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**CROSS HARBOR FREIGHT MOVEMENT PROJECT:  
PHASE 1A ARCHEOLOGICAL ASSESSMENT  
65<sup>TH</sup> STREET RAIL YARD  
BAY RIDGE TUNNEL ALIGNMENT  
BROOKLYN, KINGS COUNTY, NEW YORK**

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Prepared for

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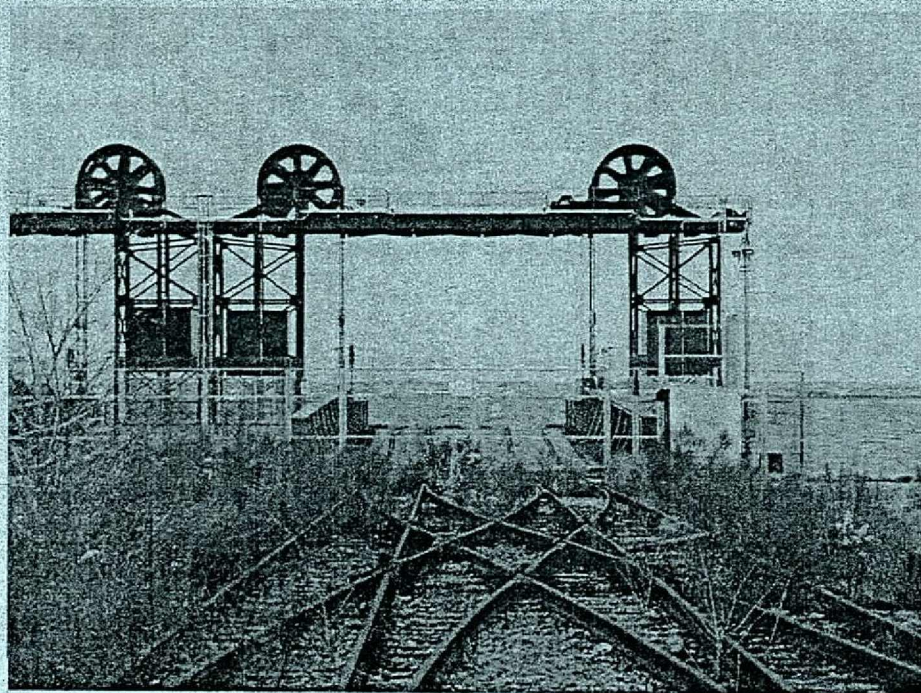
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Phase Ia Archeological Assessment  
65<sup>th</sup> Street Rail Yard  
Bay Ridge Tunnel Alignment  
Brooklyn, Kings County, New York

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## MANAGEMENT SUMMARY

John Milner Associates, Inc. (JMA) conducted a Phase 1A archeological assessment for selected components of the Cross Harbor Freight Movement Project (the Project) on behalf of AKRF, Inc. and the New York Economic Development Corporation (NYCDEC). The components of the Project discussed in this report (the Project Area) include the 65<sup>th</sup> Street Rail Yard and proposed Bay Ridge Tunnel Alignment, located in or near the Bay Ridge section of Brooklyn, Kings County, New York. No previously recorded archeological sites are located within or in the immediate vicinity of these proposed construction areas. In the opinion of JMA, the degree of previous disturbance that has occurred in the areas of proposed Project related construction that are discussed in this report makes it highly unlikely that undisturbed prehistoric archeological deposits may be present within the Project Area.

The New York City Landmarks Preservation Commission identifies the 65<sup>th</sup> Street Rail Yard as an archeologically sensitive area for late-nineteenth-century transportation-related or industrial sites. In the opinion of JMA, historical archeological deposits associated with the late-nineteenth-century construction, rebuilding, and use of the railroad depot and train yards are likely to be present at the 65<sup>th</sup> Street Rail Yard. The proposed Bay Ridge Tunnel Alignment would be built within existing railroad rights-of-way. In the opinion of JMA, the proposed tunnel alignment is unlikely to have an adverse impact on significant historic archeological resources.



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## 1.0 INTRODUCTION

### 1.1 PURPOSE AND GOALS OF THE INVESTIGATION

John Milner Associates, Inc. (JMA) conducted a Phase 1A archeological assessment for selected components of the Cross Harbor Freight Movement Project (the Project) on behalf of AKRF, Inc. and the New York Economic Development Corporation (NYCDEC). The Project is intended to improve rail freight operations across Upper New York Harbor between New Jersey and New York. The information and conclusions contained in this report are intended to assist AKRF, Inc., NYCDEC, the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) in evaluating the Project's potential effects on archeological resources.

The purpose of the Phase 1A archeological assessment is to identify previously recorded archeological sites in the vicinity of the Project's area of potential effect (the Project Area). The Phase 1A assessment also evaluates the likelihood that previously unrecorded archeological resources may be located within the Project Area. All research, fieldwork, and report preparation were conducted in accordance with the New York Archaeological Council's *Standards for Cultural Resources Investigations and the Curation of Archaeological Collections* (NYAC 1994), recommended for use by OPRHP.

### 1.2 PROJECT LOCATION AND DESCRIPTION

The goal of the Cross Harbor Freight Movement Project (the Project) is to reduce traffic on a regional scale in New York by facilitating freight operations by rail and to create redundancy of the existing bridge and tunnel network. The proposed improvements could involve the implementation of an enhanced rail float system in the harbor or the construction of a freight tunnel from Staten Island or New Jersey to the Bay Ridge Line of the Long Island Railroad (LIRR) in Brooklyn.

The components of the Project discussed in this report include the 65<sup>th</sup> Street Rail Yard and proposed Bay Ridge Tunnel Alignment, located in or near the Bay Ridge section of Brooklyn, Kings County, New York (Figure 1). These components represent only a portion of the proposed improvement alternatives that comprise the entire Project (Figure 2). Archeological sensitivity assessments concerning other components of the Project are not included in this report. In this report, the Project Area refers only to the 65<sup>th</sup> Street Rail Yard and Bay Ridge Tunnel Alignment (Figures 1, 2).

In addition to the No Action alternative, three alternatives for the Project are currently under consideration:

- *Transportation Systems Management Alternative.* This alternative would include more efficient management of the current transportation infrastructure to accommodate demand. The alternative would emphasize operating improvements and critical bottlenecks along the existing freight rail system – such as increased efficiency in float operations from Greenville Yard in New Jersey to the 65<sup>th</sup> Street Yard in Brooklyn.



- *Enhanced Float Operations Alternative.* This alternative would include enhanced and expanded capacity for the railcar float system across New York Harbor from Greenville Yard in New Jersey and from Port Ivory, Staten Island to the 65<sup>th</sup> Street Yard in Brooklyn.
- *Rail Freight Tunnel Alternative.* This alternative would include construction of a rail freight tunnel under New York Harbor. Two tunnel routes are being considered: (1) from the Staten Island Railroad to the 65<sup>th</sup> Street Yard in Brooklyn and (2) from the Greenville Yard in New Jersey to the 65<sup>th</sup> Street Yard in Brooklyn.

For the three components of the Project discussed in this report as the Project Area, possible construction activities or other improvements include:

- *65<sup>th</sup> Street Rail Yard.* Proposed Project-related construction activities at the 65<sup>th</sup> Street Rail Yard (Figure 3) include improvements to the yard to enhance track alignment and increase capacity, and the possible construction of a second railcar float bridge.
- *The Bay Ridge Tunnel Alignment.* For the Rail Freight Tunnel Alternative, two proposed tunnels would reach the Brooklyn shoreline in the vicinity of the 65<sup>th</sup> Street Rail Yard. The Staten Island tunnel would enter Brooklyn west of Owl's Head Park. A tunnel vent shaft is proposed at the seaward end of the 69<sup>th</sup> Street pier. The footprint for the tunnel vent shaft would be 230 feet by 150 feet. At this location the tunnel depth would be 100 feet. The tunnel would then be built by underground boring for 10,325 feet, rising to a depth of 65 feet between Eighth and Ninth Avenues. The New Jersey tunnel would reach the Brooklyn waterfront at the 65<sup>th</sup> Street yard. A tunnel vent shaft would be constructed within the rail yard with a footprint of 230 feet by 150 feet. At the 65<sup>th</sup> Street yard, the tunnel depth would be 100 feet. The tunnel would then be built by underground boring for 10,325 feet, rising to a depth of 65 feet between Eighth and Ninth Avenues, where the New Jersey tunnel would join the Staten Island tunnel. From this point the tunnel alignment would be built by cut-and-cover construction for 1,265 feet, rising to a depth of 35 feet at Tenth Avenue. The remainder of the tunnel alignment would be built in an open-cut for a distance of 1,865 feet, rising to meet grade between Twelfth and Thirteenth Avenues.

## 2.0 ENVIRONMENTAL AND CULTURAL CONTEXTS

### 2.1 HUDSON RIVER ESTUARY PALEO-ENVIRONMENTAL CONTEXT

The Project Area is within the Hudson River Estuary. The estuary represents the Hudson River valley that is being flooded by the present local relative rise in sea level. This rise in relative sea level is the result of both the rise in global sea level related to the continued melting of glacial ice on the earth and the isostatic rebound of the region since the last glacial maximum (Patton 1992). The transgression of coastal processes into the Hudson River estuary has resulted in either the erosion or preservation of prehistoric archeological sites in relation to the rate of local sea level rise, the level of energy related to coastal processes, and their geographic location (Hoyt et al. 1990; Kraft et al. 1983; Stright 1990). The waterfront portions of the Project Area are currently being transgressed by the continuing sea level rise of the present deglaciation of the earth.

During the Late Wisconsin Stage glacial maximum (~ 18,000 years B.P.), the New York Harbor region was covered with the southerly flowing Laurentide Ice Sheet. This glacial flow aided the scouring of the general valley of the Hudson River. Rapid warming of the climate after ca. 15,000 yrs B.P., causing the retreat, thinning, and melting of the ice sheet, resulted in the deposition of moraines and outwash deposits within the region. As the Laurentide Ice Sheet melted and retreated, regional sea level began to rise from a position of approximately 30 meters below present, soil development began on the glacial outwash deposits above sea level, and both flora and fauna advanced into the region. With the continuing rise in sea level, coastal processes have migrated across the outwash deposits and their associated soils to the present coastline of New York Harbor. Presently, the Hudson River is being filled with modern estuarine deposits that are periodically dredged for the purpose of shipping. This dredging of New York Harbor can be identified by the linear shipping channels seen on Figure 1 (USGS 1981, 1995).

The Ronkonkoma Moraine, an enormous deposit of mixed sands, silts, clays, and boulders deposited ca. 15,300 B.P., marks the final advance of the glaciers. The Ronkonkoma Moraine forms the southern side of Long Island extending from Lake Success at the border of Queens and Nassau Counties to Montauk Point (Snow 1980; Wolfe 1995:460). A few centuries later the retreating ice paused again, depositing a second band of sediments identified as the Harbor Hill Moraine. The Harbor Hill Moraine extends southwest across Queens from Little Neck Bay, across Brooklyn and Staten Island and into New Jersey. The post-glacial environment supported a diversity of flora and fauna. Paleontological remains recovered in the New York City area include the remains of mammoth, giant bison, saber-tooth tigers, giant ground sloth, mastodon, and prehistoric horse (Wolfe 1995:461). After 12,000 B.P., the tundra environment gradually came to include more cold-adapted evergreen species. Palynological evidence indicates that vegetative and corresponding faunal communities changed concurrently with the warming climate (Snow 1980:114). Regional floral and faunal communities achieved an essentially modern character, with corresponding faunal communities, by about 4,000 B.P. (Funk 1991:52).

The surface of the glacial outwash deposits represents the landscape that humans would have exploited since the Wisconsin Stage glacial maximum. As sea level continues to rise, coastal processes are continuing to transgress the glacial outwash deposits and bury them below estuarine deposits. Thus, directly below the surface separating the deposits related to glacial outwash and the estuarine deposits is the target of any investigation to identify human occupation of the landscape below present sea level.



## 2.2 PREHISTORIC PERIOD CULTURAL CONTEXTS

Evidence from known archeological sites reveals dramatic cultural changes occurred throughout the long period of human occupation in coastal New York. Environmental changes and technological innovations influenced subsistence practices and choices of settlement location of prehistoric Native American groups. The availability and changing importance of ecological resources affected the distribution of camping sites, special activity sites, and village locations across the landscape. Settlement locations and cultural practices were also affected by increasing exchange and social contact between Native American groups in the later prehistoric periods and the influence of Europeans in the Contact and Colonial periods.

The prehistory of Eastern North America is commonly divided into three major temporal periods: Paleo-Indian, Archaic, and Woodland. These periods are each characterized by distinctive subsistence practices, social organization, settlement systems, and material culture. The definition of these cultural systems and an explanation for changes in culture through time provide a structure upon which archeological research questions can be framed. Archeologists continually debate many details regarding chronology, adaptation, and culture change but a generally accepted outline of regional prehistory is presented here.

### 2.2.1 THE PALEO-INDIAN PERIOD, CA. 12,500 TO 10,000 B.P.

Based on radiocarbon age estimates of sites associated with Paleo-Indian fluted points, it appears that human beings first occupied the northeastern United States about 13,000 B.P. (Levine 1990). The distinctive lithic components of Paleo-Indian assemblages consist of long, fluted projectile points and a variety of end scrapers, side scrapers, knives, graters, and perforators (Fiedel 2000; Funk 1976; Ritchie 1971). This tool-kit is superbly designed for hunting, butchering, and animal processing activities. The association of fluted Clovis points with extinct megafauna such as mammoth and mastodon at sites in the western and southern United States suggests that Paleo-Indians were largely dependent on big game hunting for subsistence (Fiedel 2000). However, there is no clear evidence for Paleo-Indians hunting Pleistocene fauna other than caribou in the northeastern United States. Like historically documented hunters and gatherers, Paleo-Indian subsistence patterns were likely very dependent on the collection of a variety of fruit and vegetable resources (Funk 1976; Levine 1990; Ritchie 1980; Snow 1980:150). Paleo-Indian peoples probably lived in small, mobile bands and their choice of settlement seems to have been conditioned by access to upland forest resources, low-lying swamp areas, medium to large sized drainages, and high-quality lithic sources (Fiedel 2000; Funk 1976).

Evidence for Paleo-Indian occupations in the New York City region comes from scattered surface finds of fluted projectile points on Staten Island and Long Island. The Port Mobil Site on Staten Island is the best known Paleo-Indian site in the New York City area. Twenty-one fluted points and more than 120 stone tools have been recovered from the vicinity of this site, now located in a extensively disturbed oil-tank farm that in the early Holocene would have been a high point of land overlooking the Arthur Kill (Cantwell and Wall 2001:41). A large number of mammoth and mastodon teeth have been recovered from the continental shelf by fisherman, indicating that the exposed portions of the continental shelf were inhabitable in the early post-glacial period (Snow 1980:105). Archeologists assume that numerous Paleo-Indian and Early Archaic period sites in the New York City area were located off of the present coastline, and were subsequently inundated by the post-glacial rise in sea levels (Funk 1991; 57; Cantwell and Wall 2001:38). There are no known Paleo-Indian sites located in Brooklyn (Raber et al. 1985:13).

### 2.2.2 THE ARCHAIC PERIOD, CA. 10,000 TO 2,700 B.P.

The Archaic Period subsumes a diverse group of hunting and gathering cultures that occupied North America throughout the dramatic environmental changes of the early Holocene. Archaic cultures in the Northeast are generally characterized as small, mobile social groups, and their sites are usually small and lacking permanent structures, fortifications, extensive storage pits, and elaborate mortuary remains (Ritchie 1980:32). Archaic settlement and subsistence practices in southeastern New York were organized around seasonal movements between coastal and inland riverine areas with a reliance on both woodland and aquatic resources (Tuck 1978). Archaic Period sites in New York City tend to be located along the East and Hudson Rivers, and Archaic sites have been identified in Lower Manhattan, the Bronx, and on Ellis Island. During the Archaic Period, sea levels were lower than present and many sites are located on uplands adjacent to areas that would have been estuarine marsh but have been subsequently inundated (Lenik 1992).

The Early Archaic Period (ca. 10,000 to 8,000 B.P.) is poorly represented in the Northeast generally (Snow 1980:157), perhaps due to relatively unfavorable or inhospitable climactic conditions during the period (Funk 1976). Very few Early Archaic sites have been excavated or radiocarbon dated in the Northeast; as a result these sites are usually identified by the presence of projectile points that resemble types found in better documented, stratified sites in the southeastern United States. Early Archaic sites are identified based on the presence of diagnostic Kanawha, Le Croy, Stanly, Hardaway, and Palmer projectile points, in association with a variety of scrapers, choppers, and ground stone woodworking tools (Ritchie and Funk 1971; Snow 1980:161-163).

The Middle Archaic (ca. 8,000 to 6,000 B.P.) is often characterized as a period of adaptation to the emerging temperate climactic conditions of the Holocene, including the exploitation of a wide variety of floral and faunal species similar to those of the modern era (Snow 1980:182-183). Middle Archaic sites in the Northeast are identified by diagnostic Neville, Stark, and Merrimack projectile point types. Several new technological innovations appeared during this period including stone gouges and axes, large ground stone semi-lunar knives, notched net-sinkers and plummets, and ground stone spear-thrower (or atlatl) weights (Dincauze 1971; Snow 1980:184).

The Late Archaic Period (ca. 6,000 to 3,000 B.P.) in southeastern New York is identified by the presence of distinctive narrow stemmed projectile points (Tuck 1978). Local variants of this tradition include Lamoka, Wading River, Sylvan Lake or Sylvan Stemmed, Taconic, and Bare Island projectile points (Fiedel 1986; Ritchie 1971). The foraging economy of the Late Archaic was based on the scheduled exploitation of specific seasonally available resources, including an emphasis on marine resources as evident from large shell middens on coastal and riverine sites (Funk 1991:54-55; Ritchie 1980:142). Substantial population growth is indicated by significantly greater numbers of sites in the area, the larger size of some sites, and the diversification of exploited environments.

The Terminal Archaic (or Transitional Period, ca. 3,500 to 2,700 B.P.) is characterized by technological innovations and subsistence practices that are often viewed as precursors to developments that occurred in the subsequent Woodland Period. In southeastern New York, distinctive Orient Fishtail projectile points serve as a diagnostic marker of this period, along with carved steatite (or soapstone) vessels and elaborate mortuary practices (Ritchie 1971, 1980; Snow 1980:239-244).



### 2.2.3 THE WOODLAND PERIOD, CA. 3,000 B.P. TO EUROPEAN CONTACT

The Woodland Period is often distinguished from earlier prehistoric periods by significant changes in technology (notably the widespread production and use of ceramics), more intensive subsistence practices (often including the domestication of plants), increasing trends towards sedentism and larger settlements, and changes in social organization (Ritchie 1980; 179-180; Versaggi 1999). Woodland sites are distinguished from earlier periods by the appearance of fired clay ceramic vessels in the archeological record.

During the Early Woodland Period (ca. 2,700 to 2,000 B.P.) Native American groups continued the hunting, gathering, and fishing practices of the Terminal Archaic, supplemented by an increase in shellfish collecting as evidenced by large shell middens located on sites near the coast or estuaries (Funk 1976; Snow 1980:283). The Early Woodland in New York State has traditionally been identified by the presence of diagnostic Meadowood and Adena projectile points (Ritchie 1971, 1980). The distribution of these points, and related evidence for elaborate mortuary ceremonialism, within the state is generally restricted to central and western New York (Ritchie 1980; Snow 1980:266; Tuck 1978). Many researchers have recently begun to question whether Adena and Meadowood are appropriate diagnostics of the Early Woodland in the Hudson Valley and southeastern New York, and argued that projectile point chronologies for the Terminal Archaic and Early Woodland need to be reevaluated (Versaggi 1999). Rossville points serve as another diagnostic marker of Early Woodland occupations in the region, and are usually recovered in association with coastal shell middens. Vinette I pottery, a thick grit-tempered ware decorated on interior and exterior surfaces with impressed cordage or fabrics, represents one of the earliest ceramic traditions in the region (Ritchie 1980; Tuck 1978).

The Middle Woodland Period (ca. 2,000 to 1,000 B.P.) in eastern New York is characterized by changes in social and economic organization, including increasing trends towards sedentism and long-distance exchange of smoking pipes and lithic materials. Diagnostic artifacts from the Middle Woodland include Fox Creek stemmed and lanceolate projectile points, Jack's Reef points, Greene points, and a variety of decorated pottery styles (Funk 1976; Kostiwi 1995; Ritchie 1971; Snow 1980:276).

In southeastern New York, the Late Woodland Period (ca. 1,000 to 400 B.P.) is divided into the Bowman's Brook and subsequent Clasons Point Phases. These cultures are known from large village sites near tidal pools and small coves, often characterized by numerous pits for cooking, storage, and the disposal of refuse (Ritchie 1980:269), as well as smaller activity sites. The Late Woodland economy in coastal New York seems to have been primarily oriented to marine resources, supplemented by horticulture and seasonal hunting and gathering (Ritchie 1980:268-270). Diagnostic artifacts for the period include Levanna and Madison style points (Ritchie 1971) and distinctive types of pottery including Bowman's Brook Incised and Stamped, East River Cord Marked, Munsee Incised, Castle Creek Beaded, and Wickham Punctate and Incised (Ritchie 1980:270-272).

Sites with Middle and Late Woodland components are the most numerous identified in New York City. The appearance of pottery in assemblages from these sites serves as the diagnostic marker of Woodland occupations, and pottery fragments recovered from sites with earlier components suggests continued use of previously utilized locales during the Woodland Period (Lenik 1992). Late Woodland settlements were dispersed throughout the city, at locales such as Archery Range, Ward's Point, Washington Heights-Inwood, Clasons Point, Bowmans Brook, and Aqueduct. Many of these locations continued to be occupied throughout the early period of European Contact (Cantwell and Wall 2001:114-116).

## 2.3 HISTORIC PERIOD CULTURAL CONTEXTS

In the Late Woodland and Early Contact periods, the Lower Hudson Valley and coastal areas of New York were inhabited by Munsee-speaking groups of the larger Lenape (or Delaware) cultural group of Native Americans (Burrows and Wallace 1999:5; Cantwell and Wall 2001:120; Goddard 1978; Snow 1980:96). The Munsee generally lived in multi-family longhouse structures about 20 feet wide and up to 100 feet long. These houses were usually arranged as loose clusters in hamlets as opposed to nucleated villages. In addition to speaking a similar dialect of the Eastern Algonkian language, Munsee groups generally shared similar modes of subsistence, settlement, social organization, and forms of material culture (Goddard 1978; Grumet 1995:26; Snow 1980:97-99). In the early-seventeenth-century, the fur trade served as the primary motivation for Dutch colonization of the Lower Hudson Valley. Interactions with the Dutch and participation in the fur trade resulted in rapid and dramatic changes in the economy, social relations, and material culture of local Delaware groups (Burrows and Wallace 1999:11-13; Goddard 1978).

### 2.3.1 CONTACT AND COLONIAL PERIODS

Contact Period settlements are recognized in the archeological record by small quantities of European manufactured goods, such as metal kettles, tools, projectile points, ornamental brass cones, glass beads, bottles, jugs, and cloth among larger quantities of Native American material culture and refuse (Cantwell and Wall 2001:122-123). Within New York City, close to eighty Native American habitation sites have been documented, along with the locations of agricultural fields and a network of trails that connected the individual settlements (Burrows and Wallace 1999:6). In the early-seventeenth-century, Munsee communities in Brooklyn were documented at Marechkawick (sandy place) located near Borough Hall, Nayack (point of land) and Wichquawanck (sandy bank) located near Fort Hamilton, Techkonis at Gravesend, and Canarsie (grassy place) in the Flatlands. Some scholars refer to the Indians of Brooklyn collectively as the Canarsie (Bolton 1934:26; Cantwell and Wall 2001:120-121; Grumet 1995:27).

The government of Holland formally established the colony of New Netherlands in 1614, claiming exclusive rights to trade on all lands between the Connecticut and Delaware Rivers. The seat of government for this new colony was at New Amsterdam, a small Dutch fort located in Lower Manhattan. In 1621 the charter for the colony was transferred to the Dutch West India Company, an armed mercantile association formed to serve as the agents of Dutch colonialism in the New World (Burrows and Wallace 1999:19-21). The introduction of European diseases resulted in the decimation of Native American populations. These losses were compounded by casualties in wars both among Native groups and with the colonists (Brasser 1978; Goddard 1978). Snow (1980:34) estimates that prior to European contact, the total Munsee population in the Lower Hudson and Delaware valleys was between 24,300 and 51,300 people; he estimates the post-epidemic population for the same region to be only 4,500 people.

The Canarsie and other local Munsee groups gradually lost control of their lands throughout the seventeenth century. The Dutch began acquiring Native American lands in Brooklyn through a series of purchases in the 1630s, accompanied by small settlements of colonists in Gowanus and Red Hook. Intermittent warfare encouraged the westward migration of Munsee groups, including attacks by the Dutch in the 1640s and war with the Mohawk in the 1650s. The Dutch surrendered the New Netherlands colony to the English in 1664, and the English continued to secure land titles from Munsee groups in the region. The last tract of Native American land in Brooklyn at



Canarsee (or Gravesend) was sold to English colonists in 1684 (Gurnet 1995:27; Raber et al. 1985:17).

The colonization of the Bay Ridge area formally began in 1652, with the purchase of lands by the Dutch West India Company from the Nayack Indians (Manbeck 1998:4; Rawson 1995:90). The area was originally part of the Town of New Utrecht, established as one of the six original towns in Brooklyn in 1657 (Latimer 1995:148; Manbeck 1998:4). In the eighteenth and early-nineteenth-century, Bay Ridge was known as "Yellow Hook" due to the distinctive color of the clay found in the area. Yellow Hook was a small farming community of dispersed farmsteads located along the shoreline (Bangs 1912:71-72; Rawson 1995:90). By 1790 the Town of New Utrecht had only 562 residents (Latimer 1995:149), indicating the continued rural character of the area.

### 2.3.2 THE NINETEENTH AND TWENTIETH CENTURIES

The Yellow Hook area of New Utrecht remained largely undeveloped and sparsely settled through the early-nineteenth-century. The area was primarily used for farming and formed a relatively remote part of the agricultural network supplying the urban areas of Lower Manhattan. Land holdings of the earlier settlers were long, narrow tracts arranged generally perpendicular to the shore. North of Red Hook, industrial and waterfront development activities accelerated in the 1820s and 1830s on the Brooklyn shoreline. Except for occasional undocumented piers and wharves for farmers' boats, the waterfront in Yellow Hook remained virtually undeveloped until the 1840s (Raber et al. 1985:18-21).

The Town of Brooklyn was chartered as the City of Brooklyn in 1834. As the city grew as an important suburb, port, and industrial area it gradually expanded eastward. By 1860, the City of Brooklyn had over 260,000 residents, mostly foreign-born, while the remaining Towns of Kings County (including New Utrecht) were still essentially rural, with a combined population of less than 12,500 (Latimer 1995:148-151). In the 1850s, real estate speculators recognized the potential for developing Yellow Hook as a wealthy suburban residential area. The area was renamed Bay Ridge in 1853 in order to avoid any unpleasant associations with the yellow fever epidemic of 1848-1849, as well as make the area sound more appealing to developers. After the Civil War, Bay Ridge became a popular summer retreat for New York's elite and numerous mansions were built along the ridge overlooking the Narrows (Bangs 1912:72; Manbeck 1998:4; Rawson 1995). Many parts of New Utrecht remained relatively rural areas, with small farmers growing vegetables and produce to sell to the growing urban population of Brooklyn (Weinstein 1995:822).

In the 1870s, the urban growth of Brooklyn began to reach into Bay Ridge and other areas of New Utrecht. The suburban development of the area, and industrialization of the waterfront, were accelerated by the construction of railroad lines to Coney Island. The City of Brooklyn formally annexed New Utrecht in 1894 (Latimer 1995:151; Weinstein 1995:822). The industrial development of the 65<sup>th</sup> Street Rail Yard began during this period. The historical development of the Project Area is documented in Section 4.2 of this report.

Following the consolidation of New York City in 1898, the outlying areas of Brooklyn began to urbanize in the early-twentieth-century. The construction of subways and other internal improvements contributed to the rapid residential and commercial development of areas such as New Utrecht (Latimer 1995:152). Throughout the twentieth-century, Bay Ridge has been an ethnically diverse neighborhood, including large recent immigrant populations (Manbeck 1998:5; Rawson 1995).

## 3.0 RESEARCH METHODS

### 3.1 ARCHIVAL RESEARCH

Primary and secondary sources were examined in order to document the environmental setting of the Project Area, develop historic contexts for understanding potential cultural resources in the Project Area, and assess the likelihood for the Project Area to contain archeological resources. These sources included both written and cartographic documents relating to the past and present environmental conditions and human occupation of the region. Information concerning previously recorded archeological sites in the vicinity of the Project Area was acquired from the site files of the New York State Museum (NYSM), and New York State Office of Parks, Recreation and Historic Preservation (OPRHP). Early-twentieth-century references concerning the archeology of New York City were examined in order to identify archeological sites that previously existed in Brooklyn (e.g., Beauchamp 1900; Bolton 1934; Parker 1922). Previous cultural resources reports from other projects in the vicinity of the Project Area and regional syntheses of prehistory (e.g., Cantwell and Wall 2001; Funk 1976; GRA 2000; Raber et al. 1985; Ritchie 1980; Snow 1980) were examined to construct Native American cultural contexts for the Project Area. JMA also examined the historic archeological sensitivity model for Brooklyn developed by the New York City Landmarks Preservation Commission (LPC) (see Section 4.1).

Historic maps from the collection of the Queens Borough Public Library Long Island Division (QBPL) were examined in order to determine the presence of historic structures in the Project Area. JMA examined cartographic sources including the Walling (1859) *Topographical Map of the Counties of Kings and Queens* (Figure 4), the Dripps (1869) *Map of the City of Brooklyn*, the Beers (1886) *New Map of Kings and Queens Counties* (Figure 5), and the Dripps (1890) *Atlas of New Utrecht* (Figure 6). Late-nineteenth and early-twentieth-century insurance atlases consulted for the Project include the Hyde (1898) and (1905 [corrected through 1913]) atlases of Brooklyn (Figures 7, 8, 9, 10). Twentieth-century maps consulted included a 1947 City Planning Commission (CPC 1947) map of Brooklyn (Figure 11) and modern USGS (1981, 1995) maps of the Project Area (Figure 1). AKRF provided Project plans showing existing topography of the 65<sup>th</sup> Street yard (Figure 12) and geotechnical boring data (Figure 13; EKEI 1999) that provide information concerning the stratigraphy of landfill and glacial deposits in the vicinity of the 65<sup>th</sup> Street Rail Yard. JMA located detailed accounts of the construction, consolidation, and subsequent improvements of the 65<sup>th</sup> Street Rail Yard and Bay Ridge Line of the LIRR in historian Vincent Seyfried's (1966) *The Long Island Railroad, A Comprehensive History: Part 4, The Bay Ridge and Manhattan Beach Divisions*. Additional regional histories and secondary sources (e.g., Burrows and Wallace 1999; Jackson 1995; Manbeck 1995) were used to construct a historic context for the region (see Section 4.2).

### 3.2 FIELD RECONNAISSANCE

JMA personnel conducted a field reconnaissance of the Project Area on November 20, 2001. The purpose of the field reconnaissance was to assess the degree of previous ground disturbance and evaluate the potential for the Project Area to contain archeological resources. The field reconnaissance included the 65<sup>th</sup> Street Rail Yard and the Bay Ridge Line of the Long Island Railroad. JMA personnel examined the Bay Ridge Line from street overhead passes along the proposed tunnel alignment route to Fifteenth Avenue. Documentation included recording observations, and photographing significant or informative landscape features.

## 4.0 RESULTS

### 4.1 PREVIOUSLY RECORDED ARCHEOLOGICAL RESOURCES

JMA reviewed the combined site files of the New York State OPRHP and the New York State Museum in order to identify previously recorded archeological sites in the vicinity of the Project Area. Four previously recorded prehistoric archeological sites and five historic archeological sites were identified within five miles of the Project Area. Additionally, JMA reviewed the historic archeological sensitivity model developed for Brooklyn by the New York City LPC to identify historic period land use within the Project Area.

In the early-twentieth-century, archeologists recorded the former locations of prehistoric and Contact Period Native American sites in New York City (e.g., Beauchamp 1900; Bolton 1934; Parker 1920). It was recognized at the time that many of these sites were being (or would be) destroyed by urban development and construction activities across the city (Bolton 1934:131). The most comprehensive early index of archeological sites in the state is Arthur C. Parker's (1920) *The Archaeological History of New York*. Parker's site locations were based on informant interviews and it was not possible for him to field check each reported site location (Parker 1920:471). Archeologists regard Parker's site location information as general, if imprecise, indications of the presence of a site (or sites) in a given area (Sullivan 1992:6). Moreover, Parker's classification of archeological sites as villages, camps, and traces were not intended as functional definitions of each site in a modern sense. These designations instead refer to the relative archeological productivity that had been reported for each site (Bender and Curtin 1990:63-64). Four prehistoric archeological sites described by Parker (1920:582) are identified by the New York State Museum (NYSM) as being located within five miles of the Project Area (NYSM Sites 3605, 3606, 3611, and 3612).

NYSM Site 3605 is located approximately 7000 feet southwest of the Project Area. The site is described as a cache of stone and flint blades identified along the Narrows in 1837. The quantity of materials found at the site was reportedly enough to have filled a wagon (Parker 1920:582). A diversity of finished and unfinished projectile points of various sizes were reportedly included in this assemblage (Beauchamp 1900:79-80). Bolton (1934:147) identified this site as the location of Nayack, to which the Indians of Manhattan relocated after selling the island to the Dutch.

NYSM Site 3606 is a Woodland Period village or camp located approximately 1,900 feet north-northeast of the Project Area, along Flatbush Avenue north of Prospect Park. Parker (1920:582; also Beauchamp 1900:80) reported that the site was excavated in 1826. At that time the site was a barren sand hill covered with burnt and decomposed stones. Between one and one-half and four feet below the surface was a layer of ash with broken clay pipes, pottery, and arrowheads. Bolton (1934:145) identified the site as "Sand Hill".

NYSM Site 3611 refers to shell middens (Parker 1920:582) located approximately 8,500 to 13,000 feet south of the Project Area, within and north of the current US Military Reservation at Fort Hamilton. Bolton (1934:147) also described shell mounds, indicating a Native American occupation, at Fort Hamilton. NYSM Site 3612 also refers to shell middens (Parker 1920:582) located approximately 1,700 feet east-northeast of the Project Area, within Prospect Park.

Bolton (1934:145) identified two additional sites in the vicinity of the Project Area. He described an "Indian station", marked by extensive shell middens at Gowanus Bay, in the vicinity of 37<sup>th</sup>



Street and Third Avenue. Bolton also indicates that an "old Indian site" was located in Sunset Park, near 37<sup>th</sup> Street and Sixth Avenue.

JMA identified five historic archeological sites recorded by the OPRHP that are located within five miles of the Project Area. OPRHP Site A04701.000423, the Building 117 Site, is a mid-nineteenth-century domestic site located approximately 1,150 feet south of the Project Area in the Fort Hamilton Military Reservation. The Parade Ground Site, OPRHP A04701.00424, is a late-nineteenth-century to early-twentieth-century domestic site also located within the Fort Hamilton Military Reservation. OPRHP Site A04701.000508, the Bishop Mugavero Site, included mid-nineteenth-century architectural, privy, and cistern features located approximately 2,000 feet north-northeast of the Project Area on the grounds of the Bishop Mugavero Geriatric Center. The Atlantic Terminal Historic Site, OPRHP Site A04701.013923, consisted of mid-nineteenth-century stone- and brick-lined shaft features at the Flatbush Avenue Terminal (located at the intersection with Atlantic Avenue), approximately 2,100 feet north-northeast of the Project Area. OPRHP Site A04701.013594, reported by the New York City Landmarks Preservation Committee as a "Negro Burial Ground", is located approximately 2,450 feet northeast of the Project Area at Nostrand Avenue and Bergen Street.

The LPC Historical Archeological Sensitivity Model for Brooklyn identifies areas of various kinds of land use for the early (ca. 1815), middle (ca. 1852), and late (ca. 1898) nineteenth century. On the 1815 map, the area south and east of the 65<sup>th</sup> Street Rail Yard is indicated as an area of relatively sparse residential development with areas of open space or unimproved land. This designation likely refers to the group of houses along Bay Ridge Avenue in the vicinity of the Bay Ridge Dock that are depicted on the Walling (1859) map of Kings County (Figure 4). The 65<sup>th</sup> Street yard is not included in this residential area; at the time it remained undeveloped (and presumably undisturbed) waterfront.

The mid-nineteenth-century (ca. 1852) archeological sensitivity map of Brooklyn reflects the changing patterns of settlement and development that occurred during the period. An area of docks and wharves is indicated extending from the southern border of Owl's Head Park (69<sup>th</sup> Street) south to approximately 83<sup>rd</sup> Street (see Walling 1859; Figure 4). The waterfront along the Project Area and immediately to the north remained mostly undeveloped in the 1850s. The current route of the Bay Ridge Line of the LIRR also passed through large areas identified as unimproved, open space, or woodlands. These areas included the sections of the Bay Ridge Line from Fourth Avenue east to Sixth Avenue, and from Tenth Avenue east to Thirteenth Avenue. Land use along other sections of the Bay Ridge Line is not indicated on the LPC sensitivity model for 1852.

On the 1898 LPC map, the 65<sup>th</sup> Street yard is identified as a transportation/industrial area, reflecting the construction of the rail facilities at this location beginning in the 1870s. Industrial uses of the adjacent part of the waterfront also included the Edison Electric Illuminating Co. facility immediately south of the Project Area (Hyde 1898, 1905 [1913]; see Figure 8). The waterfront area immediately north of the yards is identified as unimproved or wooded areas. A residential area is indicated for the adjacent blocks south of the Bay Ridge Line between First and Second Avenues. A combined commercial/agricultural area is indicated for the block south of the Bay Ridge Line between Fifth and Sixth Avenues, and a low density residential area (less than 10% population density, according to LPC) is indicated for the adjacent block between Sixth and Seventh Avenues. The area north of the Bay Ridge Line between Tenth Avenue and New Utrecht Avenue is identified as a relatively open residential area.

## 4.2 HISTORICAL DEVELOPMENT AND ARCHEOLOGICAL SENSITIVITY OF THE PROJECT AREA

The Brooklyn waterfront in the vicinity of the Project Area has been subject to extensive and nearly continuous commercial and industrial development since the late-nineteenth-century. Extensive landscape modifications and construction activities within the Project Area began with the inauguration of a national period of railroad expansion following the Civil War. The 65<sup>th</sup> Street Rail Yard and Bay Ridge Line of the Long Island Rail Road have been variously used for passenger or freight rail services since the 1870s. A general history of this railroad development is presented below, followed by more detailed considerations of the landscape engineering, construction, and other disturbance activities that affect the archeological sensitivity of each component of the Project Area.

In 1870 the New York and Hempstead Plains Railroad Company was chartered for the purpose of constructing a railroad from Bay Ridge to Hempstead Plains in Nassau County. At the time, this line was unique among the steam railroads of Brooklyn for it was intended as a low-cost freight alternative by creating a waterfront terminal at 65<sup>th</sup> Street in order to ship barge-freight from New Jersey onto rails across Long Island (Linder and Zacharias 1999:146). Construction of this line began at both ends, and trains were running between Valley Stream and Hempstead within the next few years (Reifschneider 1925:14). At Bay Ridge, work began in April of 1873 on the construction of a large rail yard at 65<sup>th</sup> Street and excavations for a rail line through the massive ridge along the shoreline. Financial difficulties brought this construction to a temporary end in the late summer of 1873 (Seyfried 1966:5). A series of costly accidents, one fatal, forced the foreclosure of the New York and Hempstead in 1874 (Reifschneider 1925:15).

The New York, Bay Ridge, and Jamaica Railroad Company was chartered in 1875 for the purpose of constructing a railroad from Bay Ridge to Jamaica. Work resumed in January 1896 on the deep railroad cut began in 1873, and about two miles of line were completed before the company experienced financial difficulties (Reifschneider 1925:20; Seyfried 1966:8). In 1878, the line was leased to the New York and Manhattan Beach Railroad Company, owned by New York banker Austin Corbin and future owner of the Long Island Railroad. Corbin reorganized the route and purpose of the Bay Ridge line. Instead of running east-west and operating as a freight rail, Corbin changed the route to run north-south for seasonal passenger service to the banker's beach resort on Coney Island (Anderson 2001; Linder and Zacharias 1999:148). Under new management, the Bay Ridge line was extended west to New Lots Road, where it connected to the New York and Manhattan Beach's lines that ran from Green Point to Sheepshead Bay and Manhattan Beach (Reifschneider 1925:20).

Corbin's Manhattan Beach Hotel on the east end of Coney Island was a popular summer resort for late-nineteenth-century New Yorkers. The New York and Manhattan Beach Railroad and the New York, Bay Ridge, and Jamaica Railroad, both owned by Corbin, began passenger service to Manhattan Beach in 1877. Ferry lines transported passengers from Twenty Third Street (in Manhattan) to Greenpoint, and from Whitehall Street to Bay Ridge. From these ferries passengers were carried by rail to Coney Island. During the summer season, there were 13 daily trains running each way from both Bay Ridge and Green Point to Coney Island (Anderson 2001; Reifschneider 1925:20).

In 1881 Austin Corbin bought the Long Island Railroad [LIRR], and two years later constructed the Long Island City and Manhattan Beach Railroad from Fresh Pond Junction to Cooper Street,

where it connected with the existing Manhattan Beach lines. During this period of construction the rail lines of the entire Manhattan Beach system were also widened to standard-gauge and connected to the LIRR's Atlantic Avenue and Montauk (or Long Island City) branches. The three Manhattan Beach lines were consolidated in 1885 into the New York, Brooklyn, and Manhattan Beach Railway and leased to the LIRR by Corbin, their mutual owner (Anderson 2001; Smith 1958:58; Reifschneider 1925:23).

The New York, Brooklyn, and Manhattan Beach Railway's auspicious rise as a prosperous passenger rail came to an end in the 1890s. In June of 1896 Austin Corbin died after falling from his horse carriage (Anderson 2001; Reifschneider 1925:25). 1896 also witnessed the formation of the Brooklyn Rapid Transit Company [BRT] (changed to Brooklyn-Manhattan Transit Corporation in 1923), a security holdings firm that began consolidating various steam, electric, and horse-drawn trolleys and railways across Brooklyn. The BRT controlled nearly all of the street and elevated transit lines in Brooklyn by 1901 (Hood 1995). The New York, Brooklyn, and Manhattan Beach Railway could not compete with the expansion of the BRT. By the end of the summer of 1897 most passenger service from Bay Ridge to Manhattan Beach was terminated. The last season of passenger service on the Bay Ridge line was the summer of 1904, with only four round trips running daily (Seyfried 1966:102-103, 201).

In the early 1900s the Manhattan Beach network of rails was reorganized to accommodate freight service. The City of New York, the LIRR, and the BMT formed a public/private partnership and began planning a massive series of improvements that would connect the Brooklyn network of railroads to New England (Anderson 2001). One component of these improvements was the Brooklyn Grade Crossing Elimination Project, created by an act of the New York State legislature in 1903. This project was intended to provide fully graded and separate rights-of-way for the Brighton Beach Line of the BRT and the Bay Ridge and Manhattan Beach Lines of the LIRR (Diamond 2000). Components of this project were worked on and completed between 1905 and 1918. Aspects of the project included improvements to rail lines, expansion of rail yards, and construction of Hell Gate Bridge (or the New York Connecting Railroad Bridge, completed in 1917) to connect trains from New England to Queens and Manhattan (Anderson 2001; Diamond 2000; Reifschneider 1925:25; Seyfried 1966:173).

The largest component of the Brooklyn Grade Crossing Elimination Project was the Bay Ridge Improvement, which included work at the 65<sup>th</sup> Street Rail Yard as well as the Bay Ridge Line of the LIRR. A general account of the scale of work involved in this project is provided below:

"[The Bay Ridge Improvement] involved improved docks and car float facilities at Bay Ridge [the 65<sup>th</sup> Street Rail Yard] to accommodate [the] greater volume of rail freight traffic, the construction of rail yards for inter-modal freight transfer for local delivery, a 4 track tunnel 3,900 feet long, and depressing and elevating the line as required, including required bridges. It used 105,000 cubic yards of masonry and 7,500 tons of steel. Over 300,000 yards of earth was excavated, 26 miles of main track laid, and over 19 miles of yard track. The cost in 1918 dollars was about \$4.5 million" (Diamond 2000).

The Bay Ridge Line has continued as a freight-only rail throughout the twentieth century. Improvements or renovations to both the 65<sup>th</sup> Street yard and Bay Ridge Line have occurred, but at considerably smaller scales since the 1905-1918 improvements. Since 1997, the Bay Ridge Line has carried freight cars operated by the New York and Atlantic Railway. In 1999, the City of New York also awarded use of the 65<sup>th</sup> Street yard to the New York & Atlantic. The 65<sup>th</sup> Street yard has been used sporadically since being renovated by the City in the 1970s. More recent



improvements to the rail yard include newly renovated float aprons for receipt of freight from New Jersey. More detailed discussions of the construction and landscape modification histories of the various components of the Project Area are provided in the following sections.

#### 4.2.1 THE 65<sup>TH</sup> STREET RAIL YARD

The history of rail yard construction at 65<sup>th</sup> Street entails numerous episodes of construction, grading, and filling between the 1870s and 1910s (Raber et al. 1985:70). The engineered character of the waterfront is clearly visible in nineteenth-century maps of the rail yard. The degree of disturbance that characterized the 65<sup>th</sup> Street waterfront is typical for this area of the Brooklyn waterfront:

"The Reach 2 waterfront [i.e., from Bay Ridge Dock north to Henry Street] is an entirely artificial environment, which now projects between about 750 and 2550 feet beyond the approximate high water lines of the seventeenth and eighteenth centuries in most places...at an elevation of 5-8 feet above mean high water. Nineteenth and twentieth century bulkheads...form all reach margins and retain a variety of undocumented fill materials. In a few places, these bulkheads represent removal of colonial shorelines. Most landfilling and shore extension projects involved extensive dredging which provided much of the fill material. Other cultural materials may appear in landfill deposits as demolition debris, ash, and cinders" (Raber et al. 1985:7).

A review of the history of construction and landscape modification at the 65<sup>th</sup> Street yard reveals the extent of previous disturbance that characterizes this section of the waterfront. In July of 1872 the directors of the New York & Hempstead Railroad Company secured the purchase of the Michael Bergen farm at Bay Ridge. Michael Bergen's property is identified on the Walling (1859) *Topographical Map of the Counties of Kings and Queens* (Figure 4), although the boundaries of the farm are not indicated. The 110-acre farm included 1,100 feet of shoreline at 65<sup>th</sup> Street and extended east across Fourth Avenue. The company paid \$330,000 for the farm, or \$3,000 an acre. The high selling price of the property reflected the site's importance as a potentially invaluable deep-water terminal and ferry location (Seyfried 1966:3).

Work began immediately [1872-1873] on constructing a depot yard at the waterfront, as well as excavating a cut through Bay Ridge (see Section 4.2.2). The original depot yard was laid out on a five-acre site along the waterfront, although it does not appear that any buildings were constructed until 1876. By June of 1873, work had begun on the construction of a deepwater dock, planned to be 1,000 feet long, and extending up to 800 feet into the water with a depth of 16 feet at low-tide (Seyfried 1966:4). The New York and Hempstead Railroad stopped work on the 65<sup>th</sup> Street yard at the end of the summer of 1873, and went bankrupt the following year.

Under the management of the New York, Jamaica, and Manhattan Beach Railroad, work resumed on the 65<sup>th</sup> Street yard in January of 1876. As excavation work progressed on the rail line cut through Bay Ridge, the spoil from the excavations was used to fill and grade the waterfront for the proposed rail yard (Seyfried 1966:9). Construction of facilities at the rail yard began in earnest in 1876 and 1877:

"In 1876, a fence was set up around the property and walks built. A ferry house 30 x 20 [feet] was erected late [in] 1876. In February and March 1877 an engine house was built 40 x 24. In April 1877, a coal box was added 25 x 40 with a capacity of 150 tons of coal... In June 1877, the contractor, Mr. George

Kingsland, erected a depot in the form of an L; it was 48 x 160, with a waiting room 26 x 40, the latter two stories in height with a bell tower... Covered platforms extended 200 ft. from the end of the waiting room and were divided into bays 10 x 200 each... There was also a car house for storing passenger cars 500 feet in length. The docks of July 1877 had a frontage of 250 feet and a depth [length] over 1000 feet" (Seyfried 1966:200).

The newly constructed rail depot [described above] was wholly consumed in a disastrous fire on December 14, 1882. In 1883, the depot, car sheds, and dock area were rebuilt and new covered walkways connecting the docks to other facilities were erected in 1885 and 1887 (Seyfried 1966:200). Unfortunately, Seyfried (1966) does not provide detailed discussions of the rebuilt rail yard facilities, however the arrangement and dimensions of the rails, structures, and other facilities are depicted on late-nineteenth-century maps of the area.

The newly constructed docks, rail lines, and rail yard are depicted on the Beers (1886) *New Map of Kings and Queens Counties* (Figure 5), however the scale of this map prevents identification of the buildings or internal arrangement of the 65<sup>th</sup> Street yard. The docks, rails, and general location of the [rebuilt] depot are depicted on the Dripps (1890) *Atlas of New Utrecht* (Figure 6), however again individual structures are not indicated. The Dripps atlas does depict the early stages of landscape engineering that began on the rail yard property in the 1870s and 1880s. The original nineteenth-century shoreline is depicted on the map, between 300 and 600 feet west of First Avenue across the rail yard. The depot yard and docks extended up to 1000 feet from the original shoreline by 1890 (Figure 6). Work continued at the yard in the 1890s:

"In 1892, the surrounding land under water was bought as part of the New York Bay Extension Railroad scheme. In 1893, new tracks were laid in the expanded yards, new piers were built and a floating bridge added. In 1892, 15,472 acres of land in all were purchased to expand the yard to its present size" (Seyfried 1966:201).

The results of the 1890s expansion are depicted on the Hyde (1898) insurance atlas of Brooklyn (Figure 7). The insurance atlas shows the size and arrangements of buildings within the rail yard, including the depot, car shed, tool house, and engine shop. This map also documents the extent of landfill and pier construction that occurred on the property in the 1890s. The LIRR dock extends approximately 1,080 feet from the original nineteenth-century shoreline. The car slip at 66<sup>th</sup> Street extends approximately 960 feet from the original shoreline. In 1890 the waterfront had been filled to approximately 900 feet from the shoreline in the area extending from Wakeman Place (67<sup>th</sup> Street) to approximately 80 feet north of 65<sup>th</sup> Street.

The Brooklyn Grade Crossing Elimination Project in the 1900s and 1910s provided for the next major phase of construction and landscape alteration at the 65<sup>th</sup> Street yard:

"At the Bay Ridge yards the Long Island Railroad decided to take advantage of the opportunity offered by the extensive rebuilding and changing of grade to develop and increase its dock and yard facilities, the first such expansion since the improvements of 1892. The railroad entered into negotiations with New York City for the closing of 64<sup>th</sup> and 65<sup>th</sup> Streets between Second Avenue and the bay. Approval was received and in return the railroad agreed to assume all the costs of the First Avenue viaduct above the railroad tracks and enlarged yards. To get the viaduct to pass over the tracks at a sufficient height, it was necessary to depress the original track facilities 3.68 feet...

Among [the advantages provided by the Grade Elimination Project] was the layout of new and enlarged local freight delivery yards providing increased freight handling facilities. Most of all, the Bay Ridge route could now qualify as a through freight line in connection with the New York Connecting Railroad between New England and the South and West... This service was inaugurated on January 17, 1918" (Seyfried 1966:173).

Construction at the 65<sup>th</sup> Street yard during the 1910s included a new carfloat terminal as a principal component of the New York Connecting Railroad. Facilities included four new suspended-type transfer bridges and a 500 feet long pile fender rack for carfloat tie-up. At the 64<sup>th</sup> Street Pier, the LIRR expanded the wooden deck pier to accommodate four tracks for storing and switching freight cars. These facilities extended off the earlier bulkhead at the site, and represent the last period of major reconfiguration of the waterfront (Raber et al. 1985:71).

JMA conducted a field reconnaissance of the 65<sup>th</sup> Street yard on November 20, 2001. Current conditions observed on the property reflect the episodes of waterfront and landscape engineering since the 1870s. The rail yard is completely graded with a surface cover of stone fill dating from recent renovations on the property by the City since the 1970s (Plate 1). A new float apron for transferring cars and/or freight from barges is located at the west-end of the tracks on the current shoreline (Plate 2, Figure 12). Partially submerged remnants of late-nineteenth or early-twentieth-century piers, wharves, and freight loading facilities are visible in the harbor north of the float aprons (Plate 3). A recent cultural resource evaluation of these piers and wharves resulted in the recommendation that they were not historically significant due to their deteriorated condition, as well as comparison with better-preserved and documented examples of similar facilities at other locations (Raber et al. 1985:71).

The extent of excavation that occurred during the late-nineteenth century to grade the 65<sup>th</sup> Street yard and create the cut through Bay Ridge is indicated by the current topography around the rail yard (Figure 12). At the eastern end of the 65<sup>th</sup> Street yard, the Bay Ridge Line of the LIRR passes under the Gowanus Expressway and Second Avenue, within the deep cut through Bay Ridge excavated in the 1870s to 1890s. The depth of excavation that was required to create this cut and level the eastern end of the yard is clearly visible in the difference in elevation (approximately 25 feet) between the current rail yard and original topography of the ridge (Plates 4, 5; Figure 12).

The results of geotechnical borings prepared for the Project (Figure 13; EKEI 1999) also depict the extreme grade of the cut, and document the depths of fill (between 5 and 10 feet) that characterize the Brooklyn waterfront in this area. The western portion of the rail yard, extending approximately 1,000 feet east from the present shoreline, is entirely made land consisting of land fill (see original nineteenth-century shoreline on Figures 6, 7; Raber et al. 1985:7). Geotechnical borings taken along the waterfront to the north of the 65<sup>th</sup> Street yard indicate fill to depths of up to 20 feet below sea level (EKEI 1999). The eastern portions of the yard consist of fill underlain by glacial moraine deposits (Figure 13). Geotechnical borings taken in the eastern areas of the 65<sup>th</sup> Street yard (MRCE 2001:#125B and #209B) indicate fill to depths between 6 feet and 8 feet in these areas. It is likely that the depth of fill deposits generally increases across the rail yard in the areas closer to the present shoreline. Borings in the eastern area of the rail yard document variations in soil color, texture, and inclusions within the fill layers that suggest multiple episodes of fill deposition. For instance, geotechnical boring-location 125B (MRCE 2001) records the uppermost layer (to a depth of 4 feet) as brown, fine-medium silty sand, underlain (to a depth of 8-feet) with brown, coarse-fine sand with some silt. Geotechnical boring-location 209B (MRCE 2001) records the fill layer (to a depth of 6 feet) as brown/orange, medium-fine sand with some



silt and brick inclusions. Historical sources indicate that the material used to fill the rail yard and other waterfront areas came from the spoil excavated during the cut through Bay Ridge in the 1870s (Seyfried 1966:9) and from waterfront dredging during the construction of pier facilities (Raber et al. 1985:7). Multiple episodes of fill deposition are suggested in the historical accounts of the numerous phases of construction and subsequent modification at the rail yard between the 1870s and 1910s. Discrete episodes of fill deposition are not distinguishable in the geotechnical borings logs.

Archeologists recognize that during the Pleistocene vast quantities of water were trapped as ice in the glaciers. As a result, sea levels were considerably lower than at present and large tracts of the continental shelf were exposed as dry-land (Cantwell and Wall 2001:37; Snow 1980:105). At the height of the glaciation, sea levels were at least 90 meters below their present level (Funk 1991:52) and the coast was located as much as 120 miles east of its current position (Cantwell and Wall 2000:14). The retreat of the glaciers initiated a period of dramatic topographic and ecological change, including a rapid rate of sea-level rise beginning ca. 14,000 B.P. By 6,000 years ago sea levels were only about 9 meters below their current position, and continued to rise at a slower rate reaching about 2 meters below present by 2,000 B.P. (Funk 1991:52). This suggests that prehistoric archeological sites may be located in the offshore [presently underwater] areas adjacent to the 65<sup>th</sup> Street yard. However, the channels along the Brooklyn waterfront have been subject to repeated dredging and maintenance during the nineteenth and twentieth centuries (GRA 2000:17-21,38). The linear shipping channels depicted on USGS maps of the harbor (Figure 1; USGS 1981, 1995) illustrate the effects of these dredging episodes. Moreover, construction of the piers and bulkheads along the waterfront frequently including dredging as well as the deposition of large quantities of landfill (Raber et al. 1985). In the opinion of JMA, the extent of disturbance associated with these actions makes it highly unlikely that undisturbed prehistoric archeological deposits are located under the bulkheads or immediate offshore areas of the 65<sup>th</sup> Street Rail Yard.

#### 4.2.2 THE BAY RIDGE LINE TUNNEL ALIGNMENT

A proposed tunnel alignment runs from the Brooklyn waterfront along the right-of-way of the Bay Ridge Line of the LIRR to a point between Twelfth and Thirteenth Avenues where the proposed tunnel meets existing grade (see Section 1.2). The tunnel would rise from a depth of 100 feet below surface at the waterfront, to 65 feet below the surface between Eighth and Ninth Avenues, and continue rising to meet at grade between Twelfth and Thirteenth Avenues. The western portion of this tunnel alignment (from the waterfront to between Eighth and Ninth Avenues) would be an extension of tunneling construction from under the bay, the central portion (to Tenth Avenue) would be built by cut-and-cover construction, and the eastern portion (from Tenth to Thirteenth Avenues) would be built in an open cut (Figures 3, 15).

Construction of the Bay Ridge rail line occurred in tandem with the construction of the 65<sup>th</sup> Street Rail Yard in the late-nineteenth century. The cut for the Bay Ridge Line was excavated through the former orchards of the Bergen farm (Seyfried 1966:4). The initial phases of cutting through the ridge in the 1870s required the removal of massive amounts of sediment and rock from the rail line route:

"The soil through which the tunnel was being cut was a dry sandy one with here and there high boulders and beds of gravel. Most of this was carted out and used to fill up the adjacent hollows to build up the grades of 65<sup>th</sup> and 66<sup>th</sup> Streets. As of April [1873], 90 men with 40 horses and carts were at work between the shore and Fifth Avenue in the excavation through the ridge. The deepest cutting

necessary at any one point was 43 feet ([at] Fifth Avenue) and the average for a mile or two was 30 feet, the width being 32 feet, although the road bed of the tunnel for a double track was fixed at only 25 feet" (Seyfried 1966:4).

The initial phase of excavation through Bay Ridge was terminated before completion late in the summer of 1873 due to the financial problems of the New York and Hempstead Railroad. In 1875, the line was taken over by the New York, Bay Ridge, and Jamaica Railroad. In November of 1876 the line was sold again to Austin Corbin and re-organized as the New York and Manhattan Beach Railroad Company. Corbin opted to re-lay the line as a narrow gauge railroad and replaced the tracks that had been laid in 1873 (Anderson 2001). Work resumed on the Bay Ridge cut in January of 1876:

"By February 5<sup>th</sup>, Second and Third Avenues had been cut through despite occasional dangerous cave-ins... The great quantities of gravel excavated in the vicinity of Fourth Avenue made it easy to complete by the end of March the filling in of the dock where the ferryboats were due to land once the rail yard began running... Beyond [Fourth Avenue] the route offered few if any construction problems, for the right-of-way passed through level farms with gentle grades. On March 13, work began on the Johnson farm line of 61-62 Streets, between Fort Hamilton Avenue and New Utrecht Avenue" (Seyfried 1966:9).

By the end of the summer of 1876 the Bay Ridge line was completed to New Utrecht Avenue and 62<sup>nd</sup> Street, where it connected to the Brooklyn, Bath and Coney Island Railroad [now the West End Subway Line, or B Train]. After taking control of the Long Island Railroad in 1881, Corbin decided to reorganize the Manhattan Beach line [yet again] as a standard gauge track so it could connect to the LIRR's Atlantic Avenue and Montauk branches (Anderson 2001).

In the late 1870s another rail line was built from the 64<sup>th</sup> Street pier to New Utrecht Avenue. The New York and Sea Beach Railroad was a competitor of Corbin's, and the two lines serviced different hotels along the strip of resorts at Coney Island. The two lines negotiated a series of compromises and agreed to share the maintenance of the piers and yard facilities at 65<sup>th</sup> Street. The route of the New York and Sea Beach followed the right-of-way of the Bay Ridge line. From the harbor, the New York and Sea Beach ran parallel to and north of the Bay Ridge line to Eighth Avenue, where it crossed the Bay Ridge tracks and continued running parallel and south of the Bay Ridge line to 62<sup>nd</sup> Street and New Utrecht Avenue (Feinman 2001:4-5). The parallel routes of the Bay Ridge line and the Sea Beach line are depicted on the 1898 Hyde atlas of Brooklyn (Figures 8, 9, 10). The New York and Sea Beach line went bankrupt in 1896. The line was electrified and connected to the Third Avenue El [elevated train] at Third Ave and 65<sup>th</sup> Street. In 1900 the newly electrified line was taken over by the Brooklyn Rapid Transit Corporation [BRT] (Feinman 2001:13; Hood 1995).

In 1909 construction began on the Fourth Avenue subway from Brooklyn Heights. This subway line contains the only underground bridge crossing in the NYC subway system, where the Fourth Avenue subway crosses above the Bay Ridge Line while remaining underground below Fourth Avenue. In 1913 the contract for the Fourth Avenue subway was awarded to the BRT. The BRT connected the subway line to the former Sea Beach line at 59<sup>th</sup> Street (Figure 11). The Fourth Avenue subway opened for passenger traffic in 1915 (Feinman 2001:20-21). The MTA now operates the former Sea Beach line as the N Train of the New York Subway system.

After the excavation of the original cut for the Bay Ridge line in the 1870s, the most significant alteration of the right-of-way occurred during the Brooklyn Grade Crossing Elimination Project between 1903 and 1918. The Grade Crossing Elimination required depressing the rail tracks in many areas and the construction of stone retaining walls along sections of the rail right-of-way (Diamond 2000). The extent of excavation and ground disturbance that resulted from these two phases of construction is clearly visible in the current conditions of the right-of-way. In many places along the proposed Bay Ridge Tunnel Alignment, the rail lines are depressed as much as 30 feet below the surrounding ground surface (Plates 8, 9). The MTA N Train runs parallel to the Bay Ridge line within this right-of-way on an elevated terrace or berm (Plate 9).



## 5.0 CONCLUSIONS

### 5.1 PREHISTORIC ARCHEOLOGICAL SENSITIVITY

In prehistory, the Brooklyn waterfront would likely have been an attractive area for human exploitation of coastal resources and possible habitation sites. However, subsequent nineteenth- and twentieth-century development of the waterfront has dramatically altered the original configuration of the shoreline and coastal areas. In the opinion of JMA, the degree of previous disturbance that has occurred in the areas of proposed Project related construction that are discussed in this report makes it highly unlikely that undisturbed or *in situ* prehistoric archeological deposits may be present within the Project Area:

- Any potential prehistoric archeological materials or features that may be located at the 65<sup>th</sup> Street Rail Yard would be located in the upper portions of the glacial till and moraine sediments that directly underlie the artificial fill deposits that cover the entire surface of the rail yard. However, the 65<sup>th</sup> Street yard has been subject to repeated episodes of railroad construction and reconfiguration since 1870. The degree of disturbance associated with these episodes of construction makes it highly unlikely that undisturbed prehistoric archeological deposits are present beneath the fill at the 65<sup>th</sup> Street Rail Yard. Additionally, presently submerged areas along the waterfront that may have been inhabitable in prehistory when sea levels were lower are unlikely to contain undisturbed archeological deposits due to dredging associated with the construction of the rail docks as well as maintenance of the shipping channels.
- Proposed shoreline landfall locations for the Bay Ridge Tunnel Alignment would be located at the 65<sup>th</sup> Street Rail Yard and seaward end of the 69<sup>th</sup> Street pier (Figure 3; see Section 1.2). Construction of these tunnels includes the excavation of tunnel vent shafts at both of these locations. The 69<sup>th</sup> Street pier vent shaft would be located in an offshore area that has been subject to repeated episodes of dredging associated with the construction and maintenance of shipping channels in New York Harbor in the nineteenth and twentieth centuries. In the opinion of JMA, the extent of disturbance associated with these dredging episodes makes it highly unlikely that undisturbed prehistoric archeological deposits may be located in the area of the proposed 69<sup>th</sup> Street pier tunnel vent shaft. Proposed tunnel construction methods at both waterfront landfall locations are restricted to mining construction at a depth of 100 feet below surface. In the opinion of JMA, the depth of mining construction along the waterfront precludes the possibility that potential archeological deposits could be disturbed by such activities.
- The route of the proposed Bay Ridge Tunnel Alignment follows an existing rail line east of the 65<sup>th</sup> Street yard (the Bay Ridge Line of the LIRR) that was constructed within a deep cut originally excavated in the 1870s. Up to 30 feet of soil was removed in the original excavation of the cut through Bay Ridge during the construction of this line in the 1870s. Additional disturbances occurred during the construction of the Sea Beach rail lines. The Bay Ridge Line was further depressed during the Brooklyn Grade Crossing Elimination Project (ca. 1903-1918). The degree of previous disturbance along the proposed Bay Ridge Tunnel Alignment precludes the possibility that prehistoric archeological deposits exist within the rail line right-of-way.

## 5.2 HISTORIC ARCHEOLOGICAL SENSITIVITY

The New York City Landmarks Preservation Commission identifies the 65<sup>th</sup> Street Rail Yard as an archeologically sensitive area for late-nineteenth-century transportation-related or industrial sites. In the opinion of JMA, historical archeological deposits associated with the late-nineteenth-century construction, rebuilding, and use of the railroad depot and train yards are likely to be present at the 65<sup>th</sup> Street Rail Yard:

- Railroad depot and docking facilities were first constructed at the 65<sup>th</sup> Street yard in the 1870s. The original rail depot structures and facilities are described by Seyfried (1966:200; see Section 4.2.1) and were destroyed by fire in 1882. The depot and associated facilities were rebuilt in the 1880s, and this second phase of construction is documented on the 1898 Hyde insurance atlas (Figure 7). A layer of artificial fill to depths of at least six to eight feet (MRCE 2001) covers the entire ground surface of the rail yard (Figure 13, EKEI 1999). In the opinion of JMA, architectural foundations, rail segments, and other archeological features associated with these two phases of rail yard construction are likely to be present at stratigraphic interfaces within the fill deposits that cover the 65<sup>th</sup> Street Rail Yard. The area of potential historic archeological sensitivity at the 65<sup>th</sup> Street Rail Yard is indicated on Figure 14.

In the opinion of JMA, the proposed Bay Ridge Tunnel Alignment is unlikely to have an adverse impact on significant historic archeological resources:

- The Bay Ridge Line of the LIRR has been reconfigured and expanded numerous times since its original construction in the 1870s. Similarly the Sea Beach line, now N Train of the MTA, has been reconfigured to accommodate different uses since its construction in the 1870s. Remnants of earlier rail lines, or archeological features associated with these lines, may be present within the fill that underlies the current tracks along both sets of tracks. However, the various reconfigurations and phases of construction for each of these rail lines is extensively documented in both historical and cartographic sources. In the opinion of JMA, archeological remains of earlier rail lines within the Bay Ridge cut are unlikely to provide significant historical information concerning these rail lines that is not otherwise available in historical or cartographic sources.

## 5.3 RECOMMENDATIONS

The New York City Landmarks Preservation Commission identifies the 65<sup>th</sup> Street Rail Yard as an archeologically sensitive area for late-nineteenth-century transportation-related or industrial sites. In the opinion of JMA, archeological deposits associated with construction, burning, reconstruction, and use of the late-nineteenth-century rail depot may be present within the 65<sup>th</sup> Street Rail Yard (Figure 14). A program of archeological testing would be necessary to confirm the presence, location, and integrity of any historic archeological remains that may exist within the rail yard. No additional archeological work is recommended for the remaining areas of the proposed Bay Ridge Tunnel Alignment.

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## FIGURES





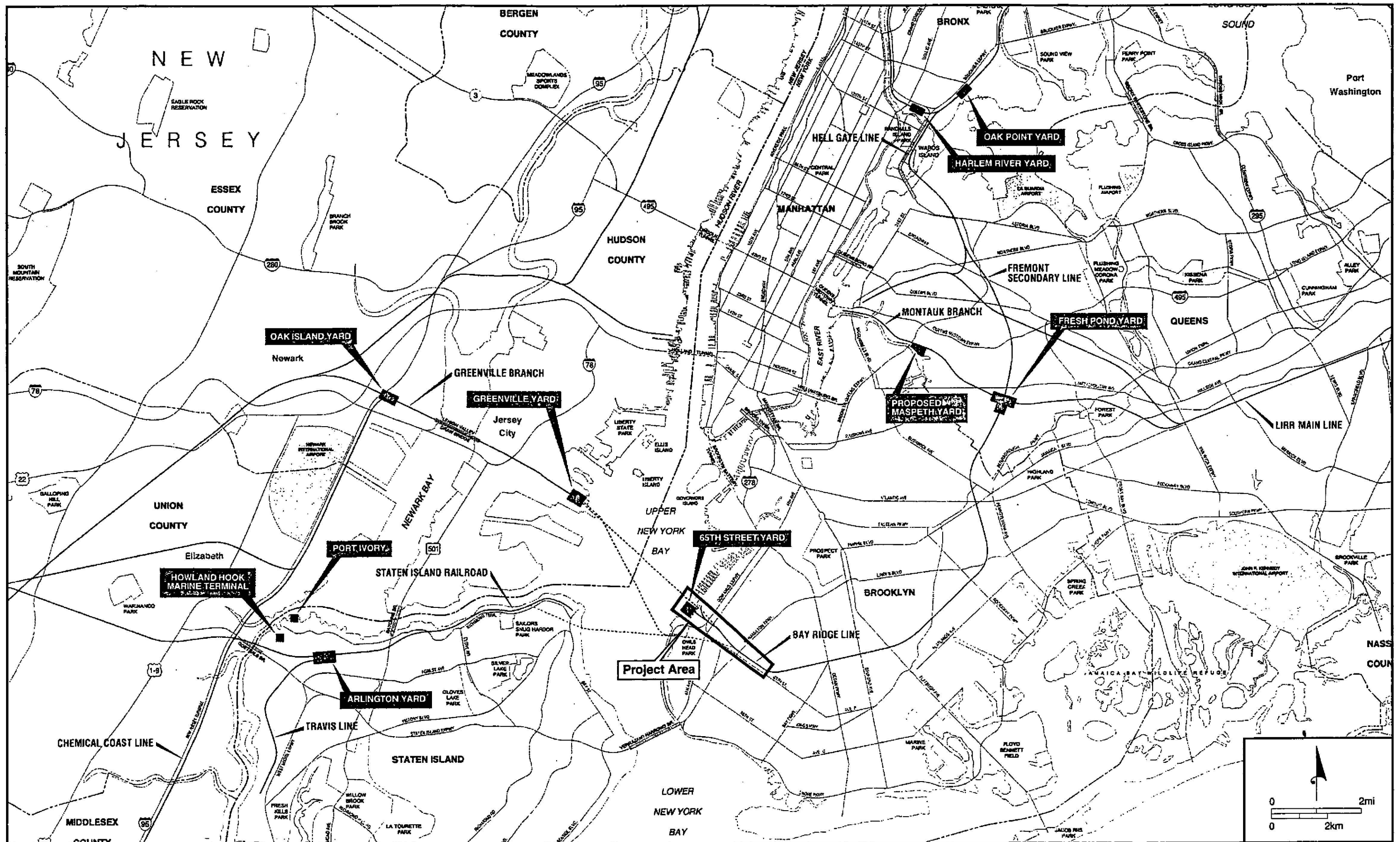


Figure 2. Project plans of the Cross Harbor Freight Movement Project showing the location of the Project Area discussed in this report.

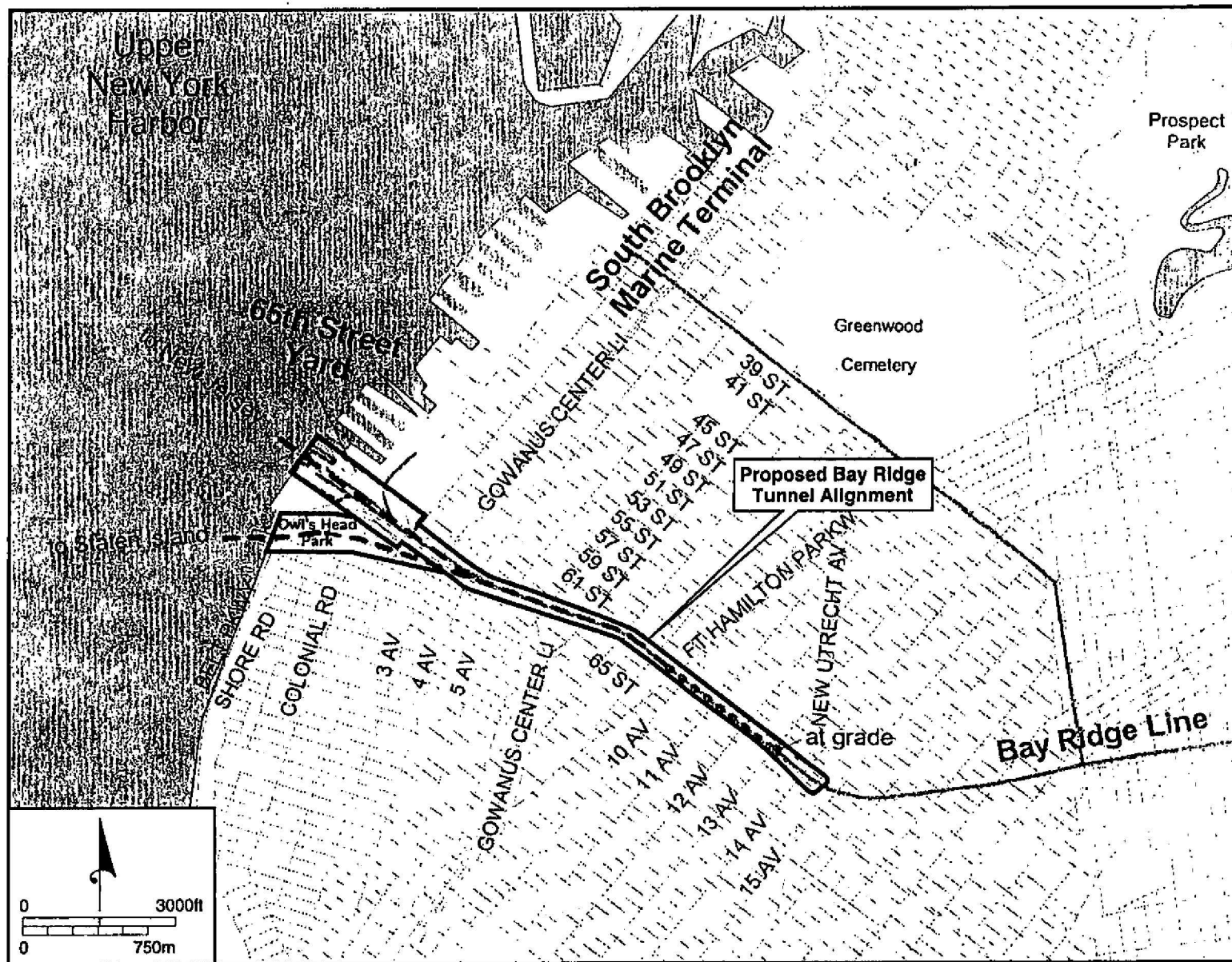


Figure 3. Detail of Project plans showing the locations of the 65th Street Rail Yard and Bay Ridge Tunnel Alignment (the Project Area).



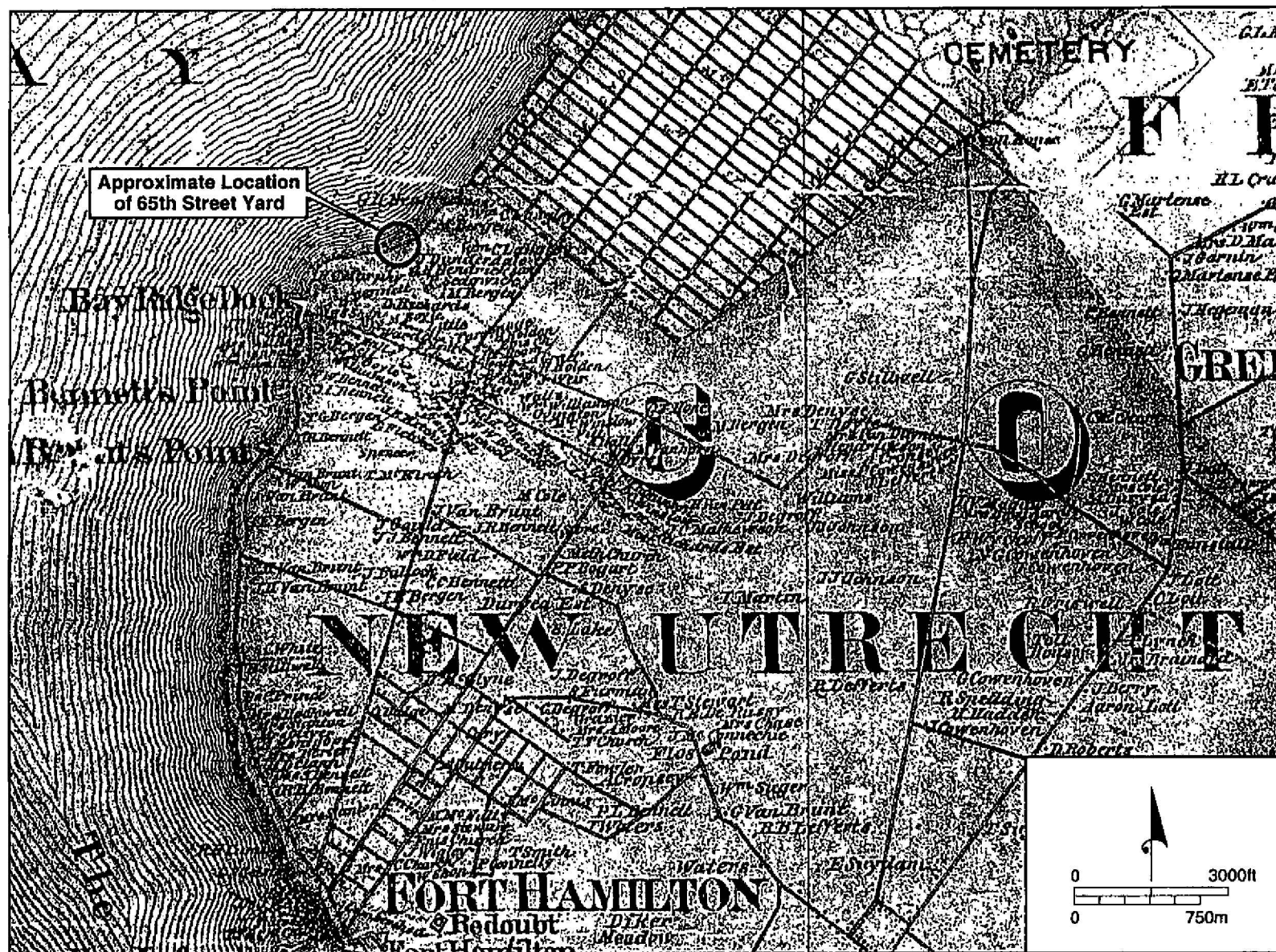


Figure 4. Detail of the Walling (1859) Topographical Map of the Counties of Kings and Queens showing the location of the Project Area.



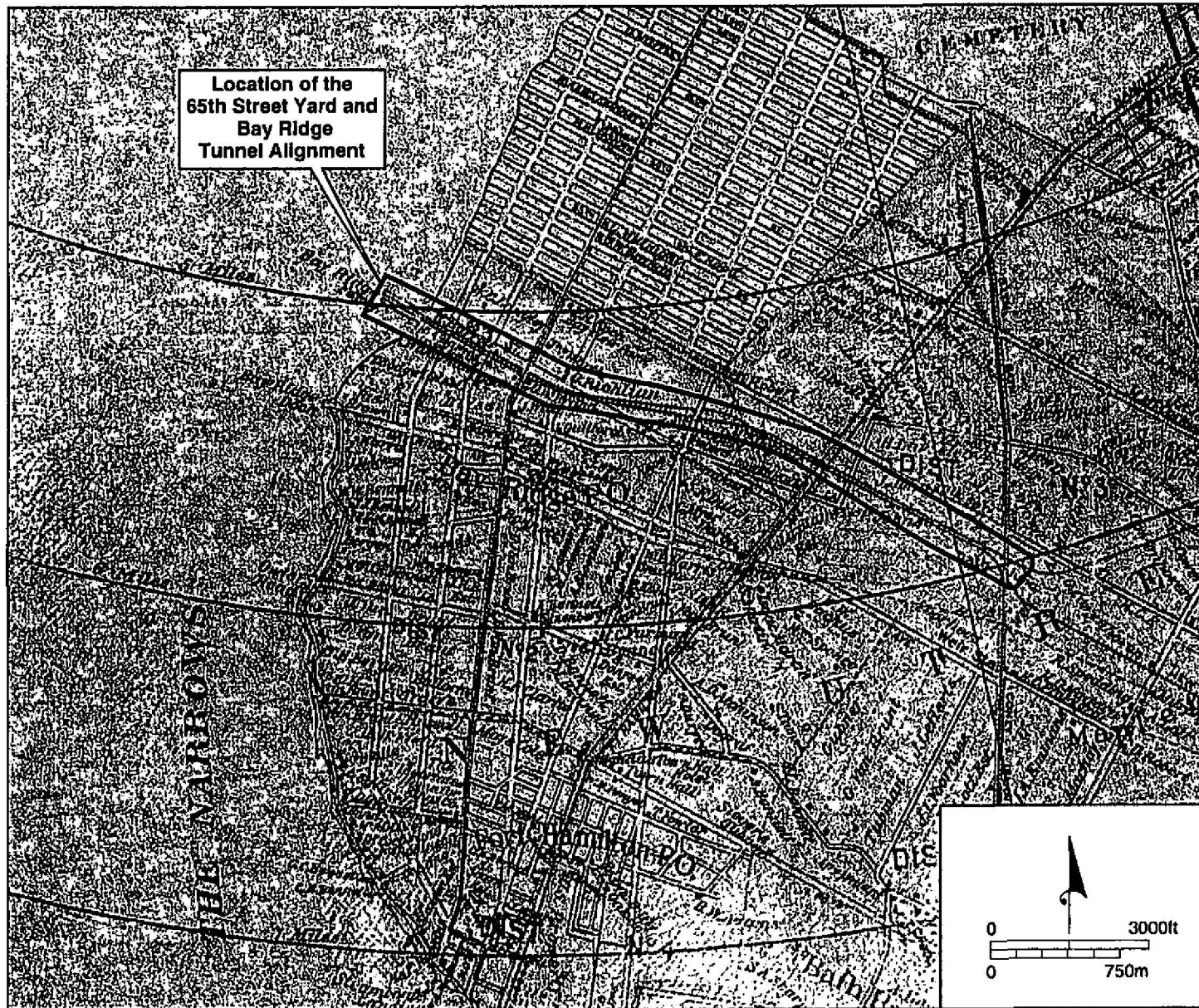


Figure 5. Detail of the Beers (1886) *New Map of Kings and Queens Counties* showing the location of the Project Area.

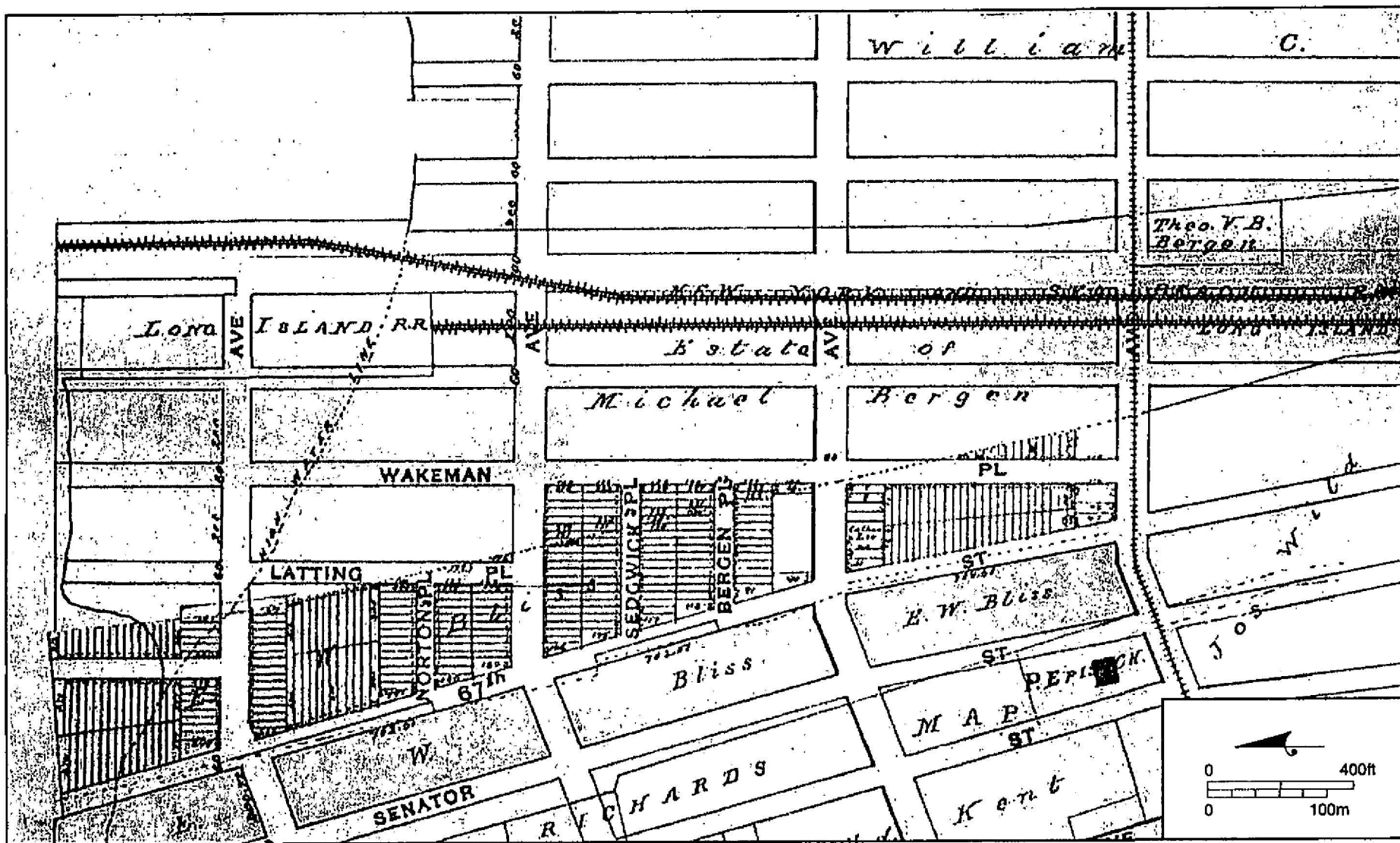


Figure 6. Detail of the Dripps (1890) *Atlas of New Utrecht* showing the location of the Project Area.



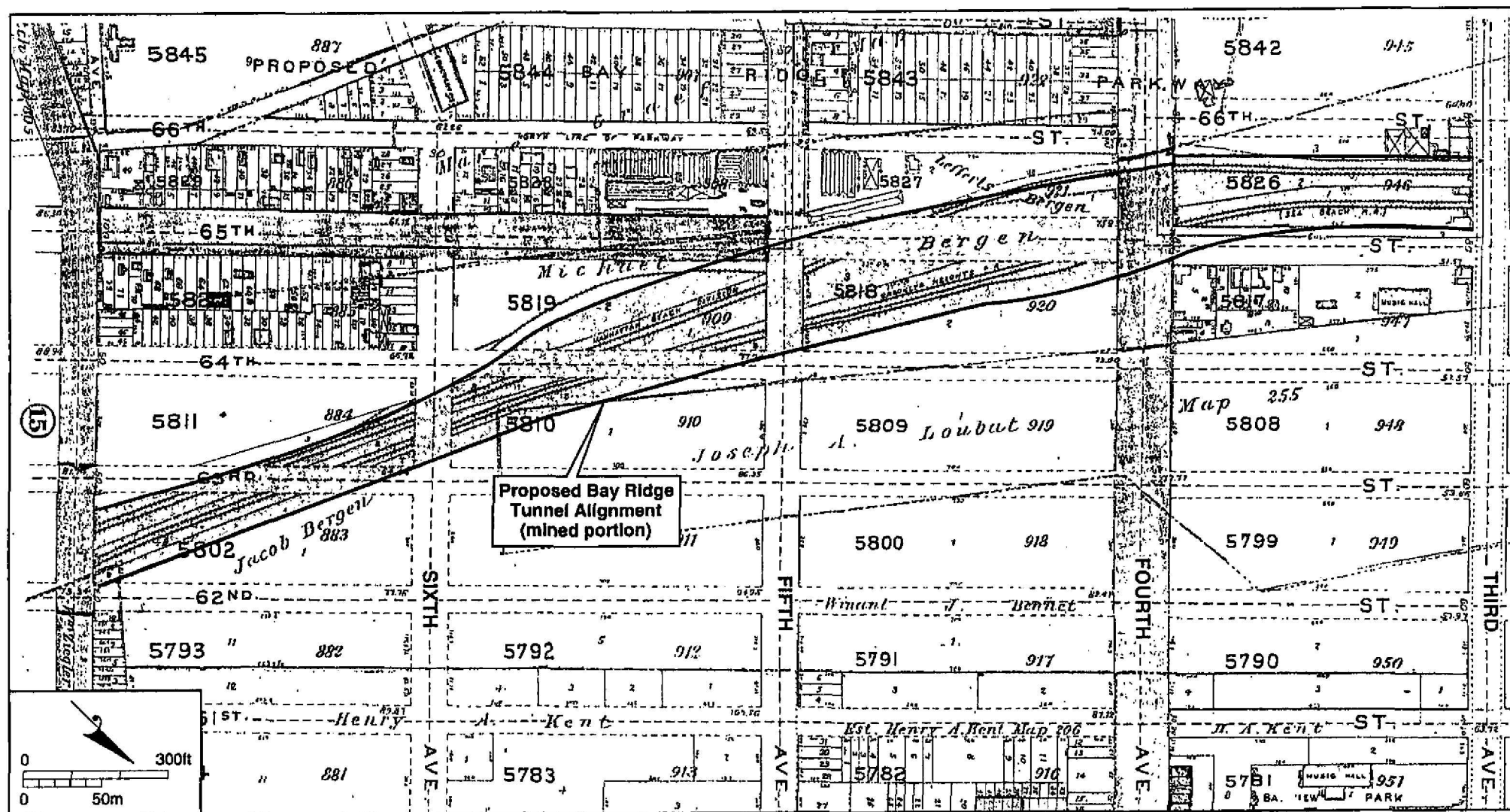
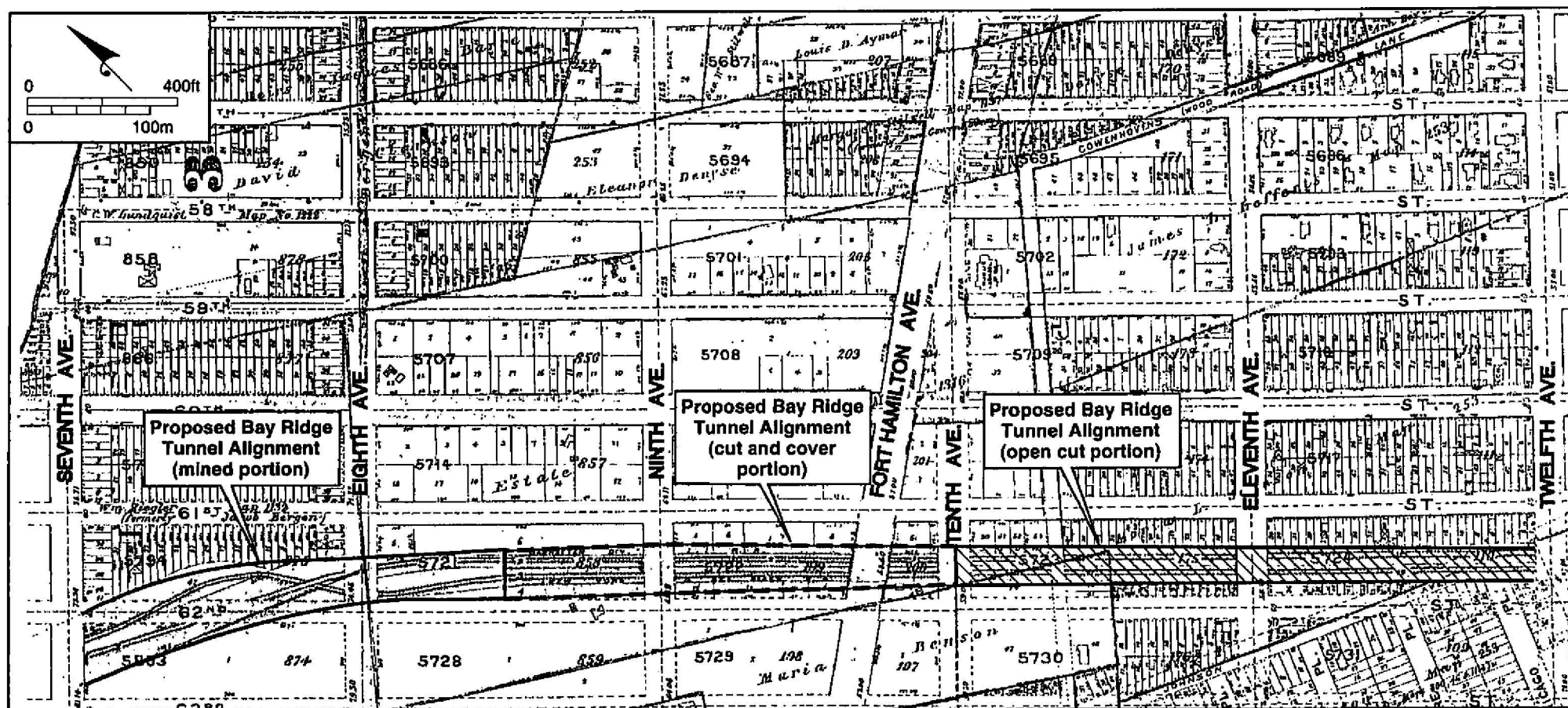


Figure 8. Detail of the Hyde (1898) *Atlas of the Brooklyn Borough of the City of New York* showing the location of the proposed Bay Ridge Tunnel Alignment.





**Figure 9. Detail of the Hyde (1898) *Atlas of the Brooklyn Borough of the City of New York* showing the location of the proposed Bay Ridge Tunnel Alignment.**

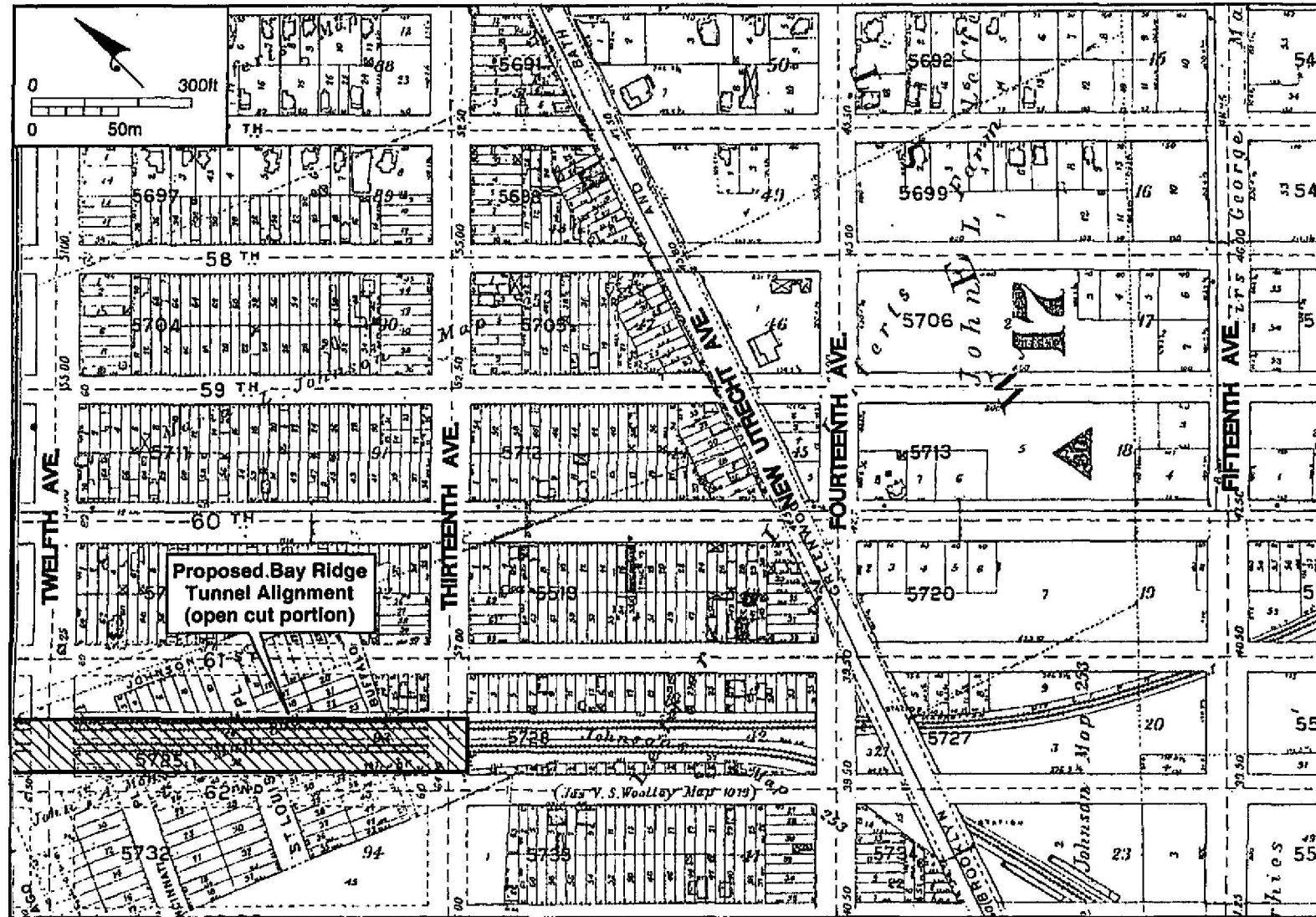


Figure 10. Detail of the Hyde (1898) *Atlas of the Brooklyn Borough of the City of New York* showing the location of the proposed Bay Ridge Tunnel Alignment.

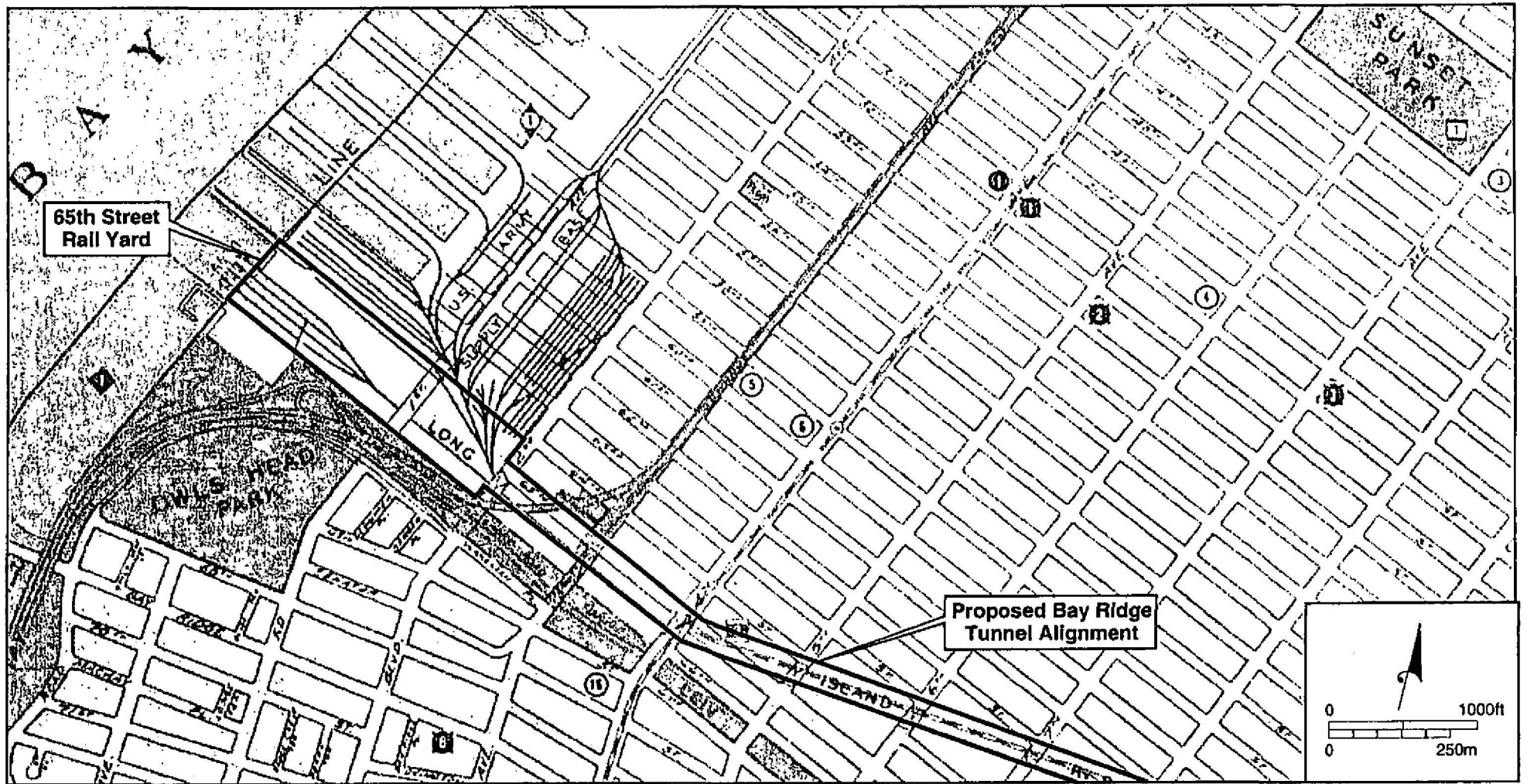


Figure 11. Detail of a City Planning Commission (CPC 1947) map showing the location of the Project Area.

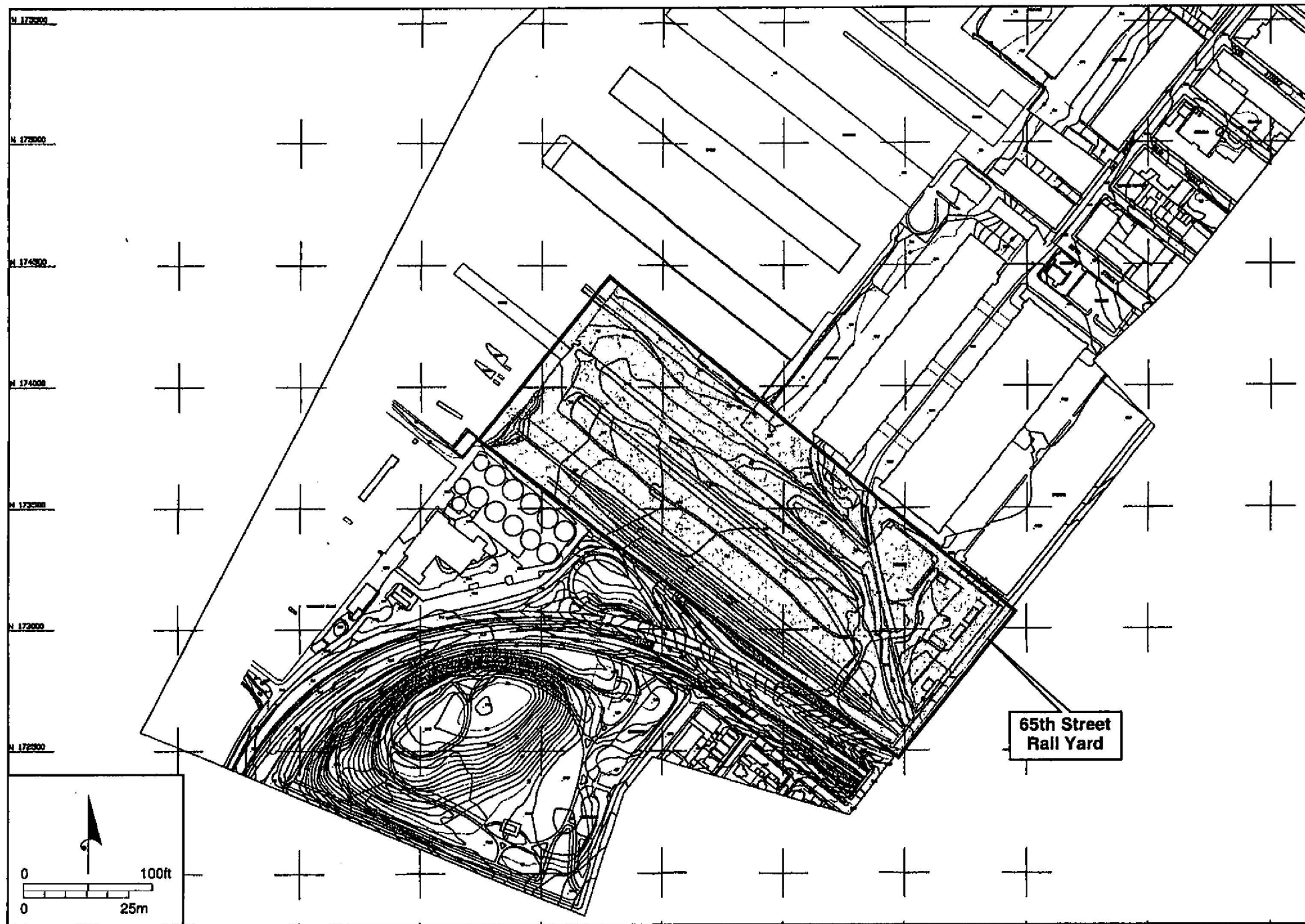


Figure 12. Project plans showing existing topography and landscape engineering at the 65th Street Rail Yard.



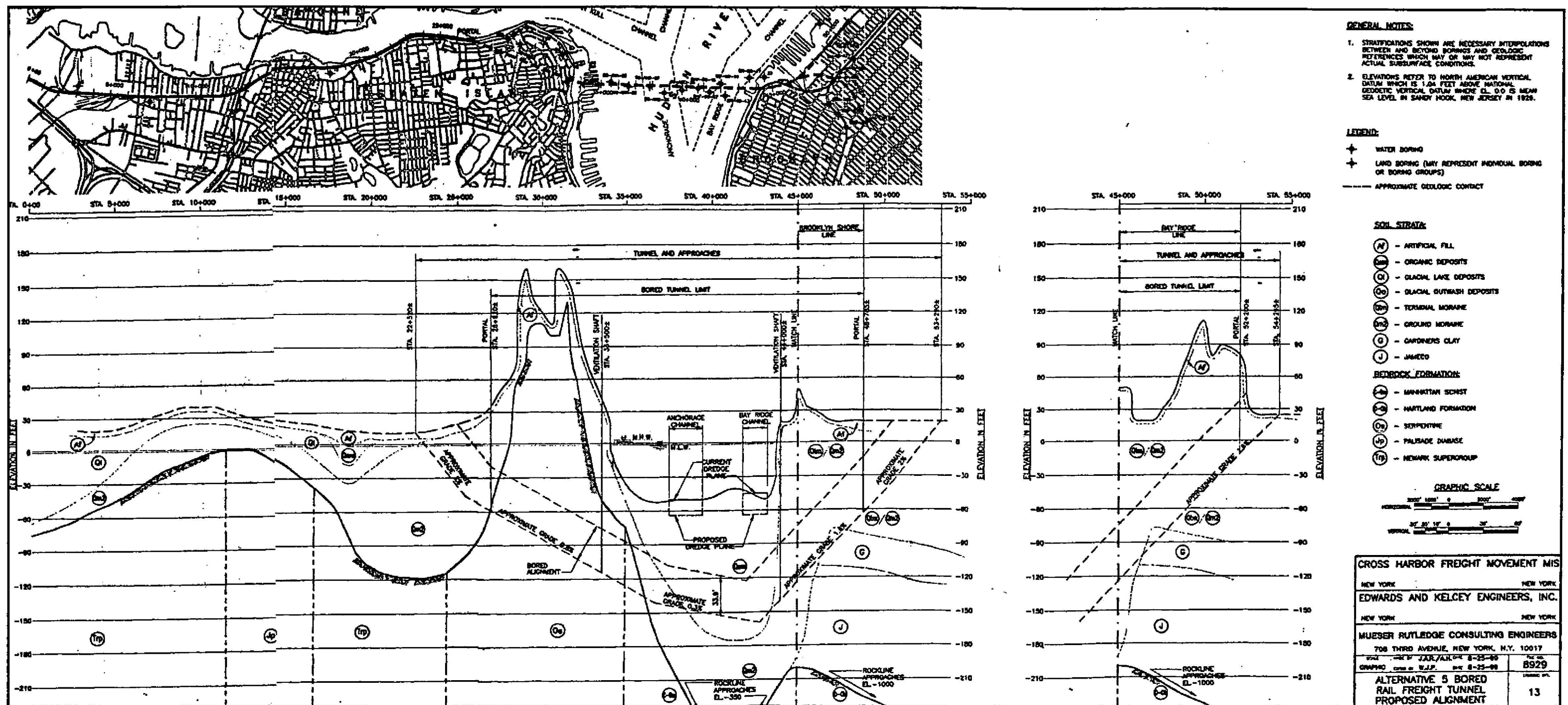


Figure 13. Project geotechnical boring results (EKEI 1999) showing the stratigraphy of the Cross Harbor Tunnel Alignments, 65th Street Yard, and Bay Ridge Tunnel Alignment.



## PLATES



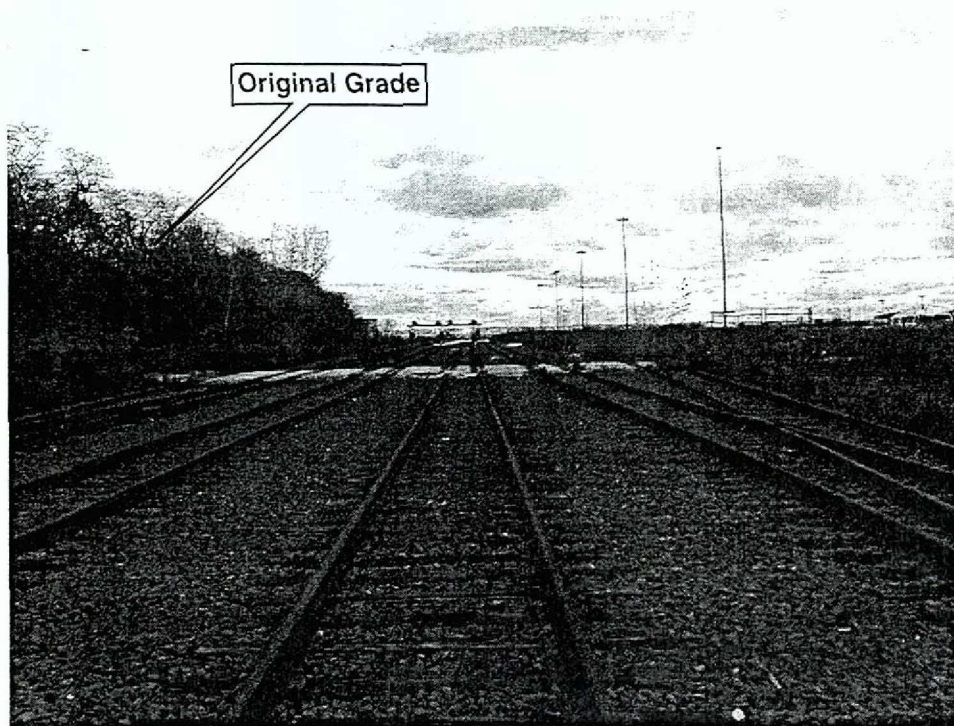


Plate 1. The 65th Street rail yard; view to the west.

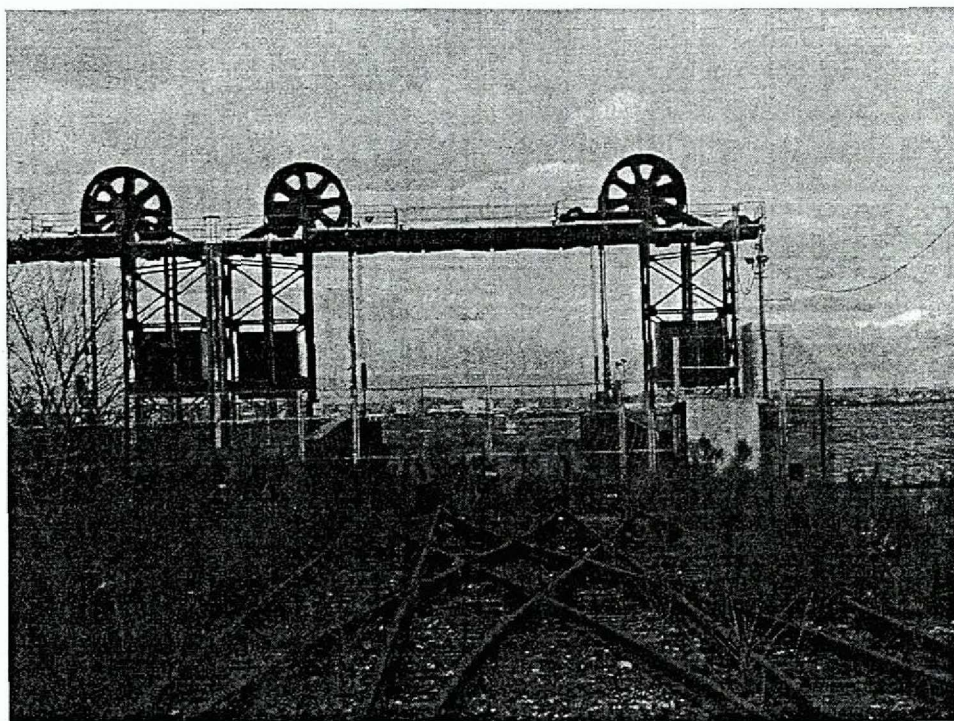


Plate 2. Modern rail-float aprons at the waterfront of the rail yard; view to the west.



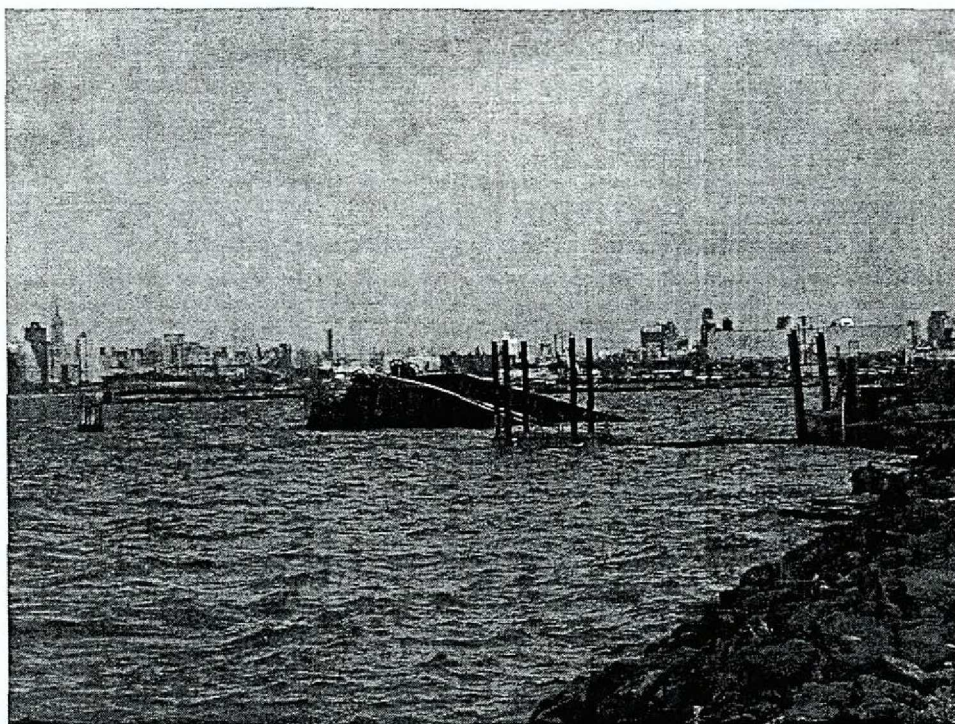


Plate 3. Partially submerged remnants of late-nineteenth or early-twentieth-century piers, wharves, and freight loading facilities at the waterfront of the rail yard; view to the north.

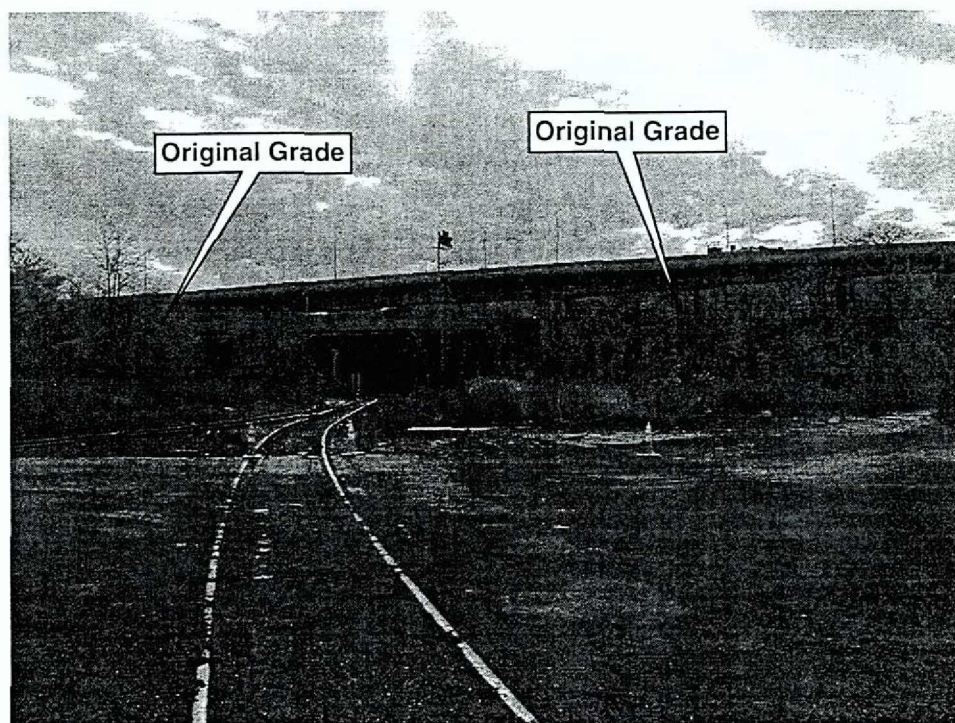


Plate 4. The Bay Ridge Line passes through a deep (approximately 30-foot) cut through Bay Ridge as it leaves the rail yard; view to the east.





Plate 5. Detail of the Bay Ridge Line passing underneath Second Avenue and the Belt Parkway; view to the south.

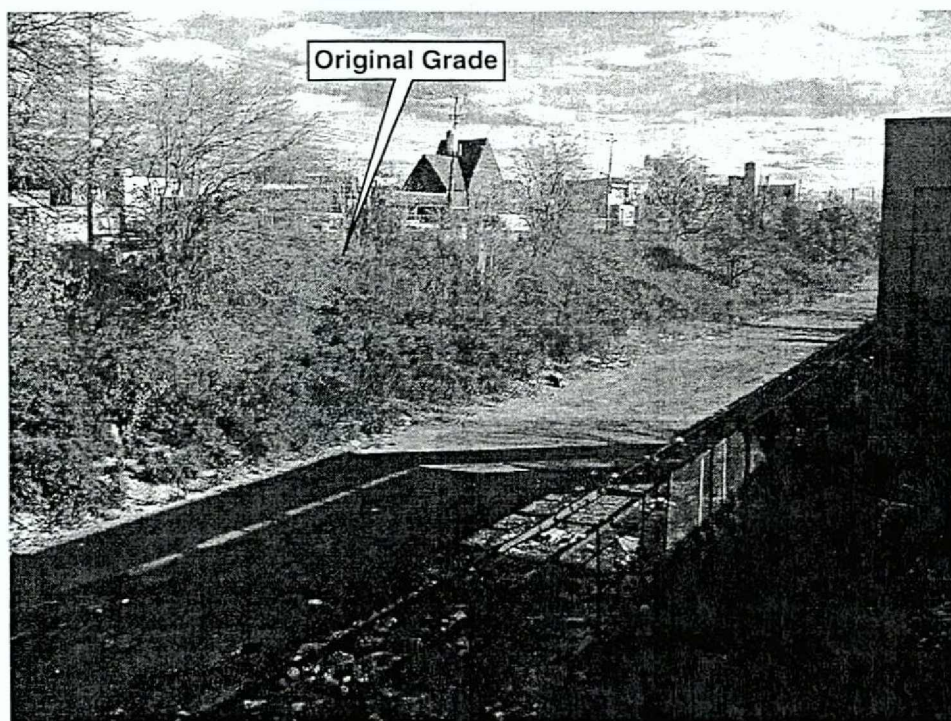


Plate 6. The Bay Ridge Line cut at Fort Hamilton Avenue showing the depth (approximately 25 feet) of the rail lines below grade; view to the east from Fort Hamilton Avenue N Train Subway Station.



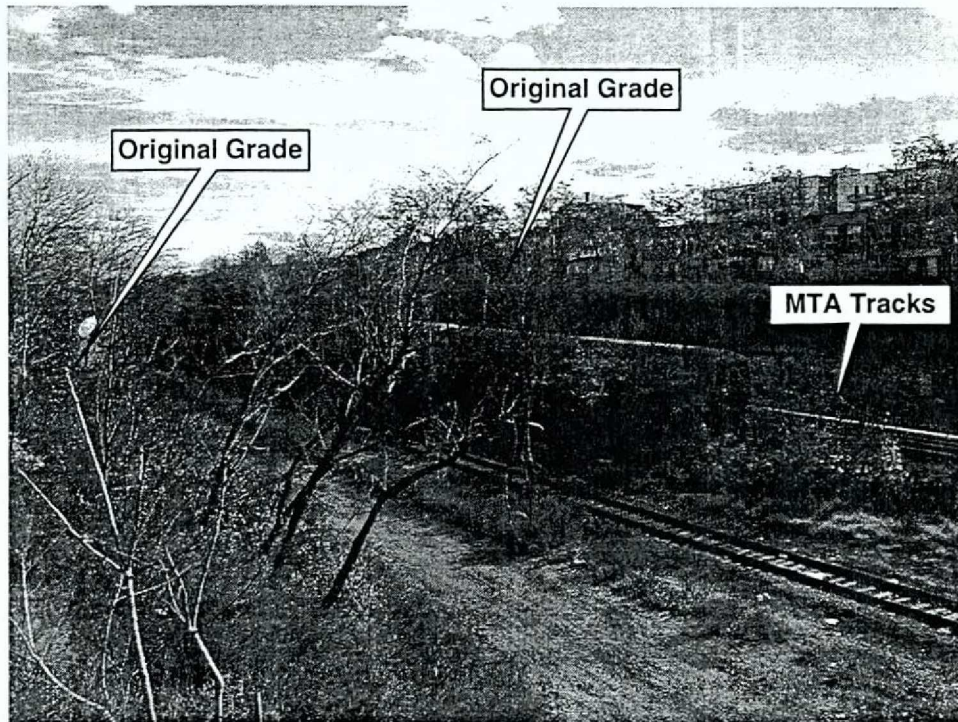


Plate 7. The Bay Ridge Line cut at Eleventh Avenue and 61st Street showing the depth (approximately 25 feet) of the rail lines below grade. The N Train of the MTA subway system runs parallel to the Bay Ridge Line on an elevated terrace within the right-of-way; view to the east.