Phase 1A Archaeological Documentary Study

Charleston Bus Annex – Stormwater Sewer
Arthur Kill Road and Allentown Lane
Charleston, Richmond County, New York

Prepared for:
Metropolitan Transportation Authority-New York City Transit
(MTA-NYCT)

Prepared by:
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November 10, 2006
Executive Summary

A. PROJECT GOAL
The goal of this Phase IA Archaeological Documentary Study is to determine the likelihood that potential archaeological resources have survived the destructive forces of time including agricultural use, the cutting of streets, the installation of utilities, and the construction of buildings. The entire APE was to be investigated in order to identify the project area's original topography, its prehistoric and historic usage and/or occupancy, past disturbance, and potential impacts.

B. PROJECT REVIEW NUMBERS
Project review numbers associated with the previous cultural resource investigation into the Charleston Bus Annex site, excluding the stormwater sewer (Louis Berger and Associates 2001):
State Historic Preservation Office Review Number: 04PR00763
New York City Landmarks Preservation Commission Review Number: 88-223R

C. INVOLVED AGENCIES
Metropolitan Transportation Authority-New York City Transit (MTA-NYCT)

D. PHASE OF SURVEY
Phase 1A Archaeological Documentary Study

E. LOCATION
Charleston, Staten Island, Richmond County, New York

F. SURVEY AREA
Portions of the streetbeds of Allentown Lane—including all the area between the shore of the Arthur Kill and the intersection of Allentown Lane and Arthur Kill Road—and Arthur Kill Road—including the section stretching 1400 feet north of its intersection with Allentown Lane.

G. USGS 7.5 MINUTE QUADRANGLE MAP
Located on the Arthur Kill quadrangle.

H. PREHISTORIC SENSITIVITY ASSESSMENT
Before European contact, the Charleston area of Staten Island had been an important hunting and fishing location for the local Raritan Indians who resided there. Many temporary campsites
dating from the Paleo-Indian period (beginning 11,000 BP) through the Late Woodland (which ended ca. AD 1500) have been identified on the shores of the Arthur Kill in the vicinity of the project area as well as in the surrounding areas. The project site’s natural topography would have made it an ideal location for the exploitation of food resources, if not for a habitation site, throughout the entire prehistoric period.

In general, Native American habitation sites on Staten Island dating to all periods of occupation are most often found in proximity to “well-drained areas near streams or wetlands” (Boesch 1994: 9). Most sites are located along the coast near water courses. More specifically, Late Archaic sites have been identified mostly in low-lying areas near water courses and marshes, while temporary camping sites during the Late Archaic were commonly found on sandy knolls (Ibid).

Because of the project area’s close proximity to marine resources, high elevations, a Native American trail, and archaeological evidence of a great number of temporary campsites, it is highly likely that the project area was utilized by Native Americans as a temporary hunting, fishing, and camping location. It is possible that archaeological resources related to those activities, including stone tools and debitage, faunal remains, shell middens, fire-cracked rocks, and other artifacts associated with temporary camp sites may be located at the site. Such artifacts have been recovered from the area immediately north of Allentown Lane, which was excavated as part of the Arthur Kill Factory Outlet Center and Tides of Charleston development projects. In addition, in 1996, a possible chert core was recovered from the “abandoned portion of Allentown Lane” during Phase 1B excavations for the Arthur Kill Factory Outlet Center, a proposed project in the area bounded by Allentown Lane, Arthur Kill Road, Androvette Lane, and the Arthur Kill, which was never developed (Hunter Research 1996: 6.20). Most often these deposits have been uncovered within the top 1 to 3 feet of the ground surface, although in the areas of higher elevation to the north of the project site, prehistoric deposits were uncovered at depths of up to 7 to 9 feet.

Soil erosion, landscaping, and mid to late 20th century soil removal have altered the landscape in the vicinity of the project area (Louis Berger and Associates 2001b) and may have resulted in bringing prehistoric artifacts closer to the present ground surface and therefore making them more vulnerable. In addition, in 1991 an interceptor sewer was installed along Arthur Kill Road, disturbing a large portion of the roadbed within the project area, which most likely disturbed the ground down to depths of approximately 10 feet below the present ground surface. Arthur Kill Road also has water, gas, and electrical lines running through it, which would also have disturbed the ground to depths of 5 to 7 feet in those areas. Therefore, it is not expected that archaeological resources dating to the prehistoric period would be recovered from within Arthur Kill Road.

Allentown Lane has also been somewhat disturbed by the installation of utilities in association with the Tides at Charleston development project currently being constructed north of Allentown Lane. A water main with associated fire hydrants and water valves are located on the northern side of the road, extending westward from Arthur Kill Road for approximately 400 feet. In addition, dry wells and manholes have been constructed at the western end of the road, near the shore, and near the intersection of Allentown Lane and Arthur Kill Road. Both sets of drywells have manholes above them as well as associated catch basins.

In mid-2006, Allentown Lane was graded and paved as part of the Tides at Charleston development. Approximately 3 to 4 feet of earth was excavated for this purpose at that time. Earlier soil borings, undertaken by Future Tech Consultants of NY, Inc. in 2004 (Appendix B),
Executive Summary

indicate that the western end of the road, near the Arthur Kill, contained 3 feet of fill (top soil) and the eastern end, near Arthur Kill Road, contained 4 feet of fill (top soil). In both locations, the fill layers overlay strata of clay, silt, and sand, presumably the original ground surface. Therefore, it is likely that the grading work undertaken in 2006 only affected the stratum of upper fill, and it is possible that potential prehistoric archaeological resources remain beneath portions of Allentown Lane.

While it is not expected that significant undisturbed prehistoric resources would be recovered from the disturbed portions of the project area within Allentown Lane and Arthur Kill Road, it is possible that prehistoric remains could be located beneath the pavement as well as on either side of the existing water main. The area to the west of Allentown Lane, a grassy hill which slopes down to a marshy area which then leads out to the Arthur Kill, appears to be undisturbed and could be sensitive for the recovery of prehistoric archaeological remains.

Therefore, the Charleston Bus Annex stormwater sewer site is determined to have high potential for the recovery of prehistoric archaeological resources within the undisturbed portions of Allentown Lane as well as the grassy and marshy areas west of the road's end.

I. HISTORIC SENSITIVITY ASSESSMENT

The installation of an interceptor sewer along Arthur Kill Road in 1991 would have disturbed a large portion of the roadbed within the project area down to depths of approximately 10 feet below the present ground surface. Arthur Kill Road also has water, gas, and electrical lines running through it, which would also have disturbed the ground to depths of 5 to 7 feet. Arthur Kill Road was established in the mid 19th century, well after the construction of the houses which were situated along the shoreline road. However, Arthur Kill Road was sufficiently distant from those earlier houses that there is little likelihood that the road would have impacted any domestic shaft features such as privies, cisterns, and wells which may at one time have been located in their rear yards. Therefore, it is not likely that historical archaeological deposits would have survived both the cutting and grading of Arthur Kill Road as well as the subsequent installation of utility lines along its length.

Although the 1844 Coastal Survey (Figure 9) does not depict Allentown Lane, it was presumably constructed in the early 1800s, after the death of John Van Allen (URS 2005). The 1844 map suggests that it ran between several houses, although none of the houses were located in its path. Furthermore, based on documentary evidence, it is presumed that the lane was constructed around the same time as the nearby houses, which would have been erected as each Van Allen child came of age and was given a portion of the family’s property (URS 2005). It is not likely that privies associated with those houses would have been located in the road’s path, as they were generally placed at a distance from both domestic structures and streets (Wheeler 2000). The homes also appear to be sufficiently distant from the lane that other domestic shaft features—such as cisterns and wells, which were generally constructed close to houses for easy access to water sources (Cantwell and Wall 2001)—would also not be situated within the roadbed.

Therefore, the Charleston Bus Annex stormwater sewer site is determined to have low potential for the recovery of Historic period archaeological resources.
J. RECOMMENDATIONS

Further study in the form of Phase 1B testing is recommended in order to identify any prehistoric archaeological resources which may be present in the grassy area to the west of Allentown Lane as well as the marshy area that connects it with the Arthur Kill. This testing could include surface reconnaissance, shovel tests and test units. Archaeological monitoring during all construction excavations—including both the installation of the sewer and pre-construction test pits—is recommended for the portion of project area located within Allentown Lane.

K. REPORT AUTHORS

Diane Dallal, R.P.A., and Elizabeth D. Meade

L. DATE OF REPORT

November 10, 2006
Table of Contents

Executive Summary ................................................................................................................. S-1

Chapter I: Introduction ........................................................................................................... I-1
   A. Project Overview ............................................................................................................. I-1
   B. Research Goals And Methodology ............................................................................... I-2
   C. Project Team ................................................................................................................ I-2

Chapter II: Environmental/Physical Setting .......................................................................... II-1
   A. Geology and Topography ............................................................................................. II-1
   B. Paleoenvironment ......................................................................................................... II-2
   C. Current Conditions ....................................................................................................... II-2
   D. Previously Conducted Cultural Resource Investigations Within One Mile
      of the Project Area ....................................................................................................... II-3

Chapter III: Precontact And Contact Period Resources ........................................................ III-1
   A. Introduction ................................................................................................................ III-1
   B. Paleo-Indian Period (11,000-10,000 BP) .................................................................. III-1
   C. Archaic Period (10,000-2,700 BP) ............................................................................ III-2
   D. Woodland Period (2,700 BP-AD 1500) .................................................................... III-3
   E. Contact Period (AD 1500-1700) ............................................................................... III-4
   F. Previously Identified Native American Archaeological Sites ..................................... III-5
   G. Prehistoric Sensitivity Assessment ............................................................................ III-8

Chapter IV: Historic Resources ............................................................................................. IV-1
   A. Introduction: Staten Island History .............................................................................. IV-1
   B. Seventeenth Century: Site History ............................................................................... IV-2
   C. Eighteenth Century: Site History ............................................................................... IV-3
   D. Nineteenth Century: Site History ............................................................................... IV-4
   E. Twentieth Century: Site History ................................................................................ IV-5
   F. Previously Identified Historic Period Archaeological Sites ....................................... IV-7
   G. Historic Sensitivity Assessment ................................................................................. IV-8
Saint Saviour's Church

Chapter V: Existing Utilities and Subsurface Infrastructure ........................................... V-1
   A. Existing Subsurface Utilities ................................................................. V-1
   B. Proposed Utilities Installations ............................................................. V-2
   C. Test Pits and Soil Borings ................................................................. V-3

Chapter VI: Conclusions and Recommendations ............................................... VI-1
   A. Introduction ....................................................................................... VI-1
   B. Conclusions and Recommendations .................................................. VI-2
      Prehistoric Sensitivity Assessment ...................................................... VI-2
      Historic Sensitivity Assessment .......................................................... VI-3
      Recommendations ............................................................................. VI-4

References ................................................................................................. References-1

Figures

Photographs

Appendix A: Plans showing the proposed work for the Charleston Bus Annex stormwater sewer

Appendix B: Plans showing locations of planned test pits and soil borings

Appendix C: Soil borings conducted for the Tides at Charleston development project
List of Tables

II-1 Project area soils........................................................................................................ II-3
II-2 Previously Conducted Cultural Resource Investigations Within One Mile
of the Project Area........................................................................................................ II-4
III-1 Previously Identified Prehistoric Archaeological Sites Within One Mile of the Project Area III-6
IV-1 Previously Identified Historic Period Archaeological Sites Within One Mile of the Project Area ................................................................................................................ IV-7
Saint Saviour's Church

List of Figures

1. Project Location
3. Previously Identified Native American Archaeological Sites Within One Mile of the Project Area.
4. The Manatus Map, 1639
7. A Sketch of the Operations of His Majesty’s Fleet and Army...in 1776. Joseph Des Barres, 1777
8. A Map of Staten Island During the Revolution, 1775-1783. Loring McMillen, 1933
10. The Map of Staten Island, or Richmond County, New York. James Butler, 1853
15. Borough of Richmond Topographical Survey, 1913
17. Sanborn Insurance Map, 1938
19. Sanborn Insurance Map, 2005
List of Photographs

Index indicating camera angles

1. Arthur Kill Road, near Charleston Bus Annex site; looking south.
2. Arthur Kill Road; looking southeast.
3. Arthur Kill Road; looking east.
4. Arthur Kill Road, showing manhole above existing sanitary sewer; looking southeast.
5. Northwest corner of the intersection of Allentown Lane and Arthur Kill Road, showing the Tides development project; looking northwest.
6. Allentown Lane, showing manhole in street and Tides development; looking west.
7. Western end of Allentown Lane during paving; looking west.
8. Western end of Allentown Lane after paving; looking west.
9. Western end of Allentown Lane after paving, showing manhole and catch basin; looking east.
10. Grassy hill and location of the proposed sewer outfall west of Allentown Lane; looking north.
11. Marshy area and wrecked barges west of Allentown Lane; looking west.
Chapter I: Introduction

A. PROJECT OVERVIEW

AKRF, Inc. has been contracted by New York City Transit (NYCT), an operating entity of the Metropolitan Transportation Authority (MTA) to perform cultural resource services for a proposed development project. The Charleston Bus Annex stormwater sewer would be installed in portions of the streetbeds of Arthur Kill Road and Allentown Lane in the Charleston (formerly Kreischerville) section of Richmond County (Staten Island), New York (Figure 1). The proposed sewer would be associated with another proposed project that would consist of a new bus annex to be used by NYCT's Department of Buses for the storage and servicing of NYCT buses.

A previous Phase 1A Archaeological Documentary Study and Phase 1B Archaeological Survey of the site of the Bus Annex, Block 7487, Lot 100, was completed in 2001 by Louis Berger and Associates (Figure 2). While the Documentary Study for that site indicated that significant archaeological resources might have been present on the site of the proposed bus annex, the subsequent Phase 1B archaeological testing determined that the area had experienced significant disturbance and was not likely to yield intact archaeological resources.

The following Phase 1A Archaeological Documentary Study focuses on the proposed stormwater sewer line which will redirect stormwater from the Bus Annex site towards the Arthur Kill via Arthur Kill Road and Allentown Lane (Figure 2). The proposed projects, including both the sewer line and the Bus Annex building, would be fully constructed and operational by 2009.

The beginning of the proposed stormwater pipe would be installed within the street bed along Arthur Kill Road near the northwest corner of the Bus Annex site on Block 7487 and would travel south on Arthur Kill Road approximately 2000 feet. It would then turn west onto Allentown Lane and run an additional 1000 feet. The sewer would continue past the end of Allentown Lane via an easement and would terminate at the shoreline of the Arthur Kill. An outfall structure would be constructed on the shoreline, where stormwater from the site would be discharged into the Arthur Kill. The stormwater pipe would be approximately 3,000 feet in length. The sewer would likely be used to convey off-site stormwater flows in addition to the on-site stormwater. Therefore, the pipe would likely increase in size from 24 inches in diameter at its origin near the bus annex site to 54 inches at the outfall.

Before the construction of the proposed sewer line, test pits would be dug in several locations to identify the placement of utilities within the streets.

The following Phase 1A Archaeological Documentary Study of the proposed Charleston Bus Annex storm-water sewer line has been designed to satisfy the requirements of the New York State Historic Preservation Office (SHPO) and the New York City Landmarks Preservation Commission (LPC) and it follows the guidelines of the New York Archaeological Council (NYAC).
The study documents the history of the proposed project site as well as its potential to yield archaeological resources including both prehistoric and historic cultural remains. In addition, it also documents the current conditions of the project area and previous cultural resource investigations which have taken place in the vicinity of the APE.

**B. RESEARCH GOALS AND METHODOLOGY**

The goal of this Phase IA Archaeological Documentary Study is to determine the likelihood that potential archaeological resources have survived the destructive forces of time including agricultural use, landfill, the cutting and grading of streets, and the installation of utilities. The entire APE was investigated in order to identify the project area’s original topography, its prehistoric and historic usage and/or occupancy, past disturbance, and potential impacts.

As part of the background research, published and unpublished resources were consulted at various information repositories, such as the Humanities and Social Sciences Branch of the New York Public Library (including the main research, local history, and map divisions), the LPC, the Municipal Archives, the archives of the Staten Island Institute of Arts and Science, the office of the Richmond County Clerk, the local history division of the Saint George branch of the New York Public Library, the Richmond County Topographical Bureau, and the New York City Department of Environmental Protection Bureau of Water and Sewers, among others.

File searches were conducted at the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), the LPC, and the New York State Museum (NYSM) to determine if prehistoric or historic sites had been reported within a half-mile of the project area.

The background research included a site inspection, analysis of primary sources including historic maps, deeds, census records, historic street directories, utilities installation records, land and tax photographs, and newspaper articles, as well as secondary sources including local histories.

The background research was analyzed in order to formulate recommendations for future archaeological work and/or research.

**C. PROJECT TEAM**

This Phase IA Archaeological Documentary Study was managed by Diane Dallal, M.A., R.P.A. Elizabeth D. Meade, M.A., completed the research and writing for the majority of the report with the editorial assistance of Ms. Dallal. Additional research assistance was provided by Molly McDonald, M.A.
Chapter II: Environmental/Physical Setting

A. GEOLOGY AND TOPOGRAPHY

The northwestern half of Staten Island, including the project area, is found within a geographic bedrock region known as the Northern Piedmont Lowland Section, while the southeastern half is within the Atlantic Coastal Plain (Louis Berger & Associates, Inc. 2001a). The northwestern portion of Staten Island is composed of conglomerates, red sandstone, red shale, and diabase that dates to the Triassic and Jurassic periods, 245 to 208 million years ago. The southeastern section contains sandstone, shale, slate, and graywacke that dates to the Later Proterozoic Cambrian and Early Ordovician period, 570 to 505 million years ago (NYSOFT 2004). The vicinity of the project area is composed mostly of the Cretaceous period Raritan sedimentary rock formation but with some Pleistocene age Harbor Hill Moraine glacial deposits to the south (Reeds 1925).

The island’s physical setting was shaped by massive glaciers of up to 1,000 feet thick that retreated from the area towards the end of the Pleistocene, which lasted from approximately 1.6 million to 10,000 years before present [BP]. There were four major glaciations which began approximately 17,000 years ago and affected New York City until roughly 12,000 years ago when the Wisconsin period—the last glacial period—came to an end. During the Wisconsin ice age, a glacial moraine traveled southwest across Staten Island, resulting in the separation of the Atlantic Coastal Plain (Reeds 1925).

The glacial movements also brought about the creation of hundreds of sand hills, or kames, throughout the New York City region, some of which reached heights of around one hundred feet. These hills were contrasted by many small streams, rivers, and lakes that were fed by the glacial runoff. As temperatures increased, those small water courses transformed into swamps and marshlands. The melting of the glaciers also caused the sea levels to rise by approximately 300 feet which subsequently caused the coastlines to recede between 60 and 90 feet, separating Staten Island from the mainland (Louis Berger & Associates, Inc. 2001b).

The original topographic setting of southern Staten Island was quite unlike the one found there today. The glacial retreat ultimately resulted in the creation of low-lying wetlands traversed by small creeks and streams across most of the island’s coastline. Before this, the Arthur Kill, which separates Staten Island from the eastern shores of New Jersey, was originally a narrow stream (Louis Berger & Associates, Inc. 2001b). At a site adjacent to the APE, groundwater was found to be flowing west towards the Arthur Kill, 42 to 47 feet below the ground surface [bgs] (Ibid).

A 1913 topographic survey of Staten Island shows that the elevation of the land in the vicinity of the project area was approximately 50 to 60 feet above sea level at Arthur Kill Road and sloped down to sea level along the shores of the Arthur Kill. Elevations depicted on current USGS maps indicate that these elevations have remained consistent through the present day.
B. PALEOENVIRONMENT

Due to the extended glacial period that left the Northeast blanketed in thick ice sheets for thousands of years, the area was not inhabited by humans until approximately 11,000 years ago. As temperatures increased, a variety of flora and fauna spread through the region. At this time, large open forests of spruce, fir, pine, and other tree species expanded across the Northeast, interspersed with open meadows and marshland. A wide variety of animal life could also be found, including large mammals such as mammoth, mastodon, caribou, musk ox, moose, as well as smaller mammals such as fox, beaver, hare, and many kinds of marine animals.

Climate changes continued to re-shape the environment of the Northeast as time progressed. As the climate grew increasingly warmer, jack pine, fir, spruce and birch trees were replaced with hardwood forests of red and white pine, oak, and beech (Ritchie 1980). Furthermore, a decrease in glacial runoff resulted in the creation of small bodies of water such as lakes as well as, later on, low-lying marshes and swampy areas. By the time of the Early Archaic period, beginning approximately 10,000 BP, there was “considerable environmental diversity, with a mosaic of wetlands, oak stands, and a variety of other plant resources...[making it]...an attractive and hospitable quarter for both human and animal populations” (Cantwell and Wall 2001: 53).

Warmer temperatures forced the herds of large mammals to travel north before eventually dying out. The new surroundings attracted other animals such as rabbit, turkey, waterfowl, bear, turtles, and white-tailed deer. The expanded water courses became home to a variety of marine life, including many varieties of fish, clams, oysters, scallops, seals, and porpoises, among others (Cantwell and Wall 2001).

By 5,000 BP, sea levels were only a few meters away from their current locations (Hunter Research 1996) and the modern climate in the northeast was established by approximately 2000 BP (Louis Berger & Associates, Inc. 2001a). By that time, the Native American population was flourishing in the area and had developed an intricate culture tied to the natural resources of the region (see Chapter III).

C. CURRENT CONDITIONS

Both natural forces and the actions of humans have permanently changed the geographic setting of Staten Island. Much of the coastline has been dramatically altered by landfilling and dock construction, although the coastline in the vicinity of the project area does not appear to have been altered significantly.

Most of the Area of Potential Effect (APE) covers preexisting, asphalt-paved streetbeds. The northern branch of the project area extends along Arthur Kill Road (Photographs 1 through 4). The remainder of the APE is situated within Allentown Lane, which runs perpendicular to Arthur Kill Road (Photographs 6 through 9). While Allentown Lane was a dirt road for centuries, it has recently been completely paved, almost all the way to the water.

Sanborn insurance maps from 2005 indicate that the area immediately surrounding the APE is currently largely undeveloped. There are several construction staging areas located on the northeast corner of Arthur Kill Road and W. Veterans Road, and a custom furniture store on the southwest corner. In addition to being overgrown, the undeveloped areas east of Arthur Kill Road were observed by AKRF staff members to be the sites of recent illegal dumping activities, and are filled with debris.
A large residential development is currently being constructed in the northwest corner of Arthur Kill Road and Allentown Lane. Fire hydrants and manholes were observed along Allentown Lane near its intersection with Arthur Kill Road (Photographs 5 and 6). These connect to an 8 inch water main that currently runs east-west, beginning approximately 400 feet west of Arthur Kill Road and traveling east, out of the project area. In addition, a series of dry wells was constructed at either end of Allentown Lane within the APE to help manage stormwater runoff. Manholes and catch basins are situated over both sets of drywells (Photographs 8 and 9, Chapter V).

At the western end of Allentown Lane, adjacent to the shore, a grassy hill slopes down to a wet, marshy area which then leads out to the Arthur Kill (Photograph 10).

Within the Arthur Kill itself, the wreckage of several rectangular barges is located in the vicinity of Allentown Lane (Figure 1, Photograph 11). The barges that could possibly be affected by the proposed Charleston Bus Annex stormwater sewer line are wooden coastwise hold barges, and might have been Coal Barges, Coal Boxes, New Haven Boxes, Grain Boxes, or Box Barges (Raber Associates 1996). These barges were determined archaeologically insignificant by the United States Army Corps of Engineers in 1996 (Rakos, personal communication, 10/20/2006). However, because of the distance between these barges and the coastline where the proposed sewer’s outfall would be located, it is not anticipated that the project would affect these vessels.

### D. PREVIOUSLY CONDUCTED CULTURAL RESOURCE INVESTIGATIONS

Several previously conducted cultural resource studies within one half-mile of the project area (Table II-2) indicate that the project area was situated within a region that is highly sensitive for prehistoric and, to a lesser extent, historic period archaeological resources. Archaeological sensitivity will be discussed in more detail in Chapters III and IV.
Table II-2
Previously Conducted Cultural Resource Investigations Within One Half-Mile of the Project Area

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Location</th>
<th>Findings</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1A Archaeological Survey for the Arthur Kill Factory Outlet Center</td>
<td>Area bounded by Allen town Lane, Arthur Kill Road, Androvette Street, and the Arthur Kill</td>
<td>Recommended archaeological testing for prehistoric and historic archaeological resources.</td>
<td>Hunter Research (Blades and Tomkins, 1995)</td>
</tr>
<tr>
<td>Phase 1B Archaeological Survey for the Arthur Kill Factory Outlet Center</td>
<td>Area bounded by Allen town Lane, Arthur Kill Road, Androvette Street, and the Arthur Kill</td>
<td>Shovel tests and excavation units recovered prehistoric archaeological resources (mostly in the form of lithic flakes and debitage, fire cracked rock, and pottery). Most of those resources were located at the southern end of the site at depths of .67 feet to 5.2 feet in different locations throughout the site. Historic period archaeological resources (including ceramics) were also uncovered at various depths.</td>
<td>Hunter Research (1996)</td>
</tr>
<tr>
<td>Phase 3 Archaeological Data Recovery at the Van Allen Farmstead and the Price Prehistoric Site for the Proposed Residential Development, the Tides at Charleston.</td>
<td>Area bounded by Allen town Lane, Arthur Kill Road, Androvette Street, and the Arthur Kill</td>
<td>Recovered archaeological resources related to the project area's historic farmsteads as well as prehistoric materials representing temporary campsites.</td>
<td>URS Corporation (2005)</td>
</tr>
<tr>
<td>Phase 1 Cultural Resource Survey: Oakwood Beach Water Pollution Control Project</td>
<td>Hylan Blvd at Richmond Ave to Arthur Kill Road at Kreischer Street</td>
<td>Prehistoric artifacts found at several locations</td>
<td>Pickman and Yamin (1984)</td>
</tr>
<tr>
<td>Preliminary Cultural Resource Assessment: Literature Search and Windshield Survey Oakwood Beach Water Pollution Control Project: Phase III and Future Plans.</td>
<td>Hylan Blvd at Richmond Ave to Arthur Kill Road at Kreischer Street</td>
<td>Area considered sensitive for prehistoric archaeological resources.</td>
<td>Pickman and Yamin (1978)</td>
</tr>
<tr>
<td>Evaluation of Archaeological Potential</td>
<td>Block 7527, Lots 17, 19, 21, 23, and 25.</td>
<td>Low sensitivity for the recovery of historic archaeological resources and moderate sensitivity for the recovery of prehistoric resources.</td>
<td>Pickman (1988)</td>
</tr>
<tr>
<td>Stage 1 Archaeological Survey</td>
<td>Block 7527, Lots 17, 19, 21, 23, and 25.</td>
<td>No significant resources identified.</td>
<td>Pickman (1989)</td>
</tr>
<tr>
<td>Phase 1A Cultural Resource Investigation, Chateau Du Bois Development</td>
<td>Near Intersection of Arthur Kill Road and the Outerbridge Crossing</td>
<td>Area considered sensitive for prehistoric archaeological resources.</td>
<td>Louis Berger and Associates (1987)</td>
</tr>
<tr>
<td>Stage 1B Cultural Resource Investigation: Gateway Cathedral</td>
<td>Near the southeast corner of Arthur Kill Road and the Outerbridge Crossing</td>
<td>Area considered sensitive for prehistoric and historic archaeological resources.</td>
<td>Louis Berger and Associates (1989)</td>
</tr>
</tbody>
</table>
Table II-2 (cont’d)
Previously Conducted Cultural Resource Investigations Within One Half-Mile of the Project Area

<table>
<thead>
<tr>
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<tr>
<td>Stage 1 Cultural Resource Investigation: Gateway Cathedral</td>
<td>Near the southeast corner of Arthur Kill Road and the Outerbridge Crossing</td>
<td>No significant resources identified.</td>
<td>Louis Berger and Associates (1990)</td>
</tr>
<tr>
<td>Harborview Project</td>
<td>Along the shores of the Arthur Kill, south of the Outerbridge Crossing</td>
<td>No impact expected because the project area was situated on made land.</td>
<td>Ebasco Environmental (1991)</td>
</tr>
<tr>
<td>Cultural Resources Documentary Study</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Stage 1B/II Archaeological Survey of Page Avenue Development Project</td>
<td>Near Page Avenue, south of the Outerbridge Crossing</td>
<td>Native American stone and ceramic artifacts recovered from disturbed context; similar finds dating to the Middle Woodland, Archaic, and Transitional periods had been found at the site during earlier investigations.</td>
<td>William I. Roberts, IV. and Nancy A. Stehling (Greenhouse Consultants, Inc) (1987)</td>
</tr>
<tr>
<td>Stage 1B Archaeological Survey of Chateau Du Bois Development</td>
<td>Near intersection of Arthur Kill Road and the Outerbridge Crossing</td>
<td>One possible lithic artifact recovered; no significant archaeological resources identified.</td>
<td>William I. Roberts, IV. and Nancy A. Stehling (Greenhouse Consultants, Inc) (1987)</td>
</tr>
<tr>
<td>Sharrett Estates</td>
<td>Near intersection of Sharrett’s Road and Arthur Kill Road</td>
<td>Identified prehistoric resources within two feet of the ground surface, layers of topsoil had previously been removed. Some prehistoric artifacts were intermixed with historic period artifacts.</td>
<td>Multiple Authors – Archaeological Research Consultants, Inc (1985)</td>
</tr>
<tr>
<td>Charleston Plaza: Environmental Impact Statement</td>
<td>Northeast corner of Veterans Road West and Arthur kill Road</td>
<td>Area considered sensitive for prehistoric and historic archaeological resources.</td>
<td>Historical Perspectives, Inc. (1996)</td>
</tr>
<tr>
<td>Charleston Retail Center: Phase 1A Archaeological Assessment</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Sources: The files of OPRHP and LPC. Boesch (1994), Louis Berger and Associates (2001a, 2001b)
Chapter III: Precontact Resources

A. INTRODUCTION

Archaeologists have divided the time between the arrival of the first humans in northeastern North America and the arrival of Europeans more than 10,000 years later into three prehistoric periods: Paleo-Indian (11,000-10,000 BP), Archaic (10,000-2,700 BP), and Woodland (2,700 BP–AD 1500). These divisions are based on certain changes in environmental conditions, technological advancements, and cultural adaptations, which are observable in the archaeological record.

B. PALEO-INDIAN PERIOD (11,000-10,000 BP)

As mentioned in Chapter II, human populations did not inhabit the Northeast until the glaciers retreated some 11,000 years ago. These new occupants included Native American populations referred to as Paleo-Indians, the forbearers of the Delaware—also called the Lenape Indians—who would inhabit the land in later years.

The Paleo-Indians most likely exploited all the different resources provided by their environment. It has been suggested that they did not only actively hunt the large mammals that roamed about the region (mammoths, mastodons, etc.), but they also hunted and trapped smaller animals and supplemented their diet with fish and gathered plants (Cantwell and Wall 2001).

There was a very distinct Paleo-Indian style of lithic technology, typified by fluted points. These were elaborately detailed stone points that would have been used for a variety of functions, most notably for hunting. They were often made of high-quality imported chert, but were also known to have been crafted from local materials. Other stone tools manufactured at this time included knives, scrapers, drills, and gravers. Wood, ivory, and other materials were also used for the manufacture of composite tools, such as hunting spears.

Archaeological evidence indicates that the Paleo-Indians were likely highly mobile hunters and gatherers. They appear to have lived in small groups of fewer than 50 individuals (Dincauze 2000) and did not maintain permanent campsites. In addition, most of the Paleo-Indian sites that have been investigated were located near water sources.

It is because of the close proximity of Paleo-Indian sites to the coastline that so few of them have been preserved in the New York City area. As the glaciers continued to melt, sea levels rose and much of what was once adjacent to the water line became submerged. Of the few Paleo-Indian sites that have been discovered in New York City, nearly all have been found on Staten Island. One such site is that of Port Mobil, on Staten Island, immediately north of the project area. Like most precontact sites, this location is situated on high ground overlooking the water. Because of heavy disturbance in the area—it is currently an oil tank farm—the site has yielded nothing more than a collection of fluted points and other stone tools characteristic of the period (Ritchie 1980). Paleo-Indian artifacts were also found along the eroding shore line 500
yards south of the Port Mobil site, closer to the APE (Ibid) and at the Cutting site in the
Rossville section of Staten Island (AKRF, Inc. 2003).

C. ARCHAIC PERIOD (10,000-2,700 BP)

The Archaic has been sub-divided into three chronological segments, based on trends identified
in the archaeological record which reflect not only the ecological transformations that occurred
during the Archaic, but the cultural changes as well. These have been termed the Early Archaic
(10,000-8,000 BP), the Middle Archaic (8,000-6,000 BP) and the Late Archaic (6,000-2,700
BP) (Cantwell and Wall 2001). The Late Archaic is sometimes further divided to include the
Terminal Archaic period (3,000-2,700 BP) as well.

The aforementioned environmental transformations included the continued post-glacial warming
trend, the extension of hardwood forests, and a decrease in glacial runoff which resulted in the
creation of lakes and other small bodies of water. There was a subsequent migration of new
animal and plant species into the area, while the herds of large mammals traveled north,
eventually dying out. The new surroundings attracted smaller animals, such as rabbit, turkey,
waterfowl, and white-tailed deer.

As the Archaic progressed and the number of plant and animal species inhabiting the area
increased, the size of the human population did as well. In general, archaeologists have shown
that Archaic Native American sites were most often located near water sources. The abundance
of food resources which arose during this period allowed the Archaic Native Americans to
occupy individual sites on a permanent or semi-permanent basis, unlike their nomadic Paleo-
Indian predecessors. These individuals migrated on a seasonal basis within specific territories
and consistently returned to and reoccupied the same sites.

The arrival of new food sources allowed the human population to expand their subsistence
strategies, but at the same time forced them to develop different technologies that would allow
such resources to be exploited. Perhaps the most important of these developments was the
advent of fishing technology, which occurred during the Middle Archaic in response to an
increasing dependence on the area's marine resources. The new technology included stone hooks
and net sinkers. In addition, the influx of nut- and seed-bearing foliage resulted in the
development of stone mortars and pestles as well as stone axes, used to process plant material.

In order to successfully hunt the smaller game animals that had established themselves in the
region, narrower spear points and knives were manufactured, along with weighted spear
throwers. Domestic technology was advanced as well, with the development of a wider variety
of hide scrapers and, later in the period, the origin of bowls made from steatite or soapstone.
Tools continued to be crafted in part from foreign lithic materials, indicating that there was
consistent trade among Archaic Native American groups from various regions in North America
throughout the Archaic.

Once again, due to rising sea levels and to the rapid development of the area, as well as the
dominance of coniferous forests at that time which generated a habitat ill-fit for human
habitation (Boesch 1994), few Early Archaic sites have been identified in New York City. Most
of those that have been identified are located on Staten Island, including Ward’s Point,
Richmond Hill, the H. F. Hollowell site, and the Old Place site. Sites such as Ward’s Point—a
domestic habitation location which due to lowered sea levels was originally inland—tend to be
deep and stratified and have yielded stone tools related to cooking, woodworking, and hide
processing. The many years of constant occupation caused the artifacts to be deeply buried under
more recent debris deposits (Cantwell and Wall 2001). However, at the Old Place Site, the only artifacts which were discovered—stone tool assemblages—were found at relatively shallow depths of around 42 inches (3½ feet) (Ritchie 1980).

There are few Middle Archaic sites in the region as well. The majority of these tend to consist of large shell middens, which are often found near major water courses such as the Hudson River, although stone points have also been found in such locations. These sites were in great danger of obliteration because of their proximity to the shrinking coastlines.

Unlike the Early and Middle periods, many Late Archaic sites have been found throughout the New York City area including many in Staten Island. Late Archaic habitation sites are often found in areas of low elevation near water courses and temporary hunting sites are often located near sandy areas (Boesch 1994). Late Archaic sites identified in Staten Island include the Pottery Farm, Bowman’s Brook, Smoking Point, Goodrich, Sandy Brook, Wort Farm, and Arlington Avenue sites, among others (Ibid).

In addition, many Terminal Archaic sites from all across the city have provided examples of what archaeologists call the Orient culture, which is characterized by long fishtail stone points and soapstone bowls. There have been extremely elaborate Orient burial sites found on eastern Long Island, but none have been identified on Staten Island. Orient-style fishtail points have been discovered along the shores of Charleston, it is assumed that they fell from eroding cliffs located nearby (Boesch 1994). In addition, most Richmond County sites dating to this period have been characterized by large shell middens (Louis Berger & Associates 2001a).

D. WOODLAND PERIOD (2,700 BP-AD 1500)

The Woodland period represents a cultural revolution of sorts for the Northeast. During this time, Native Americans began to alter their way of life, focusing on a settled, agricultural lifestyle rather than one of nomadic hunting and gathering. Social rituals begin to become visible in the archaeological record at this time. There have been many elaborate human and canine burial sites identified from this period. The first evidence of smoking has also been found—stone pipes have been uncovered at Woodland sites—and it was at this time that pottery began to be produced.

In general, there was a greater emphasis placed on composite tools during the Woodland period. While stone scrapers, knives, and hammerstones were still in use; there was an increased use of bone, shell, and wood in tool making. Furthermore, the development of bows and arrows revolutionized hunting practices. Fishing continued to be important to the local economy and wooden boats and bone hooks were often utilized (Historical Perspectives, Inc. 2005). Many tools were still made from imported materials, indicating that the trade networks established earlier were still being maintained (Cantwell and Wall 2001).

Pottery was introduced into Native American society early in the Woodland period and by the time of European contact in the 1500s, well-crafted and elaborately decorated pottery was being manufactured. Like the Archaic period, the Woodland has been divided into Early, Middle, and Late sections, which differ mostly based on the style of pottery which was produced at that time. Woodland pottery had simple beginnings; the first examples were coil pots with pointed bases, which were made with grit temper. These were replaced during the Middle Woodland period by shell-tempered vessels bearing a variety of stamped and imprinted decorations. As the period drew to a close, the decorative aspect of the pottery was further augmented with the addition of intricate ornamental rims (Louis Berger Group 2004).
Woodland-era sites across North America indicate that there was an overall shift toward full-time agriculture and permanently settled villages. Archaic sites in New York City indicate that the Native Americans there continued to hunt and forage on a part-time basis. This was most likely due to the incredibly diverse environmental niches that could be found across the region throughout the Woodland period (Cantwell and Wall 2001, Grumet 1995). Nevertheless, Woodland societies were considerably more sedentary than were their predecessors. There was, however, some farming of maize, beans, squash, and tobacco. The development of pottery, increasingly complex burial sites, and the presence of domesticated dogs are all consistent with sedentary societies, which have a close association with a particular territory or piece of land.

Woodland sites, like those of the Paleo-Indian and Archaic periods, are usually found alongside water courses. They were often occupied for long periods of time, although there was still some seasonal migration that may have left them unoccupied for brief periods throughout the year.

One Woodland period archaeological site that has been identified on Staten Island is the Bowman’s Brook site, located along the island’s northwest coastline (Figure 3 and Table III-I). That site yielded a type of incised pottery, which has since become known as the Bowman’s Brook Phase. Sites with this particular type of pottery are most often located near tidal streams or coves and are usually associated with large shell middens and refuse pits, indicating long periods of occupation (Ritchie 1980). The Bowman’s Brook site also contained several human and dog graves, as well as bundle burials (Cantwell and Wall 2001).

The Ward’s Point site, located at the southernmost point of Staten Island, was also occupied during the Woodland period. Many Native American artifacts and elaborate burials with varied grave offerings have been uncovered there (Cantwell and Wall 2001).

E. CONTACT PERIOD (AD 1500-1700)

The Woodland period ended with the arrival of the first Europeans in the early 1500s. At that time, a division of the Munsee Indians known as the Raritan occupied southern Staten Island (Bolton 1975). They entered the area towards the end of the Woodland period (Boesch 1994). They referred to Staten Island as “Aquehonga Manacknong,” possibly meaning “haunted woods,” “bushnet fishing place,” or “the high bank fort place” (Grumet 1981: 2). The name may have also referred to the village settlement at Ward’s Point (Ibid). In land transactions with the Europeans, the island was also referred to as “Matawucks” and “Eghquaous” (Boesch 1994).

Giovanni de Verazzano was the first European to view New York in 1524. However, Henry Hudson’s expedition to New York in 1609 marked the true beginning of European occupation in the area, and subsequently marked the beginning of violent encounters with the Native Americans as well. Shortly after Hudson’s men explored Staten Island, a skirmish ensued with the local Indians, resulting in the death of one of Hudson’s crewmen.

Because of this incident, the Native Americans of Staten Island were extremely wary of Europeans. They even set up look-outs on tall hills in an effort to spot approaching ships so as to prevent such vessels from landing (Historical Records Survey 1942: xii). Although the land had been “sold” to the Europeans in 1630 (Grumet 1981), it was not until 1638 that a successful European colony, that of Olde Dorpe, could be established on the island. Violence between the Native Americans and the Europeans would cause this village to be burned down and rebuilt several times throughout the contact period.

With the introduction of European culture into the indigenous society, the way of life once maintained by the Native Americans was thoroughly and rapidly altered. European guns, cloth,
Chapter III: Precontract Resources

kettles, glass beads, and alcohol soon became incorporated into the Native American economy. The Native Americans began to suffer from the side-effects of European colonization: disease, alcoholism, and warfare. As land in other parts of New York City was sold off to the Europeans, many displaced Native Americans relocated to Staten Island to the point where "the Raritan consisted of a heterogenous assortment" of Native Americans from all over the New York metropolitan area (Grumet 1981: 45).

Native Americans at first maintained the village sites they had established near water sources. As their trade with European settlers intensified, they became increasingly sedentary. However, as the European population grew and required more land, the relationship between the two groups turned sour. Fierce wars broke out between the Dutch and the Indians. This was most intense during the early 1640s when Dutch Director-General William Kieft ordered many ferocious and unprovoked attacks on the Native population. While the Kieft war ended with a treaty signed in 1645, the Raritans did not agree to peace until 1649 (Grumet 1981).

The warfare was somewhat abated when Kieft was replaced by Peter Stuyvesant, who brought some stability to the area. However, the "Peach War" of 1655 caused more inter-cultural violence on Staten Island. After that war ended, the land was re-sold to the Dutch in 1657. The Native Americans were no match for the growing numbers of armed European settlers, and the natives agreed to sell what was left of their land on Staten Island in 1670, although some Native American villages remained until the early 20th century (Grumet 1981). In the land transaction recorded in 1670, the Native Americans sold all of their holdings on Staten Island in exchange for "four hundred fathom of wampum, thirty match coats, eight coats of dozens made up, thirty shirts, thirty kettles, twenty gunnes, a [firkin of powder, sixty barres of lead, thirty axes, thirty howes, [and] fifty knives" (Bolton 1975: 73).

There are several Contact period archaeological sites that have been identified in New York City, including the aforementioned Ward's Point site on Staten Island (Grumet 1995).

F. PREVIOUSLY IDENTIFIED NATIVE AMERICAN ARCHAEOLOGICAL SITES

A review of the files at the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), the New York State Museum (NYSM), the New York City Landmarks Preservation Commission (LPC), and cultural resource surveys of projects in the immediate vicinity showed that there are at least 20 archaeological sites within a one mile radius of the project area. In addition, LPC's prehistoric sensitivity model indicates that the site is situated in an area that is expected to be highly sensitive for Native American archaeological resources.

The southwestern coast of Staten Island, including the project area, has yielded a relatively large amount of Paleo-Indian artifacts, the only such artifacts found in New York City. At that time, the Native American population appears to have lived in the high lands adjacent to the Arthur Kill and exploited the resources in the low-lying coastal region below (Boesch 1994). There is evidence that these campsites were consistently reoccupied through the Late Woodland period. In fact, the shores of the Charleston area have been described as "the locus of offshore shellfishing in the prehistoric and recent past" (Greenhouse Consultants, Inc. and Vokral 1985: 4-5). Many of the relics recovered from this area were plucked from the surface by avocational archaeologists and pot-hunters in the early 20th century. It is not entirely clear if they were in situ or if they were exposed by erosion or the movement of soils during construction.
NYCT Charleston Bus Annex—Proposed Stormwater Sewer

Many temporary campsites used by Native Americans have been identified within a one-mile radius of the project site. Early 20th century archaeologists noted that “continuous camps occur along the [southwestern] shore...with scattered relics in nearly every field” (Skinner and Schrabisch 1913:44, quoted in Historical Perspectives, Inc. 1996: 11). These sites are designated as “L” in Table III-1 and Figure 3. Another nearby campsites, Canada Hill—“A” in Table III-1 and Figure 3—was excavated in the late 1960’s and presumably was near a small pond (Boesch 1994). In the past, these sites and others like them have yielded large amounts of lithic debitage—waste flakes created during the manufacture of stone tools—as well as occasional stone tools, fire-cracked rock, and shell middens. The remnants left behind at these campsites indicate that they were used by the Native Americans during hunting and fishing excursions, but not necessarily for full-time habitation.

A series of cultivated fields used by Native Americans—site “Q” in Table III-1 and Figure 3—was also very close to the project area. It is presumed that the Native Americans would have grown corn and possibly beans and squash in fields such as these (Historical Perspectives, Inc. 1996).

Grumet (1981) indicates that a Native American trail was once located near the project area (Figure 20). In some locations, this trail appears to be running along the line of today’s Arthur Kill Road before turning west and heading toward the shore of the Arthur Kill. Both Grumet’s map and Bolton’s 1922 map of Indian paths, on which Grumet’s is based, indicate that the western branch of this road runs in the vicinity of the project area, but it is unclear if Allentown Lane itself was a Native American trail or if the scale of Grumet’s map is incorrect. Furthermore, on Bolton’s map, the trail is shown leading to a site incorrectly labeled “91” (the real site #91 is located to the northeast of the project site). No other information was uncovered which could confirm that Allentown Lane was a Native American Trail and it does not appear as such on historic maps.

Table III-1
Previously Identifed Prehistoric Archaeological Sites Within One Mile of the Project Area

<table>
<thead>
<tr>
<th>Key to Fig 3</th>
<th>Site Name</th>
<th>OPRHP #</th>
<th>NYSM #</th>
<th>Approximate Distance from APE</th>
<th>Time Period</th>
<th>Site Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Canada Hill</td>
<td>A08501.0073</td>
<td>770</td>
<td>.34 mile (1,760 feet)</td>
<td>Woodland</td>
<td>Campsites; debitage, shell fragments</td>
</tr>
<tr>
<td>B</td>
<td>RMSC/ Salamander</td>
<td>A08501.2378</td>
<td>—</td>
<td>1 mile (5,280 feet)</td>
<td>Prehistoric</td>
<td>unknown</td>
</tr>
<tr>
<td>C</td>
<td>Abraham's Pond, Locus A</td>
<td>A8501.0878</td>
<td>—</td>
<td>.75 miles (3,960 feet)</td>
<td>Archaic to Woodland</td>
<td>unknown</td>
</tr>
<tr>
<td>D</td>
<td>Abraham's Pond, Locus B</td>
<td>A8501.0879</td>
<td>—</td>
<td>.70 miles (3,696 feet)</td>
<td>Archaic to Woodland</td>
<td>Temporary Camp sites</td>
</tr>
<tr>
<td>E</td>
<td>Abraham's Pond, Locus C</td>
<td>A8501.0880</td>
<td>—</td>
<td>.65 miles (3,432 feet)</td>
<td>Archaic to Woodland</td>
<td>Temporary Camp sites</td>
</tr>
</tbody>
</table>

III-6
## Table III-1 (cont'd)
Previously Identified Prehistoric Archaeological Sites Within One Mile of the Project Area

<table>
<thead>
<tr>
<th>Key to Fig 3</th>
<th>Site Name</th>
<th>OPRHP #</th>
<th>NYSM #</th>
<th>Approximate Distance from APE</th>
<th>Time Period</th>
<th>Site Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Park Headquarters</td>
<td>A08501.0130</td>
<td></td>
<td>.70 miles (3,696 feet)</td>
<td>Archaic to Woodland</td>
<td>Temporary Camp sites</td>
</tr>
<tr>
<td>G</td>
<td>Junkyard Site</td>
<td>A08504.131</td>
<td></td>
<td>.9 miles (4,752 feet)</td>
<td>Archaic to Woodland</td>
<td>Temporary Camp sites</td>
</tr>
<tr>
<td>H</td>
<td>Clay Pit Road Bluff North</td>
<td>A08501.0123</td>
<td></td>
<td>.9 miles (4,752 feet)</td>
<td>Archaic to Woodland</td>
<td>Temporary Camp sites</td>
</tr>
<tr>
<td>I</td>
<td>Winant House</td>
<td>A08501.0083</td>
<td></td>
<td>1 mile (5,280 feet)</td>
<td>Prehistoric</td>
<td>unknown</td>
</tr>
<tr>
<td>J</td>
<td>Clay Pit Pond East</td>
<td>A08501.0121</td>
<td></td>
<td>1 mile (5,280 feet)</td>
<td>Archaic to Woodland</td>
<td>unknown</td>
</tr>
<tr>
<td>K</td>
<td>Clay Pit Road</td>
<td>A08501.0124</td>
<td></td>
<td>.75 miles (3,960 feet)</td>
<td>Temporary Camp sites</td>
<td>Temporary Camp sites</td>
</tr>
<tr>
<td>L</td>
<td>Kreischerville Campsites</td>
<td></td>
<td>4606</td>
<td>0-0.9 miles (0-4,752 feet)</td>
<td>Paleo-Indian to Late Woodland</td>
<td>Campsites: Shell Middens, stone points, fire cracked rock, traces of occupation</td>
</tr>
<tr>
<td>M</td>
<td>Charleston Beach</td>
<td></td>
<td></td>
<td>.9 miles (4,752 feet)</td>
<td>Paleo-Indian to Late Woodland</td>
<td>Native American artifacts</td>
</tr>
<tr>
<td>N</td>
<td>Port Socony Site-South</td>
<td></td>
<td></td>
<td>1 mile (5,280 feet)</td>
<td>Paleo-Indian</td>
<td>Stone points and debris</td>
</tr>
<tr>
<td>O</td>
<td>Parker: ACP RICH 19C</td>
<td></td>
<td>8471</td>
<td>.25+ miles (1,320 feet)</td>
<td>Prehistoric</td>
<td>Shell Middens and Traces of Occupation</td>
</tr>
<tr>
<td>P</td>
<td>Richmond Valley; Northeast side of Page Ave at Amboy Road</td>
<td></td>
<td></td>
<td>.85 miles (4500 feet)</td>
<td>Late Woodland</td>
<td>Campsite, stone tools, bone, shell, pottery</td>
</tr>
<tr>
<td>Q</td>
<td>Indian Fields</td>
<td></td>
<td>771 and 4620</td>
<td>.19 miles (1,000 feet)</td>
<td>Woodland</td>
<td>Traces of occupation</td>
</tr>
<tr>
<td>R</td>
<td>Bethel Church Site</td>
<td></td>
<td></td>
<td>.8 miles (4,200 feet)</td>
<td>Woodland</td>
<td>Campsite (under active cemetery)</td>
</tr>
<tr>
<td>S</td>
<td>Sharrett Estates</td>
<td></td>
<td></td>
<td>1 mile (5,280 feet)</td>
<td>Late Woodland</td>
<td>Small hunting camp</td>
</tr>
<tr>
<td>T</td>
<td>Unnamed Site: Parker (1922) -ACP-RICH</td>
<td></td>
<td></td>
<td>.95 miles (5,000 feet)</td>
<td>Early Woodland</td>
<td>Small village</td>
</tr>
</tbody>
</table>

Sources:
Boesch (1994)
Historical Perspectives, Inc. (2001)
G. PREHISTORIC SENSITIVITY

In general, most Native American habitation sites on Staten Island have been found along the coast near “well-drained areas near streams or wetlands” (Boesch 1994: 9). Late Archaic sites have been identified mostly in low-lying areas near water courses and marshes, while temporary camping sites from this period were commonly found on sandy knolls (ibid).

Although the LPC prehistoric sensitivity model indicates that the project area was not characterized by marshland, as were the areas to the north and south, historic maps depict the entire coast of the Arthur Kill in the vicinity of the project area as a marshy tract (Figure 9). Historic maps also indicate that small streams and brooks ran to the north and south of the project area. These coastal areas would have provided a variety of marine resources, most notably shellfish, which had become integral to the Native American diet. It has been noted that a small pond was located at the nearby Canada Hill site (Boesch 1994), but it is not immediately clear if there were any sources of fresh water in the immediate vicinity of the project area.

Topographic maps of Staten Island from 1913 (Figure 15) indicate that there were two hilltops in the area, one along the western side of Arthur Kill Road and the other partially extending into the southern border of Allentown Lane. Elevated areas such as these would have been useful to Native Americans attempting to spot game or even enemies.

Because of the project area’s close proximity to marine resources, high elevations, a known Native American trail, and archaeological evidence of a great number of temporary campsites in the area, it is highly likely that the project area was utilized by Native Americans as a temporary hunting, fishing, and camping location. It is possible that archaeological resources related to those activities, including stone tools and debitage, faunal remains, shell middens, fire-cracked rocks, and other artifacts associated may be located at the site. Such artifacts have been recovered from the area immediately north of Allentown Lane, which was excavated as part of the Arthur Kill Factory Outlet Center (Hunter Research 1995) and Tides of Charleston Development (URS 2005) projects.

It has been noted in previous cultural resource investigations that only very rarely have archaeological resources been recovered from active roadways (Historical Perspectives, Inc. 2001). In 1996, a possible chert core was recovered from the “abandoned portion of Allentown Lane” during Phase 1B excavations for the Arthur Kill Factory Outlet Center, a proposed project in the area bounded by Allentown Lane, Arthur Kill Road, Androvette Lane, and the Arthur Kill, which was never developed (Hunter Research 1996: 6.20). Because the streetbed of Allentown Lane was not included in the area of potential effect for that particular site, it is assumed that the chert core was a surface find. It does appear from some historic maps that Allentown Lane was located within a plot of farmland (Figure 9), it is not clear if any agricultural activity ever took place in that location.

Furthermore, archaeological testing performed in other parts of southwestern Staten Island recovered prehistoric artifacts within two to three feet of the present ground surface, if not on the surface itself (Archaeological Research Consultants, Inc 1985, Greenhouse Consultants, Inc. and John Vokral 1985). Recent archaeological testing for the Arthur Kill Factory Outlet Center (which was never developed) and the Tides of Charleston Development project (which is currently under construction) located prehistoric artifacts at relatively shallow depths in the area immediately north of Allentown Lane. Intact deposits in that location were located between .67 and 1.67 feet below the ground surface (Hunter Research 1996). Paleosol was also identified at

III-8
this site, located approximately 2.3 to 3.3 feet below ground surface; although no artifacts were recovered from that location (Ibid).

The artifacts recovered from this area included large amounts of fire cracked rock and lithic debitage, indicating that the area was used for temporary campsites. Additional evidence for the site's use as a "resource procurement camp" was found during recent excavations in the area north of Allentown Lane as well (URS 2005: i). The later episodes of archaeological testing also found prehistoric artifacts at deeper levels—even at depths of 7 to 9 feet—in more northerly parts of the Tides of Charleston Development site, suggesting that the site's occupation may date back to the Archaic period (Ibid). Testing also identified large disturbed areas throughout the site.

Soil erosion, landscaping, and mid- to late-20th century soil removal have altered the landscape in the vicinity of the project area (Louis Berger and Associates 2001b) and may have resulted in bringing prehistoric artifacts closer to the present ground surface and therefore making them more vulnerable.

**ARTHUR KILL ROAD SENSITIVITY**

In 1991 an interceptor sewer was installed along Arthur Kill Road, disturbing a large portion of the roadbed within the project area, which most likely disturbed the ground down to depths of more than 10 feet below the present ground surface (interceptor sewers are generally placed even deeper than sanitary and stormwater sewers). Arthur Kill Road also has water, gas, and electrical lines running through it, which could have disturbed the ground to depths of 5 to 7 feet. Therefore, it is not expected that any significant prehistoric archaeological resources could be located within the streetbed of Arthur Kill Road.

**ALLENTOWN LANE SENSITIVITY**

Plans on file at the Richmond County Department of Environmental Protection's (DEP) Bureau of Water and Sewer Operations do not indicate the presence of any water or sewer lines along Allentown Lane. However, utilities have recently been installed within the roadbed in association with the Tides at Charleston development project currently being constructed north of Allentown Lane. A water main with associated fire hydrants and water valves are located on the northern side of the road, extending westward from Arthur Kill Road for approximately 400 feet. In addition, dry wells and manholes have been constructed at the western end of the road, near the shore, and near the intersection of Allentown Lane and Arthur Kill Road. Both sets of drywells have manholes above them as well as associated catch basins.

In mid-2006, Allentown Lane was graded and paved as part of the Tides at Charleston development. Approximately 3 to 4 feet of earth was excavated for this purpose. However, soil boring samples taken by Future Tech Consultants of NY, Inc. in 2004 (Appendix B) indicate that the western end of the road, near the Arthur Kill, contained 3 feet of fill and the eastern end, near Arthur Kill Road, contained 4 feet of fill. Therefore, it is likely that the grading only affected these fill layers, and potential prehistoric archaeological resources remain underneath the disturbed earth.

It is therefore not expected that significant prehistoric resources would be recovered from the disturbed portions of the project area situated in the roadbeds of Allentown Lane. However, it is possible that prehistoric remains may be located below the pavement as well as on either side of the existing water main. The area to the west of Allentown Lane, a grassy hill (Photograph 10)
which slopes down to a marshy area which then leads out to the Arthur Kill—the proposed location of the stormwater sewer outfall—appears to be undisturbed and is also sensitive for the recovery of prehistoric archaeological remains.

Therefore, the Charleston Bus Annex stormwater sewer site is determined to have high potential for the recovery of prehistoric archaeological resources within the undisturbed portions of Allentown Lane as well as the grassy and marshy areas west of the road's end.

*
Chapter IV: Historic Resources

A. INTRODUCTION: STATEN ISLAND HISTORY

New York was “discovered” by Giovanni de Verrazano in 1524 and explored by Henry Hudson in 1609, thus marking the beginning of European occupation in the area. In 1621, the States-General in the Netherlands chartered the Dutch West India Company (WIC) to consolidate Dutch activities in the New World. It was at this time that the WIC began to purchase large tracts of land from the Native Americans. The Native Americans believed that land was for hunting and planting, and did not share the European view that it could be owned in perpetuity. In exchange for furs, entrepreneurs and government officials supplied Native Americans with a wide range of goods. These included not only conventional adornments such as finger rings, glass beads and wampum, but utilitarian objects such as axes, kettles and cloth. Merchandise from around the world arrived in New Amsterdam destined for Europeans and Native Americans alike, including Italian and Dutch dishes, glass beads from Venice, combs and clay pipes from Amsterdam, and glassware from Germany (Dallal 2004).

As mentioned in Chapter III, bad relations between the Dutch and the Native Americans had prevented the formation of a successful European settlement on Staten Island until the late 1630’s. Even afterwards, peaceful relations between the two groups were not established until after the British had seized the colony in 1664. A large English population grew all throughout New Netherlands, and soon they outnumbered the Dutch, making it easy for them to seize the colony in 1664. Although the Dutch were able to re-take the colony, now known as New York, in 1673, they traded it back in 1674 for “the far more lucrative colony of Surinam” (Cantwell and Wall 2001: 181). New York would remain under British control for the next hundred years.

The exodus of the bulk of the Native American population beginning in 1670 made it easier for Staten Island to become a thriving part of the New York economy — rumors of the island having been won for New York from New Jersey by Captain Christopher Billopp in a sailboat race are most likely false (Botkin 1956). Without a substantial Indian presence, there were no longer any obstacles blocking the settlement of the island and Richmond County was officially established in 1683.

Under British rule, Staten Island’s open farmland and vast coastline became essential for the production of agricultural products and collection of marine resources for export the city. The colony’s progress was both halted and facilitated in the mid-18th century during the French and Indian War, which concluded in 1763. Although the region experienced the economic side effects of being at war, thousands of British armed forces were stationed throughout the New York City area, bringing money to the region while at the same time increasing its population. During this time, New Yorkers were not completely loyal to the English crown at this time, and goods were secretly (and illegally) traded to French colonies via Staten Island’s more secluded ports (Burrows and Wallace 1999).
Despite the treacherous conduct during the French and Indian War, New York remained loyal to the British during the Revolutionary War which began in 1776. Staten Island proved to be a key asset during that war. In 1776, unsuccessful peace negotiations were held at Captain Billopp's former house (now known as the "Conference House") on the southern tip of Staten Island, south of the Charleston Bus Annex APE. The British continued to use Staten Island as a rudimentary home base due to its strategic location (Historical Records Survey 1942). It was sufficiently close to both New York and New Jersey that British soldiers could easily be dispatched in the event of an impending battle. And, reminiscent of the activities of the Raritan Indians, the island's tall hills provided views essential to tracking ships approaching the city. However, the British troops stationed in New York City caused a great deal of trouble by burning farms and homes and stealing from private citizens. This resulted in horrible and brutal living conditions for many New Yorkers.

Despite New York City's loyalty to the British during the war, after the American victory the conversion to the new American government was relatively smooth. Land which had been previously owned by British loyalists was divided and sold, which brought about a surge in population and development in the outer boroughs. This trend continued through the 19th century. In 1788, the island was officially divided into four townships, Castleton, Northfield, Southfield, and Westfield, where the project area is situated (Louis Berger and Associates 2001a).

Between 1840 and 1880, the population of Staten Island nearly quadrupled. This surge was caused in part by the increasing population density in Manhattan, which drove many people to the outer boroughs. The region's prosperity caused the counties in the New York City region to become increasingly codependent, both economically and culturally. It was therefore suggested that the counties around New York Harbor be consolidated under the name New York City. Although there was some resistance from some Staten Island residents, it officially became a borough of New York City on New Year's Day, 1898.

As part of the city proper, Staten Island flourished throughout the 20th century. Increased mass transit connected all the boroughs and allowed more people to live outside of Manhattan while still having access to the city's varied resources. The remainder of the 20th century saw continued growth and increasing population density throughout Staten Island.

B. SEVENTEENTH CENTURY: SITE HISTORY

On of the earliest known maps depicting Staten Island is Vinckeboon's 1639 "Manatus Map." While this map shows the boroughs of Manhattan and Brooklyn as having multiple plantations and settlements, only one farm is located on Staten Island, that of David Pietersen de Vries, along the island's northeast coast (Kouwenhoven 1972). As discussed previously, Native American resistance made it very difficult for the Europeans to settle the island. However, after the exodus of Native Americans from Staten Island in 1670, settlements gradually grew there.

In 1680, Captain Christopher Billopp built the aforementioned stone house, known as "The Manor of Bentley" at the southernmost tip of Staten Island, which would later become known as "Billopp's Point" (Burrows and Wallace 1999). Billopp had been granted a huge plot of land in 1676, comprising more than 960 acres of land and marsh (Historical Perspectives, Inc. 2001). This appears to be the first settlement in the southern half of Staten Island, which had remained virtually empty throughout the 17th and early 18th centuries. At that time, it appears that the project area was unoccupied and no structures were situated on it (Figures 4 and 5).
The Skene map of original land patents in Staten Island (not pictured) shows that Billopp's property was located a little more than half a mile south of the project area. The Skene map also indicates that the majority of the project area is situated in a 255 acre plot of land that was patented to Mark Dusachoy, a French Huguenot immigrant, in 1653, some of which was then granted to Paulus Richards in 1694 (URS 2005). The northernmost portion of the project area is located within land granted to William Merrill in 1686. An eighty-year old man named Mark Dusway, Sr. was recorded in a 1706 local census, as was Mark Dosway, Jr. Two large plots of land adjacent to the one previously mentioned were owned by Mark Dusachoy in the late 1600's and early 1700's, this is assumed to be the younger man. A thirty-year old man named Powell Rigar (possibly a variation of Paulus Richards) was also recorded in that census. It does not appear that any of these men or their families lived on the land, as historic maps do not show any structures in the area until later. However, members of the Dissosway family (the incarnation of the name "Dusachoy" used in later centuries) were major land owners in the area adjacent to the mill pond, about a half mile south of the project area, so it is unclear if the land was vacant or used as farmland.

C. EIGHTEENTH CENTURY: SITE HISTORY

As mentioned previously, early 18th century maps depicting Staten Island give no indication that any structures or settlements were situated in the vicinity of the project area at that time. Towns were growing slowly along the coasts of the northern half of the island, as seen in the 1733 Popple map (Figure 5). This map also shows that a ferry had been established at the southern tip of the island, running between Billopp's Point and Perth Amboy, New Jersey.

By 1764, a colonial thoroughfare was constructed which connected the ferry with others located at the Narrows, the island's easternmost point, as seen on the Bellin map (Figure 6). This road appears to follow the line of modern Amboy Road. In addition to the Billopp's Point ferry, many other ferries were established along Staten Island's western coast, facilitating the transportation of people and goods between New York and New Jersey. The Blazing Star and New Blazing Star ferries were established in 1722 and 1750, respectively (Louis Berger and Associates 2001a), and another ferry was constructed at Smoking Point by at least 1776.

The establishment of these ferries generated a great deal of traffic in lower Staten Island and prompted a surge of growth along the southwestern shore. Road construction increased, and soon the various ferries were connected by a small network of roads that crossed the entire island. The 1777 Des Barres map (Figure 7) shows that a road had been constructed that linked the Smoking Point ferry with the precursor to Amboy Road mentioned above. This road does not appear to have a modern corollary in the vicinity of the project area. The Des Barres map also shows that a significant number of structures had been established along both roads. In the vicinity of the project area, all but two were located adjacent to the roads themselves. The two exceptions were constructed along the western shoreline, presumably south of the project area, but the map's inaccuracy (the mill pond and brook located to the south of the project area is not even shown) makes this determination difficult.

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1 Two ferries are depicted at the Narrows in the 1776 Barber map (not pictured): "Watson's Ferry" to the north and "Vanderventer's Ferry House" to the south.

2 These ferries do not appear on maps until the 1770's.
The structures are more clearly identified on the 1933 McMillan map (Figure 8), which incorporates data from the Taylor and Skinner map of 1781, The Hessian map of 1777, and a French map detailing English and Hessian camps on Staten Island between 1780 and 1783. McMillen's map shows that the area surrounding the APE was for the most part occupied by a series of three structures belonging to "C. Dusaway," which would later be spelled "Dissosway." These structures are all situated along the road that originally ran along the shoreline. The Dissosway mill is depicted to the south of the project area, and the Winant house -- which stood near the intersection of present-day Ellis and Arthur Kill Roads (Greenhouse Consultants, Inc. and Volkmar 1985) -- to the north of the project area. It is impossible to determine the exact location of the project area on this map, although it appears to fall between the northernmost Dissosway property and the Winant home. The portion of the Dissosway property that is situated within the project area was sold to Charles Drake in 1795 (URS 2005).

Archaeological testing at the Arthur Kill Factory Outlet site indicated that the northern portion of that project area was not occupied until the second half of the 18th century (Hunter Research 1996).

D. NINETEENTH CENTURY: SITE HISTORY

Some or all of Charles Drake's property was sold in 1824 to John Van Allen, who died soon after the purchase (URS 2005). The Van Allens were an old Staten Island family, and were so entrenched in the island's history that the area in this section of Charleston, became known as "Van Allentown." This name was later shortened to "Allentown," after which Allentown Lane was named (Davis 1896). Van Allen's widow divided the property among her children as each came of age and established a country lane "from the beach to the woods" in order to access the different homes (URS 2005: 5.6). This was the road which would eventually become Allentown Lane.

A coastal survey of Staten Island performed in 1844 (Figure 9) provides a clearer depiction of the structures located throughout southwestern Staten Island in the early 19th century. A cluster of small farms is depicted in the vicinity of the project area. The line of future Allentown Lane projects though the middle of these farms, each of which presumably belonged to a member of the Van Allen family. Besides the construction of additional farmhouses near the Van Allen property, this map shows that not much development had occurred in the vicinity of the project area during the late 18th and early 19th centuries.

The 1853 Butler map (Figure 10) is the first historic map which portrays Allentown Lane and shows that the Van Allen family still owned most of the property on either side of the road, adjacent to the shore. The map also indicates that a moderate amount of development had occurred throughout southwestern Staten Island and many new structures, presumably domestic residences, had been constructed. There were many new property owners in the vicinity of the project area—although Arthur Kill Road was still not in its current location—including H. Drake, E. Price, Elting—whose property included a small dock or pier labeled "Elting's Landing," outside the project area—C. Shea, N.B. Combs, and M.S. Taylor.

The occupations of the area's residents in the 1850 census indicate that it was still relatively rural; most are listed as boatmen, carpenters, farmers, and the like. However, in 1854, a German immigrant named Balthazar Kreischer established a brick works just north of the project area (Sachs 1988). The success of the brick factory brought about a new era of industrialization.
which would characterize southwestern Staten Island during the second half of the 19th century and even resulted in the neighborhood becoming known as "Kreischerville."

The 1874 Beers atlas (Figure 11) reflects the construction of the Kreischer factory. More importantly, it also shows that Arthur Kill Road had been relocated to its current position, and that no roads are evident along the shore of the Arthur Kill. The 1859 Walling map (not pictured) depicts both current Arthur Kill Road as well as the shoreline road, but that map appears to be inaccurate in terms of the location of structures and smaller roads, such as Allentown Lane, have been omitted. The 1874 map shows that the Van Allens had sold their property north of Allentown lane to the McComber family, and the property to the south of O.H. Barnard, a prominent silk manufacturer (Leng and Davis 1930). In addition, the Elting property had been sold to G.A. Powers. Only two structures appear to be adjacent to the streetbeds included in the project area: a small building along Arthur Kill Road, within the property belonging to Mrs. Drake, and a house on the M.S. Taylor property on the southern side of Allentown Lane. The 1887 Beers atlas (Figure 12) shows that other than a handful of ownership changes, the project area had remained exactly the same.

An 1891 United States USGS map (not pictured) shows the locations of Arthur Kill Road and the houses that occupied the adjacent lots, but Allentown Lane is not depicted. In an 1898 version of the same map (Figure 13), no changes to the project area are shown as having occurred with the exception of the addition of Allentown Lane, which is shown as extending approximately 300 feet west of Arthur Kill Road (only as far as the houses labeled "Drake" and "M.S. Taylor" on the 1887 Beers atlas) and 1600 feet to the east of the intersection. It is not clear why the road is not depicted on the 1891 map, although it may indicate some sort of grading or paving in that area.

An 1898 atlas drawn by Robinson (Figure 14) shows that more structures had been constructed in the lots adjacent to the project area's streetbeds. None of the new buildings were located immediately adjacent to the street with the exception of two small structures located at the southwest corner of Arthur Kill Road — on this map called Riverside Avenue — and Allentown Lane. The map shows the buildings to be the property of John Hillyer. More importantly, however, the map indicates that an 8 inch water line was constructed running the length of Arthur Kill Road. No sewers are evident, however, so it must be assumed that the residents in the surrounding houses continued to use privies or cesspools for waste management and sanitation purposes.

It should be noted that two late 19th century water lot grants were issued covering the area at the end of Allentown Lane. The southern half of the road was included within a water lot granted to Ann Eliza Barnard in 1886 and the northern half to William H. Jobelman in 1895. Both grantees owned the land adjacent to those water lots at that time. However, it does not appear that any significant landfilling events occurred there.

E. TWENTIETH CENTURY: SITE HISTORY

Throughout the 1890's, Staten Island's industrialization continued. The Atlantic Terra Cotta Company was founded in Tottenville in 1897. That company produced decorative architectural pieces that were incorporated into many historic New York buildings, including the Woolworth Building in Lower Manhattan (Sachs 1988). At around the same time, the Tottenville Copper company, located near the Mill pond south of the project area, was also established (Landmarks Preservation Commission 2006). Both companies employed hundreds of worker and brought
many more residents into the area, something which is reflected in early 20th century census records, as many of the local residents are listed as working in copper, terra cotta, or brick factories.

A topographical survey of Staten Island completed in 1913 (Figure 15) indicates that Arthur Kill Road -- labeled with yet another old name, Fresh Kills Road -- was paved with macadam and was lined with picket fences on its western side and post and rail fences on the eastern side. Fire hydrants are also depicted along this road, indicating the presence of a water main. Allentown Lane is shown on that map as a dirt road lined with board, picket, and wire fences along its southern side and wire and picket fences on the north. A driveway made of cinders is shown extending from two different structures on the Jobelman property and then down Allentown Lane towards Arthur Kill Road. This map also indicates that the farm in the northwest corner of the two roads -- attributed to Hrs. Jas. Drake on other historic atlases -- was a cultivated field.

The 1917 Bromley atlas (Figure 16) does not show any new development within the project area, although it does depict the water main along Arthur Kill Road as being 12 inches in diameter. It also shows several fire hydrants located along the western side of the road.

The success of local industries in southwestern Staten Island continued to increase during the 20th century; however, it resulted in the decline of the local environment and many of the smaller neighborhood areas. While the Kreischer Brock Factory was still operational, its German name became unpopular during World War I, and the neighborhood was re-named “Charleston” (Fioravante 2002). The oyster beds in the area were condemned in 1916 because of the pollution caused by the nearby factories (Louis Berger and Associates 2001a). The construction of the Outerbridge Crossing in 1928, approximately 1,000 feet south of the project area, also permanently affected the area (Ibid). A New York Times article dating to 1927 claimed that twenty homes were going to be built along Allentown Lane, north of the location of the (at that time) proposed Outerbridge Crossing, but it does not appear that such development occurred in the vicinity of the project area.

The area became increasingly less residential as the 20th century progressed. The buildings in the lots adjacent to the project area were gradually demolished and were not replaced. A certificate of occupancy provided by the New York City Department of Buildings indicates that in 1946, a building that served as a motor vehicle repair shop, gasoline service station, and one family dwelling was situated on Block 7608, Lot 1, which is the lot located at the northwest corner of Arthur Kill Road and Allentown Lane. A gasoline service station would most likely have required underground storage tanks, but it is unclear if any such tanks existed on the site, or if their construction and use would have also caused disturbance in the adjacent streetbeds.

In 1961, the New York Times reported that the Crown Zellerbach Corporation, a San Francisco-based paper company, purchased from the city of New York the entire plot of land between Arthur Kill Road, Allentown Lane, and Androvette and Kreischer Streets, north of the project area, in 1961. According to the article, the company had intended to build a paper plant on the site, an event that does not appear to have ever taken place. Deed records indicate that Crown Zellerbach, and its successor in interest, the Arthur Kill Associates, retained some or all of this property throughout at least the 1990s.

The land surrounding the project area soon became deserted, and was then used as an illegal dumping ground by local residents. In 1979, 75 drums of chemical waste were found in the area (New York Times 1979).
Chapter IV: Historic Resources

Thoughts of development in Charleston were revived in the 1990s. In 1991, an interceptor sewer was constructed along the southern portion of Arthur Kill Road. In 1999, the New York Times reported that a large residential development project, known as the Kalien Commons, was proposed for the area in the northwest corner of Arthur Kill Road and Allentown Lane, to be constructed by the Arthur Kill Association. However, the project was not approved by the local community board and was never actualized. This project does appear to have been a precursor for the Tides of Charleston development, which is currently under construction in the same area.

F. PREVIOUSLY IDENTIFIED HISTORIC PERIOD
ARCHAEOLOGICAL SITES WITHIN ONE MILE OF THE PROJECT AREA

File searches at OPRHP and LPC identified several historical archaeological sites within one mile of the project area. Most involve historic homes, although the cluster of wrecked vessels off the coast of Allentown Lane has also been identified as a historic-period archaeological site. As noted previously, two vessels are potentially in the path of the outfall for the proposed Charleston Bus Annex stormwater sewer. However, these were determined to be not significant by OPRHP in 1996. The historic brick works located to the northwest of the project site was also identified as an archaeological resource.

<table>
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<th>Site Name</th>
<th>OPRHP #</th>
<th>Approximate Distance from APE</th>
<th>Time Period</th>
<th>Site Type</th>
<th>AdditionalReference</th>
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<td>A08501.0073</td>
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<td>Historic Scatter</td>
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<td>A08501.0079</td>
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<td>Foundation</td>
<td>Referenced in: Louis Berger and Associates (2001a)</td>
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<tr>
<td>Clinton Residence</td>
<td>A08501.0229-</td>
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<td>Domestic Residence</td>
<td>Referenced in: Louis Berger and Associates (2001a)</td>
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</tbody>
</table>
G. HISTORIC ARCHAEOLOGICAL SENSITIVITY

The installation of an interceptor sewer along Arthur Kill Road in 1991 would have disturbed a large portion of the roadbed within the project area down to depths of approximately 10 feet below the present ground surface. Arthur Kill Road also has water, gas, and electrical lines running through it, which would also have disturbed the ground to depths of 5 to 7 feet. Arthur Kill Road was established in the mid 19th century, well after the construction of the houses which were situated along the shoreline road. However, Arthur Kill Road was sufficiently distant from those earlier houses that there is little likelihood that the road would have impacted any domestic shaft features such as privies, cisterns, and wells which may at one time have been located in their rear yards. Therefore, it is not likely that historical archaeological deposits would have survived both the cutting and grading of Arthur Kill Road as well as the subsequent installation of utility lines along its length.

Although the 1844 Coastal Survey (Figure 9) does not depict Allentown Lane, it was presumably constructed in the early 1800s, after the death of John Van Allen (URS 2005). The 1844 map suggests that it ran between several houses, although none of the houses were located in its path. Furthermore, based on documentary evidence, it is presumed that the lane was constructed around the same time as the nearby houses, which would have been erected as each Van Allen child came of age and was given a portion of the family’s property (URS 2005). It is not likely that privies associated with those houses would have been located in the road’s path, as they were generally placed at a distance from both domestic structures and streets (Wheeler 2000). The homes also appear to be sufficiently distant from the lane that other domestic shaft features—such as cisterns and wells, which were generally constructed close to houses for easy access to water sources (Cantwell and Wall 2001)—would also not be situated within the roadbed.

Therefore, the Charleston Bus Annex stormwater sewer site is determined to have low potential for the recovery of Historic period archaeological resources.
Chapter V: Existing Utilities and Subsurface Infrastructure

A. EXISTING SUBSURFACE UTILITIES

ARTHUR KILL ROAD

Arthur Kill Road has been heavily disturbed by the installation of utilities in recent years (Appendix A). According to Richmond County DEP files, an 18 inch, extra-strength verified pipe interceptor sewer with a concrete cradle was installed just west of the midline of Arthur Kill Road in 1991. This sewer begins south of the project area, and extends past the southern border of Allentown Lane, where it enters the APE, for an additional 700 feet before it terminates. In general, sewers are placed around 10 feet below the ground surface and therefore can disturb more than 12 feet of earth during their installation, however, interceptor sewers are generally placed at even lower depths, so the level of disturbance associated with this sewer most likely extends past 12 feet.

Arthur Kill Road also contains two water lines, one measuring 20 inches in diameter and the other measuring 8 inches. Both lines originate at a point south of Allentown Lane and travel up the eastern side of Arthur Kill Road throughout the entire length of the project area. At a point approximately 560 feet north of the southern edge of Allentown Lane, the 8 inch water line angles northwest and continues through the rest of the project area along the western side of Arthur Kill Road. An 8-inch water line first appears along that road in the 1898 Robinson atlas (Figure 14). Water lines are generally located approximately 5 feet below the ground surface, and therefore, 6 to 7 feet could have been disturbed during their installation.

In addition, a 12 inch gas main currently runs along the eastern side of Arthur Kill Road throughout the length of the project area. Gas mains are generally located 2 to 3 feet below the ground surface, and therefore, 4 to 5 feet could have been disturbed during the line’s installation.

Two sets of existing drainage structures which are associated with the Tides of Charleston development in the northwest corner of Allentown Lane and Arthur Kill Road are located on the west side of the road. One of these begins approximately 1300 feet north of Allentown Lane, and the other approximately 210 feet north of Arthur Kill Road. The depth of these drainage structures is not immediately clear, although their capacity—the basins could potentially contain “runoff generated during storms up to and including a 10 year storm event” (Ramputla Associates Architects 2004: 16)—implies that they are very large and could therefore be deeply buried. These dry wells also have associated manholes and catch basins.

It does not appear that any electrical lines have been installed in the area; local streetlights are powered by overhead lines.

ALLENTOWN LANE

Current maps of the project area’s utilities (Appendix A) do not indicate the presence of any existing sewer, gas, or underground electrical lines along Allentown Lane. An 8 inch water line
The proposed sewer that will extend through the center of Arthur Kill Road will begin approximately 1370 feet north of the southern curbline of Allentown Lane (Appendix A). The line will begin with a manhole with two associated catch basins, the westernmost of which will be connected to an existing catch basin located to the south by a 60 foot long connection that will be 12 inches in diameter. Each catch basin will connect to the sewer via a 12 inch ductile iron pipe. At this point, the sewer will be a 24 inch reinforced concrete pipe on a concrete cradle that will run for approximate 165 feet before it connects to another manhole. The sewer will continue from that location as a 30 inch reinforced concrete pipe on a concrete cradle for 165 feet before it reaches another manhole with two associated catch basins, one on either side of the road and each connected to the sewer via 12 inch ductile iron pipes. After this manhole, the sewer will proceed as a 48 inch reinforced concrete pipe on a concrete cradle for approximately 255 feet, where it will connect to another manhole with associated catch basins and 12 inch connecting pipes. At that point, the sewer will continue as a 54 inch reinforced concrete pipe on a concrete cradle through the remainder of the project area, approximately 775 feet, towards the end of the project area. Two additional manholes with associated catch basins and 12 inch connecting pipes are located along this branch of the line, located approximately every 250 feet.

At this southern end of the sewer line, a turning chamber will be installed to divert stormwater from the Arthur Kill Road sewer to the connecting line within the streetbed of Allentown Lane. This turning chamber will be directly under a new manhole that will be connected to a catch basin to the northwest.

The new sewer will be located to the east of the existing interceptor sewer, however, for the southernmost 300 feet of the project area, the 12 inch gas main and 8 and 20 inch water mains will have to be relocated so that they are east of the proposed sewer. In the northernmost 600
feet of the project area, the 8 inch water main that currently runs to the west of the existing sewer will be relocated to the far western side of the road. Water valves will connect the relocated water line to the residential development to the west. The existing drainage structures on the western side of the road near the end of the sewer line will be removed.

Because of the area’s variable topography, the sewer is expected to be installed so that the top of the sewer line will be located anywhere between 5 and 20 feet below the ground surface (and therefore the bottom of the sewer line would be approximately 10 to 25 feet below). However, because the road was already disturbed by the construction of the existing utilities, it is not expected that the proposed work would generate a significant amount of new disturbance. Prehistoric sites in the area have generally been found at relatively shallow depths and would most likely have already been disturbed. Arthur Kill Road was distant from historic structures that pre-date its construction and it is not expected that domestic shaft features -- including privies, cisterns, and wells -- would have been located in the area.

ALLENTOWN LANE

The sewer to be installed within Allentown Lane will extend west from the turning chamber where it connects to the stormwater sewer along Arthur Kill Road (Appendix A). It will terminate at the mean high water line. The existing dry well structures, constructed in relation to the Tides of Charleston development, and any associated equipment—i.e. pipes and bulkheads—will be removed. A 54 inch reinforced concrete pipe sewer on a concrete cradle be installed through the center of the road. For the eastern half of Allentown Lane, the top of the sewer will be located approximately 5 feet below the ground surface. However, west of the central manhole, this depth extends to up to 15 feet in some locations.

Catch basins located on both the north and south sides of the road will connect to the main sewer via 12 inch ductile iron pipes at three locations where manholes will also be constructed; one at each end of the road and the third in the center. The westernmost manhole will be connected to a third catch basin, on the western border of the road.

This portion of the project area would have experienced some disturbance at the western end, where dry wells were constructed, and at the eastern end, approximately 115 feet from the western curbline of Arthur Kill Road, where drainage structures and a water main may have disturbed the area to depths of 5 to 7 feet. The extent of disturbance related to the construction of the Tides of Charleston development located north of Allentown Lane is unknown, but the presence of a water valve and two hydrants may indicate that the water main continues for an additional 80 feet or more, although it is possible that those utilities are connected to alternate water sources. If this is not the case, then the middle portion of Allentown Lane—west of the water line’s terminal point and east of the dry well structures at the end of the road—as well as the possibly undisturbed areas on either side of the water main installation have the potential to yield prehistoric archaeological resources.

C. TEST PITS AND SOIL BORINGS

A series of test pits is planned to identify the locations of various utility lines prior to construction of the proposed stormwater sewer (Appendix B). In addition, 15 geo-tech borings are planned for the entire length of the project area along Allentown Lane and Arthur Kill Road. These borings are generally small in diameter—measuring approximately 3"—and are not expected to significantly impact archaeological resources. An archaeologist will examine the
boring logs and the results and the boring logs will be included in any subsequent archaeological studies that might be generated by this project.

One planned test pit (TP #1) is located along Allentown Lane, approximately 180 feet west of its intersection with Arthur Kill Road, and it is presumably located directly over an existing 8-inch water line. The planned test pit would measure 5 feet in length, width, and depth. Due to the fact that the areas on either side of the water main may be undisturbed, it is possible that prehistoric archaeological resources may be present in the location of this test pit. Because this work is exploratory, it is also possible that the test pit could be widened or that other pits may be excavated in Allentown Lane.

Three additional test pits are planned for Arthur Kill Road. Two of these (TP #2 and 3) will be 18 feet in length and 5 feet in width and depth. They will be located at distances of approximately 20 and 350 feet north of the intersection with Allentown Lane. The third test pit on Arthur Kill Road (TP #4) will be larger, measuring 36 feet in length and 5 feet in width and depth. This test pit is located just north of the Charles Bus Annex Site. Because of the significant amount of disturbance caused by the installation of utilities in Arthur Kill Road, it is not expected that these test pits will affect intact archaeological resources.
Chapter VI: Conclusions and Recommendations

A. INTRODUCTION

As part of the development process, the preceding Phase 1A Archaeological Documentary Study of the Charleston Bus Annex stormwater sewer route was prepared to satisfy the requirements of the New York State Historic Preservation Office (SHPO) and the New York City Landmarks Preservation Commission (LPC) and it follows the guidelines of the New York Archaeological Council (NYAC). The project area is situated in the streetbeds of portions of Arthur Kill Road and Allentown Lane in the Charleston (formerly Kreischerville) section of Richmond County (Staten Island), New York (Figures 1 and 2).

The proposed project would consist of a new bus annex to be used by NYCT's Department of buses for the storage and servicing of NYCT buses. As a component of NYCT's efforts to manage current and future transit demands, the Charleston Bus Annex would alleviate the current shortage of storage and servicing facilities for the Staten Island bus fleet and would improve overall operational efficiencies as well. The goal of this Phase 1A Archaeological Documentary Study is to determine the likelihood that potential archaeological resources have survived the destructive forces of time including agricultural and domestic use, erosion, the cutting of streets, and the installation of utilities. The entire APE was investigated in order to identify the project area's original topography, its prehistoric and historic usage and/or occupancy, past disturbance, and potential impacts.

The study documents the history of the project area as well as its potential to yield archaeological resources including both prehistoric and historic remains. In addition, it also documents the current conditions of the project area and previous cultural resource investigations which have taken place in the vicinity of the APE.

As part of the background research, published and unpublished resources were consulted at various information repositories, such as the Humanities and Social Sciences Branch of the New York Public Library (including the main research, local history, and map divisions), the LPC, the Municipal Archives, the archives of the Staten Island Institute of Arts and Science, the office of the Richmond County Clerk, the local history division of the Saint George branch of the New York Public Library, the Richmond County Topographical Bureau, and the New York City Department of Environmental Protection Bureau of Water and Sewers, among others. In addition, file searches were conducted at the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), the LPC, and the New York State Museum (NYSM) to determine if prehistoric or historic sites had been reported within a half-mile of the project area.
B. CONCLUSIONS AND RECOMMENDATIONS

PREHISTORIC SENSITIVITY ASSESSMENT

Before European contact, the Charleston area of Staten Island had been an important hunting and fishing location for the local Raritan Indians who resided there. Many temporary campsites dating from the Paleo-Indian period (beginning 11,000 BP) through the Late Woodland (which ended ca. AD 1500) have been identified on the shores of the Arthur Kill in the vicinity of the project area as well as in the surrounding areas. The project site’s natural topography would have made it an ideal location for the exploitation of food resources, if not for a habitation site, throughout the entire prehistoric period.

In general, Native American habitation sites on Staten Island dating to all periods of occupation are most often found in proximity to “well-drained areas near streams or wetlands” (Boesch 1994: 9). Most sites are located along the coast near water courses. More specifically, Late Archaic sites have been identified mostly in low-lying areas near water courses and marshes, while temporary camping sites during the Late Archaic were commonly found on sandy knolls (Ibid).

Because of the project area’s close proximity to marine resources, high elevations, a Native American trail, and archaeological evidence of a great number of temporary campsites, it is highly likely that the project area was utilized by Native Americans as a temporary hunting, fishing, and camping location. It is possible that archaeological resources related to those activities, including stone tools and debitage, faunal remains, shell middens, fire-cracked rocks, and other artifacts associated with temporary camp sites may be located at the site. Such artifacts have been recovered from the area immediately north of Allentown Lane, which was excavated as part of the Arthur Kill Factory Outlet Center and Tides Development projects. In addition, in 1996, a possible chert core was recovered from the “abandoned portion of Allentown Lane” during Phase 1B excavations for the Arthur Kill Factory Outlet Center, a proposed project in the area bounded by Allentown Lane, Arthur Kill Road, Androvette Lane, and the Arthur Kill, which was never developed (Hunter Research 1996: 6.20). Most often these deposits have been uncovered within the top 1 to 3 feet of the ground surface, although in the areas of higher elevation to the north of the project site, prehistoric deposits were uncovered at depths of up to 7 to 9 feet.

Soil erosion, landscaping, and mid to late 20th century soil removal have altered the landscape in the vicinity of the project area (Louis Berger and Associates 2001b) and may have resulted in bringing prehistoric artifacts closer to the present ground surface and therefore making them more vulnerable. In addition, in 1991 an interceptor sewer was installed along Arthur Kill Road, disturbing a large portion of the roadbed within the project area, which most likely disturbed the ground down to depths of approximately 10 feet below the present ground surface. Arthur Kill Road also has water, gas, and electrical lines running through it, which would also have disturbed the ground to depths of 5 to 7 feet in those areas. Therefore, it is not expected that archaeological resources dating to the prehistoric period would be recovered from within Arthur Kill Road.

Allentown Lane has also been somewhat disturbed by the installation of utilities in association with the Tides at Charleston development project currently being constructed north of Allentown Lane. A water main with associated fire hydrants and water valves are located on the northern side of the road, extending westward from Arthur Kill Road for approximately 400 feet.
addition, dry wells and manholes have been constructed at the western end of the road, near the shore, and near the intersection of Allentown Lane and Arthur Kill Road. Both sets of drywells have manholes above them as well as associated catch basins.

In mid-2006, Allentown Lane was graded and paved as part of the Tides at Charleston development. Approximately 3 to 4 feet of earth was excavated for this purpose at that time. Earlier soil borings, undertaken by Future Tech Consultants of NY, Inc. in 2004 (Appendix B), indicate that the western end of the road, near the Arthur Kill, contained 3 feet of fill (top soil) and the eastern end, near Arthur Kill Road, contained 4 feet of fill (top soil). In both locations, the fill layers overlay strata of clay, silt, and sand, presumably the original ground surface. Therefore, it is likely that the grading work undertaken in 2006 only affected the stratum of upper fill, and it is possible that potential prehistoric archaeological resources remain beneath portions of Allentown Lane.

While it is not expected that significant undisturbed prehistoric resources would be recovered from the disturbed portions of the project area within Allentown Lane and Arthur Kill Road, it is possible that prehistoric remains could be located beneath the pavement as well as on either side of the existing water main. The area to the west of Allentown Lane, a grassy hill which slopes down to a marshy area which then leads out to the Arthur Kill, appears to be undisturbed and could be sensitive for the recovery of prehistoric archaeological remains.

Therefore, the Charleston Bus Annex stormwater sewer site is determined to have high potential for the recovery of prehistoric archaeological resources within the undisturbed portions of Allentown Lane as well as the grassy and marshy areas west of the road’s end.

**HISTORIC SENSITIVITY ASSESSMENT**

The installation of an interceptor sewer along Arthur Kill Road in 1991 would have disturbed a large portion of the roadbed within the project area down to depths of approximately 10 feet below the present ground surface. Arthur Kill Road also has water, gas, and electrical lines running through it, which would also have disturbed the ground to depths of 5 to 7 feet. Arthur Kill Road was established in the mid 19th century, well after the construction of the houses which were situated along the shoreline road. However, Arthur Kill Road was sufficiently distant from those earlier houses that there is little likelihood that the road would have impacted any domestic shaft features such as privies, cisterns, and wells which may at one time have been located in their rear yards. Therefore, it is not likely that historical archaeological deposits would have survived both the cutting and grading of Arthur Kill Road as well as the subsequent installation of utility lines along its length.

Although the 1844 Coastal Survey (Figure 9) does not depict Allentown Lane, it was presumably constructed in the early 1800s, after the death of John Van Allen (URS 2005). The 1844 map suggests that it ran between several houses, although none of the houses were located in its path. Furthermore, based on documentary evidence, it is presumed that the lane was constructed around the same time as the nearby houses, which would have been erected as each Van Allen child came of age and was given a portion of the family’s property (URS 2005). It is not likely that privies associated with those houses would have been located in the road’s path, as they were generally placed at a distance from both domestic structures and streets (Wheeler 2000). The homes also appear to be sufficiently distant from the lane that other domestic shaft features—such as cisterns and wells, which were generally constructed close to houses for easy access to water sources (Cantwell and Wall 2001)—would also not be situated within the roadbed.
Therefore, the Charleston Bus Annex stormwater sewer site is determined to have low potential for the recovery of Historic period archaeological resources.

RECOMMENDATIONS

Further study in the form of Phase 1B testing is recommended in order to identify any prehistoric archaeological resources which may be present in the grassy area to the west of Allentown Lane as well as the marshy area that connects it with the Arthur Kill. This testing could include surface reconnaissance, shovel tests and test units. Archaeological monitoring during all construction excavations—including both the installation of the sewer and pre-construction test pits—is recommended for the portion of project area located within Allentown Lane.
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Figures
Project Location
USGS Map, Arthur Kill Quadrangle
Figure 1
NYCT Charleston Bus Annex

Charleston Bus Annex: Area of Potential Effect

Figure 2
Previously Identified Native American Archaeological Sites
Within One Mile of the Project Area.
USGS Map, Arthur Kill Quadrangle

NYCT Charleston Bus Annex

Figure 3
The Manatus Map, 1639
Figure 4
New York and Perthamboy Harbours.
Henry Popple, 1733
Figure 5
Baye et Port d' York, Capitale de la Nouvelle York.
Jacques Bellin, 1764

Figure 6
A Sketch of the Operations of His Majesty's Fleet and Army...in 1776. Joseph Des Barres, 1777

Figure 7
A Map of Staten Island
During the Revolution, 1775-1783.
Loring McMillen, 1933
Figure 8
Map of New-York Bay and Harbor and the Environs.
U.S. Coast Survey, 1844

NYCT Charleston Bus Annex

Figure 9
The Map of Staten Island, or Richmond County, New York.
James Butler, 1853
Figure 10
Atlas of Staten Island, Richmond County, New York. J.B. Beers, 1887

NYCT Charleston Bus Annex

Figure 12
United States Geological Survey:
New Jersey - New York, Staten Island Sheet, 1898
Figure 13
Borough of Richmond Topographical Survey, 1913

Figure 15

NYCT Charleston Bus Annex
NYCT Charleston Bus Annex

Sanborn Insurance Map, 1938
Figure 17
Sanborn Insurance Map, 1938, Updated Through 1951.

NYCT Charleston Bus Annex

Figure 18
Map of Native American Place Names, Trails, and Habitation Sites.
Robert S. Grumet, 1981
Figure 20
Map of Archaeological Sensitivity
Sanborn Insurance Map, 2005
Figure 21

NYCT Charleston Bus Annex
Photographs
Arthur Kill Road, near Charleston Bus Annex site, looking south

Arthur Kill Road, looking southeast

NYCT Charleston Bus Annex
Northwest corner of the intersection of Allentown Lane and Arthur Kill Road, showing the Tides development project, looking northwest.

Allentown Lane, showing manhole in street and Tides development, looking west.
Western end of Allentown Lane after paving, showing manhole and catch basin; looking east

Grassy hill and location of the proposed sewer outfall west of Allentown Lane; looking north
Marshy area and wrecked barges west of Allentown Lane; looking west.
Appendix A:
Plans showing the proposed work for the Charleston Bus Annex stormwater sewer
THE METROPOLITAN TRANSPORTATION AUTHORITY
ACTING BY THE
NEW YORK CITY TRANSIT AUTHORITY

INDEX OF DRAWINGS

PROGRESS PRINTS

DESIGN AND CONSTRUCTION OF THE
CHARLESTON BUS ANNEX
STATEN ISLAND, NEW YORK

CONTRACT CM-1025, TASK NO. 24

OCTOBER 23, 2006
CIVIL CONTRACT DRAWINGS
SEWER CHAMBER DETAIL
TO BE DEVELOPED
BASED ON COMMENTS FROM NYCDEP
Appendix B:
Plans showing locations of planned test pits and soil borings.
NOTE:
1. SOIL BORINGS B1, B6 AND B11 SHALL BE CONVERTED INTO GROUNDWATER OBSERVATION WELLS. THE DEPTH OF GROUNDWATER SHALL BE MEASURED AT THE COMPLETION OF INSTALLATION AND ONCE AGAIN AFTER 7 DAYS HAVE ELAPSED SINCE COMPLETION.
"TIDES" DEVELOPMENT

MATCH LINE B-3

ARThUR KILL ROAD

LOCATE EXISTING UTILITIES

TP H3 - 18'0" x 3'0" x 5'0"

LOCATE EXISTING UTILITIES

SCALE: 1' = 40'-0"
"TIDES" DEVELOPMENT

CHARLESTON BUS ANNEX SITE

TP B4 = 36'6" x 5' x 5'30"
LOCATE EXISTING UTILITIES

ARTHUR KILL ROAD

SCALE: 1" = 40'-0"
Appendix C:
Soil borings conducted for the Tides at Charleston development project.
FIELD TEST BORING REPORT

THE TIDES OF CHARLESTON
ALLENTOWN LANE & ARTHUR KILL ROAD
STATEN ISLAND, NEW YORK

PREPARED FOR: Allen Arthur, LLC
c/o The Tides
99 Hook Road
Bayonne, NJ 07002

PREPARED BY: Future Tech Consultants of New York, Inc
52 E 2nd Street
Mineola, NY 11501
FTC Job No.: AAL0104
Date: August 10, 2004

Steve J. J. Lin, P.E.
NY Lic. # 071926
FIELD SOIL CLASSIFICATION SYSTEM

Future Tech Consultants of New York, Inc. uses the following definitions, abbreviations, and terminologies to classify and correlates soil and rock samples in the field.

UNIFIED CLASSIFICATION: The soil samples are described by major constituents, minor constituents, with modifiers, color, odors, moisture and density/consistency. USCS symbols are included in parenthesis when requested.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS):

COARSE GRAINED SOILS
GW - Well graded gravel
GP - Poorly graded gravel
GM - Silt gravel
GC - Clayey gravel
SW - Well graded sand
SP - Poorly graded sand
SM - Silt sand
SC - Clayey sand

FINE GRAINED SOILS
ML - Silts of low plasticity
CL - Clays of low plasticity
OL - Organic silt/clay of low plasticity
MH - Silts of high plasticity
CH - Clays of high plasticity
OH - Organic silt/clay of high plasticity
PT - Peat and high organic soils

SOIL PARTICLE SIZE IDENTIFICATION
Boulder - 12 inch diameter or greater
Cobble - 3 to 12 inch diameter
Gravel - 1/2 to 3 inch
Sand - 2 to 0.425 mm
Silt & Clay - Smaller than 0.075 mm

MODIFIERS (Percentage)
Trace (tr) 1-10
Some (sm) 11-20
Adjective (ty) 21-35
And (&) 36-50

ABBREVIATIONS
Color
Bn - brown
Gy - gray
Blk - black
Wh - white
Rd - red
Lt - light
Dk - dark
Multi - multi-colored

Size
C - coarse grained
M - medium grained
F - fine grained
Misc. - Miscellaneous
W.O.R. - weight of rod
W.O.H. - weight of hammer
N.R. - no recovery
T.B.C. - test boring completed

DENSITY - Cohesionless soil (Gravel & Sand)

Consistency Approximate range of (N)
Very loose ............... 4 blows/ft or less
Loose .................. 5 - 10 blows/ft
Medium dense ....... 11 - 30 blows/ft
Dense ................. 31 - 50 blows/ft
Very dense ............ 51 blows/ft or higher

CONSISTENCY - Cohesive soil (clay & silt)

Consistency Approximate range of (N)
Very soft ................ 1 blow/ft or less
Soft .................... 2 - 4 blows/ft
Medium stiff ........... 5 - 8 blows/ft
Stiff ................... 9 - 15 blows/ft
Very stiff ............. 16 - 30 blows/ft
Hard ................... 31 blows/ft or greater

ROCK QUALITY

R.O.D. (%) Rock Description
0 - 25 Very poor
25 - 50 Poor
50 - 75 Fair
75 - 90 Good
90 - 100 Excellent

Standard Penetration Test (SPT - ASTM D-1586) - a 2.0" O.D. (1-3/8" I.D.) split barrel sampler is driven into undisturbed soil by means of a 140 pound weight hammer free falling a vertical distance of 30 inches. The sampler is normally driven three or four successive 6-inch increments. The total number of blows required for the last or middle 12 inches of penetrations is termed as Standard Penetration Resistance (N).
**FIELD TEST BORING LOG**

**CLIENT:** Allen Arthur, LLC  
**PROJECT:** Tides of Charleston, Arthur Kill Road, SI, NY  
**DRILLER:** Craig Test Boring  
**BORING NO.:** B-2  
**Sheet 1 of 1**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample</th>
<th>Date</th>
<th>Method of Advancing Boring</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0'2'</td>
<td>S-1</td>
<td>08/02/04</td>
<td>Mud Rotary</td>
<td>Msc, sand, sm. silt, tr. clay / bn, moist, loose (SM/Top Soil)</td>
</tr>
<tr>
<td>5'7'</td>
<td>S-2</td>
<td>08/02/04</td>
<td>Mud Rotary</td>
<td>Cmf sand, clayey &amp; silt / bn, moist, m. dense (SC)</td>
</tr>
<tr>
<td>10'12'</td>
<td>S-3</td>
<td>08/02/04</td>
<td>Mud Rotary</td>
<td>Same (SC)</td>
</tr>
<tr>
<td>15'17'</td>
<td>S-4</td>
<td>08/02/04</td>
<td>Mud Rotary</td>
<td>Cmf sand, sm silt / bn, wet, loose (SM)</td>
</tr>
<tr>
<td>20'22'</td>
<td>S-5</td>
<td>08/02/04</td>
<td>Mud Rotary</td>
<td>Same (SM)</td>
</tr>
</tbody>
</table>

Test Boring Completed @ 22'

---

- **S-2O.D:** Split Spoon Sample  
- **U:** Undisturbed Sample, 3" Diam.  
- **N:** Standard Penetration Resistance per 6"  
  (140# Hammer, 30" drop, Automatic Trip)

---

All reports are confidential property of clients, and information contained may not be published or reproduced pending written approval.
## FIELD TEST BORING LOG

**CLIENT:** Allen Arthur, LLC  
**PROJECT:** The Tides of Charleston, Arthur Kill Road, SI, NY  
**DRILLER:** Craig Test Boring  
**BORING NO.:** B-1  
**DATE:** 08/03/04  
**FTC No.:** AAL 0104  
**Ground Surface Elev.:** 40’

### Ground Water Data

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<th>Sample</th>
<th>Method of Advancing Boring</th>
<th>Soils Description</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 0’-40’ |        | A | Mud Rotary | Cmf sand, mud clay & silt / bn, moist, v, dense  
|       |        |   |            | (Topsilt/Fill)  |         |
| 4’    |        |   |            | Clay, sm silt & mf sand / gy, moist, v. soft (CL) |         |
| 9-65  | S-1    |   |            | Cmf sand, clayey, sm silt / reddish bn, moist, m. silt (SC) |         |
| 4’    | S-2    |   |            | Same / stiff (SC) |         |
| 9-65  | S-3    |   |            | Cmf sand, clayey, sm silt, tr f gravel / reddish bn, moist, v. stiff (SC) |         |
| 9-65  | S-4    |   |            | Same (SC) |         |
| 9-65  | S-5    |   |            | Cmf sand, sm silt / bn, weat, m. dense (SM) |         |
| 9-65  | S-7    |   |            | Same (SC) |         |
| 9-65  | S-8    |   |            | Same (SC) |         |
| 9-65  | S-9    |   |            | Same (SC) |         |

**REFERENCES:**

- S-2’ O. Split Spone Sample
- U - Unsturbed Sample, 3’ Diam
- N - Standard Penetration Resistance per 6’
- (140# Hammer, 30’ drep, Automatic Trip)

**Inspected By:** S. Lin, P.E.
# FIELD TEST BORING LOG

**CLIENT:** Allen Arthur, LLC  
**PROJECT:** The Tides of Charleston, Arthur Kill Road, SI, NY  
**DATE:** 08/03/04  
**BORING NO.:** B-1  
**FTC No.:** AAL 0104

<table>
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<th><strong>NYC Classification</strong></th>
<th><strong>Soil Description</strong></th>
<th><strong>Remarks</strong></th>
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<tr>
<td>40'</td>
<td>S-9</td>
<td>40'-42'</td>
<td>10-17-16-22</td>
<td>7-65</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cmf sand, sm silt / bn, wet, dense (SM)</td>
<td>Test Boring Completed @ 42'</td>
</tr>
</tbody>
</table>

- S-9: 40'-42' Sample
- U: Undisturbed Sample, 3" Dia.

N: Standard Penetration Resistance per 6"  
(140# Hammer, 30" drop, Chisler & Rope System)

* Elevation provided by Rogers Surveying, PLLC

**Inspected By:** S. Lin, P.E.
NOTES:
1. This Drawing was developed based on the drawing of "TEES AT CHARLESTON PROPOSED DRYWELL LAYCUT AND ELEVATIONS" prepared by Hogan Surveying, PLLC.
2. Drywell borings were generally performed around the stake locations as shown on this plan.