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**PHASE IA ARCHAEOLOGICAL INVESTIGATION OF THE
GOWANUS FACILITIES UPGRADE PROJECT AREA
BLOCK 411, LOTS 14 AND 53
BOROUGH OF BROOKLYN, NEW YORK
(CAPITAL PROJECT GOW PS-FP01, D&B No. 1887-A)**

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ENVIRONMENTAL REVIEW

JUL 27 2006

Prepared for:

LANDMARKS PRESERVATION
COMMISSION

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September 5, 2002

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MANAGEMENT SUMMARY

Prior to mid-nineteenth century development, the Gowanus Facilities Upgrade project area consisted of an open water channel of Gowanus Creek and adjoining wetlands which likely were situated just above mean sea level. The creek and wetlands were filled during the mid-nineteenth century. Native American sites would not have formed within the portion of the project area that was inundated nor would they likely have formed within the adjoining low-lying wetlands. Even if aboriginal sites were formerly present in the project area, the extensive development projects that occurred there would have destroyed them. Accordingly, the project area is not considered to be sensitive for the presence of Native American cultural resources and further archaeological investigations to test for the presence of such resources are not warranted.

By the early 1850's, the project area was filled and the Gowanus Canal constructed. Structures were not constructed within the project property until sometime between 1886 and 1893. By 1893, the City of Brooklyn apparently had acquired the property and a brick structure constructed in the northwest corner. Whether this structure was a dwelling or served some other function associated with the City of Brooklyn (possibly the Department of Water Supply) was not determined during this study. If the building did serve as a residence it is unlikely privies or cisterns were associated with it since the structure likely was constructed with connections to a municipal water supply and sewer system since those utilities had been installed in Butler Street and surrounding streets by 1886. No other buildings were built within the project area until sometime after 1908 when a brick structure associated with the New York City Department of Water Supply was erected. The Flushing Tunnel was constructed through the project area in 1911 and the tunnel gate house, Flushing Tunnel building/power house, and associated facilities built sometime after that date. Still other structures were constructed within the project area by 1948. It is unlikely that potentially significant domestic or industrial type artifact deposits associated with activities occurring at these structures would have developed within the project area. Construction of the buildings, as well as installation of storm/waste sewers between Butler Street and the Gowanus Canal and other utilities, likely disturbed much of the project area to beneath the depth of fill. No other Historic period event or activities were identified during the research conducted for this investigation which could have resulted in the formation of artifact deposits within the current project area. Accordingly, the project area is not considered to be sensitive for the presence of Historic period archaeological sites and further archaeological investigations to test for the presence of such resources are not warranted.

Three early twentieth century structures, the Gowanus Canal Flushing Tunnel, the gate house for the tunnel, and the Flushing Tunnel building/power house, within the current project area may have architectural and/or historic value and could be affected by proposed construction activities. If the structures will be substantially modified by the proposed project, they should first be evaluated by a qualified architectural/industrial historian or historic preservation specialist to determine their architectural and/or historic value. Remaining structures within the project area are not considered to have architectural and/or historic value.

1.0 INTRODUCTION

This report presents the results of a Phase Ia archaeological investigation of the proposed Gowanus Facilities Upgrade project area (Capital Project GOW PS-FP01, D&B No. 1887-A) situated on Block 411, Lot 14 and Lot 53 at the head of the Gowanus Canal in the Borough of Brooklyn (Kings County), New York City, New York (Figures 1 - 2). The study has been conducted and this document prepared at the request of Dvirka and Bartilucci Consulting Engineers, Woodbury, New York for the Bureau of Environmental Engineering of the New York City Department of Environmental Protection (NYCDEP). All work was conducted according to the standards and guidelines for conducting archaeological surveys as presented in the New York City Environmental Quality Review (CEQR) Act Technical Manual.

The objectives of this study are to assess the likelihood that possibly significant cultural resources are present within the project area and to recommend any necessary further investigations.

Properties listed on or considered eligible for listing on the New York State and/or National Registers of Historic Places have not been previously identified within the project area. The Carroll Street Bridge over the Gowanus canal, however, located five blocks south of the project area, has been recognized by the New York City Landmarks Preservation Commission (1987) as an important engineering landmark property (Designation List 192, LP-1553, September 29, 1987). The bridge, built in 1888 - 1889, is one of "the oldest bridges in New York City and the oldest of four known extant late-nineteenth/early twentieth century American bridges of the "retractile" type (New York City Landmarks Preservation Commission 1987: 1; see also McCahon 2002). In addition, the Boerum Hill Historic District, a National Register district (date of listing: September 26, 1983) containing approximately 225 residential properties, consisting mostly of three story brick row houses of Greek Revival and Italianate design built during the mid-nineteenth century, is located four blocks north of the project property (New York City Landmarks Preservation Commission 1973; Shaver 1993:70). The district is bounded by Pacific, Wyckoff, Bergen, Nevins, Bond, and Hoyt Streets.

1.1 Gowanus Facilities Upgrade Project Area Description

The Gowanus Facilities Upgrade project area is an L-shaped, relatively level, two acre parcel situated at the head (north end) of the Gowanus Canal between Douglas Street on the south and Butler Street on the north (Figures 3 - 5). The Gowanus Canal and privately owned

commercial properties border the property on the east. Privately owned residential and commercial properties border the project area on the west with Bond Street extending north to south, west of the bordering properties. Existing facilities within the project area consist of a sewage pumping station, bar screen chamber, tide gate chamber, service building (crew quarters), Flushing Tunnel building/power house, tunnel gate house, and diesel oil storage tanks (see Figures 2, 4 - 9, and 32; NYCDEP 2001:1). The brick Flushing Tunnel building/power house and brick gate house, and possibly portions of the tide gate chamber, were constructed in the early twentieth century (Figures 5 - 7; see Chapter 4.7). From the gate house and Flushing Tunnel building/power house, gates can be lowered into the Flushing Tunnel to seal and drain that section when equipment repairs and maintenance are necessary. The other above ground buildings on the property were constructed later in the twentieth century and modified in 1988 (Ames 2002). The Flushing Tunnel, an approximately 12.5 foot diameter tunnel situated at 19.84 feet below modern grade (NYCDEP 1985), opened in 1911. The tunnel snakes its way below the project area from the southeast to the northwest before turning west at Butler Street (Figure 2). It brings East River water from the Buttermilk Channel, located approximately 6,280 feet west of the property, via pumping and tidal action, to the Gowanus Canal. The tunnel opens into the canal below the depth of water at maximum low tide just to the south of the project area. The transported water is forced into the canal, passing through it and Flushing contaminates and stagnant water out, back into the East River at the canal's mouth at Gowanus Bay.

The Gowanus canal, bordering the southern portion of the project property on the east, was initially constructed in the late 1840s by enlarging Gowanus Creek (Gallagher and Kachur 1995:494; Raber 2002:18). It was subsequently improved through dredging, the constructing of docks, and the rebuilding of bridges between 1866 and 1869 (Howard 1893:133, 163).

Prior to the mid-nineteenth century period, the project area apparently consisted of an open channel of Gowanus Creek and associated low-lying salt marshes situated at or near mean sea level (Raber 2002:18; see Chapters 2 and 4; Figure 10). The creek channel and marshlands, including the current project site, were filled sometime between 1846 and c. 1850 (see Chapters 4.6 and 4.7). Current elevations at the site range between approximately seven and a half feet and 11 feet above mean sea level (United States Geological Survey 1979; New York City Department of Environmental Protection 1985).

1.2 General Project Description

As of this writing, the Gowanus Facilities Upgrade Project consists of the following elements:

Wastewater Pumping Station:

- Replacement of mechanical, HVAC systems and installation of four (4) new wastewater pumps, piping, and valves;
- Expansion of wet well valve level and replacement of existing concrete floor slab at elevation +0.16';
- Extension of superstructure over the influent chamber and expanded valve level;
- Installation of mechanical bar screens and a screenings removal conveyor system; and
- Replacement of existing roofing, doors, railings and grating.

Flushing Tunnel Building:

- Removal of all mechanical, electrical, and heating and ventilation systems;
- Construction of four (4) floor extension to the existing Crew Headquarters for Collection Facilities West personnel within the existing Flushing Tunnel Building superstructure;
- Construction of flushing pump system, including modifications to the Flushing Tunnel and motor pit, and installation of three (3) axial flow pumps; and
- Architectural upgrade and/or replacement of masonry, windows, doors, roof drainage system, and roofing.

Service Building:

- Upgrade of existing Crew Headquarters for Collection Facilities West personnel, including the replacement of all mechanical, electrical, and heating and ventilation systems.

Gate House:

- Removal of HVAC systems, including the removal of the existing Flushing Tunnel sluice gate; and
- Architectural upgrade and/or replacement of masonry, windows, doors, roof drainage system, and roofing.

Flushing Tunnel:

- Construction of two additional access chambers: one at the intersection of Columbia and Degraw Streets, and one in Butler Street, north of the facility; and
- Installation of a mechanical bar screen within the tunnel, beneath the existing vehicle garage of the Service Building.

Wastewater Force Main:

- Removal of the existing abandoned wastewater force main from the Flushing Tunnel; and
- Installation of a new wastewater force main(s), either within the existing Flushing Tunnel or within City streets.

According to the NYSDEC (2002:1), sewage transmission alternatives for transporting pumped sewage from the Gowanus Facilities pumping station are being investigated. This may include the construction of a new force main through the Flushing Tunnel or city streets. Upon selection of an alternative, the pumping station will be upgraded and modified to match the new system curve.

The NYCDEP Bureau of Water Pollution Control has also selected the Gowanus Facility as the preferred site for the new Crew Headquarters for Collections Facilities West. Therefore, facility planning and design for the new Crew Headquarters has been included in the project.

1.3 Previously Conducted Cultural Resource Investigations in the Project Area Vicinity

A cultural resources reconnaissance survey of the Gowanus Creek channel (i.e. the Gowanus

Canal), conducted in 1978 for the United States Army Corps of Engineers (Kopper and Black 1978) as part of a dredging project, determined that as of 1978 "accessible cultural resources" were not located within the channel/canal or at nearby upland dredge spoil disposal sites. The disposal sites were located along the Brooklyn waterfront near the canal's mouth. The 1978 study did indicate, however, that inundated resources, particularly Native American sites, may be affected by proposed dredging and that that work should be monitored. The report stated that prior to development and filling in the mid-nineteenth century, the area consisted of marshland with areas of high ground on which previously recorded Native American sites were identified. Filling and creation of the canal could have buried and inundated such sites (Kopper and Black 1978:21 - 22). However, no report of such monitoring was found during the research conducted for this study.

A Stage I archaeological survey conducted for the Red Hook water pollution control project evaluated the sensitivity of the area along Nevins Street between Butler and President Streets (Solecki 1977). The report concluded that the study area was primarily formerly marsh adjacent to Gowanus Creek that was filled by the early 1860s. The study area was determined not to be archaeologically sensitive.

An archaeological assessment was conducted for Block 189 (338 Pacific Street), the proposed Bishop Mugavero Geriatric Center, located six blocks north and one block west of the Gowanus Facilities project property (Geismar 1990). Prior to construction of the Gowanus Canal, the proposed geriatric center site was located just north of the tidal Gowanus Creek and its adjacent marshland. The Geismar study determined that the geriatric center study area was sensitive for archaeological deposits and features associated with pre-1867 residences and that "vestiges of prehistoric or early historic Native American use on the property may be present beneath fill" (Geismar 1990). Subsequent investigations at the site identified the presence of domestic type archaeological deposits and features (assigned the New York State Office of Parks, Recreation, and Historic Preservation [OPRHP] archaeological site number A047-01-0508) but did not detect the presence of Native American artifacts (Geismar 1991).

OPRHP has assigned the archaeological site number A047-01-013923 to the Atlantic Terminal Historic Site. The site is comprised of 12 former house locations with their period of significance dating from the 1840s to 1860s. The site is located near 6th Avenue and Atlantic Avenue, approximately three-quarters of a mile northeast of the project area.

1.4 Methodology

This Phase Ia archaeological investigation involved documentary research on the Euro-

American history and Native American culture history and adaptations of the Gowanus Facilities Upgrade project area and vicinity and a pedestrian reconnaissance. Research for the study was conducted at the following repositories:

New York City Public Library, Local History, Map, and General Research Divisions

New York City Landmarks Preservation Commission

Elmer Holmes Bobst Library, New York University

The New York State Office of Parks, Recreation, and Historic Preservation

The Brooklyn Public Library

The Brooklyn Historical Society.

Knowledgeable people spoken to as part of the research conducted for this investigation include:

Mr. Arnold Pickman, Professional Archaeologist, New York City

Mr. Peter Shaver, New York State Office of Parks Recreation, and Historic Preservation

Dr. Daniel Pagano, New York City Landmarks Preservation Commission

Ms. Amanda Suptkin, New York City Landmarks Preservation Commission

Ms. Gina Santucci, New York City Landmarks Preservation Commission

Dr. H. Arthur Bankhoff, New York City Landmarks Preservation Commission

Ms. Lynn Rakos, New York Army Corps of Engineers, New York District

Mr. Steve Cabrera, Dvirka and Bartilucci, Consulting Engineers

Mr. James Ames, Site Manager, Gowanus Facilities site, New York City Department of Environmental Protection.

The pedestrian reconnaissance was conducted on June 11, 2002. Based on the documentary research and pedestrian reconnaissance, the archaeological sensitivity of the project area was assessed. Assessment of Native American period sensitivity was based on the location of known archaeological sites reported in the literature as well as consideration of the present and former topographic and physiographic characteristics of the project area, and a review of the parcel's construction history. Assessment of Historic period sensitivity was based on an analysis of late eighteenth to twentieth century maps as well as a review of secondary sources.

A preliminary evaluation also was undertaken of the existing structures within the project area. The evaluation was based on the age of the existing structures, their architectural style, and current condition.

2.0 ENVIRONMENTAL SETTING OF THE PROPOSED GOWANUS FACILITIES UPGRADE PROJECT AREA

The project area is part of the gently undulating landscape of northwest Brooklyn. It is situated immediately east and north of the northernmost point of the Gowanus Canal. Prior to the late 1840's, the project area consisted of salt marshland and open water associated with Gowanus Creek, a low-lying tidal estuary of upper New York Bay that extended from Gowanus Bay to just north of the project area. Extensive salt marshes bordered the creek for most of its length. In its northernmost reach, the creek branched into a number of channels. During the late 1840's, the Gowanus Canal was constructed following much of the route of Gowanus Creek.

The former extent of the wetlands and Gowanus Creek in the vicinity of the current project is shown on a late nineteenth century map that indicates the extent of low-lying ground, salt marshes, and original shoreline in Brooklyn based on surveys conducted in 1776 and 1777 (see Figure 10 and Chapter 4.7). The map indicates that prior to filling, the project area consisted of an open channel of Gowanus Creek and adjoining wetlands (Figure 10). The first real high ground or terrace-like landform overlooking the creek and wetland north of the project area began just north of Dean Street with the first substantial terrace in the vicinity of Atlantic Avenue. On the west, high ground overlooking Gowanus Creek and its wetlands began west of Hoyt Street. The locations are between a quarter and a third mile north of the project area and approximately 700 feet to its west. Such areas of high ground would have been prime locations for Native American occupation.

2.1 Geology

The Gowanus Creek Facilities Upgrade project area is part of the inner plain of the emergent lowland of the Atlantic Coastal Plain geomorphic/physiographic province. (The Gowanus Creek area is the boundary zone between the Atlantic Coastal Plain province and the Piedmont Lowlands physiographic province to the north and northwest (see Wolfe 1977:207). The Atlantic Coastal Plain consists of broad, low-lying, belted terrain, generally less than 50 feet in elevation, which gradually slopes to the southeast (Wolfe 1977:207). The elevation of the current project area (which was filled in the nineteenth century) is generally less than approximately 12 feet above mean sea level (United States Geological Survey 1979; NYCDEP1985). The Gowanus Canal is situated at sea level (Raber 2002:18).

The bedrock in Brooklyn consists of soft, easily eroded and folded, metamorphic and igneous rock of Cretaceous age, specifically muscovite-biotite, schist, gneiss, and granite (Gratacap 1904; Schubert 1968; Rogers, Isachsen, Mock, and Nyahay 1990; Isachsen, Landing, Lauber, Rickard, and Rogers 1991). The bedrock surface generally dips to the southeast.

2.2 Surface Geology

The portion of the Atlantic Coastal Plain in Brooklyn that includes the project area vicinity was greatly affected by the Wisconsin glaciation. Glacial drift is present below post-Pleistocene deposits over most of the area north of the terminal moraine of the Wisconsin glaciation to depths of up to 150 feet. One moraine indicative of the last advance of the Wisconsin Stage glaciers is present in Brooklyn. Approximately 75,000 years ago, the Wisconsin ice sheet reached as far south as what is now the middle of Long Island depositing debris culled from New England and New York State in front of it, forming the Ronkonkoma moraine. The Ronkonkoma moraine is present as a band of low hills that extend from Lake Success on the Queens-Nassau border to Montauk Point. A later readvance of the Wisconsin ice at a slightly different orientation formed a second moraine, the Harbor Hill moraine. The Ronkonkoma moraine intersects the Harbor Hill moraine in the Little Neck/Lake Success vicinity at the Queens/Nassau County border with deposits from the latter partially burying Ronkonkoma deposits. The combined moraine traverses southwestward through Queens from south of Little Neck Bay through Ridgewood to Prospect Park in Brooklyn (passing south and southeast of the current project area) and continues across the northern mouth of the Narrows through Staten Island and into New Jersey and points west. The existence of the moraine and its associated hilly landscape was noted by a mid-seventeenth century map maker who noted on a topographic map of Long Island that "hills run from one end of ye island [Long Island] to ye other" (Hubbard 1666).

North of the moraine in Brooklyn (including the current project area), glaciofluvial events created kames, kame terraces, eskers, and kettles, most of which have been obliterated by development.

2.3 Flora and Fauna

The predominant pre-contact period habitats present within the Atlantic Coastal Plain were saltwater/brackish water marshes and tidal flats, freshwater marshes, and upland climax forest (Robichaud and Buell 1973:106). In many localities, brackish, and fresh water marshes grade from the open shore to the upland forest.

Saltwater and brackish water marshes were formerly common along the entire shoreline of Brooklyn, also occurring inland for a short distance along the banks of tidal creeks such as Gowanus Creek. Chrysler (1910) provides a list of 38 plants found in the Coastal Plain in salt and brackish water marshes and meadows in the order of their occurrence in soils with decreasing salt content. All are or were formerly present in Brooklyn. The first four are glasswort, found nearest to salt water, sea lavender, salt reed grass, and salt water cord grass. The composites marsh elder and groundsel occur near the center of Chrysler's list followed a little further down by cat-tail. The last four salt tolerating plants are swamp-rose, arrowhead, lizard's tail, and bur-marigold.

Freshwater marshes were present along the edges of lakes, ponds, creeks, and wherever depressions of land were kept flooded on a regular basis by high water tables (Robichaud and Buell 1973:105). In pre-Contact period freshwater marsh environments, the plant community was typically dominated by reed grass, cat-tail, and/or wild rice (the latter made practically extinct in the area due to the effects of pollution). All of these would have been important economic plants for Native American groups. Other plants that would have been common in pre-Contact period freshwater marshes were low-growing grass-like sedges, bulrushes, arrow-*arum*, blue flag, spike rush, bur reed, water dock, marsh fern, orange touch-me-not, and swamp milkweed (Robichaud and Buell 1973:125-127).

The remaining portions of the Atlantic Coastal Plain are characterized as upland forest because the most abundant or dominant type of vegetation present were tall growing, deciduous broadleaf trees (Robichaud and Buell 1973:106). The forests are specifically described as oak-chestnut forests composed primarily of mixed oaks (white, red, and black) with some chestnut trees also present on drier slopes (Robichaud and Buell 1973:106). Beech, several varieties of hickory, sugar maple, white ash, pepperridge, sweet and sour gum, tulip, and black cherry also would have been numerous (Shelford 1974).

A description of the plentiful oak-chestnut forest in the area around Hempstead in 1670, but also applicable to the current project area vicinity, away from the wetlands associated with Gowanus Creek, is provided by Daniel Denton (1670):

The greatest part of the island is very full of timber, as Oaks, white and red, Walnut trees, Chestnut trees, which yield store of mast for Swine, and are often therewith sufficiently fatted with oat-corn as also Maples, Cedars, Saxifrage, Beech, Birch, Holly, Hazel, with many sorts more.

Shellfish were one of the most important prehistoric subsistence resources found along the Brooklyn shoreline in the Atlantic Coastal Plain. The species commonly utilized by Native Americans were oysters, soft shell clams, hard shell clams, scallops, and various marine snails. Pre-Contact period faunal species usually present within the Atlantic Coastal Plain's marshes included various invertebrates, migratory water fowl and other birds, muskrat, small rodents, rabbit, raccoon, otter, skunk, opossum, and white-tailed deer (Shelford 1974; Gosner 1978; Roberts 1979). In the province's freshwater streams, marshes, and lakes were found mussels, fish, certain amphibians and reptiles, migratory fowl, and semi-aquatic mammals (Shelford 1974). Pre-Contact period faunal species present within the forests of the Coastal Plain included game birds, small mammals, white-tailed deer, bear, and during at least a portion of the prehistoric period, elk (Shelford 1974). Anadromous fish species would have been present seasonally within northwest Brooklyn via streams and creeks, such as Gowanus Creek, emptying into the estuary system (the East River, the Narrows, Upper New York Bay, western Long Island Sound). All of these economically useful forms would have been present in the project area vicinity during the Native American and early Historic periods.

3.0 DOCUMENTARY RESEARCH - NATIVE AMERICAN PERIOD

The Native American and Native American - European Contact period cultural history of the project area region is provided in Chapter 3.1 and 3.2. This is followed by descriptions of Native American sites and other evidence of Native American activity previously identified in the Gowanus Facilities Upgrade project area vicinity (Chapter 3.3 and 3.4). Analysis of the Native American archaeological sensitivity of the project area is provided in Chapter 5.1.

3.1 Background Culture History

The prehistory of the Kings County region, which includes the project area, encompasses the PaleoIndian, Archaic, Transitional, and Woodland periods. The PaleoIndian period (10,000 - 8,000 B.C.) represents the earliest occupation of the southeastern New York region. The Archaic (8,000 - 1,700 B.C.) refers to a time prior to the introduction of horticulture and pottery manufacture and is divided into Early, Middle, and Late periods. The Transitional period (1,700 - 1,000 B.C.) witnessed a gradual change in Archaic lifestyles with the development of "Woodland" period traits. The Woodland period (1,000 B.C. - A.D. 1,600), which is characterized by the use of pottery and reliance on horticulture, also is divided into Early, Middle, and Late periods.

The PaleoIndian period corresponds with the end of the Wisconsin glaciation (80,000 - 11,000 B.P.). The last advance of the ice sheet associated with this stage reached its maximum approximately 18,000 years B.P., covering the approximate northern third of Brooklyn with glacial ice. After approximately 18,000 B.P., world wide temperatures started to rise and melting and northward retreat of the ice sheet began. A continuous morainal feature consisting of mixed sands, silts, and clays, and boulders, marks the southernmost advance of the ice sheet (see Chapter 2.2).

Sea levels were lower during the PaleoIndian period and the subsequent Early to Middle Archaic period due to sea water being trapped in the remaining glacial ice. Brooklyn during most of this era was located well inland from the Atlantic coast, being a tract of raised ground containing glacial lakes, and traversed by meltwater streams and rivers.

A tundra environment characterized the landscape of Brooklyn during the late glacial and immediate post-glacial periods. As the glaciers retreated northward, water drained from the melting ice sheet creating large inland lakes, bogs, and marshes. One of the larger of the lakes (Proglacial Lakes Flushing) covered the northwestern portion of Brooklyn, including the

Gowanus Creek channel and the project area, and extending to the northeast (see Wolfe 1977: 160 and Figure 5-18). The lake drained around 12,500 years ago. Other large proglacial lakes (Proglacial Lakes Hudson, Hackensack, and Passaic) were located in the New York metropolitan area further to the west and north.

The tundra landscape was succeeded by woodland with local forests consisting primarily of spruce and fir with small amounts of oak and other deciduous species (Snow 1980). Many faunal species now extinct or no longer native to the area were present in the forests. These included mammoth, mastodont, horse, caribou, giant beaver, sloth, elk, moose, and peccary (Snow 1980). Remains of extinct fauna found in the project area region include mastodont teeth recovered in 1858 from a buried peat layer near Baisley Pond. The pond is located approximately nine miles east of the project area.

Little is known about cultural activities during the PaleoIndian period although it is generally accepted that the region was first inhabited by humans at approximately 10,000 B.C. (Funk 1976; Ritchie 1980). Small nomadic bands of hunters and gatherers subsisted probably on the animal species mentioned previously as well as small game animals, certain riverine resources, and a variety of plants. Population density, however, was very sparse. A variety of functionally diverse site types, however, have been identified based upon intersite variability of artifact assemblages and environmental setting. These include base camps, quarry workshops, rockshelter habitations, open air hunting camps, kill and butchering sites, and other temporary camps (Funk 1972; Gardner 1974; Moeller 1980; Gramley 1982).

A small number of PaleoIndian sites have been recorded in the New York metropolitan area. The closest to the project area are located on Staten Island (Port Socony north a.k.a. Port Mobil north/North Beach and Cutting site, Kreischerville; Charleston Beach; see Ritchie 1980) between 15 and 19 miles to the southwest. Others in the metropolitan area are the multi-component Piping Rock site on the Hudson River shoreline in Westchester County (Funk 1976:206; Brennan 1977) and the Dutchess Quarry Cave, Kings Road, and West Athens Hill sites in Orange County (see Funk 1976).

Most evidence of PaleoIndian activity, however, comes from scattered surface finds of Clovis Fluted points, a diagnostic PaleoIndian artifact (Funk 1976:205). At least two fluted points have been recovered from western Long Island. One was found in the Bayswater section (Platt 1994, 1995; Stone 1996) of Queens, approximately 12 miles northeast of the project area. The exact location of the find is not indicated in the literature but it likely was recovered from the high, well-drained ground overlooking the former lake bed of Proglacial Lake Flushing. Once the lake drained, the area would have contained numerous marshes, ponds, and a narrower East River Channel. Another fluted point was recovered from a land fill

deposit at the Wilkins site, located at 141st Street and 14 Avenue in the College Point section of Queens, approximately ten miles northeast of the project area. Almost all of the other fluted points found in New York City were recovered from Staten Island as surface finds. Others have been recovered from Nassau and Suffolk Counties (Saxon 1973; Rutsch 1970).

Information from known PaleoIndian sites in the New York - New Jersey - Pennsylvania-Connecticut region suggests that raised, well-drained areas near rivers, streams or wetlands were the areas preferred for occupation. The project area vicinity during the late glacial and early Holocene periods would probably have fit such a topographic and physiographic description. Rock shelters, areas near lithic sources, and lower river terraces also were subject to PaleoIndian occupation and use (Werner 1964; Funk 1976; Moeller 1980; Ritchie 1980; Marshall 1982).

The lack of data from PaleoIndian sites, especially stratified sites, in Brooklyn (and the remainder of New York City and Long Island) is the primary reason for the current lack of understanding of PaleoIndian adaptations on Long Island. Many PaleoIndian sites in the vicinity probably were located off the Atlantic and Long Island Sound shores and were inundated by post-glacial rising sea levels (Edwards and Emery 1966, 1967; Salwen 1962, 1965, 1975). Many sites probably were submerged beneath the rising waters of the bays and inlets along the north and south coasts of Long Island. Meltwater rivers formerly were associated with most of these areas. Prior to submergence, the areas would have contained productive environments (i.e. marshes, lakes, streams) that could have been exploited for subsistence purposes by PaleoIndian populations.

During the Archaic period (8,000-1,000 B.C.), the environment changed from a pine dominated forest to an increasingly deciduous forest which achieved an essentially modern character by 2,000 B.C. (Salwen 1975). While Archaic cultures have been traditionally thought of as reflecting a forest-based adaptation, more recent research has produced a picture of an increasingly varied subsistence pattern based on the seasonal exploitation of various faunal and floral resources (Ritchie and Funk 1973; Funk 1976; Kraft 1986; Starbuck and Bolian 1980). In the lower Hudson Valley and Long Island Sound area oyster became a major component of subsistence, at least seasonally, during this period (Brennan 1977). At this time, the project area probably was a marshy tract.

Archaic hunters and gatherers were still nomadic and organized into small bands which occupied localities along the Long Island shoreline, especially its protected coves, inlets, and bays, primarily during the warmer months of the year. During the colder months, Long Island's Archaic populations likely occupied more protected interior locations (Wyatt 1977; Ritchie 1980; Kraft 1986). Population growth throughout the period resulted in an increase in

both site density and the number of functional site types represented in the archaeological record. Site types recognized for this period include spring fishing camps along major streams, fall open air hunting camps, rockshelter habitations, shellfish collecting and processing stations, mortuary sites, quarry and workshop sites, and semi-permanent villages (Harrington 1909; Brennan 1974; Dincause 1976; Barber 1980; Ritchie 1980; Snow 1980). Ritchie states that most Archaic sites were small and multi-component, lacking traces of substantial dwellings, fortifications, storage pits, and graves (Ritchie 1980:32 and 35). Evidence of house patterns attributable to the Late Archaic period, however, has been reported from the Howard site in Old Lyme, Connecticut near Long Island Sound (Pfieffer 1983).

In the vicinity of the project area, the range of reported site types associated with the Archaic period is limited to shellfishing stations and rockshelters along the Long Island Sound shore and possibly small temporary camps in the interior (Skinner 1919a, 1919b, 1920, 1932; Funk 1976; Levine 1978; Ritchie 1980; Truex 1982).

Most information concerning the Archaic period comes from Late Archaic sites since evidence for Early and Middle Archaic sites in the region is almost as scarce as for PaleoIndian sites. Human population, site density, and site size apparently increased in the Long Island region during the Late Archaic period. Some sites appear to have been occupied on a semi-permanent basis. Sites apparently containing Late Archaic components have been found on high ground bordering Long Island Sound north shore bays and inlets, in low-lying areas in close proximity to estuaries, and along major interior streams.

Sites dating to the Transitional period (or Terminal Archaic; 1,500 - 1,000 B.C.) are most frequently found along the coast and major waterways (Funk 1976; Ritchie 1980; Vargo and Vargo 1983) although smaller sites are known from the interior (Funk 1976; Vargo and Vargo 1983). New and radically different broadbladed projectile point types appeared during this period as did the use, during the latter half, of steatite (soapstone) vessels. In western Long Island, Transitional period components have been found on high ground bordering the bays and inlets of the north shore.

During the Early Woodland period (1,000 B.C. - A.D. 1), the use of fired clay ceramic vessels gradually replaced the reliance on steatite vessels. Subsistence practices included a continuation of the hunting, gathering, and fishing of the Archaic but were supplemented by an increase in shellfish collecting. It has been suggested that this indicates a trend towards more sedentary lifestyles (see Funk 1976; Snow 1980).

Human populations during the Middle Woodland period (A.D. 1 - 800) gradually adopted a more sedentary lifestyle. Although it is generally felt that subsistence was essentially based on

hunting and gathering supplemented by fishing and shellfish collecting, there has been speculation that domestication of various plants occurred during this period (Ritchie and Funk 1973; Snow 1980). Most Middle Woodland sites on Long Island are located near estuaries although smaller inland sites also are known (Funk 1976; Ritchie 1980).

By Late Woodland times (A.D. 900 - 1,600), horticulture was the primary subsistence base and permanent villages existed. Use was still made, however, of temporary and special purpose campsites (Ritchie 1980; Snow 1980). Most Late Woodland sites are located along the Long Island Sound shore and the Hudson River and its major tributaries, although smaller inland camp sites and shell fish processing sites have been recognized (Skinner 1919a, 1919b; Bolton 1920; Parker 1922; Funk 1976; Levine 1978; Ritchie 1980; Truex 1982).

Late Woodland sites are relatively numerous in western Long Island with components being identified at the Wilkins, Clearview, Aqueduct, and Oakland Lake sites among others. Large base camps/villages are usually located adjacent to tidal inlets and major rivers. These were probably occupied on a permanent or semi-permanent basis. Smaller inland sites, usually located near a water source, that were probably occupied on a seasonal or temporary basis, also have been recognized (Funk 1976; Ritchie 1980; Snow 1980). Extensive shell middens associated with Late Woodland occupations also have been identified in western Long Island (see Boesch 1997).

Smith (1950), basing his conjectures on ceramic typologies, sees an initial "Windsor Tradition" Late Woodland culture occupying all of Long Island. This culture was eventually forced from the western part of Long Island by groups associated with the "East River" culture. Smith sees East River culture groups as expanding eastward from New Jersey and/or southeastern New York. The East River culture is divided into an earlier Bowman's Brook phase and a later Clason's Point phase.

3.2 Native American - European Contact Period

The documentary history of the Brooklyn vicinity which includes the project area begins with the information recorded by early settlers concerning the Native American groups who occupied the area when Europeans first arrived in the early seventeenth century.

The Contact period (A.D. 1600 - ca. 1750) is the time of the first large scale contacts between Native Americans and European colonists. By the latter part of the Late Woodland period Native American cultures began to resemble those of groups that were encountered by seventeenth century Europeans. At this time Long Island Native Americans were part of the

widespread Algonquian cultural and linguistic stock. Specifically, they were a group of Munsee (Minsi) speakers who migrated into the area during Late Woodland times (Goddard 1978a, 1978b; Salwen 1978; Grumet 1995).

Munsee speakers were a linguistic subgroup of the Lenape or Delaware. The Lenape consisted of autonomous, loosely related bands or lineages living in small family groups or hamlets. They never formed a politically united tribe. The origin of the name "Lenape" is unclear. Goddard (1978b:236) states that the name translates roughly as "real people." Salomon (1982:14) agrees in a general sense stating that the name means "the real men" or "common people."

The Munsee composed a relatively large, loosely related Lenape group who shared the same totemic symbol, the wolf (Ruttenber 1872:47). They occupied most of the land south of the Catskill Mountains to a line drawn from the headwaters of the Lehigh River through the Delaware water gap area to the Raritan River in New Jersey, and eastward to approximately the Smithtown area of Long Island (Salwen 1978).

Munsee settlements included camps along major rivers, estuaries, coves, inlets, and bays with larger villages located at river mouths (Salomon 1982). Small hunting, gathering, and agricultural sites were located in the interior. Despite references to such sites by early European explorers and settlers, only a few Contact period sites have been identified on Long Island.

Robert Juet, an officer on the "Half Moon", provides an account in his journal of some of the Contact period Native Americans who inhabited southeastern New York (see Cunningham 1959). In his entries for September 4th and 5th, 1609 he states (Juet 1859:28):

This day the people of the country came aboard of us, seeming very glad of our coming, and brought greene tobacco, and gave us of it for knives and beads. They goe in deere skins loose, well dressed. They have yellow copper. They desire cloathes, and are very civill. They have great store of maize or Indian wheate whereof they make good bread. The country is full of great and tall oakes.

This day [September 5th, 1609] many of the people came aboard, some in mantles of feathers, and some in skinnes of divers sorts of good furies. Some woman also came to us with hempe. They had red copper tabacco pipes, and other things of copper they did wear about their necks. At

night they went on land againe, so wee rode very quite, but durst not trust them.

The political, linguistic, and social relationships that existed among the various bands of Munsee speakers probably will never be fully understood for a number of reasons. The Native groups themselves had no fixed boundaries and "ownership" of particular areas may have overlapped with use rights shared. EuroAmerican colonists also frequently misunderstood and misrecorded Native American associations with particular areas. Finally, early pressure on some Native groups by colonial expansion probably resulted in frequent shifts of villages and territories (Goddard 1978b).

Native American identification with particular areas and with themselves as members of particular "tribes", and the development of large permanent villages, was likely the result of changes in Native American social and subsistence systems caused by seventeenth century EuroAmerican territorial expansion (Ceci 1980; Strong 1997). Native American identification during the period of initial European Contact, and probably during the Late Woodland period as well, likely was not based on "tribal" identification but on kinship relations, shared totems, linguistic relationships, and/or other criteria (Strong 1997:23).

Scholars traditionally have associated the Carnarsie with the Brooklyn vicinity (Bailey 1959; Becker 1934; Bolton 1920, 1934, 1975; Furman 1875; Skinner 1932; Swanton 1952; Tooker 1911). They were described as the most powerful Native American group on Long Island (Bolton 1920:210) and part of the Montauk (Metoac or Matouwas Confederacy (Solecki 1982:97). The latter reportedly comprised of 12 Long Island Native American groups (Becker 1934). The traditional lands of the Canarsie reportedly included most of Brooklyn, including the project area, portions of Queens County as far east as Jamaica, Wards Islands, Governors Island, and Blackwells Island, and probably the lower part of Manhattan (Bolton 1920:210 Rutttenber 1872:73). According to Beauchamp 1907:98 and Tooker (1911:32-33), the name "Carnarsie" roughly translates as "the fenced place" reportedly referring to a fence or boundary which separated at least a part of their lands from Euro-American colonists. Others (Rutttenber 1906:89; Brinton 1885), however, feel that the name means "long small grasses" in reference to the large flat meadows that made up part of Brooklyn prior to European colonization. The recorded name by which the group was referred therefore was a mid-seventeenth century name, likely applied by Dutch colonists. What the Carnarsie referred to themselves as prior to the reported erection of the fence is not recorded.

Other scholars feel that the Carnarsie were restricted to the southeastern portion of Brooklyn and that during the early seventeenth century what is now the project area vicinity was the traditional territory of the Marachkwiek, a Munsee group of uncertain affiliation, but probably

related to the Canarsie (Grumet 1981:26-27). The name reportedly translates as "sandy place" (Beauchamp 1907:99).

Problems and conflicts during the seventeenth century between Long Island Native Americans and the Dutch resulted in the deaths of large numbers of aboriginals (Hodge 1910; Washburn 1978). The introduction of European diseases such as smallpox further devastated the local Native American populations. During the early period of European contact, the total Native American population of Long Island is estimated to have numbered approximately 7,500 individuals (Cook 1976:84). The population of the Canarsie has been estimated at approximately 1,900 people. By the year 1650, it has been estimated that the total population of Long Island had been reduced to approximately 1,000 individuals (Cook 1976:84). By the time of the American Revolution, only 100 to 200 Native Americans remained on Long Island (Cook 1976:82).

3.3 Native American Sites in the Project Area Vicinity

According to Lopez and Wisniewski (1978:208):

At one time there were undoubtedly numerous aboriginal sites in Kings County on the western end of Long Island in coastal New York, especially along the shoreline of the East River, the Narrows, Gowanus Bay, and the Bays of Gravesend, Jamacia, and Sheepshead. Today, however, Kings County, better known as Brooklyn, forms part of the busy skyscraper metropolis of Greater New York City. Not only are the sites gone, but remaining to us is not even a single site report, only a few place references here and there in the early literature.

Bolton (1920:130) limits the distribution of sites primarily to the shoreline of Brooklyn, stating that the "interior area [of Brooklyn] was destitute of occupied stations, owing to the absence of watercourses."

A small number of sites, however, have been identified in the vicinity of the proposed Gowanus Facilities property. The avocational archaeologist Arthur C. Parker (1922) indicates that a Native American camp site with a Woodland period component was located at Baltic Street between 5th and 6th Avenues. The New York State Museum (NYSM) site number 3606 was assigned to the location (also referred to as ACP Kings 2). The location of the site is approximately half a mile northeast of the project area. Parker describes the site as being located "on a barren sand hill in 1826 covered with burnt stones, layers of ashes, oyster and

clam shell, clay, pipes, coarse pottery, and arrowheads." Furman (1875:98) also apparently refers to the site. Generally overlooking the Gowanus Creek and wetland system, the site probably was oriented towards exploiting subsistence resources associated with those environments.

Another site (NYSM number 9412) containing "a distinct layer of ash, cinder with coarse pottery, arrowheads, and rough clay smoking pipes was recorded by Furman (1874:98) near what is now the intersections of Jay, Front, Bridge, and York Streets. The location is approximately one and a half miles north of the project area.

Other Native American sites reported in the literature that were located in the project area vicinity include:

- a Contact period site, possibly a village, referred to as "Werpos" or "Warpoes" located at Hoyt and Baltic Streets less than a half mile northwest of the project area (Bolton 1934: Figure 4). The site may have been a fortified village (Bolton 1920:130). Stiles (1867:424) also mentions the site, locating it at the head of the Gowanus Creek, stating that it contained a "Large Indian burying ground... where remains were exhumed a few years ago in leveling the ground for city purposes.
- a Contact period village site referred to as "Marechawik" or "Marechikawieck", located at Callatin Place and Elm Place in Brooklyn. The location is approximately one mile northwest of the current project area (Bolton 1934: Figure 4). The site reportedly was the principal habitation of the Marachkswiek.
- a large shell midden at 37th Street and 3rd Avenue (Parker 1922, Bolton 1934). The former site area is approximately two miles south of the project area.
- a large shell midden at Bergen Island (Parker 1922; Bolton 1934).
- habitation site and shell midden at Flatlands (Carnarisie). The site reportedly contained a Contact period component, being one of the principal villages of the Carnarsie. The site reportedly was located near the current intersection of Flatbush Avenue and Kings Highway, approximately four and a half miles southeast of the Gowanus Facilities property.
- the Ryders Pond site, a large multicomponent habitation site on Sheepshead Bay (Lopez and Wisniewski 1978).

- a cache of stone and chert blades at the Narrows larger enough in quantity to fill “a wagon load” (Lopez and Wisniewski 1978:208). The location is approximately two miles south of the project area.
- a site reportedly referred to during the Contact period as “Rinnegokonck” was located northwest of the project area on the southwestern side of Wallabout Bay, supposedly near a small swampy stream on land now part of the Brooklyn Navy Yard (Bolton 1934:145; Grumet 1981:46). The general location is approximately four miles northwest of the project area.

3.4 Other Evidence of Native American Activity in the Project Area Vicinity

Other indications of Native American activity in the project area vicinity are suggested by references to Contact period aboriginal trails in the area. Such a trail followed portions of what is now 3rd Avenue roughly following Gowanus Creek. The trail passed approximately one quarter mile east of the project area (Bolton 1920, 1934). Grumet (1981:70), however, indicates that this trail roughly followed the route of modern day 4th Avenue. Another trail followed what is now Flatbush Avenue (Bolton 1920, 1934), which extends past the project area approximately a half mile to the north. The two trails intersected north of the project area. Grumet places still another trails running roughly parallel to Gowauns Creek on its east side between Gowanus Bay and the Flatbush Avenue trail.

Portions of Fulton Street, north of the project area, also followed an aboriginal trail which “turned southeast at the Municipal Building, near which point the Old Red Hook Lane branched off and led by a side path to the settlement at Werpos” (Bolton 1934:62).

All these trails would have been important regional and local travel corridors and by-ways, communications arteries, and trade routes for Contact period Native Americans. Their importance probably also extended for some period back in time. Unrecorded other, more minor, trails would have extended to the East River, Gowanus Creek, and other locales. All of the trails would have brought seventeenth century Native Americans into the immediate vicinity of the project area.

The term Gowanus, applied to the bay and creek, has been variously translated as “a young or small pine”, “the sleeper”, “to sleep” and “the shallows, flowing down (Ruttenber 1906:90; Beauchamp 1907:98; Tooker 1911:66; see Grumet 1981:11). Others state that the term derives from the name Gouwane, reportedly a seventeenth century sachem of the Carnarsie (Gallagher 1995a:494).

During the early seventeenth century, Native American groups reportedly frequented the mouth of Gowanus Creek, likely exploiting waterfowl and other subsistence resources in the adjoining marshes and cultivating higher ground in interior areas. According to Grumet (1981: 11), early to mid-seventeenth century references frequently refer to "Indian fields" in what is now the Gowanus section Brooklyn (i.e. downtown Brooklyn-Red Hook section of Kings County - Grumet 1981:11). At least some of the fields were part of a tract known as Sassians maize field (with Sassians translated as sower, planter or to sow - Grumet 1982:50 - 51), located southwest of the project area. Grumet (1981:11) states that "Native people probably stopped farming these lands following their sale in the late 1630's. They continued, however, to visit their fishing camps on the shores of Gowanus Bay until well into the eighteenth century." Such activities would have brought contact period Native Americans into the project area vicinity.

4.0 DOCUMENTARY RESEARCH - HISTORIC PERIOD

The Euro-American history of the Gowanus Facilities Upgrade project area vicinity is provided in Sections 4.1 - 4.3 of this chapter with the nineteenth and twentieth century development history of the project property provided in Chapter 4.4. An assessment of the Historic period archaeological sensitivity of the project area is presented in Chapter 5.1.

4.1 The Early Years

In 1609, Henry Hudson, representing the Netherlands, entered and explored the river that now bears his name. Three years later, anxious to solidify their claim to the area, the Dutch commissioned Adrian Block to further explore the region that came to be called New Netherlands. After initial difficulties at Manhattan Island, Block sailed past Hell Gate in the East River and into Long Island Sound. All of the newly explored territories were claimed by the Dutch. On the basis of these voyages, the Dutch West India Company established the colony of New Netherlands, settling on Nutten (Governors) Island and the lower tip of Manhattan (New Amsterdam) in 1624-1625. A decade later, in 1635, the Dutch West India Company began settling what is now Brooklyn. The earliest recorded land purchases in Brooklyn occurred in 1636 in areas now known as Flatbush and Flatlands when Wouter van Twiller, the director of the colony, and some associates (Jacob van Corlear, Andries Hudden, Wolphert Gerritsen van Couwenhoven among others) acquired tracts from local Native Americans and established bouweries (farms). In the Flatlands area the tract acquired by the Dutch was known to local Native Americans as Keskachauge or Keskateuw and the bouwery that was established was called Achtervelt (Bergen 1867; Stiles 1867). Over the next decade, other purchases were made in the Gowanus and Wallabout Bay areas with patents granted by Willem Kieft who succeeded Twiller as director of the colony (Hazelton 1925). By the early 1640's, a number of dispersed farmsteads had developed around the marshes which were harvested for salt hay. The current project area was included in a larger tract extending east and west of the northern reach of Gowanus Creek that was acquired by Jan Eversen Bout and Jacob Stoffelson by patent grant on July 6, 1646 (Figure 11). These individuals likely farmed portions of their property but the current project area would have been open water (part of Gowanus Creek) and/or adjoining salt marshland. Whether these individuals constructed residences or other buildings on their grant was not determined during this study but if so they likely would have been situated away from Gowanus Creek and its wetlands on land higher in elevation and drier.

By the early 1640's ferry service was established linking Brooklyn with Manhattan to meet the needs of local farmers. The service stimulated more growth in what is now western Brooklyn. Over the next two decades six towns were chartered and established by the Dutch West India Company in Brooklyn. Five were Dutch settlements and one was an English settlement. The Dutch settlements were Breuckelen (Brooklyn) chartered in 1646, New Amersfoort (Flatlands) in 1647, Midwout (Flatbush), also called 'Vlacke-Bos, in 1652, New Utrecht in 1657, and Boswick (Bushwick) in 1661. The English settlement was the Town of Gravesend, founded in 1645, by Anabaptist refugees from New England and eastern Long Island (Gallagher 1995b: 32). In addition to the towns, a number of small settlements had developed, mainly around cross road settings. These included communities at Greenpoint, Waal-bogt (Wallabout), Cripplebush, Bedford, Gowanus, and the New Lots (Gallagher 1995b:32).

Brooklyn's farmers during this period grew mainly grain and vegetables which they transported to market in New York by boat. Many of the farmers around Gowanus Creek kept boats for this purposed moored in the creek. The trip round the Red Hook peninsula through the Buttermilk channel to lower Manhattan, however, was treacherous with the local waters generally very rough. To avoid this hazardous journey and eliminate the need to travel around Red Hook to Gowanus Bay, a Gowanus Creek mill owner named Vechte, started a canal project in the late 1660's, creating a channel directly from the East River to the mouth of Gowanus Creek, (Raber 2002:18). This canal (Vechte's canal) was in use until the 1840's when construction of the Atlantic Docks closed its East River end (Raber 2002:18).

The settlements generally grew slowly in population and size for most of the seventeenth century. The closest town to the project area was Breuckelen which developed near the ferry along what is now Fulton Street near the East River directly across from New Amsterdam. By 1660, 134 people lived in the town (New York City Landmarks Preservation Commission 1973:2). The settlement was generally located less than three quarters of a mile northwest of the project area.

The project area vicinity throughout the seventeenth century remained rural and agricultural in nature with only a few dispersed settlements. The area's Euro-American population was small. By mid-century, however, three tide mills had been established at points along Gowanus Creek. The seventeenth century Ancient Map reproduced by Bergen (1864), which likely dates to sometime after 1655, indicates this settlement pattern showing only a few structures in the Gowanus - Breuckelen vicinity (Figure 11). The nearest structure shown on that map in the project area vicinity is one of the above mentioned tide mills (see Figure 11). It was owned by individuals named DeForest and Adam Brouwer by 1661. By the period of the American Revolution, this mill was owned by an individual named John C. Freeke and referred to as Freeke's Mill or the Old Gowanus Mill. The mill was generally located within marshland along

the east side of Gowanus Creek, between what are now Sackett and Union Streets just east of the present day Gowanus Canal (see Solecki 1977:4). The side channel of Gowanus Creek near the mill was dammed to create a mill pond. The former location of the mill was approximately one quarter mile southeast of the project area. The mill, and an associated nearby dwelling and bridge, were burned on August 27, 1776 by American troops during the Battle of Brooklyn (see Chapter 4.3 and Figure 15). Another structure in the current project area vicinity that is shown on the Ancient Map is the Hannes Bergen residence (also Hans or Hansen Bergen - see Bergen 1866; see Figure 11) formerly located approximately one quarter of a mile southwest of the project area, west of what is now Hoyt Street near Union Street.

In 1664, English forces under the Duke of York captured New Amsterdam and the surrounding towns and lands from the Dutch. This take over apparently did little to affect the lives of the residents of Kings County. With the takeover, the Town of Breuckelen changed its name to Brooklyn. Other towns also changed their names (see above).

Due to gradually increasing populations during the mid and late seventeenth century period, however, governmental changes were necessary to meet the growing administrative needs of the Brooklyn settlers. As a result, Kings County was established as a separate administrative unit by the New York colonial legislature in 1683.

By the turn of the seventeenth century, another tide mill, referred to as Denton's Mill (also referred to as the Lower or Yellow Mill), was located just south of Brouwer/Freeke's Mill (see Solecki 1977:4), reportedly at the corner of Carroll Street west of Third Avenue. A mill pond (separate from Freeke's Mill pond) served Denton's Mill. The mill and a nearby bridge also were burned by Americans during the Battle of Brooklyn (Solecki 1977:10).

Throughout the seventeenth century, the project area remained inundated as part of Gowanus Creek and its adjoining wetlands and a nearby tributary stream (see Chapter 4.7 and Figure 10). Little development occurred in the immediate project vicinity by the late seventeenth century and most of the county's population during this period was situated west or south of the project area.

4.2 The Early to Mid-Eighteenth Century

Kings County retained its rural, agricultural nature throughout the early and mid-eighteenth century. The project area during this period remained inundated as part of Gowanus Creek and its adjoining wetlands and a nearby tributary stream (see Chapter 4.7 and Figures 18 and

20). Away from the creek and wetlands, the landscape was comprised of numerous agricultural fields and woodlands.

The 1767 Ratzler map (Figure 12) shows Gowanus Creek and the surrounding wetlands. The nearest structures to the project area shown on the map are the former Brouwer Mill (Lower Mill) and dwelling (Figure 12:18 and 19) and the Bergen home (Figure 12:3) which as of 1767 was the residence of Jacob Bergen (see Stiles 1867). Other structures also are shown on this map in the general project area vicinity. These include the Jacob Van Brunt residence, formerly located less than a 1,000 feet northeast of the project area (Figure 12:10), and the Frederick Lubbertse dwelling formerly located on the high ground approximately one half mile northwest of the project area (Figure 12:4).

4.3 The Revolutionary War Years

During the period of the American Revolution, the Gowanus Creek area of Brooklyn remained rural and agricultural in nature with a relatively small population that was mostly of Dutch ethnicity. The war and political turmoil apparently aroused little interest or passion in the local population. During this period, the current project area was part of the farmstead of J. Garritson (Beers 1874; Perris 1855). It continued to be open water, part of a channel of Gowanus Creek, and marshland (see Figures 13 - 15).

One of the most important of the early military engagements of the war occurred on August 27, 1776, extending across much of western Brooklyn. British and Hessian forces had landed unopposed on August 22 near what is now Fort Hamilton at the Narrows as part of an operation to destroy the American army and occupy New York City (Johnston 1878).

Prior to the British landings, the Americans had constructed a line of fortifications centered along the Brooklyn Heights ridge, a southwest to northeast tending landform that extends through Brooklyn. The southernmost of the fortifications was named Fort Box (named after Major Daniel Box, a senior aide to the American General Nathaniel Greene) which was located west of Gowanus Creek where Carroll Park is today (Gallagher 1995b:78). About three quarters of a mile north of Fort Box was Fort Greene, located at present day State and Schermerhorn Streets, situated about two-thirds of a mile north of the project area. One hundred and fifty yards further north, at the corner of what is now the intersection of DeKalb and Hudson Avenues was a circular artillery battery. Still further north was Fort Putnam, located on the heights overlooking Wallabout Bay. The right wing of the American line was anchored by the salt marshes along Gowanus Creek (Gallagher 1995b:78 and 102; Johnston 1878). The locations of these positions are shown on Figures 13 - 15). South of Brooklyn

Heights, the Americans had established advanced positions parallel to a line of hills. The Americans fielded approximately 7,000 troops under the overall command of General Israel Putnam with the right side of the American lines, which included the Gowanus area, under the direct command of General Lord Sterling. The attacking British and Hessian force numbered approximately 22,000 troops (Gallagher 1995b:61).

Following their landings at the Narrows, the British advanced northward in three columns. A large body of British and Hessians, forming the left wing of the British Army under the command of General James Grant, moved northward from the Narrows along the Shore-Gowanus Road forcing the retreat of American pickets and other forces attempting to counter the advance. The right wing of the British army, 14,000 strong under the command of General William Howe, advanced along the Kings Highway branching into two columns at Flatlands with one column, composed of Hessians and Scots under the command of General de Heister, moving to Flatbush along the Flatbush Road. The remaining troops continued along the Kings Highway to New Lots (Johnston 1878; Gallagher 1995).

On the morning of August 27, 1776, Grant's troops engaged a small body of American troops in a fierce fight near Gowanus Village. The vicinity of this fight extended over the area now covered by 38th and 39th Streets between 2nd and 5th Avenues. The Americans, thinking that this force represented the main British penetration into Brooklyn, reinforced their troops with two regiments. The Americans established a defensive line near 20th Street and Third Avenue (Stiles 1884:I:51-55; Johnston 1878:161-163; Wilson 1892-93:II:506-509). Meanwhile, the Hessian and Scot column advancing to Flatbush attacked the American defenses at Battle Pass. Grant's and de Heister's attacks, however, were feints designed to keep the American's attention turned to the south while the remaining British column continued undetected to New Lots.

Upon reaching New Lots, Howe's force turned east, flanking the outer American defenses at Battle Pass and Bedford Pass and striking hard at the defensive lines at Gowanus. The Americans facing Grant and de Heister realized that they were being outflanked and their lines broke in great disorder, the troops withdrawing across the Gowanus marsh and creek, seeking the protection of the American lines at Fort Box. A number of the retreating Americans reportedly drowned crossing the creek, marshlands, and Vechte's canal. To gain time for the retreating Americans, a reinforced company of 400 Maryland troops under Lord Stirling stood against a force of at least 2,000 British troops north of present day J.J. Byrne Park at Gowanus. Although outnumbered, the Marylanders attacked the British six times in order to try and drive them back, gaining time for the withdrawing American force to escape. Of the 400 Maryland troops engaged, 256 were killed and over one hundred others were wounded and/or captured (Gallagher 1995b:129-130). The archaeological site files of the New York

State Office of Parks, Recreation, and Historic Preservation include a listing for a mass grave location for the Maryland troops killed in the battle (OPRHP archaeological site number A047-01-014947). The burials reportedly are located at 3rd Avenue between 7th and 8th streets. The location is approximately two-thirds of a mile south of the current project area. Others, however, have indicated that the Maryland troops are more likely buried somewhere in Prospect Park (Bankhoff 2002, personal communication; Rakos 2002b, personal communication).

In order to delay the advancing British and Hessians and save the American army, American troops under the command of a Colonel Ward burned Freeke's and Denton's mills and residences, and most importantly, the bridges over Freeke's and Denton's Mill ponds. This effectively trapped large numbers of American troops on the east side of the Gowanus Creek facing the advancing enemy. American soldiers attempting to cross the narrow pathway over Freeke's Mill dam reportedly were attacked by Hessian artillery resulting in their suffering overwhelming casualties (Solecki 1977:11).

With the remaining American forces secured behind their fortifications on Brooklyn Heights, the British established lines east of Gowanus Creek, thinking to trap the Americans against the East River. In one of the more remarkable achievements of the war, however, the Americans were secretly ferried across the river on the foggy night of August 29-30. Thus, the American army was saved to continue the war.

It has been estimated that the Americans lost 3,300 men killed, wounded and/or captured in the Battle of Brooklyn while the British casualties numbered 373 including 61 men killed (Gallagher 1995b:136).

Following the Battle of Brooklyn, the British occupied western Long Island and Manhattan, departing only with the end of the American Revolution in 1783. Throughout the occupation, thousands of American prisoners were held in deplorable conditions in British prison ships moored in Wallabout Bay. For the local population, however, the occupation proved to have mixed consequences. *According to Ment (1979:24):*

For the farmers of Kings County, profits from sales of produce and supplies to the occupation forces were balanced by the expense and inconvenience of compulsory billeting of troops, the loss of valuable timber cut to serve the British army's needs, and occasional theft and disorder from roving bands of privateers.

4.4 The Late Eighteenth Century

Most of Kings County retained its rural, agricultural nature throughout the late eighteenth century. Only the Town of Brooklyn witnessed commercial growth, reflecting its proximity to the ferry and New York City. By the end of the century, the town contained ropewalks, distilleries, slaughterhouses, and shops (Latimer 1995:153). During this period, the current project area continued to be open water, part of a channel of Gowanus Creek, and marshland.

4.5 The Nineteenth Century

During the early nineteenth century, the Gowanus area remained agricultural in nature but situated near the growing Town of Brooklyn (Weld 1938:5). By the 1830's, increased growth in the town caused its population and commercial development to expand southward. The development of street grids in the project area vicinity by the 1830's reflect this development (see Figures 16 - 19). The growth of Brooklyn resulted in its incorporation as a City in 1834 (Weld 1938: 51-52). The municipal limits of the city included Gowanus and the current project area.

Throughout the mid-nineteenth century period the Kings County area continued to grow with the City of Brooklyn becoming commercial and suburban in nature and the remaining towns retaining a prosperous agricultural existence. By 1860, the City of Brooklyn had a population of 266,661 inhabitants with the remaining towns in Kings County having a combined population of less than 12,500 people (Latimer 1995:151). Growth continued for the remainder of the nineteenth century and with the opening of the Brooklyn Bridge in 1883 more and more business located in Kings County increasing the economic interdependence of New York City and Brooklyn. By 1896, the City of Brooklyn had annexed the five remaining towns in Kings County dramatically increasing its size. In order to ease administrative and debt problems caused by its rapid growth, Brooklyn and New York City consolidated on January 1, 1898 and the City of Brooklyn became the Borough of Brooklyn (Latimer 1995:152).

4.6 The Gowanus Canal, Gowanus Canal Flushing Tunnel, and Flushing Tunnel Building

After the 1830's, the modern Brooklyn waterfront began to develop. This change affected Gowanus Bay and Gowanus Creek. By the late 1840's, plans were developed by Daniel Richards, a local prosperous landowner, to transform Gowanus Creek into Gowanus Canal by dredging and modification of the stream banks. Financing for the project was with private

funds. The initial purpose of the canal was to drain much of the surrounding marshland in the southern portions of Brooklyn and provide a sewer outlet. By 1860, the size of Richard's canal was approximately five feet deep, 100 feet wide, and one mile long, generally corresponding with the parameters of the main channel of the existing canal (Raber 2002:18).

Between 1866 and 1869, the City of Brooklyn decided to modernized the canal by further dredging and the construction of docks and other facilities along its sides. The purpose of this work was to create a serviceable waterway capable of bringing ship traffic well into south Brooklyn and to fill areas along the waterway to permit development (Stiles 1884:503, 509; Raber 2002:18).

According to the New York City Landmarks Preservation Commission (1987:2):

In 1847, developer-businessman Col. Daniel Richards petitioned the Brooklyn Common Council for permission to open streets in South Brooklyn. Richards had initiated the planning of the Atlantic Docks and Basin (begun 1840), and the Erie and Brooklyn Basins at Red Hook, which were the first of the major improvements to transform the Brooklyn commercial waterfront. As the port of New York expanded in the nineteenth century, the entire shoreline of Brooklyn from Greenpoint down to Red Hook was built up with docks and warehouses. To further spur commerce and development in South Brooklyn, Richards envisioned at the same time the creation of a mile-long barge canal fashioned out of Gowanus Creek, and the draining of the adjacent marshlands. It was not until 1866-1869, however, that state legislation was passed to improve the Gowanus Canal, through dredging, the construction of docks, and rebuilding of bridges. The Gowanus Canal Improvement Commission was appointed to oversee the projects, while the Brooklyn Improvement Company was to perform construction work. As completed the canal extended the mile between Hamilton Avenue and Baltic Street, and five branches with docks extended for an additional two-thirds of a mile. One hundred feet wide and varying in depth from twelve to sixteen feet, the Gowanus Canal became lined with such industrial concerns as lumber, coal, brick, and stone yards, and flour and plaster mills. Six bridges crossed the canal.

Changes to the canal occurred over the next decade and a half resulting in an industrial waterway that was 5,700 feet long, 100 feet wide, and 15 feet deep at high tide. The presence of the canal aided the commercial and residential development along its route. In addition to

the previously mentioned industries, by the end of the century the canal was lined with foundries, paint and ink factories, and electroplating shops. In addition, sewage from area residences emptied directly into the canal. As a result, the waterway became highly polluted being referred to as an open cesspool in 1893 by the local newspaper, the *Daily Eagle*. Tidal action was not sufficient to clean the canal of contaminants. By 1893, a storm drain was constructed into the north end of the canal (through the current study area) to provide additional flushing action. The local sewer system also was upgraded in 1904 (Raber 2002: 18) to increase flushing of the canal. These actions, however, proved to be only partially successful and may even have increased the problem by depositing additional organic material and pollutants into the canal (Rakos 2002a:20).

In order to help clean the canal on a more continual basis, the City of New York (which incorporated the City of Brooklyn in 1898 - see above), proposed to pump water from the East River into the head of the Gowanus Canal flushing out into Gowanus Bay. This was discarded since the increased water would hinder loaded barges entering into the canal (Rakos 2002a:18). It also was felt that a reversed flow of the water, pumping polluted Gowanus Canal water directly to the East River at Buttermilk Channel, would more effectively clean the canal than if East River water was brought to it (Rakos 2002a:20).

According to Rakos (2002a:20):

Following years of research, engineering, and design, the final plan was implemented to flush the canal waters through a 12-foot-diameter tunnel running 6,280 feet and into Buttermilk Channel. The flushing tunnel, as built, is of brick pointed and smoothed with concrete. The January 11, 1908, issue of *Engineering Record* described the tunnel's construction in detail.

As construction of the tunnel proceeded, design of the pump house [the flushing tunnel building/power house] was undertaken and was overseen by Edwin J. Fort, the city's chief engineer of sewers. Plans and specifications called for an "alternating current electric motor directly connected to a horizontal shaft driving a screw or turbine pump" to deliver 30,000 cubic feet of salt water per minute (14,000 L/s). At the contractor's suggestion, the tunnel diameter at the wheel pit was reduced to 9 feet and a 9-foot wheel "similar to a ship's propeller" was installed.

The pump house facility includes a historic power house and gate house, as well as a more recent service building, [and] pump station...

The red brick power house has a truss-supported roof and 20-foot-tall arched windows. The building contains the motor pit in which the motor driving propeller sits at approximately 15 feet below floor level. Each of the power and gate houses contain a tide [sluice] gate used to shut off water flow for repairs.

Operation of the Flushing Tunnel in the decades after its construction reportedly proved successful, at least in part, in cleaning the Gowanus Canal waters (Rakos 2002a:20).

Shipping and industrial use of the Gowanus Canal peaked in the early twentieth century. By the 1940's and 1950's, siltation and pollution within the canal, the decline in industries surrounding it, and the advent of new transportation systems resulted in lessening industrial shipping along the waterway (Raber 2002:19). With the advent of containerized shipping in the early 1960's, remaining canal shipping declined rapidly. The Flushing Tunnel suffered a mechanical breakdown around the same time and was out of commission for many years resulting in the increased degradation of the canal. The tunnel was reactivated in 1999, operating 24 hours a day. However, its water flow is reversed compared to its original design (NYCDEP 2000; Rakos 2002a:20). According to Rakos (2002a:20), the tunnel's current water flow "...brings fresh water from New York Harbor into the canal at an average rate of 200 million gallons a day (760 million L/day)."

4.7 Development in the Project Area During the Nineteenth and Early Twentieth Century

In order to investigate the history of land use within the project area, maps showing the pertinent section of Kings County and other documentary sources were consulted. On late eighteenth century (referred to above) to mid-nineteenth century maps, it was determined that the current project area is situated towards the northern end of Gowanus Creek. It was an area of open water with adjoining wetlands to the immediate west. By the late 1840's, the Gowanus Canal had been constructed by the dredging, straightening, and filling of portions of Gowanus Creek. Adjoining wetlands also were drained and filled. Canal construction terminated just south of Butler Street.

The project area parcel was created during the canal's construction by filling portions of the northernmost extent of the creek and draining and filling the wetlands formerly located on its west side. The northern terminus of the canal served as a convenient location indicator when viewing post-1850 maps with the current project area located immediate north and west of that point.

The pre-1850 maps reviewed for this study show the progression of the street grid indicative of continuing development in the project area vicinity. However, in Brooklyn, streets are frequently depicted on Historic period maps prior to their actual construction (see Rothschild and Dublin 1985:11), reflecting foresight in urban planning. While in some instances this could be misleading, the depiction of planned street routes provided a convenient indicator of specific locations relative to those roadways. By 1840's (see below), if not earlier, the existing road way system had been planned, although likely not actually constructed, in the current project area vicinity. The property was situated, as it is currently, between Butler and Douglas Streets and east of Bond Street. These roads, therefore, also served as location indicators for this investigation.

The 1834 Martin map (Figure 16) shows the Gowanus Creek prior to the construction of the canal. It also shows existing and planned streets for the project area vicinity. No structures are shown on the 1834 map between Butler and Douglas Street and east of Bond Street (i.e. the project area) as of that year. The map implies that Gowanus Creek and its adjoining wetlands, had been filled by this date but that is unlikely and what is actually shown is planned development. The nearest structures to the project property shown on the 1834 map are: 1) Freeke's Mill, located approximately 1,000 feet to the southeast; 2) the Bergen homestead situated approximately a quarter mile to the southwest; and 3) another homestead (likely the former Jacob Van Brunt house - see Chapter 4.2), located approximately 700 feet to the northwest.

The 1844-1845 United States Coast Survey map (Figure 17) does not indicate any structures along the extreme northern reaches of Gowanus Creek which include the current project area vicinity. The map shows the extent of the creek and associated wetlands. The nearest structures shown on the map to the project area are the former Bergen house, located west of Gowanus Creek, and the reconstructed mill structures formerly owned by Freeck and Denton. The location of Gowanus Creek in relation to the current project area during this period is more clearly seen on the 1846 Butt map (Figure 18) which shows the modern street grid in relationship to those water courses. The area east of Bond Street between Butler and Douglas Streets is indicated on the 1846 map as consisting of open water that is part of the channel of Gowanus Creek. (On the 1846 map this location is just to the right of the letter R in the word "WARD" indicating the proposed 10th Ward.) A small tributary is shown on the 1846 map flowing into the west side of Gowanus Creek just south of what is now Butler Street. This confluence area likely was surrounded by marshy ground.

The 1850 Perris map (Figure 19) indicates that the area east of Bond Street between Butler and Douglas Streets had been established as blocks by that year suggesting that the Gowanus Creek wetlands had been drained and filled. However, no structures are shown on the map as

located in this area as of that year suggesting that development had not occurred there. The Gowanus Canal, however, also is not shown on the map suggesting that it may not be completely accurate since the canal was constructed in the late 1840's (Gallagher and Kachur 1995:494).

The location of the Gowanus Canal is shown on the 1855 Perris map (Figure 20) relative to the former channel of Gowanus Creek. The project area is located on that map east (to the right) of Bond Street between Butler and Douglas Streets.

By 1869, according to the Dripps map of that year (Figure 21), the current project area (situated at the north end of the Gowanus Canal) was part of the Ross Lumber Yard. No structures are indicated on that map as being located within the lumber yard.

Structures still were not located within the project area as of 1880, according to the Bromley map of that year (Figure 22). The map indicates that 14 lots comprised the project area as of that year and that it was part of block number 259. The Gowanus Canal also is clearly shown. The project area likely remained part of the H. Ross and Son Lumber Yard as of 1880 which also owned parcels to the project area's east (right of the canal on the 1880 map). The 1880 map also indicates the former outline of Gowanus Creek.

The 1886 Robinson map (Figure 23) indicates that structures still had not been constructed within the project area as of that year and that it remained part of a lumber yard. Municipal water lines are shown extending through Butler Street on the 1886 map. They are not shown on the 1880 Bromley map indicating that they were installed sometimes between that year and 1886.

By 1893, according to the Bromley map of that year (Figure 24), the City of Brooklyn had acquired the former lumber yard property, including the current project area. A brick structure (198 Butler Street) had been constructed northwest of the canal in the area currently occupied by the Gowanus Facilities service building. Two six inch municipal water mains are shown extending through Butler Street on the 1893 map. The water lines apparently had been installed in the street sometime after 1880 (see above). Accordingly, it is likely that the brick structure was constructed with connections to that municipal supply.

The brick structure is shown in the same location on the 1898 Hyde map (Figure 25) as it is shown on the 1893 map. No other structures are shown on the Hyde map within the project area. The map indicates that a 120 inch storm sewer had been installed between Butler Street and the Gowanus Canal through the eastern portion of the project property by 1898. The 1898 map also shows the former outline of Gowanus Creek, indicating that it encompassed the

vast majority of the project area. The portion of the project area outside of the depicted creek outline was the former confluence location of the tributary stream shown on the 1846 Butt map.

The 1903 Hyde map (Figure 26) indicates that New York City's Department of Water Supply had acquired the project area and adjoining land to the east by that year. The brick structure and storm drain are indicated in the same location as they are shown on the 1898 map. The 1903 Hyde map describes the structure as a two and a half story building. By 1903, the project area's block number had been changed from number 259 to number 411 (the current block designation).

The 1908 Bromley map (Figure 27) shows the brick structure in the same configuration as it is shown on the 1903 map. No other structures are shown on the map as located within the project area.

By 1911, the Flushing Tunnel had been constructed. The portion of its route through the project area is shown on the Bromley map of that year (Figure 28). The map indicates that the tunnel follows a reversed S-shaped route through the project area from the Gowanus Canal to Butler Street. The brick structure in the northwestern corner of the property is shown in the same configuration as it is shown on the 1908 map. In addition, a one and a half story brick structure was constructed by 1911, just south of the first brick structure at 198 Butler Street. The Bromley map also indicates that additional storm sewers had been constructed between the Gowanus Canal and Butler Street through the eastern portion of the project area. The New York City Department of Water Supply remained the owner of the property as of 1911.

By 1915, according to the Sanborn map of that year (Figure 29), the existing Flushing Tunnel building/power house and gate house were constructed. The two and a half story brick structure in the northwestern corner of the project property is shown on the 1915 map in the same location as it is shown on earlier maps. However, to its south the 1915 map shows a two story brick structure (the existing Flushing Tunnel building/power house - Figure 29) that apparently had replaced the one and a half story brick structure depicted on the 1911 map. The two story brick structure is shown in a slightly different location and in a different configuration on the 1915 map than is the one and a half story structure that is depicted on the 1911 map. South of the Flushing Tunnel building/power house, the 1915 map depicts the presence of another brick structure that is apparently the existing tunnel gate house (Figure 29). Both the Flushing Tunnel building/power house and gate house likely were built in 1911 or soon afterwards (Rakos 2002a:20).

By 1929, the project area was part of the City of New York's Water Supply Distribution

Gowanus Station facility, according to the Hyde map of that year (Figure 30). The two and a half story brick structure in the northwestern corner of the project property, the Flushing Tunnel building/power house, and the gate house are shown on the 1929 map in the same configurations as they are shown on the 1915 map. Additional sewer lines were installed by 1929 in the northern portion of the project area, extending between Butler Street and the Gowanus Canal.

The Flushing Tunnel building/power house and tunnel gate house are shown in the same configuration on the 1948 Sanborn map (Figure 31) as they are shown on the 1929 map. By 1948, a small office building had been constructed south of the southwestern portion of the power house and a sewage pumping station (constructed in 1947 - NYCDEP 2000) had been constructed to the east of the Flushing Tunnel building/power house, at the head of the canal. The Sanborn map also indicates that the two and a half story brick structure (198 Butler Street) located in the northwestern portion of the project area on early maps was no longer present as of that year but had been replaced by a brick and frame structure. This structure reportedly was modified/replaced in 1988 when the existing service building was constructed (Ames, personal communication 2002; Figure 2).

5.0 ASSESSMENT OF ARCHAEOLOGICAL AND ARCHITECTURAL SENSITIVITY AND RECOMMENDATIONS

5.1 Conclusions

The chapter presents the archaeological sensitivity of the Gowanus Facilities Upgrade project area and a preliminary evaluation of the existing structures on that property.

5.1.1 Native American Period Sensitivity

Prior to mid-nineteenth century development, the Gowanus Facilities Upgrade project area consisted of an open water channel of Gowanus Creek and adjoining wetlands. The wetlands likely were situated just above mean sea level. The creek and wetlands were filled during the mid-nineteenth century, raising the elevation of the project area to between seven and a half and 11 feet above mean sea level. Native American sites would not have formed within the portion of the project area that was inundated. Nor would they have formed within the adjoining low-lying wetlands, particularly as those locations likely flooded on an occasional, perhaps tidal basis. Native Americans could have utilized any localized areas of raised and relatively dry ground present within the wetlands, forming sites oriented towards the exploitation of subsistence resources associated with Gowanus Creek and its marshes. However, given the proximity of Gowanus Creek, situated at sea level, it is unlikely that substantial areas of such raised ground existed within the wetlands that formerly covered the project area. Even if such raised areas and aboriginal sites were formerly present in the project area, including sites dating to periods of lower sea levels, the extensive development projects that occurred there during the twentieth century would have destroyed them. The development projects consisted of construction of: 1) the Gowanus Canal, the Flushing Tunnel, sewage pumping station, bar screen chamber, tide (sluice) gate chamber, and service building/crew quarters and 2) no longer present late nineteenth/early twentieth century structures, as well as the installation of diesel oil storage tanks, storm/waste sewers, and other utilities, etc. Excavations for such construction projects, particularly the Flushing Tunnel situated at almost 20 feet below contemporary grade, would have penetrated the fill (7.5 to 11 feet thick), disturbing any former ground surfaces that may have been present. Accordingly, the project area is not considered to be sensitive for the presence of Native American cultural resources.

5.1.2 Historic Period Sensitivity

Prior to the late 1840's the project area was undeveloped consisting of an open channel of Gowanus Creek and adjoining wetlands. By the early 1850's, the project area was filled and the Gowanus Canal constructed. By 1869, the project area was part of a lumber yard (which extended to the lots east of the project area) and continued as such until at least 1886. Structures were not located within the project area during this period, according to the Historic period maps reviewed for this study. Given the nature of activities associated with the lumber yard (sales, storage), it is unlikely that archaeological deposits would have formed there. Any employee privy that may have been in use probably was located in the portion of the lumber yard that was located east of the project area, where structures apparently were located (see Figure 23). By 1893, the City of Brooklyn apparently had acquired the property and a brick structure had been constructed in the northwest corner of the current project area (198 Butler Street). Whether this structure was a dwelling or served some other function associated with the City of Brooklyn (possibly associated with the Department of Water Supply) was not determined during this study. If the building did serve as a residence, it is unlikely privies or cisterns were associated with it since the structure likely was constructed with connections to a municipal water supply and sewer system. Those utilities had been installed in Butler Street and surrounding streets by 1886 (see Figure 23). Installed waste lines apparently were emptying directly in Gowanus Canal.

No other buildings were built within the project area until sometime after 1908 when a brick structure associated with the New York City Department of Water Supply was erected (Figure 27 - 28). The Flushing Tunnel was constructed through the project area in 1911 and the gate house, Flushing Tunnel building/power house, and associated facilities built sometime after that date (Figures 28 - 29). Still other structures (an office, service building/crew quarters, and the existing pump house) were constructed within the current project area by 1948 (Figure 30). It is unlikely that potentially significant domestic or industrial type artifact deposits associated with activities occurring at these structures would have developed within the project area. Their construction, as well as installation of storm/waste sewers between Butler Street and the Gowanus Canal and other utilities, likely disturbed much of the project area to beneath the depth of fill.

No other Historic period event or activities were identified during the research conducted for this investigation which could have resulted in the formation of artifact deposits within the current project area.

5.1.3 Architectural Resources

Three early twentieth century structures, the Gowanus Canal Flushing Tunnel, the gate house for the tunnel, and the Flushing Tunnel building/power house are located within the current project area and could be affected by proposed construction activities. The exterior of the gate house and Flushing Tunnel building/power house do not appear to have been substantially modified since their construction. The interior of the gate house also appears to have been unmodified with the possible replacement of some tunnel gate components. Portions of the Flushing Tunnel building/power house have been modified by the installation of new equipment but the interior of the structure itself appears to be relatively unchanged. The Flushing Tunnel itself was not examined as part of this study. The three structures are associated with an important early twentieth century engineering feat, the transport of East River water to the Gowanus Canal to continually flush that waterway of pollutants. That activity directly affected the health and standard of living for local residents and businesses residing in proximity to the canal. Accordingly, the Flushing Tunnel, gate house, and power house may have architectural and/or historical value.

Remaining structures and facilities in the project area are of relatively recent construction and are not considered to have architectural or historical value.

5.2 Recommendations

The project area is not considered to be sensitive for the presence of Native American period or Historic period archaeological sites. Accordingly, additional archaeological investigations to test for such resources are not warranted.

As stated above, the Gowanus Canal Flushing Tunnel, the gate house, and the power house (tunnel building) may have architectural and/or historic value. A qualified industrial historian or historic preservation specialist could make such determination if the proposed construction project includes a major modification of any of these structures.

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FIGURES



Figure 1
 Proposed Gowanus Facilities Upgrade Project Area Region
 Source: General Drafting Company, Inc. 1983
 Scale of Original: 1 inch = 1.3 feet

(Arrow indicates approximate location of the project area.)

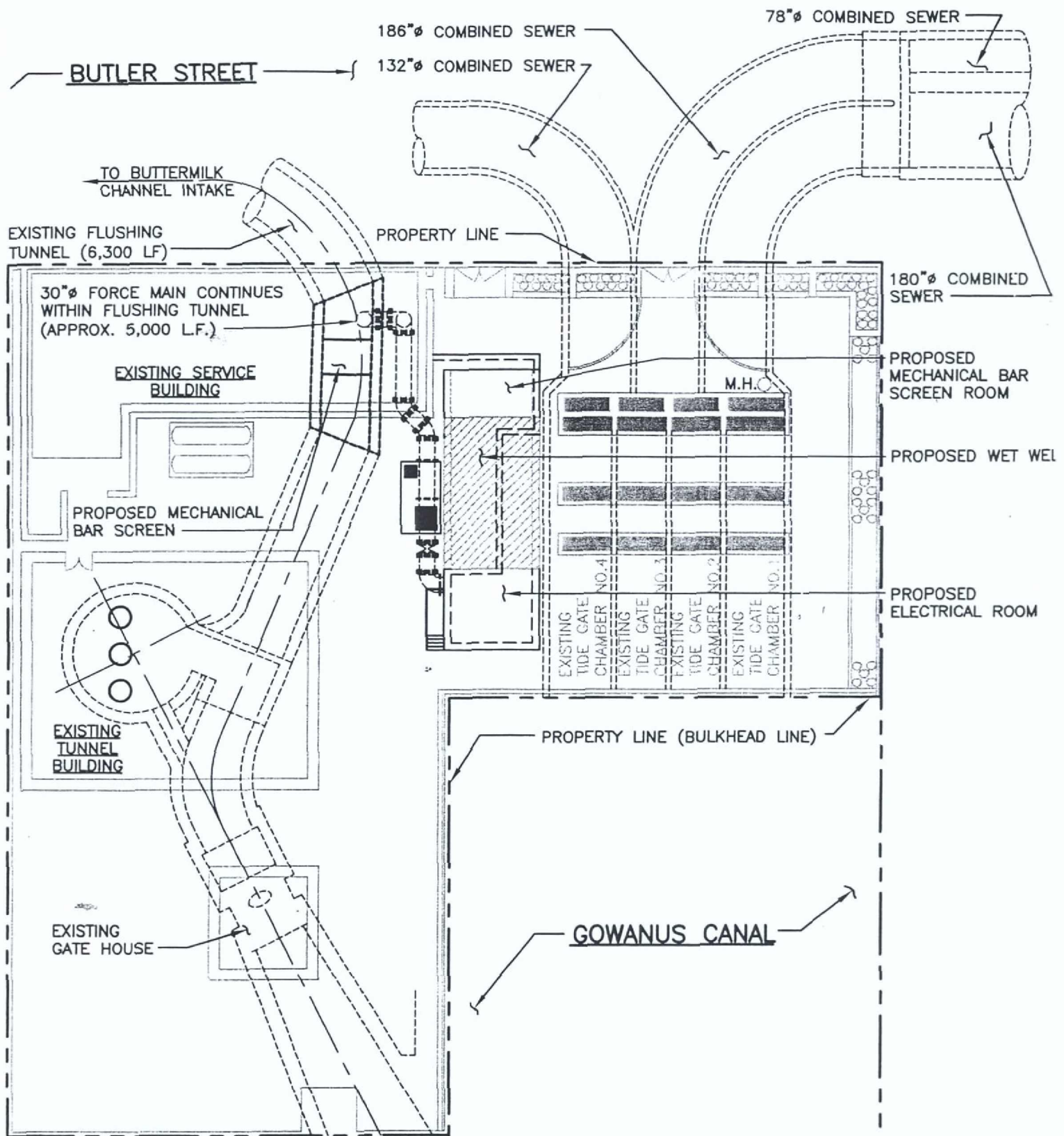


Figure 2

Proposed Gowanus Facilities Upgrade Project Area

Source: New York City Department of Environmental Protection 2001

Scale of Original: 1 inch = 30 feet

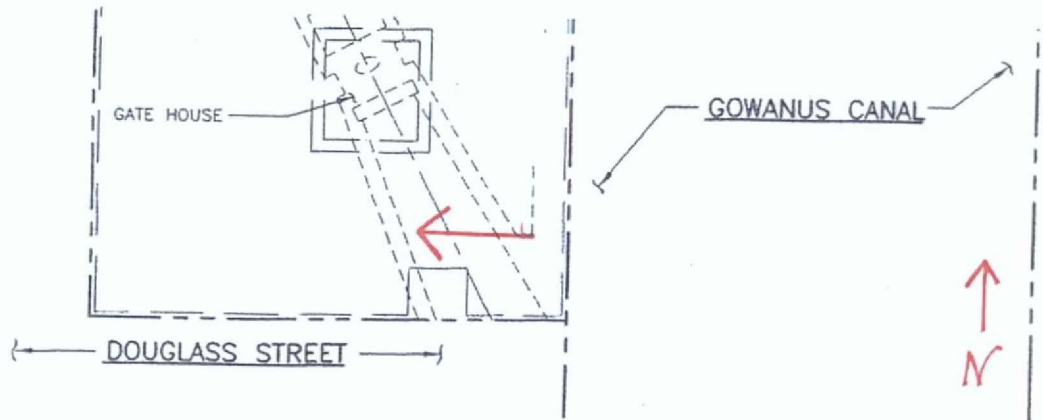


Figure 3
Southern Portion of the Gowanus Facilities Upgrade Project Area

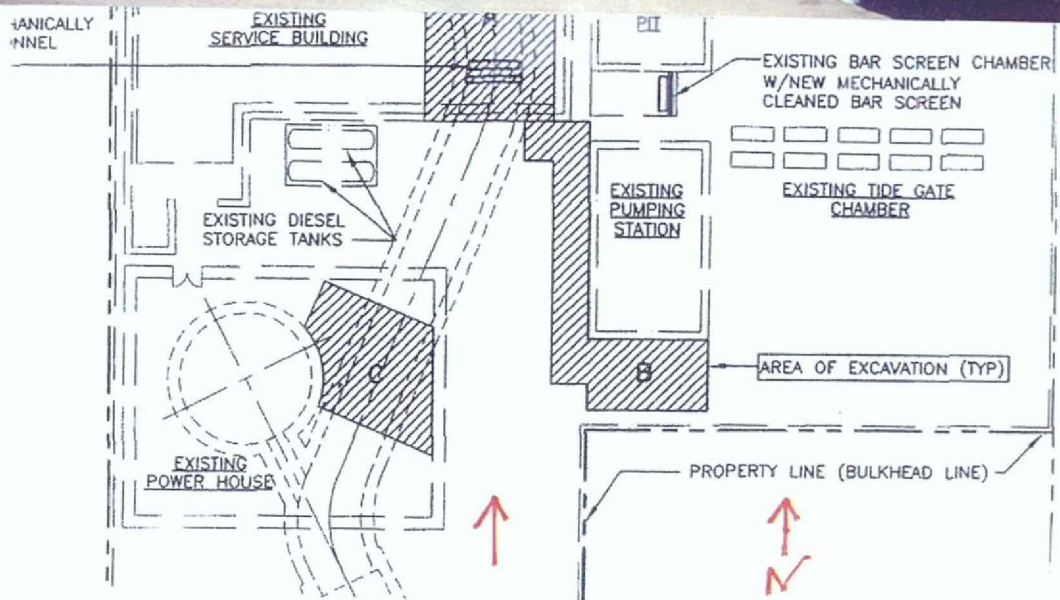


Figure 4
 Central Portion of the Gowanus Facilities Upgrade Project Area

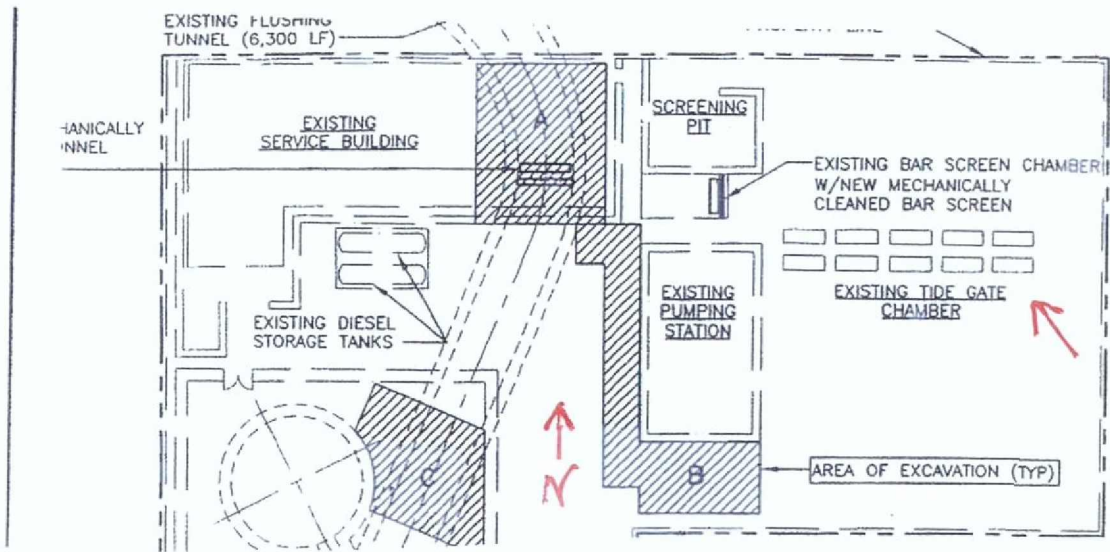
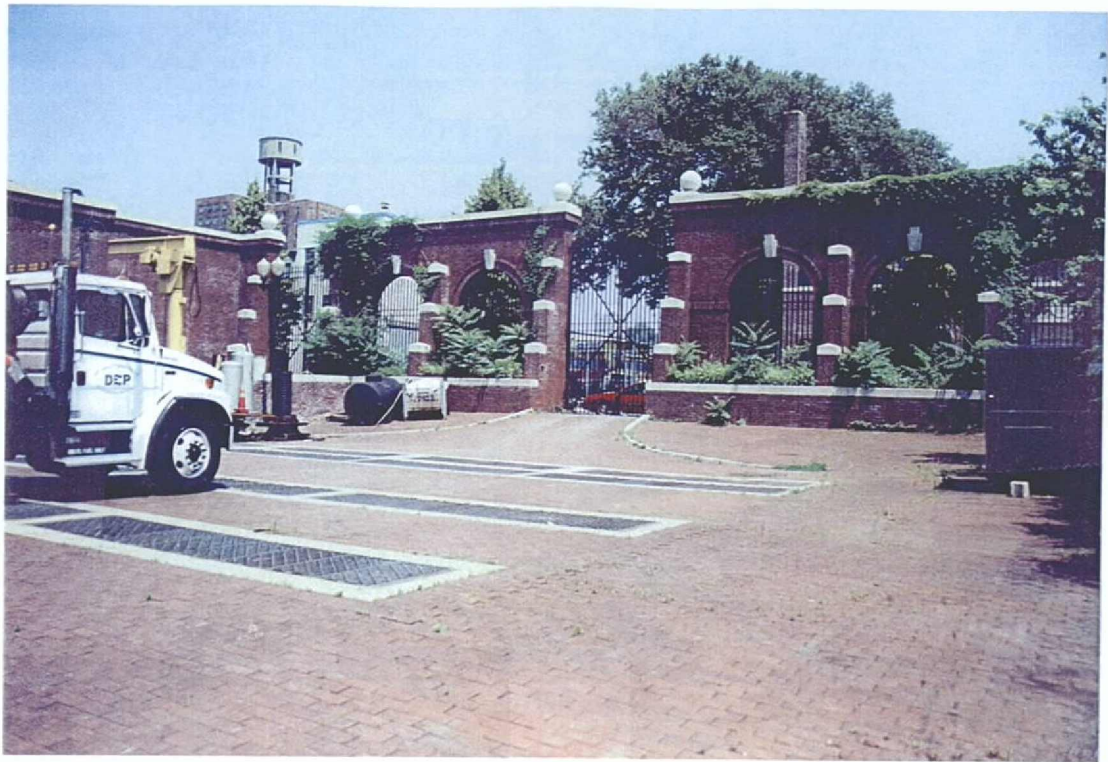


Figure 5
 Eastern Portion of the Gowanus Facilities Upgrade Project Area

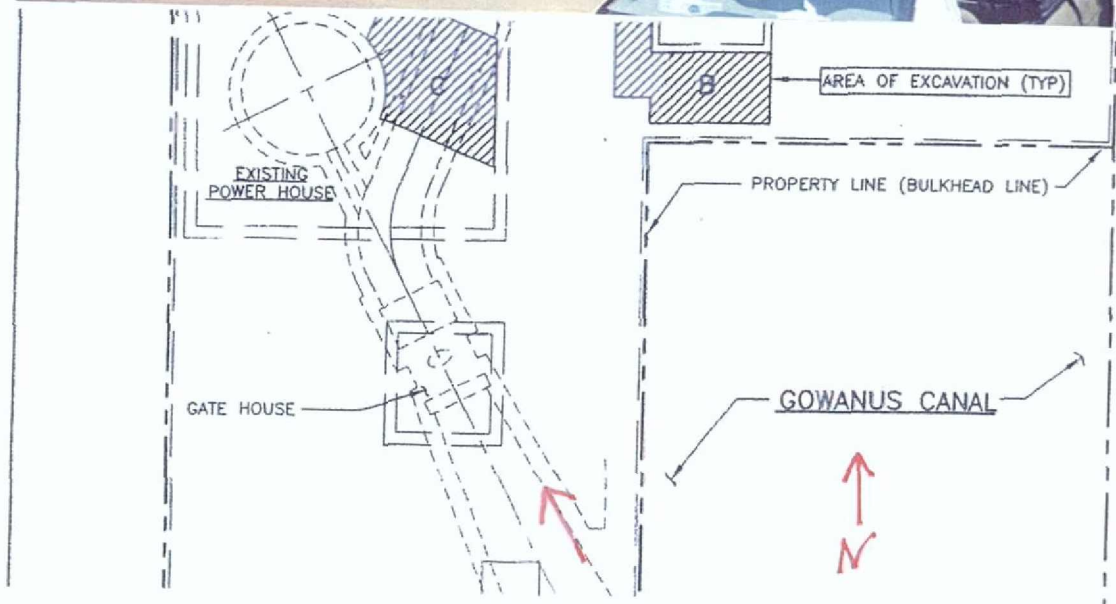
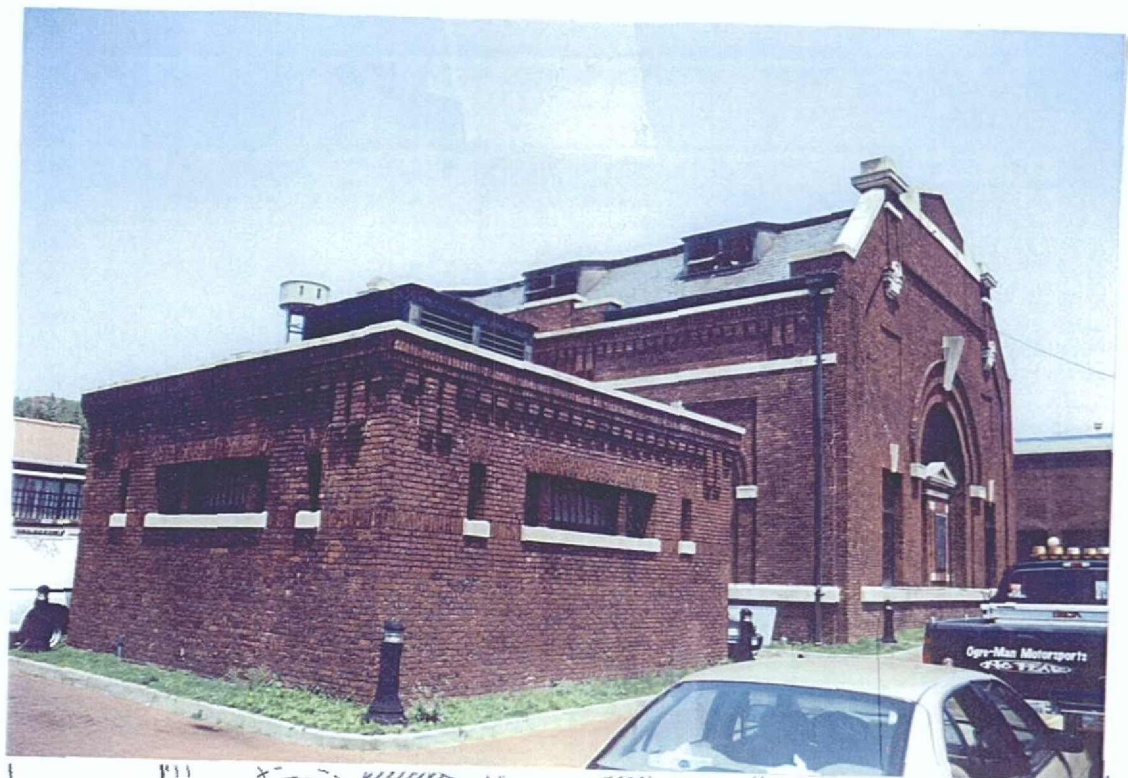


Figure 6
Central Portion of the Gowanus Facilities Upgrade Project Area Showing the Gate House (Foreground) and the Power House (Background)

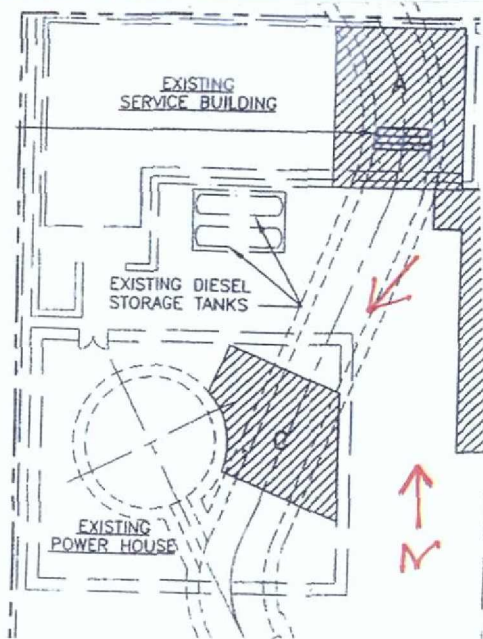
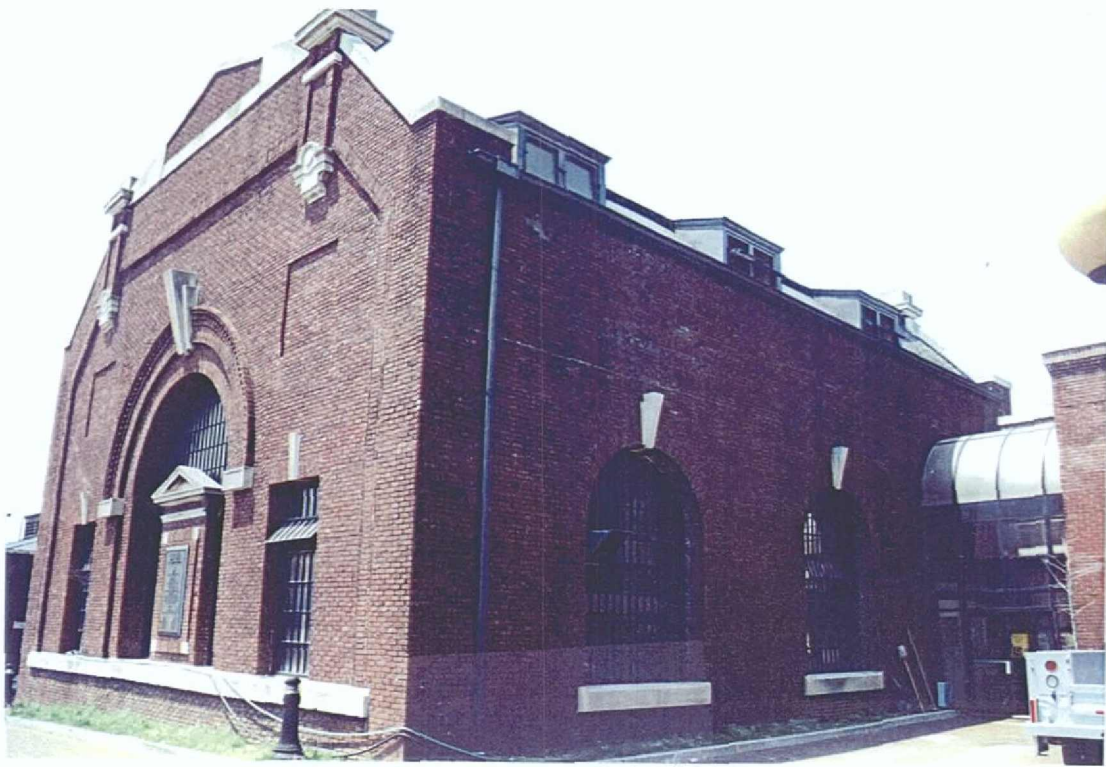


Figure 7

Power House - Gowanus Facilities Upgrade Project Area

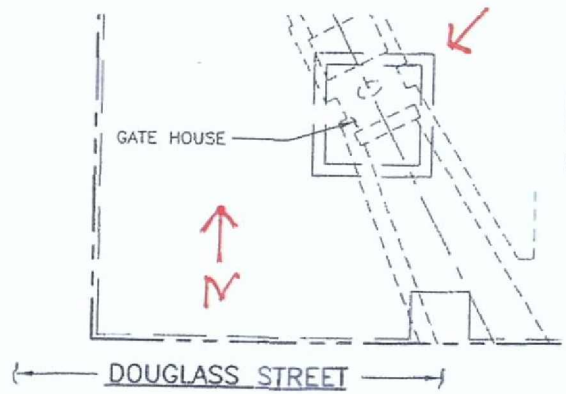


Figure 8
Gate House - Gowanus Facilities Upgrade Project Area

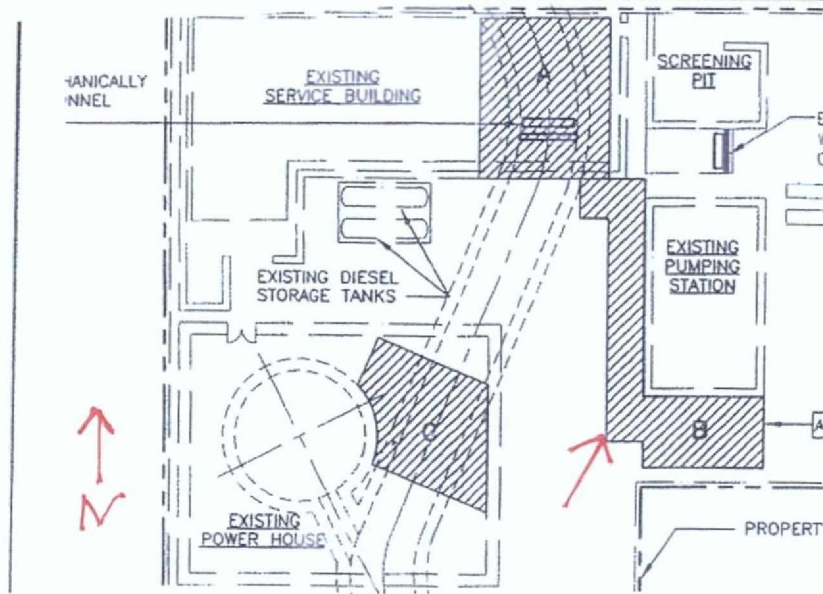


Figure 9
Sewage Pump Station - Gowanus Facilities Upgrade Project Area

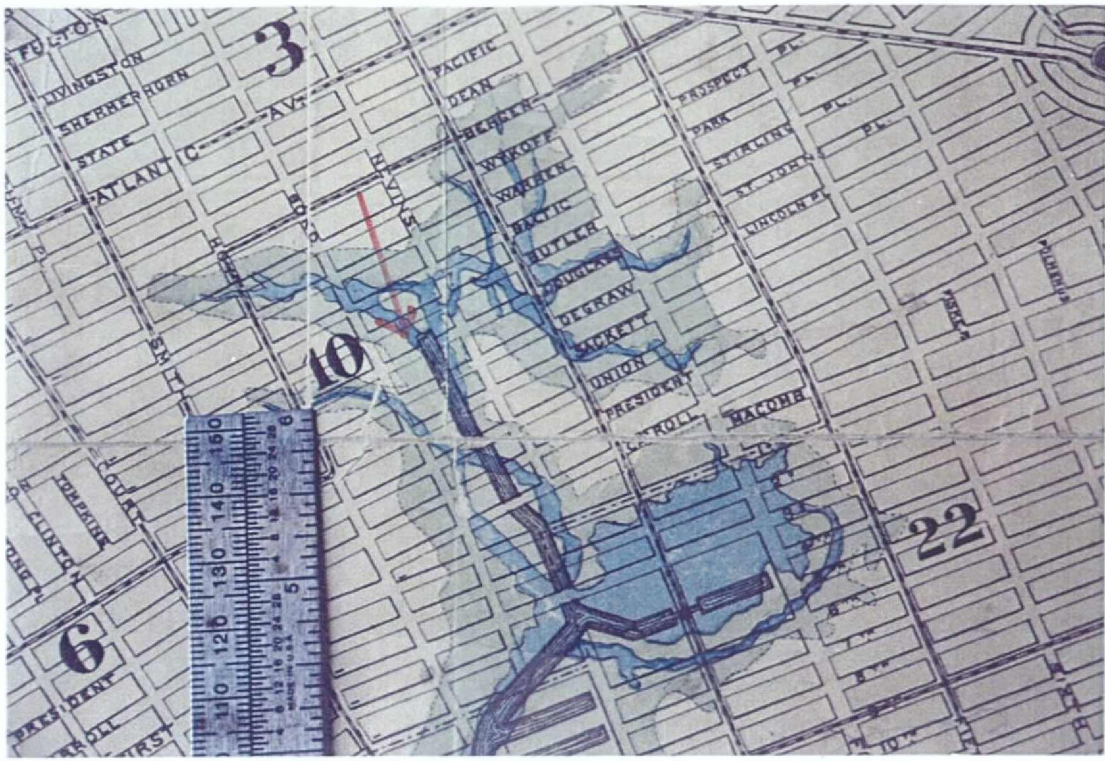


Figure 10
Map Showing the Pre-Development Extent of Gowanus Creek and
its Associated Wetlands
Source: American Lithographic Company n.d.
No Scale

(Arrow indicates approximate location of the project area.)

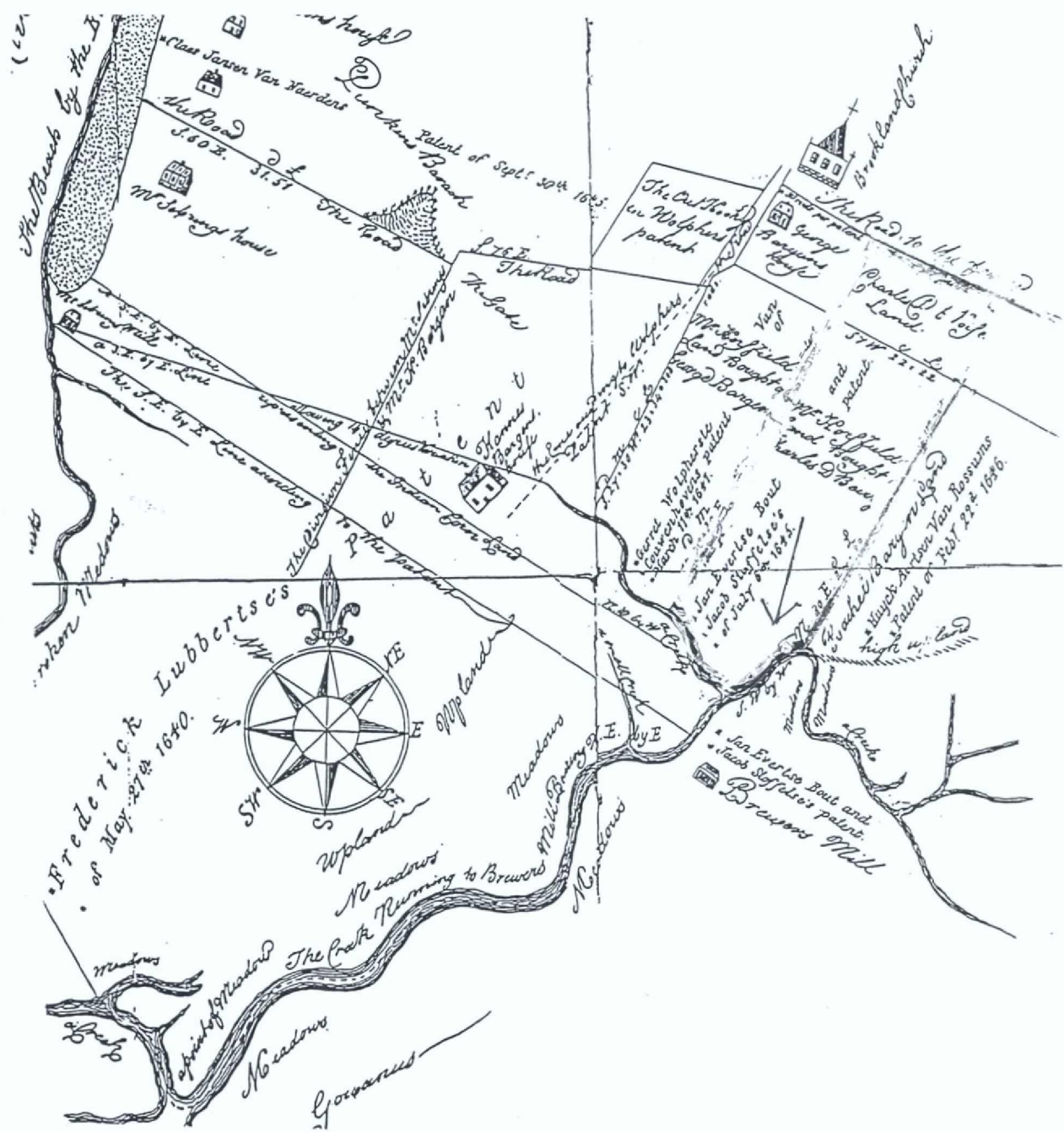


Figure 11
 "Ancient Map"
 Source: Bergen 1865
 No Scale

(Arrow indicates approximate location of the project area.)



Figure 12

1767 Ratzer Map

Scale of Original: 1 inch = 2,000 feet

(Arrow indicates approximate location of the project area.)

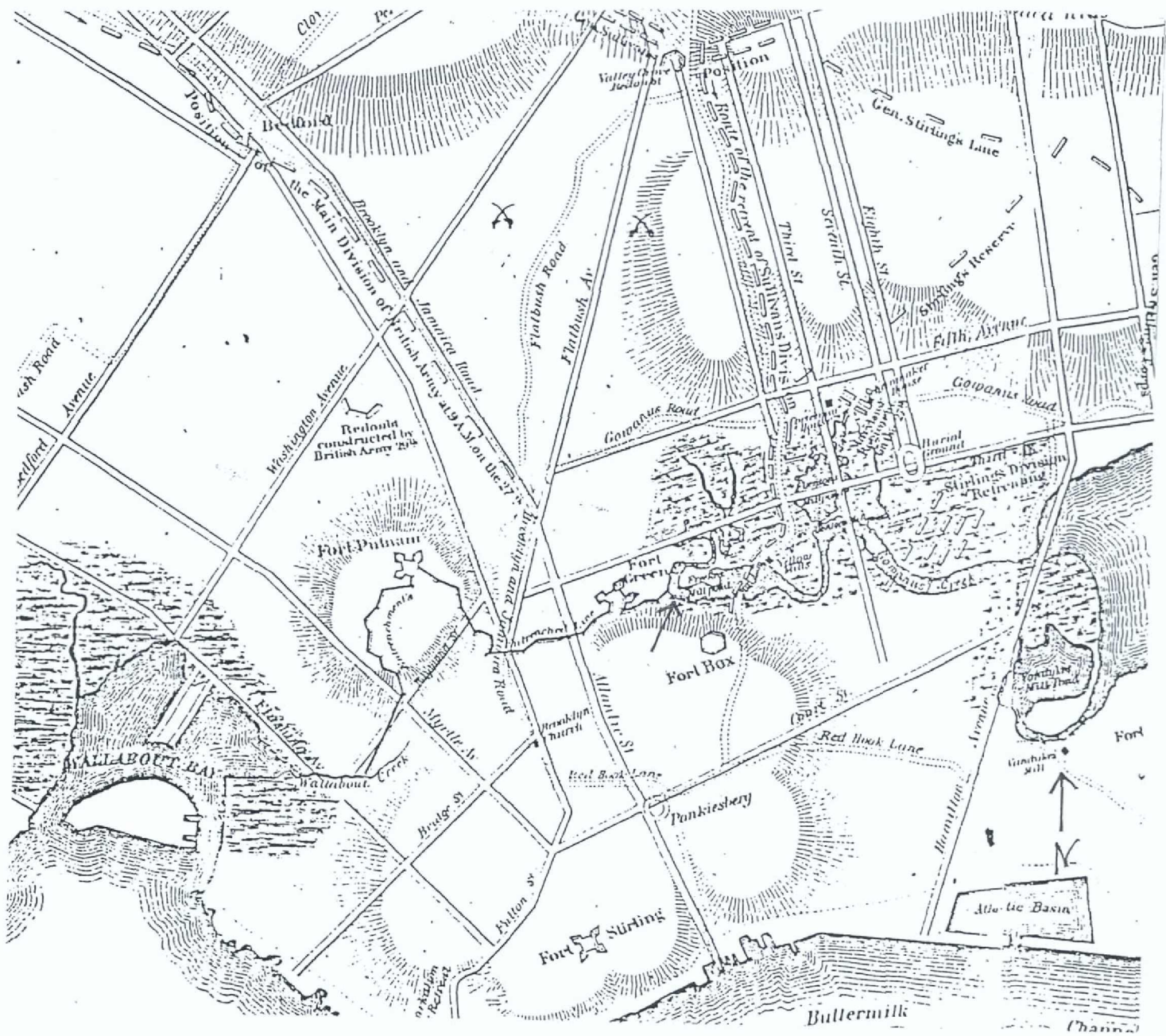


Figure 13
 Map Showing Major Locations in the Battle of Brooklyn, 1776
 Source: Anonymous n.d.
 No Scale

(Arrow indicates approximate location of the project area.)

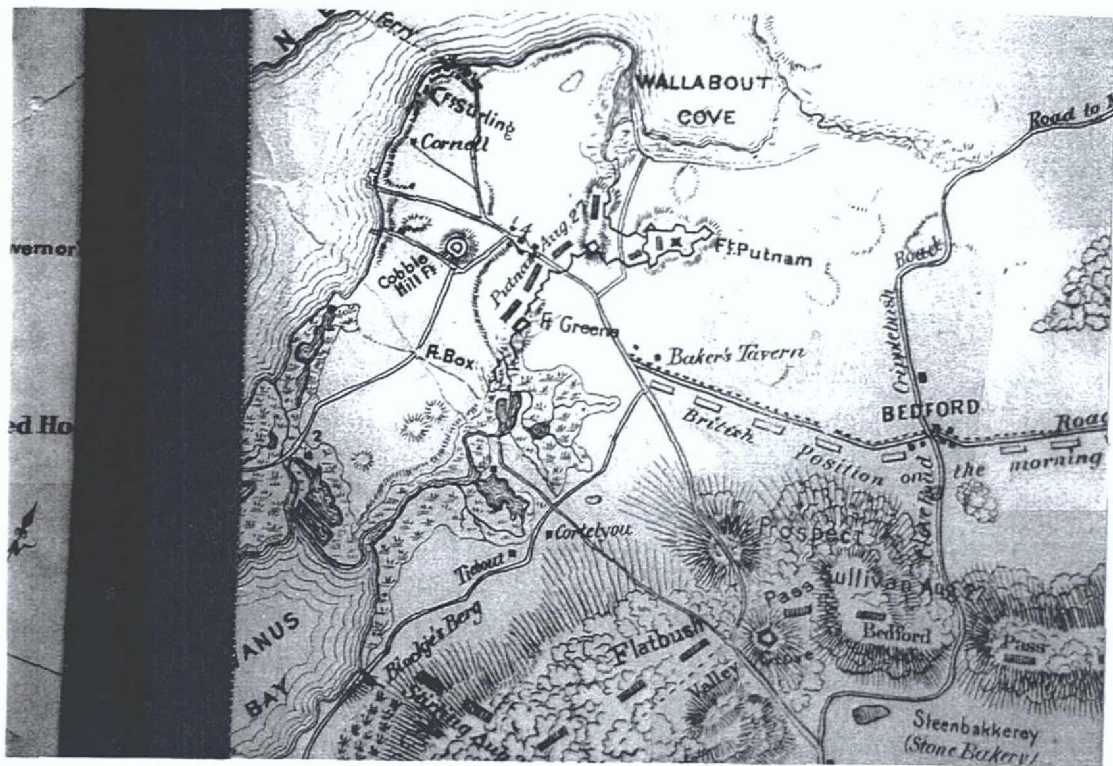


Figure 14
Map of the Battle of Brooklyn, August 27, 1778
Source: Stiles 1867
No Scale

(Arrow indicates approximate location of the project area.)

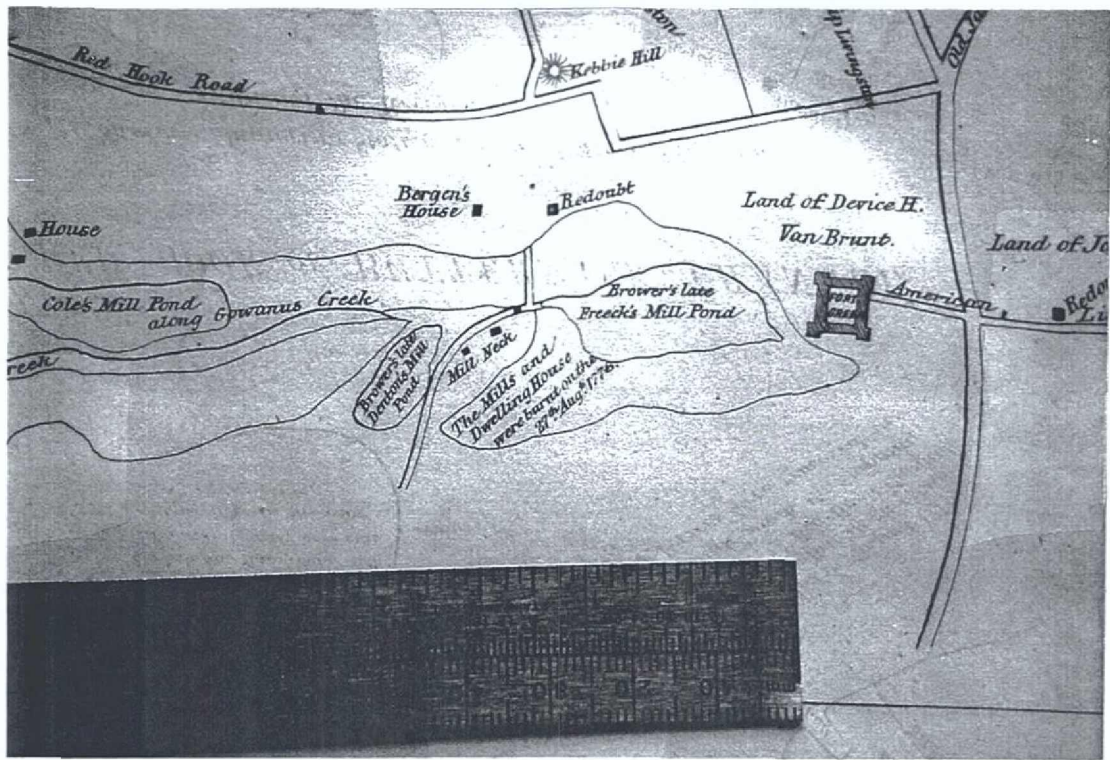


Figure 15
Map of Brooklyn at the Time of the Revolutionary War
Source: Johnson n.d.
No Scale

(Arrow indicates approximate location of the project area.)

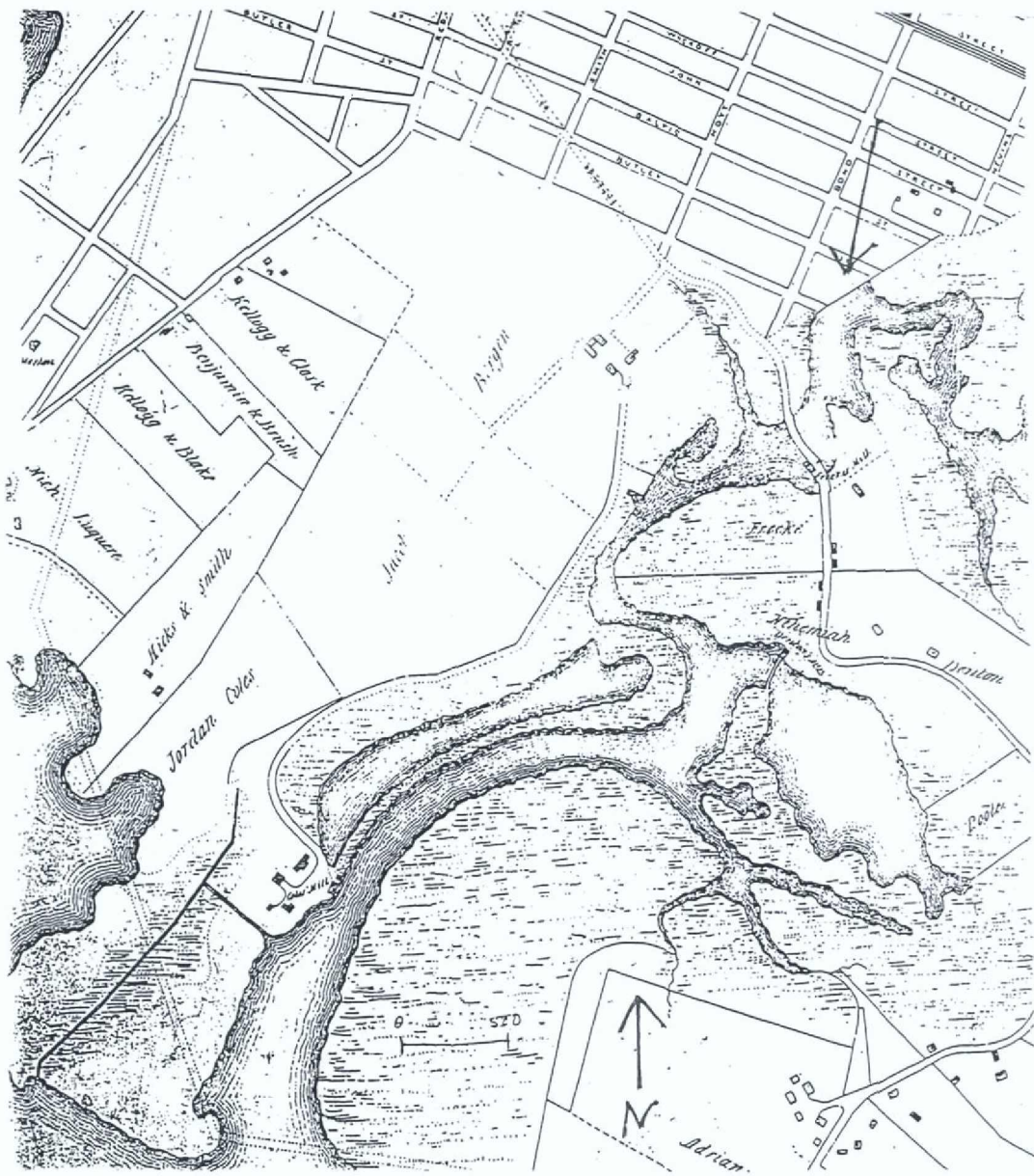


Figure 16

1834 Martin Map

Scale of Original: 0.6 inch = 500 feet

(Arrow indicates approximate location of the project area.)



Figure 17
1844 - 1845 United States Coast Survey Map
Scale of Original: 1:31,000

(Arrow indicates approximate location of the project area.)

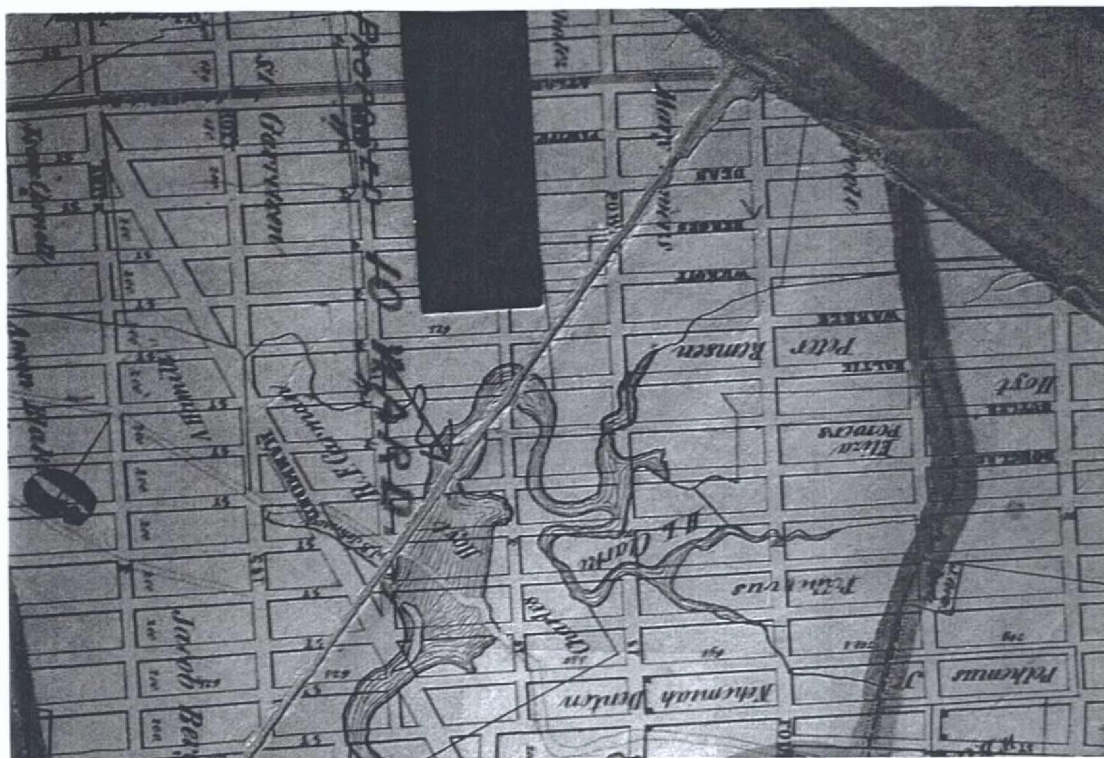


Figure 18
1846 Butt Map
Scale of Original: 1 inch = 800 feet

(Arrow indicates approximate location of the project area.)

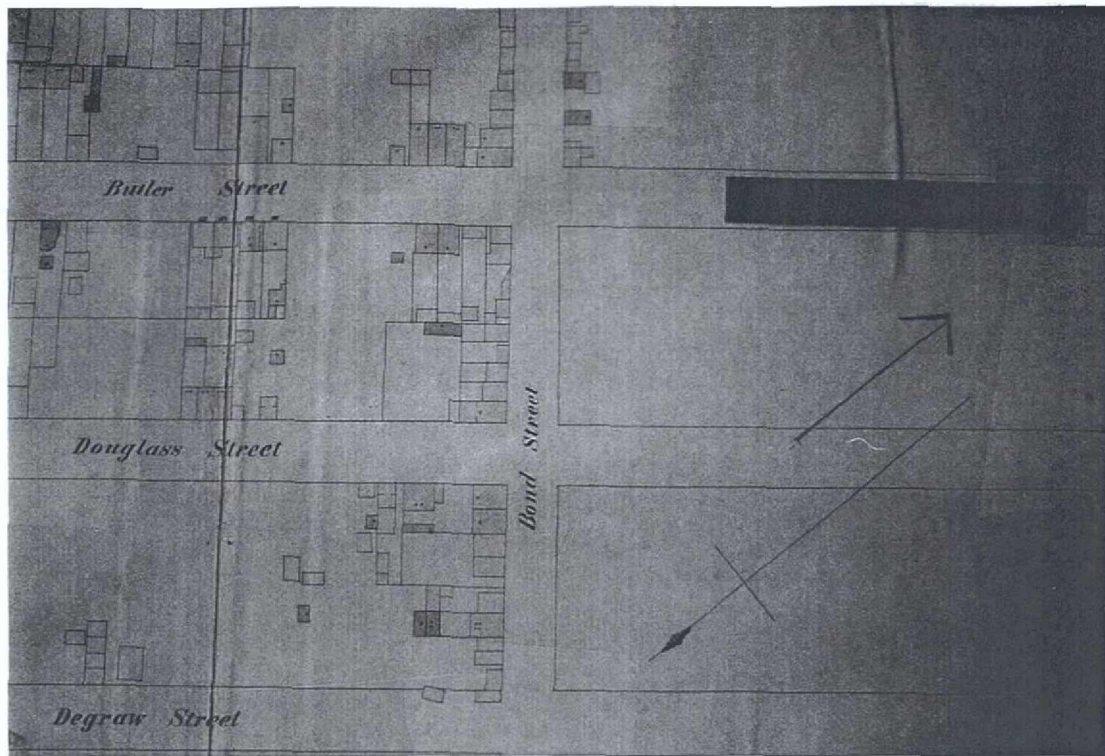


Figure 19
1850 Perris Map
Scale of Original: 1.5 inches = 100 feet

(Arrow indicates approximate location of the project area.)

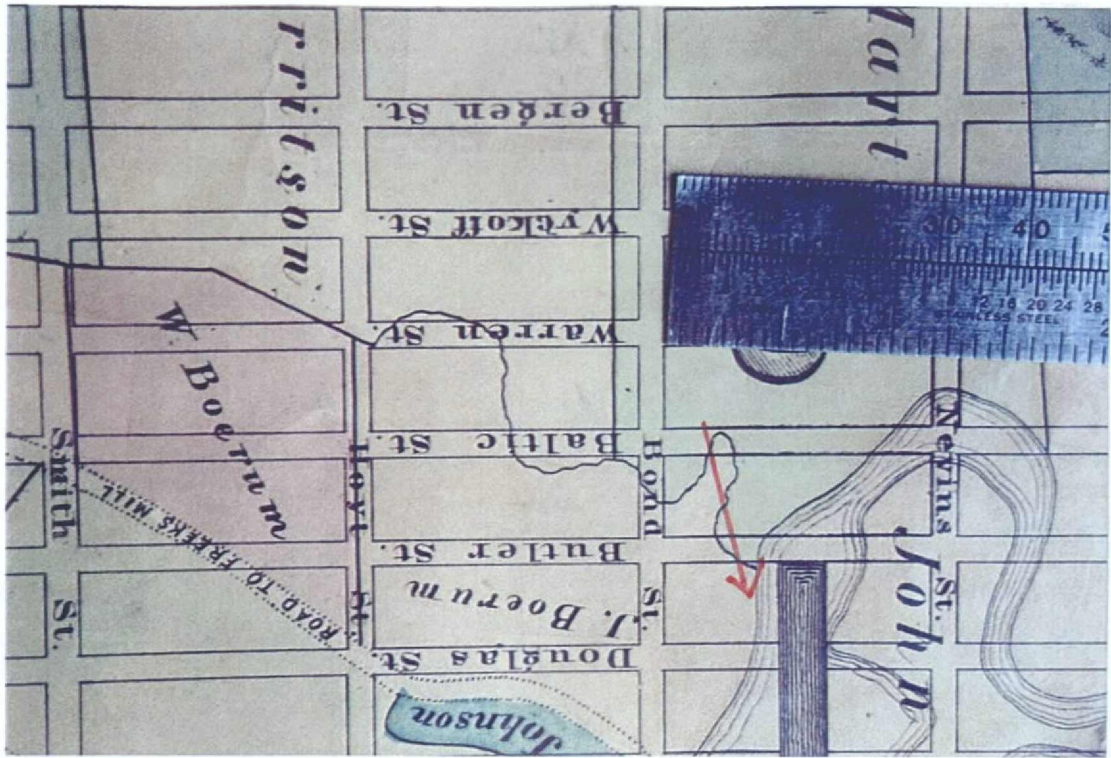
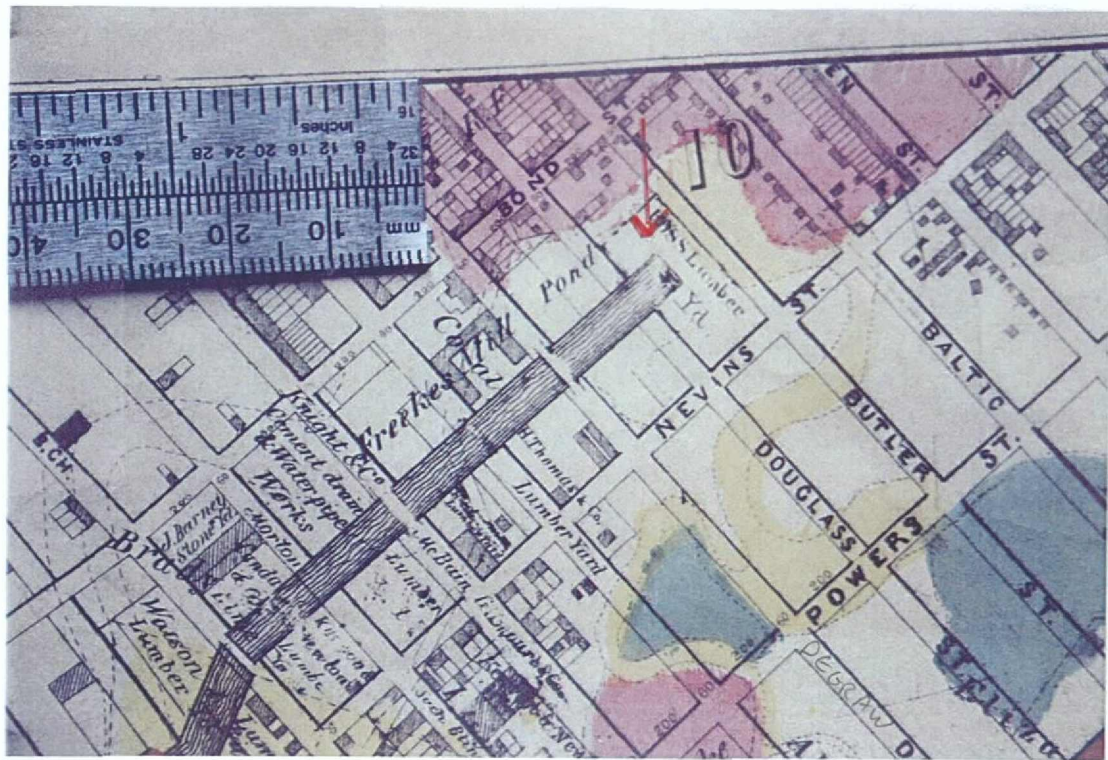


Figure 20
1855 Perris Map
No Scale

(Arrow indicates approximate location of the project area.)



President
Union St
Sackett
Carroll

Figure 21
1869 Dripps Map
Scale of Original: 1 inch = 560 feet

(Arrow indicates approximate location of the project area.)

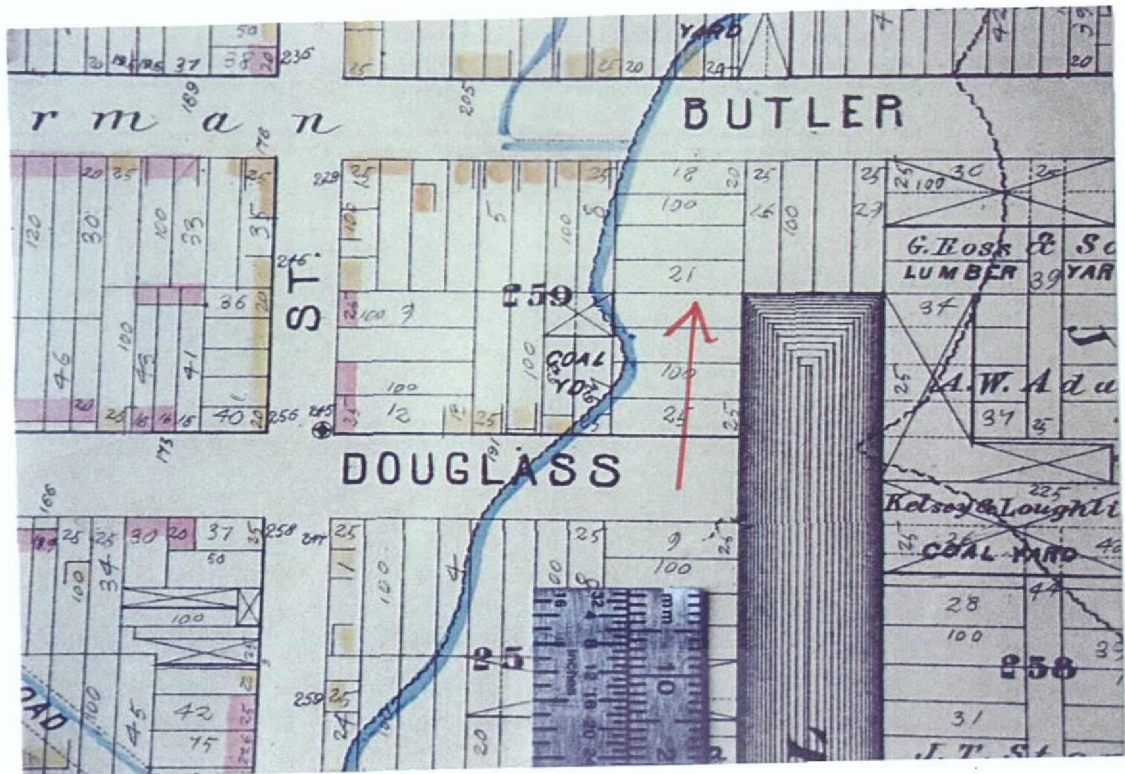


Figure 22
1880 Bromley Map
Scale of Original: 1 inch = 160 feet

(Arrow indicates approximate location of the project area.)

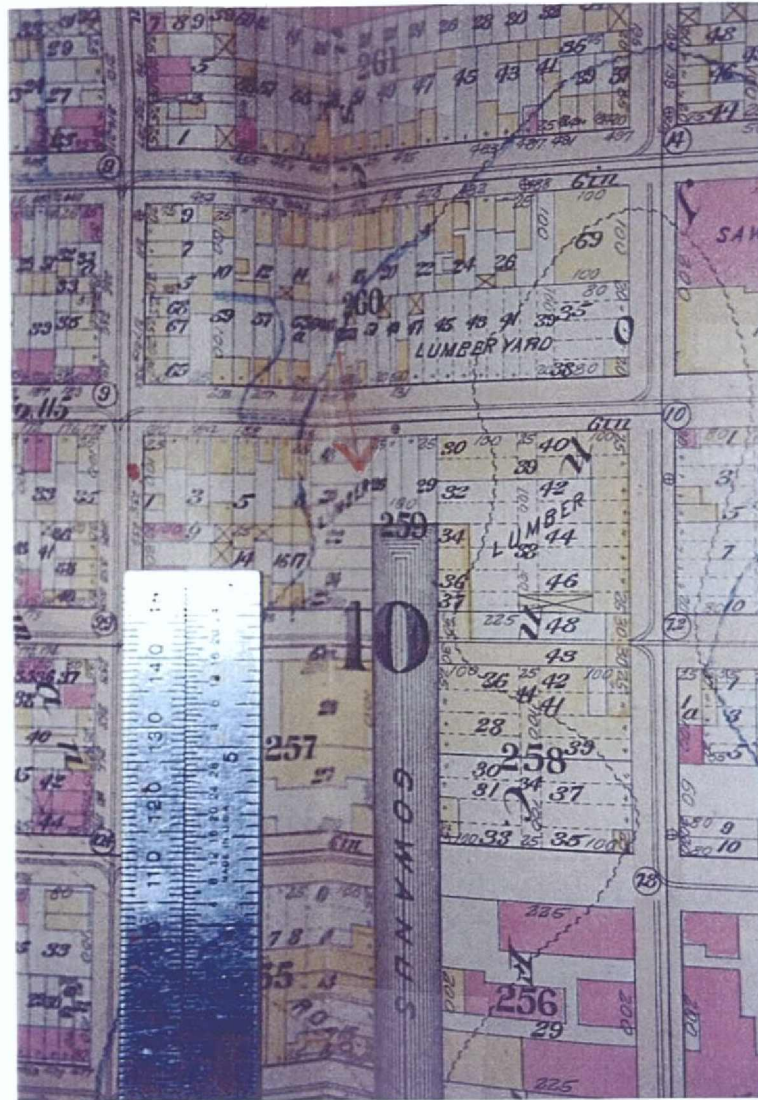


Figure 23
1886 Robinson Map
Scale of Original: 1 inch = 200 feet

(Arrow indicates approximate location of the project area.)

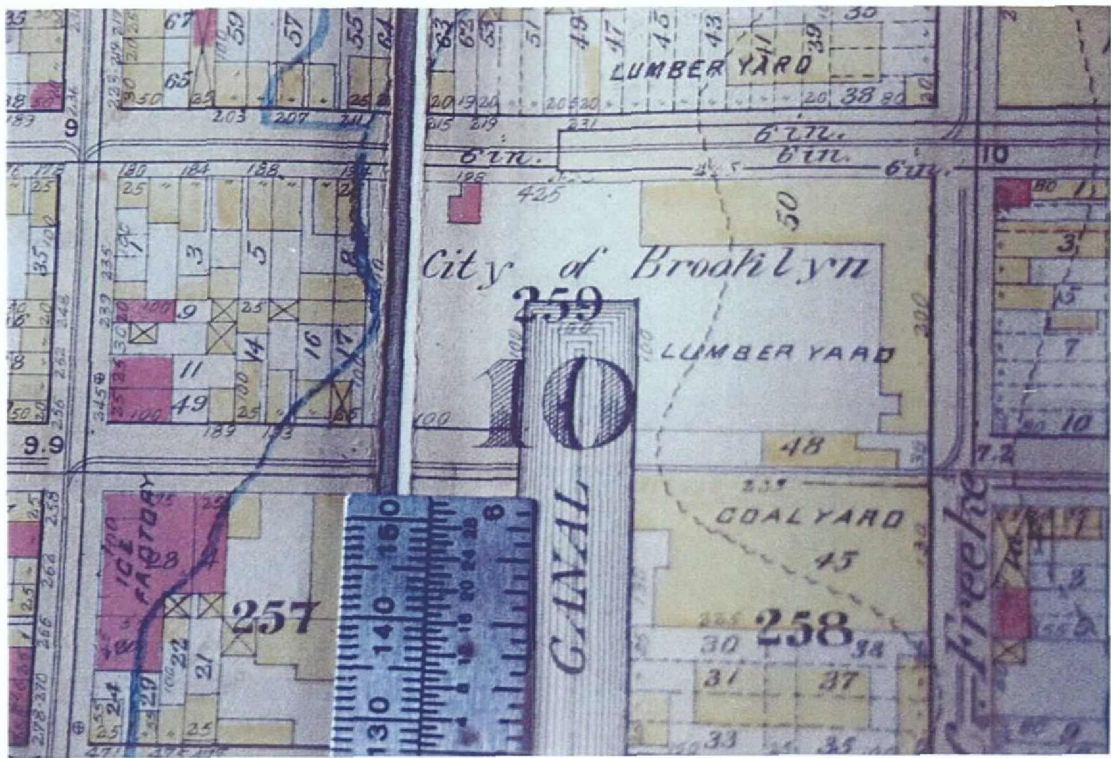


Figure 24
1893 Bromley Map
Scale of Original: 1 inch = 200 feet

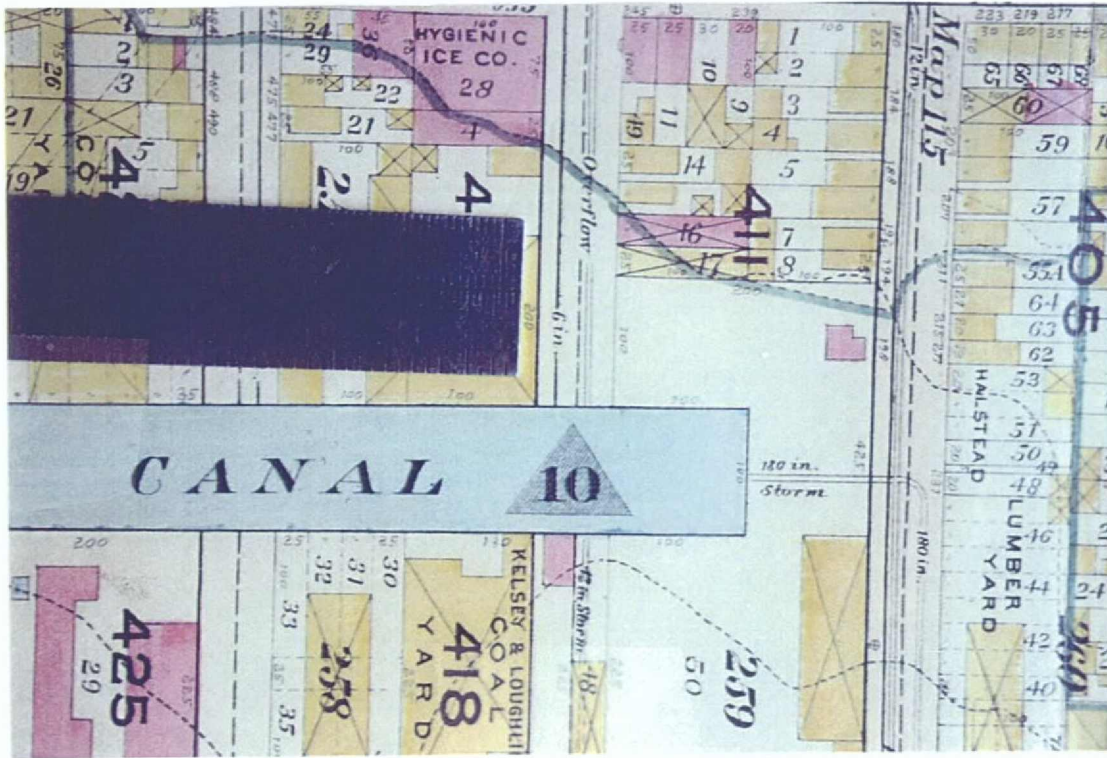


Figure 25
1898 Hyde Map
Scale of Original: 1 inch = 160 feet

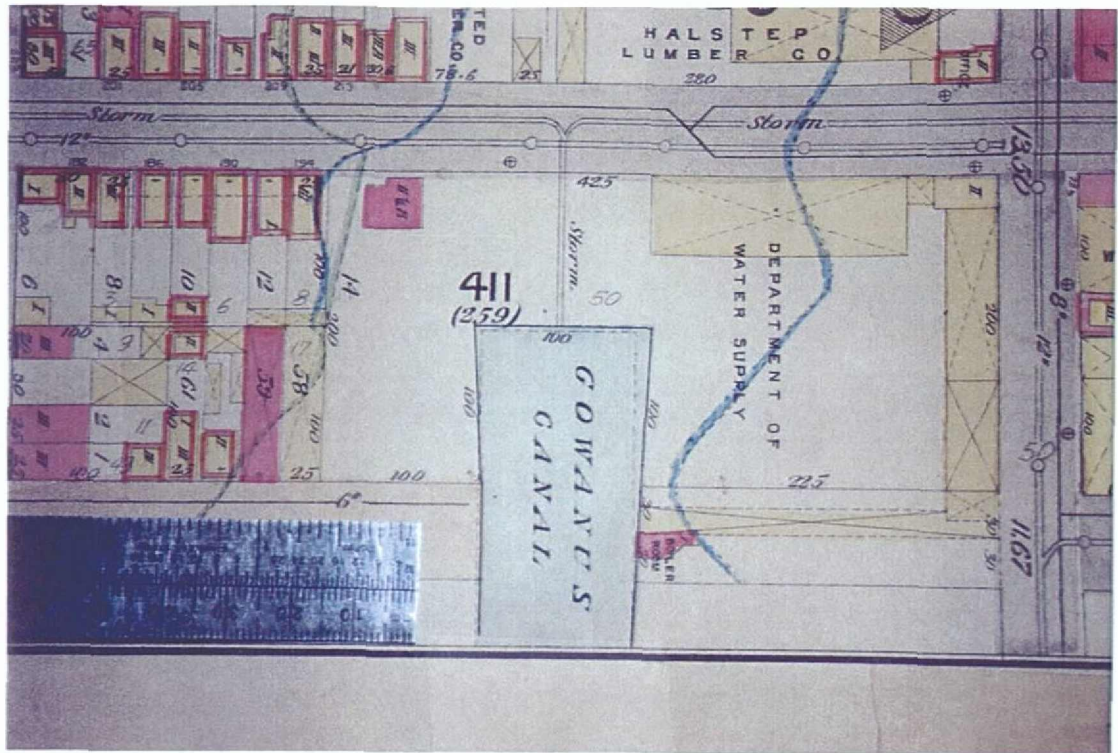


Figure 26
1903 Hyde Map
Scale of Original: 1 inch = 100 feet

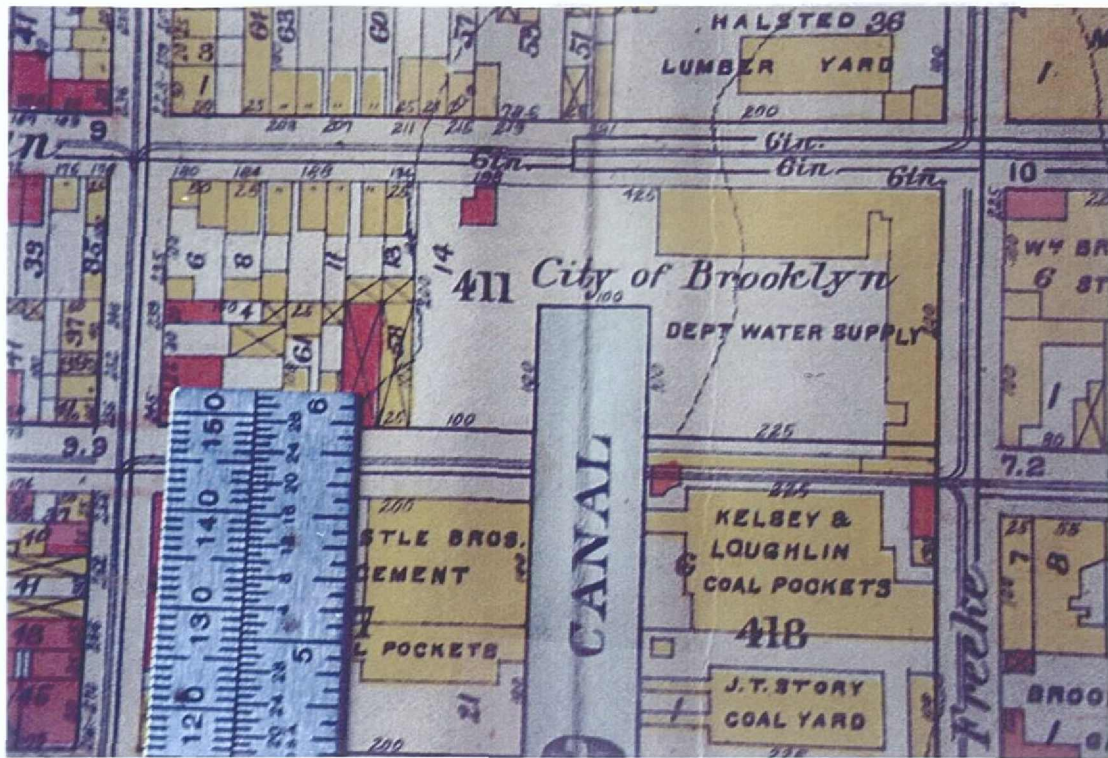


Figure 27
1908 Bromley Map
Scale of Original: 1 inch = 200 feet

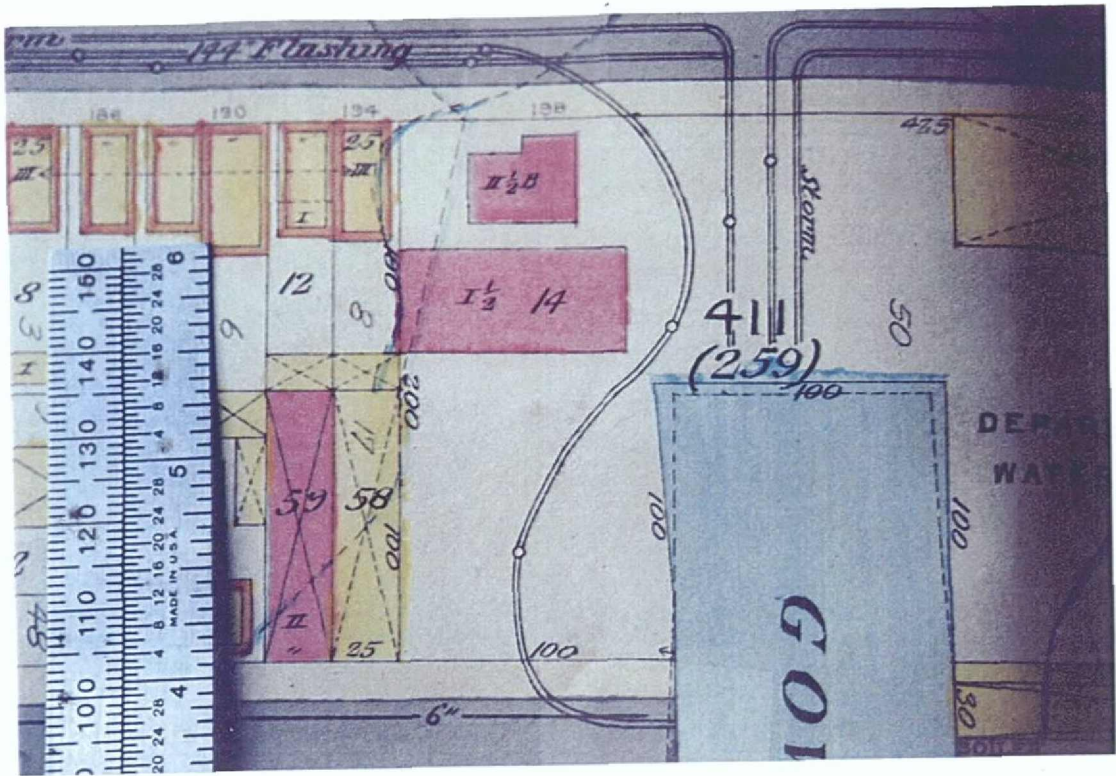


Figure 28
 1911 Bromley Map
 Scale of Original: 1 inch = 80 feet

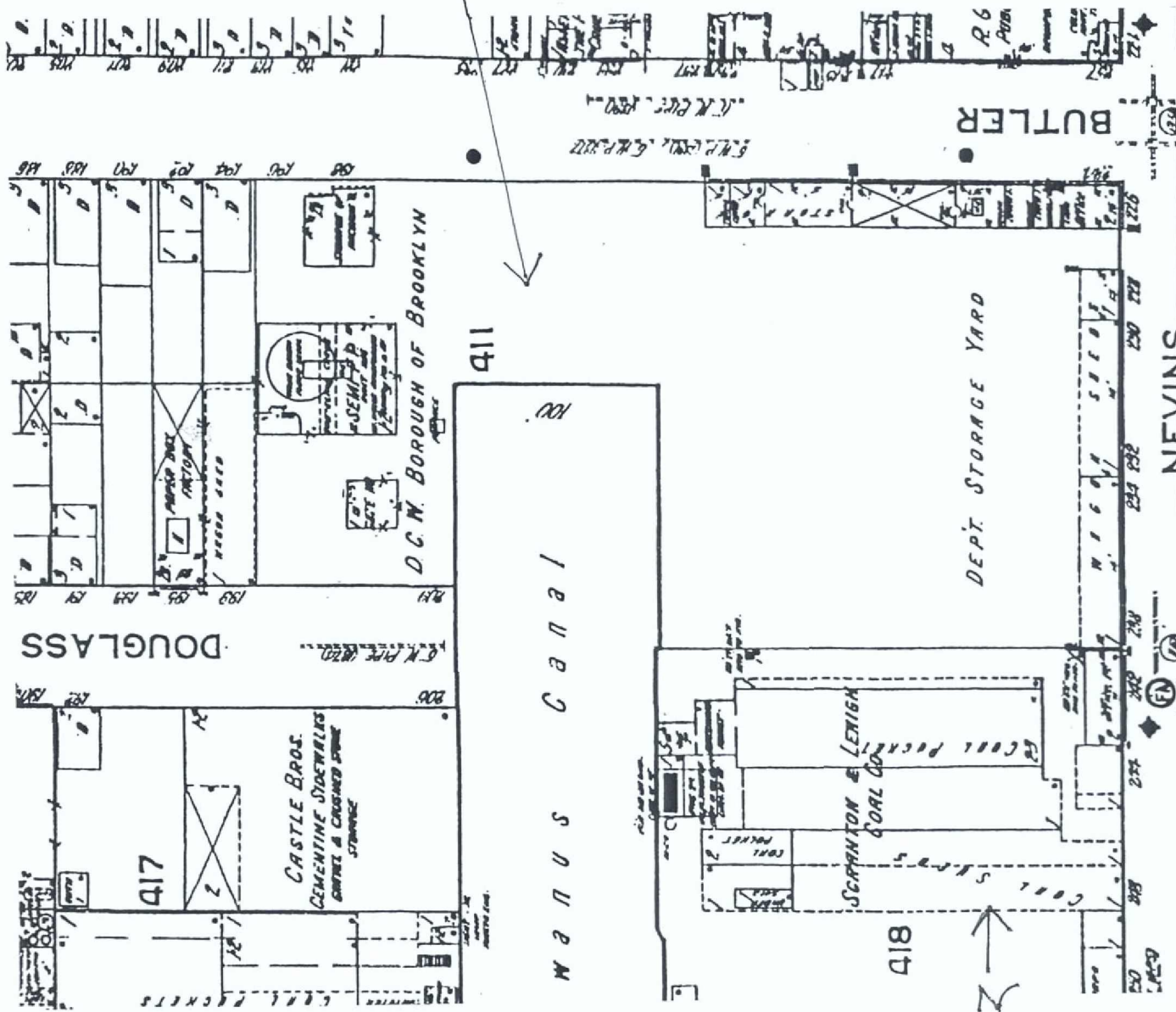


Figure 29
 1915 Sanborn Map
 Scale of Original: 1 inch = 60 feet
 (Arrow indicates approximate location of the project area.)

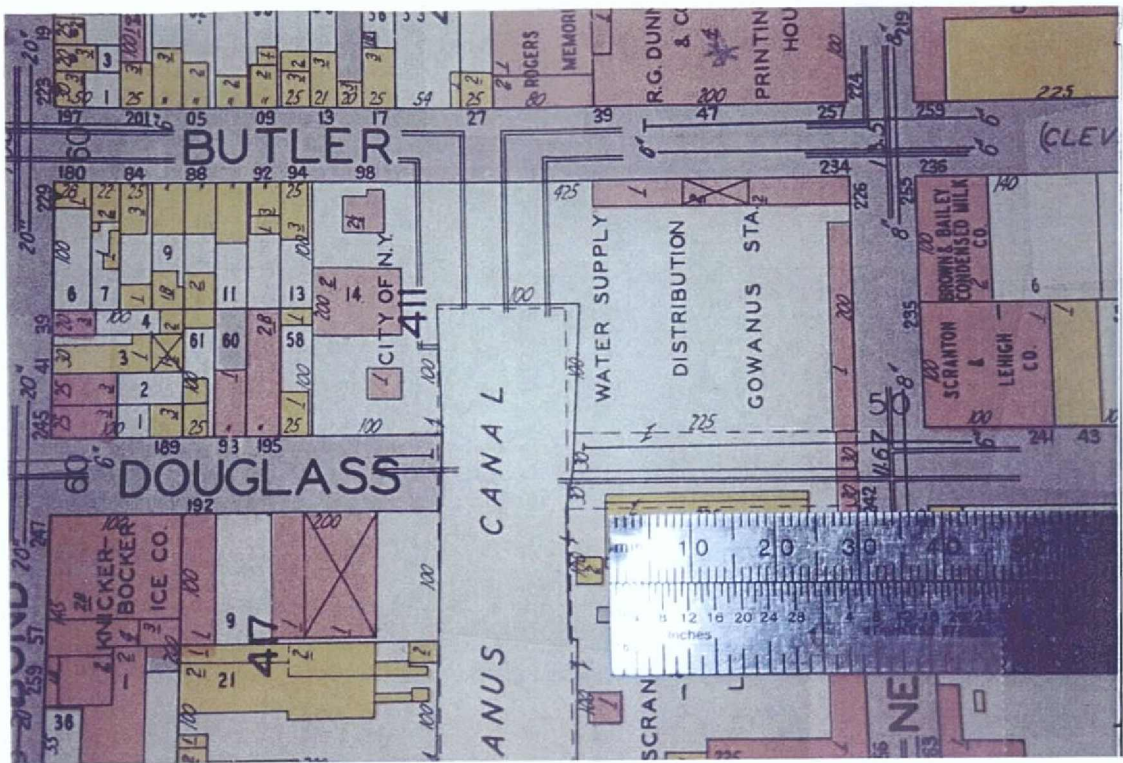


Figure 30
 1929 Hyde Map
 Scale: inch = 160 feet

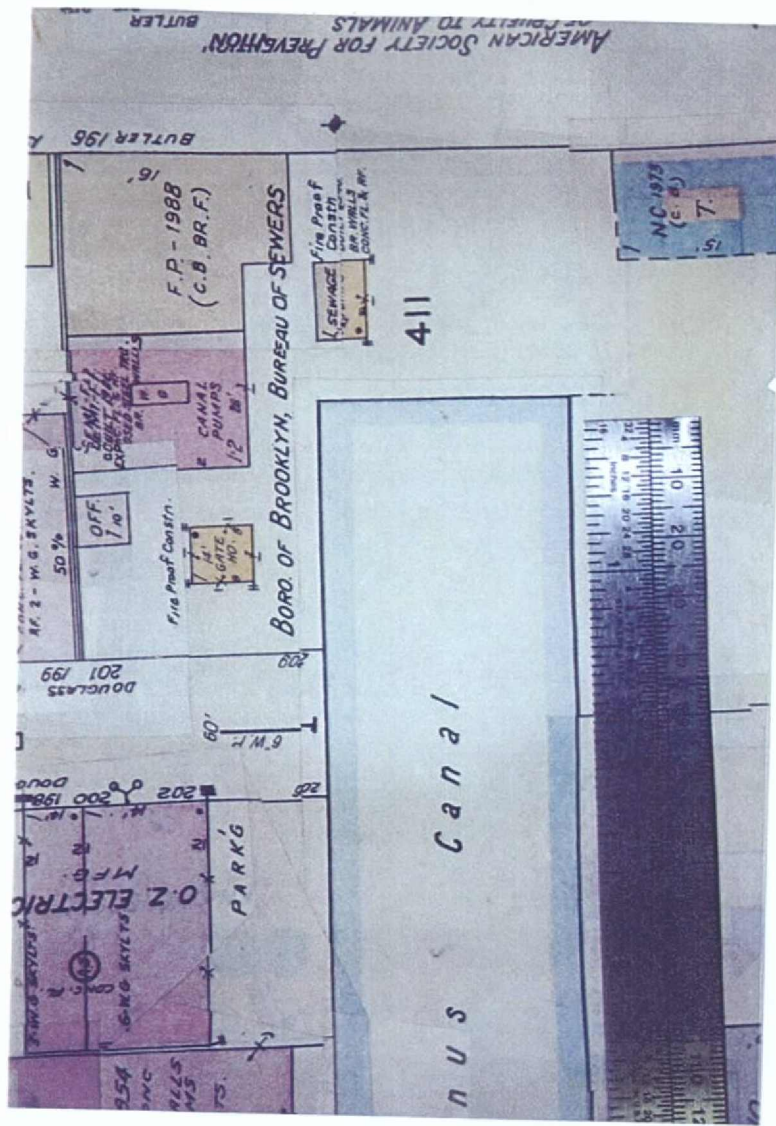


Figure 31
 1948 Sanborn Map
 Scale of Original: 1 inch = 60 feet

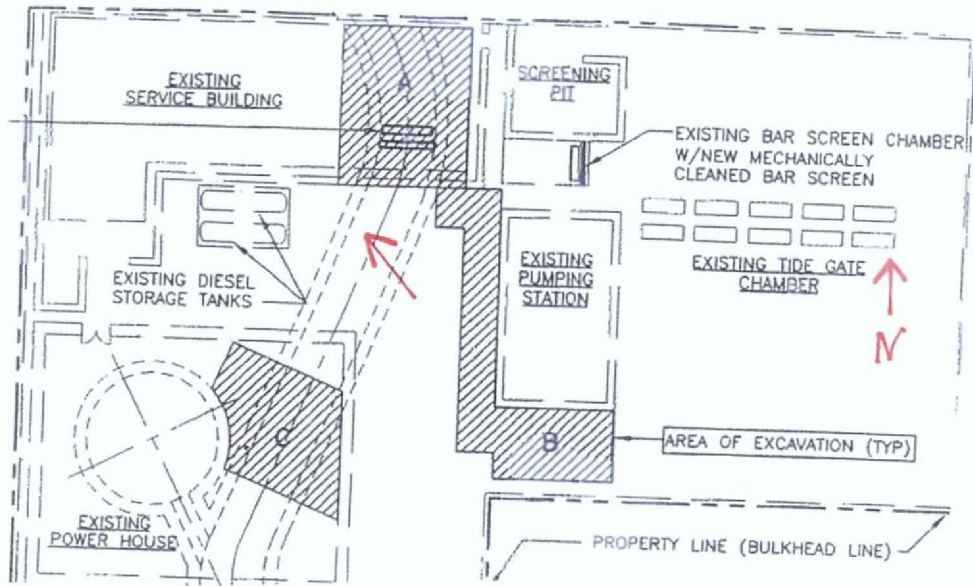


Figure 32
Existing Service Building - Gowanus Facilities Upgrade Project Area