

IN 10/2/96

Attachment 1

A CULTURAL RESOURCE RECONNAISSANCE STUDY  
OAKWOOD BEACH, STATEN ISLAND,  
RICHMOND COUNTY, NEW YORK

Lynn Rakos  
Environmental Analysis Branch  
New York District  
U.S. Army Corps of Engineers

November 1994

815

## **I. Study Area**

Oakwood Beach is located on the south shore of Staten Island, Richmond County, New York, between Great Kills Harbor and New Dorp Beach. The specific project area is adjacent to the Gateway National recreation Area, south of Oakwood Creek, and the Oakwood Beach Water Pollution Control Plant (Figure 1).

The study area is part of the unsubmerged coastal plain. Local features of this physiography are tidal marshes and shallow bays which border the shoreline (U.S. Army Corps of Engineers 1964).

Great Kill Harbor is located at a dividing line between two landforms. North of the Harbor is a flat, low-lying glacial outwash plain. To the south, a northeast-southwest trending terminal moraine ridge dominates the landscape, with irregular surfaces and higher relief (U.S. Army Corps of Engineers 1964).

Subsurface materials consist of unconsolidated Cretaceous to Recent sediments which lie over deeply buried bedrock. Recent sediments consist of alluvial sands and gravels interspersed with dark organic silt and clay. The deposits are thin and difficult to differentiate from the Pleistocene deposits below. Littoral forces have eroded much of the Staten Island shoreline including Oakwood Beach. A westward littoral movement has resulted in the build up of the Crookes Point spit across the Great Kill Harbor. The backshore, foreshore and nearshore have been subject to varying amounts of modern landfilling activities (U.S. Army Corps of Engineers 1964).

Presently the southern portion of the project area contains numerous wetlands. The northern portion is upland and primarily wooded. The woodlands are interspersed with dense thicket. The Oakwood Beach Water Pollution Control Plant dominates the project in the south. The northern levee is in an area of residential development. A concrete slab driveway runs southeast from Riga Avenue, northeast of Dugdale Avenue. A modern house was located here until the 1960s when the structure burned and was removed (Jacqueline Neilson, personal communication 1994). A small brick backyard structure remains.

## **II. Study Description**

A storm in December 1992 and a March 1993 blizzard caused significant flooding in Oakwood Beach. Many people were forced to evacuate their homes which suffered considerable flood damage. The Oakwood Beach Water Pollution Control Plant also experienced considerable difficulties due to flooding.

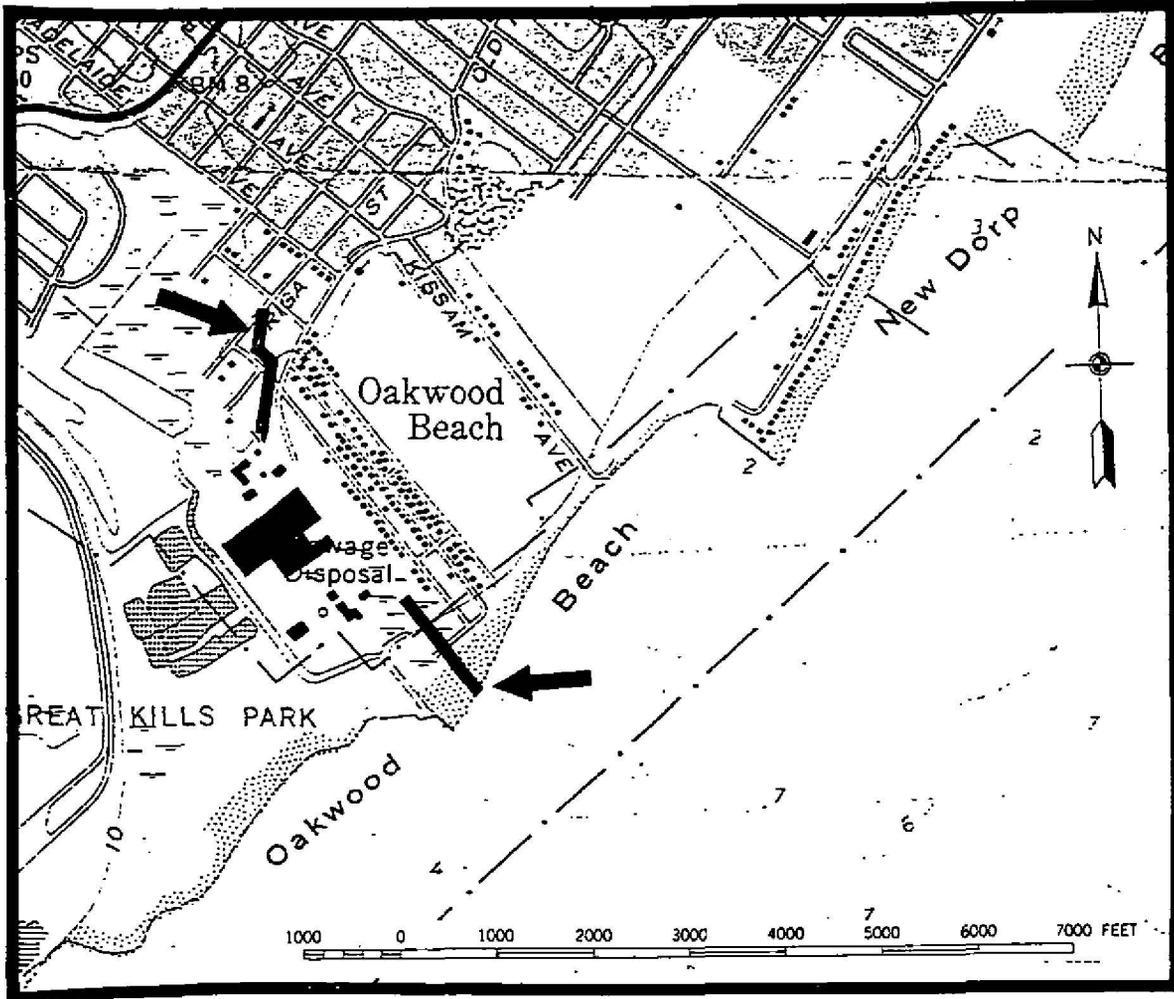


Figure 1. Project location. Arrows point to two proposed levees. Source: USGS Arthur Kill quadrangle. 1966.

A wooden seawall adjacent to a tide gate at the mouth of Oakwood Creek has deteriorated and has been flanked due to the erosion of the protective beach. This situation has left many residents and the Water Treatment Plant vulnerable to future flooding. The Corps will evaluate the feasibility of reducing the effects of shoreline erosion on the seawall, and provide flood control measures, thereby providing protection for the sewage treatment plant and the adjacent community.

This project is being conducted under the continuing authority of the Flood Control Act of 1946 which allows for limited funds to be provided for emergency shoreline and streambank protection and stabilization. The funding was received from the Continuing Authority Program, Section 14 emergency shoreline protection authority.

### **III. Procedures**

Research on the prehistory and history of the project area was conducted through the following institutions:

The New York Public Library, Map, General Research and U.S. History, Local History and Genealogy Divisions.

New York City Landmarks Commission Library and files

The Environmental Analysis Branch Library, New York District, U.S. Army Corps of Engineers.

National Park Service, Gateway National Recreation Area.

The New York State Museum and the New York State Office of Parks, Recreation and Historic Preservation were also contacted regarding project area prehistoric archaeological sensitivity.

A field visit was made to the project area by the Corps project archaeologist.

### **IV. Previous Research**

The Oakwood Beach area has been the subject of a number of cultural resources studies. A very informative historical overview was written in 1980 for the National Park Service (Baugher-Perlin and Bluefeld 1980). This study provided background information on Lake's Mill which was located in the project vicinity and on the Great Kills Harbor historical development in general. Several archaeological surveys were also conducted in the project vicinity (WAPORA, Inc. 1978, Pickman and Yamin 1984, Rutsch 1984, Greenhouse Consultants 1990).

One of eight foci of the Greenhouse Consultants' work was the Oakwood Beach Water Pollution Control Plant. This area was part of an extensive marsh filled with 8 to 16 feet of material in the 20th century. Subsurface testing was recommended in three locations to examine the former marsh surface for cultural materials (Greenhouse Consultants, Inc. 1990). This testing was reportedly undertaken in advance of the sewer plant expansion. Apparently no artifacts were recovered but no report is available on this testing (Hofstein, personal communication 1994).

The Rutsch report documented fieldwork conducted in the wetlands on the southeastern side of Great Kills Harbor. This work was undertaken to examine the former marsh surface for cultural materials. The deposits were culturally sterile (Rutsch 1984).

## V. Study Area Prehistory

The earliest detection of human presence in the northeast is generally accepted as beginning approximately 12,000 to 13,000 years ago. The chronological sequence of prehistoric occupation is divided into three major cultural periods: Paleo-Indian (circa 12,500-8,000 B.P.), Archaic (circa 8,000-3,000 B.P.) and Woodland (circa 3,000 B.P.-A.D. 1600). Many overviews of the prehistory and the paleoenvironment of the New York/New Jersey metropolitan area have been published (e.g., Ritchie 1980; Kraft 1986) and will not be reiterated here.

Numerous prehistoric sites have been documented along the south shore of Staten Island. Consultation with the New York State Museum Anthropology Survey indicates that there are presently three sites in the project vicinity (NYSM#s 4617, 4628 and 8481) (Wellman, personal communication 1994).

Site 4617 reportedly contained traces of a shell midden. Traces of occupation were recovered from Site 4268. A camp was documented at Site 8481. This site, to the southwest of the Oakwood Beach Water Pollution Control Plant, was reported by Alanson Skinner early this century. The Oakwood, or Great Kills, Site (Site 4881) was located just to the northeast of a former pond and marsh which would have provided a fresh water source (Greenhouse Consultants, 1990).

The NYSM has evaluated the project area as having a high sensitivity for prehistoric sites. This assessment is based on the similarity of terrain to other areas in the vicinity where sites have been documented. The physiographic characteristics of the area also suggest a high probability for prehistoric remains (Wellman, personal communication 1994).

## VI. Study Area History

The initial documented European occupation of Staten Island occurred in 1626 when the Director of the Dutch West India Company purchased the island from the Native American population. The English took possession of the island in 1664 (Greenhouse Consultants, Inc. 1990). Great Kills Harbor was used for its marine resources since prehistoric populations occupied the area and was used historically as early as the 1600s. The bay was abundant with clams, oysters and fish until the 20th century when pollution depleted the supply.

The 17th and 18th century history of this area has not been extensively researched at this time. By the Revolutionary War the northern shore of Great Kills Harbor was occupied. Structures were present on the north side of Great Kills Harbor and at that time the southern levee project area property is attributed to a Corleyou family. A "D. Lake" was shown as owning property nearby (Figure 2). Lake later owned a mill that is depicted on the northwest side of Great Kills Harbor by 1797 (A New and Correct Mapp (sic) of the County of Richmond made in the year 1797).

The mill is associated with a "Loveridge" family on mid-19th century maps (Dripp 1850 [Figure 3], Butler 1853). Baugher-Perlin and Bluefeld suggest that Loveridge might in fact refer to the miller rather than the owner.

The mill is referred to as a "grist mill," with no proprietor indicated, in 1866 (Colton 1866). The Beers map of 1874 again attributes ownership to Lake (Baugher-Perlin and Bluefeld 1980). The mill does not appear on any maps after 1874, although the Lake family mill was reportedly still standing in 1890, but had apparently been out of operation for years by that time (Baugher-Perlin and Bluefeld 1980).

A drawing made of the mill in 1891 depicts a small frame building surrounded by marsh. The mill was run by tidal power and the property had "a dam and tidal gate and water was stored up during flood tide to use during the ebb" (Balch quoted in Baugher-Perlin and Bluefeld 1980). The mill apparently only served the local community and was not a large commercial venture. It was reportedly demolished in 1895 or 1896 and any archaeological remains of the mill were probably destroyed by the construction of the Gateway National Recreation Area facilities.

Two structures near the beach were depicted on the 1850 map as Loveridge properties. These structures were located approximately 1/4 mile north of the proposed southernmost



Figure 2. Plan No. 31 du Camp Anglo-Hessois dans Staten Island. 1780 & 1783. Proposed levee alignments are depicted.

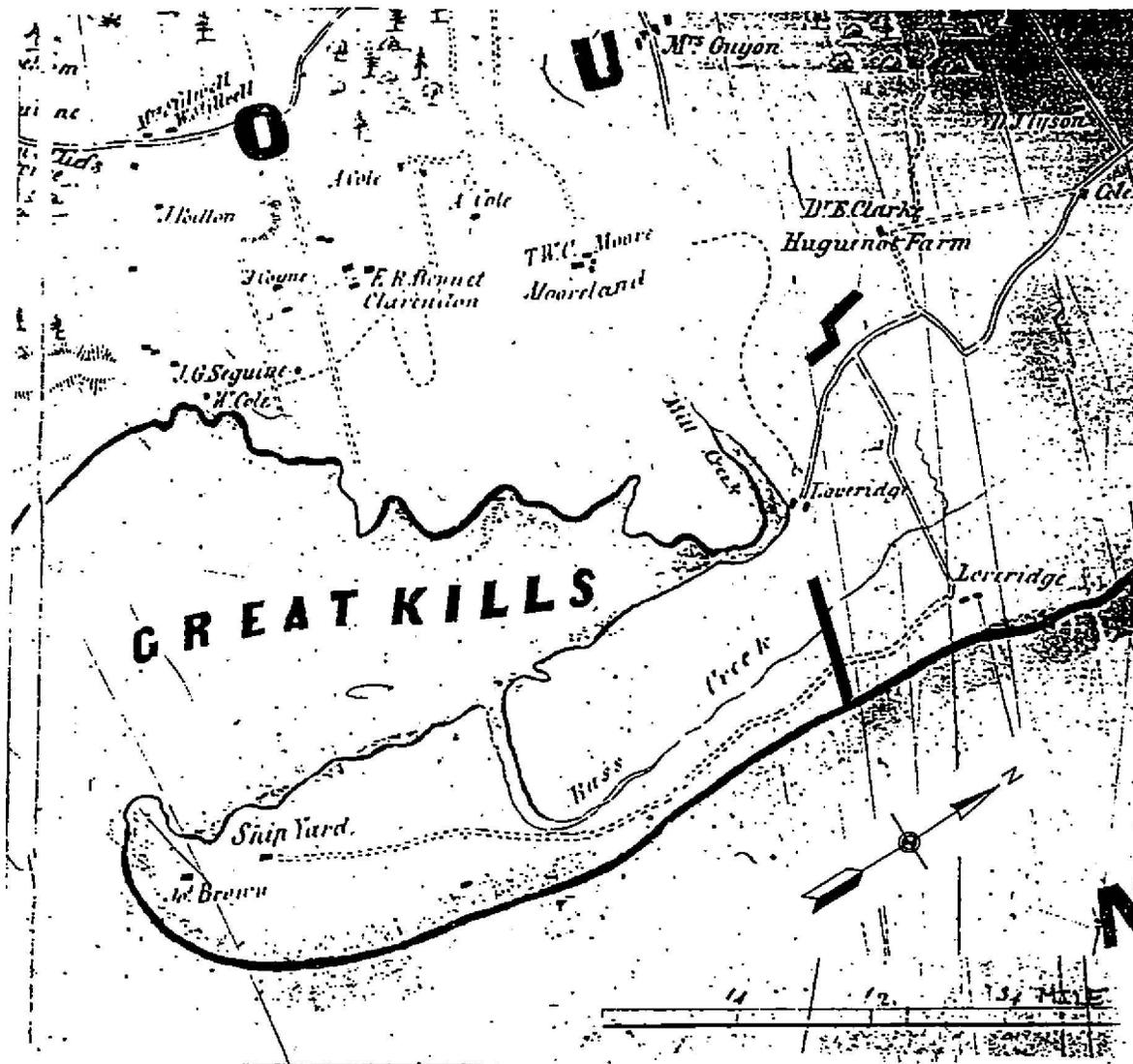


Figure 3. Dripp's Map of Staten Island or Richmond County. 1850. Proposed levee alignments are depicted.

levee at the end of a trail. They are labeled "Fish Houses" on Figures 4 and 5. By 1887 they may have no longer been extant (Figure 6).

Two structures attributed to a Dr. E. Clark are shown in 1859 on the west side of Old Mill Road, approximately 1/8 of a mile south of the northern most proposed levee (Figure 4). Colton's map of 1884 reflects a similar property distribution (Figure 5). The structures at this property appear to be a dwelling and a barn (Figure 6). This farmstead is clearly depicted on Figures 7 and 8 which shows the dwelling, stables, orchard and cultivated fields. The Presbyterian Church of Sea and Land have may utilized the Clark dwelling in the early 20th century (Bromley 1917).

Two other structures stood in the project vicinity but appear to be out of the project area itself. A structure attributed to Lake & McCluse is depicted on the west side of Old Mill Road (Figures 4 and 5) but shown on the east side in the Beers atlas (Figure 6). The building again appears on the west side in 1890 (Figure 7) suggesting that the 1874 atlas location is incorrect. This dwelling was the Lake family farmstead, the configuration of which is detailed on Figures 7 and 8. A family burial ground associated with the Lake's was in use between 1740 and 1850. The cemetery site was reportedly beneath what is now the Oakwood Beach Water Pollution Control Plant (New York Times, 5/23/93).

A structure stood at the intersection of the Old Mill Road with a trail leading from the beach (Figures 5, 6 and 7). The structure was apparently demolished by 1911 (Borough of Richmond Topographical Survey 1911).

The Crookes Point/Great Kills Harbor area was used primarily for salt meadow. In the mid-19th century a ship builder occupied two structures on the point and a fisherman made use of a third. Squatters occupied the point in the 1920s. An extensive network of ditches were excavated in the marsh (see Figure 7, 8 and 9) and Bass Creek was channelized (Figure 7). The City of New York used much of the marsh around the Harbor for landfill in the 1940s. This reclaimed land was later used for a City park and then became part of the federal Gateway National Recreation Area.

Many of the buildings in this section of Oakwood Beach were constructed in the 1930s. The dwellings are predominantly of the bungalow type. The water treatment plant was built in the 1950s and has since been expanded several times.

## VII. Discussion of Potential Cultural Resources

The potential for encountering prehistoric remains in the uplands portion of the project area is high. This assessment

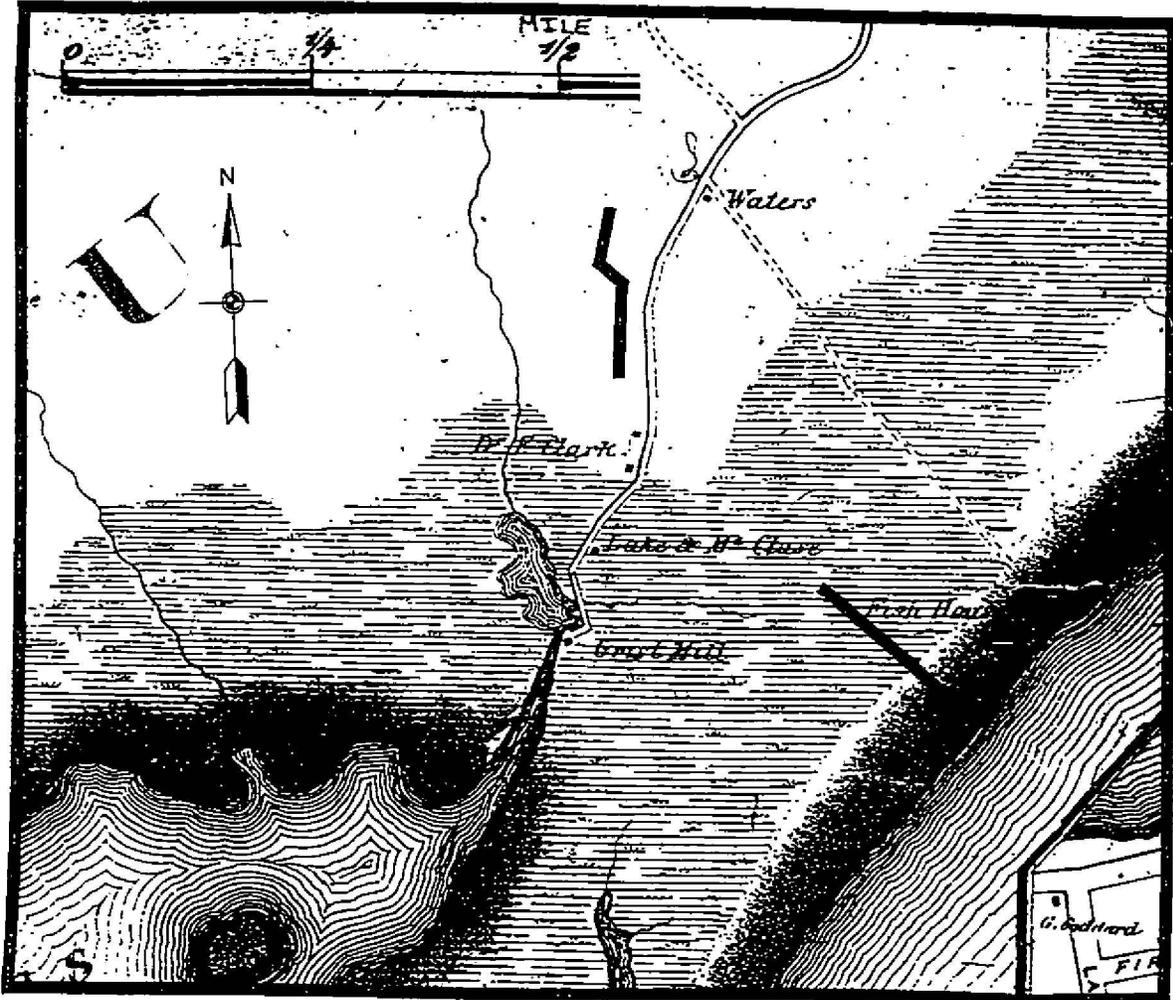


Figure 4. Walling's Map of Staten Island, 1859.  
Proposed levee alignments are depicted.





Figure 6. Beers Atlas of Staten Island. 1887.  
Proposed levee alignments are depicted.

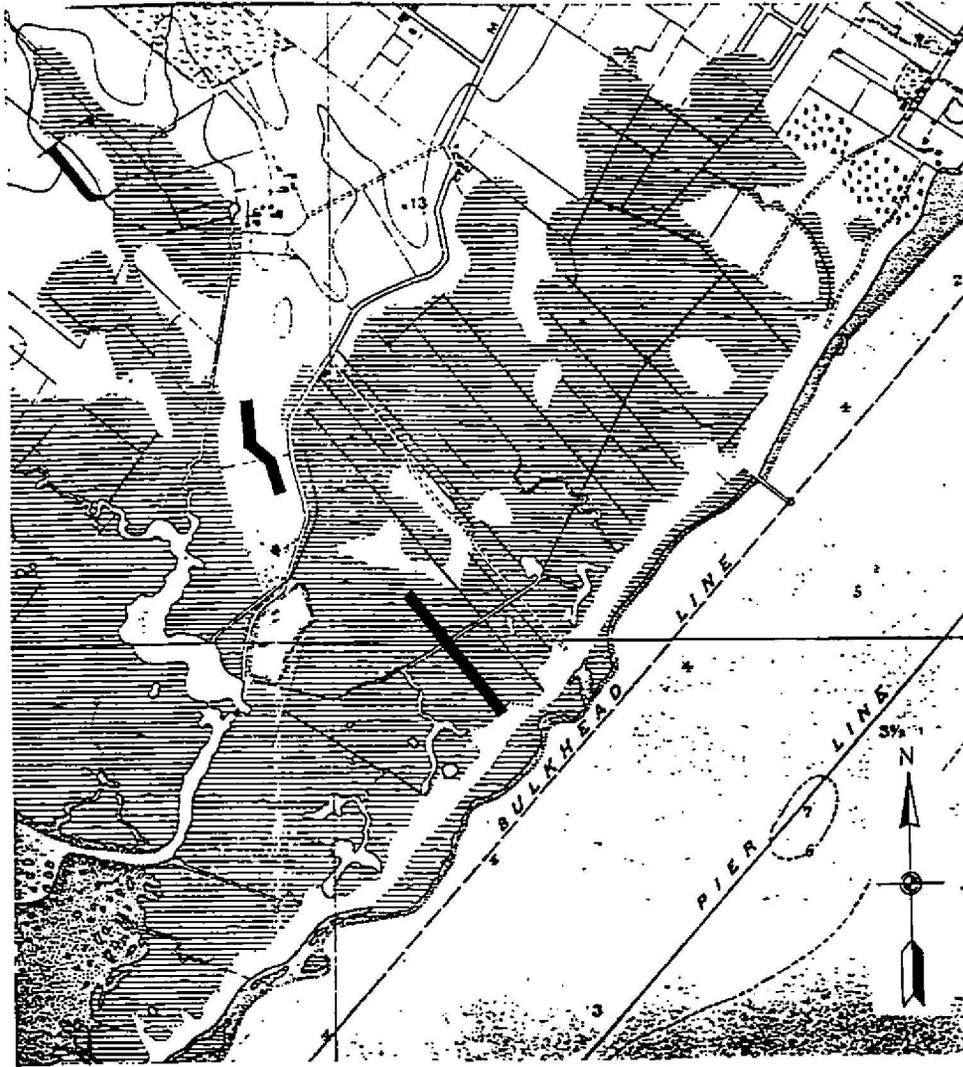


Figure 7. Vermuele & Bien. A Topographical Atlas of Staten Island. 1890. Scale 1":1/4 mile. Proposed levee alignments are depicted.

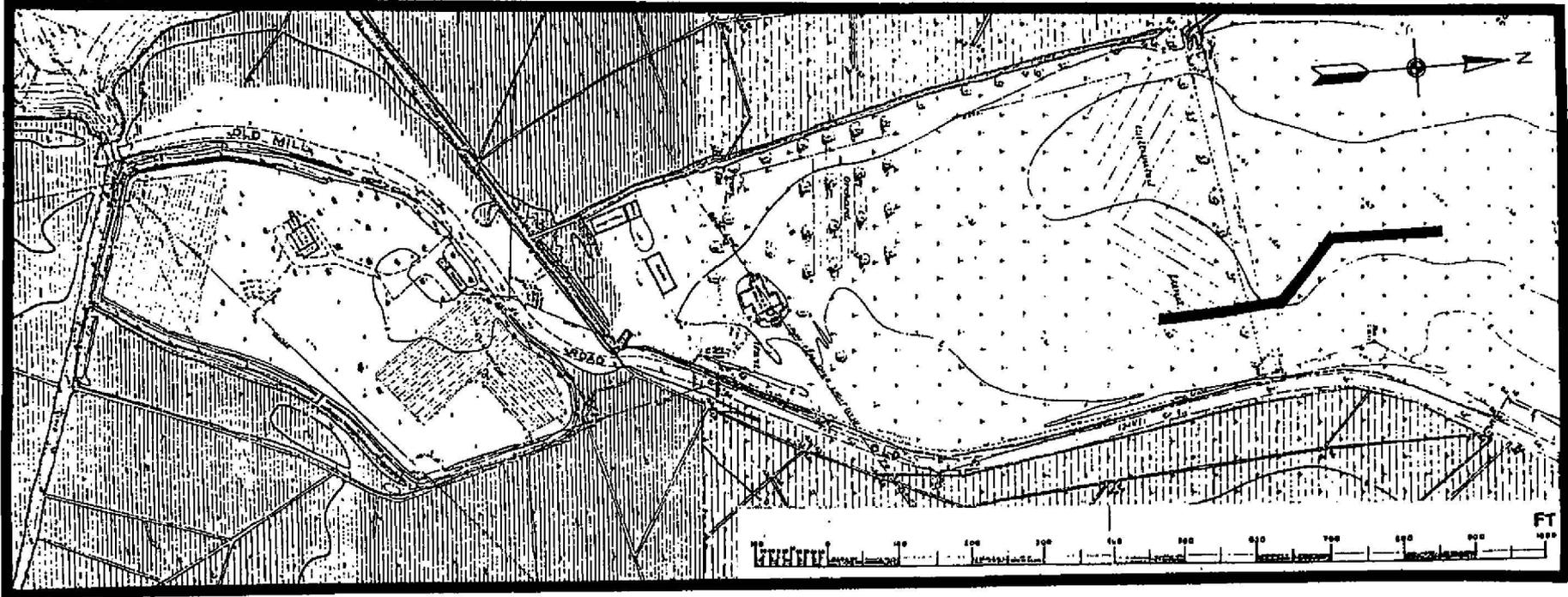


Figure 8. Borough of Richmond Topographical Survey. 1911. Proposed levee alignment is depicted. The Lake Farm Complex is shown on the right.

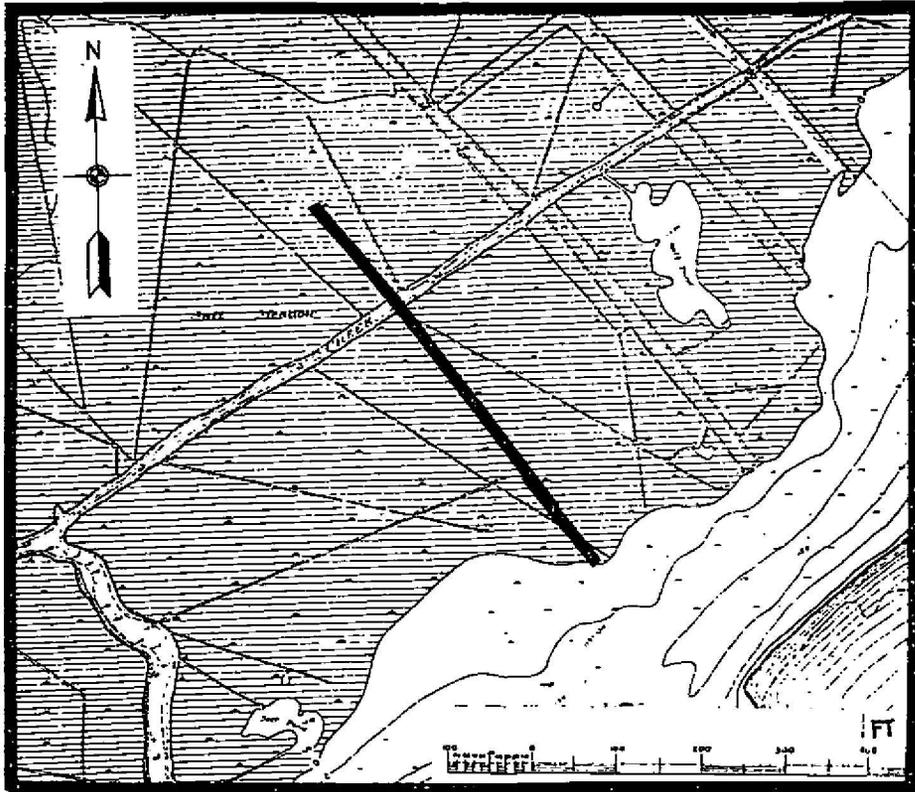


Figure 9. Borough of Richmond Topographical Survey. 1911. Proposed levee alignment is depicted.

is based on the location of known sites in the area. The northernmost proposed levee alignment runs along the axis of a point of high ground that extends into the marsh. This landform would have provided an ideal location to exploit the natural resources of the marsh and therefore has a high archaeological sensitivity.

The southern alignment crosses the marsh. The marsh surface was examined twice in the field for evidence of cultural material. Both of these efforts yielded negative results (Rutsch 1984; Hofstein, personal communication 1994). It seems unlikely that the wetland area would have been occupied by the Native American population.

As can be ascertained from the cartographic evidence, most of the historic development took place south and west of the proposed alignments. The mill and both the Lake and Clark farms were probably destroyed by the construction of the Great Kills National Recreation Area and the Oakwood Beach Water Pollution Control Plant. It is unlikely that significant remains from the historic period would be present in either of the proposed levee alignments.

#### **VIII. Effects of Study Plans on Cultural Resources**

Project plans call for the construction of two levees (see Figure 1). The southern levee segment extends 670 linear feet and includes a tide gate. The northern levee extends a total of 1060 feet.

Preparation for this structure will involve the excavation of a ten-foot wide trench running the length of the levee to a depth of 3 to 6 feet below surface. This will support a core of compacted impervious fill.

It is in the opinion of the U.S. Army Corps of Engineers that an archaeologically sensitive area may be effected by this flood control project. Subsurface testing is recommended for the northern proposed levee alignment to determine presence or absence of cultural materials. Based on negative evidence obtained from previous testing in the marsh no further work will be required for the southern proposed alignment. ✓

## REFERENCES

A New and Correct Mapp (sic) of the County of Richmond made in the Year 1797.

Baugher-Perlin, Sherene and Frederick A. Bluefeld  
1980 A Background Study of Historic Land Use of the Gateway National Recreation Area, Staten Island Unit. Prepared for the North Atlantic Regional Office, National Park Service.

Butler, James  
1853 Map of Staten Island. James Butler.

Bromley, George W. and Walter S.  
1917 Atlas of the City of New York. Borough of Richmond. G.W. Bromley & Co. Philadelphia.

Colton, G.W. and C.B.  
1866 Map of Staten Island. G.W. & C.B. Colton & Co. New York.

Greenhouse Associates, Inc.  
1990 Archaeological Sensitivity Evaluation for Eight Water Pollution Control Plant Expansions in New York City. On file, New York City Landmarks Commission.

Hofstein, Harold  
1994 New York City Department of Environmental Protection, Division of Facilities Design North. Personal communication, 2 November 1994.

Nielson, Jacqueline  
1994 Chairperson, Oakwood Beach Flood Victims Committee.

New York Times  
1993 Sunday, May 23, 1993. p.1.

Pickman, Arnold and Rebecca Yamin  
1984 Oakwood Beach Water Pollution Control Project Phase I Cultural Resources Survey. Hylan Avenue at Richmond Boulevard to Arthur Kill Road at Kreisler Street (2 vols.). On file, New York City Landmarks Commission.

Rutsch, Edward S.  
1984 Stage 1B Cultural Resource Survey of the Proposed Intercepting Sewer in the Proposed Tennyson Drive between (and including) Robinson Street and Prospect Point Street, Oakwood Beach, Borough of Staten Island, New York. On file, New York City Landmarks Commission.

U.S. Army Corps of Engineers

1964 Cooperative Beach Erosion Control and Interim Hurricane Study (survey). Staten Island, New York, Fort Wadsworth to Arthur Kill. On file, U.S. Army Corps of Engineers, New York District.

Vermuele and Bien

1890 A Topographical Map of Staten Island. Vermuele and Bien. New York.

WAPORA, Inc.

1978 EIS Background Document Preliminary Cultural Resources Assessment: Literature Search and Windshield Survey, Oakwood Beach Water Pollution Control Project Phase III and Future Phases. On file, New York City Landmarks Commission.

Wellman, Beth

1994 Letter 9/19/94, New York State Museum Anthropological Survey, to Stuart Piken, US Army Corps of Engineers.



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
NEW YORK DISTRICT, CORPS OF ENGINEERS  
JACOB K. JAVITS FEDERAL BUILDING  
NEW YORK, N.Y. 10278-0090

Attachment 2

November 22, 1994

Environmental Assessment Section  
Environmental Analysis Branch

Mr. J. Winthrop Aldrich  
New York State Office of Parks,  
Recreation and Historic Preservation  
Historic Preservation Field Services Bureau  
Peebles Island, P.O. Box 189  
Waterford, NY 12188-0189

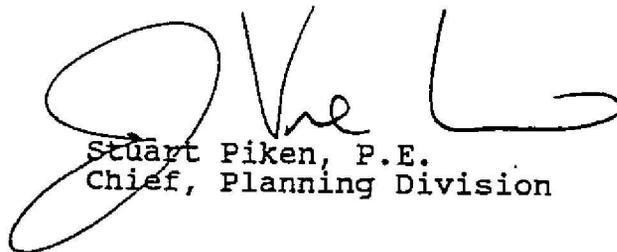
Dear Mr. Aldrich,

The U.S. Army Corps of Engineers, New York District (Corps) is conducting a reconnaissance level study for a Section 14 flood control project at Oakwood Beach, Staten Island, Richmond County, New York.

A cultural resource assessment of the study area was undertaken by the Corps. The report is enclosed for your review. Please provide us with any comments you may have on our proposed strategy for archaeological investigations. As project planning proceeds, further cultural resource evaluation and consultation with your office will be undertaken.

If you or your staff require additional information or have any questions, please contact Lynn Rakos, Project Archaeologist, (212)264-4663. Thank you for your assistance.

Sincerely,



Stuart Piken, P.E.  
Chief, Planning Division

Enclosure



Joan K. Davidson  
Commissioner

New York State Office of Parks, Recreation and Historic Preservation  
Historic Preservation Field Services Bureau  
Peebles Island, PO Box 189, Waterford, New York 12188-0189

518-237-8643

December 6, 1994

Stuart Piken, P.E.  
Chief, Planning Division  
Environmental Analysis Branch  
U.S. Army Corps of Engineers  
New York District  
Jacob K. Javits Federal Building  
New York, New York 10278-0090

Attn: Lynn Rakos

Re: CORPS  
Oakwood Beach Flood Control  
Staten Island, Richmond Co.  
94PR2506

Dear Mr. Piken:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO) with regard to the proposed strategy for archeological investigations associated with the above project. We have reviewed the proposal in accordance with Section 106 of the National Historic Preservation Act of 1966 and the relevant implementing regulations.

Based upon our review of A Cultural Resources Reconnaissance Study, Oakwood Beach, Staten Island, Richmond County, New York, prepared by Lynn Rakos and dated November 1994, the SHPO concurs with the conclusions and recommendation for subsurface testing at the location of the northern proposed levee only.

If you have any questions or comments on this matter, please contact me at 518/237-8643, ext. 280.

Sincerely,

James Warren  
Program Analyst  
Field Services Bureau

JPW:cm



~~Dean K. Davidson~~  
~~Commissioner~~  
Bernadette Castro  
Commissioner

New York State Office of Parks, Recreation and Historic Preservation  
Historic Preservation Field Services Bureau  
Pebbles Island, PO Box 189, Waterford, New York 12188-0189

518-237-8643

May 25, 1995

Stuart Piken  
Chief, Planning Division  
Department of The Army  
New York District, Corps of Engineers  
Jacob K. Javits Federal Building  
New York, NY 10278-0090

Dear Mr. Piken:

Re: CORPS  
Oakwood Beach Flood Control  
Staten Island  
94PR2506

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966 and the relevant implementing regulations.

Based upon this review, the SHPO concurs with the recommendations of the Cultural Resource Reconnaissance Study. We look forward to receiving the results of the additional investigations when that work is completed.

When responding, please be sure to refer to the SHPO project review (PR) number noted above. If you have any questions, please feel free to call me at (518) 237-8643 ext. 255.

Sincerely,

Robert D. Kuhn, Ph.D.  
Historic Preservation Coordinator  
Field Services Bureau

RDK:cm

**ATTACHMENT 5  
SHOVEL TEST SOIL PROFILES  
ARCHAEOLOGICAL SURVEY  
OAKWOOD BEACH, STATEN ISLAND, RICHMOND COUNTY, NEW YORK**

TEST #	DEPTHS (Below Surface)	SOIL DESCRIPTION	CULTURAL MATERIALS
1	0 - 3"	2.5YR 2.5/1 loam (root mat)	---
	3 - 9"	7.5YR 3/3 slightly clayey loam	historic ceramics, brick*
	9 - 19"	10YR 6/6 mottled very compact clayey silt	---
2	0 - 2"	2.5YR 2.5/1 loam (root mat)	---
	2 - 14"	5YR 4/3 loam	lithics, historic ceramics, brick*, charcoal*
	14 - 25"	mottled 10YR 6/6 and 5/6 clayey loam w/ coarse sand stone fragments & pebbles	---
3	0 - 2"	2.5YR 2.5/1 loam (root mat)	---
	2 - 15"	mottled 10YR 6/6 & 5/6 clayey loam w/ coarse sand & pebbles	---
4	0 - 1"	2.5YR 2.5/1 loam	---
	1 - 10"	7.5 YR 3/3 clayey loam	lithics, historic ceramics
	10 - 16"	10YR 6/6 mottled compact clayey sand	---
5	0 - 10"	7.5YR 4/3 clayey loam	historic ceramics
	10 - 18"	mottled 10YR 5/4 & 5/6 silt w/ coarse sand	---
6	0 - 1"	2.5YR 2.5/1 loam	---
	1 - 10"	7.5YR 3/3 clayey loam	historic ceramics
	10 - 15"	mottled 10YR 6/6 sandy clay silt	---
7	0 - 11"	7.5YR 3/3 slightly clayey loam	---
	11 - 18"	10YR 5/4 coarse sand	historic ceramics
8	0 - 3"	5YR 2.5/1 loam	---
	3 - 14"	7.5YR 4/3 slightly clayey loam	---
	14 - 20"	10YR 6/6 slightly clayey silt w/ coarse sand	---
9	0 - 6"	5YR 4/3 clayey loam	---
	6 - 18"	5YR 6/6 clayey silt	lithics
* = Discarded in field			

TEST #	DEPTHS (Below Surface)	SOIL DESCRIPTION	CULTURAL MATERIALS
10	0 - 2"	5YR 4/3 loam	---
	2 - 10"	7.5YR 3/3 silty loam	lithics, historic ceramics
	10 - 26"	7.5YR 4/4 coarse sandy silt	---
11	0 - 3"	7.5YR 4/3 loam	---
	3 - 11"	10YR 4/3 silt	historic ceramics, bakelite, coal*
	11 - 18"	10YR 7/3 compact coarse sandy silt	---
12	0 - 4"	7.5YR 4/2 loam	---
	4 - 9"	10YR 4/4 slightly clayey loam	---
	9 - 15"	10YR 6/6 compact coarse sandy silt	---
	15 - 19"	7.5YR 6/6 compact coarse sandy silt	---
13	0 - 5"	7.5YR 2.5/1 loam	---
	5 - 18"	7.5YR 5/6 clayey silt w/ coarse sand	---
14	0-14"	construction fill, rocks	---
	14 - 25"	5YR clayey silt w/ coarse sand	---
15	0 - 7"	fill on east half w/ cobbles	---
	0 - 14"	fill on west half (plowzone & subsoil)	---
	7 & 14 - 18"	5YR 4/6 clayey silt w/ coarse sand	---
16	0 - 7"	10YR 5/3 sand & silt w/ pebbles & debris, compact	modern bottle glass*; chain link fence fragments*; plastic*
	7 - 14"	mottled clay w/ pebbles	---
	14 - 20"	10YR 4/4 clay w/ pebbles & concrete	---
	20"	rock impasse	---
17	0 - 10"	10YR 5/3 coarse sand	modern bottle glass*
	10 - 19"	10YR 4/4 clay	---
	19 - 27"	10YR 2/2 clay w/ rocks	---
	27"	standing water	---
* = Discarded in field			

**ATTACHMENT 6**

**ARTIFACT INVENTORY  
ARCHAEOLOGICAL SURVEY  
OAKWOOD BEACH, STATEN ISLAND, RICHMOND COUNTY, NEW YORK**

<u>Test #/Stratum</u>	<u>Artifact Description</u>	<u>Quantity</u>
1/2	Ceramic pearlware, plate, base fragment, undecorated	1
	Ceramic whiteware, rim fragment, undecorated	1
	Ceramic whiteware, body fragment, undecorated	3
2/2	Glass clear, curved glass	1
	Glass aqua, flat glass	1
	Ceramic porcelain, blue and white, decorated, body fragment	1
	Ceramic whiteware, body fragment, undecorated	1
	Lithic jasper flake, w/ cortex	1
	Lithic possible argillite flake	1
4/2	Ceramic whiteware, body fragment, undecorated	1
	Lithic black chert flake	1
5/1	Ceramic whiteware, blue and white transfer print, body fragment	1
	Ceramic whiteware, rim fragment, undecorated	1
	Ceramic whiteware, body fragment, undecorated	1
6/2	Ceramic whiteware, body fragment, undecorated	3
7/2	Glass aqua, flat glass	1
	Ceramic whiteware, blue and white transfer print, body fragment	1
9/2	Lithic black chert flake	1
10/2	Ceramic whiteware, blue and white transfer print, body fragment	1
	Ceramic whiteware, rim sherd, undecorated	1
	Ceramic whiteware, body fragment, undecorated	1
	Lithic jasper, worked core	1
11/2	Ceramic whiteware, body fragment, undecorated	6
	Plastic Bakelite, flat	2