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CULTURAL LANDSCAPE REPORT FOR FORT HANCOCK

TREATMENT PLAN

GATEWAY NATIONAL RECREATION AREA - SANDY HOOK UNIT





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INTRODUCTION

LANDSCAPE REHABILITATION GOALS AND PRINCIPLES

EXISTING CONDITIONS AND LANDSCAPE TREATMENT
RECOMMENDATIONS

KEY LANDSCAPE REHABILITATION PROJECTS

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Cover Photo: September 1930 National Geographic aerial photo of Fort Hancock.
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INTRODUCTION

PURPOSE AND NEED

The purpose of this cultural landscape treatment plan is to provide the National Park Service with guidelines for rehabilitating the cultural landscape of Fort Hancock based on the future use of the site, while preserving historic character. This report is an implementation tool that synthesizes documentary research from the 1997 “Historic Landscape Assessment for Fort Hancock” and the 1999 “Cultural Landscape Report for the Proving Ground and Wartime Expansion Areas” along with numerous prior planning documents.

For the past twenty-five years, the buildings and landscape features at Fort Hancock have deteriorated. Providing economically self-sustaining new uses for this extraordinary ensemble of resources has been determined by a lengthy and comprehensive planning process as the best way to ensure long-term preservation. However, with the opportunity for reuse, comes the need to articulate what are appropriate and inappropriate treatment choices.

Several planning documents have preceded this report and provide guidance and support for the preferred treatment strategy, including the 1979 “Final Environmental Statement-General Management Plan” (General Management Plan), the 1990 “General Management Plan Amendment-Interpretive Prospectus” (General Management Plan Amendment), and “Development Concept Plan and Environmental Assessment: Adaptive Use of Fort Hancock and the Sandy Hook Proving Ground” (Environmental Assessment or EA), prepared in February 2002 and revised in July 2003. The Fort Hancock EA proposed adaptive use, or rehabilitation, actions were determined to have no significant impact on the historic and natural resources of the park in a “Finding of No Significant Impact” report, or FONSI, signed in July 2003. The 2003 Fort Hancock FONSI recommended the preparation of this cultural landscape treatment plan.

The 1990 General Management Plan Amendment first proposed that Fort Hancock be managed through a public/private arrangement involving one or more partners. A range of new uses was identified in the amendment as appropriate for Fort Hancock including educational, hospitality, and residential uses, research centers, conference facilities, and professional offices.¹ Significantly, although private groups are invited into the rehabilitation process and will manage some of the structures through long-term leases, the landscape

and site infrastructure will remain the responsibility of the National Park Service and remain fully accessible to the public.

All prior planning documents have identified rehabilitation as the preferred treatment approach for Fort Hancock from among the preservation treatments recognized by the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. Of the four treatments - preservation, rehabilitation, restoration and reconstruction - rehabilitation is recognized as the most accommodating to change. This report does not recommend taking action to restore conditions at Fort Hancock to reflect a single period of time in its long history. Rather, the following recommendations use the directives of the rehabilitation treatment approach, where emphasis is placed on the preservation of surviving historic characteristics, features, and materials, and accommodating new uses through the addition of compatible new features and materials.

HISTORICAL SIGNIFICANCE

The federal reservation at Sandy Hook has played dual roles in United States military history; first, as the site of both the Army Ordnance Board's Proving Ground between 1874 and 1919, and second as Fort Hancock, the chief unit in the defense of New York Harbor for much of the time between 1898 through the Cold War, ending with the development and deployment of intercontinental ballistic missiles (ICBM) in the late 1960s.² The property was deactivated by the U.S. Army in 1974 and transferred to the National Park Service, becoming a unit of the new Gateway National Recreation Area.

A National Register of Historic Places Inventory-Nomination Form for Fort Hancock was completed and certified by the Keeper of the National Register in 1979, indicating two separate periods of significance; the first for the Sandy Hook Proving Ground, 1874-1919, and the second for the theme of Coastal Defenses, 1859-1950s. However, many features survive on site that post-date the 1950s, relating to later periods of the development of Nike missile technology. Correspondence between the National Park Service and the New Jersey State Historic Preservation Officer in 1996 relating to the park's List of Classified Structures (LCS) explains that: "... because the Nike missile era identified in the NHL documentation continued almost to the date of transfer between the military and the NPS, December 31, 1974, the deactivation date for Fort Hancock, is used as the end date of the period of significance."³ Concurrence on this matter from the New Jersey State Historic Preservation Officer on January 2, 1997 established 1974 as the end date of the period of significance.

DESCRIPTION OF THE STUDY AREA

Fort Hancock is a historic district of the Sandy Hook Unit of Gateway National Recreation Area, which is comprised of several noncontiguous units located around New York Harbor in New York State and New Jersey (Figure 1.1). Fort Hancock is located on the northwest side of the Sandy Hook peninsula, facing Sandy Hook Bay, just south of the active U.S. Coast Guard Station (Figure 1.2). The project boundaries have been drawn to include the Fort Hancock Historic District, excluding the wartime expansion areas and proving ground east of the core fort landscape (Figures 1.3 and 1.4).

Fort Hancock contains more than one hundred buildings, many of which date to the late 1800s and early 1900s, that share stylistic similarities, notably the distinctive yellow brick and Classical-Revival ornamentation. The structures are grouped to take advantage of views to Sandy Hook Bay on the western horizon and are centered around two key open spaces, the Parade Ground and Athletic Field. Numerous mature street trees line the narrow streets of the Fort, contributing to a campus-like appearance. Currently, the National Park Service and several park partners including the New Jersey Marine Sciences Consortium, Brookdale Community College, and the National Oceanic and Atmospheric Administration, among others, occupy several rehabilitated structures, while many buildings remain empty.

METHODOLOGY AND SCOPE OF WORK

The objective of this cultural landscape treatment plan is to provide treatment recommendations for this historic place that will preserve the integrity and character of the cultural landscape. To achieve this goal, this report is organized into three main chapters: 1) an examination of the principles of the rehabilitation treatment approach and how they relate to site specific issues, 2) discussion of existing conditions and feature level recommendations that address rehabilitation actions, organized according to broad characteristics and specific landscape features of the site, 3) descriptions of key landscape rehabilitation projects.

The preparation of this landscape treatment plan has drawn upon the park's extensive archives, local historical organizations, the NPS Denver Service Center Technical Information Center, and the National Archives in Washington, D.C. Two previous cultural landscape research documents, the 1994 "Historic Landscape Assessment for Fort Hancock" that was revised in 1997 and the 1999 "Cultural Landscape Report for Proving Ground and Wartime Expansion Areas

at Sandy Hook," also provided historical information that enriched the treatment plan. The level of investigation is considered "thorough" as defined by *A Guide to Cultural Landscape Reports: Contents, Processes and Techniques*.

Documentation and evaluation of existing landscape conditions has been accomplished using narrative text, photographs, and graphic plans. Plan documentation is based on existing topographic surveys and base maps supplied by the park. Fort Hancock's structures are referenced to the park's building numbering system and the List of Classified Structures (LCS). However, documentation focuses primarily on existing conditions to the extent that they influence landscape treatment recommendations. Contemporary site functions, visitor services, interpretation, park operations, and maintenance issues are described as appropriate in the context of proposed landscape treatment.

ENDNOTES

¹ National Park Service, in association with Sandy Hook Partners, LLC, "Environmental Assessment: Adaptive Use of Fort Hancock and the Sandy Hook Proving Ground Historic District." United States Department of the Interior, Gateway National Recreation Area, New Jersey, July 2003, p 2-4, citing the 1990 Amendment to the 1979 General Management Plan.

² National Register of Historic Places Inventory-Nomination Form. National Park Service, October 1979.

³ Savage to Pfoutz, 5 November 1996. From correspondence in reference to "List of Classified Structures," countersigned by Dorothy Guzzo, NJ SHPO, 2 January 1997. NPS, National Register Files, Northeast Region, Boston Office.



Figure 1.1. Context map of the units of Gateway National Recreation Area. The Sandy Hook unit is at the bottom of the image. GATE files.

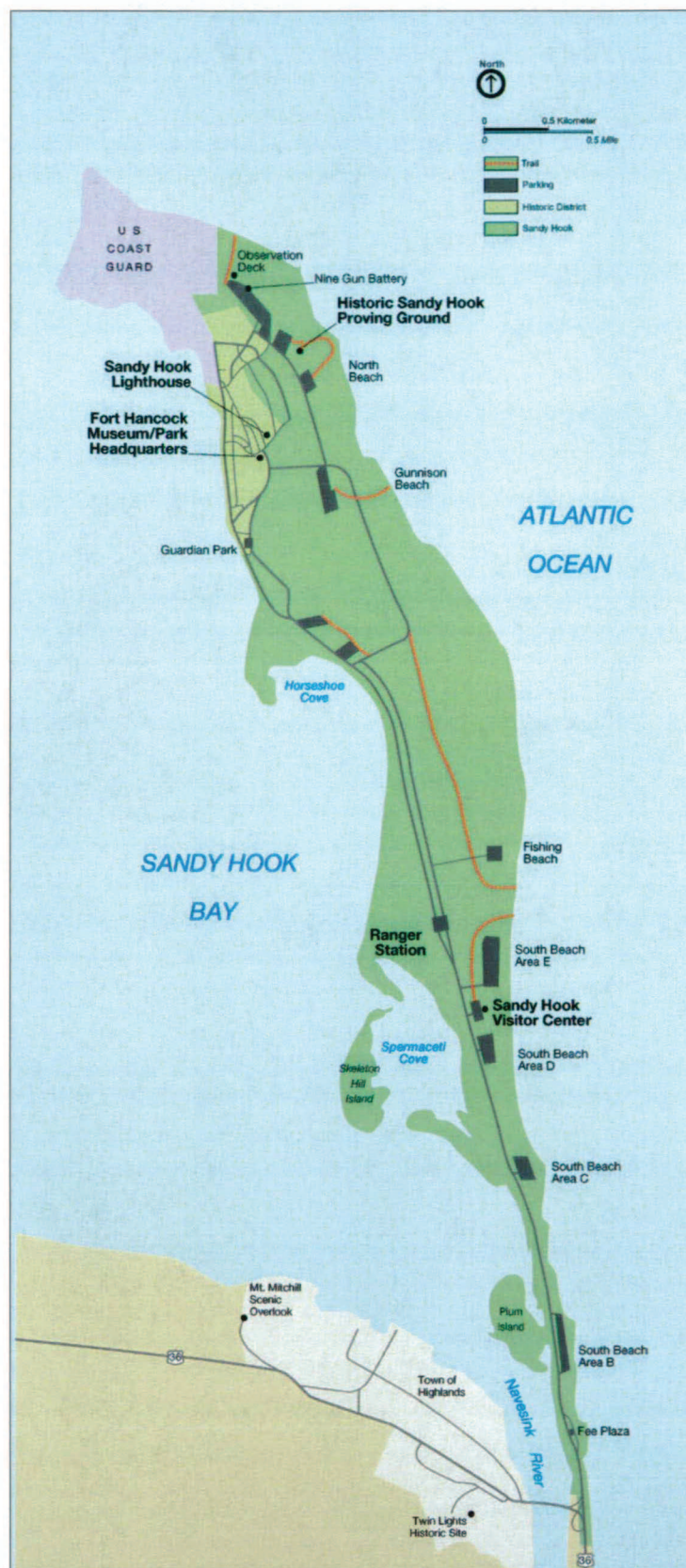


Figure 1.2. Sandy Hook Context Map. Fort Hancock is located on the north end of the peninsula, just south of the Sandy Hook Coast Guard Station. GATE files.

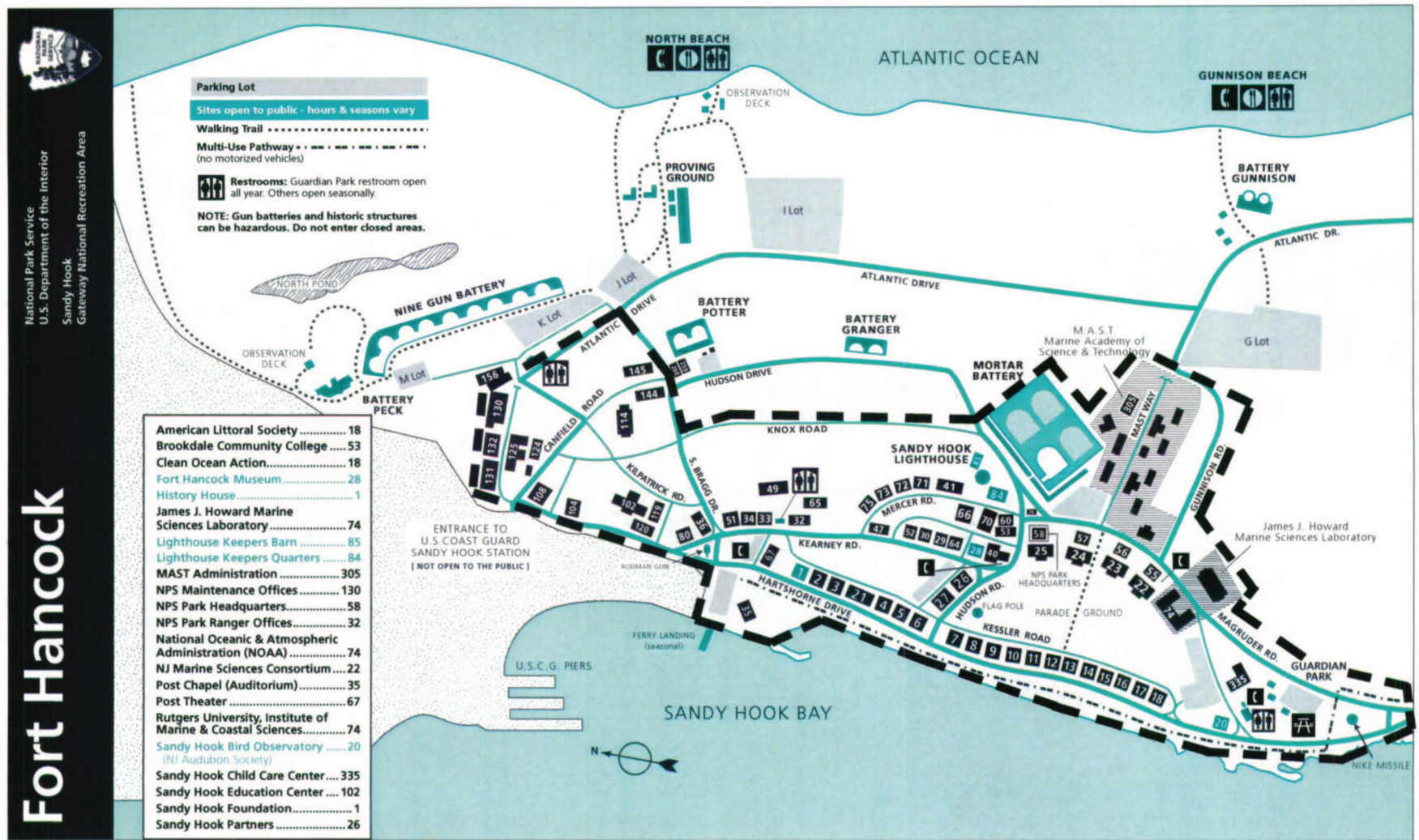


Figure 1.3. Study Area for the Cultural Landscape Treatment Plan for Fort Hancock, Sandy Hook Unit, Gateway National Recreation Area. The study area is outlined in a dashed black line. Image courtesy of Gateway National Recreation Area, Sandy Hook Unit.



Figure 1.4. 2004 aerial photograph of Fort Hancock, Sandy Hook Unit of Gateway National Recreation Area. The study area is outlined in black. GATE files.

CHAPTER 1: LANDSCAPE REHABILITATION GOALS AND PRINCIPLES

INTRODUCTION

This chapter seeks to tie the Secretary of the Interior's Standards for rehabilitation to site-specific issues at Fort Hancock to better illustrate how rehabilitation guidelines will direct future change. The goal in rehabilitating the Fort Hancock landscape is to preserve historic characteristics and features and also to recapture the vitality and sense of community that once characterized the former military post.

Several elements of the Fort Hancock landscape are easily identifiable as defining aspects of the site's historic character. They include the campus-like, small scale feeling created by narrow streets, mature street trees with intertwined canopies, uniform architectural styles and building setbacks, and well-defined central open spaces. Also significant to the overall character is the simplicity in which the landscape is ornamented; foundation plantings are understated, no free-standing formal gardens exist, and visual clutter is kept to a minimum. All of this reflects the historic utilitarian use of the site as a military base. Military hierarchy is visible through the placement of officers' quarters along choice bay frontage, located across the Parade Ground from the barracks buildings housing the soldiers under their command.

Habitation of the property is far reduced from historic levels and because of this the buildings and grounds at Fort Hancock have been in decline since the U.S. Army vacated the property in 1974. The National Park Service has not received the funding or staff required to maintain these facilities at levels typical of the armed forces, therefore conditions at Fort Hancock no longer reflect the intensity of maintenance common to active military sites.

GOALS OF LANDSCAPE REHABILITATION

The following goals have been identified for the rehabilitation process, for both landscapes surrounding leased structures as well as the larger landscape and infrastructure remaining under the management of the National Park Service.

RESOURCE PROTECTION

- Preserve the character of Fort Hancock's designed landscape;
- Reverse the deterioration present in the resources, including the replacement of missing street trees, foundation plantings, and rehabilitation of turf;
- Protect archeological resources;
- Balance cultural and natural resource values in making choices required to facilitate new uses.

PUBLIC SAFETY AND ACCESSIBILITY

- Provide a safe and accessible park environment for visitors and partners;
- Repair Fort Hancock's deteriorated system of street trees and site lighting while achieving a safe environment, adding minimal new lighting designed with timers, motion-sensors, and light shields to minimize light pollution;
- Repair or replace in-kind deteriorated paved surfaces, avoiding the replacement of existing commonplace surfaces with new designs or treatments that are currently more fashionable;
- Implement traffic calming measures such as raised sidewalks to promote safety and accessibility for pedestrians and bicyclists.

COMMUNITY SUPPORT AND INVOLVEMENT

- Review, revise and implement landscape rehabilitation choices in an inclusive way that fosters community support and goodwill;
- Comply with regulatory requirements for consultation required by the National Historic Preservation Act of 1966;
- Correct deteriorated site conditions detracting from a positive visitor experience, or hindering the public's understanding of Fort Hancock's historical significance.

PRINCIPLES OF LANDSCAPE REHABILITATION

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repairs, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.¹ According to the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, elements of rehabilitation provide that:

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.

At Fort Hancock: the application of this standard recommends that the former military base will continue to be used and managed primarily as a cultural resource. As is the case in active military bases, this would suggest a mix of public and private new uses with the National Park Service continuing to control access and use. In the case of officers' quarters that were once private dwellings with yards, there is an opportunity to continue private or semi-private uses. Open spaces such as the Parade Ground, Athletic Field, and Sandy Hook bay frontage serve as key organizational elements of the site plan and would be protected from new site construction or other encroachments in order to support continued public enjoyment of the historic site. Buildings and landscapes that were once service-oriented, such as workshops and warehouses, may be given new functions supportive of both private and public use of the entire site.

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces and spatial relationships that characterize a property will be avoided.

At Fort Hancock: the application of this standard recommends against changing the site plan of the property. Major realignment and widening of roads would be not be permitted, and construction of new buildings on public open spaces would not be recommended. The Fort Hancock EA explored the possibility of only two new structures on site, that of a National Park Service maintenance facility or garage/warehouse for maintenance operations within the current maintenance area, and a structure at the site of the former Post Hospital near Guardian Park. If built, these new buildings should be designed to reflect the scale and proportions of the former buildings, with geometry and details designed for compatibility with the historic architectural ensemble. Replacement of shade trees would be limited to the edges of the historic post's roadways, as was the case historically, while the species of trees planted may be modified to address contemporary concerns for natural resource issues and sustainability.

3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

At Fort Hancock: the application of this standard aims to preserve authenticity and recommends against adding undocumented elements and features to the landscape in order to create a "historic look." Replacements of missing historic features should be in-kind replacements, as they appeared at the end of the period of significance, or 1974. Choosing to replace features from an earlier period in Fort Hancock's long history, such as streetlights from the 1920s, based on an aesthetic preference is not recommended.

4. Changes to a property that have acquired historic significance in their own right shall be retained and preserved.

At Fort Hancock: the application of this standard recommends that changes made to the landscape after the end of its initial period of development c. 1905 that have acquired a significance in their own right should be preserved. The current period of significance ends in 1974 and landscape characteristics and features present during World War II and the Cold War should be preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

At Fort Hancock: the application of this standard is related to #2 above. This includes the preservation of site details reflecting domestic habitation, such as outdoor clotheslines, trash can enclosures, and school bus stops. Serviceable everyday materials such as asphalt roadways and concrete sidewalks, where they currently exist, need not and should not be replaced with something more fashionable or appealing. Monocultural stands of street trees that survive, such as the London planetrees along the west side of Barracks Row, should be preserved by replacing failing specimens in-kind. Where harsh growing conditions have not permitted the establishment and survival of an even-aged street tree monoculture, such as the case along Hartshorne Drive, a more practical and durable mix of species may be introduced.

6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

At Fort Hancock: the application of this standard indicates that repairs are preferable to replacement, and that the replacement of missing features intended to evoke a historic period must be undertaken only following rigorous

scholarship. At Fort Hancock, two distinct examples of historic street lighting exist, though most of the standing fixtures are in poor condition. Missing or deteriorated examples of these two streetlights will be replaced with fixtures that share design similarities with the historic lights. In-kind replacement is recommended to present a seamless appearance of the historic scene. Replacements should resemble historic fixtures in form, material, and design but may differ slightly based on cost considerations and commercial availability.

This principle can also be related to displays of militaria around the fort landscape. Adequate documentation exists to justify the re-introduction of selected missing features. Historic Fort Hancock armaments or appropriate replacements may be placed in designated areas that have high interpretive value.

7. Chemical or physical treatments, if appropriate, will be undertaken, using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

At Fort Hancock: the application of this standard suggests that pruning and treatment of existing plantings should be undertaken by a trained horticulturist with experience working at historic properties.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

At Fort Hancock: the application of this standard recommends that ground disturbing activities be reviewed by a trained archeologist as part of compliance with Section 106 of the National Historic Preservation Act of 1966.

9. New additions, exterior alteration, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

At Fort Hancock: the application of this standard recommends that the scale and zoning of any proposed rehabilitation of vacant building sites reflect the historic scale, massing, and zoning issues reflected in the original site plan. An example of applying this standard relates to a possible infill of the hospital site, the post hospital having been destroyed in a fire in 1985. A new building constructed on this site should reflect the approximate footprint, and general massing of the former building, while it would be appropriate for the structure to

reflect its own time in the articulation of the facades and the execution of architectural details. This would successfully distinguish a new structure from the surviving historic buildings.

10. New additional and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

At Fort Hancock: the application of this standard indicates that new construction be designed to be reversible, that is, removal in the future would not destroy historic buildings, landscape characteristics, or features. New site features such as directional and orienting signage, benches, water fountains, and bicycle racks will become necessary for the adaptive use of the fort. These will be located in the landscape in a manner that will not harm historic fabric or interfere with the presentation of the historic character of Fort Hancock.

ENDNOTES

¹ Excerpted from: U.S. Department of the Interior. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. National Park Service. Cultural Resource Stewardship and Partnerships. Heritage Preservation Services, Washington, D.C. 1996.

CHAPTER 2: EXISTING CONDITIONS AND LANDSCAPE TREATMENT RECOMMENDATIONS

INTRODUCTION

The purpose of this chapter is to present informed landscape treatment recommendations that preserve Fort Hancock's historic character and guide rehabilitation efforts. Earlier reports that address the treatment of Fort Hancock, including the Fort Hancock EA and the 1999 "Fort Hancock Rehabilitation Guidelines" (hereafter referred to as the 1999 Rehabilitation Guidelines) are referenced and supplemented in the recommendations.

The following material is organized according to seven important characteristics of the landscape. The characteristics are used to divide the landscape into its component parts in order to clearly communicate both condition and relevant preservation issues. These characteristics include spatial relationships and views, topography, land use, buildings and structures, circulation, vegetation, and site furnishings and fixtures. Landscape treatment recommendations follow the assessment of existing conditions.

The level of detail for any given recommendation varies according to its preservation implications. For example, recommendations for circulation, vegetation, and site furnishings and fixtures are presented at a feature level due to concerns about the rehabilitation of street trees, foundation plantings, hedges, parking lots, benches, and street lights. Fort Hancock EA directives relating to these landscape characteristics are reiterated in this report to provide clear direction for rehabilitation. Conversely, treatment recommendations for spatial relationships, views, topography, and land use are presented at a broader scale. Though many specific rehabilitation guidelines apply to buildings and structures, this report defers to other architectural guidelines for treatment and discusses the buildings and structures broadly.

SPATIAL RELATIONSHIPS AND VIEWS

Fort Hancock's site plan evolved from the desire to reflect military order and the need to establish zones for work and zones for residential activities. Implementation of the site plan involved conforming to existing site conditions, which included the infrastructure serving the U.S. Life-Saving Service, the Army's unfinished Civil War-era Third System fortifications, and the Sandy Hook Proving Ground and its associated dock facility, railroad lines, and buildings.

The new fort was laid out west of the Sandy Hook Lighthouse and south of the other existing features.

Historically, as today, the large, central open space of the Parade Ground serves as one of the most distinct and recognizable features of the historic district (Figure 2.1). Much of the Parade Ground is defined by the architecture of Officers Row, the linear row of senior officers' quarters that back onto the Parade Ground and face Sandy Hook Bay (Figure 2.2). Within Officers Row, the most senior officers' housing, Row House Twelve, occupies the center of the row of buildings with officers of lesser rank flanking it in descending order. Sitting several hundred yards east of Officers Row across the Parade Ground are the large barracks buildings, or Barracks Row, purposefully constructed to place the enlisted men in view of the officers. Another broad open space, the Athletic Field, is found north of the Parade Ground, separated by Hudson Road. Junior officers' quarters along Hartshorne Drive define the west side of the Athletic Field.

Outside the Parade Ground and Athletic Field, the spatial organization is more random, yet is marked by other distinct neighborhoods. A group of non-commissioned officers' quarters known as Sergeants Row is located east of the Athletic Field, forming a cluster of similarly scaled and designed buildings that are now used for park housing. Another distinct cluster of buildings located east of the large barracks buildings between the Parade Ground and Magruder Road, called Barracks Row, is the Marine Academy of Science and Technology (MAST) campus. The campus was created from several rehabilitated, one-story, concrete-block, World War II-era buildings.

A collection of former service buildings, including the bakery, stables, and firehouse, is located northeast of the Athletic Field. Their functions dictated their location within the military base, being somewhat isolated from the officers' quarters and the Parade Ground. All of these sub-areas ring the main open spaces and historic center of activity, generally following a pattern of less densely spaced, more loosely organized roads and structures the further they are located from Hartshorne Drive. Unprogrammed open spaces of mowed grass or native vegetation are prevalent at the district's perimeter.

Views of the bay are the most striking aspect of Fort Hancock's site plan (Figure 2.3). Buildings along Hartshorne Drive, including Officers Row, the chapel, and the theatre, feature sweeping views of the water between the gaps in the officers' quarters. As all trees on site were placed along roads and paths, not interspersed within open lawns, views from Barracks Row are channeled toward the water.

Views elsewhere on site are more limited because of the various buildings, yet framed views to the water are still available because of the flat terrain and relatively open landscape.

SPATIAL RELATIONSHIPS AND VIEWS - TREATMENT RECOMMENDATIONS

The spatial relationships between buildings, open spaces, natural areas, and Sandy Hook Bay are central to the historic character of Fort Hancock. The clean lines and uncluttered details of the Fort Hancock landscape that typify the spare, simple, and utilitarian character of the landscape should be preserved. Any rehabilitation of the area should not change the fundamental relationships between key features and characteristics, including the organization of buildings around the Parade Ground and Athletic Fields, the buildings of Officers Row and the water's edge, and the close alignment of Barracks buildings and supporting structures like the mess halls and laundry.

Views from Fort Hancock to Sandy Hook Bay should be considered and protected in every rehabilitation decision. Important views of Sandy Hook Bay seen from Officers Row and the Barracks Row should not be impeded by the placement of visual intrusions such as above ground utilities or plantings. It is recommended to avoid placing plant material, site furnishings, or utilities in between the homes of Officers Row in order to keep view corridors open (Figure 2.4). Elsewhere on site, the simple planting design of open lawn and street trees should be retained to leave views to the bay unencumbered.

TOPOGRAPHY

Fort Hancock and Sandy Hook Proving Ground project into Sandy Hook Bay at only a few feet above sea level. The entire area can be characterized as nearly flat, with gentle grade changes that are all but imperceptible to the casual observer. Some sand dunes line the east shore of the peninsula, outside the study area of this report.

TOPOGRAPHY -- TREATMENT RECOMMENDATIONS

As an important feature of the cultural landscape, the level topography of Fort Hancock should be retained. Any new construction in the Fort Hancock historic district should respect the existing topography and avoid, for example, the construction of artificial berms or drastic grade changes.

LAND USE

Fort Hancock is used by institutional and educational groups today, although with low intensity compared with historic levels. Approximately one hundred buildings are found in the Fort Hancock area, some of which are used by the National Park Service, the National Oceanic and Atmospheric Administration, New Jersey Marine Sciences Consortium, Brookdale Community College, and the Marine Academy of Science and Technology.

Fort Hancock is used by recreational visitors, some of which arrive via the Sandy Hook Multi-Use Pathway, a popular paved path that runs the length of the peninsula for walking, bicycling, and roller-blading. The path currently terminates at the ferry landing, but the park has plans to extend it through Fort Hancock to the north beaches located east of the study area. A sizable number of seasonal visitors, many of whom frequent Sandy Hook's northwest beaches, arrive via the ferry landing. Many casual and repeat visitors use the fort area as well as over 25,000 school children who attend educational programs sponsored by the National Park Service and its partners.

LAND USE -- TREATMENT RECOMMENDATIONS

The rehabilitation program proposed for Fort Hancock will introduce several new uses, yet all will be compatible with existing land use and the mission of the park. The National Park Service will retain responsibility for all primary public open spaces such as the Parade Ground, the Athletic Field, and the bay frontage. The site will host recreational, educational, hospitality, not-for-profit, and office uses that preserve the cultural and natural resources of Fort Hancock. Activities that do not complement the park's mandate, such as manufacturing or industrial uses, will not be permitted.

Schematically, visitor services, including interpretation, education, and recreation, are projected to increase significantly in the future. A new park-wide visitor center is scheduled to open in Barracks Building 25 in 2011. This, along with visitation to the Keepers Quarters Museum, Sandy Hook Lighthouse, and educational activities offered in Barracks Row and the MAST Campus will bring numerous day-use visitors to the core area of Fort Hancock. National Park Service activities including staff housing and maintenance will remain centered in the non-commissioned officers' neighborhood and in areas north and east of the Athletic Field, respectively.

BUILDINGS AND STRUCTURES

Approximately one hundred buildings are found within the study area, most of which were built before 1910. The buildings are made from a distinctive yellow brick that visually unifies the district. This homogeneity is enhanced by a uniform blue-green color selection for all painted trim throughout the study area, identified as Federal Standard Color #34058 in the 2001 “Sandy Hook Historic Structures Paint Plan” (Figure 2.10). Though built over several decades and for a variety of purposes, many structures contain elements representative of the Classical Revival era. The large, single-family buildings of Officers Row, with slight variations, are replicas of one another. These are among the most distinctive buildings on site, partly because of their architectural merits and partly as a cohesive architectural ensemble that survives as originally designed. Several large barracks buildings stand at the east side of the Parade Ground. These buildings contrast in scale with smaller houses for non-commissioned officers, now used for park housing, just outside the Athletic Field area. Many of the structures share similar architectural elements such as front porches, building materials, and finishes that provide consistency despite significant variations in scale and design.

Many structures were built during times of intense military activity, notably during World War I and II, only to be removed after the end of conflict. Few of these war-time wood frame structures remain at Fort Hancock, but those that do are visually distinct from their older masonry counterparts. Most are two-story, white painted, wood clapboard buildings with rectangular footprints. Distinct examples of the remaining World War II buildings are the concrete block structures that make up the MAST Campus.

Buildings that once serviced the busy military community are located throughout Fort Hancock. Some date to the turn of the century, like the stable and mess halls, while others are more modern, including the small gas station, theatre, and chapel. Overwhelmingly, they are constructed of the distinctive yellow brick that characterizes the historic district.

The oldest functioning lighthouse in the United States is located at Fort Hancock, northeast of the Parade Ground (Figure 2.11). Maintained by the National Park Service, the lighthouse is a tall, tapered octagonal stone building with a white painted exterior. Several fortifications, both earthen and masonry, exist in the Fort Hancock and Sandy Hook Proving Ground district, yet are located outside of the study area of this report.

BUILDINGS AND STRUCTURES -- TREATMENT RECOMMENDATIONS

Character defining features of all Fort Hancock buildings must be preserved. All rehabilitation work must comply with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and be in compliance with current accessibility and building codes. Specific rehabilitation guidance for Fort Hancock's ensemble of buildings and structures falls outside of the scope of this landscape treatment plan. Please refer to the Fort Hancock EA and the 1999 Rehabilitation Guidelines for further information.

CIRCULATION AND VEHICULAR PARKING

Fort Hancock features a complex network of roads and sidewalks (Figure 2.5). Hartshorne Drive and Magruder Road encircle the core area of Fort Hancock, serving as the primary vehicular roads for the historic district and the active U.S. Coast Guard Station. As it runs through Fort Hancock, Hartshorne Drive is a nineteen and a half foot wide road with bluestone curbing that parallels Sandy Hook Bay. Magruder Road is a slightly wider road with concrete curbing that splits from Hartshorne Drive at Guardian Park and travels around the east side of Barracks Row. Hudson Road divides the area's main open spaces, the Parade Ground and Athletic Field, connecting resources east of Fort Hancock, including the Mortar Battery, Gunnison Beach, and North Beach, to Hartshorne Drive.

A series of secondary roads are laid out with little overarching design other than to connect the buildings of the core area. Kessler Road runs east of Officers Row, abutting the Parade Ground and Athletic Field. Other secondary roads such as Kearney, Mercer, and McNair roads connect park housing and former service buildings north of the Parade Ground. Gunnison Road serves the MAST campus, intersecting perpendicularly with Magruder Road east of the Parade Ground. Though the roads of Fort Hancock were once an asphalt base with a chipped stone top coat, all are now bituminous concrete.

There are currently 708 spaces at Fort Hancock, including 132 identified for National Park Service use, 130 identified for partner use and 568 designated for the public.¹ Vehicular parking occurs in numerous small to medium sized lots spread throughout the study area. Many buildings have several parking spaces located along side them, for example Officers Row buildings have two spaces each, the NOAA labs have their own lots, and the Bachelor Officers Quarters and Post Headquarters share a lot just north of the buildings. Parking for the barracks and MAST campus occurs in a lot on the east side of Magruder Road.

Pedestrian circulation is currently well defined surrounding the Parade Ground and Barracks Row. The buildings are connected by a brick, semi-circular sidewalk that mirrors the arc of the Parade Ground. Another key pedestrian route is the concrete sidewalk that runs along the east side of Hartshorne Drive. Walkways connecting the Officers Row buildings to Hartshorne Drive are made of a variety of materials including concrete, brick, and bluestone (Figure 2.6 and 2.7). A concrete sidewalk bisects the Parade Ground, connecting the Barracks buildings with Hartshorne Drive. Segments of Hudson and Kearney Roads have concrete sidewalks along one side of the street. Kessler, Magruder, Gunnison, Mercer, and McNair Roads do not host a large volume of pedestrian traffic and lack sidewalks.

Shuttle bus service runs between the ferry landing near the Post Chapel and the eastern ocean-front beaches during the summer weekends. Busses also transport school children to educational sessions with various partner organizations, dropping them off in the South Parade parking lot. Between fifteen and twenty busses transport MAST students to school on weekdays during the school year.

In 2004, the National Park Service completed a major phase of a Multi-Use Path for bicycles, walkers, joggers, and roller-bladers that runs the length of the peninsula, connecting various beaches and points of interest. This paved, twelve-foot wide path enters the Fort Hancock area near Guardian Park and travels between the bay shore and Hartshorne Drive (Figure 2.8). Currently, it terminates near the chapel and ferry landing, awaiting funding to complete the project that will extend the trail to Gunnison and North Beaches.

CIRCULATION AND VEHICULAR PARKING -- FEATURE LEVEL RECOMMENDATIONS

The 2003 Fort Hancock EA, prepared in anticipation of the proposed historic leasing program, defines parameters for modifications to vehicular circulation and parking. Locations and numbers of parking spaces in this report are based on conceptual figures generated in the Fort Hancock EA and the subsequent 2003 Fort Hancock FONSI. However, the following recommendations concerning individual parking lots are schematic and subordinate to the overarching goal of keeping parking at Fort Hancock at or below 1378 spaces.

As directed in the Fort Hancock EA, the total number of spaces at Sandy Hook is capped at 5,036. While the number of spaces at Fort Hancock will increase with the adaptive use program, from 708 to 1378, the increased number will be reallocated from other areas at Sandy Hook, notably the eventual removal of 650 spaces from K Lot located northeast of Fort Hancock, to retain the figure of

5,036 park-wide parking spaces (Figure 2.9). Recreational park users and beachgoers will be invited to use parking on the east side of Fort Hancock on weekends to compensate for the decreased beach parking created by K Lot's removal. Only one exception to the 2003 Fort Hancock EA is made in the following recommendations, that of retaining parking spaces at the Chapel Lot. However, the proposed retention of Chapel parking spaces is offset by reducing proposed parking elsewhere in Fort Hancock so that the total number of parking spaces does not exceed the 1,378 spaces specified in the Fort Hancock EA.

As stated in the Fort Hancock EA, all new or expanded parking areas will be located on previously disturbed sites. Fort Hancock's current eighteen lots will be increased to twenty-four and be well dispersed throughout the historic district in order to provide convenient parking to the leased buildings. The following specific directives appear in the Fort Hancock EA and are followed by more detailed recommendations.

Fort Hancock EA Directive:

All new and redesigned lots would be constructed to prevent pollution from petroleum product runoff through the use of best practice drainage structures or porous pavement.²

Recommendation: Specialized storm water catch basins that trap oils and salt from surface runoff will be employed and drainage will be properly treated before being discharged. Portions of parking lots may be left without bituminous pavement, making use of stabilized turf techniques to reduce the amount of storm water runoff. Solutions could include installing reinforced soil with a high percentage of crushed aggregate or an engineered product such as Grasspave®, a plastic mat inserted in the soil to provide stability while allowing runoff to percolate and a grass surface to be maintained.

Fort Hancock EA Directive:

All buildings would have adjacent universally accessible parking spaces.³

Recommendation: As Fort Hancock parking is to be provided in several lots dispersed throughout the area, there are many opportunities to provide accessible parking spaces. Where a parking lot is not within a reasonable distance to the building, specially designated accessible parking spaces will be provided. This may take the form of small capacity lots adjacent to buildings. Along Officers Row, two parking spaces will be provided at the rear of each structure, accessed via Kessler Road.

Fort Hancock EA Directive:

On-street parking will not be permitted, nor will any streets be widened to accommodate any increase in vehicle circulation.⁴

Recommendation: The width of roads at Fort Hancock is a defining element of this primary circulation route. The scale and configuration of the roads adds to the historic campus setting of the post. Currently, the roads in the heart of Fort Hancock range between eighteen and twenty-five feet in width, which is representative of historic conditions. Many roads are lined with mature street trees that contribute to the feeling of enclosure, provide shade, and have a psychological effect in reducing vehicular speeds. Roads on the perimeter of the area have less definition, are mostly found without street trees and curbs, and tend to be slightly wider.

In the rehabilitation of Fort Hancock, no streets should be widened beyond their current width, most notably Hartshorne Drive. The segment of Hartshorne Drive that parallels Officers Row serves as the Main Street for this historic military community. Widening this important roadway to accommodate projected increases in traffic volume is not recommended. The narrow width of the road, lined with bluestone curbing, may serve the same purpose in reducing vehicular speeds as traffic calming strategies and devices. A wider cross-section would encourage greater vehicular speeds and would compromise the integrity of the road's historic materials and character.

Traffic calming measures such as raised pedestrian crosswalks at key intersections and narrowing roadway entrances at minor service roads may be utilized to reduce vehicular speeds and promote a safe and pleasant pedestrian environment.

Fort Hancock EA Directive:

The intersection of Kearney Road and South Bragg Drive would be reconfigured for safety. The island would be removed and South Bragg Drive at Building 36 would be shifted to the south.⁵

Recommendation: Currently, the intersection of South Bragg Drive and Kearney Road is confusing and potentially dangerous. Several components of the intersection are problematic, namely the greater than ninety degree angle on the southeast corner which encourages high speeds and the extraneous road segment in front of the Mule Barn. As Hartshorne Drive can be accessed from South Bragg Drive and Kearney Road via the road segment on the south side of the Rodman Gun, the short Kearney Road extension is an unnecessary and

complicating element. It is recommended that the Kearney Road extension in front of the Mule Barn be closed to through traffic, yet retain its historic asphalt pavement. It is also recommended that the South Bragg Drive and Kearney Road intersection be realigned into a ninety degree angle. See the Recommended Landscape Rehabilitation Projects section of this report for a proposed site plan and more discussion of this issue.

Fort Hancock EA Directive:

Buses would use the Fort Hancock Lot, the South Parade Ground Lot and the Chapel Lot for drop-off and would then move to the south end of Knox Road, North Beach, or Gunnison Beach lots for parking and staging.⁶

Recommendation: As use of Fort Hancock increases, bus service will increase as well. Currently, buses shuttle visitors between the existing ferry landing and park beaches as well as transport students to and from Fort Hancock for educational sessions. In the future, projected uses may bring more school groups, conferences, and recreational users via bus. It is recommended that buses drop off passengers at the parking lots listed above where modifications will be made to address visitor safety and bus maneuverability. After drop-off, buses will be required to proceed to the larger outlying lots to park where more space is available.

Though the Fort Hancock EA lists Knox Road as potential location for bus parking, the park has made plans to convert the southern portion of the road into the Multi-Use Path, removing it from consideration as bus parking. The beach parking lots or proposed outlying Fort Hancock lots may be used for bus parking instead.

Fort Hancock EA Directive:

Crosswalks between buildings and parking lots would be improved for safety.⁷

Recommendation: As historic buildings are reoccupied at Fort Hancock, pedestrian activity will increase. The proposed campus-like setting will generate much more foot traffic as tenants and visitors walk between buildings, open spaces, parking lots, and the water's edge. Personal safety is paramount and crosswalks will be created and/or improved to clearly delineate where pedestrians will venture into vehicular paths. Raised crosswalks may be used at high traffic intersections to slow vehicular speeds and create safe pedestrian crossings. The Multi-Use Path, used by walkers, joggers, bikers, and roller-bladers among others, will be extended from its current terminus near the

Chapel. Where the Multi-Use Path crosses roads, likely Hartshorne Drive and Kearney Road, a sufficiently wide crosswalk will be clearly marked.

Fort Hancock EA Directive:

*Existing historic walkways would be maintained. Additional walkways to accommodate new circulation patterns created by the adaptive use activities will be added where needed for safety. These will be primarily to connect new parking areas with existing walkways.*⁸

Recommendation: Modifications to walkway surfaces to promote an aesthetic bias, such as replacing an existing historic concrete walkway with a more appealing or fashionable brick surface will not be permitted. The introduction of new walkways will be judicious and only where needed to supplement the existing pedestrian circulation system. New walkways should mirror the pattern, scale, and material of surrounding walkways. In most cases, new segments of pedestrian walkway will be of concrete and the same concrete-aggregate mix should be used site-wide. Historic walkways should not be removed unless they are in disrepair, and when that is the case, are to be replaced in-kind. This will perpetuate a diversity of sidewalk paving material within the area, which is representative of the lengthy period of significance.

VEGETATION

The surviving plant palette at Fort Hancock is similar to what was found historically, that of a simple and straightforward planting scheme tailored for both seaside growing conditions and to evoke military order. Fort Hancock currently includes a variety of plant materials and types, ranging from areas of native grass and low-growing shrubs that receive little care or management, to clipped lawn, domestic plantings, and street trees. Reduced maintenance following deactivation of the army base, coupled with natural cycles of growth and decay has left much of Fort Hancock's plantings in fair to poor condition.

Within the core of Fort Hancock, the most significant plantings are the trees lining the streets and central open spaces (Figure 2.12). Many impressive London planetrees (*Platanus x acerifolia*) line Kearney, Magruder, and Kessler Roads, as well as the pedestrian path west of the barracks buildings. Many of these mature shade trees date to the original construction of Fort Hancock (1898 to 1905) and due to the use of a single species, have helped unify the area into a visually cohesive landscape. Some of the London planetrees have died and not been replaced, breaking the continuous canopy.

Along the bay side of Officers Row, white poplar trees (*Populus alba*) once lined both sides of Hartshorne Drive. Heavy winds and salt spray from the bay create an adverse environment for all but the hardiest of species and only a few poplars remain.

Few trees grow beyond the immediate margins of roadways, a notable exception being the remnants of a circle of mature Austrian pines (*Pinus nigra*) ringing the Parade Ground flagstaff. A few self-sown or "volunteer" trees grow next the buildings on Officers Row but no other trees dot the landscape - a historic pattern that has persisted since the initial development of Fort Hancock (Figure 2.13). The only place where trees have historically been permitted to grow as specimens within an open lawn is the grounds of the Officers Club at the northeast end of the study area.

While domestic foundation plantings were once a common element around single family residential buildings, which were planted and cared for independently by the residents of the structures, little remains today other than a few tenacious iris, daylilies, and garden phlox. The exceptions are small gardens surrounding the foundation of the house rented by the Audubon Society and around the former dwellings of non-commissioned officers now occupied by park personnel. Cut grass abuts the foundations of all other buildings.

Large amounts of turf are maintained at Fort Hancock. The Parade Ground and Athletic Fields represent the largest expanses of cut grass, but smaller turf areas surrounding individual buildings, and smaller open spaces together comprise several acres. The quality of the turf at Fort Hancock, like so many of the park's landscape features, has suffered from limited maintenance. National Park Service maintenance staff mows regularly, but the turf is of poor quality and in need of reseeding, weed control and fertilization.

The National Park Service, in cooperation with the New Jersey Audubon Society, promotes the use of native vegetation. This report relies on a definition of native plants already established by natural resource specialists in the 1997 "Flora of Gateway National Recreation Area." Plants are considered native if they are "natively occurring in the Gateway area (e.g. a native coastal plain species of Long Island, Staten Island or Sandy Hook)."⁹ The emphasis on native plants has improved wildlife habitat and increased the amount of vegetation allowed to grow unmanaged, mostly on the periphery of Fort Hancock. Plants found in these rapidly naturalizing areas include a mix of native and non-native species including beach plum (*Prunus maritima*), salt spray rose (*Rosa rugosa*), staghorn

sumac (*Rhus typhina*), poison ivy (*Rhus radicans*), Russian olive (*Elaeagnus angustifolia*), northern bayberry (*Myrica pensylvanica*), eastern red cedar (*Juniperus virginiana*), and common juniper, (*Juniperus communis*) among others.

VEGETATION -- FEATURE LEVEL RECOMMENDATIONS

The following vegetation recommendations are grouped into four general categories: Street Trees, Foundation Plantings, Specimen Plantings, and Turf Rehabilitation. Guiding principles for the design and layout of each category are presented in this segment along with lists of acceptable plants to be used in each application.

STREET TREES

Though a military base is typically characterized by a strong sense of order and even perhaps uniformity, this was imperfectly manifest in the planting of white poplars along Hartshorne Drive. If there ever was a sense of continuity in the street tree plantings along Hartshorne Drive, it was short-lived. Careful examination of historical aerial photographs shows that the street trees along Hartshorne Drive were in a constant state of change due to the harsh climate conditions. It appears that there was never a time when a stable and continuous canopy of trees lined both sides of the road. In the early 1900s, white poplars were evenly spaced along Hartshorne Drive, and London planetrees lined the backside of Officers Row. Yet as early as the 1920s, photographs document incomplete street tree coverage on Hartshorne Drive. Yet, the London planetrees at the eastern perimeter of Fort Hancock, lining the east side of the Parade Ground, Kearney, and Hudson Roads fared better given their more sheltered locations. Tree replacement efforts occurred throughout the period of significance with variable results. The most consistent presence of trees on Hartshorne Drive appears to have existed toward the center of Officers Row, centered at the residence of the Commanding Officer, where the most maintenance was likely directed.

Hartshorne Drive Street Tree Recommendation

Fort Hancock EA Directive:

White poplar (Populus alba) would NOT be replaced in-kind. It would be replaced by a combination of: sugar hackberry (Celtis laevigata, var. "All Seasons"), common hackberry (Celtis laevigata x occidentalis, var. "Magnifica"), London planetree (Platanus x acerifolia, var. "Columbia," or "Liberty"), American elm (Ulmus americana, var. "Valley Forge," or "Homestead," and sycamore maple (Acer pseudoplatanus).¹⁰

Recommendation: *The Secretary's of the Interior's Standards for the Treatment of Historic Properties* recommends replacing historic features in-kind when they become damaged or deteriorated. Yet, the standards also recognize that conditions may exist that preclude replacement-in-kind, as is the case along Hartshorne Drive. As directed by the Fort Hancock EA, a substitute species is recommended because of white poplar's invasive tendencies, short life span, and typically weak wood. Given the harsh growing conditions along Hartshorne Drive and the potential for devastating loss of the planting if a pest infestation occurs, replanting a single species is not recommended.

Hartshorne Drive should be planted with a mix of street trees comprised of extremely hardy deciduous species. A mixed planting will help guard against the sudden death of all the trees should a pest or disease target a single species. In addition, planting a mixture of species can be viewed as a long-term field trial to select the best trees for the site. As the weaker specimens inevitably die, the success of the hardiest trees will be obvious. The proposed mix of trees will have an aesthetic effect unlike the intended uniformity of the original planting of white poplars, yet will be similar to the uneven row of trees that matured throughout the period of significance (Figure 2.14). A mixture of the following three species is recommended to reestablish the Hartshorne Drive street trees.¹¹

Sycamore Maples (*Acer pseudoplatanus*) have 3-6", 5 lobed, dark green, leathery leaves and grayish bark with reddish brown and orange tones that commonly flakes to expose the inner orange brown bark. The species is hardy from planting zone 4 through 7. In favorable conditions these trees may grow to a height of 40-60.' Sycamore maples are not commonly used landscape trees and do not exemplify superior form, seasonal color, or specimen tree qualities, but they are recommended for their hardiness in the face of extreme conditions. These exotics withstand sustained salt-laden winds in exposed coastal areas and are a good choice for street tree replacement along Hartshorne Drive.

Common Hackberry (*Celtis occidentalis*) is a native tree, growing between 40'-60' tall, and known for its tolerance of many types of adverse conditions. Hackberries are not distinctive looking trees but their hardiness makes up for their unremarkable appearance. Their leaves are 2-5" long, ovate in shape and a dull green color. Hackberry bark is a brownish grey with small knob-like projections. They will grow in wet or dry areas; withstand full sun, wind, and sandy soils. Hackberries grow prolifically throughout Fort Hancock with proven success.

London Planetrees (*Platanus x acerifolia*) have proved to be successful at Fort Hancock, witnessed by the numerous mature specimens located throughout the area. They are large trees, reaching seventy to one hundred feet tall with a sixty-five to eighty foot spread. London planetrees are most known for their handsome mottled bark, whose layers show light green, tan, and cream colors. The leaves are a dark olive green and are not known for colorful fall foliage. They are a versatile tree that is known to tolerate a number of environmental stressors. London planetrees are not native.

New trees should be located parallel to the corners of the buildings, not immediately in front of, or directly between structures, to avoid blocking views from the Parade Ground and from the front porches of Officers Row (Figures 2.15 and 2.16). Trees should be centered in the planting strip between the road and sidewalk on the east side of Hartshorne Drive and three feet from the curb on the west side.

Site-Wide Street and Tree Recommendations

Fort Hancock EA Directive:

*Missing historic trees would be replaced in-kind (with some exceptions), and in their historic location.*¹²

Recommendation: Outside of the challenging conditions of Hartshorne Drive, historic monocultural plantings of London planetrees survive as an important character-defining feature of the landscape and should be replaced in-kind. The London plane tree's distinctive mottled, green, grey, tan, and white bark, high canopy, broad spreading habit, and broad, medium green leaves is a striking street or specimen tree that is well adapted to urban conditions and has proved its hardiness at Fort Hancock. Cultivars 'Liberty' and 'Metzam' (Metroshade™) show resistance to anthracnose, a common disease that causes twig dieback and defoliation in both sycamores and London planetrees. 'Metzam' may be preferred because of its typical 70' height, where 'Liberty' reaches 50'.

Implementation Recommendations for Street Tree Plantings:

Typically, young trees have a higher rate of success than older trees when transplanted. However, a larger tree makes a more immediate impact on the landscape and has the perception of greater value. Therefore, it is recommended that mid-sized trees, being approximately one and a half inches in caliper, ten to twelve feet in height, and with a minimum root ball of twenty inches in diameter, be planted at Fort Hancock.¹³

Trees should be planted in a wide and shallow hole, so the root flare of the planted tree is slightly above grade. Cover the excavated area with a two to three inch layer of mulch to prevent damage from mowing equipment and to retain soil moisture. Stake the new trees with two one-inch wooden stakes and secure them with twine and wide straps of burlap where they come in contact with the trunk (Figures 2.17 and 2.18). Trees should receive one inch of water per week for the first year to ensure optimum growth. Street trees should be planted three feet back from the curb or road edge, or otherwise in the center of a roadside planting strip.

See the street tree planting plan in the following chapter of this report for specific species and placement information (Figure 3.29).

Tree Gifting Program

In cooperation with a friends group, the park may consider beginning a program to purchase and endow the long term care of individual trees at Fort Hancock. Adopt-A-Tree programs have been successful in numerous city park systems, cemeteries, and private properties. The advantage of such a program is having independent funding devoted exclusively to the purchase and care of trees.

A partnership between the National Park Service and a friends group is the most effective way to administer a successful tree endowment program. As the National Park Service is free to accept monetary donations earmarked for specific functions, the agency is not legally permitted to hold interest-bearing accounts for such programs, hence removing the possibility of generating future income for the tree program. A not-for-profit or independent organization allied with the National Park Service has no such restrictions and may invest donation money to generate interest and create an endowment.

FOUNDATION PLANTINGS

Historically, the hierarchy of the Fort Hancock environment was reflected in the planting plans around buildings of different land use. Officers Quarters and single family residences often featured small gardens around the perimeter of the buildings while barracks buildings, mess halls and other public buildings were adorned with simple foundation hedges. Service buildings had no foundation plantings. The ornamental borders at the foundations of single family residences contained a variety of plant material, both herbaceous and woody, depending on the preferences and gardening skill of the occupant. Plant material was kept close to the buildings and below the height of the front porch railings. Typical of a military landscape, photographic documentation shows the individual gardens as well maintained.

For the purpose of this report, recommendations for foundation plantings at Fort Hancock fall under three categories that correspond to historic use: residential, public, and service. Residential buildings include all single-family residential structures including Officers Row and non-commissioned officer's housing. Public buildings include those historically used for public purposes at the base, like the YMCA, theater, headquarters building, and post office. Also included in this category are the barracks buildings because of their historically similar landscape treatment as the public buildings. Service buildings are those that were historically used to maintain the operations of the military base like the stables, mule barn, mess halls, fire house, gas station, and bakery. Each building at Fort Hancock has been assigned one of the three categories that dictate the structure's landscape treatment. See Appendix A for a list of Fort Hancock buildings and their corresponding foundation planting category.

Foundation Planting Recommendations:

Site-Wide

Any existing invasive species identified by the federal government or the State of New Jersey as having the potential to cross-pollinate or spread naturally beyond the Fort boundary should be removed. However, this recommendation does not apply to non-invasive non-native species that already exist on site, such as historic privets or daylilies that pose no threat of spreading beyond their present locations.

Residential Buildings

New occupants of historically residential buildings are encouraged to plant beds around their perimeters. The width of all planting beds will be limited to a maximum of four feet from the foundation. All plant material should be kept below the railing of the front porches, with the exception of taller shrubs at the corners of the building. The plant palette surrounding the buildings may be exclusively shrubs -- individual specimens or a hedge; a mixture of shrubs and herbaceous material -- perennials, annuals, and vines, or be exclusively herbaceous material.

Tenants of Officers Row buildings will be required to install and maintain planting beds on their west sides, facing Hartshorne drive. Planting beds along other facades are optional (Figure 2.19). Plantings on the primary (west) facades of Officers Row should be composed primarily of woody shrubs to provide year-round visual interest, but may be edged with a variety of perennials or annuals.

A plant list has been generated to guide residential building tenants in their plant selection. None of the recommended plants are known to be invasive or noxious according to state and federal standards. Not all of the plants suggested were known to have existed historically at Fort Hancock but all are common landscape plants that were used regionally during the historic period and exhibit adaptability to seaside conditions. See Appendix B for lists of recommended shrubs, perennials, vines, and annuals to be planted at historically residential buildings.

Public Buildings

Public buildings should maintain a simple plan of foundation shrubs without creating the look of domesticity. A single species hedge is recommended for each structure, though the plant types may vary between buildings. Foundation shrubs should not be sheared into individual shapes, but allowed to mature into a continuous mass and pruned in order to keep growth within bounds. Plant heights should be kept below the bottom of the first floor windows. Where there are elevated porches, such as is the case with the Enlisted Men's Barracks, plantings should be kept below the exterior porch railings.

In the barracks/mess hall complex, drawn to include the eight buildings located along the crescent shaped east side of the Parade Ground, foundation plantings are required along the buildings' west facades. Other public buildings should contain plantings along the sides that serve as their main entrances. See Appendix B for a list of foundation plantings for public buildings

Service Buildings

Service buildings will be devoid of foundation plantings and surrounded by lawn or groundcover, as they were historically. Any groundcover from the list generated for single family residences may be used around service buildings if it will thrive in the chosen building's microclimate.

An exception to the recommendation above is the treatment of plantings at the MAST campus. The school will retain the current plantings yet will transition to the park's recommended plant list as plants require replacement. Current plants are permitted to remain, as most are appropriate to the Fort Hancock setting.

SPECIMEN PLANTINGS

Hedge on West Side of Hartshorne Drive

The historic hedge on the west side of Hartshorne Drive should be reestablished. A sheared privet hedge once lined the west side of Hartshorne Drive, planted between the White poplar street trees. As the street trees blew over during heavy

storms, many of the shrubs uprooted, leaving an incomplete line of vegetation along Hartshorne Drive. If the roadside hedge is to be restored, a hardier species than privet may be a more practical choice, as the hedge will be subject to high winds, salt spray from the bay, and salt thrown from winter snow plowing. Furthermore, rather than planting the shrubs in line with the street trees as was historically done, it is recommended that the two-foot high hedge be offset 8-10' west of the trees. This modified planting layout will provide a buffer between Hartshorne Drive and the Multi-Use Path that traverses the area between the seawall and the street. The hedge will buffer the recreational use and will provide a physical impediment to keep people from straying from the Multi-Use Path.

The proposed hedge would extend the length of Hartshorne Drive across from the buildings of Officers Row, or from Building 18 to the Post Theatre.

The following shrubs are recommended species to use in reestablishing the Hartshorne Drive hedgerow:

Bayberry (*Myrica pensylvanica*), is a native seashore plant growing abundantly at Sandy Hook and is an established part of the park's vegetative palette. The mounding shrub with fragrant long narrow leaves exhibits high salt tolerance and is an excellent massing plant. If left to mature naturally, bayberry can become large but periodic hand pruning and salt laden winds would easily keep it below three feet in height. Its loose, natural habit does not closely mimic a privet but its hardiness makes it an obvious plant to consider for the hedge replacement.

Highbush blueberry (*Vaccinium corymbosum*) flourish near the ocean, being tolerant of sandy soils and salty conditions. Its 1-2 1/2" elliptical leaves and spreading branch habit creates a loose, moderately dense shrub that will easily grow to 5' high with a 5' spread. The leaves are dark green and similar in size and texture to a privet. Sheering is not recommended but light pruning to control overall height and width is possible. A highbush blueberry hedge would appear less formal and more naturalistic than a clipped hedge.

Inkberry (*Ilex glabra*) is an excellent hedging or massing shrub with 3/4-2" long slender leaves that has a moderately dense, somewhat feathery growth habit. This native shrub will grow to 6-8' tall and slightly greater than that in spread if left to grow naturally but will take pruning. Sheering is not recommended. Mature specimens can become leggy. Inkberries show

tolerance to seaside conditions but may show signs of stress against the heavy salt-spray and sustained winter winds.

Common juniper (*Juniperus communis* var. 'depressa') is another hardy shrub that would be well adapted to the harsh winds and salt along Sandy Hook Bay. The evergreen shrubs grow almost everywhere and take to hedging well. The 'Depressa' variety is a low growing form that rarely exceeds three feet in height, and is the most common variety of this species occurring naturally in eastern North America.¹⁴

Austrian Pines at Post Flagstaff

A semi-circle of overgrown Austrian pine trees (*Pinus nigra*) is located along the west side of the Post Flagstaff, at the northeast quadrant of the Parade Ground. These trees are the few survivors of a planting that once encircled the flagstaff. The extant aged trees with tall trunks and uncharacteristically high canopies no longer define the circular space. Though the Fort Hancock EA recommends replanting the missing trees in the circle and eventually replacing the existing trees in-kind when they die, this two-phased effort is not recommended. Instead, it is recommended that the existing trees be removed -- which are without individual significance as single specimens -- and the historic Austrian pine circle be replaced as a single effort. Thus, the feature will be restored in its entirety. Eight, five to six foot tall trees would restore this feature.

Officers Club Lawn Area

The Fort Hancock Officers Club sits apart from the key areas of activity at the northern extent of the study area. It was built on a slight rise, set back from the ocean and near what now functions as the park maintenance facility. The area was historically planted liberally with street trees, shade trees, and ornamental shrubs that helped screen the building from surrounding post development and reinforce a sense of separation. Open lawn was maintained between the informal, randomly spaced woody plant material. Unlike the majority of Fort Hancock, a diverse palette of trees was used around the Officers Club including the ubiquitous London planetree, as well as several varieties of maples, catalpas, and hackberries. Common landscape shrubs were planted in the lawn, though not surrounding the building's foundation, including hollies, lilacs, yews, and junipers. The plant material is now overgrown (Figure 2.20).

For the purposes of the rehabilitation of the landscape, the Officers Club area is bounded by Knox Road, Canfield Road, and South Bragg Drive, and includes the lawn areas surrounding the building as well as the small triangular piece of land northwest of the building that is created from the intersection of Kilpatrick,

Canfield, and Knox Roads. The informality of the Officers Club landscape should be perpetuated through the maintenance of open lawn and preservation of historic specimen trees and shrubs. Historic pathways and circulation patterns should be preserved as part of rehabilitation plans for this central open space. Of high importance is the retention and replacement of the area's street trees found at the perimeter of the Officers Club parcel. London planetrees should be utilized around the site's perimeter to blend with the character of the adjacent Fort Hancock landscape. See Figure 2.21 for a proposed schematic planting plan for the Officers Club.

Because there will be an interval of time between the completion of this report and the implementation of its recommendations, it is recommended that an updated inventory of the existing vegetation be completed, similar to the one appearing in the "Landscape Preservation Maintenance Guide for Fort Hancock" of 1994, and a detailed planting plan be prepared for the Officers Club lawn area just prior to implementation.

TURF REHABILITATION

Clipped lawn is an essential component of the Fort Hancock cultural landscape. Large areas of open space, notably the Parade Ground and Athletic Field were maintained historically for military pageantry, drilling, and recreation. Currently, the turf around the Fort area is in poor condition. The presence of many Canada geese and limited routine maintenance, outside of regular mowing, has led to a deterioration of the turf. Reestablishing healthy and low maintenance lawns is recommended to improve the overall condition of the cultural landscape.

The Fort Hancock EA outlines a commitment to sustainable landscape maintenance practice, evidenced by the following directives:

Fort Hancock EA Directive:

Turf management and ornamental plantings would include drought resistant species where appropriate to the cultural landscape, in order to reduce reliance on irrigation, pest control, and fertilizer.¹⁵

Recommendation: The tough seaside conditions prove challenging to many common grasses but several turf-type tall fescue blends have been engineered to adapt to the very conditions at Fort Hancock. Several, such as *Enviro-Blend®*, "Triad," and the *Rebels®* blends are known for their ability to withstand heavy use and to grow in poor, dry soils with little maintenance. All are available through the Pennington Seed Company (See www.penningtonseed.com).

Fort Hancock EA Directive:

Turf and foundation plantings may be irrigated using tertiary treated wastewater from the park's treatment plant.¹⁶

Recommendation: It is recommended to allow the turf grass at Fort Hancock to go into summer dormancy before a recycled wastewater irrigation system can be implemented, with the exception of after overseeding when new seeds will require regular watering for germination. This may yield yellowish dry grass in the heat of summer but if this is allowed to occur throughout the site, it will be visually consistent and not out of context with historic conditions. Tall fescue grasses are not harmed by summer dormancy and are known for showing drought resistance.

Additional Turf Grass Rehabilitation Recommendations

The following turf grass rehabilitation recommendations provide additional guidance for establishing healthy and sustainable lawns at Fort Hancock. The fort's existing turf should not be removed to reestablish new turf from bare soil. The following recommendations are for a multi-year turf rehabilitation program which will yield results without disrupting activities occurring on the lawns at Fort Hancock. For more specific turf management recommendations, see Appendix C.

- Identify and apply necessary soil amendments to increase porosity, air exchange capability, drainage, and to enhance resistance to compaction. In severely compacted situations, the addition of porous materials, such as AXIS, a diatomaceous earth product, can help remediate compaction.
- Maintain proper soil pH and fertility; optimum turfgrass growth occurs at a pH of 6.4 - 6.8. Test soil annually and apply lime when necessary.
- Test soil to determine nutritional health. In the northeast, fertilizer provides the best results when applied in late August, September and October. One pound of Nitrogen per 1000 sq. ft. should be supplied with each application. Implement a natural organic fertilizer program to enhance the level and activity of beneficial microorganisms and increase water and nutrient holding capacity of the soil, increased air and water pore space, and improved resistance to compaction.
-

- **Manage Soil Compaction** with a mechanical core aerator. A core aerator removes narrow cores of soil and thatch from the lawn producing a series of small 2-4" deep holes that allow water, air, and fertilizer to reach turf roots. Aerate soil during the most active growth periods of grass, i.e. early spring and/or fall.
- **Renovate Lawn Areas** when they become worn due to heavy use or weather extremes. Repair bare spots by overseeding using a slicer seeder in the early fall only. Set the seed delivery rate moderately low, applying 1-3 lbs of seed per thousand square feet. Larger areas may be renovated using a broadcast seeder. Scarify the surface with a slicer seeder or garden rake to prepare the seed bed and use a drop type or centrifugal spreader. Lightly rake the area after seeding and roll to press the seed into the soil. Renovate lawn areas during the late summer or early fall.
- **To discourage the presence of geese** on the Parade Ground and Athletic Field, evaluate the possibility of applying a mixture of the non-toxic, biodegradable product "Goose Chase®" or equivalent. This liquid produces a bitter taste (active ingredient methyl anthranilate) that is unpleasant to geese. This product is typically mixed according to label instructions with water at a ratio of sixty parts water, one part "goose chase®" and applied through a sprayer at a rate of sixty gallons of the diluted product per acre. The product is reapplied after mowing for optimum effectiveness.
- **Alter Mowing Practices.** Lawns should be mowed often without removing more than one third of the total height. Grass height should be 2" for spring and fall and 2 ½" for the summer months. Mower blades should be sharpened regularly to avoid tearing the leaves. Clippings should be left on the lawn unless a disease outbreak occurs. The mowing pattern should be routinely changed so that grooming lines do not occur.
- **Manage Thatch Build-Up** by removing all but 1/2" of thatch to ensure proper growth and quality of the grass.
- **Manage Weed Growth** by adjusting soil pH and fertility levels and by mechanically overseeding the area. Use top quality grass seed with less than .1% weed content. Some chemical weed management will also help re-establish the turfgrass. Consult with the regional IPM coordinator to discuss the use of a pre-emergent herbicide.

- Provide turfgrass management training for maintenance staff

SITE FURNISHINGS AND FIXTURES

A wide range of site furnishings, notably for lighting, are located throughout Fort Hancock, representing many years of habitation and evolving land use.

Historically there were many styles of street lights, including a cast iron gooseneck light that was installed after electricity was brought to the peninsula in the early 1900s. Only one of these remains. Multiple other styles of street lighting were introduced in subsequent decades, several of which remain in varying states of repair.

A large lighting improvement effort was undertaken in the 1950s and concrete light posts replaced older models (Figure 2.22). These 1950s-era lights received new luminaires in the 1960s. Multiple examples remain along Kessler Road and around Sergeants Row, though as a group they are in disrepair.

In contrast, Hartshorne Drive has a series of modernly styled streetlights installed in the 1960s that are in good condition and provide visual continuity along the road (Figure 2.23). These lights have cylindrical aluminum supports and a simple upright, lantern-style light fixture with a shade to direct light downward.

The NPS installed new lighting around Fort Hancock in the 1980s to supplement the existing historic streetlights. These newer fixtures, sometimes called “cobra heads,” have a square, tapered, grey-stained, wood poles and aluminum light fixtures supported by an aluminum arm. These are predominantly located along roadways and parking lots, not in pedestrian areas.

Lighting was added more recently around the MAST campus and NOAA Marine Laboratory. The lights at both facilities are similar in style but the MAST lights are pole-mounted square boxes that shine light downward and the NOAA lights have similar square luminaires mounted on arms. Both are painted a flat dark brown color (Figures 2.24 and 2.25).

A few new experimental light poles have been added along Kessler Road that mimic the historic gooseneck and Walter Reed styles of the early 1900s.

Overall, the street lights of Fort Hancock are in poor condition and are dissimilar in scale, material, and style. However, with the exception of the most recent trial

introductions, the fixtures date to the period of significance and are representative of design choices made during the active period of Fort Hancock.

Other site furnishings include the Parade Ground flagpole, several benches, and picnic tables. A concrete sidewalk and several large Austrian pine trees surround the tall, white flagpole that is symbolically located at the center of Fort Hancock. Two weathered wood benches are located at the YMCA. They are simple wood slat benches features metal pipe supports mounted permanently into the surrounding concrete pad. Fifteen to twenty picnic tables are placed at Guardian Park in the warm months. These are typical aluminum tables on metal pipe supports. No trash cans for public use exist because of the park's carry-in, carry-out policy. Dumpsters and trash cans are provided around park housing and buildings occupied by tenants and NPS offices.

SITE FIXTURES -- FEATURE LEVEL RECOMMENDATIONS:

STREET LIGHTING

Through implementation of its environmental policies, the National Park Service seeks to reduce night-sky light pollution by employing materials and methods that include timers, motion detectors, and specially designed light fixtures. The agency also seeks to preserve the historic character of its historic properties. The following recommendations deal broadly with choices relating to the compatibility of new and replacement light fixtures at Fort Hancock. In addition, particular care has been given toward recommending an effective and harmonious arrangement of light poles with street trees. Nevertheless, the following lighting recommendations serve as a point of beginning, and are not intended to replace engineering calculations and findings that would result from a professional lighting study. Such a study, prepared by lighting engineers, is recommended prior to planning construction work. However, the outcome of an engineering study should not be understood to replace management judgment or agency policy. A park superintendent has the discretionary authority to implement a lighting plan that does not meet levels of outdoor lighting required by building codes or suggested by lighting industry guidelines in order to protect other resource values.

Lighting recommendations for Fort Hancock are directly influenced by the chosen treatment option generated in the 2003 Fort Hancock EA and refined in the 2003 Fort Hancock FONSI. This language provides welcome direction for the complex task of creating a lighting plan for Fort Hancock. As stated in option one, or the preferred alternative identified by the Fort Hancock FONSI:

When it is necessary to replace important resources that are missing or deteriorated beyond repair, or to make alterations and additions to assure continued use, the new features will be contemporary in design yet compatible with character-defining features of the District. New features will not attempt to replicate historic features but will be differentiated in a way that does not create a false historical appearance.¹⁷

As directed by the 2003 Fort Hancock EA and 2003 Fort Hancock FONSI, two replacement lighting strategies will be implemented at Fort Hancock; the first is replacement-in-kind of historic lights, and the second is selecting a new fixture that is contemporary yet compatible with the character of the district to be located in areas that were not historically lighted or in areas that currently have non-historic lighting.

Since lighting from several different eras within the period of significance exists on site, it is recommended to perpetuate the eclectic mix of fixtures. Two types of historic streetlights remain and warrant replacement-in-kind. One is the spun aluminum fixture dating to the 1960s that lines the east side of Hartshorne Drive and the other is the 1950s era cast concrete fixture located on Kessler Road, around the Parade Ground, and in the vicinity of Sergeants Row. Missing or deteriorated examples of these two historic lights will be replaced with commercially available, cost effective replacements that will closely match the originals in design, color, texture, and material.

All other areas of Fort Hancock --including both areas that have existing non-historic lighting or in areas that are not currently lit and will need to be in the future -- will use a new fixture of a contemporary yet compatible style. This new light style will be clearly non-historic but will not draw attention by being either too modern nor heavily ornamented. The new fixture will be made to blend into the landscape through the use of a dark surface color and a design that is similar to the scale and basic styling of the historic lights.

See Figure 2.26 for a diagram of the proposed locations of the different lighting styles in the study area.

In general terms, implementing a lighting plan at Fort Hancock will lead to higher nighttime light levels than currently exist due to the large number of non-functioning street lights and historically wide fixture spacing. However, this does not mean that the new lighting plan should create more light than necessary to provide a safe nighttime environment for tenants and residents. The treatment

plan relies on guidelines set by the industry accepted lighting standards association, the Illuminating Engineers Society of North America (IESNA).

The first component of identifying adequate light levels for Fort Hancock includes matching the site with the IESNA's lighting categories of Local/Subdivision, Collector/Main Street, or Major/Roadway that refer to the level and type of use. Recognizing that much of the projected use Fort Hancock will be during daylight hours, limited amounts of twenty-four hour hospitality, residential and educational activities will require lighting. Historic Fort Hancock should be categorized as requiring Local/Subdivision light levels. According to IESNA definitions, Local/Subdivision lighting "is ideal for areas with low nighttime pedestrian traffic, such as residential developments consisting of single-family homes, townhouses, small apartment buildings, and small neighborhood shops. It is also suitable for roadways providing direct access."¹⁸ This information then provides guidance on choosing mounting height, pole spacing, and lamp wattage.

Local/Subdivision light levels should maintain 0.5 to 0.7 footcandle illuminance and 6 to 1 average/minimum uniformity. This translates into the formula for maintaining adequate light levels throughout the lighted area, while avoiding large areas of darkness. While footcandles, defined as the light levels generated from the lamp and density of light on the horizontal and vertical planes, are important to establish, maintaining adequate uniformity is most important. This means avoiding cones of darkness between light fixtures. Uniformity is calculated by averaging the highest generated light levels with the lowest light levels appearing along the lighted surface.

As a matter of policy, reducing night-sky pollution is a priority for the adaptive use of Fort Hancock. This can be accomplished through a number of measures including spacing the fixtures appropriately to avoid over-lighting and by choosing light fixtures that cast light downward. IESNA has created a ranking system that rates light fixture or "luminaire" types based on how much light is released into the night sky, known as cutoff classification. At Fort Hancock, the range of options considered for replacement fixtures should fall into the "semi-cutoff" category while the new fixtures should be classified as "cutoff."

IESNA defines semi-cutoff luminaires as those that allow less than five percent of the total lamp lumens to project above ninety degrees from the lamp source.¹⁹ Cutoff luminaires do not exceed two and a half percent of the lamp lumens above 90 degrees. Achieving cutoff and semi-cutoff status will be accomplished by choosing luminaires with downward facing caps and through the use of reflector

caps. Semi-cutoff fixtures are appropriate for replacements of historic fixtures that must conform to existing stylistic constraints. However, since the new fixture has no precedent at Fort Hancock and will be of a contemporary design, a higher standard cutoff classification is achievable.

The use of timers, motion detectors, or mechanisms to vary the intensity of light based on time of day or level of activity may be used at Fort Hancock to reduce light pollution and help conserve energy.

Recommendations for Selecting Replacement Historic Fixtures

Historic streetlights will be replaced in-kind with fixtures that share the same proportion, material, color, and styling as the originals. Both spun aluminum and cast concrete streetlights are readily available in commerce and several manufacturers have stock items that will meet the project requirements.

While most of the Hartshorne Drive streetlights are in working condition, it is recommended to replace the entire system of lights with in-kind replacements. This is a justifiable action under the rehabilitation treatment due to health and safety considerations and the desire for the proposed lighting plan to be compatible with the proposed street tree plan. Furthermore, at over forty years old, the Hartshorne Drive lights are near the end of their useful life, helping justify their replacement with new fixtures that share character defining characteristics.

As stated earlier, trees along Hartshorne Drive should be aligned with the corners of the residences in order to preserve water views from both the buildings' front porches and from the Parade Ground. As the existing lights on Hartshorne Drive are two hundred feet apart, casting insufficient light for a vehicular roadway, a replacement fixture would need to be inserted between each existing fixture. In doing this, the new and existing lights would come into conflict with the proposed street trees. It is recommended to replace the existing historic street lights in-kind at approximately one hundred feet on-center, located between the proposed street trees to reduce conflict between the light source and tree canopies and to retain open view corridors.²⁰

It is recommended to replace the Hartshorne Drive streetlights with the "Hermosa" fixture made by Bieber Lighting®. This aluminum light has a similar semi-cutoff capped luminaire, simple round, non-fluted pole, and can be specified to the same height, color, and surface finish as the existing historic lights. A sixteen-foot fixture with a non-painted brushed aluminum finish is recommended. See Figure 2.27 for an image of the fixture.

In-kind replacement fixtures for the concrete light poles found at the Parade Ground and Athletic Field can be purchased from SkyCast Inc®. The recommended fixture features an octagonal concrete pole with a tapered base from their "Milwaukee" line, specified with a salt-and-pepper concrete finish. The semi-cutoff luminaire has a round globe covered with a wide cone-shaped cap. Seventy-watt high pressure sodium bulbs with reflectors are recommended. Replacement concrete lights should be approximately twelve feet tall. See Figure 2.28 for an image of the fixture.

Since the streetlights in Sergeants Row remain in good condition and provide adequate light for the residential setting, they should be preserved. When they no longer function, they should be replaced with the Skycast® cast concrete replacement fixture.

Similar to Hartshorne Drive, the historic spacing of the existing concrete streetlights around the Parade Ground is wider than is recommended. An approximately one hundred foot spacing using a subdued medium-level seventy-watt high pressure sodium bulb would conform with the recommendations of IESNA (See Appendix D for lighting diagrams that illustrate the balance between pole spacing, light sources, and uniformity).

While taking the industry standards into consideration, the park Superintendent retains the discretionary authority to implement a plan that does not fully meet all code requirements to satisfy the mission of resource preservation. Since the lighted path on the east side of the space, or west side of Barracks Row, is for pedestrians only and since Kessler Road on the west side of the Parade Ground is a low speed, low traffic service road, the spacing of street lights should be expanded. Installing the street lights at two hundred feet on-center instead of one hundred feet on-center will reduce the number of fixtures around the Parade Ground, reducing visual intrusions in the landscape and will reduce the total light output on site.

The final decision on the number and spacing of lights should be made as part of a professional lighting study completed by a qualified lighting engineer. The lighting study should be based on the lighting fixtures and criteria outlined in this cultural landscape treatment plan.

Recommendations for New Streetlights and Replacements for Existing Non-Historic Lights

A new fixture style is recommended site-wide for areas of Fort Hancock that were not lit historically and for areas that currently have non-historic lighting.

These features will be contemporary in design yet compatible with historic design precedents established at the fort. The light should be unremarkable in its styling and a dark green color so it will not draw attention away from the significant historic resources of Fort Hancock's landscape.

A composite material is recommended for the new light poles. Composite poles are made from a number of materials, mainly fiberglass, and have many benefits. Installation is simplified due to their light weight, yet despite this, they offer excellent strength in windy situations. Of all the pole materials, composite is the closest to maintenance free. Because of the manufacturing process, the finish will not rust, chip, or flake. Natural solvents may be used to remove graffiti and after their working life, the poles can be recycled. Composite poles are generally less expensive than aluminum, cast iron, and concrete and have life-spans similar to aluminum poles. Nicks or gouges can be touched-up with repair kits supplied by the manufacturer.

It is recommend to use luminaires made by Lumec® and composite poles made by Shakespeare®. The lights should be twelve feet tall. Three alternative fixture styles are proposed though all share similarities such as conical luminaires and shielded caps to direct light downward. Two are from Lumec's "Opticone" series, models OPC and OPC-YM and the third alternative is model CAND6 of Lumec's "Candela" series. See Figures 2.29-2.31 for images of the new lighting alternatives.

An exception to the recommendation to replace all non-historic lights with the new light style is the retention of existing lights at the MAST campus and NOAA laboratories. Since the lights in these areas are relatively new, energy efficient, and non-light polluting, replacement with the site-wide compatible fixture should only occur after these are no longer functioning. At the future time when outdoor lighting serving the MAST campus and NOAA laboratory is replaced, lighting placement should be reevaluated so the resulting level of illumination is consistent with the neighboring areas of Fort Hancock. Replacement lighting, in addition to being of a consistent style, should also employ timers and motion detectors wherever practical in order to reduce night-sky pollution. See Figures 3.29-3.32 in the following chapter for the proposed Fort Hancock lighting plan.

PATHWAY LIGHTING

Path lighting will become necessary at Fort Hancock when pedestrian use of the site increases due to new occupants. Fixtures should be placed in pedestrian areas not adequately lit by street lighting. This includes along the path between

the mess halls and the barracks and along sidewalks leading to parking lots. Since path lighting will be an introduced feature to the cultural landscape, it is recommended that the lights be an unobtrusive style that does not attract the eye --modern yet of a low profile -- and focusing light downward to avoid night-sky pollution. It is recommended that the fixtures be a dark green color, similar to the new streetlights. See Figure 2.32 for an image of the recommended bollard light, the BD8 by Lumec.

BENCHES

Several types of benches existed around the fort during the period of significance, though specific information about dates and locations of different styles is scant. One bench that is clearly documented in site photographs was the “World’s Fair” style, which was a typical wood slat park bench with slender cast iron supports and circular armrests. It is recommended to use commercially available World’s Fair style benches as needed at Fort Hancock. See Figure 2.33 for an image of a recommended bench style, that may have a back or be back-less. The new benches should be located next to a sidewalk or building, not placed in open lawn. Benches should be located along the curved east sidewalk of the Parade Ground, near the chapel and mule barn, and near other public use buildings.

TRASH RECEPTACLES

Fort Hancock, like all of Sandy Hook, is a carry-in, carry-out facility. This policy will continue in the future so no public trash receptacles will be provided at Fort Hancock. However, trash removal service will be provided for residents and tenants of Fort Hancock. Dumpsters will be provided at buildings with commercial uses by an independent refuse contractor. Effort should be taken to place the containers strategically to avoid visual intrusions near front entrances or in areas of high visitor traffic. Screening elements such as simple wood fences or minimal hedging (chosen from the palette of acceptable hedge material) may be utilized to reduce the impact of highly visible dumpsters.

Residential buildings, including the park housing in Sergeants Row and the buildings of Officers Row, will have smaller individual trash storage containers. These should be structures large enough to hold two or three typical residential trash cans, be made of pressure treated wood, and have secure lids to keep out wildlife. Any historic trash enclosures remaining on site should be preserved, whether they are utilized or not.

DRINKING FOUNTAINS

Several water fountains should be placed in areas of high visitor use. Recommended locations may include near the National Park Service visitor

center and buildings frequented by the public. A straightforward, unadorned fixture should be used to clearly delineate that they are non-historic features. A dark green, similar to the color of the new streetlights, should be used. See Figure 2.34 for a graphic of recommended style of ADA compliant drinking fountain.

BICYCLE RACKS

As the site is used by recreational visitors, bicycle racks should be incorporated into the palette of site fixtures. A straightforward, dark green, metal rack is recommended and should be located in high visitor use areas like at the National Park Service visitor center and ferry landing. See Figure 2.35 for a graphic of recommended style of fixture.

PICNIC TABLES

Picnic facilities are currently available at Guardian Park and it is recommended that this use continue. When the existing picnic tables fall into disrepair, it is recommended to replace them with similar features for ease of transporting and storage during the winter months. Tables should have aluminum benches and table tops, supported by metal pipe rails. A dark green surface color is recommended to visually tie them to other site features. Picnic tables should be restricted to Guardian Park. See Figure 2.36 for an image of a recommended picnic table style.

STREET SIGNS

A draft Fort Hancock Sign Plan was created in 2002 and examines in detail the historic signage of the district and makes recommendations for future sign placement. It was prepared in anticipation of the adaptive use program when the need for signage will increase. The report describes historic and existing signs in the district and creates a plan for the design, location, and implementation of future signage. Paramount to the recommendations is the desire to use compatible features that are uniform throughout Fort Hancock, a principle supported by this landscape treatment plan. This report supports the findings and recommendation of the 2002 draft Sign Plan.

The draft Sign Plan specifies that new signage should be limited to reduce the impact on the cultural landscape. Design specifications describe the kind of signage allowable for different types of buildings. Also discussed is the process required for reviewing and placing new signs as the need arises.

One remaining historic street sign is located in the park archives. It is made of two solid metal plates, placed perpendicularly to one another, and was once mounted on a metal pole. The historic signs were reddish brown with black

lettering. A distinctive feature of the historic signs was the placement of a small rectangular "Fort Hancock" emblem at the top of each street sign (Figure 2.37).

It is recommended to select new street signs of a contemporary design, similar to typical municipal signs. Six inch high, rectangular signs with brown backgrounds and white lettering are recommended. Two single-faced signs should sandwich a square pole with perforated holes that accepts mounting hardware. At cross streets, a second street sign should be placed perpendicularly below the first sign. A smaller sign, approximately four inches high, reading "Fort Hancock" should be placed on the top of each pole to create a unifying element throughout the historic district's signage. See Figure 2.38 for an example of such a sign. This identifying element shares design similarities with historic Fort Hancock signage, yet is not an attempt to duplicate the original features. In accordance with the Federal Highways Administration, Manual on Uniform Traffic Devices, the bottom of the signs should be no less than seven feet from the ground.

UTILITIES

One particularly important action described in the Fort Hancock EA relating to utilities is the burying of existing and proposed new utilities. If this is not carefully considered, the layout of new underground utilities may bear negative consequences for the site's street trees. Engineering drawings for underground utilities should be coordinated with a certified arborist or natural resource manager. The Fort Hancock EA calls for the Hartshorne Drive utility corridor to be located on the east side of the street, approximately twelve feet from the edge of the roadway and as close to the sidewalk as possible. Underground conduit should be located well to the east of the sidewalk. The area between Hartshorne Drive and the sidewalk should be a dedicated planting strip to promote healthy tree root development. It is vitally important that Hartshorne Drive street trees and underground utilities not share the narrow strip between the road and the sidewalk. Electrical conduits feeding streetlights located within the planting strip should be arranged to "T" off of the underground electrical line buried east of the sidewalk. Should the electrical line serving the streetlights be placed within the planting strip to run parallel to the road for its entire length, this will adversely impact the survival rate for the street tree planting.

Currently, numerous utility boxes are located in between the residences of Officers Row, undisguised and prevalent. As clipped lawn surrounds the structures, the boxes are noticeable features on the landscape. It is recommended that existing and proposed utility boxes be placed underground or in close proximity to the structures they service.

ENDNOTES:

¹ Fort Hancock EA, July 2003, Appendix C.

² Fort Hancock EA, July 2003, 30.

³ Ibid.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid.

⁹ "Flora of Gateway National Recreation Area," Second Printing, 1997, National Park Service, Gateway National Recreation Area, Division of Natural Resources and Compliance, 4.

¹⁰ Fort Hancock EA, July 2003, Appendix D: "Guidelines for the Replacement of Historic Trees and Building Foundation Plantings."

¹¹ Trees considered and rejected for replanting along Hartshorne Drive and Kessler Road: Lacebark elms (*Ulmus parvifolia*), whose common name derives from its characteristic mottled and exfoliating bark, matures to a 40'-50' height. Although an elm variety, this non-native species is resistant to Dutch Elm Disease and has been used in a variety of landscape situations. Its greatest attribute is its extreme toughness; the tree has shown durability in many difficult growing conditions, including along coastlines. Lacebark elm was eliminated from consideration for planting at Fort Hancock because of its non-native status.

American elm (*Ulmus americana*) cultivars, 'Valley Forge,' 'Homestead' have exhibited resistance to Dutch elm disease. These varieties all exhibit the classic vase-like shape, have 3"-6" ovate-oblong leaves, and have dark gray bark with broad, deep, intersecting ridges. Their habit is upright with a high arching crown and vase shape. Though American elms show tolerance to salts in the soil, their ability to withstand heavy wind and salt spray remains in question. Because of this, American elm is not recommended for use at Fort Hancock.

Sugar Hackberry (*Celtis laevigata*) is a common and hardy variety of hackberry that characteristically grows in low wet areas. The cultivar 'Magnifica' introduced by Princeton Nurseries is said to be a cross between *Celtis occidentalis* and *Celtis laevigata* is untroubled by witches broom in its branching that is otherwise common among hackberries. The orange-red to blue-black fruit is sweet and attractive to birds, providing the common name. The Sugar hackberry was eliminated from consideration for planting at Fort Hancock because of its non-native status in the region.

¹² Fort Hancock EA, July 2003, Appendix D: "Guidelines for the Replacement of Historic Trees and Building Foundation Plantings."

¹³ These proportions of caliper to height to root ball size are specified by the American Standards for Nursery Stock, typical shade trees.

¹⁴ Dirr, 438.

¹⁵ Fort Hancock EA, 31.

¹⁶ Fort Hancock EA, 31.

¹⁷ Fort Hancock FONSI p 3

¹⁸ "Outdoor Lighting Application Guide," Lumec® product literature.

¹⁹ "Outdoor Environmental Lighting Guide," Holophane Lighting product literature.

²⁰ Typically, pole spacing for local roads should be no greater than six times the height of the fixture. This is a widely accepted lighting industry "rule of thumb."



Figure 2.1. The Parade Ground is bordered by Barracks buildings, pictured in the background, and the structures of Officers Row, just outside of the frame at image right. OCLP, 2004.



Figure 2.2. Officers Row fronts onto a strip of open space along the water's edge, as shown here. The buildings back onto the Parade Ground, one of the defining spaces of Fort Hancock. OCLP, 2004.

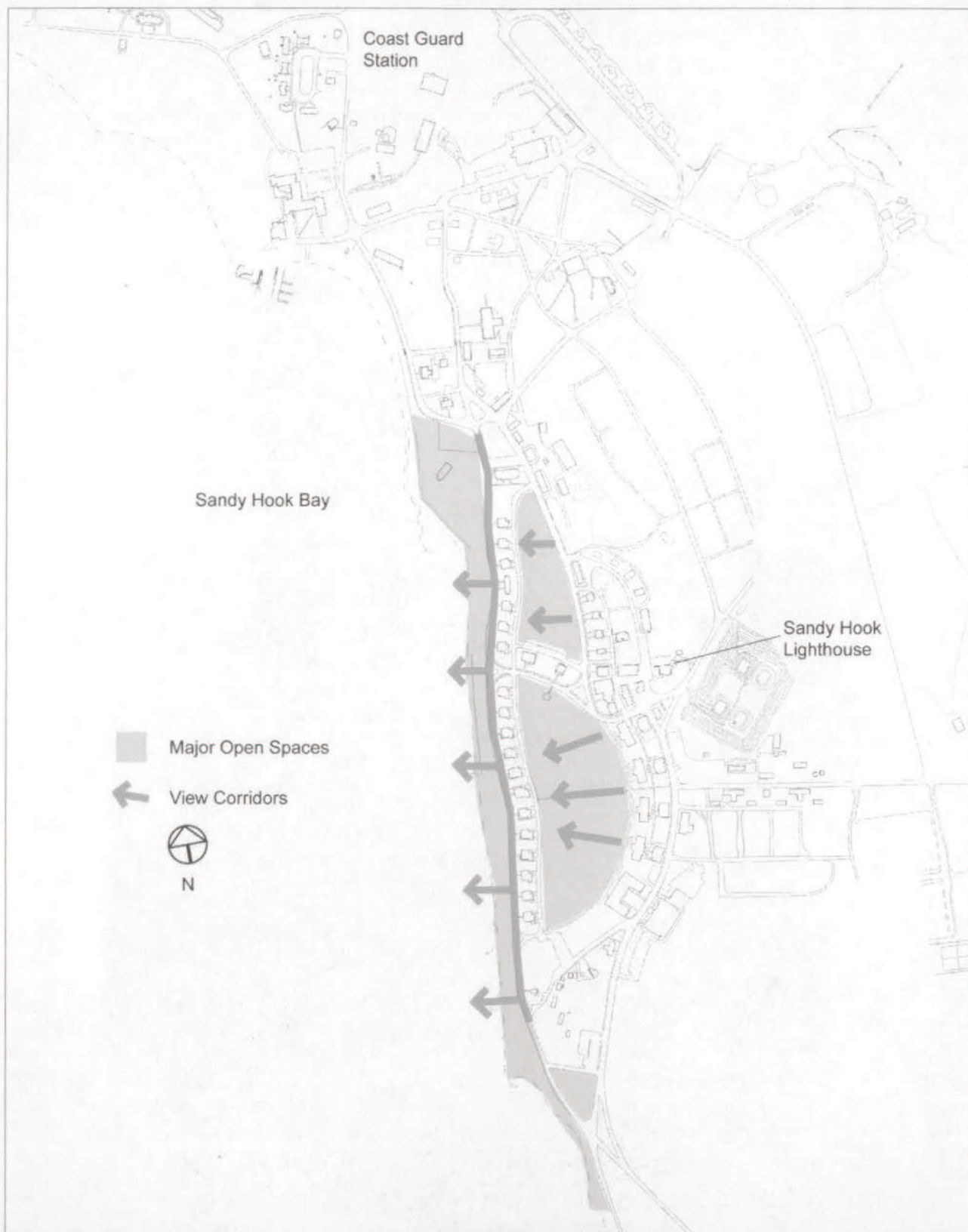


Figure 2.3. Diagram of defining open spaces and views at Fort Hancock. The most significant views on-site are those from the Fort to Sandy Hook Bay, which were used historically to define the spatial organization of Fort Hancock. Other notable views not illustrated on the diagram include the view north and south along the Parade Ground, the view south across the Athletic Field to the Post Flagstaff, views to Officers Row from the bay, and views of the Sandy Hook Lighthouse from the bay and the Post Flagstaff. Not to scale. OCLP, 2004.



Figure 2.4. Above ground utility boxes are located throughout the study area, notably between the buildings of Officers Row, as pictured above. These fixtures should be located to one side of the gap between Officers Row quarters or underground, rather than in the center of the open space. OCLP, 2004.



Figure 2.5. The building currently leased by the Audubon Society is typical of the smaller single family homes at Fort Hancock. OCLP, 2004.

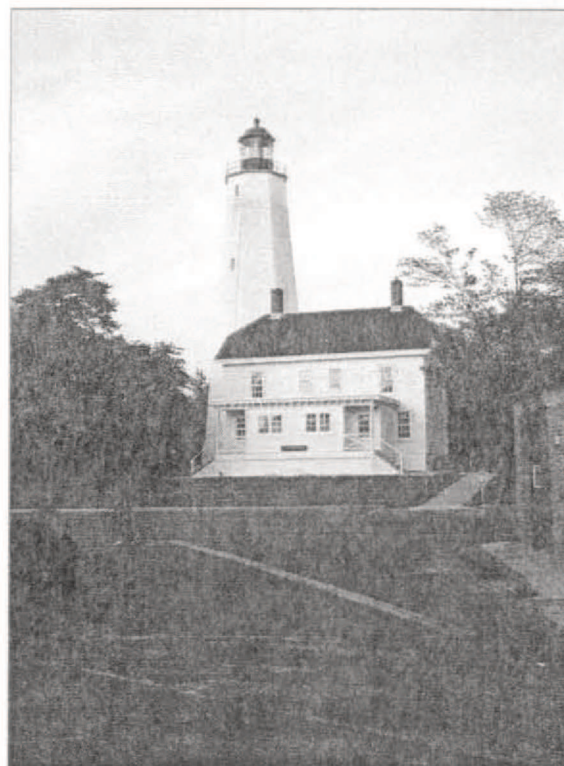


Figure 2.6. The Sandy Hook lighthouse and Keepers Quarters Museum. OCLP, 2004.



Figure 2.7. Vehicular and pedestrian circulation is highlighted in this diagram of Fort Hancock. Existing roads, paths, and parking lots appear white, while all other spaces including lawns and building footprints are colored black. Not to scale. OCLP, 2004.



Figure 2.8. Poured concrete sidewalks line the east side of Hartshorne Drive. OCLP, 2004.

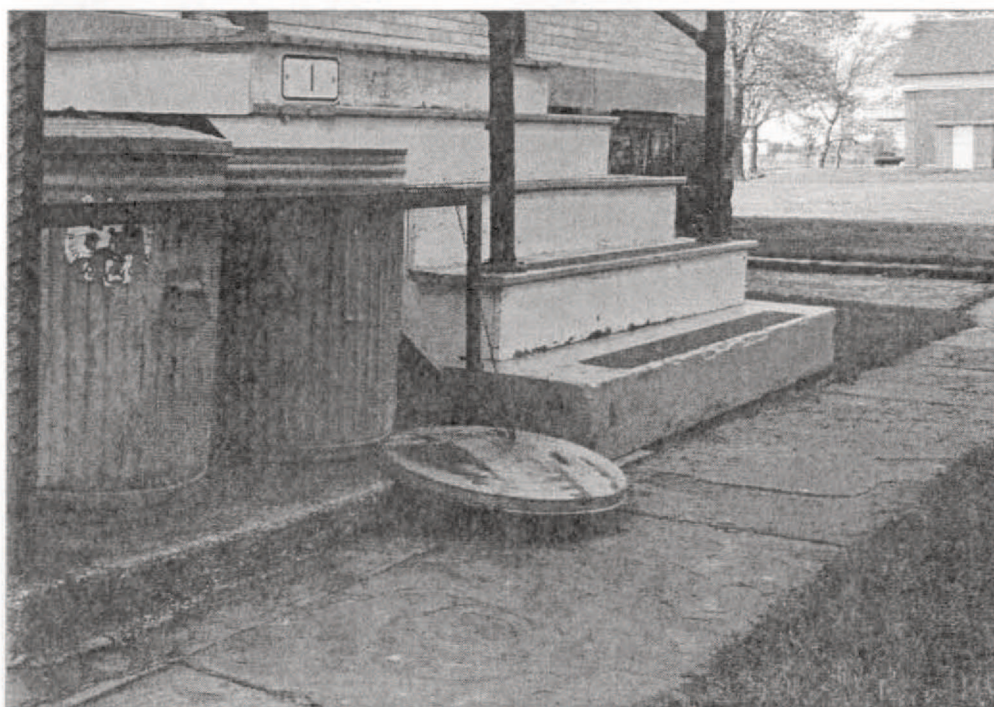


Figure 2.9. Some walkways surrounding the homes of Officers's Row are flagstone, like the one pictured above. Also note the trash can enclosures. OCLP, 2004.



Figure 2.10. The multi-use path travels between the water's edge and Hartshorne Drive. OCLP, 2004.

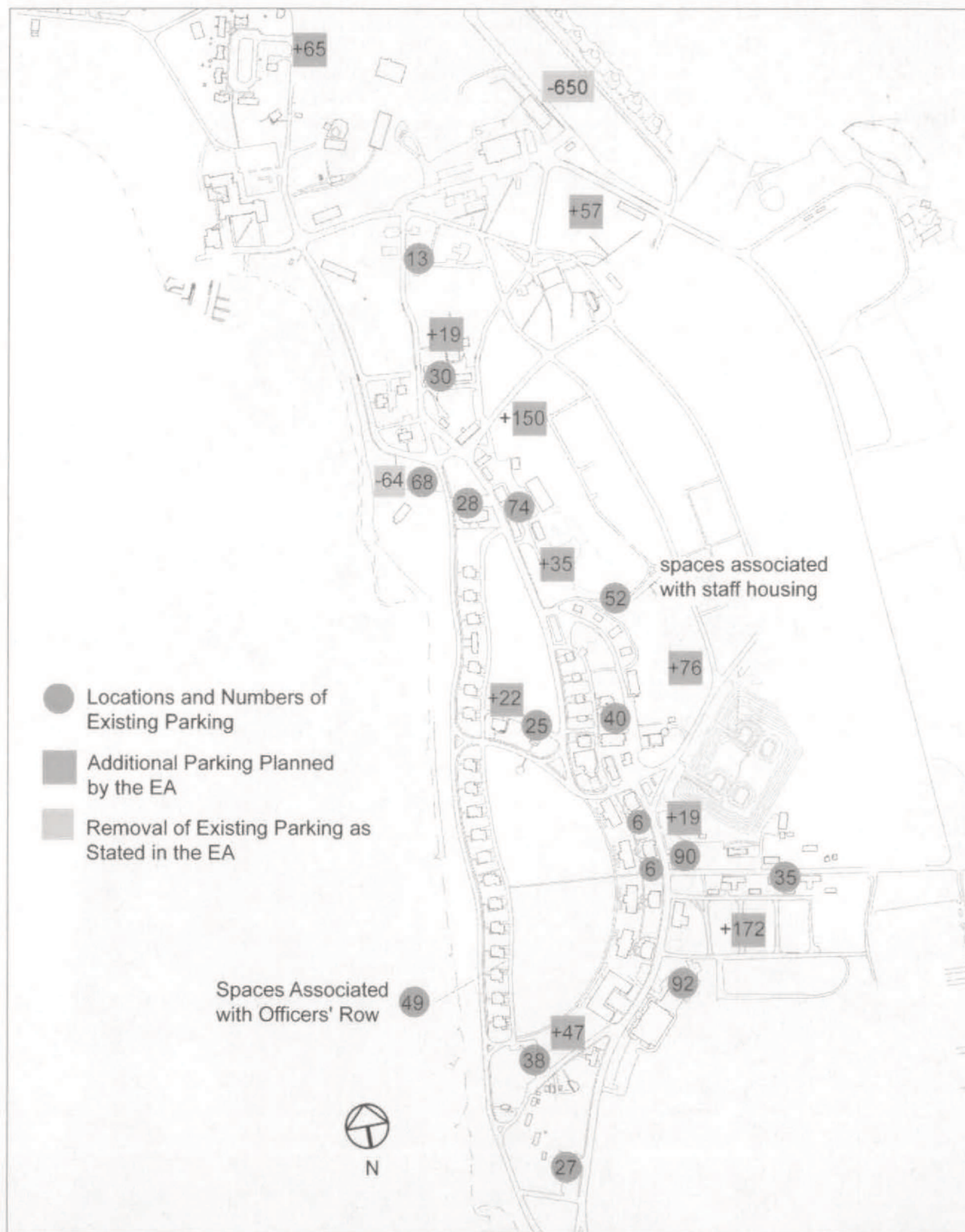


Figure 2.11. Parking diagram highlighting existing parking lots and the changes proposed in the Environmental Assessment. OCLP, 2005.



Figure 2.12. Mature street trees line the curved edge of the Parade Ground. OCLP, 2004.



Figure 2.13. Several self-seeded trees have been allowed to mature along side the front porches of Officers Row. These should be removed. OCLP, 2004.



Figure 2.14. 1930 aerial photo shows the inconsistent street tree coverage along Hartshorne Drive that was typical throughout the period of significance. September 1930, National Geographic aerial photograph of Fort Hancock. Copy in Gateway NRA Museum Collection, Catalogue #833.

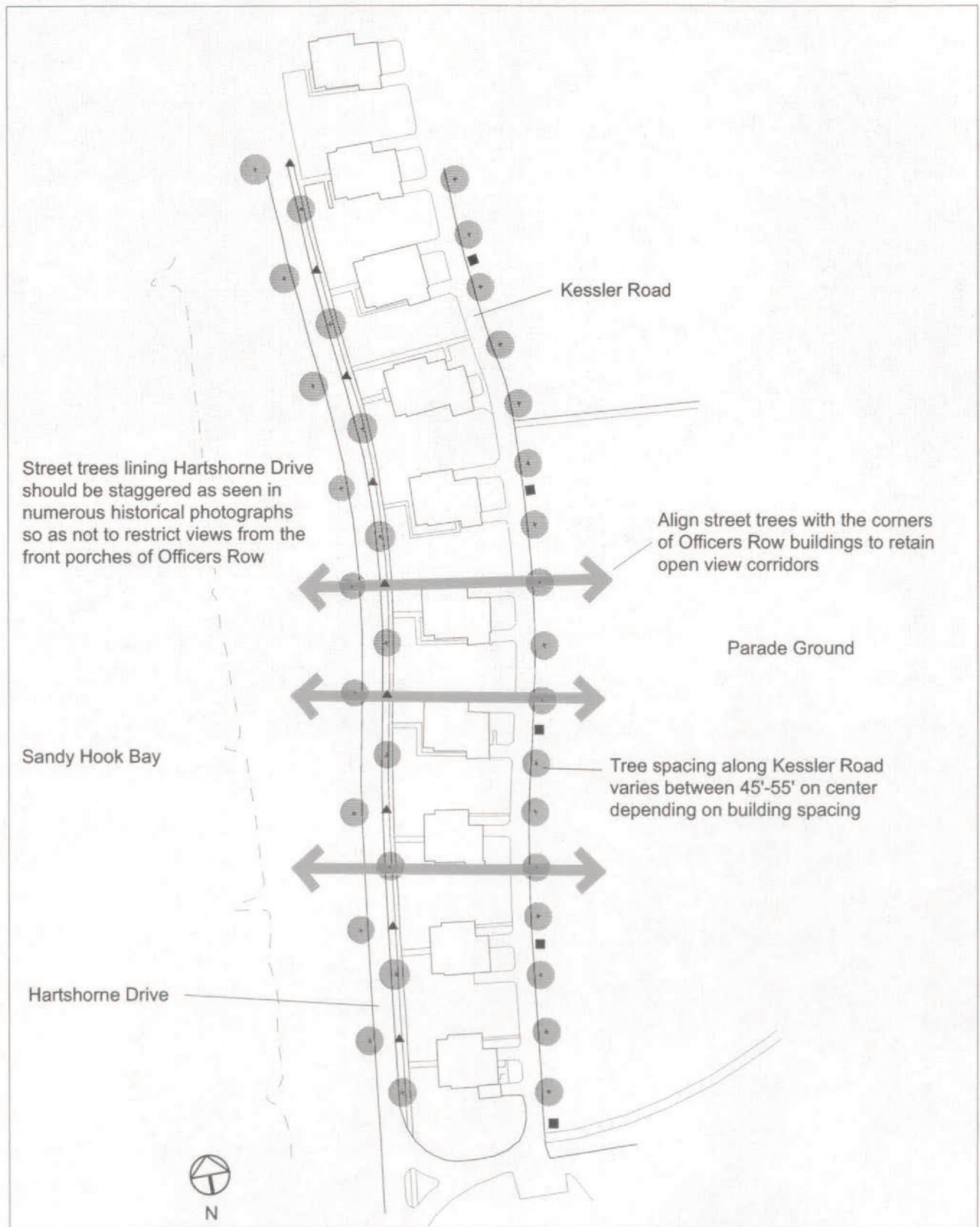


Figure 2.15. Hartshorne Drive street tree planting diagram. The triangles represent proposed replacement streetlights along Hartshorne Drive and the squares represent proposed replacement street lights along Kessler Road. The new lights are located to avoid interfering with open view corridors between the Parade Ground and Sandy Hook Bay and are evenly spaced between street trees. Not to scale. OCLP, 2004.



Figure 2.16. Proposed Hartshorne Drive streetscape after replanting of street trees and hedge, looking south. OCLP, 2005.

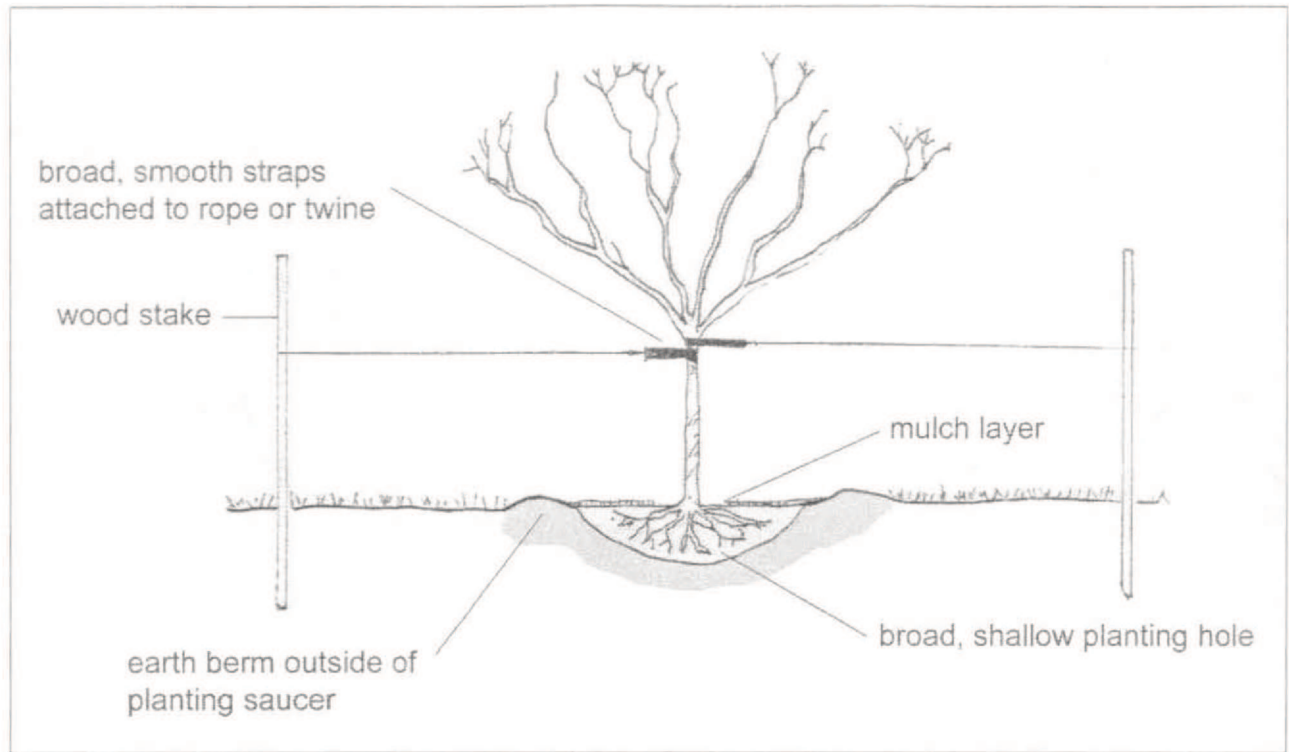


Figure 2.17. Tree planting diagram. OCLP, 2005.

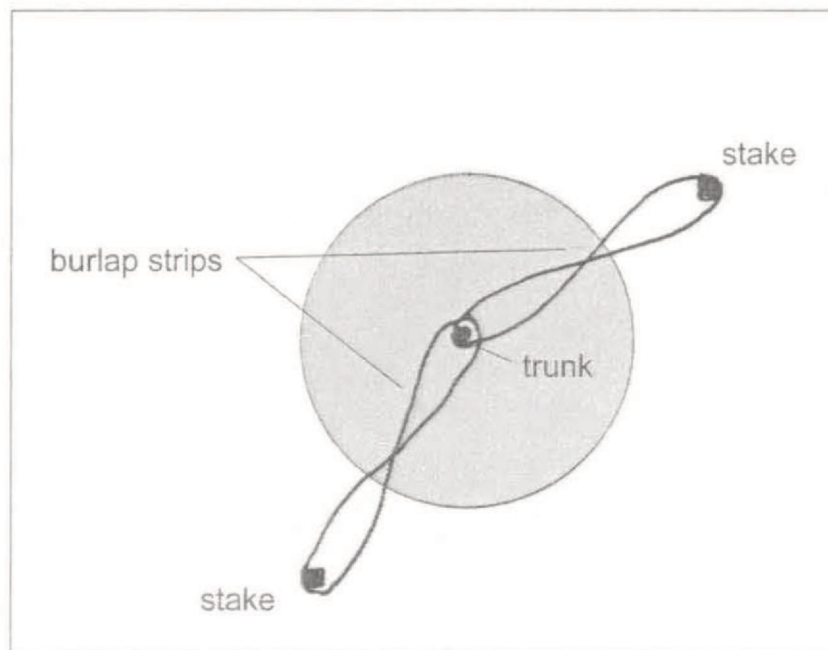


Figure 2.18. Tree staking diagram. OCLP, 2005.

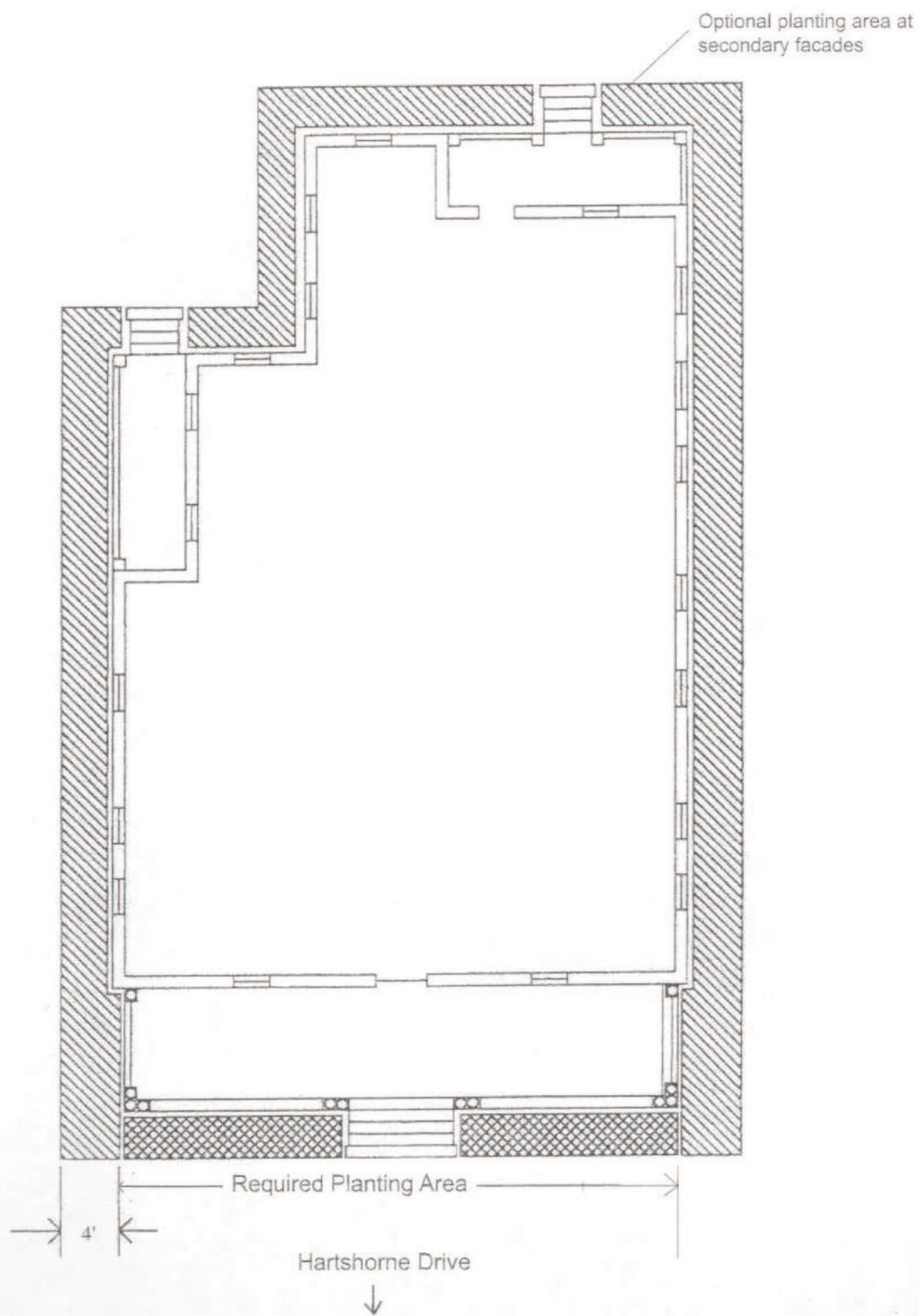


Figure 2.19. Diagram of foundation planting areas at Officers Row buildings. Graphic from the 1999 Fort Hancock Rehabilitation Guidelines.



Figure 2.20. Overgrown vegetation dominates the Officers Club landscape. The building can be seen through the trees in the background. OCLP, 2005.



Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Officers Club

Schematic Planting Plan

Figure 2.21



National Park Service
Olmsted Center for
Landscape Preservation
50 Warren Street
Brookline, MA 02445
617-399-1889

LEGEND

Scale: 1"=50'



Figure 2.22. A surviving concrete streetlight in the vicinity of Sergeants Row. OCLP, 2005.

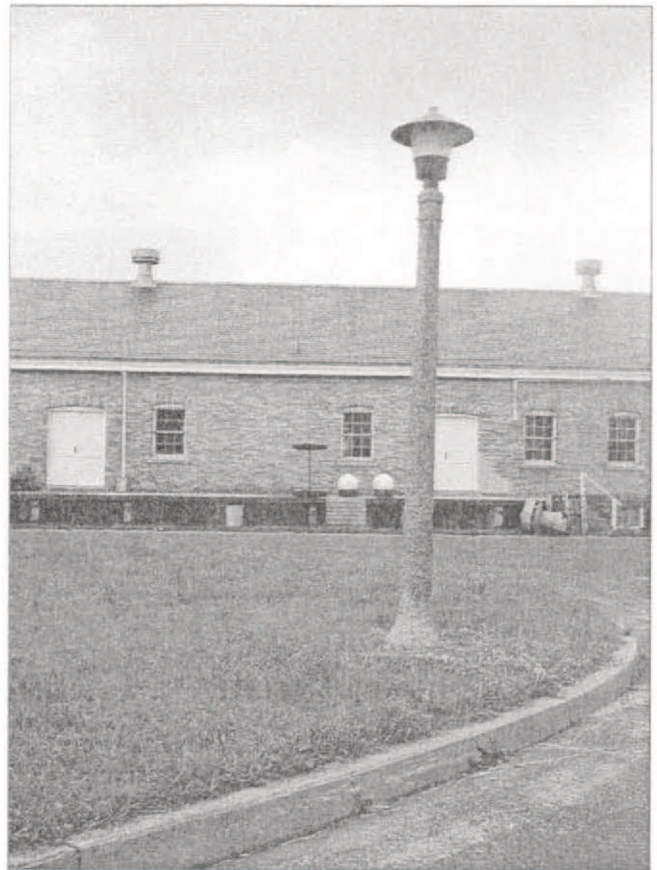


Figure 2.23. The 16 foot spun aluminum streetlights along Hartshorne Drive. OCLP, 2005.





Figure 2.24. Contemporary lights at the MAST Campus. OCLP, 2005.



Figure 2.25. Contemporary lights at the NOAA laboratories. GATE photo, 2005.

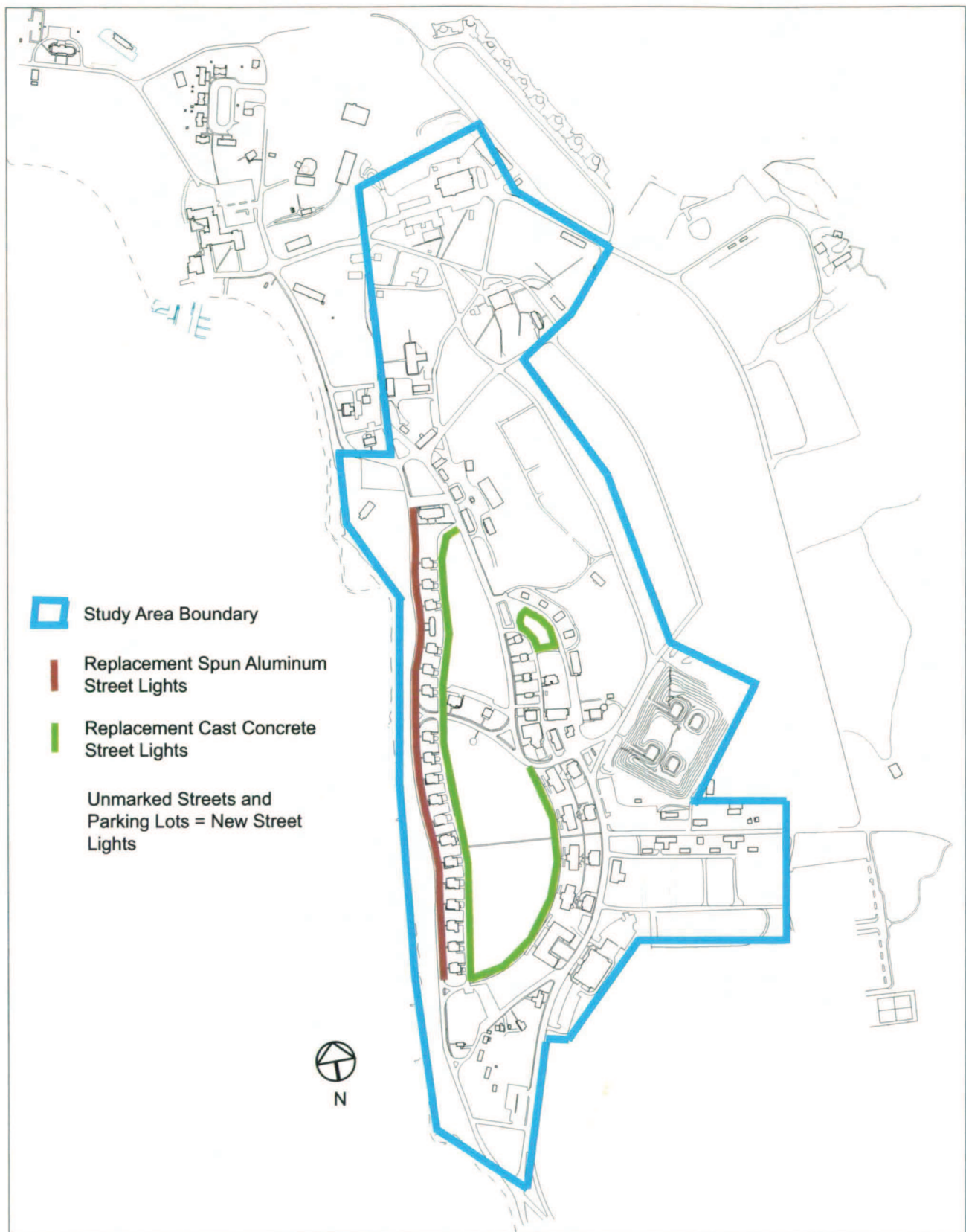


Figure 2.26. Zone map for Fort Hancock streetlight replacement. Streets marked with the green line will receive replacement concrete light fixtures, streets lined in brown will receive replacement aluminum light fixtures, and all other streets and parking lots in the study area (not marked with a color) will receive the new style of light fixture. Not to scale. OCLP, 2005.



Figure 2.27 (Above). This shielded Hermosa luminaire from Bieber Lighting is recommended to replace fixtures along Hartshorne Drive. An unpainted, brushed aluminum finish will be specified for surface color.

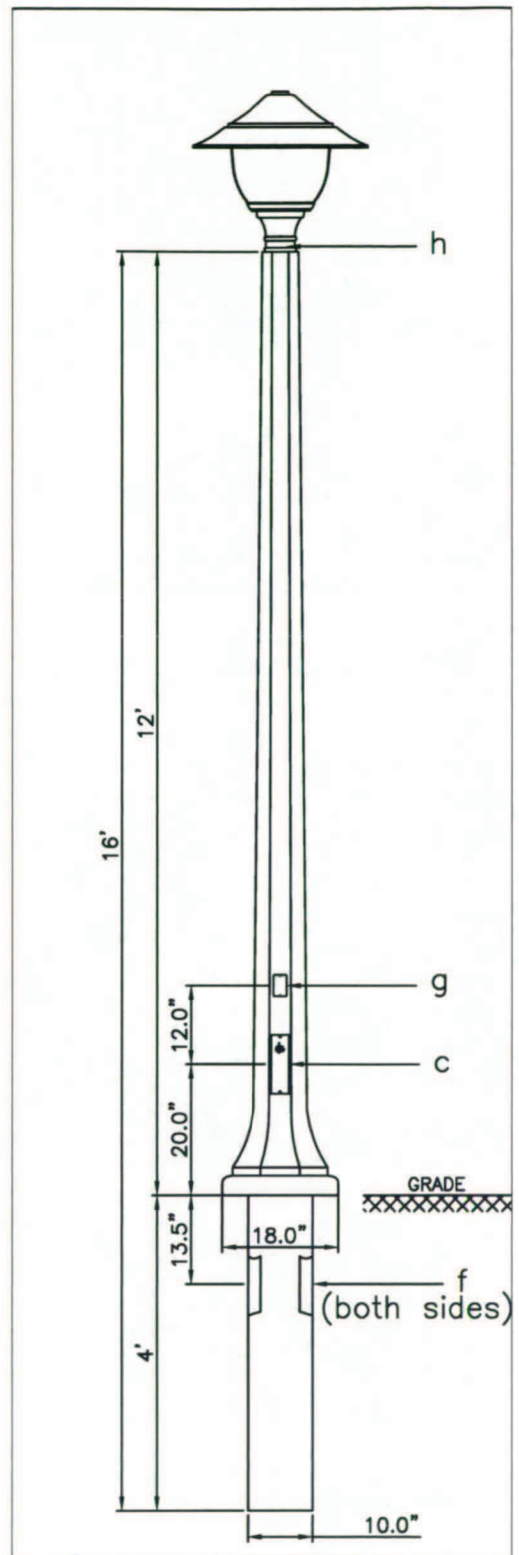


Figure 2.28 (Right). Concrete streetlights at the Parade Ground, Athletic Field, and Sergeants Row should be replaced by this 12' cast concrete fixture made by Skycast.

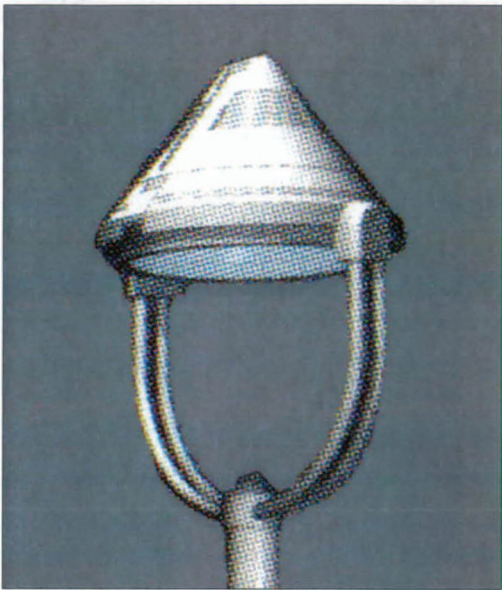


Figure 2.29. Image of an alternative for the new streetlight. This is the OPC-YM "Opticone" light made by Lumec.



Figure 2.30. Image of an alternative for the new streetlight. This is the OPC "Opticone" light made by Lumec.



Figure 2.31. Image of an alternative for the new streetlight. This is the CAND6 "Candela" light made by Lumec.

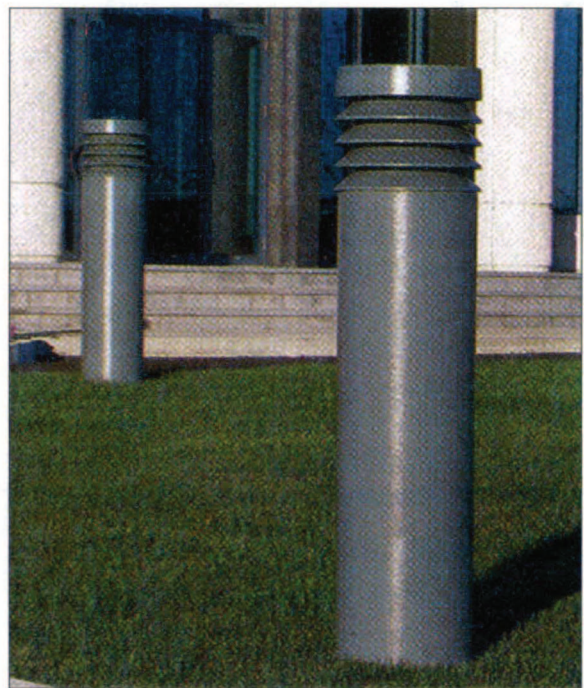


Figure 2.32. Image of the preferred bollard. This is the BD8 bollard made by Lumec.



Figure 2.33. This 'World's Fair' style bench is similar to ones found historically at Fort Hancock. The wood and metal bench is distributed by Kenneth Lynch and Sons.

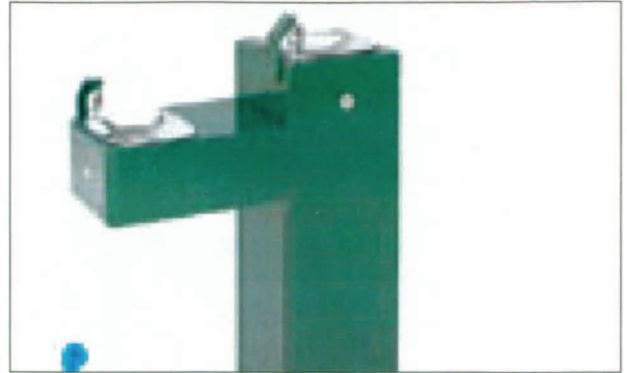


Figure 2.34. Several water fountains should be placed around the historic district, near high visitor use areas. It is recommended to use simple ADA accessible fixture with a dark green surface color to harmonize the water fountains with other introduced site amenities.



Figure 2.35. Standard bicycle racks should be placed near areas of high visitor use, especially at the NPS visitor center and Ferry landing.



Figure 2.36. A simple aluminum and metal picnic table that is light-weight and easy to transport is recommended for Fort Hancock. A dark green surface color will help visually harmonize the picnic tables with other introduced site amenities. The picnic tables should be limited to placement at at Guardian Park.



Figure 2.37. The historic Fort Hancock street signs were reddish brown with black lettering. Notice the small sign reading "Fort Hancock" located above the street names. OCLP, 1994.



Figure 2.38. This street sign from off-site shows the mounting hardware and configuration of the recommended street signs for Fort Hancock. The small sign on top should be constant on all signs, reading "Fort Hancock." Lower sign panels would list street names. Brown backgrounds with white lettering is recommended. OCLP, 2005.

CHAPTER 3:

KEY LANDSCAPE REHABILITATION PROJECTS

INTRODUCTION

This chapter provides more specific information about the most important landscape rehabilitation projects for the adaptive use program at Fort Hancock. The projects highlighted below will require dedicated funding from sources outside the park's annual budget. All of the projects, which include new and modified parking facilities, replacement of street trees, replacement of street lighting, and replacement of street signage, are instrumental in providing a safe and historically appropriate environment for the new users of Fort Hancock.

SITE PARKING

Providing adequate vehicular circulation and parking will be an essential component of the success of the rehabilitation program. To meet the number of parking spaces determined by the Fort Hancock EA and Fort Hancock FONSI, several new parking lots are proposed at Fort Hancock and it is recommended to reconfigure several existing lots. As previously directed, there will be 1,378 parking spaces at Fort Hancock after the final realization of the Fort Hancock adaptive use program. The construction of these parking lots will be phased based on the pace of the rehabilitation program.

Access and parking for busses is an important component of the Fort Hancock parking plan because of the many educational programs offered that bring large groups to the site. Several of the proposed parking lots incorporate bus drop-off and/or parking.

See Figure 3.1 for locations of the proposed schematic Fort Hancock parking lots. It is important to note that schematic parking lot layout alternatives incorporated into this report will require revisions as part of the process of preparing official construction documents. Placement of vegetation in the parking lot alternatives is schematic and subject to change.

A) Reconfigure Existing Chapel/Ferry Dock area

The existing Chapel and Ferry Dock parking lot is an informal packed earth lot that has spaces for approximately sixty-eight cars. In the summer season, the lot is also used by a shuttle bus that picks up beachgoers from the Ferry Landing. Future plans for the currently unused Chapel call renting the renovated building for events such as weddings and lectures. It is intended that the building function

in concert with activities occurring at the Theatre and Mule Barn and will consequently need a central out-door gathering space.

Though the Fort Hancock EA calls for the removal of all of the parking spaces at the Chapel/Ferry Dock, it is recommended to reconfigure the lot so bus pick-up and drop-off can occur along with limited parking for ferry service and Chapel events. The proposed plan includes sixty-two parking spaces. Traffic will enter the site at north side of the area, into the parking lot located north of the Chapel, and exit via a semi-circular drive in front of the Chapel. The curved driveway, that closely resembles the layout of the historic driveway, may also double as drop-off for Chapel events and the shuttle bus. A paved patio area will be located at the main door of the Chapel, aligned with views of the post flagstaff and Rodman gun, providing an excellent orientation location where visitors can take in the wider Fort Hancock district. See Figure 3.2 for the proposed plan and Figures 3.3, 3.4, and 3.5 for alternatives considered but rejected.

B) Reconfigure Mule Barn Intersection

Proposals for the reuse of the Mule Barn that stands at the intersection of South Bragg Drive and Kearney Road identify food service or hospitality uses. This will bring visitors and patrons to the area throughout the day, generating considerable foot traffic. Currently the intersection of South Bragg and Kearney Road is greater than 90 degrees and encourages high vehicular speeds. This may create conflicts in the future when pedestrian traffic increases. Another issue between existing conditions and potential reuse of the area is that the sidewalk outside the south doors of the Mule Barn are very narrow, placing patrons almost on South Bragg Street after exiting the Mule Barn.

Several adaptations to the area are recommended to accommodate the adaptive use. To create a wider pedestrian area on the north side of the Mule Barn, South Bragg Road should be realigned. By removing the small raised island, removing the curved turning lane onto South Bragg Road, and moving the road several feet to the south, a simplified ninety-degree intersection and wider sidewalk could be created. This will slow vehicular speeds and create a safe buffer for pedestrians entering and exiting the Mule Barn. The short segment of Kearney Road that travels east of the Rodman gun and west of the Mule Barn could be blocked to vehicular traffic with removable bollards, directing all traffic to access Hartshorne Drive via South Bragg Road. The unused roadway could then be used by the restaurant for outdoor seating. This plan also includes a route for the extension of the Multi-Use Path that is slated to pass through the area. For a schematic plan of the proposed realignment, see Figure 3.2 of the Chapel lot. It is important to note that schematic alternatives for the realignment of this

intersection found in this report will require revisions as part of the process of preparing official construction documents.

C) Expand Athletic Field Lot

Twenty-five parking spaces are currently provided at the Post Headquarters/Athletic Field, standing at the southern extents of the Athletic field. Future plans for the Post Headquarters and Bachelor Officers Quarters buildings include hospitality and administrative uses. To serve the future need, twenty-two additional parking spaces are required. The existing lot will be expanded by two bays to the north and increased slightly east and west to accommodate the parking in a fairly linear configuration and avoid encroaching too much on the Athletic Field. A vehicular drop-off has been proposed at the west side of the Bachelor Officers Quarters, along Kearney Road, to serve the hospitality uses planned for the building. See Figure 3.6 for the proposed plan and Figures 3.7 and 3.8 for alternatives considered but rejected.

D) Construct Coal Pit Lot

The Coal Pit Lot is planned for the historic location of the post's coal storage area along Kearney Road. It is currently undeveloped with small to mid-sized woody vegetation growing abundantly. A concrete foundation of the former coal shed remains in the space. It is intended that this lot service the buildings located at the north portion of Officers Row.

The proposed lot contains sixty-nine spaces, thirty four more than directed in the Fort Hancock EA. The lot is set back from Kearney Road to preserve the concrete foundation of the former coal shed, as well as to accommodate a vegetative buffer. As the land rises slightly toward the rear of the space, the proposed parking lot is not deep in order to reduce the amount of earthmoving and disturbance. See Figure 3.9 for the proposed schematic plan and Figures 3.10 and 3.11 for alternatives considered but rejected.

E) Construct Coal Yard Lot

The Coal Yard Lot is proposed northwest of the Sandy Hook Lighthouse, near the corners of Hudson and Knox Roads. This lot is likely to service overflow traffic generated from the Lighthouse, proposed National Park Service visitor center, and activities at the former YMCA. The area is currently unprogrammed and dominated by native shrubs and small trees. The proposed lot calls for seventy-nine parking spaces, three more than the seventy-six proposed in the Fort Hancock EA, and space for four busses. Busses dropping students or tour groups at the National Park Service visitor center could drive the short distance

and park in the Coal Yard Lot. The proposed lot has two access points, one on Hudson Road and the other exiting just north of the Lighthouse. Pedestrian and bicycle traffic can access the future Multi-Use Path extension east of the lot, though a specially designated path. See Figure 3.12 for proposed plan and Figures 3.13 and 3.14 for alternatives considered but rejected.

F) Reconfigure South Parade Lot

The South Parade lot will be a critical parking facility at Fort Hancock due to its central location. The lot is currently a rough graded lot formerly the site of a large hospital annex on the south side of the Parade Ground, just east of the site of the former hospital building. A small portion at the west side of the open space is paved and parking occurs informally on the unstriped lot. Cars park haphazardly near the intersection of Kessler Road, some on the pavement and some on the grass. School busses often use the space, including the unpaved portion, for drop-off and parking. A National Park Service restroom was created from the former morgue building at the southwest extent of the existing parking lot, which is often utilized by school groups and bus tours.

It is intended to provide ninety-two parking spaces at the South Parade lot to serve tenants in Barracks Row and the southern buildings of Officers Row, as stated in the Fort Hancock EA. An infrequently used road runs along the south side of the lot, servicing the day-care center and National Park Service restrooms. This road does not serve through traffic and could be used for parallel parking for several buses. See Figure 3.15 for the proposed plan and Figure 3.16 for an alternative considered but rejected.

G) Construct Tent City Lot

The Tent City lot is proposed for an area south of the MAST Campus that historically served as the site of temporary tent housing for troops. It is currently an infrequently mowed grassy area abutting a tract of naturally growing grass and shrubs that serves as wildlife habitat. Underground utilities for the MAST Campus are located in the northwest corner of the space, witnessed by several vent pipes protruding from the ground. It is likely that this lot will serve the buildings of Barracks Row, as well as weekend beach traffic.

The treatment plan calls for adding 172 parking spaces, the same number specified in the Fort Hancock EA. Access to the Tent City lot is provided along Gunnison Road and purposefully not into the MAST Campus. The north side of the parking lot will be screened with vegetation to separate the space from the school zone. The proposed plan avoids the underground utilities and utilizes the

remainder of the space without encroaching into natural area to the east. See Figure 3.17 for the proposed plan and Figure 3.18 for an alternative considered but rejected.

H) Reconfigure Fort Hancock lot

The Fort Hancock Lot is centrally located to serve the future National Park Service visitor center, current administration building, and other tenants of Barracks Row. By reconfiguring the ninety spaces that exist today, an additional fourteen spaces can be added to maximize the capacity of the lot. A sidewalk and curb should be added along the edge of the parking lot along MAST Way to provide safe access for students entering and exiting the MAST campus. Additionally, the construction of a raised crosswalk at the junction of MAST Way and Magruder Road will slow vehicular speeds into the MAST campus and provide a safe crossing for students. See Figure 3.19 for the proposed plan.

F) Construct Paddock Lot

The Paddock area is a mowed grass field encircled by a post and rail fence located northeast of the Mule Barn. This site has been proposed as the location of a parking lot to service activities centered at the Chapel, Mule Barn, and Theater. Because of its size, the lot could also be used for special event overflow parking. The treatment plan has proposed a parking lot with two egress points on South Bragg Road, a sidewalk to the Mule Barn/Chapel/Theatre area and room for 130 cars and four busses. Some of this parking lot may be left as reinforced turf to make a smaller paved area and to allow more surface drainage. A cluster of informally placed native vegetation may be planted on the west side of the lot to screen it from the Mule Barn/Chapel/Theatre area. Select plant material from the approved list of shrubs that appears in Appendix B of this report. See Figure 3.20 for the proposed plan.

I) Construct Warehouse Lot

It is proposed to lease space in the complex currently used by the National Park Service for maintenance activities. The National Park Service would retain access and sole control over the east portion of the maintenance yard with two buildings in the west part of the complex being rented. Subsequently, parking must be provided at these structures. The Fort Hancock EA calls for sixty-five spaces at the western extents of the maintenance yard, which is supported by the proposal of this treatment plan. The lot would be located south of the National Park Service gas pumps and screened on that side and to the east to separate tenant activities from the National Park Service storage yard. National Park Service maintenance vehicles would be rerouted to access the maintenance facility solely from the east. See Figure 3.21 for the proposed plan.

J) Construct Tennis Lot

A parking lot is proposed to serve the Officers Club and beach parking near the intersection of Kilpatrick and Atlantic Drives. The area is currently an infrequently mowed area, located across Atlantic Drive from a National Park Service restroom facility. Fifty-five spaces are proposed, two less than the Fort Hancock EA directive, with two egress points, one on Kilpatrick Drive and the other on Atlantic Drive. See Figure 3.22 for the proposed plan and Figure 3.23 for an alternative considered but rejected.

K) Construct Mess Hall Lots

Small capacity parking lots will be added at the mess halls lining Magruder Road, Buildings 55, 56, and 57. One six-car lot currently exists on the south side of Building 58, the National Park Service Headquarters, and will serve as a model for the others. The lots will be used primarily for handicapped parking and deliveries for the buildings of Barracks Row. A lot will be located on the north side of Building 57, the south side of Building 56, and the north side of Building 55. This configuration will leave an uninterrupted corridor between Buildings 57 and 56, the main viewshed connecting the east and west sides of the Parade Ground. See Figure 3.24 for the proposed plan.

L) Reconfigure Gas Station Intersection

Currently the area surrounding the gas station is a busy vehicular and pedestrian area due to the presence of the National Park Service headquarters building, Brookdale College, and the Keepers Quarters Museum. This use will increase markedly in the future when the National Park Service visitor center moves to the area and other buildings are leased. Little directional signage is provided for motorists and even less for pedestrians.

It is recommended to provide more structure to the area to reduce the potential for conflict between motorists and pedestrians. A defined three-way stop should be created at the intersection of Magruder and Hudson Roads. One way roads should be established around the Gas Station to direct the flow of traffic past Brookdale College and the Keepers Quarters Museum. Also, the intersection at the corner of the Gas Station and Mercer Road should be defined with bollards. It is currently an expanse of asphalt that leads to vehicular confusion. See Figure 3.25 for the proposed plan and Figures 3.26, 3.27, and 3.28 for alternatives suggested but rejected.

STREET TREE REPLACEMENT

The street tree planting plan generated for Fort Hancock as part of this report includes 148 trees. These trees are comprised of a mixture of London planetrees, hackberries, and sycamore maples. See Figure 3.28 for the proposed street tree planting plan. See the street tree section of the previous chapter for specific actions relating to planting methods and tree selection.

It is recommended to plant one and one half inch caliper trees that are commercially available, at the estimated 2006 cost of three hundred and fifty dollars. Installation and a one-year maintenance contracts that includes watering will likely cost six hundred and fifty dollars. Therefore, for estimating purposes, each tree at Fort Hancock will require an outlay of approximately one thousand dollars.

STREET LIGHTING REPLACEMENT

Replacement of the Fort Hancock streetlights should be implemented only after the completion of a comprehensive utility study and a lighting plan by a lighting engineer. The lighting guidelines in this report have been developed to help preserve the historic character of Fort Hancock and can be incorporated into a professional lighting plan. Notably the recommendations concerning adequate light levels, and luminaire design, height, and placement of the new and replacement light fixtures.

Currently, seventy-four streetlights, both functioning and non-functioning, exist on site. Of those, twenty-seven should remain, including the full-cutoff brown "shoe-box" style lights found at the MAST and NOAA facilities, and the historic concrete light poles in the vicinity of Sergeants Row.

See Figures 3.28-3.31 for the proposed street light replacement plan.

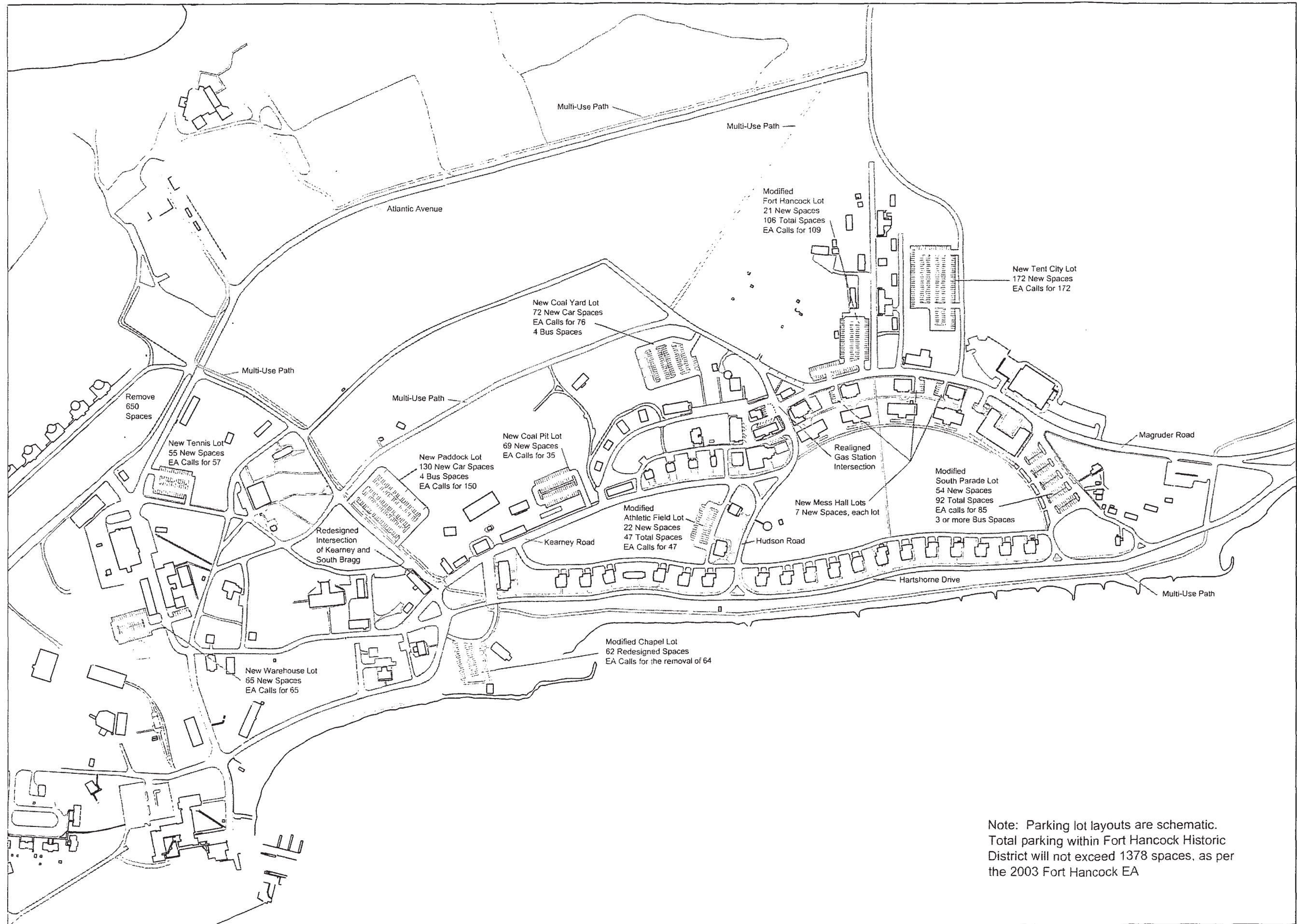
When nearing the implementation phase of the streetlight project, direct purchase of the lighting poles and fixtures from the manufacturer should be considered. By contracting only the installation component of the project, the park may reap substantial savings. If the entire project is contracted to a lighting or general contractor, that company will purchase the fixtures from a lighting wholesaler, passing on the costs of the vendor. However, the park may opt to pay more to have the contractor take responsibility for the purchase, delivery, and installation. Another benefit of contracting the entire project would be avoiding

a contracting exercise and eliminating the responsibility for maintaining the quality and condition of the fixtures before they are installed.

REHABILITATION OF GUARDIAN PARK

Just prior to Fort Hancock's deactivation in 1974, the Army chose to commemorate its important air defense mission at Sandy Hook with the creation of "Guardian Park." This park was built at the triangular plot of land defined by the intersection of Hartshorne Drive and Magruder Road. A disarmed Nike "Hercules" missile was installed next to an Nike "Ajax" missile that had been placed there earlier. These obsolete weapons served as monuments to the last phase of Fort Hancock's defensive mission. A stone monument commemorating six U.S. Army enlisted men and four Ordnance Corps civilian employees killed during an explosion was also relocated to Guardian Park from nearby Middletown, New Jersey. Concrete walkways and young landscape plantings were installed at the same time prior to the departure of the Army.

Guardian Park, located at the southern extremity of historic Fort Hancock, now serves as a gateway to the historic district. This treatment plan has focused primarily on site-wide issues relating to plantings, parking, lighting fixtures and landscape furnishings needed for the re-use of the historic district. However, Guardian Park has also become deteriorated during the past thirty years. A large portion of the deterioration may be corrected through implementation of turf rehabilitation and management recommendations offered in this report. However, the rehabilitation of plantings of trees and shrubs, in an effort to recapture the character of this area as it existed in 1974 would be appropriate as a subsequent follow-up effort to this landscape treatment plan.



Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Proposed Parking Plan

Figure 3.1

Note: Parking numbers reflect preferred alternatives



National Park Service
Olmsted Center for Landscape Preservation

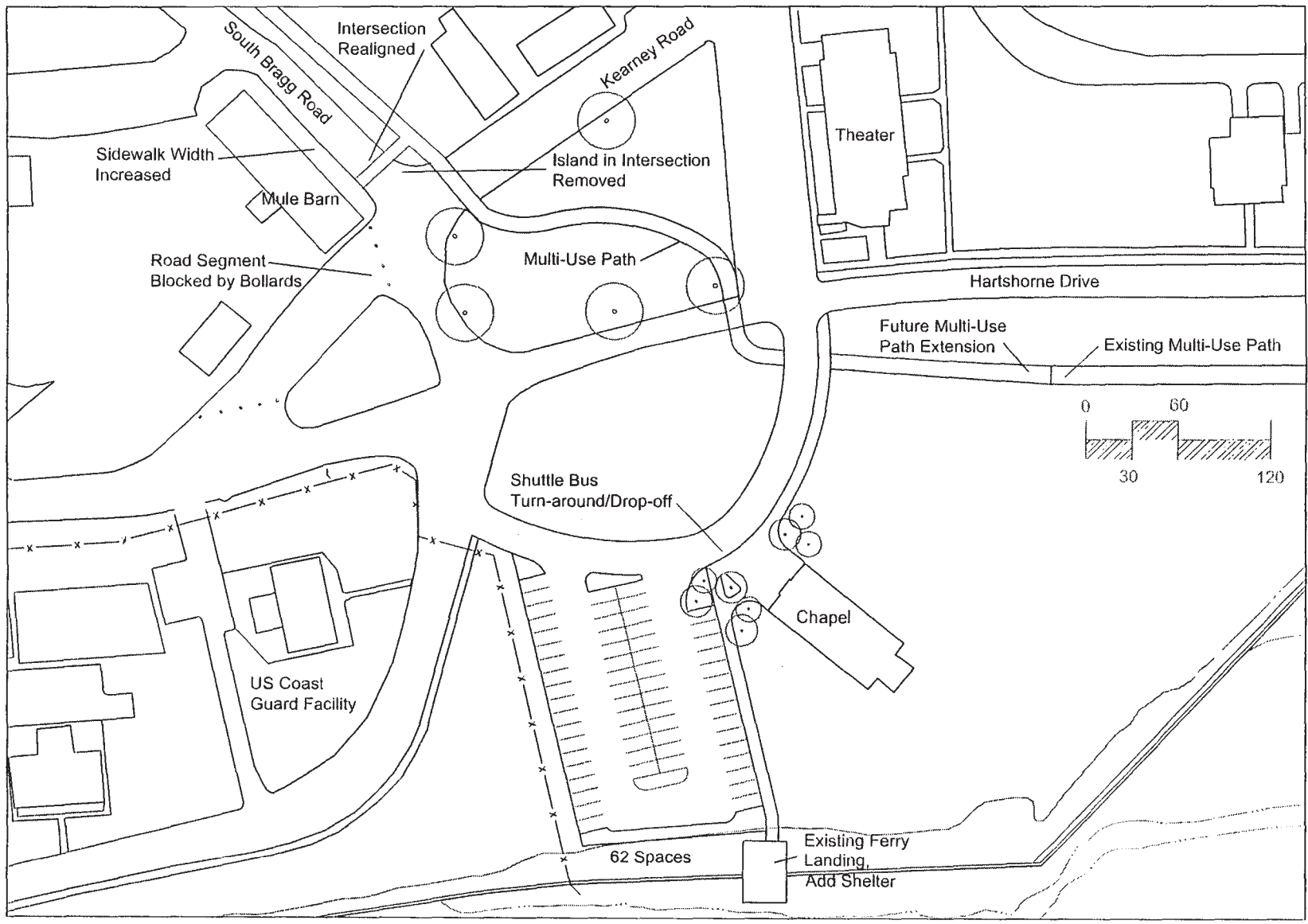
Boston NHP
Charlestown Navy Yard,
Quarters C
Boston, MA 02129
(617) 241-6954

LEGEND

Scale: 1"=400'







Cultural Landscape Treatment Plan for Fort Hancock

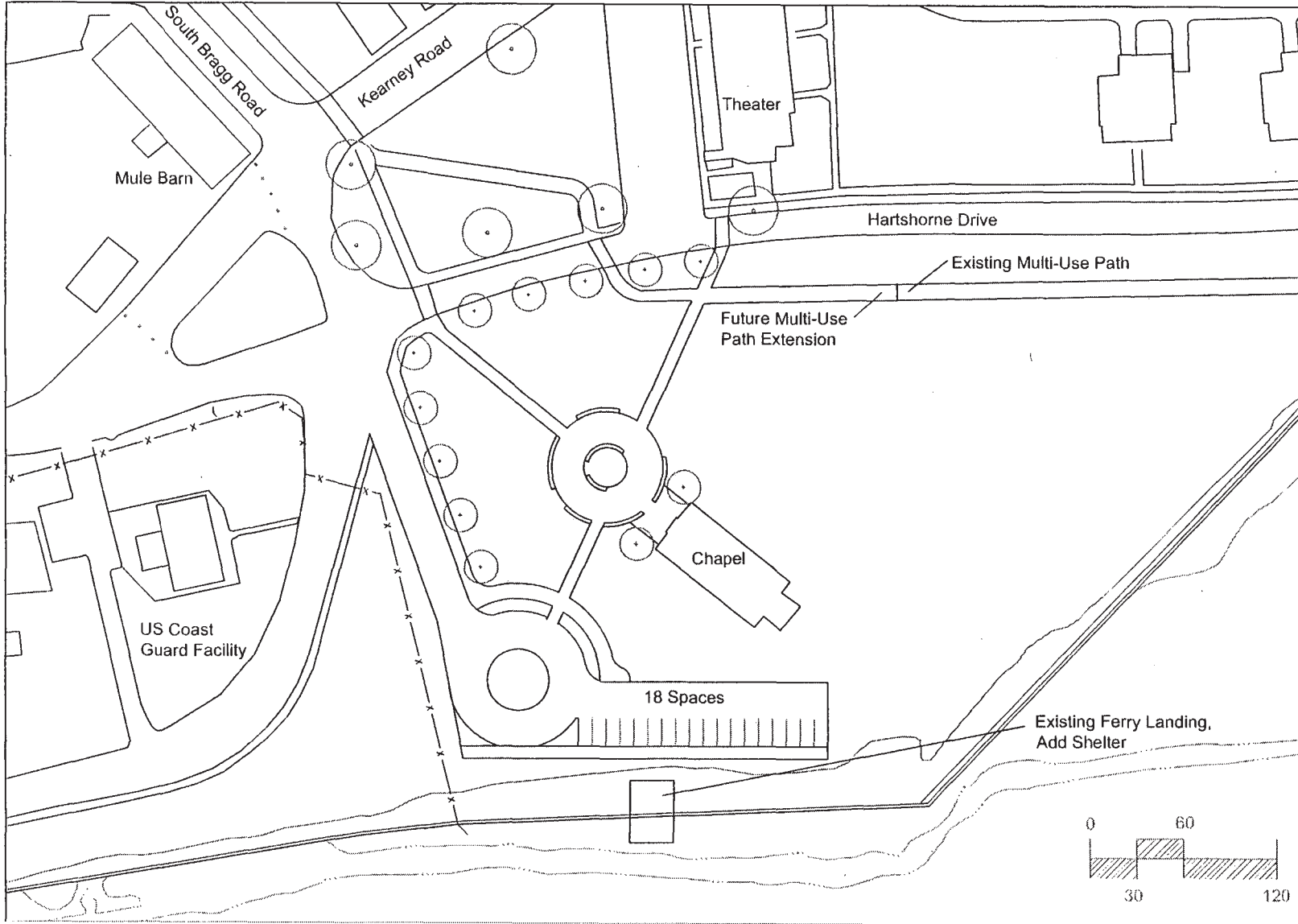
Gateway National Recreation Area

Modified Chapel Alternative A Preferred Alternative

Figure 3.2

 **GRANDED CENTER**
National Park Service
Olmsted Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-586-1589

LEGEND
Scale: 1"=60'

Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

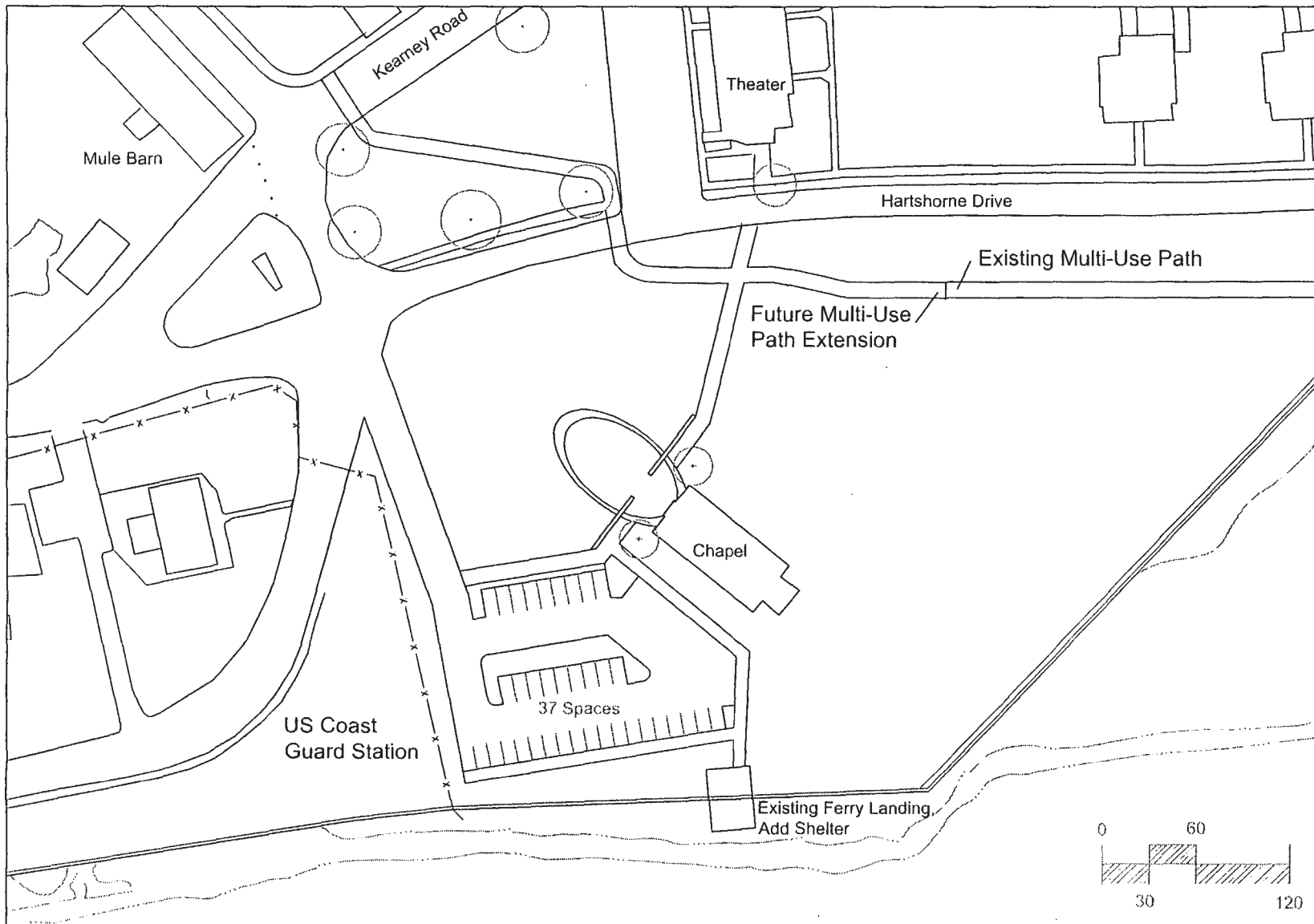
Modified Chapel Alternative B

Figure 3.3

 **NATIONAL PARK SERVICE**
 Olmsted Center for Landscape Preservation
 99 Warren Street
 Brookline, MA 02445
 617-566-1609

LEGEND
 Scale: 1"=60'





Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

Modified
Chapel
Alternative C

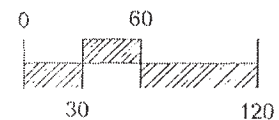
Figure 3.4



National Park Service
Olmsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-552-1689

LEGEND

Scale: 1"=60'



Cultural Landscape
Treatment
Plan for Fort Hancock

Gateway
National
Recreation
Area

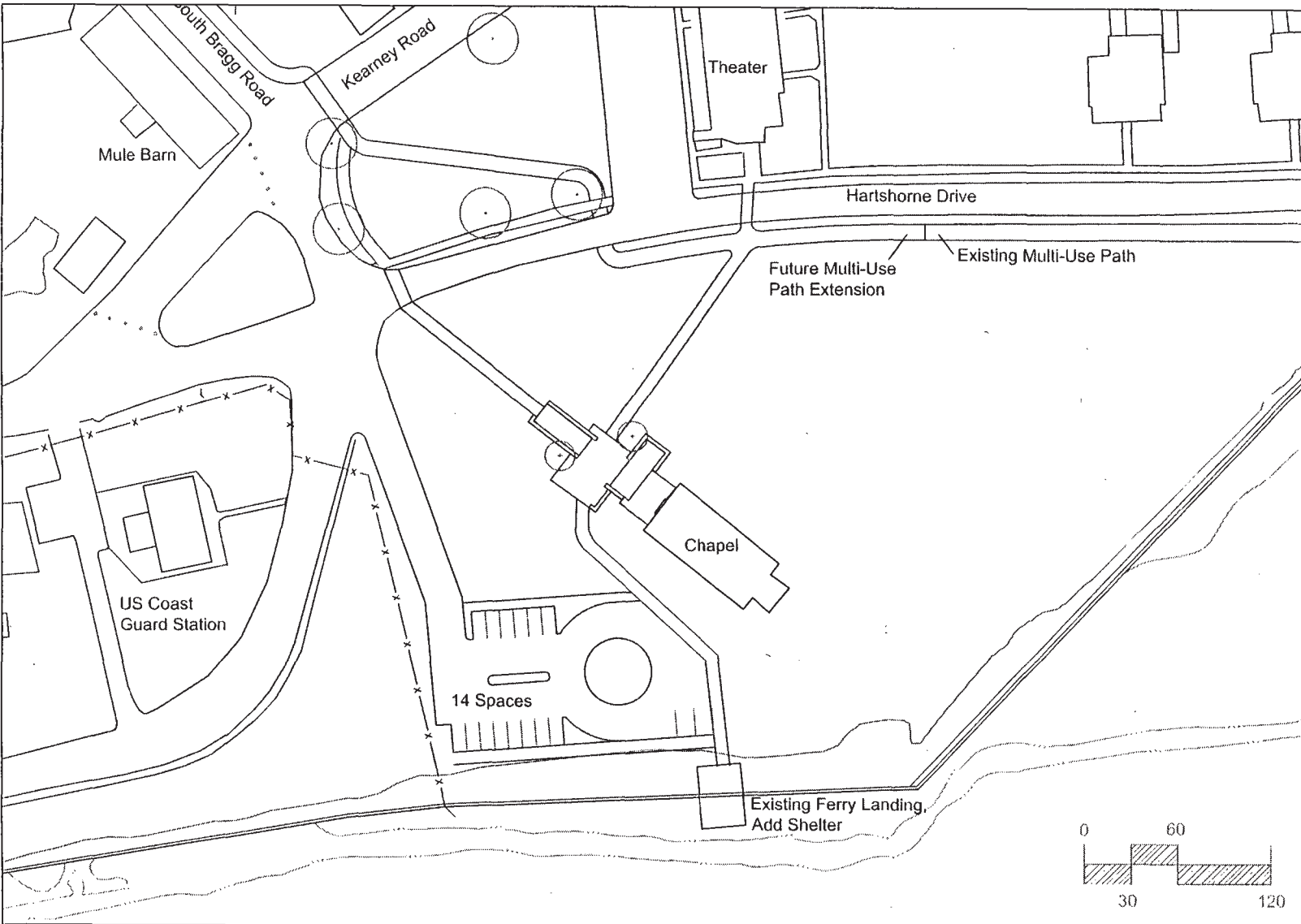
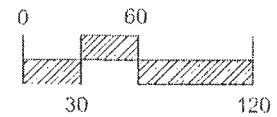
Chapel
Alternative
D

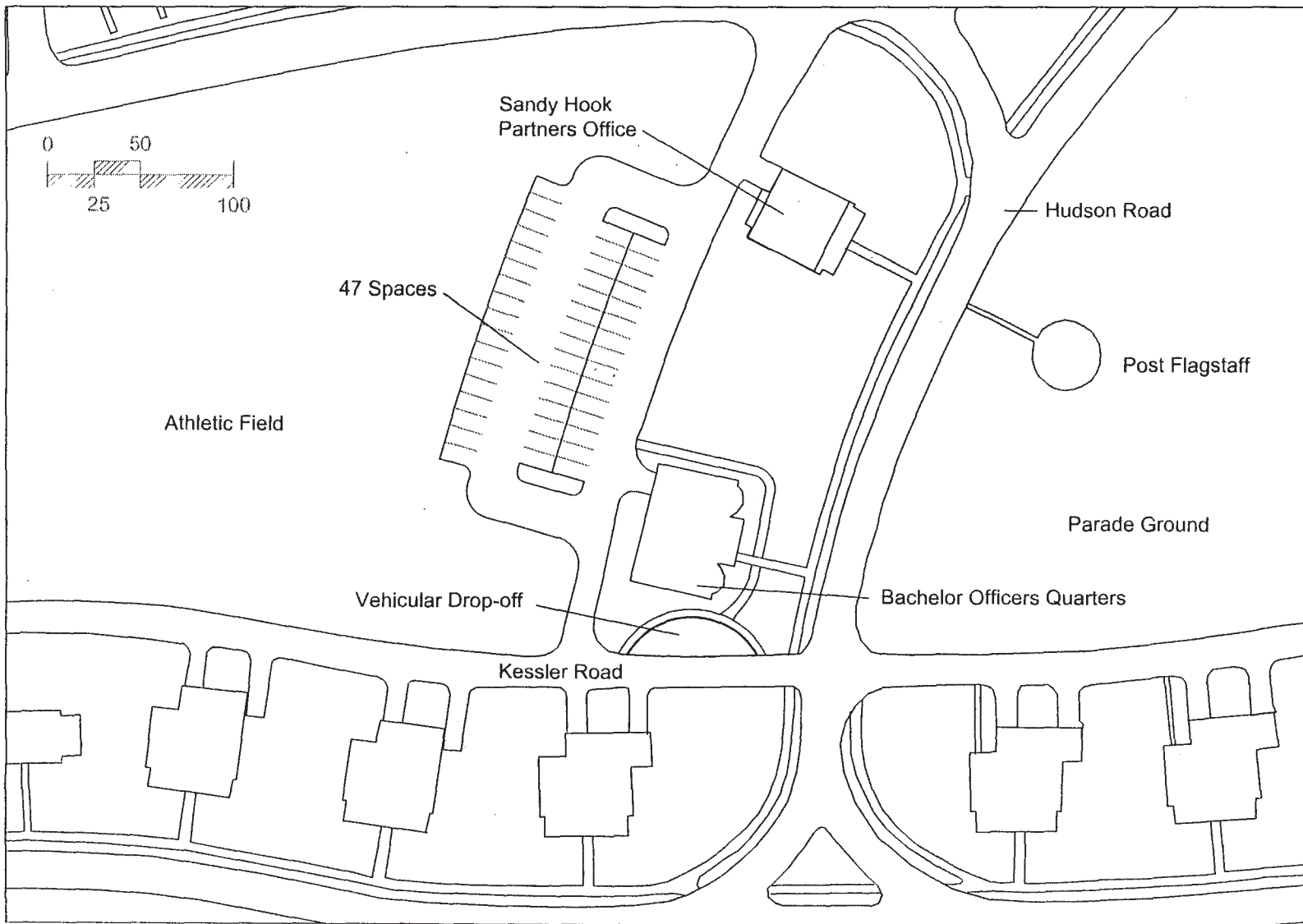
Figure 3.5

 OLIVETTE
CENTER
National Park Service
Olivette Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-666-1069

LEGEND

Scale: 1"=60'





**Cultural
Landscape
Treatment
Plan for Fort
Hancock**

**Gateway
National
Recreation
Area**

**Modified
Athletic
Field Lot**

**Alternative
A
Preferred
Alternative**

Figure 3.6



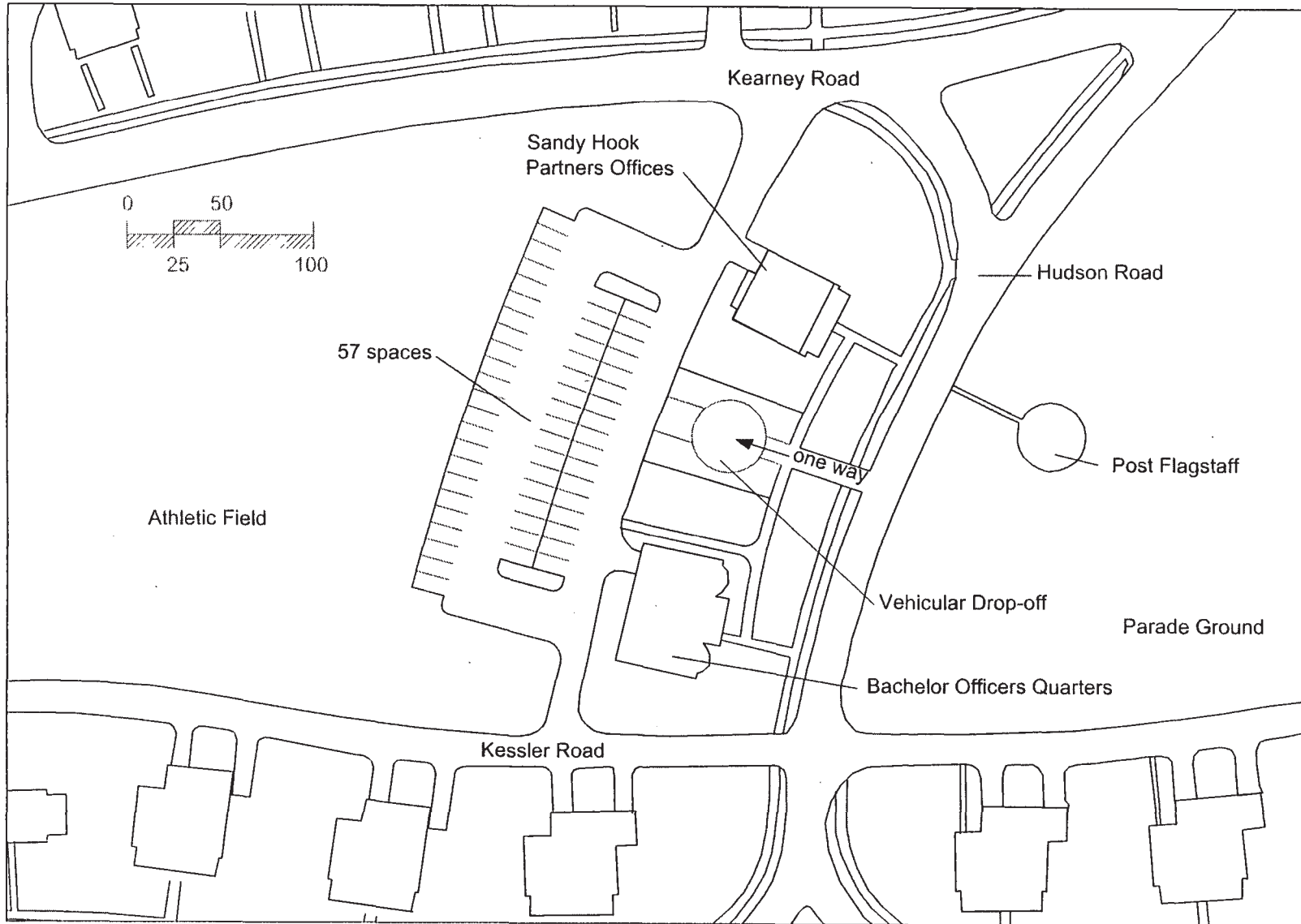
National Park Service
Olmsted Center for
Landscape Preservation
89 Warren Street
Brookline, MA 02445
617-566-1689

LEGEND

Scale: 1"=50'



100



Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Modified Athletic Field Lot

Alternative B

Figure 3.7

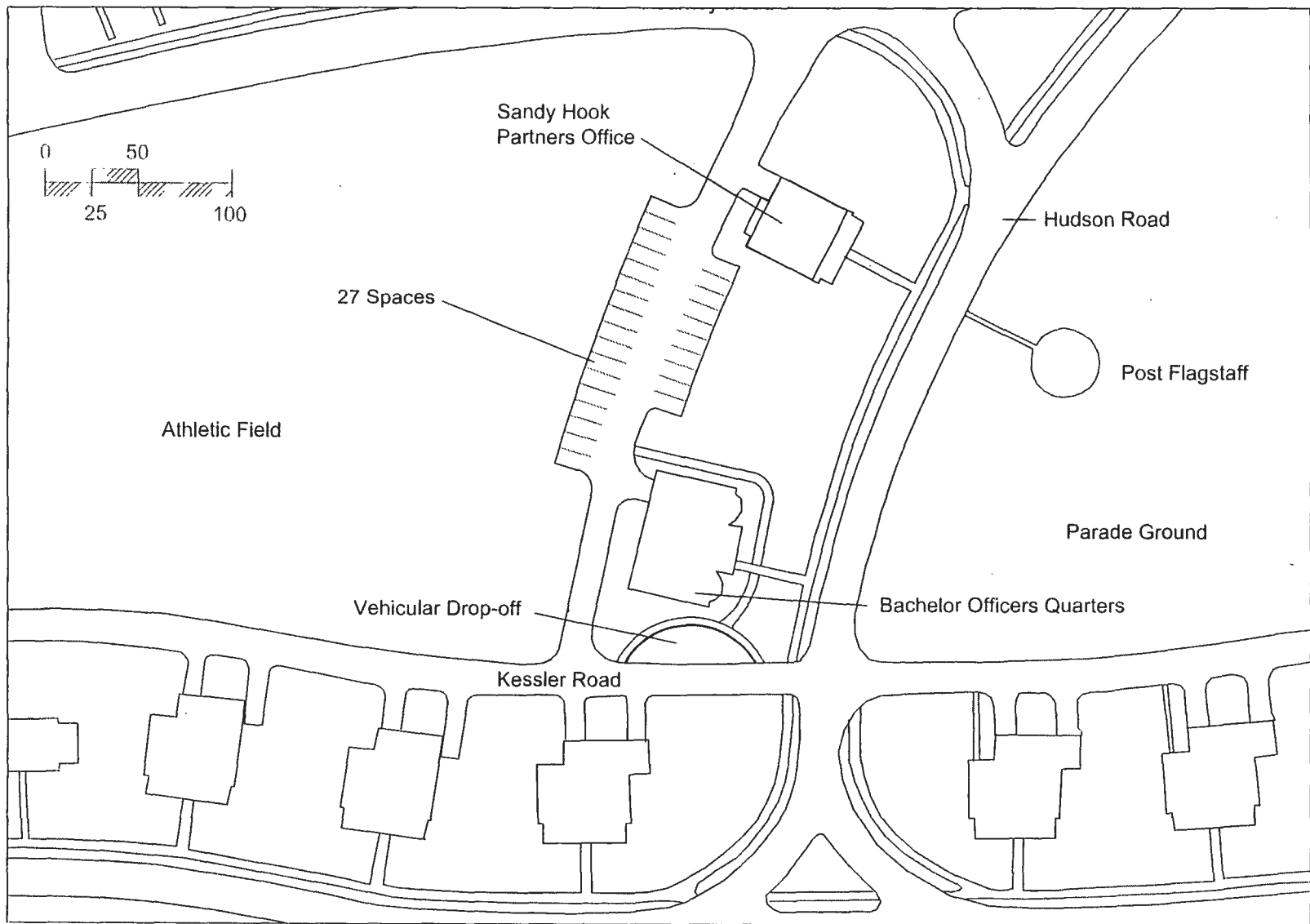


National Park Service
Olmsted Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-665-1689

LEGEND

Scale: 1"=50'





Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

Modified
Athletic
Field Lot

Alternative C

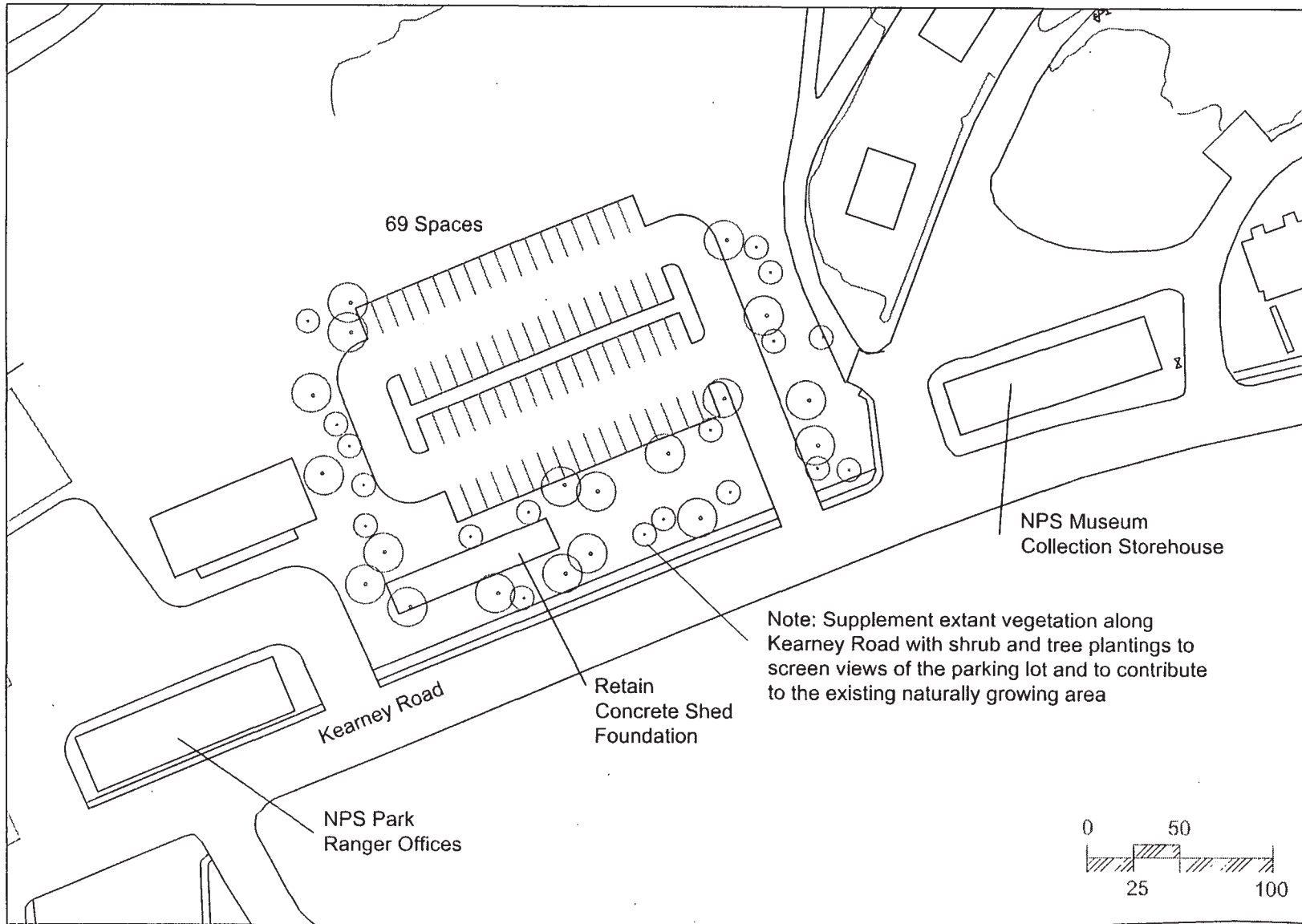
Figure 3.8

 **NATIONAL PARK SERVICE**
Olmsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-552-1089

LEGEND

Scale: 1"=50'





Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

New Coal Pit Lot Alternative A Preferred Alternative

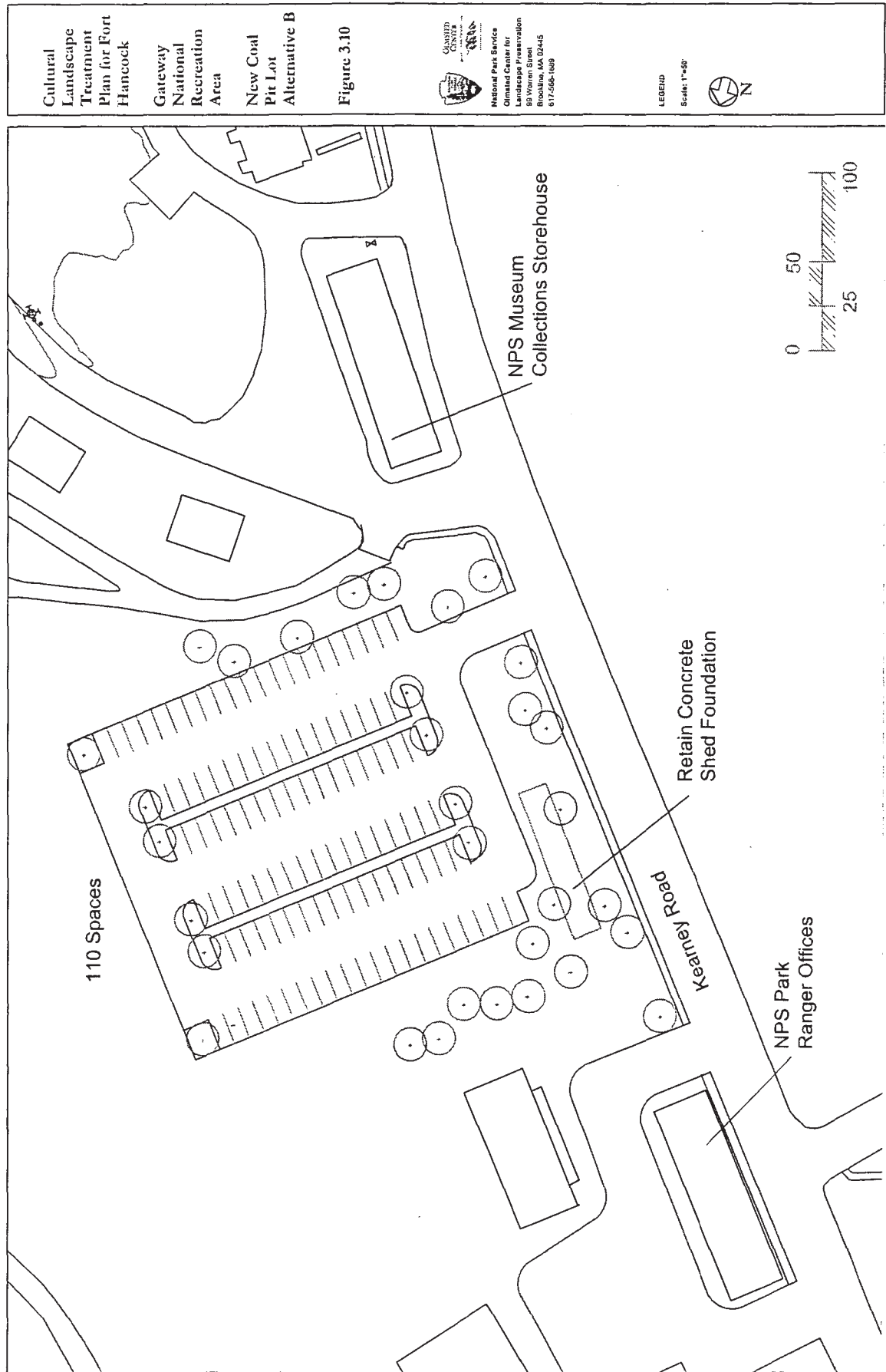
Figure 3.9

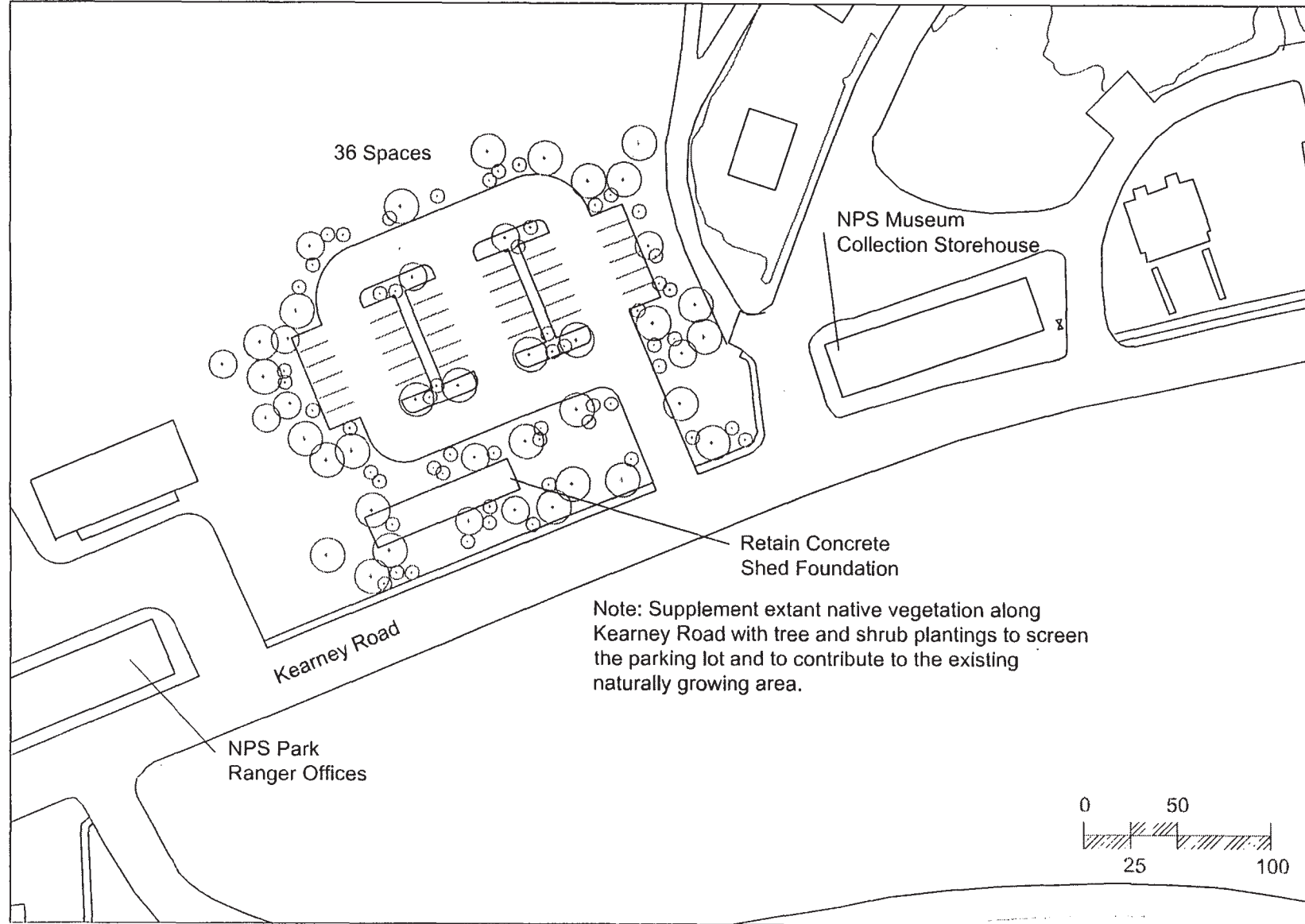
 **NATIONAL PARK SERVICE**
Olmsted Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-556-1869

LEGEND

Scale: 1"=50'





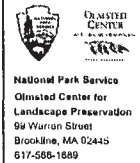


Cultural Landscape Treatment Plan for Fort Hancock

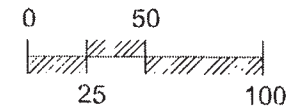
Gateway National Recreation Area

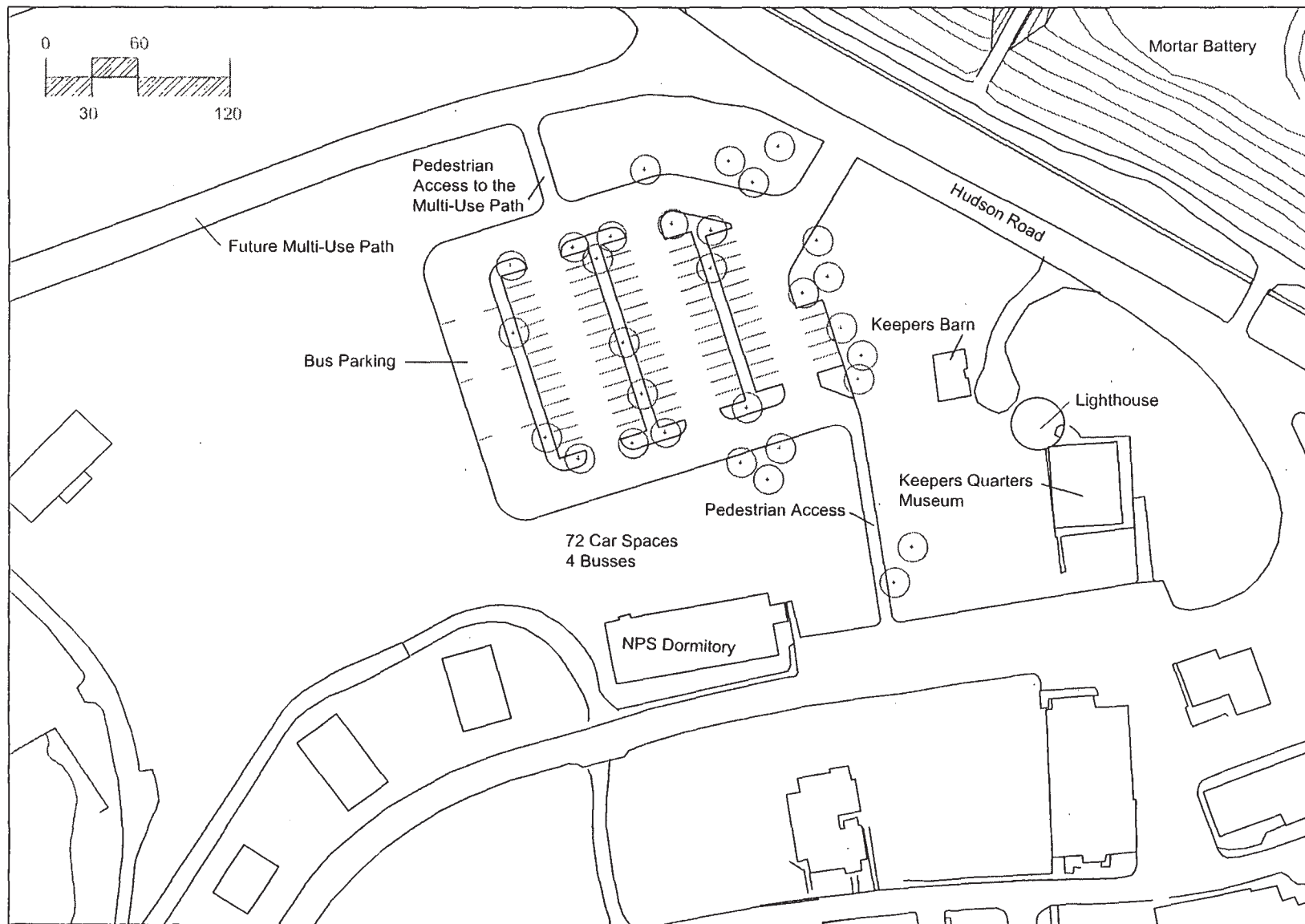
New Coal Pit Lot Alternative C

Figure 3.11



LEGEND
Scale: 1"=50'





Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

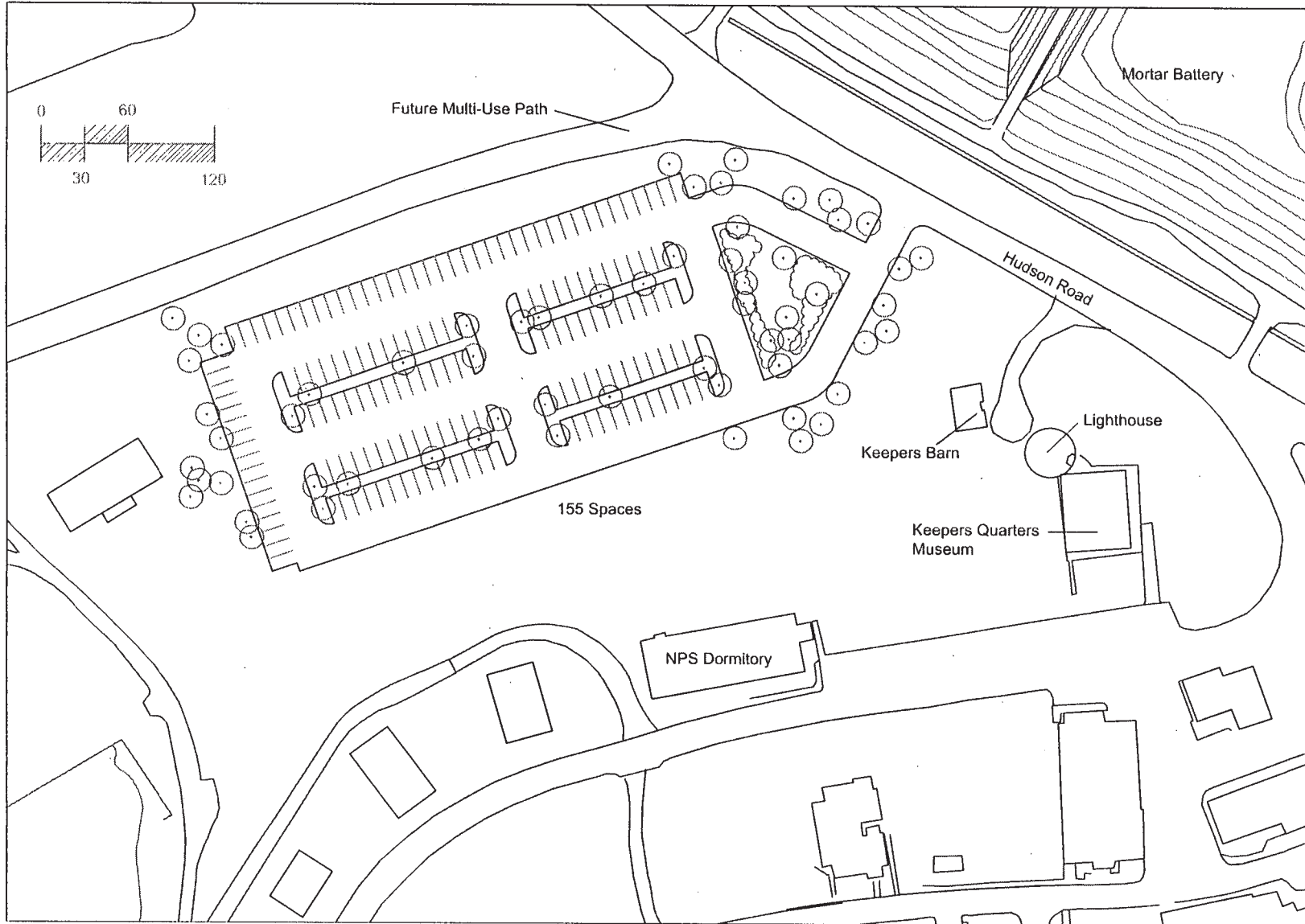
New Coal
Yard Lot
Alternative
A
Preferred
Alternative

Figure 3.12

 **NATIONAL PARK SERVICE**
Olmsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-666-1689

LEGEND
Scale: 1"=50'





Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

New Coal Yard Lot Alternative B

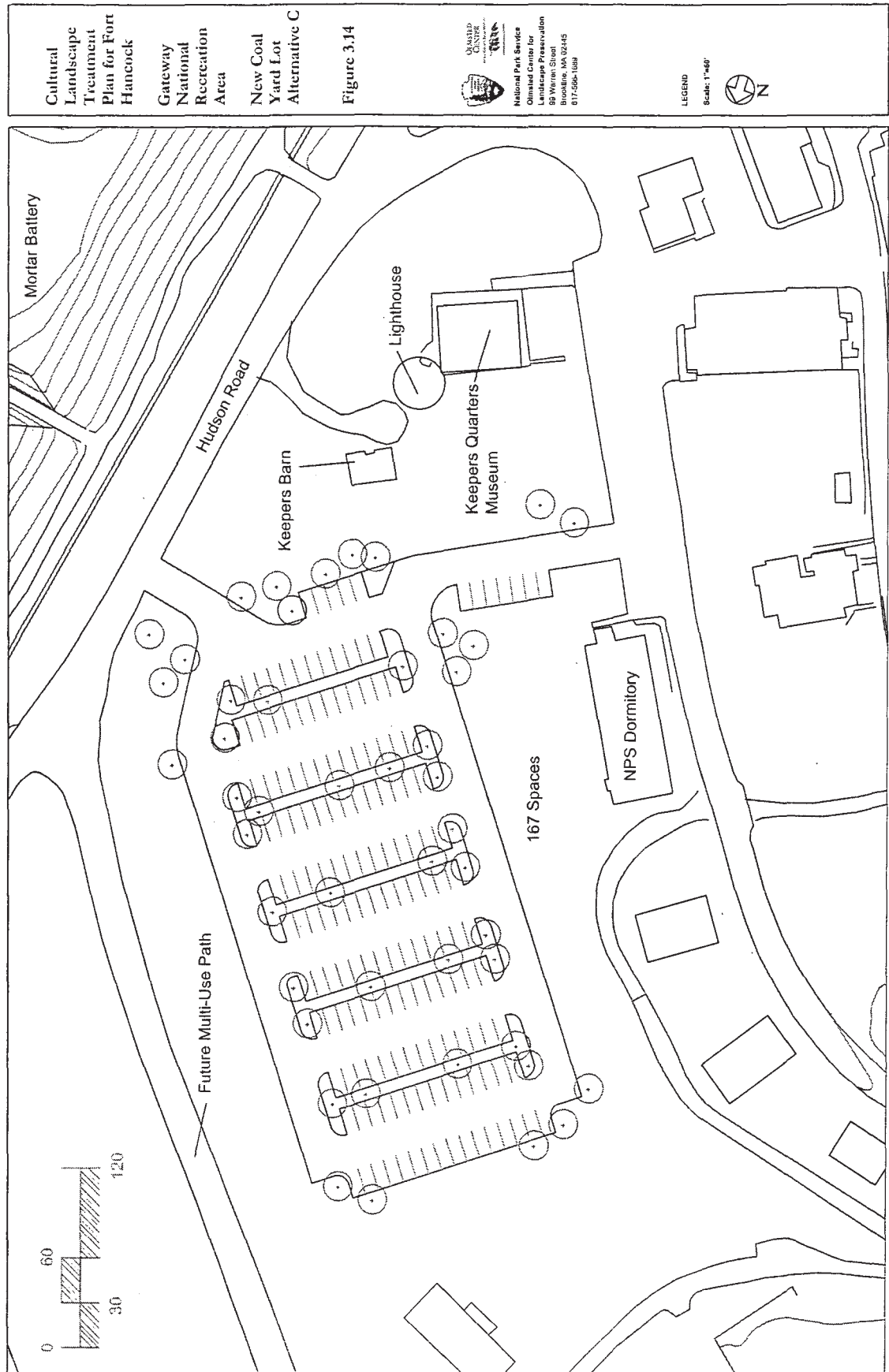
Figure 3.13

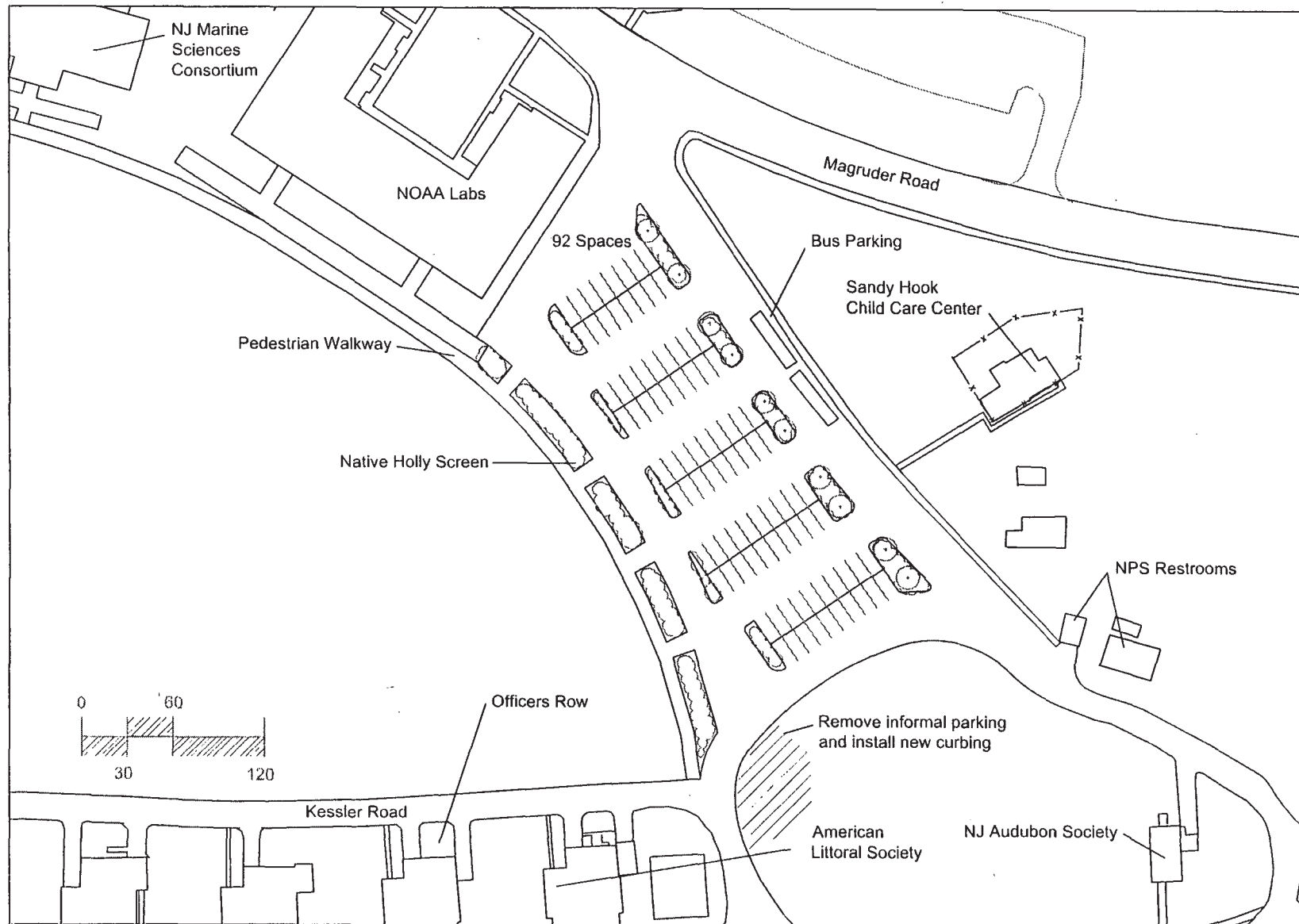
 OLINSTEAD CENTER
National Park Service
Olinstead Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-568-1689

LEGEND

Scale: 1"=60'







Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Modified South Parade Lot Alternative A Preferred Alternative

Figure 3.15

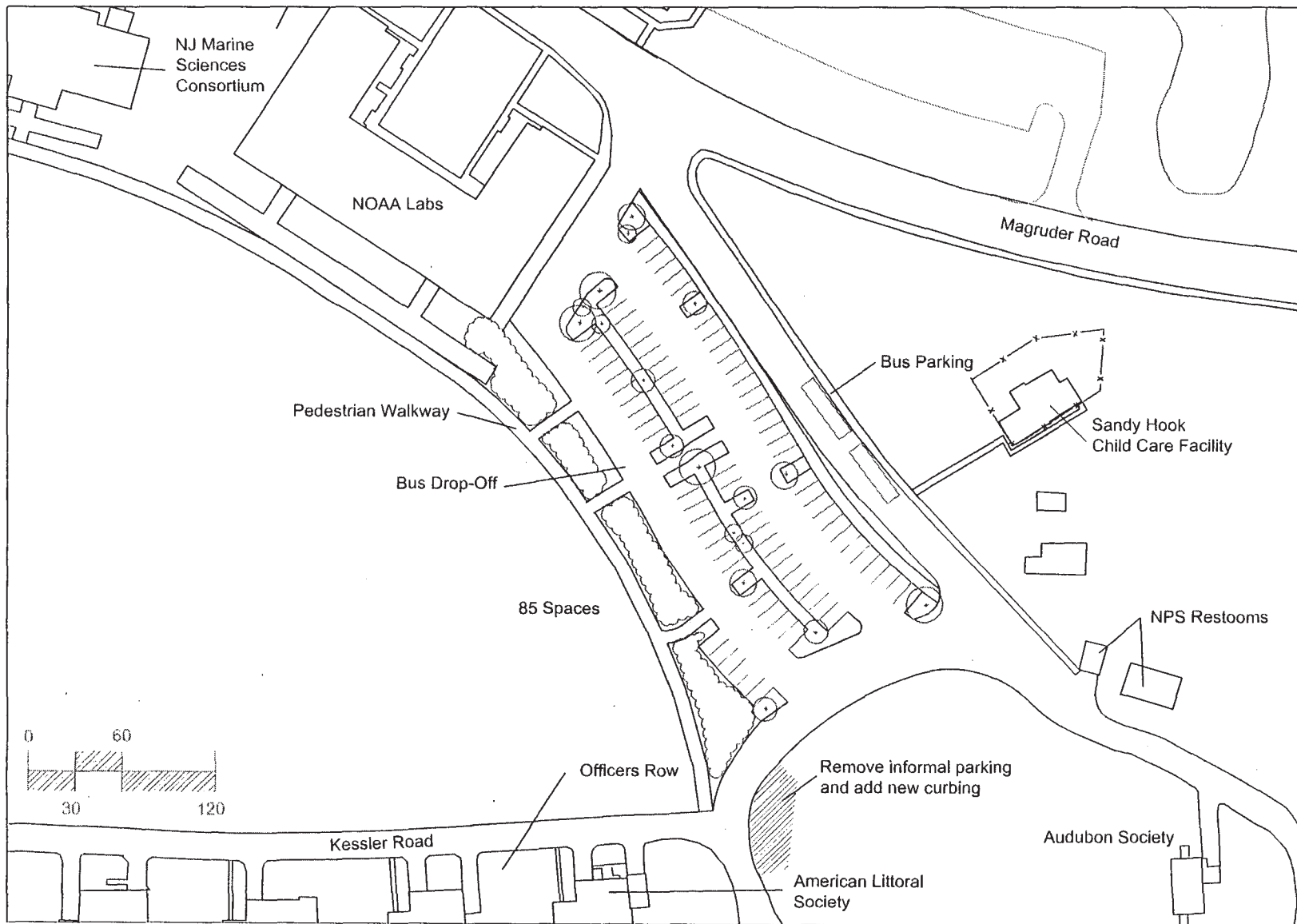


National Park Service
Olmsted Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-552-1009

LEGEND

Scale: 1"=60'





Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

Modified
South
Parade Lot
Alternative B

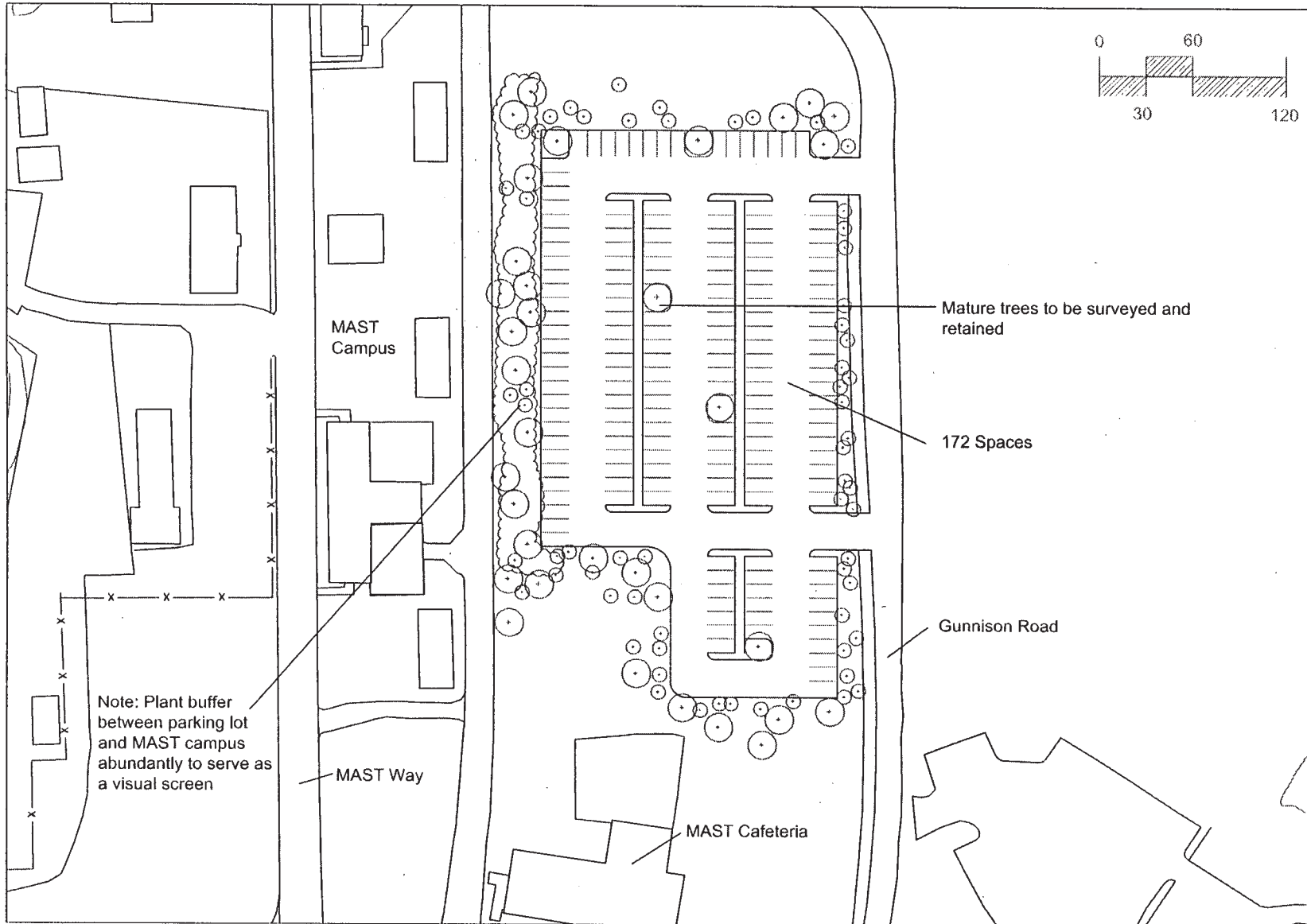
Figure 3.16

 OLINSTEAD CENTER
National Park Service
Olinstead Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-568-1089

LEGEND

Scale: 1"=60'





Cultural Landscape Treatment Plan for Fort Hancock

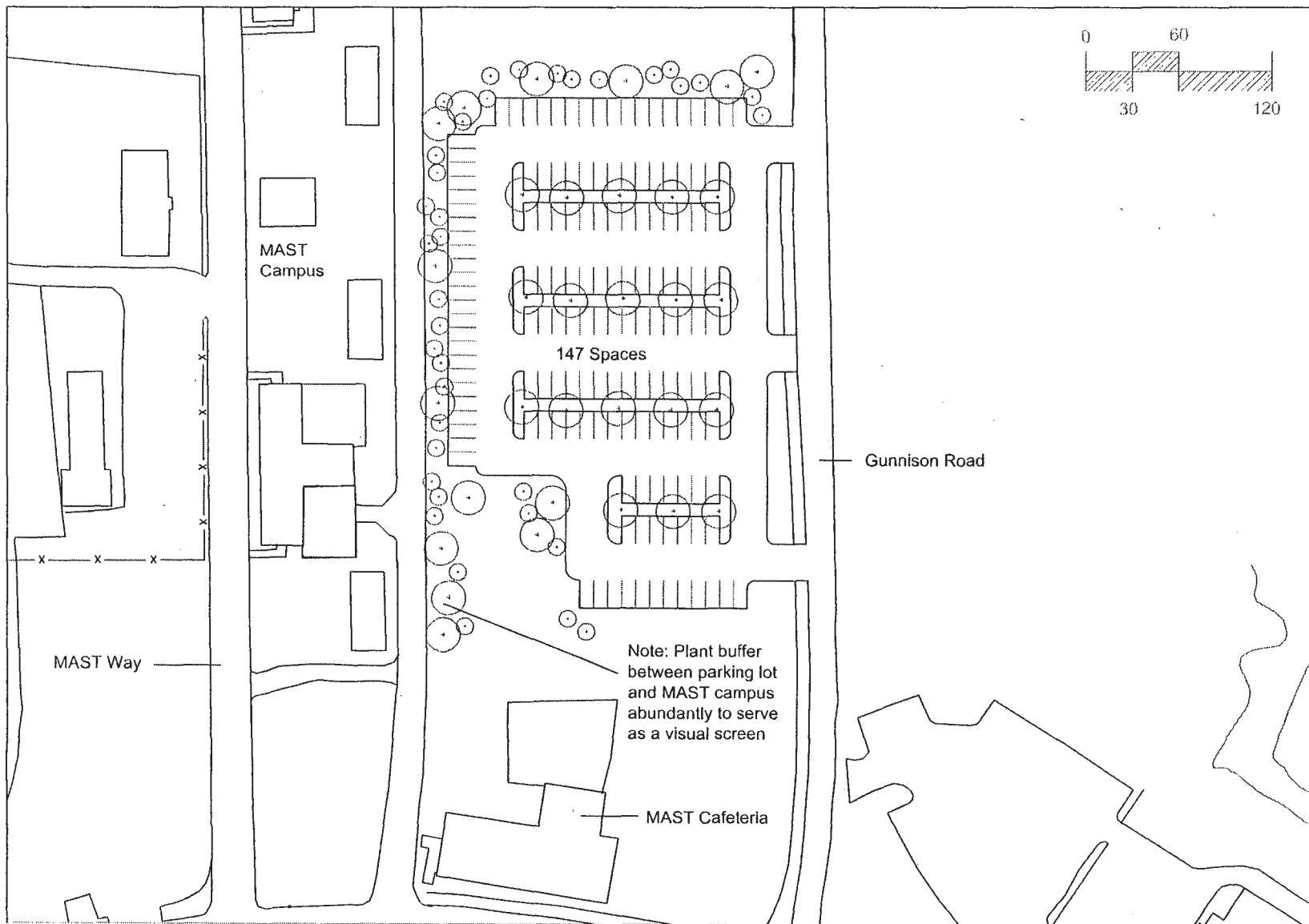
Gateway National Recreation Area

New Tent City Lot Alternative A Preferred Alternative

Figure 3.17

OLNEY CENTER
 Olney Center for Landscape Preservation
 99 Warren Street
 Brookline, MA 02445
 617-552-1889

LEGEND
 Scale: 1"=80'
 N



Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

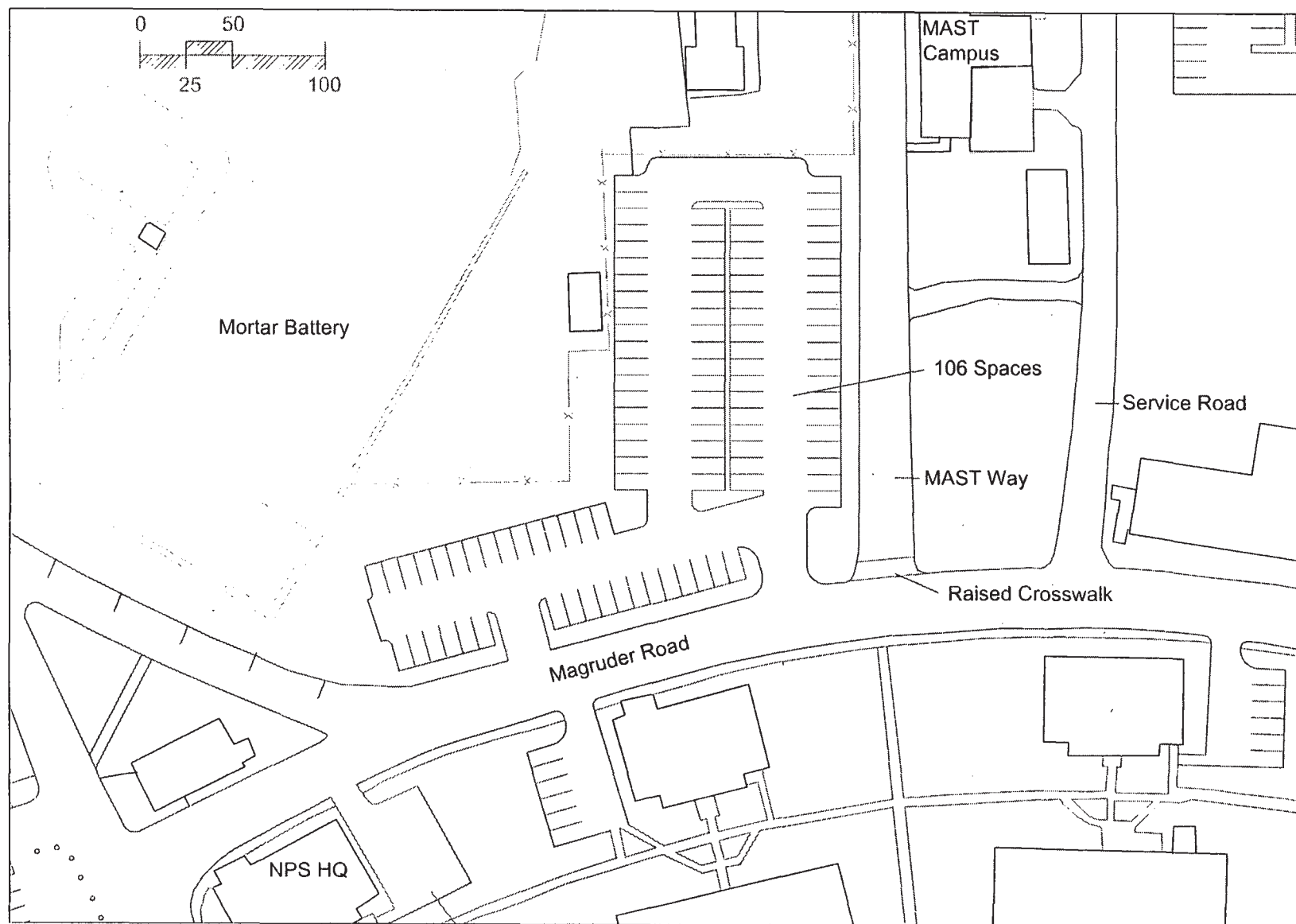
New Tent
City Lot
Alternative B

Figure 3.18

 **NATIONAL PARK SERVICE**
Olmsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-552-1089

LEGEND
Scale: 1"=80'





Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Modified Fort Hancock Lot

Figure 3.19

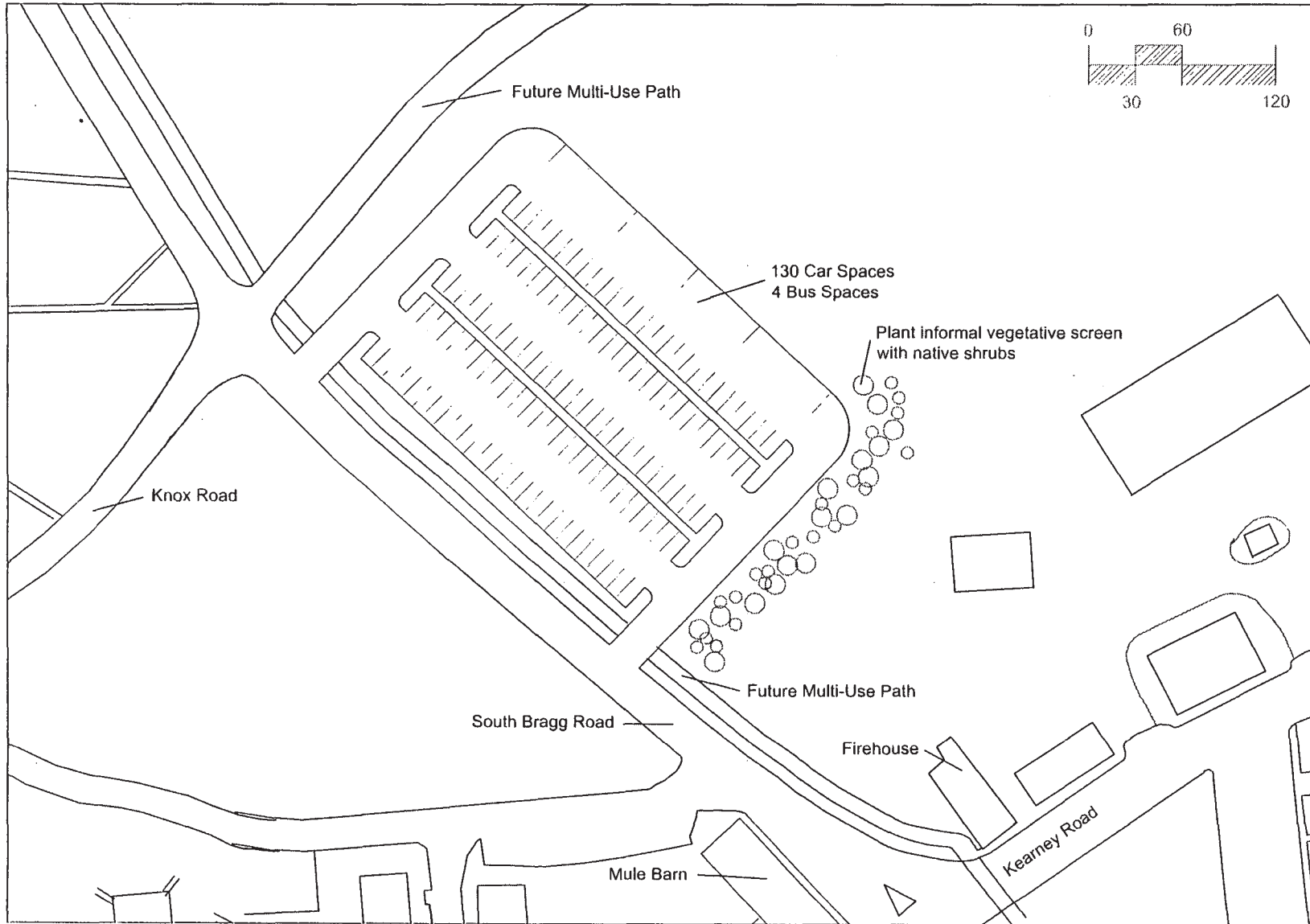


National Park Service
Olmsted Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-566-1089

LEGEND

Scale: 1"=50'





**Cultural
Landscape
Treatment
Plan for Fort
Hancock**

**Gateway
National
Recreation
Area**

**New
Paddock Lot**

Figure 3.20



National Park Service
Olmsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-556-1069

LEGEND

Scale: 1"=60'



Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

New
Warehouse
Lot

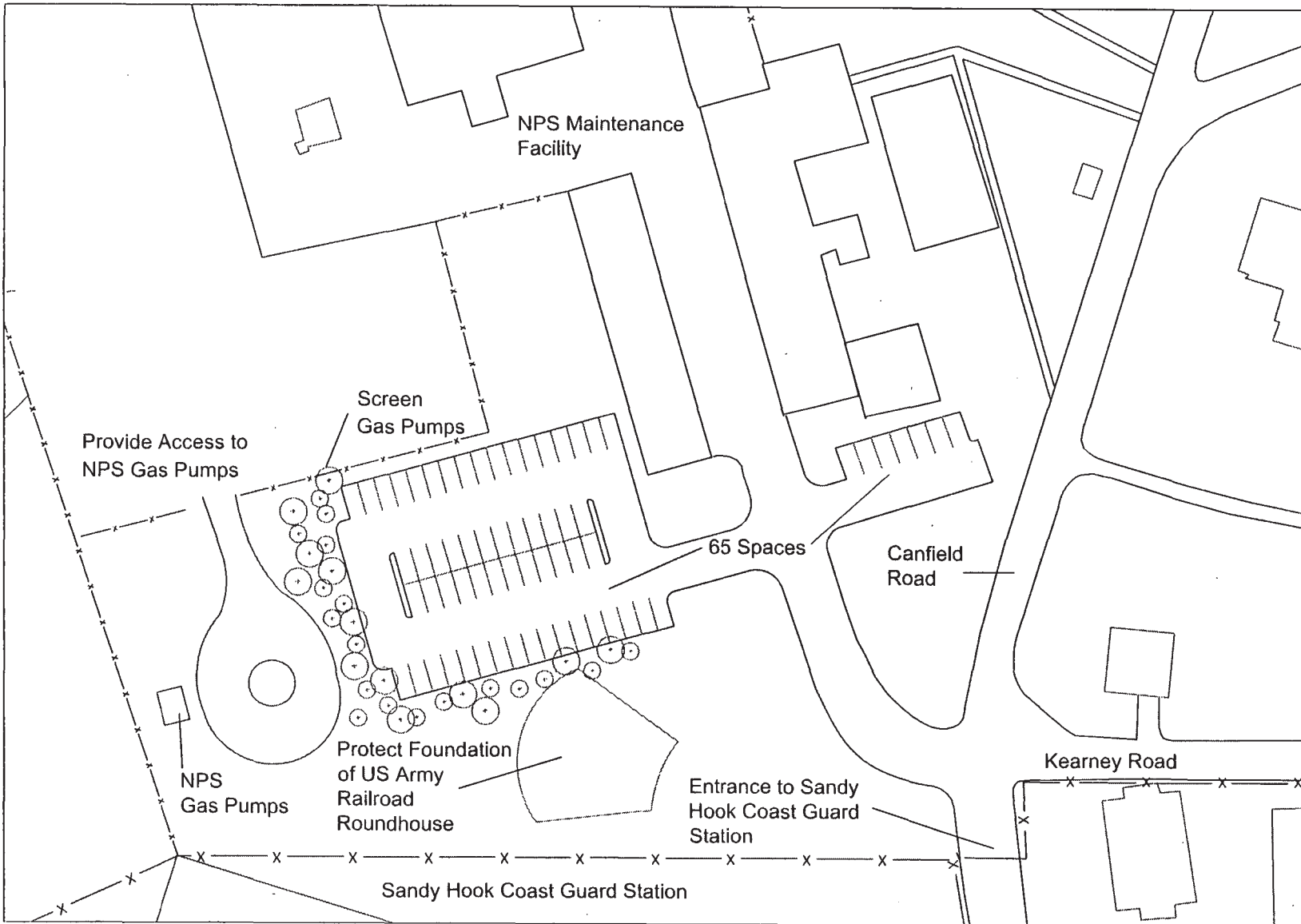
Figure 3.21

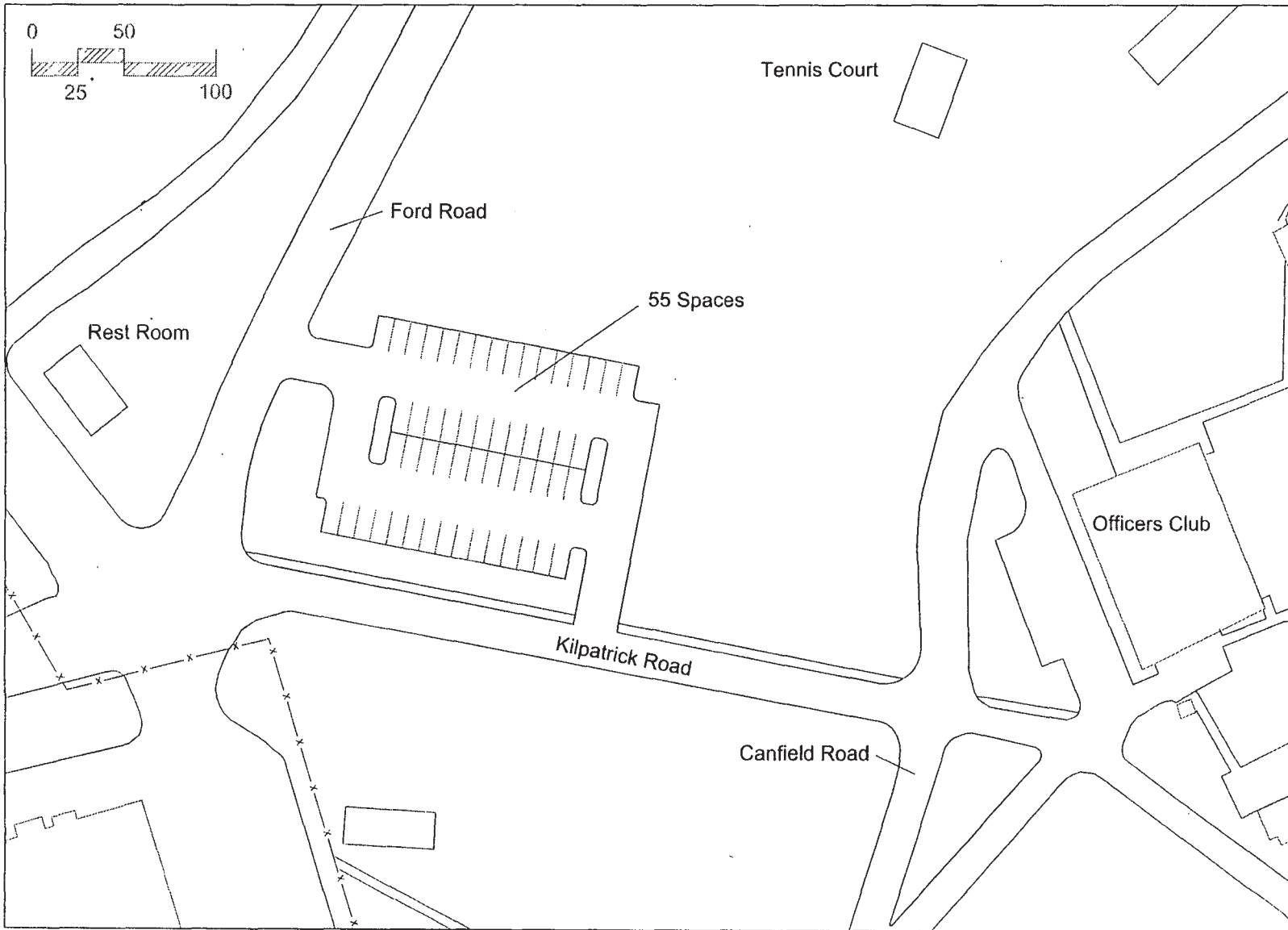


National Park Service
Olmsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-566-1889

LEGEND

Scale: 1"=50'





Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

New
Tennis Lot
Alternative
A
Preferred
Alternative

Figure 3.22



National Park Service
Olmsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-566-1889

LEGEND

Scale: 1"=50'



Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

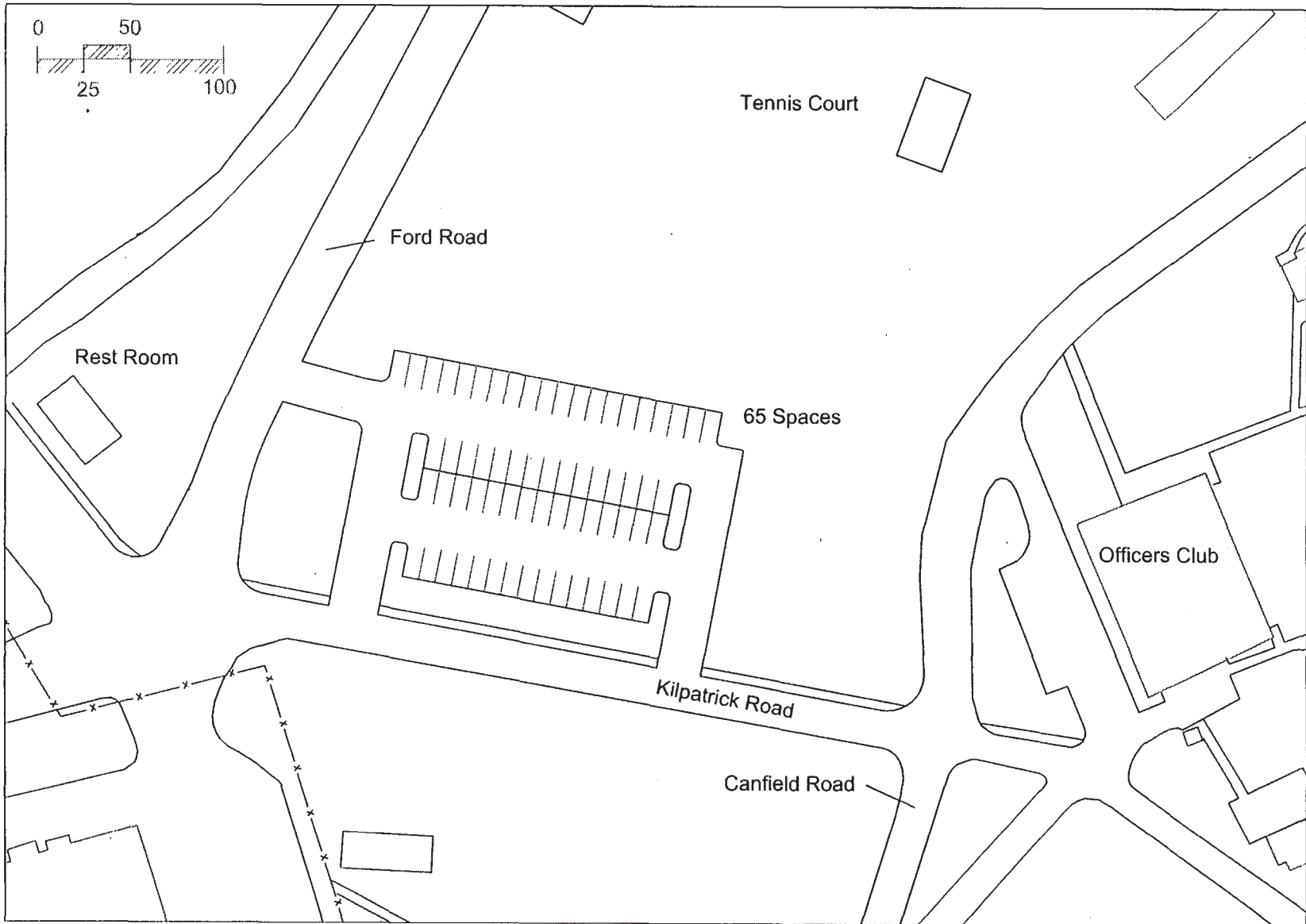
New Tennis Lot Alternative B

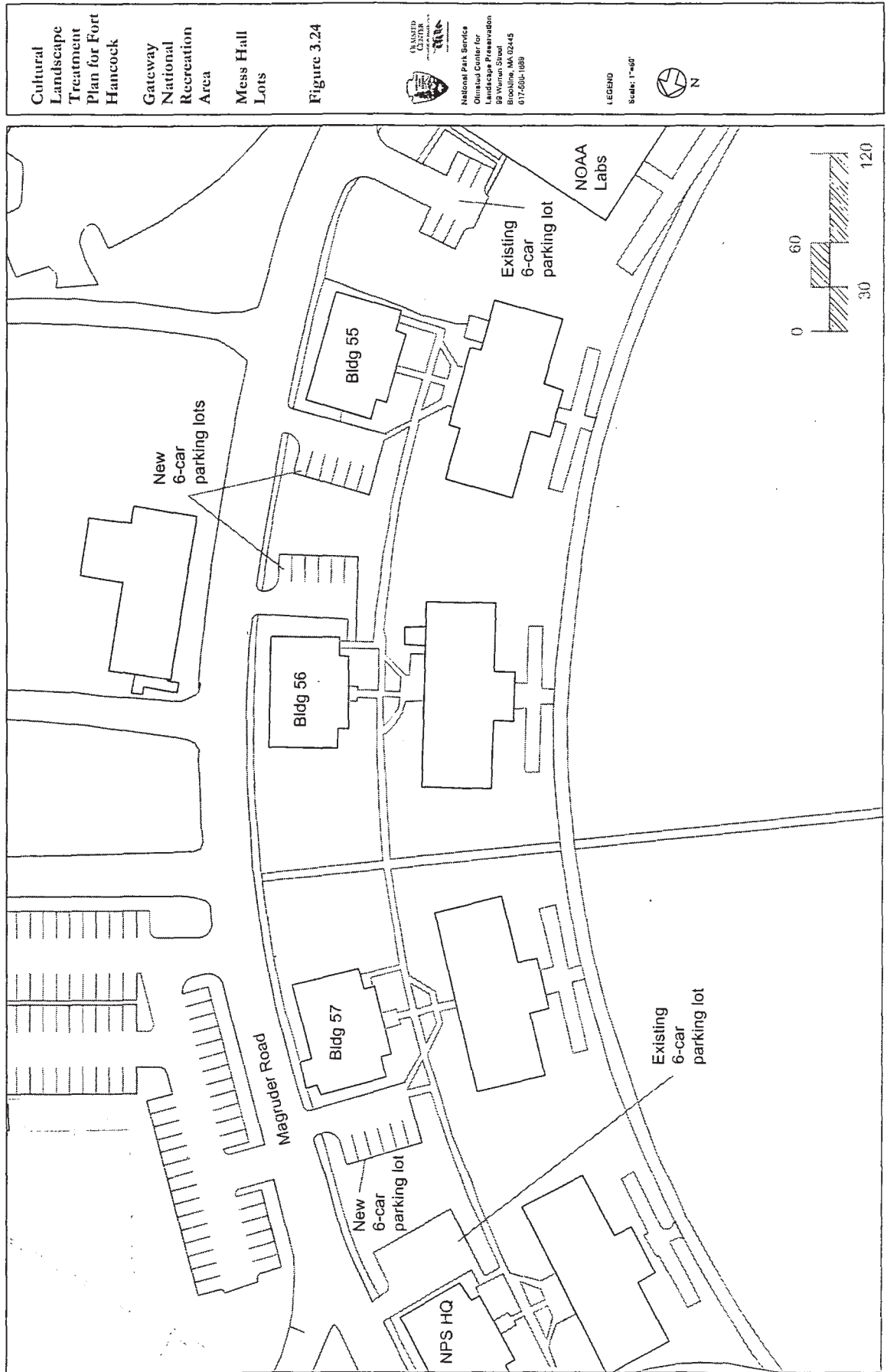
Figure 3.23

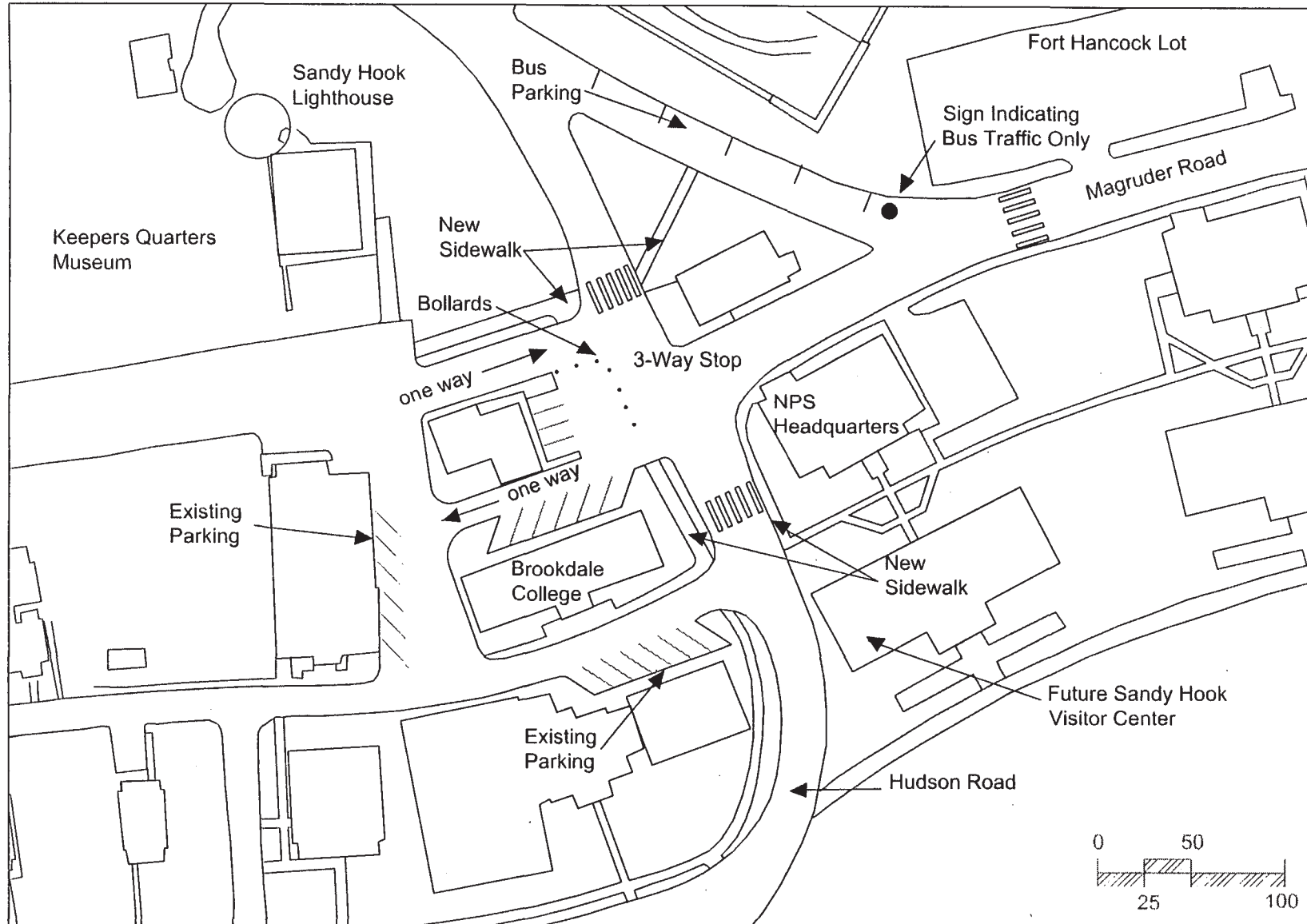
 OLIMSTED CENTER
National Park Service
Olimsted Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-556-1689

LEGEND

Scale: 1"=50'







Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

Realignment
of Gas
Station
Intersection

Alternative
A
Preferred
Alternative

Figure 3.25

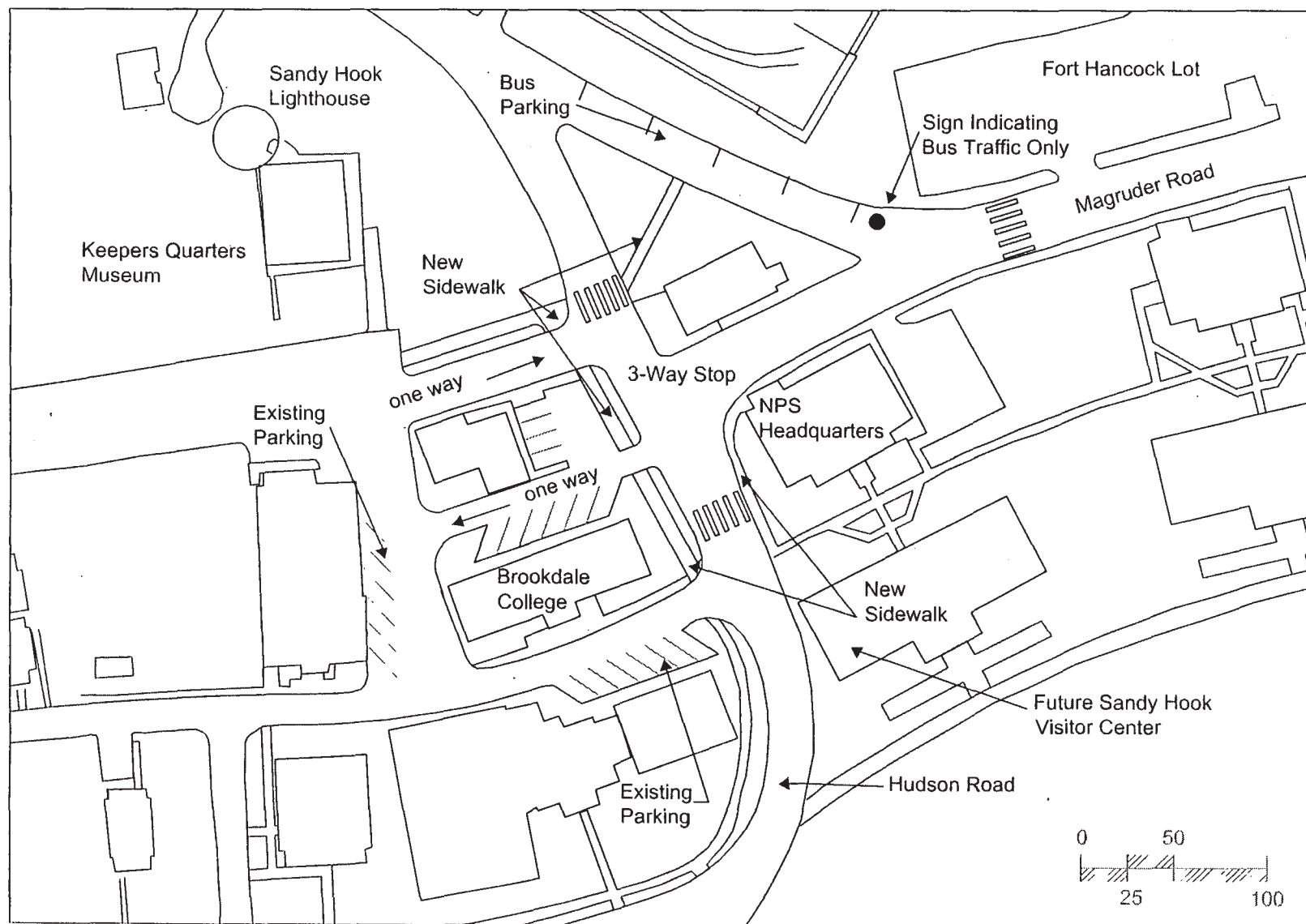


National Park Service
Olmsted Center for
Landscape Preservation
89 Warren Street
Brookline, MA 02445
617-568-1689

LEGEND

Scale: 1"=50'





Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Realignment of Gas Station Intersection

Alternative B

Figure 3.26

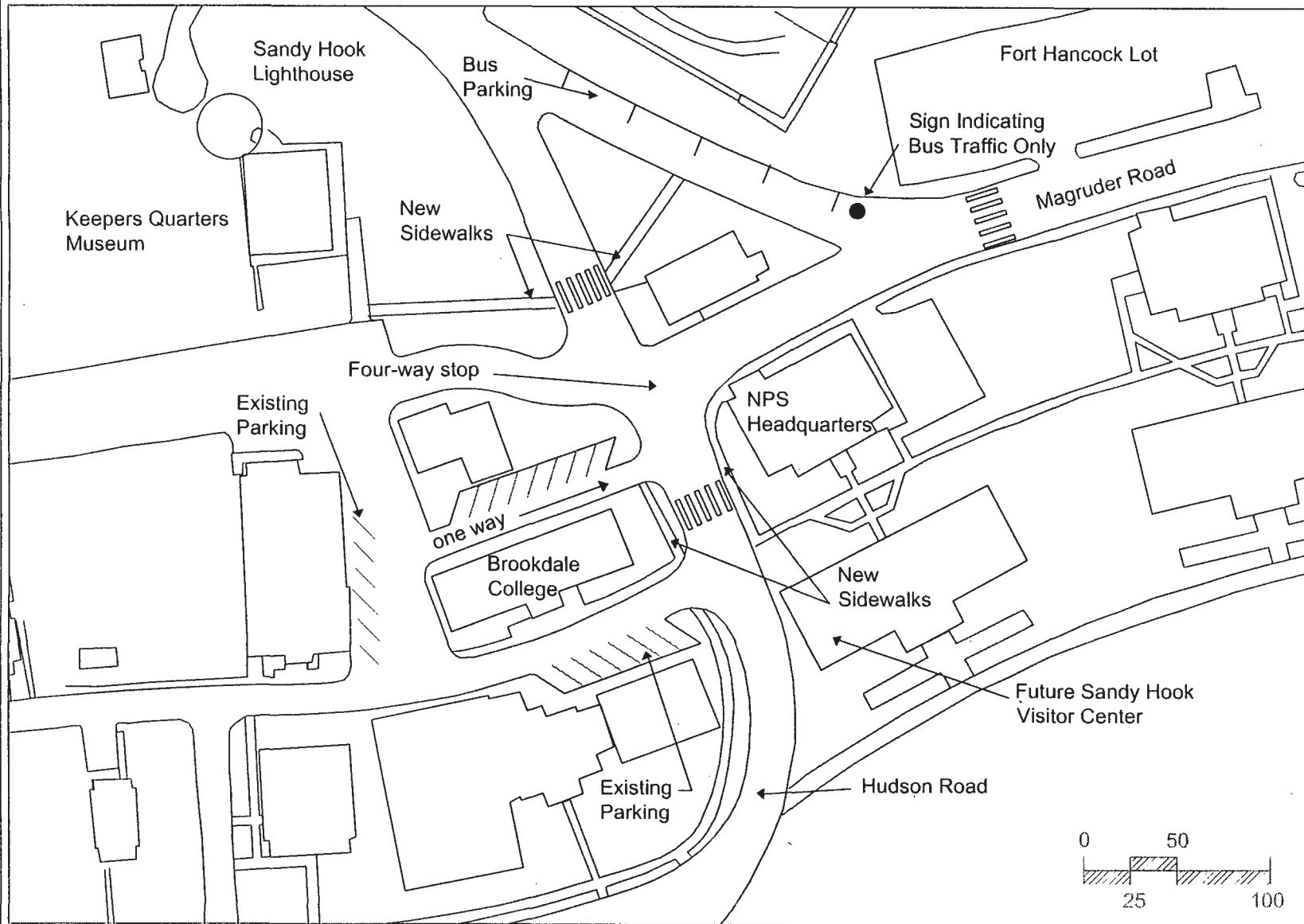


National Park Service
Olmsted Center for Landscape Preservation
66 Warren Street
Brookline, MA 02445
617-566-1689

LEGEND

Scale: 1"=50'





Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Realignment of Gas Station Intersection

Alternative C

Figure 3.27

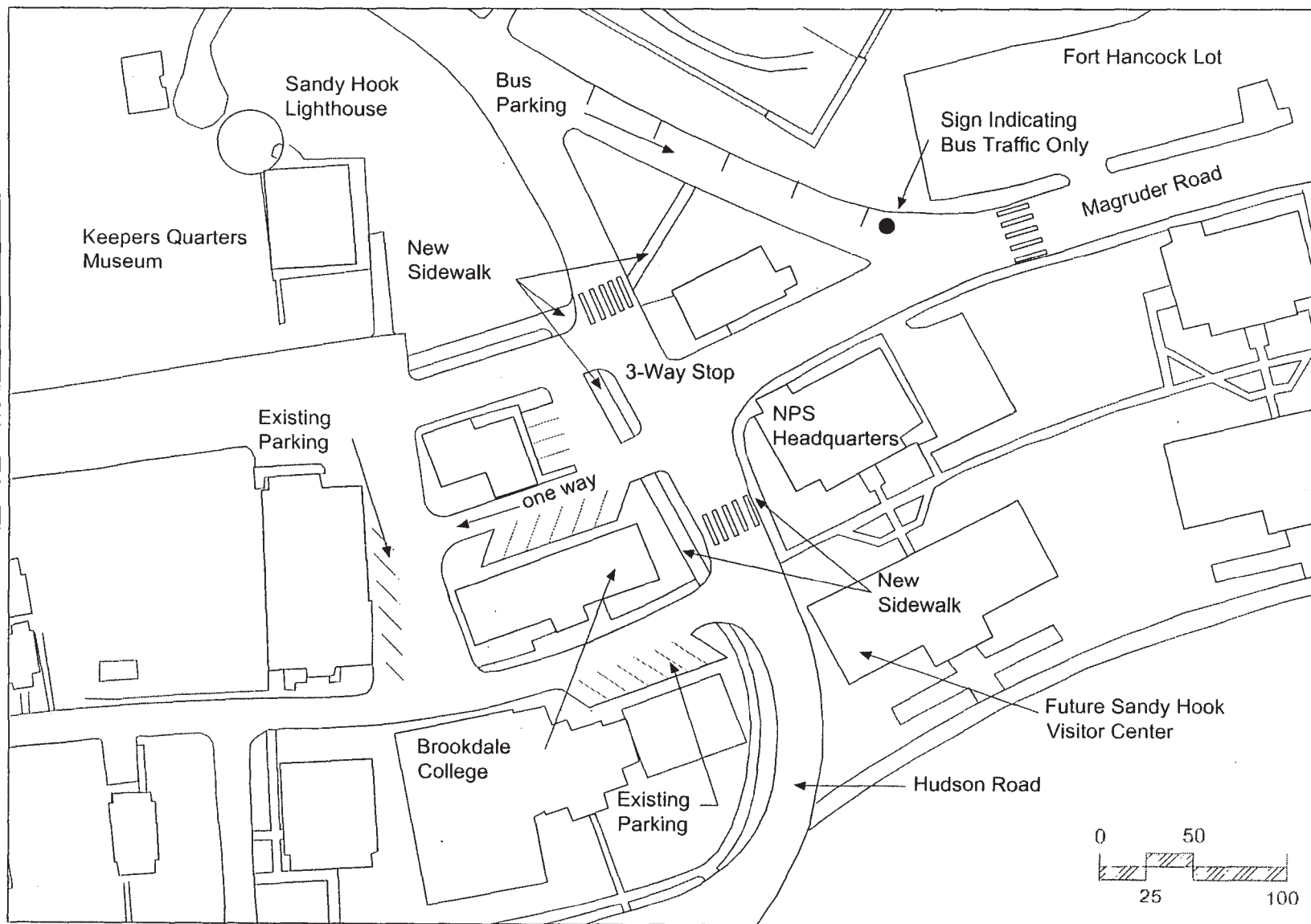


National Park Service
Onsted Center for Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-556-1689

LEGEND

Scale: 1"=50'





Cultural
Landscape
Treatment
Plan for Fort
Hancock

Gateway
National
Recreation
Area

Realignment
of Gas
Station
Intersection

Alternative
D

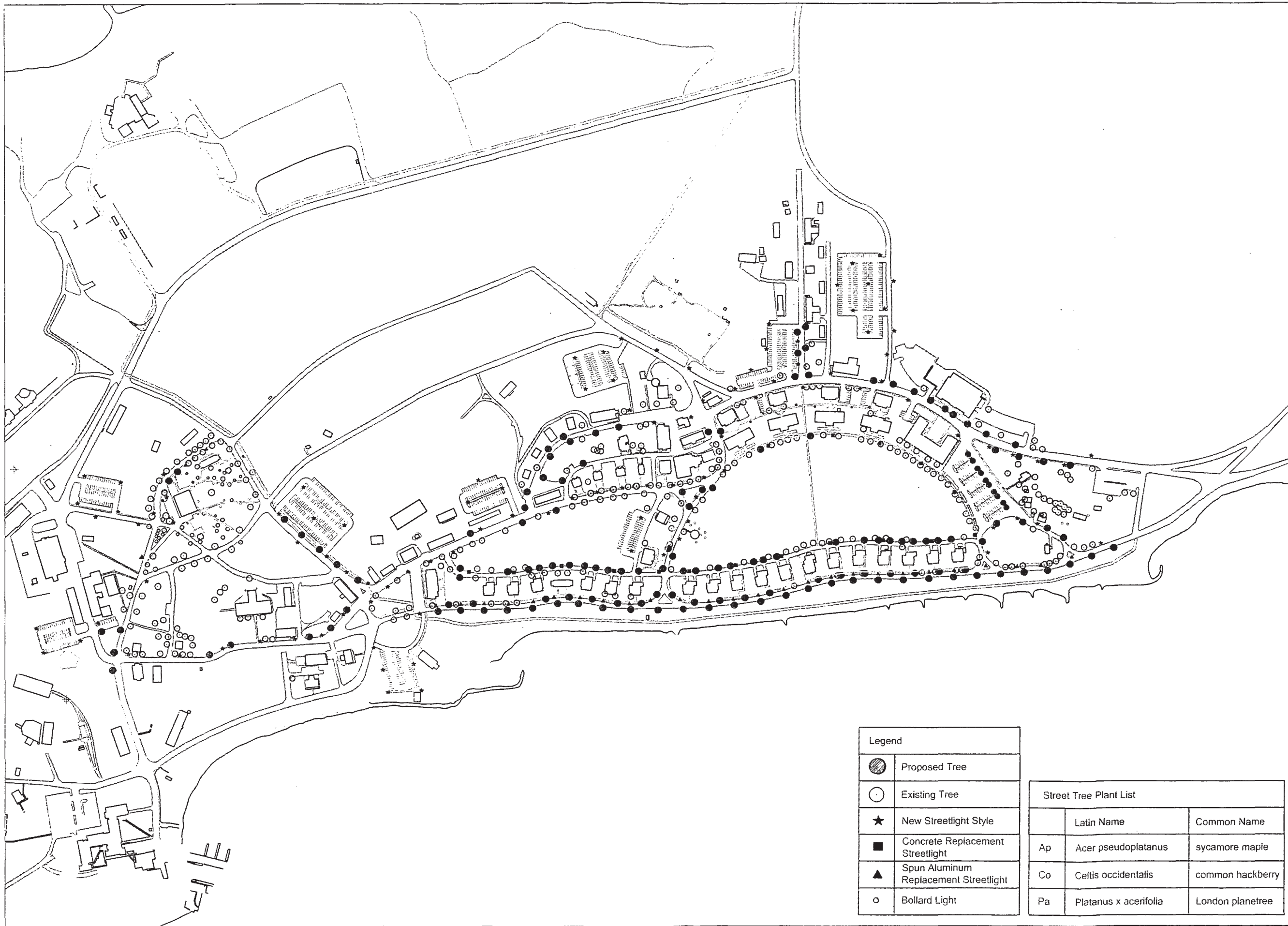
Figure 3.28

 **NATIONAL PARK SERVICE**
Olinsted Center for
Landscape Preservation
99 Warren Street
Brookline, MA 02445
617-560-1089

LEGEND

Scale: 1"=300'





Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Proposed Street Tree and Street Light Plan

Figure 3.29



National Park Service
Olmsted Center for Landscape Preservation

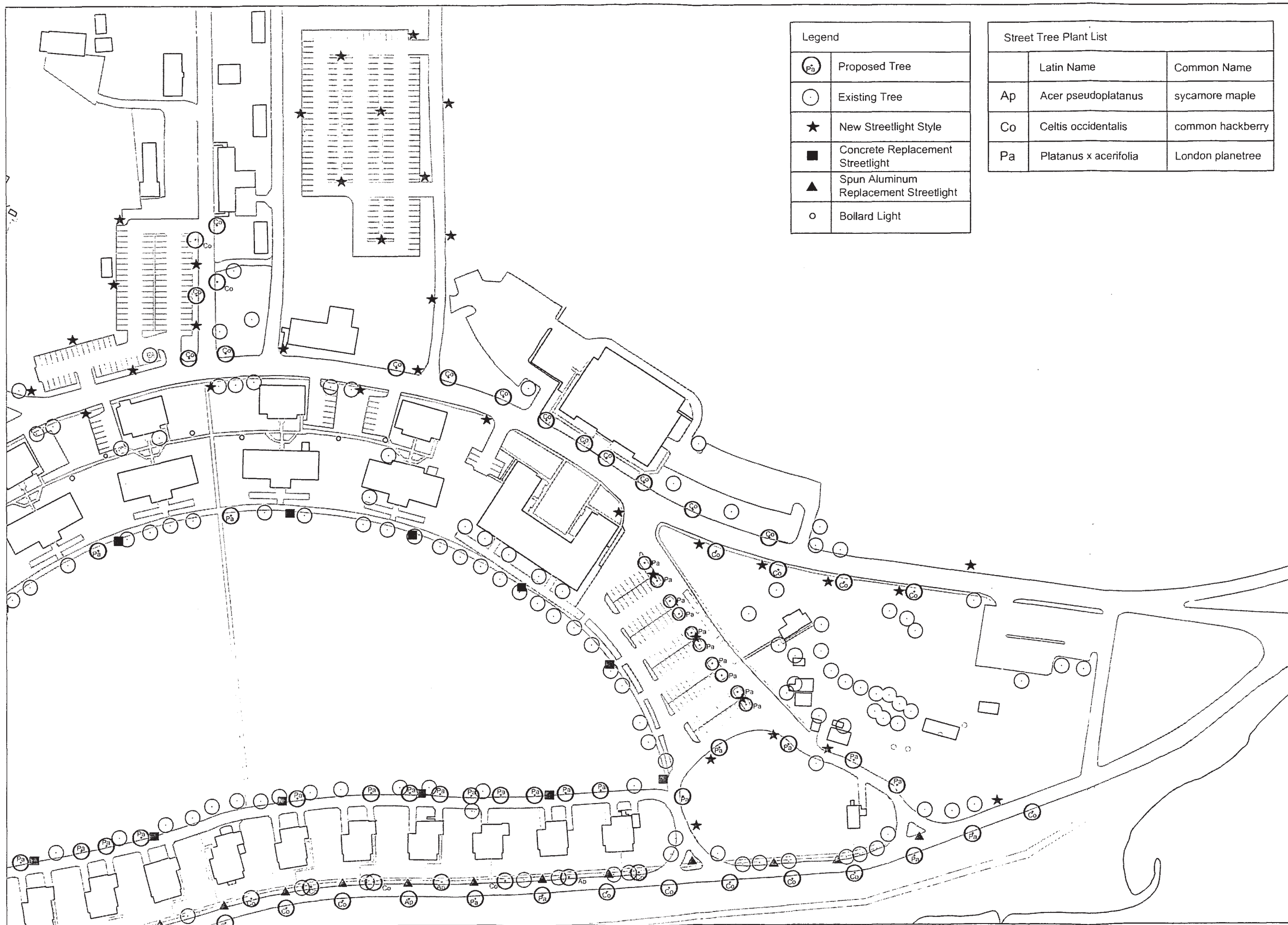
Boston NHP
Charlestown Navy Yard,
Quarters C
Boston, MA 02129
(617) 241-6954

LEGEND

Scale: 1"=400'







Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Street Tree and Streetlight Plan, South Area Enlargement

Figure 3.30



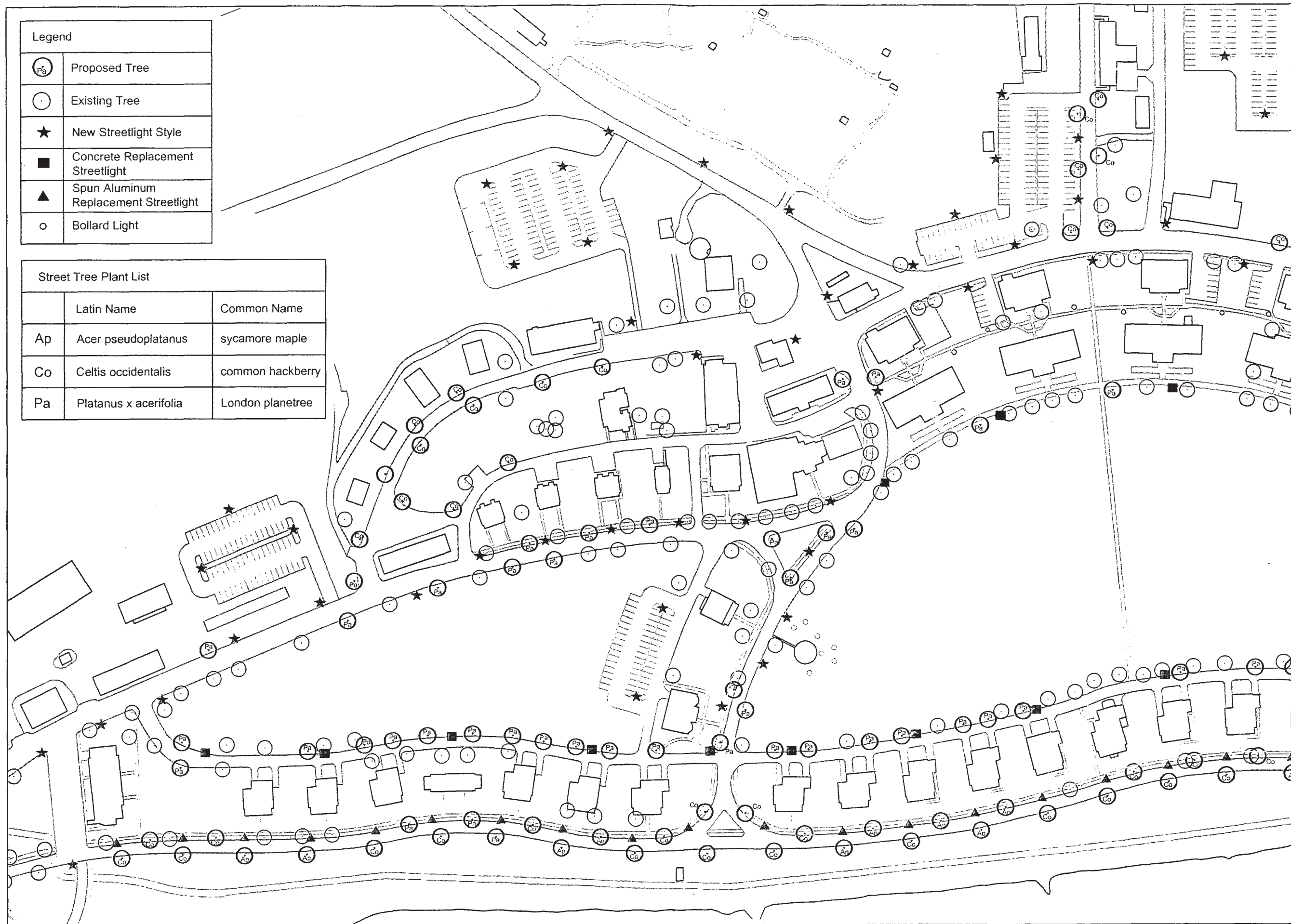
National Park Service
Olmsted Center for Landscape Preservation

Boston NHP
Charlestown Navy Yard,
Quarters C
Boston, MA 02129
(617) 241-6954

LEGEND

Scale: 1"=150'





Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Street Tree and Streetlight Plan, Central Area Enlargement

Figure 3.31



National Park Service
Olmsted Center for Landscape Preservation

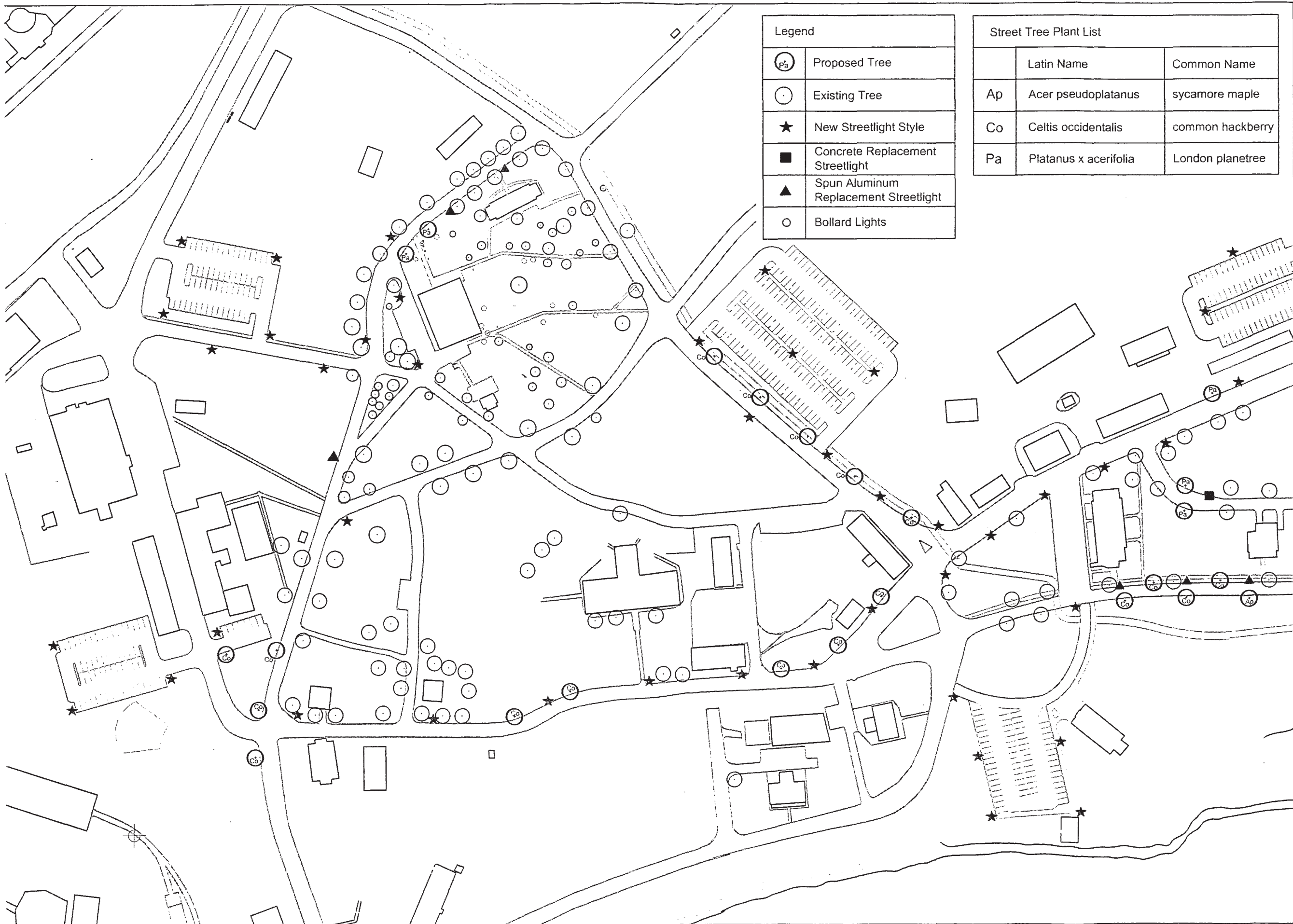
Boston NHP
Charlestown Navy Yard,
Quarters C
Boston, MA 02129
(617) 241-6954

LEGEND

Scale: 1"=150'







Cultural Landscape Treatment Plan for Fort Hancock

Gateway National Recreation Area

Street Tree and Streetlight Plan, North Area Enlargement

Figure 3.32



National Park Service
Olmsted Center for Landscape Preservation

Boston NHP
Charlestown Navy Yard,
Quarters C
Boston, MA 02129
(617) 241-6954

LEGEND

Scale: 1"=150'





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Product Literature

"Outdoor Environmental Lighting Guide," Holophane Lighting product literature.

"Outdoor Lighting Application Guide," Lumec® product literature.

Appendix A: Building and Foundation Planting Chart, 1 of 5

(planting category based on historic use)

Building Name	Bldg. No.	Date	Historical Use	Present Use	Management	Planting Category
Lieutenants Quarters	1	1898	Housing	Museum	NPS	Residential
Lieutenants Quarters	2	1898	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	3	1898	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	4	1898	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	5	1899	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	6	1899	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	7	1899	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	8	1899	Housing	Vacant	Historic Lease	Residential
Captains Quarters	9	1899	Housing	Vacant	Historic Lease	Residential
Captains Quarters	10	1899	Housing	Vacant	Historic Lease	Residential
Captains Quarters	11	1899	Housing	Vacant	Historic Lease	Residential
Commander's Quarters	12	1899	Housing	Vacant	Historic Lease	Residential
Captains Quarters	13	1899	Housing	Vacant	Historic Lease	Residential
Captains Quarters	14	1899	Housing	Vacant	Historic Lease	Residential
Captains Quarters	15	1899	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	16	1899	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	17	1899	Housing	Vacant	Historic Lease	Residential
Lieutenants Quarters	18	1899	Housing	Park Partner	Historic Lease	Residential
Hospital Steward Quarters	20	1899	Housing	Education Partnership	Cooperative Agreement	Residential
2-Family Officers Quarters	21	1939	Housing	NPS Housing	Historic Lease	Residential
Enlisted Barracks	22	1899	Housing	Education Partnership	Cooperative Agreement	Public
Enlisted Barracks	23	1899	Housing	Vacant	Historic Lease	Public
Enlisted Barracks	24	1898	Housing	Vacant	Historic Lease	Public
Enlisted Barracks	25	1898	Housing	Vacant	NPS	Public
Post Headquarters	26	1899	Head-quarters	Offices	Historic Lease	Public
Bachelor Officers Quarters	27	1899	Housing	Vacant	Historic Lease	Residential
Post Guardhouse	28	1899	Post Jail	Museum	NPS	Service
NCO Quarters	29	1899	Housing	NPS Housing	NPS	Residential
NCO Quarters	30	1898	Housing	NPS Housing	NPS	Residential
Quartermaster Storehouse	32	1898	Warehouse	NPS Operations	NPS	Service
Bakery	33	1898	Bakery	Vacant	Historic Lease	Service

Appendix A: Building and Foundation Planting Chart, 2 of 5*(planting category based on historic use)*

Building Name	Bldg. No.	Date	Historical Use	Present Use	Management	Planting Category
Fire Station Office	34	1899	Office/ Dormitory	NPS Operations	NPS	Service
Chapel/ Auditorium	35	1941	Chapel	Reception / Events	Historic Lease (Shared Use)	Public
Mule Stables	36	1899	Stable	Vacant	Historic Lease	Service
Pump House	37	1928	Pump Station	Pump Station	NPS	Service
YMCA / Gymnasium	40	1903/ 1941	YMCA/ Gym	Gym/US Post Office	Historic Lease	Public
Post Office	41	1941	Post Office	NPS Housing	NPS	Public
Quartermaster Latrine	44	1899	Latrine	Vacant	NPS	Service
Shell Warehouse	45	1921	Warehouse	NPS Operations	NPS	Service
Commissary	47	1900	Storehouse	NPS Operations	NPS	Service
Warehouse	49	1942	Warehouse	NPS Operations	NPS	Service
Fire House #1	51	1905	Firehouse	NPS Operations	NPS	Service
NCO Quarters	52	1905	Housing	NPS Housing	NPS	Residential
Post Exchange	53	1905	Exchange/ Offices	Education Partnership	Cooperative Agreement	Public
Mess Hall	55	1905	Kitchen/ Dining	Vacant	Historic Lease	Public
Mess Hall	56	1905	Kitchen/ Dining	Vacant	Historic Lease	Public
Mess Hall	57	1905	Kitchen/ Dining	Vacant	Historic Lease	Public
Mess Hall	58	1905	Kitchen/ Dining	NPS Operations	NPS	Public
Gas Station	60	1936	Gas Station	Vacant	Historic Lease	Service
NCO Quarters	64	1907	Housing	NPS Housing	NPS	Residential
Storehouse	65	1905	Storehouse	NPS Operations	NPS	Service
NCO Quarters	66	1908	Housing	NPS Housing	NPS	Residential
Post Theater	67	1933	Theater	Theater/ Meeting	Historic Lease (Shared Use)	Public
Post Exchange/ Gymnasium	70	1909	P.X./Gym	Vacant	Historic Lease	Public
NCO Quarters	71	1909	Housing	NPS Housing	NPS	Residential
NCO Quarters	72	1909	Housing	NPS Housing	NPS	Residential
NCO Quarters	73	1909	Housing	NPS Housing	NPS	Residential

Appendix A: Building and Foundation Planting Chart, 3 of 5

(planting category based on historic use)

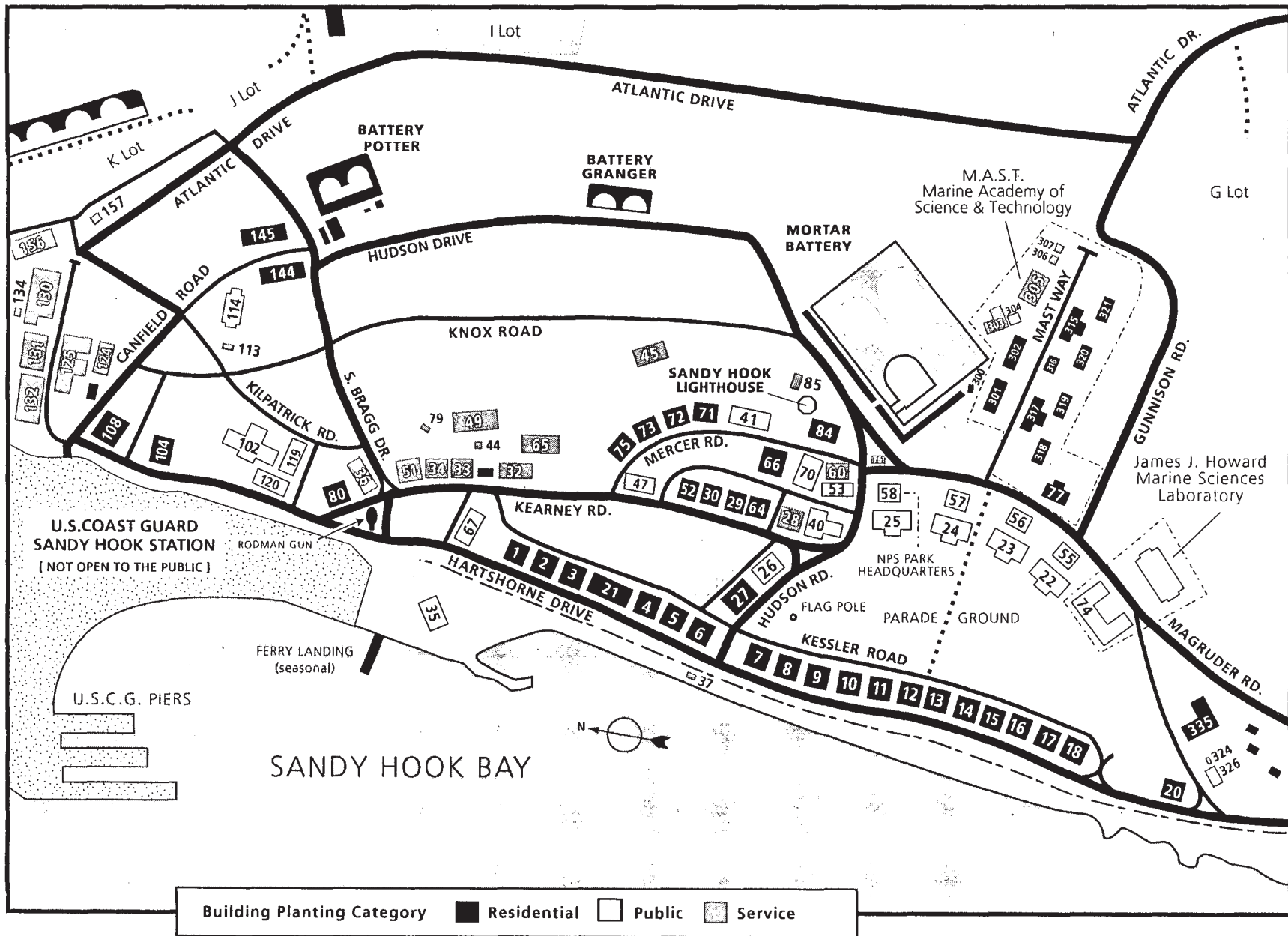
Building Name	Bldg. No.	Date	Historical Use	Present Use	Management	Planting Category
Enlisted Barracks	74	1909	Housing	State Offices	State of NJ	Public
NCO Quarters	75	1910	Housing	NPS Housing	NPS	Residential
Fire House #2	76	1910	Fire House	NPS Operations	NPS	Service
Laundry	77	1941	Laundry	Educational Partnership	Cooperative Agreement	Service
Oil and Paint Storehouse	79	1918	Storehouse	Storage	Historic Lease	Service
2-Family NCO Quarters	80	1910	Housing	Vacant	Historic Lease	Residential
Lighthouse Keepers Quarters	84	1883	Housing	Education Partnership	Cooperative Agreement	Residential
Barn	85	1910	Barn/ Garage	Museum	NPS	Service
Proving Ground Barracks	102	1909	Barracks	Education Center	NPS	Public
NCO Quarters	104	1894	Housing	NPS Operations	NPS	Residential
NCO Quarters	108	1905	Housing	NPS Operations	NPS	Residential
Laundry	113	1905	Laundry	Vacant	NPS	Service
Officers Club	114	1878	Housing	Vacant	Historic Lease	Public
WWII Barracks	119	1941	Barracks	NPS Housing	NPS	Public
WWII Barracks	120	1941	Barracks	NPS Housing	NPS	Public
Power Plant	124	1907	Power Plant	NPS Storage	Historic Lease	Service
Motor Shop	125	1907	Motor Shop	NPS Storage	Historic Lease	Service
Proving Ground Storehouse	130	1907	Maintenance Shops	NPS Operations	NPS	Service
Proving Ground Shelter House	131	1907	Maintenance Shops	NPS Operations	NPS	Service
Proving Ground Paint Shop	132	1907	Maintenance Shops	NPS Operations	NPS	Service
Proving Ground Storehouse	134	1907	Maintenance Shops	NPS Operations	NPS	Service
Officers Quarters	144	1939	Housing	NPS Housing	NPS	Residential
Officers Quarters	145	1939	Housing	NPS Housing	NPS	Residential
Warehouse	156	1942	Warehouse	NPS Operation	NPS	Service

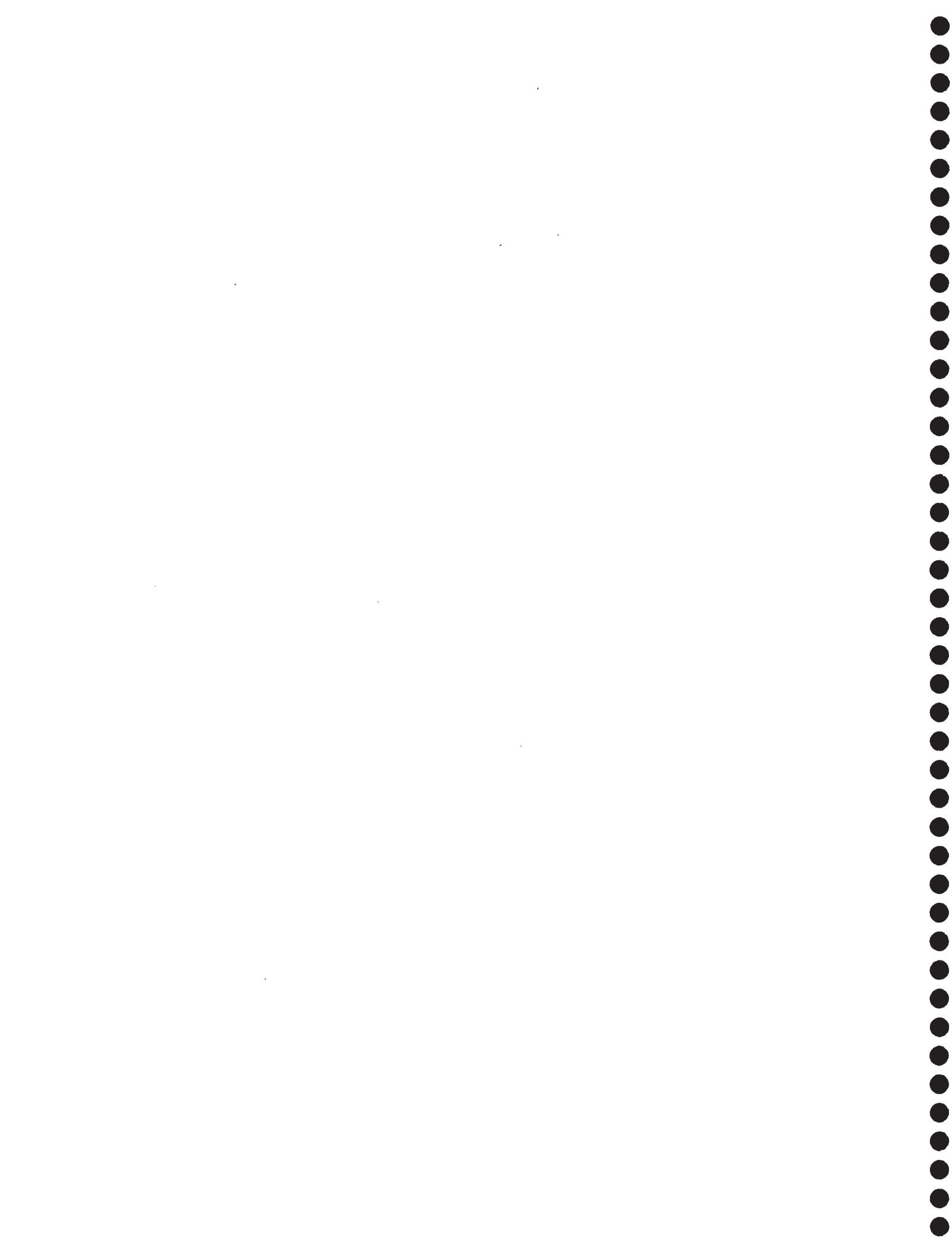
Appendix A: Building and Foundation Planting Chart, 4 of 5*(planting category based on historic use)*

Building Name	Bldg. No.	Date	Historical Use	Present Use	Management	Planting Category
Laundry/Latrine	157	1967	Latrine	Restroom	NPS	Service
Latrine	300	1940	Latrine	Vacant	NPS	Service
Officers Mess	301	1941	Kitchen/ Dining	Educational Partnership	Cooperative Agreement	Public
Camp Headquarters	302	1941	Offices	Educational Partnership	Cooperative Agreement	Public
Storehouse	303	1941	Storehouse	Educational Partnership	Cooperative Agreement	Service
Officers Latrine	304	1941	Latrine	Educational Partnership	Cooperative Agreement	Service
Dispensary	305	1941	Dispensary	Educational Partnership	Cooperative Agreement	Public
Sewage Pump Station	306	1940	Pump Station	Vacant	NPS	Service
Sewage Pump Station	307	1940	Pump Station	Vacant	NPS	Service
Mess Hall	315	1941	Kitchen/ Dining	Educational Partnership	Cooperative Agreement	Public
Post Exchange	316	1941	Exchange	Educational Partnership	Cooperative Agreement	Public
Mess Hall	317	1941	Kitchen/ Dining	Educational Partnership	Cooperative Agreement	Public
Dispensary	318	1941	Dispensary	Educational Partnership	Cooperative Agreement	Public
Post Exchange	319	1941	Exchange	Educational Partnership	Cooperative Agreement	Public
Enlisted Men's Latrine	320	1941	Latrine	Educational Partnership	Cooperative Agreement	Service
Enlisted Men's Latrine	321	1941	Latrine	Educational Partnership	Cooperative Agreement	Service
Power Plant	324	1941	Power Plant	Restroom	NPS	Service
NCO Quarters	335	1898	Housing	Day Care Center	Cooperative Agreement	Residential
Morgue	326	1905	Morgue	Restroom	NPS	Service
Howard Marine Laboratory	N/A	1990	N/A	NJ State Offices	Cooperative Agreement	Public

Appendix A: Building and Foundation Planting Chart, 5 of 5

(planting category based on historic use)





Appendix B: Recommended Plant Lists for Fort Hancock, 1 of 4

Recommended Foundation Shrubs for Public Buildings

Latin Name	Common Name	Height	Shade Tolerance	Deciduous/ Evergreen	Native
<i>Ilex glabra</i>	Inkberry	9'	Tolerant	Evergreen	X
<i>Juniperus communis</i>	Common Juniper	4-6'	Intermediate	Evergreen	X
<i>Myrica pensylvanica</i>	Northern Bayberry	9'	Intermediate	Semi-Evergreen	X
<i>Pieris floribunda</i>	Mountain Andromeda	6'	Tolerant	Deciduous	X
<i>Vaccinium corymbosum</i>	Highbush Blueberry	6-12'	Intermediate	Deciduous	X

Recommended Mid-Height to Tall Shrubs for Residential Buildings

Latin Name	Common Name	Height	Shade Tolerance	Deciduous/ Evergreen	Native
<i>Aronia arbutifolia</i>	red chokeberry	9'	Intermediate	Deciduous	X
<i>Aronia melanocarpa</i>	black chokeberry	9'	Intermediate	Deciduous	X
<i>Baccharis halimifolia</i>	groundsel-bush	5'-12'	Intolerant		
<i>Clethra alnifolia</i>	summersweet	9'	Tolerant	Deciduous	X
<i>Cornus sericea</i>	redosier dogwood	7'	Intolerant	Deciduous	X
<i>Cotoneaster divaricatus</i>	spreading cotoneaster	5-6'	Intolerant	Deciduous	
<i>Hibiscus syriacus</i>	rose-of-sharon	8-12'	Intolerant	Deciduous	
<i>Hydrangea macrophylla</i>	bignleaf hydrangea	6-12'	Intolerant	Deciduous	
<i>Hydrangea quercifolia</i>	oakleaf hydrangea	4-8'	Tolerant	Deciduous	
<i>Ilex glabra</i>	inkberry	9'	Tolerant	Evergreen	X
<i>Juniperus communis</i>	common juniper	5-7'	Intermediate	Evergreen	X
<i>Myrica pensylvanica</i>	northern bayberry	9'	Intermediate	Semi-Evergreen	X
<i>Pieris floribunda</i>	mountain andromeda	6'	Tolerant	Deciduous	X
<i>Prunus maritima</i>	beach plum	6'	Intolerant	Deciduous	X
<i>Rosa rugosa</i>	salt spray rose	6'	Intolerant	Deciduous	
<i>Sambucus Canadensis</i>	American elder	5-12'		Deciduous	X
<i>Syringa vulgaris</i>	common lilac	5-12'	Intermediate	Deciduous	
<i>Vaccinium corymbosum</i>	highbush blueberry	6-12'	Intermediate	Deciduous	X

Appendix B: Recommended Plant Lists for Fort Hancock, 2 of 5

Recommended Low Growing Shrubs for Residential Buildings

Latin Name	Common Name	Height	Shade Tolerance	Deciduous/ Evergreen	Native
<i>Abelia x grandiflora</i>	glossy abelia	3-6'	Intermediate	Deciduous	
<i>Ceanothus americana</i>	New Jersey tea	2-3'	Intermediate	Deciduous	X
<i>Chaenomeles</i> sp.	flowering quince	3-6'	Intermediate	Deciduous	
<i>Cotoneaster apiculatus</i>	cranberry cotoneaster	3'	Intermediate	Deciduous	
<i>Cotoneaster horizontalis</i>	rockspray cotoneaster	5'	Intermediate	Deciduous	
<i>Leucothoe</i> sp.	leucothoe	3-6'	Tolerant	Evergreen	X
<i>Juniperus sabina</i>	savin juniper	4-6'	Tolerant	Evergreen	
<i>Juniperus conferta</i>	shore juniper	1-2'	Intolerant	Evergreen	
<i>Myrica gale</i>	sweetgale	4'	Tolerant	Deciduous	X
<i>Paeonia suffruticosa</i>	tree peony	4-5'	Intermediate	Deciduous	
<i>Potentilla fruticosa</i>	bush cinquefoil	1-4'	Intolerant	Deciduous	X
<i>Rosa virginiana</i>	Virginia rose	4-6'	Intolerant	Deciduous	X
<i>Suaeda fruticosa</i>	shrubby goosefoot	2-3'	Intolerant	Evergreen	X
<i>Vaccinium angustifolium</i>	lowbush blueberry	6"-2'	Intermediate (needs acid soil)	Deciduous	X

Recommended Groundcover for All Buildings

Latin Name	Common Name	Height	Shade Tolerance	Deciduous/ Evergreen	Native
<i>Arctostaphylos uva-ursi</i>	bearberry	6"-12"	Intolerant	Evergreen	X
<i>Convallaria majalis</i>	lily of the valley	6"	Tolerant	Deciduous	
<i>Juniperus horizontalis</i>	creeping juniper	1-2'	Intolerant	Evergreen	X
<i>Juniperus procumbens</i>	Japanese garden juniper	8-12"	Intolerant	Evergreen	
<i>Opuntia humifusa</i>	eastern prickly pear	3-4"	Intolerant	Succulent	X
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Vine	Intermediate	Deciduous	X
<i>Pachysandra procumbens</i>	Alleghany pachysandra	4-8"	Requires Shade	Deciduous in north	X
<i>Thymus serpyllum</i>	mother-of-thyme	4-6"	Intolerant	Semi-Evergreen	

Recommended Tall Perennials for Residential Buildings: (N)=Native

Latin Name	Common Name	Height	Sun/Shade Preference	Flower Color	Flowering Season
<i>Alcea rosea</i>	hollyhock	4'-5'	Full Sun	Pink, Rose, Red	Late Summer
<i>Aster novae-angliae</i> <i>Aster novi-belgii</i> (N)	New England aster and New York aster	3-4'	Sun/Part Shade	Pink, Salmon	Late Summer
<i>Baptisia tinctoria</i>	wild indigo	3'	Part Shade	Yellow	May - September

Appendix B: Recommended Plant Lists for Fort Hancock, 3 of 5

Recommended Tall Perennials for Residential Buildings

(continued from previous page)

<i>Cimicifuga sp.</i>	snakeroot	4-8'	Full Sun/Part Shade	White, Light Pink	Mid-Summer - Early Fall
<i>Delphinium sp.</i>	delphinium	2-5'	Full Sun	Blue, Purple, Pink	Early - Late Summer
<i>Digitalis sp.</i>	foxglove	3-4'	Full Sun/Part Shade	Varied	Late Spring to Mid Summer
<i>Festuca glauca</i>	blue fescue	12"-5'	Full Sun/Part Shade	Known for Blue or Green Foliage	Ornamental Grass
<i>Hibiscus moscheutos</i> (N)	swamp rose mallow	3-6'	Full Sun	White, Red, Pink	Mid-Summer - Early Fall
<i>Liatris scariosa</i>	blazing star	2-5'	Full Sun	Reddish Purple	August-September
<i>Liatris spicata</i>	gayfeather	3'	Full Sun	Reddish Purple	Mid Summer - Early Fall
<i>Lupinus</i>	lupines	3-4'	Full Sun	Varied	Early to Mid-Summer
<i>Osmunda claytoniana</i>	interrupted fern		Shade	Green Foliage	
<i>Papaver orientale</i>	oriental poppy	2-4'	Full Sun	Varied	Late Spring- Early Summer
<i>Physostegia virginiana</i>	Virginia lion's heart	3'	Full Sun/Part Shade	White, Pink	Mid-Summer - Late Fall
<i>Yucca filamentosa</i> (N)	yucca	3-5'	Full Sun	Distinctive foliage, central white flower spike	Mid-Summer

Recommended Mid-Height Perennials for Residential Buildings: (N)= Native

Latin Name	Common Name	Height	Sun/Shade Preference	Flower Color	Flowering Season
<i>Aquilegia sp.</i>	columbine	1-3'	Full Sun/Part Shade	Varied	Late Spring to Early Summer
<i>Asclepias tuberosa</i> (N)	butterfly milkweed	2'	Full Sun	Varied	Mid-Summer to Early Fall
<i>Astilbe sp.</i>	astilbe	2-3 1/2'	Part Shade/Full Shade	Red, White, Pink	Early to Mid-Summer
<i>Chrysanthemum sp.</i>	chrysanthemum	1-3'	Full Sun/Part Shade	Varied	Mid-Summer to Late Fall
<i>Coreopsis lanceolata</i>	tickseed	1-2'	Full Sun/Part Shade	Yellow	Late Spring
<i>Dicentra spectabilis</i>	bleeding heart	2'	Part Shade	Red, Pink, White	Late Spring to Early Summer
<i>Hosta decorata</i> and <i>fortunei</i> - avoid cultivars	plantain lily (hosta)	1-3'	Part Shade/ Shade	Widely used for green foliage	Summer
<i>Hyssop officianalis</i>	hyssop	2'	Full Sun	Blue, Pink	Mid to Late Summer
<i>Iris germanica</i>	bearded Iris	1-3'	Full Sun/Part Shade	Varied	Late Spring to Early Summer
<i>Lavendula angustifolia</i>	lavender	2-3'	Full Sun	Light Blue	Late Spring to Summer
<i>Lobelia cardinalis</i>	cardinalflower	2-3'	Part Shade	Red	Summer to Early Fall (may also be used as an annual)
<i>Lychnis coronaria</i>	rose campion	3'	Full Sun	Varied	Early to Late Summer
<i>Mentha spicata</i>	peppermint	2'	Part Shade	Dark Green Foliage	
<i>Monarda didyma</i>	bee-balm	3-4'	Full Sun/Part Shade	Red, Pink, Purple	Mid-Summer to Late Fall
<i>Oenothera biennis</i> (N)	evening primrose	3-4'	Sun	Yellow	Late Spring- Early Fall
<i>Paeonia sp.</i>	peony	2-4'	Full Sun/Part Shade	Red, Pink, White, Yellow	Late Spring to Early Summer

Appendix B: Recommended Plant Lists for Fort Hancock, 4 of 5**Recommended Mid-Height Perennials for Residential Buildings***(continued from previous page)*

<i>Phlox paniculata</i>	garden phlox	6"-4'	Full Sun/Part Shade	Pink, White, Blue, Purple	Late Spring to Early Summer
<i>Rudbeckia hirta</i>	black-eyed susan	3'	Full Sun	Yellow	Late Summer
<i>Solidago sp. (N)</i>	goldenrod	1-4'	Full Sun/Part Shade	Yellow	Late Summer to Mid Fall

Recommended Low Growing Perennials for Residential Buildings: (N)= Native

Latin Name	Common Name	Height	Sun/Shade Preference	Flower Color	Flowering Season
<i>Achillea sp. (N)</i>	yarrow	12"-4'	Full Sun	Yellow, White, Red, Pink	Mid-Spring to Early Summer
<i>Alyssum saxatile</i>	alyssum	12"	Full Sun	Yellow	Late Spring
<i>Arabis sp.</i>	rock cress	2-10"	Full Sun	White, Pink	Early Summer to Mid Fall
<i>Armeria maritima</i>	common thrift	6-12"	Full Sun	Red, Pink, White	Late Spring to Early Summer
<i>Aurinaria saxatilis</i>	golden-tuft	6-12"	Full Sun	Yellow	Mid-Spring to Early Summer
<i>Dianthus sp.</i>	pinks	4-15"	Full Sun	Red, Pink, White	Late Spring to Early Summer
<i>Dicentra canadensis</i>	squirrel corn	12"	Shade	White	Spring
<i>Heuchera sanguinea</i>	coral bells	12-18"	Part Shade	Red, White, Pink	Late Spring to Late Summer
<i>Limonium sp.</i>	sea lavender	8-12"	Full Sun	Yellow to Lavender	Mid to Late Summer
<i>Lychnis viscaria</i>	German catchfly	1-3'	Part Shade	Purple, Pink, Red, White	Spring to Summer
<i>Phlox divaricata</i>	woodland phlox	8-12"	Part Shade	Purple, Pink, White, Blue	Spring to Early Summer
<i>Potentilla sp.</i>	cinquefoil	12"	Full Sun	Orange, Yellow, Red	Early to Late Summer
<i>Erigeron sp.</i>	fleabane	4-30"	Full Sun	Blue, Pink	Early to Late Summer
<i>Gypsophila sp.</i>	baby's breath	1-3'	Full Sun	White, Light Pink	Early Summer to Early Fall
<i>Iberis sempervirens</i>	evergreen candytuft	1'	Full Sun/Part Shade	White	Mid-Spring to Early Summer
<i>Phlox subulata</i>	moss phlox	4"	Sun	White, Purple	Spring
<i>Sedum sp.</i>	stonecrop	3"-3'	Full Sun/Part Shade	Widely used for waxy light green foliage	Summer
<i>Senecio sp.</i>	groundsel	8-18"	Full Sun/Part Shade	Yellow	Mid-Spring to Late Spring
<i>Thymus</i>	thyme	4-8"	Part Shade	Delicate green foliage	

Recommended Annuals for Residential Buildings: (N)=Native

Latin Name	Common Name	Height	Sun/Shade Preference	Flower Color	Flowering Season
<i>Ageratum houstonianum</i>	ageratum	6"-18"	Sun/Part Shade	Blue, White, Pink	Summer to Fall
<i>Alcea rosea</i>	hollyhock	4'-5'	Sun	Pink, Rose, Red	Late Summer
<i>Caleddula officinalis</i>	pot-marigold	1-2'	Sun/Part Shade	Gold, Yellow, Orange	Summer to Fall
<i>Centaurea sp.</i>	cornflower	2 1/2'	Sun	Purple, Blue, Yellow, White	Late Spring to Fall

Appendix B: Recommended Plant Lists for Fort Hancock, 5 of 5

Recommended Annuals for Residential Buildings

(continued from previous page)

<i>Clarkia sp.</i>	clarkia	18"-3'	Sun/Part Shade	White, Pink, Blue	Late Spring to Fall
<i>Cleome sp.</i>	spiderflower	1-3'	Sun/Part Shade	White, Pink, Blue	Summer to Fall
<i>Cosmos sp.</i>	cosmos	10"	Sun	Varied	Summer-Fall
<i>Eschscholtzia californica</i>	California-poppy	2'	Sun	Orange, Red, Yellow, Pink	Early to Late Spring
<i>Gaillardia sp.</i>	gaillardia	2'	Sun	Yellow, Red	Late Summer
<i>Glaucium corniculatum</i>	sea-poppy	1 1/2"	Sun	Red	Summer
<i>Helichrysum bracteatum</i>	strawflower	3'	Sun	Various	Mid-Summer to Late Fall
<i>Lobularia maritime</i>	sweet alyssum	1'	Sun	Blue	Late Spring to Summer
<i>Lathyrus odoratus</i>	sweetpea	Vine	Sun	Yellow, Purple	Early Summer
<i>Nigella damascene</i>	love-in-a-mist	18"-2'	Sun	Light Blue, White	Spring to Early Summer
<i>Papaver sp.</i>	poppy	2'	Sun	Varied	Summer
<i>Petunia sp.</i>	petunia	6"-3'	Sun	Varied	Summer
<i>Portulaca sp.</i>	portulaca	8"	Sun	Varied	Summer
<i>Salvia sp.</i>	sage	1-3'	Sun	Varied	Summer
<i>Scabiosa sp.</i>	scabiosa	1-3'	Sun	Dark Purple, Rose, White	Summer
<i>Tithonia rotundifolia</i>	tithonia	3-6'	Sun	Orange, Yellow	Summer
<i>Tropaeolum sp.</i>	nasturtium	6"-2', vine	Sun	Yellow, Orange, Red	Summer
<i>Verbena tenera</i>	sand verbena	2"	Sun	White, Pink, Purple	Late Spring to Fall
<i>Zinnia sp.</i>	zinnia	18"-3'	Sun	Varied	Summer to Fall

Note: This list of annuals may also be used for planting in small pots placed on porches and porch stairs. Plantings in window boxes hung from windowsills will not be allowed, however planting boxes smaller than 3' x 1' x 1' may be hung from the porch railings of Buildings 1 through 21, as stated in the 2003 Fort Hancock EA.

Appendix C: Turfgrass Management Recommendations, 1 of 3

Fort Hancock Turf Grass Management Recommendations

Identify and apply necessary soil amendments

- Amendments are added to soil for increasing porosity, air exchange capability, drainage, and to enhance resistance to compaction. In severely compacted situations, the entire soil profile/character can be modified. The addition of porous materials, such as AXIS, a diatomaceous earth product, can help improve turf conditions in soils that are repeatedly compacted. These products resist compaction by creating stable pores or pockets of air and water space within the soil and could be considered for some of the highly compacted areas adjacent to walks and parking areas at SPAR.
- Maintaining proper soil pH and fertility is critical to achieving an effective turf management program. Soil management practices at the park should be implemented to adjust and maintain adequate pH and fertility to support turf growth. A correct pH range allows turf to absorb nutrients, such as nitrogen (N), potassium (K), magnesium (Mg), and calcium (Ca) from the soil. If pH is too high or too low, nutrients may be "locked" onto soil particles and not be available to plants. Most soils in the Northeast are somewhat acidic and require routine limestone applications to keep pH in a favorable range for turf. Optimum turfgrass growth occurs at a pH of 6.4 - 6.8.

The pH range of soils at a site can vary substantially from area to area and from year to year. Lime applications should be based on soil test results only. Applications should never exceed 50#/Total Square Footage (TSF)/application. If soil pH is low enough to require more than 50#/TSF, two or more applications at different times in the year should be made.

There are three types of limestone that can be applied to turf for soil pH adjustment:

1. Calcitic (CaCO_3) raises pH
2. Dolomite ($\text{CaMg}(\text{CO}_3)_2$), raises pH while adding magnesium
3. Gypsum (CaSO_4), does not change pH

Limestone is not a fertilizer. Rather, it is a material that is used to raise soil pH with the objective of improving nutrient uptake by the plant. Proper soil pH increases the efficiency of fertilizing by allowing the nutrients applied to the soil to be more readily available to the turf.

Soil samples should be collected once or twice each year to determine pH levels. The test results provided will include recommendations on the amount of lime that needs to be applied to properly adjust the soil pH.

- The nutritional health of turfgrass is dependent on a fertilization program that is developed using information derived from soil tests. Fertilizer applications should be timed to provide nutrients to plants when they use the material effectively. In the northeast, fertilizer provides the best results when applied in late August, September and October. One pound of actual Nitrogen per 1000 sq. ft. should be supplied with each application.

Actual applications should be based on annual soil test results collected from each lawn area. In the absence of a soil test, a fertilizer with a 3-1-2 or closely equivalent ratio of nitrogen, phosphorous and potassium should be used.

The implementation of a natural organic fertilizer program will enhance the level and activity of beneficial microorganisms. These microorganisms will improve the decomposition rate of thatch and other organic matter resulting in an increase of water and nutrient holding capacity of the soil, increased air and water pore space, and improved resistance to compaction. An organic fertilization program also helps to minimize the use of pesticides and other synthetic products on turf.

Appendix C: Turfgrass Management Recommendations, 2 of 3

Manage Soil Compaction

- Soil compaction results from the loss of air and/or water space between soil particles. It is typically a result of over use from pedestrians, equipment or vehicles. Excessive soil compaction reduces the effectiveness of a soil to support turf growth, limits water and air exchange and increases erosion. Ultimately, if left untreated, soil compaction will result in the loss of turf.
- Areas of soil compaction can be corrected through mechanical aeration, however, the timing of aeration and the equipment used needs to be thoughtfully selected. Poor timing and inappropriate equipment can worsen the soil compaction problem.
- Aerating the soil with mechanical equipment can effectively minimize the compaction. While there are several different types of aerators available, a core aerator provides the best results for most typical turfgrass situations. A core aerator removes narrow cores of soil and thatch from the lawn producing a series of small 2-4" deep holes. These holes allow water, air, and fertilizer to reach turf roots.
- The actual process can temporarily injure turf roots. It is best to accomplish mechanical aeration during the most active growth periods of grass, i.e. early spring and/or fall. This will encourage quick recovery of turf after any injury that may occur.

Renovate Lawn Areas

- Periodic or cyclic renovation of turf areas should be anticipated. The frequency can vary from every two years to twenty years or more, depending on the use of the area, level of care, and weather extremes.
- Overseeding will be required to fill in bare spots and even out lawn coverage. Use a slicer seeder in the early fall only, targeting areas in need of renovation. The seed delivery rate of the slicer should be set moderately low, applying 1-3 lbs of seed per thousand square feet
- Lawn may also be renovated using a broadcast seeder. Scarify the surface with a slicer seeder or garden rake to prepare the seed bed. To ensure a uniform application, use a drop type or centrifugal spreader at half of the recommended rate, walking in two directions at right angles to one another. Following the seeding, the area should be lightly raked to incorporate the seed into the top ¼" of soil. Be careful not to rake the seed too deeply into the soil, as the seed needs exposure to sunlight for germination. Roll the seeding area lightly to press the seed into the soil and to ensure good seed to soil contact.
- Renovate lawn areas during the late summer or early fall. Temperatures and moisture levels are favorable for growth, while competition from weeds is reduced. This provides the new seeds enough time to germinate before the onset of winter.

Alter Mowing Practices

- Lawns should be mowed often, never removing more than one third of the total height. Grass height should be 2" for spring and fall and 2 ½" for the summer months. Taller plants photosynthesize energy readily, shade out low growing weeds such as crabgrass, and develop more extensive root systems. Grass height taller than 3" is not recommended.
- Mowing should begin around mid-April and continue until the grass has stopped growing in the fall.
- Mower blades should be sharpened regularly to avoid tearing the leaves. If the blades are dull, the turf will appear grayish after mowing.
- Clippings should be left on the lawn unless a disease outbreak occurs.
- The mowing pattern should be routinely changed so that grooming lines do not occur.

Appendix C: Turfgrass Management Recommendations, 3 of 3**Manage Thatch Build-Up**

- The thatch layer should not exceed 1/2" because build-up reduces growth and quality of the grass and the effectiveness of fertilization and irrigation.
- Avoid fertilizer with high nitrogen content.
- Use organic fertilizers to assist in the breakdown of thatch by promoting the activity of soil microorganisms.

Manage Weed Growth

- Initially, attempts should be made to improve the quality of the turf by adjusting soil pH and fertility levels and by mechanically overseeding the area.
- Use top quality grass seed with less than .1% weed content.
- Some chemical weed management will also help re-establish the turfgrass. Consult with the regional IPM coordinator to discuss the use of a pre-emergent herbicide, such as Siduron (commercial name Tupersan) that is registered to use in newly seeded lawns.

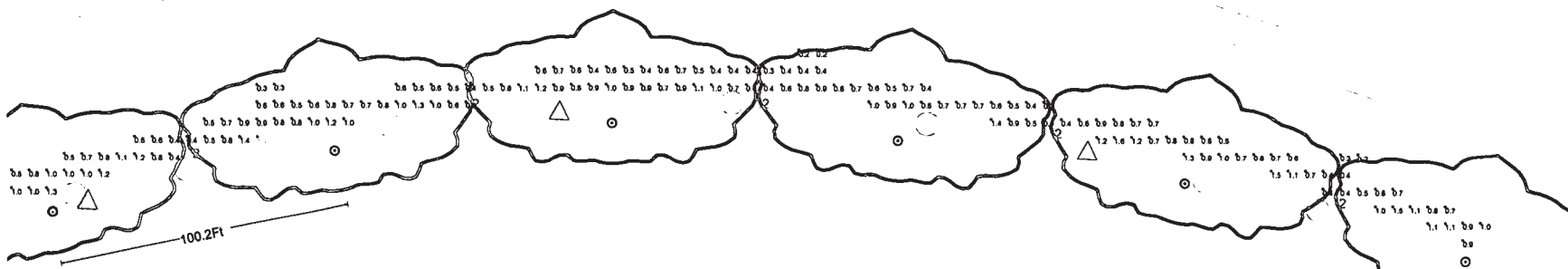
Provide turfgrass management training for site staff

- Site staff should receive introductory and annual training in the principles and practices of turf management.

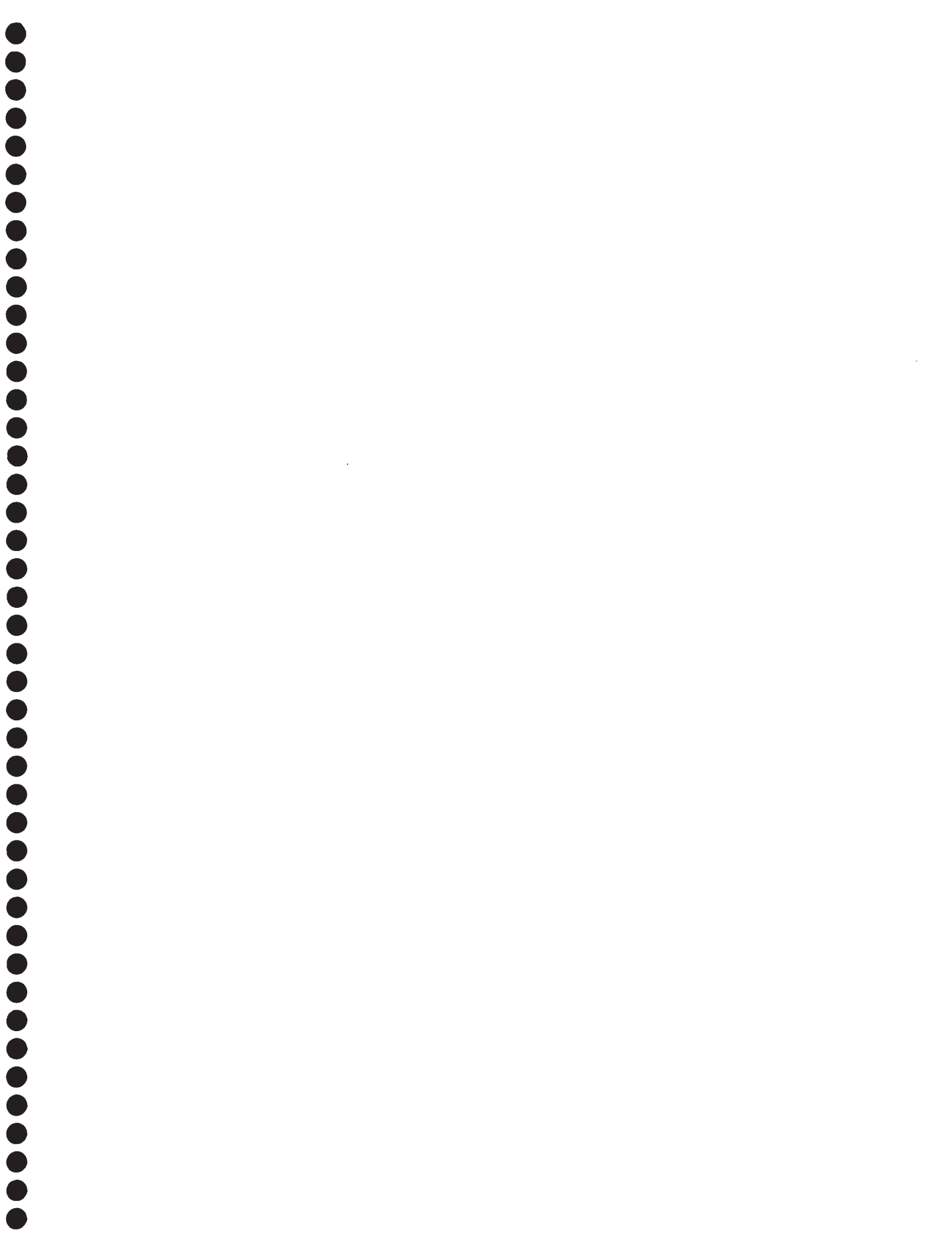
Luminaire Schedule					
Project: Fort Hancock					
Symbol	Qty	Label	Arrangement	Lumens	LLF
	6	OP3N-70hps	SINGLE	6300	0.700

Numeric Summary							
Project: Fort Hancock							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Typical #1	Illuminance	Fc	0.76	1.7	0.2	3.80	8.50

Luminaire Location Summary	
Project: All Projects	
Z	
11	
11	
11	
11	
11	
11	







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