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EIS BACKGROUND DOCUMENT

PRELIMINARY CULTURAL RESOURCES ASSESSMENT:

LITERATURE SEARCH AND WINDSHIELD SURVEY

Oakwood Beach Water Pollution Control Project

Phase III and Future Phases

Contract #68-01-4616, DOW #1

Submitted to:

USEPA Region II
26 Federal Plaza
New York, New York 10007

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AIR

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WATER

Table of Contents

<u>Section</u>	<u>Page</u>
Summary	i
I Introduction	I-1
A. Reference Sources	I-2
II Cultural Background	II-1
A. Historical Overview	II-1
B. Greenridge	II-2
1. Prehistoric Resources	II-2
2. Historic Resources	II-3
C. Rossville	II-4
1. Prehistoric Resources	II-4
a. Huguenot Site	II-4
b. Wort Farm	II-5
c. Rossville Campsite	II-6
d. Chemical Lane	II-6
e. Gerike Organic Farm	II-8
f. Clay Pit Road	II-8
g. Summary	II-8
2. Historic Resources	II-9
a. Blazing Star Tavern	II-9
b. Revolutionary War	II-10
c. Industrialization	II-11
d. Historic Archaeological Sites	II-11
D. Kreischerville (Charleston)	II-13
1. Prehistoric Resources	II-13
a. Socony-Port Mobil Area	II-13
b. Kreischerville	II-14
c. Canada Hill	II-15
2. Historic Resources	II-15
a. Early buildings	II-16

Table of Contents (Cont'd.)

<u>Section</u>	<u>Page</u>
E. Tottenville	II-18
1. Prehistoric Resources	II-18
a. Ward's Point	II-19
b. Burial Ridge	II-20
c. Page Avenue	II-22
2. Historic Resources	II-24
a. Amboy Ferry	II-24
b. Biddle Properties	II-25
c. The Conference House	II-26
F. Prince's Bay to Great Kills	II-27
1. Prehistoric Resources	II-27
2. Historic Resources	II-28
a. Oyster Business	II-29
b. Seguine Point	II-30
c. Purdy Hotel	II-30
d. The Dental Works	II-31
e. Wolfe's Pond	II-31
f. The Poillon House	II-32
g. Other Areas	II-33
III. Ground Surface, Previous Subsurface Disturbance and Analysis of Soil Borings	III-1
A. Eltingville Pumping Station to Mayflower Avenue Pumping Station	III-1
B. Mayflower Avenue Pumping Station	III-2
C. Arthur Kill Road from Mayflower Avenue to Warsaw Avenue Pumping Station	III-4
D. Warsaw Avenue Pumping Station	III-6
E. Kreischer Street Pumping Station	III-6
F. Kreischer Street to End of Ellis Street	III-6
G. Shore Line from Ellis Street to Tottenville Emergency Overflow Sewer	III-7
H. Tottenville Emergency Overflow Sewer to Tottenville Pumping Station	III-9
I. Billop Avenue to Hylan Boulevard	III-9
J. Hylan Boulevard from Bedell Avenue to Sharrott Avenue	III-10
K. Sharrott Avenue to Wolfe's Pond Pumping Station	III-10
L. Wolfe's Pond Park to Cornelia Avenue	III-11
M. Cornelia Avenue to Arden Avenue	III-12
N. Arden Avenue to Wiman Avenue	III-13

Table of Contents (Cont'd.)

<u>Section</u>	<u>Page</u>
IV. Conclusions and Recommendations	IV-1
A-K Subsurface Testing	
A. Wiman Avenue to Cornelia Avenue	IV-2
B. Cornelia Avenue to Hylan Boulevard	IV-3
C. Hylan Boulevard between Sharrott Avenue and Bedell Avenue	IV-3
D. Bedell Avenue to Ellis Street - Including Conference House Park	IV-4
E. Emergency Overflow Sewers - Tottenville, Wolfe's Pond and Kreischerville Street	IV-8
F. Ellis Street and Arthur Kill Road to Mayflower Avenue Pumping Site	IV-8
G. Kreischer Street Pumping Station	IV-9
H. Warsaw Avenue Pumping Station	IV-10
I. Mayflower Avenue Pumping Station and Fresh Kills Treatment Plant	IV-10
J. Mayflower Avenue Pumping Station to Richmond Avenue	IV-11
K. Arthur Kill Road to Eltingville Pumping Station	IV-11
L. Structures of Historical Interest	IV-12
Appendices	
A. Photographs of Project Area	A-1
B. Persons Consulted	B-1
C. Project Description	C-1
D. References	D-1

List of Exhibits

- Exhibit 1. Map of Staten Island showing prehistoric and historic sites in the project area. List of prehistoric and historic sites.
- Exhibit 2. Map of Staten Island (Motanucke, Monocknong, Aquehonga, Eghquaons, Staaten Eylant), by Charles W. Leng with "Ye Olde Names and Nicknames "by William T. Davis, 1896.
- Exhibit 3. A Map of Staten Island During the Revolution, 1775-1783. Loring McMillen, 1933.
- Exhibit 4. Archaeological Map of Staten Island. Alanson Skinner, 1909.
- ✓ Exhibit 5. Archaeological Tests at Chemical Lane. (Taken from Rubertone, 1974, p 4)
- Exhibit 6. The "Hessian Map", ca 1777.
- Exhibit 7. Map Giving the Location of Shell Deposits. (Taken from Skinner, 1947)
- ✓ Exhibit 8. Ward's Point Archaeological Zone
- Exhibit 9. "Map II - Sites Near Ward's Point" (Taken from Jacobson, 1960)
- Exhibit 10. Project Route at Ward's Point showing Jacobson's sites 4,5 and 6.
- Exhibit 11. Route of Planned Construction

Summary

This report presents results of a preliminary survey of cultural resources in primary impact areas of the proposed Oakwood Beach Water Pollution Control Project, Phase III and Future Phases, in southwest Staten Island, New York.

A literature search and field review (conducted in December 1977) provided information pertaining to prehistoric and historic resources in the affected area. An evaluation was prepared of potential effects upon these resources due to the proposed project. Significant findings and conclusions are:

A. Prehistoric Resources

Prehistoric material has been found along the entire route of the proposed project. It is concluded the entire project area shoreline is archaeologically sensitive (Exhibit 4).

There are 28 areas where prehistoric materials have been either collected from the surface or excavated. Of these, five have produced artifacts from the Paleo-Indian period -- 10,500 B.C. in the Northeast (Funk, 1976).

Three sites at Port Mobil (i.e. North Beach, Port Mobil Hill, Charleston Beach) have made a significant contribution to knowledge of the Paleo-Indian period. In particular, the Charleston Beach site is instructive as material has been found in beach margin peat deposits as well as on the beach at low tide. The proposed sewer will not affect these previously disturbed sites. However, other sites may be present along the shoreline and in the water.

Surface finds at Cutting, Smoking Point and Kreischerville indicate the presence of more Paleo-Indian material. Wherever the proposed sewer traverses the shoreline and there are no bluffs, the project may disturb what evidence is left of the earliest occupation of the Northeast.

Archaic period materials have been found both on the shore and inland.

Though most of the 28 areas are in the vicinity of the shore, the sites at Chemical Lane in Rossville (i.e. Pottery Farm, Chemical Lane and Smoking Point) include Archaic and Transitional components. The Gerike Farm site, on the other side of Arthur Kill Road, has also yielded Archaic period materials. The proposed route of the sewer in this area is under the Arthur Kill Road. That sites are located on either side of the road in this vicinity makes it impossible to exclude the possible presence of material underneath the road and within the project easement.

Archaic components have been reported in the Tottenville area at Ward's Point and Page Avenue. Funk presents two carbon-14 dates for the Ward's Point material, 5310 B.C. \pm 125 and 6300 B.D. \pm 140 (Funk, 1976). Jerome Jacobson's attempt to synthesize the work done to date at Ward's Point (Jacobson, 1960) make it clear how much information has been lost. Nevertheless, Ward's Point was declared eligible for the National Register of Historic Places in 1976. There still appears to be enough undisturbed material within the archaeological preserve to be useful for future research-oriented excavation. No part of this area, which was the site of a contact village as well as earlier occupations, should be destroyed. However, the proposed sewer passes directly through the designated preserve. The location of the proposed Tottenville Treatment Plant also intersects the area (Exhibit 10).

The Page Avenue site includes an Archaic component. The situation in this area is comparable to that in Rossville where there are sites on both sides of Arthur Kill Road. Sites exist along Page Avenue on both sides of Hylan Boulevard. This raises the possibility of archaeological material existing under Hylan Boulevard itself -- the planned route of the sewer.

Most reported sites on Staten Island reflect Middle and Late Woodland occupations. Ten of the eleven sites in the Rossville area produced Middle

and/or Late Woodland materials. From the extant evidence, the entire Rossville area may be considered archaeologically sensitive. Generally, the sewer is to extend under Arthur Kill Road which dates to the 18th Century (McMillen). However, this does not preclude prehistoric remains under that road. Paleo-Indian materials found along the Kreischerville shore attest to its archaeological sensitivity. Woodland artifacts have also been found at Charleston Beach and Kreischerville. The route is again under the road with its attendant problems. Although most material in the Kreischerville area has been found near the shore the Canada Hill site is on high ground. Elsewhere in the project area there are sites located at higher elevations.

Archaeological sites in the Tottenville area include Middle and Late Woodland components including contact period materials (Ward's Point and Page Avenue). It is universally agreed that Tottenville was an area of dense, aboriginal occupation (Bayles, 1887; Skinner, 1903 and 1909; Bolton, 1920). The village of Aquehonga was known in historic times. As noted above many artifacts representing earlier occupations have also been recovered. It is, of course, possible the division between Page Avenue and Ward's Point is an artifact of destruction and/or archaeological attention. The occupation may have been continuous in which case the path of the sewer threatens even more than is designated on the National Register.

Surface finds along the southern shore are concentrated in the Prince's Bay area, a likely area of aboriginal occupation, though the shoreline on either side of the Bay was probably equally attractive. The distribution of finds again may be an artifact of archaeological attention. The Prince's Bay shoreline, including the site of the Wolfe's Pond pumping station, could be rich in archaeological resources. Much of the proposed route here does not run under existing streets.

Between Wolfe's Pond and Great Kills fewer sites have been recorded. This is unexplained but, as the evidence stands, the area may be considered less archaeologically sensitive. This is also true of the Greenridge area where only two sites have been recorded. The proposed route in this section, however, turns inland and is thus less likely to incur remains of aboriginal occupation.

In summary, there exist significant archaeological resources along the route of the proposed project. Disturbance of any of this material would be a loss of information on the prehistoric period of the Northeast.

B. Historic Resources

While there are innumerable important historic buildings along the proposed route none is threatened with destruction by the project. However, some areas of historic significance (i.e. the Old Rossville community, clay pit tunnels in Rossville and possibly Kreischerville, the Conference House area in Tottenville, and Revolutionary encampments on the southshore) may be disturbed.

Nothing of historic significance is noted in Greenridge though Rossville still has the character of the community that grew up around the Old Blazing Star Ferry. Early 19th century buildings, including what is thought to be the Old Blazing Star Tavern, line the road in front of where the ferry would have docked (Appendix A , Photo. #). A number of old houses and a possible schoolhouse are located in the community.

The integrity of historical significance of Rossville could satisfy criterion for nomination to the National Register of Historic Places. However, Arthur Kill Road is narrow here and construction of the proposed sewer in this area might damage existing structures.

Further, Rossville was also important in the clay industry of the 19th century. A rail spur (F, Exhibit 1) extended from the kaolin pits, under Arthur

Kill Road, to the Ultramarine works (G, Exhibit 1). The tunnel has been located and may be disturbed by the sewer. ✓

Much interest has recently been expressed in the remnants of the clay industry (Schneider, 1976). Kreischerville, named for Balthasar Kreischer the founder of the brick industry on Staten Island, may contain remains of two rail spurs from the clay pits to the shore (J, K, Exhibit 1). Ruins of Kreischer's factory (L, Exhibit 1) are strewn about the woods just south of where the Kreischer Street Pumping Station is planned. A lithograph in Bayles (p. 733) shows the exact layout of the factory and should be evaluated before construction potentially endangers the site. ✓

The Conference House at Ward's Point is listed on the National Register. As discussed above, part of the park in which it sits has been nominated to the Register as Ward's Point Archaeological Area. This area contains historic as well as prehistoric materials. The Conference House, built before 1680, had several out buildings which are no longer standing. These associated structures might be productively studied from their remains. For historic, as well as prehistoric purposes, this preserve should be completely protected from the proposed intrusion of the project. ✓

Prince's Bay was settled early in Staten Island's history. The Purdy Hotel, probably the first house in the area, built in 1690, still stands on Purdy Place. The sewer will run under the road approximately 110 to 115 feet from the front of this well-preserved structure. Later structures -- the Seguine House, The Dental Works -- are further from the route and not endangered. The foundations of a manual drawbridge, built by the 1830's and associated with the oyster industry, is nearer the path of the project. ✓

The Wolfe's Pond area was used by New York State for burial of Yellow Fever victims between 1857 and 1890. The cemetery was east of the Wolfe farmhouse and

close to the water, so close that coffins have been known to wash out on the beach. The exact location of the burial ground is unknown though the planned location of the Wolfe's Pond Pumping Station is in its general vicinity.

East of Wolfe's Pond no specific historic sites have been identified close to the proposed route. The Hessian Map, however, shows British encampments and redoubts all along the southern shore (Exhibit 6). With 30,000 troops encamped on Staten Island in 1776, the probability of encountering Revolutionary litter is high.

In summary, therefore, the planned route of construction may disturb four historically significant areas: the old Rossville community, the tunnels associated with the clay pits in Rossville and possibly Kreischerville, the Conference House area in Tottenville, and the Revolutionary encampments along the southern shore.

C. Conclusions

The study area is a region of a high archaeological sensitivity. There is a strong likelihood significant deposits of prehistoric and/or historic period materials may exist along the proposed route of sewer construction and areas to be affected by pumping stations and the Tottenville and Fresh Kills treatment plants.

It is recommended an intensive Phase I Cultural Resource Survey be conducted. The purpose would be to specifically determine locations of significant prehistoric and historic materials prior to disturbance by construction activities. In particular, further investigations should focus on the Tottenville-Conference House Park-Page Avenue section and the Wolfe's Pond-Prince's Bay shoreline section.

The need for sub-surface testing would not be eliminated by selection of alternate construction routes. However, selection of an alternate route in the area of Conference House Park is recommended.

I. Introduction

This report presents results of a preliminary survey of cultural resources in primary impact areas of the proposed Oakwood Beach Water Pollution Control Project, Phase III and Future Phases in Staten Island, New York. Analysis included a thorough literature search and windshield survey.

For purposes of the literature search the study area was defined as the approximately 16 square mile southern portion of the Borough of Richmond, City of New York (Staten Island). This area is bordered by Arthur Kill, Raritan Bay and the Atlantic Ocean on the east, south and west respectively. On the north, it is bounded by an imaginary line from the headwaters of Richmond Creek to the end of Wiman Avenue on the Atlantic shore. The windshield survey was conducted on December 29 and 30, 1977, along the proposed route of construction. Photographs of the project area and standing structures along the planned route of construction were taken on January 23, 1978. These photographs are included as Appendix A.

This study was prepared pursuant to provisions of the National Historic Preservation Act of 1966, Executive Order 11593 (Protection and Enhancement of the Cultural Environment), the Archaeological and Historic Preservation Act of 1974 and the 1973 Procedures of the Advisory Council on Historic Preservation. Thus, the major objectives were to:

- (1) Identify known archaeological and historic resources within the study area; and,

- (2) Assess the sensitivity of the project area from an archaeological and historical perspective.

This report includes recommendations for further investigation of cultural resources in the project area.

Principal investigators of this survey were Arnold Pickman and Rebecca Yamin.

A. Reference Sources

Research for this study was conducted at New York and Rutgers University libraries, the Research Division of the New York Public Library, the New York Historical Society, the Staten Island Historical Society, and the Staten Island Institute of Arts and Sciences. The National Register of Historic Places and the files of the Metropolitan Area Archaeological Survey were also consulted. Further, officials of the New York State Office of Parks and Recreation, Division of Historic Preservation and the New York State Museum and Science Service were contacted.

Proposed construction activities were evaluated relative to construction drawings titled WP - Oakwood Beach Water Pollution Control Project, prepared by the City of New York, Environmental Protection Administration, Department of Water Resources, Bureau of Water Pollution Control. Drawings for all but one of the contracts included in the overall project are dated 1970. Drawings for contract 6B, which covers the area from Wolfe's Pond Park east to Wiman Avenue are dated 1976. Research also included evaluation of logs of soil borings which were conducted in the project area in 1968-1970. Copies of these logs are in-

cluded in soils engineering reports filed in the Subsurface Exploration Section, Division of Plants and Structures, New York City General Services Administration.

Numerous persons knowledgeable of the project area were consulted either in person or by telephone. They are listed in Appendix B. Other references are presented in Appendix D.

II. Cultural Background

A. Historical Overview

The Indians who greeted the first Dutch settlers of Staten Island were local bands of Unami Delaware--the Raritans in the south and the Hackensacks in the north. They watched, first, Verrazano (1524) and, later, Henry Hudson (1609) sail into the Bay of New York.

European settlement was not easy due to conflicts with the Indians. For example, the earliest Dutch settlement was burned. By the 1660's, however, grants were made under the auspices of the Dutch West Indian Company to several French Waldenses and to a greater number of Huguenots.

In 1664 Peter Stuyvesant, the Dutch governor, ceded New Amsterdam to the English. The first Governor of New York, Richard Nicholls, was replaced in 1668 by Colonel Francis Lovelace who is credited with the final purchase of Staten Island from the Indians.

By 1770 there were 3,000 settlers on Staten Island. Most were farmers or fishermen. At the end of the French and Indian War several British brigades encamped on Staten Island and paid local residents for food and firewood (McMillen, 1976). The British took advantage of the hospitality and in 1776 encamped 30,000 troops in preparation for the Battle of Long Island.

Prior to European settlement the waters around Staten Island provided an abundance of oysters. The colonists exploited this resource. By the first half of the 19th century the

shellfish industry reached its peak and new industries were begun. Clay was used to manufacture bricks, chemical and dye manufacturers were started, lead factories opened.

The first railroad to cross the Island opened in 1860. Steam ferries replaced the old boats between New York City and New Jersey. The construction of the Outerbridge Crossing in 1928 provided the first bridge connection to the mainland. The opening of the Verrazano Narrows Bridge in 1964, however, spurred extensive development throughout Staten Island.

Accounts of prehistoric and historic activities in the project area are discussed below. Also presented are observations of archaeologists and historians in their examinations of:

- Greenridge;
- Rossville;
- Kreischerville (Charleston);
- Tottenville; and,
- Prince's Bay to Great Kills.

B. Greenridge

1. Prehistoric Resources

Several sites evidencing prehistoric man have been reported in the vicinity of Fresh Kills and Richmond Creek.

"Ye Olde Names and Nicknames" (Exhibit 2) records "indian implements" at two locations--Ketchum's Hill and south of Arthur Kill Road between Annandale Road and Journeay Avenue. Ketchum's Hill is situated outside the project area though the

other, (No. 1, Exhibit 1), is within it. (The latter is recorded in the Metropolitan Area Archaeological Survey as STD-3). The area has been referred to as "Fiddler's Green" and described as a campsite containing "early relics" (Skinner, 1909).

Another site, Lake's Island, is located on a point of land formed by the confluence of Great Fresh Kill and Fresh Kills. A small Indian village atop a shell heap on high ground which extended out into the marsh has been located here. Materials have been found outside the midden, under the salt marsh, similar to discoveries in other parts of Staten Island. Today the site is covered by a garbage incinerator and is in a region extensively disturbed by garbage dumps.

2. Historic Resources

During the Revolutionary period there were seven houses adjacent to Arthur Kill Road in the Greenridge area of the project between the Ridgewood and Annandale Roads (aka Seaman's Lane) intersections. Though renamed, Arthur Kill Road follows the same course today it followed in the 18th century (Reed, 1965), with the exception of a short section south of Kreischerville (McMillen, 1935). There are no old houses visible in this area today, though foundations and other traces have been found all over Staten Island (McMillen, personal communication, 1977).

A mill, Stillwell's Mill, has been located on Carl's Neck Run at the Seaman's Lane intersection (McMillen, Exhibit 3), but does not appear on the later "Ye olde names and nicknames".

(Today only marsh is visible in the area). The owners of six houses beyond Seaman's Lane included a Seaman, a Journey and a Stillwell, obviously important people to the area as deduced from place names. (St. Michael's Home for Children now stands about where the Stillwell house would have been, and has been at this location at least since 1896).

Two Victorian houses now stand in the vicinity of the Arden Avenue-Arthur Kill Road intersection. They are set back from the road, away from the proposed route of the sewer. The Greenridge area along Arthur Kill Road is not built up and may contain ruins of many old structures in its wooded embankments. ✓

C. Rossville

1. Prehistoric Resources

The Rossville area has been identified as generally rich in aboriginal material (No. 14, Exhibit 4): "Lodges, shells, etc. run from Cedar Hill to Winant's Brook. There are sites all along the shore to Kreischerville with early relics. All the sandy fields along the shore yield relics but here and there shell pits and heaps proclaim more specialized occupation. At Burial Point (Exhibit 2) graves are said to have been found." ✓

a. Huguenot Site

A number of specific sites have been investigated since the turn of the century. For example, The Huguenot site (Nos. 3-14, Exhibit 1) at the Huguenot Avenue - Arthur Kill Road intersection was exposed when the area was being bulldozed for fill. Pre- ✓

dominantly Middle Woodland artifacts were found (Anderson, 1964). The cutting site (N.Y., Exhibit 1) produced the first fluted point from Staten Island and other Archaic and Woodland materials. Though the point--the Eastern Clovis type, made of jasper --was found somewhere between 1914 and 1917, its significance was not recognized until approximately 50 years later (Sain, 1962).

b. Wort Farm Site

The Wort Farm Site has been an area of much archaeological activity, and described as a series of "Indian fields," (Exhibit 4). Mr. Isaac Wort Sr. is reported to have found a burial in a stone walled chamber with several skeletons and many relics including a stone bowl. Though none of the artifacts remained for archaeological inspection, the stones were piled and remained for many years.

The former Wort Farm is now owned by New York City. It is bounded by Barry Street, Winant Avenue, Woodrow Road, and Rossville Avenue (No. 5, Exhibit 1). Excavations were conducted in the summers of 1963 and 1964, 1966, 1967, 1968, 1969, and 1971. Middle and late Woodland projectile point types were recovered from the plow zone and characteristically Late Archaic Bare Island points from an undisturbed yellow sand. It was speculated the predominance of weapons, knives and scrapers, along with traces of hearths, suggest the site served as a hunting camp probably recurrently occupied by small numbers of people for relatively short spans of time (Williams, 1964). Subsequent

work has corroborated this speculation. A chopper and two hammerstones were recovered in 1969 from red clay below the Archaic artifact producing sand. This suggests occupation by early man, though more work is necessary to establish this hypothesis with any certainty (Horwitz, 1969).

c. Rossville Campsite

The Rossville campsite (No. 6, Exhibit 1) may be a western extension of the Woodland occupation in this area. Ceramics found are described as "probably Late Bowman's Brook." The area is scattered with oyster shell, fire cracked stones and stone working debitage (Kaeser, 1966). The Rossville Shell Heap (No. 7, Exhibit 1) likewise may be part of a general Woodland occupation. Shells and artifacts were found in a dirt mound, the shell accumulation dense with quartz and chert flakes. Fragments of glazed historic ceramics were also found. This site was completely destroyed in the building of the West Shore Expressway. Site No. 8 (Exhibit 1) reflects a single find of a crescent-shaped artifact (ulu) in St. Luke's Cemetery.

d. Chemical Lane

Chemical Lane is another area that has received archaeological attention. The area is called "Burying Hill" on "Ye olde names and nicknames". Three sites border the Lane, which extends west from Arthur Kill Road to Smoking Point: Pottery Farm (No. 9, Exhibit 1), Chemical Lane (No. 10, Exhibit 1), and Smoking Point (No. 11, Exhibit 1). A cultural resources survey

conducted in 1974 contained recommendations for areas prior to installation of a proposed pipeline (Rubertone, 1974). (This pipeline project was never completed). ✓

The preliminary analysis of material from subsurface tests at the Pottery Farm Site indicated two cultural affiliations: a preceramic occupation characterized by Orient fishtail projectile points, implying contemporaneity with the Orient Culture native to Long Island (1043 B.C - 763 B.C.) and a later Woodland occupation recognized by nondiagnostic ceramic sherds (grit tempered, smooth interior and exterior but too small for typological classification) and a rim sherd of a clay pipe bowl with a fine incised checker-board pattern below the rim, similar to other aboriginal clay pipes that date from Middle to late Woodland times (A.D.350 - 1625) (Ibid).

Only Archaic materials--narrow bladed projectile points of argillaceous material reminiscent of Poplar Island Points and more Orient fishtails--were found at the Smoking Point Site. (Ibid). Paleo-Indian material has reportedly been found in the area of the bluff (Schneider, personal communication, 1977).

A third archaeologically sensitive area in the region has been identified, though no materials have been found (Area III, Exhibit 5). It has been suggested the small stream could have been attractive to aboriginal occupation when sea levels were somewhat lower than they are at present (Rubertone, 1974).

Chemical Lane is no longer passable to cars and not even easily located. The sites are presumably as undisturbed today

as they were when the 1974 survey was completed.

e. Gerike Organic Farm

On the other side of Arthur Hill Road an archaeological Site (No. 12, Exhibit 1) has been reported on the Gerike Organic Farm (New Bulletin, 1963). An Archaic component is reported "at a low level" and a Late Woodland (or transitional to Late Woodland) component in a bulldozed area near the surface. Recovered spearheads, scrapers and several caches of hammerstones are believed to be Archaic. Recovered Woodland materials included many sherds of pottery and triangular projectile points (Ibid).

f. Clay Pit Road

Scattered sites have been reported on either side of Clay Pit Road (No. 13, Exhibit 1). A collection of late and Middle Woodland material has been recovered (pottery, mostly "Vinette modified", triangular and side notched points, point working debitage and hammerstones). This is specifically the area Skinner seemed to be referring to in his general description (cited above) of Rossville.

g. Summary

It is obvious from Skinner's survey and work to date that there was significant aboriginal occupation in the Rossville area from Archaic times up to the colonial period. In fact, the last Indians on Staten Island (an old couple called Sam and Hanna, and their daughter, Nance), lived in the vicinity. A

family, at least part Indian, named Story, also lived near Rossville or Kreischerville. Finally, several Negroes living at Bogardus Corners (just southeast of Wort's Farm) in 1907 claimed to have Indian blood (Skinner, 1909).

2. Historic Resources

Most of the land around Smoking Point was divided among colonials by patent dating from 1670 (Schneider, personal communication, 1977). Huguenots were among the first settlers in the area. They included the families of Mersereau, Seguire and Disosway. The Wogloms, Winants and Coles are also on early maps (Exhibit 3). The Blazing Star Burial Ground (A, Exhibit 1), now being restored by the Richmond Jaycees, reflects this early period. Some of the stones are unmarked, others bear dates between 1751 through the early 1800's.

a. Blazing Star Tavern

Well before the Revolution a ferry was kept at Smoking Point by Joseph Wright. It was known as Blazing Star and was originally a scow capable of ferrying stage coaches, horses and passengers across the Kill. An inn was built close by the ferry in 1825, though a structure labelled "Old Blazing Star" appears on the early revolutionary maps as well (Exhibit 3).

Today, The Old Blazing Star Tavern perhaps still stands at the southeast corner of St. Luke's Avenue and Arthur Kill Road (McMillen, personal communication 1977). This is part of a community of structures that were probably associated with the ferry. Across the street are four buildings in a general state

of dilapidation. The third building has a bell tower and large, garage-like doors. A post office and livery stable were reportedly situated in this location (Beers Atlas, 1874). The ferry slip itself is less accessible as Witte's junkyard extends to the Kill. Some of the oldest houses in the area, including one belonging to the Woglom's may be within Witte's domain.

Beyond St. Luke's Avenue is another old structure, possibly a schoolhouse, and a group of small houses. At the intersection of Harvey and Arthur Kill is a particularly beautiful old house, It is another candidate for the Blazing Star Tavern, though it stands where the house of Joseph Wright appears on the McMillen map. This whole group of houses exhibits the character of a community (C, Exhibit 1). On the north side of Arthur Kill Road and east of St. Luke's Cemetery are two old houses. The easternmost is the Wright house build in 1700 (D, Exhibit 1). The house next to it was also built in the 18th century. St. Luke's Cemetery (E, Exhibit 1) may be what is usually identified as the Sleight Family graveyard. Most of the stones are too eroded to be legible, though several Sleight family members were buried there in the early 19th century. The Sleight Family graveyard is a New York City Landmark though its location is described where the Blazing Star Burial Ground actually is located.

b. Revolutionary War

During the Revolution at least two companies of British soldiers were garrisoned at Rossville. The legend on the Hes-

sian Map (Exhibit 6) reads "e. Old Blazing Star: Lt. Col. Von Schuler with 2 Companies." Another three companies were at Sandy Ground, "c. Sandy Ground: Maj. Von Wurb w. 2 Companies, Capt. Waldenberg with 1 Company."

c. Industrialization

It was after the Revolution that Rossville began to thrive. Two great estates were built in the mid 1800's--Ross's "castle" at Ross's Cove, and the 30 room mansion of Henry Mason. Neither exists today).

Much of the growth of Rossville resulted from the developing clay industry. In 1835 Balthasar Kreischer had come to New York City to help rebuild it after the "Great Fire". In looking for a source of clay for manufacturing bricks (up to that time fire brick had been brought from England) he discovered and bought a great deal of land south of Rossville, first for mining and later as a location for a new brickworks. Besides brickworks Kreischer established chemical works in 1850 and an ultramarine blue factory in 1852. By 1885 the International Ultramarine Works, Ltd. was established at Rossville between Smoking and Ellis Points (Exhibit 2). "This factory was fed clay by a railway underneath Arthur Kill Road from the kaolin pit in the high ground about where Blue Factory Bog now lies" (Schneider, p 12).

d. Historic Archaeological Sites

With recent interest in preservation of the Blue Factory Bog area a number of people have located the tunnel and spur along which this railway ran (Exhibit 1). Photographs have re-

corded the small portion of the tunnel that is visible and which includes a brick with the Kreischer name on it. Today there is a building and ruins at the foot of Johnson Street where the factory would have stood (Exhibit 1). These ruins and presumed route of the rail spur are in the exact place indicated in the Beers 1874 Atlas.

Several historic archaeological sites have been reported in the Rossville area. Between Arthur Kill Road and the West Shore Expressway, about 1000 feet east of Rossville Avenue, an 18th century midden was exposed (H, Exhibit 1). This corresponds to the location of the Cole house on the McMillen map (Exhibit 3). William Cole was one of the most prominent Methodist preachers in Staten Island and instrumental in the organization of the first Methodist Church in 1787--now the Woodrow Methodist Church, a New York City Landmark (J, Exhibit 1). A number of Rossville families contributed to the founding of that church. They included the Disosways, Wogloms, Wrights and Winants (Bayles). The artifacts that reflect the Cole life style, or at least a contemporary of the Cole's, are kaolin clay pipestem fragments, sherds of lead glazed earthenware slip-decorated in brown stripes on yellow background, and a slate pencil.

At Smoking Point there are reportedly remains of several Disosway structures. This corresponds to the location of Disway land holdings in Beers 1874 Atlas. A frame house and barn are supposed to have stood in this area.

In perspective, Rossville figured importantly in the settlement of Staten Island. It was settled early, and its inhabi-

tants were among the founders of early institutions. The ferry was the focal point for the development of a community, and strategic in the Revolution. Later the Ultramarine Blue factory attracted a growing population.

D. Kreischerville (Charleston)

1. Prehistoric Resources

The distinction between Rossville and Kreischerville is arbitrary and irrelevant to prehistoric occupation. As previously discussed, Paleo-Indian remains, i.e. fluted points, have been found all along the shoreline from Smoking Point to Kreischerville and beyond (Schneider, personal communication, 1977). Evidence of early man in the northeast is very sparse (Ritchie, 1965), and the materials from Staten Island, if thoroughly studied, could make a significant contribution to understanding of the original inhabitants of the New World.

a. Socony-Port Mobil Area

The Paleo-Indian finds in the Port Socony-Port Mobil area include three sites: North Beach (No. 15, Exhibit 1), Port Mobil Hill (No. 16, Exhibit 1), and Charleston Beach (No. 17, Exhibit 1). However, Port Mobil Hill and Charleston Beach may represent activity areas of the same encampment (Kraft). The six artifacts from North Beach are generally larger and may belong to an earlier and different occupation. Most of the artifactual material has come from the Port Mobil Hill site. This area is now inside the Mobil Oil Company's tank farm and has been excessively disturbed by bulldozing, grading and erection of

earthen dams around the oil tanks. A total of 144 specimens have been collected from all three sites since 1967.

The material from Charleston Beach and Port Mobil includes 18 fluted points, six unbroken. The majority are of the Clovis type, though at least half are less than two inches long. This is unusually small for the Northeast region in which the usual Clovis form is between two to five inches long (Ritchie, 1965). However, points of this length are not unknown. (Such a point from the Potts site in Oswego County is illustrated in Ritchie, 1965). Ten preforms, six fluted (?) and unfluted triangular points, two or three biface knives, seven uniface knives, 60 scrapers, unilateral and bilateral spokeshaves, an end scraper-concave scraper combination tool, single spur gravers, and drills have also been recovered.

The Charleston Beach site was excavated in 1967. Paleo-Indian through Middle Woodland materials were found eroding out from below a thick peat deposit at low tide when the beach was exposed. The site was determined to have four layers and most of the artifacts were found in the bottom four inches of the second layer (sandy peat 14 to 20 inches thick beginning at a depth of 12 inches). Tidal action had mixed together material from Paleo-Indian to Late Woodland (Salwen, 1968).

b. Kreischerville

The general designation, Kreischerville, (No. 18, Exhibit 1), has been used to include cover surface finds "along the shoreline edge of the Arthur Kill River" between Port Socony (Mobil)

and Outerbridge. Finds have been made on the surface and along beach washout and include ten fluted points, a pestle, a large net anchor, fish-tail points, scrapers, axes and other materials such as hammers, fire-cracked stone and debitage. These materials could possibly represent the Paleo-Indian through Woodland periods. Other general designations indicate aboriginal material in this area. Shell heaps have been reported along the shoreline (Exhibit 7, Skinner, (Exhibit 7, Skinner, 1947). "Ye olde names and nicknames" records "indian implements" in the area. There are sections in the area that are not developed. For instance, in the stretch between Kreischer and Allentown Road the land is high and wooded on both sides of Arthur Kill Road. This location coincides with the one section of Arthur Kill Road that was not in the same place in the 18th century (Exhibit 3).

c. Canada Hill

The Canada Hill archaeological site (No. 14, Exhibit 1), listed in the Metropolitan Area Archaeological Survey, is located in the block bounded by Drumgoole Boulevard, Arthur Kill Road, Englewood Avenue and the West Shore Expressway. Surface collection from this site has yielded kaolin pipe fragments, whelk columns, quartz and chert chips, fragments of glazed ceramic and fire cracked rock. Only limited sub-surface exploration has been carried out.

2. Historic Resources

Kreischerville was named for Balthasar Kreischer who, as

discussed above, exploited the clay resource of Staten Island and established a brickworks in 1854. However, a feud over clay apparently developed between Kreisler and Abraham Ellis (Schneider, personal communication, 1977). Both established railroad spurs to the kaolin pits. These railways, and the one to the Ultramarine Works, appear in Beers 1874 Atlas.

Today, The Ellis spur (J, Exhibit 1) should be located just north of the present Ellis Place, now within the Mobil Tank Farm. The Kreisler spur (K, Exhibit 1), ran just south of the road that leads from Kreisler Street to the water, though it does not appear on existing maps. It has not been determined if either of these spurs ran under Arthur Kill Road. It is known, though, that because they transported heavy box wagons, drawn by mules, a downhill course was most practical.

Field investigations revealed a gully, similar to that near the Ultramarine Works, at the hypothetical end of the Kreisler spur. Local historians have not been able to locate any remnants of the Ellis or Kreisler railways, however (McMillen, personal communication, 1977).

a. Early Buildings

Remains of the brick factory (L, Exhibit 1) originally covered three acres, and may be seen today in the woods between Kreisler Street and the water. One of the Kreisler houses still stands and has been deemed a New York City Landmark (M, Exhibit 1). The original mansion built by Balthasar himself burned in 1931. The standing structure is one of two mirror

image houses built by his sons, Edward and Charles. Excellent pictures of all three Kreischer houses have been recorded (Bayles). It is reported the foundations of the original mansion may still be seen on their hilltop location (Kushnuck, personal communication, 1977).

Some of the earliest houses in Staten Island stood in the Kreischerville area. The Winant-Hendrickson house was built by J. Hendrickson, was at the corner of Ellis Place and Arthur Kill Road (N, Exhibit 1) until it was razed in 1929. One stone was discovered marked "1696 I.H.".

The original Winant-Henrickson house was a stone structure with the stones laid in mud with lime made from oyster shell. It had an early primitive fireplace with a hole in the garret floor for smoke. The frame extension on the house was added after the Revolution (Bailey, 1936). ✓

The Disosway house (O, Exhibit 1) stood at what is now the entrance to the Outerbridge Crossing (Exhibit 3). The Disosways were among the early Huguenot Staten Island settlers. For example, Mark Disosway petitioned for 255 acres of land in 1684 and more in 1695. The house was built by Mark in the closing years of the 17th century or by his son, Israel, in the early 18th century. It was stone with a gable roof and deep overhanging eaves both front and back. A frame addition was added later. Similar to the Winant-Hendrickson house, it was demolished in the 1920's (Bailey, *ibid*).

This same Disosway family ran a mill at the mouth of Mill Creek (P, Exhibit 1). The great grandson of Mark, Cornelius Disosway Jr. bought the mill which he ran and rebuilt in about

1803. By 1874 it was in other hands and became known as Weir's Grist and Saw Mill. The Nassau Smelting Factory now stands on the site of this mill.

A number of other old structures stand along the project route. These include:

- Public School 4 (1896) just beyond the intersection with Ellis Place on the other side of Arthur Hill Road;
- A house, just beyond P.S. 4, at the corner of Storer Avenue, built in 1840 (McMillen, personal communication, 1977), which is in a good state of preservation; and
- An inn at Sharrott's Road which was established in 1859. (The building is undistinguished, and may or may not contain any of the original structure).

Kreischerville, now called Charleston, still retains enough old structures and undeveloped space to have the character of an old community.

E. Tottenville

1. Prehistoric Resources

The most extensive and ancient Indian occupation of Staten Island was at Tottenville (Bolton, 1920). Known as Aquehonga (high sandy banks), perhaps as many as 100 Indian families lived there in the summer (Weingarten, 1967) moving inland to less exposed areas in the winter. Arrowheads were reportedly found "by the bushel" (Bayles, 1887). Burials have been known in Tottenville since the 1850's (Jacobson, 1960) and a great deal of archaeological attention has been given to Ward's Point since

that time.

a. Ward's Point

In 1976 the Ward's Point Archaeological Area was determined eligible for the National Register of Historic Places. The protected area included 68.5 acres though there was some question at the time whether this encompassed all archaeological resources. Because this designation was made early in the program of such eligibility determinations, information on the exact extent of the protected area is somewhat less than adequate in terms of present standards (Griffith, personal communication, 1977). There is no verbal description and only the map (Exhibit B) is on file. The eligibility determination has also proved inadequate in terms of protecting the site(s) from non-professional investigation.

Ward's Point (No. 20, Exhibit 1) was the subject of study in 1960 (Jacobson). To evaluate the prehistoric relationship of Ward's Point to New Jersey (the Abbott Farm Site in particular) and to the rest of coastal New York, all the work that had been done to date was reviewed. Jacobson's "Map II, sites near Ward's Point" is included as Exhibit 9. His site 4 is located within the path of the proposed route of the sewer. Sites 5 and 6 are in close proximity to the proposed route (Exhibit 10).

Jacobson's site 4 is known only from a collection of specimens by Herbert Reed and reported to Jacobson. The provenience was presumably the foot of Hylan Boulevard on the shore.

Areas 5 and 6 were once the Appleby and later the Acker es-

tate. By 1897 some 19 skeletons and many artifacts had been unearthed. Though the relative position of these discoveries can be plotted the collections have been lost. Presumably these finds include a previous report, which described one skeleton as accompanied by Dutch pottery and the neck of a large glass bottle "indicating communication with the whites, a fact not previously noted by anyone" (Natural Science Association of Staten Island). One five skeleton burial was found in this area when an early excavator for the Staten Island Museum dug into one of a number of circles of shells along the low ridge that extends from the present Surf Avenue to the bluff. This area was considered by Jacobson as part of Burial Ridge, though the concentration of materials just to the north is what is usually defined as the Burial Ridge site.

b. Burial Ridge

Burial Ridge proper has been worked virtually continuously from the mid-1800's to the present. George Hubbard Pepper excavated for the Natural Science Association of Staten Island between 1893 and 1897 and Harrington for the Museum of American Indian in 1920. Their trenches are indicated on Jacobson's map. Harrington found only three burials but hundreds of artifacts. He mapped and recorded 35 features. The artifacts were grouped by the Heye Foundation, with all stone objects assigned one catalog number and ceramics another catalog number. The most recent report of burials was made in 1967 (Anderson, 1967). Anderson has described nine sites, including one with grave of-

ferings. The latter burial is attributed to the Bowman's Brook period.

A stratigraphic picture of the Burial Ridge area has been reconstructed (Jacobson, 1960). It is described as (1) a surface of sand, humus or black topsoil, 2 to 12 inches with historic materials; (2) a second layer consisting of oyster shells from 6 to 20 inches deep, often well mixed with earth containing shell and grit tempered pottery including collared and incipient collared types and no European goods; (3) a third layer of "stained soil" a few inches thick bearing no artifacts and only existing on the eastern edge of the ridge; and, (4) a fourth layer of sandy subsoil of unknown depth in which "Algonkian" sherds were found (Harrington) and from which stemmed projectile points were retrieved (Anderson and Sainz).

Combining the three major areas of work in the Ward's Point area, (i.e. Billop Ridge (pits and burials in a sandy ridge about 200 feet northwest of the Billop house), Burial Ridge and the Burial Ridge extension (Exhibit 4)), it is concluded there is: (1) some, but thin, evidence for the Archaic at Ward's Point (a handful of artifacts of ground or slightly modified stone); (2) A few Transitional-Early Woodland Points (Orient fishtails and Steubenville); (3) A Middle Woodland child burial (diagnostic ceramic types and platform pipes); and, (4) A substantial late Woodland component (East River ceramic types) with eventual mixture of East River and European goods representative of the contact period.

The shell layer associated with the Woodland artifacts

covers at least 11 acres. It may not all reflect actual aboriginal occupation. Shellmounds were perhaps leveled by early settlers and thus created the breadth of the deposit (Jacobson, *ibid*). It has also been suggested some of the shells were the result of the oyster industry of the 1820's as the shell deposit varies in depth from area to area. Though the greater portion of the explored sites are on the shell covered bluff, some finds have been made at considerably lower elevations. As previously noted, finds have been made on the beach elsewhere in Staten Island where there are no bluffs (e.g. Charleston Beach, and Kreischerville). Due to ongoing erosion from water action, it is unlikely to find cultural material in front of bluffs. Where water action is more gentle, however, material might appear on the beach or even in water which at one time was an exposed land surface (Salwen, personal communication, 1978). ✓

c. Page Avenue

Projectile points and other artifacts have been found in the area of two residences, 36 Hopping Avenue and 750 Page Avenue, in Tottenville (Salwen). This provides additional support for the inference that the archaeological sensitivity of the area extends beyond the mapped boundaries of the Ward's Point Archaeological Zone.

A number of sites have been identified and excavated at Page Avenue. Material has been noted here and included with Ward's Point (Skinner, 1909). This area has been actively investigated by most of Staten Island's local archaeologists.

The area is described as "a series of sites scattered throughout the woodlands for some distance" (Anderson, 1965). The site proper, however, encompasses 30,000 square feet and has been excavated only on the west side of the road. Primarily Middle Woodland material was taken from this area. Abbott type pottery, net-impressed and cord-marked pottery, Middle Woodland points and drills, anvil stones, shaft smoothers, scrapers, pendants, cody knives, axes, etc. have been recovered.

In another location the skull of a dog and the body of a child have been unearthed (Anderson, 1966). The child's head lay on an anvil stone, the bones in an oval shaped pit only two feet below the surface. Associated with the burial were sherds of fabric, impressed ceramics, a net sinker and a quartz projectile point

It is reported four different occupations, extending from Early Archaic through Woodland times, are represented at Page Avenue (Ibid). Others have found historic material (including a cannon ball, two George II coins (c. 1700) a Spanish real of the same period and colonial dishware fragments as well as prehistoric material (3/4 grooved axe, 71 projectile points, quantities of pottery, and several scrapers (Guether, 1962).

Material has also been found on both sides of Page Avenue, south of Hylan Boulevard. A possible campsite has been defined in the area (Kaeser, 1966). Material taken from here includes Windsor and East River ceramic sherds, a basal section of a side notched point reworked to a drill, a hammerstone, a cobble with battered end for ceramic temper and miscellaneous stone

working debitage. Burned oyster, clam valves and split deer bone fragments were also found. These findings are similar to those at other sites reported along the southern shore (e.g. Red Bank, Sharrott Ave, Wolfe's Pond and Seguine's Pond, described below).

2. Historic Resources

Tottenville was a center of settlement and activity for Indians and later for the colonists. The first important railroad to cross Staten Island extended from Clifton to Tottenville. Its first Board of Directors included a number of people whose properties are discussed elsewhere in this report. These persons included Joseph Seguine, Joel Wolf, Henry Seaman, F.R. Bennet, S. Seguine, William Totten, and George White. When the railroad was half built, the Board appealed to Commodore Vanderbilt to help ensure its completion--accomplished in 1860.

The railroad operates today as it did in the past, to the bottom of Bentley Street. Up the street is a proposed New York City Landmark, the Tidewater Tavern (Q, Exhibit 1). This building is an example of the Greek Revival style. It was built between 1830 and 1840. A recent attempt to open the Tidewater as a restaurant did not succeed. It has recently been repainted though it is now closed.

a. Amboy Ferry

At the foot of Bentley Street is the old ferry slip included under Totten's Landing in the 1852 railroad map (R, Exhibit 1). The slip was eventually moved to Totten (or Main Street). Pilings

stand in the water at both locations but no associated buildings or ruins are evident. The original ferry was at the foot of Amboy Road (S, Exhibit 1). Reportedly a ferry was established as early as 1650 by the Raritan Indians. The Billopp family of Bentley Manor eventually maintained the service, for four generations. Therefore at various times it was known as Amboy Ferry, Billopp's, Dote's (Doty's) and Butler's Ferry. Thomas Farmer Billopp is supposed to have built what was known as the Old Ferry Tavern in about 1740 and which burned in 1866.

Just beyond where the Amboy Ferry would have been located is the site of what is believed to have been "a strong battery erected to cover the retreat of the British army from Perth Amboy, in case of attack by American forces" (Tancredi, 1977). The area, which also includes the partial foundations of the old Amboy ferry house, has been recommended for designation as an historic landmark by local historians. Ongoing construction, however, threatens the site. The proposed sewer is located below the bluff in this location. However, it is not clear exactly where or how significant the Amboy ferry building might be or whether there may be ruins of the Old Ferry Tavern. ✓

b. Biddle Properties

The Biddle Grove Association property is immediately north of Amboy Road (Beers 1874). Biddle's Grove was used as a religious meeting ground by groups from the New York area in the 1830's, 40's and 50's. It was divided for house plots at about the time of the Civil War (Powell, personal communication, 1977).

South of Amboy road, on the Bluff, is a house labelled Bedell

on various documents (e.g., Walling map, Beers 1874, and 1852 Railroad map) (U, Exhibit 1). The Bedell's were a prominent family dating from the 1760's. In particular, the Rev. Gregory Townsend Bedell DD, born 1793, was an esteemed divine of the Episcopal Church. The house is a Greek Revival structure considered by McMillen to be worthy of New York City Landmark status. It represents a distinctively Staten Island variation on the Greek Revival style (McMillen, 1942).

c. The Conference House

The Conference House, a National Historic Landmark, stands on an open, landscaped slope with a commanding view of Raritan Bay. The house was reportedly built in 1668 though other estimates are more conservative. It was built by Captain Christopher Billopp who was awarded 1687 acres of land by Governor Dongan. Capt. Billopp called it the Manor of Bentley in honor of his boat.

The Conference House has fieldstone siding. A clapboard extension, added later, is located at its rear. It is rather unornamented on the inside and believed not to be the Billopp main residence (McMillen, personal communication, 1977). Further, it has been described as "nothing remarkable. The hall and staircase are extremely plain. In fact there is no decoration to be seen anywhere" (Davis, 1926).

The Conference House became historically important when it was chosen as the meeting place for Lord Howe and a delegation from the Congress of Philadelphia. The meeting between Lord Howe, Benjamin Franklin, John Adams and Edward Rutledge took place Sept. 11, 1776. The patriots, of course, refused Howe's offer

of peace and held out for independence.

The Conference House has been through various states of deterioration and renovation. At one time it even had a Greek Revival portion (Davis, 1926). It is now being restored under the auspices of the Conference House Association.

It was owned by the Ward's after the Billopp's, then the Parkinson's, then the Aspinwall's. Eventually, the Harmon National Real Estate Corporation bought it from the estate of Charles Leland and in 1925 gave it, and about an acre of land, to the State of New York (Davis, *ibid*).

F. Prince's Bay to Great Kills

1. Prehistoric Resources

Aboriginal occupation in the Prince's Bay area is known only from surface collections. The Red Bank site (No. 23, Exhibit 1), referred to as Huguenot (Skinner, 1909; No. 16, Exhibit 4), was on the bluff between Butler's or Jack's Creek and Raritan Bay (creek evident on "Ye olde names and nicknames", Exhibit 2). It was described as a small shell heap where Indians probably camped while fishing. A few tiny fragments of pottery and deer bones were found (Skinner, 1909). A few small isolated heaps were found in this area. The Sharrott Avenue site (No. 24, Exhibit 1) may be one such heap. ✓

The Museum of the American Indian lists three catalog entries. A shell heap at Wolfe's Pond (No. 25, Exhibit 1) and another at Seguine's Pond (which is actually beyond Prince's Bay) has been included (Skinner, 1909). At Wolfe's Pond the site was located on the bluff overlooking the bay (although at present the bluff

is quite low). Similar to Red Bank, it yielded pot sherds and deer bone fragments. The Museum of the American Indian has a grooved axe from Wolfe's Pond and a number of other artifacts labelled Prince's Bay. These include one arrowpoint, five arrowpoint fragments, and a steatite object with two circular notches.

In 1903 Skinner reported a site at Bunker Hill near Arbutus Lake (No. 26, Exhibit 1) though by 1909 believed there were no traces of occupation even though a point or two had been found. "Ye olde names and nicknames" (Exhibit 2) indicates "indian implements" in this area. The Museum of the American Indian lists a number of entries - five arrowpoints and fragments - from Huguenot Park (No. 27, Exhibit 1). A surface find at Woods of Arden Road (No. 28, Exhibit 1) implies aboriginal presence.

There is obviously a pattern of Indian presence, if not occupation, along the southern shoreline. Indians may have been in Prince's Bay, similar to their later colonial counterparts, to exploit the oyster beds. Recent research ("Prince's Bay, Lemon Creek, and the Oyster Industry," unpublished, 1977) indicates Indians came from as far away as Howland Hook to savor the oysters of Tottenville and left mounds of shells. As oysters were one of the advantages which induced settlers to come to Staten Island, Prince's Bay became a center of the oyster industry.

2. Historic Resources

A number of historically significant structures still stand in Prince's Bay. Their presence reflects the economic and strategic importance of this area since the earliest settlement of

Staten Island.

The Red Bank Light (W, Exhibit 1) on the bluff at the foot of Cunningham Road (now Mt. Lorretto property) stands on the site of several earlier lookouts. Some type of fortification was built there by the Americans for an engagement in August 1777 (Powell, *ibid*). A later earthwork was constructed by the British in front of the position now occupied by the lighthouse.

Another redoubt was erected in anticipation of the War of 1812. In addition, a blockhouse was placed near it though no action actually took place in the area. The blockhouse was destroyed when the lighthouse was built in 1828. The standing structure has been robbed of its upper portion which has been replaced by a religious statue. The foundations, however, are original.

a. Oyster Business

The growth of Prince's Bay was very much dependent on a thriving oyster business. When the earliest settlers arrived the entire floor of New York Bay was covered with oysters. By 1715, oyster gathering had to be legally limited, however, as the beds were being stripped clean.

By the beginning of the next century all the beds in the New York/New Jersey vicinity had been virtually worked out. Prince's Bay oystermen took advantage of this situation. They brought seed oysters from other areas (first Staten Island, then Long Island, finally from the Chesapeake) and planted them in the Bay. By 1813 Prince's Bay oysters were well known and the business was at its height in the 1850's. Structures associated with the Prince's Bay Oyster Company lined the east side of the mouth of

Lemon Creek and the foot of Seguine Avenue. A bridge crossed the creek in this location. The bridge could be opened manually by two men walking around in the center. They would hold a bar which turned a metal key five feet long that extended through an opening in the road bed.

A reference, as early as the 1830's, has been made to the bridge. It operated for 100 years. A new bridge exists today though what are probably the foundations of the old one exist upstream (X, Exhibit 1). The proposed sewer construction may disturb what is left of the old bridge. ✓

b. Seguine Point

Seguine Point is named for the Seguine family which took over the former Manee property in about 1828. Before that time the point was known as Manee's Point (Exhibit 3). The original Seguine homestead burned in 1835. The elegant Greek Revival house that still stands replaced it in 1840 (Y, Exhibit 1). Today it is a New York City Landmark.

Its original owner, Joseph Seguine, was an economically and politically successful individual in Westfield. He was supervisor of the town in 1826 and again between 1837 and 1839. At the meeting held in 1851 to discuss the founding of the railroad, Seguine was elected president and retained the presidency of the Staten Island Railroad until his death (Powell, 1977). He also helped design plans for the Staten Island Oil Company and was chief founder and first president of the Company (discussed below).

c. Purdy Hotel

The McMillen map (Exhibit 3) indicates four houses stood on

the shore of Prince's Bay at least as early as 1775. The Purdy Hotel (Z, Exhibit 1), a distinguished example of this early period, still stands. It is believed this is one of the earliest houses on Staten Island, built in about 1690 (McMillen, personal communication, 1977). It may have been owned by the Manee family as it appears in the exact place a Manee house is indicated on McMillen's Revolutionary map (Exhibit 3). It was probably the first structure in the area and is presently being considered for designation as a New York City Landmark.

Reportedly the British had a small redoubt just east of the Purdy Hotel (Exhibit 6) during the Revolution. General Vaughn made his headquarters in the house itself (Powell, 1977). It was not a hotel until the 19th century when the Purdys had at least three houses in the area (Beers 1874).

d. The Dental Works

The Dental Works (AA, Exhibit 1) are what was originally the Oil Company founded by Seguine in 1854. They are a complex of factory buildings now used as a shopping arcade. The original factory made candies from Palm Oil brought from Africa in Seguine's ships. The buildings were later used by a Dental Manufacturing Company (thus, their name) that was absorbed by the S.S. White Company.

e. Wolfe's Pond

East of Prince's Bay is Wolfe's Pond. This area, too, was settled by the late 17th century. A homestead graveyard once stood on the bluff near the eastern edge of the present park property, about 100 yards from the ocean (CC, Exhibit 1). The

graveyard was destroyed in 1928. Another graveyard was also located in the Wolfe's Pond area. In 1857 New York State bought the Wolfe Farm located on the southeastern side of Wolfe's Pond. The apparent intent was to move the Quarantine quarters to this area. The oystermen, fearing such a move would injure their business, were determined that it not take place. When they were ignored, they took things in their own hands and, disguised as Indians, burned the Farm to the ground.

The State retained control of the Wolfe's Pond property, and used it for burial purposes until 1890. Graves were reportedly so shallow that coffins used to wash out on the beach. The burial ground was some distance to the east of the ruins of the farmhouse, quite close to the water (BB, Exhibit 1)¹ The ruins of the farmhouse and outbuildings may also still be present in the southeastern part of the pond area. The 1852 map of the proposed line of the Staten Island Railroad shows two structures in that location labelled Joel Wolfe

f. The Poillon House

The Biel family house was located north of the proposed sewer route (DD, Exhibit 1). The House, known by various names (the Woods of Arden House, the Poillon House, Oaklands and Tasomock Farm), is a New York City Landmark under the name of Poillon. At present, application for nomination to the National Register is being prepared.

The property was first owned by Domine Petrus Tesschenmaker of the Dutch Reformed Church who acquired a patent from Governor Thomas Dongan on Nov. 3, 1685 (Boyle-Cullen, 1953). He constructed

¹ Information on the Quarantine comes from Powell's two articles and conversations with the author. Unfortunately neither Powell's work nor consultation with maps and other sources give the exact location of the Quarantine burial ground.

a one-room stone shelter which now constitutes one half the basement. The room would have measured 16 by 16 feet inside the two foot thick stone walls. The room contained a secret pocket within the stone wall about 9 by 9 by 4 feet in which Domine stored his church records.

By 1696 the property was owned by the Poillon's who kept it for three generations. They expanded the structure into a typical Flemish-style farmhouse (Boyle-Cullen, 1954) and surrounded it with 160 acres of orchard.

It was not until 1837, when Dr. Samuel Akerly bought the house, that it was expanded to its present size. Akerly farmed the land and even wrote on the state of agriculture in his day (McMillen, 1971). It was sold after his death to Frederick Law Olmstead. It is believed some of the trees Olmstead planted still shade the house (Biel, personal communication, 1977).

Today the house is not in good condition and is surrounded by a development of incongruously modern houses.

g. Other areas

Beyond the Poillon House nothing of historical significance has been discovered. However, the Hessian Map (Exhibit 6) shows redoubts and encampments all along the southern shore. Although remnants of the Revolution may have already been destroyed by the building of bungalow colonies, some sections of this area are still fairly undeveloped. ✓

III. Ground Surface, Previous Sub-surface Disturbance and Analysis of Soil Borings

This section presents findings and conclusions reached as a result of inspection of the project area and soil boring records.

A. Eltingville Pumping Station to Mayflower Avenue Pumping Station

Extending from the Eltingville pumping station, the route of the Fresh Kills interceptor will cross what was originally a low lying area. The streets in this area, shown on project drawings, have not yet been constructed. (This is similar to other sections of the project area.)

Visual inspection of this general area from the vantage point of Richmond Avenue indicates the presence of a land fill operation in the area to be traversed by the interceptor. Soil borings taken in this area in 1968 reveal the presence of 4 to 17 feet of fill. Profile drawings indicate construction will take place below the level of the fill. Soil borings (Johnson Soils Engineering Co. 1968) show the surface underlying the fill does not contain peat and thus implies the surface in this area was probably never under water. ✓

After the route of construction joins Arthur Kill Road, the interceptor will be placed to the north of the pavement until it reaches a point 440 feet west of Carlyle Green. The south side of Arthur Kill Road in this area contains some individual houses and housing developments with some wooded areas and a large open area in the vicinity of Saint Michael's Home for Children.

The ground is at approximately the same grade as the road surface which varies up to a maximum of about 40 feet before dropping sharply to the low lying marsh area to the north. This strip of land contains brush with some small trees. In some places the land rises sharply before the drop-off. This may be an artificial embankment. The interceptor and the Mayflower Avenue

force mains will be placed in the area between the Arthur Kill Road pavement and this embankment at a distance which varies from 5 to 20 feet north of the Arthur Kill Road pavement.

In this area the south side of Arthur Kill Road contains individual houses and housing developments with wooded areas and a large open area in the vicinity of Saint Michael's Home for Children. The force mains will be placed beneath the present Arthur Kill Road pavement from a point 440 feet west of Carlyle Green to the intersection of Arthur Kill Road with the West Shore Expressway.

Soil borings indicate the presence of 2 to 8 feet of fill from the point at which the interceptor joins Arthur Kill Road westward to a point mid-way between Token Street and Crossfield Avenue and 4 to 8 feet of fill in the vicinity of Muldoon Avenue. The description of this material does not include the mention of debris, and vegetation is not indicated as being present under the fill. The identification of this material as fill depends on the judgment of the drillers who took these borings. If this material is in fact fill, construction of the interceptor would disturb the underlying ground surface.

Previous disturbance of the surface below Arthur Kill Road would have been caused by the installation of water and gas mains. In general, the water and gas mains which are present beneath the streets within the project area are placed from 2 to 5 feet below the surface. In addition, the section of Arthur Kill Road west of Ladd Avenue contains an existing sanitary sewer beneath the south side of the pavement.

B. Mayflower Avenue Pumping Station Area

The Mayflower Avenue pumping station and associated emergency overflow sewer and the interceptor and force mains which enter and leave the pumping station will be located between Arthur Kill Road and the shore of the Arthur Kill. Visual observation indicates the western part of this area is low lying

with marsh grass vegetation while the eastern part consists of higher ground, apparently a land fill operation, which is also covered by marsh grass. Examination of soil borings indicates the pumping station will be located in this higher area and that this is, in fact, a fill area. Approximately 20 feet of fill is indicated in the area of pumping station construction. Seven to 13 feet of organic silt underlies the fill followed by 1 to 6 feet of peat. It is assumed a similar stratigraphy exists throughout the larger area which would be affected by the construction of the proposed Fresh Kills treatment plant. Borings taken west of the pumping station site indicate the presence of 6 to 17 feet of fill overlying 4 to 11 feet of peat. One boring placed by the shore of the Arthur Kill in the approximate location of the planned emergency overflow sewer indicates the presence of 16 feet of peat and an absence of any overlying fill.

The depth of peat is of significance in the analysis of the archaeological potential of this area. As discussed below, in the Tottenville shoreline section, it has been established the sea level has been rising during the post-glacial period. Peat accumulations form as the sea encroaches upon the land. Particles of silt are deposited in the roots of vegetation, thus building up a new ground surface in which new vegetation grows. As the sea level continues to rise, more silt is trapped in the roots of the existing vegetation and additional vegetation grows in this soil. The formation of peat deposits thus occurs in such a way that the surface of a wetlands area is maintained at the current sea level. The number of feet of peat deposits thus indicates the number of feet which the sea level has risen since the sea invaded a given area. By dating basal peat deposits by the carbon-14 method, it is possible to construct curves showing the elevation of the sea at different times during the post-glacial period (Emery; Newman, personal communication 1977). According to curves

drawn for the New York City area by Dr. Walter Newman of the City University of New York (personal communication 1977), the first encroachment of the sea in this area, as indicated by the presence of 16 feet of peat, would have occurred at approximately 2500 B.C. Prior to this time at least portions of this area would have been drier and therefore habitable by man. By 1000 B.C. (corresponding to 4 feet of peat) the major part of the area would have been transformed into wetlands and rendered uninhabitable.

Since the bottom of the peat deposits marks the beginning of the encroachment of the waters of the Arthur Kill, any traces of prehistoric occupation would be found at or below this depth. Project drawings indicate pumping station construction would disturb the ground surface beneath the peat. The driving of piles to support the overflow pipe and a concrete headwall on the Arthur Kill shore would also disturb the ground surface underlying the peat, although the planned route of interceptor construction may run to the south of the peat deposits.

C. Arthur Kill Road from Mayflower Avenue to Warsaw Avenue Pumping Station

The interceptor will re-enter Arthur Kill Road from the low lying land to the north approximately 25 feet east of the Blazing Star cemetery. The interceptor and force main will then extend beneath Arthur Kill Road until the force main enters the Warsaw Avenue pumping station. An existing water main is located beneath the road in this area. A gas main also runs beneath the pavement in the extreme eastern and western portions. Project drawings indicate no gas mains exist west of Saint Lukes Avenue to a point approximately 2600 feet east of Ellis Place.

East of Rossville Avenue Arthur Kill Road narrows to between 32 and 36 feet, passing among a group of old houses that are a part of the old community of Rossville. To the north, on the shore of the Arthur Kill, a number of hulks

are visible. Some of these vessels may have been used for the Old Blazing Star Ferry. The sewer pipe will be placed from 20 to 40 feet from the front of all but one of the old buildings. The other is set back farther from the road. West of this community there is a junkyard on the north side of the road with some open areas on the south. More old houses stand on either side of Arthur Kill Road between St. Lukes Avenue and Zebra Place. St. Luke's cemetery is located on the north side of Arthur Kill Road just west of these houses.

A liquid natural gas tank farm is located west of the cemetery. Much of the area on both sides of the road west of the gas tanks is wooded, with some houses and commercial structures. A wooded area on the north side of the road separates the tank farm from the Staten Island correctional facility and associated parking area. Approximately 200 feet east of Johnson Street a gully is visible on both sides of Arthur Kill Road. By walking along the edge of the gully on the north side of the road the top of a brick arch at the base of the headwall of the gully may be observed. This brick structure apparently runs beneath Arthur Kill Road. Most of the area on either side of Arthur Kill Road west of Johnson Street is wooded, with a few houses on the south. On the northwest corner of the intersection of Arthur Kill Road and Ellis Place is a low lying area containing marsh grass cover. This is the former site of the Winant house.

Soil borings indicate the presence of 3 to 7 feet of fill between St. Lukes Avenue and Zebra Place in Rossville. Construction of the interceptor would disturb the ground surface beneath this fill. Borings also indicate the presence of 7 to 10 feet of fill for a distance of approximately 1800 feet west of the culvert which is located approximately 200 feet east of Johnson Street (i.e., Shamrock Avenue on the 1970 construction drawings). Construction of the

interceptor in the westernmost 675 feet of this area will affect the ground surface underlying the fill. The Warsaw Avenue force main will be placed in the remaining 1125 feet. Since force main construction would only reach depths of 7 to 8 feet in this area, the surface beneath the fill may not be disturbed. However, as noted above, these soil borings do not indicate the presence of debris in this fill and the description of this soil as fill is dependent on the judgment of those taking the borings. It is possible this "fill" is actually the natural ground surface.

D. Warsaw Avenue Pumping Station

This pumping station will be constructed in an area of deciduous woods. Five soil borings were taken at this site. One boring, placed in the middle of the site, indicates the presence of three feet of gravel fill. Another, placed in the northeast corner of the site, indicates the presence of four feet of brick, wood and boulders. This may represent a former house site. The other borings suggest the presence of an undisturbed ground surface.

E. Kreischer Street Pumping Station

This pumping station will be constructed in a low lying area with brush and marsh grass cover located west of Kreischer Street and north of an old basin or slip which was utilized by the brick factory which formerly stood to the south of the slip.

Some of the soil borings taken in the area indicate the presence of a few feet of peat (Joseph S. Ward and Associates, 1970). One boring taken approximately 150 feet east of the Arthur Kill shore indicates the presence of eight feet of fill overlying six feet of peat.

F. Kreischer Street to End of Ellis Street

The force main and interceptor will follow Kreischer Street and Arthur Kill Road to Nassau Place. Kreischer Street contains existing gas and water

mains. Arthur Kill Road contains only a water main. The area on either side of Arthur Kill Road is wooded from Kreischer Street to Veterans Road. This is an area of higher ground. It represents the western end of a glacially created ridge which runs the length of Staten Island (New York City Department of Water Resources 1975). Between Veterans Road and the Outerbridge Crossing there are some areas of marsh to the right of Arthur Kill Road and some areas which have been disturbed by previous construction. From the Outerbridge Crossing to Nassau Place both sides of Arthur Kill Road contain houses and commercial establishments with some wooded areas. The planned route will leave Arthur Kill Road at its intersection with Nassau Place and head west through a low lying area of marsh grass before turning south again through deciduous woods to intersect Ellis Street. It will extend beneath Ellis Street until it meets the shore line. Ellis Street contains an existing water main as well as a storm drain. The north side of the street contains homes and lawns in front of old commercial buildings in a state of disrepair. The Staten Island Rapid Transit tracks are located to the south of Ellis Street. Some of the borings taken beneath Ellis Street indicate the presence of 7 to 10 feet of fill. This fill was probably deposited in the course of road construction. Interceptor construction activities will penetrate beneath the fill.

G. Shore Line from Ellis Street to Tottenville Emergency Overflow Sewer

In this area a sand beach slopes upward from the Arthur Kill. The interceptor will be placed approximately 10 to 20 feet east of the high water line. In some areas the beach is bordered by bluffs which rise almost vertically. The top of these bluffs contains deciduous woods with some houses. In other areas the ground beyond the beach slopes more gradually upward. The lawn of the Conference House National Landmark is one of these areas. In other areas the beach is bordered by flat areas with marsh grass cover. One of these

extends north for about 640 feet beginning north of the Conference House property.

Soil borings taken in this area indicate the presence of 2.5 to 14 feet of peat. Borings indicate that there is another such area, containing 2 to 7 feet of peat, approximately 500 to 700 feet south of Bentley Street. An early prehistoric site was discovered in similar terrain at Charleston Beach, north of this area.

One soil boring placed approximately 40 feet south of Bentley Street indicates the presence of a dense accumulation of shells to a depth of nine feet, with traces of shell fragments in the underlying sand. There is a possibility this represents remains of a prehistoric shell midden. ✓

Where the sewer route will cross the foot of Bentley Street, wooden pilings are visible which are probably connected with the former ferry. At the foot of Amboy Street some wooden piers are visible which may be connected with the former Amboy Street Ferry.

An important consideration in any assessment of archaeological resources in this area is that sea levels have been rising since the terminal Wisconsin glaciation. The amount of increase in any given area is a combination of a world-wide increase due to glacial melting and local increases due to subsidence of the land (Salwen 1962; Emery and Garrison, 1967). Therefore, land which is now under the Arthur Kill was previously dry and habitable. The date at which this ground would have been habitable varies according to the accepted rate of sea level rise and the slope of the land. It certainly was habitable at the beginning of man's occupation of eastern North America, which is conservatively estimated to have begun some 12,000 years ago.

Construction plans for the Tottenville outfall pipe indicate the bottom of the Arthur Kill slopes gradually to a depth of approximately nine feet below X

mean sea level before dropping off sharply to greater depths. A reconstruction of past sea levels in the New York City area (Newman, personal communication 1977) indicates this land may have been dry as late as 2,000-3,000 B.C.

H. Tottenville Emergency Overflow Sewer to Tottenville Pumping Station

Between the shore line and its intersection with Bullop Avenue the construction route will traverse a fairly flat area covered with deciduous woods and brush. The windshield survey indicated the presence of shell scattered over the surface in this area.

I. Billop Avenue to Hylan Boulevard

Billop Avenue east of the Tottenville pumping station extends through low lying terrain with wooded areas and some beach bungalow-type structures standing on either side of the road. The interceptor and force mains will be placed under the road. Construction plans do not indicate the presence of utilities beneath Billop Avenue west of Brighton Street. East of Brighton Street a gas main runs beneath the road. A water main extends to the east beginning at Rockaway Street.

At Loretto Street the interceptor/force main route will traverse a wooded area and then extend along the shore line, in most places north of the beach. The shore line is wooded. A few structures are standing in this area. Lawns are located between the houses and the beach. These lawns will apparently be traversed by the interceptor.

The force mains will run beneath Bedell Avenue, which slopes upward to the north. An existing sewer runs beneath the pavement. The east side of Bedell Avenue is wooded. Houses stand on the west side with some wooded areas. A known archaeological site is located in the wooded area between Bedell and Page Avenues.

J. Hylan Boulevard from Bedell Avenue to Sharrott Avenue

Force mains and the interceptor will be placed under Hylan Boulevard in this area. This roadway is approximately 70 feet wide and an existing water main runs under the pavement. A gas main also runs beneath Hylan Boulevard west of Richard Avenue. Between Bedell and Richard Avenues, Hylan Boulevard is bordered by woods to the north with commercial buildings and some wooded areas to the south. Between Richard Avenue and Sharrott Avenue the road is bordered on both sides by open fields associated with the Mount Loretto Home for Children. West of Sharrott Avenue Hylan Boulevard passes within 400 feet of the shore of Prince's Bay. Marsh grass vegetation exists between the road and the bay.

Soil borings (Joseph S. Ward and Associates, 1969) indicate the presence of 6 to 14 feet of fill along Hylan Boulevard between 500 to 1250 feet west of Sharrott Avenue, the approximate location of the marsh grass area. The fill may have been deposited in this low lying area at the time the road was constructed. Construction of the interceptor would result in the disturbance of the ground surface beneath the fill. ✓

K. Sharrott Avenue to Wolfe's Pond Pumping Station

The interceptor route will traverse the top of the bluffs which line the shore of Prince's Bay. There are stands of deciduous woods and brush in some portions of this area as well as large open area associated with a group of small camp buildings. Remains of a brick structure were noted on the surface several hundred feet west of Bayview Avenue. The interceptor will cross Lemon Creek in the vicinity of some old wooden pilings which may be associated with an old bridge which stood in this area as early as 1830. ✓

Soil borings indicate peat accumulations of 9 to 14 feet on either shore of Lemon Creek. In one spot this peat is overlain by eight feet of fill. Interceptor construction will affect the ground underlying the peat deposits, thus disturbing any remains of early prehistoric occupations which may remain from the period prior to the encroachment of the sea in this area.

On the east side of Lemon Creek the interceptor route will pass through a boatyard, approximately 400 feet south of the Seguire house. It will then run beneath Purdy Place. This street contains existing gas and water mains. The interceptor will pass approximately 115 feet south of the front of what was formerly the Purdy Hotel. Other structures stand along the north side of Purdy Place. The area to the south contains short scrubby vegetation.

Soil borings indicate the presence of 6.5 to 13 feet of fill in the boatyard and beneath Purdy Place. Identification of this material as fill was made by those conducting the soil borings. The boring logs do not indicate that it contained debris. The interceptor will be placed beneath the indicated depth of fill.

L. Wolfe's Pond Park to Cornelia Avenue Including Pumping Station Site

The Wolfe's Pond pumping station will be located in an area of brush and some trees in the southeast corner of Wolfe's Pond Park and just south of the Wolfe's Pond overflow creek. East of the pumping station the interceptor route will pass through open parkland. The eastern end of the park contains a parking area which may have been subject to some surface disturbance.

There is a more gradual slope down to the beach in the Wolfe's Pond Park area than to the east and west, where bluffs drop sharply to the beach. Both types of terrain represent likely camping places for aboriginal populations. Prince's Bay supported an oyster fishing industry in historic times and this food resource would have attracted aboriginal populations to this area as well.

Two graveyards with historic associations formerly stood in the eastern part of the park area. There are no surface indications of these graveyards and their precise location is uncertain. It cannot be determined whether there are any remaining burials in the area or whether construction of the interceptor would disturb them.

M. Cornelia Avenue to Arden Avenue

East of Cornelia Avenue is a wooded area. A small group of bungalows is located along the shore near Cornelia Street. In this area the land slopes up gradually from the shore and the interceptor will be placed 100 to 300 feet north of the shore line. Further east the steeper bluffs resume and the interceptor route will run along the top of these bluffs in a largely wooded area in which a few houses are located. East of Swaim Avenue to a point approximately 250 west of Arbutus Avenue the interceptor will be placed on the beach at the base of the bluffs. It will then resume its course on top of the bluffs in the area of two houses which stand to the west of Arbutus Avenue. East of Arbutus Avenue the interceptor route will extend through the area of beach scrub vegetation which stands between Arbutus Lake and the shore.

Soil borings taken in this area indicate 9 to 10 feet of sand overlying 10 to 14 feet of organic silt and some peat. This probably represents an old marsh surface. The sewer will be placed 10 to 15 feet below the surface in this area. However, construction drawings indicate that piles will be driven to support the sewer. This will result in disturbance of the surface underlying the old marsh deposits.

The route of construction will continue along the shore within the Saint Joseph's by the Sea property, and south of a row of bungalows which front on Zephyr Avenue. East of Poillon Avenue a steep bank or bluff again rises steeply from the beach and the interceptor will run along the base of this bluff for

a distance of approximately 300 feet east of Poillon Avenue. It will then extend along the top of the bluff, passing through a bungalow colony, and continue along the shoreline on the top of the bluff through an area containing bungalows with some areas of woods and brush to Harold Avenue.

Soil borings taken in the area in which the interceptor route will leave the beach indicate 7 to 17 feet of sand overlying 10 to 21 feet of peat and black organic silt, which probably represents another old marsh surface. The sand overlying this and the marsh area near Arbutus Lake has probably accumulated naturally. Construction will affect the surface underlying the peat.

In the block between Harold Avenue and Arden Avenue the interceptor will be placed beneath an existing Street (Ocean Driveway) which runs along the top of the bluffs. Existing water and gas mains run beneath this street. A row of houses stands on the north side of Ocean Driveway.

N. Arden Avenue to Wiman Avenue

The interceptor route will run through a wooded area between Arden Avenue and Woods of Arden Road. Construction drawings indicate a land fill operation to the south of the planned route. Soil borings, however, do not indicate fill along the route of construction, which is apparently located north of the fill area.

The area east of Woods of Arden Road has been subject to disturbance in many locations due to construction of several housing developments. The interceptor route will follow the route of two mapped streets, Wakefield Road and Tennyson Drive. In most of the blocks these streets have not been constructed. Existing utilities (water and gas mains) exist only in the block between Woods of Arden Road and Hales Avenue and in the two blocks between Glover Street and Wiman Avenue. Some of the other blocks have paved surfaces, others are dirt roads and others still contain woods or brush. East of Preston Avenue the

interceptor will be placed on the south side of the existing or planned street. The north side will be subject to additional disturbance from construction of a planned 10 inch sanitary sewer which is not part of the present project.

Soil borings indicate the presence of 7 to 11 feet of fill between Armstrong and Wiman Avenues. Five to seven feet of organic silt, peat and vegetation is indicated beneath the fill from Armstrong Avenue to east of Point Street. Construction will affect the ground underlying the fill and organic material.

IV. Conclusions and Recommendations

This literature search and windshield survey has indicated South Richmond is an area of high archaeological sensitivity. There is a strong likelihood significant deposits of prehistoric and/or historic period materials may exist along the proposed route of sewer construction and in the area to be affected by construction of pumping stations and the proposed Tottenville and Fresh Kills treatment plants. The possibility of finding such deposits can be eliminated only in limited areas of the route. Therefore, it is recommended a Phase I intensive survey be conducted along the planned route of construction. The objective of this survey would be to determine whether the planned construction would in fact disturb deposits of prehistoric or historic period materials. The determination of the significance of any deposits located as a result of Phase I testing would be the objective of a further, Phase II investigation.

The Phase I survey would include the placing of sub-surface tests at fixed intervals. These would be small shovel tests or test pits which would cover a surface of one to two square feet and which would be excavated to the depth of sterile subsoil. It is recommended the spacing of these tests be varied in different areas according to their relative archaeological sensitivity.

Based on available information construction is most likely to disturb sub-surface cultural resources in the Tottenville-Conference House Park-Page Avenue section and the Wolfe's Pond-Prince's Bay shoreline area. Recommendation for testing in specific parts of the construction route are discussed below.

It should be noted the location of known sites indicates the likelihood that aboriginal occupation occurred throughout South Richmond. Thus, the need for sub-surface testing would not be eliminated by selection of alternate construction routes. However, selection of an alternate route in the area of Conference House Park is recommended. This is discussed at greater length below.

A. Sub-surface Testing - Wiman Avenue to Cornelia Avenue (Eastern border of Wolfe's Pond Park)

This area is considered to be less archaeologically sensitive than other parts of the construction route because of the relative lack of reported prehistoric and historic sites in the area. It is possible aboriginal sites do exist in this area, however. This is especially likely from Wolfe's Pond Park to the vicinity of Arden Avenue, the point at which the planned route will leave the immediate shoreline.

The placing of sub-surface tests every 100 feet is recommended for this area. Testing would not be necessary, however, in the area in which the interceptor route will run between the bluffs and the shore line. Due to erosion, the bluffs would have extended further south in prehistoric times. Therefore, the present beach area would not have been in existence.

East of Woods of Arden Road there are some areas in which the surface has been disturbed by housing development construction and in which testing would not be necessary. In other areas tests should be placed at intervals of 150 feet or more.

There are three areas in this section in which soil borings indicate the presence of peat deposits: south of Arbutus Lake, east of Poughkeepsie Avenue and in the Armstrong Avenue - Point Street area. It is possible undisturbed materials from the early prehistoric period are preserved beneath these deposits. It may be possible to determine whether such materials are present by a close examination of the beach area, where wave action could be eroding the edge of the peat deposits. Therefore, it may be possible to examine the surface below the peat using manual methods. In addition, evidence of prehistoric materials beneath the peat deposits could be present on the beach in the form of artifacts eroded out from beneath the peat. If these methods do not permit a determination of the presence or absence of

prehistoric materials beneath the peat, testing using power equipment may be necessary. Where the deposits of peat and overlying sand are particularly deep this may involve the drilling of undisturbed core samples.

The City of New York has retained soil samples taken from the 1968-1970 borings. It is not believed, however, examination of this soil would provide an adequate test for prehistoric materials. Only a portion of the core column from each stratum has been saved. Therefore only a partial sample of the chronological sequence represented by this column is available. In addition, this soil would have been subject to disturbance in the process of the engineering analysis.

B. Cornelia Avenue (Eastern Border of Wolfe's Pond Park) to Hylan Boulevard

This area is one of the more archaeologically sensitive along the route of construction. No archaeological excavation has been done but there have been a number of surface finds of aboriginal material. Topographical considerations indicate this would have been an ideal location for aboriginal settlement. In addition, early maps indicate some of the earliest houses in South Richmond stood near the shore of Prince's Bay and that there were Revolutionary War encampments of British soldiers in the area.

Structural remains and/or middens from these occupations could be present below the present ground surface. It is recommended tests in this area be placed every 50 feet and in a 50 foot grid pattern within the area of construction of the Wolfe's Pond pumping station.

As previously noted, it is possible for remains of early prehistoric occupations to be preserved beneath peat deposits. Such deposits exist on the shore of Lemon Creek. It may be necessary to use power equipment to sample the ground surface underlying these peat deposits.

C. Hylan Boulevard between Sharrott Avenue and Bedell Avenue

This area has considerable archaeological potential. The Page Avenue

site and Tottenville campsite #4 indicate the potential at the western end of this section of the construction route. Surface finds have been reported at the eastern end (near Sharrott Avenue).

It is likely construction of Hylan Boulevard has caused disturbance of the top of the ground surface beneath the roadway. Deeper disturbance would have been caused in some areas through installation of utilities. However, the possibility undisturbed prehistoric sites or portions remain under the present roadway cannot be eliminated. These deposits could take the form of refuse or storage pits, burials, or other archaeological features which may have been dug down into the subsoil and thus have been unaffected by construction of the roadway. It is recommended sub-surface tests be placed every 100 feet in the undisturbed ground which exists alongside the present roadway. If this Phase I testing should reveal the presence of prehistoric sites, procedures should then be developed to determine the amount of undisturbed material beneath the road.

West of Sharrott Avenue, Hylan Boulevard is only about 400 feet north of Prince's Bay. There is a low lying area between the road and the bay. Prehistoric peoples were often attracted to this type of terrain because of the available food resources. Hylan Boulevard appears to be built on fill in this area. Construction will penetrate beneath this fill, disturbing the underlying ground surface. Tests in this area should be placed south of the road on the northern edge of the low lying area. If manual testing reveals the presence of deep peat deposits in this area, it may be necessary to conduct subsequent tests using power equipment.

D. Bedell Avenue to Ellis Street - Including Conference House Park

This area is the most archaeologically sensitive of those along the route of proposed construction. The present route will extend through the

Ward's Point archaeological zone, which has been determined eligible for nomination to the National Register of Historic Places. The western portion of the proposed Tottenville treatment plant site also lies within the zone. The presence of the Page Avenue site and Tottenville campsite #4 to the east of this zone indicates the probability of prehistoric sites throughout this entire area, even beyond the mapped borders of the Ward's Point Archaeological zone. These borders do not necessarily reflect the actual limits of prehistoric occupations in this area.

Excavations in this area have investigated only a small portion of prehistoric cultural resources which exist. Because of the dwindling supply of undisturbed prehistoric sites on Staten Island, and in the northeastern United States in general, this zone should be maintained as an undisturbed reservoir of knowledge which should be tapped only through carefully planned, research oriented archaeological excavation. Phase I testing in the Ward's Point archaeological zone would, in itself, represent a disturbance of the integrity of the site and should be avoided if at all possible.

It is, therefore, recommended the proposed route of construction be altered so as to completely bypass this area. Further, the site of the proposed Tottenville treatment plant be relocated. For example, the sewer route could depart from Hylan Boulevard at Bedell Avenue, to extend north on Bedell and Bethel Avenues and Nassau Place to Arthur Kill Road. This route would be located below the 50 foot contour. It is possible prehistoric sites are also located along this proposed route, especially west of the Page Avenue site. Sub-surface testing would still be necessary. The present route, however, extends through an area in which prehistoric sites are almost certain to be disturbed.

Should other than archaeological considerations preclude the adoption of

the alternate route suggested above, a second alternative is recommended. That is, the route of the sewer could be continued west along Hylan Boulevard until it intersects the presently planned route along the shore of the Arthur Kill. The proposed treatment plant site would also be relocated. This route would still extend through the Ward's Point archaeological zone and would pass just south of the Conference House, listed in the National Register of Historic Places. Thus, undisturbed deposits of prehistoric and/or historic materials may still exist under Hylan Boulevard and testing would still be necessary within the boundaries of the Ward's Point archaeological zone. However, the present route runs just south of and at approximately the same elevation as the site of known burials. Dense accumulations of shell in this area were noted during the course of the windshield survey. Therefore, it is concluded this area is almost certain to yield prehistoric materials.

If non-archaeological considerations require the presently planned route to be followed, an intensive testing procedure should be followed in this area. Before any testing is conducted within the Ward's Point archaeological zone, however, the National Advisory Council on Historic Preservation must be notified as the testing itself would represent disturbance of cultural resources which have been declared eligible for nomination to the National Register of Historic Places.

The objective of testing within the boundary of the Ward's Point archaeological zone would be to determine whether archaeological material is present: (1) Within a 75 foot wide corridor centered on the midpoint of the planned sewer pipe; and, (2) In the portion of the zone which would be disturbed by the construction of the proposed treatment plant.

Testing in this area should be conducted at 50 foot intervals along Bedell Avenue and Billop Avenue outside the borders of the Ward's Point

archaeological zone and at less than 50 foot intervals from the border of the zone to the shoreline. Close spacing in this area is recommended to locate possible concentrations of prehistoric burials. Tests should be placed in a 50 foot grid pattern in the area to be affected by the construction of the proposed Tottenville treatment plant. Tests should also be placed at 50 foot intervals along the route of the proposed extension of the interceptor northeast of the Billop Avenue - Bedell Avenue intersection.

Testing along the shore line within and to the north of the Ward's Point archaeological zone will require separate consideration. Some areas of the Arthur Kill shore line are bordered by bluffs which have been subject to constant erosion. The present beach/shoreline area was formerly the location of higher ground, the bluffs having eroded back to their present location. The rapid rate of erosion in the Ward's Point area (Weingartner 1967) indicates this situation probably existed even in late prehistoric times. Prehistoric sites would not be found below the bluffs as this low lying land did not exist in prehistoric times (Salwen, personal communication, 1978). Any prehistoric artifacts found on the beach in these areas would have been washed down from sites located on top of the bluffs. Therefore, sub-surface testing in these areas, even within the boundaries of the Ward's Point archaeological zone, is not necessary.

A different situation exists, however, along those stretches of shoreline where the land slopes more gently back from the present water line. Because of rising sea levels, the shoreline in prehistoric times stood well back from its present location. Prehistoric inhabitants could have lived at sites which are presently beach or marsh grass areas. A prehistoric site was found in precisely this type of terrain in the Charleston Beach area. Artifacts have even been found on the beach below the high water mark at this site (Salwen,

personal communication, 1978). Thus the presence of undisturbed prehistoric sites along the shore is possible.

Because some of these areas of gently sloping shoreline lie within the Ward's Point archaeological zone and because known finds of Paleo-Indian projectile points have been made along the shore of the Arthur Kill, these areas of shoreline should be closely examined. A close surface examination should be undertaken to detect artifacts which may be eroding out of the beach margins, especially in the area of peat deposits north of the Conference House property and south of Bentley Street. This should be augmented by sub-surface testing every 50 feet in those areas where it appears accumulation of sand may have obscured eroding beach margins. If surface examination and manual testing does not permit determination of the presence or absence of prehistoric material beneath the marsh deposits which will be disturbed by the proposed construction, further testing below the peat using power equipment may be necessary. At the Charleston Beach site the excavated prehistoric material was found beneath the peat deposits.

E. Emergency Overflow Sewers - Tottenville, Wolfe's Pond and Kreischerville Street

A portion of these pipes would be installed below mean sea level. As prehistoric sea levels were lower than at present, areas now under water would have been habitable during prehistoric times. If testing above the low tide line indicates the presence of prehistoric materials in these areas it may be necessary to carry out further testing below the surface of the water using coring devices.

F. Ellis Street and Arthur Kill Road to Area of Mayflower Avenue Pumping Station

This area is archaeologically sensitive. The portions of this section which are closer to the shoreline, along Ellis Street and in the Rossville area,

are sensitive because of aboriginal occupations which have been noted from both surface finds and archaeological excavations along the shore of the Arthur Kill. In areas which are located further inland prehistoric sites have been noted on both sides of Arthur Kill Road. As stated in the discussion of the Hylan Boulevard section, road construction and installation of utilities would have caused previous disturbance except where the route of construction crosses open ground northwest of the intersection of Arthur Kill Road and Ellis Street. The presence of undisturbed sites or portions of sites beneath Ellis Street and Arthur Kill Road cannot be ruled out, however. ✓

It recommended sub-surface tests be placed every 100 feet along the route of construction. The tests should be placed to either side of the paved roads. In areas where borings indicate the presence of fill beneath Arthur Kill Road, tests should be placed well back from the road. If traces of aboriginal occupations are noted, Phase II testing would determine the extent to which undisturbed material exists beneath the present pavement.

G. Kreischer Street Pumping Station

This area lies along the shoreline and is of great archaeological sensitivity. Paleo-Indian projectile points have been found along the shore in this area and prehistoric sites have been excavated along the shore slightly north of this area.

Tests should be placed 50 feet apart in the area near the shoreline which will be affected by construction of the outfall sewer, and in a 50 foot grid pattern in the area of construction of the pumping station. Tests in areas of peat accumulation should penetrate beneath the peat. A small fill area approximately 150 feet east of the Arthur Kill shore should be avoided. Testing in unfilled areas will provide indications of the presence or absence of prehistoric materials.

H. Warsaw Avenue Pumping Station

This station will be constructed in what appears to be a largely undisturbed area of deciduous woods to the east of Arthur Kill Road. Soil borings indicate the presence of some deposits of debris. Known sites and surface finds indicate the archaeological sensitivity of this area as discussed above.

It is recommended that tests be placed in a 50 foot grid pattern in the area which will be affected by the construction of this pumping station.

I. Area of Construction of the Mayflower Avenue Pumping Station, Proposed Fresh Kills Treatment Plant, Interceptor and Force Mains and Outfall Sewer Located North of Arthur Kill Road

This is an area of tidal marsh. The eastern part, in which the Mayflower Avenue pumping station and the proposed Fresh Kills treatment plant would be constructed, has been filled. The western part has some unfilled areas. Construction would affect the ground surface underlying the fill and marsh deposits. Because of rising sea levels and shoreline archaeological finds, the presence of early prehistoric sites beneath the peat deposits cannot be eliminated.

It is recommended testing be carried out beneath the fill and peat deposits. Because of the large depths of peat deposits and fill this testing should be conducted using core drilling techniques which would provide a large diameter, undisturbed sample.

The interceptor route will also run through the low lying area to the north of Arthur Kill Road, but soil borings indicate it will be placed between the peat deposits and the southern edge of the low lying area. The western, unfilled, portion of this route may be tested by manual methods. Such testing would not eliminate the need to test in the areas of peat accumulation as discussed above.

J. Mayflower Avenue Pumping Station to Low Lying Area East of Richmond Avenue

This area is not as sensitive as those discussed above as only two pre-historic sites have been reported. It is possible this is a result of less intensive investigation, however.

Tests should be placed every 150 feet in this area. West of Carlyle Green, where the interceptor will be placed under Arthur Kill Road, tests should be placed in undisturbed areas on either side of the road. In the area to the east, in which the interceptor route will run to the north of the Arthur Kill Road pavement, tests should be placed on this side of the road. In the vicinity of Muldoon Avenue soil borings indicate fill beneath Arthur Kill Road. Tests should be placed in the open area on the south side of the road where the land slopes upward. Project drawings indicate a future Iris Avenue pumping station may be placed in this area in the low lying ground located to the north of Arthur Kill Road. Some testing should be carried out in this area.

Another area of fill is located east of a point mid-way between Crossfield Avenue and Token Street. A portion of this area has been subject to extensive disturbance from construction of the Arthur Kill Road-Richmond Avenue-Richmond Parkway intersection. West of this intersection sub-surface tests should be placed in any areas on the south side of the road which have not been disturbed by housing construction. East of the intersection testing of the ground surface underlying the fill can best be accomplished by placing sub-surface tests in the low lying area to the north. This will be discussed in the following section.

K. Arthur Kill Road to the Eltingville Pumping Station

The area to the north of Arthur Kill road which will be traversed by the

route of construction is a former low lying area which has been subject to land fill operations. Soil borings indicate the presence of fill along the construction route and that, although this was a low lying area, there are no accumulations of peat.

There have been no reported finds of prehistoric material from this low lying area. The presence of such material cannot be ruled out, however.

To test along the route of construction it would be necessary to use power equipment to remove or drill beneath the underlying fill. Visual inspection indicates, however, the area located south of Arthur Kill Road, east of Richmond Road and west of the route of construction has apparently not been filled. This area probably represents the original ground surface which is covered by fill along the route of construction to the east and also beneath Arthur Kill road to the south. It is recommended several sub-surface tests be placed in this area. This would result in the sampling of the same terrain as that covered by the fill. As there is no indication of peat accumulation, testing could be carried out with manual equipment.

L. Existing Structures of Historical Interest Which May Be Affected by Construction

Most of the existing structures discussed in this report which are of historical or architectural interest would not be adversely affected by the planned construction activities. There are, however, two possible exceptions.

The group of seven structures located on either side of Arthur Kill Road immediately west of Rossville Avenue may be eligible for nomination to the National Register of Historic Places. These structures probably date to the late 18th - early 19th century and are the survivors of the historic Rossville community. The third criterion for assessing eligibility for nomination to the National Register encompasses:

"districts, sites, buildings, structures and objects of State and local importance that possess integrity of location, design setting, materials, workmanship, feeling and association and....that represent a significant and distinguishable entity"

whose components may lack individual distinction (King 1977). This community, which is a part of historic Staten Island, may meet this criterion.

While the proposed construction will not directly affect any of the structures which comprise this community, the sewer pipe will be laid as close as 20 feet to these structures with excavation probably coming even closer. With the planned construction route this is unavoidable as Arthur Kill Road is only 32 to 36 feet wide in this area. Some of the structures appear to be in an uncertain state of repair at present. Therefore, vibrations from construction activities could conceivably cause some damage. It is recommended that, as part of the proposed Phase I study, an architectural historian inspect these buildings to determine their architectural significance and additional historical research be conducted. Personnel of the New York State Office of Parks and Recreation, Division of Historic Preservation can then evaluate this architectural data as well as the information on the history of Rossville. If this community, or any part thereof, is found to be eligible for nomination to the National Register of Historic Places, a structural inspection should be undertaken to determine the susceptibility to damage from the proposed construction activities.

The other structure which may be adversely impacted by the proposed construction is the brick culvert located approximately 200 feet east of Johnson Street. This culvert is associated with the 19th century mule drawn railroad which supplied the local brick factory. The structure is therefore associated with the industrial history of Staten Island. Project drawings contain a concrete pipe at this location which would apparently not be affected by sewer construction. No identification is made of the brick culvert, however, and it

is not certain if this structure would be damaged. The Division of Historic Preservation should review data presented in this report pertaining to the structure. As a part of the recommended Phase I sub-surface investigation measurements should be made of the depth of this brick structure beneath Arthur Kill Road. Such measurements should be compared with construction drawings to ascertain whether this structure would be affected by the proposed construction.

APPENDIX A
Photographs of Project Area

APPENDIX B
Persons Consulted

Numerous persons were consulted during the study. These people, representatives of public and private agencies and knowledgeable individuals, provided a wealth of information. They are:

Charles Gillette - New York State Museum and Science Service

Michael Greenman - Subsurface Exploration Section, Division of Plants
and Structures, New York City General Services Administration

Cheri Griffith - National Register of Historic Places

William Guether - Avocational Archaeologist, Tottenville

Lenore Kulick - New York State Office of Parks and Recreation, Division
of Historic Preservation

Daniel Maciejak - New York State Parks Commission, New York City Office

Loring McMillen - Borough Historian, Staten Island Historical Society

Hugh Powell - Map Collection, Staten Island Institute of Arts and
Sciences

Professor Bert Salwen - Department of Anthropology, New York University

Gail Schneider - Librarian, Staten Island Institute of Arts and Sciences

Dennis Tancredi - Field Researcher, Richmondtown

APPENDIX C

Project Description

The Oakwood Beach Water Pollution Control Project, Phase III consists of the construction of approximately 17 miles of interceptor sewers and force mains and the construction of five pumping stations and emergency overflow sewers. The project is divided into two major sections - the Fresh Kills system and the Tottenville-West Branch system. Construction in these sections is to be carried out under 15 separate contracts; 6A, 6B, T7-13 and FK20-25. The route of planned construction is shown in Exhibit 11.

The Fresh Kills system will begin at the proposed Eltingville pumping station, which is part of Phase II of the Oakwood Beach Pollution Control Project. This system will involve the installation of interceptor sewer pipe ranging from 21 to 60 inches in diameter which will be placed between 10 and 30 feet below the existing ground surface. With the exception of the area immediately west of the Eltingville pumping station and the vicinity of the Mayflower Avenue pumping station the interceptor will be placed beneath Arthur Kill Road.

According to the 1970 construction drawings, the Mayflower Avenue pumping station will be located approximately 1200 feet west of Huguenot Avenue (measured along Arthur Kill Road) and approximately 300 feet north of the road. Dual 18 and 20 inch force mains will run southwest from the pumping station to meet Arthur Kill Road until their connection with the interceptor approximately 400 feet east of Carlyle Green. The force mains will be placed from 5 to 30 feet below the existing ground surface. Construction of the Mayflower Avenue pumping station and associated grading and landscaping will affect an area measuring approximately 110 by 125 feet.

The interceptor will run west from the Mayflower Avenue pumping station for a distance of approximately 1550 feet before heading south to rejoin Arthur Kill Road. At the point where the interceptor will turn south the

emergency overflow sewer will run north to the shore of Arthur Kill. The interceptor will then run beneath Arthur Kill Road to a point approximately 2300 feet east of Ellis Place, where it will connect with the force main leading to the Warsaw Avenue pumping station. The interceptor will be placed between 10 and 30 feet beneath the existing ground surface in this area. A 16 inch diameter force main will connect the interceptor with the Warsaw Avenue pumping station. It will be placed 5 to 10 feet below the existing surface for most of its length. The Warsaw Avenue pumping station will be located on the east side of Arthur Kill Road approximately 95 feet south of Ellis Place. Construction of this pumping station and associated grading and landscaping will affect an area of approximately 110 to 104 feet.

The Tottenville-West Branch system will begin at the Kreischer Street pumping station. This facility will be located on the west side of Kreischer Street approximately 400 feet west of Arthur Kill Road. Construction of this pumping station and associated grading and landscaping will affect an area of about 95 by 225 feet. The emergency outfall sewer will run approximately 550 feet east of the pumping station and empty into the Arthur Kill. A 12 inch diameter force main will run beneath Kreischer Street to its intersection with Arthur Kill Road and then south on Arthur Kill Road until it connects with the interceptor approximately 150 feet south of Kreischer Street. The force main will be placed approximately 10 to 15 feet beneath the present ground surface.

From its intersection with the force main, the interceptor will run south beneath Arthur Kill Road until its intersection with Nassau Place. It will then run west and then south again to meet Ellis Street 260 feet from its intersection with Arthur Kill Road. The interceptor will then follow Ellis Street to the shoreline. It will then be placed along the shoreline

in the flat area in front of the bluffs which rise immediately to the west along most of the shore. Elevation of the ground surface in this shoreline area ranges from approximately -2 to +5 feet above the Richmond datum, which is 3.152 feet above mean sea level at Sandy Hook. The interceptor will follow the shoreline until it intersects the emergency outfall pipe from the Tottenville pumping station approximately 1500 feet south of Hylan Boulevard. The emergency outfall sewer will run southwest for approximately 720 feet. It will empty into the Arthur Kill below the mean high water line. From this point the interceptor will run east across Conference House Park to the intersection of Billop Avenue and Connecticut Street. It will then run under Billop Avenue to the Tottenville pumping station. In this section the interceptor ranges from 18 to 42 inches in diameter. North of the intersection of the interceptor and the Tottenville pumping station outfall sewer the interceptor will be placed between 5 and 15 feet below the existing ground surface. East of this point the depth will range from 10 to 15 feet.

The Tottenville pumping station will be located on the north side of Billop Avenue approximately mid-way between Aspinwall and Carteret Streets. An area of approximately 170 by 144 feet would be affected by construction of this pumping station and associated grading and landscaping operations. East of the pumping station, twin 12 and 24 inch diameter force mains will be placed in the same trench as the 27 to 30 inch interceptor. These pipes will run beneath Billop Avenue to Loretto Street and then continue east over open ground to Bedell Street. The force mains will then be placed beneath Bedell Avenue north to Hylan Boulevard. At Hylan Boulevard 12 and 24 inch force mains will continue east beneath the pavement to Page Avenue. In the above area the sewer pipes would be placed 10 to 20 feet below the existing ground surface.

A plan has been proposed to run an additional interceptor northwest from the point, noted above, where the interceptor and force mains will intersect Bedell Avenue. This proposed interceptor would extend for a distance of approximately 2400 feet to the intersection of Butler Boulevard and Clermont Avenue.

The interceptor will run below Hylan Boulevard from Page Avenue east to Sharrott Avenue. It will cross Lemon Creek and then run beneath Purdy Place to its intersection with Holton Avenue. East of Holton Avenue it will enter the Wolfe's Pond pumping station. In this section, the interceptor will be 42 to 60 inches in diameter and will be placed 10 to 40 feet below the existing ground surface.

The Wolfe's Pond pumping station will be located on the east side of Holton Avenue and south of the Wolfe's Pond overflow creek. Construction of the pumping station and associated landscaping and grading will affect an area measuring approximately 165 by 165 feet. The approximately 900 feet long emergency outfall sewer will run southeast along Holton Avenue and into Raritan Bay. Twin 14 and 24 inch diameter force mains will run east of the pumping station for a distance of approximately 1500 feet through Wolfe's Pond Park. The force mains will be placed between 5 and 15 feet below the existing ground surface.

The final section of the interceptor will begin at the end of these force mains. In this section the interceptor will be 54 to 60 inches in diameter and will be placed 10 to 35 feet below the existing ground surface. At the point of intersection of the force mains and the interceptor, an eight inch spur will extend to the northwest for a distance of 450 feet to service a planned comfort station in Wolfe's Pond Park. East of this point the interceptor will continue across Wolfe's Pond Park to Huguenot Avenue. It will

then continue east along the shore to Arbutus Avenue where it will cross open ground south of Arbutus Lake and then return to the vicinity of the shore before leaving the immediate shore area again east of Arden Avenue. The shore area in general is bordered by a bank which rises from the beach. Except for a few short stretches, the interceptor route will run along the top of the bank. East of Woods of Arden Road there is ongoing housing development activity. The route of construction will follow existing streets in some of the blocks between Woods of Arden Road and the end of the route at Wiman Avenue.

In addition to the planned sewer and pumping station construction discussed above, the construction of two additional sewage treatment plans has been proposed. These would be constructed in the vicinity of the planned Tottenville and Mayflower Avenue pumping stations. Construction of the Tottenville plant is proposed in an area which is located between Connecticut and Carteret Streets, (approximately 675 feet), and which extends north of Billop Avenue for about half the distance to Clermont Avenue (approximately 400 feet). The proposed Fresh Kills treatment plant would be constructed in an area which extends approximately 800 feet west and 600 feet north of the planned location of the Mayflower Avenue pumping station.

The areas of proposed construction described above (with the exception of the proposed treatment plants) will comprise approximately 250 acres. This land exists within private property easements, park lands and the beds of mapped streets. Where construction will take place on private land, a 25 foot permanent easement and a temporary easement of 25 feet on either side of this will be obtained. The temporary easement will be required for the movement of equipment. Thus it can be assumed that along the route of sewer construction surface disturbance will occur in a 75 foot wide corridor

extending for 37.5 feet on either side of the centerline of the sewer pipe. All sewer construction will be carried out using "open-cut" techniques, (New York City Department of Water Resources 1975).

APPENDIX D

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