REPORT ON PHASE 1A ARCHAEOLOGICAL DOCUMENTARY RESEARCH OF A PORTION OF BROOKLYN BRIDGE PARK LOCATED BETWEEN THE EAST RIVER, PLYMOUTH, MAIN AND WASHINGTON STREETS BOROUGH OF BROOKLYN

State Project Review No. 01PR0081
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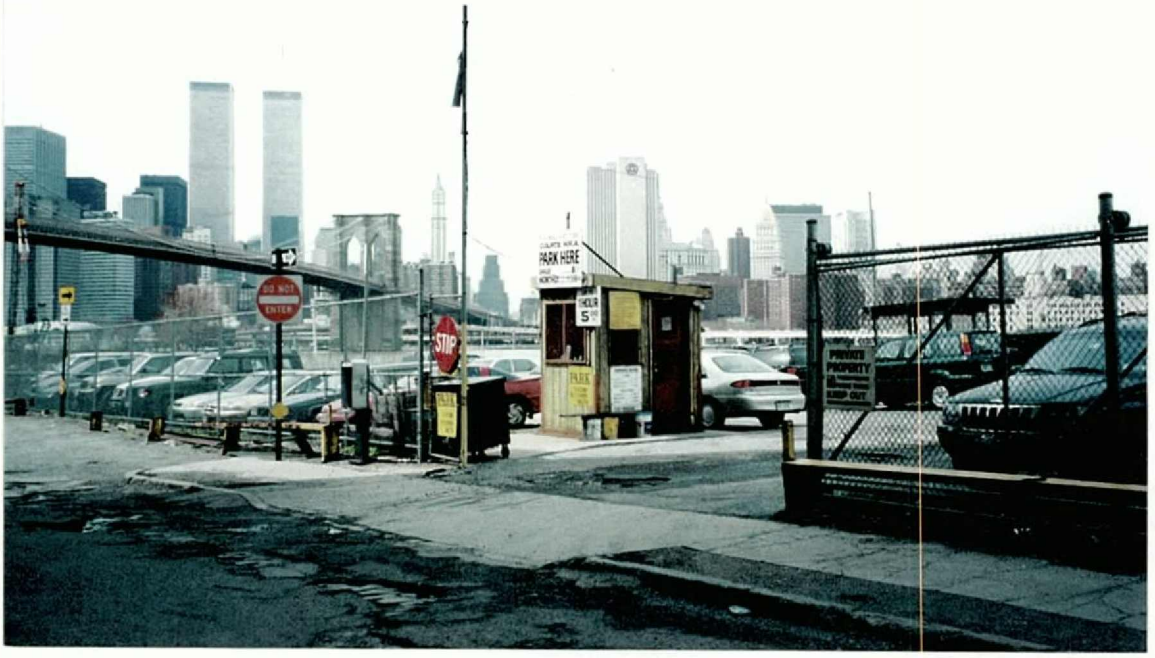

Part of Brooklyn Bridge Park

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EXECUTIVE SUMMARY

This Phase 1A archaeological documentary study of a portion of Brooklyn Bridge Park was conducting in advance of the New York City Department of Parks and Recreation constructing a new park. This archaeological study was done to comply with environmental review regulations and meets the New York Archaeological Council standards used by the New York State Office of Parks, Recreation and Historic Preservation.

Historical documentation shows the project parcel, which is along the shore of the East River, did not exist prior to 1824. The property was under water and not initially filled until around that time. A portion of the property was part of the landing for the Catherine Street ferry which operated from 1795 through the early-twentieth century. The remainder of the property was used as a coal yard for the ferry and also by a succession of other coal and lumber businesses through that time. After the ferry service was discontinued lumber and coal businesses continued to operate on the block up until around the 1930s. A portion of the block was then used for storage and a real estate company built a pier and shed in the former location of the Catherine Street Ferry landing. This piershed eventually deteriorated and the entire pier was removed as part of a 1984 drift removal project.

The property is currently used as a parking lot. Debris and pieces of former construction of the bulkheads, decks and piers can be seen along the shore on the western side of the property. The planned impacts from construction of the new park will not require excavation below the depth of fill based on borings done earlier this year. Therefore there is no potential for the recovery of archaeological remains from the pre-contact period. The structural remains of buildings associated with the coal and lumber businesses which operated on the block from the 1830s through the 1930s were temporary and their industrial uses would eliminate the potential for the recovery of other than generic archaeological remains which would be difficult, at best, to associate with a particular structure or time period. Therefore no archaeological testing is recommended for the recovery of remains associated with these businesses.

The remains of the earliest incarnation of the Catherine Street Ferry landing are out of the planned area of impacts. The ferry landing was expanded in the early 1850s and the footprint of this ferry is within the planned project impacts to a slight degree. However remains of the structures related to this ferry were likely subsumed or superceded by the construction of the piershed which was demolished in the 1980s. Exposed bulkhead cribwork is visible from the shore and compares with the existing large body of data on this type of construction. Furthermore it would be difficult to date the cribwork to a particular time period or use of the property primarily because these features were generally repaired or reconstructed above the level of mean low water. Only a very small portion of the planned stone steps possibly both covers the footprint of this former ferry landing and will be excavated to a depth below mean low water. Therefore no archaeological testing is recommended for the recovery or documentation of remains associated with the former ferry landing.

Although no archaeological testing is recommended for the project parcel, archaeological monitoring of construction excavations in the area of the stone steps is recommended. This is a follow up precaution to ensure potential identification of remains of the Catherine Street Ferry be documented archeologically in the remote event they are uncovered.

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INTRODUCTION

The City of New York Department of Parks and Recreation is undertaking the development of a portion of Brooklyn Bridge Park in Brooklyn, New York (Figure 1). This portion of the park is located between Main and Washington Streets from Plymouth Avenue to the East River (Figure 2). It is Tax Block 16, Lots 1 and 5. Lot 5 is located along the western part of the parcel. It can be thought of as a continuation of Main Street. Lot 1 is the eastern part of the project area.

Lot 1 is part of the National Register of Historic Places Fulton Ferry District, a site designated by virtue of its association with Brooklyn's earliest commercial development dating back to the 1830s and continuing through the late nineteenth century. The project parcel is also adjacent to the National Register of Historic Places DUMBO Industrial District. The entire project parcel is adjacent to the New York City Landmark designated Fulton Ferry Historic District. Both the National Register nomination (1974) and the Landmarks Preservation Commission designation report (1977) were reviewed for this study. The project parcel is located catty-corner to the Empire Stores which is part of the Fulton Ferry Historic District and was the subject of an archaeological investigation in 1980 by Ralph Solecki. The other directly relevant works are Raber Associates 1984 Cultural Resources Investigation done as part of the Army Corps of Engineers drift removal project in Brooklyn from the Manhattan Bridge to the Erie Basin and the historic structures report on the Empire-Fulton Ferry State Park prepared by Beyer Blinder Belle in 1990.

The Parks Department plans to create a playground and perform associated improvements to the project parcel. The New York State Office of Historic Preservation has identified the property as having the possibility of containing potentially significant archaeological resources. Therefore, in advance of this work, the Parks Department has contracted for this Phase 1A archaeological documentary study. This report is being conducted to comply with environmental review regulations and to meet the standards of the New York State Historic Preservation Office.

The significant planned below ground impacts which will result from this project include grading, excavation on the shore for stone steps, installation of new water, electrical, and storm sewer lines,

construction of a new playground, new fences, and the planting of numerous large trees. Figure 3 depicts the general areas of grading as shown in the request for proposal for this study. Figure 4 is the Parks Department grading and utilities plan. It shows the extent of the grading and filling as well as the locations of all of the utility lines, except the electrical lines to connect the new lighting. Figure 5 is the lighting plan. Figure 6 is the planing plan. A large number of plantings are planned, however the below ground impact from these plantings will be dependent on their size. Larger plantings will naturally necessitate the excavation of larger holes in the ground.

Specifications for the planned work at this portion of Brooklyn Bridge Park were examined to determine the depths of impact for the various aspects of the project. The deepest impact will be from 40 foot deep piles to support the concrete slab for the tall ship in the playground area and for the nautical flagpole. Piles are also planned for the gateway posts. The stone steps will necessitate excavation of up to fourteen feet. The creation of the beach will disturb up to eight feet below the current grade. The stone walls will create below ground disturbances of from five to eight feet. The cast iron ornamental bollard and granite curb will reach a depth of about five feet below grade, as will the gateway posts. Appurtenances which will reach depths of four to five feet below grade include: the playground retaining wall, the seven foot ornamental steel gate, play equipment posts, the ferry boat spray, the playground bridge, and the water meter. All other park accessories will impact depths of three feet or less. Depth of utility line trenches will generally be four feet below grade for the water lines and eighteen inches for the electrical lines.

This report will examine the history of the project parcel and evaluate it's archaeological potential in light of the proposed impacts to the site. All research was conducted by and this report prepared by Linda Stone. The author would like to thank Marcha Johnson and Raymundo Gomez of the New York City Department of Parks and Recreation for their assistance in facilitating this project.

METHODOLOGY

This archaeological study was prepared using documentary, cartographic, and archival sources. The research included a survey of standard repositories of information including the New York Public Library, the New York City Landmarks Preservation Commission, the New York City Parks Department, the Brooklyn Borough President's Topographic Bureau, the Kings County Register, the Brooklyn Buildings Department, the Municipal Archives, the Municipal Reference Library and the New York District of the Army Corps of Engineers Library.

As part of the evaluation of historic archaeological potential, a variety of information sources were used to collect data on the history of the project area and to document previous site disturbances. Cartographic and documentary sources were located at the New York Public Library's Central Research Branch Local History and Genealogy Division and Map Division, the Topographic Bureau of the Brooklyn Borough President's Office, the Kings County Register of Deeds, and the Brooklyn Buildings Department.

As part of the evaluation of potential pre-contact site resources there are generally several factors which are considered. However, early on in the research of the project parcel it was evident the property was under water throughout recorded history up until the nineteenth century. Therefore the potential for the site to preserve archaeological remains from the period prior to European contact is substantially reduced and becomes dependent on the depth of planned impacts in relation to the depth of fill. As a result, analysis of soil boring, site plans, and previous archaeological findings near the project parcel was done to assess the site's archaeological potential from this early period.

This report combines its presentation of the local history with the general history of the project vicinity in order to provide a context for events, places and people which have potential significance to the project area.

PROJECT AREA TOPOGRAPHY

Current Conditions

The project parcel is located on the Brooklyn waterfront of the East River in the shadow of the Manhattan Bridge and in the view of the Brooklyn Bridge. It is currently being used as a parking lot (See Cover). The site was visited on March 30, 2001, a rainy and overcast day, and on April 16, 2001, a slightly overcast day. Parking spaces covered the majority of the project parcel. The surface was mainly paved with asphalt. There were also parts covered with crushed stone. The parcel's perimeter is fenced off from parking and is a concrete covered pedestrian walkway.

A marked change in grade between the pedestrian walkway and the parking lot was seen in the southeastern parts of the project parcel and continued north along most of the eastern walkway. This grade change can be seen on the topographic survey (see Figure 7). Grades within the project parcel go from a high of about 12 feet along the eastern side of the property to a low of under five feet along the western side.

Within the walkway and parking lot there are no visible signs of the history of the property; no visible foundations or other features. However there is much to be said about what can be seen along the water's edge around the project parcel. There can be seen rubble from the demolition of what was once there. Demolition debris abounds. Bricks, concrete blocks, timbers, paving, and parts of the bulkhead can all be seen. Plates 1 and 2 depict some of this debris.

Part of the earlier deck can be seen in Plate 1 beneath a concrete pier or support. This appears to be an *in situ* feature and is related to the conglomerate surface of the deck beneath it. It is possible this surface is a remnant of an earlier surface which was later covered with fill. A portion of a wooden retention feature can be seen in the foreground toward the right of Plate 1. Only one vertical post is visible along the segment seen in Plate 1.

Plate 2, taken slightly to the east of Plate 1, shows parts of at least two episodes of bulkhead construction or reconstruction. Wooden members are seen near the water line at close to the center of the photograph.

A large horizontal twelve inch squared beam is held in place by many tight fitting vertical twelve by six timbers. A decaying horizontal timber, now measuring about ten by five inches across, is in front of these. Behind the wooden construction is part of a steel reinforced concrete retaining wall. Crumbling concrete remains of the deck are seen at the level above, just below the parking lot fence. Although not connected now, this concrete wall seems to have been filled with demolition debris and then topped with the concrete deck.

Some of the cribwork from the Lot 1 bulkhead can also be seen along the left side of Plate 2. Plate 3 provides a closer view. About a thirty foot long segment is exposed. A twelve inch square timber is seen resting on a portion of another (left edge of Plate 3) and on possible wooden piles along the rest of its exposed length. This beam is topped with perpendicular twelve inch timbers at a fixed interval of five-and -a-half feet on center. Three of those timbers can be seen on Plate 3. Although difficult to see in the photograph, they are overlaid by a length of four inch thick plank. There are several feet of fill and debris above this level up to the concrete walkway.

Other observations made during the site inspection include a part of what looks like a concrete pile overlaid with a fragment of wooden decking and then with a concrete deck, along the water side of Lot 5. Some of the stratigraphy below the concrete was exposed by erosion. About six inches of soil underlaid the concrete deck. This was then underlaid with four inches of concrete and nine inches of crushed stone. These strata were underlaid by a stratum of flagstones and soil was observed at the base.

Boring Data

A series of nine borings was conducted in January and February of this year. Figure 8 depicts the locations of the borings within the project area. All borings contained a top layer of fill below the paving. The fill measured either ten or seventeen feet thick with an average depth of thirteen feet. This represents a depth below which all planned project impacts, except the piles and a small portion of the stone steps, will reach.

The fill was consistently described as silty coarse to fine sand with inclusions of concrete, asphalt, brick, wood, cinders, rock, etc. It was not differentiated by color or content within any of the borings. Such differentiation could indicate the possible existence of multiple fill episodes. However the presence of

multiple fill episodes cannot be ruled out based on these borings either. This is because the boring logs do not contain enough detail to evaluate the fill. The existence of multiple fill episodes seems likely for other reasons. The primary reason is that the shoreline in the project area vicinity was expanded over time and this would have meant fill was added at different times during this expansion. This theory is bolstered by the observation of the stratigraphy on the eroding shore.

In 1980 Ralph Solecki examined soil boring taken in Main Street south from Plymouth Street as part of his work on the Empire Stores. He identified four fill episodes in that part of Main Street beginning in the early 1800s (Solecki 1980: 1-1a, 24-25). Beyer Blinder Belle identified three fill episodes in the Empire - Fulton Ferry State Park; during the years 1796, 1816, and 1850 (BBB 1990: II-32-33).

The current boring data also records the depth at which ground water was reached in eight of the nine borings. The water table was encountered at between eight and ten and a half feet below the ground surface. The average depth of ground water was 9.25 feet in the borings. This means that ground water was encountered within the fill deposits.

SITE HISTORY

Ownership History

The history of the project parcel is inextricably tied to the history of the Catherine Street Ferry which operated on the parcel from 1795 through the early-twentieth century (the end date is not entirely clear in the documentary record). This portion of Brooklyn Bridge Park is comprised of two lots and a portion of Main Street at the corner of Plymouth Street. Lot 1 is the eastern part of the parcel and begins at a point along the north side of Plymouth Street, east of Main Street, and extends east to Washington Street and north to the East River. Lot 5 is the part of the parcel extending north from the foot of Main Street. As just discussed, this property is landfill. The shore line did not extend north of Plymouth Street until sometime after 1824 (see below).

The County Register of Deeds did not index very many deeds for the block. Only nine of the deeds postdate 1824 and two of those were listed with the wrong Liber and Page numbers and were therefore not accessible. The earliest post-1824 deed identified during this research was dated July 14, 1842. It recorded land including Lot 1 of the project parcel as transferring from Mr. and Mrs. Rodman and Catherine Bowne to Samuel Bowne "the ferry proprietor" in exchange for $15,000 (Liber 103, Page 380). Two deeds were recorded during 1867. They were both related to the division of the estate of Samuel Bowne who had died in 1853. The next two recorded deeds were the mis-recorded deeds and they were dated May 15, 1903 and February 25, 1909.

The next deed, chronologically, was dated February 27, 1909. It recorded the transfer of a portion of Lot 1 from the Carsten Offerman Coal Company to John F. Schmadeke. It refers to previous transactions of this property. A 1909 lease for the property states "the said land, bulkhead and pier to be used as a yard for unloading storing and distributing coal and lime". It also says the shed on the property, presumably the one labeled "John F. Schmadeke Inc. Coal Yard" on the 1915 insurance map (see Figure 18), is used for storage of "cement, plaster and lath" (Liber 3134, Page 31). The 1909 lease also included a "dredging clause", referring to the previous 1903 lease made by Mrs. Kate Duryea to the Union Ferry Company and it refers to the property as "ferry premises". This indicates the eastern part of the project parcel as well as the western part (Lot 5), where the ferry landing was historically located, were both considered ferry property. Therefore, one may conclude the remaining, or center, portion of the parcel was also ferry

property at one time. However, no specific deeds were located for this portion of the project parcel. Beginning in 1881 and continuing at least through 1898 when Brooklyn became part of New York City, tax records show Block 16 was at least partially owned by William Duryea (a descendant of Samuel Bowne) who leased the property to the Union Ferry Company.

No deeds were recorded for the property between 1909 and 1965 in the deed indices. Three deeds were recorded for 1965. However two of these were actually bank releases. The only actual deed recorded the transfer of Lot 1 from Consolidated Edison of New York, Inc. to the City of New York (Liber 9443, Page 422). In 1966, the city condemned Block 16 and took possession (DCAS Records).

Although no deeds were recorded in the period between 1909 and 1965 in the indices, it stands to reason there was at least one deed which would have transferred the property to Con Edison. There actually may have been multiple deeds. These would have included the remainder of Lot 1 in addition to Lot 5. Building Department records show a portion of Lot 1 owned by Mrs. K. Duryea who received a permit in 1914 to alter her horse stable located at 91 Plymouth Street. Figure 18 depicts 91 Plymouth Street in 1915 as an office of the Frank Sprague Lumber Company. Therefore Mrs. Duryea's stable was either demolished or its use converted to an office during the intervening year. The 1990 Historic Structures Report for the Empire - Fulton Ferry State Park refers to a circa 1930 transaction between the estate of John Arbuckle and Famous Realty, Inc. transferring a large portion of waterfront property including the project parcel for the sum of $1,500,000 (Beyer Blinder Belle 1990: II: 24). An unsuccessful attempt was made to find the source of this information with hope it would lead to more property data.

Obviously some of the ownership history is sketchy. The County Register's Office and the Brooklyn Buildings Department have relatively little information about Block 16. John Banguiat of the Brooklyn Borough President's Office reports it is difficult to find such records for waterfront property in particular (personal communication). Other records summarize the ownership of what is now the project parcel.

> The Catharine Ferry was first established in 1795, by William Furman and Theodosius Hunt, lessees from the corporation of New York...called the 'New Ferry', and ran from what was then called 'New Ferry Street' (now Main Street,) to the foot of Catharine Street, New York. In 1805, the Corporation of New York, in order to further establish their right to the ownership of the landings on both sides of the river, ... purchased from Joshua Sands, the foot of Main Street and property adjoining, for a ferry-landing. This ferry was leased to Rodman Bowne in 1811, and continued to him and his brother, by renewals, until 1852, when the ferry was purchased by Cyrus P. Smith and Wm. F.

Buckley... (Pierrepont 1879: 25).

During the time period Rodman Bowne had the lease for the ferry landing, the shoreline in the project area was extended by landfilling, thus actually creating what is now the project parcel. As previously stated, Rodman Bowne, during this period, purchased land near the ferry within the eastern side of the project area and later sold it to Samuel Bowne.

A detailed unlabeled map was found at the Municipal Archives. It appeared to have been originally made by at least 1898 since there was a note that the "survey at Washington Street was made" in March 1898. The map was subsequently updated multiple times with information on property ownership and survey information including building locations. This map states Block 16 Lot 1 was assigned to Ports and Terminals on August 28, 1978, although it has actually been a city owned property since 1966. It is possible the notation on the map does not apply to Block 16. The map dates the deed to Famous Reality Inc. from July 7 and 9, 1945 (rather than circa 1930) and the deed to Con Edison to May 10, 1963 rather than 1965. This information seems to complete the most of the chain of ownership for the project parcel in the twentieth century.

Seventeenth Century

Although the earliest history of Brooklyn had no direct relevance to the project parcel since it did not exist back then, this history is relevant in establishing the basis for the expansion of the area and the development of what is now the project parcel.

The first land purchase made in what is now Brooklyn was in 1636 at Gowanus Bay. By 1637 Walloons were building homes around Wallabout Bay, to the east of what is now the project parcel. One of the earliest settlers was Joris Jansen de Rapelje, who purchased over 300 acres at Wallabout in 1637.

The settlements in the area were expanding to the point that by 1642 Cornelius Dircksen was able to establish a successful ferry from Peck Slip in Manhattan to the foot of what became the Road to the Ferry or the Road to Jamaica, which commonly became known as Old Ferry Road (officially laid out in 1704), and later called was Kings Highway and then after 1814 Fulton Street and is now called Cadman Plaza West (Federal Writers Project 1939: 433, 448). This is now part of both the New York City Landmark Fulton Ferry District and the National Register of Historic Places Fulton Ferry District.

> The livestock driven along this road made the waterfront around the ferry landing a convenient location for the slaughterhouses that processed the animals for market. The colonial butchers who maintained these abattoirs could easily transport the meat by the ferry to its New York terminus at the Fly Market, where many of these butchers had stalls (Raber Assoc. 1984: 21).

Dircksen had a home and sixteen acres of land on the Brooklyn side of his ferry route (Hazelton 1925: 1640, Stiles 1993: I: 35). The land owners to the east of Dircksen, along the waterfront, were Jacob Wolphertsen van Couwenhaven and Frederick Lubbertson. These property owners were those who owned the fast land which is now directly south of the project area. Dircksen sold his house and the ferry rights to William Thormassen in 1643. Hazelton is not clear to whether Thormassen actually controlled the ferry (Hazelton 1925: 1640). "Governor Stuyvesant had enacted the first ordinance controlling the ferry service" in 1654 (City of New York 1977: 2). By 1660 the ferry was "regulated by an ordinance of the Council" (Stiles 1993: I: 111). These were apparently the earliest attempts at government involvement in the New York ferry business. As ferrying became more prosperous, these attempts to gain control and make money from ferrying were to become an integral part of the ferry business.

Eighteenth Century

> During this period, the embryo City of New Amsterdam or New York provided rural Long Island with a market for agricultural produce, and the ferry rapidly became a focal element in this traffic. Cattle destined for this market were herded from the outlying settlements of the Island to the Brooklyn Ferry where slaughterhouses flourished amidst the rapid development of this commercial depot (New York State 1974: #3-1).

"At the foot of Catherine Street Ferry was established a small public market, called 'Titus' market, which was in reality a butcher stand, something like the one at the old Fulton Ferry" (Solecki 1980: 10).

One of the earliest maps to clearly show the project parcel is Stiles' Map of the Brookland Ferry, in 1766-7 and 1867 (Stiles 1993: I: 311) (Figure 9). This map is actually a reproduction of Ratzer's Plan of the City of New York with the streets from the time of Stiles original publication superimposed. The Ratzer plan depicts the section of Brooklyn around the ferry, which was later known as the Fulton Ferry. The project area portion of Brooklyn Bridge Park was clearly under water at that time. The name "Mr. Rapailie" can be seen on Figure 9. This is presumably a descendant of Joris Jansen de Rapelje, one of the earliest European landowners in Brooklyn.

During the Revolutionary War the ferry was "the main link between the islands, the Ferry was the route

used in 1776 by General Washington's Army for evacuation following its defeat in the Battle of Long Island" (State of New York 1974: #3-1). "This strategic retreat across the East River was characterized by the British historian George Trevelyan as 'that master stroke of energy, dexterity and caution by which Washington saved his army and his country' - an historic event to be remembered (City of New York 1977: 2).

The need for additional ferry service between Brooklyn and Manhattan prompted the opening of a new ferry in 1795. New Ferry, as it was originally called, was located at the foot of Main Street and ran a route of about 735 yards to Catherine Street in Manhattan (see Figure 10). Figure 10 shows the New Ferry pier possibly extending north into what is now the project parcel. However since the map is not scaled, it is not possible to say with any certainty how far north of Water Street the pier extended. The ferry was established by William Furman and Theodosius Hunt. Furman "was interested in a rope-walk, the head of which was in Main Street, near the ferry, and extended northeasterly, over the shoals and water" (Howard 1893: 63, Stiles 1993:I: 378). This description of the rope walk makes it sound as though it existed in an area now part of the project parcel.

Figure 10 also shows that the area west of Main Street had been filled by 1795 to create Water Street. However there does not appear to have been any filling to the east of Main Street within what is now the project parcel. Although difficult to discern in Figure 10, there appears to be a bridge beginning at the east side of Main Street and heading northeast to the edge of the map. About one hundred years after the map was drawn, Pierrepont describes the bridge as a "drawbridge" (Pierrepont 1879: 19). This is the only mention and depiction of a drawbridge to Main Street found during the course of this research. Perhaps this feature was related to the previously mentioned rope walk which was described as heading northeasterly, over the water, from Main Street.

Nineteenth Century

By the turn of the century the waters of the East River along Brooklyn in the project area vicinity were teaming with maritime traffic, relatively speaking. At this time the Ferry District was a vital and viable entity. It extended from Joralemon Street east to the Mill Pond at Wallabout (Howard 1893: 63). The United States bought forty acres of Wallabout to establish the Navy Yard in 1801. During the same year the Village of Brooklyn "was incorporated as a fire district" (Stiles 1993: I: 685-6). In 1816 the State

Legislature passed an act incorporating the Village of Brooklyn (Dikeman 1870: 5). In 1834 it was incorporated as a city (Dikeman 1870: 6; Pierrepont 1879: 56).

"In 1805, the Corporation of New York, in order to further establish their right to the ownership of the landings on both sides of the river, ... purchased from Joshua Sands, the foot of Main Street and property adjoining, for a ferry-landing" (Pierrepont 1879: 25). For a short period of time, prior to 1811, the ferry to Catherine Street was run by Noah Waterbury and Henry Stanton, who succeeded Furman and Hunt (Stiles 1993: III: 554). As mentioned above, Rodman Bowne obtained the ferry lease in 1811. However Rodman and Samuel Bowne bought "all the boats, and appurtenances" of the Catherine Ferry in 1809 (Stiles 1884: I: 439).

> Landfilling began in earnest early in the nineteenth century, especially north of the old ferry district. Northwest of Main Street between 1807 and 1809, McKenzie's Hill was leveled, and the resulting earth used to fill in around the wharves that extended into the flats of the river. There was more demand for waterfront property due to the strong commercial development taking place around the ferry landings just to the south (Raber Assoc. 1984: 23).

After 1808, John Garrison Murphy, a Brooklyn mill-wright, "in conjunction with Mr. Rodman Bowne, ... invented and patented the machinery of the horse or 'team-boats', which were used to cross the East river at the ferries" (Stiles 1993: II: 25). "The boats had two hulls twenty feet apart, covered by one deck. The paddle wheel was on a shaft between the hulls, was made to revolve by horses treading an endless incline as they do in threshing in the country" (Hazelton 1925: 1644). The team-boats were first used at the Catherine Street Ferry in 1814 and for a while it was called the "Team-Boat" Ferry. The introduction of team-boats to this ferry was a requirement of Bowne's lease (Stiles 1993: III: 555). Prior to the use of team-boats, the ferries were either row boats or sail boats. Stiles quoted the Long Island Star of April 16, 1814: "This was the first horse-boat used on the river, and Catharine Ferry took the lead in the transportation of passengers and freight and effected a revolution in ferry navigation" (Stiles 1884: I: 439).

In 1814 Robert Fulton built his first steam-powered ferry. The first use of a steam ferry on the Catherine Street route was in 1822. The Bownes introduced single-hull steam boats in 1824. These were reportedly the first of their kind "that ever crossed the East River". The Bownes ran the Catherine Street ferry together until 1836 when Samuel Bowne got a lease for it in his own name (Howard 1893: 288).

A gravel sidewalk and curbstones were ordered for the Catherine Ferry in 1813 (Solecki 1980: 23). By 1819, the ferry landing at the foot of Main Street is depicted on maps, but Plymouth Street had not yet been filled. Figure 11 shows the shore line in the project area vicinity as it looked in 1819. The Main Street Slip is shown with piers extending toward the East River in two pieces. The western pier extended north to an imaginary line at the southern side of Plymouth Street shown, as a dotted line on Figure 11. The eastern pier extended further out into the water north of Plymouth Street. The total length of that pier was about 140 feet. Another 1819 map contains a profile of Main Street. The profile extended as far north as twenty feet south of the southeastern corner of the intersection at Main and Plymouth Streets. At this point it shows an elevation of 1.4 feet and then Main Street sloping up toward the south to 2.8 feet at Water Street and between 7.2 and 9.4 feet at Front Street (Lott 1819). Main Street is depicted as a dotted line with a width of 100 feet. However the schedule of laid down streets officially describes Main Street as fifty feet wide in 1819. Washington Street was officially sixty feet wide adjacent to the project parcel in 1819 (Dikeman 1870: 18).

Stiles described Water Street before it was "raised and regulated" in 1824: "Water Street, between Main and Washington, which was previously almost an impassable slough, was raised and regulated" (Stiles 1993: II: 220). Because Plymouth Street is north and down slope from Water Street, it may be inferred Plymouth Street did not exist at that time. Plymouth Street was legally opened August 9, 1844 (Brooklyn Borough President 1970). It likely existed some time prior to that, possibly as early as 1811 in some places (Beyer Blinder Belle 1990: II-29). The schedule of laid down streets describes Plymouth Street as being forty feet wide between Main and Washington Street in 1819 (Dikeman 1870: 18). However the earliest mapped depiction of Plymouth Street within the project parcel found during this research is on Burr's 1833 Map of the City of New York. It clearly shows the project area having been filled (see Figure 12). Therefore we can assume the project parcel was initially filled between 1824 and 1833. We can also assume that Plymouth Street was in use by 1833, although it was not legally opened until 1844. Main Street had been widened to one hundred feet at some time prior to its survey in 1842 (Ludlam 1843).

Although Burr's 1833 map depicts the project area having been filled by that time, there is a widely cited 1834 map which does not. Martin's 1834 map does not show any fill extending north of Plymouth Street within the project parcel. It is possible Martin's map was actually drawn prior to 1834, but not published until that year.

Solecki writes in some detail about the confusion in determining where and when the shoreline expanded in the project area vicinity in the early- to mid-nineteenth century (Solecki 1980: 7). "A wall of brick and stone is mentioned in a 1835 record at the corner of Plymouth and Main, and a bulkhead is mentioned in 1846 as being 503 feet north of Water Street on the East River, putting it well beyond Plymouth Street" (Solecki 1980: 8). Both of these dates concur with the analysis that the project parcel began to be filled between 1824 and 1833.

At the end of 1835 the Common Council received a proposal to establish a permanent water-line in front of the city. By 1836 General J. G. Swift recommended a line of bulkheads be established. The part of their course in the vicinity of the project parcel would run from "... the outer end of a wharf near to Adams Street, and thence to a point in the East river, that is 237 feet from the edge of the dock at the end of Fisher street, and thence to a point in the East river, that is 101 feet from the outer end of the easternmost wharf on the east side of Fulton Ferry..." (Stiles 1993: II: 251-2). The actual legislation describes the bulkhead line measured from the southern side of Plymouth Street. The distance to the bulkhead line between Washington and Adams Streets, east of the project parcel, was 611 feet. West of the project parcel, west of Main Street, the bulkhead line was 431 feet north of Plymouth Street (Dikeman 1870: 133). General Swift told Stiles, in 1860, "this line became the law, but my plan, and report, and all other documents, and resolutions of the common council suddenly disappeared from its records, and whether ever returned I do no know, but the anxiety to extend the lots into the water has done some injury to that water line" (Stiles 1993: II: 252). Thus it seems there was concern by many parties in claiming land from the river.

In 1843 the State Legislature authorized Samuel Bowne to "erect, construct, and maintain wharves, docks, bulkheads and piers on the land under water in front of his lands... not to extend into the East river beyond the permanent water line or line of bulkhead determined and established by the Commissioners... May 25, 1836 (Dikeman 1870: 114).

> Throughout the 19th century the western shore of Long Island dominated the local commercial sector, in marked contrast to the agricultural character of the rest of the island. As the Port of New York became America's premier harbor after 1815, Brooklyn began its rise as the port's major warehousing, storage, and receiving center for bulk products. Waterfront development strongly affected industrial and residential growth patterns. Before 1840, this development was somewhat sporadic, and featured a variety

> of industrial, commercial, and residential uses. Larger and more systematic development after 1840 eliminated most of the earlier mixed waterfront uses... (Raber Assoc. 1984: 24).

By 1850, the New Ferry was commonly called the Catherine (or Catharine) Street Ferry after it's Manhattan landing place. It was one of four independent ferries operating between Brooklyn and Manhattan. There were three other ferries between these localities which were all operated by the Brooklyn Union Ferry Company which was organized by Henry Pierrepont in 1844 (City of New York 1977: 3) These three included the Fulton Ferry (Stiles 1993: III: 550).

The competition in the ferry business had become intense by the mid-nineteenth century. The early 1850s purchases of three of the ferries by Cyrus Smith and William Buckley should have been a shot in the arm. Smith had been a director of Union Ferry Company. He resigned his post to run the Catherine Ferry and two other independent ferries he recently bought (Pierrepont 1879: 68). However issues related to price, service, competition, and safety of the ferries all contributed to the 1853 announcement of the closure of the independent ferries. The public clamor was intense. Citizens successfully appealed to the Union Ferry Company to consolidate and take over the independent ferries. By 1854 the Union Ferry Company of Brooklyn was formed and it officially obtained the monopoly on Brooklyn/Manhattan ferry service. Cyrus Smith returned to work as the managing director of the monopoly and held that post until his death in 1877. However the company ran at a loss and was thereby forced to reduce service until 1856. The loss was a result of the losses of all but the Fulton Ferry, which had continuously been able to pay its expenses. The mounted debts of the other ferries were partially covered by the surplus of the Fulton Ferry. By the end of the 1850s the Ferry Company was operating at a surplus (Pierrepont 1879: 68-71; Smith 1855: 83).

During the mid-nineteenth century other modes of transportation were also having an impact on the development of Brooklyn. The Brooklyn City Railroad Company brought horse-car service to city streets in 1853. At the height of their operations, they ran twelve lines to Fulton Ferry (City of New York 1977: 4).

The 1852 Dripps map shows the project parcel had been built up substantially by mid-century (see Figure 13). Dripps depicts the Catherine Ferry slip as well as two other piers and several buildings within the project parcel. Perris' 1855 Map of Brooklyn shows major changes to the block in the few intervening

years. Although many buildings are depicted, none of the same structures shown on the 1852 map are still present in 1855. Numerous additional buildings can be seen as can alterations in the Catherine Ferry landing since 1852, no doubt reflecting the new proprietorship (see Figure 14). The ferry had expanded to two slips and several frame structures had been built. These presumably were the ferry house and/or buildings associated with it. To the east of the ferry slips were the Ferry Company's coal yard which had a pier extending into the East River as well as several small buildings. Perris' 1855 map also shows several coal and wood yards operating on the block. These are Camberson & Dezendorf Wood & Coal Yard on Plymouth Street adjacent to the ferry landing, John Muchmore Coal & Wood Yard on Plymouth Street in the southeast corner of the block and J. J. Barnard & Co. Wood Yard at then northeast corner of the block in between the two piers.

The ferry landing itself looks to have had one large frame building, which is labeled "Catherine Ferry" on Figure 14, and three smaller frame structures toward the water. The Ferry Company Coal Yard had three small frame buildings adjacent to the Catherine Ferry buildings and a small brick building to the north, toward the water. The Camberson & Dezendorf Wood & Coal Yard had two frame structures along Plymouth Street. A third frame structure is also shown abutting these to the west. However it is not clear if this small building was part of the Wood and Coal Yard property of part of the Ferry's. The John Muchmore Coal & Wood Yard had four small frame buildings along Plymouth Street and three larger frame structures along the eastern side of the block. The J. J. Barnard & Co. Wood Yard had two small buildings on its property at the northern part of the block.

Dripps' 1869 map is not quite as detailed as the Perris 1855 map. Nevertheless further changes within the block are clear. The piers and shoreline had remained unchanged. The ferry building also had a similar configuration on both maps. However most of the remainder of the block had changed. The only other building on the block which appears unchanged from 1855 to 1869 is the Camberson & Dezendorf Wood & Coal Yard building, although it is not labeled on the 1869 map. Two other buildings are depicted on the 1869 map. One is a small building on Plymouth Street in the center of the block. The other is a large L-shaped structure. The short side was at the southeast corner of the block at Plymouth and Washington Streets and the long side extended from Plymouth Street north to the rear of the block.

By the late 1860s, it was considered that the ferries were running at capacity and in identifying an

alternative, the New York Bridge Company was formed. In 1874, when the charter for the bridge company was completed, a new ferry building was constructed for the Catherine Street Ferry (Pierrepont 1879: 99-100, 112-3). By 1880 the Union Ferry Company carried about fifty million passengers annually, almost doubled over the previous twenty years (Hazelton 1925: 1646). The 1880 Bromley Atlas depicts additional changes in the structures located on the property (see Figure 15). The Ferry Landing seems somewhat altered with possible slips extending southward toward Plymouth Street, reflecting the 1874 changes. The remainder of the block is labeled "Coal" and "Lumber", however all of the structures depicted are in different locations than those shown on the 1869 map. Therefore the older buildings must have been demolished.

Additional construction took place in the block during the 1880s. Figure 16 depicts the block in 1886. Several new frame structures had been built along Plymouth Street. The second stage of construction of the Empire Stores, located catty-corner from the project area, had also been completed by this time (Solecki 1980: 1). "The Empire Stores were among the many warehouses constructed during the post-Civil War economic boom along the Brooklyn waterfront. By 1870, the waterfront was so completely lined with privately owned warehouses and docks that Brooklyn had earned the nickname the 'walled city'" (City of New York 1977: 16). Bromley's 1893 Atlas depicts most of the same buildings as shown on the 1886 Atlas (Figure 16). The label "Coal Yard" is written along the Washington Street side of the block and "Lumber Yard" is written through the central portion of the block in the 1893 Atlas.

The 1880s were a time of expansion for Brooklyn with the opening of the Brooklyn Bridge in 1883. Because the bridge charged a toll, its immediate impact on the ferry business was not felt. However when the toll was eliminated in 1895, ferry business expectedly decreased (City of New York 1977: 4; Hazelton 1925: 1646). Elevated trains began running on Brooklyn Bridge in 1898 (New York State 1977: #8-2). By the close of the century, Brooklyn had been consolidated into New York City and the ferry business was a dying industry. The New York City Landmarks Preservation Commission feels the Fulton Ferry Historic District's "golden age ended with the opening of the Brooklyn Bridge. Thereafter, the area began a rapid decline which was virtually to terminate its viable existence as a commercial district forty years later, with the abandonment of ferry service to Manhattan" (City of New York 1977: 6).

Twentieth Century

Construction began on the Manhattan Bridge in 1901. Its completion in 1909 along with the new subway service between Manhattan and Brooklyn signaled the ultimate demise of the ferry. The 1904 Sanborn Insurance map of the project parcel provides an incredible amount of detail on the project block during this period (see Figure 17). The Union Ferry Company property is shown extending from the ferry landing east to the center of the block. It contained a coal shed, an elevated coal run out onto the pier, as well as a few smaller associated buildings. Within this property, at the corner of Plymouth and Main Streets, is a dwelling. An unlabeled structure was shown at this location on the 1893, 1886, and 1880 maps. Figure 17 also shows the Joseph H. Colyer Coal Yard on the eastern side of the project parcel and running along Washington Street. This was the area labeled "Coal Yard" on the 1893 Bromley Atlas. The central portion of Figure 17 shows the Frank H. Sprague Lumber Yard. This was the location labeled "Lumber Yard" on the 1893 Bromley Atlas.

By 1915 the ferry company is no longer depicted on the Sanborn Map (see Figure 18). It was possibly out of operation by then. The former dwelling located at the corner of Plymouth and Main Streets is labeled "Plumbers Office" and the Ferry Coal Yard was no longer. By 1915 the former Coal Yard property was being operated by R. Gair Co. Inc., who also operated a number of businesses on Plymouth Street in 1915. Two commodities (packing cases and lumber) were either being made or stored at the site which is now part of the project parcel. The former elevated coal run was either removed by 1915 or reduced and called a trestle. Frank H. Sprague was still operating his lumber yard in the center of the block in 1915. However the coal yard along Washington Street was then being operated by John F. Schmadeke Inc., who owned that portion of what is now the project parcel (Liber 3134, Page 30).

The City took over the remaining failing ferry operations from Union Ferry Company at the end of 1922. The ferry was ultimately abandoned in 1924 (Hazelton 1925: 1646-7). "With the ferry in disuse and the commercial hub shifted inland, the waterfront was relegated to a warehouse, trucking, and light industrial area" (New York State 1974: #8-2).

The 1929 Hyde Atlas shows most of the block emptied. The only buildings depicted are two small structures along Plymouth Street, one at the corner of Washington Street and the other at the corner of Main Street. Robert Gair was operating a pier where the Catherine Ferry landing used to be located and

its configuration was substantially changed from the nineteenth century. This new configuration can be seen on the 1939 Sanborn Map after the removal of the two buildings from Lot 1 (see Figure 19). Gair Reality Corp. was operating a warehouse on Lot 5 in 1939. Sanborn describes the building as "hollow tile constn/stuccoed/roof wood sheathed". This building was still standing in 1970 when it was mapped by the Brooklyn Borough President's Office. They described it as tile block with cement cover and said it ranged from one to two stories. Raber Associates described this piershed in 1984 as "somewhat less typical... built c. 1925 with tile walls on steel framing (Raber Assoc. 1984: 43). It was soon after demolished.

By the 1970s the two piers at the end of Lot 1 had gone into disuse and the area between them either filled or silted in. Some of the remaining deteriorating piles were also removed during the 1980s drift removal project.

The concrete walkway which currently runs around the perimeter of the property is a more recent addition. The Buildings Department did not have any record of issuing a permit for its construction. It is possible another agency had that responsibility. Marcha Johnson of the Parks Department speculates the path was built and is maintained by the parking lot tenant currently occupying the site (personal communication).

CONCLUSIONS AND RECOMMENDATIONS

The portion of Brooklyn Bridge Park documented in this report was not originally filled until sometime between 1824 and 1833. The project area would have been filled in at least three episodes, based on the documentary evidence. The earliest was by 1833. A subsequent fill episode would have been by the mid-1850s, around the time the Catherine Street Ferry landing was expanded. It is not clear if any filling took place within the project area in the late nineteenth century or in any time up until the 1970s when the area between the two eastern piers was filled.

A substantial part of the project area will be impacted by construction of this portion of Brooklyn Bridge Park. However the only proposed impacts which will penetrate below the depth of fill are the piles. A small portion of the stone steps on the up slope side will possibly penetrate below the average depth of fill, with removal of about fourteen feet of material. However the boring taken closest to the stone steps, Boring #3, contained seventeen feet of fill. Therefore it is quite unlikely the project impacts will reach any natural surface. Thus there is virtually no possibility of the project impacting archaeological remains associated with the pre-contact period. Raber Associates describes the potential for preservation of archaeological remains from the Pre-European Contact period when excavation below the fill takes place. "Construction and maintenance dredging has everywhere disturbed nineteenth century offshore bottom conditions, but it remains unclear whether these actions removed prehistoric land surfaces or only continuing historic sedimentation deposits" (Raber Assoc. 1984: 7). Furthermore, the author knows of no submerged archaeological resources recovered from the project parcel vicinity. Therefore no archaeological testing is recommended for identifying remains of the pre-contact period.

Most of the below ground disturbances will be to possible historic period remains. A large number of those disturbances will be within Lot 1. Historically Lot 1 did not exist until circa 1830. It was used throughout most of the rest of the nineteenth century and well into the twentieth century as coal and lumber yards. These yards contained a succession of transient buildings. Archaeological remains associated with these structures would not be considered significant mainly because of the temporary nature of the buildings and their industrial usage would have left generic remains which would be difficult, at best, to associate with a particular structure or time period.

The depth of the impacts created by the construction of the beach and stone steps will mean destruction of part of the existing bulkhead slightly to the east of the former ferry landing. The remains of the bulkhead in this area would be of limited interest. "There is fairly abundant twentieth century data on the repair or construction of present bulkhead lines built after 1840. These data show old bulkheads behind projected repair or replacement work, and they are striking in their similarity. Open cribwork structures seem to have been universal" (Raber Assoc. 1984: 38). Raber Associates go on to describe the cribwork and its construction in detail (ibid.: 38-41). Portions of the timber cribwork can be seen in Plate 3, as it is currently exposed and in Plate 4 from a distance. Raber Associates describes this type of bulkhead construction as "widespread" from circa 1840 through 1930 (ibid.: 39). They go on to say it can be difficult to date construction of these features and even when archaeological evidence is available, repair work and replacement of bulkhead components can complicate identification. They report the cribwork "cells each measured from 5 to 8 feet on a side" (ibid.: 38). The actual measurement of the exposed cribwork cells in the project parcel is 5½ feet. While there is much discussion of cribwork and bulkheads by Raber Associates, they report cribwork bottoms are not well documented (ibid.: 40). However the planned impact depths will not reach the base of the cribwork, which is usually 20 - 25 feet below mean low water (ibid.: 38). Therefore no archaeological testing is recommended for this part of the Brooklyn Bridge Park project.

The most historically significant use of the project parcel was in Lot 5 where the Catherine Street Ferry operated form 1795 through the early-twentieth century. Analysis of the possible location of historic remains of the ferry landing was done by superimposing the beach and stone steps impact areas on a number of the historic maps (see Figures 13, 14, 15, 17, and 19). Figure 13 shows the planned impacts from construction of the beach at the base of the stone steps will affect the footprint of only a small portion of the eastern part of the area where the early 1850s ferry slip was located. Once the ferry was expanded circa 1853, it likely obliterated, rather than subsumed, the earlier landing structures within the project impact area. This can be seen by comparing Figures 13 and 14. By 1855 the ferry facilities had expanded eastward within the project parcel. A small portion of the southwestern part of the planned stone steps and beach access ramp overlies possible ferry structures which persisted from the mid-nineteenth century through the early-twentieth century.

Demolition of the former Gair piershed and the Main Street pier in 1984 would have likely obliterated

most of the archaeological evidence of the historic ferry slip. At the time of the demolition, Raber Associates inventoried the Catherine Street Ferry as possibly having intact piles and bulkheading. The "present timber bulkhead established under ferry c. 1900, with pile supported ferry house to line of John St." (Raber Assoc. 1984: 45). They recommended the Main Street pier be removed and "Remove miscellaneous piles offshore. Remove timber faced timber cribbing bulkhead under pier to grade allowing rubble (1320 cy) to remain" (ibid. catalog: 1). It is possible some discontinuous remains of the former ferry landing could be found in the southern part of the planned beach area. Plate 4 shows the area as it currently looks.

The possibility of finding remains of the pre-1850s ferry landing structure in the impact areas is quite remote since not much of that area will be impacted and the depth of planned impacts in that spot does not reach below mean low water. Raber documents repairs to bulkheads above the level of mean low water but generally not below, thereby compromising the integrity of any structure above that level or above. Therefore no archaeological testing for the earlier ferry remains is recommended.

Should remains of the ferry landing exist, they most likely would be from the post-1850s period. As stated above, this period of bulkhead construction is quite well documented. Furthermore the fact the ferry landing configuration did not change after 1850 means there would be difficulty in dating the remains which may exist and differentiating original construction from repair work or reconstruction. Additionally the construction of the Gair Reality Corporation Pier (see Figure 19) and its subsequent demolition would have created further structural changes to the archaeological record and, as stated above, likely obliterated remains of the historic ferry landing. Therefore no archaeological testing is recommended for the project parcel.

However, since this portion of the Brooklyn Bridge Park is part of an historic district and because there is a slight chance archaeological remains associated with the historic ferry landing could be found in the beach steps, beach or the area of the beach entrance ramp, archaeological monitoring is recommended in that area. A monitoring plan should be prepared by an archaeologist prior to construction and implemented in coordination with the New York City Department of Parks and Recreation and their contractor.

Plate 1 View of the western side of the project parcel taken from the shore facing southwest.

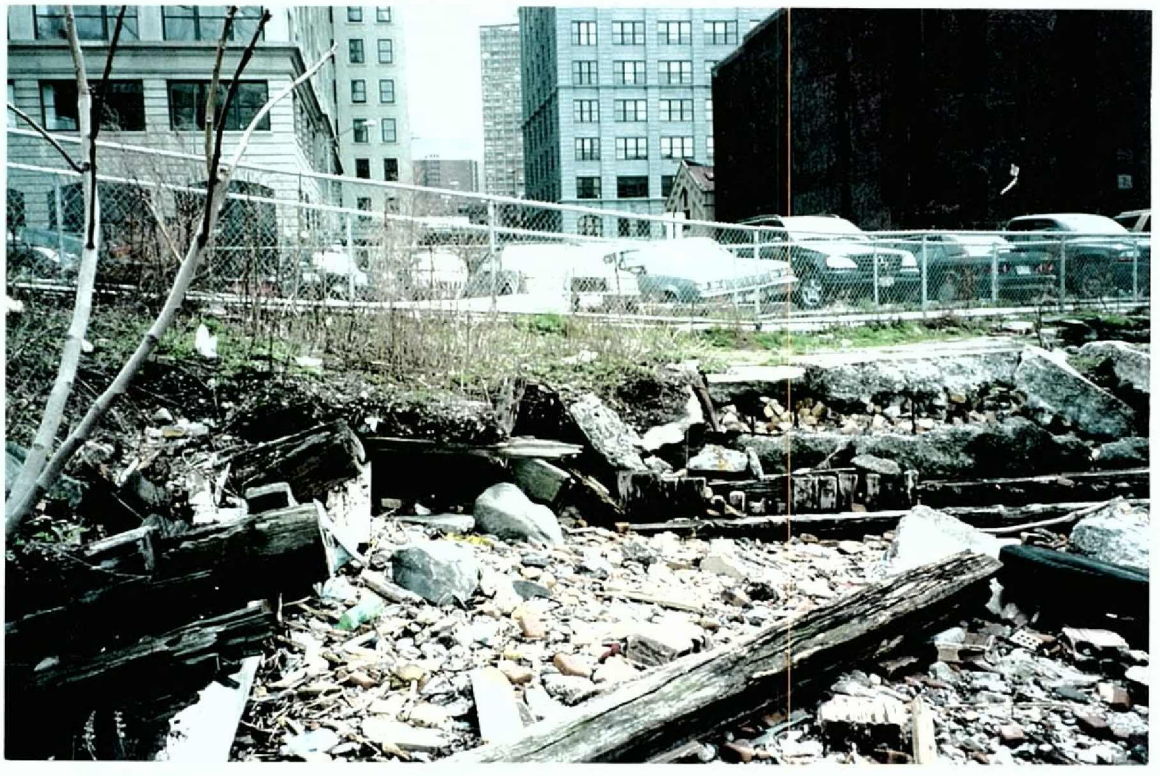


Plate 2 View of the shoreline of the project parcel taken from the western edge facing south.

Plate 3 View of cribwork along the central portion of the western side of the project parcel facing east.

Plate 4 View of the project parcel from the shore showing the location of the future beach and stone steps.

Not to Scale

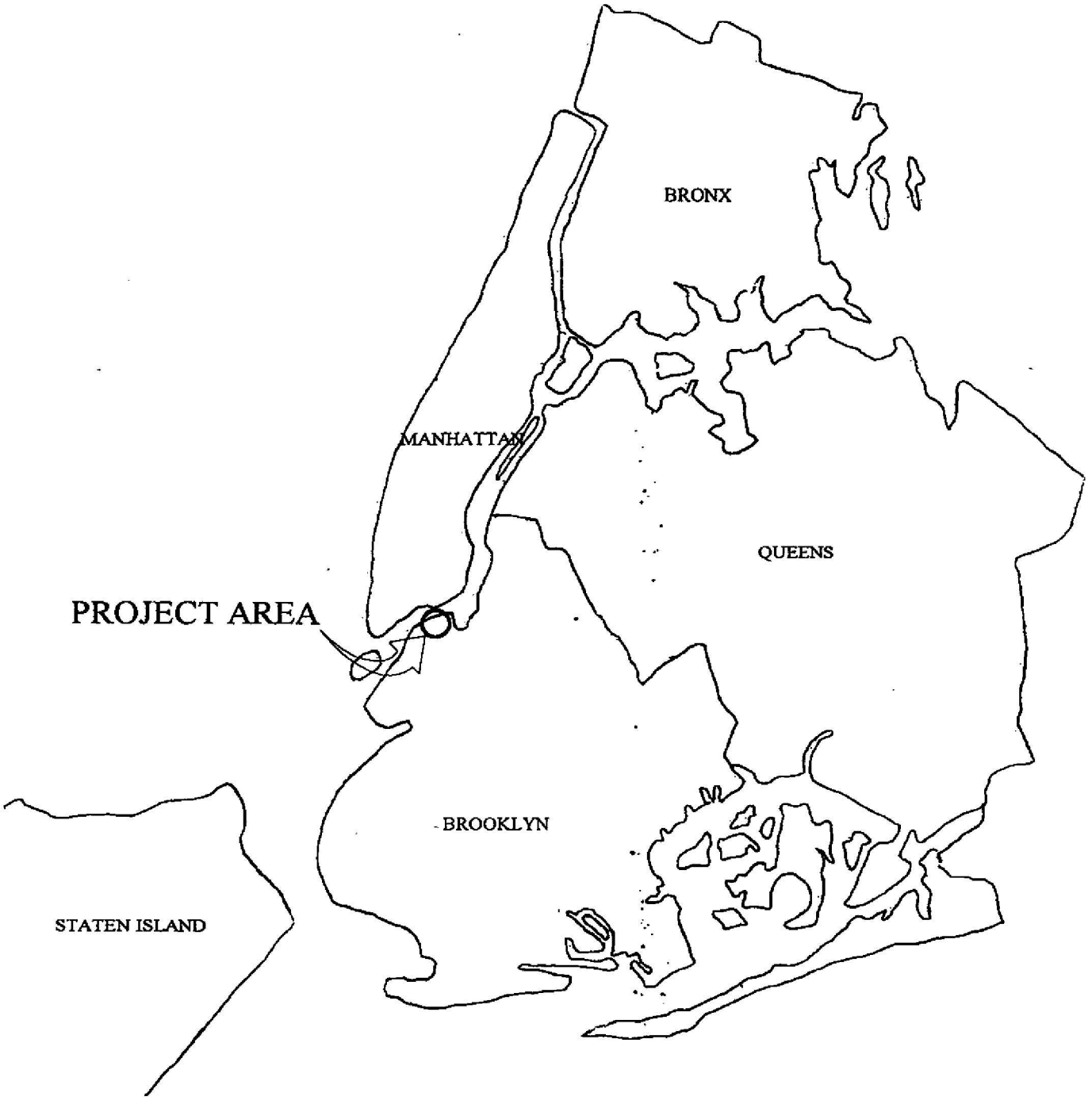


Figure 1 Project Area Location Within the City of New York.

PROJECT AREA LOCATION PLAN :

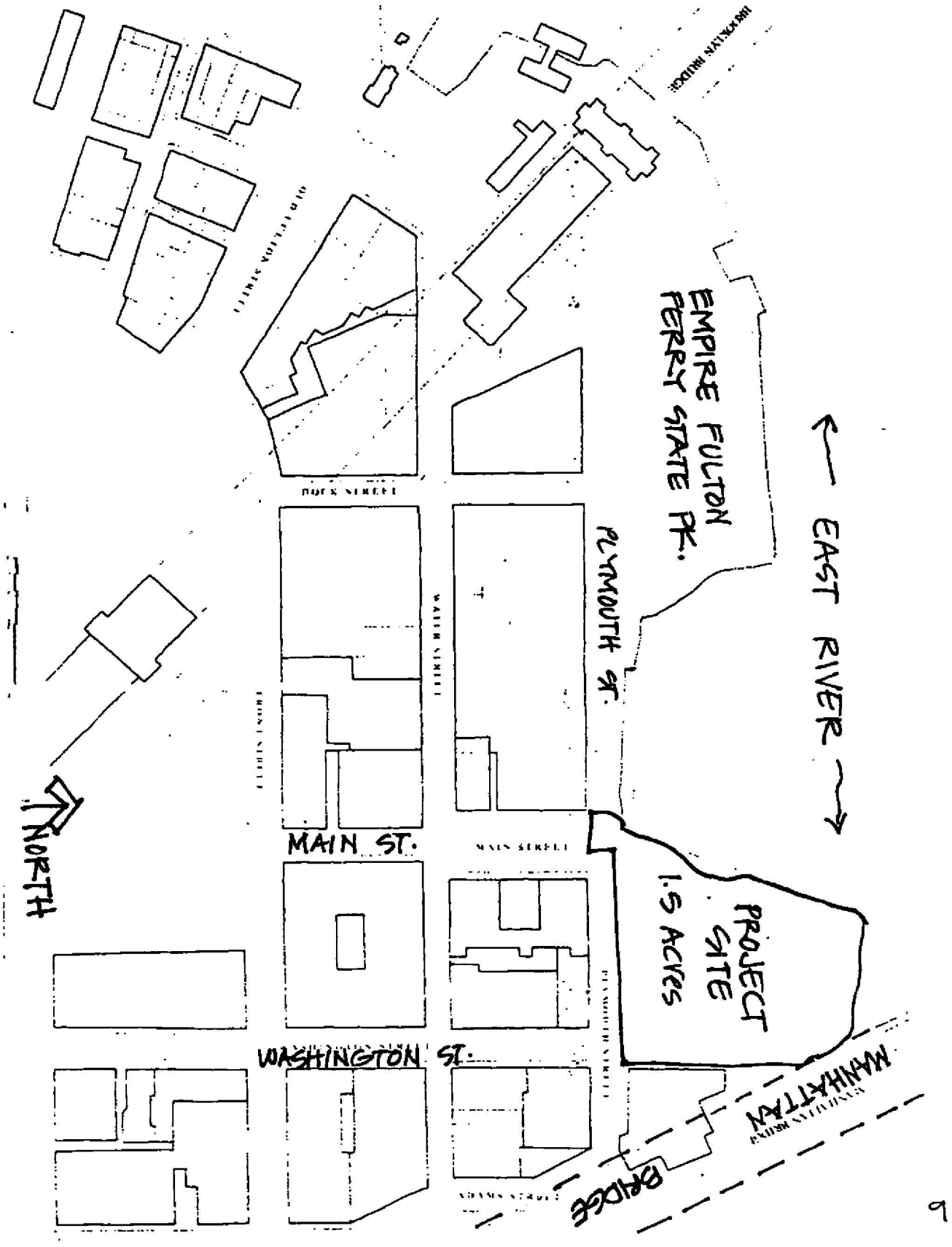


Figure 2 Project Area Local Map.

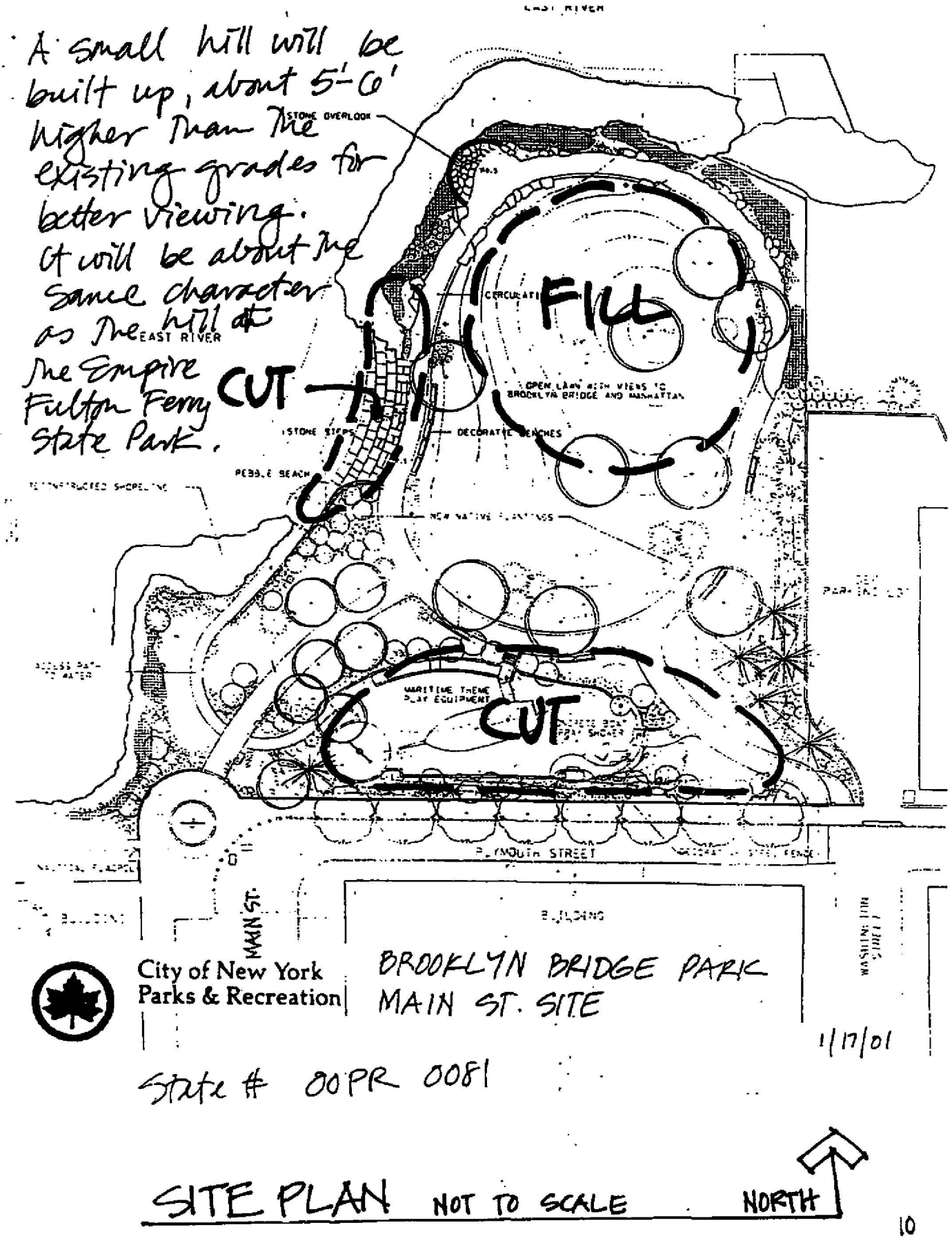


Figure 3 Site Plan From the Parks Department Request for Proposal.

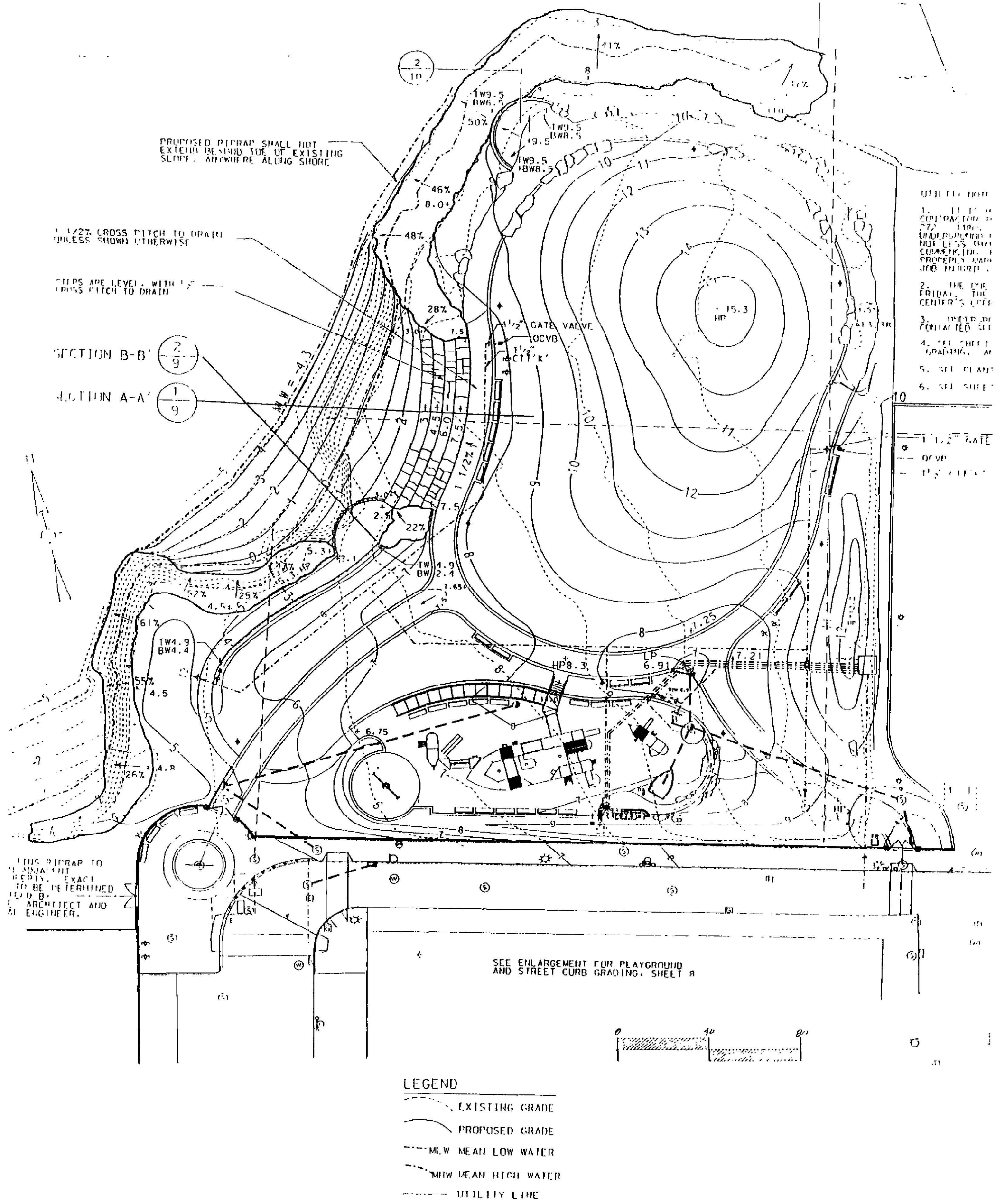


Figure 4 Portion of the Parks Department Grading and Utilities Plan (BG-38150-101M Sheet 6R).

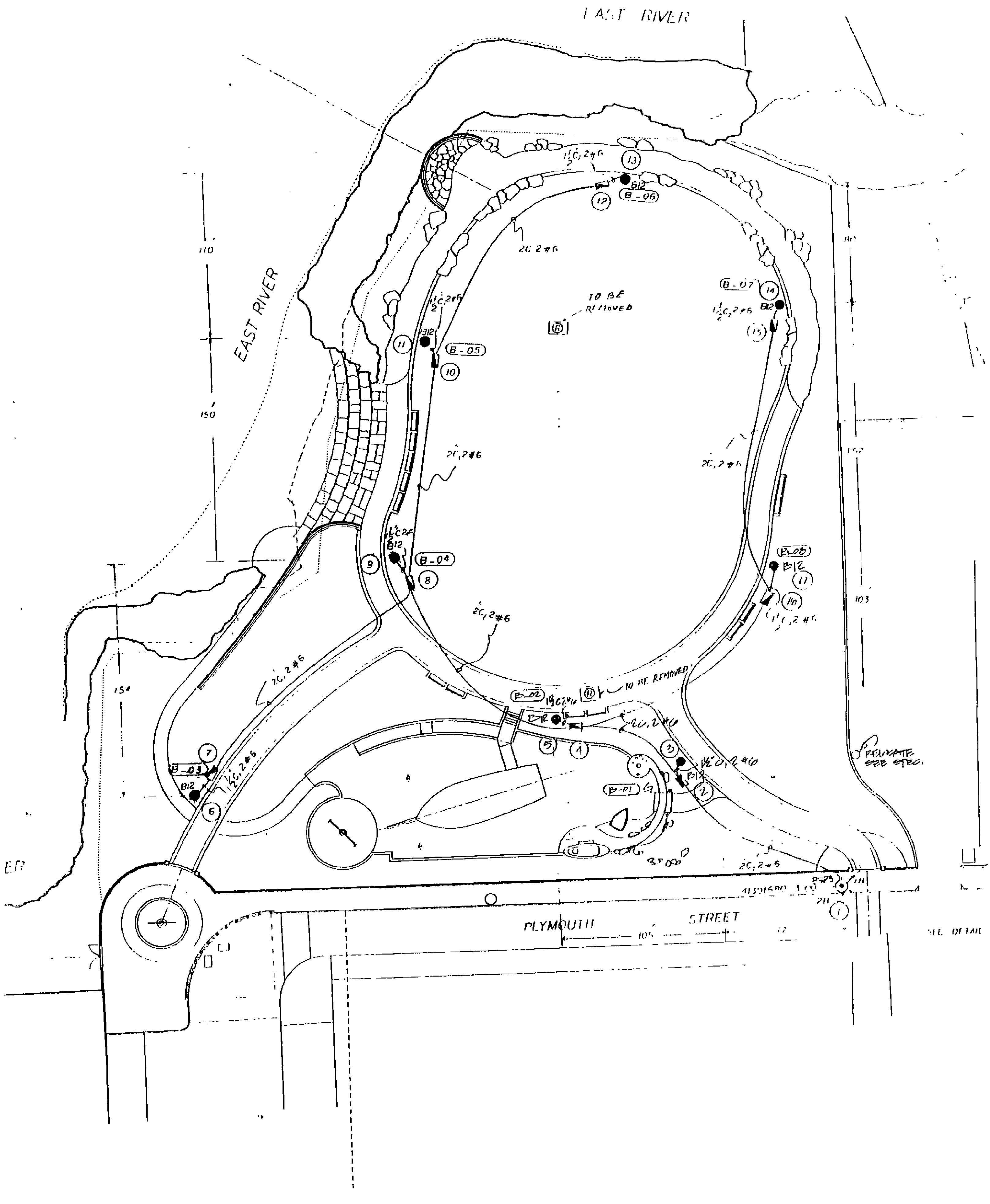


Figure 5 Portion of the Parks Department Lighting Plan (BG-38150-101M Sheet 32).

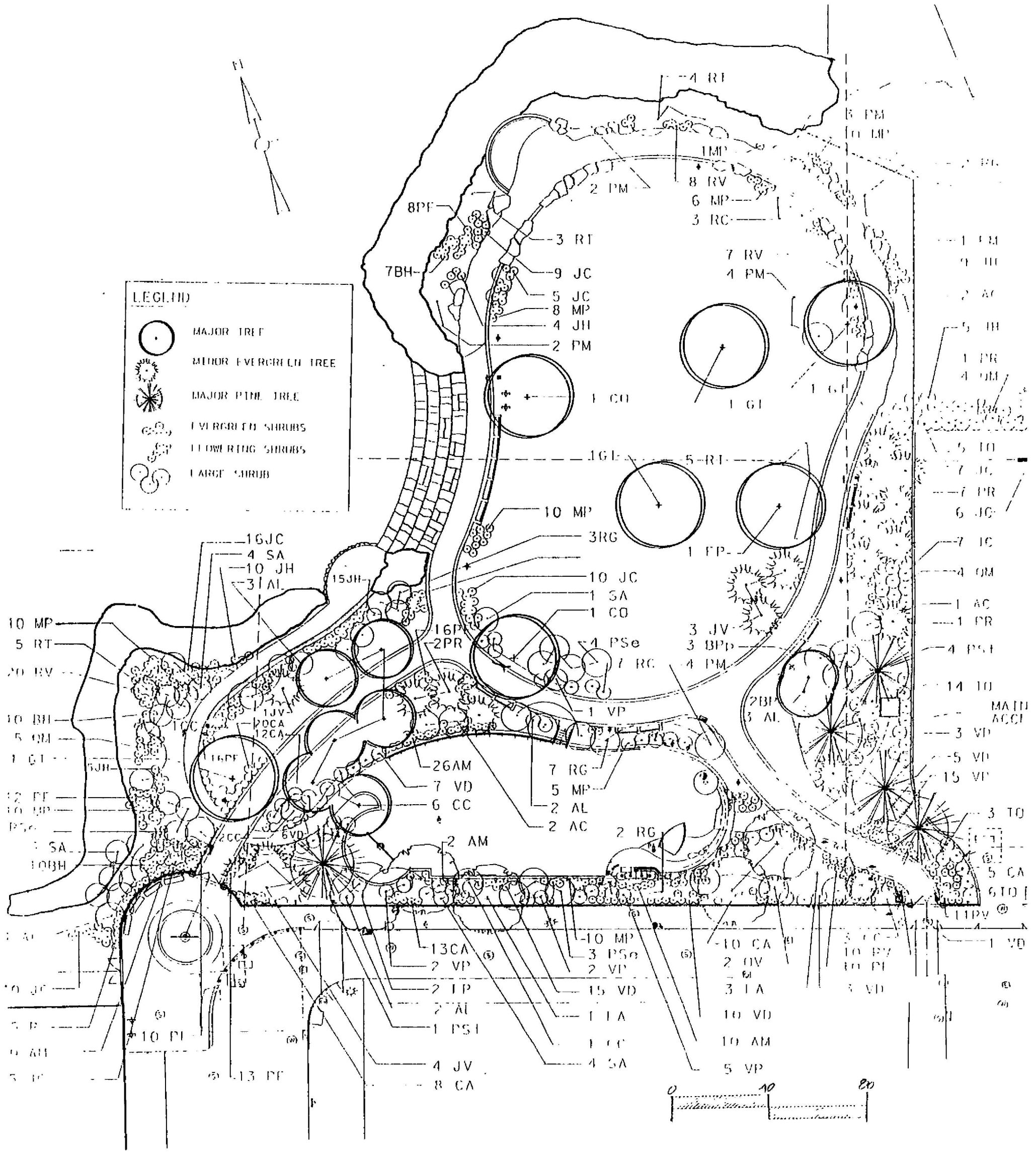


Figure 6 Portion of the Parks Department Planting Plan (BG-38150-101M Sheet 7).

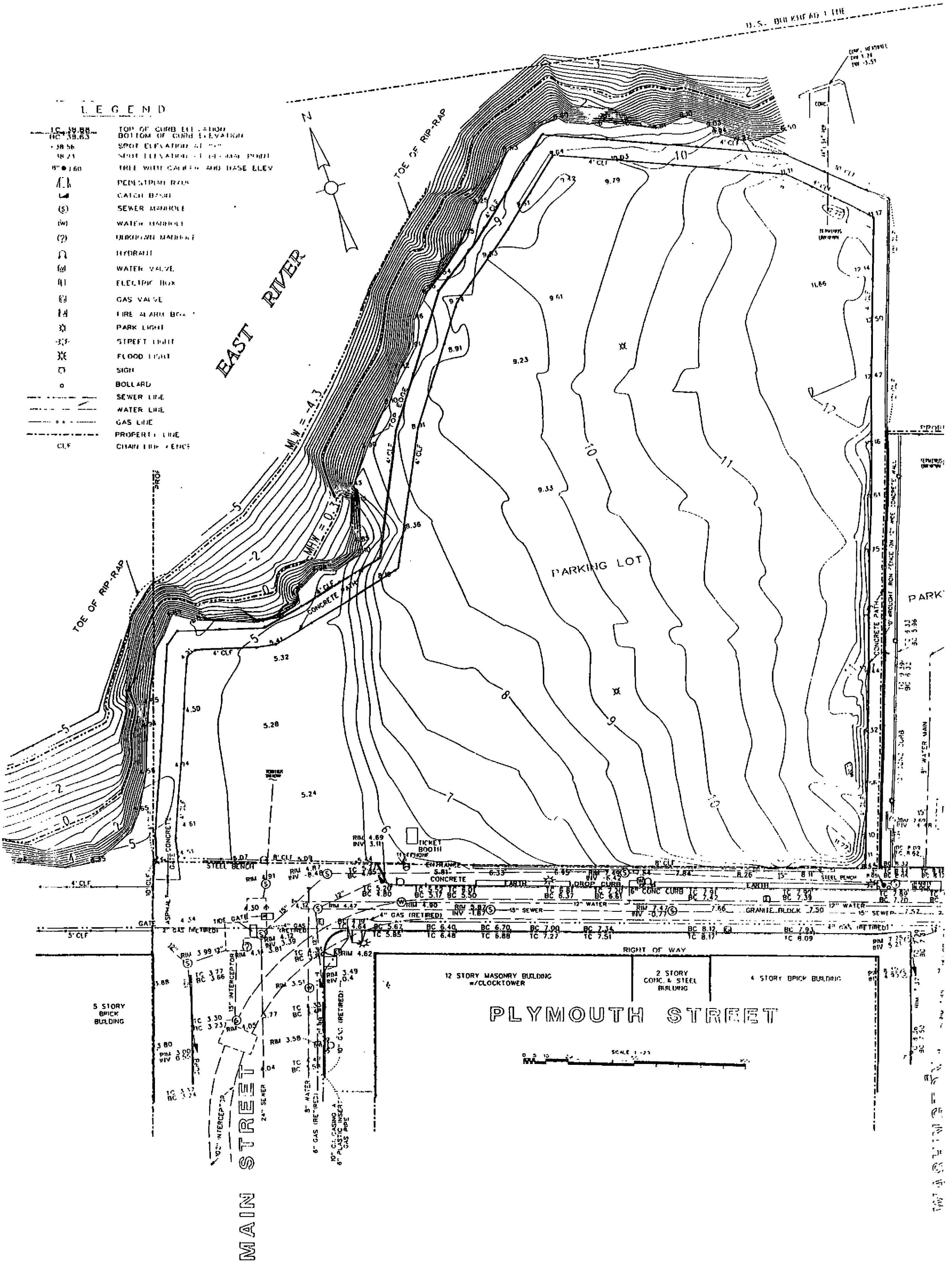


Figure 7 Topographic Survey of a Portion of Brooklyn Bridge Park (BE-38150-101M Sheet 2).

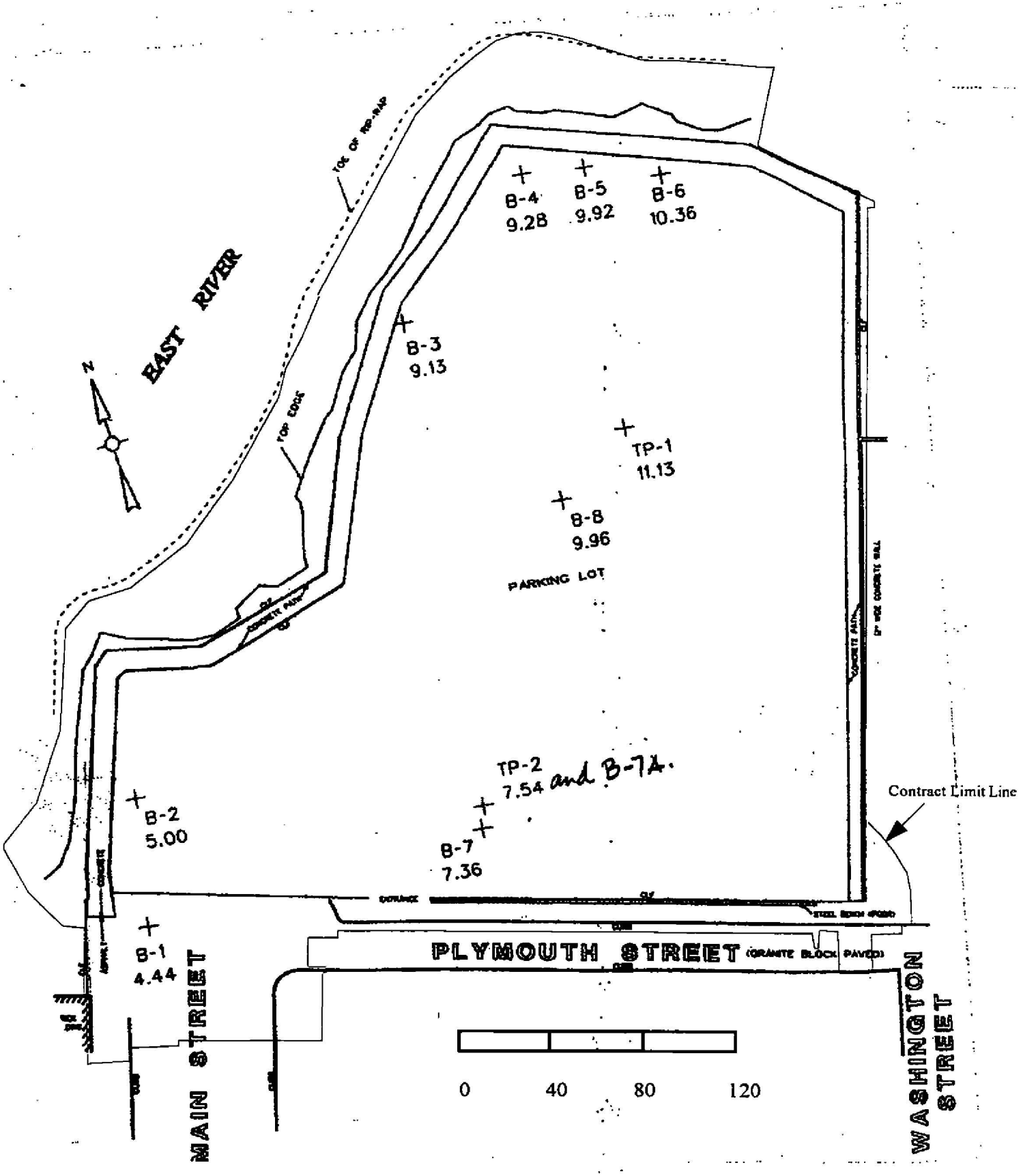
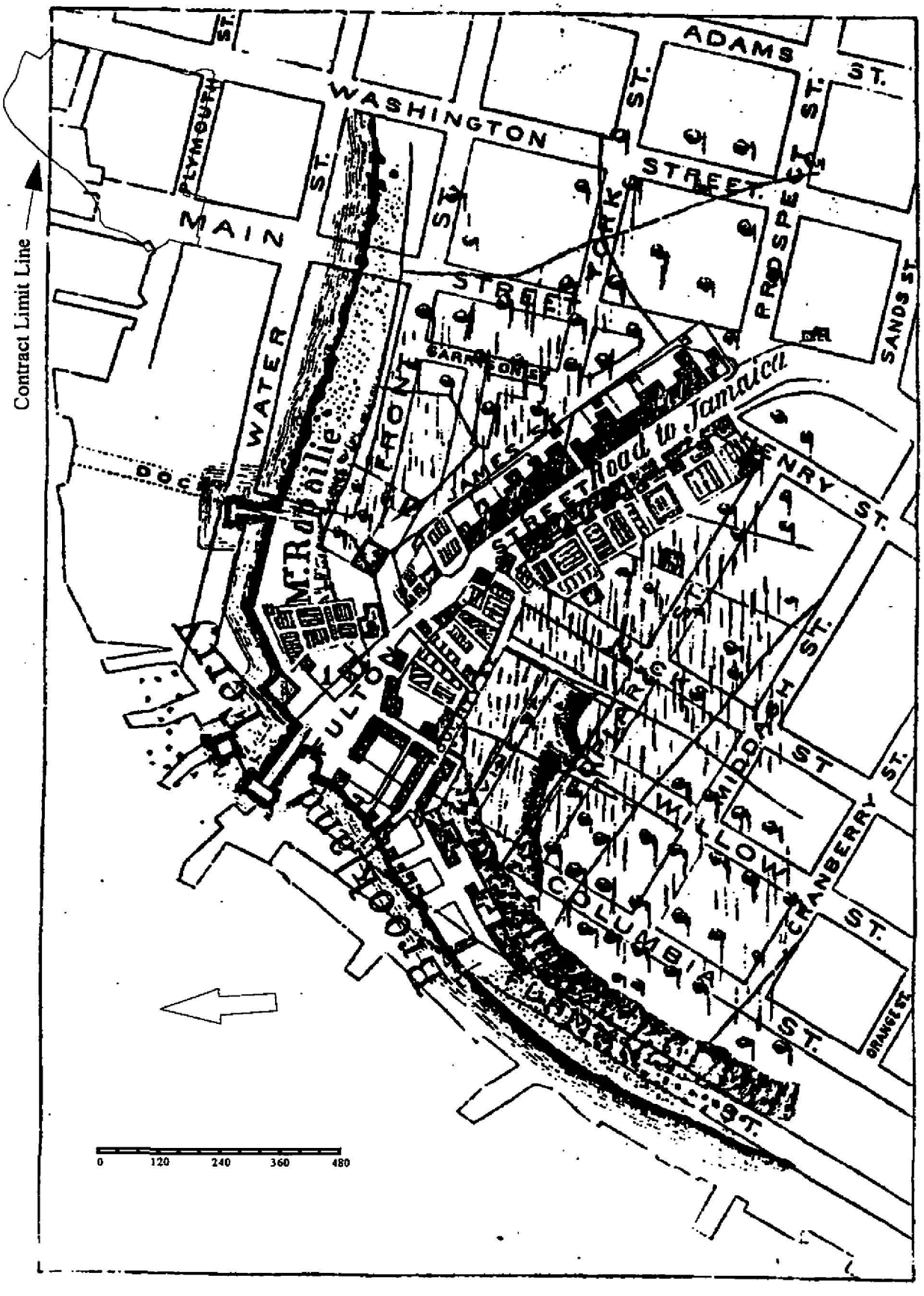


Figure 8 Boring Location Plan.



MAP OF BROOKLAND FERRY, IN 1766-7 AND 1867.

Figure 9 Map of the Brookland Ferry (Stiles 1993: I: 311).

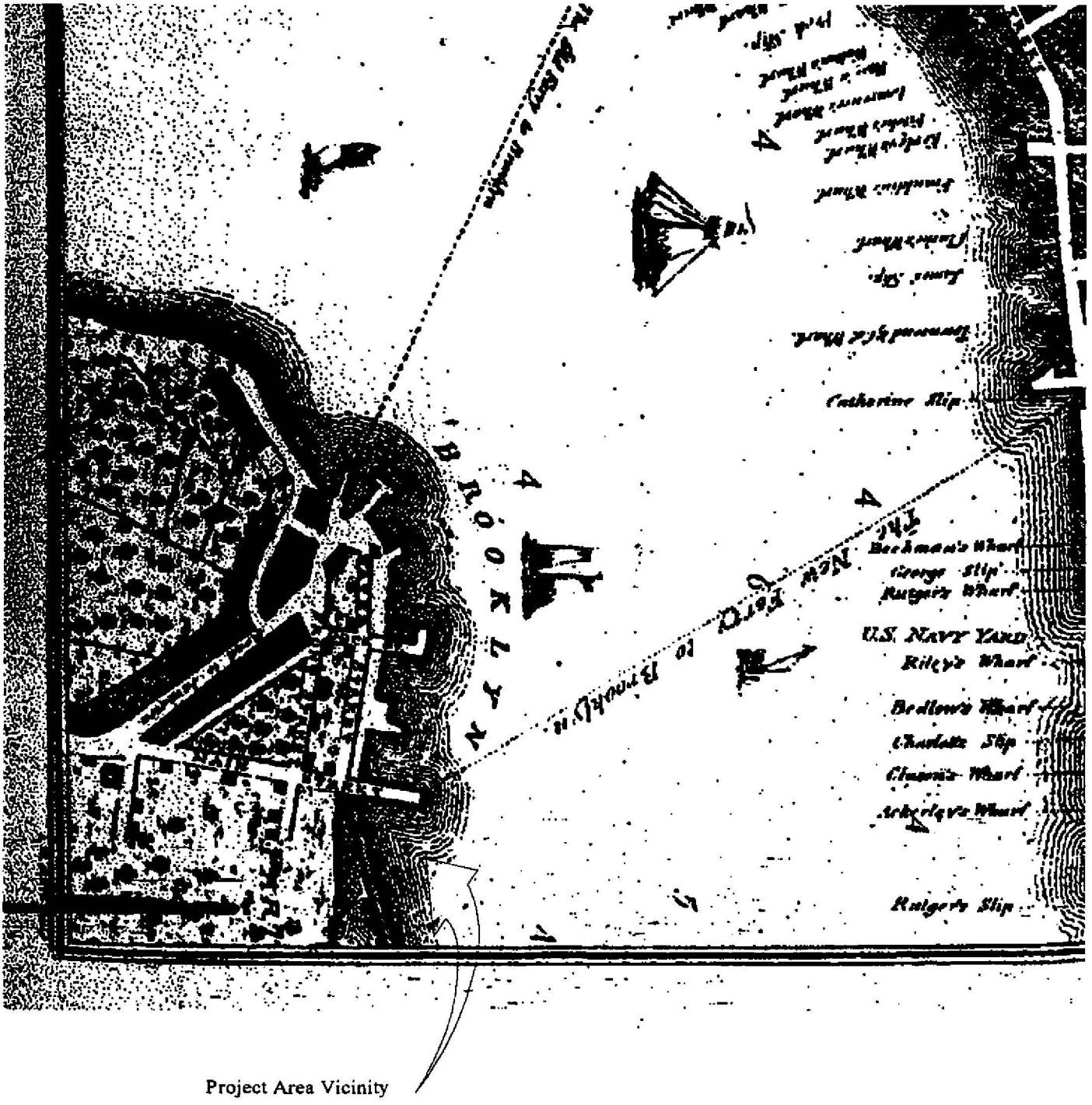


Figure 10 Portion of the Map of Ferry From Fly Market Slip, 1797 (Pierrepont 1879: 19).

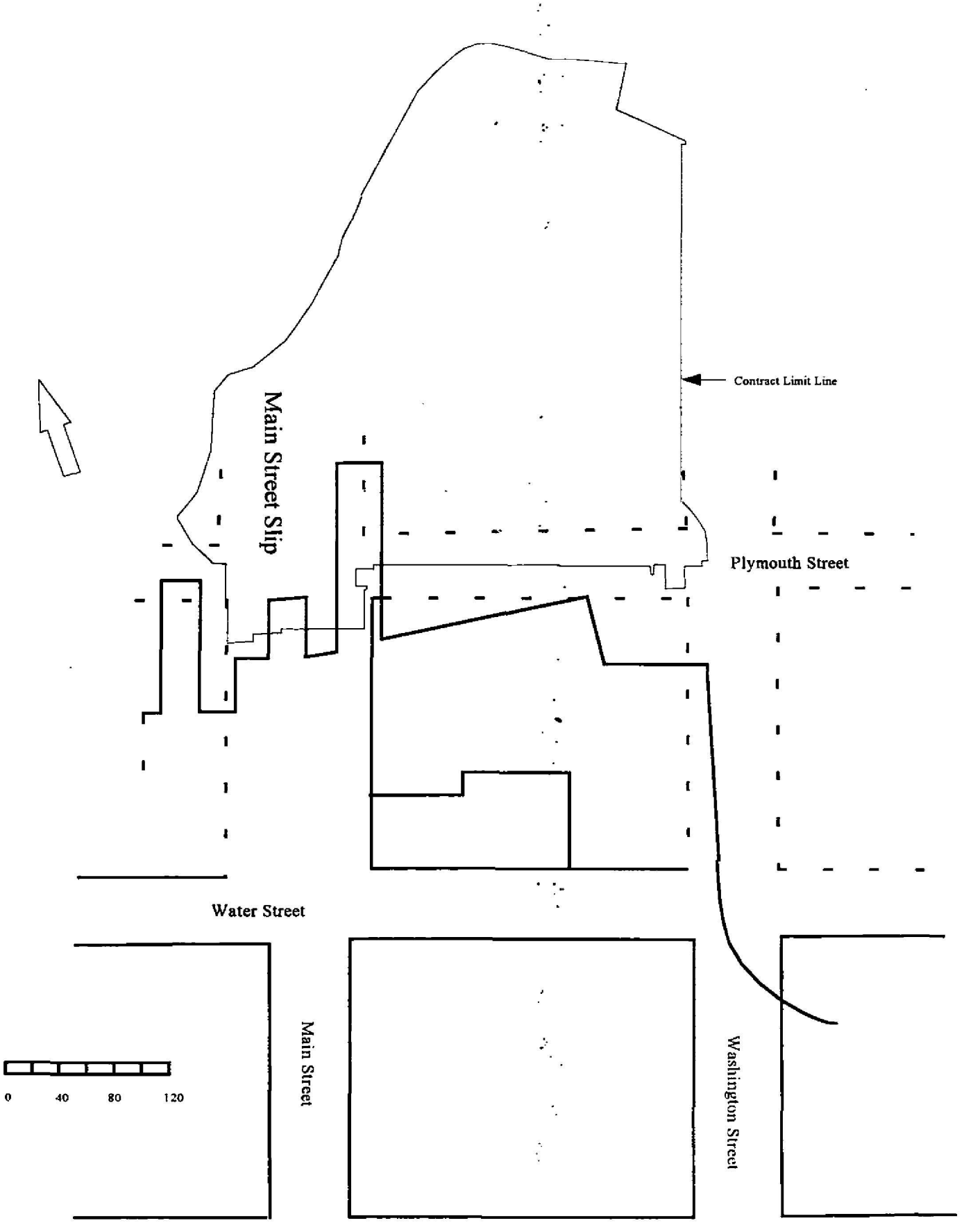


Figure 11 Portion of the 1819 Map of the Village of Brooklyn.

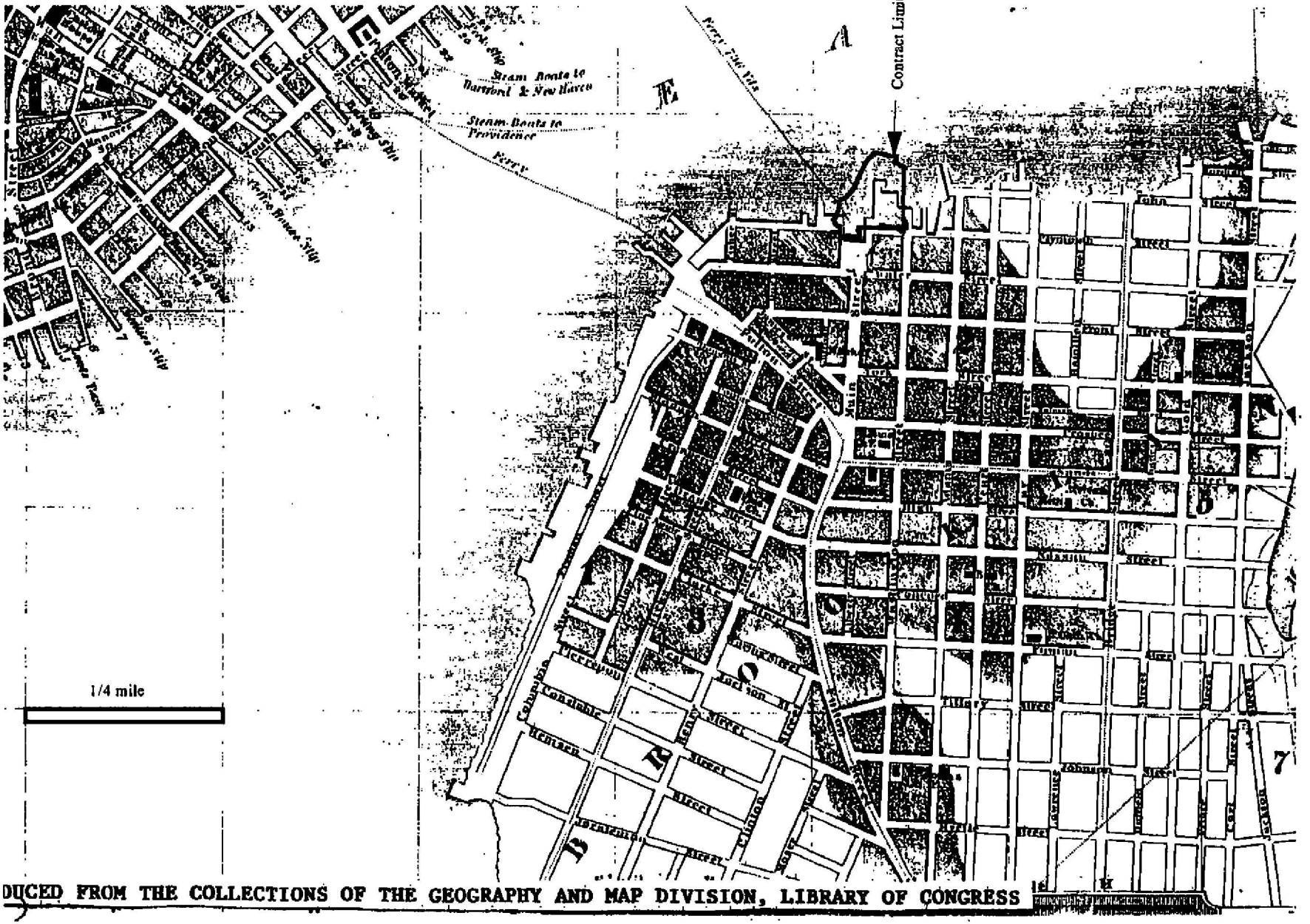


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Figure 12 Portion of the 1833 Burr Map of the City of New York.

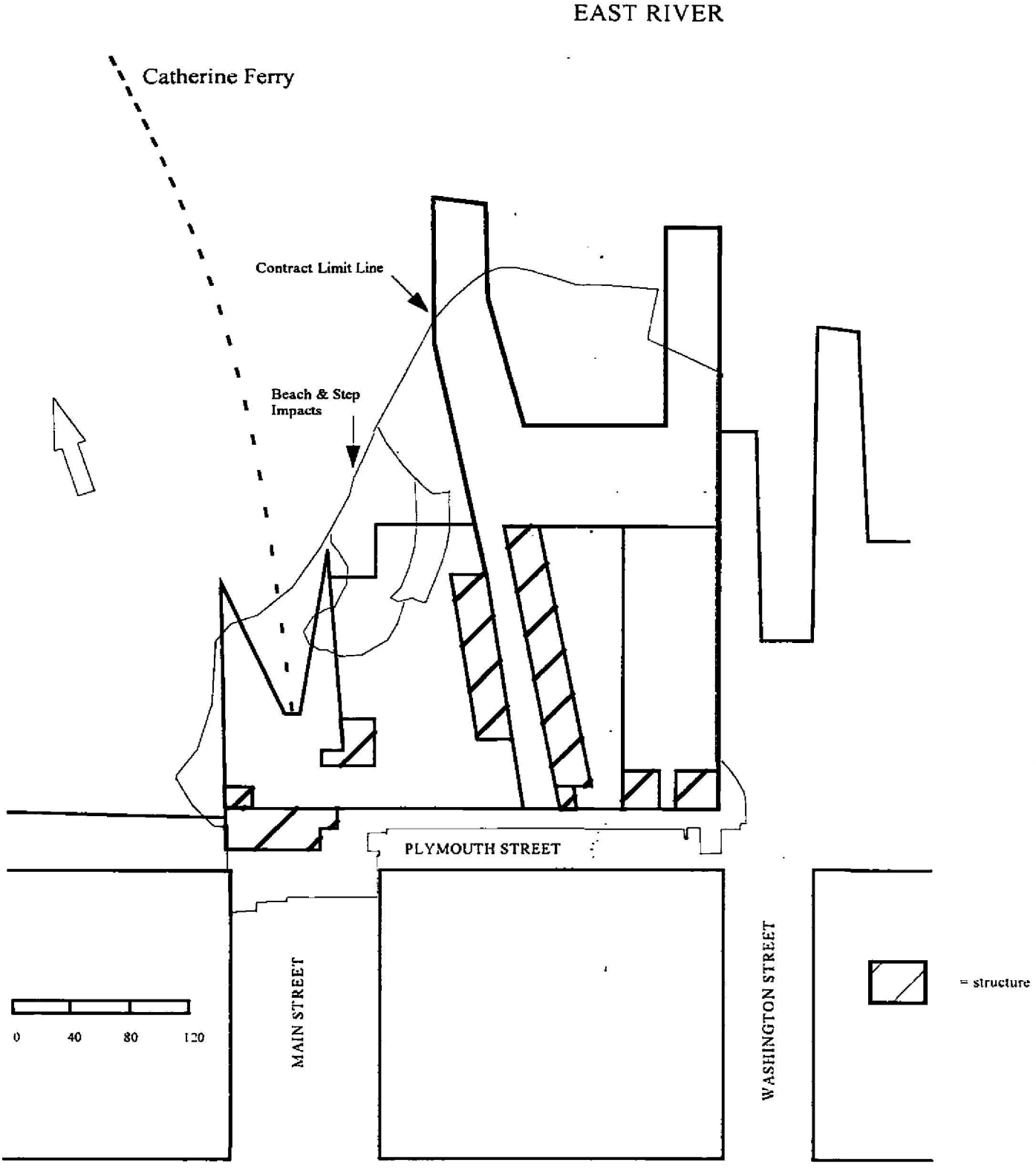

Figure 13 From a tracing of Dripps' 1852 Map of the City of New York Showing the Contract Limit Line and the Beach and Steps Impact Areas.

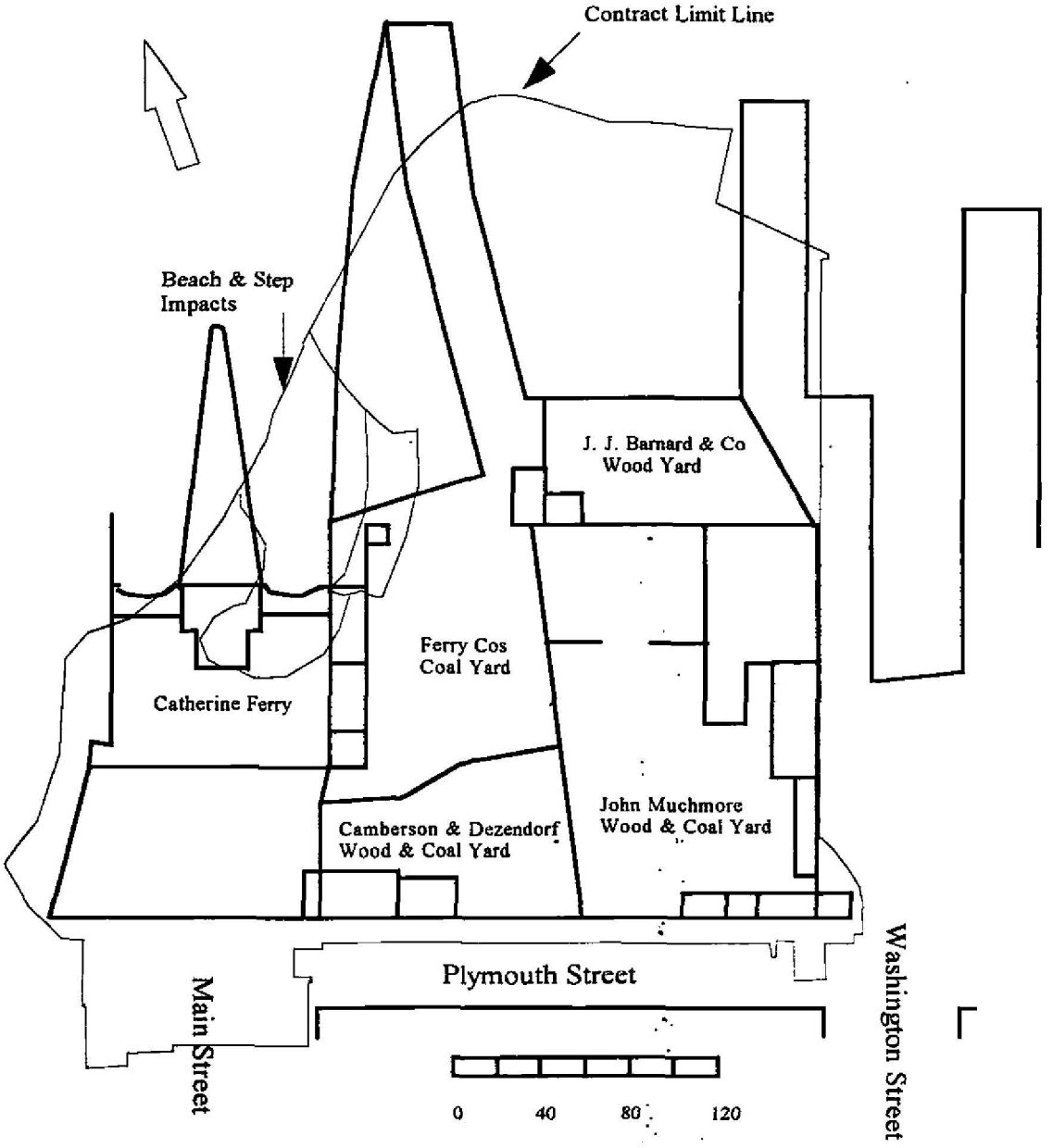

Figure 14 From a tracing of Perris' 1855 Maps of the City of Brooklyn Showing the Contract Limit Line and the Beach and Steps Impact Areas.

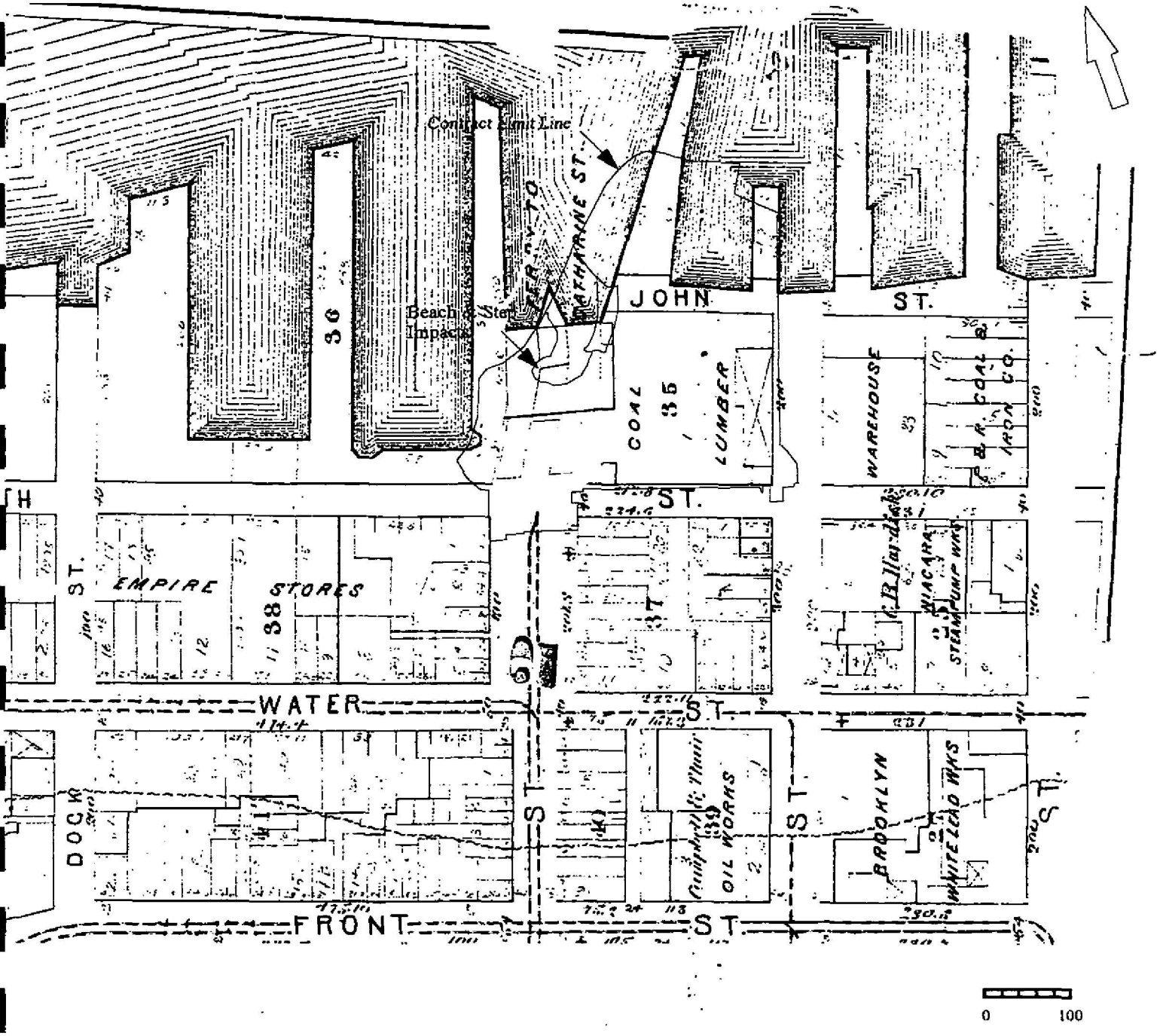

Figure 15 Portion of the 1880 Bromley Atlas of Brooklyn Showing the Contract Limit Line and the Beach and Steps Impact Areas.

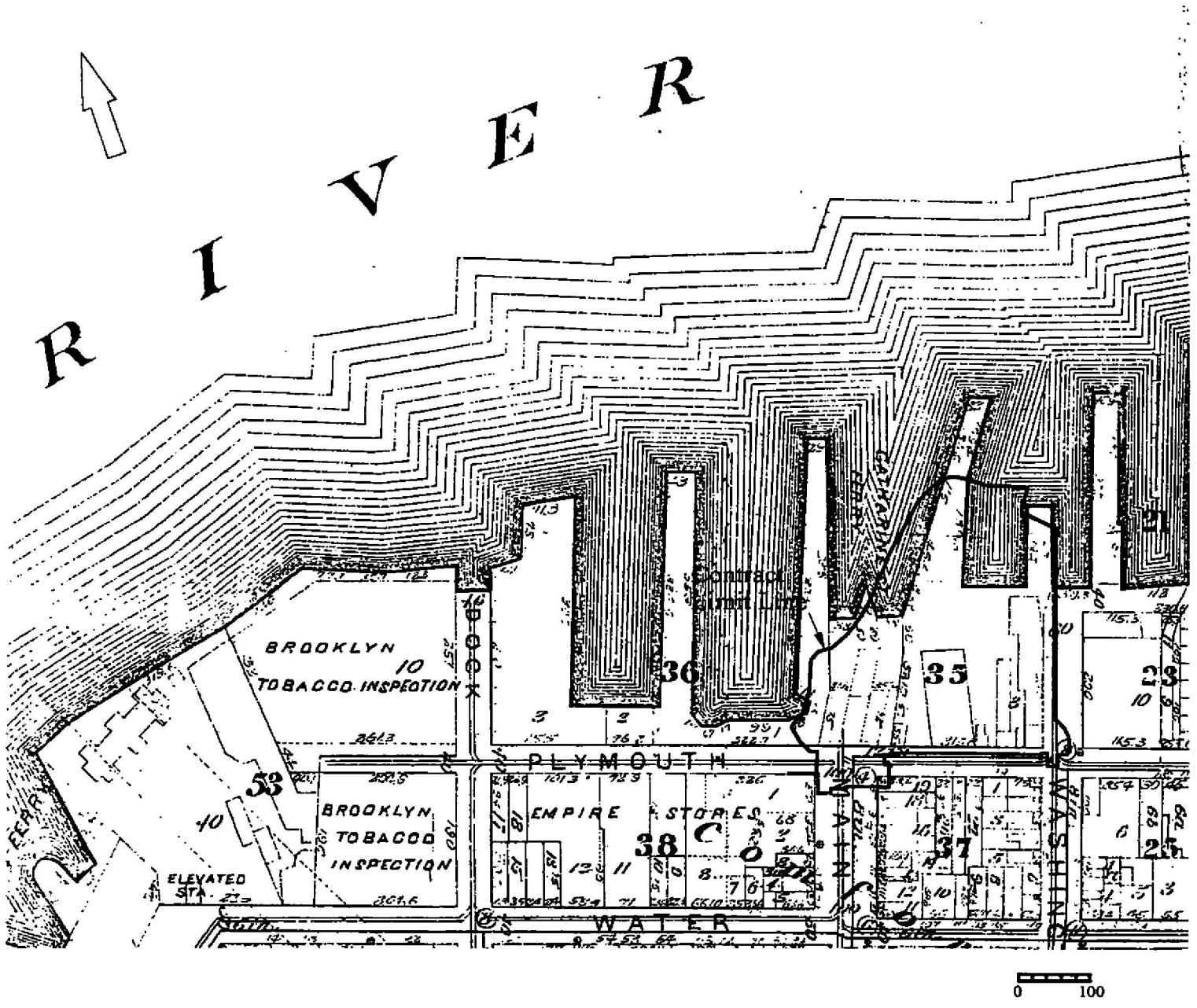

Figure 16 Portion of the 1886 Robinson Atlas of Kings County.

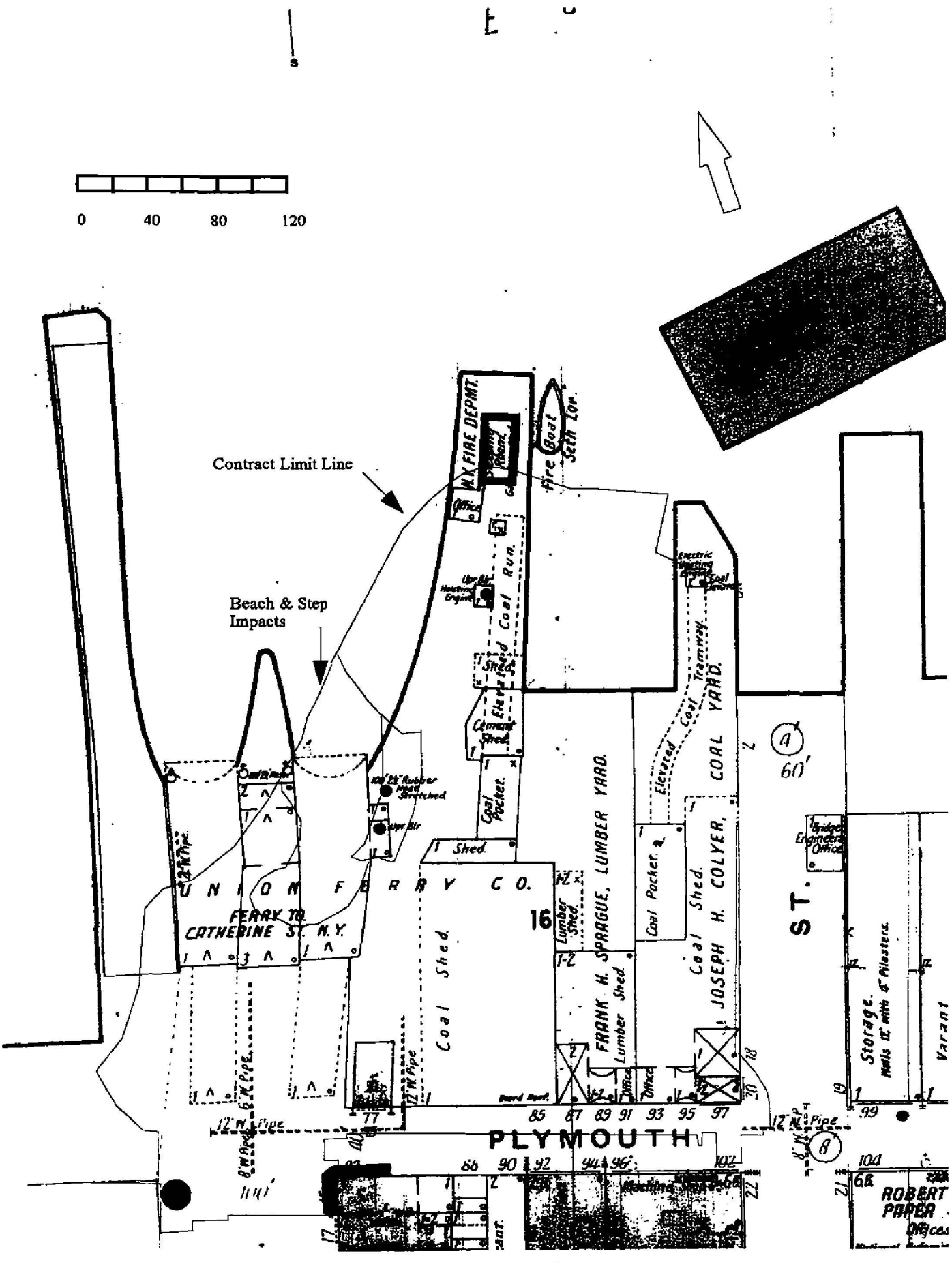

Figure 17 Portion of the 1904 Sanborn Insurance Company Maps of the Borough of Brooklyn Showing the Contract Limit Line and the Beach and Steps Impact Areas.

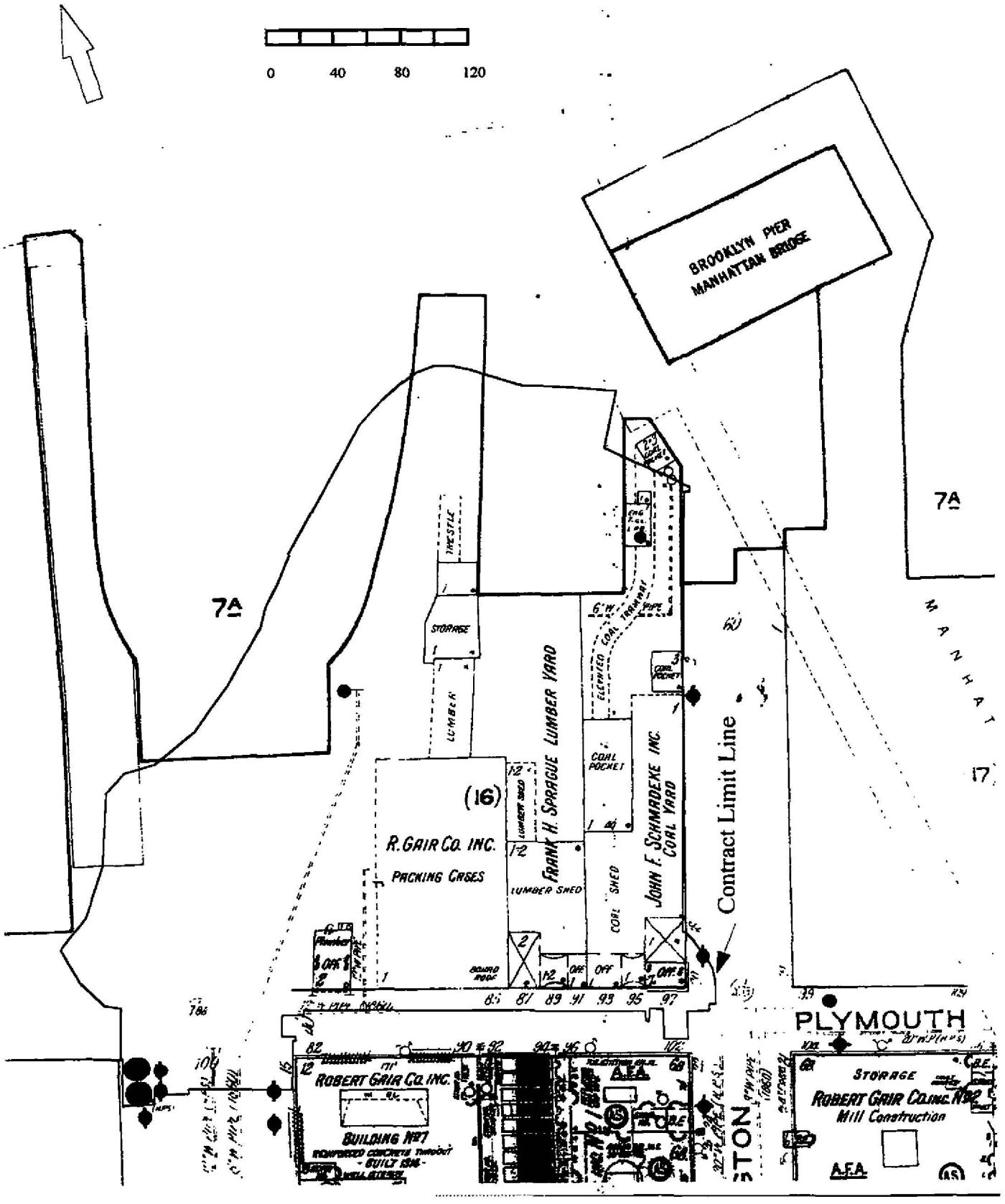

Figure 18 Portion of the 1915 Sanborn Insurance Company Maps of the Borough of Brooklyn.

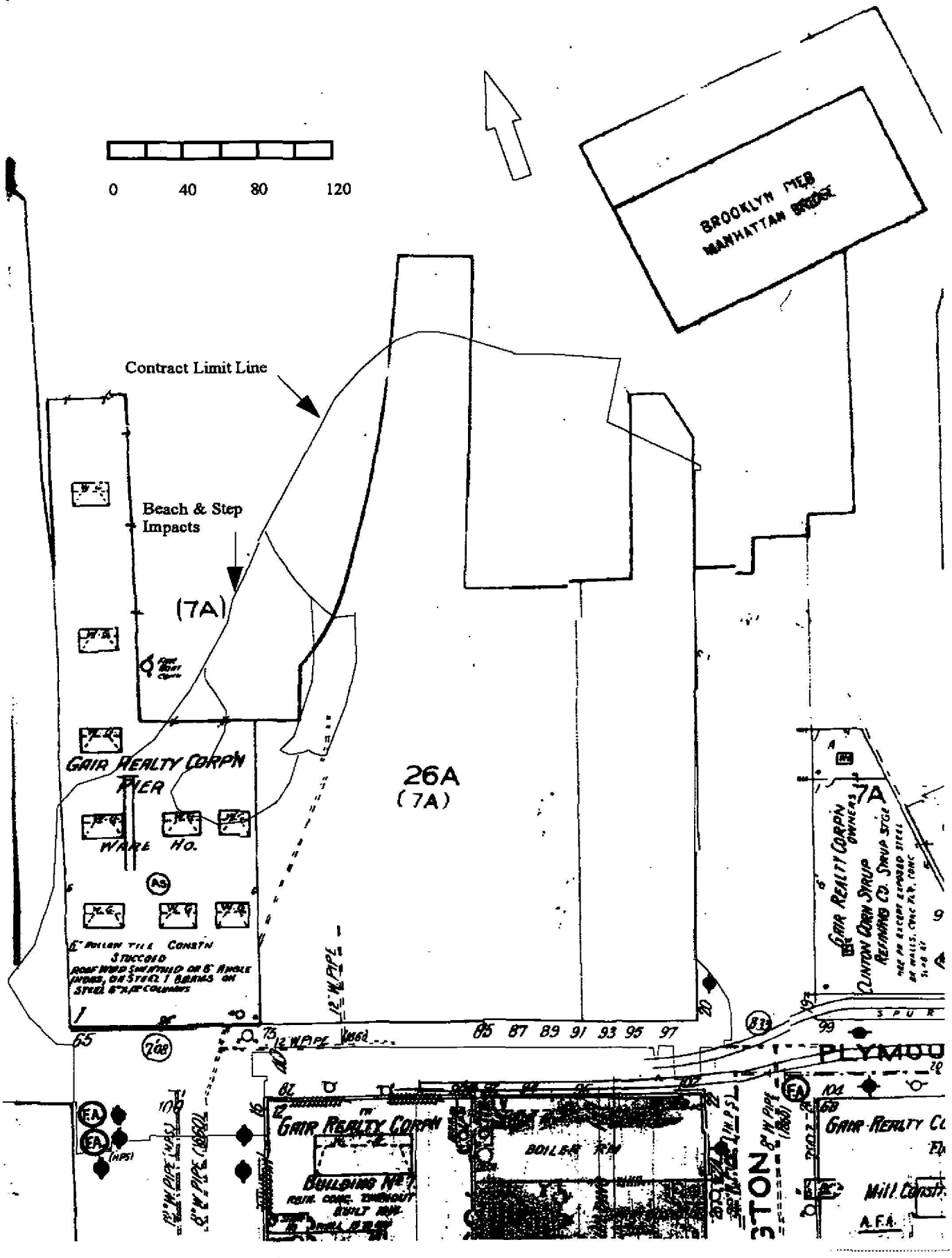

Figure 19 Portion of the 1939 Sanborn Insurance Company Maps of the Borough of Brooklyn Showing the Contract Limit Line and the Beach and Steps Impact Areas.

BIBLIOGRAPHY

Armbruster, Eugene L.
1919 *The Ferry Road on Long Island*. New York..

Beyer Blinder Belle
1990 Empire - Fulton Ferry State Park Feasibility Study, Brooklyn, New York. Volume 1. Historic Structures Report. New York State Urban Development Corporation & Office of Parks, Recreation and Historic Preservation. December 1990.

Bromley, G.W. & Co.
1880 Part of Wards 1, 2 and 4. City of Brooklyn. *Atlas of the Entire City of Brooklyn*. Plate 1.

Bromley, George W. and Walter S.
1893 *Atlas of the City of Brooklyn*. Plate 2. Philadelphia: G.W. Bromley and Co.

Brooklyn Borough President's Office Topographic Bureau
1970 Final Damage Map in the Matter of Acquiring Title to the Real Property Required for the Opening of Washington Street From Plymouth Street to a Point 200 Feet northerly thereof and Main Street from Water to Plymouth Street in the Borough of Brooklyn, City of New York. Brooklyn Topographic Bureau Map Y-2041.

Burr, David
1833 Map of the City of New York. J. Distornell, 1834, New York: J. Colton.

City of New York
1977 Fulton Ferry Historic District Designation Report.

Dikeman, John Jr.
1870 The Brooklyn Compendium showing the opening and closing and alterations in the lines of the various streets, avenues, &c., in the City of Brooklyn. Published by order of the Common Council. Brooklyn Daily Times.

Dripps, M., publisher
1852 *Map of the City of Brooklyn*.

1869 *Map of the City of Brooklyn*. Being the former Cities of Brooklyn and Williamsburgh and the Town of Bushwick.

Federal Writers' Project
1939 *The WPA Guide to New York City*. New York: Pantheon Books.

Furman, W., W. Henry, T. J. Stanton and A.I. Barbaris
1819 Map of the Village of Brooklyn in the County of Kings, surveyed in the year 1819 under the direction of W. Furman, W. Henry, T. J. Stanton and A.I. Barbaris of the said Village pursuant to an Act of the Legislation of the State of New York .

Hazelton, Henry I.
1925 *The Borough of Brooklyn and Queens, Counties of Nassau and Suffolk, Long Island, New York, 1609-1924.* Volume II and Biographical. New York: Lewis Historical Publishing Company Inc.

Howard, Henry W.B. (editor)
1893 *The Eagle and Brooklyn: History of the City of Brooklyn from its Settlement to the Present Time.* Brooklyn: Brooklyn Daily Eagle.

Lott, Jeremiah
1819 A Profile of Main Street in the Village of Brooklyn in the County of Kings. April 19, 1819. Brooklyn Topographic Bureau Map 235.

Ludlam, Silas
1843 Profile of Plymouth Street from Main to Jackson Streets. Surveyed December 1843.

New York State Division for Historic Preservation
1974 National Register of Historic Places Nomination form. Fulton Ferry Historic District. Prepared by Lynn A. Beebe. April 1974.

Perris, William
1855 *Maps of the City of Brooklyn.* Volume 2. Plate 4.

Pierrepont, Henry Evelyn
1879 *Historical Sketch of the Fulton Ferry, and it's Associated Ferries.* Eagle Job and Book Printing Department.

Raber Associates
1984 Final Report Cultural Resources Investigations in Brooklyn Reach 1: New York Harbor Collection and Removal of Drift Project. Conducted for New York District, U.S. Army Corps of Engineers. Contract No. DACW51-84-C-0004.

Robinson & Pidgeon
1886 *Robinson's Atlas of the City of Brooklyn.* Part of Wards 1, 2, 4 & 5, Brooklyn, N.Y. Plate 1.

Sanborn Map Company
1904 *Insurance Maps of the Borough of Brooklyn, City of New York.* Volume 2. Plates 5 & 6.

1915 *Insurance Maps of the Borough of Brooklyn, City of New York.* Volume 2. Plates 5 & 6.

1939 *Insurance Maps of the Borough of Brooklyn, City of New York.* Volume 2. Plates 5 & 6.

Smith, William H. (publisher)
1855 The Brooklyn City and Kings County Record.

Solecki, Ralph
1980 Stage 2 Archaeology and History of the Empire Stores, 2-14 Main Street, Brooklyn. Contract 1A, Red Hook Water Pollution Control Project, Brooklyn, New York for Underpinning and Foundation Constructors, Inc. to Red Hook Constructors, Joint Venture, Change Order No. 1A-1. Owner - City of New York Department of Environmental Protection. January 12, 1980.

Stiles, Henry R.
1993 *A History of the City of Brooklyn*. 3 Volumes. Brooklyn: Originally Published by Subscription 1867-1870. Bowie, MD: Heritage Books

1884 *The Civil, Political, Professional and Ecclesiastical History and Commercial and industrial Record of the county of Kings and the City of Brooklyn*. Albany, NY: W. Munsell.