HISTORICAL PERSPECTIVES INC.

PHASE IA ARCHAEOLOGICAL ASSESSMENT

WORLD TRADE CENTER MEMORIAL AND REDEVELOPMENT PROJECT, SOUTHERN SITE
BLOCK 54, LOT 1
BOUNDED BY GREENWICH, LIBERTY, WASHINGTON, AND ALBANY STREETS
AND
BLOCK 56, LOTS 15, 20, AND 21
BOUNDED BY LIBERTY, WASHINGTON, CEDAR AND WEST STREETS

NEW YORK, NEW YORK

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EXECUTIVE SUMMARY

The Lower Manhattan Development Corporation (LMDC) proposes to undertake, in cooperation with the United States Department of Housing and Urban Development and the Port Authority of New York and New Jersey, a World Trade Center Memorial and Redevelopment Plan (the Proposed Action) that includes construction of a World Trade Center Memorial and memorial-related improvements, as well as commercial, retail, museum and cultural facilities, new open space areas, new street configurations, and certain infrastructure improvements at the World Trade Center Site (WTC Site) and the Adjacent Sites including the two city blocks south of the WTC Site and portions of Liberty and Washington Streets (collectively the Southern Site) and possibly below grade portions of Site 26 in Battery Park City.

LMDC is conducting a coordinated environmental review pursuant to the National Environmental Policy Act (NEPA) and the New York State Environmental Quality Review Act (SEQRA). LMDC is preparing a Generic Environmental Impact Statement. This archaeological study was prepared as part of the environmental review process and to satisfy the requirements of Section 106 of the National Historic Preservation Act, and complies with the standards of the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) (New York Archaeological Council 1994) and the guidelines of the New York City Landmarks Preservation Commission (LPC) (CEQR 2001; LPC 2002). This report focuses on the Southern Site; a separate study was prepared for the WTC Site.

The Southern Site comprises Block 54, Lot 1 (the entire block) and Block 56, Lots 16, 20, and 21 (the northern half of the block). Block 54 is bounded by Greenwich, Liberty, Washington, and Albany Streets. The northern half of Block 56 is bounded by Washington, Liberty, Cedar and West Streets. The reconstruction project also will entail closing or modifying the section of Liberty Street between Greenwich and West Streets; the section of Albany Street between Greenwich and Washington Street; the section of Washington Street between Albany and Cedar Streets; the section of Cedar Street between Washington and West Streets; and closing the section of Washington Street between Liberty and Cedar Streets.

This Phase IA assessment will describe both current and pre-September 11 conditions on the project site (including soil and geological boring data), previous cultural resources investigations undertaken in the vicinity of the project site, the history of the property, and based upon the preceding sections, the site's sensitivity for the recovery of archaeological resources. The Area of Potential Effect (APE) will be referred to throughout this report, and constitutes the footprint of planned construction and disturbance on the site, entire Block 54 and northern half of Block 56 site, and those portions of Liberty, Washington, Cedar, and Albany Streets that will be excavated. Where pertinent, the term "Southern Site" may be used to describe the APE as a whole. When only specific portions of the APE are being discussed, individual block and street names will be used.

Block 54 currently contains the 130 Liberty Street building (a.k.a. the *Deutsche Bank* building), a 38-story structure with multiple basement levels. North of the bank building was a two-level elevated plaza with a basement. Both the building and the plaza were severely damaged by the terrorist attacks on September 11, 2001. The building currently is unoccupied and being repaired, and the plaza north of the building has been removed and its site excavated to varying depths below the present street grade.

The northern half of Block 56 currently has no structures. Prior to September 11, 2001, the block contained the St. Nicholas Greek Orthodox Church, at 155 Cedar Street (Lot 20), and surface parking. The church building was destroyed by the terrorist attacks and its remains have since been removed from the site.

The Phase IA study determined that any precontact archaeological resources that may have once existed within the APE have almost certainly been destroyed by exposure to the elements along the ancient Hudson River shoreline. No archaeological field investigations are recommended for precontact resources.

Potential shaft features predating the 1850s may survive under former basements in what were rear yards of Block 56. Wharf and/or cribbing features may survive both under former basements on Block 56, and under active utilities within the Liberty Street, Washington Street, Cedar Street (between Washington and West Streets), and Albany Street portions of the APE.

If feasible, HPI recommends avoidance of areas sensitive for historic period archaeological resources during project construction. Since avoidance is not feasible in this case, further archaeological consideration in the form of Phase IB archaeological investigations is recommended both to document potential shaft features in former rear yards on Block 56, and potential extant wharf and cribbing features under Block 56, Liberty Street, Washington Street, Cedar Street (between Washington and West Streets), and Albany Street. For several reasons (explained in detail in the report), HPI recommends that the Phase IB investigations within the APE consist of archaeological monitoring, undertaken in conjunction with project construction, rather than pre-construction archaeological testing. Draft guidelines addressing the use of archaeological monitoring on urban sites (NYAC/PANYC 2002) indicate that monitoring may be appropriate where archaeological testing is found to be not feasible. HPI feels that this criterion applies in this situation. Specific proposed monitoring locations are outlined in the report.

Prior to any excavation within the APE, an archaeological monitoring plan should be developed by the archaeological consultant, in consultation with the NYSOPRHP and the LPC. Representatives from the undertaking agency, the developer, and the construction contractor may be consulted while developing the monitoring plan, and would need to agree to its terms. The monitoring plan should be prepared according to applicable archaeological standards (New York Archaeological Council 1994; NYAC/PANYC 2002; LPC 2002). As part of the monitoring plan, it may be necessary to establish a protocol between the archaeological consultant and the review agencies that determines a

particular percentage (or sample) of the streetbeds that will be subjected to archaeological monitoring. RPA-certified professional archaeologists, with an understanding of and experience in urban archaeological excavation techniques, would be required to be part of the archaeological team.

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3. Northern half of Block 56 (behind chain link fence), looking north. Cedar Street in foreground.

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5. Washington Street from Cedar to Liberty Streets, looking north. World Trade Center site in background.

I. INTRODUCTION

The Lower Manhattan Development Corporation (LMDC) proposes to undertake, in cooperation with the United States Department of Housing and Urban Development and the Port Authority of New York and New Jersey, a World Trade Center Memorial and Redevelopment Plan (the Proposed Action) that includes construction of a World Trade Center Memorial and memorial-related improvements, as well as commercial, retail, museum and cultural facilities, new open space areas, new street configurations, and certain infrastructure improvements at the World Trade Center Site (WTC Site) and the Adjacent Sites including the two city blocks south of the WTC Site and portions of Liberty and Washington Streets (collectively the Southern Site) and possibly below grade portions of Site 26 in Battery Park City.

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This Phase IA assessment will describe both current and pre-9/11 conditions on the project site (including soil and geological boring data), previous cultural resources investigations undertaken in the vicinity of the project site, the history of the property, and based upon the preceding sections, the site's sensitivity for the recovery of archaeological resources. The Area of Potential Effect (APE) will be referred to throughout this report, and constitutes the footprint of planned construction and disturbance on the site. The APE is considered the entire Block 54 and northern half of Block 56 site, and those portions of Liberty, Washington, Cedar, and Albany Streets that will be excavated. Where pertinent, the term "Southern Site" may be used to describe the APE as a whole. When only specific portions of the APE are being discussed, individual block and street names will be used.

Block 54 currently contains the 130 Liberty building (a.k.a. the *Deutsche Bank* building), a 38-story structure with multiple basement levels. North of the bank building was a two-level elevated plaza with a basement. Both the building and the plaza were severely damaged by the terrorist attacks on September 11, 2001. The building currently is unoccupied and being repaired, and the plaza north of the building has been removed and its site has been excavated to varying depths below the present street grade.

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The HPI project team consisted of Julie Abell Horn, M.A., R.P.A., who conducted the majority of the project research and wrote this report; Cece Saunders, M.A., R.P.A., who accompanied Ms. Horn on the site walkover, and Christine Flaherty, M.A., who collected the historic maps and prepared the graphics. Betsy Kearns and Faline Fox provided editorial and interpretive assistance.

II. METHODOLOGY

Preparation of this archaeological study involved using documentary, cartographic, and archival resources. Repositories visited (either in person or by using their on-line electronic resources) or contacted included the New York City Register; the New York City Municipal Archives; the New York City Department of Buildings; the New York City Department of Design and Construction; the New York Public Library; the Columbia University library; the LPC; and the NYSOPRHP. AKRF provided current site data and various maps.

A site walkover was undertaken on September 8, 2003 by Julie Abell Horn and Cece Saunders of HPI and Anne Locke of AKRF. Caesar Johnson and Dennis Malopowski from the Port Authority accompanied the team on the site walkover. Conditions were sunny and dry. The team made notes and took photographs of buildings, structures, and existing ground conditions. Cece Saunders returned to the APE on October 3, 2003 to take additional photographs.

III. ENVIRONMENTAL/PHYSICAL SETTING

Prior to landfilling in the eighteenth and early nineteenth centuries, the entire APE was under water. Greenwich Street marked the approximate shoreline of the Hudson River before landfilling. Soil borings adjacent to the APE, conducted at various times during the twentieth century (most in the late 1960s and early 1970s, prior to construction of the former World Trade Center, the Westside Highway, and adjacent Battery Park City), as well as soil borings made prior to construction of 130 Liberty Street, are useful in reconstructing the past landforms and specific subsurface conditions on the site.

The foundation bedrock, which extends across the entire APE, is composed of a metamorphic rock known as the Manhattan formation. It lies at about 40 feet below sea level within the APE (Moran et al. 1970). Soil stratigraphy above the bedrock varies depending on location. In many soil borings, a stratum of decomposed rock, gravel, or boulders was found directly above the bedrock, ranging from 5-25 feet in thickness. In other locations, the rock layer was absent. Above the decomposed rock or the bedrock there was a thinner layer of coarse sand, 5-10 feet in thickness (which was the original glacially-deposited land surface prior to flooding of the Hudson River channel). On top of the sand was a layer of silt, or "river mud" that accumulated on the river bottom over thousands of years (and ranged from 7-30 feet thick). The uppermost layer was historic fill, bringing the area up to its current elevation. In general, the APE vicinity contains about 15-20 feet of landfill, with the least amount of landfill on the east side of the APE, and the greatest amount of landfill on the west side of the APE (Rock Data Map, Sheet 3; Fisher Brothers 1971). In some instances, the fill material contained notations of wood, timbers, or cribbing, suggesting former wharf or bulkhead construction in close proximity to the APE (Rock Data Map, Sheet 3).

Before landfilling occurred, all portions of the APE were at about sea level, with Greenwich Street marking the approximate edge of the former shoreline. Historic filling, undertaken as the shoreline was moved west (and described in Section IV), raised these areas up to their twentieth century elevations. Sanborn maps indicate elevations above sea level of all street intersections (interior portions of the blocks may have experienced additional landfilling as development progressed). Prior to construction of the former World Trade Center, these elevations within the APE were as follows:

Street intersection	**Elevation**
Greenwich and Liberty	11
Greenwich and Cedar	11
Greenwich and Albany	11
Washington and Liberty	5
Washington and Cedar	5
Washington and Albany	6
West and Liberty	4
West and Cedar	3

Dr. Dennis Weiss of City College has conducted research on reconstructing Paleo-shorelines in the metropolitan New York area. While working with Ed Rutsch on the Westway project (which was succeeded by the Route 9A project) he proposed that 6,000 years ago there was a possible bay from Cedar Street to north of the World Trade Center, at about 40 feet below sea level (HCI 1983:57). The configuration of this drowned shoreline feature is shown in Figure 3.

IV. BACKGROUND RESEARCH/HISTORICAL OVERVIEW

A. Site File Search Results

Research conducted at the NYSOPRHP, the Landmarks Preservation Commission (LPC), and the library of HPI revealed one archaeological resource immediately adjacent to the project APE, and a number of archaeological sites within a one-mile radius of the APE. Table 1, below, summarizes these resources. Those sites with NYSM or NYSOPRHP numbers are listed first; the remaining sites have been reported to the LPC and do not have site numbers.

The single archaeological resource documented adjacent to the APE was remains of a wooden ship dating to the Dutch period of occupation, and thought to be remains of the *Tyjger*, a vessel that burned and was abandoned along the shoreline in 1613. It was found during excavation for the I.R.T. subway line along Greenwich Street (at Dey Street) in 1916, and documented by amateur historian James Kelly, who was a supervisor on the subway project. The ship, which consisted of a burned keelson and three rib frames, was found beneath about 9 feet of fill and 11 feet of river silt. Archaeologists Ralph Solecki and Bert Salwen returned to the area in 1967, when the World Trade Center was being built, and attempted to find the rest of the ship, which was thought to lie west of the I.R.T. line. Unfortunately, their efforts were unsuccessful, and the remains of the *Tyjger* were never found (Solecki 1974).

The remaining archaeological sites recorded within a one-mile radius of the APE are concentrated in the Financial District, the area within and surrounding the South Street Seaport, and the City Hall Park and Foley Square areas. Although researchers have undertaken a number of archaeological assessments in close proximity to the APE, such as the Westside Highway project (HCI 1983), the Route 9A project (Hartgen and HPI 1990), the 7 World Trade Center Project (Cobbs et al. 2002), and the AT&T building project (Greenhouse Consultants, Inc. 1985), these studies did not entail any archaeological testing, and therefore no sites were recorded. For that reason, these investigations are not included in the table, below. Sites that fall within larger historic districts (HD), either state or locally designated, are indicated.

Table 1: Archaeological sites within a one-mile radius of the APE

Site Number	Site Name	Location	Time Period	Remarks
NYSM 4059	Shell Point	Near Canal St.	Unknown Precontact	

Site Number	Site Name	Location	Time Period	Remarks
NYSM 4060	N/A	Lower East side vicinity	Unknown Precontact	
A06101.000531	Clasons Point	Battery Park	Woodland	
A06101.007671	576 Broome St.	Above Canal St.	Unknown historic	Site form missing
A06101.001285	Washington Street Urban Renewal Site	Tribeca	Early nineteenth century	
A06101.001304	City Hall Park	City Hall Park	Eighteenth century	Part of Commons and African Burial Ground HD
A06101.000604	209 Water Street	South Street Seaport Area	c. 1775-1800	Within South Street Seaport HD
A06101.000623	Telco Block	South Street Seaport Area	c. 1740-1775	Within South Street Seaport HD
A06101.001283	Barclay's Bank	Financial District	1750s-1820s	
A06101.001284	Assay Site	Financial District	Revolutionary era	
A06101.001272	64 Pearl Street	Financial District	Late 17th century	
A06101.001282	Broad Street Plaza	Financial District	17th century-modern	
A06101.001271	175 Water Street	Near South Street Seaport	c. 1740-1780	
A06101.006763	Schermerhorn Row	South Street Seaport Area	1780-1810	
	Tyjger	Greenwich and Dey Streets	1613	Within project area
	7 Hanover Square	Financial District	Late 17th century	
	Old Slip and Cruger's Wharf	Financial District	1690-1800	
	Stadt Huys Site	Financial District	17th-19th centuries	
	Foley Square	North of City Hall Park	19th century	
	African Burial Ground	North of City Hall Park	18th-19th century	Within the Commons and African Burial Ground HD

B. Site History

1. Precontact Period

Indian settlement near fresh-water rivers and salt bays is known both from early documents and archaeological research conducted over the past 100 years. For this assessment, it is necessary to establish whether the APE would have been attractive to the Native American population, and if so, what kind of sites might be expected.

To understand how Native Americans exploited different environmental niches over time, researchers typically separate the prehistory into time periods according to their distinct cultural differences. Archaeologists divide the Native American period into three sub-periods: the Paleo-Indian, the Archaic, and the Woodland, which are further divided as shown below:

PERIOD	YEARS BEFORE PRESENT (BP)
Paleo-Indian	13,000 – 10,000
Early Archaic	10,000 – 8,000
Middle Archaic	8,000 - 6,000
Late Archaic	6,000 - 3,700
Terminal Archaic	3,700 – 2,700
Early Woodland	2,700 - 2,000
Middle Woodland	2,000 – 1,200
Late Woodland	1,200 – 300

Paleo-Indian Period

The sea level was notably lower during this period, so many sites that were once on well-drained land near the ancient coast are now submerged, and sites that later became swamps could have been dry land. Leonard Eisenberg's research has indicated that three types of terrain were preferred for Paleo-Indian sites (Eisenberg 1978):

- lowland waterside camps near coniferous swamps and near larger rivers;
- upland bluff camps in the areas where deciduous trees dominated;
- ridge-top camps, also where deciduous trees dominated.

Eisenberg notes that the waterside settlements he studied were situated on locally well-drained soils (Eisenberg 1978). Archaeo-exploitation of upland zones was limited

primarily to the Late Archaic Period and after, whereas Connecticut River Valley research indicates Paleo- Indian exploitation of the upland zone ridge terraces overlooking water courses (Gorman 1983:18-22). Paleo-Indian sites are scarce in the Northeast. More scientifically documented field excavations of this period would greatly aid our understanding of southern New York's past.

Archaic Period

The sea level began to rise during the Archaic Period, as glaciers melted and receded. In the coastal and tidewater area of New York, the Archaic Stage (ca. 9,000 years ago) is "represented by numerous, small, nearly always multi-component sites, variously situated on tidal inlets, coves and bays, particularly at the heads of the latter, and on fresh-water ponds on Long Island, Shelter island, Manhattan Island, Fisher's Island, and Staten Island and along the lower Hudson River on terraces and knolls, at various elevations having no consistent relationship to the particular cultural complex" (Ritchie 1980:143). These people were primarily hunters and gatherers, with recent indications of more permanent settlements.

Woodland Period

By the time of the Woodland Stage (c. 3,000 years ago) the sea level and exposed coastal regions were, in most respects, as they appear today. The archaeological evidence from Woodland Stage sites indicates a strong preference for large scale habitation sites to be within proximity to a major fresh water source (e.g., a river, a lake, an extensive wetland), and smaller scale extractive-functioning sites to be situated at other resource centers (e.g., quarrying sites, butchering stations, and shell gathering localities). The production of pottery and the use of the bow and arrow began in this period, as did the practice of agriculture.

Contact Period

This final period, after the arrival of the first Europeans, is characterized as a period of decline for the Native Americans. Plagues, intertribal stress, and the pursuits of Europeans to obtain land rights resulted in the subsequent breakdown of native sociopolitical organization during the seventeenth century. The plagues of 1616-1620, inadvertently introduced by Europeans, depopulated many groups with total losses in southern New England and New York estimated at between 70-90 percent of the original population (Snow 1980:34). Moreover, the conflicts engendered by rapid colonial expansion, war, and epidemics, caused many Native American groups either to leave the area or take up habitation in established communities, i.e. reservations (Brasser 1978:85).

2. Historic Period

Prior to 1700, the entire APE was under water, with the future line of Greenwich Street marking the approximate shoreline.

By the turn of the eighteenth century, landfilling along the Hudson River shore had begun. Generally, early travelers had found the East River a better and safer harbor as the high bluffs and jagged edges of the Hudson River thwarted docking. However, the Hudson River did prove vital in linking northern territories to the growing village on Manhattan. Toward that end, between 1699 and 1701 several entrepreneurs filled and built docks on the three blocks between Cedar and Cortlandt Streets and Greenwich Street and Washington Street (Buttenwieser 1987:32). These docks are visible on the Lyne-Bradford Plan, published in 1731 (Figure 4). Two docks are illustrated within what would become Block 54, within the APE: Comfort's Dock, at the foot of Thames Street, and Ellison's Dock, at the foot of Cedar Street (then called Little Queen Street).

The year before the Lyne-Bradford Plan was published, the Montgomery Charter was established, extending land ownership privileges an additional two blocks beyond the low water mark into the Hudson River. The charter included a provision for creating three streets – Greenwich, Washington and West – parallel to the river (Hoag 1905:32). The Maerschalck Plan, made in 1755, shows the continued outward spread of the waterfront along the Hudson River (Figure 5).

Activity along the waterfront within the APE vicinity accelerated in 1764, when regular ferry service began between Paulus Hook, Jersey City and Mesier's Slip (at Cortlandt and the future intersection of Washington Street). King's Wharf was built between Cortlandt and Dey Streets by 1767, and by 1775, the city's dock, known as Corporation Dock, had been constructed at Fulton and Greenwich Streets, and received passengers from the new Hoboken Ferry (HCI 1983:240). The Ratzen Plan, published in 1776, illustrates the location of King's Wharf and an adjacent arsenal, as well as the ferry service route to Paulus Hook (Figure 6). Within the APE, this plan shows portions of Block 54 already landfilled and two wharves within Block 56.

In 1789, the city's directory included a map for the first time, showing points of interest (Figure 7). It also shows that Greenwich Street and a portion of Washington Street had been constructed within the APE, and the northern half of what would become Block 54 had been filled in. The southern half of Block 54 is shown as a basin. In the years following the Revolutionary War, an attempt was made to urge the construction of the street along the Hudson River originally provided for in the 1730 charter. In 1791, Albany Basin was constructed, between Albany and Cedar Streets and extending from Greenwich Street past the line of Washington Street. It is clearly shown on the Taylor-Roberts Plan of 1797 (Figure 8). Here, the northern pier at Albany Basin, along the line of Cedar Street, is marked "Luke's Wharf" and the southern wharf, at Albany Street, is labeled "Swartout's Wharf." Within what would become the northern half of Block 56, just south of Liberty Street, was a wharf designated "Lindsey's Wharf." The map also shows that portions of the northern half of Block 56 (just west of Washington Street) had been landfilled. At this time, the southern half of Block 54 was part of the Albany Basin complex.

In 1795 the Common Council again had passed an ordinance creating West Street, a 70 foot wide outer street, demarcating the western boundary of the city. The proposed

creation of West Street was intended to compel landowners to pursue landfilling where they were granted water rights. At that time, only Greenwich Street was actually complete. In 1804 the Common Council increased the distance from Washington to West Street from 160 feet to 200 feet, lengthening the developed blocks between them by 40 feet (HCI 1983:153). By 1813, the Albany Basin Piers were partially filled in to help create West Street (HCI 1983:241).

Construction of West Street was a slow process, occurring over the approximate 15-year stretch from 1817-1831 (HCI 1983:162). The City continued to pass ordinances during this period to impel development. In 1825, the Common Council passed an ordinance demanding the creation of West Street and filling of water lots. In 1828 the Council further requested that West Street be extended to cross the slip at Washington Market between Fulton and Vesey Streets (HCI 1983:161). Although the Common Council was relentless in their pursuit to assure the complete construction of West Street, filling and development was slow. Land reclamation and filling along the Hudson River waterfront was pursued by either allowing unstructured harbor silts and river accretion to build up, or by placing fill in engineered retaining devices (Geismar 1983:672). In lower Manhattan, ships were sometimes deliberately sunk as cribbing to help stabilize fill (Berger 1983:9). After wharves and piers were built, derelict ships were sunk adjacent to them, and together these features contributed to and operated to retain fill. Of note, however, extensive research has not identified any ships used as landfill within the APE (Hartgen and HPI 1992).

Wooden cofferdams, wharves, and bulkheads were built as fill retaining devices, framed with hewn logs, filled with loose stone, and covered with earth (Geismar 1983:30). Timber grillage was commonly used as cribbing, a practice first employed in Europe. Colonists continued to use this method, as both the Dutch and English had previously, aided by the ample supply of wood in the region. To retain fill, quays were first built by driving a row of wooden piles into the river with diagonal braces bolted to the inside, forming the face work. Earth and fill was then placed in the vacant area behind the piles, and was then planked over to form a roadway level with adjacent streets (Geismar 1983:31). Wooden jetties were similarly built. Once the economic value of clean fill generated from building excavations was realized, this was no longer used as fill. Instead, wharves and piers were frequently used as dumping boards, where garbage was collected and pushed overboard into scows or directly into the river. Rubbish, ballast, and street trash pushed the shoreline further west. The 1836 Colton topographical map illustrates the configuration of West Street after years of landfilling (Figure 9). It shows that the APE was completely filled by this time.

The pace of development within the APE is visible on several mid-nineteenth century maps. The Dripps 1852 map illustrates that by this time, all the streetfronts within the APE had been solidly filled with buildings (Figure 10). The Perris 1857-62 maps show additional detail of the APE, indicating that the blocks had been nearly completely built up by this period (Figure 11).

By the 1850s, the APE had been supplied with piped city water, allowing residents to discontinue their reliance on public and private wells and cisterns for their water supply. The build out of lots within the APE shown on the Dripps and Perris maps is partially related to the introduction of piped water: private wells and cisterns were located in backyard areas of lots; once they were no longer necessary, they could be covered over and the yard areas used for additional building space.

Sanborn Insurance maps depict the APE from the late nineteenth century through the mid-twentieth century (1894, 1923, and 1951). Figures 12, 13, and 14 illustrate the continued development within the APE during this period, with the blocks completely covered by multiple-story buildings containing various businesses. The I.R.T. subway was built under Greenwich Street, opening in 1918.

All of the structures on Block 54 were demolished prior to construction of the 130 Liberty Street building in 1971. At this time, Cedar Street between Greenwich and Washington Streets was demapped, and the two halves of the block were merged into a larger block. By 1971, some of the lots on the northern half of Block 56 had already been cleared of structures; nearly all the other buildings were demolished in 1971 and the lots turned into surface parking. The exception was the St. Joseph's Greek Orthodox Church building on Lot 21, which stood on the block until being destroyed on September 11, 2001 (Figure 15).

The terrorist attacks on September 11, 2001 severely damaged 130 Liberty Street on Block 54, and destroyed St. Joseph's Greek Orthodox Church. The 130 Liberty Street building currently is being stabilized, while the remains of the church building have been removed from the site.

3. Disturbance Record

There are varying levels of disturbance throughout the APE. The following is a breakdown of these past construction and excavation activities.

Block 54

The majority of Block 54 has been significantly disturbed for construction of 130 Liberty Street (Photograph 1), which encompasses the southern half of the block, and approximately one-third of the northern half of the block. Pilings, which support the building, were excavated to bedrock (approximately 35-40 feet below sea level), and the base of the foundation slab was poured at 28 feet below sea level, which is over 20 feet below the base of the landfill, where archaeological resources would have existed (Fisher Brothers 1972). There is little doubt that all archaeological resources within this area of the block have been destroyed.

The former plaza north of the 130 Liberty Street building (Photograph 2) also required subsurface excavation. The base of its foundation slab was poured at 9 feet below sea level, or 14-20 feet below grade, depending on location. Here, soil borings indicated the

historic fill layer ended between 2.5-6.5 feet below sea level (also depending on location), or 15.5-20 feet below grade (Fisher Brothers 1972). Thus, the plaza excavation extended past the depth of the fill layer, and also destroyed any potential archaeological resources here.

Block 56

Currently, all of the northern half of Block 56 contains a surface parking lot (Photograph 3). After being landfilled, a process that occurred in stages from the 1790s through the early 1820s, the northern half of Block 56 (Lots 15-28) supported numerous buildings along all four streetfronts. By the late nineteenth and early twentieth centuries, these buildings ranged from 2-7 stories in height, and covered the entire footprint of the block. According to building records on file at the Municipal Archives (block and lot folders), all of these buildings had basements, ranging in depth from 4-10 feet below grade. The basement depths are summarized below; where data were unavailable an estimate was made of former basement depths based on height and age of similar buildings that did have this information. Usually, nineteenth-century buildings up to 5-6 stories high had basements of about 10 feet in depth, whereas twentieth century buildings and/or buildings more than 10 stories high had deeper basements, usually at least 20 feet below grade.

Lot number	**Depth of Basement**
15	6 feet below grade
16 (includes former Lot 17)	8 feet below grade
18 (includes former Lot 19)	10 feet below grade
20	4 feet below grade
21	10 feet below grade
22	Data unavailable, but building was four stories tall; assume basement no more than 10 feet below grade
23	Data unavailable, but building was two stories tall; assume basement no more than 10 feet below grade
24	8 feet below grade
25	Data unavailable, but building was four stories tall; assume basement no more than 10 feet below grade
26	10 feet below grade
27	6 feet 6 inches below grade
28	10 feet below grade

In addition to the basement depths, some lots had information about the way the foundations were laid. For Lot 16 (147-149 Cedar Street), building records indicated when a 4-story building was erected in 1896, the foundation was not placed on soil, but on wooden logs, measuring 7-10 inches in diameter and all oriented in the same direction. The soil surrounding the logs was noted as “soft clay.” On Lot 26 (146 Liberty Street),

the 1-3 story tall building, erected in 1909, had its foundation laid on "wood piles," and the surrounding soil was described as "mud."

The wooden logs and wood piles are likely the remains either of former wharves that once existed on this block and were sunk within the landfill, or wooden cribbing used specifically to contain the landfill. It seems apparent that rather than removing the remains of these wharves or cribs, some of the buildings simply were laid over them. The fact that at least portions of these wharves or cribs survived under some of the deepest basements on the block along both Cedar and Liberty Streets, suggests additional wharf and/or crib elements could be extant within this block.

Sidewalks and Streetbeds

According to utility data provided by the Port Authority, both the sidewalks and the streetbeds (Liberty Street between Greenwich and West Streets [Photograph 4]; Washington Street between Cedar and Liberty Streets [Photograph 5]; Washington Street between Albany and Cedar Streets; Cedar Street between Washington and West Streets; and Albany Street between Greenwich and Washington Streets) within the APE contain various subsurface conduits, to a depth of about five feet below grade. Sanitary sewers are 18 inches in diameter and up to eight feet below grade (Port Authority 2003).

4. Precontact Archaeological Sensitivity

Shoreline reconstruction research (see the *Environmental Setting* section of this report) suggests that soil levels below the historic fill and the river siltation deposits might be sensitive for precontact resources dating to the Paleo-Indian period. However, these resources, being exposed along the ancient Hudson River shoreline, would have been subjected to erosion, siltation, and tidal action for several thousand years. Considering the fragility of Native American sites in general, and the high level and duration of disturbance along the shoreline, it seems unlikely that any potential precontact resources would have survived in such an environment.

5. Historical Archaeological Sensitivity

Two types of historical archaeological remains may be extant within portions of the APE. These are wharf and crib features, and shaft features (wells, cisterns, and privies). Each type of resource is described separately.

Wharf and Crib Features

Archival research has documented former wharves at various locations within the APE, both along the lines of the streets (Liberty, Cedar, Washington, and Albany Streets) and within the interior portions of the blocks. Portions of these former wharves may have been included as landfill, and wooden cribbing likely was used as a method to contain the soil.

Building records for Block 56 indicate at least two instances of basements constructed on top of wooden logs and/or pilings, undoubtedly the remains of either former wharves or cribbing. In both cases, these wooden elements were documented at 8-10 feet below grade. None of the former basements on this block was more than 10 feet below grade, suggesting that additional wharf and/or cribbing features may be extant under the cellar floors. Additionally, it is possible that remains of these features could exist beneath the Liberty Street, Washington Street, Albany Street, and Cedar Street (west of Washington Street) portions of the APE. While these streets currently contain active subsurface utilities, the depth below grade of the wooden elements on Block 56 suggests that similar resources could be extant below the level of the utilities.

No wharf and/or crib feature should be extant on Block 54, however, as foundation plans for 130 Liberty Street and its plaza indicate that excavation extended below the historic fill layer, where these features would have been located.

Shaft Features

The former interior portions of lots within the northern half of Block 56 have the potential to contain historical archaeological resources associated with occupation of the blocks from the late 1700s through the 1850s, when the area was supplied with public piped water and sewers. Prior to the nineteenth century, when build out occurred on these blocks, properties would have had open yard areas where shaft features such as privies, cisterns, wells, and cesspools would have been located. Historical archaeological resources related to dwellings are often preserved in these features. The survival of these resources will depend on the extent to which former basements disturbed these former yard areas, and the depth to which these shaft features were excavated.

The potential depth of shaft features throughout Manhattan is varied, and depends, in part, on the subsurface conditions at the time they were excavated. Wells would have been excavated at least as deep as the water table, and possibly deeper to access potable water. For example, once the water from the Collect Pond in Lower Manhattan was no longer potable, having been declared “stagnant and mephitic” in 1796, deeper wells were dug throughout the city to access clean water (Kieran 1982:31). At Bleecker Street near Broadway, in 1832 a well was bored to a depth of 448', of which 400' was through solid rock (Ibid.). However, this was not the typical depth for wells hand excavated in backyards throughout the city prior to the availability of high pressure steam engines (ca.1815) which allowed for deep drilling. These would typically have extended through soil to the water table, at whatever depth that was encountered, and possibly deeper to access better water.

The anticipated depth of privies is also difficult to estimate, given that subsurface conditions such as soil permeability and the number of households served would have affected the size and depth of vaults. Geismar notes that a possible privy identified at 17 State Street extended 13' below the grade that existed at the time it was constructed, and that this depth coincided with the depth of a privy excavated at the Augustine Heerman warehouse site on the block bounded by Whitehall, Broad, Bridge, and Pearl Streets, also

in Lower Manhattan (Geismar 1986:44). As noted above, by 1823 privies were required to be at least five feet deep (Goldman 1988:45). Archaeologists have found numerous privies on landfilled properties in downtown Manhattan, including some nestled up against former cobb wharves (Berger 1990; Geismar 1983; Soil Systems 1982).

Since basements on Block 56 were 10 feet below grade or less, there is a reasonable likelihood that the lower reaches of early shaft features may be extant under the former cellar floors. The level of the water table after landfilling (which presumably would dictate the minimum depth of wells) is assumed to be deeper than 10 feet below grade (the maximum depth of the former basements on the block), but probably no deeper than about 15 feet below grade (soil boring data for adjacent Block 54 indicate the water table ranged from 12-18 feet below grade in 1971, suggesting similar conditions on Block 56). Thus, depending on depths of former basements below grade, there is a 5-10 foot vertical zone where shaft feature remains might be possible.

No shaft features should be extant on Block 54, as construction of 130 Liberty Street and its adjacent plaza necessitated excavation below the water table and the historic fill layer, where these features would have been located.

V. CONCLUSIONS

A. Precontact Period Resources

As the preceding sections have described, any precontact archaeological resources that may have once existed within the APE have almost certainly been destroyed by exposure to the elements along the ancient Hudson River shoreline.

B. Historic Period Resources

As described above, shaft features may survive under former basements in what were rear yards of Block 56. Wharf and/or cribbing features may survive both under former basements on Block 56, and under active utilities within the Liberty Street, Washington Street, Cedar Street (between Washington and West Streets), and Albany Street portions of the APE.

For shaft features, identifying and examining buried features associated with late eighteenth through mid-nineteenth century occupation of these lots may reflect the daily activities of the residents and provide insight into cultural behavior. Shaft features were usually filled and capped, providing stratified deposits within the feature. Because of the unique depth of these resources, the lowest levels are rarely disturbed even if the feature becomes truncated by subsequent historical activity. The deepest layers often act as a time capsule, preserving historical artifacts within the enclosed environment.

If undisturbed deposits of cultural material from the historic development of the APE do still exist, they may have the potential to provide meaningful information regarding the lives of the people who lived there. When recovered from their original context and in association with a specific historical occupation, historical deposits can provide a wealth of information about consumption patterns, consumer choice, gender relations, ethnicity, economic status, and other important issues.

Wharf and crib features commonly are found on landfill sites in downtown Manhattan, and have been studied extensively in the archaeological and archival record. Several archaeological studies addressing wharves and landfill devices (Berger 1990; Hartgen and HPI 1992) concluded that because these features were similarly constructed over long periods of time, future archaeological investigations should be limited only to documenting joinery techniques associated with the features, which have the potential to reveal temporal and geographic differences in craftsmanship and technology. Berger (1990:V-25) recommended that research designs for archaeological wharf studies focus on recording exteriors (front and back) and interiors of as many sections of the wharf as possible, using standard engineering/structural terminology during photo documentation.

VI. RECOMMENDATIONS

A. Precontact Period Resources

No archaeological field investigations are recommended for precontact resources.

B. Historic Period Resources

If feasible, HPI recommends avoidance of areas sensitive for historic period archaeological resources during project construction. Since avoidance is not feasible in this case, further archaeological consideration in the form of Phase IB archaeological investigations is recommended both to document potential shaft features in former rear yards on Block 56, and potential extant wharf and cribbing features under Block 56, and potential extant wharf and cribbing features under Block 56, Liberty Street, Washington Street, Cedar Street (between Washington and West Streets), and Albany Street.

Figure 16 shows the locations where these potential archaeological resources may exist, and where HPI proposes further field investigations. Within Block 56, those lots where subsurface wooden elements (thought to be remains of wharves and/or cribbing) have been identified in archival records are indicated. HPI recommends archaeological investigations occur within these two lots, and the lots located between them – a total of 9 former lots, or slightly more than half of the lots on this part of the block, which should afford a sufficient sample size. In conjunction with documenting wharf and/or cribbing features, which will require removal of up to 10 feet of overburden, HPI recommends that the presence of shaft features be investigated concurrently on these lots. Shaft features would be located in the rear portions of the lots, behind former street-fronting structures.

For several reasons, HPI recommends that the Phase IB investigations within the APE consist of archaeological monitoring undertaken in conjunction with project construction, rather than pre-construction archaeological testing. Both potential shaft features and wharf/crib features are expected to be found at depths up to 10 or 15 feet below the current grade. OSHA regulations require stepping or shoring if excavations extend below 3 feet. Within the APE, where large amounts of soil and other overburden (such as concrete basement elements on former home lots and active utilities within streetbeds) will need to be removed before reaching the archaeological resource zone, it will be most practical (and cost effective) to undertake these excavations in tandem with project construction, which can provide the large-scale excavation and soil removal operations necessary, shore up the site to facilitate deep excavation, and provide dewatering equipment if the water table interferes with archaeological resource recovery. Draft guidelines addressing the use of archaeological monitoring on urban sites (NYAC/PANYC 2002) indicate that monitoring may be appropriate where archaeological testing is found to be not feasible. HPI feels that this criterion applies in this situation.

Prior to any excavation within the APE, an archaeological monitoring plan should be developed by the archaeological consultant, in consultation with the NYSOPRHP and the

LPC. Representatives from the undertaking agency, the developer, and the construction contractor may be consulted while developing the monitoring plan, and would need to agree to its terms. The monitoring plan should be prepared according to applicable archaeological standards (New York Archaeological Council 1994; NYAC/PANYC 2002; LPC 2002). As part of the monitoring plan, it may be necessary to establish a protocol between the archaeological consultant and the review agencies that determines a particular percentage (or sample) of the streetbeds that will be subjected to archaeological monitoring. RPA-certified professional archaeologists, with an understanding of and experience in urban archaeological excavation techniques, would be required to be part of the archaeological team.

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FIGURES

PHOTOGRAPHS

November 7, 2003

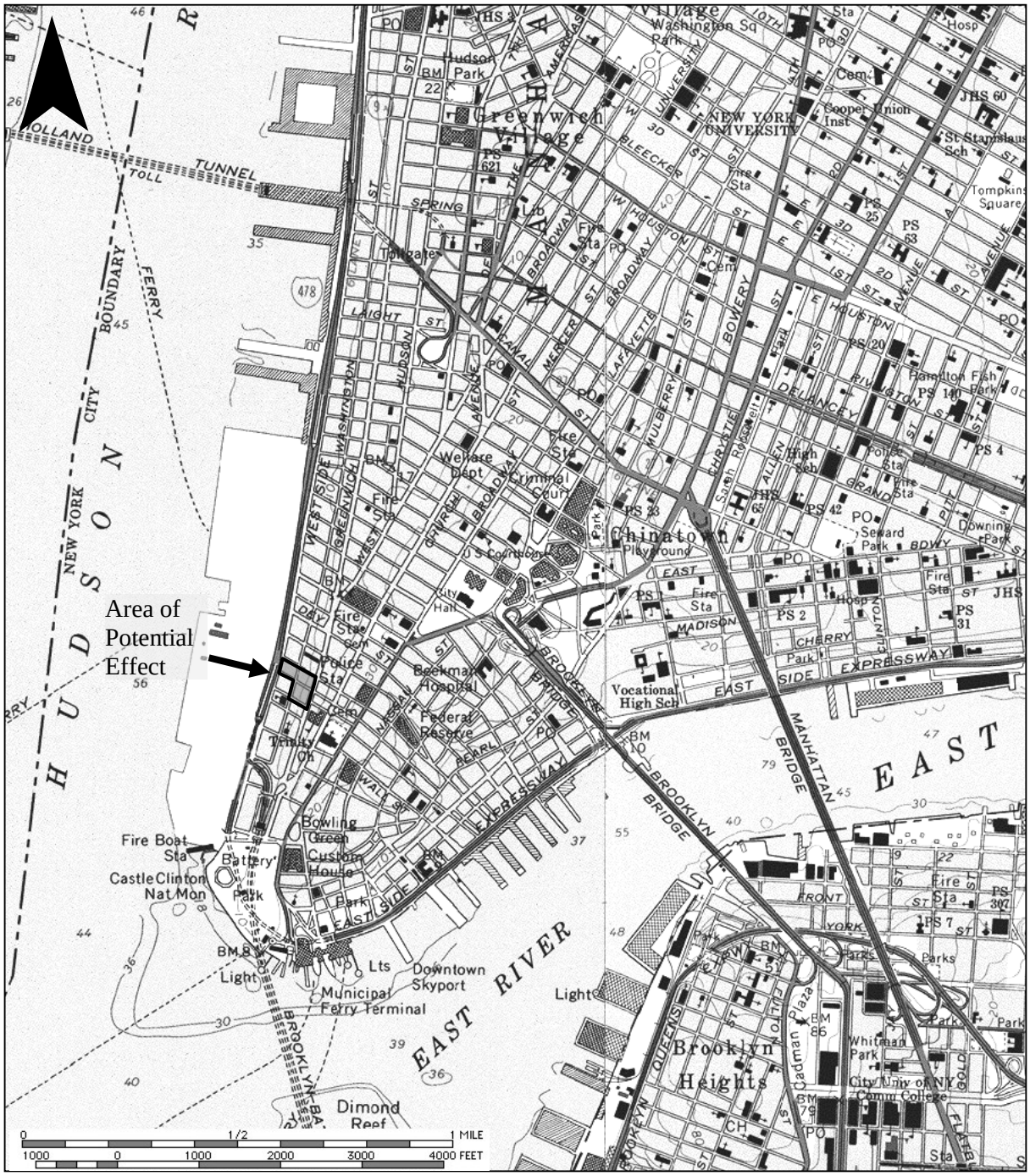

FIGURE 1

USGS Jersey City, NJ and Brooklyn, NY Quadrangles.
United States Geological Survey, 1976 and 1995.

Southern Site (Blocks 54 and 56).

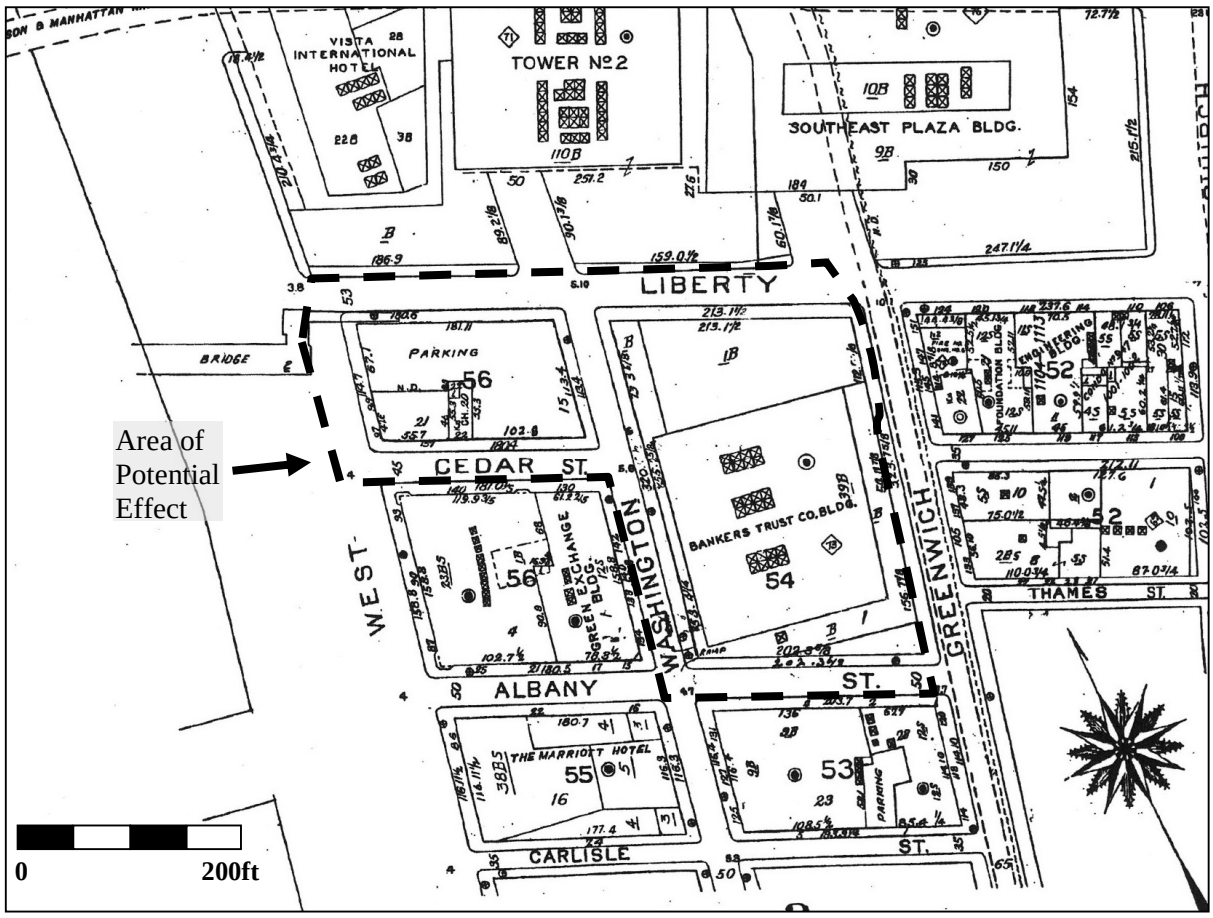

FIGURE 2

Area of Potential Sensitivity.
Sanborn 2001.

Southern Site (Blocks 54 and 56).

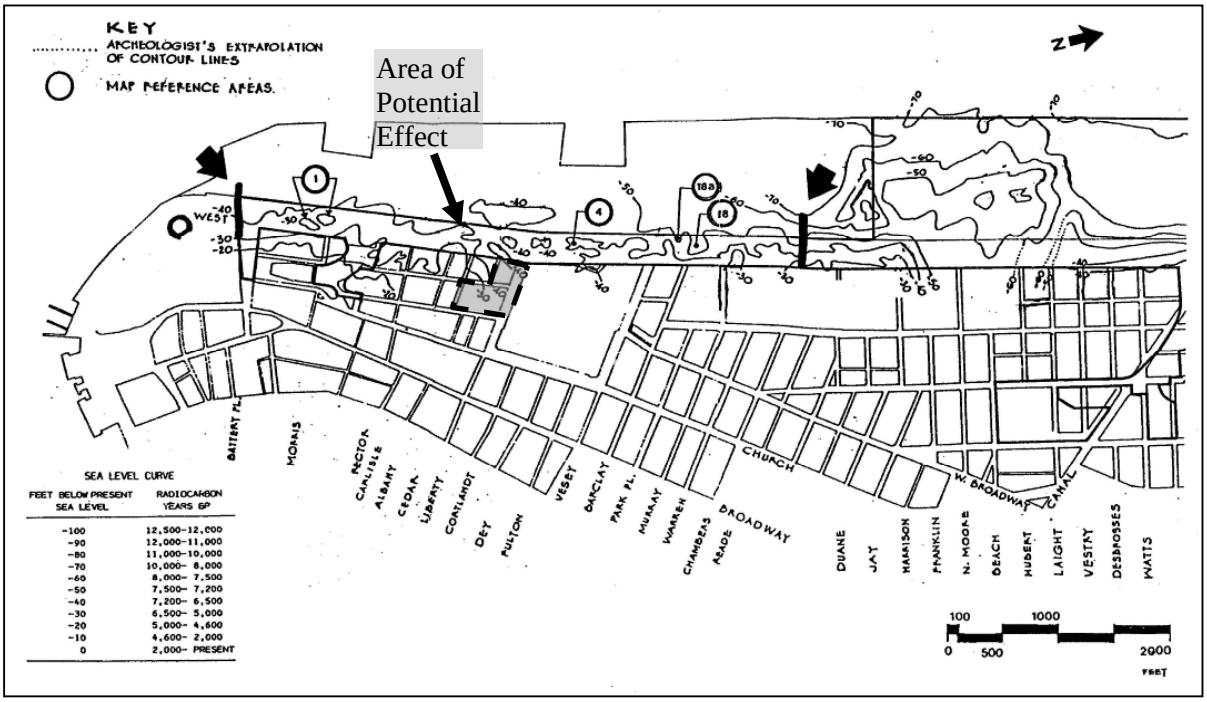

FIGURE 3

Ancient Sea Levels along the Hudson River with Potential Archaeological Sites.
HCI 1983, Figure 4, p. 48.

Southern Site (Blocks 54 and 56).

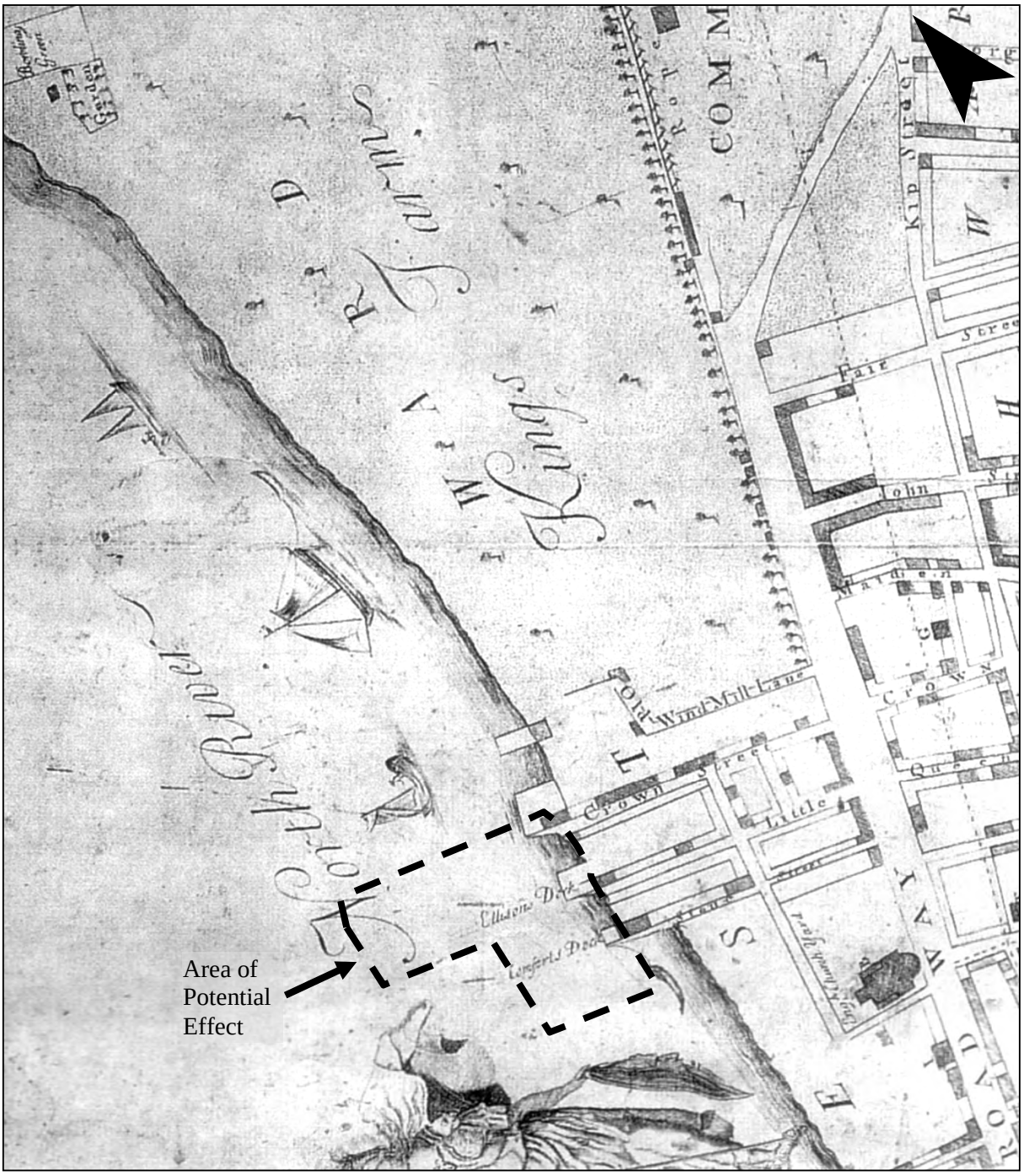

FIGURE 4

A Plan of the City of New York from an actual Survey Made by James Lyne. Bradford 1731.

Southern Site (Blocks 54 and 56).

Approximate Scale: 1 inch= 250 feet

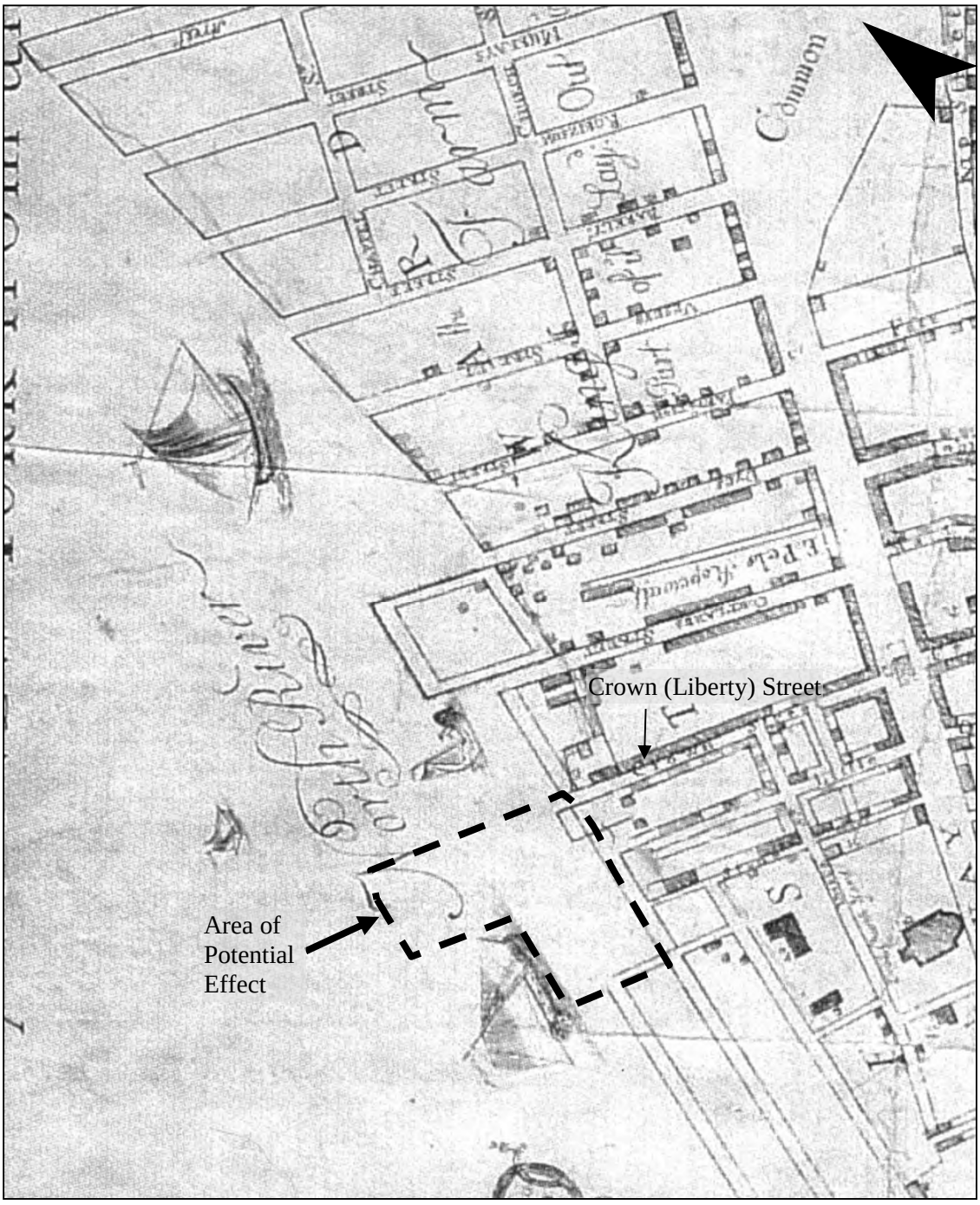

FIGURE 5

A Plan of the City of New York from an actual Survey Anno Domini – M,DCC,IV.
Maerschalk 1755.

Southern Site (Blocks 54 and 56).

Approximate Scale: 1 inch= 250 feet

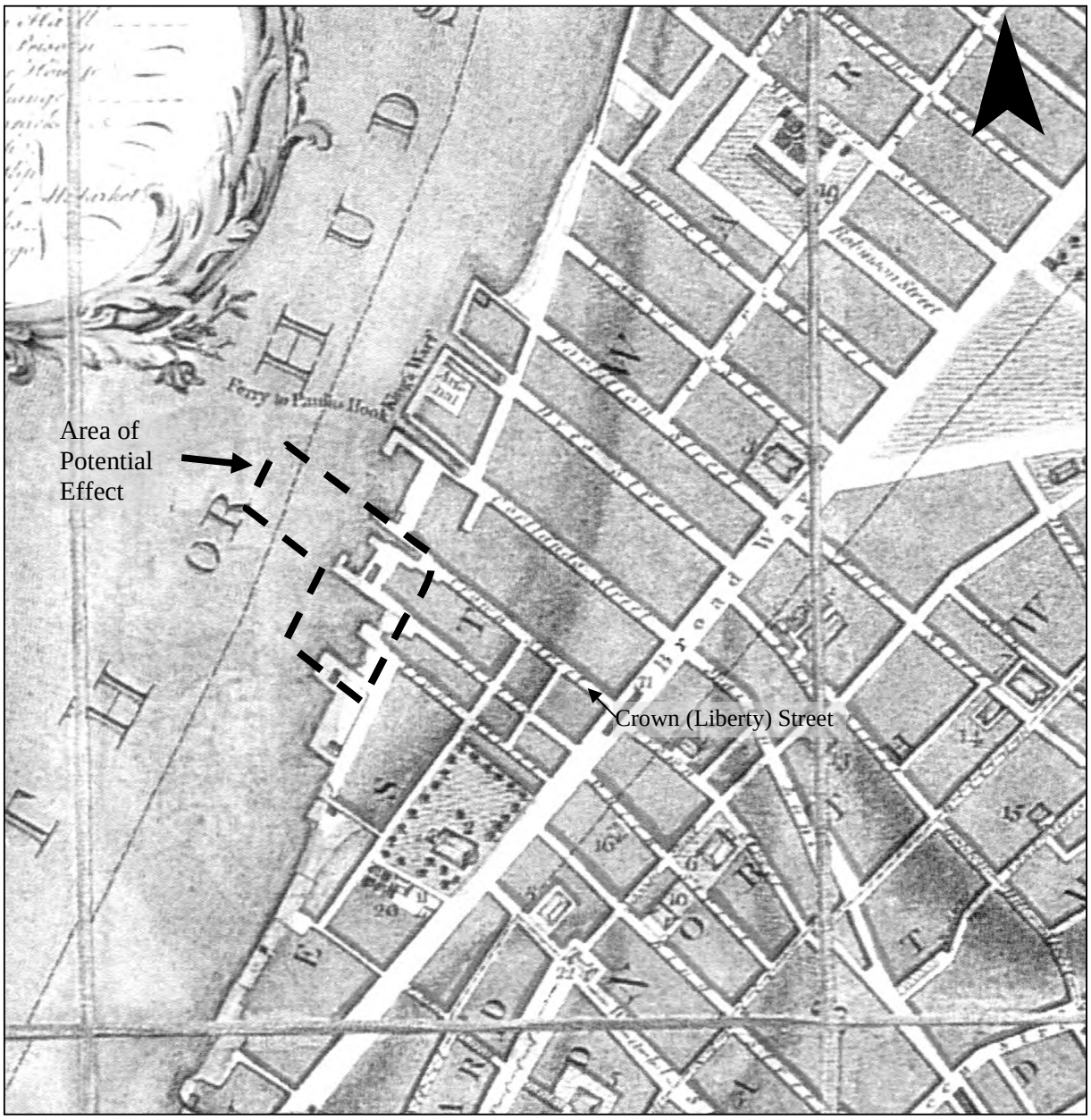

FIGURE 6

To His Excellency Sr. Henry Moore, Bart...This Plan of the City of New York, Is Most Humbly Inscribed.
Ratzen 1776.

Southern Site (Blocks 54 and 56).

Approximate Scale: 1 inch= 400 feet

FIGURE 7

The New-York Directory and Register for the Year 1789.
McComb 1789.

Southern Site (Blocks 54 and 56).

Approximate Scale: 1 inch= 500 feet

FIGURE 8

A New & Accurate Plan of the City of New York in the State of New York in North America.
Taylor-Roberts 1797.

Southern Site (Blocks 54 and 56).

Approximate Scale: 1 inch= 400 feet

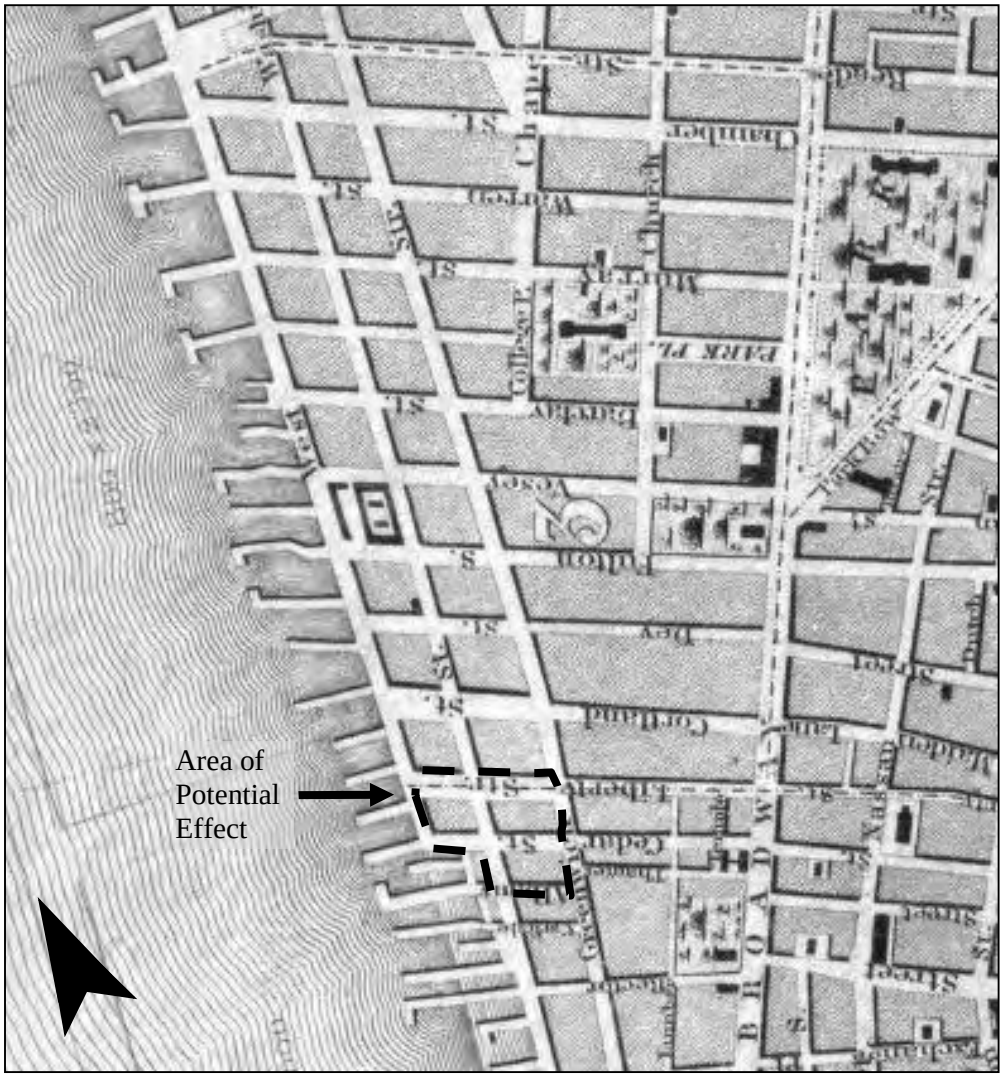

FIGURE 9

Topographical Map of the City and County of New-York, and the Adjacent Country.
Colton 1836.

Southern Site (Blocks 54 and 56).

Approximate Scale: 1 inch= 600 feet

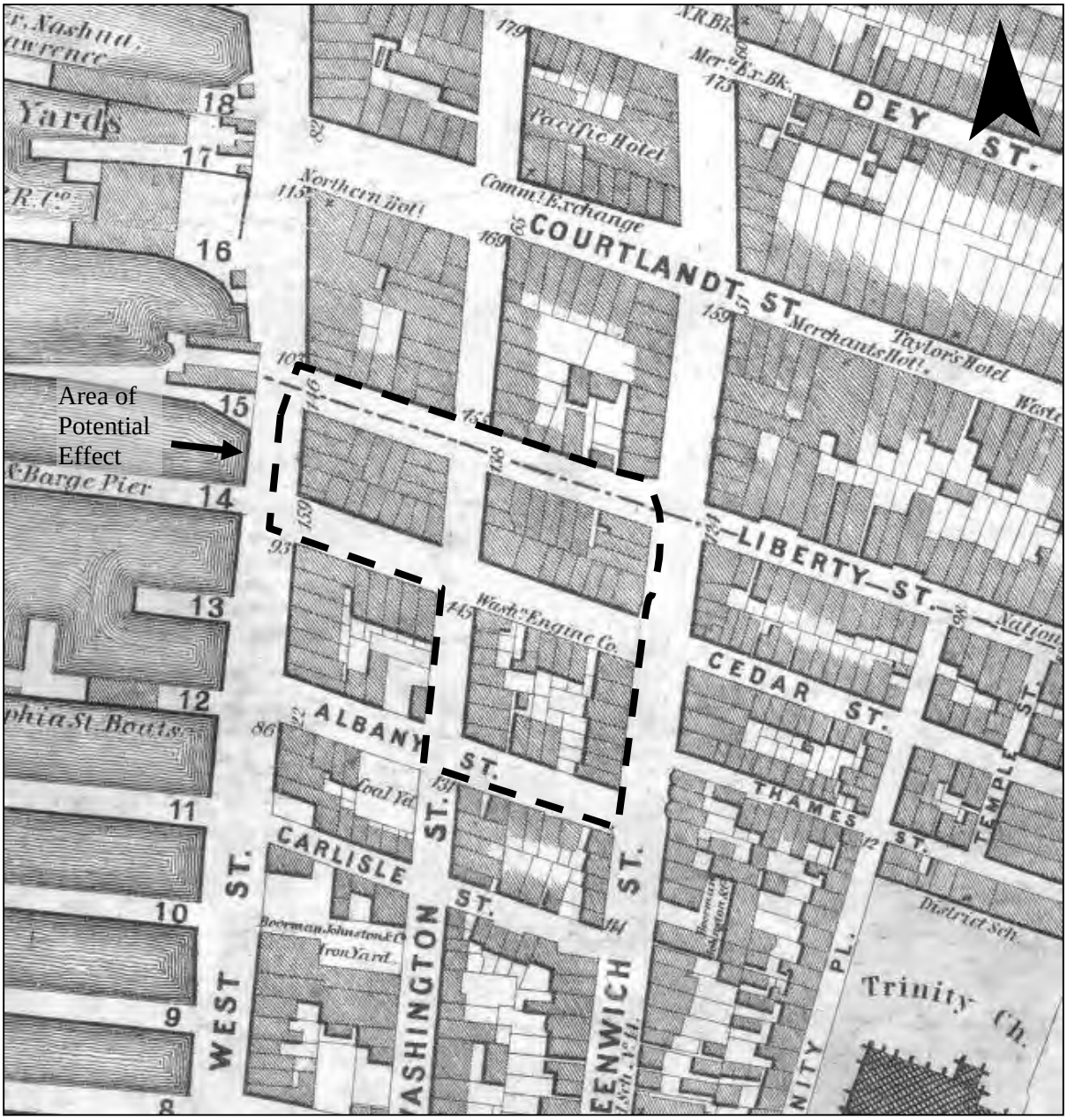

FIGURE 10

Map of the City of New York Extending Northward to 50th Street.
Dripps 1852.

Southern Site (Blocks 54 and 56).

Approximate Scale: 1inch= 200 feet

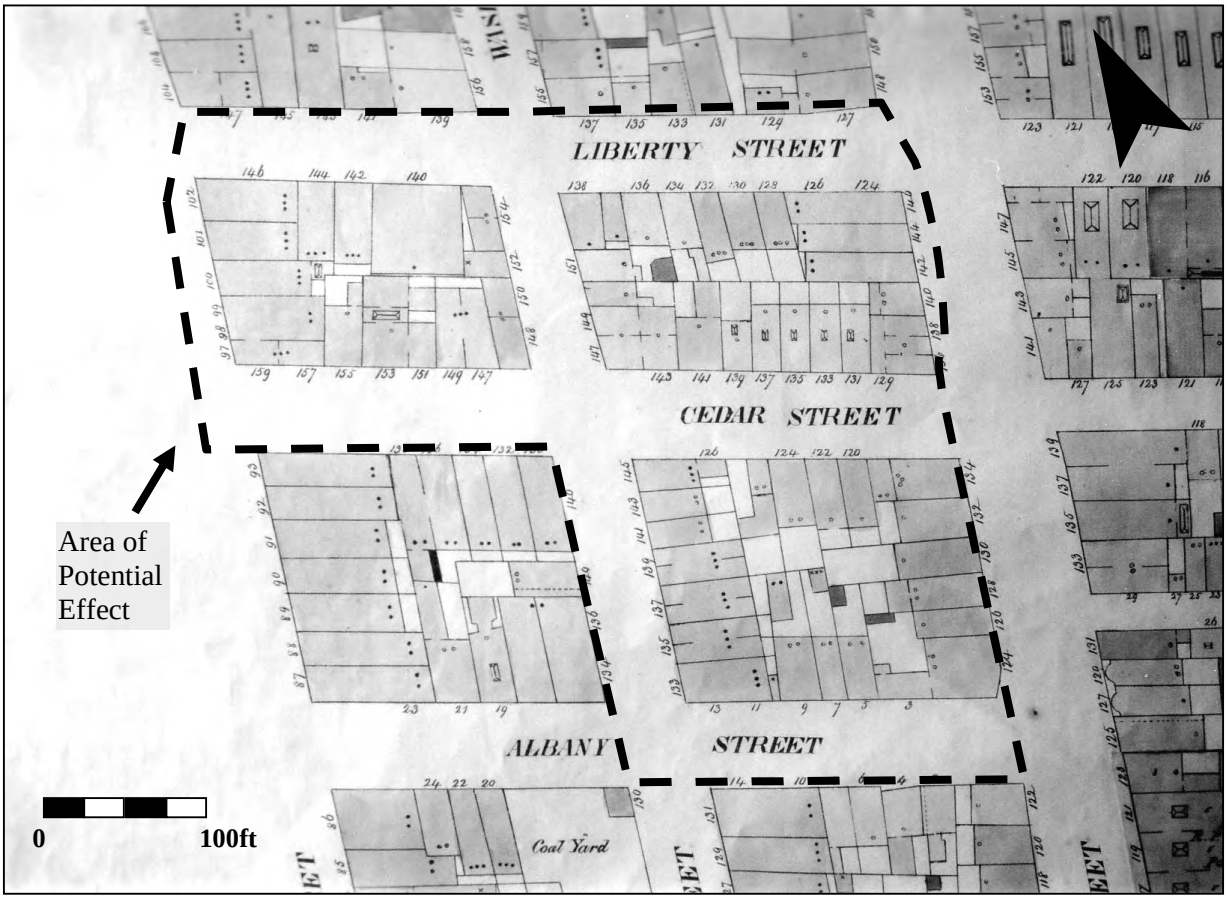

FIGURE 11

Maps of the City of New York.
Perris 1857-62.

Southern Site (Blocks 54 and 56).

FIGURE 12

Insurance Maps.
Sanborn 1894.

Southern Site (Blocks 54 and 56).

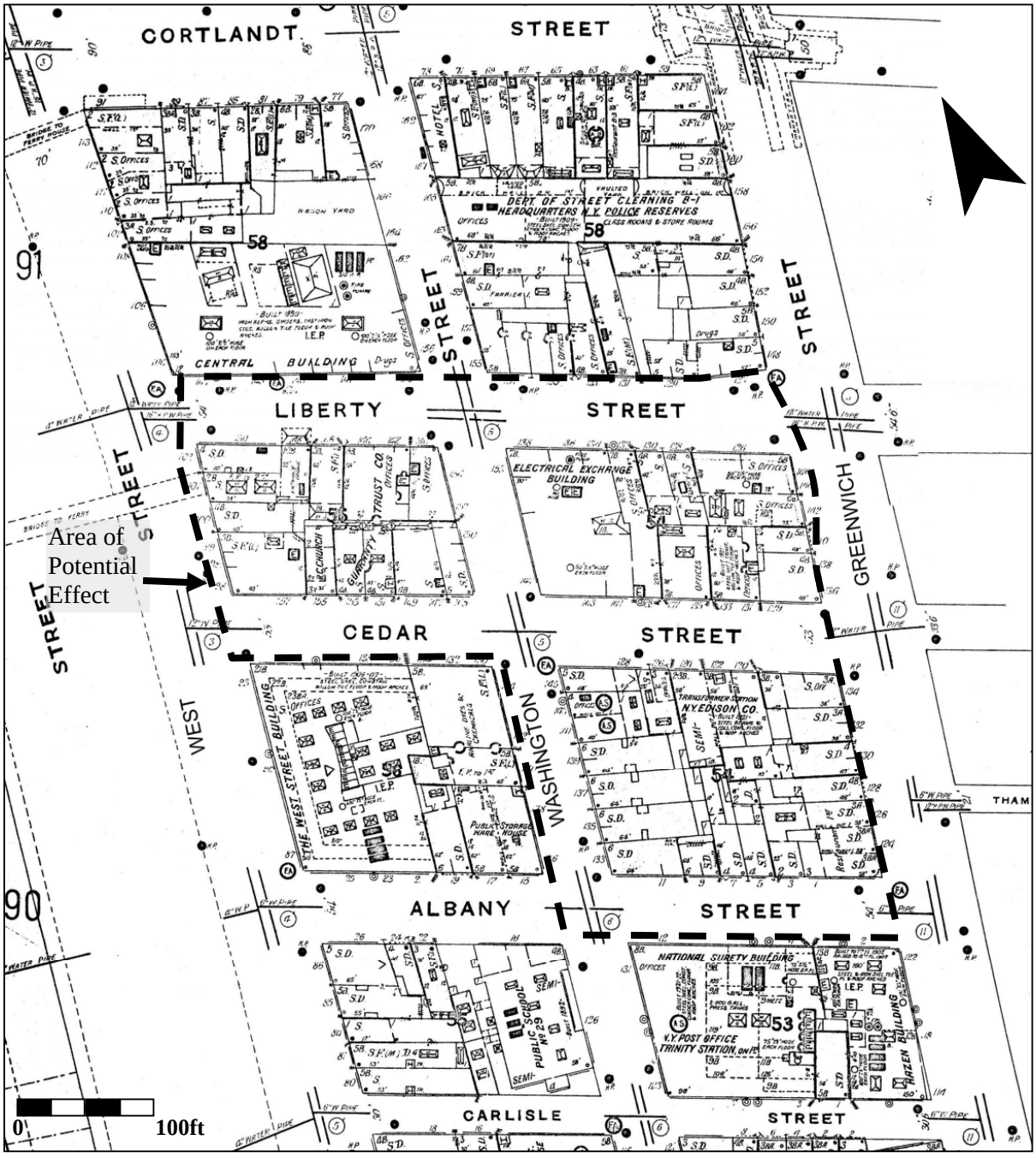

FIGURE 13

Insurance Maps.
Sanborn 1923.

Southern Site (Blocks 54 and 56).

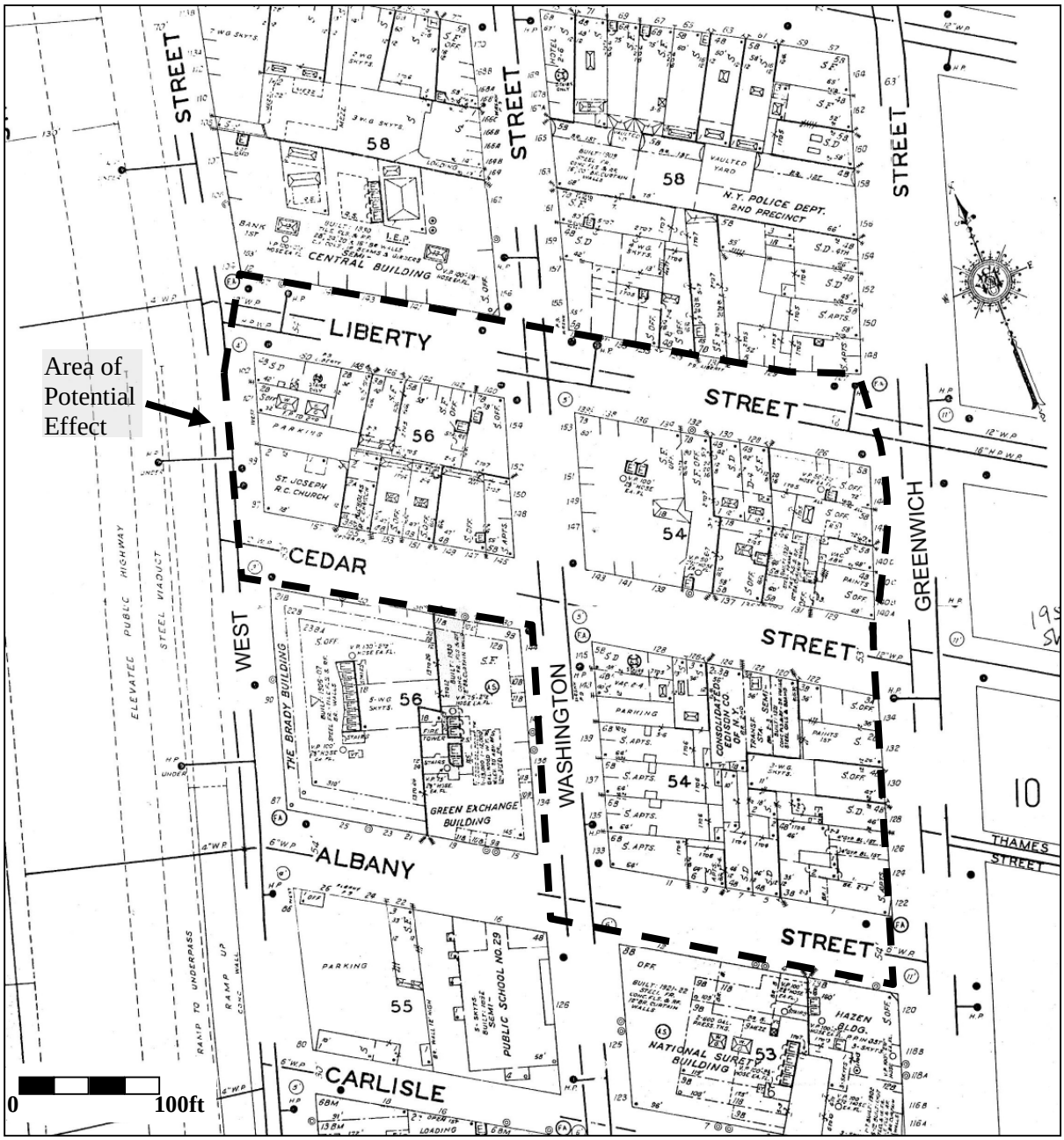

FIGURE 14

Insurance Maps.
Sanborn 1951.

Southern Site (Blocks 54 and 56).

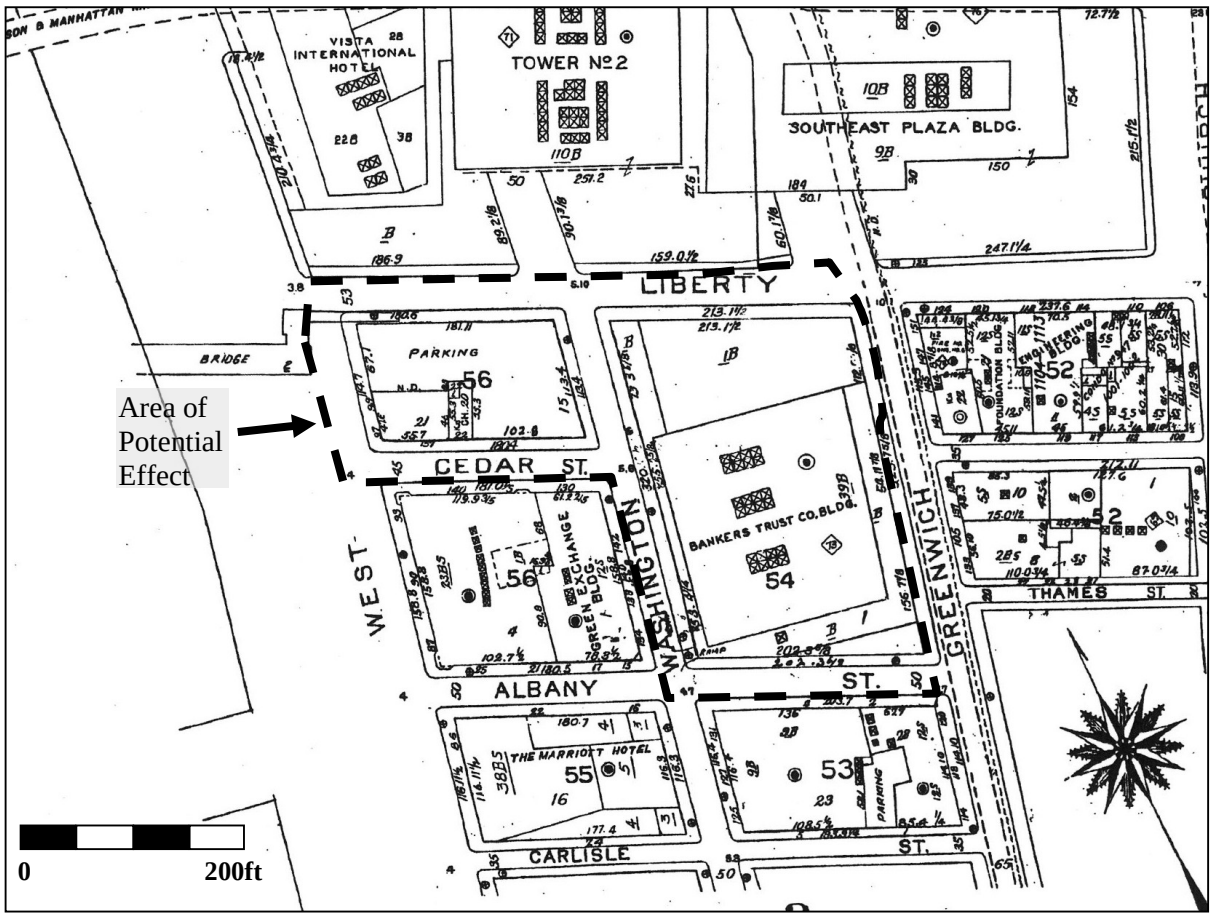

FIGURE 15

Insurance Maps.
Sanborn 2001.

Southern Site (Blocks 54 and 56).

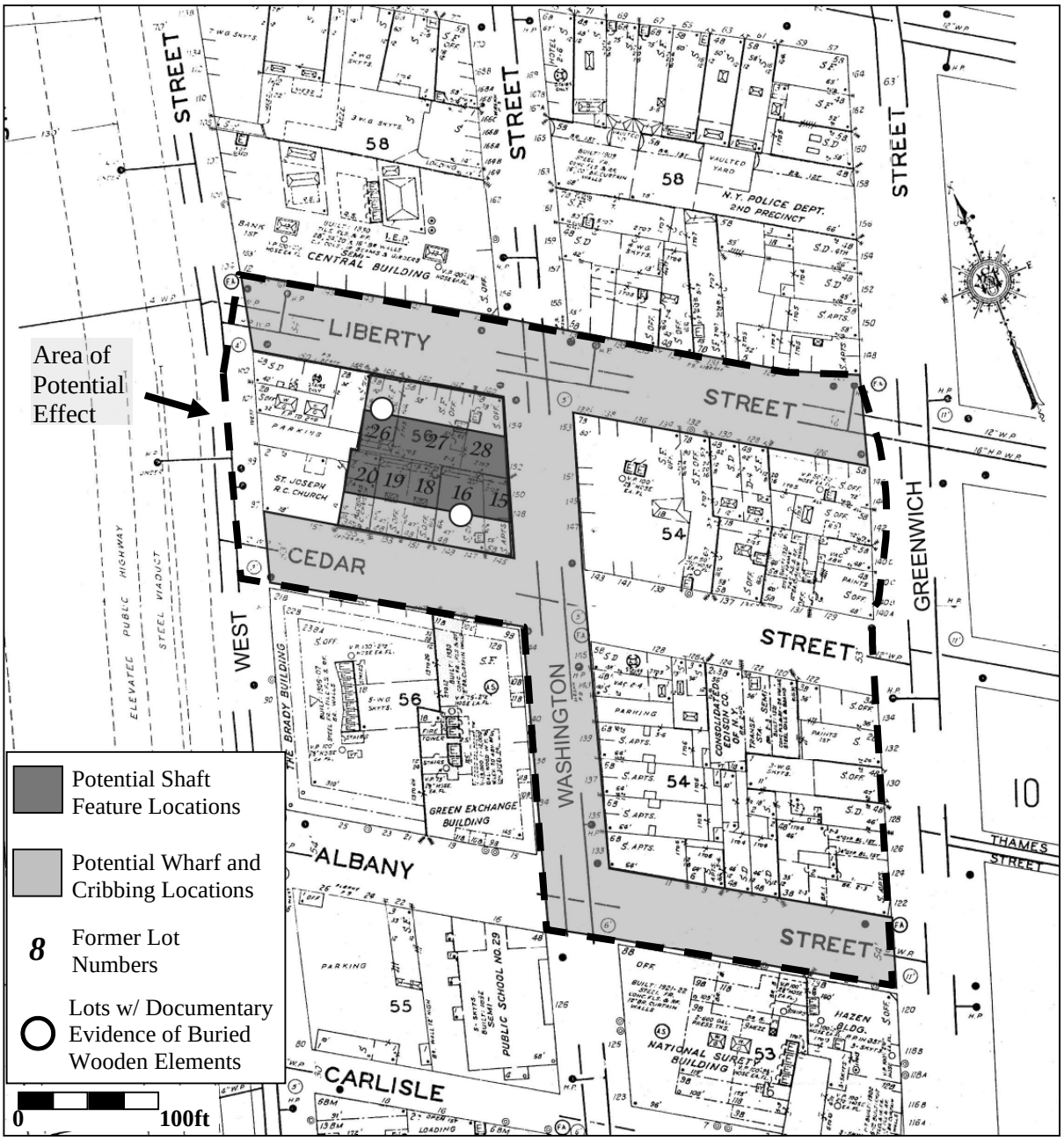

FIGURE 16

Proposed Archaeological Investigations.
Southern Site (Blocks 54 and 56).
Sanborn 1951.

Photograph 1: Deutsche Bank building (shrouded in black) on Block 54, looking southeast from World Trade Center site. Liberty Street in foreground.

Photograph 2: Excavated former plaza area north of Deutsche Bank building, looking east. Liberty Street on left, Greenwich Street in background.

Photograph 3: Northern half of Block 56 (behind chain link fence), looking north. Cedar Street in foreground.

Photograph 4: Liberty Street from Washington to West Streets, looking northwest. World Trade Center site behind American flag on right.

Photograph 4: Washington Street from Cedar to Liberty Streets, looking north. World Trade Center site in background.