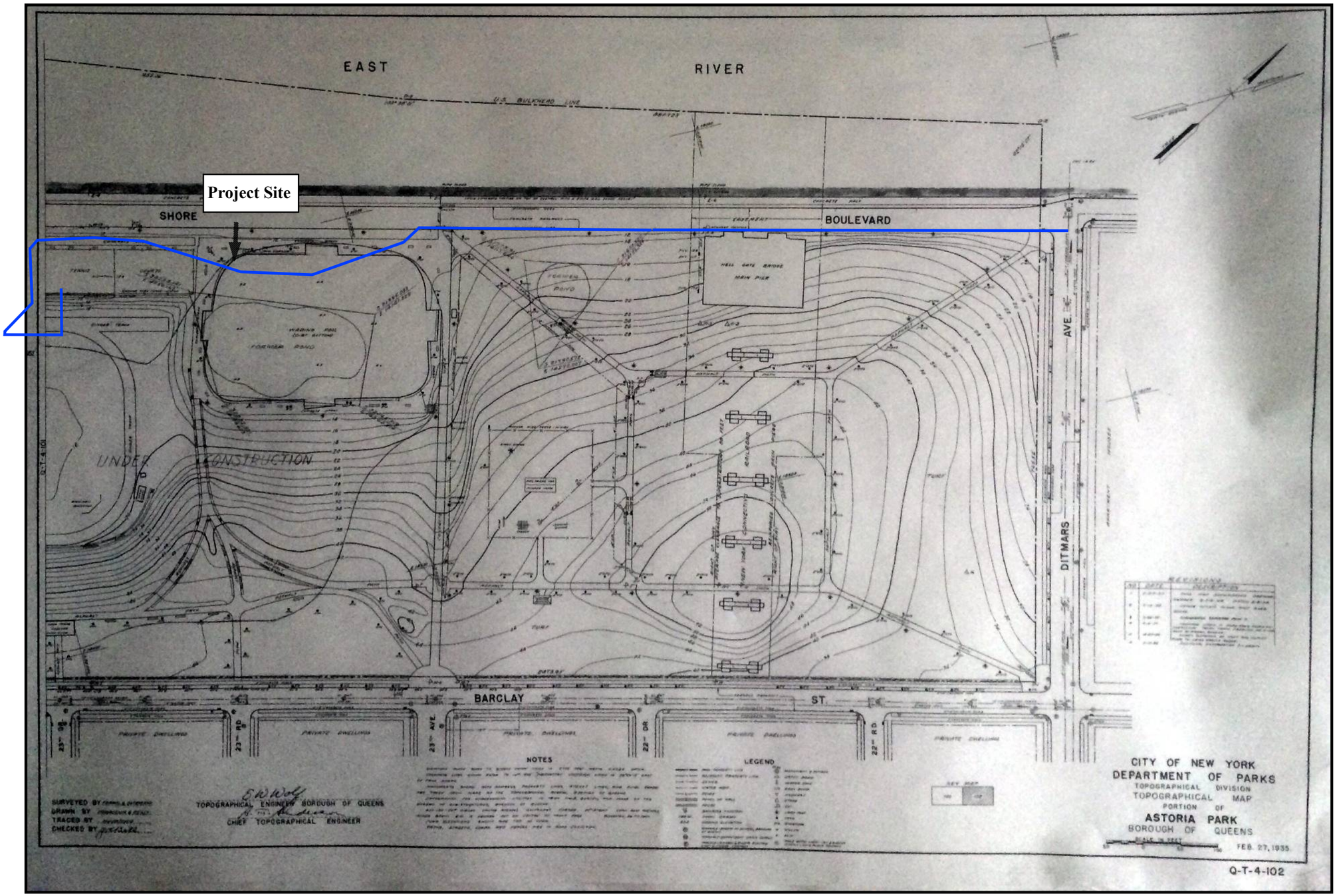


Figure 11b: Project site on *Topographical Map, Portion of Astoria Park, Borough of Queens* (Department of Parks 1935).

Photograph 1: North playground comfort station. Proposed sanitary sewer will run from building under pathway. View looking north.

Photograph 2: Pathway leading from comfort station to pool concession building on right where sanitary sewer will run. View looking northeast.

Photograph 3: Astoria Pool concession building. Sanitary sewer proposed to run under pathway on left and in foreground. View looking south.

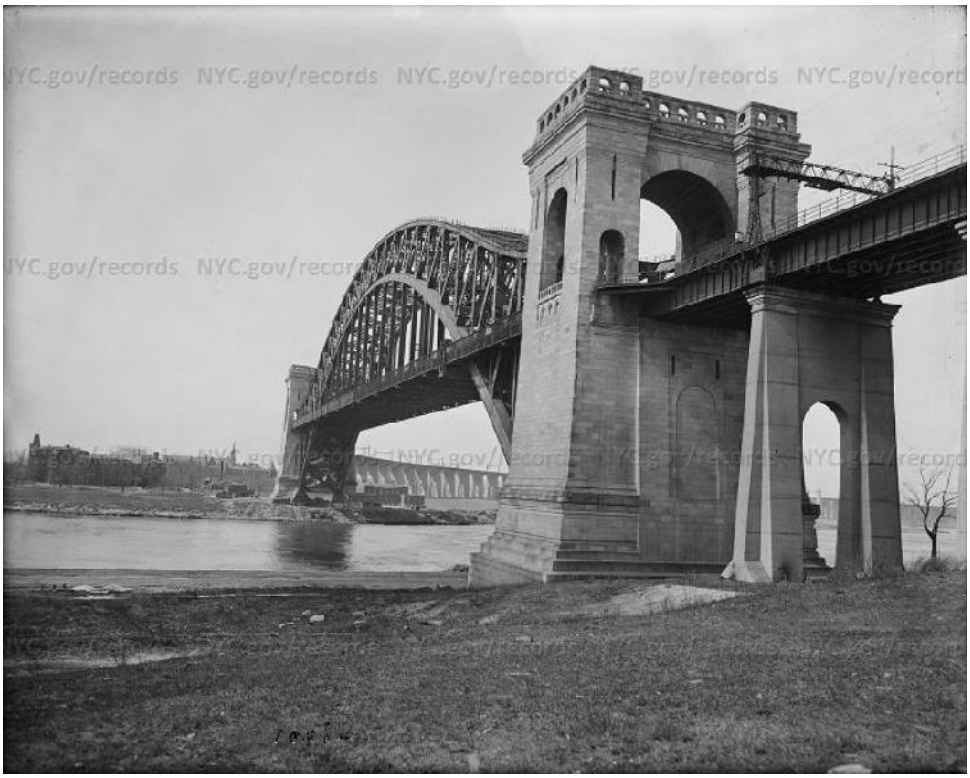
Photograph 4: Route of proposed sanitary sewer under pedestrian pathway with Hell Gate Bridge in background. View looking northeast.

Photograph 5: Continued route of proposed sanitary sewer under pedestrian pathway. View looking northeast.

Photograph 6: Continued route of proposed sanitary sewer under pedestrian pathway nearing Hell Gate Bridge. View looking northeast.

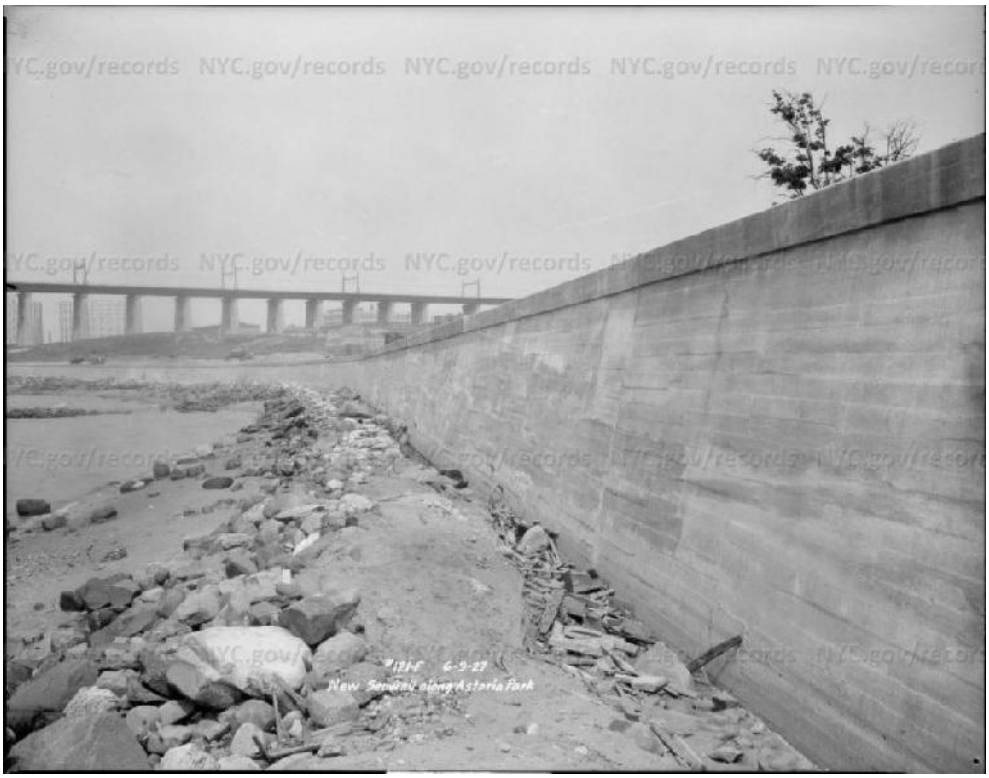
Photograph 7: Last stretch of proposed sanitary sewer route north of Hell Gate Bridge. View looking northeast.

Photograph 8: Terminus of proposed sanitary sewer route at Ditmars Boulevard. View looking northeast.



Photograph 9: View of Hell Gate Bridge from Astoria Park. April 7, 1927. Image bps_10864. Courtesy New York City Municipal Archives.

Photograph 10: Astoria Park – Driveway along East River under construction. June 9, 1927. Image bpq_0121-e. Courtesy New York City Municipal Archives.



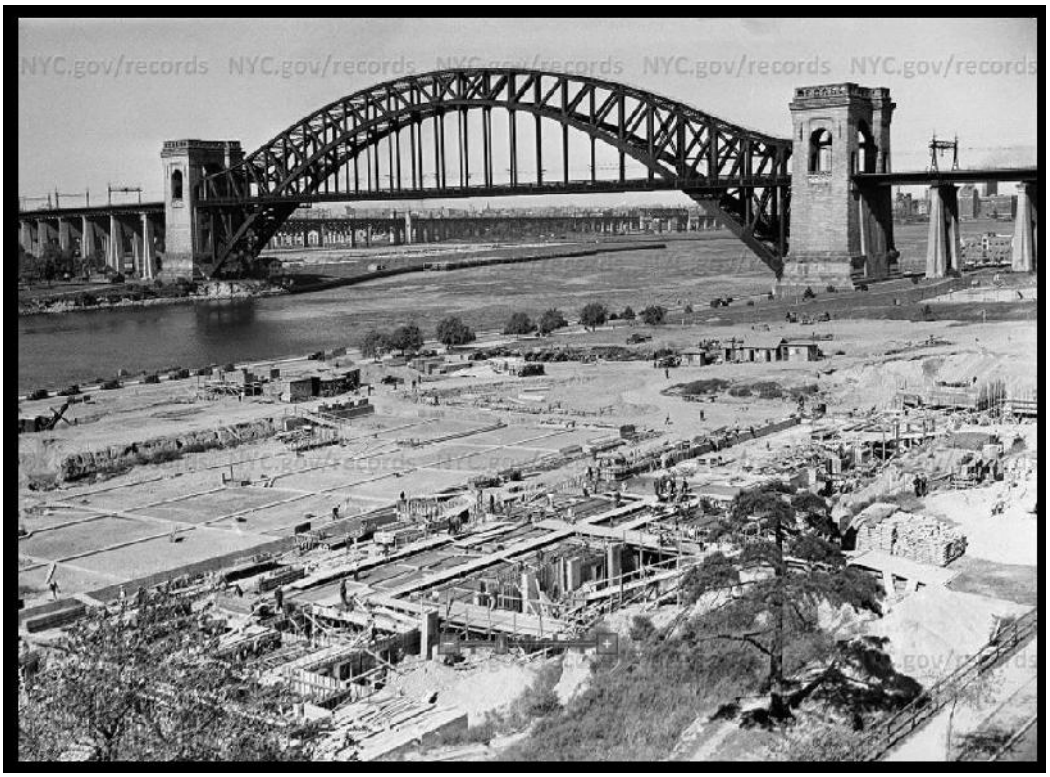
Photograph 11: New Seawall along Astoria Park. June 9, 1927. Image bpq_0121-f. Courtesy New York City Municipal Archives.

Photograph 12: Triborough Bridge Astoria Park pier. July 14, 1932. Image bps_15323. Courtesy New York City Municipal Archives.

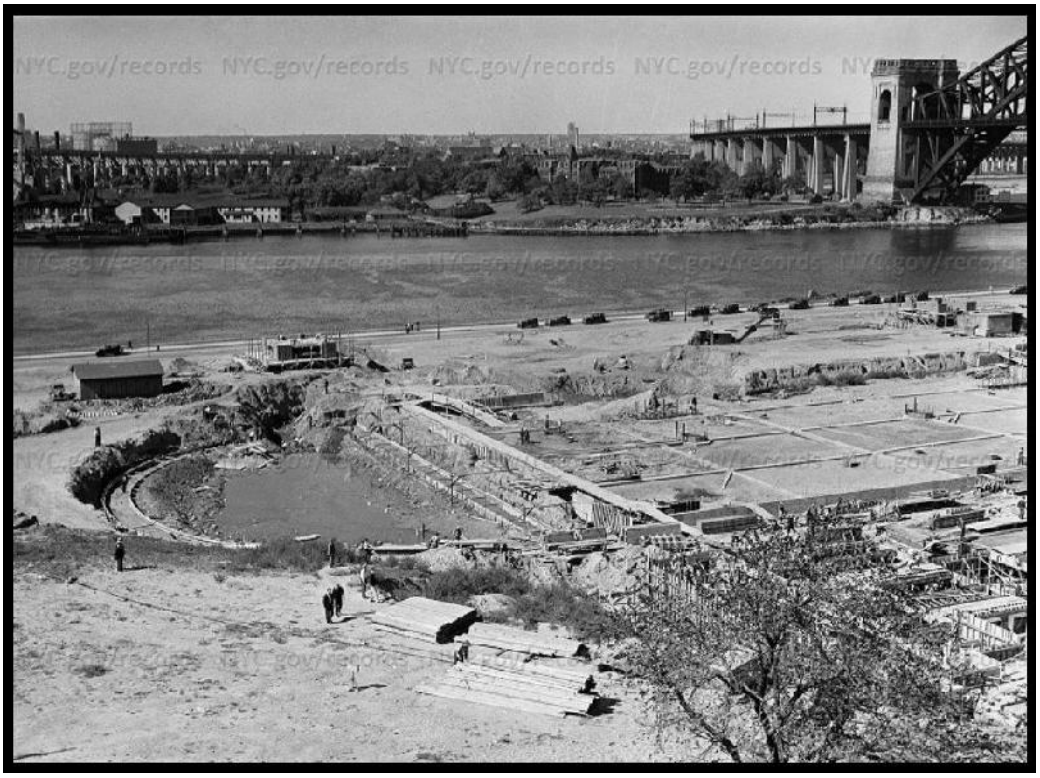
Photograph 13: Detail, Triborough Bridge Astoria Park pier. July 14, 1932. Image bps_15323. Courtesy New York City Municipal Archives.

Photograph 14: Astoria Park, aerial photograph. January 1934. Image dpr_13744. Courtesy New York City Municipal Archives.

Photograph 15: Hell Gate Bridge, showing Astoria Park in Queens, while under construction. June 11, 1935. P.L. Sperr. Courtesy New York Public Library.



Photograph 16: Astoria Park swimming pool under construction. September 23, 1935. Image dpr_01685. Courtesy New York City Municipal Archives.

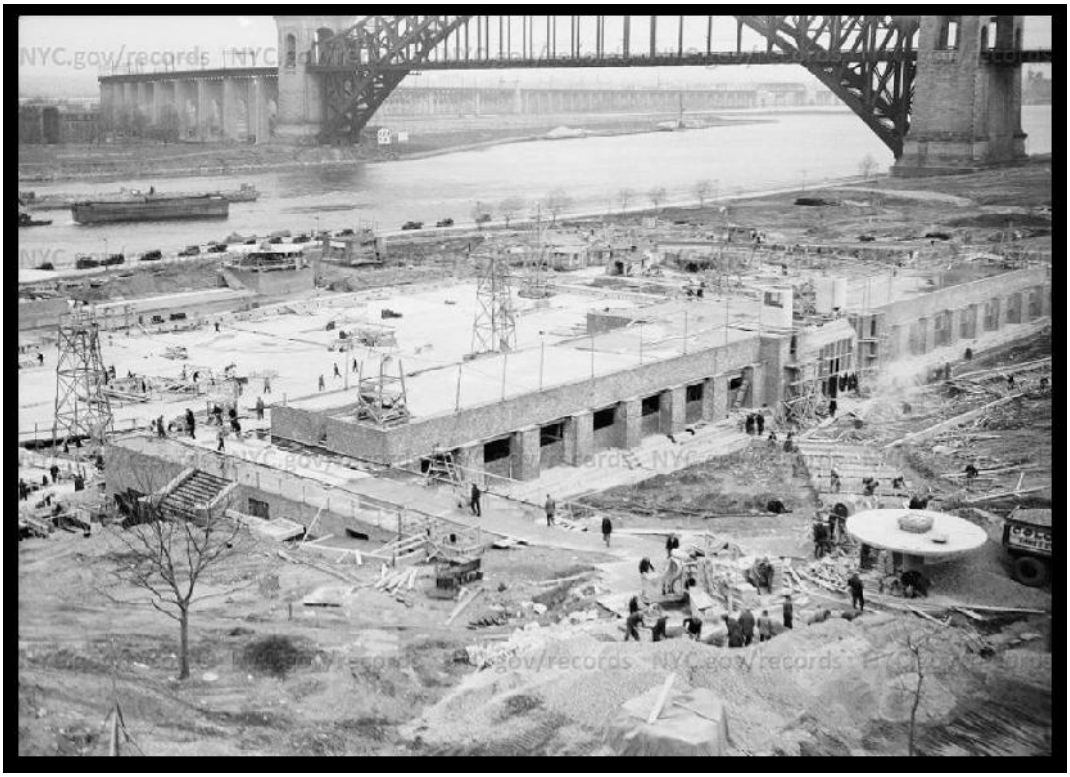


Photograph 17: Astoria Park swimming pool under construction. September 23, 1935. Image dpr_01686. Courtesy New York City Municipal Archives.

Photograph 18: Astoria Park north comfort station under construction. October 24, 1935. Image dpr_01753. Courtesy New York City Municipal Archives.

Photograph 19: Astoria Park pool under construction. November 27, 1935. Image 1844_Q004_11-27-1935. Courtesy New York City Parks Photo Archive.

Photograph 20: Astoria Park swimming pool construction. April 3, 1936. Image dpr_2643. Courtesy New York City Municipal Archives.



Photograph 21: Astoria Park swimming pool construction. April 3, 1936. Image dpr_2644. Courtesy New York City Municipal Archives.


Photograph 22: Astoria Park. July 17, 1936. P.L. Sperr. Courtesy New York Public Library.

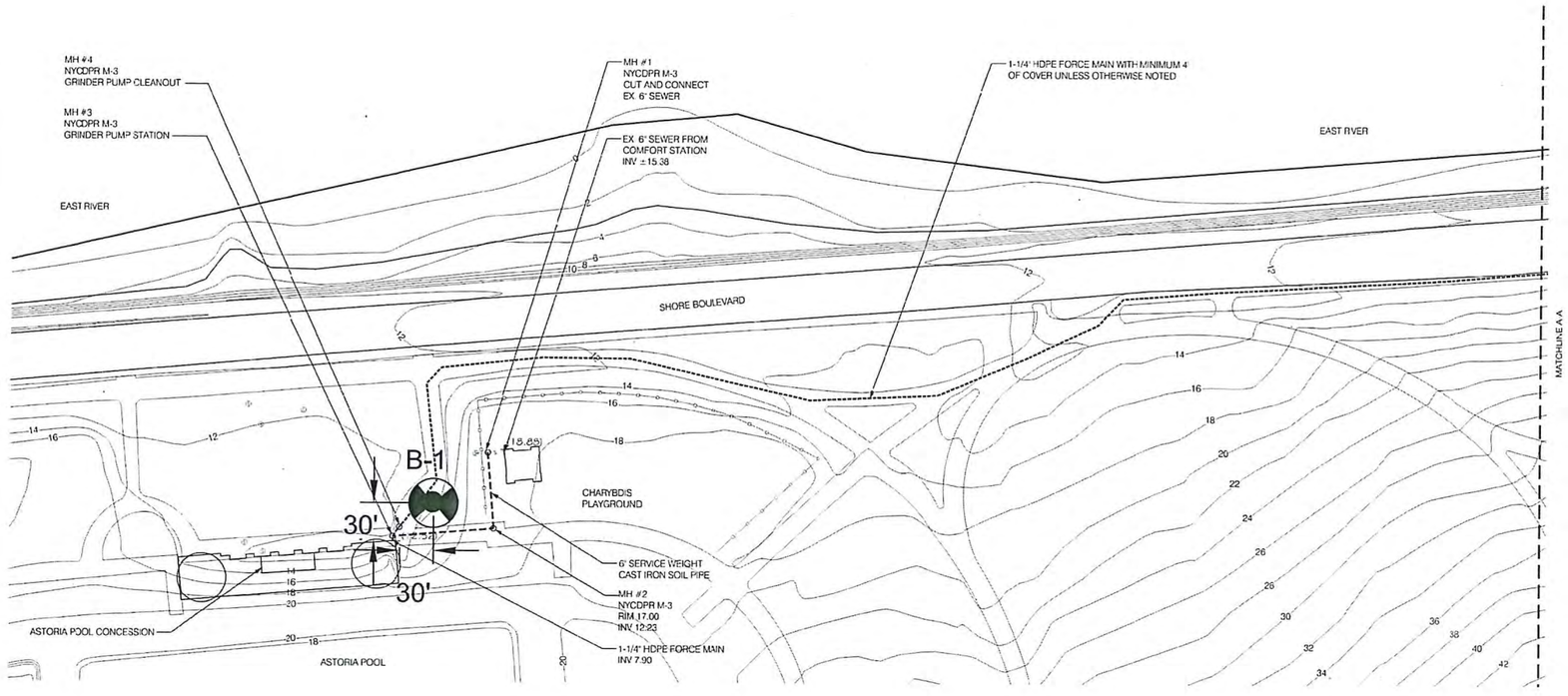
Photograph 23: Astoria Park. July 25, 1936. P.L. Sperr. Courtesy New York Public Library.

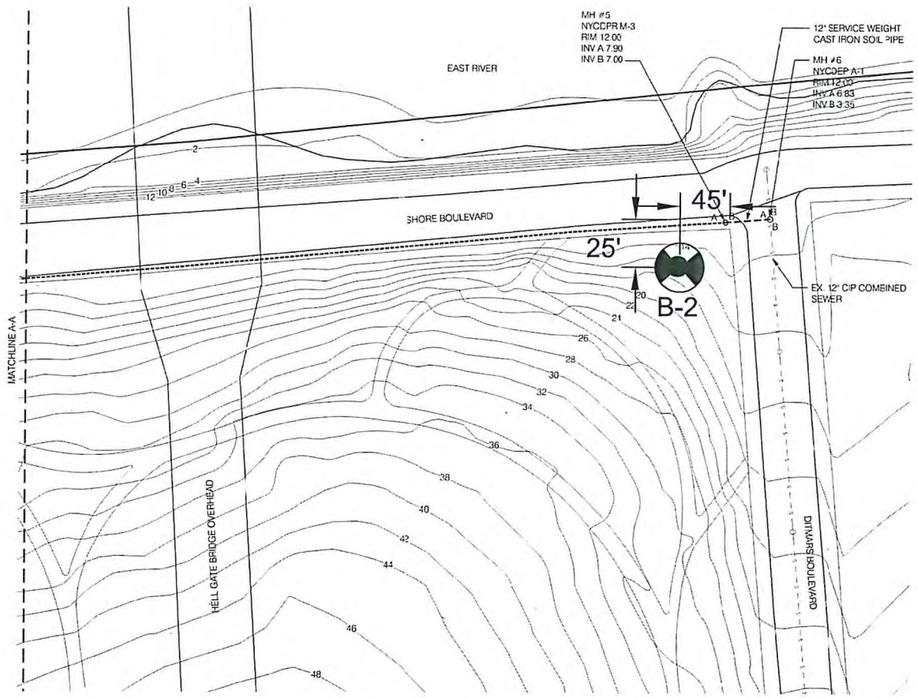
Photograph 24: Astoria Park. July 25, 1936. P.L. Sperr. Courtesy New York Public Library.

Photograph 25: Astoria Park. July 25, 1936. P.L. Sperr. Courtesy New York Public Library.

Photograph 26: Astoria Park Pool with Hell Gate Bridge in background. August 20, 1936. Image 10776.2_Q004_08-20-1936. Courtesy New York City Parks Photo Archive.

APPENDIX A: SOIL BORINGS (OWEIS ENGINEERING INC. 2016).





UTILITY PLAN-OPTION 2-FORCE MAIN TO DITMARS BOULEVARD

SCALE: 1" = 40'-0"

NORTH

0 20' 40' 80'

NOTES

1. ALL ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM, 1988 (NAVD 88).
2. EXISTING INFORMATION IS BASED ON THE FOLLOWING SOURCES:
   - 2.1 EXISTING TOPOGRAPHICAL DATA TAKEN FROM SURVEY PERFORMED BY MONTROSE OF ASTORIA SWIMMING POOL DATED MAY 12, 2015 PROVIDED BY NYC DPR.
   - 2.2. EXISTING CONTOURS AND LOCATIONS OF ROADWAYS, SIDEWALKS AND PATHWAYS ARE TAKEN FROM AVAILABLE GIS DATA.
   - 2.3. EXISTING SEWER INFORMATION IN ASTORIA BOULEVARD SOUTH IS BASED ON DATA TAKEN FROM SURVEY DATED JULY 23, 1982 PROVIDED BY NYC DPR.
   - 2.4. EXISTING SEWER INFORMATION IN DITMARS BOULEVARD IS BASED ON DATA TAKEN FROM RECORD SEWER PLANS DATED JUNE 10, 1913 PROVIDED BY NYC DEP.
3. EXISTING POOL CONCESSION DRAIN AND NORTHERN PLAYGROUND COMFORT STATION DRAIN SIZES, LOCATIONS AND DEPTHS WERE OBTAINED ON A SITE VISIT ATTENDED BY NYC DPR AND HAKS ON JULY 19, 2016.
4. ALL PROPOSED SANITARY SEWER GRAVITY DRAIN PIPE IS 12" SERVICE WEIGHT CAST IRON SOIL PIPE AT 0.5% SLOPE UNLESS OTHERWISE NOTED.
5. ALL PROPOSED SANITARY SEWER FORCE MAIN PIPE IS 1-1/4" HDPE PIPE WITH 4' COVER UNLESS OTHERWISE NOTED.

LEGEND

- PROPOSED SANITARY SEWER - GRAVITY DRAIN
- PROPOSED SANITARY SEWER - FORCE MAIN
- PROPOSED SEWER MANHOLE
- EXISTING SEWER
- EXISTING SEWER MANHOLE

APPROX. BORING LOCATION

SCHEMATIC (30%) DESIGN SUBMISSION
NOT FOR CONSTRUCTION
PROGRESS PRINT

HAKS
ENGINEERS, ARCHITECTS & LAND SURVEYORS, P.C.

CITY OF NEW YORK
PARKS & RECREATION
OLMSTED CENTER
FLUSHING MEADOWS CORONA PARK
FLUSHING, NEW YORK 11368

SEAL

PROJECT TITLE
CONSTRUCTION OF A SANITARY SEWER LINE TO SERVE THE NORTH PLAYGROUND COMFORT STATION & THE ASTORIA POOL CONCESSION IN ASTORIA PARK, LOCATED OFF OF SHORE BOULEVARD BETWEEN 23RD TERRACE AND 23RD DRIVE, BOROUGH OF QUEENS

DRAWING TITLE
UTILITY PLAN-OPTION 2-FORCE MAIN TO DITMARS BOULEVARD

DESIGNED BY	DRAWN BY		CHECKED BY
LISA PRUGNO, P.E.	LISA PRUGNO, P.E.		DAVID NICKLE, P.E.
B-SCAN	SCALE: AS SHOWN	DRAWING NO.: C106.00	CONTRACT NO.: Q004-216M
BLOCK: 898, 889	DATE: 9/5/2016		SHEET No. 6 OF X SHEETS
LOT: 1			

OWEIS ENGINEERING INC.

PROJECT	ASTORIA PARK FORCE MAIN TO DITMARS AVENUE	**BORING NO.**	B-1
LOCATION	Shore Blvd.	**SHEET NO.**	1 OF 3
CLIENT	HAKS	**PROJECT NO.**	16-NY115-01
BORING LOCATION	Close to the Pool	**SURFACE ELEV.**	~12'
EASTING	Shore Blvd. **NORTHING**	**VER. DATUM**	NAVD 88
		HOR. DATUM	

EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

DRILLING RIG CME

CASING

4" dia. — 20' depth

depth

ADVANCEMENT METHOD Hud rotary

DRILL RODS NWJ

ROTARY BIT DIAMETER, IN. 3 7/8"

DRILLING MUD USED QUIK-GEL

AUGER N/A

SAMPLERS

HAMMER TYPE Donut

WEIGHT 140 lbs **DROP** 30" **RATE** Maual

D-SAMPLER 2" split spoon

U-SAMPLER N/A

OTHER N/A

ROCK CORING

CORING FEED N/A

CORE BARREL N/A

CORE BIT N/A

REMARKS

1. 5' CASING ADDED
2. 5' CASING ADDED
3. 10' CASING ADDED
4. HARD DRILLING; TINY ANGULAR ROCK FRAGMENTS IN WASH
5. SPOON BOUNCING ZERO RECOVERY

LEGEND

TV = Torvane Shear Strength, TSF
CT = Coring Time, minutes/foot
CB = Casing Blows Per Foot
OLT = Other Lab Testing Performed
PP = Pocket Penetrometer Unconfined Compressive Strength, TSF

REMARK TYPES

LC = Lost Circulation
HD = Hard Drilling
RC = Rig Chatter
CBJ = Core Barrel Jam
PO = Petroleum Odor
CW = Change in Wash
SS = Slickensided
EOB = End Of Boring
ML = Mudline

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATIONS

PIEZOMETER__ MONITORING WELL__ INSTALLED NO **SKETCH SHOWN ON** N/A

PAY QUANTITIES

2" DIA. SAMPLE BORING **LIN. FT.** 25' **NO. OF 3" UNDISTURBED SAMPLES** N/A

CORE DRILLING IN ROCK **LIN. FT.** N/A **OTHER** N/A

BORING CONTRACTOR

DRILLER Jerry **HELPER(S):** Chris

OEI OBSERVER J. Xiao **DATE:** 11/9/2016

CLASSIFICATION CHECK

BORING LOG

Oweis ENGINEERING INC.
INNOVATIVE GEOTECHNICAL ENGINEERING SOLUTIONS

PROJECT ASTORIA PARK FORCE MAIN TO DITMARS AVENUE — BORING NO. B-1
PROJECT NO. 16-NY115-01 — SHEET 2 OF 3
LOCATION APPROX. 75' EAST OF CONCESSION, 30' NORTH — GROUND ELEVATION ~12'
OEI OBSERVER JX

DAILY PROGRESS	SYMBOL	SAMPLE NO.	SAMPLE DEPTH (ft)	SAMPLE BLOWS/6"	SAMPLE REC (in)	SAMPLE DESCRIPTION	STRATA	DEPTH (ft)	MOISTURE CONDITION	FIELD TESTS	REMARKS (TYPE)
13:00 11/9/16 JX		S-1	1	4-4	14"	Brown mf SAND trace Silt (SP) (Possible Fill)		1	M		
			2	5-6				2			
		S-2	3	20-38	2"	2" Gravel in tip of spoon		3			
			4	19-20				4			1
			5					5			
		S-3	6	5-19	4"	Gray mf SAND, little Silt, trace Gravel (SM)		6	W		
			7	20-80				7			
			8					8			2
			9					9			
			10				SP/SM	10			
		S-4	11	12-22	6"	Gray f SAND, trace Silt (SP).		11	W		
			12	22-18				12			
			13					13			
			14					14			
			15					15			
		S-5	16	59-50	5"	Gray mf SAND, Little Silt, Little mf Gravel (SM/SP)		16			
			17	50-42				17			
			18					18			3
			19					19			
			20					20			
		S-6	21	43- 100/6"	8"	Dark gray mf SAND, trace Silt (SP)		21			
			22			Decomposed Bedrock		22			4

BORING LOG

Oweis ENGINEERING INC.
INNOVATIVE GEOTECHNICAL ENGINEERING SOLUTIONS

PROJECT ASTORIA PARK FORCE MAIN TO DITMARS AVENUE
PROJECT NO. 16-NY115-01
LOCATION APPROX. 75' EAST OF CONCESSION, 30' NORTH

BORING NO. B-1
SHEET 3 OF 3
GROUND ELEVATION ~12'
OEI OBSERVER JX

DAILY PROGRESS	SYMBOL	SAMPLE NO.	SAMPLE DEPTH (ft)	SAMPLE BLOWS/6"	SAMPLE REC (in)	SAMPLE DESCRIPTION	STRATA	DEPTH (ft)	MOISTURE CONDITION	FIELD TESTS	REMARKS (TYPE)
			23			(Possible Top of Bedrock at 23 ft.)		23			5
5:45 11/9/16 JX			24					24			
			25	50/0"	0"	No Recovery		25			
						E.O.B at 25'					
			26					26			
			27					27			
			28					28			
			29					29			
			30					30			
			31					31			
			32					32			
			33					33			
			34					34			
			35					35			
			36					36			
			37					37			
			38					38			
			39					39			
			40					40			
			41					41			
			42					42			

OWEIS ENGINEERING INC.

PROJECT	ASTORIA PARK FORCE MAIN TO DITMARS AVENUE	**BORING NO.**	B-2
LOCATION	Shore Blvd. & Ditmas Blvd.	**SHEET NO.**	1 OF 2
CLIENT	HAKS	**PROJECT NO.**	16-NY115-01
BORING LOCATION	Corner of Shore Blvd. & Ditmas Blvd.	**SURFACE ELEV.**	~16'
EASTING	**NORTHING**	**VER. DATUM**	NAVD 88
		HOR. DATUM	

EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

DRILLING RIG	CME
CASING	
4" dia.	5' depth
	depth
ADVANCEMENT METHOD	Hud Rotary
DRILL RODS	NWJ
ROTARY BIT DIAMETER, IN.	3 7/8"
DRILLING MUD USED	QUIK-GEL
AUGER	N/A
SAMPLERS	
HAMMER TYPE	Donut
WEIGHT	140 lb **DROP** 30" **RATE** Manual
D-SAMPLER	2" Split Spoon
U-SAMPLER	N/A
OTHER	N/A
ROCK CORING	
CORING FEED	Hydraulic
CORE BARREL	NX-Core Barrel
CORE BIT	NX-diamond bit

REMARKS

1. After S-2, 5' casing added (18.5" stickup)
2. Use 30o lb. Hammer drive 3.5" further to get sample (10 blows)
3. Low speed spinning

LEGEND

TV = Torvane Shear Strength, TSF
CT = Coring Time, minutes/foot
CB = Casing Blows Per Foot
OLT = Other Lab Testing Performed
PP = Pocket Penetrometer Unconfined Compressive Strength, TSF

REMARK TYPES

LC = Lost Circulation
HD = Hard Drilling
RC = Rig Chatter
CBJ = Core Barrel Jam
PO = Petroleum Odor
CW = Change in Wash
SS = Slickensided
EOB = End Of Boring
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WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATIONS

PIEZOMETER__ MONITORING WELL__ INSTALLED No **SKETCH SHOWN ON** N/A

PAY QUANTITIES

2" DIA. SAMPLE BORING	**LIN. FT.** 15'	**NO. OF 3" UNDISTURBED SAMPLES**	N/A
CORE DRILLING IN ROCK	**LIN. FT.** 5'	**OTHER** N/A	

BORING CONTRACTOR

DRILLER Jerry **HELPER(S):** Chris

OEI OBSERVER J. Xiao **DATE:** 11/9/2016

CLASSIFICATION CHECK

BORING LOG

Oweis ENGINEERING INC.
INNOVATIVE GEOTECHNICAL ENGINEERING SOLUTIONS

PROJECT ASTORIA PARK FORCE MAIN TO DITMARS AVENUE — BORING NO. B-2
PROJECT NO. 16-NY115-01 — SHEET 2 OF 3
LOCATION Corner of Shore Blvd and Ditmars Blvd. — GROUND ELEVATION ~16'
OEI OBSERVER JX

DAILY PROGRESS	SYMBOL	SAMPLE NO.	DEPTH (ft)	BLOWS/6"	REC (in)	SAMPLE DESCRIPTION	STRATA	DEPTH (ft)	MOISTURE CONDITION	FIELD TESTS	REMARKS (TYPE)
7:45 11/9/16 JX						Dark brown Top Soil (8")					
		S-1	1	8-26	20"			1	D		
						Red brown f SAND, trace f Gravel, trace Silt (SP)					
			2	23-23		(Possible Fill)		2			
		S-2	3	24-50	18.5"	Yellow brown to red brown mf,SAND, little mf Gravel		3	D		
				28-57/4.5"		trace Silt (SP), (Possible Fill)					
			4					4			1
		S-3	5	60-85	16.5"	Yellow brown cf SAND, little mf Gravel, trace Silt (SP)		5	M		
			6	42-80			SP	6			
		S-4	7	24-66	9.5"	Same (SP)		7	M		
				41-63		(Possible Fill)					
			8					8			
						Dark brown cm SAND. Some c (-) f Gravel. (SW), Till					
		S-5	9	71-55	12"	Decomposed rock at tip of spoon		9			
				60-100/4"							
			10					10			
		S-6	11	100/3.5"	3.5"	Dark Gray Decomposed Rock (GP)		11			2
			12				SW/GP	12			
			13					13			RC
			14					14			
			15					15			
						Soil to 16 ft.					3
			16	0		Approximate Top of Bedrock		16			
			17	13:30		Gray m grained, hard, slightly fractured, m weathered.		17			
					35"	Schist					
		C-1	18	13:15				18			
						Rec= 35/60 =58%					
12:00 11/9/16 JX			19	12:30		RQD=28/60=46.7%		19			
			20	9:32				20			
						E.O.B @ 20'					
			21					21			
			22					22			