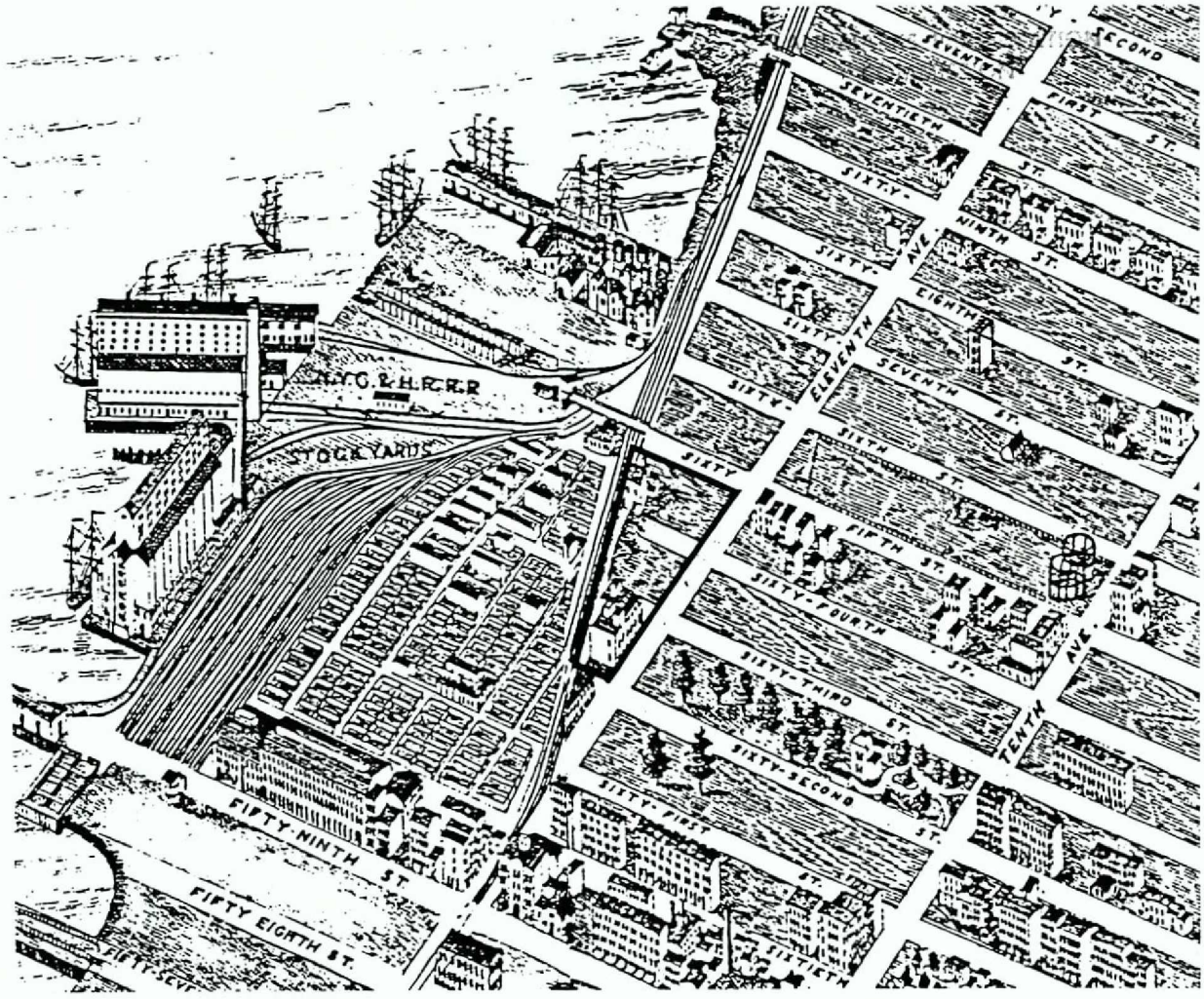
An Archaeological Evaluation of the Manhattan West Site, New York City



CEQR No. 86 - 268M

Prepared for Konheim & Ketcham

Prepared by Joan H. Geismar, Ph.D.

August 31, 1987

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Unless otherwise noted, photographs by Joan Geismar

ABSTRACT

The Manhattan West Development site, located between 61st and 64th Streets on the west side of West End Avenue, remained undeveloped shoreline until the mid-nineteenth century. Until now, its development has been mainly if not solely industrial, and, for most of its history, was related primarily to railroads (a major exception is the New York Times Plant that stood on the northern part of the site from the late-1950s until 1976). By 1848, the historic and innovative Hudson River Railroad ran across the site's western periphery, and remnants of its road and track undoubtedly remain under fill. Of particular interest is the embankment built into the Hudson River on the site's western portion in the vicinity of the extension of 63rd Street. Also of interest is the mid-nineteenth century fill that must abut this embankment to the west. Monitoring deep foundation excavations in this area would provide a cost-effective means of viewing and recording the embankment; it would also facilitate collection of a fill sample to determine whether or not health-related municipal laws concerning landfill were observed. A brief monitoring program designed to address these issues without disrupting construction schedules or activities is recommended. Following these recommendations, no impact on significant archaeological resources is anticipated as a result of the Manhattan West project.

INTRODUCTORY SUMMARY AND RECOMMENDATIONS

Introductory Summary

This report presents an evaluation of the historical and archaeological potential of the Manhattan West development site located on the west side of West End Avenue between 61st and 64th Streets. It was prepared for Konheim & Ketcham as part of an environmental impact statement pursuant to the City Environmental Quality Review (CEQR) process. The proposed development is expected to combine residential units and retail stores with underground parking, private and community open space, and a health club.

The site, which is situated on central Manhattan's western periphery (Figure 1), extends about 708 ft. south from the mid-line of the extension of 64th Street to a point just north of the extension of 61st Street; its southern boundary cuts northwest 118 ft. and its western boundary runs north to a point approximately 375 ft. west of West End Avenue on 64th (Figure 2). The entire parcel, which is almost a triangle, covers 176,272 sq. ft. or about 4.05 acres.

At this writing the site contains a commercial parking lot with two unrelated structures fronting on West End Avenue, a Mobil gas station between 61st and 62nd Streets and a one-story concrete block garage near 63rd Street (Plates 1 and 2). In addition, there are two parking lot booths on the site.

While West End Avenue slopes up as it heads north, the site grade remains at the 61st Street level. Consequently, a retaining wall that reaches a height of 23 ft. at its northern end extends from about 63rd to 65th, the length of the New York Times printing plant located here until 1976. A chain link fence runs along this wall

MANHATTAN WEST: Location Map.

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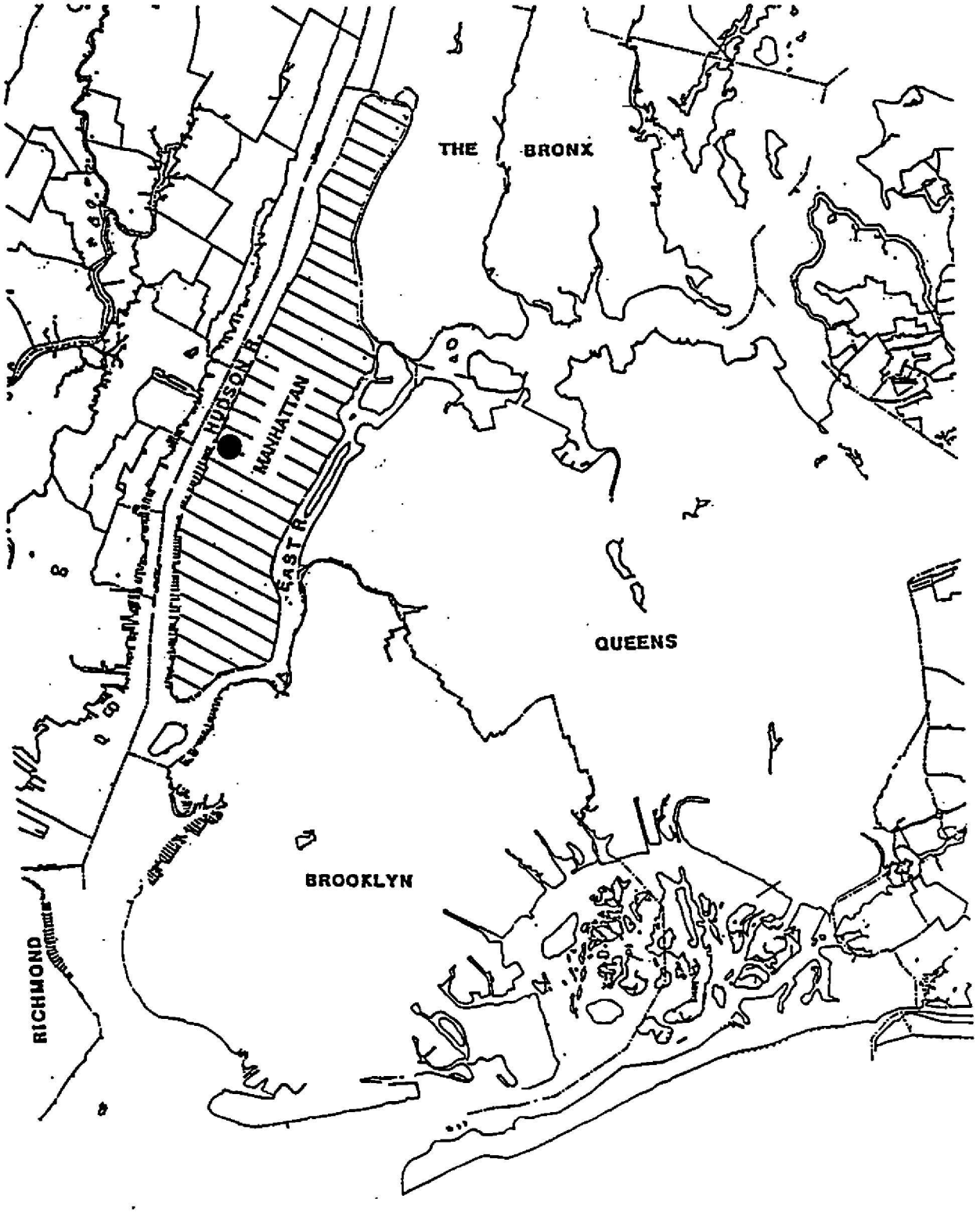

MANHATTAN WEST: Project Site Location.

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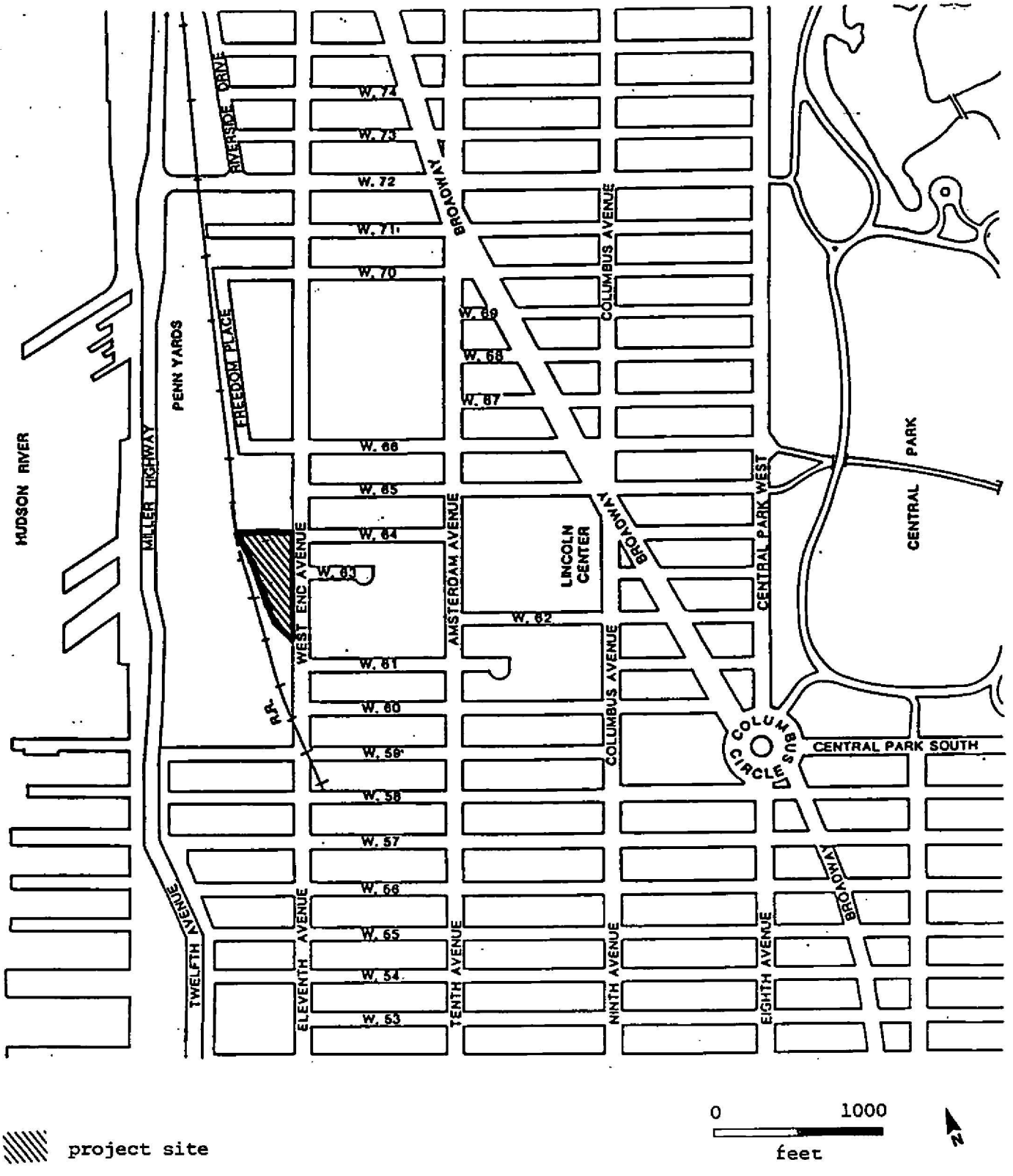


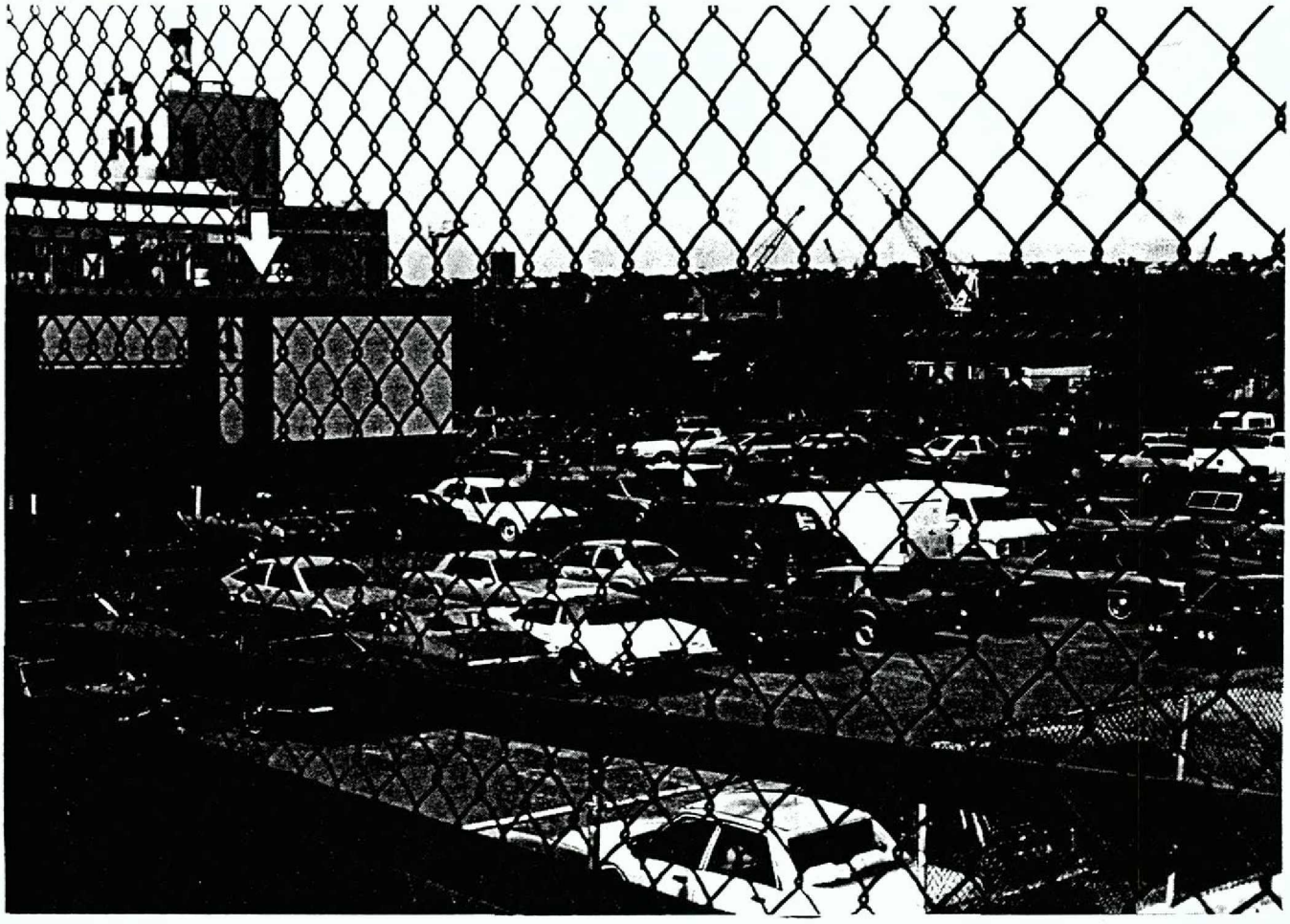


Plate 1. View looking southwest from West End Avenue near 64th Street. The view is through the chain link fence that runs north along the Avenue from 63rd Street. Garage on left side of photo (arrow) is located near 63rd Street; the cars in the foreground are parked where the southern portion of the New York Times printing plant was located (photo: 6/25/86).

at street level. The current grade of West End Avenue undoubtedly was established when it was run as an extension of 11th Avenue in the late-1860s (it wasn't until 1894 that it was changed to West End Avenue in the site area). This grade seems to accommodate a natural hill on the east side of the avenue (Plate 3 and Figure 3).

To the west, a drop to the low, flat land that was the site of the former Penn Central yards, now part of the T.V. City development site, marks the landfill used in the late-1860s to reclaim land from the Hudson; still further west, above the landfill, rises the Miller Highway, an extension of 12th Avenue, with the Hudson River and piers beyond (Figure 4).

Although the site land was patented in the late-seventeenth century, its development was late and, until now, mainly if not wholly industrial. Seventeenth-century Dutch grants did not extend this far north, and even after it was patented by the English in 1677, the site remained farmland. Fresh water streams were located north and south of the project site and, as noted above, a series of hills stood to the east where the Amsterdam Houses now stand (see Figure 3).

The first extensive site development occurred in the late-1840s when the Hudson River Railroad was constructed along its western periphery. Throughout its development history, site structures have been related mainly to railroads, the nineteenth-century exception being a three-story building erected between 62nd and 63rd Streets in 1854. At least for a time, this was apparently a laundry but it may also have been a residence.

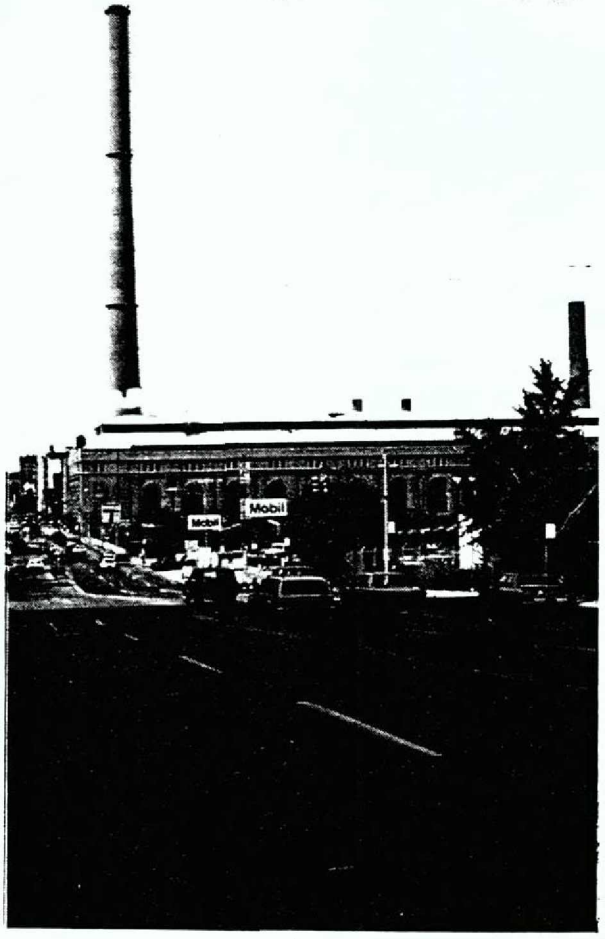


Plate 2. Looking south from 65th Street and West End Avenue. Note Mobil Station at 61st Street and Con Edison Plant at 59th Street (photo: 6/25/86).

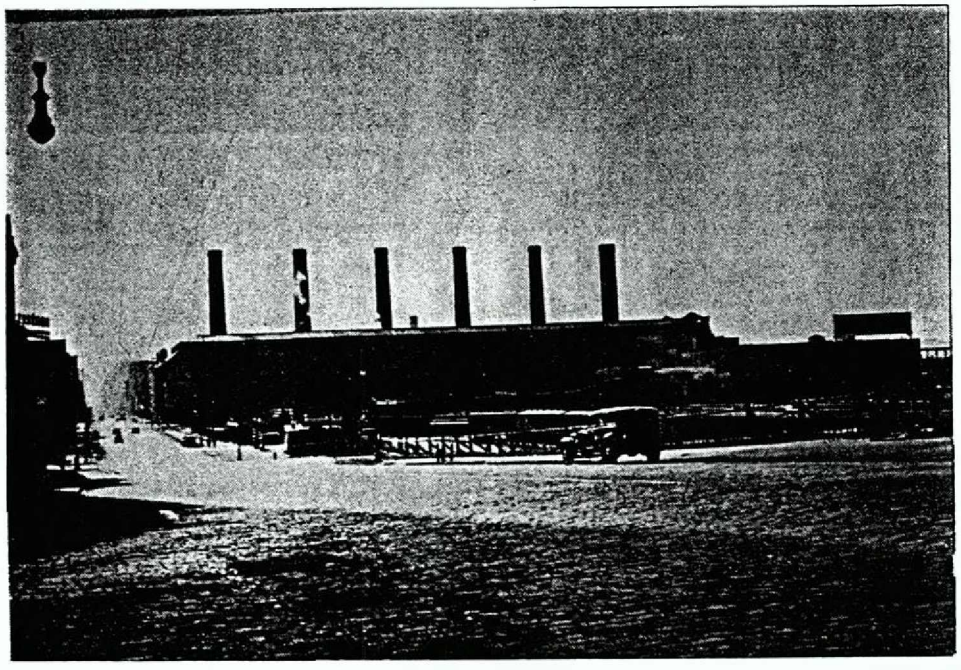


Plate 3. Same general view as Plate 2 (above) taken more than a half century before. New York Central tracks (formerly the Hudson River Railroad) and yard then on the site. Note there are many more lower smoke stacks on the Con Edison building than there are now (NYPL Photographs 1934:1037 C4).

MANHATTAN WEST: Details of 19th Century Topographic Maps Showing the Project Site.

3

Figure a. Detail of 1854 Harrison & Magraine Topographic Map of Manhattan.

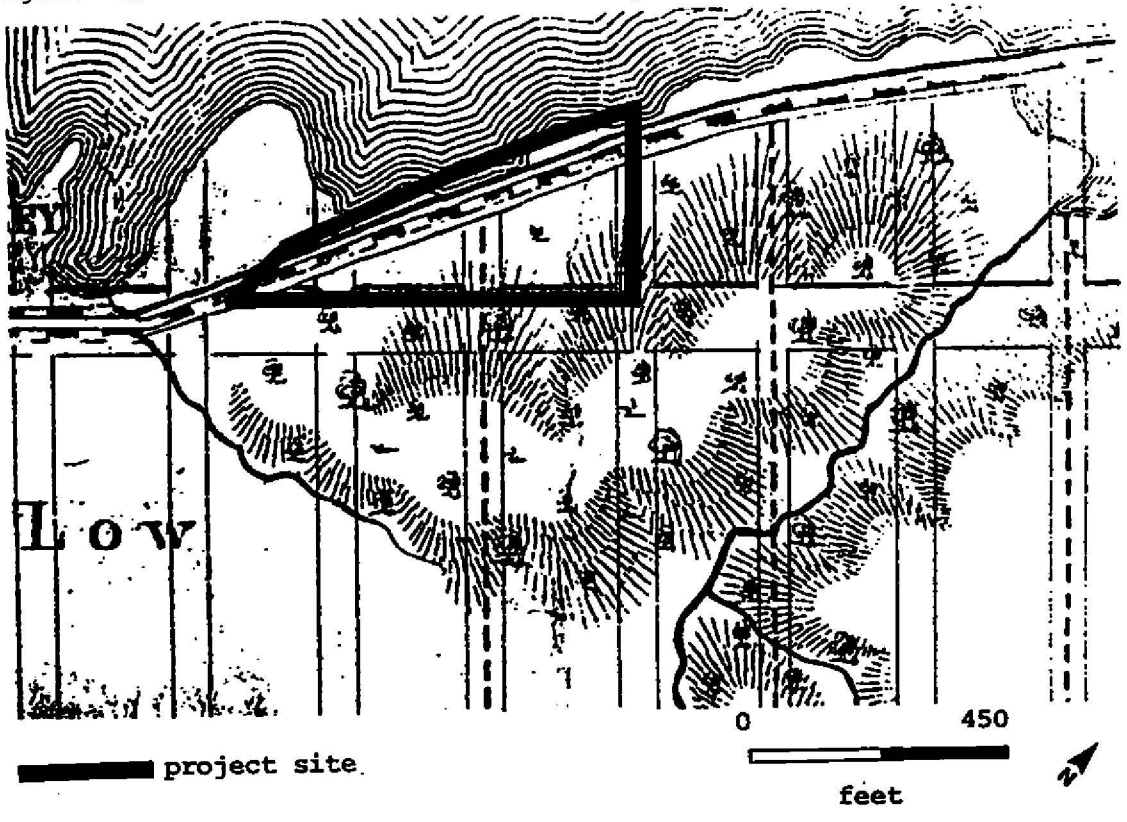
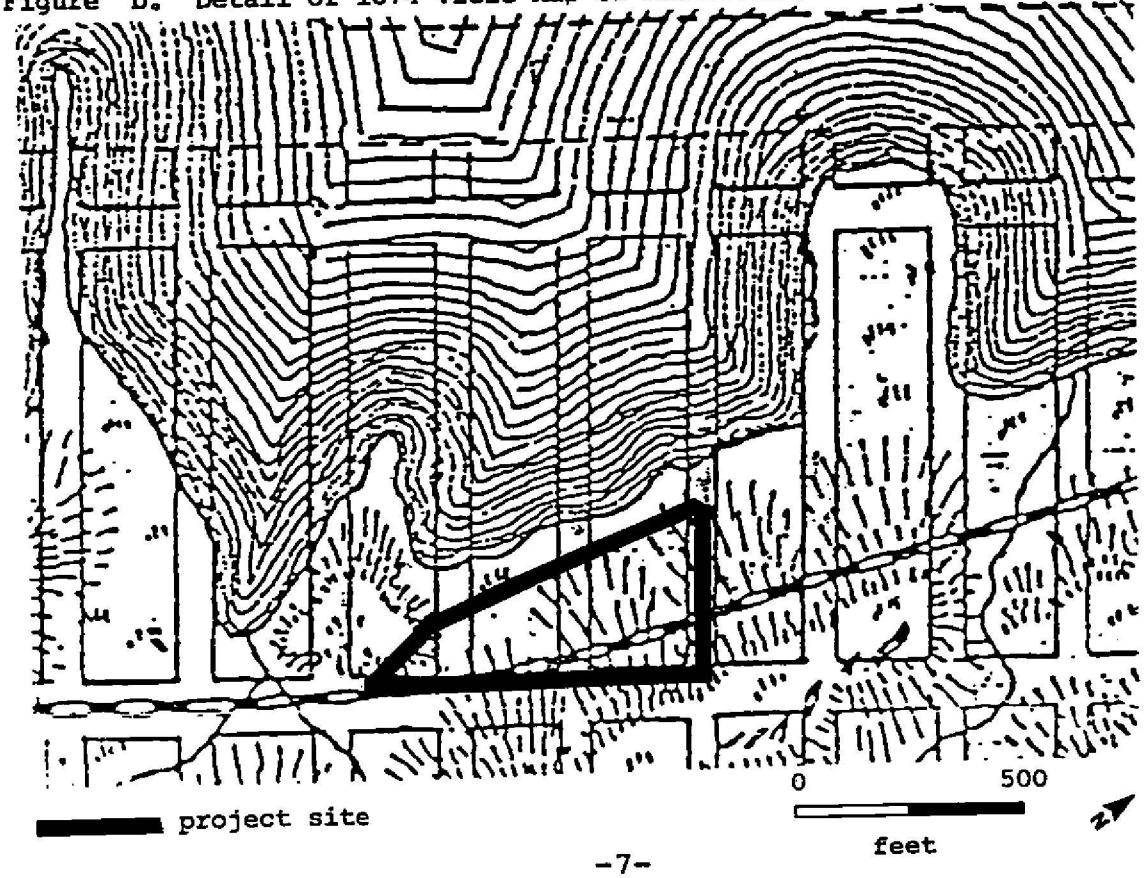
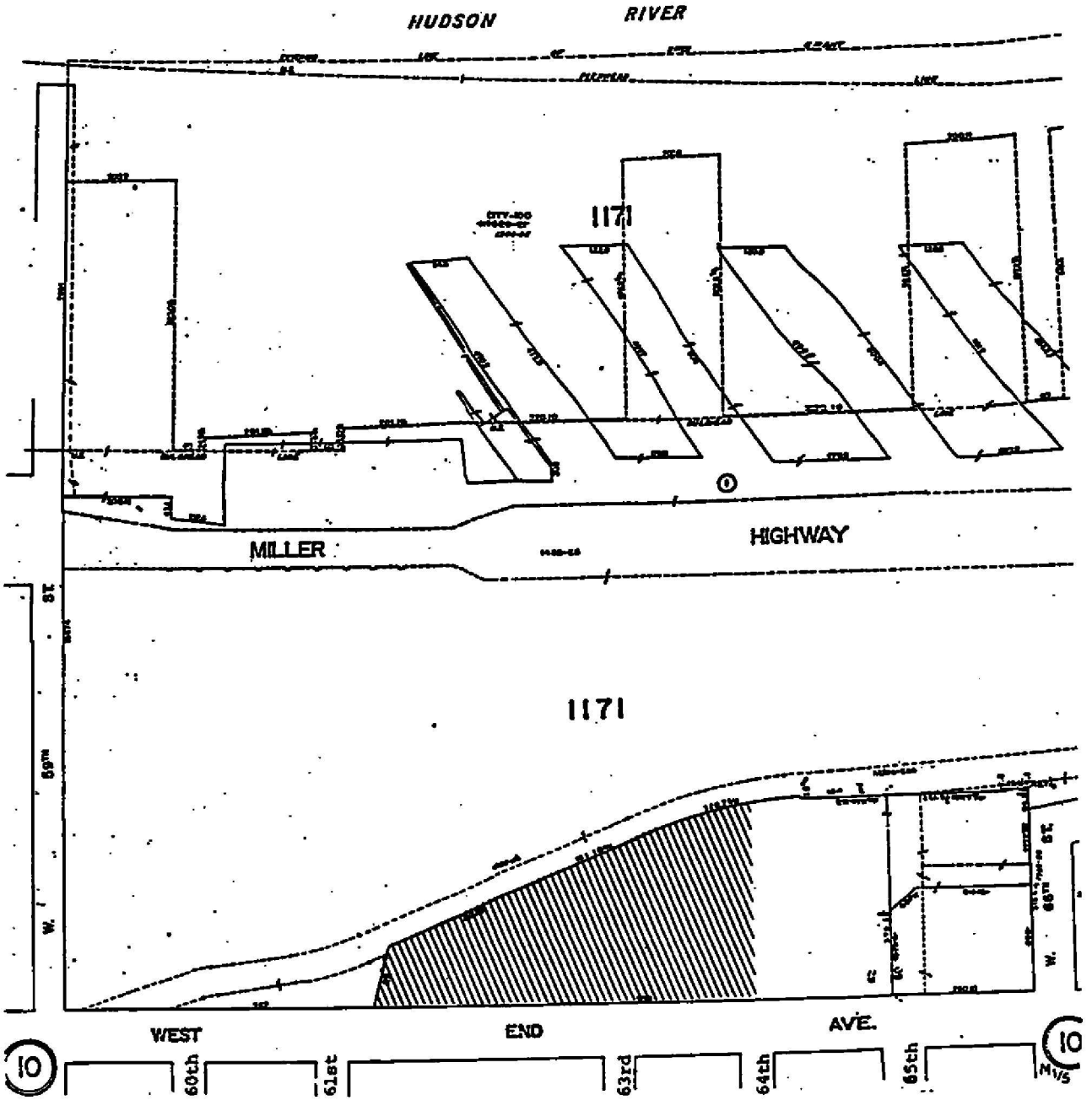


Figure b. Detail of 1874 Viele Map of Manhattan.



MANAHATTAN WEST: 1985 Tax Map.



project site

dimensions indicated

This railroad use continued until about 30 years ago (Plates 4-5) when the site's most notable structure, the New York Times printing plant, opened in 1959. This four-story building fronted on West End Avenue from 63rd Street to 65th and, although the building is now gone, its basements apparently remain sealed beneath the parking lot.

While it is possible that prehistoric Native American groups may have used the site for temporary hunting and fishing camps, neither its history nor the information from borings suggest that prehistoric sites or historical resources such as early homesteads remain. What these data do indicate, however, is that approximately 200 linear ft. of landfill were introduced between 62nd and 64th Streets in preparation for laying the track bed for the Hudson River Railroad sometime between 1848 and 1849. This in turn suggests that a fill-retaining construction--usually a bulkhead or cribbing but in this case perhaps a seawall and embankment--from that time is located on the site under more recent fill.

Since it is likely that this segment of the site was filled solely to accommodate the railroad track, this construction undoubtedly abuts later fill to the west (based on deeds and other data, water lot grants west of the site were filled five to twenty years after the railroad was built). Foundation excavations that extend down 22 ft. or more below grade and are within 100 feet of the 63rd Street mid-line in the western portion of the project site should reveal evidence of the method used to create the track bed and retain the fill. They would also provide the opportunity to sample and compare fill from this mid-nineteenth century shore-

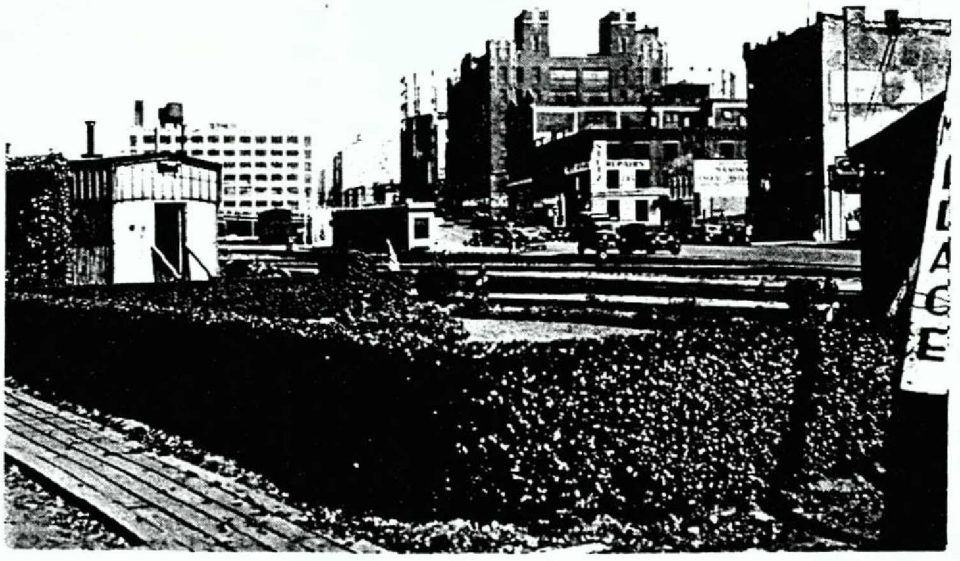


Plate 4. View looking north on West End Avenue (center of photo) in 1933. Low structures and greenery on the west side of the Avenue at 60th Street (foreground) were related to the New York Central Railroad. Sometime around 1930, the building to the left rear of the photo was built as a warehouse and is now the ABC Building located just north of the site between 65th and 66th Streets (NYPL Photographs 1933:1037: A5).

Plate 5. Same as Plate 4, above from 60th Street. The entrance to the New York Central tracks is the foreground between 60th and 62nd Streets, apparently just north of the greenery shown in foreground of Plate 4 (NYPL Photographs 1933:1037 B6).

line site with that from earlier Manhattan fill sites along the East and Hudson Rivers. This kind of research could be done during a brief monitoring period coordinated with construction activities (see Figure 16 for location of area of concern). Beyond the recommendations made here, no impact on significant archaeological resources is anticipated.

Recommendations

Given the site's situation, history, and development, combined with its current development plans, a brief foundation monitoring program is recommended; its goal and design would be to document the method used in constructing the track bed for one of the city's earliest railroads, a major engineering feat in its time. It would also offer the opportunity to sample mid-nineteenth-century fill from this Hudson River shoreline site. It is a program limited to a specific portion of the site (see Figure 16) and can be coordinated with planned construction activities. In addition, although there is no indication that Native American camps or deposits were located on the site, it is possible that isolated shell piles or "middens" (discarded shell refuse often combined with other aboriginal trash) might be uncovered during foundation excavations. In the event this may occur, an archaeologist should be on call to record and sample any such deposits uncovered during these excavations. This could be done quickly with little or no disruption to construction schedules.

The findings and recommendations presented here are based on the detailed information presented in the following sections.

SITE DEVELOPMENT, PREHISTORIC AND HISTORICAL CONDITIONS

The site's development and use are considered in two phases: the prehistoric period before European contact and the historic or post-contact period. The former conceivably covers as many as 14,000 years, the latter the past 350. While reconstruction of the historical period is possible through various documents, the assessment of the site's prehistoric potential is based on early-twentieth century archaeological literature, some more recent analyses, and speculation. The sources researched for historical data include the Municipal Archives, the Manhattan Borough President's Office (topographic bureau), various city agencies, and the libraries of the New York Historical Society and the Engineering Society as well as the New York Public Library, the New York Society Library, the Jervis Library in Rome, New York, and the author's private collection. It also entailed interviews and communication with representatives of The New York Times and Metro North Railroad.

The Prehistoric Period

Over the last century, archaeological investigation has revealed that metropolitan New York was continuously if sparsely inhabited by aboriginal populations at least since the retreat of the last glacier 10,000 to 12,000 years ago. On Manhattan, most evidence for prehistoric Native American use or occupation has been found on the northern part of the island (Skinner 1915: 52). While a single arrow point was found at 81st Street and the Hudson River (Skinner 1915:52), there are no recorded sites or finds in the immediate project area. However, many of the

sites recorded in Manhattan were discovered during late-nineteenth and early twentieth century development, particularly street grading (e.g., Skinner 1915:50-52). While significant development has occurred on the site since the late-1950s (such as construction of the New York Times plant), streets have never been run through it.

From New York City's early excavations and from more recent investigation of aboriginal sites beyond Manhattan, patterns of land use have been reconstructed. In addition to maize or corn production, which may not have been introduced in the area until contact (Ceci 1977), Native American populations tended to define specific activity or use areas, such as the extensive burial ground at Tottenville on Staten Island (Jacobson 1980) or the hunting or fishing camps located throughout the metropolitan area (Skinner 1915:50-52; 1909). Although "villages" are documented in the literature, those such as the Canarsie site in Brooklyn (e.g., Bolton 1920:313), probably date to the early post-contact period rather than prehistoric times (Ceci 1977).

With the exception of Inwood Park on Manhattan's northern tip, where extensive shell piles or "middens" still exist and where rock shelters are known to have been reused over time, sites documented on Manhattan are mainly transient but perhaps revisited camps used during hunting and gathering forays. (Just recently, during the refurbishing of Liberty and Ellis Islands, extensive Native American shell middens were accidentally uncovered and recorded by the National Park Service but have not yet

been dated [Pousson 1986]; these may also be examples of sites intermittently visited over long periods of time.) In addition, occasional isolated finds such as stone points (like the one mentioned above found at 81st Street) or tools are documented.

At the turn of the present century, shell heaps and deposits (Figure 5), burials, and hearths were documented on both the east and west sides of upper Manhattan (Skinner 1915: 49-51). Moreover, long-established aboriginal trails are believed to have traversed the island from its southern to northern ends, with a major trail running through what is now Central Park (Bolton 1922:Map I). To date, however, no sites have been documented along the island's Hudson shore. One explanation for this may be that more protected sites were sought (e.g., Bolton 1922:42), but summer breezes from the river would undoubtedly have been as attractive to Native Americans as they are to the city's current occupants and estuarine food resources, such as fish, shellfish, and water birds, would not have been ignored.

Skinner noted that small temporary camps were probably once located wherever springs or small brooks emptied into the East or Hudson Rivers (Skinner 1915:52). Rather than being non-existent, it is more likely that these transient camps have been lost during development. A major aspect of development along the Hudson shore was the filling episodes that have occurred in the project area since the mid-nineteenth century, activities that conceivably would have protected rather than destroyed these sites.

Because development has only partially occurred on the site, data from borings are important in assessing the like-

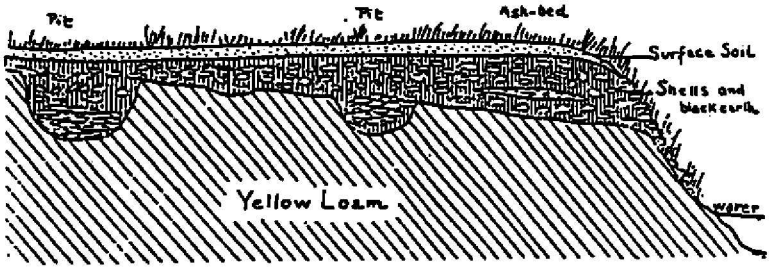


Figure 5a. Diagram of a typical shell deposit (Skinner 1915:13).

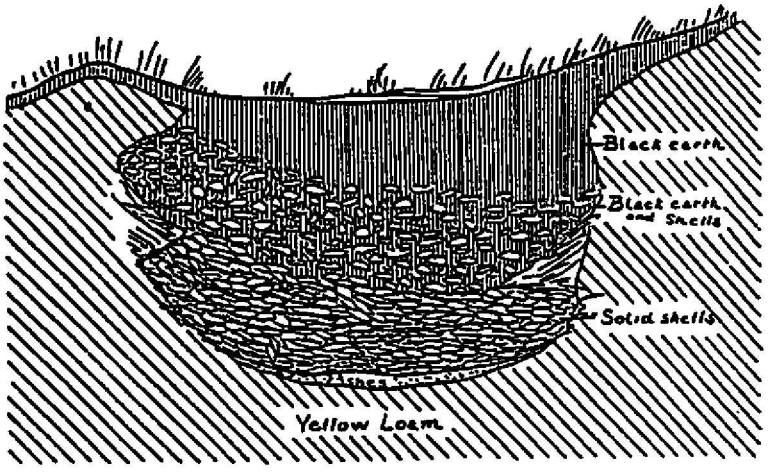


Figure 5b. Cross section of a shell pit (Skinner 1915:14).

lihood of finding intact evidence of aboriginal use or occupation. The twelve borings recently drilled by Testwell Craig Test Boring Co., Inc. in preparation for current development (some of them including continuous samples to aid in the archaeological assessment [see Soil Boring Data and Appendix A]) revealed no evidence of aboriginal use. They did, however, indicate that portions of the site's western periphery contained 22 to 28 ft. of fill (see Appendix A, Borings B5, B6, B10, and B11).

Since topographic maps from the last century indicate that fresh water was available just north and south of the project site (see Figure 3), and since the shoreline in the site area included a small lagoon or bay (see Soil Boring Data below) that might have been attractive to Native American hunters and gatherers, it is possible that foundation excavations will uncover some deeply buried evidence of transient prehistoric use. Since the Manhattan West Site contains deep fill, the most significant evidence for this use would be shell heaps or middens left by Manhattan's Native American hunters and gatherers. Exploration for isolated aboriginal artifacts is not a viable option.

The Historical Period

Until the tracks of the Hudson River Railroad were laid in 1848, the project site was undeveloped farmland bordering the Hudson River. No Dutch grants had been issued north of Great Kill, a stream that entered the Hudson at what is now 42nd Street. In 1677, the land that included the project site was

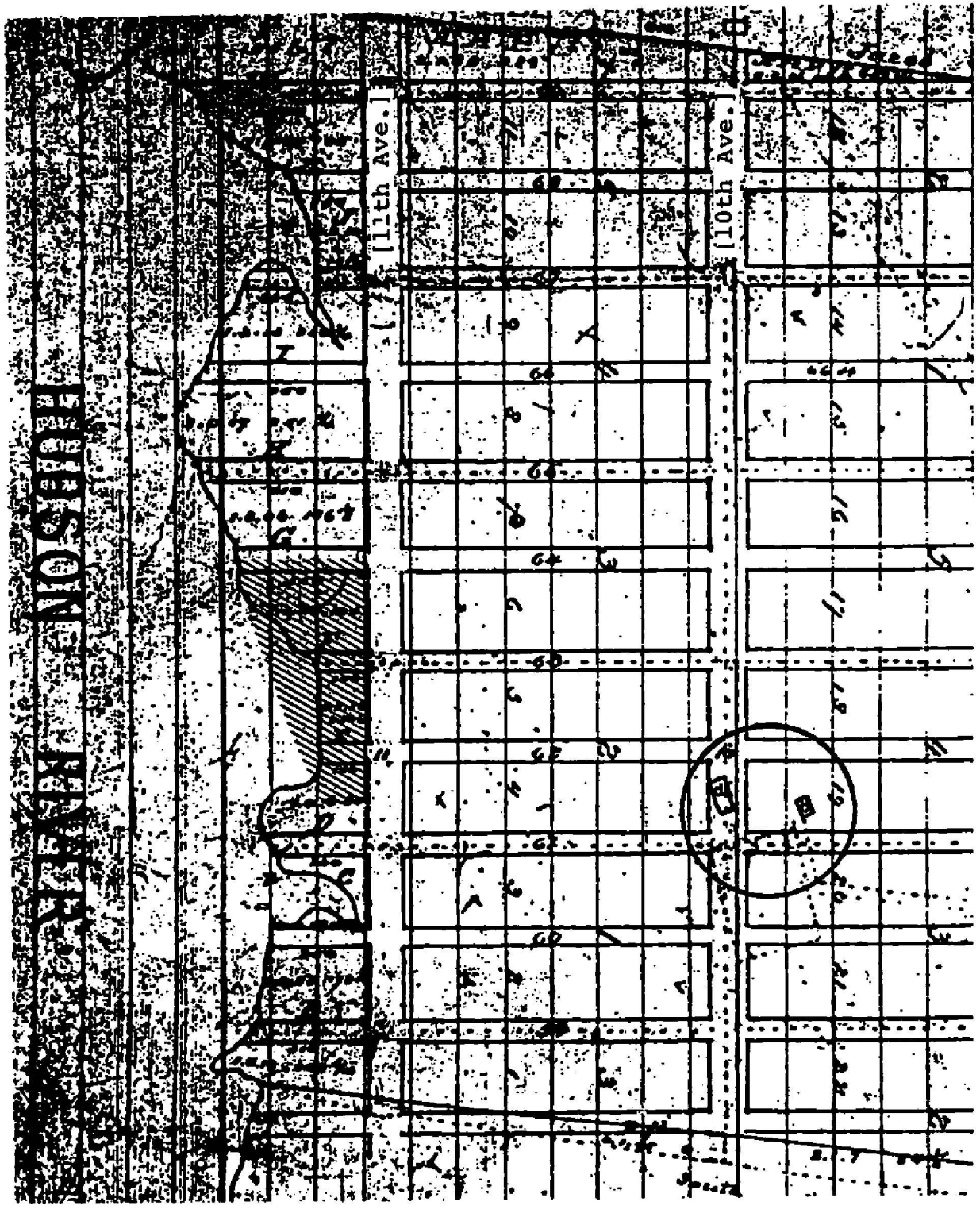
first patented to Thomas Hall, Jan Vigne, Egbert Wouters, and Jacob Leedsite [Leendersen] who initially received "upwards of 500 acres" north of the Great Kill (42nd Street) (Stokes IV 1922: 265); apparently a second grant increased this holding to about 1000 acres (Stokes VI 1928:125) and included land along the Hudson almost to 89th Street. Hall, who acquired Lots 3 and 4, the part of the grant that included the project site, owned a great deal of land on Manhattan and is believed to have been among the island's first English settlers (e.g., Stokes IV 1922:81). Over the next half century, Hall's land passed first to Theunis Cornelissen Stille and then to John Harpendink who apparently sold it to Etienne de Lancey in 1729 (Stokes IV 1922:139).

This property remained in the illustrious de Lancey family --among whom were a member of the King's council and a Lieutenant Governer of the Province of New York (Mott 1908:81-82)--for three generations. In 1779 it was confiscated from James de Lancey the younger, Etienne's grandson and a British sympathizer. In 1785, when it was bought from the Commissioners of Forfeiture by John Somerindyck [Somerindike], a grocer (Liber of Deeds [hereafter LD] 85:295), the property included a dwelling house probably built by Etienne's son, Stephen, which was located between what is now 61st and 62nd Streets where 10th Avenue has been run (Stokes VI 1928:140). Another building, a barn, was situated just to the east, however, no structures are indicated directly on the project site (Figure 6).

In 1809, nineteen years after Somerindyck's death, the 318-acre farm that stretched along the river from 57th to 70th

MANHATTAN WEST: Detail of 1808 Bridges Survey of the Somerindyck Farm. Mid-18th century dwelling and barn circled.

6



project site, approx.

no scale given

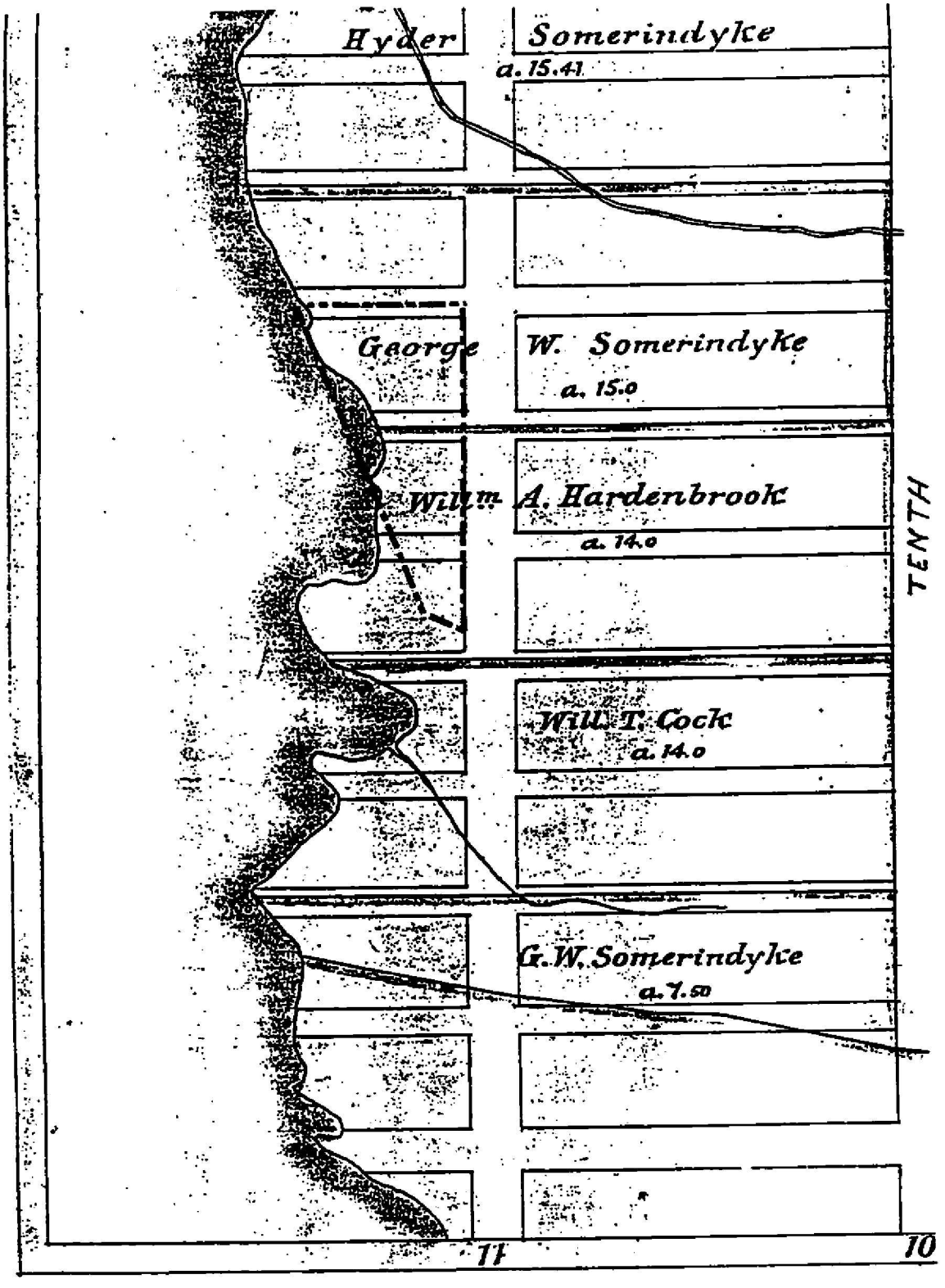
Somerindyck dwelling (d)
and Barn (b) circled

Streets (Mott 1908:81) was divided among his five children (Conveyance Index Prior to 1917:Book 128). The portion that included the project site was allocated to a daughter and son: Margaret, the wife of William A. Hardenbrook, a grocer like his father-in-law, received the lots between 61st and 63rd Streets while George W. Somerindyck acquired those between 63rd and 64th (LD 85:295ff; Sackersdorf 1868, Figure 7 this report)). Through a series of foreclosures and sales, both holdings were acquired first by John Low and then, after his death in November of 1852 (New York Evening Post), through inheritance by his daughters Julia Ann and Susan and his son William P.

John Low's extensive property included "Locust Grove," a large house located southeast of the site. Called "Low's Wood," this land, which included the site, was a favorite picnic spot even after the advent of the Hudson River Railroad in 1848 (Mott 1908:12). In this year, track for the new railroad followed the shore to 62nd Street where it angled east to 11th Avenue (see Figure 13). Julia and Susan, who remained unmarried, held the land east of the track while their brother's holding was west of it and included the rights to adjoining water lots. Susan parcelled her land between 62nd and 63rd Streets and in 1854, a Samuel Leetch acquired two lots and built the site's first structure (LD 636:75ff; Tax Rolls Ward 22 [hereafter TR] 1854).

Maps from the 1860s and early-1870s show Leetch's three-story structure, but its exact location is a question. It appears from the deed description that the Dripps map (Plate 6) is less accurate than the Perris (Plate 7), but even on the Perris the parcel may be too far south.

MANHATTAN WEST: Detail of 1868 Sackersdorf Map of Farms based on 1815 map. This is an 1887 reprint. 7



project site, approx.

no scale given

Note: although southern portion of the project area is shown as belonging to William Hardenbrook, it actually belonged to his wife, Margaret Somerindyck.

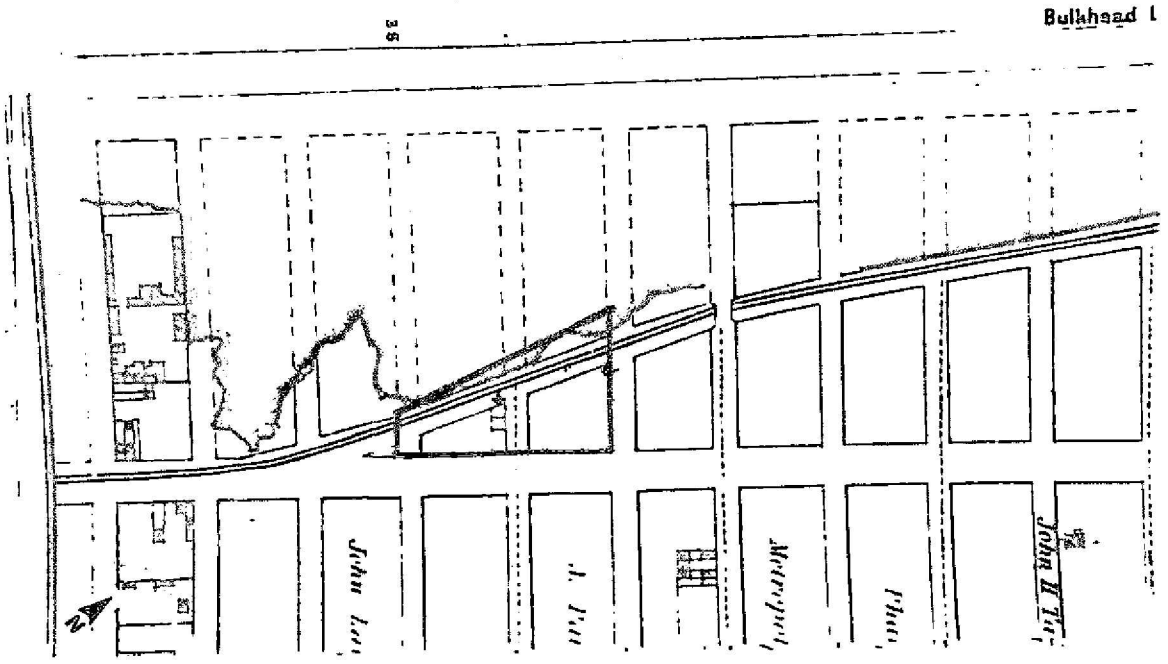


Plate 6. Detail of Dripps Map of New York City and Vicinity (1867). Note 3-story building on south side of 63rd Street (arrow). This location appears to be north of the description of the property in the deed to Samuel Leetch in 1854 (Map, NYPL Map Division). Site outlined in black.

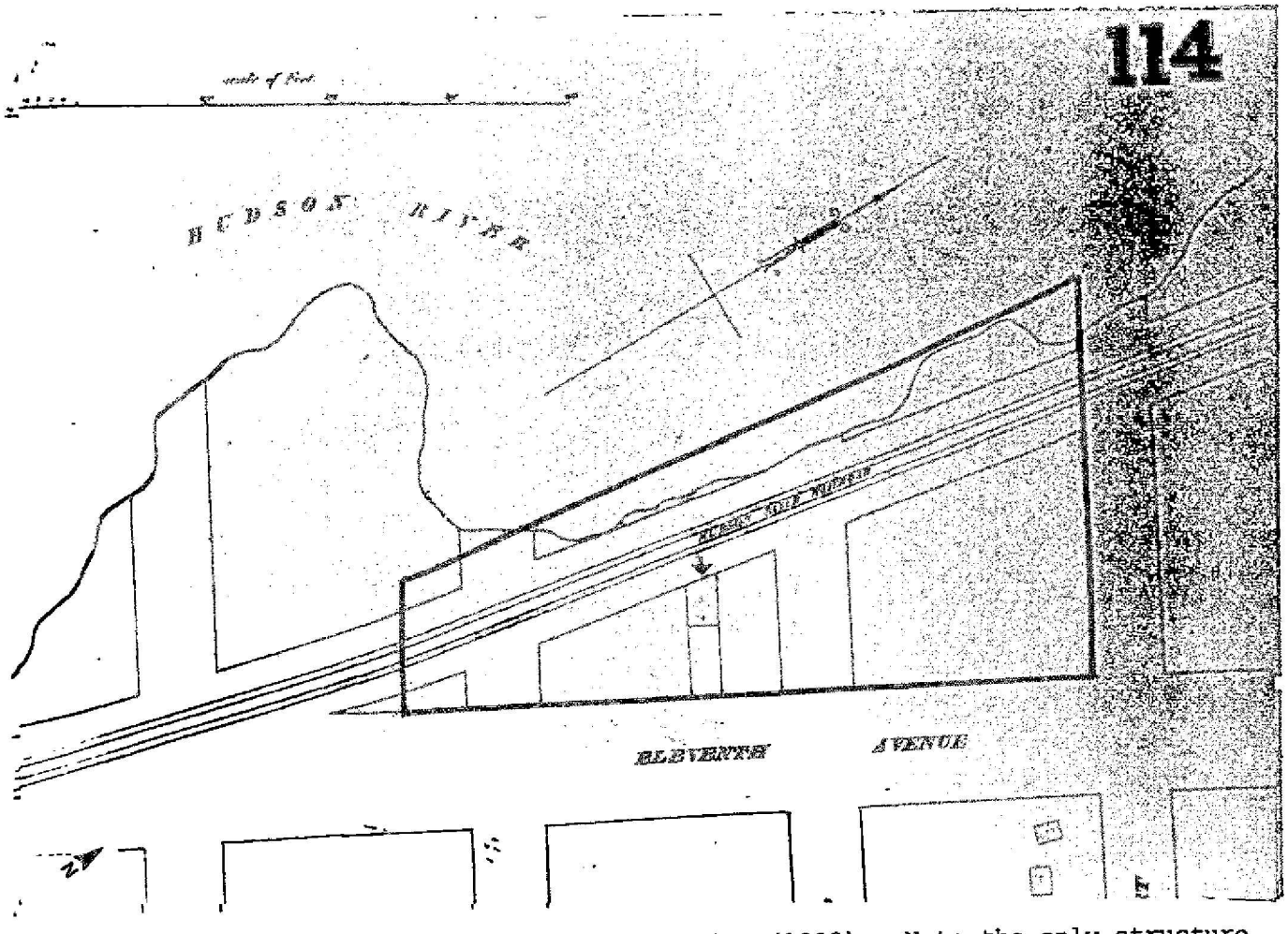


Plate 7. Detail of Perris Maps of New York City (1862). Note the only structure on the site is a 3-story building (arrow) between 62nd and 63rd Streets. The location of the building, apparently a laundry and dwelling in 1854 appears more accurate than that shown on the later Dripps map (see Plate 6, above). (Map, NYPL Map Division). Site outlined in black.

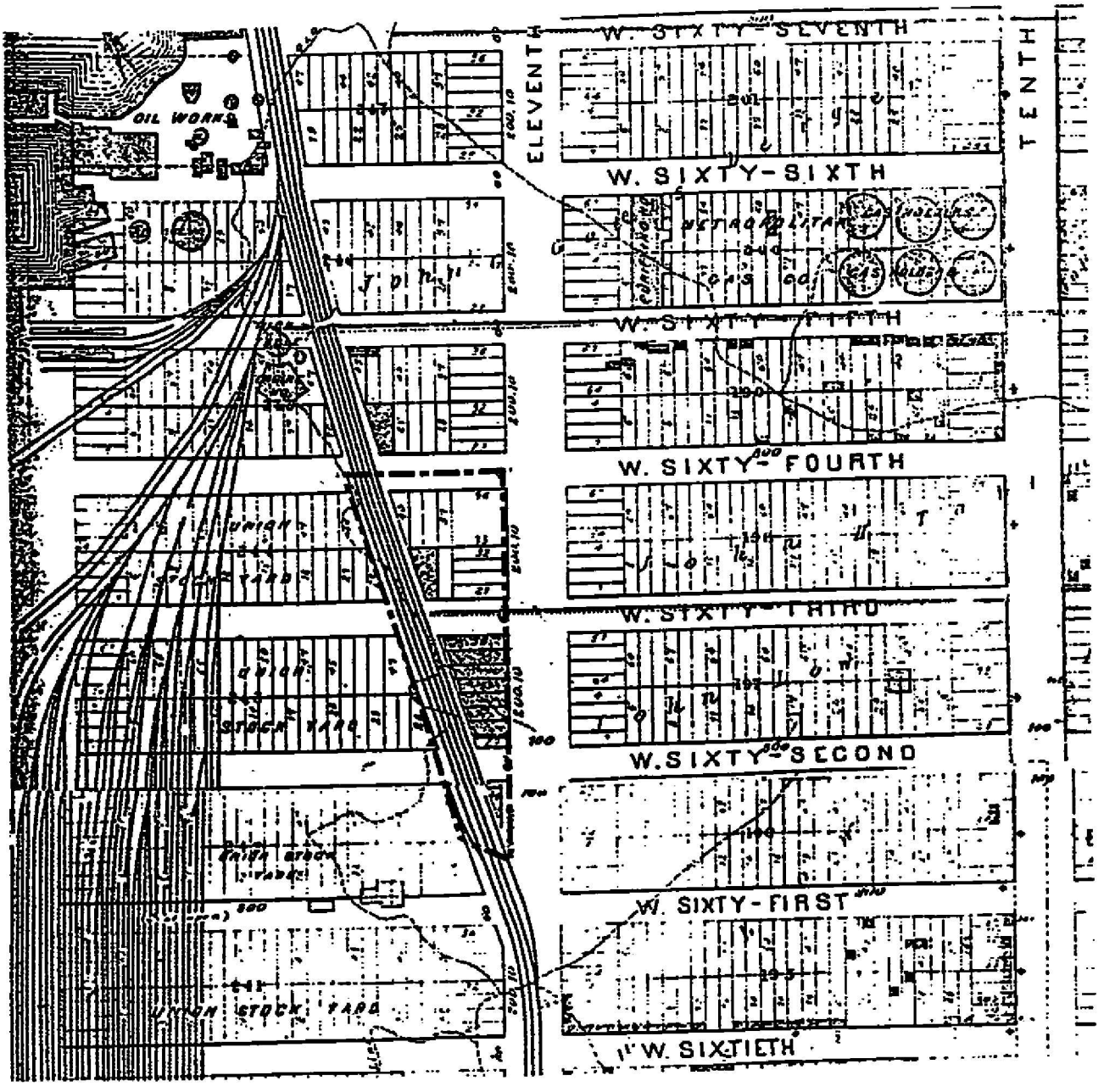
The only listing for Leetch is in the 1854 New York Directory which indicates the building was a laundry, but since no other address is given as his residence, it may also have been his home. This building, which was apparently a rental property, passed through several hands until it was replaced by a large, two-story structure indicated on maps dating from 1879 (Bromley 1879; Galt and Hoy 1879, Figures 8 and 9 this report).

Between 1852 and 1869, while the area was still bucolic (Plate 8), the rights to land under water to the west were acquired by owners of the project site and others; this included John Paine, William Blodgett, and John Wetmore who had purchased land from the Lows (LD 1312:235ff) and water lot grants from the city (e.g., Grants of Land Under Water Liber I:414, 496).

Maps document that streets between 59th and 65th from 11th to 12th Avenues were graded and therefore filled by 1869 (e.g., Figure 10), indicating that the land west of the site was reclaimed from the Hudson by this time. Above 65th Street, this was not yet the case (Map, Borough of Manhattan President's Office 1868:#2429) and even earlier landfill may have been introduced directly on the site to accommodate the railroad (see below). A map of the proposed route indicates the track bed ran just offshore in a lagoon or bay-like area in the vicinity of 63rd Street (See Figure 13). A report on the plan suggests that in the vicinity of 63rd Street this track was to run on an embankment created by a stone seawall and fill (Jervis 1846:4-5; see below).

MANHATTAN WEST: Detail of 1879 Bromley Atlas

8

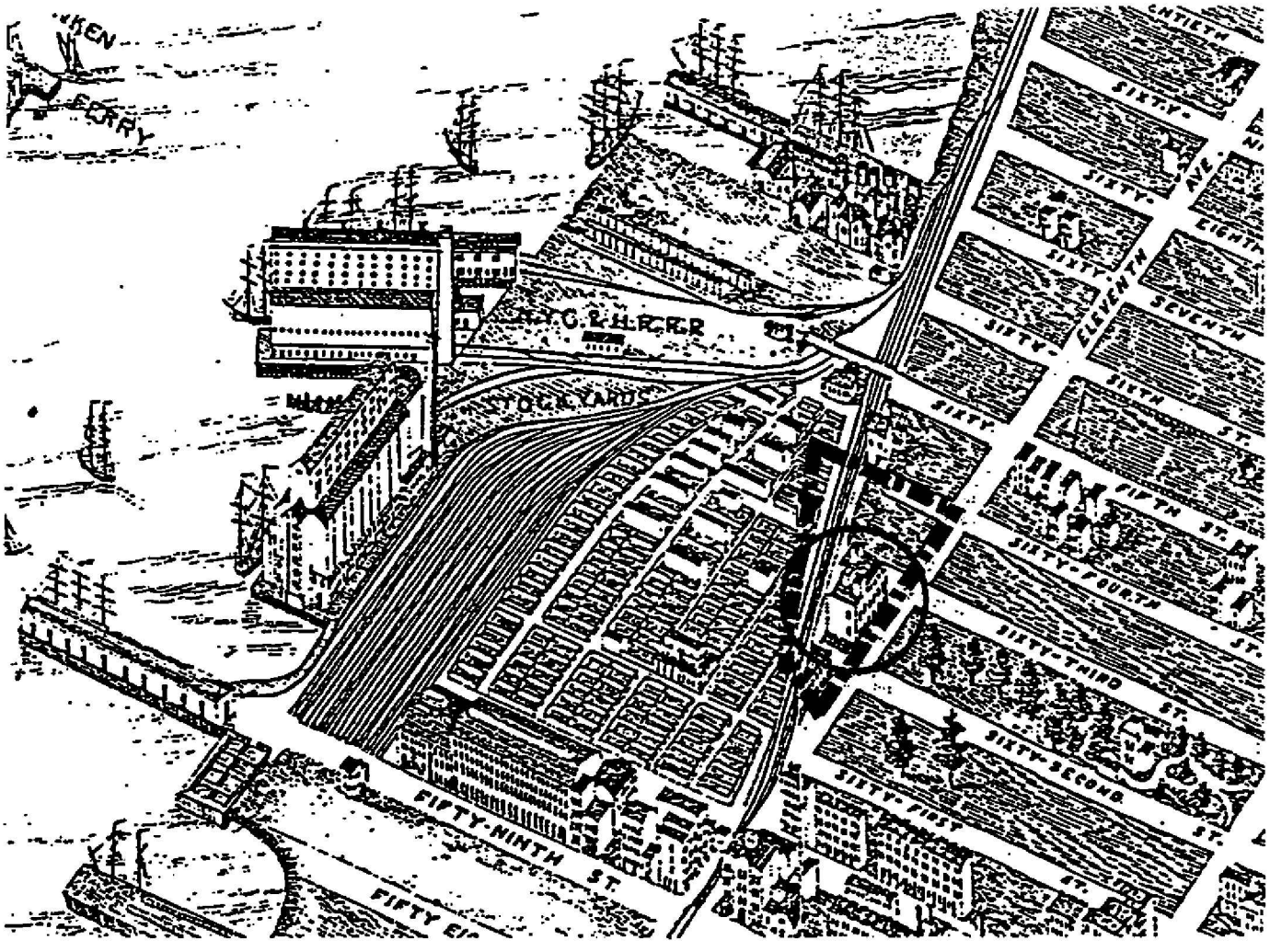


▬▬▬ project site, approx.

Structures indicated between 61st and 63rd Streets are shown isometrically on the contemporaneous Galt & Hoy map (see Figure 9).

MANHATTAN WEST: Detail of 1879 Galt & Hoy Isometric Map of New York City

9



project site, approx.

no scale given

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Two-story structure located between 62nd and 63rd Streets is circled. Other structures shown between 61st and 62nd Streets are not documented in tax records.

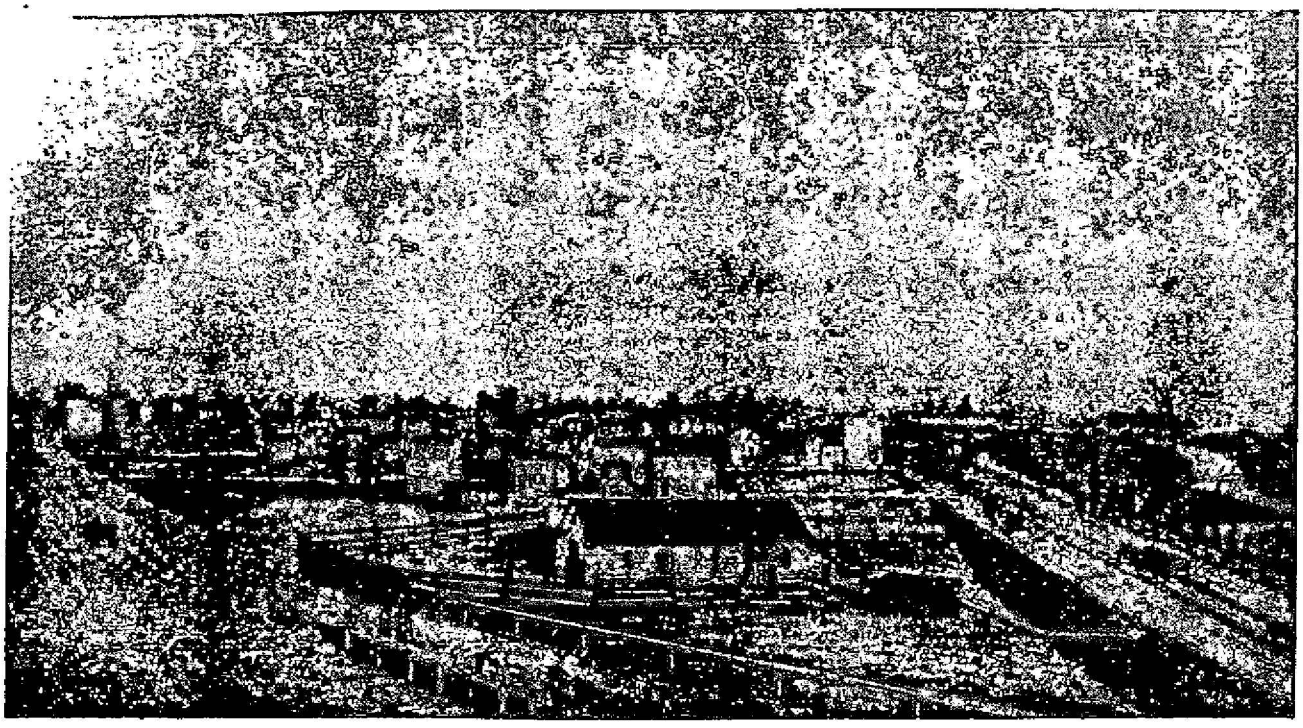
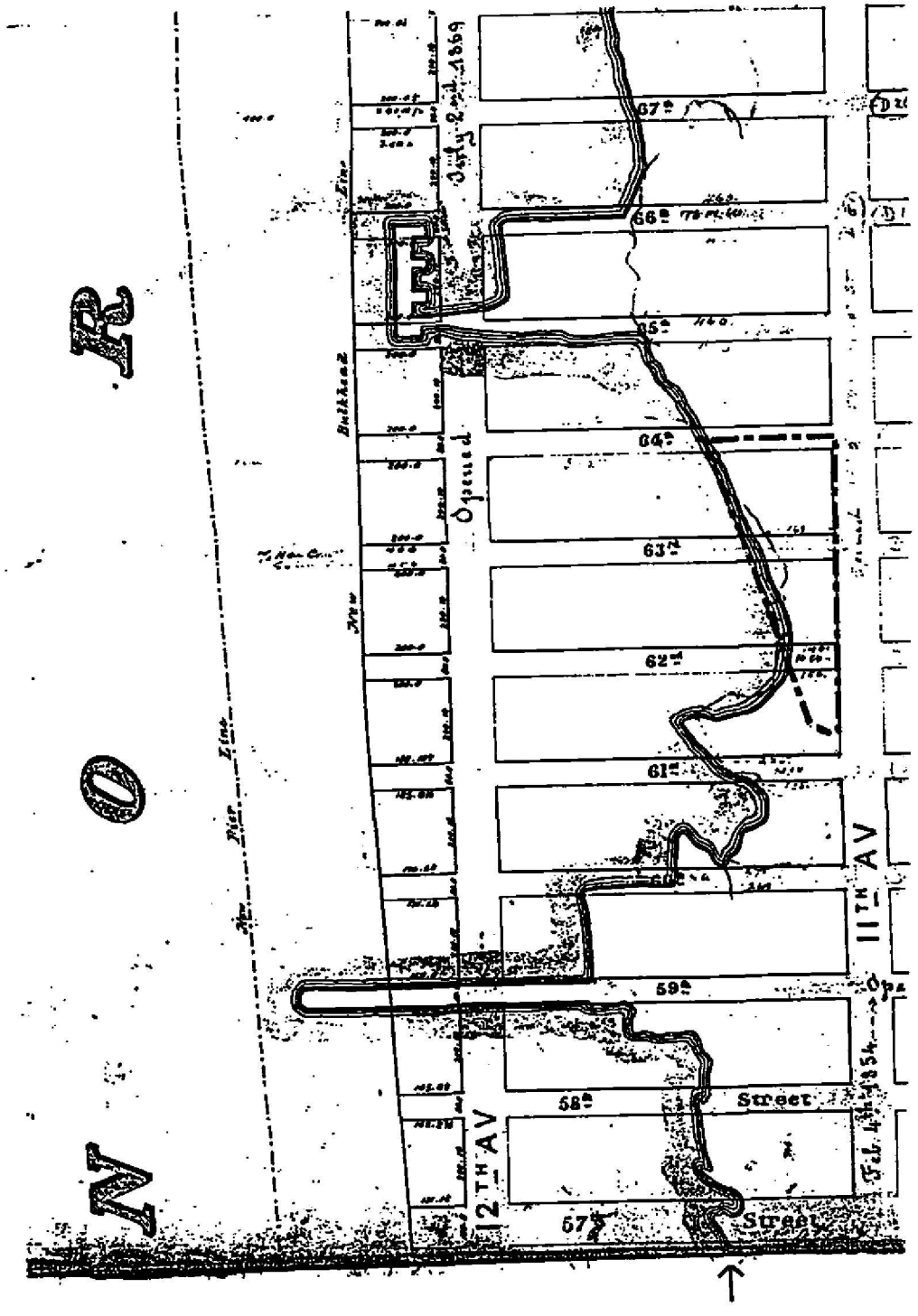


Plate 8. View of the former Somerindyck Farm looking north from what became Columbus Circle. While the site is to the west beyond this 1862 view, the general buccolic nature of the area undoubtedly extended west despite development that included the Hudson River Railroad. What appear to be skaters in Central Park to the far right seem incongruous with the warm-weather dress and activities of the people depicted on the left hand side of the picture (Mott 1908:opposite page 80).

MANHATTAN WEST: Detail of Road Opening Map (Undated)

10



project site, approx.

original shoreline

dimensions as indicated

Although undated, information on the map indicates it post-dates 1869. Note that 12th Avenue in the site area was opened by this year, indicating the land was filled by then.

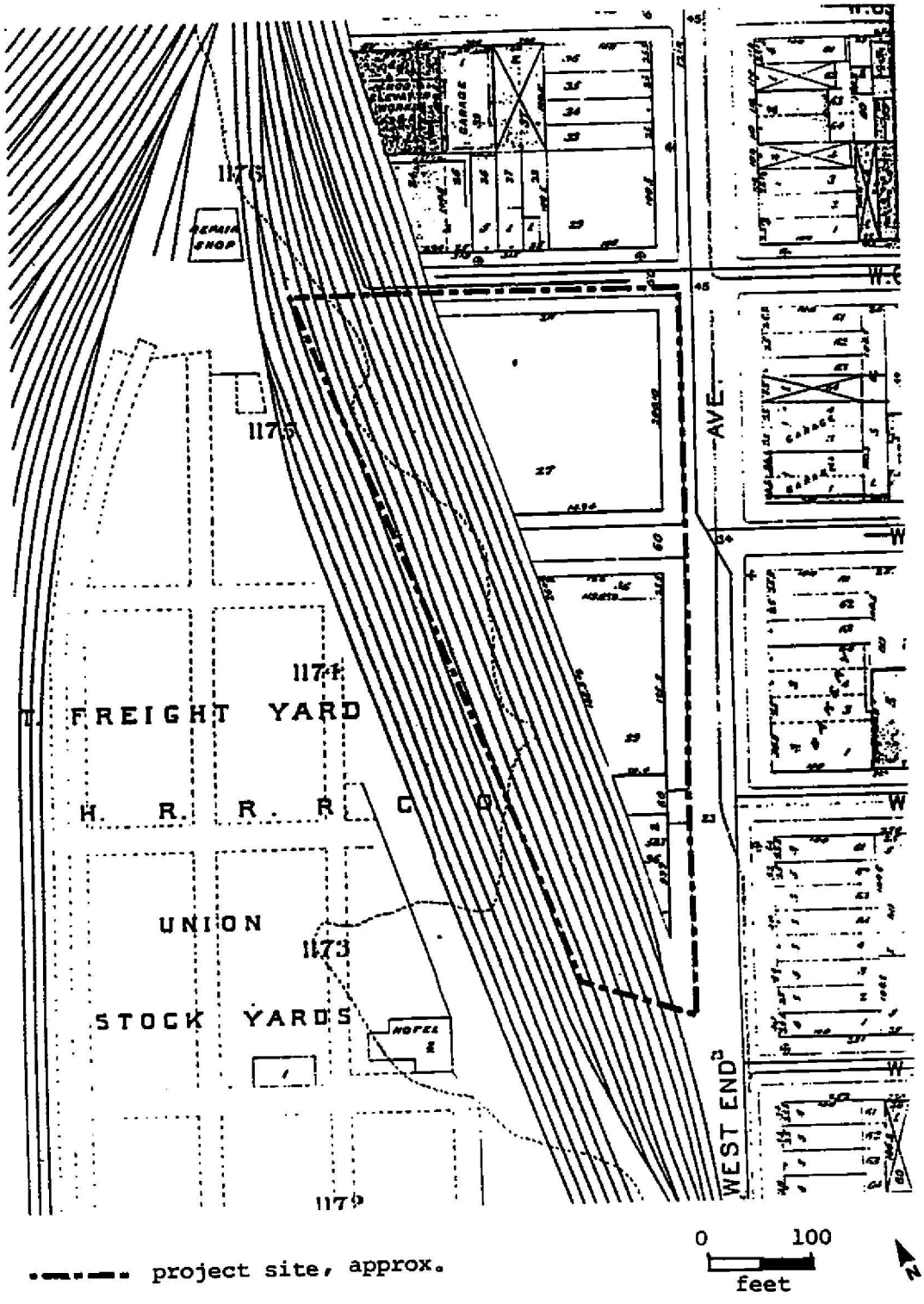
In addition to the double tracks that crossed the site by 1848 and expanded over time, stock and freight yards were located on landfill west and south of the site by 1879 and other industries had sprung up to the south and north (Bromley 1879; see Figure 8 this report). As noted earlier, by this time a large, two-story structure had replaced Leetch's building (TR 1879; see Figure 9 this report); a Gill & Mansfield are listed on the tax rolls for this property, the former a millwright, the latter a feed dealer (New York Directory 1877). At about this same time, several one-story frame and brick structures briefly stood between 63rd and 64th Streets (e.g., Perris & Browne 1871). It is possible this development was at least indirectly related to the railroad's function and expansion. Deed restrictions imposed by Julia and Susan Low against noxious development such as slaughter houses or tanneries (e.g., LD 1066:7ff) may have helped limit the project site to this kind of use.

Over time, an elevator works, a bakery, stables, and garages coexisted with one- to three-story buildings and vacant lots to the east and north while railroad development intensified on and to the west of the site (Bromley 1899, Figure 11 this report). This development continued through the first half of the twentieth century (see Plates 3 and 4). By this time, low structures such as loading platforms were built to service the railroad (New Building Plans [hereafter NB] 1528-05, 371-12, 1314-12, 105 to 107-30).

To take advantage of the shipping facilities provided by what was by then the New York Central Railroad (Harris 1986:

MANHATTAN WEST: Detail of 1899 Bromley Atlas

11



project site, approx.

Note intensified railroad track construction and the location of stock yards. Note also that structures between 61st and 63rd Streets on earlier maps are gone (see Figures 8 and 9).

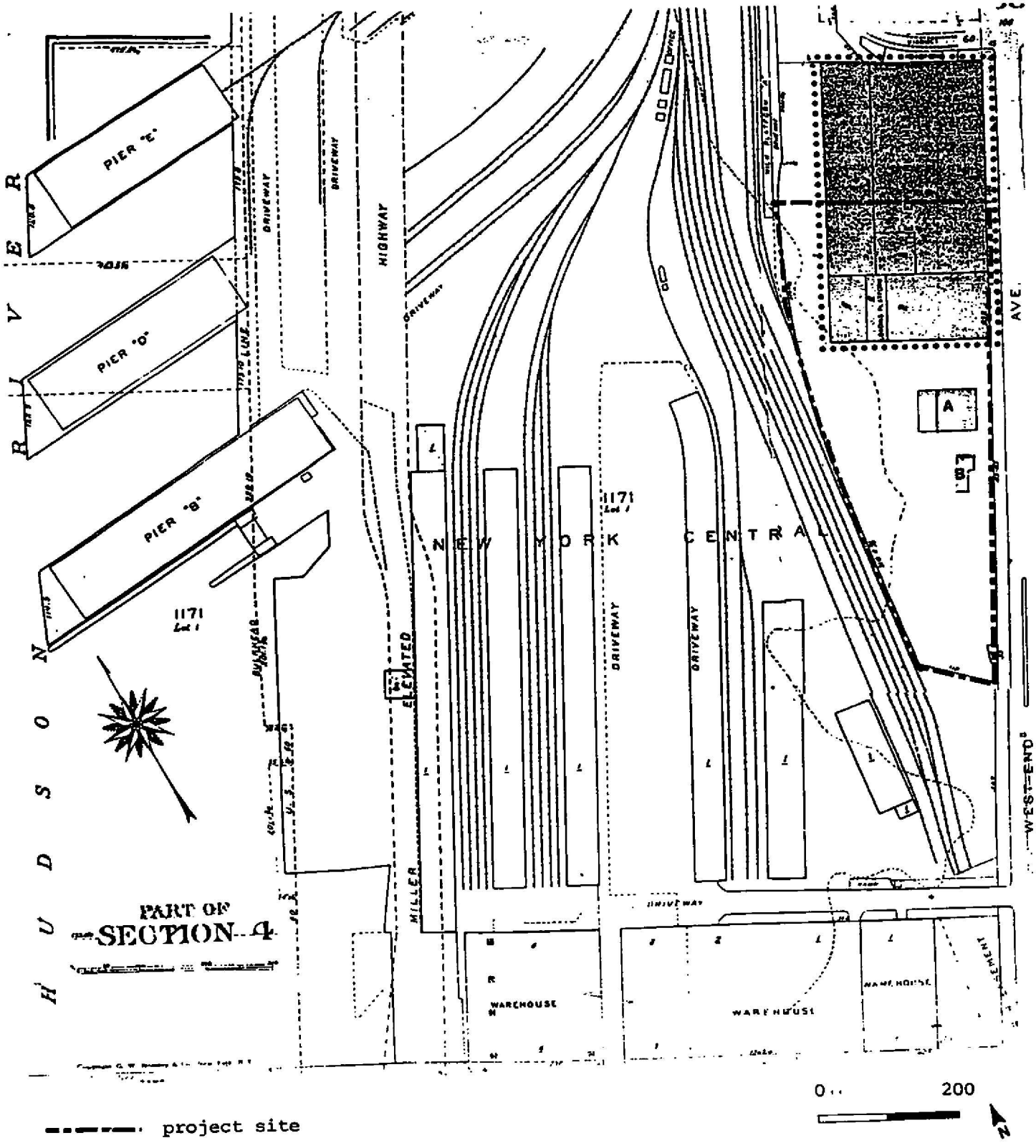
personal communication), the New York Times filed plans in 1956 for a printing plant on the site that ultimately was to have included a fourteen-story tower to accommodate the paper's entire operation (NB 138-56). In 1959, a four-story segment of this complex was opened (Figure 12), but the tower was never built (Rothman 1986: personal communication). Apparently the basement of this now-demolished building remains sealed beneath the parking lot, a situation noted by the tenant of the garage at 63rd Street and supported by the conditions recorded in borings (see Borings B2, B3, B4, B7, and B8, Appendix A).

In 1976, seventeen years after printing operations began, the plant closed (Rothman 1986:personal communication). The year before, Donald Trump had been given an eight year option on the property, and in 1982 it was picked up by Helmsley-Spear (Purnick 1982). At that time, a consortium of investors proposed the Lincoln West development that included the project site (Konheim & Ketcham 1987:personal communication). Currently, the development proposed by the Brodsky Organization includes residential buildings with ground-level neighborhood retail stores above a parking garage; it also incorporates a large health club, a public park between 63rd and 64th Streets, and private open space (Konheim & Ketcham 1987:personal communication).

Reconstruction of the site's history indicates from its initial development in the mid-nineteenth century until now it has been mainly industrial. The only facet of this development of historical significance relates to the mid-nineteenth century construction of the Hudson River Railroad that ultimately linked

MANHATTAN WEST: Detail of 1931 Bromley & Robinson Atlas (updated to 1961) Showing New York Times Plant.

12



project site

A Garage

B Gas Station

..... NY Times Plant

New York City to Albany via a land route. A brief general history of the Hudson River Railroad and its relation to the project area will be found in the following section.

THE HUDSON RIVER RAILROAD IN NEW YORK CITY

General Development

The site's initial and major development depended on the mid-nineteenth-century introduction of the Hudson River Railroad, later part of the New York Central Railroad. Although the Vanderbilt name is associated with the New York Central Railroad and is found in the conveyance history of the project site (e.g., LD 497:306), Cornelius Vanderbilt was not an organizer of the Hudson River Railroad and did not become involved with it until after it was a successful venture.

The Hudson River Railroad was intended to provide an overland link between Albany and New York City and was under consideration as early as 1832 (Carter 1909:180) or about the same time the Harlem River Railroad to the east was chartered (Anon. n.d.). Finally, in May of 1846, after several aborted attempts to get action, the state legislature incorporated its charter and authorized construction of a roadway between New York and Albany (Stokes V 1926:1798). A stipulation was that this new enterprise, then the most costly railroad in the United States (White 1986:personal communication), would not infringe on the Harlem River Railroad. One month later, the entire capital stock of $3,000,000 had been subscribed, mainly in New York City (Carter 1909:180), but two subsequent extensions for starting deadlines indicate that work was initially delayed.

In May of 1847, the city's Common Council permitted the railroad to "construct a double track along the Hudson River from Spuyten Devil [sic] Creek to near 68th Street occupying 12th Avenue where it lies along the shore, thence winding from the shore to intersect the 11th Avenue at or near 60th Street..." (Stokes V 1926:1803). From here it was to run through the middle of the avenue to 32nd Street, a route that became known as Railroad or "Death" Avenue (NYPL Photographs 1933:1037 A4). It then was to curve to 10th Avenue at 30th Street where it would run on the avenue to West Street (Stokes V 1926:1803). (It should be noted that steam engines were prohibited below 30th Street and horses were used to draw the train between 33rd and Chambers Streets [Stokes V 1926:1803]). On the 30th of September, 1849, a locomotive ran the 48 miles from 30th Street to Peekskill (Stokes V 1926:1822). By October, 1851--with its first station at Chambers Street and College Place--the railroad was ready for passengers.

In 1853, apparently in response to agitation over the unexpected competition the railroad presented to the Erie Canal, consolidation of ten independent railroads made history, and the New York Central Railroad was formed (Carter 1909:180-181). Its charter was for 500 years and its capital was fixed at 23 million dollars. It wasn't until 1863 that Cornelius Vanderbilt, by then a multi-millionaire from his ferry and steamship lines, became involved with the Hudson River Railroad. Five years later, after he had maneuvered a takeover of the New York Central, the Hudson River Railroad merged with it. At about

this same time, in his drive to improve the railroad, Vanderbilt erected the first Grand Central Station at 42nd Street and a depot for the Hudson River Railroad at once-fashionable St. John's Park in what it now TriBeCa.

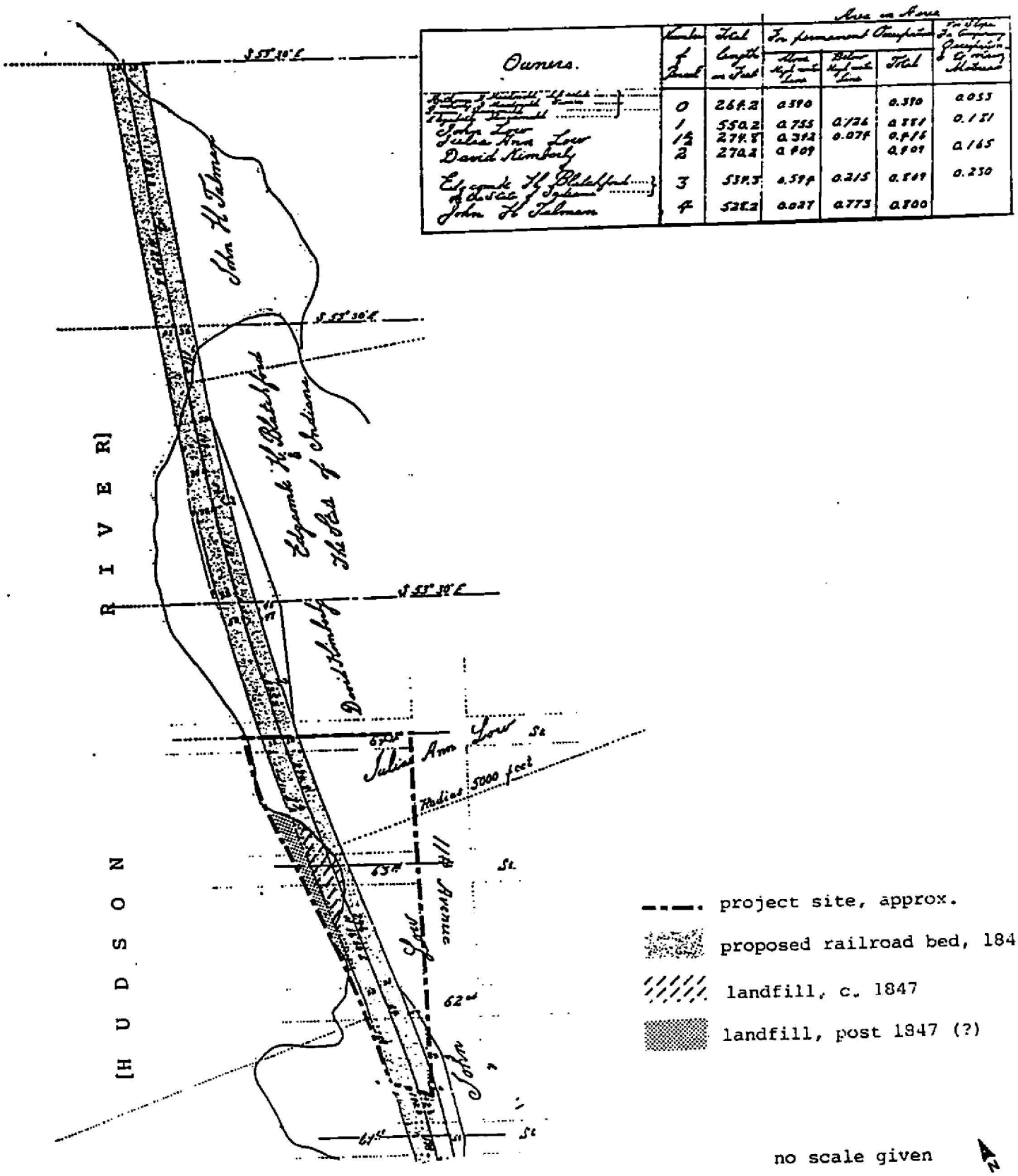
Nineteenth-century maps show a steady increase in trackage on and around the site; this included tracks laid on the more recently filled land just west of the project site (for example, compare the 1854 Harrison & Magrane Map, Figure 3a this report, with the 1879 Bromley Map, Figure 8). By the time the New York Central merged with the Pennsylvania Railroad in 1968, the original Hudson River tracks were no longer in operation (Kaplan 1986:personal communication). As noted in the historical section, in the first decades of the twentieth century most if not all the site's development continued to center around railroads and included platforms and other low structures to service them (see Plates 3 and 4).

The Railroad in the Site Area

Deeds document the Hudson River Railroad's land acquisition in the site area in 1848 (e.g. LD 502:102, 502:104, 497:306), and an 1847 route map indicates its planned location on the site (Figure 13). In the vicinity of 63rd Street, this was just off shore and would have required some kind of landfill to lay the track. Although no plans have been found, contemporary reports provide some information about this undertaking and a treatise on nineteenth-century engineering techniques offers additional clues. For example, John B. Jervis, the chief engineer of the project (and, incidentally, of the Croton water

MANHATTAN WEST: Detail of 1847 Map of the Planned Route of the Hudson River Railroad in the Site Area

13



Note areas of fill in the vicinity of 63rd Street (based on Map 475, Manhattan Borough President's Office, Topographic Bureau).

system), published reports before and after the railroad was built; the earlier of these was obviously promotional and perhaps must be approached with a degree of caution. In addition, he kept a journal that documents work on the railroad but does not mention the site area specifically; however, it does indicate that work in Section 1, which included the site, proceeded well, and by January 1, 1849, preparation for the superstructure was almost complete (Jervis 1847-1859:189).

Prior to construction, Jervis described the river's shore as "generally favorable for an embankment where it is necessary" (Jervis 1846:3). This included areas between points of land such as those found north and south of 63rd Street where embanking was required to keep the track route straight (Figure 13). Of special interest is his comment that "the depth of water, as far out as the embankment will extend...mostly or entirely in the river, is generally from one to two feet at ebb tide; and in no place [along the shore] exceeds three feet" (Jervis 1846:3-4). This implies a relatively simple maneuver although, for reasons of safety, the line's road was to be wide (Jervis 1846: 9, 18), entailing the construction of substantial foundations to support embankments. For a distance of about ten miles above 14th Street, 190,000 cubic yards of embankment and 29,000 cubic yards of protective walls were planned (Jervis 1846:23).

What had sounded simple in plan turned out to be more complicated in practice. Land acquisition was costly and difficult, the river banks rugged and irregular, and the river bottom uncertain (Jervis 1850:4-5). Another problem concerned the in-

experience of the many contractors involved--it was a new kind of engineering undertaken under difficult conditions--but by September 1, 1847, the project was mainly contracted.

The following is a description of the planned embankment construction that theoretically applies to the project site:

> ...it was necessary, in all earth work, to construct a river wall, to protect the earth from being carried away by the surf from the river... an artificial foundation is made by filling in a mass of loose stone, which is brought up to low water level, and then levelled off and the wall commenced. The wall is about seven feet thick at the base, and three feet at the top (Jervis 1850: 5).

Jervis notes that excavated earth and rock were used to form embankments; this increased the cost of excavation but prevented the countryside from being mutilated to provide materials (Jervis 1850:7). He does not, however, describe the timber framework or "sheet piling" recommended by some late-nineteenth-century engineers to support embankments and provide stability (Gilespie 1871:167-168). In addition, it should be noted that concave fill levels, no more than 3 ft. thick, were also recommended (Gilespie 1871:167-168). Jervis undoubtedly knew of these techniques and may have used them. Unfortunately, his journal, mentioned earlier, does not reveal the specific construction methods used in the site area (Jervis 1847-1849).

Among the general engineering problems encountered were the rugged shoreline and the difficulties of running and maintaining the line in the numerous bays (Jervis 1850:8). Therefore, it is possible some contractors may have found it neces-

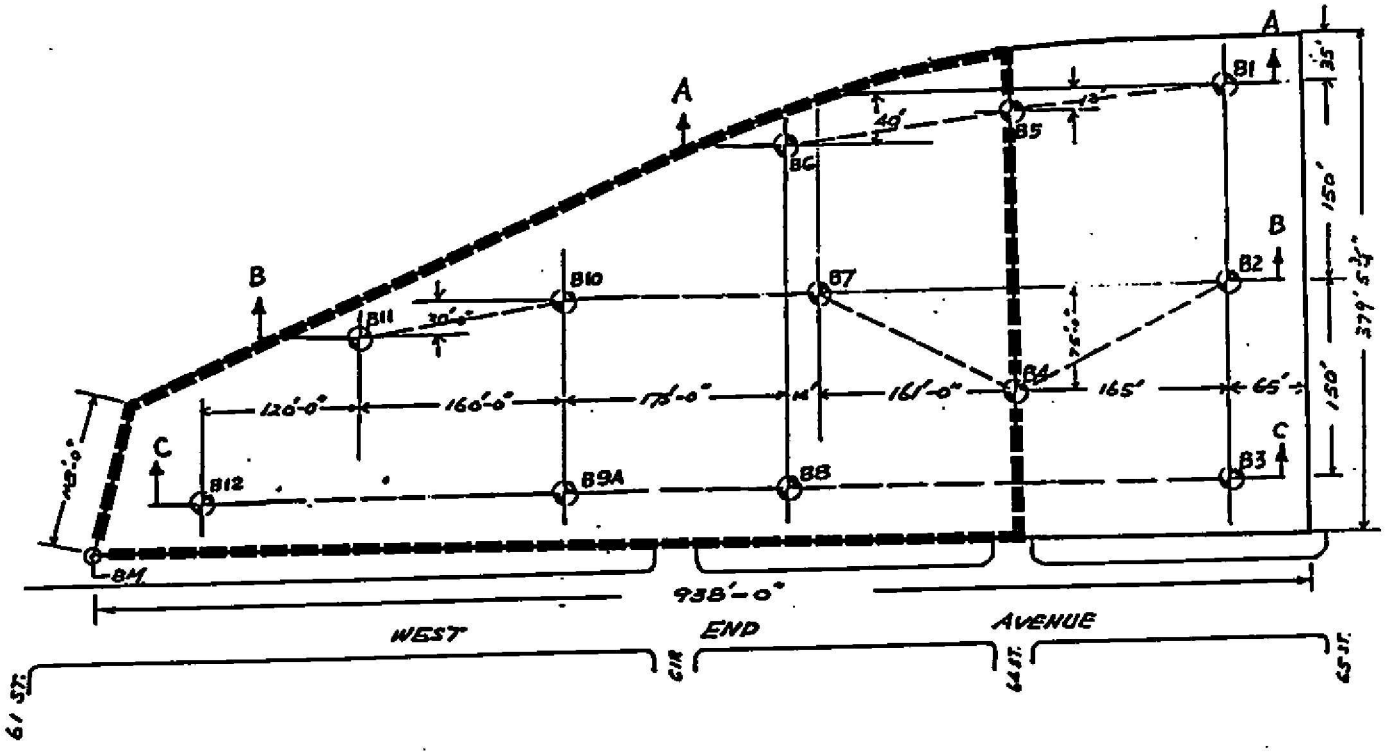
sary to use timber to fashion and stabilize embankments. If so, these constructions would differ from those planned by Jervis, and the fill, which conceivably would not be randomly deposited but layered, would contrast with that deposited solely for land reclamation.

Comparison of water levels and fill depths suggests that a great deal of fill has been introduced across this portion of the site. This is based on the 1 to 3 ft. water depth at ebb tide noted by Jervis, and the fill depths recorded in borings from the site's western periphery (14 to 28 ft. below the current surface). Foundation excavations in this area should determine whether portions of the fill are systematically deposited for embankment construction or merely randomly deposited for land reclamation. If deep enough, they might also reveal the techniques used to support the railroad embankment that ran approximately 100 ft. north and south of the 63rd Street mid-line.

SOIL BORING DATA

As noted earlier, in preparation for construction twelve borings were sampled to bedrock by Testwell Craig Test Boring Co., Inc. To recover information about subsurface conditions for the archaeological evaluation, several of the borings were sampled continuously rather than at the 5-ft. intervals usually acceptable for construction purposes. These included borings B5, B6, B9A, B10, B11, and B12 (Figure 14 and Appendix A). Boring B9A was drilled adjacent to B9 where interval sampling had recovered a shell 6 ft. below the surface (because of site

MANHATTAN WEST: Soil Boring Location Plan (Testwell Craig 1986) 14



— BORING LOCATION

— BENCH MARK

dimensions as indicated

Project Site

conditions, B9 was terminated at 17 ft. and not taken to bedrock). The continuous sample from B9A indicated that the shell from B9 and another from B9A were part of a fill deposit that extended approximately 16 ft. below the surface and was not of any cultural significance. Moreover, a basement floor from an unidentified building and boulders were encountered under this fill, further negating any prehistoric associations for the shell.

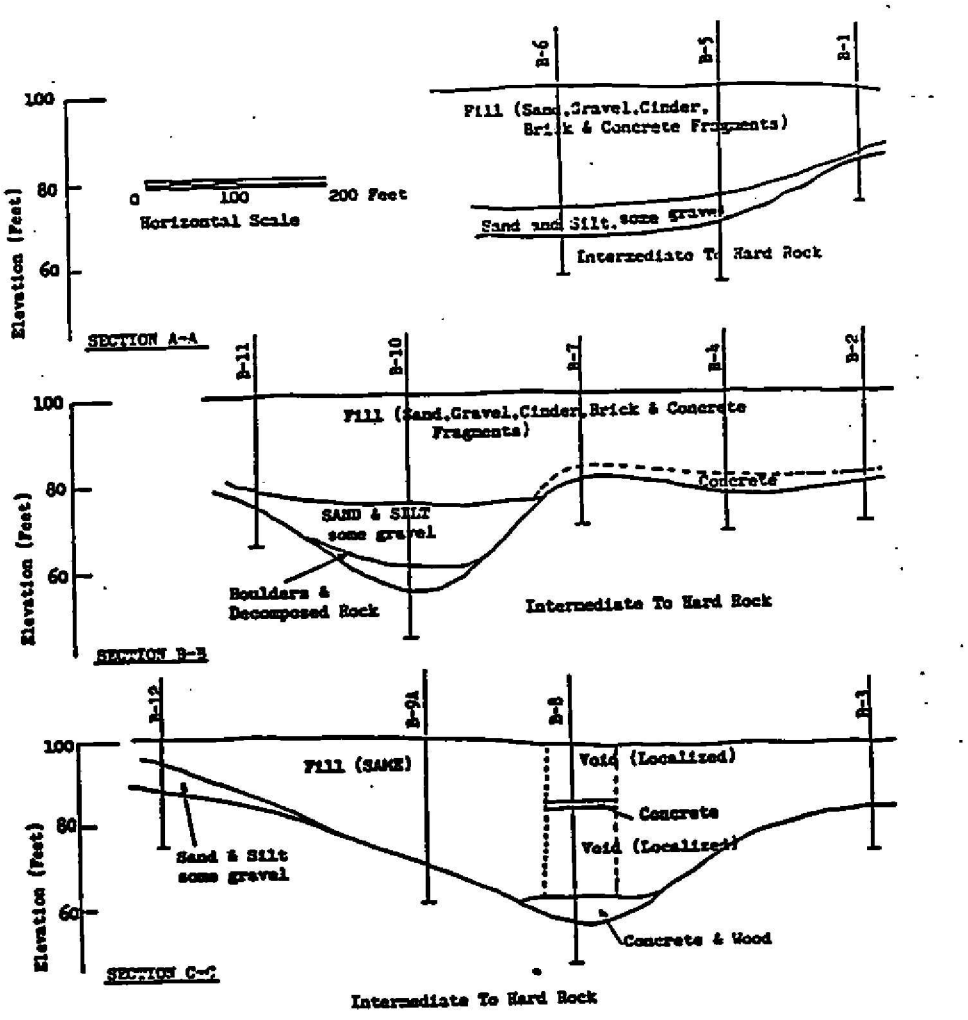
The location of B12 just north of 61st Street was in part chosen on the basis of the 1874 Viele map that indicated this was the site's only hilly area. Because of this, it was thought prehistoric hunters might have chosen to camp there or use it as a place to spot game (see section on prehistory and Figure 3b). The soil boring data did not provide any evidence of this kind of use, but did indicate bedrock was about 10 ft. higher here than elsewhere on the tested portion of the site (Figure 15, CC). However, this may only have been a minor surface elevation since the 1854 Harrison & Magrane topographic map, which generally appears more reliable than the Viele, does not indicate a hill at this location (compare Figures 3a and 3b, this report).

Several borings revealed empty space beneath the surface of the demolished New York Times printing plant site (see Appendix A, B2, B3, B4, B7, and B8) where demolition debris was expected. This void tends to support information from the tenant of the garage at 63rd Street that equipment from the plant, which would have been costly to remove, is sealed beneath the parking lot.

In terms of an archaeological assessment, the most important information came from B10 in the western portion of the

MANHATTAN WEST: Subsurface Profiles Based on Soil Borings (Testwell Craig 1986)

15



NOTES:

1. Elevations are based on surveyor's sidewall cut (located at SE Corner of property line) at assumed elevation of +100 feet.
2. See Fig. 1 for location of Sections.
3. Elevations and thickness of Soil Strata between borings are estimated and may vary from the condition shown.

horizontal scale as indicated above

site just south of 63rd Street (Figure 14 and Appendix A). Continuous sampling indicated 27 ft. of miscellaneous fill overlying 13 ft. of an offshore deposit of silt and sand containing fragments and traces of shell above river sand (B10 Appendix A; Messergell 1986:personal communication). These findings indicate this portion of the site was once part of the river and support the shoreline configuration shown on the 1847 map of the Hudson River Railroad (see Figure 13).

It appears that filling would have been required to accommodate approximately 200 ft. of track planned just off shore in the vicinity of 63rd Street. Consequently, this lagoon-like, offshore area of the site constitutes the first fill episode in the project area, one that would have included a landfill-retaining construction. As noted earlier, in this case it may have been a stone seawall or it may have incorporated timber supports and planking (see Section on Hudson River Railroad).

Within two decades, this fill was extended to reclaim land west of the site from the Hudson River (see Historical section). It is possible that some of this later fill will be found along a small portion of the site's western periphery, beyond the track bed.

LANDFILL AND HEALTH IN THE 1860S

Over the last eighteen years, and particularly in the last decade, archaeologists working in Manhattan have collected unprecedented data about eighteenth and early-nineteenth-century landfill techniques and practices (e.g., Geismar 1983; Huey 1985; Klein 1986; Pickman and Rothschild 1981; Rockman et al. 1983;

Wall and Henn 1986). A recent comparison of these fills suggested that municipal laws instituted to protect the city's inhabitants during Yellow Fever epidemics (ca. 1795-1822) were most stringently observed during periods when these epidemics were annual events. But even then, laws were flouted (Geismar in press).

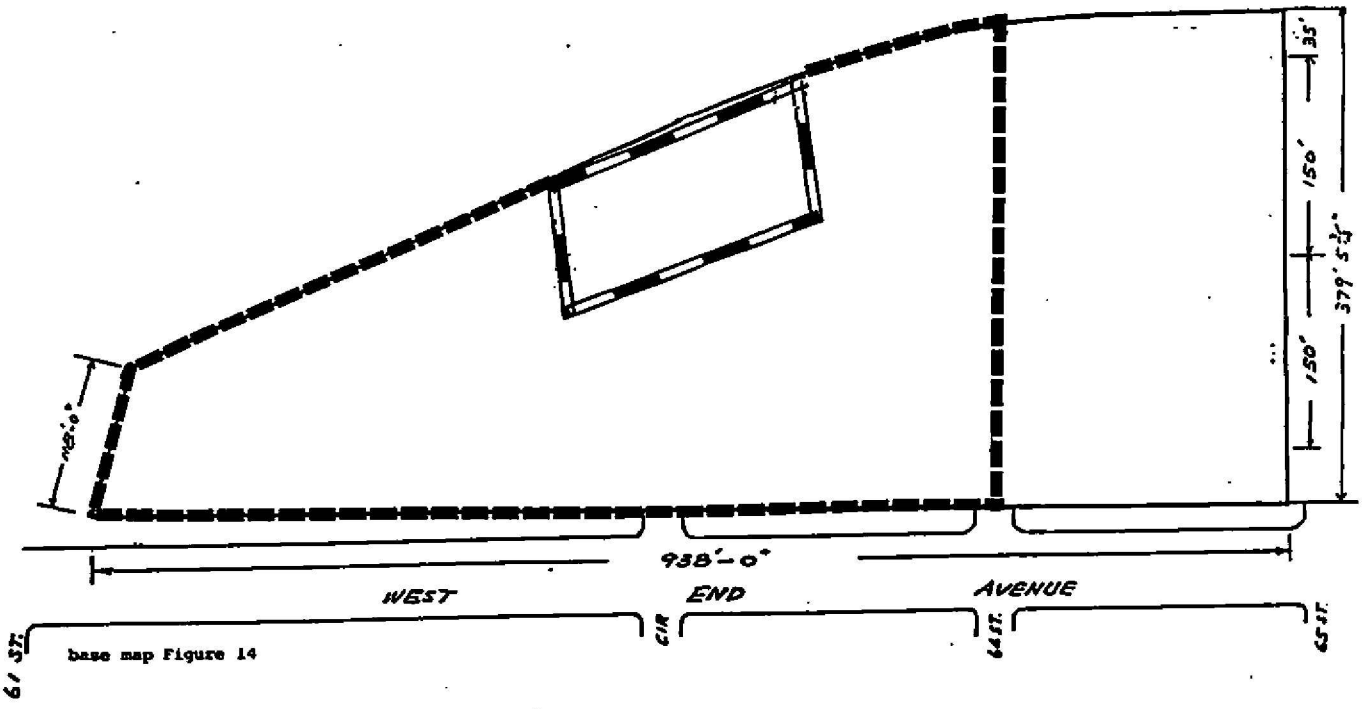
To date, little is known about mid-nineteenth century fill except that laws were still in effect (e.g., Morton 1860:70) but noxious conditions apparently continued to prevail (Smith 1866: 304). Briefly testing landfill from the western portion of the project site would provide the opportunity to document the relative amount of refuse in the fill and compare it with earlier samples. This kind of quantitative information is not available in records and could be recovered easily and quickly during monitoring of deep foundation excavations at the Manhattan West Site.

RECOMMENDATIONS

Foundation excavations in the vicinity of 63rd Street on the western portion of the site may cut into remnants of the mid-nineteenth century Hudson River Railroad track bed preserved under fill. This track ran on fill approximately 100 ft. north and south of the extended mid-line of 63rd Street in the western portion of the site (Figure 16). In this area, which originally was just offshore, an embankment was constructed to maintain a straight road bed, but the techniques used to create it remain speculative. Monitoring of dewatered pile-cap excavations or other deep shafts or trenches (22 or more ft. below the surface --or at elevation +1--in the area of concern) might provide a "window" to view and record the construction methods used in

MANHATTAN WEST: Area to be Monitored

16



base map Figure 14

approx. area to be monitored

Project Site

0 150

ft.

building this segment of an historic, innovative railroad line. In addition, it would provide the opportunity to collect a sample of mid-nineteenth century landfill which would expand our knowledge about materials used to reclaim land in this time period. Perhaps most importantly, it might determine whether municipal laws instituted to protect the health and well-being of the city's inhabitants were observed or flouted (the latter was the case in the mid- to late-eighteenth century).

The recommended field program would be designed to address these issues without delaying construction schedules or hampering construction activities. Recently, this kind of investigation has been successfully undertaken both in Manhattan (e.g., Geismar and Shmookler 1985) and London (e.g., Bateman and Milne 1983). Following the recommendations made in this report, no impact on significant archaeological resources is anticipated as a result of the Manhattan West project.

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MANHATTAN WEST: Soil Boring Logs (Preliminary)

A

FIELD SOIL TEST BORING DATA
Lehrer-McGovern
West End Avenue & 60th Street
Manhattan, New York

DATE: August 28, 1986

LAB. NO.: 2291

Prepared For: Lehrer-McGovern
387 Park Avenue
New York, N.Y. 10016

Prepared By: Testwell Craig Test Boring Co., Inc.
P.O. Box 477
Mays Landing, N.J. 08330

TESTWELL CRAIG TEST BORING COMPANY, INC.

August 28, 1986

Lehrer/McGovern
387 Park Avenue
New York, N.Y. 10016

Attn: Mr. Peter Dunsay

Re: Subsurface Investigation
Manhattan West Project
West End Avenue
Manhattan, New York

Dear Mr. Dunsay,

Pursuant to your request we have performed subsurface investigation for the above referenced project and herein present our findings.

As planned, a total of twelve (12) borings were performed. Boring locations are indicated in the boring location plan (Figure I). A record log sheet for each boring is also attached for your reference.

SUBSURFACE CONDITION

The subsurface condition of the project site is briefly described below in a narrative form, reference is made to Figure 2 - a graphic representation of the subsurface profile.

Stratum 1 - At the surface is an asphalt and concrete pavement or slab-on-grade overlying miscellaneous fill. The fill ranges from six (6) to forty (40) feet and contains sand, gravel, cinders, brick and concrete fragments.

Stratum 2 - Beneath the fill is glacial till and/or glacial drift. Generally, the till is composed of brown coarse to fine sand, silt (primarily non-organic), and some coarse to fine gravels. This stratum covers only the West half of the site.

565 EAST HARDING HIGHWAY • POST OFFICE BOX 477 • MAYS LANDING, NEW JERSEY 08330 609-625-1700

Stratum 3 - Beneath the till or fill is bedrock. The rock is Manhattan Schist and varies from intermediate to hard in classification. Each boring was terminated at a depth of 10 feet in the rock.

We hope that the above information would suffice you to prepare the environmental impact statement for the referenced project. Should any further information be needed please do not hesitate to contact our office.

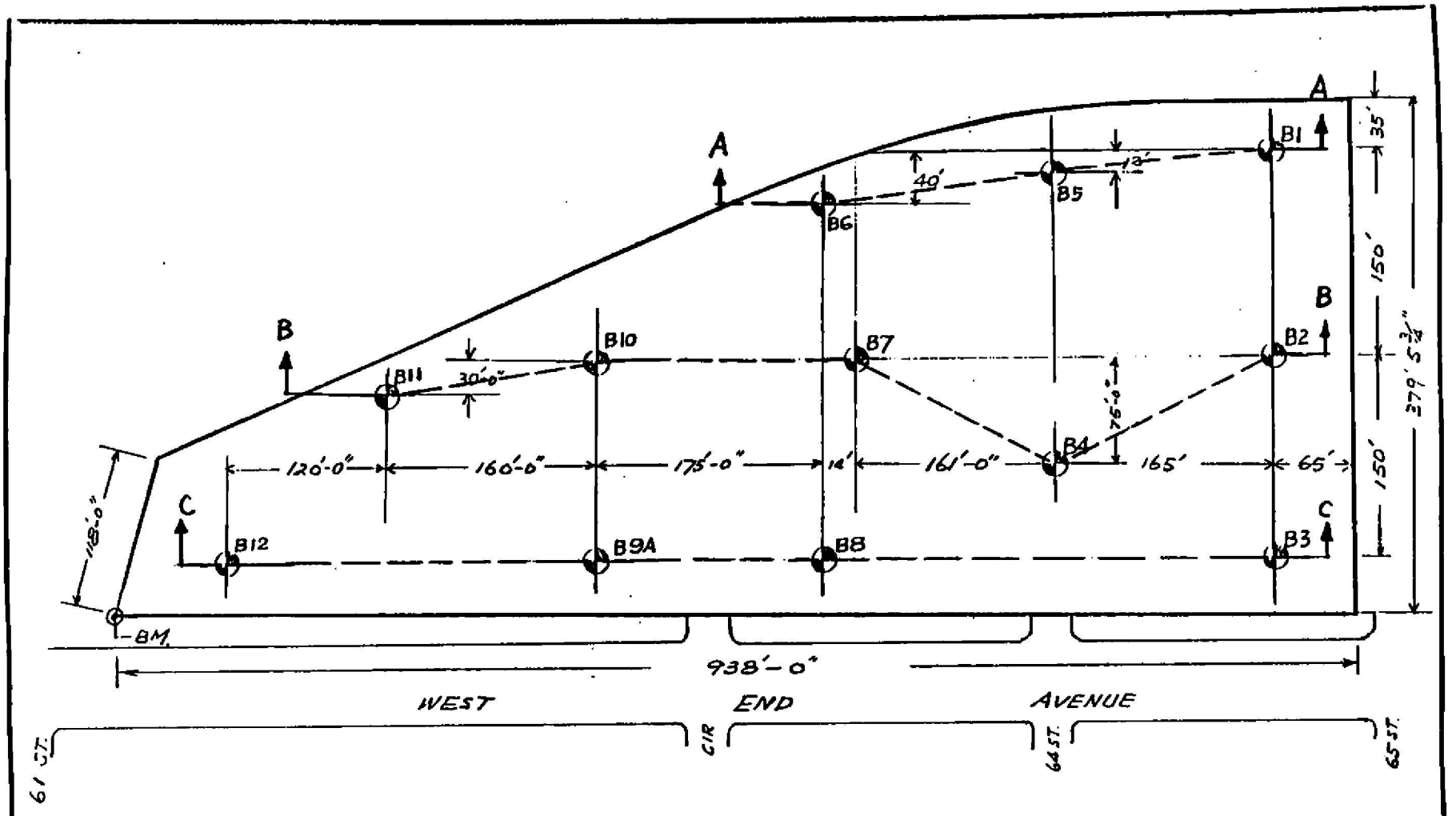
Respectfully submitted,

TESTWELL CRAIG TEST BORING CO., INC.

F. Gordon Craig (KK)

F. Gordon Craig
Division Manager

Attachments: Figure 1
Boring Location Plan
Figure 2
Subsurface Profile
Boring Legend Sheet
Boring Logs



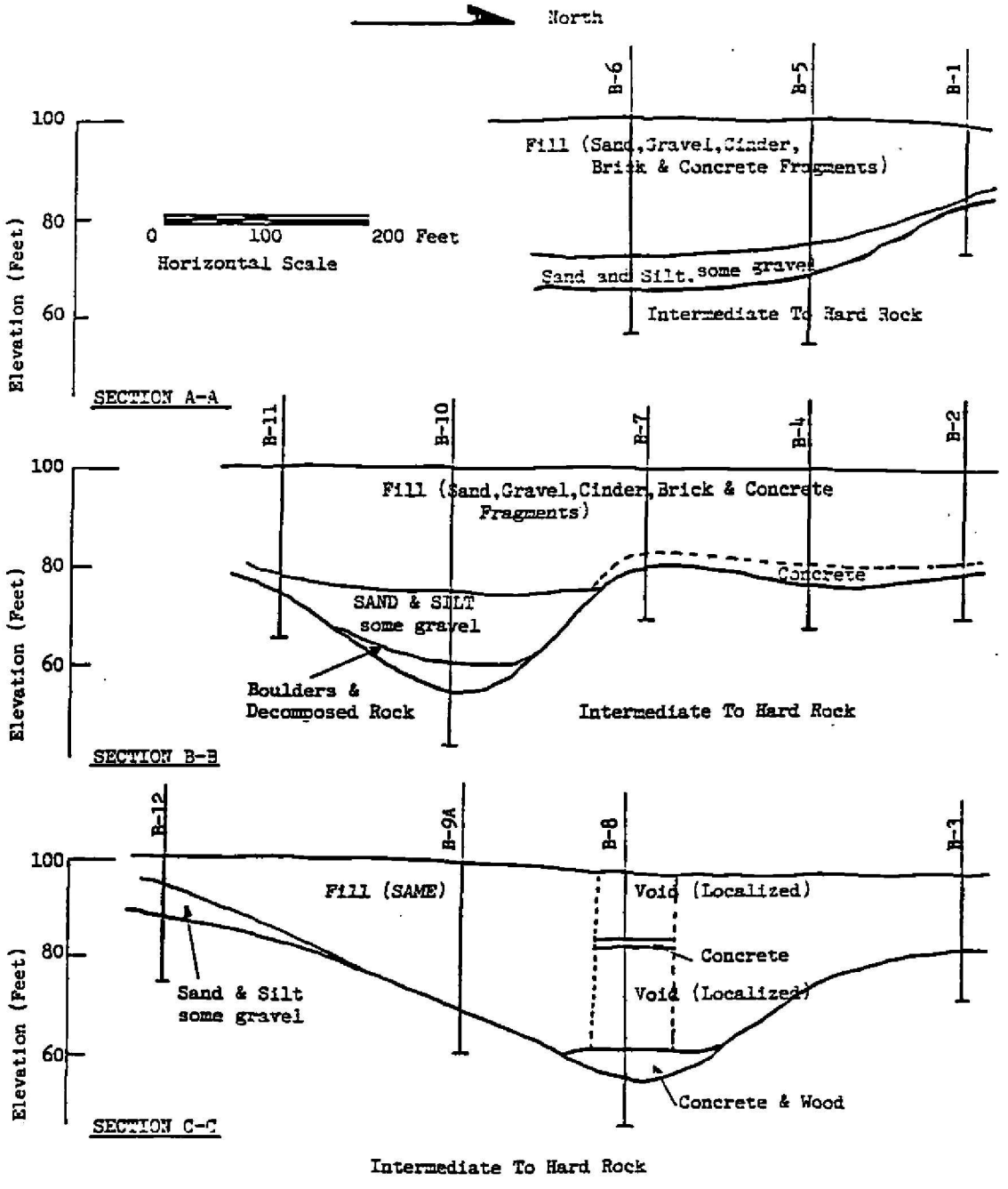
BORING LOCATION PLAN

MANHATTAN WEST PROJECT

TESTWELL CRAIG TEST BORING CO. INC.

MAYS LANDING, NEW JERSEY

DR. BY: SL	FIG. No. : 1	LAB. No. : 2291
CK'D BY:	SCALE :	DATE : 8/20/86



NOTES:

1. Elevations are based on surveyor's sidewall cut (located at SE Corner of property line) at assumed elevation of +100 feet.
2. See Fig. 1 for location of Sections.
3. Elevations and thickness of Soil Strata between borings are estimated and may vary from the condition shown.

SUBSURFACE PROFILE

TESTWELL CRAIG TEST BORING CO. INC.

MAYS LANDING, NEW JERSEY

DR. BY: SL	FIG. NO.: 2	LAB. NO.: 2291
CK'D BY:	SCALE:	DATE: 8/20/86

LEGEND SHEET - BORING DATA

SOIL

Bn - brown
Gy - gray
Blk- black
wh - white

Rd - red
Or - orange
Bl - blue

Multi - multi-colored
Lt - light
Dk - dark

NOTATION

trace - tr
some - sm
adjective - (ly)
and - &

PERCENT (%) BY WEIGHT

0 - 10
10 - 20
20 - 35
35 - 50

coarse grained - c
medium grained - m
fine grained - f

HSA - Hollow Stem Auger Casing
SS - Split Spoon Soil Sampler

WOR - Weight of Rods
WOH - Weight of Hammer
NR - No Recovery of Sample

ROCK

ROCK QUALITY DESIGNATION, R.Q.D.

R.Q.D.	Description of Rock Quality*
0-25%	Very Poor
25-50%	Poor
50-75%	Fair
75-90%	Good
90-100%	Excellent

*after Deere et al, 1967

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TESTING ENGINEERS ● STEEL ● WATER ● CONCRETE ● CHEMICAL ANALYSIS ● SOILS ● TEST BORINGS ● CORE DRILLING ● ASPHALT ● RESEARCH

FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B-1 Sheet No. 1 of 1 Ground Surface Elev. 102.6'

Ground Water Data				A - Method of Advancing Boring		Depth
Depth	Hour	Date	Hrs. After Completion	A	4" Hollow Stem Auger	0 to 16.0'
				B	NX Core Drilling	16.0' to 26.0'
9.0'		6-24-86	Comp of Hole			to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
					ASPHALT	0.2'
		S-1	1.0-3.0'	2-6-8-10	Misc.Fill: C-M-F SAND,cf gravelly, sm silt/blk,moist,med.dense (cinders)	Fill 1.0-15.9'
5		S-2	5.0-7.0'	4-31-11-9	SAME/dense (cinders,concrete fragments)	Class 11-65
	A					
10		S-3	10.0-12.0'	4-8-8-9	SAME/med. dense	
					SAME	15.5'
15		S-4	15.0-15.9'	12-100/5"	C-M-F SAND,sm silt,sm f gravel, bn,moist,v.dense (micaceous)	Class 6-65 16.0'
20	B	Run #1	16.0-21.0'	Cored 60" Rec. 36"	Intermediate Rock (highly fractured w/many weathered seams)	Class 3-65 21.0' Rock is Manhattan Schist
25		Run #2	21.0-26.0'	Cored 60" Rec. 60"	Medium Hard Rock (moderately w/some weathered seams)	Class 2-65 26.0'
					Test Boring Completed @ 26.0'	
30					Surveyor's sidewalk cut at S.E. property corner (on West Sidewalk of West End Avenue) assumed elevation +100.0'.	
35						

S - 2" O.D. Split Spoon Sample ■ U - Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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PRELIMINARY REPORT

TESTING ENGINEERS • STEEL • WATER • CONCRETE • CHEMICAL ANALYSIS • SOILS • TEST BORINGS • CORE DRILLING • ASPHALT • RESEARCH

FIELD TEST BORING LOG

CLIENT Lehrer-McGovern

DATE August 27, 1986

PROJECT West End Avenue & 60th Street, Manhattan, New York

LAB. NO. 2291

Boring No. B-2 Sheet No. 1 of 1 Ground Surface Elev. 101.5'

Ground Water Data				A - Method of Advancing Boring	Depth
Depth	Hour	Date	Hrs. After Completion	A Roller Bit	0 to 16.5'
				B Wire Line - NX Core Drilling	16.5' to 31.0'
					to

Depth	A	Sample No.	Sample Depth	N	Soil Classification	Remarks
			0-2.5'	Roller Bitted	Asphalt, fill and concrete	2.5'
5	A				VOID (airspace) 2.5-16.5'	
10						
15						16.5'
		Run #1	16.5-19.0'	Cored 30" Rec. 0"	VOID	19.0'
20		Run #2	19.0-20.0'	R.12" C. 12"	CONCRETE	20.0'
25	B	Run #3	21.0-26.0'	Cored 60" Rec. 48"	Medium Hard Rock (moderately fractured w/some weathered seams)	Rock is Manhattan Schist Class 3-65
30		Run #4	26.0-31.0'	Cored 60" Rec. 60"	Medium Hard Rock (slightly fractured w/few weathered seams)	31.0'
					Test Boring Completed @ 31.0'	
35					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	

1 S-2" O.D Split Spoon Sample ■ U-Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern

DATE August 27, 1986

PROJECT West End Avenue & 60th Street, Manhattan, New York

LAB. NO. 2291

Boring No. B-3 Sheet No. 1 of 1 Ground Surface Elev. 97.7'

Ground Water Data				A - Method of Advancing Boring		Depth
Depth	Hour	Date	Hrs. After Completion	A	Roller Bit	0 to 9.0'
				B	NX Core Drilling	9.0' to 21.0'
						to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
5	A			Roller Bitted		
					9.0'	
10	B	Run #1	9.0-12.0'	Cored 36" Rec. 15"	CONCRETE	
		Run #2	12.0-13.0'	R.12" C.12"	CONCRETE	
15		Run #3	13.0-16.0'	Cored 36" Rec. 17"	CONCRETE	
					16.0'	Rock is Manhattan Schist Class 2-65
20		Run #4	16.0-21.0'	Cored 60" Rec. 60"	Medium Hard Rock (moderately fractured w/sm weathered seams)	
					21.0'	
					Test Boring Completed @ 21.0'	
25						
30					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	
35						

S - 2" O.D. Split Spoon Sample ■ U - Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B- 4
Sheet No. 1 of 1
Ground Surface Elev. 100.3'

Ground Water Data				A - Method of Advancing Boring		Depth
Depth	Hour	Date	Hrs. After Completion	A	Roller Bit	0 to 17.0'
				B	NX Core Drilling	17.0' to 31.0'
						to

Depth	A	Sample No.	Sample Depth	N	Soil Classification	Remarks
5			5.0'	Roller Bit 0-17.0'	Fill: F GRAVEL & cmf sand/ multi,wet, (cinders,brick fragments,concrete fragments) Class 11-65	Samples Collected from WASH Return
10	A		10.0'			
15			15.0'			
			17.0'			17.0'
20		Run #1	17.0-22.0'	Cored 60" Rec. 45"	CONCRETE	21.0'
	B				ROCK	Rock is Manhattan Schist Class 2-65
25		Run #2	22.0-27.0'	Cored 60" Rec. 60"	Medium Hard Rock (v.slightly fractured w/sm weathered seams @ 23-23.5')	27.0'
30		Run #3	27.0-31.0'	Cored 48" Rec. 48"	Hard Sound Rock (v.slightly fractured w/v.few weathered seams)	Class 1-65 31.0'
35					Test Boring Completed @ 31.0'	
					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	

1 S-2" O.D. Split Spoon Sample ■ U-Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N-Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B-5 (moved 10' East) Sheet No. 1 of 2
Ground Surface Elev. 102.9'

Ground Water Data			A - Method of Advancing Boring	Depth
Depth	Date	Hrs. After Completion	A 4" Hollow Stem Auger	0 to 31.5'
			B NX Core Drilling	31.5' to 41.5'
14.0'	7-7-86	Comp of Hole		to

Depth	A	Sample No.	Sample Depth	N	Soil Classification	Remarks
					ASPHALT	0.2'
		S-1	1.0-3.0'	3-6-6-5	Fill:C-M-F SAND,sm cf gravel,sm silt/blk,moist,med.dense (cinders)	2.5' Fill 0-25.0' Class 11-65
5		S-2	3.0-5.0'	46-13-9-19	Fill:C-M-F SAND,silty,sm cf gravel/bn,moist,med.dense (micaceous,sm cinders,brick,concrete,slag)	5.0'
		S-3	5.0-7.0'	10-7-6-6	Fill:C-M-F SAND,sm cf gravel,sm silt/bn,moist,med.dense (micaceous)	7.0'
		S-4	7.0-9.0'	9-30-8-8	Fill:C-M-F SAND,sm cf gravel,sm silt/blk,moist,dense (cinders,ash,brick)	
10		S-5	9.0-11.0'	6-5-12-17	SAME/med. dense	11.0'
		S-6	11.0-13.0'	7-9-9-11	Fill:C-M-F SAND,silty,sm f gravel/ bn,moist,med.dense (micaceous,tr ash)	13.0'
	A	S-7	13.0-15.0'	5-7-8-10	Fill: M-F SAND,silty,tr f gravel/bn,moist,med.dense (tr brick)	
15		S-8	15.0-17.0'	5-15-12-7	SAME	17.0'
		S-9	17.0-19.0'	3-3-5-12	Fill: C-M-F SAND,sm cf gravel, sm silt/bn,blk,moist,loose (brick, cinders,ash,glass)	
20		S-10	19.0-21.0'	9-12-18-21	SAME/med. dense	20.0'
		S-11	21.0-23.0'	12-7-5-17	Fill:C-M-F SAND,tr f gravel,tr silt/gy,bn,moist,med.dense SAME	
		S-12	23.0-25.0'	14-15-9-6	SAME/bn,blk,(tr brick)	25.0'
25		S-13	25.0-27.0'	4-7-2-2	M-F SAND & silt/blk,moist, loose (micaceous)	Class 8-65
		S-14	27.0-29.0'	5-8-16-41	C-M-F SAND,cf gravelly,sm silt/blk,moist,med.dense	28.0' Class 6-65
30		S-15	29.0-30.8'	8-8-15-100/3"	SAME,sm cf gravel/bn,(micaceous)	
	B	Run #1	31.5-36.5'	Cored 60" Run 40"	Intermediate Rock (v.highly fractured w/many weathered seams)	31.5' Auger Refusal Class 3-65 Rock is Manhattan Schist
35						

1 S-2" O.D. Split Spoon Sample ■ U-Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N-Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

TESTWELL CRAIG TEST BORING CO., INC.

FIELD TEST BORING LOG

BORING NO. B-5 SHEET NO. 2 of 2 LAB NO. 2291

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
					(top 12" of core highly decomposed	36.5'
40	B	Run #2	36.5-41.5'	Cored 60" Rec. 44"	Intermediate Rock (highly fractured w/many weathered seams)	Rock is Manhattan Schis Class 3-65 41.5'
45		Run #3	41.5-46.5'	Cored 60" Rec. 60"	Medium Hard Rock (moderately fractured w/some weathered seams, verticle fractures)	Class 2-65 46.5'
					Test Boring Completed @ 46.5'	
50						
55					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	
60						
65						
70						
75						
80						
85						

S-2" O.D. Split Spoon Sample ■ U-Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N-Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

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TESTWELL CRAIG TEST BORING, INC.

PRELIMINARY REPORT

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern

DATE August 27, 1986

PROJECT West End Avenue & 60th Street, Manhattan, New York

LAB. NO. 2291

Boring No. B-6 Sheet No. 1 of 2 Ground Surface Elev. 102.7'

Ground Water Data				A - Method of Advancing Boring		Depth
Depth	Hour	Date	Hrs. After Completion	A	4" Hollow Stem Auger	0 to 35.0'
				B	NX Core Drilling	35.0' to 45.0'
						to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
		S-1	0-2.0'	4-4-4-4	Fill:C-M-F SAND,cf gravelly,sm silt/ blk,moist,loose (cinders)	
		S-2	2.0-3.2'	5-7-100/3"	SAME (cinders,slag,ash)	Fill 0-28.0'
					4.0'	
5		S-3	4.0-6.0'	4-7-5-4	Fill: M-F SAND,silty,sm cf gravel/ blk,or bn,moist,med.dense (micaceous,tr woo	
		S-4	6.0-8.0'	6-5-5-6	SAME,sm clay/loose	Class 11-65
		S-5	8.0-9.5'	6-7-100/6"	SAME/blk,gy,v. dense	
10						10.0'
		S-6	10.0-12.0'	3-4-9-39	Fill:M-F SAND,sm silt,tr f gravel/ bn,moist,med.dense	11.0'
		S-7	12.0-14.0'	11-15-13-9	Fill:C-M-F SAND,sm cf gravel,sm silt/ blk,moist,med.dense (cinders,slag)	12.0'
15		S-8	14.0-16.0'	7-12-7-7	Fill:C-M-F SAND,sm silt,sm cf gravel/bn,moist,med.dense (brick frag.)	14.0'
		S-9	16.0-18.0'	7-8-6-7	Fill: M-F SAND & SILT,tr f gravel/ bn,moist,med.dense (micaceous)	
	A	S-10	18.0-20.0'	4-5-5-6	SAME (½" layer of rd bn clay at 18.5'	20.0'
20		S-11	20.0-22.0'	5-7-10-10	C-M-F SAND,sm f gravel,tr silt/gy,moist,med. dense	22.0'
		S-12	22.0-24.0'	6-4-2-10	Fill: F SAND & SILT,tr f gravel/ dk bn,moist,loose	
25		S-13	24.0-26.0'	1-1-1-2	SAME (tr glass,cinder)	
		S-14	26.0-28.0'	7-4-2-5	SAME (brick,ash,cinder,shell)	28.0'
		S-15	28.0-30.0'	2-3-3-4	M-F SAND,silty,sm cf gravel/ bn,dk gn,gy,moist,loose	Class 6-65
30		S-16	30.0-32.0'	6-6-10-10	C-M-F SAND,sm silt,cf gravel/ bn,moist,med. dense	30.0' Class 6-65
		S-17	32.0-33.4'	5-35-100/5"	C-F GRAVEL & cmf sand,sm silt/ gy,blk,wh,moist,v.dense (Decomposed Rock)	32.0' Class 5-65
35		S-18	35.0-35.0'	100/0"	N.R.	

1. S-2" O.D. Split Spoon Sample ■ U-Undisturbed Sample. 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N-Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

TESTWELL CRAIG TEST BORING PRELIMINARY REPORT

FIELD TEST BORING LOG

BORING NO. B-6 SHEET NO. 2 of 2 LAB NO. 2291

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
40	B	Run #1	35.0-40.0'	Cored 60" Rec. 41"	Intermediate Rock (moderately fractured w/some weathered seams)(highly fractured core from 38.5'-40.0')	Rock is Manhattan Schist
		Run #2	40.0-45.0'	Cored 60" Rec. 52"	Intermediate Rock (highly fractured w/many weathered seams)	Class 3-65
45					Test Boring Completed @ 45.0'	45.0'
50					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	
55						
60						
65						
70						
75						
80						
85						

S - 2" O.D. Split Spoon Sample ■ U - Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B-7 Moved 10'N Sheet No. 1 of 1
Ground Surface Elev. 101.9'

Ground Water Data			
Depth	Hour	Date	Hrs. After Completion

A - Method of Advancing Boring		Depth
A	Roller Bit	0 to 17.9'
B	Wire Line - NX Core Drilling	17.9' to 30.5'
		to

Depth	A	Sample No.	Sample Depth	N	Soil Classification	Remarks
5	A			Roller Bit 0-17.9'		
10						
15						
						17.9'
20	B	Run #1	17.9-20.5'	Cored 31" Rec. 10"	CONCRETE (basement)	20.5'
		Run #2	20.5-23.0'	Cored 30" Rec. 30"	Medium Hard Rock (slightly fractured w/few weathered seams)	Class 2-65
25		Run #3	23.0-28.0'	Cored 60" Rec. 56"	SAME (6" layer of highly weathered rock @ 26.0')	Rock is Manhattan Schist
30		Run #4	28.0-30.5'	Cored 30" Rec. 28"	SAME (vertcal fractures w/ partally weathered edges)	30.5'
					Test Boring Completed @ 30.5'	
35					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	

S - 2" O.D. Split Spoon Samole ■ U - Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern

DATE August 27, 1986

PROJECT West End Avenue & 60th Street, Manhattan, New York

LAB. NO. 2291

Boring No. B-8 Sheet No. 1 of 2 Ground Surface Elev. 96.9'

Ground Water Data				A - Method of Advancing Boring		Depth
Depth	Hour	Date	Hrs. After Completion	A	Wire Line - NX Core Drilling	0 to 0.5'
				B	Roller Bit	0.5' to 11.4'
				A	NX Core Drilling	11.4' to 50.5'

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
	A	Run #1	0-0.5'	R. 6" C.6"	CONCRETE (deck)	0.5'
5	B				VOID (airspace)	
10		Run #2	11.4-12.4'	Cored 12" Rec. 4"	CONCRETE	12.0' 12.4'
15		Run #3	12.4-15.0'	Cored 32" Rec. 0"	VOID (airspace)	
20	A					
25						
30		#4	15.0-31.0'	Rec. 0"	VOID (airspace)	31.0'
35		Run #5	31.0-36.0'	Cored 60" Rec. 43"	CONCRETE	

1 S-2" O.D Split Spoon Sample ■ U-Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N-Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

TESTWELL CRAIG TEST BORING CO., INC.

FIELD TEST BORING LOG

PRELIMINARY

BORING NO. B-8 SHEET NO. 2 of 2 LAB NO. 2291

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
					WOOD (24")	
						38.7'
40		Run #6	36.0-41.0'	Cored 60" Rec. 50"	CONCRETE (18")	
					ROCK (9")	40.3' Rock is Manhatt. Schist
	B				Medium Hard Rock (moderately fractured w/some weathered seams)	
45		Run #7	41.0-46.0'	Cored 60" Rec. 59"		Class 2-65
					Medium Hard Rock (slightly fractured w/few weathered seams)	Class 2-65
50		Run #8	46.0-50.5'	Cored 54" Rec. 54"		50.5'
					Test Boring Completed @ 50.5'	
55						
60						
65						
70						
75						
80						
85						

Surveyor's sidewalk cut at S.E. property corner (on West Sidewalk of West End Avenue) assumed elevation +100.0'.

S - 2" O.D. Split Spoon Sample ■ U - Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B-9 Sheet No. 1 of 1 Ground Surface Elev. 100.5'

Ground Water Data				A - Method of Advancing Boring	Depth
Depth	Hour	Date	Hrs. After Completion	A 4" Hollow Stem Auger	0 to 17.0'
					to
12.0'			Comp of Hole		to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
					ASPHALT 0.2'	
		S-1	1.0-3.0'	11-17-17-17	Misc Fill: C-M-F SAND, cf gravelly, sm silt/bn, rd, moist, dense (bricks, cinders)	Class 11-65
5					5.0'	
		S-2	5.0-7.0'	2-10-4-5	SILT & mf sand/bn, moist, med. dense (shell @ 6.0')	
	A					
10					SAME/dk gy, loose 11.0'	
		S-3	10.0-12.0'	2-2-3-8	M-F SAND, sm cf gravel, sm silt/or bn, moist, loose (micaceous)	
15					15.0'	
		S-4	15.0-17.0'	10-15-24-20	C-F GRAVEL & f sand, silty/bn, moist, dense 17.0'	
					Refusal @ 17.0'	
20					Test Boring Completed @ 17.0'	
					(moved hole @ archeologist request)	
25					Surveyor's sidewalk cut at S.E. property corner (on West Sidewalk of West End Avenue) assumed elevation +100.0'.	
30						
35						

1 S-2" O.D. Split Spoon Sample ■ U-Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern

DATE August 27, 1986

PROJECT West End Avenue & 60th Street, Manhattan, New York

LAB. NO. 2291

Boring No. B-9A Sheet No. 1 of 2 Ground Surface Elev. 100.5'

Ground Water Data				A - Method of Advancing Boring	Depth
Depth	Hour	Date	Hrs. After Completion	A 4" Hollow Stem Auger	0 to 15.0'
					to
13.0'			Comp of Hole		to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
					ASPHALT	0.3'
		S-1	1.0-2.5'	5-9-9-25/0"	Fill:C-M-F SAND,cf gravelly,sm silt/blk, moist,med.dense (concrete,cinder fill)	3.0'
5		S-2	3.0-5.0'	7-5-5-5	Fill:SILT & F SAND,tr f gravel or bn,gy,moist,stiff (micaceous)	FILL 0-29.5' Class 11-65
		S-3	5.0-7.0'	3-4-5-6	SAME	
	A	S-4	7.0-9.0'	3-8-3-4	SAME (tr shell)	8.0'
10		S-5	9.0-11.0'	4-5-4-4	Fill: SILT & M-F SAND,sm f gravel/ bn,gy,moist,stiff (micaceous,sm glass frag. Fill:M-F SAND,cf gravelly,silty/ dk bn,blk,moist,loose	9.0' 11.0'
		S-6	11.0-13.0'	8-63-17-12	Fill:C-F GRAVEL,sm cmf sand,sm silt/blk,gy,rd,wet,v.dense (gravel is dec. rock & brick frag.)	13.0'
		S-7	13.0-13.8'	41-100/4"	Fill:C-M-F SAND,f gravelly,sm silt/bn,blk,moist,v.dense (pet.	odor @ 13.0'
15						15.0'
		Run #1	15.0-19.5'	Cored 54" Rec. 15"	CONCRETE	
20		Run #2	19.5-23.0'	Cored 42" Rec. 6"	BOULDER,cobble fill	
	B	Run #3	23.0-24.5'	R. 3" C.18"	SAME	
25		Run #4	24.5-27.5'	Cored 36" Rec. 3"	N.R. (void)	
		Run #5	27.5-29.5'	Cored 24" Rec. 10"	SAME	29.5'
30		Run #6	29.5-34.5'	Cored 60" Rec. 57"	Intermediate Rock (highly fractured w/few weathered seams)	Rock is wh Quartzite overlain gn, blk,serpen ti 34.5' Class 3-65
35						

1 S-2" O.D Split Spoon Sample ■ U - Undisturbed Sample. 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

TESTWELL CRAIG TEST BORING CO., INC.

PRELIMINARY REPORT

FIELD TEST BORING LOG

BORING NO. B-9A SHEET NO. 2 of 2 JOB NO. 2291

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
40	B	Run #7	34.5-39.5'	Cored 60" Rec. 55"	Medium Hard Rock (slightly fractured w/few weathered seams)	Rock is Manhattan Schist Class 2-65 39.5'
					Test Boring Completed @ 39.5'	
					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	
45						
50						
55						
60						
65						
70						
75						
80						
85						

S - 2" O.D. Split Spoon Sample ■ U - Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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PRELIMINARY REPORT

FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B-10 Sheet No. 1 of 2 Ground Surface Elev. 101.1'

Ground Water Data				A - Method of Advancing Boring	Depth
Depth	Hour	Date	Hrs. After Completion	A 4" Hollow Stem Auger	0 to 40.0'
Drillwater				B NX Core Drilling	40.0' to 55.0'
14.0'			Comp of Hole		to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
		S-1	0.5-2.0'	4-5-6	ASPHALT 0.3' / Fill:C-M-F SAND,sm cf gravel,tr silt/bn,blk,moist,med.dense (cinders, wood,ash,brick frags)	
		S-2	2.0-4.0'	4-5-7-7	Fill:M-F SAND,silty,f gravelly bn,moist,med.dense (brick frags) 3.0'	FILL 0-24.0'
5		S-3	4.0-6.0'	3-4-4-4	SAME/loose 6.0'	Class 11-65
		S-4	6.0-8.0'	3-4-12-15	Fill:C-M-F SAND,sm silt,sm f gravel/blk,moist,med.dense (cinder fill) 8.0'	
10		S-5	8.0-10.0'	14-15-19-22	Fill:M-F SAND,sm gravel,sm silt/or bn,moist,dense (micaceous) 10.0'	
		S-6	10.0-12.0'	5-7-6-7	Fill:F SAND & silt,tr clay/bn gy,moist,med. dense	
		S-7	12.0-14.0'	5-7-8-12	SAME,tr f gravel/bn	
15		S-8	14.0-16.0'	5-5-7-9	SAME/wet 16.0'	
	A	S-9	16.0-18.0'	5-3-3-4	Fill:C-M-F SAND,sm f gravel, tr silt/bn,gy,wet,loose (micaceous) 18.0'	
20		S-10	18.0-20.0'	3-3-3-3	Fill:C-M-F SAND,f gravelly, tr silt/blk,wet,loose (cinder fill)	
		S-11	20.0-22.0'	6-4-8-10	SAME 21.0' / Fill:C-M-F SAND,sm f gravel,tr silt/gy,bn,wet,med. dense 22.0'	
		S-12	22.0-24.0'	1-2-1-3	Fill:C-M-F SAND,sm cf gravel,sm silt/bn,gy,blk,wh,wet,v.loose (cinder & ash fill) 24.0'	
25		S-13	24.0-26.0'	2-1-1-2	SILT,sm organic silt,tr f sand/bn, blk,moist,v.soft (varved,shell @ 25.8')	Class 9-65
		S-14	26.0-28.0'	1-2-2-1	SAME/soft (shell fragments)	
		S-15	28.0-30.0'	1-2-2-4	SAME 30.0'	
30		S-16	30.0-32.0'	5-9-7-21	M-F SAND,silty,sm f gravel/bn, moist,med. dense (shell frags)	Class 7-65
35						

1 S-2" O.D Split Spoon Sample ■ U-Undisturbed Sample. 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N-Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

TESTWELL CRAIG TEST BORING CO., INC.

FIELD TEST BORING LOG

PRELIMINARY REPORT

BORING NO. B-10 SHEET NO. 2 of 2 LAB NO. 2291

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
	A	S-17	35.0-37.0'	29-50-30-17	SAME/v. dense	37.0' Class 5-65
		S-18	38.0-38.7'	31-100/2"	C-F GRAVEL,sm cmf sand,tr silt/blk,gy,moist,v.dense (decomposed rock)	40.0' Auger Refusal
40						
		Run #1	40.0-45.0'	Cored 60" Rec. 27"	BOULDERS & Decomposed Rock/ Soft Rock	Class 4-65 45.0'
45	B					Rock is Quartzite
		Run #2	45.0-50.0'	Cored 60" Rec. 54"	Intermediate Rock (highly fractured w/many weathered seams)	Class 3-65 50.0'
50						
		Run #3	50.0-55.0'	Cored 60" Rec. 54"	Medium Hard Rock (moderately fractured w/many weathered seams)	Class 2-65 55.0'
55					Test Boring Completed @ 55.0'	
					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	
60						
65						
70						
75						
80						
85						

S - 2" O.D. Split Spoon Sample ■ U - Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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PRELIMINARY REPORT

FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B-11 Sheet No. 1 of 1 Ground Surface Elev. 101.2'

Ground Water Data				A - Method of Advancing Boring		Depth
Depth Drill	Hour water	Date	Hrs. After Completion	A	4" Hollow Stem Auger	0 to 23.5'
				B	NX Core Drilling	23.5' to 33.5'
16.0'		7-7-86	Comp of Hole			to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
					ASPHALT	0.3'
		S-1	2.0-4.0'	14-31-13-36	Fill:C-M-F SAND,sm f gravel, sm silt/bn,moist,dense (micaceous)	Fill 0-22.0' Class 11-65
5		S-2	4.0-6.0'	4-5-5-6	SAME/loose (sm concrete & brick)	6.0'
		S-3	6.0-8.0'	4-6-5-9	Fill:M-F SAND,sm cf gravel,sm silt/blk,moist,med.dense (ash & cinder fill)	8.0'
10	A	S-4	8.0-10.0'	3-6-7-8	Fill:M-F SAND,silty,sm c gravel/bn,moist,med.dense (brick frags)	
		S-5	10.0-12.0'	3-4-4-4	SAME	12.0'
		S-6	12.0-14.0'	4-4-6-6	Fill:M-F SAND,sm silt/bn, moist,loose (micaceous)	
15		S-7	14.0-16.0'	9-5-4-10	SAME,silty,sm cf gravel/bn, blk,(tr cinder,brick frags)	16.0'
		S-8	16.0-18.0'	7-6-12-14	Fill:C-M-F SAND,sm cf gravel, sm silt/bn,moist,med.dense	
		S-9	18.0-20.0'	3-5-4-8	SAME,silty/blk,bn, (ash & cinder fill)	
20		S-10	20.0-22.0'	3-6-2-4	SAME/loose	22.0'
		S-11	22.0-22.4'	17-72-100/5"	C-M-F SAND,tr silt/bn,gy,moist, v. dense (micaceous)	23.5'
25		Run #1	23.5-28.5'	Cored 60" Rec. 48"	Medium Hard Rock (moderately fractured w/few weathered seams)	Rock is Manhattan Schist Class 2-65
	B					
30		Run #2	28.5-33.5'	Cored 60" Rec. 60"	SAME	33.5'
					Test Boring Completed @ 33.5'	
35						

Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.

1 S-2" O.D. Split Spoon Sample ■ U-Undisturbed Sample, 3" Diameter ▨ — Core Drilling N.R — No Recovery

N-Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

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FIELD TEST BORING LOG

CLIENT Lehrer-McGovern
DATE August 27, 1986
PROJECT West End Avenue & 60th Street, Manhattan, New York
LAB. NO. 2291
Boring No. B-12
Sheet No. 1 of 1
Ground Surface Elev. 100.1'

Ground Water Data				A - Method of Advancing Boring		Depth
Depth	Hour	Date	Hrs. After Completion	A	4" Hollow Stem Auger	0 to 11.9'
				B	NX Core Drilling	11.9' to 26.7'
12.0'			Comp of Hole			to

Depth	A	Sample No.	Sample Depth	Sample N	Soil Classification	Remarks
					~~Asphalt~~	0.2'
		S-1	0.5-2.5'	6-8-6-5	Fill:C-M-F SAND,sm f gravel,sm silt/blk,moist,med. dense (cinders)	
		S-2	2.5-4.5'	7-7-8-12	SAME	4.5' FILL 0-5.5'
5		S-3	4.5-6.5'	22-34-14-16	Fill:C-M-F SAND,sm cf gravel,sm silt/blk,moist,dense (sm cinders,brick frags	
	A	S-4	6.5-8.5'	2-6-5-4	C-M-F SAND,sm c gravel,sm silt bn,miost,dense(¼" layers of bn silt)	7.5' Class 6-6
					C-M-F SAND & silt,tr f gravel/ bn,moist,med.dense	6.5' Class 7-6
10		S-5	8.5-10.5'	8-13-13-14	C-F GRAVEL,cmf sandy,sm silt/ blk,gy,wh,moist,med.dense (micaceous)	8.5' Class 6-6
		S-6	10.5-11.9'	11-22-100/4"	C-M-F SAND,silty,sm cf gravel/ bn,moist,v. dense (micaceous)	11.9' Auger Refusal
15		Run #1	11.9-15.5'	Cored 48" Rec. 28"	Intermediate Rock (highly fractured w/many weathered seams)	Class 3-65
		Run #2	15.9-16.7'	R. 10" C.10"	SAME	Rock is Manhattan Schist
	B	Run #3	16.7-21.7'	Cored 60" Rec. 37"	SAME	21.7'
20						
		Run #4	21.7-26.7'	Cored 60" Rec. 56"	Medium Hard Rock (moderately fractured w/some weathered seams)	Class 2-65
25						26.7'
					Test Boring Completed @ 26.7'	
					Surveyor's sidewalk cut at S.E. property corner (on West sidewalk of West End Avenue) assumed elevation +100.0'.	
30						
35						

1 S-2" O.D Split Spoon Sample ■ U-Undisturbed Sample. 3" Diameter ▨ — Core Drilling N.R. — No Recovery

N - Standard Penetration Resistance per 6" (140# Hammer, 30" drop)

Driller J. Craig

ACKNOWLEDGMENTS

As always, many people and institutions are to be thanked for their cooperation and support during research and preparation of this report. Among them are Carolyn Konheim and Sherry Koehler of Konheim & Ketcham, Bob Cane and Paul Buck of Buck & Cane, Architects, Peter Dunsay of Lehrer/McGovern, Construction Managers for the project, and Jeff Craig of Testwell Craig Test Boring Co., Inc. I also thank Kenneth R. Cobb, Deputy Director of the Municipal Archives and Alice C. Hudson, Chief of the New York Public Library Map Division, and their respective staffs, and the staffs of the Engineering Library, The New York Historical Society Library, The New York Society Library, and The Local History and Genealogy Room of the New York Public Library. My thanks also go to Elise Wagner of Brown & Wood for her helpful editorial comments, and to Keith D. Kinna, Assistant Director of the Jervis Library in Rome, New York, for his invaluable assistance. And, as so many times before, my special thanks to Harry Kleiderman of the Manhattan Borough President's Office (Topographic Bureau) for sharing his expertise and resources.