CULTURAL LANDSCAPE REPORT • HISTORIC STRUCTURE REPORT

Apostle Islands National Lakeshore – Bayfield, Wisconsin

VOLUME I OF VI: INTRODUCTION AND OVERALL DEVELOPMENT HISTORY

APOSTLE ISLANDS NATIONAL LAKESHORE

LIGHT STATIONS OF MICHIGAN ISLAND, OUTER ISLAND, DEVILS ISLAND, LONG ISLAND AND SAND ISLAND

JULY 2011

CULTURAL LANDSCAPE REPORT, HISTORIC STRUCTURE REPORT AND ENVIRONMENTAL ASSESSMENT

VOLUME I

APOSTLE ISLANDS NATIONAL LAKESHORE

BAYFIELD, WISCONSIN

LIGHT STATIONS OF MICHIGAN ISLAND, OUTER ISLAND, DEVILS ISLAND, LONG ISLAND AND SAND ISLAND

JULY 2011
UNITED STATES DEPARTMENT OF THE INTERIOR

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CULTURAL LANDSCAPE REPORT AND HISTORIC STRUCTURE REPORT

LIGHT STATIONS OF MICHIGAN ISLAND, OUTER ISLAND, DEVILS ISLAND,
LONG ISLAND AND SAND ISLAND

APOSTLE ISLANDS NATIONAL LAKESHORE

NATIONAL PARK SERVICE
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EXECUTIVE SUMMARY

In order to develop a comprehensive planning tool, the National Park Service (NPS or Park Service) has requested the creation of a Cultural Landscape Report (CLR) and a Historic Structure Report (HSR) for five of the light stations at Apostle Islands National Lakeshore (park). The two reports have been combined into one document as outlined in Chapter 2: Methodology.

The intent of this combined CLR/HSR is to guide treatment and use of the aboveground cultural resources associated with five light stations on Michigan, Outer, Devils, Long, and Sand islands. Documentation of historic significance and evaluation of integrity of the cultural landscapes provides the framework upon which treatment recommendations are based. An investigation and evaluation of the cultural landscape and their buildings has been conducted using NPS and National Register of Historic Places (NRHP or national register) guidelines and forms the body of this report. The report provides park managers with a comprehensive understanding of the physical evolution of the cultural landscape and guidance for the management of the cultural resources.

Apostle Islands National Lakeshore was established by Congress in 1970 and is "dedicated to the preservation and public enjoyment of significant historic, scenic, natural and recreational resources."[1] Located in Bayfield County, Wisconsin (location maps 02 and 03), the park consists of 21 islands and a 12-mile-long segment of the Wisconsin mainland. Within its boundaries are 69,372 acres, of which 27,323 acres are submerged lands in Lake Superior. The islands range in size from 3-acre Gull Island to 10,054-acre Stockton Island. In December 2004, 80% of the park's land area was congressionally designated as the "Gaylord Nelson Wilderness" area.

The single largest collection of NRHP lighthouses and lighthouse complexes in the National Park System are located within the park, in part, attracting its nearly 170,000 visitors in 2009. Primary reasons for visiting include camping, boating, sea kayaking, fishing and visiting the lighthouses. The Park Service faces many challenges associated with the long-term management and maintenance of the light stations, including maintenance of cultural landscapes and historic structures. Today, due to encroaching vegetation, the landscapes of the light stations differ from those of the period of significance (1856 to 1978). NPS management practices, since the establishment of the park, have allowed natural reforestation in many areas. Areas that were once cleared as part of light station operations are now forested as a result of natural regeneration. These areas now provide wildlife habitat and, in a few cases, uncommon plant communities, however they compromise the integrity of the cultural landscapes.

The structures of the light stations are in varying need of repair to mitigate the conditions and deterioration that threaten their longevity. Remediation of hazardous materials is also an issue as is improving visitor access to the light stations and structures. If an informed, comprehensive plan for cultural landscape and historic structure treatments is not developed and implemented, the growing list of deferred maintenance may compromise the historic integrity of the resources over time, diminish the resources' interpretive value and deflate the visitor experience. There could also be damaging effects on natural resources and habitat if future rehabilitation efforts are implemented piecemeal without adequately considering cumulative environmental consequences. Similarly, the cultural landscape, if approached piecemeal, would also be compromised.

The CLR/HSR will be used in support of the park's General Management Plan (GMP), Comprehensive Long-range Interpretive Plan, and associated compliance as required by the National Historic Preservation Act (NHPA) of 1966, as amended, and by the National Environmental Policy Act (NEPA) of 1969, as amended. It will also be used to guide any additional landscape and structural treatments beyond the initial

[1] Apostle Islands National Lakeshore website: www.nps.gov/apis/planyourvisit/things2know.htm

treatments discussed in the CLR/HSR. Used in concert, the two documents will guide future management of the park's resources.

SUMMARY OF RESEARCH DONE

As outlined in Chapter 2: Methodology, all readily available park documentation was reviewed and a series of field investigations were conducted in the summer and fall of 2009. The reviewed sources, including historic drawings; historic photographs; and log books from the lighthouse keepers, the United States Coast Guard (Coast Guard) and NPS volunteers, were analyzed.

SUMMARY OF MAJOR RESEARCH FINDINGS

The light stations were built between 1856 and 1938. Their development coincided with the technological light station advances of the times. Research and field observations determined the following findings:

- The change from manned light stations to automated light stations reduced the level of care and maintenance of the landscapes and structures.
- Technological advances affected both the operations and the light station facilities, particularly in terms of the ancillary/utilitarian structures (e.g., fog signal, oil, and power buildings).
- The Coast Guard occupation of the light stations altered the historic fabric of the structures and landscapes.
- The NPS era brought a heightened appreciation for historic preservation.
- The extent of natural reforestation in the formerly cleared areas of the light stations has been significant.
- Materials sampling indicates a fair number of "hard" (cement-rich) mortars have been used for past repointing efforts. When used with softer masonry, this can accelerate deterioration.
- Proper ventilation within the towers and other historic structures is critical for long-term maintenance.

SUMMARY OF MANAGEMENT ISSUES

The following management issues were identified by the team (refer to "Chapter 5: Management Issues" for further explanation):

- Maintenance of Historic Resources
- Accessibility (ABAAS)
- Life Safety/Code Compliance (guardrails, handrails, exit paths)
- Hazardous materials
- Interpretation and Park Signage
- Boat Docks and Landings
- Wilderness and Reservation Boundaries
- Clearing Practices
- Shoreline Slope Stabilization
- Sustainability
- Evolving Projects/Changing Objectives
- Construction Logistics

SUMMARY OF RECOMMENDED TREATMENTS

The overarching treatment strategy for the light stations is rehabilitation, recognizing that within this approach, individual features or structures may warrant preservation (typically stabilization) or restoration. Likewise, assuming that treatments will be undertaken in phases, stabilization may become the first step. The CLR/HSR includes the following proposed uses and treatments:

- **Michigan Island: Rehabilitation** – Rehabilitate Old Michigan Island Lighthouse for self-guided visitor use at the quarters and guided tours to the Tower. Rehabilitate the Keepers Quarters for seasonal housing. Rehabilitate the Second Tower for guided tours. Preserve the Assistant Keepers Quarters and Workshop, Power House, Shed and Privy primarily for NPS maintenance, with the possibility of providing visual access to visitors to the Shed and Privy. Rehabilitate the cultural landscape including selective clearing of trees; stabilizing the slope embankment; upgrading site accessibility; repairing the tram to a working condition; removing invasive vegetation; confining historic vegetation that might be invasive; and restoring historic plantings.
- **Outer Island: Rehabilitation** – Rehabilitate the Tower for guided visitor use. Rehabilitate the Keepers Quarters for staff shelter. Rehabilitate the Fog Signal Building for possible visitor use. Preserve the Oil Storage and Privy for NPS storage. Rehabilitate the cultural landscape including clearing of trees; stabilizing the slope embankment; maintaining recent site drainage improvements; repairing the tramway to working order; removing noncontributing features; and maintaining small scale contributing features.
- **Devils Island: Rehabilitation** – Rehabilitate the Tower, Keepers Quarters, Assistant Keepers Quarters, Oil House 2 and Fog Signal Building (remove noncontributing south addition) for varied levels of visitor use. Preserve Oil House 1, Tramway Engine Building and Boathouse for NPS storage. Rehabilitate the cultural landscape including clearing trees; repairing tram tracks; maintaining lawn areas; and retaining contributing small scale features.
- **Long Island: Rehabilitation** – Rehabilitate LaPointe Light Tower for guided visitor tours. Rehabilitate Chequamegon Point Tower (no visitor tours). Preserve the Triplex and the Oil Building. Rehabilitate the cultural landscape including investigating the extent of concrete walks; clearing trees; stabilizing ruins; constructing a new dock; and retaining contributing small scale features.
- **Sand Island: Restoration** – Restore the Light Station Tower and Quarters to pre-1921 conditions for visitor tours and possible overflow shelter for staff. Make the kitchen physically accessible and add interpretive program access for the remainder of the Light Station Tower and Quarters. Preserve the Oil Building and Privy for possible visitor visual access. Restore and rehabilitate the cultural landscape including clearing of trees; upgrading site accessibility; restoring missing fencing; and relocating and removing noncompatible small scale features.

NEXT STEPS

1. Implement revised Preferred Alternative of the second VA held in December 2010 for realization of pending construction projects.
2. Continue to seek funding to implement the remaining treatment recommendations identified in the CLR/HSR.
3. Seek enhanced maintenance funding to protect the resources after implementation of the CLR/HSR treatment recommendations.
4. Initiate a National Historic Landmark (NHL) nomination.

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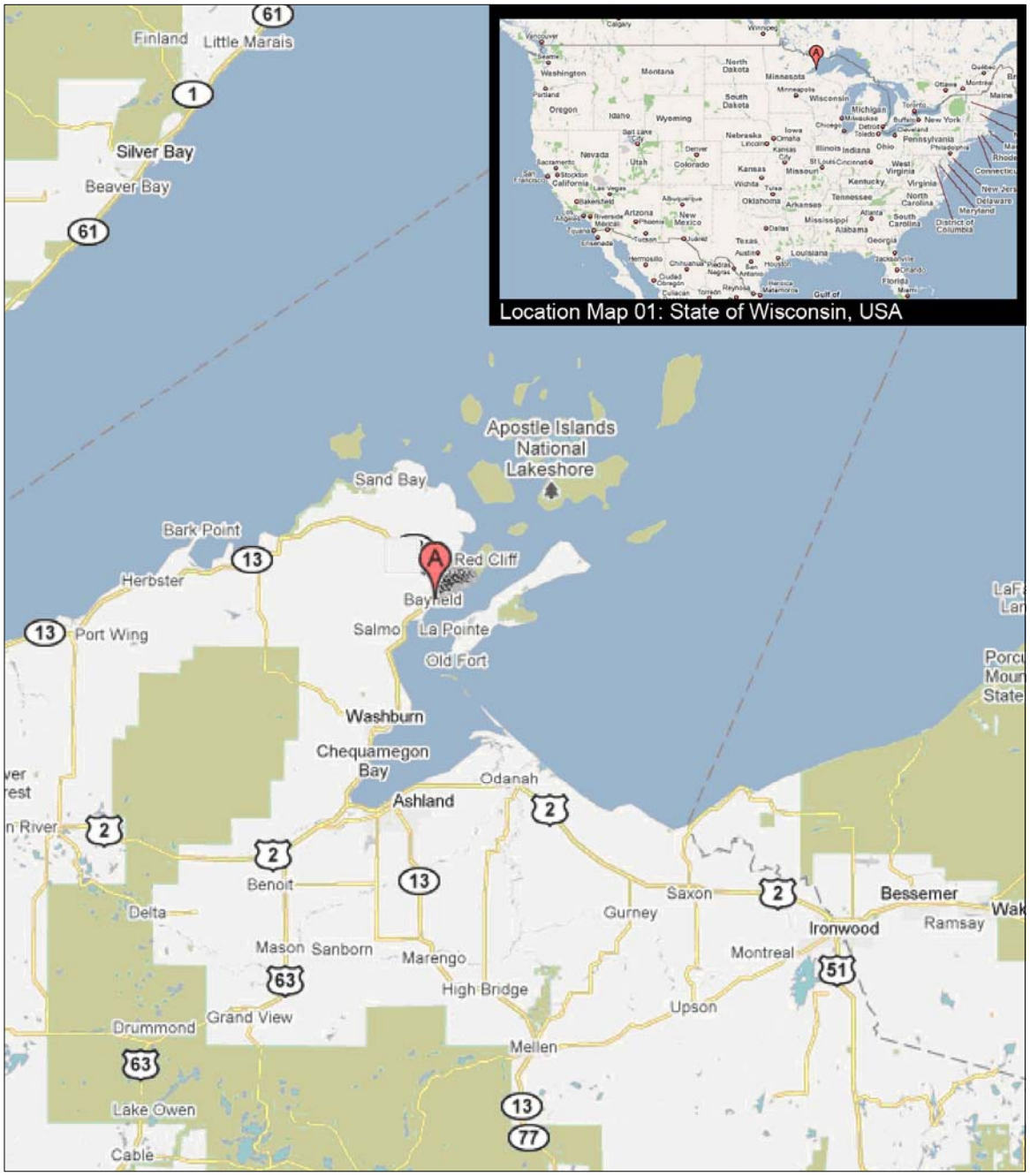
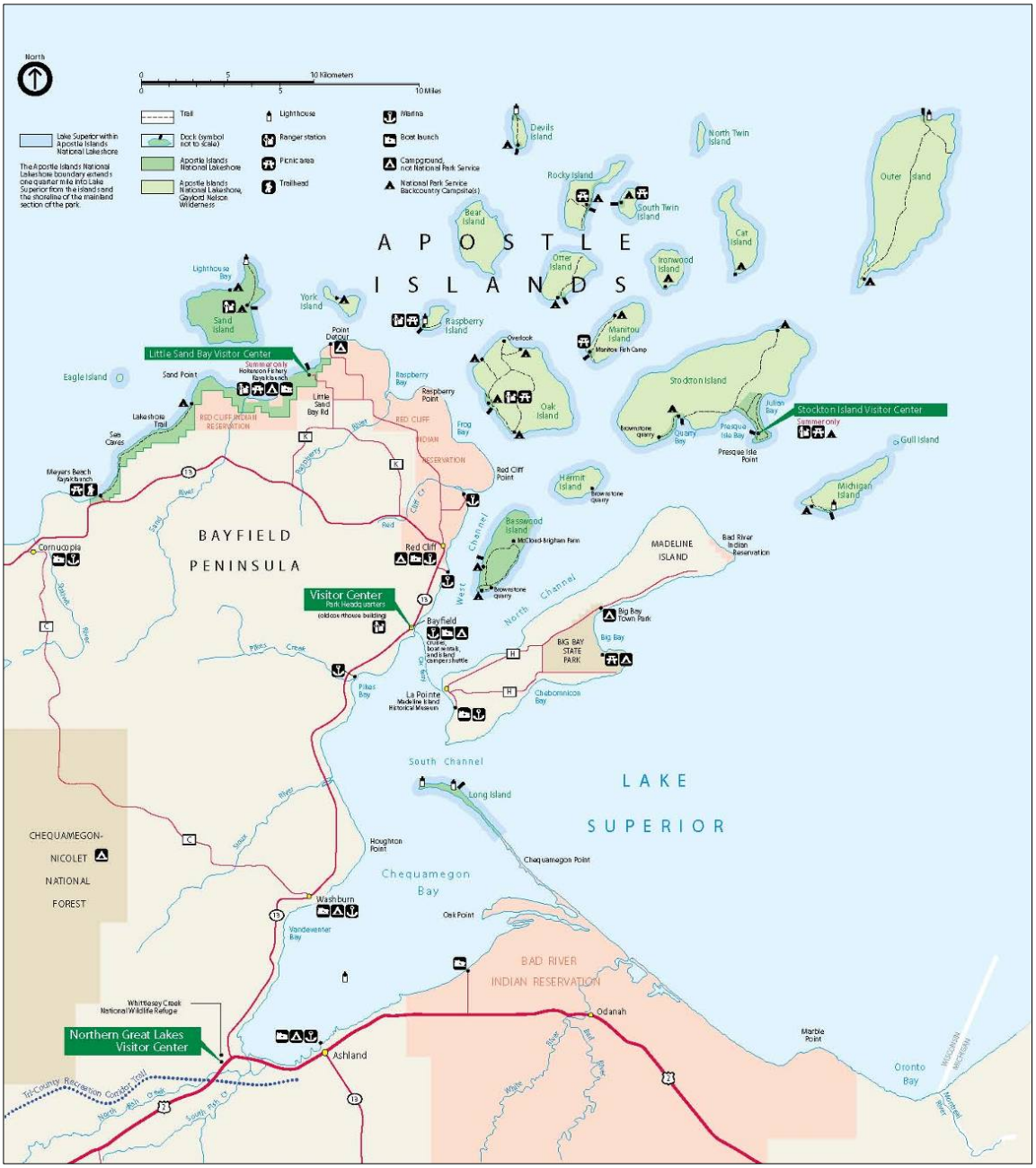
LOCATION MAPS



Location Maps 01 and 02: State of Wisconsin and City of Bayfield, Wisconsin



Location Map 03: Apostle Islands National Lakeshore, Bayfield

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CHAPTER 1: INTRODUCTION

OVERALL REPORT ORGANIZATION

The CLR and HSR were conducted concurrently and are presented as one cohesive document to assure coordination of the work. The combined document presents the CLR and HSR as peer documents and will result in a logical continuum of the integrity of the light stations from the broad scale of landscape treatments to the specifics of interior finishes. For ease of use by park staff, separate volumes were created. As such, the document is organized as follows:

- Volume I: Executive Summary, Introduction, Methodology, Context, Current Designations, Park Significance, Administrative Data, Management Issues, Proposed Treatment Criteria, Overall Apostle Islands History, Appendices including the NPS Review Team, Glossary of Terms, Bibliography, Class C Cost Estimate, 2010 Accessibility Plan document, Fire Safety Email Correspondence and Hazardous Materials Sampling Methodology
- Volume II: Michigan Island Light Station History, CLR, HSR, and Appendices
- Volume III: Outer Island Light Station History, CLR, HSR, and Appendices
- Volume IV: Devils Island Light Station History, CLR, HSR, and Appendices
- Volume V: Long Island Light Station History, CLR, HSR, and Appendices
- Volume VI: Sand Island Light Station History, CLR, HSR, and Appendices

PURPOSE AND NEED OF THE CLR/HSR

Purpose

The purpose of the CLR/HSR is to research and record the history and existing condition of the historic light stations (landscapes and structures) on five islands in the park. The document will provide guidance for the future treatment and use of these landscapes and structures in ways consistent with the park's General Management Plan (GMP) and other relevant laws, regulations, policies, and guidance. The document presents professional research and insight for NPS management that will inform decisions for appropriate treatment of significant cultural and natural resources, enhanced interpretation and an improved visitor experience.

Need

The CLR/HSR is needed to provide a comprehensive understanding of the historic development of these landscapes and structures; to evaluate their significance; understand their condition; and to provide treatment recommendations that respond appropriately to their historic character while accommodating current and future needs. The CLR/HSR is needed to guide the treatment and use of the aboveground resources associated with the significant cultural landscapes and structures of the light stations on Michigan, Outer, Devils, Long, and Sand islands. The park's GMP indicates the need to restore or rehabilitate structures for cultural resource preservation and interpretive opportunities. The GMP also identifies the need for additional efforts to preserve the exteriors of structures and to stabilize and preserve the cultural landscapes in the immediate vicinity of the light stations.

PROJECT OBJECTIVES OF THE CLR/HSR

The objectives for the combined CLR/HSR are as follows:

- Document the development and evolution of the cultural landscape and structures of the Michigan, Outer, Devils, Long, and Sand islands' light stations within the park.
- Document the existing condition of the cultural landscape and structures of the Michigan, Outer, Devils, Long, and Sand islands' light stations.
- Evaluate the significance and integrity of the cultural landscape and structures of the Michigan, Outer, Devils, Long, and Sand islands' light stations within the park.
- Provide treatment recommendations for managing the cultural landscape and structures within the Michigan, Outer, Devils, Long, and Sand islands' light stations.
- Provide treatment recommendations for the cultural landscape and structures to address management needs identified by the park in the Michigan, Outer, Devils, Long, and Sand islands' light stations.
- Provide management recommendations for specific cultural landscapes and structures within the Michigan, Outer, Devils, Long, and Sand islands' light stations that accommodate current and future needs while preserving the historic character and significant features.
- Provide necessary information and sufficient research and documentation required by a National Historic Landmark (NHL) district nomination, and encompassing all of the light stations of the park as a system.
- Provide necessary information and education to the NPS interpreters and site managers about the history and development of the light stations with the ultimate goal of enhancing the visitor's experience.
- Provide recommendations for efficiently managing the cultural landscapes and structures within the Michigan, Outer, Devils, Long, and Sand islands' light stations while taking into consideration budget constraints.

CHAPTER 2: METHODOLOGY

The following section describes the methodology associated with each aspect of the CLR/HSR. Because a CLR and HSR each have their own NPS required formats and standards, it should be noted that in the effort of coordination and to prevent duplication, liberties have been taken with the typical format to provide a cohesive document for park personnel.

CULTURAL LANDSCAPE REPORT METHODOLOGY

Report Methodology / Research Design

The CLR was conducted at a thorough level of investigation and documentation for Michigan Island and Long Island and at a limited level of investigation for Outer, Devils, and Sand islands. The work included historical research, existing condition assessment and landscape analysis.

The thorough level research methodology, as defined by the Park Service, focuses on the use of select documentation of known and presumed relevance, including primary and secondary sources that are easily available.[2] The thorough level of research and investigation did not include archeological techniques to locate buried ruins or artifacts.

The limited level research methodology, as defined by the Park Service, focuses on the use of available, select and published secondary sources and primary sources, if known.[3] The limited level of research and investigation did not include archeological techniques to locate buried ruins or artifacts.

The CLR also utilized other materials provided by the Park Service such as the Historical Records Survey (HRS), Geographic Information System (GIS) database, National Historic Landmark (NHL) nomination, the park GMP, historic photographs, planning documents, and natural resource studies.

Existing conditions investigations for all five of the islands were conducted according to best practices. Existing site information provided by the park, including the 1990 Historic American Building Survey drawings, and field work were utilized to document the cultural landscape of the light stations. Site surveys, conducted in summer and fall 2009, recorded the existing condition of the cultural landscape on each of the five islands. Documented features include spatial organization, topography, views and vistas, circulation, buildings, structures, and vegetation. This inventory was undertaken to understand the island's cultural landscape as a whole, and to document these features that contribute to its historic character.

Findings for all islands are presented in an illustrated narrative format that includes brief written text, matrices, photographs, and maps.

Descriptions of the cultural landscape features and their conditions at each island are presented in the Existing Condition Assessment and Landscape Analysis, organized by landscape characteristics. The following criteria were used to evaluate condition.

- **GOOD -** The features of the landscape do not require intervention; only minor or routine maintenance is needed at this time.
- **FAIR -** Some deterioration, decline, or damage is noticeable; the feature may require immediate intervention; if intervention is deferred, the feature will require extensive attention in a few years.

[2] *Page et al 1998:*
[3] *Page et al 1998:*

- **POOR -** Deterioration, decline, or damage is serious; the feature is seriously deteriorated or damaged, or presents a hazardous condition; due to the level of deterioration, damage, or danger the feature requires extensive and immediate attention.

Landscape Characteristics

Landscape characteristics have been identified for the Apostle Islands light stations using best practices that address the specific character and unique nature of each island's light station development.[4] A landscape characteristic is defined as the tangible and intangible characteristic of a landscape that individually and collectively gives the landscape its character and aids in understanding its cultural value.[5] The light stations' landscape characteristics provide a system for organizing and understanding the site history and existing condition. They assist in documenting the changes in the landscape over time.[6]

The appearance of a cultural landscape, both historically and at present day is a web of landscape characteristics that are the tangible evidence of the historic and current uses of the land. A landscape characteristic may also be referred to as a "*character defining feature*," which is a "*prominent or distinctive aspect, quality, or characteristic of a historic property that contributes significantly to its physical character*."[7]

Landscape characteristics and their associated character-defining features contribute to the overall integrity of location, design, materials, workmanship, setting, association, and feeling.

- Spatial Organization is the arrangement of elements creating the ground, vertical and overhead planes that define and create space, including the arrangement of topography and buildings.
- Topography is the three-dimension configuration of the landscape surface characterized by features and orientation, including bluffs, cliffs, slopes and drainages of the islands.
- Views and Vistas are features that create or allow a range of vision which can be natural or designed and controlled; these include views of the light stations from Lake Superior and views from the light towers and lighthouses.
- Circulation is spaces, features, and materials that constitute systems of movement.
- Buildings are either currently or were historically habitable structures. These are included in the Historic Structure Report.
- Structures are smaller nonhabitable buildings and significant features (now or historically) such as privies, tramways, and out buildings.
- Small scale Features are elements that provide detail and diversity combined with function and aesthetics; including paving; structural remnants; tram tracks; site walls; signs; and walls of building ruins.
- Vegetation is the indigenous or introduced trees, shrubs, vines, ground covers, and herbaceous materials on-site. Vegetation includes lawns and landscape garden areas.

Landscape Analysis

The analysis of the cultural landscape compares the site history of each light station with its existing condition to identify those landscape characteristics that retain integrity and contribute to the understanding of the significance and historical identity of the light stations.[8]

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[4] Page et al 1998b section 3, Landscape Characteristics: 6-11
[5] Ibid., 11
[6] Ibid., 11
[7] US Department of the Interior, National Park Service
[8] Page et al 1998: 69

Each light station is comprised of a series of landscape characteristics that together give it a distinctive organization. The interrelationship of these characteristics has influenced the development of each island's cultural landscape as a whole. Each landscape characteristic is analyzed to determine those features that contribute to the significance of the cultural landscape and those that do not. Contributing and noncontributing features are presented by landscape characteristic (as presented above).

Contributing features are those physical attributes that add to the historical significance of the landscape by exhibiting the associations, qualities, or archeological values for which the light station is significant. A feature is considered contributing if all of the following are true: it was present during the period of significance; it relates to the documented significance of the property; it possesses historic integrity; it is capable of revealing information about the period; or it independently meets NRHP criteria.[9]

Noncontributing features are those that were not present during the period of significance or do not relate to the significance of the light station; no longer possess historic integrity; are not capable of yielding important information about the period; or do not independently meet NRHP criteria. Features added to the landscape that did not exist during the period of significance are also considered noncontributing. In the CLR, noncontributing features are analyzed for their impact to and compatibility with the cultural landscape, and are determined to be either compatible or noncompatible.

Compatible features are those that do not detract from the historic character of the landscape, and are of similar materials and scale to contributing features from the period of significance. Noncompatible features are visually incongruous with the cultural landscape, and conflict with the mass, scale, form, materials, texture or color of contributing historic features.[10]

HISTORIC STRUCTURE REPORT METHODOLOGY

The Historic Structure Report (HSR) presents documentary, graphic and physical information for each building within the light station. Historic documents (original drawings, rehabilitation drawings, historic photographs, keepers' logs, historic maps, and other historic documentation), Historic American Building Survey (HABS) drawings, park maintenance records, material testing and site investigations were utilized to compile the record of each structure's original development, historic alterations and current condition. Very limited destructive testing (paint and mortar sampling, primarily) was performed. The process required a multidisciplinary approach that included the review of architectural, mechanical, electrical and structural systems, and hazardous materials. These disciplines reflect the key areas and issues addressed within the body of the report.

Significant dates or periods of construction are established to document historic and nonhistoric/contributing and noncontributing buildings and features and to determine the relative significance of each feature to the building and of each building to the light station in which it resides. Where physical evidence does not support historic documentation and where historic records themselves are inconsistent, findings are documented to establish a baseline for future research.

[9] *National Register Bulletin 16a – How to Complete the National Register Registration Form* 1991
[10] US Department of the Interior, National Park Service 1997: 84

Physical Description

A brief physical description of each building precedes the section that describes individual building features and includes information such as massing, form, orientation, materiality and general plan layout. Field observations contributed to descriptions of each extant feature and attendant condition rating. In addition to field observations, over 200 material samples were obtained and tested to determine historic paint colors and mortar and plaster composition. Results are included in each island volume's appendices. Features observed by discipline include the following:

Architecture: roof; gutters and downspouts; chimney(s); exterior walls; dormers (if applicable); windows; exterior doors; exterior trim; tower walk, railing, roof and finials/vents (if applicable); tower lantern (if applicable); interior doors; wall finishes; ceiling finishes; interior trim; floor; stairs; casework and accessibility

Structural: foundation; floor framing; roof framing; ceiling framing; wall framing; lateral system and load requirements

Mechanical: plumbing systems; HVAC and fire suppression

Electrical: system configuration; conductor insulation; overcurrent protection; lighting systems; telecommunications; fire alarm system and lightning protection

Hazardous Materials: asbestos; lead containing paint; lead duct; lead in soils and mold

A presentation of the Character Defining Features, those characteristics that embody each building's special and notable qualities, follow the description of physical features. Mass and form; layout of spaces; exterior materials; openings and interior materials are included where applicable.

Condition Assessment

Each building and building feature was evaluated and an attendant condition rating determined. A general building condition assessment is presented first, followed by the condition assessment and ratings of each feature or component. The condition rating system is as follows.

(Note: These terms are also applied to the overall structure/building.)

GOOD The feature is intact, structurally sound and performing its intended purpose. The feature needs no repair or rehabilitation, but only routine or preventive maintenance.

FAIR The feature is in fair condition if either of the following conditions is present:

- There are early signs of wear, failure or deterioration though the feature is generally structurally sound and performing its intended purpose – or –
- There is failure of a portion of the feature.

POOR The feature is in poor condition if any of the following conditions is present:

- The feature is no longer performing its intended purpose – or –
- Significant elements of the feature are missing – or –
- Deterioration or damage affects more than 25% of the feature – or –
- The feature shows signs of imminent failure or breakdown.

UNKNOWN Not enough information is available to make an evaluation.

Treatment and Use

Lastly, the treatment and use is discussed for each building. Of benefit to the CLR/HSR's development was the Value Analysis/Choosing by Advantages (VA/CBA) meeting, held in the park in May 2010. The purpose of the VA/CBA was to facilitate the project's scoping process and to identify appropriate treatments within the context of the park's current and future ability to perform the work. A preferred alternative was identified which allowed the Ultimate Treatment and Use section to be tailored to it specifically. The proposed use for each building and overall treatment recommendation guides the feature by feature work recommendation for specific materials. Treatment recommendations are developed based on the following criteria.

Severity Impact Level Definitions

For the purposes of the HSR, an "impact" is defined as a detectable result of an agent or series of agents having a negative effect on the significant characteristics or integrity of a feature or structure and for which some form of mitigation or preventative action is possible. The condition assessment includes only those impacts likely to affect the structure within the next five years.

The Level of Impact Severity and their definitions are given below. For all levels, except unknown, two criteria are given. At least one of the criteria must be met for the declared Level of Impact Severity.

SEVERE 1. The structure/feature will be significantly damaged or irretrievably lost if action is not taken within two (2) years.
2. There is an immediate and severe threat to visitor or staff safety.

MODERATE 1. The structure/feature will be significantly damaged or irretrievably lost if action is not taken within five (5) years.
2. The situation caused by the impact is potentially threatening to visitor or staff safety.

LOW 1. The continuing effect of the impact is known and will not result in significant damage to the structure/feature.
2. The impact and its effects are not a direct threat to visitor or staff safety.

UNKNOWN Not enough information is available to make an evaluation.

Compliance and requirements refer to Table 6-1 provided in Volume I, Chapter 6, Requirements for Treatment. Alternatives for Treatment are discussed as well as any adverse effects of the Recommended Treatments.

Appendices for each island's HSR include a summary matrix of treatment recommendations, glossary of terms (repeated at each volume for ease of use for the park personnel), a summary of hazardous material findings, hazardous material analysis reports, and material composition testing data of paint, plaster, and mortar.

CHAPTER 3: CONTEXT, CURRENT DESIGNATIONS, AND PARK SIGNIFICANCE

REGIONAL CONTEXT

The park is on the tip of the Bayfield Peninsula on the southern shore of Lake Superior. The light stations were originally built on this island chain to guide ships to the port in Ashland, and then later to guide ships around the archipelago and toward Duluth.

POLITICAL CONTEXT

The park is administered by the Midwest Regional Office (MWRO) of the Park Service. The park is within the state of Wisconsin and is included in the 7th Congressional District.

ENVIRONMENTAL CONDITIONS CONTEXT

Geography plays a major role in the general nature of the Apostle Islands' light stations. The isolation of the islands required that each light station contain all elements necessary for self-sufficiency. Dwellings had to be included, and a boat facility was essential. Except for Long Island, each light station is located at a considerable elevation above the water, reducing the necessary height of the light tower.

Except in the case of Devils Island, isolation has helped protect the light stations from extensive vandalism. Most deterioration to these remarkably intact buildings and structures has resulted from the extreme weather of Lake Superior. An almost universal change to all Lake Superior light stations is the loss of the original boat docks, usually as a result of a severe storm.

Administrative records indicate that many of the light stations had anywhere from 4 to 10 acres of land cleared to improve visibility of the light. Today, the light station grounds have an artificially determined boundary that is generally a much smaller area. Gardens, sheds, barns and other landscape features are missing.

Long Island has a unique situation among the Apostle Islands light stations as some of its buildings are now archeological remains. The remnants of the original lighthouse and the fog signal building are sufficient to suggest that additional meaningful information can be gained through archeological investigations.

CURRENT DESIGNATIONS

The National Register of Historic Places (NRHP) nomination was submitted as two separate nominations. The first included light stations on Devils, Michigan, Outer, Sand, and Raspberry islands and was nominated as one 33.8-acre unit (but not as a district). The unit was listed on the national register on March 8, 1977 with a state level of significance in the areas of transportation and commerce, and with varying periods of significance from 1852 to 1929. The second nomination was for Long Island, which was included in the 1979 nomination prepared by the Coast Guard "Coast Guard Lighthouses and Light Stations on the Great Lakes," and placed on the national register on August 4, 1983. The Long Island light station was included amongst a larger collection. The listed period of significance for all of the stations in this nomination was 1832 to 1919.

SIGNIFICANCE AND CONTEXTS PER EXISTING DESIGNATIONS

Both the 1977 and the 1983 nomination forms emphasize the significance of the light stations under NRHP Criterion A for their contributions to our understanding of the broad patterns of our history related to navigation, shipping and commerce both on Lake Superior and in the nation. The nominations also address the significance of the light stations under Criterion C as examples of the trends and transitions in lighthouses related to architecture, operations and technologies between 1855 and 1929. The 1977 nomination notes the light stations have excellent integrity, particularly in comparison to other surviving historic light stations in the area.

The 1977 NRHP nomination form indicates that all structures and buildings at each light station are "considered significant," except for certain buildings at Michigan and Devils islands. Specific boundaries for each light station or for each historic area are not provided. The 1929 buildings at Michigan Island, including the brick Power House, brick Keepers Quarters, and wood-framed Assistant Keepers Quarters and Workshop, would have been less than 50 years old at the time the nomination was prepared and were not deemed significant, probably because they had not yet met the NRHP 50-year age standard. The privy behind and associated with the older (1857) lighthouse was described on the form but was not included in the list of significant features. No explanation for the omission is provided.

At Devils Island, the Fog Signal Building was not deemed to be significant. This could be because the research for the nomination had not determined the age of the structure, or that in 1977 the Coast Guard was still operating radio equipment out of the Fog Signal Building. No explanation is provided. The two oil houses at Devils Island were not described, so they consequently have no recognition of their significance.

The Boathouse at Devils Island was also described but was omitted from the list of significant structures. It appears that the site boundaries defined in the nomination form for each of the light stations did not extend to the shore line and therefore did not include any boat houses, docks or piers. The nomination form states the tracks from the tram had been removed, however most tracks remain today.

Additional information has been gathered in the 32 years since the nomination was prepared. A related NRHP Multiple Property Documentation Form titled "Light Stations of the United States" was completed and approved in 2002. This comprehensive summary of the history of lighthouses in the United States includes discussions of administrative history, architecture and engineering, evolution of lighthouse optics and technology, and significant associated persons. The document includes extensive information that was not available to the 1977 and 1983 nominations.

The new information has been incorporated into the reconsideration of the significance of the contributing features and structures for this report.

A draft nomination for a National Historic Landmark (NHL) District encompassing all of the Apostle Islands light stations has been developed and is on file at the park offices. The draft has received a preliminary review by the Park Service and requires revision and further development of the national context and national significance.

SIGNIFICANCE AND THE LIGHT STATION CONCEPT

The NRHP nomination form (1977) for the light stations describes the buildings and structures and states that all are significant with a few exceptions (see the Park Historic Designation section). New studies of lighthouses throughout the United States have been completed since that nomination was prepared.

The NRHP Multiple Property Documentation Form titled "Light Stations of the United States" was completed in 2002. It provides a comprehensive definition of light stations, along with suggested prioritization of features when considering whether a station has historical significance and integrity. This study adopts the concept of the light station, which evolved under the administration of the United States Lighthouse Board between 1852 and 1910. The early station typically included the light tower, a dwelling, a garden, a place to store oil, and livestock outbuildings such as a chicken coops or barns. As technologies developed, the station definition was expanded to include new features including fog signal buildings, additional dwellings for personnel to operate the new equipment, workshops, cisterns, storage buildings, garages, radio buildings, boathouses, and tramways. Automation and electrification led to removal of some of the older vacated buildings.

The most important aspect of the concept of the light station is that it is a combination of features and is not limited to either just the lighthouse or to the lighthouse and immediate grounds. While the boathouse or a garden may be far from the light tower, for example, they are still important elements and should be considered in the overall definition of the light station.

The concept of a light station also allows cultural landscape features, such as gardens, walks and even trash dumps, to be considered within the definition of the historic site. The relationship between the light station buildings and the setting are important in defining the light station. The 1977 nomination for the Apostle Islands light stations appeared to focus more on the immediate improvements around the light, which may explain why certain features were omitted.

RECOMMENDED PERIOD OF SIGNIFICANCE

The recommended period of significance for the Apostle Islands light stations recognizes the crucial role of the light at each island, and as a connected system as the navigational aid for Lake Superior. The most important feature of a light station is arguably the light. The physical aspects of the light are manifested in the built features that comprise the light station – the light itself, light towers, lighthouses, fog bells/signals, utilities (oil, kerosene, electricity, radio beacons, etc), boat docks and tramways, outbuildings, clearings for operation of the light, as well as residences, vegetation and site features constructed and modified for human habitation. The evolution of the light technology (Argand lamp and reflector system, and Fresnel lens) and the light station (its built features), illustrate the continuum of modifications and technological advances that were required to address the ongoing navigational needs of industrial shipping in Lake Superior for more than 120 years.

Historic District

A period of significance of 1852 to 1978 is recommended to recognize the continuum of historical significance of the role of the Apostle Islands light stations in navigation. The period begins with the first construction activities on the islands related to the light and navigation of Lake Superior, which was the construction of the Michigan Island Lighthouse and its site development. The period ends with the change from manned lights to automated lights, of which the last automation occurred at Devils Island. The 1978 date also corresponds with the departure of Coast Guard personnel.

Individual Light Stations

In addition to the overall period recommended for the light stations as a district, a recommended period of significance for each island is identified. This addresses the continuum of changes and modifications that occurred on that island within the District's period of significance. The same rationale used for determining the period of significance for the District is used to identify the beginning and end of each island's period of significance.

Michigan Island: 1856 – Old Michigan Island Lighthouse to **1943** – Second Tower light automated

Outer Island: 1874 – Lighthouse, Fog Signal Building and Privy to **1961** – automation

Devils Island: 1892 – wood light tower, Fog Signal Building, Tramway Engine Building, Boathouse and oil houses to **1978** – automation

Long Island: 1858 – original LaPointe Lighthouse to **1964** – LaPointe Tower automation

Sand Island: 1881 – Lighthouse to **1921** – automation

Raspberry Island: 1862 – Lighthouse (light arrived in 1864) to **1947** – automation

ARCHEOLOGICAL REVIEW

Archeological resources on the islands have received some attention since the properties became part of the park. Most of the documentation of archeological work has been archived at the Park Service Midwest Archeological Center.

Archeological studies specific to the light stations include a series of test trenches excavated at Devils, Michigan, Raspberry and Sand light stations to determine if proposed drainage improvements at these sites would impact subsurface cultural remains. This project was carried out in 1988 and found minimal cultural material within the small areas tested. The report emphasizes that the test areas included in the study are not representative of the potential for buried cultural material at each of the stations and stresses that a number of areas, such as dumps, privies, and building foundations, would probably yield extensive buried materials. The project is documented in the Midwest Archeological Center Technical Report No. 8, by Vergil E. Noble, titled "The Archeological Investigation of Four Lighthouse Complexes at the Western End of Lake Superior: The 1988 Testing Program within Apostle Islands National Lakeshore." (Published 1993)

An archeological survey of Long Island was conducted in 1992 to obtain basic data as to the nature of and potential for buried cultural resources. Due to the shifting sands on the island, archeologists supplemented the typical walking survey and surface observation techniques with the excavation of test trenches at regular intervals. The report said that the survey "...added no new sites to the relatively short list of known cultural resources on the island." The survey was successful, however, in terms of providing documentation of the existing cultural resources on the island as of 1992. The report noted that the ruins of the older, abandoned, Long Island Light Station have very great potential for future archeological research and interpretation in quite a different manner from the standing, intact light station structures on the other islands. Further archeological investigations are recommended. The survey report is Midwest Archeological Center Technical Report No. 47, "The 1992 Archeological Survey of Long Island, Lake Superior, Apostle Islands National Lakeshore," by Vergil E. Noble, published 1996.

RECOMMENDED ACTIONS

The first 1977 NRHP nomination should be updated to recognize the light stations as a district and to include Long Island. In addition, the more in-depth information provided by the CLR/HSR on the light stations and their cultural landscapes should be included in the update. The period of significance should also be updated so that it reflects the expanded period of time (1852 to 1978) that recognizes the continuum of modifications and technological advances that occurred on the light stations in response to ongoing navigational needs of industrial shipping in Lake Superior.

Given the park's goal to resubmit a revised NHL application, revising the previous NRHP application to reflect the CLR/HSR findings would be another recommended action.

CHARACTER-DEFINING FEATURES AND STRUCTURES

Character defining features of a light station are prioritized in the "Light Stations of the United States" multiple property documentation form. The prioritized physical elements and a discussion of how these features are exhibited at the Apostle Islands light stations follows (please also refer to each building's character defining features list in each island's HSR chapter):

1. Tower – The light tower, which defines the function and purpose of the site, is the highest priority of character defining features on the site. The condition of the tower is considered in terms of if the lantern is in place, if the lens that was used during the period of significance is in place, if the tower's interior is intact, if mechanisms related to the operating the light are still there and if attached rooms remain.

Except for Long Island, all of the Apostle Islands' towers are in place with original or historically altered lanterns. Changes to the towers occurred within each island's period of significance. At Long Island, the first tower was remodeled into the Keepers Quarters in 1897 and the quarters were abandoned in 1939. The two replacement towers (built in 1897) on Long Island are in place; although the Chequamegon Tower was moved about 100' back from its original location in 1987. The towers retain original interior and attached features. The wood stairs in the Old Michigan Island Light Station were replaced with metal stairs, sometime before 1900 (see Volume II, Michigan Island History). The Devils Island Tower was remodeled in 1915 when additional structural braces were added. The additions occurred within the period of significance. Only Devils Island has the original lens in place. (This lens was removed for a short period and reinstalled.)

2. Keepers Quarters – The presence of the Keepers Quarters is the second most important feature. A quarters with good integrity is the best scenario, but altered quarters in their original location are also important.

Keepers quarters are present at all of the Apostle Islands light stations. All have very good to excellent exterior integrity. The Sand Island Light Station Quarters with attached light tower also has very good interior integrity because the light was automated in 1921 and very little effort was put into changing it after that time. The Old Michigan Island Lighthouse was remodeled, primarily on the inside of the residential area, to accommodate the changing numbers of keepers and assistant keepers. The alterations occurred within the period of significance. (See Chapter 3, Period of Significance section.) The Keepers Quarters at Devils Island have moderate exterior alterations. The windows have been replaced and a dormer was altered. These changes occurred during the period of significance. The 1938-1939 Public Works Administration-funded keepers' quarters, known as the Triplex, at Long Island are unchanged, but the original quarters are in ruins. As has been noted before, the ruins appear to have great potential for further information through archeological investigations.

3. Fog Signal Building – These buildings are deemed important just for their presence on the site, with less importance as to their historic integrity. The lighthouse documentation form notes that sound signal equipment is "extremely rare and, therefore, especially significant."

Standing fog signal buildings are on Devils Island and Outer Island. Both buildings were remodeled to accommodate other equipment, mostly radio or radio beacon equipment. The Outer Island Light Station has fog signal equipment in the building dating to the 1940s. The foundations of the Long Island building are visible and have archeological potential.

4. Oil house, generator house, fuel tanks, workshop, and other ancillary buildings related to the operation of the light – These elements are important to the understanding of how the light keeping function occurred.

Only Michigan Island lacks an oil house. It was demolished in 1929 as part of the installation of the metal Second Tower and other buildings because the new electric light in the Second Tower did not require oil. The Power House was built as part of the 1929 additions to Michigan Island. The oil houses in the Apostle Islands light stations are all quite similar square buildings with pyramidal roofs. They were usually brick or metal. Generators at Devils and Outer islands are in the fog signal buildings.

5. Other subsidiary structures – These features usually related to daily life at the station and included privies, sheds, cisterns, boathouses, tramways and walkways.

Many of these features occur at the Apostle Islands light stations providing insight into domestic life. Unfortunately, none of the livestock pens or barns survived and the boat docks have been replaced multiple times.

6. Spatial organization – The spatial organization includes the arrangement of buildings, site elements, and cleared areas of the light station. This characteristic is important to understand how the light station functioned during the period of significance.

Each light station occupies a cleared area on a forested island with the exception of Long Island where the forest has developed as the island has evolved over time.

7. Views – Light stations were built as aids to navigation for ships on Lake Superior. Visibility of the lighthouses and light towers was critical to this function and is generally obscured today.

INTEGRITY OF THE STATIONS

All of the Apostle Islands light stations exhibit a high degree of integrity in terms of location, design, setting, workmanship, materials, feeling, and association. The stations are all in their original locations. Except for the Chequamegon Point Tower on Long Island, the character defining buildings are in their original locations and the physical relationships between the buildings are intact. The Chequamegon Point Tower has been moved about 100' back from its original site in response to an encroaching shoreline. The new location does not significantly change the light station.

The design integrity of the buildings remains very good, except that the original Fresnel lenses have been removed from all of the towers except for Devils Island. The setting has been protected because all of the stations are located within lighthouse reservations. Few alterations of the cultural landscape have occurred, with the exception of the encroachment of the adjacent forest into the historic cleared area of the light stations. Modern outhouses, installed by the Park Service, are typically placed away from the buildings in areas now forested and currently out of view. These cleared areas are much smaller than those that existed historically. The NPS vault toilet at Michigan Island is an exception in that it is at the edge of the current cleared area.

Materials and workmanship are clearly evident on the exteriors of the structures. Some of the interiors of the residences have newer materials and the interiors of the fog signal buildings have been altered to allow for installations of radio equipment and generators.

All of these features combine to create a very strong feeling of the historic light station and an association with the works of the federal lighthouse administrations that administered them including the Lighthouse Board, the Lighthouse Bureau, and the Coast Guard.

CHAPTER 4: ADMINISTRATIVE DATA

NAMES, NUMBERS, AND LOCATION DATA

The 27 buildings included in the HSR along with additional landscape elements in this project with their corresponding names, numbers, and location data are in the following summary charts, which are divided by island. Since some of the buildings have served more than one purpose, alternative commonly used names are included in the charts. Use of the Facility Management System Software (FMSS) number, the List of Classified Structures identifying number (LCS ID), and the preferred structure name is the best means of identifying the building. The preferred structure name is used in the CLR/HSR document.

In addition to the buildings noted on the LCS, other features associated with the light stations have been identified as either historically contributing or significant to the state of Wisconsin. These are listed after the tables and are included in the CLR portion of this document.

Table 4-1: Michigan Island

NPS Struct. #	FMSS #	LCS Struct. #	LCS ID	Preferred Structure Name	LCS and Other Names (per 2009 reports)	Year Built	Current API #	Current Use in 2009
MIB03	26572	23103A	006371	Old Michigan Island Lighthouse	Michigan Island Light Station First Tower and Keepers Quarters	1856	64	Vacant
MIB06	26582	23104A	006372	Second Tower	Metal Light Tower/ Light Tower 1929/ New Tower	1880, 1929	85	Exhibit Space
MIB01	26766	23103G	006389	Keepers Quarters	Michigan Island Light Station New Keepers Quarters	1929	64	Seasonal Employee Housing, Exhibit Space
MIB02	26589	23103F	006388	Asst. Keepers Quarters and Workshop	Michigan Island Light Station Maintenance Shed	1929	58	Storage and the NPS Workshop
MIB04	26574	23103D	006386	Power House	Michigan Island Light Station Generator House	1928	64	Storage
MIB07	26585	23103B	006373	Shed	Michigan Island Light Station Storage Shed	1869, 1929	58	Storage
MIB05	26577	23103C	006385	Privy	Michigan Island Light Station Privy	1929	51	Vacant

Table 4-2: Outer Island

NPS Struct. #	FMSS #	LCS Struct. #	LCS ID	Preferred Structure Name	LCS and Other Names (per 2009 reports)	Year Built	Current API #	Current Use in 2009
OUB01	26768	22105A	006376	Outer Island Tower	Outer Island Light Station Light Tower/ Lighthouse and Quarters	1874	76	Vacant
OUB02	26768	22105B	101140	Keepers Quarters	Outer Island Light Station Lighthouse and Quarters	1874	76	Seasonal Employee Housing
OUB03	26770	22104B	006378	Fog Signal Building	Outer Island Light Station Fog Signal Building	1875	64	Storage and the NPS Workshop
OUB05	26772	22104C	006379	Oil Storage	Outer Island Light Station Oil House/ Outer Island Magazine	1874	51	Vacant
OUB04	26771	22104D	006380	Privy	Outer Island Light Station Brick Outhouse	1874	51	Vacant/ Interior Not Accessible at Time of Survey
	78484		006377	Dock*	Outer Island Light Station Dock	1958	71	NPS and small pleasure boats landing

Table 4-3: Devils Island

NPS Struct. #	FMSS #	LCS Struct. #	LCS ID	Preferred Structure Name	LCS and Other Names (per 2009 reports)	Year Built	Current API #	Current Use in 2009
DEB01	25189	17103A	017081	Devils Island Light Station Tower	Devils Island Light Station Light Tower	1898	85	Vacant
DEB02	25191	17103B	017082	Keepers Quarters	Devils Island Light Station Keepers Quarters	1896	73	Seasonal Employee Housing, Small Exhibit in One Room
DEB03	25192	17103C	017083	Asst. Keepers Quarters	Devils Island Light Station First Assistant Keepers Quarters/Assistant Keepers House	1897	51	Vacant
DEB04	25196	17103D	017084	Fog Signal Building	Devils Island Light Station Fog Signal Building	1891	64	Storage and the NPS Workshop
DEB05	25197	17103E	017085	Oil House 1	Devils Island Light Station Magazine 1/ East Oil Storage Building	1892	51	Vacant
DEB06	25198	17103F	017086	Oil House 2	Devils Island Light Station Magazine 2/ West Oil Storage Building	1908-1913	51	Vacant
DEB08	25200	17104A	017094	Tramway Engine Bldg	Devils Island Tram House/ Hoisting Engine House	1901	51	Vacant
DEB09	25202	17106A	017098	Boathouse	Devils Island Boathouse	1891	51	Vacant
DEB 07	25199		017087	Pump House*	Devils Island Light Station Pump House	1940s	51	Vacant
	78499		017099	Dock*	Devils Island Light Station Dock	1947	71	NPS and small pleasure boats landing
	78621		017097	Cross-Island Trail*	Devils Island Light Station Roadway	1892; widened 1920s	58	NPS and visitor pedestrian trail

Table 4-4: Long Island

NPS Struct. #	FMSS #	LCS Struct. #	LCS ID	Preferred Structure Name	LCS and Other Names (per 2009 reports)	Year Built	Current API #	Current Use in 2009
LOB01	25215	24102F	101643	LaPointe Light Tower (preferred name)	Long Island Light Station Tower	1890	79	Vacant
LOB05	25221	24102B	101656	Chequamegon Point Tower	Chequamegon Point Tower/ Chequamegon Light	1896	63	Vacant/ Interior Not Accessible at Time of Survey
LOB02	25217	24101A	101647	Triplex	Long Island Light Station Triplex/ Light Station Quarters	1938	51	Proposed Seasonal Employee Housing
LOB03	25219	24101B	101648	Oil Building	Long Island Light Station Yellow Oil House/ Paint Locker	1896	43	Vacant
LOB06	109881		101642	Fog Signal Building Foundation*	Long Island Light Station Fog Signal Building Foundation (Ruin)	1890	51	Vacant
LOB04	109620		101562	Original LaPointe Lighthouse Oil Building*	Long Island Light Station Old Oil House	1897	43	Vacant
LOB07	109621		101651	Original LaPointe Lighthouse*	Long Island Old Lighthouse	1858, 1896	55	Vacant

Table 4-5: Sand Island

NPS Struct. #	FMSS #	LCS Struct. #	LCS ID	Preferred Structure Name	LCS and Other Names (per 2009 reports)	Year Built	Current API #	Current Use in 2009
SAB01	25154	06142A	006381	Light Station Quarters	Sand Island Light Station and Keepers Quarters/ Lighthouse and Quarters	1881	85	Seasonal Employee Housing, Exhibit Space
SAB05	36466	06142B	006382	Oil Building	Sand Island Light Station Oil House/ Sand Island Oil Storage Building	1901	58	Vacant
SAB06	25159	06142C	006383	Privy	Sand Island Light Station Privy/ Historic Lighthouse Privy	1881	51	Vacant

*Included in CLR only.

For clarification, according to the List of Classified Structures (LCS), other elements on the islands in the study have been identified as either historically contributing or significant to the state of Wisconsin. These elements are:

Michigan Island Light Station:

- Concrete Walks – Contributing
- Steps/Tramway – State of Wisconsin
- Gull Island Lighthouse – State of Wisconsin
- Radio Beacons – Contributing

Outer Island Light Station:

- Steps/Tramway – Contributing
- Oil Tank Cradles – Contributing
- Concrete Walks – Contributing
- Flagpole – Contributing
- Concrete Cradle Underground Storage – Contributing

Devils Island Light Station:

- Concrete Walks– Contributing
- Cistern – Contributing
- Stone Retaining Wall – Contributing
- Hoist and Derrick Pier – Contributing
- Flagpole – State of Wisconsin
- Tramway – State of Wisconsin
- Tramway Cart – State of Wisconsin
- Outer Crib – State of Wisconsin
- Radio Tower – Contributing
- Oil Storage Tank Complex – Contributing
- Oil Tank Cradles – Contributing

Long Island Light Station:

- Power Lines – Contributing
- Cistern – Contributing
- Concrete Walks – Contributing
- Concrete Foundation Piers – Contributing
- Radio Tower Pier Foundation – Contributing

Sand Island Light Station:

- Concrete Walks – Contributing

Park Methodology for Monitoring the Future Needs of Structures

(Per Randy Ross, Facility Manager of Apostle Islands National Lakeshore, as of 2/16/2010)
The park will continue to use the Facility Management Software System (FMSS) to monitor needs and create projects. It will do this by performing Annual and/or Comprehensive Condition Assessments that will recognize the deficiencies. The Annual Assessments are quick inspections that catch the obvious problems. The Comprehensive Assessments are more detailed in-depth inspections that find the nonobvious problems. The deficiencies will then be entered as work orders. Like work orders will be bundled to form projects. Work orders to replace features that are determined to be at the end of their life cycle (painting siding, roof replacement) are considered Component Renewal (CR). Once features go beyond their life cycle the work orders become Deferred Maintenance (DM).

The priorities of the structures are determined by each structure having an Asset Priority Index (API) this number ranges from 100 to 0 (an API of 100 means that it is the most important structure in the park). The API is determined by park staff in regards to its importance to natural and cultural resource preservation, visitor use, park operations and substitutability.

There is a Current Replacement Value (CRV) given to each structure. This value is basically what it would cost to replace if the structure was destroyed. This is a difficult figure to determine with historic structures especially with some of the fine detail and materials that are no longer available.

The condition of structures is determined by the Facility Condition Index (FCI). This figure is determined by the Deferred Maintenance divided by the Current Replacement Value (FCI=DM/CRV).

FCI	*Condition*
0.00 – 0.10	*Good*
0.10 – 0.15	*Fair*
Greater than 0.15	*Poor*

The overall goal of the park is to have all structures in good condition.

RELATED STUDIES

Several studies provide considerable background material on the Apostle Islands light stations, and include the following. All of the data reviewed as part of the CLR/HSR is listed in the bibliography.

The National Historic Landmark nomination and the List of Classified Structures provide a synopsis of each building's history and importance to its specific island. Dates of rehabilitation and alterations are also listed in the LCS and provide a concise chronology of important structural modifications to the buildings.

"People and Places: A Human History of the Apostle Islands," is a historic resource study written by Jane C. Busch for the Park Service in 2008. It is an in-depth history of the Apostle Islands and its greater importance to Lake Superior, focusing mainly on the economy and trade of the region. Each island is highlighted as is the whole archipelago with emphasis on the importance of trade to the area and how it affected the islands and their structures. The social history of the area is also provided in Jane Busch's study.

Previous studies for Raspberry Island also informed the current CLR/HSR. The HSR for Raspberry Island was completed in 2000; the CLR in 2004. Reflection and analysis of the previous work on Raspberry Island has also informed the team on how best to proceed for the remaining five islands.

Additional documentation was provided by the Historic Structure Preservation and Utilities Team for Apostle Islands. These include an account of work accomplished at the light stations in the last 11 years (1998-2009); a matrix of each structure noting when they were reroofed and with what material, a 20-year cyclical reroof program backlog chart; and recommendations on which roofs need replacing.

Newspaper articles, books, and firsthand letters, descriptions, and photographs from the Apostle Islands archives located in Bayfield, Wisconsin were also reviewed.

The Historic American Buildings Survey (HABS) of the Apostle Islands light stations, completed in 1990, surveyed the primary structures and sites and documented their existing condition. HABS is administered by the Heritage Documentation Program and is the nation's first federal preservation program. Beginning in 1933, HABS employees have documented the architectural heritage of America and compiled this

information in the Library of Congress. Today, the Library of Congress houses nearly 40,000 records, including HABS, HAER (Historic American Engineering Record) and HALS (Historic American Landscapes Survey) records. The HABS plans, sections and elevations drawn for most of the islands' structures note the dimensions and details of the buildings and have been used as the existing condition plans. The plans for the sites note many of the features and have been used as the basis for the CLR plans.

Copies of original plans and early photos of the islands and the buildings were researched at the Apostle Islands archives in the Park Service Headquarters and Visitor Center in Bayfield, Wisconsin. Duplicates of other plans, details, aerials, and historic documents relating to the Apostle Islands light stations were obtained from the NPS Technical Information Center (TIC) in Denver, Colorado.

A number of related studies on the Apostle Islands as an archipelago of historic importance relating to trade, technological development, and recreational activities were also reviewed.

The General Management Plan/Wilderness Management Plan was released to the public in draft format in July 2009 and finalized in June 2011. The preferred alternative states that at least two additional lighthouses (choosing from Sand, Outer and Michigan Island) will be rehabilitated. The Long-Range Interpretive Plan for Apostle Islands was published in June of 2002, and, like the GMP, provides information about the NPS plans and goals for development. Summaries of this plan and the GMP are listed below.

General Management Plan/Wilderness Management Plan/
Environmental Impact Statement (GMP/EIS)
Released June 2011

The preferred alternative will serve as the management plan for the Apostle Islands for the next 15 to 20 years. Below is a summary of the GMP/EIS Preferred Alternative:

- Two additional light stations would be restored or rehabilitated, similar to Raspberry Island light station. Part of Long Island light station would be rehabilitated for park staff housing
- Additional transportation opportunities to encourage more visitors to come to Sand, Basswood, and Oak islands
- Manitou Island Fish Camp would be preserved and stabilized, the cultural landscape partially rehabilitated
- No change in the number of the docks, but some docks would be relocated, improved, or expanded
- Bayfield Visitor Center would be built in a new location closer to the water to improve contact with visitors and to be located with an operations center; Park HQ would remain in Old Bayfield County Courthouse; the Little Sand Bay Visitor Center would be replaced with visitor contact station
- New ranger station and accessible beach ramp developed at Meyers Beach, which is on the mainland
- Compared to Alt. 1, most of adverse impacts would be long-term negligible to minor; increased visitor use on some islands would result in minor to moderate long-term adverse effects on vegetation, shorelines, and sandscapes
- Minor to major long-term beneficial impacts would occur due to improved access and experiences to visitors, improved facilities, decreased staff fragmentation, increased staffing levels, increased spending by visitors; none of these impacts considered unacceptable.

The GMP/EIS addresses the NPS goals for future accessibility in the following statements.

"Visitor Use and Experience: Strategies," page 37:

- "All of Apostle Islands National Lakeshore's programs and facilities will be evaluated on a regular basis to ensure that they are accessible to the extent feasible."

"Accessibility for Persons with Disabilities," page 86:

- "Few additional facilities are anticipated during the life of this plan, and those that are constructed will only be added if they provide essential environmental protection and are appropriate to the setting. In those cases, the facility design will be accessible consistent with federal law and NPS policy. Whenever feasible, the National Park Service will go beyond the legal requirements and make the facilities as accessible as possible using a wilderness-appropriate primitive design."

"NPS Preferred Alternative: Mainland Unit," page 118:

- "A ramp would be installed at Meyers Beach, which would provide access to the beach for visitors with disabilities."

Long-Range Interpretive Plan: Apostle Islands National Lakeshore,
Published June 2002

The Interpretive Plan has set goals for the future of the park's outreach and education for visitors. This plan is formed around seven themes that encourage discussion, imagination, and further investigation of the Apostle Islands. The themes are:

1- "At the center of the continent, Lake Superior has long served as a highway of commerce connecting the Apostle Islands region to a global economy, thereby transforming the landscape and its people."
2- "The Stories of Apostle Islands National Lakeshore reveal themselves along edges where water meets land and sky, field meets forest, culture meets culture, and past meets future."
3- "After being altered by centuries of exploitation, the Apostle Islands' environment is restoring itself and regaining its wilderness characteristics."
4- "The Apostle Islands have long attracted people to Lake Superior's shore to enjoy world-class opportunities for a variety of recreational experiences."
5- "The Apostle Islands' protected plant and animal communities, remote yet not removed from outside influences, serve as indicators to help measure the pulse of the planet."
6- "Lake Superior defines the Apostle Islands, shapes its ecosystems, and sustains life in the region."
7- "Dynamic and uncontrollable, Lake Superior is a force to be encountered on its own terms."

Source: *Long-Range Interpretive Plan: Apostle Islands National Lakeshore*, NPS June 2002, p 28-34

A variety of methods are used to communicate the park's primary interpretive themes and facilitate public understanding of the park's meaning and significance. These include such personal interpretive services as informal visitor contacts, interpretive talks, illustrated programs, conducted activities, and curriculum-based education programs. Interpretive media such as publications, audio-visual programs, wayside exhibits, visitor center exhibits, and the park's website are also important in communicating this information to the public.

DOCUMENTATION RECOMMENDATIONS AND FUTURE STUDIES

The Apostle Islands archives in Bayfield, Wisconsin and the NPS Technical Information Center (TIC) in Denver, Colorado are appropriate locations for the archival materials related to the buildings in this study. TIC will receive copies of the information recovered by this document as will the Apostle Islands archives.

The following future studies are necessary planning tools for the future of the light stations.

- Develop an Interpretative Plan for each island to further refine the information to be presented to the visitors.
- Develop an Archeology Investigative Approach Plan to inform investigations and future improvements, so that archeological resources are protected.
- Develop an Underwater Resource Plan to inform how to handle extant resources (such as the docks) in the future.
- Continue to develop an overall Park Accessibility Plan, using the recommendations of June 2010 as a basis and include non-mobility related disabilities (Appendix B). Accessibility features identified in the plan shall be included in pending design/construction projects.
- Develop an overall Park Hazardous Material Mitigation Plan to identify and prioritize future remediation efforts.
- Develop an overall park Integrated Pest Management (IPM) Program.
- In order for a more successful NHL nomination, perform a comparative analysis of other historic American Light Stations, specifically within the Great Lakes region.

CHAPTER 5: MANAGEMENT ISSUES

The following topics have been identified as management concerns that are integrally related to the work in the CLR/HSR and are common to several or all of the light stations in the Apostle Islands. These issues are discussed to provide an overview of the particular concern as it relates to potential treatment recommendations for the cultural landscape and historic structures of the light stations.

MAINTENANCE OF HISTORIC RESOURCES

Current and previous management practices including deferred maintenance, and lack of funding, have resulted in loss and/or deterioration of character defining features. As these actions continue, individual features are compromised and/or lost or removed, resulting in an overall loss of historic character.

ACCESSIBILITY (ABAAS)

The NPS will provide persons with disabilities the highest feasible level of physical access to historic properties that is reasonable, consistent with the preservation of each property's significant historical features and the requirements of Section 504 and ABAAS for historic properties.

The Park Service has undertaken an accessibility analysis, separate from the CLR/HSR, to determine an accessibility plan for the six light stations in the Apostle Islands: Raspberry, Michigan, Outer, Devils, Long, and Sand islands. This work was intended to address the light station system as a whole and the accessibility requirements to be achieved at each individual light station and only addresses physical access. The report is included in Appendix B. It should be noted that each of the light stations included in this study (Michigan, Outer, Devils, Long, and Sand) may be reached by pleasure boats and small vessels at docks or landings near the light stations. Access by larger public cruise boats is limited to Raspberry and Stockton islands. An overall park-wide Accessibility Transition Plan to address visitors with non-mobility related disabilities is in progress by the park but has not yet been completed at the time of printing. The CLR/HSR incorporates the recommendations into each of the light station's plans based on the 6/2010 findings. In summary the recommendations are as follows:

For the Michigan Island Light Station the recommendations included the following measures:

- Provide a new accessible restroom (Vault Toilet) with an accessible path
- Study alternatives to provide an accessible route from the top of the tramway to Old Michigan Island Light Station
- Provide an accessible route to the west entry door of Old Michigan Island Lighthouse and through the entire first floor, including widening the west entry door and installing a freestanding ramp

For the Outer Island Light Station the recommendations included the following measures:

- Provide a new accessible restroom (Vault Toilet) with an accessible path

For the Devils Island Light Station the recommendations included the following measures:

- Provide a new accessible restroom (Vault Toilet) with an accessible path
- Study the alternatives regarding which structure is best suited to host the public

For the Long Island Light Station the recommendations included the following measures:

- Provide a new accessible restroom (Vault Toilet) at the LaPointe Light Station with an accessible path

For the Sand Island Light Station the recommendations included the following measures:

- Provide a new accessible restroom (Vault Toilet) with an accessible path
- Study alternatives for site approach including providing an accessible trail, including boardwalks from the East Bay boat landing to the light station
- Provide an accessible route to the kitchen level of the Light Station Quarters

The NPS must ensure that all interpretive programs, services and opportunities are provided in such a way as to ensure that they are accessible to all individuals with disabilities and meet the requirements of Section 504 of the Rehabilitation Act of 1973. The unique stories of each light station should be made available to visitors and staff through accessible interpretive programs at the APIS Visitor Center in Bayfield, WI, interpretive waysides and at the APIS Little Sand Bay Visitor Center.

LIFE SAFETY/CODE COMPLIANCE

Safety is paramount to visitor and employee use of the buildings. Code compliant handrails and guardrails were noted as a critical item; however, their installation without becoming visually disruptive to the historic fabric will be a challenge. Further, as projects commence design, full code studies utilizing the International Existing Building Codes (IEBC) will be required to determine the level at which code compliance is attainable at these remote sites.

HAZARDOUS MATERIALS

Although further sampling and testing is needed, hazardous materials of lead paint, asbestos containing materials, petroleum, guano and mold were identified. An analysis of employee and visitor safety versus mitigation costs will be required.

INTERPRETATION AND PARK SIGNAGE

Interpretation and educational programs are primarily the responsibility of the park through its rangers, programs, and exhibits. *The Long-Range Interpretive Plan*, 2002 guides interpretive efforts in the park. Information and interpretation include interpretive signs on the light stations and collections housed within various buildings. APIS is developing a system-wide interpretation plan that includes the six sight stations: Raspberry, Michigan, Outer, Devils, Longs, and Sand. Park signs are closely tied to interpretation and will be addressed by the park as part of the interpretation plan. Recommendations for interpretation programs and facilities are not included in the CLR/HSR but will be developed in the interpretive plan by the park.

BOAT DOCKS AND LANDINGS

The CLR/HSR has addressed the individual boat docks at the light stations with regard to location, configuration and basic materials of docks and how this relates to the historic character of the cultural landscape. Details of the physical condition, materials and engineering have not been included in the CLR/HSR. Boat dock planning work is currently under study by the Park Service under separate but related projects, including the Great Lakes Restoration Initiative.

WILDERNESS AND RESERVATION BOUNDARIES

A large portion of the park is designated as the Gaylord Nelson Wilderness, established on December 8, 2004, and includes 80% of the land area of the park (approximately 33,500 acres of the park's 42,160-acre land base).[11] The wilderness designation includes large portions of Michigan, Outer, and Devils islands. No parts of Sand, Basswood, and Long islands are included in the wilderness designation. Specific areas on Michigan, Outer, and Devils islands were set aside as light station reservations and are outside the wilderness boundary. Sand and Long islands also contain light station reservations, as does Raspberry Island, which is not included in this study.

Beginning in the mid-1800s the United States Lighthouse Board began reserving lands for the development of light stations in the Apostle Islands. The reservations varied in size and configuration from entire islands such as Devils and Raspberry islands, to small portions of land on Michigan, Outer, Long, and Sand islands. The reservations remain in place today as a part of the park. Some adjustments to boundaries were made in 1939 when the Coast Guard assumed authority of the light stations in the Apostle Islands.

CLEARING PRACTICES

Maintenance of the historic cleared areas of the light stations is an ongoing maintenance practice that the park has implemented since the park's inception in 1970. Restoring and maintaining the historic cleared areas of each light station is important to maintaining the integrity of each individual light stations and the system of light stations as a whole. Best management practices for the clearing of trees and shrubs to reduce forest encroachment have been considered in developing treatment recommendations for the light stations. In general applicable clearing best management practices include the following methods:

- Remove large trees by standard felling practices. A small number of trees and trunks can be moved into the forest and remain as felled wood. Larger numbers of tree trunks will need to be bucked and removed from the island.
- Brush removal will most likely be a combination of practices that include: stack and burn on site in slash piles; wide scattering of materials in adjacent forest; chip and place on-site foot trails (small amount of initial removals). The movement of brush and wood to mainland or other islands is prohibited by the park.

SHORELINE SLOPE STABILIZATION

Due to the nature of the topography and geology shoreline bank erosion is an ongoing process and concern in the Apostle Islands, specifically at the Raspberry, Outer, and Michigan Island light stations. These light stations are most susceptible to shoreline erosion that could impact light station buildings and structures. Slope stabilization projects have been implemented at Raspberry and Outer islands but none have been initiated at Michigan Island. The park has established a program of slope stabilization monitoring and a proposed series of best management practices primarily to prevent erosion from potentially damaging the light stations and structures.

Because of the high erosion potential clearing work along the shoreline banks must be done carefully and selectively, and care should be taken not to initiate erosion by overworking slopes. Only through careful planning and management action will these banks be kept stable. This work may best be accomplished in

[11] *Draft General Management Plan/Wilderness Management Plan/Environmental Impact Statement* (GMP/EIS). 2009. Page 15

an incremental manner with a sound erosion monitoring program in place and a plan for biostabilization of the banks.

The recommendations for select clearing along the shoreline banks at Michigan and Outer islands and strategies for maintaining stable shoreline slopes are included in the individual light station cultural landscape reports.

SUSTAINABILITY

Due to environmental, operational and safety concerns, the park is dedicated to reducing (eliminating) the use of carbon fuel within the park. This includes maximizing pv (photo-voltaic), minimizing the use of propane and reducing the quantity of boat trips per light station required for maintenance.

EVOLVING PROJECTS/CHANGING OBJECTIVES

It is understood that the CLR/HSR is a management tool for the Park Service. As such, it is a static document whereas the management of the park is dynamic and driven by environmental, programmatic, and budgetary forces. Therefore, while specific treatment recommendations have been identified in the CLR/HSR, it is understood that changing objectives in future management may prompt differing treatments.

CONSTRUCTION LOGISTICS

Construction projects on the islands of Lake Superior are difficult. Rapidly changing weather can limit boat access to the islands. Depending on the dock used, boat size and speed, travel to each island (and between islands) can vary from a half hour to an hour. Seasonal shifts further limit boat access to the islands as portions of the lake can freeze from mid-October (in extreme years) to April. All of these factors will contribute to higher construction costs for the park.

INTEGRATED PEST MANAGEMENT (IPM) PROGRAM

All buildings can be a risk for pest infestation. To date, the Old Michigan Lighthouse and the Triplex at Long Island have been identified as having bat infestations. The park should develop an overall program to guide policy on mitigation techniques.

CHAPTER 6: PROPOSED TREATMENT CRITERIA

This chapter includes a synopsis of the treatment recommendations as well as the process by which the preferred alternative was selected.

SUMMARY OF TREATMENT RECOMMENDATIONS

The overarching treatment strategy for the light stations is rehabilitation, recognizing that within this approach, individual features or structures may warrant preservation (typically stabilization) or restoration. Likewise, assuming that treatments will be undertaken in phases, stabilization may become the first step. The CLR/HSR includes the following proposed uses and treatments:

- **Michigan Island: Rehabilitation** – Rehabilitate Old Michigan Island Lighthouse for self-guided visitor use at the quarters and guided tours to the Tower. Rehabilitate the Keepers Quarters for seasonal housing. Rehabilitate the Second Tower for guided tours. Preserve the Assistant Keepers Quarters and Workshop, Power House, Shed and Privy primarily for NPS maintenance, with the possibility of providing visual access to visitors to the Shed and Privy. Rehabilitate the cultural landscape including selective clearing of trees; stabilizing the slope embankment; upgrading site accessibility; repairing the tram to a working condition; removing invasive vegetation; confining historic vegetation that might be invasive; and restoring historic plantings.
- **Outer Island: Rehabilitation** – Rehabilitate the Tower for guided visitor use. Rehabilitate the Keepers Quarters for staff shelter. Rehabilitate the Fog Signal Building for possible visitor use. Preserve the Oil Storage and Privy for NPS storage. Rehabilitate the cultural landscape including clearing of trees; stabilizing the slope embankment; maintaining recent site drainage improvements; repairing the tramway to working order; removing noncontributing features; and maintaining small scale contributing features.
- **Devils Island: Rehabilitation** – Rehabilitate the Tower, Keepers Quarters, Assistant Keepers Quarters, Oil House 2 and Fog Signal Building (remove noncontributing south addition) for varied levels of visitor use. Preserve Oil House 1, Tramway Engine Building and Boathouse for NPS storage. Rehabilitate the cultural landscape including clearing trees; repairing tram tracks; maintaining lawn areas; and retaining contributing small scale features.
- **Long Island: Rehabilitation** – Rehabilitate LaPointe Light Tower for guided visitor tours. Rehabilitate Chequamegon Point Tower (no visitor tours). Preserve the Triplex and the Oil Building. Rehabilitate the cultural landscape including investigating the extent of concrete walks; clearing trees; stabilizing ruins; constructing a new dock; and retaining contributing small scale features.
- **Sand Island: Restoration** – Restore the Light Station Tower and Quarters to pre-1921 conditions for visitor tours and possible overflow shelter for staff. Make the kitchen physically accessible and add interpretive program access for the remainder of the Light Station Tower and Quarters. Preserve the Oil Building and Privy for possible visitor visual access. Restore and rehabilitate the cultural landscape including clearing of trees; upgrading site accessibility; restoring missing fencing; and relocating and removing noncompatible small scale features.

SUMMARY OF VALUE ANALYSIS/CHOOSING BY ADVANTAGE

In the midst of the CLR/HSR project, a Value Analysis/Choosing by Advantages (VA/CBA) process was integrated into the project in May of 2010. It was determined by the team that the future construction projects potentially being determined by the CLR/HSR was worthy of the VA/CBA process to ensure that the decisions being made were objectively meeting the NPS criteria. Of the three alternatives evaluated, alternative 2, with minor modifications, was selected due to its greatest value to the Park Service. (Refer to separate VA/CBA report.)

The VA/CBA was primarily a project scoping exercise to evaluate the range of opportunities. The Class C Cost Estimate (appendix A) exceeds the current available construction funding. However, as a CLR/HSR, it was agreed by the team that the short term funding limitations should not necessarily limit the longer term vision and goals typically generated in a CLR/HSR. Therefore, the long-term plan will be funded by a variety of funding sources over many years in order to achieve full implementation.

The following sections are general information pertaining to the proposed use and recommended treatments contained within the HSR treatment recommendations per building:

REQUIREMENTS FOR TREATMENT (HSR)

NPS 28, Chapter 8 instructs that the Requirements for Treatment section will identify laws, regulations, and functional requirements that apply to the historic structure. This calls for specific attention to issues of life safety, fire protection, energy conservation, abatement of hazardous materials, and accessibility. In addition to the issues as called for by NPS 28, this section includes cultural resource protection and management.

Table 6-1 lists the issues, relevant policies, laws, codes, and standards that outline potential impacts that shape treatments of the buildings recommended in this HSR. Although not necessarily all inclusive, the matrix should be considered a starting checklist for design of treatments and management of the resources. Further guidance and a listing of related regulations may be found at: http://www.nps.gov/dscw/laws-pol.htm. Although regulations may appear prescriptive, their application to historic buildings and structures always requires careful consideration of the resource's historic character and integrity along with interpretation and/or alternative means of fulfilling regulatory requirements.

Table 6-1: Relevant Policies, Laws, Codes, and Standards

Topic	Code/Policy/Law	Comments
Life Safety	National Fire Protection Association - NFPA 101 International Building Code (IBC) 2009 Executive Order (EO) 12941 ASCE7 International Existing Building Code (IEBC) 2009 Amendment to Public Buildings Act 1988 NFPA 70 National Electrical Code	Life safety issues are those that relate to fire, storm, collapse, crowd behavior, and other related considerations. See individual building reports for specific life safety deficiencies. It is important to note that even though a feature's condition may be "poor," it does not necessarily mean it poses a life safety threat. For instance, exterior trim, in some cases, is severely deteriorated, but this condition does not constitute a life safety issue. <u>Life Safety Issues:</u> * Lack of code compliant hand rails or guardrails at stairs. * Lack of code complaint guardrails at several towers. * Damaged porch framing which is the exit path (Devils Island Keepers and Assistant Keepers Quarters) * Trip hazards on exit routes Several buildings have entry doors that lack a code-compliant landing on both sides of the door. Specific impacts for each building should be identified upon development of schematic rehabilitation design for the ultimate use. * With regard to the buildings' ability to resist seismic events (see EO 12941), evaluation of seismic capacity was beyond the scope of this report.
Fire	NPS Director's Order (DO)-58: *Structural Fire Management*	To establish fire performance requirements for the islands and for this report, the mechanical engineer communicated with Brian Olson of the DSC. They concluded that the introduction of fire suppression systems was not recommended for the buildings based on their current use and limited water supply. Please refer to Appendix C.
Protection	Various NFPA Standards DO-28 – NPS 28 NPS *Management Policies 2006*, 5.3.1.2. Fire Detection, Suppression and Post Fire Rehabilitation NPS *Management Policies 2006*, 9.1.8, Structural Fire Protection and Suppression IEBC 2009 ASCE7 IEBC 2009 Integrated Pest Management (IPM) Program NPS Management Policies 2006, Section 4.4.52	

Topic	Code/Policy/Law	Comments
Energy Conservation	Guiding Principles of Sustainable Design Greening Federal Facilities, An Energy, Environmental and Economic Resource Guide for Federal Facility Managers and Designers IESNA 9th Edition ASHRAE/IESNA 90.1 International Mechanical Code 2009	This report does not address this topic in depth. It is understood that the park's goal is to eliminate dependency on fossil fuels. With regard to thermal insulation energy concerns in buildings that are unconditioned that are likely to remain in this or similar use, the topic of energy conservation is not relevant, other than electrical supply. For the other buildings, impacts to the building relative to this topic depend on ultimate use of the buildings. Specific impacts for each building would be identified upon development of schematic rehabilitation design for the determined use.
Hazardous Material Abatement	Resource Conservation and Recovery Act Environmental Protection Agency Regulations Occupational Safety and Health Administration Regulations Arizona Department of Health Services	Generally all painted surfaces are suspect as having lead-based paint in underlying coats. Future treatment (rehabilitation) would not result in direct impact to the building but would trigger construction personnel protection requirements during preparation of surfaces for repainting. Specific impacts to each building should be identified and evaluated once qualified personnel have completed a hazardous material survey/ testing.
Accessibility	General Administration Services (GSA), Architectural Barriers Act Accessibility Standards (ABAAS) DO-28 – NPS 28 Section 504 Rehabilitation Act	Park and DSC staff and a local accessibility consultant met on-site in 6/2010 to discuss the overall accessibility of the park. This report has been included in Appendix B for reference only. The outcome of the 6/2010 report was that the park identified a need for a holistic Accessibility Transition Plan which is currently underway at the time of printing. Accessibility challenges exist at this park and their mitigation requirements must be evaluated with the merits of the historic integrity of the cultural landscape and structures. Programmatic access is one concept that the park is exploring whether by wayside exhibits or at the park's visitor center. Specific sections of ABAAS have language and possible exceptions regarding alterations to historic buildings (F202.5); site arrival points (F206.21); entrances (F206.4); Multistory Buildings (F206.2.3) and Toilet Rooms (F213.2). The Wisconsin State Historic Preservation Officer (SHPO) has reviewed the draft of this document and will be consulted for pending future construction projects.
Cultural Resource Protection and Management	DO-28 and NPS 28 Cultural Resource Management The Secretary of the Interior's Standards and Guidelines for Rehabilitating Historic	All these buildings have significance related to the history of the nation. The rehabilitation designs will undergo strict scrutiny to ensure that every reasonable effort to retain historic character and integrity has been addressed. Rehabilitation

Topic	Code/Policy/Law	Comments
	Buildings 1995 Archeological and Historic Preservation Act 1974 EO 11593, “Protection and Enhancement of the Cultural Environment” Programmatic Memorandum of Agreement among the Park Service, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Office (1995) National Historic Preservation Act of 1966 as amended, Section 106, and Section 110 Advisory Council on Historic Preservation's regulations, *Protection of Historic Properties* 36 CFR 800	design and construction that conforms to the Secretary of Interior's Standards and Guidelines for Rehabilitation will facilitate avoiding adverse effect determinations.
Integrated Pest Management (IPM)		Important in relation to maintenance, preservation and restoration work. It impacts employee and visitor safety and health. Should be further investigated as projects are scoped.

ALTERNATIVES FOR TREATMENT (HSR)

Physically, the buildings addressed in this HSR should be treated as viable and active structures. The uses of the buildings range from preservation/mothballing, to NPS utilitarian use and from moderate to full visitor access and use. These buildings warrant sensitive preservation of intact features, restoration of deteriorated or missing fabric, and rehabilitation to adopt a change in use.

Through the design phases for specific projects and as individual buildings are preserved, restored, or rehabilitated, refinement to the alternatives will occur. Because of severe deterioration, on and in several of the buildings, in-kind replacement of historic materials where needed will be required. Care should be taken to avoid attempting to make the buildings look as if new. Development of plans for each island will lead to funded construction projects, some requiring conversion of structures for new uses. Rehabilitation is the process of making possible a compatible new use for a property through repair, alterations and additions while preserving those portions of features which convey its historical, cultural, and architectural values. The emphasis remains on retention and repair of historic materials. Character defining spaces and features must be protected. Preservation and restoration sensitivity are intentional outcomes of a rehabilitation approach. Upgraded engineering systems for contemporary comfort, convenience and safety, meeting program needs and codes, are tailored changes to a rehabilitated structure. Throughout, the Secretary of the Interior's Standards shall be used.

Please refer to the HSR volumes for discussions of alternatives specific to each building.

ASSESSMENT OF EFFECT FOR RECOMMENDED TREATMENTS (HSR)

Adverse effects can be evaluated as impacts which diminish the historical integrity of the property, such that the distinguishing characteristics of the building that qualified it as contributing to a historic district, are irreversibly changed or lost. Adverse impacts can include loss of historic fabric and character defining features, alteration of historic finishes, loss of spatial relationships, and inappropriate alterations/additions. It is the opinion of the authors of this report that the recommended treatments may be accomplished without diminishing a building's individual or the site's collective characteristics (location, design, setting, workmanship, materials, feeling, and association) that qualify these properties for inclusion on the national register and designation as contributing structures to the pending Apostle Islands National Lakeshore Historic Landmark District application.

Please refer to the HSR volumes for discussion of effects for recommended treatments.

CHAPTER 7: OVERALL APOSTLE ISLANDS HISTORY

The Great Lakes extend more than 1,000 miles across the northern United States. Rich and diverse natural resources, both in and surrounding the lakes, have attracted explorers and settlers from prehistoric times to the present. The water provided an efficient means of transportation for early travelers and traders, but required risky navigation around unmarked hazards. As commerce developed on the Great Lakes, freighters relied on navigational markers for safe passage. The federal government's lighthouses, buoys, and lightships not only paralleled the growth in commerce, but were vital prerequisites for its development.

The remarkably intact light stations in the Apostle Islands illustrate the development and interdependence of commerce, community and the role of the federal government's lighthouse service. While each station was developed separately to address specific navigational needs, the collection of stations illustrates the evolution of lighthouses, the settlement and development of the Chequamegon Bay and Lake Superior, and the role of lighthouses in American commerce.

Six of the Apostle Islands light stations are within the boundaries of the park. Five of these stations are addressed in detail in this document. The sixth station at Raspberry Island is documented in previous studies *(Historic Structure Report Raspberry Island Lighthouse*, December 2000 and Cultural Landscape Report Raspberry Island Lighthouse. November 2004). The other major Chequamegon Bay light, the Ashland Breakwater light, guides ships into Ashland harbor and is outside of the park.

All seven light stations are still functioning navigational aids. Using modern illumination techniques, the light stations guide today's marine traffic, as they have for more than 150 years.

THE GREAT LAKES NETWORK

Light stations played a vital role as the Great Lakes developed into an integrated network of commerce, shipping and community development. The first boats on the lakes could take advantage of the relatively calm waters connecting Lakes Michigan, Huron and Erie, but the rough rapids in the river connecting to Lake Ontario and to Lake Superior threatened lives and cargo. In the 1600s and 1700s, French fur traders first freighted their cargo east across Lake Superior via canoes and struggled to portage around the rapids in the waterway that connected to Lake Huron. The French and later the English launched vessels for use on Lake Superior, but still faced an arduous overland transport of goods to the next waterway.[12]

The United States began to establish a presence in the area after the War of 1812. In 1825, their 300-mile man-made waterway- the Erie Canal- bypassed Lake Ontario by connecting Lake Erie at Buffalo with Albany. At Albany, the canal connected with the Hudson River to carry goods to New York City and its international ports. In 1829 Canadian developers completed the Welland Canal that avoided Niagara Falls and connected Lake Erie to Lake Ontario. The critical link to Lake Superior required navigation of the rapids in the 21-foot drop on the Saint Mary's River between Lakes Superior and Huron. Congress recognized the importance of the connection and granted land to the State of Michigan in 1852 to develop the Saint Mary's Falls Ship Canal at Sault St. Marie. The canal system, also known as the Soo Locks, opened in 1855, completing the final western link in the Great Lakes network.

[12] Faltinson, Brian J. "Split Rock Light Station," National Historic Landmark Nomination. Washington, D.C.: National Park Service, 2008. Page 21.

The vast interconnected lake system boosted the American economy via easier transport of goods and greater access to natural resources. In 1855 $600 million worth of goods passed through the Great Lakes, constituting more than the total value of all of America's foreign trade for that year.[13]

EARLY LIGHTHOUSE ADMINISTRATION AND THE LIGHTHOUSE BOARD

Lighthouses were federal projects. They were part of the first public works administration program established in the United States. President George Washington signed the ninth act of Congress, known as the Lighthouse Act, on August 7, 1789, establishing the federal government's jurisdiction over lighthouses. Secretary of the Treasury, Alexander Hamilton directly supervised the new U.S. Lighthouse Establishment.

Stephen Pleasonton, the Fifth Auditor of the Treasury, oversaw the Establishment beginning in 1820. He held the position until 1852. Under Pleasonton, the nation's lighthouses and their lighting systems declined until they became enormously inferior to those used by other maritime powers. In 1838, Congress attempted to address the deficiencies and divided the Lighthouse Establishment into eight districts with an appointed naval officer to inspect each district.

The attempts to improve the Establishment had little effect. Criticisms of the lighthouse system increased, inspiring Congress in 1851 to appoint an investigative panel of scientists and military officers. The panel's findings of faults, provided in their 760-page January 1, 1852 report, were derogatory and numerous.

Following the examples of the respected lighthouse organizations in England, Scotland, Ireland, and France, the report recommended a nine-member board to oversee daily operations. Pleasonton was promptly replaced by this new Lighthouse Board, which consisted of two Navy officers, two members from the Army Corps of Engineers, two civilians of "high scientific achievement," a Navy Secretary and an Army Secretary. The Secretary of the Treasury was the ex-officio president. The new board began work on October 9, 1852. The stated main mission of the Lighthouse Board was to upgrade the embarrassingly shabby facilities, to build new lighthouses, and to support safe water travel. The Board operated for 58 years from 1852 to 1910.

Lighthouse historian F. Ross Holland Jr. called 1852 "the single most important year in the history of this nation's aids to navigation." In assessing the impact of the Lighthouse Board, Holland wrote, "The board raised the reputation of the United States' lighthouses from the bottom of the heap to the top, and set the establishment on the road along which it has since led the world…"[14]

The Lighthouse Board led a multifaceted transition in technology, professional conduct and facilities. Its work addressed various forms of maritime navigational aids including buoys, light ships, fog signals and harbor lights. Joseph Henry, the first secretary of the Smithsonian Institution (1847-1878), and a member of the Lighthouse Board, chaired the Board's Committee on Experiments. Henry was America's preeminent scientist with a distinguished career as an inventor and professor at Princeton. His pioneering work in electricity and magnetism helped bring about the invention of the telegraph, electric motor, and telephone. Henry's influence was clear in the technical advances implemented at the lighthouses.

The Board immediately set out to replace the inferior Argand lamp and reflector systems in American lighthouses with new Fresnel lenses. A young French physicist named Augustin Fresnel invented the lens in 1822. The Frenchman devised a series of glass prisms surrounding the lamp and arranged in a

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[13] Hyde, Charles K. *The Northern Lights: Lighthouses of the Upper Great Lakes.* Lansing, Michigan: Two Peninsula Press, 1986.Page 15.

[14]Holland Jr., Francis Ross. *America's Lighthouses, An Illustrated History*. New York: Dover Publications, 1988 reprint of 1972 publication. Page ix and Page 37. See also Noble, Dennis Page 87 and Hyde page 31.

configuration resembling a beehive. The lens used only a quarter of the amount of fuel required by the old Argand lamp system and produced a bright beam that easily doubled the 5- to 7-mile visibility range of most of the lighthouses.

Fresnel lenses are classified into seven orders based on focal length. The first order is the largest and has the longest focal length, and is exclusively used on sea coasts. The smallest, or sixth order, is used on pier or breakwater lights. A third and a half order lens was also developed, resulting in seven orders. Three Gulf Coast light towers had third and a half order lenses, but the others in this size category were used only on the Great Lakes on coast and harbor lights.

After 1854, all new light stations used Fresnel lenses. Between 1854 and 1857 the Lighthouse Board refitted 75 existing lights with Fresnel lenses. Five stations on the Great Lakes used the second order. The only second order lens on Lake Superior was installed at the Rock of Ages Lighthouse at Isle Royale. All of the lens manufacturers were French, including Henri (or Henry) LaPaute; Barbier & Fenestre; and Sautter, Lemonier & Cie. Mechanical devices were developed in the 1870s to create the appearance of a flashing light. Charles Hyde noted in a 1986 publication that there were still about 100 Fresnel lenses in use on the Great Lakes.

When the price of sperm whale oil soared in the mid-1800s, the Committee on Experiments tested a number of alternative fuels to power the lights. The Lighthouse Board decided to use whale lard beginning in about 1860. The Board also considered kerosene, but the volatile fluid was not immediately adopted. An 1899 history of the Great Lakes relayed this cautionary tale:

> The great danger attending the use of mineral oils has been known ever since they have been used, and hence their use as an illuminant for lighthouses has been adopted only in recent times, and with great caution. In 1864 the keeper of a lighthouse on Lake Michigan substituted a lamp burning kerosene oil for one burning lard oil. Soon after commencing its use he attempted to extinguish the light by blowing down the chimney; an explosion occurred, and set his clothing on fire. He had scarcely reached the bottom of the stairs when another explosion took place which blew the entire lantern from the tower and destroyed the lenticular apparatus.[15]

After new studies with kerosene, the Board converted to this fuel in 1877. Kerosene required adjustments to the lamp and new storage arrangements to remove the combustible fuel from the designated storage areas in the lighthouse keeper's home, where the lard oil had previously been stored. Lamps were redesigned in the late 1870s and 1880s to burn kerosene. The Board systematically constructed separate oil storage houses at the stations.

Another successful product from France, the incandescent oil vapor lamp, was introduced in 1898. The vapor lamp operates with pressurized kerosene, similar to a Coleman® stove apparatus. It generated brighter lights with no increase in fuel consumption. The first incandescent lamp in America lit the North Hook light in New Jersey in 1904. The Lighthouse Board experimented with electricity but did not adopt it.

Acetylene gas was introduced to power winter lights, smaller beacons and lighted buoys. The gas tank connected to a temperature sensitive valve that closed in the warmth of the day and opened in cold night time temperatures.

[15] J. B. Mansfield, ed., *History of the Great Lakes. Volume I*, Chicago: J. H. Beers & Co., 1899 accessed at www.maritimehistoryofthegreatlakes.ca/GreatLakes

The earliest attempts to warn mariners on foggy days come from booming canons and hand struck bells. Fog signal technology had progressed by 1851 to mechanized fog bells and steam powered whistles – no doubt to the relief of the ears of the lighthouse keepers!

The Committee on Experiments, which worked under the Lighthouse Board, tested steam whistles in the 1860s and settled on a steam locomotive whistle. Coal fired boilers provided the steam, causing a logistics problem. The keeper had to quickly build a large enough fire to generate adequate heat in time to build steam pressure to blow the whistle during a foggy day. Sometimes the fog would be gone before the whistle could blow.

The Great Lakes light keepers faced an additional challenge of sending out fog warnings in smoke laden air. Chicago's calamitous fire in October of 1871 contributed to the dense smoke from frequent fires, mostly logging-related, in the forests of Wisconsin, Michigan and Ontario. Navigation was exceedingly hazardous in the fall of that year. Smoke-choked air plagued the Great Lakes between 1870 and 1918, creating numerous navigational perils.[16] By 1892, the Great Lakes had 56 fog signals including 16 bells and 46 steam whistles.

The Lighthouse Board divided the country into 12 districts with an Army officer as the district engineer and a Navy officer as the inspector. The engineer supervised construction and repair. The inspector oversaw operations, salaries, supplies and personnel. Many of the military officers were seasoned veterans from the Civil War. The Board rearranged the districts into 16 entities in 1886, placing Lake Superior in District 11 along with the Detroit River, Lake St. Clair, the St. Clair River, Lake Huron and the St. Mary's River.

The increasing technological demands required a well-trained crew of lighthouse keepers. The old patronage system of appointment gave way to independent hiring. The Board emphasized the professional status of the keeper's position and produced prolific written instructions for keepers. In 1885 the Board introduced uniforms for male keepers.

The "Light List," an informative annual summary of lights was published for mariners, standardized color schemes for buoys were developed and other consistent standards were adopted to ease the navigational challenges of the mariner.

The Lighthouse Board assumed design, construction, and maintenance duties for their facilities, a function that had previously been contracted out. As part of their new responsibilities, the Board purchased the *Challenge* in 1856 for $6,250. The first federally owned tender on the Great Lakes, the 120-ton schooner wrecked in 1857 near Isle Royale, was repaired and returned to service as the *Lamplighter*.

The *Amaranth* (commissioned in 1891 and serving until 1945) and the Superintendent's tender *Marigold* (commissioned 1890 and serving until 1945) were the Board's regular tenders in the Apostle Islands.

New lighthouse designs were developed, reviewed and approved by the Board. The earliest simple buildings with attached towers were constructed of wood, stone, or brick. They gave way to more elaborate keepers quarters and detached taller towers. Successful designs were repeated at various locations. In the 1870s a number of tower designs incorporated decorative architectural elements, such as arched windows, corbels and window trim, suggesting a sort of Italianate aesthetic. Many of these towers were designed while Major Orlando Poe served in administrative posts for the Board. Poe is credited with introducing the

[16] Mannikko, Nancy Farm and Robert W. Mackreth. "Apostle Islands Light Stations," National Historic Landmark Nomination—Draft. N.D.

concept of the lighthouse as a stately governmental structure representing more than just a utilitarian function.[17]

Under the stewardship of the Lighthouse Board (1852–1910), America's lighthouse inventory grew from 331 to about 4,000. In 1852 there were 76 lighthouses on the Great Lakes. By 1900 there were 334. Lake Superior did not have a lighthouse until Whitefish Point and Copper Harbor were completed in 1848-1849. That was soon to change.

SETTLING WESTERN LAKE SUPERIOR

In 1855, the Soo Locks opened access to Lake Superior, and to the incredibly rich bounty of natural resources on the lands around the lake. While the fur trade had waned in the 1830s, mineral survey reports in 1841 confirmed common knowledge about the potential for copper and iron mining, followed by discoveries of iron deposits in 1844. Enterprising mining companies tried to function without the passage out of the Lake. In 1845 the *Independence* was portaged around the St. Mary's River falls to be used on Lake Superior to ship copper. Eight years later the Cleveland Iron Mining Company portaged their first 152 tons of iron ore the opposite direction on its way to Pennsylvania.[18]

The potential mineral development spurred on federal actions to gain control of the land around Lake Superior. Treaties negotiated with the Ojibwe in 1837, 1842 and 1854 pushed the Ojibwe population west. Many moved to the Bad River and Red Cliff reservations. Wisconsin became a state in 1848.

Well before the locks opened, speculators raced to locate Lake Superior's western port. It was clear that the powerful network of commerce and shipping on the Great Lakes would extend west to the newly developing areas of the United States. The new port would link rail and water transportation systems and provide great development opportunities. An enterprising developer could buy government land at $1.25 an acre and subdivide and resell for fabulous returns.[19] The risk was in predicting where the successful town would be. The speculators rushed to the two natural port locations with the greatest potential. One location incorporated St. Louis and Superior Bays, which were protected by an offshore bar. The Superior Bays site was the ideal point for a railroad connection from and to the west.

The other likely port was in Chequamegon Bay, which was sheltered by the Apostle Islands. Chequamegon Bay had three suitable locations for a port at the present locations of Ashland, Washburn, and Bayfield. The future Ashland location had some topographic constraints but was close to the known iron ore sources in the Penokee Range. The site that would be Bayfield offered deep water, a desirable feature for large boats. The Washburn harbor site was deep, sheltered, and with ample level land. Chequamegon Bay also already had the thriving small community of La Pointe.

Investors scrambled to establish their claims. The town of Superior somehow emerged first, in 1853, in spite of the battles between three hastily formed investor groups who were all fighting to claim the first and best town site. The three warring factions included 18 men of which seven were members of Congress and the others were wealthy politicians and lawyers from Washington, D.C. The town of Oneota followed in 1854. Oneota eventually consolidated with several other small towns into the city of Duluth. At the same time, two separate partnerships platted two towns on Chequamegon Bay. Whittlsey and Bay City (which

[17] Mannikko, Nancy Farm and Robert W. Mackreth. "Apostle Islands Light Stations," National Historic Landmark Nomination—Draft. Bayfield, WI.: Apostle Islands National Lakeshore, n.d.
[18] Portage information from Faltinson, Brian J. "Split Rock Light Station," National Historic Landmark Nomination. Washington, D.C.: National Park Service, 2008.Pages 24-25.
[19] Larson, Lars. "Chequamegon Bay and its Communities; Ashland Bayfield LaPointe; A Brief History 1659-1883." Whitewater, Wisconsin: University of Wisconsin, 2005. Page 82.

would merge to become Ashland) were located about 1 mile apart. Minnesota Senator Henry Rice, who was involved with the gang of 18 who established Superior, organized another group of east coast investors to plat and create Bayfield in 1856.

In three short years at least five communities had formed to vie for the coveted western port of Lake Superior. Although La Pointe was an established community with historic roots in the French, English, and American fur industry, it was on an island (Madeline Island) and lacked access to overland connections and to the extensive natural resources on the mainland. It lost out in the speculative town boom, but bustled as the supply center for the three fledgling communities in Chequamegon Bay.

On February 8, 1851, Wisconsin Senator Orasmus Cole requested and received a Congressional appropriation of $5,000 to build a lighthouse at La Pointe on Madeline Island.[20] The Congressman could hardly have known his request was the first in a series of navigational aids that would guide traffic through and around the Apostle Islands on the way into Chequamegon Bay.

By 1853 a survey and the related title work had been initiated for the lighthouse site, but the Lighthouse Board's District Inspector, Captain Lorenzo Sitgreaves, nixed the La Pointe location in favor of a position on nearby Long Island. A series of mix-ups ensued and the first lighthouse in the Apostle Islands ended up on Michigan Island. The light station included the keeper's quarters with an attached tower, a privy, and a woodshed. The Michigan Island light operated during 1857, before it was replaced by a new station constructed where Sitgreaves required on Long Island.

The Long Island lighthouse (known as the LaPointe lighthouse) was lit in 1858. It was a wood-framed house with a square wood tower projecting from the roof. Another lighthouse was proposed in 1859 for Raspberry Island. This light would guide westbound vessels passing Bayfield, and eastbound vessels searching for the safe route between Bear and York islands as they headed into the channel around the mainland to Bayfield. The Raspberry Light Station was placed in service in 1863. Neither light station saw much traffic in its first years. The national financial panic of 1857, followed by the Civil War, drained the region of its population. By 1863, only one family lived in the Bay City-Ashland (newly renamed from Whittlsey) area. There were 250 people living in Bayfield in 1865.[21]

People returned to the bay after the Civil War. In some ways, they picked up right where they left off, banking on the expectation that the area's rich natural resources would soon create a boom. Railroads had not yet reached northern Wisconsin, so exports were primarily products located close to the water, including locally quarried brownstone and timber. Fish were also a major commodity. As other commerce on the lake developed and exports grew, increasing ship traffic from the east prompted a request in 1868 for a new navigational aid on Outer Island and for the relighting of the Michigan Island light in 1869.

Boats traveling in and out of Duluth passed north of the Apostle Islands. Outer Island marked a turning point for this major shipping route and also presented a potentially dangerous complication caused by the shallow Outer Island shoal. The shoal extended more than 1 mile north of the island and could ground the ship of an inattentive captain. The Wisconsin Legislature first requested a lighthouse on Outer Island in 1868 noting "This *(island)* is the easternmost of a dangerous group of islands lying off a point right on the course of vessels bound in and out of the important and much frequented harbor of Superior…" Their request was made more urgent when a rail line was completed from St. Paul to Duluth in 1870, connecting inland freight and passengers to the lake. District Engineer Orlando Poe added to the argument in an 1871 letter requesting the lighthouse.

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[20] Pepper, Terry. Lighthouses of Lake Superior website www.terrypepper.com/lights/superior

[21] Busch, Jane C. "People and Places: A Human History of the Apostle Islands; Historic Resource Study of Apostle Islands National Lakeshore" Bayfield: Apostle Islands National Lakeshore. 2008.
Pages 18-19.

Congress would not be convinced until 1873 when it provided the appropriation and construction began. Work was completed in the fall of 1874. Construction was plagued by mistakes and bad weather. Eight days after the first lighting of the lamp, a storm washed the boat dock away. Two days later, another storm washed the bank away and the new shoreline came within 8' of the new fog signal building. This first fog signal building in the Apostle Islands went down in a landslide in November within weeks of the first whistle blast. A new signal building went up the next year. Six years later – on October 16 and 17, 1880 – the lighthouse keeper wrote in his log of the fiercest storm he had ever seen on the lake. The light tower "…swayed like the top of a tree," and the boat dock was entirely washed away again.

The light proved its worth for the steadily increasing lake traffic. In 1878 Ashland counted 405 steam and sail boat visits. The 1870s and 1880s were accelerated growth years for the Chequamegon Bay, instigated by the long awaited arrival of the railroads. The Wisconsin Central Railroad connected to Ashland in 1877, followed by two other railroads in 1884 and 1885. Bayfield finally got a railroad connection in 1883, but only after the Chicago, St. Paul, Minneapolis & Omaha Railroad founded the town of Washburn 20 miles away and built its terminal there. Bayfield could only watch as Washburn soon acquired a grain elevator, coal dock, merchandise dock, and three sawmills. On the water, during the 1880s, another kind of "iron horse," the steam driven steel-hulled ship, gradually replaced the older wood and iron steamers and sailing vessels.

Historian Jane Busch provides an illustration of the activity in the Chequamegon Bay at the time.

> Travel between the towns, light stations, logging camps, and quarry camps of the Apostle Islands and Chequamegon Bay was mainly by water. There was no choice, of course, for travel to the islands, but people also preferred to travel by boat between Ashland and Bayfield in lieu of a slow and bumpy wagon ride. Small sailboats known as Mackinaw boats were the most common local watercraft, and they provided transportation service until steam-powered tugboats arrived in the 1870s. Steam tugs were faster, more reliable, and more powerful than sailboats, able to tow a barge of brownstone or a raft of logs as well as carry passengers...there were several steam tugs operating on the bay, providing regular ferry and freight service between Bayfield and Ashland and somewhat less regular service to La Pointe…In 1884 and 1885 two more railroad lines were completed to Ashland… By then there were five sawmills operating in Ashland, which rivaled Duluth-Superior as the leading port on Lake Superior.[22]

The statistics are impressive. In 1883 the Chequamegon Bay ports shipped out more than 63 million board feet of lumber.[23] Bayfield, the leading fishing port on Lake Superior, welcomed A. Booth and Sons of Chicago in 1885 when Bayfield and Ashland's combined catch for the year was 3,159,500 pounds. That total was 35.7% of the 8,825,980 pounds caught that year on Lake Superior.[24]

An attractive reddish-brown brownstone, known as brownstone, was quarried on the islands and the mainland. About 70 quarry companies operated in the Lake Superior region between the 1880s and the early 1900s.[25] Tourists flocked to the resorts along the bay and in the Apostle Islands. Madeline Island's economy benefited from tourism and from newcomers building vacation cottages and resorts.

As more and more ships entered Lake Superior concern mounted over the safety of the route around Sand Island and near the very shallow waters created by a ridge extending south of the island. In 1871, the

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[22] Busch, Jane C. "People and Places: A Human History of the Apostle Islands; Historic Resource Study of Apostle Islands National Lakeshore" Bayfield: Apostle Islands National Lakeshore. 2008. Page 20.
[23]Larson, Lars. "Chequamegon Bay and its Communities; Ashland Bayfield LaPointe; A Brief History 1659-1883." Whitewater, Wisconsin: University of Wisconsin, 2005.Page 186.
[24]Busch, Jane C. "People and Places: A Human History of the Apostle Islands; Historic Resource Study of Apostle Islands National Lakeshore" Bayfield: Apostle Islands National Lakeshore. 2008. Pages 20, 165 and 177.
[25] Eckert, Kathryn Bishop. *The Sandstone Architecture of the Lake Superior Region.* Detroit: Wayne State University Press, 2000. Pages 12-13.

Lighthouse Board, upon recommendation from Major Orlando Poe, requested a new light on the north tip of the island to guide traffic away from the danger. It took nine years for the Board to convince Congress of the need for the appropriation, but the lighthouse was finally built in 1881. The Board selected a popular design already used at other brick lighthouses on the Great Lakes. Instead of constructing the house of brick; however, the builders employed brownstone quarried on the island, resulting in an unusual, cost-effective, and very attractive variant of the design.

Devils Island, located at the northernmost extent of the Apostle Islands was another important navigational point. The influential Cleveland Vessel Owners Association requested a lighthouse at this critical navigation point marking the northwestern edge of the Apostle Islands, and the Lighthouse Board fully agreed. Congress approved the requested appropriation in 1889, and added $5,500 for a fog signal the next year. The Lighthouse Board quickly realized it had sorely underestimated the costs to build on such a distant island with difficult landing and site conditions. The Board ended up constructing the station in phases, installing a temporary wood tower until funds could be appropriated to build an iron one. The light in the wood tower was lit in 1891. The permanent iron tower was lit in 1901.

In the 1890s, Ashland's port rose to prominence. It was in the top three shipping ports on Lake Superior in the early 1890s.[26] The other Chequamegon communities saw heavy shipping traffic too. In 1892-1893, the Bayfield area had more than 19 logging companies that cut more than 108 million board feet.[27]

The following list of shipments from Ashfield in 1892 provides an idea of the nature and quantities of exports pouring from the area:

Iron Ore	2,227,407 tons
Lumber	285,000,000 board feet
Brownstone	460,000 tons
Pig Iron	40,000 tons
Grain and Flour	200,000 barrels
General Merchandise	10,000 tons
Brick	1,500,000 units

The same year, *The Ashland Daily Press* reported 7,104 arrivals and departures from the docks, a 41% increase over the 1891 totals. The numbers are particularly impressive considering there was no shipping traffic for the three to four months in each year when the lake is frozen.

Iron ore soon quickly became a major component of the local shipping economy. The iron ores in the Gogebic Range were first mined in 1884. Once the railroad arrived, the iron mines began transporting huge quantities of iron ore that unloaded onto waiting ships at the enormous ore docks in Ashland. The first rail shipments to Ashland in 1885 totaled an unremarkable 119,563 tons, but output quickly increased to a little less than two and a quarter million tons in 1892 or 26% of all iron ore shipped from Lake Superior's ports for that year.[28] With little to no charcoal available to smelt and reduce the ore at the mine site, the raw material required maximum capacity freighters for transport. The ore docks were also sized to accommodate large loads. In 1889 the U.S. Army Corps of Engineers constructed a massive breakwater to protect the docks. Over the years, it became clear to the Lighthouse Board that the boats negotiating Madeline, Stockton, and Michigan islands en route to Ashland could barely see the light from the

[26] *Ashland Daily Press* 1892 annual report on commerce; see also M Mansfield, J.B. ed. *History of the Great Lakes. Volume I.* Chicago: J. H. Beers & Co., 1899. Accessed at www.maritimehistoryofthegreatlakes.ca/GreatLakes.; and Busch, Jane C. "People and Places: A Human History of the Apostle Islands; Historic Resource Study of Apostle Islands National Lakeshore" Bayfield: Apostle Islands National Lakeshore. 2008.
[27] Bayfield Heritage Association exhibit material. September 2009.
[28] M Mansfield, J.B. ed. *History of the Great Lakes. Volume I.* Chicago: J. H. Beers & Co., 1899. Accessed at www.maritimehistoryofthegreatlakes.ca/GreatLakes.

diminutive tower on Long Island. The Lighthouse Board made plans to replace the tower with lights at the east and west ends of the island. The eastern light was known as the LaPointe Light Tower, named after the first lighthouse request made more than 40 years earlier. The Lighthouse Board lobbied for five years from 1890 to 1895 until Congress finally agreed to fund the new lights. Both lights went into service in the fall of 1897. The old wood lighthouse was remodeled to remove the tower and expand the interior. It continued to serve as a keeper's quarters.

The new navigational aids marked the beginning of economic changes in the early 1900s. After about 75 years of logging, the mainland was exhausted of stands of pine and logging shifted to hemlock and hardwoods. Many large logging corporations moved away to other regions. Local smaller scale producers worked around Bayfield and on some of the Apostle Islands. The Schroeder Lumber Company of Milwaukee was one of the larger scale logging companies. The company established a logging operation on Outer Island. The lumber company purchased the timber rights in 1920, and logging began in 1924. The last year the company worked on the island was 1930, when 225 men cut six million board feet of timber.[29] Schroeder purchased land on Michigan Island, and logged from 1919 to 1923.

Popular tastes in architecture shifted away from the styles that had incorporated the local brownstone, and the demand withered away. Most of the brownstone quarries were closed by 1900.

Fishing, however, maintained a strong place in the local economy and in the economy of Lake Superior. The Bayfield and Ashland combined fishing total for 1903 was 4,783,566 pounds which was 36% of the total amount produced in the United States from Lake Superior that year.[30]

Iron ore increased its dominance at the ports as other natural resource production declined. Ore from the Gogebic and Penokee ranges was sent east from Ashland to supply American industry. Large quantities of iron ore from the Mesabi Range were shipped from Duluth and Superior. In 1910 the iron shipped across Lake Superior accounted for 70% of the United States iron production, and all of it was transported by boat.[31] While Ashland never reached the primary port status of Duluth, it remained a busy and integral port with vital connections to the iron mines. By 1906, Ashland recorded over 2,000 arrivals and departures in one year, averaging more than eight vessels a day during the shipping season.

In 1915, the Ashland Breakwater Light was installed to guide the ore ships around the breakwater structures. This light was one of the early projects of the newly reorganized federal lighthouse administration.

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[29] Busch, Jane C. "People and Places: A Human History of the Apostle Islands; Historic Resource Study of Apostle Islands National Lakeshore" Bayfield: Apostle Islands National Lakeshore. 2008. Page 229.
[30] All fishing statistics in this section from Busch, Jane C. "People and Places: A Human History of the Apostle Islands; Historic Resource Study of Apostle Islands National Lakeshore" Bayfield: Apostle Islands National Lakeshore. 2008. Pages 176-178.
[31] Hyde, Charles K. . United States Coast Guard Lighthouses and Light Stations on the Great Lakes. National Historic Landmark Nomination. Washington, D.C.: National Park Service, 1979. Item 8 page 1.

Photograph courtesy of Jack Armstrong
Trains dumped their load into chutes that loaded into waiting freighters at the Ashland ore docks. The first ore docks were installed in 1885. These are the third docks and were constructed in 1915-1917. Over a billion tons of iron ore was shipped from this dock during World War II. The last iron ore shipment was in 1965. The docks are scheduled for demolition.

THE LIGHTHOUSE BUREAU TAKES CONTROL

By the end of the 19th century, the Lighthouse Board had turned a marginally adequate public works administration into an advanced, professional system. The system, however, grew beyond its capacity and began to experience administrative problems. In 1910 the nine-member Board was replaced by an administrative department called the Bureau of Lighthouses and placed under the new (created in 1903) Commerce Department. A civil engineer named George R. Putnam was hired as the first director. Putnam substantially increased civilian personnel and improved their working conditions. In 1916 there were 92 lighthouse service employees over the age of 70, and 24 employees with more than 40 years of service. Putnam implemented the first pension program for lighthouse keepers in 1918. He also oversaw a barrage of technical improvements. Under Putnam, in 1924, the U.S. lighthouse system would become the largest in the world with more than 16,800 aids to navigation.[32]

An officer from the Army Corps of Engineers continued to advise each district, but the character of the new bureau changed from military to civilian. The extensive technological changes eventually led to automation and eliminated the need for the people for whom Putnam had so prudently developed a pension program.

In about 1900, a Canadian company developed the diaphone signal in which diesel powered engines drove air compressors that emitted a loud single or two tone “wahhh.” The Bureau bought the rights to manufacture the diaphones in the United States in 1914 and built them in New Jersey. By 1925, 104 of the 127 fog signals on the Great Lakes were gasoline or diesel powered. Most of the others were bells. In 1929

[32] Hyde, Charles K. *The Northern Lights: Lighthouses of the Upper Great Lakes.* Lansing, Michigan: Two Peninsula Press, 1986. Page 31.

the Bureau developed a "diaphragm signal" that sounded like a diaphone but was cheaper to build and repair.

A more sophisticated "blind" signal, the radio beacon was introduced to lighthouses in 1921. The beacon sent out an identification signal in Morse code alerting ships of the beacon's location. Of course the ships also had to be modernized to be equipped with radio receivers. An experimental radio beacon was installed in a lighthouse in 1917. After further tests, radio beacons were installed, beginning in 1921.[33] The first radio beacon on the Great Lakes was on a light ship on Lake Huron (commissioned June 12, 1925) at which time there were 12 others in use in the United States. A second radio beacon quickly followed that same year at Devils Island. About 200 radio beacons operated in the late 1920s and into the 1930s. The radio beacon helped improve America's ranking from sixth to second in shipping safety from 1920 to 1935. Only the Netherlands had a better safety record.[34]

New innovations moved the lighthouses toward an inevitable automation. Two power sources, gas and electricity, provided the tools. The Bureau expanded on the acetylene gas systems introduced under the Lighthouse Board. Writing in his 1917 book, Putnam said that in the Great Lakes, "…automatic lights are now left burning at certain of the stations when the keepers are taken off about December 10, with sufficient gas supply so that the lights will burn two weeks."[35] This system was particularly applicable to the light stations of the Apostle Islands where the keepers left in December just before the lake froze over.

Electricity took a little longer to get established. Although electricity was used to light the torch of the Statue of Liberty in 1886, the light was not considered satisfactory and the concept of electric light remained unchampioned until sometime between 1915 and 1920. Power lines were more widespread after 1920 rendering it easier and less expensive to use electric lighting. Most of the remote lighthouses used generators in the 1920s and 1930s.

Timers for the lights and a rotary lamp changer that held two 1,000-watt lamps (bulbs) reduced the need for a constant keeper's vigil at the lighthouse. By the 1930s, fog signals driven by electricity and activated by remote control eliminated another excuse to employ a full-time keeper. On the Great Lakes, 68 major and 45 minor lights had electricity in 1925.

New lenses were designed for the electric powered lamp. While the older Fresnel lenses could be and were adapted to electricity, new lenses were installed beginning in the early 1920s. One of the more common designs encased the electric lamp in a glass lens, which also served as the lantern. Another design mimicked those used on train locomotives. On the Great Lakes, by 1925, there were 276 of these newer lenses and 193 Fresnel lenses.

One final major light station installation occurred in the Apostle Islands under the Lighthouse Bureau, but the Lighthouse Board had started the plans for the station well before the reorganization. The Lighthouse Board saw the increasing need to update the dated navigational aids at Michigan Island. The practically antique 1857 vintage light tower and the lack of a fog signal led the Board to lobby for new equipment and technology. The Board began a campaign in 1908, noting the 65-foot-tall light tower on Michigan Island was not visible to the lake traffic to the north. Charles Keller, the Lighthouse District Engineer, recommended a new light and fog signal be built at a new location on the island. The local *Bayfield County Press* repeated this desire in a 1908 article.

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[33] Hyde, Charles K. *The Northern Lights: Lighthouses of the Upper Great Lakes.* Lansing, Michigan: Two Peninsula Press, 1986. Page 44.
[34] Clifford, Candace, ed. "Light Stations of the United States" National Register Multiple Property Documentation Form. Washington, D.C.: Department of the Interior, 2002. Page 12.
[35]Putnam, George R. *Lighthouses and Lightships of the United States.* Boston: Houghton Mifflin Company, 1917. Page 134.

The Lighthouse Board deliberated over placing a tower on nearby Gull Island, and eventually settled on a plan to build a new station on Michigan Island at an estimated cost of $100,000. It took 20 years of annual requests before Congress finally appropriated enough money for a new station. The Lighthouse Bureau took over the crusade in 1910. In 1918, the Bureau acquired the 112-foot-tall cast iron skeletal tower from Schooner Ledge on the Delaware River. Drawing on the newest emerging technology, the Bureau incorporated the tower into a revised proposal to install a radio beacon on Michigan Island and an unmanned acetylene powered light on Gull Island in lieu of the original scheme.

The radio beacon at Michigan Island would be the third one in the Apostle Islands, following the installation at Devils Island and another installation at Long Island in 1927. The acetylene gas light had been in use with limited applications since about 1915. One was installed at the Sand Island station in 1921. Seven years later a second acetylene powered winter light was lit, this time on Devils Island.

The revised estimated costs for the new Michigan Island plan came to $85,000 for the light tower, beacons and support buildings for the light station. Congress approved the revised plan and construction officially began in 1928. However, based on the keeper's logs, the wood-framed Assistant Keepers Quarters and Workshop was built in 1927, two years before the recycled Schooner Ledge Light Tower was moved from storage on the island and installed at the station. At 112' tall, this Tower is the tallest in the Apostle Islands. A new brick Power House that also housed the radio beacon equipment was also constructed in 1929. A new brick Keepers Quarters completed the 1929 additions in spite of what appeared to be a trend toward automation.

In the 1920s lighthouse technology was in a state of flux, as new technologies slowly replaced older ones. In addition to the acetylene and radio beacon devices, new diaphones replaced the old steam powered fog signal whistles at the Long Island light station in 1925, followed the next year at Devils Island. Outer Island, the site of the oldest fog signal in the Bay, replaced its steam whistle with a diaphone in 1929.

Radio communications between the Apostle Islands light stations improved in the 1930s with the development of an intra-island radio system and radio telephones. Electricity was very late in coming to the remote light stations. A diesel powered generator was installed on Devils Island in 1928. Michigan Island had power generated from the new 1929 power building. The Lighthouse Bureau tried out a battery powered winter light on the LaPointe Light Tower in 1934. In 1937, electric lights were installed in both of the Long Island towers. Outer Island electrified the rotating mechanism for the light in 1939 and electrified the light and fog signal system in 1942.

Many of these technological changes occurred in spite of the economic hardships of the Great Depression. The local economy, which had relied so much on demands for the natural resources of the region, declined. Local community leaders sought new ways to boost the economy, including a plan to develop a national park in the Apostle Islands. Harlan Kelsey visited the area on assignment for the Park Service in 1930 to assess the potential for a park. Kelsey's report described depleted lands desecrated by logging and forest fire and recommended against establishing a park. The Park Service closed the investigation.

THE COAST GUARD AND A RETURN TO THE TREASURY

As part of President Franklin D. Roosevelt's Reorganization Act of 1939, the Lighthouse Bureau duties were transferred to the Coast Guard. The Coast Guard operated under the Treasury Department, so after 36 years under the Commerce Department the administration of lighthouses returned to its original designation under the Treasury. The Coast Guard inherited a New Deal project begun under the Lighthouse Bureau on Long Island. The Public Works Administration funded a new Keepers Quarters (a triplex) and a boat dock, built between 1938 and 1941. The old Keepers Quarters was abandoned.

After a brief absorption into the Navy during World War II, the Coast Guard returned to the Treasury. The Great Lakes became the Ninth Coast Guard District. The Coast Guard worked to modernize and automate stations, including the Chequamegon Bay light stations. Sand Island had already been automated in 1921. Michigan Island was next in 1943. Outer Island was automated in 1961, followed three years later by the LaPointe Light Tower at Long Island. Devils Island served as the work center for the Coast Guard, so it was the last light station in Chequamegon Bay to be automated in 1978. By 1965, only 80 manned light stations remained in the Great Lakes. The last manned stations on the Great Lakes were Point Betsie, Michigan and Sherwood Point, Wisconsin. These stations were fully automated in 1983.

The only remaining lighthouse with official keepers is the Boston Harbor Light Station. Reflecting America's strong ties to its lighthouse history, Congress passed an act stating that this station, the oldest light station in the country, would be permanently staffed.

Except for iron mining, the Chequamegon Bay's natural resource extraction and shipping-based economy was gradually replaced by commercial fishing and tourism, supplemented by agriculture. Lake Superior iron mines produced as much as a third of American iron production up to World War II. The last shipment of ore left the Ashland ore docks in 1965. Fishing remained important to the economy until the sea lamprey, an exotic species, destroyed the Lake Superior fishing industry in the 1950s. The fishery is still in recovery.

Tourism and outdoor recreation advocates for the Apostle Islands joined conservationists to help raise awareness of the unique qualities of Chequamegon Bay. On September 26, 1970, President Richard Nixon signed a bill establishing the Apostle Islands National Lakeshore. Long Island, which had been left out of the original boundaries, was included by a bill signed by President Ronald Reagan on October 17, 1986.

Although they are automated, the light stations are all still in use, mostly using solar powered optics. The frequency of the traffic that they guide is much reduced and changed in character as natural resource extraction has been replaced by tourism. Today's boat traffic includes motorized craft, sailboats and kayaks accommodating recreationalists and fishermen and women.

The lighthouses of the Great Lakes sparked joy for lighthouse historian F. Ross Holland. "I was continually surprised," he wrote in *Great American Lighthouses*. "What a unique treasure trove of lighthouses the region has." The lighthouses served a vital function. We are fortunate to still see their lights today.

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GLOSSARY OF TERMS

PRIMARY TREATMENT APPROACH – PRESERVATION
Preservation standards include measures necessary to sustain the existing form, integrity, and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. Preservation requires the retention of the greatest amount of historic fabric, including the landscape's historic form, features, and details as they have evolved over time. Limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work is permitted.

HOW TERMINOLOGY IS USED IN THE PRESERVATION APPROACH

Maintain – are those standard maintenance practices that are necessary to retain the features of a property as a contributing resource. Maintenance activities are usually not classified as repair, however minor repair such as replacement of posts or railings or segments of paving are included. Limited and sensitive upgrading of building systems (mechanical, electrical, plumbing) and other code related work is appropriate.

Plant – the removal and replanting of landscape plantings and vegetation as part of maintenance activities

Protect – short term and minimal measures used to stabilize and protect features, such as fencing around landscape features

Relocate – the removal and resetting of noncontributing features

Remove – the removal of nonhistoric features

Repair – features, components of features and materials that require additional work. These may include declining building features (e.g., roofing, foundation, mechanical systems) structures, small scale features (e.g., repair of a railing) or landscape plantings (e.g., repair mass planting by adding infill plantings). Features that are repaired will match the old in design, color, texture, and if possible, material. Distinctive features that are repaired will match the old in design, color, texture, and if possible, material. Replacement work will only occur when historic fabric is deteriorated beyond repair. Evaluation of restoration and low-impact options must be exhausted before replacement is considered feasible.

Retain –are those actions that are necessary to allow for a feature (contributing or noncontributing) to remain in place in its contributing current configuration and condition. Retention of historic fabric is the primary tenet for preservation treatment of historic properties. The extent of historic fabric represents historic integrity which is fundamental to the recognition and status of historical development.

Stabilize – immediate measures (more than standard maintenance practices) are needed to prevent deterioration, failure, or loss of features.

PRIMARY TREATMENT APPROACH – REHABILITATION
Rehabilitation in intended to return a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values. Rehabilitation allows for repairs, alterations, restoration of missing features, and additions necessary to enable a compatible use for a property as long as

the portions or features which convey the historical, cultural, or architectural values are preserved. Limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work is permitted.

HOW TERMINOLOGY IS USED IN THE REHABILITATION APPROACH

Maintain – are those standard maintenance practices that are necessary to retain the features of a property as a contributing resource. Maintenance activities are usually not classified as repair, however minor repair such as replacement of posts or railings or segments of paving are included. Limited and sensitive upgrading of building systems (mechanical, electrical, plumbing) and other code related work is appropriate.

Plant – the removal and replanting of landscape plantings and vegetation as part of maintenance activities or the restoration of missing features.

Reestablish – are those measures necessary to depict a landscape feature as it occurred historically. Reestablishment may include the replacement of missing landscape features such as views, planting patterns, spatial relationships, or small scale features.

Relocate – remove and reset noncontributing features

Remove – removal of nonhistoric features

Repair – features, components of features and materials that require additional work. These may include declining building features (e.g., roofing, foundation, mechanical systems) structures, small scale features (e.g., repair of a railing) or landscape plantings (e.g., repair mass planting by adding infill plantings). Features that are repaired will match the old in design, color, texture, and if possible, material. Distinctive features that are repaired will match the old in design, color, texture, and if possible, material. Replacement work will only occur when historic fabric is deteriorated beyond repair. Evaluation of restoration and low-impact options must be exhausted before replacement is considered feasible.

Restore – are those measures necessary to depict a feature or area as it occurred historically. Restoration may include repair of a feature so that it appears as it did historically or it may include replacement of missing features or qualities. Restoration is undertaken when a “period of significance” is determined and that period of significance (original construction or a succeeding period representing a continuum of change for the property) becomes a project goal. Restoration is only recommended when restorative details can be substantiated by documentary and physical evidence. Without indisputable evidence restorative work risks conjectural decision making, leading to inaccurate and inappropriate historical appearance. Restoration must avoid the creation of a false sense of historical development.

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Stabilize – immediate, more extensive measures (more than standard maintenance practices) are needed to prevent deterioration, failure, or loss of features.

PRIMARY TREATMENT APPROACH – RESTORATION

Restoration standards allow for the accurate depiction of a property as it appeared at a particular time in its history by means of the removal of features from other periods in its history and reconstruction of missing

features from the period of significance. The limited and sensitive upgrading of systems (mechanical, electrical, plumbing) and other code related work is appropriate.

HOW TERMINOLOGY IS USED IN THE RESTORATION APPROACH

Maintain – are those standard maintenance practices that are necessary to retain the features of a property as a contributing resource. Maintenance activities are usually not classified as repair, however minor repair such as replacement of posts or railings or segments of paving are included. Limited and sensitive upgrading of building systems (mechanical, electrical, plumbing) and other code related work is appropriate.

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Stabilize – immediate, more extensive measures (more than standard maintenance practices) are needed to prevent deterioration, failure, or loss of features.

CONDITION ASSESSMENT DESCRIPTION LEVELS
Feature Condition Definitions
(Note: These terms are also applied to the overall structure/building.)

GOOD The feature is intact, structurally sound and performing its intended purpose. The feature needs no repair or rehabilitation, but only routine or preventive maintenance.

FAIR The feature is in fair condition if either of the following conditions is present:
- There are early signs of wear, failure or deterioration though the feature is generally structurally sound and performing its intended purpose – or –
- There is failure of a portion of the feature.

POOR The feature is in poor condition if any of the following conditions is present:
- The feature is no longer performing its intended purpose – or –
- Significant elements of the feature are missing – or –
- Deterioration or damage affects more than 25% of the feature – or –
- The feature shows signs of imminent failure or breakdown.

UNKNOWN Not enough information is available to make an evaluation.

RATINGS OF TREATMENT SEVERITY
An impact is a detectable result of an agent or series of agents having a negative effect on the significant characteristics or integrity of a structure and for which some form of mitigation or preventative action is possible. The assessment should include only those impacts likely to affect the structure within the next five years.

The Level of Impact Severity and their definitions are given below. For all levels, except UNKNOWN, two criteria are given. At least one of the criteria must be met for the declared Level of Impact Severity.

SEVERE 1. The structure/feature will be significantly damaged or irretrievably lost if action is not taken within two (2) years.
2. There is an immediate and severe threat to visitor or staff safety.

MODERATE 1. The structure/feature will be significantly damaged or irretrievably lost if action is not taken within five (5) years.
2. The situation caused by the impact is potentially threatening to visitor or staff safety.

LOW 1. The continuing effect of the impact is known and will not result in significant damage to the structure/feature.
2. The impact and its effects are not a direct threat to visitor or staff safety.

UNKNOWN Not enough information is available to make an evaluation.

DEFINITIONS OF TERMS

A

AAS: Atomic Absorption Spectroscopy

AC: Alternating current; the movement of current through an electrical circuit that periodically reverses direction. Alternating current is the form of electric power that is delivered to businesses and residences.

ACM: Asbestos-Containing Material

Accessibility: a term used to describe facilities or amenities to assist people with disabilities and can extend to Braille signage, wheelchair ramps, elevators/lifts, walkway contours, reading accessibility, etc. According to its website, the Park Service is "committed to making all practicable efforts to make NPS facilities, programs, services, employment, and meaningful work opportunities accessible and usable by all people, including those with disabilities. This policy reflects the commitment to provide access to the widest cross section of the public and to ensure compliance with the Architectural Barriers Act of 1968, the Rehabilitation Act of 1973, the Equal Employment Opportunity Act of 1972, and the Americans with Disabilities Act of 1990. The Park Service will also comply with section 507 of the Americans with Disabilities Act (42 USC 12207), which relates specifically to the operation and management of federal wilderness areas. The accessibility of commercial services within national parks are also covered under all applicable federal, state and local laws." (Source: http://www.nps.gov/aboutus/eeo.htm)

AES-ICP: Atomic Emission Spectroscopy – Inductively Coupled Plasma

AIHA: American Industrial Hygiene Association

Air Terminal: A rod that extends above a surface to attract lightning strikes.

AL: Action Level

B

Beam*:* a structural member, usually horizontal, with a main function to carry loads cross-ways to its longitudinal axis.

Branch Circuit: Insulated conductors used to carry electricity to an associated device or devices that originate from a single circuit breaker.

BTUH: British Thermal Unit per Hour; A traditional unit of energy.

BX Cable: Cable with flexible steel armored outer tube with individual copper conductors insulated with rubber and covered with a cotton braided sheath.

C

Cantilever: refers to the part of a member that extends freely over a beam or wall, which is not supported at its end.

Cast Iron: a large group of ferrous alloys that are easily cast. Cast iron tends to be brittle and is resistant to destruction and weakening by oxidation. The amount of carbon in cast irons is 2.1 to 4 wt%.

CFR: Code of Federal Regulation

Cistern: An underground receptacle for storage of liquids, usually water.

Clay Sewer: Sewer pipe made from vitrified clay that is highly resistant to corrosion.

Column: a main vertical member that carries axial loads from beams or girders to the foundation parallel to its longitudinal axis.

D

DC: Direct current; the unidirectional flow of current through an electrical circuit. Direct current is produced through such sources as batteries, thermocouples, or photovoltaic solar cells.

Dead Load: describes the loads from the weight of the permanent components of the structure.

Deflection: the displacement of a structural member or system under a load.

DRO: Diesel-Range Organics

E

ELPAT: Environmental Lead Proficiency Analytical Testing

EMT: Electro-metallic tubing; A metallic tube raceway that is used to carry and protect current carrying conductors or cables.

EPA: Environmental Protection Agency

F

Flue Vent: A duct or pipe conveying combustion by-products from a heater or furnace.

Fluorescent: A source of light that emits light radiation at longer wavelengths and lower energy.

Footing: a slab of concrete or an assortment of stones under a column, wall, or other structural member to transfer the loads of the member into the surrounding soil.

Foundation*:* supports a building or structure.

FRP: Fiberglass reinforced plastic

Full Sawn (FS): Lumber cut, in the rough, to its full nominal size.

G

Gable: located above the elevation of the eave line of a double-sloped roof.

Galvanized Steel: Steel coated with zinc carbonate to resist corrosion.

GPM: Gallon per minute; a standard unit of volumetric liquid flow rate.

Grade: the ground elevation of the soil.

Gravity Vent: Openings in a roof intended to vent hot air by the action of convection.

Gray Water: Wastewater generated from domestic washing activities and not containing human waste.

GRO: Gasoline Range Organics

H

Header: a member that carries joists, rafters or beams and is placed between other joists, rafters or beams.

Hip Roof: a roof sloping from all four sides of a building.

HUD: Housing and Urban Development

HVAC: Heating, Ventilation, and Air Conditioning.

I

IAQ: Indoor Air Quality

IEUBK: Integrated Exposure Uptake Biokinetic

Incandescent: A source of light that works by incandescence, or works by a heat-driven light emission through black-body radiation.

Inverter: A device that converts electrical direct current (DC) to electrical alternating current (AC).

J

Joist: a horizontal structural load-carrying member which supports floors and ceilings.

K

kVA: Kilovolt-ampere equal to one thousand volt-amperes. kVA is a unit to express the apparent power consumed in an electrical circuit or electrical device.

kW: Kilowatt equal to one thousand watts. A kilowatt is typically used to express the output power consumption of large devices or electrical systems.

L

LBP: Lead-Based Paint

LCP: Lead-Containing Paint

LCS: Lead-Contaminated Soils

Leach Field: A drain field used to remove contaminants and impurities from liquid that emerges from a septic tank.

LED: Light emitting diode; a semiconductor light source that can emit light in various colors and brightness.
Live Load: nonpermanent loads on a structure created by the use of the structure.

Load: an outside force that affects the structure or its members.

Louver: An opening with horizontal slats angled to allow passage of air while keeping out rain and snow.

M

Mg/kg: Milligrams per Kilogram

N

NEC: National Electric Code.

NESHAP: National Emission Standards for Hazardous Air Pollutants

Nonpotable Water: Water that has not been approved for safe human consumption.

NVLAP: National Voluntary Laboratory Accreditation Program

O

OSHA: Occupational Safety and Health Administration

Overcurrent Protection: A fuse, circuit breaker or relay that will open the electrical circuit when the downstream electrical current exceeds the stated current rating.

P

Passive Ventilation: Ventilation of a building without the use of a fan or other mechanical system.

Pitch: the slope of a member defined as the ratio of the total rise to the total run.

PLM: Polarized Light Microscopy

PV: Photovoltaic; An array of solar modules or cells that collect solar energy and convert the energy into direct current electricity.

PVC: Polyvinyl Chloride; A biologically and chemically resistant plastic widely used for household sewage pipe.

R

Rafter: a sloped structural load-carrying member which supports the roof.

RBM: Regulated/Hazardous Material

Reaction: the force or moment developed at the points of a support.

RLM: Industrial stem mounted reflector.

Romex: Wiring with rubber insulated conductors in an overall sheath of braided cotton fiber.

S

Seismic Load: loads produced during the seismic movements of an earthquake.

Septic Tank: A sewage tank containing anaerobic bacteria which decomposed waste discharged into the tank.

Shear: forces resulting in two touching parts of a material to slide in opposite directions parallel to their plane of contact.

Shelter: a structure that can be used for rustic camping in the event that staff are not able to leave the island due to weather. No utilities are provided.

Snow Load: loads produced from the accumulation of snow.

Span: the distance between supports.

Step-down Transformer: A device that converts a high voltage down to a lower voltage through a series of winding coils.

Structural Steel**:** an iron alloy with a carbon content of 0.16% to 0.29%. Steel is malleable, and easily welded.

Strut: a structural brace that resists axial forces.

Stud: a vertical wall member used to construct partitions and walls.

T

Thermal Expansion Tank: A tank used in a closed water heating system to absorb excess water pressure caused by thermal expansion.

TSI: Thermal System Insulation

Turbine Vent: Vents utilizing rotating wind vanes to create air flow.

V

Vent Stack: A vertical pipe proving ventilation.

W

WAC: Wisconsin Administrative Code

WDNR: Wisconsin Department of Natural Resources
Wrought Iron: an iron alloy with very low carbon content, in comparison to steel. Wrought iron is tough, malleable, ductile and easily welded.

X

XRF: X-ray fluorescence analyzer

Other

30 µg/m3: 30 micrograms per cubic meter

µg/SF: Micrograms of Lead Dust per Square Foot of Floor Space

1x: Piece of dimensional lumber 1” (nominal) / ¾” (actual) thick

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APPENDIX A: CLASS C COST ESTIMATE AND PHASING FOR THE PREFERRED ALTERNATIVE

CLASS C COST ESTIMATE

Class C Construction Cost Estimate

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Preferred Alternative

Basis of Estimate

Date of Estimate: March 4, 2011

Estimated By: Parametrix, Inc.
7186 South Highland Drive #200
Salt Lake City, Utah
(801) 733-5900

Supporting Material: Design Team Narrative & Matrices
Site Concept Plans
Historic Drawings & Photographs
Site Estimate - Per Landscape Architect
Hazmat Estimate - Per Consultant

Cost Data: Parametrix National Cost Data Base - 2011

Mark-ups and Add-ons: **Published Location Factor:** Apostle Islands National Lakeshore - Bayfield, Wisconsin - Negative 5.3 Percent.
Project Remoteness:
Michigan Island, 17 Miles - 20 Percent.
Outer Island, 32 Miles - 25 Percent.
Devils Island, 23 Miles - 20 Percent.
Long Island, 6 Miles - 20 Percent.
Sand Island, 19 Miles - 20 Percent.
Federal Wage Rate Factor: Included in Labor Costs - 7.5 Percent.
Design Contingency: Concept Documents - 20 Percent
Taxes: Sales Tax Included in Costs - 5.5 Percent.
Standard General Conditions: Remote Location **-** 14 Percent.
Government General Conditions: Remote Location - 8 Percent.
Bonds and Permits: No Permit Costs. Bond - 2 Percent.
Historic Preservation Factor: 15 Percent.
Overhead: Medium Size Project - 10 Percent.
Profit: Medium Size Project - 10 Percent.
Contracting Method Adjustment: Early Indication is that Construction Contract will be Pre-Qualified Open Competitive - 5 Percent.
Inflation Escalation: Assume Start of Construction to be May 2012. 18 Month Construction Period. Inflation Predictions Indicate 4 Percent per year.

Comments: Class C Construction Cost Estimate Based on;
Design Team Narrative & Matrices
Site Concept Plans
Historic Drawings & Photographs
Site Estimate - Per Landscape Architect
Hazmat Estimate - Per Consultant

Cost Estimate Includes Logistics to the Various Sites.
Material, Labor & Equipment (Including Waste) will Require Boat Transportation & Docking.
Cost Estimate Includes Weather Delays and a Seasonal Construction Time Frame.

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate is Based on 2011 Costs

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

MASTER SUMMARY

Item	Description	Direct Cost	Total Net
	MICHIGAN ISLAND	**$894,124**	**$2,322,946**
	OUTER ISLAND	**$446,878**	**$1,202,923**
	DEVILS ISLAND	**$750,032**	**$1,948,594**
	LONG ISLAND	**$538,468**	**$1,398,947**
	SAND ISLAND	**$269,115**	**$699,164**
	TOTAL	**$2,898,616**	**$7,572,574**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate is Based on 2011 Costs

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

SUMMARY - MICHIGAN ISLAND

Item	Description	Direct Cost	Total Net
	MICHIGAN ISLAND - Site Improvements	**$104,220**	**$270,765**
	MICHIGAN ISLAND - Old Michigan Island Lighthouse	**$280,867**	**$729,698**
	MICHIGAN ISLAND - Second Tower	**$54,524**	**$141,655**
	MICHIGAN ISLAND - Keepers Quarters	**$226,232**	**$587,754**
	MICHIGAN ISLAND - Assistant Keepers Quarters & Workshop	**$83,016**	**$215,678**
	MICHIGAN ISLAND - Power House	**$96,428**	**$250,521**
	MICHIGAN ISLAND - Shed	**$42,652**	**$110,811**
	MICHIGAN ISLAND - Privy	**$6,183**	**$16,064**
	TOTAL (Michigan Island)	**$894,124**	**$2,322,946**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Site Improvements

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	SITE IMPROVEMENTS - Cost Per Consultant					
	Site Clearing, 4 Acres	1	LS	$28,200	$28,200	$73,264
	Site Circulation / Accessibility	1	LS	$36,245	$36,245	$94,165
	Site Structures	1	LS	$7,500	$7,500	$19,485
	Small Scale Site Features	1	LS	$3,000	$3,000	$7,794
	Station Vegetation	1	LS	$29,275	$29,275	$76,057
					$104,220	**$270,765**
	Subtotal Direct Construction Costs				**$104,220**	**$270,765**
	Published Location Factor (Negative 5.3 Percent)				-$5,524	
	Remoteness Factor (20 Percent)				$20,844	
	Federal Wage Rate Factor (7.5 Percent)				$3,908	
	Design Contingency (20 Percent)				$20,844	
	Total Direct Construction Costs				**$144,293**	
	Standard General Conditions (14 Percent)				$20,201	
	Government General Conditions (8 Percent)				$11,543	
	Bond (2 Percent)				$2,886	
	Historic Preservation Factor (15 Percent)				$21,644	
	Subtotal NET Construction Cost				**$200,567**	
	Overhead (10 Percent)				$20,057	
	Profit (10 Percent)				$20,057	
	Estimated NET Construction Cost				**$240,680**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$12,034	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$18,051	
	Total Estimated NET Cost of Construction				**$270,765**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Old Michigan Island Lighthouse

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$90,043	$90,043	$233,933
	Remove Roofing, Shingles	1,459	SF	$3.21	$4,683	$12,168
	Remove Finishes - Floor, Wall & Ceiling	2,154	SF	$2.68	$5,773	$14,998
					$100,499	**$261,098**
	ARCHITECTURAL					
	Exterior Wall - Repair Plaster, Repoint Masonry	3,389	SF	$7.49	$25,384	$65,947
	Exterior Wall, Coat Masonry	3,389	SF	$2.14	$7,252	$18,842
	Exterior Wall, Remove & Replace Wood Shingles	8	SF	$26.75	$214	$556
	Modify Wall - Enlarge Door Opening	1	EA	$1,873	$1,873	$4,865
	Exterior Stairs	11	SF	$64.20	$706	$1,835
	Millwork, Refinish Existing	15	LF	$160.50	$2,408	$6,255
	Handrails	86	LF	$96.30	$8,282	$21,516
	Security Gate	1	EA	$1,391	$1,391	$3,614
	Roofing, Asphalt Shingles, Felt & Flashings	1,459	SF	$6.96	$10,155	$26,382
	Raingutter & Downspouts	120	LF	$48.15	$5,778	$15,011
	Windows, New Glazing	55	SF	$58.85	$3,237	$8,409
	Windows, Reinstall Glazing	164	SF	$19.26	$3,159	$8,206
	Windows, Paint Frame & Sash	219	SF	$23.54	$5,155	$13,393
	Door, Refinish & Replace Hardware - Existing	15	LEAF	$749.00	$11,235	$29,189
	Wood Flooring, Refinish Original	3,628	SF	$5.35	$19,410	$50,427
	Paint, Tower Roof & Trim	50	SF	$6.42	$321	$834
	Paint & Repair Plaster, Interior Wall & Ceiling	5,106	SF	$4.28	$21,854	$56,776
	Paint, Miscellaneous Items	1	LS	$2,000	$2,000	$5,196
					$129,812	**$337,253**
	STRUCTURAL					
	Floor Structure, Reinforce Existing	62	SF	$37.45	$2,322	$6,032
	Roof Structure, Reinforce Existing	55	SF	$32.10	$1,766	$4,587
					$4,087	**$10,619**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Old Michigan Island Lighthouse

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Remove Plumbing Fixtures & Piping	2	EA	$802.50	$1,605	$4,170
	Remove Boiler & Piping	1	EA	$2,675	$2,675	$6,950
	Remove Radiators	2	EA	$642.00	$1,284	$3,336
	HVAC, Increase Ventilation	2,154	SF	$9.10	$19,601	$50,925
					$25,165	**$65,380**
	ELECTRICAL					
	Remove Light Fixtures	10	EA	$69.55	$696	$1,807
	Remove Receptacles	10	EA	$53.50	$535	$1,390
	Replace Lightning Protection System	1,459	SF	$4.28	$6,245	$16,223
	Photovoltaic System (Ventilation)	2,154	SF	$6.42	$13,829	$35,927
					$21,304	**$55,347**
	Subtotal Direct Construction Costs				**$280,867**	**$729,698**
	Published Location Factor (Negative 5.3 Percent)				-$14,886	
	Remoteness Factor (20 Percent)				$56,173	
	Federal Wage Rate Factor (7.5 Percent)				$10,533	
	Design Contingency (20 Percent)				$56,173	
	Total Direct Construction Costs				**$388,861**	
	Standard General Conditions (14 Percent)				$54,441	
	Government General Conditions (8 Percent)				$31,109	
	Bond (2 Percent)				$7,777	
	Historic Preservation Factor (15 Percent)				$58,329	
	Subtotal NET Construction Cost				**$540,517**	
	Overhead (10 Percent)				$54,052	
	Profit (10 Percent)				$54,052	
	Estimated NET Construction Cost				**$648,620**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$32,431	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$48,647	
	Total Estimated NET Cost of Construction				**$729,698**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Second Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$32,235	$32,235	$83,747
	Remove Exterior Window	10	SF	$8.56	$86	$222
					$32,321	**$83,969**
	ARCHITECTURAL					
	Security Gate	1	EA	$1,391	$1,391	$3,614
	Roofing, Repair Existing	280	SF	$7.49	$2,097	$5,449
	Replace / Repair Vent Caps (Brass)	8	EA	$214.00	$1,712	$4,448
	Windows, New Glazing	10	SF	$58.85	$589	$1,529
	Windows, Paint Frame & Sash	72	SF	$23.54	$1,695	$4,403
	Door, Refinish & Replace Hardware - Existing	1	LEAF	$749.00	$749	$1,946
	Paint & Repair Plaster, Interior Wall & Ceiling	927	SF	$4.28	$3,968	$10,308
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$12,700	**$32,995**
	STRUCTURAL					
	Column Bases, Repair Existing	2	EA	$3,210	$6,420	$16,679
					$6,420	**$16,679**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Second Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	HVAC, Increase Ventilation - Passive	262	SF	$5.35	$1,402	$3,642
					$1,402	**$3,642**
	ELECTRICAL					
	Inspect / Replace Lightning Protection System	262	SF	$6.42	$1,682	$4,370
					$1,682	**$4,370**
	Subtotal Direct Construction Costs				**$54,524**	**$141,655**
	Published Location Factor (Negative 5.3 Percent)				-$2,890	
	Remoteness Factor (20 Percent)				$10,905	
	Federal Wage Rate Factor (7.5 Percent)				$2,045	
	Design Contingency (20 Percent)				$10,905	
	Total Direct Construction Costs				**$75,489**	
	Standard General Conditions (14 Percent)				$10,568	
	Government General Conditions (8 Percent)				$6,039	
	Bond (2 Percent)				$1,510	
	Historic Preservation Factor (15 Percent)				$11,323	
	Subtotal NET Construction Cost				**$104,930**	
	Overhead (10 Percent)				$10,493	
	Profit (10 Percent)				$10,493	
	Estimated NET Construction Cost				**$125,916**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$6,296	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$9,444	
	Total Estimated NET Cost of Construction				**$141,655**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$47,756	$47,756	$124,071
	Remove Roofing, Shingles	1,105	SF	$3.21	$3,547	$9,215
	Remove Finishes - Floor, Wall & Ceiling	1,932	SF	$2.68	$5,178	$13,452
					$56,481	**$146,738**
	ARCHITECTURAL					
	Wood Porch, Repaint	126	SF	$10.70	$1,348	$3,503
	Exterior Wall - Clean Brick	2,180	SF	$2.14	$4,665	$12,120
	Exterior Wall - Repair Brick	65	SF	$21.40	$1,391	$3,614
	Handrails	70	LF	$96.30	$6,741	$17,513
	Roofing, Asphalt Shingles, Felt & Flashings	1,105	SF	$6.96	$7,691	$19,981
	Replace Raingutters & Downspouts	130	LF	$48.15	$6,260	$16,262
	Windows, New Glazing	20	SF	$58.85	$1,177	$3,058
	Windows, Paint Frame & Sash	200	SF	$23.54	$4,708	$12,231
	Door, Refinish & Replace Hardware - Existing	20	LEAF	$749.00	$14,980	$38,918
	Wood Flooring, Refinish Original	1,782	SF	$5.35	$9,534	$24,769
	Paint, Exterior Siding & Trim	200	SF	$2.68	$536	$1,393
	Paint, Soffit & Trim	441	SF	$3.75	$1,654	$4,296
	Paint & Repair Plaster, Interior Wall & Ceiling	4,667	SF	$4.28	$19,975	$51,895
	Paint, Miscellaneous Items	1	LS	$2,000	$2,000	$5,196
	ADA Lift, Allowance	1	LS	$8,500	$8,500	$22,083
					$91,159	**$236,832**
	STRUCTURAL					
	Concrete Slab Infill (Replace)	30	SF	$26.75	$803	$2,085
	Concrete Ramp & Railings	80	SF	$117.70	$9,416	$24,463
	Floor Structure, Reinforce Existing	56	SF	$37.45	$2,097	$5,449
	Roof Structure, Reinforce Existing	921	SF	$12.84	$11,826	$30,723
					$24,141	**$62,720**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Inspect / Repair Septic System	1	LS	$15,000	$15,000	$38,970
	Remove Propane Piping	100	LF	$10.70	$1,070	$2,780
	HVAC, Propane Piping	75	LF	$28.89	$2,167	$5,629
	HVAC, Increase Ventilation	1,932	SF	$9.10	$17,581	$45,676
					$35,818	**$93,056**
	ELECTRICAL					
	Replace Lightning Protection System	1,105	SF	$4.28	$4,729	$12,287
	Photovoltaic System (Ventilation)	1,932	SF	$6.42	$12,403	$32,224
	Replace Smoke Detectors	1	LS	$1,500	$1,500	$3,897
					$18,633	**$48,408**
	Subtotal Direct Construction Costs				**$226,232**	**$587,754**
	Published Location Factor (Negative 5.3 Percent)				-$11,990	
	Remoteness Factor (20 Percent)				$45,246	
	Federal Wage Rate Factor (7.5 Percent)				$8,484	
	Design Contingency (20 Percent)				$45,246	
	Total Direct Construction Costs				**$313,218**	
	Standard General Conditions (14 Percent)				$43,851	
	Government General Conditions (8 Percent)				$25,057	
	Bond (2 Percent)				$6,264	
	Historic Preservation Factor (15 Percent)				$46,983	
	Subtotal NET Construction Cost				**$435,373**	
	Overhead (10 Percent)				$43,537	
	Profit (10 Percent)				$43,537	
	Estimated NET Construction Cost				**$522,448**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$26,122	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$39,184	
	Total Estimated NET Cost of Construction				**$587,754**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Assistant Keepers Quarters & Workshop

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$30,052	$30,052	$78,076
	Remove Roofing, Shingles	714	SF	$3.21	$2,292	$5,954
					$32,344	**$84,030**
	ARCHITECTURAL					
	Handrails	25	LF	$96.30	$2,408	$6,255
	Roofing, Asphalt Shingles, Felt & Flashings	714	SF	$6.96	$4,969	$12,911
	Raingutters, Downspouts & Splashblocks	54	LF	$48.15	$2,600	$6,755
	Windows, New Glazing & Screens	50	SF	$58.85	$2,943	$7,645
	Windows, Paint Frame & Sash	98	SF	$23.54	$2,307	$5,993
	Door, Refinish & Replace Hardware - Existing	10	LEAF	$749.00	$7,490	$19,459
	Wood Flooring, Refinish Existing	364	SF	$5.35	$1,947	$5,059
	Paint, Exterior Siding & Trim	1,134	SF	$2.68	$3,039	$7,896
	Paint, Soffit & Trim	415	SF	$3.75	$1,556	$4,043
	Paint & Repair Plaster, Interior Wall & Ceiling	778	SF	$4.28	$3,330	$8,651
	Paint, Miscellaneous Items	1	LS	$1,000	$1,000	$2,598
					$33,589	**$87,265**
	STRUCTURAL					
	Roof Structure, Reinforce Existing	34	SF	$32.10	$1,091	$2,835
					$1,091	**$2,835**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Assistant Keepers Quarters & Workshop

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Cap Unused Piping	1	LS	$1,000	$1,000	$2,598
	HVAC, Increase Ventilation	778	SF	$9.10	$7,080	$18,393
					$8,080	**$20,991**
	ELECTRICAL					
	Replace Feeder Circuitry	778	SF	$3.75	$2,918	$7,580
	Photovoltaic System (Ventilation)	778	SF	$6.42	$4,995	$12,976
					$7,912	**$20,556**
	Subtotal Direct Construction Costs				**$83,016**	**$215,678**
	Published Location Factor (Negative 5.3 Percent)				-$4,400	
	Remoteness Factor (20 Percent)				$16,603	
	Federal Wage Rate Factor (7.5 Percent)				$3,113	
	Design Contingency (20 Percent)				$16,603	
	Total Direct Construction Costs				**$114,936**	
	Standard General Conditions (14 Percent)				$16,091	
	Government General Conditions (8 Percent)				$9,195	
	Bond (2 Percent)				$2,299	
	Historic Preservation Factor (15 Percent)				$17,240	
	Subtotal NET Construction Cost				**$159,761**	
	Overhead (10 Percent)				$15,976	
	Profit (10 Percent)				$15,976	
	Estimated NET Construction Cost				**$191,714**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$9,586	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$14,379	
	Total Estimated NET Cost of Construction				**$215,678**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Power House

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$21,704	$21,704	$56,387
	Remove Roofing, Shingles	779	SF	$3.21	$2,501	$6,497
					$24,205	**$62,884**
	ARCHITECTURAL					
	Exterior Wall - Repair Brick	175	SF	$21.40	$3,745	$9,730
	Repair Stairs & Add Railings	1	LS	$3,500	$3,500	$9,093
	Roofing, Asphalt Shingles, Felt & Flashings	779	SF	$6.96	$5,422	$14,086
	Raingutter, Downspouts & Splashblocks	88	LF	$48.15	$4,237	$11,008
	Windows, New Glazing	40	SF	$58.85	$2,354	$6,116
	Windows, Paint Frame, Sash & Repair Hardware	40	SF	$23.54	$942	$2,446
	Door, Refinish & Replace Hardware - Existing	5	LEAF	$749.00	$3,745	$9,730
	Paint, Soffit & Trim	56	SF	$3.75	$210	$546
	Paint & Repair Plaster, Interior Wall & Ceiling	1,300	SF	$4.28	$5,564	$14,455
	Paint, Miscellaneous Items	1	LS	$1,000	$1,000	$2,598
					$30,719	**$79,807**
	STRUCTURAL					
	Roof Structure, Repair Existing	110	SF	$32.10	$3,531	$9,174
					$3,531	**$9,174**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Power House

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Tram Hoist, Replace w/ Diesel Powered Unit	1	LS	$16,200	$16,200	$42,088
	HVAC, Increase Ventilation	832	SF	$9.10	$7,571	$19,670
					$23,771	**$61,758**
	ELECTRICAL					
	Diesel Generator, Remove	1	EA	$3,210	$3,210	$8,340
	Replace Branch Circuitry	832	SF	$5.35	$4,451	$11,564
	Photovoltaic System (Ventilation)	832	SF	$6.42	$5,341	$13,877
	Overcurrent Protection	1	LS	$1,200	$1,200	$3,118
					$14,203	**$36,899**
	Subtotal Direct Construction Costs				**$96,428**	**$250,521**
	Published Location Factor (Negative 5.3 Percent)				-$5,111	
	Remoteness Factor (20 Percent)				$19,286	
	Federal Wage Rate Factor (7.5 Percent)				$3,616	
	Design Contingency (20 Percent)				$19,286	
	Total Direct Construction Costs				**$133,505**	
	Standard General Conditions (14 Percent)				$18,691	
	Government General Conditions (8 Percent)				$10,680	
	Bond (2 Percent)				$2,670	
	Historic Preservation Factor (15 Percent)				$20,026	
	Subtotal NET Construction Cost				**$185,571**	
	Overhead (10 Percent)				$18,557	
	Profit (10 Percent)				$18,557	
	Estimated NET Construction Cost				**$222,686**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$11,134	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$16,701	
	Total Estimated NET Cost of Construction				**$250,521**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Shed

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$3,000	$3,000	$7,794
	Remove Roof & Structure	444	SF	$7.49	$3,326	$8,640
					$6,326	**$16,434**
	ARCHITECTURAL					
	Remove Plywood Flooring & Replace Wood Flooring	135	SF	$12.84	$1,733	$4,503
	Exterior Wall, Wood Studs	599	SF	$4.82	$2,887	$7,501
	Wood Roof Shingles & Flashings	444	SF	$8.56	$3,801	$9,874
	Windows, New Glazing	25	SF	$58.85	$1,471	$3,822
	Windows, Paint Frame & Sash	25	SF	$23.54	$589	$1,529
	Doors, Refinish, Replace Hardware & Add Plexiglass Panel	2	LEAF	$1,017	$2,033	$5,282
	Paint, Exterior Siding & Trim	599	SF	$2.68	$1,605	$4,171
	Paint, Soffit & Trim	82	SF	$3.75	$308	$799
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$14,927	**$38,780**
	STRUCTURAL					
	Concrete Foundations	10	CY	$856.00	$8,560	$22,239
	Concrete Slab on Grade	240	SF	$13.91	$3,338	$8,673
	Wood Roof Structure & Sheathing	444	SF	$21.40	$9,502	$24,685
					$21,400	**$55,598**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Shed

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$42,652**	**$110,811**
	Published Location Factor (Negative 5.3 Percent)				-$2,261	
	Remoteness Factor (20 Percent)				$8,530	
	Federal Wage Rate Factor (7.5 Percent)				$1,599	
	Design Contingency (20 Percent)				$8,530	
	Total Direct Construction Costs				**$59,052**	
	Standard General Conditions (14 Percent)				$8,267	
	Government General Conditions (8 Percent)				$4,724	
	Bond (2 Percent)				$1,181	
	Historic Preservation Factor (15 Percent)				$8,858	
	Subtotal NET Construction Cost				**$82,083**	
	Overhead (10 Percent)				$8,208	
	Profit (10 Percent)				$8,208	
	Estimated NET Construction Cost				**$98,499**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$4,925	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$7,387	
	Total Estimated NET Cost of Construction				**$110,811**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Privy

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$1,739	$1,739	$4,518
					$1,739	**$4,518**
	ARCHITECTURAL					
	Metal Roofing, Repair Existing	15	SF	$42.80	$642	$1,668
	Windows, Paint Frame & Sash	2	SF	$47.08	$94	$245
	Wood Flooring, Repaint Existing	16	SF	$5.35	$86	$222
	Paint, Exterior Siding & Trim	140	SF	$5.35	$749	$1,946
	Paint, Roof & Trim	59	SF	$6.42	$379	$984
	Paint, Interior Wall & Ceiling	166	SF	$4.28	$710	$1,846
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$3,160	**$8,210**
	STRUCTURAL					
	Concrete Foundations	1	CY	$1,284	$1,284	$3,336
					$1,284	**$3,336**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

MICHIGAN ISLAND - Privy

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$6,183**	**$16,064**
	Published Location Factor (Negative 5.3 Percent)				-$328	
	Remoteness Factor (20 Percent)				$1,237	
	Federal Wage Rate Factor (7.5 Percent)				$232	
	Design Contingency (20 Percent)				$1,237	
	Total Direct Construction Costs				**$8,560**	
	Standard General Conditions (14 Percent)				$1,198	
	Government General Conditions (8 Percent)				$685	
	Bond (2 Percent)				$171	
	Historic Preservation Factor (15 Percent)				$1,284	
	Subtotal NET Construction Cost				**$11,899**	
	Overhead (10 Percent)				$1,190	
	Profit (10 Percent)				$1,190	
	Estimated NET Construction Cost				**$14,279**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$714	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$1,071	
	Total Estimated NET Cost of Construction				**$16,064**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate is Based on 2011 Costs

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

SUMMARY - OUTER ISLAND

Item	Description		Direct Cost	Total Net
	OUTER ISLAND - Site Improvements		**$46,608**	**$125,460**
	OUTER ISLAND - Outer Island Tower		**$56,774**	**$152,827**
	OUTER ISLAND - Keepers Quarters		**$232,789**	**$626,631**
	OUTER ISLAND - Fog Signal Building		**$99,444**	**$267,688**
	OUTER ISLAND - Oil Storage		**$4,867**	**$13,100**
	OUTER ISLAND - Privy		**$6,396**	**$17,217**
	TOTAL (Outer Island)		**$446,878**	**$1,202,923**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Site Improvements

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	SITE IMPROVEMENTS - Cost Per Consultant					
	Site Clearing, 2.5 Acres	1	LS	$20,283	$20,283	$54,597
	Site Circulation / Accessibility	1	LS	$17,450	$17,450	$46,973
	Site Structures	1	LS	$2,750	$2,750	$7,403
	Small Scale Site Features	1	LS	$4,500	$4,500	$12,113
	Landscape Plantings	1	LS	$1,625	$1,625	$4,374
					$46,608	**$125,460**
	Subtotal Direct Construction Costs				**$46,608**	**$125,460**
	Published Location Factor (Negative 5.3 Percent)				-$2,470	
	Remoteness Factor (25 Percent)				$11,652	
	Federal Wage Rate Factor (7.5 Percent)				$1,748	
	Design Contingency (20 Percent)				$9,322	
	Total Direct Construction Costs				**$66,858**	
	Standard General Conditions (14 Percent)				$9,360	
	Government General Conditions (8 Percent)				$5,349	
	Bond (2 Percent)				$1,337	
	Historic Preservation Factor (15 Percent)				$10,029	
	Subtotal NET Construction Cost				**$92,933**	
	Overhead (10 Percent)				$9,293	
	Profit (10 Percent)				$9,293	
	Estimated NET Construction Cost				**$111,520**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$5,576	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$8,364	
	Total Estimated NET Cost of Construction				**$125,460**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Outer Island Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$13,201	$13,201	$35,535
	Remove Finishes - Floor, Wall & Ceiling	95	SF	$5.35	$508	$1,368
					$13,709	**$36,903**
	ARCHITECTURAL					
	Exterior Wall - Repoint / Seal Masonry	3,192	SF	$7.49	$23,908	$64,357
	Handrails	17	LF	$96.30	$1,637	$4,407
	Windows, New Glazing & 1 Storm Window to Match Existing	3	SF	$117.70	$353	$950
	Door, Refinish & Replace Hardware - Existing	1	LEAF	$749.00	$749	$2,016
	Flooring, Repair Existing	277	SF	$3.21	$889	$2,394
	Ceiling, Repair Existing	201	SF	$3.75	$754	$2,029
	Patch Roof Rust	65	SF	$4.28	$278	$749
	Paint, Roof & Trim	65	SF	$12.84	$835	$2,247
	Paint, Interior Wall & Ceiling	3,138	SF	$1.61	$5,052	$13,600
	Paint, Stairs	4	FLT	$1,070	$4,280	$11,521
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,346
					$39,235	**$105,615**
	STRUCTURAL					
	Monitor Existing Cracks	1	LS	$2,000	$2,000	$5,384
					$2,000	**$5,384**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
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Estimate By: Parametrix, Inc.
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Estimate is Based on 2011 Costs

OUTER ISLAND - Outer Island Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	HVAC, Increase Ventilation - Passive	95	SF	$10.70	$1,017	$2,736
					$1,017	**$2,736**
	ELECTRICAL					
	Inspect / Replace Lightning Protection System	95	SF	$8.56	$813	$2,189
					$813	**$2,189**
	Subtotal Direct Construction Costs				**$56,774**	**$152,827**
	Published Location Factor (Negative 5.3 Percent)				-$3,009	
	Remoteness Factor (25 Percent)				$14,194	
	Federal Wage Rate Factor (7.5 Percent)				$2,129	
	Design Contingency (20 Percent)				$11,355	
	Total Direct Construction Costs				**$81,442**	
	Standard General Conditions (14 Percent)				$11,402	
	Government General Conditions (8 Percent)				$6,515	
	Bond (2 Percent)				$1,629	
	Historic Preservation Factor (15 Percent)				$12,216	
	Subtotal NET Construction Cost				**$113,205**	
	Overhead (10 Percent)				$11,321	
	Profit (10 Percent)				$11,321	
	Estimated NET Construction Cost				**$135,846**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$6,792	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$10,188	
	Total Estimated NET Cost of Construction				**$152,827**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
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Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$88,868	$88,868	$239,218
	Remove Finishes - Floor, Wall & Ceiling	2,494	SF	$2.68	$6,684	$17,992
					$95,552	**$257,210**
	ARCHITECTURAL					
	Metal Roofing, Repair Existing	655	SF	$8.56	$5,607	$15,093
	Chimney Liner	37	LF	$107.00	$3,959	$10,657
	Exterior Wall - Repoint / Seal Masonry & Replace 1 Window Sill	2,204	SF	$7.49	$16,508	$44,437
	Handrails	40	LF	$96.30	$3,852	$10,369
	Millwork, Refinish Existing	12	LF	$160.50	$1,926	$5,184
	Windows, Paint Frame & Sash & Replace Glazing Putty	216	SF	$23.54	$5,085	$13,687
	Repair Secondary Entry	1	LS	$2,500	$2,500	$6,730
	Wood Flooring, Refinish Original	1,779	SF	$5.35	$9,518	$25,620
	Paint, Roof & Trim	243	SF	$3.75	$911	$2,453
	Paint, Soffit & Trim	339	SF	$3.75	$1,271	$3,422
	Paint, Exterior Siding & Trim	224	SF	$2.68	$600	$1,616
	Paint & Repair Plaster, Interior Wall & Ceiling	4,780	SF	$4.28	$20,458	$55,071
	Paint & Repair Stairs	1	FLT	$1,338	$1,338	$3,600
	Paint, Miscellaneous Items	1	LS	$2,000	$2,000	$5,384
					$75,533	**$203,322**
	STRUCTURAL				**Not Required**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
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Estimate is Based on 2011 Costs

OUTER ISLAND - Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Remove Unused Propane Piping	25	LF	$10.70	$268	$720
	Inspect / Repair Septic System	1	LS	$15,000	$15,000	$40,378
	HVAC, Increase Ventilation	2,494	SF	$9.10	$22,695	$61,092
					$37,963	**$102,190**
	ELECTRICAL					
	Replace Lightning Protection System	1,222	SF	$4.28	$5,230	$14,079
	Photovoltaic System (Ventilation)	2,494	SF	$6.42	$16,011	$43,100
	Overcurrent Protection	1	LS	$2,500	$2,500	$6,730
					$23,742	**$63,909**
	Subtotal Direct Construction Costs				**$232,789**	**$626,631**
	Published Location Factor (Negative 5.3 Percent)				-$12,338	
	Remoteness Factor (25 Percent)				$58,197	
	Federal Wage Rate Factor (7.5 Percent)				$8,730	
	Design Contingency (20 Percent)				$46,558	
	Total Direct Construction Costs				**$333,936**	
	Standard General Conditions (14 Percent)				$46,751	
	Government General Conditions (8 Percent)				$26,715	
	Bond (2 Percent)				$6,679	
	Historic Preservation Factor (15 Percent)				$50,090	
	Subtotal NET Construction Cost				**$464,171**	
	Overhead (10 Percent)				$46,417	
	Profit (10 Percent)				$46,417	
	Estimated NET Construction Cost				**$557,005**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$27,850	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$41,775	
	Total Estimated NET Cost of Construction				**$626,631**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Fog Signal Building

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$39,294	$39,294	$105,773
	Remove Finishes - Floor, Wall & Ceiling	1,024	SF	$2.68	$2,744	$7,387
					$42,038	**$113,160**
	ARCHITECTURAL					
	Handrails	20	LF	$96.30	$1,926	$5,184
	Exterior Wall - Replace Chipped Shingles	250	SF	$10.70	$2,675	$7,201
	Windows, Paint Frame, Sash & Replace Hardware	96	SF	$23.54	$2,260	$6,083
	Door, Refinish & Replace Hardware - Existing	13	LEAF	$749.00	$9,737	$26,210
	Wood Flooring, Refinish Existing	81	SF	$10.70	$867	$2,333
	Ceiling, Repair Existing	1,024	SF	$2.68	$2,744	$7,387
	Paint, Interior Wall & Ceiling	2,190	SF	$1.61	$3,526	$9,491
	Paint, Soffit & Trim	333	SF	$3.75	$1,249	$3,361
	Paint, Stairs	1	FLT	$1,070	$1,070	$2,880
	Paint, Miscellaneous Items	1	LS	$1,000	$1,000	$2,692
					$27,054	**$72,824**
	STRUCTURAL					
	Ceiling Framing, Reinforce Existing	210	SF	$12.84	$2,696	$7,258
					$2,696	**$7,258**
	MECHANICAL					
	Remove Piping	25	LF	$10.70	$268	$720
	Tram Hoist, Replace w/ Diesel Powered Unit	1	LS	$16,200	$16,200	$43,608
					$16,468	**$44,328**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Fog Signal Building

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	ELECTRICAL					
	Diesel Generator, Remove	1	EA	$3,210	$3,210	$8,641
	Replace Branch Circuitry	1,024	SF	$5.35	$5,478	$14,747
	Overcurrent Protection	1	LS	$2,500	$2,500	$6,730
					$11,188	**$30,117**
	Subtotal Direct Construction Costs				**$99,444**	**$267,688**
	Published Location Factor (Negative 5.3 Percent)				-$5,271	
	Remoteness Factor (25 Percent)				$24,861	
	Federal Wage Rate Factor (7.5 Percent)				$3,729	
	Design Contingency (20 Percent)				$19,889	
	Total Direct Construction Costs				**$142,653**	
	Standard General Conditions (14 Percent)				$19,971	
	Government General Conditions (8 Percent)				$11,412	
	Bond (2 Percent)				$2,853	
	Historic Preservation Factor (15 Percent)				$21,398	
	Subtotal NET Construction Cost				**$198,287**	
	Overhead (10 Percent)				$19,829	
	Profit (10 Percent)				$19,829	
	Estimated NET Construction Cost				**$237,945**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$11,897	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$17,846	
	Total Estimated NET Cost of Construction				**$267,688**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Oil Storage

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$1,000	$1,000	$2,692
					$1,000	**$2,692**
	ARCHITECTURAL					
	Exterior Wall - Repair, Repoint & Seal Brick	261	SF	$10.70	$2,793	$7,517
	Door, Repaint Existing	1	LEAF	$90.95	$91	$245
	Paint, Floor & Interior Wall	300	SF	$1.61	$483	$1,300
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,346
					$3,867	**$10,408**
	STRUCTURAL				**Not Required**	
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$4,867**	**$13,100**
	Published Location Factor (Negative 5.3 Percent)				-$258	
	Remoteness Factor (25 Percent)				$1,217	
	Federal Wage Rate Factor (7.5 Percent)				$182	
	Design Contingency (20 Percent)				$973	
	Total Direct Construction Costs				**$6,981**	
	Standard General Conditions (14 Percent)				$977	
	Government General Conditions (8 Percent)				$558	
	Bond (2 Percent)				$140	
	Historic Preservation Factor (15 Percent)				$1,047	
	Subtotal NET Construction Cost				**$9,704**	
	Overhead (10 Percent)				$970	
	Profit (10 Percent)				$970	
	Estimated NET Construction Cost				**$11,645**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$582	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$873	
	Total Estimated NET Cost of Construction				**$13,100**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Privy

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$1,355	$1,355	$3,647
					$1,355	**$3,647**
	ARCHITECTURAL					
	Exterior Wall - Repair, Repoint & Seal Brick	132	SF	$10.70	$1,412	$3,802
	Millwork, Refinish Existing	5	LF	$267.50	$1,338	$3,600
	Metal Roofing, Repair & Repaint Existing	56	SF	$7.49	$419	$1,129
	Windows, Paint Frame & Sash	3	SF	$47.08	$141	$380
	Wood Roof Vent, Epoxy Stabilize	1	EA	$267.50	$268	$720
	Door, Refinish Existing	1	LEAF	$240.75	$241	$648
	Paint, Exterior Trim	135	SF	$5.35	$722	$1,944
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,346
					$5,041	**$13,570**
	STRUCTURAL				**Not Required**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

OUTER ISLAND - Privy

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$6,396**	**$17,217**
	Published Location Factor (Negative 5.3 Percent)				-$339	
	Remoteness Factor (25 Percent)				$1,599	
	Federal Wage Rate Factor (7.5 Percent)				$240	
	Design Contingency (20 Percent)				$1,279	
	Total Direct Construction Costs				**$9,175**	
	Standard General Conditions (14 Percent)				$1,285	
	Government General Conditions (8 Percent)				$734	
	Bond (2 Percent)				$184	
	Historic Preservation Factor (15 Percent)				$1,376	
	Subtotal NET Construction Cost				**$12,753**	
	Overhead (10 Percent)				$1,275	
	Profit (10 Percent)				$1,275	
	Estimated NET Construction Cost				**$15,304**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$765	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$1,148	
	Total Estimated NET Cost of Construction				**$17,217**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

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Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

SUMMARY - DEVILS ISLAND

Item	Description		Direct Cost	Total Net
	DEVILS ISLAND - Site Improvements		**$121,598**	**$315,912**
	DEVILS ISLAND - Devils Island Light Station Tower		**$100,383**	**$260,797**
	DEVILS ISLAND - Keepers Quarters		**$222,364**	**$577,704**
	DEVILS ISLAND - Assistant Keepers Quarters		**$158,208**	**$411,026**
	DEVILS ISLAND - Fog Signal Building		**$90,317**	**$234,646**
	DEVILS ISLAND - Oil House #1		**$3,520**	**$9,145**
	DEVILS ISLAND - Oil House #2		**$6,513**	**$16,922**
	DEVILS ISLAND - Tramway Engine Building		**$9,603**	**$24,948**
	DEVILS ISLAND - Boathouse		**$37,526**	**$97,494**
	TOTAL (Devil's Island)		**$750,032**	**$1,948,594**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate is Based on 2011 Costs

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

DEVILS ISLAND - Site Improvements

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	SITE IMPROVEMENTS - Cost Per Consultant					
	Site Clearing, 8.7 Acres	1	LS	$22,410	$22,410	$58,221
	Site Circulation / Accessibility	1	LS	$49,063	$49,063	$127,465
	Site Structures	1	LS	$36,000	$36,000	$93,529
	Small Scale Site Features	1	LS	$13,875	$13,875	$36,047
	Landscape Plantings	1	LS	$250.00	$250	$650
					$121,598	**$315,912**
	Subtotal Direct Construction Costs				**$121,598**	**$315,912**
	Published Location Factor (Negative 5.3 Percent)				-$6,445	
	Remoteness Factor (20 Percent)				$24,320	
	Federal Wage Rate Factor (7.5 Percent)				$4,560	
	Design Contingency (20 Percent)				$24,320	
	Total Direct Construction Costs				**$168,352**	
	Standard General Conditions (14 Percent)				$23,569	
	Government General Conditions (8 Percent)				$13,468	
	Bond (2 Percent)				$3,367	
	Historic Preservation Factor (15 Percent)				$25,253	
	Subtotal NET Construction Cost				**$234,009**	
	Overhead (10 Percent)				$23,401	
	Profit (10 Percent)				$23,401	
	Estimated NET Construction Cost				**$280,811**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$14,041	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$21,061	
	Total Estimated NET Cost of Construction				**$315,912**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Devils Island Light Station Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$47,500	$47,500	$123,406
					$47,500	**$123,406**
	ARCHITECTURAL					
	Handrails	42	LF	$96.30	$4,045	$10,508
	Windows, Restore Operation - Export / Import to Site	150	SF	$64.20	$9,630	$25,019
	Windows, Paint Frame & Sash	153	SF	$23.54	$3,602	$9,357
	Door, Repaint & Replace Hardware - Existing	4	LEAF	$749.00	$2,996	$7,784
	Paint, Exterior Siding & Trim	1,794	SF	$2.68	$4,808	$12,491
	Patch Roof Rust	94	SF	$4.28	$402	$1,045
	Paint, Roof & Trim	94	SF	$12.84	$1,207	$3,136
	Paint, Interior Wall & Ceiling	226	SF	$1.61	$364	$945
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$27,553	**$71,584**
	STRUCTURAL					
	Foundation, Repair Cracks	576	SF	$21.40	$12,326	$32,024
	Additional Investigation, Allowance	1	LS	$10,000	$10,000	$25,980
					$22,326	**$58,004**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

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Estimate is Based on 2011 Costs

DEVILS ISLAND - Devils Island Light Station Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	HVAC, Clean & Re-install Ball Ventilator	1	EA	$856.00	$856	$2,224
	HVAC, Increase Ventilation - Passive	223	SF	$5.35	$1,193	$3,100
					$2,049	**$5,323**
	ELECTRICAL					
	Inspect / Replace Lighting Protection System	223	SF	$4.28	$954	$2,480
					$954	**$2,480**
	Subtotal Direct Construction Costs				**$100,383**	**$260,797**
	Published Location Factor (Negative 5.3 Percent)				-$5,320	
	Remoteness Factor (20 Percent)				$20,077	
	Federal Wage Rate Factor (7.5 Percent)				$3,764	
	Design Contingency (20 Percent)				$20,077	
	Total Direct Construction Costs				**$138,980**	
	Standard General Conditions (14 Percent)				$19,457	
	Government General Conditions (8 Percent)				$11,118	
	Bond (2 Percent)				$2,780	
	Historic Preservation Factor (15 Percent)				$20,847	
	Subtotal NET Construction Cost				**$193,183**	
	Overhead (10 Percent)				$19,318	
	Profit (10 Percent)				$19,318	
	Estimated NET Construction Cost				**$231,819**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$11,591	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$17,386	
	Total Estimated NET Cost of Construction				**$260,797**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$60,058	$60,058	$156,032
	Remove Floor Decking & Structure	66	SF	$19.26	$1,271	$3,302
	Remove Roofing, Shingles	70	SF	$6.42	$449	$1,168
	Remove Finishes - Floor, Wall & Ceiling	2,373	SF	$2.68	$6,360	$16,522
					$68,138	**$177,024**
	ARCHITECTURAL					
	Handrails	30	LF	$96.30	$2,889	$7,506
	Exterior Wall - Repoint / Seal Masonry	3,040	SF	$7.49	$22,770	$59,156
	Roof Shingles, Wood	72	SF	$17.12	$1,233	$3,202
	Windows, Paint Frame & Sash & Replace Glazing Putty	190	SF	$23.54	$4,473	$11,620
	Door, Refinish Existing	14	LEAF	$267.50	$3,745	$9,730
	Door Hatch, Replace / Stabilize Rotted Wood & Repaint	1	LS	$750.00	$750	$1,949
	Flooring, Repair Existing	210	SF	$3.21	$674	$1,751
	Paint, Porch	67	SF	$10.70	$717	$1,863
	Paint, Soffit & Trim	452	SF	$3.75	$1,695	$4,404
	Paint, Interior Wall & Ceiling	2,633	SF	$1.61	$4,239	$11,013
	Paint, Stairs	1	FLT	$1,070	$1,070	$2,780
	Paint, Miscellaneous Items	1	LS	$2,000	$2,000	$5,196
					$46,254	**$120,168**
	STRUCTURAL					
	Wood Floor Decking & Structure	66	SF	$53.50	$3,531	$9,174
	Floor Structure, Reinforce Existing	47	SF	$37.45	$1,760	$4,573
					$5,291	**$13,746**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
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Estimate is Based on 2011 Costs

DEVILS ISLAND - Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Remove Unused Propane Piping	15	LF	$21.40	$321	$834
	Inspect / Repair Septic System	1	LS	$15,000	$15,000	$38,970
	Clean & Repair Radiators	12	EA	$1,445	$17,334	$45,034
	HVAC, Increase Ventilation	2,373	SF	$9.10	$21,594	$56,102
					$54,249	**$140,940**
	ELECTRICAL					
	Light Fixtures	15	EA	$240.75	$3,611	$9,382
	Receptacles	20	EA	$160.50	$3,210	$8,340
	Inspect / Replace Lightning Protection System	921	SF	$4.28	$3,942	$10,241
	Replace Feeder / Branch Circuitry	2,373	SF	$7.49	$17,774	$46,177
	Fire Alarm System, New Smoke / Carbon Monoxide Detectors	2,373	SF	$0.91	$2,159	$5,610
	Photovoltaic System (Ventilation)	2,373	SF	$6.42	$15,235	$39,580
	Overcurrent Protection	1	LS	$2,500	$2,500	$6,495
					$48,431	**$125,824**
	Subtotal Direct Construction Costs				**$222,364**	**$577,704**
	Published Location Factor (Negative 5.3 Percent)				-$11,785	
	Remoteness Factor (20 Percent)				$44,473	
	Federal Wage Rate Factor (7.5 Percent)				$8,339	
	Design Contingency (20 Percent)				$44,473	
	Total Direct Construction Costs				**$307,862**	
	Standard General Conditions (14 Percent)				$43,101	
	Government General Conditions (8 Percent)				$24,629	
	Bond (2 Percent)				$6,157	
	Historic Preservation Factor (15 Percent)				$46,179	
	Subtotal NET Construction Cost				**$427,929**	
	Overhead (10 Percent)				$42,793	
	Profit (10 Percent)				$42,793	
	Estimated NET Construction Cost				**$513,515**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$25,676	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$38,514	
	Total Estimated NET Cost of Construction				**$577,704**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Assistant Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$54,355	$54,355	$141,215
	Remove Finishes - Floor, Wall & Ceiling	2,153	SF	$2.68	$5,770	$14,991
					$60,125	**$156,206**
	ARCHITECTURAL					
	Exterior Wall - Repoint Masonry	86	SF	$14.98	$1,288	$3,347
	Wood Stairs, Porch - Replace Existing	5	RISER	$240.75	$1,204	$3,127
	Handrails	40	LF	$96.30	$3,852	$10,008
	Millwork, Refinish Existing	10	LF	$160.50	$1,605	$4,170
	Windows, Paint Frame & Sash	198	SF	$23.54	$4,661	$12,109
	Windows, Repair & Reglaze	50	SF	$58.85	$2,943	$7,645
	Door, Refinish & Replace Hardware - Existing	15	LEAF	$749.00	$11,235	$29,189
	Wood Flooring, Refinish Existing	1,225	SF	$5.35	$6,554	$17,027
	Flooring, Repair Existing	217	SF	$3.21	$697	$1,810
	Paint & Repair Plaster, Interior Wall & Ceiling	4,969	SF	$4.28	$21,267	$55,253
	Paint, Porch	67	SF	$10.70	$717	$1,863
	Paint, Soffit & Trim	341	SF	$3.75	$1,279	$3,322
	Paint, Stairs	1	FLT	$1,070	$1,070	$2,780
	Paint, Miscellaneous Items	1	LS	$2,000	$2,000	$5,196
					$60,371	**$156,844**
	STRUCTURAL					
	Wood Floor Decking & Structure	81	SF	$53.50	$4,334	$11,258
	Floor Structure, Reinforce Existing	54	SF	$37.45	$2,022	$5,254
	Columns, Reinforce Existing	2	EA	$1,605	$3,210	$8,340
					$9,566	**$24,852**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
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Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Assistant Keepers Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Remove Plumbing Fixtures & Piping	2	EA	$802.50	$1,605	$4,170
	Radiators, Clean Existing	9	EA	$321.00	$2,889	$7,506
	HVAC, Increase Ventilation - Passive	2,153	SF	$5.35	$11,519	$29,925
					$16,013	**$41,601**
	ELECTRICAL					
	Remove Light Fixtures	5	EA	$48.15	$241	$625
	Remove Receptacles	10	EA	$37.45	$375	$973
	Inspect / Replace Lightning Protection System	2,153	SF	$4.28	$9,215	$23,940
	Remove Feeder / Branch Circuitry	2,153	SF	$1.07	$2,304	$5,985
					$12,134	**$31,524**
	Subtotal Direct Construction Costs				**$158,208**	**$411,026**
	Published Location Factor (Negative 5.3 Percent)				-$8,385	
	Remoteness Factor (20 Percent)				$31,642	
	Federal Wage Rate Factor (7.5 Percent)				$5,933	
	Design Contingency (20 Percent)				$31,642	
	Total Direct Construction Costs				**$219,039**	
	Standard General Conditions (14 Percent)				$30,665	
	Government General Conditions (8 Percent)				$17,523	
	Bond (2 Percent)				$4,381	
	Historic Preservation Factor (15 Percent)				$32,856	
	Subtotal NET Construction Cost				**$304,464**	
	Overhead (10 Percent)				$30,446	
	Profit (10 Percent)				$30,446	
	Estimated NET Construction Cost				**$365,357**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$18,268	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$27,402	
	Total Estimated NET Cost of Construction				**$411,026**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Fog Signal Building

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$39,666	$39,666	$103,053
	Remove Finishes - Floor, Wall & Ceiling	1,316	SF	$2.68	$3,527	$9,163
					$43,193	**$112,216**
	ARCHITECTURAL					
	Exterior Wall - Repoint Masonry	126	SF	$14.98	$1,887	$4,904
	Exterior Wall - Repair Existing Shingles	200	SF	$10.70	$2,140	$5,560
	Roofing, Repair Existing	1,222	SF	$3.21	$3,923	$10,191
	Windows, Paint Frame, Sash & Repair Hardware	108	SF	$23.54	$2,542	$6,605
	Door, Refinish & Replace Hardware - Existing	6	LEAF	$749.00	$4,494	$11,675
	Flooring, Repair & Paint Existing	819	SF	$3.21	$2,629	$6,830
	Ceiling, Repair Existing	128	SF	$5.35	$685	$1,779
	Paint, Interior Wall & Ceiling	2,568	SF	$1.61	$4,134	$10,741
	Paint, Exterior Trim	1,222	SF	$3.21	$3,923	$10,191
	Paint, Miscellaneous Items	1	LS	$1,000	$1,000	$2,598
					$27,357	**$71,075**
	STRUCTURAL					
	Wall Framing, Replace South Addition	380	SF	$9.63	$3,659	$9,507
	Roof Structure, Reinforce Existing	754	SF	$10.70	$8,068	$20,960
					$11,727	**$30,467**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Fog Signal Building

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL				**Not Required**	
	ELECTRICAL					
	Replace Light Fixtures	10	EA	$240.75	$2,408	$6,255
	Replace Branch Circuitry	1,316	SF	$4.28	$5,632	$14,633
					$8,040	**$20,888**
	Subtotal Direct Construction Costs				**$90,317**	**$234,646**
	Published Location Factor (Negative 5.3 Percent)				-$4,787	
	Remoteness Factor (20 Percent)				$18,063	
	Federal Wage Rate Factor (7.5 Percent)				$3,387	
	Design Contingency (20 Percent)				$18,063	
	Total Direct Construction Costs				**$125,044**	
	Standard General Conditions (14 Percent)				$17,506	
	Government General Conditions (8 Percent)				$10,004	
	Bond (2 Percent)				$2,501	
	Historic Preservation Factor (15 Percent)				$18,757	
	Subtotal NET Construction Cost				**$173,812**	
	Overhead (10 Percent)				$17,381	
	Profit (10 Percent)				$17,381	
	Estimated NET Construction Cost				**$208,574**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$10,429	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$15,643	
	Total Estimated NET Cost of Construction				**$234,646**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
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Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
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Estimate is Based on 2011 Costs

DEVILS ISLAND - Oil House #1

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$1,985	$1,985	$5,157
					$1,985	**$5,157**
	ARCHITECTURAL					
	Remove Loose Mortar & Repoint Masonry	1	LS	$1,000	$1,000	$2,598
	Door, Repair Frame	1	LEAF	$535.00	$535	$1,390
					$1,535	**$3,988**
	STRUCTURAL				**Not Required**	
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$3,520**	**$9,145**
	Published Location Factor (Negative 5.3 Percent)				-$187	
	Remoteness Factor (20 Percent)				$704	
	Federal Wage Rate Factor (7.5 Percent)				$132	
	Design Contingency (20 Percent)				$704	
	Total Direct Construction Costs				**$4,873**	
	Standard General Conditions (14 Percent)				$682	
	Government General Conditions (8 Percent)				$390	
	Bond (2 Percent)				$97	
	Historic Preservation Factor (15 Percent)				$731	
	Subtotal NET Construction Cost				**$6,774**	
	Overhead (10 Percent)				$677	
	Profit (10 Percent)				$677	
	Estimated NET Construction Cost				**$8,129**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$406	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$610	
	Total Estimated NET Cost of Construction				**$9,145**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Oil House #2

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$3,032	$3,032	$7,877
					$3,032	**$7,877**
	ARCHITECTURAL					
	Remove & Replace Metal Roof Shingles	144	SF	$9.10	$1,310	$3,404
	Install Roof Ridge Cap	26	LF	$40.66	$1,057	$2,747
	Paint, Roof & Trim	144	SF	$6.42	$924	$2,402
	Paint, Interior Wall & Ceiling	59	SF	$3.21	$189	$492
					$3,481	**$9,045**
	STRUCTURAL				**Not Required**	
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$6,513**	**$16,922**
	Published Location Factor (Negative 5.3 Percent)				-$345	
	Remoteness Factor (20 Percent)				$1,303	
	Federal Wage Rate Factor (7.5 Percent)				$244	
	Design Contingency (20 Percent)				$1,303	
	Total Direct Construction Costs				**$9,018**	
	Standard General Conditions (14 Percent)				$1,262	
	Government General Conditions (8 Percent)				$721	
	Bond (2 Percent)				$180	
	Historic Preservation Factor (15 Percent)				$1,353	
	Subtotal NET Construction Cost				**$12,535**	
	Overhead (10 Percent)				$1,253	
	Profit (10 Percent)				$1,253	
	Estimated NET Construction Cost				**$15,042**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$752	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$1,128	
	Total Estimated NET Cost of Construction				**$16,922**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Tramway Engine Building

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$6,497	$6,497	$16,879
					$6,497	**$16,879**
	ARCHITECTURAL					
	Exterior Wall - Repoint Masonry	16	SF	$14.98	$240	$623
	Windows, Paint Frame & Sash & Replace Glazing Putty	27	SF	$23.54	$636	$1,651
	Door, Refinish & Replace Hardware - Existing	2	LEAF	$749.00	$1,498	$3,892
	Paint, Soffit & Trim	62	SF	$3.75	$233	$604
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$3,106	**$8,069**
	STRUCTURAL				**Not Required**	
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$9,603**	**$24,948**
	Published Location Factor (Negative 5.3 Percent)				-$509	
	Remoteness Factor (20 Percent)				$1,921	
	Federal Wage Rate Factor (7.5 Percent)				$360	
	Design Contingency (20 Percent)				$1,921	
	Total Direct Construction Costs				**$13,295**	
	Standard General Conditions (14 Percent)				$1,861	
	Government General Conditions (8 Percent)				$1,064	
	Bond (2 Percent)				$266	
	Historic Preservation Factor (15 Percent)				$1,994	
	Subtotal NET Construction Cost				**$18,480**	
	Overhead (10 Percent)				$1,848	
	Profit (10 Percent)				$1,848	
	Estimated NET Construction Cost				**$22,176**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$1,109	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$1,663	
	Total Estimated NET Cost of Construction				**$24,948**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

DEVILS ISLAND - Boathouse

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$5,000	$5,000	$12,990
	Remove Floor Planking & Structure	130	SF	$9.63	$1,252	$3,252
					$6,252	**$16,243**
	ARCHITECTURAL					
	Exterior Wall - Repair Existing	1,070	SF	$5.35	$5,725	$14,872
	Wood Stairs, Railings & Landing	1	FLT	$1,070	$1,070	$2,780
	Windows, Repair & Paint Frame & Sash & Replace Glazing Putty	7	SF	$47.08	$330	$856
	Door, Repair & Refinish Original	2	LEAF	$749.00	$1,498	$3,892
	Paint, Exterior Siding & Trim	1,070	SF	$2.68	$2,868	$7,450
	Paint, Soffit & Trim	63	SF	$3.75	$236	$614
	Paint, Miscellaneous Items	1	LS	$1,000	$1,000	$2,598
					$12,726	**$33,062**
	STRUCTURAL					
	Wood Floor Planking & Structure	130	SF	$26.75	$3,478	$9,035
	Floor Structure, Reinforce Existing	576	SF	$10.70	$6,163	$16,012
	Wall & Roof Framing, Reinforce / Replace Existing	925	SF	$9.63	$8,908	$23,142
					$18,548	**$48,189**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate is Based on 2011 Costs

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

DEVILS ISLAND - Boathouse

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$37,526**	**$97,494**
	Published Location Factor (Negative 5.3 Percent)				-$1,989	
	Remoteness Factor (20 Percent)				$7,505	
	Federal Wage Rate Factor (7.5 Percent)				$1,407	
	Design Contingency (20 Percent)				$7,505	
	Total Direct Construction Costs				**$51,955**	
	Standard General Conditions (14 Percent)				$7,274	
	Government General Conditions (8 Percent)				$4,156	
	Bond (2 Percent)				$1,039	
	Historic Preservation Factor (15 Percent)				$7,793	
	Subtotal NET Construction Cost				**$72,218**	
	Overhead (10 Percent)				$7,222	
	Profit (10 Percent)				$7,222	
	Estimated NET Construction Cost				**$86,661**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$4,333	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$6,500	
	Total Estimated NET Cost of Construction				**$97,494**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate is Based on 2011 Costs

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

SUMMARY - LONG ISLAND

Item	Description		Direct Cost	Total Net
	LONG ISLAND - Site Improvements		**$66,940**	**$173,911**
	LONG ISLAND - La Pointe Light Tower		**$84,122**	**$218,550**
	LONG ISLAND - Chequamegon Point Lighthouse		**$30,157**	**$78,349**
	LONG ISLAND - Triplex		**$352,051**	**$914,633**
	LONG ISLAND - Oil Building		**$5,198**	**$13,504**
	TOTAL (Long Island)		**$538,468**	**$1,398,947**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - Site Improvements

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	SITE IMPROVEMENTS - Cost Per Consultant					
	Site Clearing, 5.2 Acres	1	LS	$12,890	$12,890	$33,488
	Site Circulation / Accessibility	1	LS	$29,700	$29,700	$77,161
	Site Structures	1	LS	$19,250	$19,250	$50,012
	Small Scale Site Features	1	LS	$4,500	$4,500	$11,691
	Landscape Plantings	1	LS	$600.00	$600	$1,559
					$66,940	**$173,911**
	Subtotal Direct Construction Costs				**$66,940**	**$173,911**
	Published Location Factor (Negative 5.3 Percent)				-$3,548	
	Remoteness Factor (20 Percent)				$13,388	
	Federal Wage Rate Factor (7.5 Percent)				$2,510	
	Design Contingency (20 Percent)				$13,388	
	Total Direct Construction Costs				**$92,678**	
	Standard General Conditions (14 Percent)				$12,975	
	Government General Conditions (8 Percent)				$7,414	
	Bond (2 Percent)				$1,854	
	Historic Preservation Factor (15 Percent)				$13,902	
	Subtotal NET Construction Cost				**$128,823**	
	Overhead (10 Percent)				$12,882	
	Profit (10 Percent)				$12,882	
	Estimated NET Construction Cost				**$154,588**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$7,729	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$11,594	
	Total Estimated NET Cost of Construction				**$173,911**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - La Pointe Light Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$29,775	$29,775	$77,356
	Remove Exterior Window	7	SF	$8.56	$60	$156
	Remove Finishes - Floor, Wall & Ceiling	334	SF	$2.68	$895	$2,326
					$30,730	**$79,837**
	ARCHITECTURAL					
	Repair Exterior Wall	30	SF	$21.40	$642	$1,668
	Handrails	61	LF	$96.30	$5,874	$15,262
	Windows, New Glazing	7	SF	$117.70	$824	$2,141
	Windows, Paint Frame & Sash	69	SF	$23.54	$1,624	$4,220
	Door, Repaint & Replace Hardware - Existing	5	LEAF	$749.00	$3,745	$9,730
	Door, Remove & Patch Rust	5	LEAF	$856.00	$4,280	$11,120
	Patch Roof Rust	62	SF	$4.28	$265	$689
	Paint, Floor	350	SF	$2.94	$1,029	$2,673
	Paint, Roof & Trim	62	SF	$12.84	$796	$2,068
	Paint, Exterior Siding & Trim	1,045	SF	$2.68	$2,801	$7,276
	Paint, Interior Wall & Ceiling	640	SF	$1.61	$1,030	$2,677
	Paint, Stairs	3	FLT	$1,070	$3,210	$8,340
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$26,621	**$69,161**
	STRUCTURAL					
	Foundation, Repair Cracks	130	SF	$42.80	$5,564	$14,455
	Bases / Belled Ends, Repair Existing	8	EA	$909.50	$7,276	$18,903
	Additional Investigation, Allowance	1	LS	$10,000	$10,000	$25,980
					$22,840	**$59,339**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - La Pointe Light Tower

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	HVAC, Increase Ventilation - Passive	334	SF	$5.35	$1,787	$4,642
					$1,787	**$4,642**
	ELECTRICAL					
	Inspect / Replace Lightning Protection System	334	SF	$6.42	$2,144	$5,571
					$2,144	**$5,571**
	Subtotal Direct Construction Costs				**$84,122**	**$218,550**
	Published Location Factor (Negative 5.3 Percent)				-$4,458	
	Remoteness Factor (20 Percent)				$16,824	
	Federal Wage Rate Factor (7.5 Percent)				$3,155	
	Design Contingency (20 Percent)				$16,824	
	Total Direct Construction Costs				**$116,467**	
	Standard General Conditions (14 Percent)				$16,305	
	Government General Conditions (8 Percent)				$9,317	
	Bond (2 Percent)				$2,329	
	Historic Preservation Factor (15 Percent)				$17,470	
	Subtotal NET Construction Cost				**$161,889**	
	Overhead (10 Percent)				$16,189	
	Profit (10 Percent)				$16,189	
	Estimated NET Construction Cost				**$194,267**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$9,713	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$14,570	
	Total Estimated NET Cost of Construction				**$218,550**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - Chequamegon Point Lighthouse

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$24,427	$24,427	$63,462
	Remove Finishes - Floor, Wall & Ceiling	159	SF	$2.68	$426	$1,107
					$24,853	**$64,569**
	ARCHITECTURAL					
	Windows, Paint Frame & Sash	16	SF	$47.08	$753	$1,957
	Windows, Remove Plexiglas & Provide New Glazing	16	SF	$58.85	$942	$2,446
	Paint, Roof & Trim	50	SF	$12.84	$642	$1,668
	Paint, Exterior Siding & Trim	437	SF	$2.68	$1,171	$3,043
	Paint, Interior Wall & Ceiling	171	SF	$1.61	$275	$715
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$4,283	**$11,128**
	STRUCTURAL				**Not Required**	
	MECHANICAL				**Not Required**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - Chequamegon Point Lighthouse

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	ELECTRICAL					
	(USCG Light & Power Equipment Relocation Not Included)					
	Inspect / Replace Lightning Protection System	159	SF	$6.42	$1,021	$2,652
					$1,021	**$2,652**
	Subtotal Direct Construction Costs				**$30,157**	**$78,349**
	Published Location Factor (Negative 5.3 Percent)				-$1,598	
	Remoteness Factor (20 Percent)				$6,031	
	Federal Wage Rate Factor (7.5 Percent)				$1,131	
	Design Contingency (20 Percent)				$6,031	
	Total Direct Construction Costs				**$41,753**	
	Standard General Conditions (14 Percent)				$5,845	
	Government General Conditions (8 Percent)				$3,340	
	Bond (2 Percent)				$835	
	Historic Preservation Factor (15 Percent)				$6,263	
	Subtotal NET Construction Cost				**$58,036**	
	Overhead (10 Percent)				$5,804	
	Profit (10 Percent)				$5,804	
	Estimated NET Construction Cost				**$69,644**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$3,482	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$5,223	
	Total Estimated NET Cost of Construction				**$78,349**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - Triplex

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$112,929	$112,929	$293,391
	Remove Roof Sheathing	986	SF	$2.14	$2,110	$5,482
	Remove Roofing, Shingles	1,971	SF	$3.21	$6,327	$16,437
	Remove Plywood Infill at Windows	100	SF	$3.21	$321	$834
	Remove Finishes - Floor, Wall & Ceiling	4,830	SF	$2.68	$12,944	$33,630
					$134,631	**$349,774**
	ARCHITECTURAL					
	Moisture Barrier, Foundation	1,568	SF	$10.70	$16,778	$43,588
	Roofing, Repair Hole at Cornice	1	LS	$500.00	$500	$1,299
	Roofing, Asphalt Shingles, Felt & Flashings	1,971	SF	$6.96	$13,718	$35,640
	Windows, Epoxy Stabilize & Patch Areas of Rust	600	SF	$9.10	$5,460	$14,185
	Windows, New Glazing	600	SF	$58.85	$35,310	$91,736
	Windows, Paint Frame & Sash	600	SF	$16.05	$9,630	$25,019
	Interior Wall Framing & Gypsum Board	1,600	SF	$8.56	$13,696	$35,582
	Porch, Epoxy Stabilize & Paint	57	SF	$13.91	$793	$2,060
	Ceiling, Gypsum Board	1,605	SF	$2.14	$3,435	$8,923
	Paint, Exterior Siding & Trim	2,692	SF	$2.68	$7,215	$18,744
					$106,534	**$276,777**
	STRUCTURAL					
	Floor Structure, Reinforce Existing	1,620	SF	$8.56	$13,867	$36,027
	Wall Structure, Repair Column Base	1	LS	$750.00	$750	$1,949
	Roof Structure, Reinforce Existing	1,981	SF	$12.84	$25,436	$66,083
	Roof Sheathing	986	SF	$3.21	$3,165	$8,223
					$43,218	**$112,282**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - Triplex

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Remove Plumbing Fixtures & Piping	12	EA	$267.50	$3,210	$8,340
	HVAC, Increase Ventilation	4,830	SF	$5.35	$25,841	$67,134
					$29,051	**$75,474**
	ELECTRICAL					
	Remove Light Fixtures	4,830	SF	$0.54	$2,608	$6,776
	Photovoltaic System (Ventilation)	4,830	SF	$6.42	$31,009	$80,561
	Overcurrent Protection	1	LS	$5,000	$5,000	$12,990
					$38,617	**$100,327**
	Subtotal Direct Construction Costs				**$352,051**	**$914,633**
	Published Location Factor (Negative 5.3 Percent)				-$18,659	
	Remoteness Factor (20 Percent)				$70,410	
	Federal Wage Rate Factor (7.5 Percent)				$13,202	
	Design Contingency (20 Percent)				$70,410	
	Total Direct Construction Costs				**$487,414**	
	Standard General Conditions (14 Percent)				$68,238	
	Government General Conditions (8 Percent)				$38,993	
	Bond (2 Percent)				$9,748	
	Historic Preservation Factor (15 Percent)				$73,112	
	Subtotal NET Construction Cost				**$677,506**	
	Overhead (10 Percent)				$67,751	
	Profit (10 Percent)				$67,751	
	Estimated NET Construction Cost				**$813,007**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$40,650	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$60,976	
	Total Estimated NET Cost of Construction				**$914,633**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

LONG ISLAND - Oil Building

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$1,908	$1,908	$4,957
	Remove Finishes - Floor, Wall & Ceiling	42	SF	$10.70	$449	$1,168
					$2,357	**$6,125**
	ARCHITECTURAL					
	Door, Refinish & Replace Hardware - Existing	1	LEAF	$749.00	$749	$1,946
	Paint, Roof Vent	1	EA	$428.00	$428	$1,112
	Paint, Roof & Trim	94	SF	$3.75	$353	$916
	Paint, Exterior Siding & Trim	210	SF	$2.68	$563	$1,462
	Paint, Interior Wall & Ceiling	154	SF	$1.61	$248	$644
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$2,840	**$7,379**
	STRUCTURAL				**Not Required**	
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$5,198**	**$13,504**
	Published Location Factor (Negative 5.3 Percent)				-$275	
	Remoteness Factor (20 Percent)				$1,040	
	Federal Wage Rate Factor (7.5 Percent)				$195	
	Design Contingency (20 Percent)				$1,040	
	Total Direct Construction Costs				**$7,196**	
	Standard General Conditions (14 Percent)				$1,007	
	Government General Conditions (8 Percent)				$576	
	Bond (2 Percent)				$144	
	Historic Preservation Factor (15 Percent)				$1,079	
	Subtotal NET Construction Cost				**$10,003**	
	Overhead (10 Percent)				$1,000	
	Profit (10 Percent)				$1,000	
	Estimated NET Construction Cost				**$12,003**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$600	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$900	
	Total Estimated NET Cost of Construction				**$13,504**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate is Based on 2011 Costs

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

SUMMARY - SAND ISLAND

Item	Description		Direct Cost	Total Net
	SAND ISLAND - Site Improvements		**$24,120**	**$62,664**
	SAND ISLAND - Light Station Quarters		**$233,990**	**$607,910**
	SAND ISLAND - Oil Building		**$4,172**	**$10,839**
	SAND ISLAND - Privy		**$6,833**	**$17,752**
	TOTAL (Sand Island)		**$269,115**	**$699,164**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

SAND ISLAND - Site Improvements

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	SITE IMPROVEMENTS - Cost Per Consultant					
	Site Clearing, 1.0 Acre	1	LS	$3,540	$3,540	$9,197
	Site Circulation / Accessibility	1	LS	$7,680	$7,680	$19,953
	Small Scale Site Features	1	LS	$5,875	$5,875	$15,263
	Station Vegetation	1	LS	$7,025	$7,025	$18,251
					$24,120	**$62,664**
	Subtotal Direct Construction Costs				**$24,120**	**$62,664**
	Published Location Factor (Negative 5.3 Percent)				-$1,278	
	Remoteness Factor (20 Percent)				$4,824	
	Federal Wage Rate Factor (7.5 Percent)				$905	
	Design Contingency (20 Percent)				$4,824	
	Total Direct Construction Costs				**$33,394**	
	Standard General Conditions (14 Percent)				$4,675	
	Government General Conditions (8 Percent)				$2,672	
	Bond (2 Percent)				$668	
	Historic Preservation Factor (15 Percent)				$5,009	
	Subtotal NET Construction Cost				**$46,418**	
	Overhead (10 Percent)				$4,642	
	Profit (10 Percent)				$4,642	
	Estimated NET Construction Cost				**$55,701**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$2,785	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$4,178	
	Total Estimated NET Cost of Construction				**$62,664**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

SAND ISLAND - Light Station Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$57,645	$57,645	$149,763
	Remove Roofing, Shingles	2,071	SF	$3.21	$6,648	$17,271
	Remove Finishes - Floor, Wall & Ceiling	2,132	SF	$2.68	$5,714	$14,844
					$70,007	**$181,878**
	ARCHITECTURAL					
	Chimney Liner	38	LF	$107.00	$4,066	$10,564
	Wood Ramp, ADA	16	SF	$133.75	$2,140	$5,560
	Handrails	42	LF	$96.30	$4,045	$10,508
	Millwork, Refinish Existing	15	LF	$160.50	$2,408	$6,255
	Windows, Paint Frame, Sash & Replace Hardware	314	SF	$16.05	$5,040	$13,093
	Windows, New Lantern Glazing	80	SF	$58.85	$4,708	$12,231
	Door, Refinish & Replace Hardware - Existing	17	LEAF	$749.00	$12,733	$33,081
	Roofing, Metal Shingles & Flashings	2,071	SF	$17.12	$35,456	$92,114
	Raingutter & Downspouts	156	LF	$48.15	$7,511	$19,515
	Replace Missing Brass Intake Caps	5	EA	$214.00	$1,070	$2,780
	Wood Flooring, Refinish Original	1,384	SF	$5.35	$7,404	$19,237
	Flooring, Repair Existing	192	SF	$3.21	$616	$1,601
	Paint & Repair Plaster, Interior Wall & Ceiling	3,078	SF	$4.28	$13,174	$34,226
	Paint, Stairs	1	FLT	$1,070	$1,070	$2,780
	Paint, Miscellaneous Items	1	LS	$2,000	$2,000	$5,196
					$103,440	**$268,739**
	STRUCTURAL					
	Floor Sheathing	99	SF	$6.42	$636	$1,651
	Floor Structure, Reinforce Existing	96	SF	$37.45	$3,595	$9,340
	Roof Structure, Reinforce Existing	272	SF	$21.40	$5,821	$15,123
					$10,052	**$26,114**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

SAND ISLAND - Light Station Quarters

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL					
	Remove Unused Propane Piping	20	LF	$21.40	$428	$1,112
	Cistern, Clean, Paint & Seal Existing	1	EA	$5,350	$5,350	$13,899
	HVAC, Increase Ventilation	2,132	SF	$9.10	$19,401	$50,405
					$25,179	**$65,416**
	ELECTRICAL					
	Replace Lightning Protection System	2,132	SF	$4.28	$9,125	$23,707
	Photovoltaic System (Ventilation)	2,132	SF	$6.42	$13,687	$35,560
	Overcurrent Protection	1	LS	$2,500	$2,500	$6,495
					$25,312	**$65,762**
	Subtotal Direct Construction Costs				**$233,990**	**$607,910**
	Published Location Factor (Negative 5.3 Percent)				-$12,401	
	Remoteness Factor (20 Percent)				$46,798	
	Federal Wage Rate Factor (7.5 Percent)				$8,775	
	Design Contingency (20 Percent)				$46,798	
	Total Direct Construction Costs				**$323,959**	
	Standard General Conditions (14 Percent)				$45,354	
	Government General Conditions (8 Percent)				$25,917	
	Bond (2 Percent)				$6,479	
	Historic Preservation Factor (15 Percent)				$48,594	
	Subtotal NET Construction Cost				**$450,303**	
	Overhead (10 Percent)				$45,030	
	Profit (10 Percent)				$45,030	
	Estimated NET Construction Cost				**$540,364**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$27,018	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$40,527	
	Total Estimated NET Cost of Construction				**$607,910**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

SAND ISLAND - Oil Building

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$2,191	$2,191	$5,692
					$2,191	**$5,692**
	ARCHITECTURAL					
	Door, Refinish & Replace Hardware - Existing	1	LEAF	$749.00	$749	$1,946
	Paint, Interior Wall & Ceiling	228	SF	$3.21	$732	$1,901
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$1,981	**$5,146**
	STRUCTURAL				**Not Required**	
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$4,172**	**$10,839**
	Published Location Factor (Negative 5.3 Percent)				-$221	
	Remoteness Factor (20 Percent)				$834	
	Federal Wage Rate Factor (7.5 Percent)				$156	
	Design Contingency (20 Percent)				$834	
	Total Direct Construction Costs				**$5,776**	
	Standard General Conditions (14 Percent)				$809	
	Government General Conditions (8 Percent)				$462	
	Bond (2 Percent)				$116	
	Historic Preservation Factor (15 Percent)				$866	
	Subtotal NET Construction Cost				**$8,029**	
	Overhead (10 Percent)				$803	
	Profit (10 Percent)				$803	
	Estimated NET Construction Cost				**$9,634**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$482	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$723	
	Total Estimated NET Cost of Construction				**$10,839**	

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

SAND ISLAND - Privy

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	DEMOLITION					
	Building Related:					
	Hazmat (Mold, Lead, Etc) Cost Per Consultant	1	LS	$2,087	$2,087	$5,422
					$2,087	**$5,422**
	ARCHITECTURAL					
	Millwork, Refinish Existing	5	LF	$160.50	$803	$2,085
	Windows, Paint Frame, Sash & Remove Board	3	SF	$47.08	$141	$367
	Doors, Refinish, Replace Hardware & Add Plexiglass Panel	1	LEAF	$909.50	$910	$2,363
	Roofing, Replace Metal Ball Closures at Edges of Ridge	2	EA	$304.95	$610	$1,585
	Paint, Exterior Siding & Trim	20	SF	$10.70	$214	$556
	Paint & Repair Plaster, Interior Wall & Ceiling	163	SF	$8.56	$1,395	$3,625
	Paint, Miscellaneous Items	1	LS	$500.00	$500	$1,299
					$4,572	**$11,879**
	STRUCTURAL					
	Floor Sheathing	27	SF	$6.42	$173	$450
					$173	**$450**

Project: Light Stations of Michigan, Outer, Devils, Long & Sand Islands
Park: Apostle Islands National Lakeshore
PMIS: 154596

Estimate By: Parametrix, Inc.
Date: March 4, 2011

Reviewed By: Parametrix, Inc.
Date: March 4, 2011

Estimate is Based on 2011 Costs

SAND ISLAND - Privy

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost	Total Net
	MECHANICAL				**Not Required**	
	ELECTRICAL				**Not Required**	
	Subtotal Direct Construction Costs				**$6,833**	**$17,752**
	Published Location Factor (Negative 5.3 Percent)				-$362	
	Remoteness Factor (20 Percent)				$1,367	
	Federal Wage Rate Factor (7.5 Percent)				$256	
	Design Contingency (20 Percent)				$1,367	
	Total Direct Construction Costs				**$9,460**	
	Standard General Conditions (14 Percent)				$1,324	
	Government General Conditions (8 Percent)				$757	
	Bond (2 Percent)				$189	
	Historic Preservation Factor (15 Percent)				$1,419	
	Subtotal NET Construction Cost				**$13,149**	
	Overhead (10 Percent)				$1,315	
	Profit (10 Percent)				$1,315	
	Estimated NET Construction Cost				**$15,779**	
	Contracting Method Adjustment (Pre-Qualified Open Competitive - 5 Percent)				$789	
	Inflation Escalation (22 Months to Midpoint of Construction, Jan 2013 - 7.5 Percent)				$1,183	
	Total Estimated NET Cost of Construction				**$17,752**	

LANDSCAPE COST ESTIMATE DETAILS

Michigan Island

Park: Apostle Islands National Lakeshore
Package: Michigan Island Treatment Preferred Alternative

Reviewed By:
Date: 2/7/11

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost
Division 01					
Division 02					
	Site Clearing				
1	Clear forest to meadow (inc. stump removal)	2.2	acre	$ 4,000.00	$ 8,800.00
2	Selective Removal of embankment of trees	1.8	acre	$ 3,000.00	$ 5,400.00
3	Stabilize embankment	1	ls	$ 14,000.00	$ 14,000.00
	Subtotal				**$ 28,200.00**
	Circulation/Site Accessibility				
1	Retain boat dock location	1	ls	$ -	$ -
2	Repair tramway to working condition	1	ls	$ -	$ -
3	Repair tramway	1	ls	$ 1,200.00	$ 1,200.00
4	Repair tram turntable (see power house)	1	ls	$ -	$ -
5	Repair tramway railing (west side)	130	lf	$ 50.00	$ 6,500.00
6	Add tramway railing (east side)	130	lf	$ 100.00	$ 13,000.00
7	Repair tram tracks by replacing timbers and resetting tracks	345	lf	$ 25.00	$ 8,625.00
8	Widen concrete walks (410 lf)	820	sf	$ 6.00	$ 4,920.00
9	Repair concrete walks	200	sf	$ 10.00	$ 2,000.00
	Subtotal				**$ 36,245.00**
	Structures				
1	Protect Area of Root Cellar	1	ls	$ 2,500.00	$ 2,500.00
2	Mark Oil Building	1	ls	$ 5,000.00	$ 5,000.00
3					
	Subtotal				**$ 7,500.00**
	Small Scale Features				
1	Relocate solar panel to less obtrusive location.	1	ls	$ -	$ -
2	Repaint flagpole	1	ls	$ 1,000.00	$ 1,000.00
3	Restore missing small scale features (birdbath, planter)	1	ls	$ 250.00	$ 250.00
4	Relocate fire pit	1	ls	$ 250.00	$ 250.00
5	Maintain radio antennae pole and base (2)	1	ls	$ 1,000.00	$ 1,000.00
6	Maintain drainage system	1	ls	$ 500.00	$ 500.00
7	Retain non-contributing features--misc. concrete footings	1	ls	$ -	$ -
	Subtotal				**$ 3,000.00**
	Station Vegetation				
1	Restore orchard planting pattern				
	Preserve Existing Apple Tree	1	ea	$ 500.00	$ 500.00
	Replant orchard trees	12	ea	$ 250.00	$ 3,000.00
2	Restore Pine Plantings				
	Preserve Existing Pines (pruning)	9	ea	$ 500.00	$ 4,500.00
	New Pine plantings	7	ea	$ 250.00	$ 1,750.00
3	Restore Landscape Features at Old MI Lighthouse				
	Tree Plantings	12	ea	$ 250.00	$ 3,000.00
	Stone Planters	7	ea	$ 250.00	$ 1,750.00
	Shrub Plantings	25	ea	$ 25.00	$ 625.00
	Perennial Plantings	1	ls	$ 750.00	$ 750.00
	Wood Fencing	400	ea	$ 10.00	$ 4,000.00
4	Restore Landscape Features at Keepers Quarters				
	Remove and replant Cedar hedge	30	ea	$ 30.00	$ 900.00
	Restore stone planter feature	5	ea	$ 250.00	$ 1,250.00
	Perennial plantings	1	ls	$ 750.00	$ 750.00
5	Remove non-contributing trees west of Old Lighthouse (4)	8	ea	$ 500.00	$ 4,000.00
6	Remove invasive plant materials from landscape	1	ls	$ 2,500.00	$ 2,500.00
	Subtotal				**$ 29,275.00**
	SUBTOTAL SITE WORK				**$ 104,220.00**

Outer Island

Park: Apostle Islands National Lakeshore
Package: Outer Island Treatment Preferred Alternative

Reviewed By:
Date: 2/7/2011

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost
Division 01					
Division 02					
	Clearing				
1	Clear forest to meadow (inc. stump removal)	1.2	acre	$ 4,000.00	$ 4,800.00
2	Selective clearing of trees on embankment	1.3	acre	$ 3,000.00	$ 3,900.00
3	Stabilize embankment	1	ls	$ 11,000.00	$ 11,000.00
4	Maintain Drainage Swale	1165	lf	$ 0.50	$ 582.50
	Subtotal				**$ 20,282.50**
	Circulation/Site Accessibility				
1	Retain current Boat Dock location	1	ls	$ -	$ -
2	Repair tramway to working condition	1	ls	$ 2,500.00	$ 2,500.00
3	Maintain tram tracks	145	lf	$10.00	$1,450.00
4	Repair tramway railings (east side)	110	lf	$ 37.50	$ 4,125.00
5	Add tramway guardrail (west side)	110	lf	$ 62.50	$ 6,875.00
6	Repair concrete walks	1	ls	$ 2,500.00	$ 2,500.00
	Subtotal				**$ 17,450.00**
	Structures				
1	Retain NPS Privy	1	ls	$ -	$ -
2	Protect Area of Cabin	1	ls	$ 2,500.00	$ 2,500.00
3	Mark historic location of well	1	ls	$ 250.00	$ 250.00
	Subtotal				**$ 2,750.00**
	Small Scale Features				
1	Retain Park Signs	1	ls	$ -	$ -
2	Remove Propane Tanks	1	ls	$ 1,000.00	$ 1,000.00
3	Repair Flagpole (bluff)	1	ls	$ 1,000.00	$ 1,000.00
4	Retain Concrete Foundation west of Fog Signal Building	1	ls	$ -	$ -
5	Stabilize Cistern	1	ls	$ 500.00	$ 500.00
6	Retain Fuel Tank	1	ls	$ -	$ -
7	Maintain Flag Pole (compass)	1	ls	$ 250.00	$ 250.00
8	Repair Ladder Stand	1	ls	$ 1,500.00	$ 1,500.00
9	Relocate Fire Pit	1	ls	$ 250.00	$ 250.00
10	Retain Solar Panel	1	ls	$ -	$ -
	Subtotal				**$ 4,500.00**
	Station Vegetation				
1	Remove landscape plantings between FSB and Oil Storage	5	ea	$ 25.00	$ 125.00
2	Maintain landscape plantings south of Oil Storage	10	ea	$ 150.00	$ 1,500.00
	Subtotal				**$ 1,625.00**
	SUBTOTAL SITE WORK				**$ 46,607.50**

Devils Island

Park: Apostle Islands National Lakeshore
Package: Devils Island Preferred Alternative

Reviewed By:
Date: 2/7/2011

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost
Division 02					
	Clearing				
1	Clear forest to brush (stump removal not inc.) between K Q and Tower	1.1	acre	$ 3,000.00	$ 3,300.00
2	Clear vegetation along shoreline to low brush	3.7	acre	$ 2,000.00	$ 7,400.00
3	Clear forest to brush - west of Tower (stump removal not inc.)	3.5	acre	$ 3,000.00	$ 10,500.00
4	Clear forest to lawn south of Tower	0.07	acre	$ 4,000.00	$ 280.00
5	Clear forest at tram track corridor	0.13	acre	$ 3,000.00	$ 390.00
6	Clear forest to brush (stump removal not inc.) at Tramway Engine Bldg	0.18	acre	$ 3,000.00	$ 540.00
	Subtotal	**8.68**			**$ 22,410.00**
	Circulation				
1	Maintain hiking trail and corridor to Boat House	5600	lf	$ 2.75	$ 15,400.00
2	Maintain hiking trails to East and West Landings	4350	lf	$ 2.75	$ 11,962.50
3	Stabilize tram tracks	1600	lf	$ 12.00	$ 19,200.00
4	Repair concrete walks	1	ls	$ 2,500.00	$ 2,500.00
	Subtotal				**$ 49,062.50**
	Structures				
1	Maintain pump house	1	ls	$ 4,000.00	$ 4,000.00
2	Maintain radio tower	1	ls	$ 1,000.00	$ 1,000.00
3	Maintain beacon light	1	ls	$ 1,000.00	$ 1,000.00
4	Repair boat dock	1	ls	$ 20,000.00	$ 20,000.00
5	Maintain stone jetty	1	ls	$ 10,000.00	$ 10,000.00
	Subtotal				**$ 36,000.00**
	Small Scale Features				
1	Stabilize derrick footings	1	ls	$ 1,000.00	$ 1,000.00
2	Repair masonry tram terminal	1	ls	$ 10,000.00	$ 10,000.00
3	Remove fencing at Fog Signal Building	1	ls	$ 1,000.00	$ 1,000.00
4	Maintain basin north of Tower	1	ls	$ 1,000.00	$ 1,000.00
5	Retain footings north of Tower	3	ls	$ -	$ -
5	Retain oil tank footings south of Oil House 1	1	ls	$ -	$ -
6	Maintain flagpole	1	ls	$ 250.00	$ 250.00
7	Maintain well head	1	ls	$ 125.00	$ 125.00
8	Retain tramway anchor east of Tramway Engine Building	1	ls	$ -	$ -
9	Retain solar panel	1	ls	$ -	$ -
10	Retain fire pit	1	ls	$ -	$ -
11	Maintain stone wall at Boat House site	1	ls	$ 500.00	$ 500.00
	Subtotal				**$ 13,875.00**
	Landscape Plantings				
1	Maintain ornamental planting bed at Oil House 2	1	ls	$ 125.00	$ 125.00
2	Maintain lilac west of Keepers Quarters	1	ea	$ 125.00	$ 125.00
3	Preserve lawn clearing	1	ls	$ -	$ -
	Subtotal				**$ 250.00**
	Subtotal Site Work				**$ 121,597.50**

Long Island

Park: Apostle Islands National Lakeshore
Package: Long Island Treatment Preferred Alternative

Reviewed By:
Date: 2/7/11

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost
Division 01					
Division 02					
	Clearing				
	LaPointe				
1	Clear trees to dune along shoreline	1.61	acre	$ 2,000.00	$ 3,220.00
2	Clear trees to dune (50' from Buildings)	0.63	acre	$ 2,000.00	$ 1,260.00
3	Clear trees to dune at radio beacon tower	0.02	acre	$ 2,000.00	$ 40.00
4	Maintain clearing at footpath from LaPointe to south shoreline	0.26	acre	$ 1,500.00	$ 390.00
	Original Lighthouse				
1	Clear forest at lighthouse ruin area	1.00	acre	$ 3,000.00	$ 3,000.00
	Chequamegon Point				
1	Clear trees 50' from towers	0.00	acre	$ -	$ -
	Reservation				
1	Clear forest along walk corridor	1.66	acre	$ 3,000.00	$ 4,980.00
	Subtotal	**$ 5.18**			**$ 12,890.00**
	Circulation/Site Accessibility				
	LaPointe				
1	Maintain Boat Dock in current location	1	ls	$ 5,000.00	$ 5,000.00
2	Repair concrete walks	1	ls	$ 2,500.00	$ 2,500.00
3	New floating boardwalk across dune	1170	sf	$ 10.00	$ 11,700.00
4	Remove boardwalk	0	ls	$ -	$ -
5	Preserve corrugated metal path from LaPointe to south shoreline	1	ls	$ 1,000.00	$ 1,000.00
	Original Lighthouse				
1	Investigate/locate additional historic walks under sand	1	ls	$ 1,000.00	$ 1,000.00
	Chequamegon Point				
1	Investigate/locate additional historic walks under sand	1	ls	$ 1,000.00	$ 1,000.00
2	Repair concrete walks	1	ls	$ 2,500.00	$ 2,500.00
	Reservation				
1	Investigate/locate additional historic walks under sand	1	ls	$ 5,000.00	$ 5,000.00
	Subtotal				**$ 29,700.00**
	Structures				
	LaPointe				
1	Maintain Fog Signal Building foundation	1	ls	$ 750.00	$ 750.00
2	Stabilize Shed	1	ls	$ 2,500.00	$ 2,500.00
3	Remove Utility Units west of Fog Signal Building	1	ls	$ 1,000.00	$ 1,000.00
4	Add new NPS restroom (vault)	0	ls	$ 10,000.00	$ -
	Original Lighthouse				
1	Stabilize Lighthouse Ruin	1	ls	$ 2,500.00	$ 2,500.00
2	Repair Oil Building	1	ls	$ 2,500.00	$ 2,500.00
3	Stabilize Privy	1	ls	$ 2,500.00	$ 2,500.00
4	Stabilize Root Cellar	1	ls	$ 2,500.00	$ 2,500.00
5	Retain Remnant Shed	1	ls	$ -	$ -
	Chequamegon Point				
1	Maintain Old Light Tower in current location	1	ls	$ -	$ -
2	Remove Light Tower	1	ls	$ 5,000.00	$ 5,000.00
	Subtotal				**$ 19,250.00**
	Small Scale Features				
	LaPointe				
1	Maintain Cistern and Piping (add lockable top)	1	ls	$ 2,500.00	$ 2,500.00
2	Retain Concrete Footings - A (Steel Framed Radio Tower)	1	ls	$ -	$ -
3	Retain Concrete Footings - B (Radio Beacon Tower)	1	ls	$ -	$ -
4	Retain Remnant Rubble Pile	1	ls	$ -	$ -
5	Retain Fuel Tank	1	ls	$ -	$ -
6	Retain Septic Bed	1	ls	$ -	$ -
7	Repair Flagpole	1	ls	$ 2,000.00	$ 2,000.00
8	Preserve Pipe Crib	1	ls	$ -	$ -
	Chequamegon Point				
1	Retain Original concrete footing for Old Light Tower	1	ls	$ -	$ -
2	Retain Rubble Crib Remnants	1	ls	$ -	$ -
	Reservation				
1	Maintain Overhead Electric Line	6270	lf	$ -	$ -
	Subtotal				**$ 4,500.00**
	Landscape Plantings				
	Original Lighthouse				
1	Maintain Cottonwoods (3) and Maple (1)	4	ea	$ 150.00	$ 600.00
	Subtotal				**$ 600.00**
	SUBTOTAL SITE WORK				**$66,940.00**

Sand Island

Park: Apostle Islands National Lakeshore
Package: Sand Island Treatment Preferred Alternative

Reviewed By:
Date: 2/7/11

Item	Description	Quantity	Unit	Cost/Unit	Direct Cost
Division 01					
Division 02					
	Clearing				
1	Clear forest to brush (stump removal not inc.)	0.58	acre	$ 3,000.00	$ 1,740.00
2	Clear forest to lawn (inc. stump removal)	0.45	acre	$ 4,000.00	$ 1,800.00
	Subtotal	**1.03**			**$ 3,540.00**
	Circulation				
1	Repair wooden staircase to landing	1	ls	$ 2,500.00	$ 2,500.00
2	Widen concrete walks (140 lf)	280	sf	$ 6.00	$ 1,680.00
3	Maintain East Bay trail and cleared corridor (2 miles, 8' width)	2	mile	$ 1,750.00	$ 3,500.00
	Subtotal				**$ 7,680.00**
	Small Scale Features				
1	Relocate Solar Panel	1	ls	$ 750.00	$ 2,000.00
2	Remove Fuel Tank	1	ls	$ 1,000.00	$ 2,000.00
3	Retain and Monitor Dump Sites	1	ls	$ 500.00	$ 500.00
4	Relocate Fire Pit	1	ls	$ 250.00	$ 250.00
5	Remove Flagpole	1	ls	$ 500.00	$ 500.00
6	Remove Stone North Arrow	1	ls	$ 125.00	$ 125.00
7	Remove and Replace Wooden Headwall	1	ls	$ 500.00	$ 500.00
	Subtotal				**$ 5,875.00**
	Station Vegetation				
1	Remove non-contributing tree	2	ea	$ 750.00	$ 1,500.00
2	Remove non-contributing vegetation	1	ls	$ 750.00	$ 750.00
3	Maintain lilacs	3	ea	$ 125.00	$ 375.00
4	Clear garden for plantings	1	ls	$ 500.00	$ 500.00
5	Restore missing garden features (fencing)	140	lf	$ 10.00	$ 1,400.00
6	Remove invasive plant materials from landscape	1	ls	$1,500.00	$2,500.00
	Subtotal				**$ 7,025.00**
	Subtotal Site Work				**$ 24,120.00**

PHASING

The park has expressed interest in phasing the overall project and will likely be required due to the budget constraints regardless.

The CLR/HSR recommendations generally follow the outcome of the May 2010 VA/CBA. Due to budget considerations, a second VA/CBA was held in December 2010 which used the May 2010 Preferred Alternative as a basis but reduced the scope to meet the available funding. The following is a list of items the first phase will include. As construction funds allow, the park will initiate the remainder of the CLR/HSR recommendations.

To date, Phase 1 generally includes:

- Focus on three islands: Michigan, Outer, Sand and Devils (no work on Long Island other than the roof of the Triplex.)
- Emphasis on large-scale landscape and major buildings
- Light station site accessibility (only between buildings – park to further study island access)
- Supports some volunteer or staff occupancy
- Supports visitor access (to most major buildings)

Please refer to the following spreadsheet which was included in the December 2010 VA Report as the preferred alternative.

Note that only shaded cells of the third column are included in the scope.

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Preferred Alternative:
Michigan, Outer, Long, Sand Islands with stabilization at Devils

MICHIGAN ISLAND

MICHIGAN ISLAND SITE					
	Quantity	Total Net	CLR/HSR Report	CLR/HSR Report Priority	Change from 2010.12.16 VA?
SITE/CULTURAL LANDSCAPE					
Site Clearing	4 ACRES	$103,101	POOR	SEVERE	N
Site Circulation/ Accessibility	1 LS	$96,652	FAIR	MODERATE	N
Site Structures	1 LS	$72,334	POOR	LOW	N
Small Scale Site Features	1 LS	$8,549	GOOD	LOW	N
Reservation Vegetation	1 LS	$6,576	FAIR to POOR	MODERATE	N
Station Vegetation	1 LS	$71,743	POOR	MODERATE	N
New Boat Dock	1	$500,000			N

$858,955

Overall Island Assumptions:
-Focus on (4) islands: Michigan, Outer,Devils and Sand
-Triplex work on Long, by Park
-Emphasis on large-scale landscape and major buildings
-Includes localized site accessibility where noted
-Supports volunteer or staff occupancy
-No lead soil mitigation

OLD MICHIGAN ISLAND LIGHTHOUSE					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, mold and bat guano were identified or assumed to be present.	1 LS	$171,063 (No lead soil mitigation)		MODERATE and LOW	Y (refined hazmat $, post-VA)
Roof Removal and Replacement	1,459 SF	$38,646	POOR	SEVERE	N
Repair Plaster and Repoint and Coat Masonry, Exterior Walls	3,389 SF	$103,940	FAIR	MODERATE	N
Install Rain gutter and Downspouts	120 LF	$15,056	N/A	MODERATE	N
Enlarge Door Opening	1 EA	$4,879	POOR	SEVERE	N
Install Exterior Stairs	11 SF	$1,840	FAIR	SEVERE	N
Remove and Replace Interior Finishes	7,260 SF	$56,945	POOR	SEVERE	N

Refinish Existing Millwork	15 LF	$6,273	GOOD to FAIR	MODERATE	N
Install Handrails in Tower and Kitchen Entry	86 LF	$21,580	FAIR	SEVERE	N
Install Security Gate at Tower Base	1 EA	$3,625			N
Install New Glazing; Reinstall Glazing in Windows; Repaint Frames and Sash	55 SF; 164 SF; 219 SF	$30,098	FAIR	MODERATE	N
Paint Tower Roof and Trim	50 SF	$836	FAIR	MODERATE	N
Paint Miscellaneous	1 LS	$5,261			N
STRUCTURAL					
Reinforce Existing Floor Structure	62 SF	$6,050	FAIR	SEVERE	N
Reinforce Existing Roof Structure	55 SF	$4,600	GOOD	UNKNOWN	N
MECHANICAL					
Remove Plumbing Fixtures and Piping	1 LS; 2 EA	$4,182	FAIR to POOR	LOW	N
Remove Boiler and Piping; Remove Radiators	1 EA; 2 EA	$10,316	FAIR	LOW	N
HVAC - Increase Ventilation	2,154 SF	$51,049	FAIR and POOR	SEVERE	N
ELECTRICAL					
Remove Light Fixtures and Receptacles; Install Photovoltaic System	20 EA; 2,154 SF	$39,240	POOR	SEVERE	N
Replace Lightning Protection System	1,459 SF	$16,272	FAIR to POOR	SEVERE	N
					$591,751

SECOND TOWER					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$13,150 (No lead soil mitigation)		MODERATE and LOW	Y - refined hazmat $
Roof Repair	280 SF	$5,465	GOOD	LOW	N
Remove Exterior Plexiglass Window	10 SF	$223	FAIR	MODERATE	N
Paint Soffit and Trim	50 SF	$1,673	GOOD	LOW	N
Install Security Gate at Tower Base	1 EA	$3,625			N
Install New Glazing in Windows; Repaint Frames and Sash	10 SF; 72 SF	$5,949	FAIR	MODERATE	N
Paint Miscellaneous	1 LS	$1,315			N
STRUCTURAL					
Repair Existing Column Bases	2 EA	$16,729	GOOD	UNKNOWN - Need to investigate cracked columns.	N
MECHANICAL					
Replace or Repair Brass Vent Caps, Increase Passive Ventilation	8 EA, 262 SF	$8,113	FAIR	MODERATE	N
ELECTRICAL					
Inspect and Replace Lightning Protection System	262 SF	$4,383	FAIR	MODERATE	N
					$60,625

KEEPERS QUARTERS					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$125,615		MODERATE and LOW	Y- revised hazmat $, based on information/discussion w hazmat consultant, after VA
Roof Removal and Replacement	1,105 SF	$29,269	POOR	SEVERE	N
Clean and Repair Exterior Brick	2,245 SF	$15,781	GOOD	MODERATE	N
Refinish Wood Porch	126 SF	$10,539	GOOD	LOW	N
Paint Exterior Siding and Trim	200 SF	$12,268	FAIR	LOW	N
Paint Soffit and Trim	441 SF	$4,304	FAIR	LOW	N
Install Handrails at Stairs	70 LF	$17,565	FAIR	SEVERE	N
Repaint Window Frames and Sash	200 SF	$1,394	GOOD	LOW	N
Refinish Existing Wood Flooring	1,782 SF	$24,843	FAIR	MODERATE	N
Remove and Replace Interior Finishes	4,667 SF	$65,516	GOOD	MODERATE	N
Paint Miscellaneous	1 LS	$5,261			N
STRUCTURAL					
Concrete Slab Infill, Concrete Ramp and Railings (Back Door Landing)	110 SF	$26,627	FAIR	SEVERE	N
Reinforce Existing Floor Structure	56 SF	$5,465	GOOD	LOW	N
Reinforce Existing Roof Structure	921 SF	$30,815	GOOD	LOW	N
MECHANICAL					
HVAC - Increase Ventilation	1,932 SF	$45,787	FAIR	MODERATE	N
Remove and replace propane piping	175 LF	$8,434	GOOD	MODERATE	N
ELECTRICAL					
Replace Lightning Protection System	1,105 SF	$12,324	FAIR	MODERATE	N
Ventilation - Existing PV System Expansion	1,932 SF	$32,320	FAIR	MODERATE	N
					$474,127

ASSISTANT KEEPERS QUARTERS & WORKSHOP					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$47,422 (No lead soil mitigation)		LOW	Y - refined hazmat $
Roof Removal and Replacement	714 SF	$18,912	POOR	SEVERE	N
Install Rain gutter and Downspouts	54 LF	$6,775	POOR	MODERATE	N
Paint Exterior Siding and Trim	1,134 SF	$7,904	GOOD	LOW	N
Paint Soffit and Trim	415 SF	$4,050	GOOD	LOW	N
Install New Glazing, Repaint Window Frames and Sash	50 SF, 98 SF	$13,678	FAIR	LOW	N
Paint Miscellaneous	1 LS	$2,630			N
STRUCTURAL					
Reinforce Existing Roof Structure	34 SF	$2,844	UNKNOWN	MODERATE	N
MECHANICAL					
Cap Unused Piping	1 LS	$2,630	POOR	LOW	N
HVAC - Increase Ventilation	778 SF	$18,438	POOR	MODERATE	N
ELECTRICAL					
Replace Feeder Circuitry	778 SF	$7,592	POOR	MODERATE	N
Ventilation - PV System	778 SF	$13,015	POOR	MODERATE	N
					$145,890

POWER HOUSE					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$34,248 (No lead soil mitigation)		LOW	Y - refined hazmat $
Roof Removal and Replacement	779 SF	$20,634	POOR	SEVERE	N
Install Rain gutter and Downspouts	88 LF	$11,041	N/A - None existing.	SEVERE	N
Repair Exterior Brick	175 SF	$9,759	GOOD	LOW	N
Paint Soffit and Trim	56 SF	$546	N/A	LOW	N
Repair Stairs	1 LS	$2,630	GOOD	LOW	N
Install New Glazing, Repaint Window Frames and Sash	40 SF, 40 SF	$8,588	FAIR	LOW	N
Paint Miscellaneous	1 LS	$2,630			N
STRUCTURAL					
Repair Existing Roof Structure	110 SF	$9,201	GOOD	LOW	N
MECHANICAL					
Replace Tram Hoist	1 EA	$21,000	POOR	SEVERE	Randy Ross to verify; $16,200 is base cost (not installed)
HVAC - Increase Ventilation	832 SF	$19,718	FAIR to POOR	MODERATE	N
ELECTRICAL					
Replace Branch Circuitry	832 SF	$11,599	POOR	LOW	N
Ventilation - Existing PV System Expansion	832 SF	$13,919	GOOD	MODERATE	N
Overcurrent Protection	1 LS	$3,156	GOOD	MODERATE	N
					$168,669

SHED -- Exterior Stabilization Only					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$18,442		LOW	Y- revised hazmat $, based on information/discussion w hazmat consultant, after VA
Roof Removal and Replacement	444 SF	$18,570	POOR	SEVERE	N
Install New Glazing, Repaint Window Frames and Sash	25 SF, 25 SF	$5,367	POOR	MODERATE	N
					$42,379

Total for Michigan Island Pref Alt.:	$2,342,396

OUTER ISLAND

OUTER ISLAND TOWER					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$20,000 (assoc. paint)		MODERATE and LOW	N
Exterior Wall - Repoint/Seal Masonry	3,192 SF	$64,549	FAIR to POOR	MODERATE	N
Install Handrails	17 LF	$4,420	POOR	MODERATE	N
Patch Roof Rust	65 SF	$751	FAIR	MODERATE	N
Paint, Roof and Trim	65 SF	$2,253	FAIR to POOR	MODERATE	N
Paint, Exterior Siding and Trim	3,192 SF	$23,053	FAIR to POOR	MODERATE	N
Install New Glazing; Reinstall Glazing in Windows; Repaint Frames and Sash	3 SF; 150 SF	$10,506	GOOD	LOW	N
Paint Miscellaneous	1 LS	$1,363			N
STRUCTURAL					
Monitor Existing Cracks	1 LS	$5,451	GOOD	LOW	N
MECHANICAL					
HVAC - Increase Ventilation - Passive	95 SF	$2,744	FAIR and POOR	MODERATE	N
ELECTRICAL					
Inspect/Replace Lightning Protection System	95 SF	$2,196	FAIR to POOR	MODERATE	N
					$137,286

KEEPERS QUARTERS					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$30,000 (assoc. paint)		MODERATE and LOW	Y - reduced, based on discussion w hazmat consultant, after VA
Exterior Wall - Repoint / Seal Masonry	2,204 SF	$44,569	GOOD	MODERATE	N
Install Handrails	40 LF	$10,400	POOR	LOW	N
Chimney Liner	37 SF	$10,689	FAIR	LOW	N
Windows, Repaint Frames and Sash	216 SF	$13,728	GOOD	MODERATE	N
Wood Flooring, Refinish Existing	1,779 SF	$25,696	GOOD to FAIR	MODERATE	N
Paint, Roof & Trim	243 SF	$2,457	GOOD	MODERATE	N
Paint, Soffit & Trim	339 SF	$3,428	GOOD	LOW	N
Paint, Exterior Siding & Trim	224 SF	$1,618	GOOD	LOW	N
Paint Miscellaneous	1 LS	$5,451			N
MECHANICAL					
HVAC, Increase Ventilation	2,494 SF	$61,241	FAIR	SEVERE (Chimney Liner); MODERATE (Ventilation/Piping)	N
ELECTRICAL					
Replace Lightning Protection System	1,222 SF	$14,121	FAIR to POOR	MODERATE	N
Photovoltaic System (Ventilation)	2,494 SF	$43,229	POOR	MODERATE	N
					$266,627

FOG SIGNAL BUILDING					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$20,000		MODERATE and LOW	N
Install Handrails	20 LF	$5,200	POOR	LOW	N
Roofing, Repair Existing	1,290 LF	$11,180	GOOD	LOW	N
Windows, Paint Frame & Sash	96 SF	$6,101	FAIR	MODERATE	N
Paint, Soffit & Trim	333 SF	$3,367	FAIR	LOW	N
Paint Stairs	1 FLT	$2,889	GOOD to FAIR	LOW	N
Paint Miscellaneous	1 LS	$2,725			N
STRUCTURAL					
Reinforce Existing Roof Structure	210 SF	$7,280	GOOD	LOW	N
MECHANICAL					
Tram Hoist, Replace	1 EA	$21,000	POOR	SEVERE	Randy Ross to verify; $16,200 is base cost (not installed)
					$79,742

OIL STORAGE					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$500		LOW	N
Exterior Wall - Repair & Repoint Brick	261 SF	$7,540	FAIR	LOW	N
					$8,040

PRIVY					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$1,000		LOW	N
Exterior Wall - Repair Brick	132 SF	$3,813	FAIR	LOW	N
Roofing, Repair Existing	56 LF	$485	FAIR to POOR	MODERATE	N
Windows, Paint Frame & Sash	3 SF	$381	FAIR	LOW	N
Paint, Exterior Siding & Trim	135 SF	$1,950	FAIR	LOW	N
					$7,629

Total for Outer Island Pref. Alt.:	$499,324

DEVILS ISLAND

DEVILS ISLAND LIGHT STATION TOWER					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$52,600 (No lead soil mitigation)		MODERATE	refined hazmat $
Install Handrails	42 elf	$10,539	FAIR	MODERATE	N
Windows, New Glazing	150 LF	$23,002	GOOD	MODERATE	N
Windows, Paint Frame & Sash	153 SF	$9,385	GOOD to FAIR	MODERATE	N
Paint, Exterior Trim	1,794 SF	$12,505	GOOD	MODERATE	N
Paint Roof Rust	94 SF	$1,048	FAIR	SEVERE	N
Paint, Roof & Trim	94 SF	$3,145	FAIR	SEVERE	N
Paint Miscellaneous	1 LS	$1,315			N

STRUCTURAL					
Foundation, Repair Cracks	576 SF	$32,120	POOR (visible portion)	UNKNOWN (evaluate further)	N
Additional Investigation, Allowance	1 LS	$26,303			N
MECHANICAL					
HVAC - Increase Ventilation (Passive)	223 SF	$3,109	FAIR	MODERATE	N
ELECTRICAL					
Inspect/Replace Lightning Protection System	223 SF	$2,487	FAIR to POOR	MODERATE	N
					$177,558

KEEPERS QUARTERS					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$50,000 (No lead soil mitigation)		MODERATE	N
Remove Floor Decking & Structure	66 SF	$3,312	FAIR	MODERATE	N
Remove Roofing, Shingles	70 SF	$1,171	GOOD to FAIR	LOW	N
Exterior Wall - Repoint Masonry	3,040 SF	$59,332	GOOD	LOW	N
Roof Shingles, Wood	72 SF	$3,212	GOOD to FAIR	LOW	N
Windows, Paint Frame & Sash	190 SF	$11,655	FAIR to POOR	SEVERE	N
Paint, Soffit & Trim	452 SF	$4,411	GOOD	LOW	N
STRUCTURAL					
Wood Floor Decking & Structure	66 SF	$9,201	FAIR	MODERATE	N
MECHANICAL					
HVAC, Increase Ventilations	2,373 SF	$56,239	FAIR	MODERATE	N
ELECTRICAL					
Inspect and Replace Lightning Protection System	921 SF	$10,272	FAIR to POOR	MODERATE	N
Photovoltaic System (Ventilation)	2,373 SF	$39,698	FAIR	MODERATE	N
					$248,503

ASSISTANT KEEPERS QUARTERS					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$50,000 (No lead soil mitigation)		MODERATE and LOW	Y - reduced, based on discussion w hazmat consultant, after VA
Exterior Wall - Repoint Masonry	86 SF	$3,357	GOOD	MODERATE	N
Windows, Paint Frame & Sash	198 SF	$12,145	GOOD to FAIR	MODERATE	N
Paint, Roof & Trim	1,198 SF	$11,691	GOOD	LOW	N
Paint, Soffit & Trim	341 SF	$3,328	FAIR	LOW	N
STRUCTURAL					
Wood Floor Decking & Structure	81 SF	$1,292	FAIR	SEVERE	N - but this number has been reduced to reflect Park's role in the work
Floor Structure, Reinforce Existing	54 SF	$5,270	FAIR	SEVERE	N
MECHANICAL					
HVAC, Increase Ventilation (Passive)	2,153 SF	$30,015	FAIR to POOR	MODERATE	N
ELECTRICAL					
Inspect and Replace Lightning Protection System	262 SF	$24,012	FAIR to POOR	MODERATE	N
					$141,110

FOG SIGNAL BUILDING					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$20,000 (No lead soil mitigation)		MODERATE	Y - reduced, based on discussion w hazmat consultant, after VA
Exterior Wall - Repoint Masonry	126 SF	$4,918	GOOD	LOW	N
Exterior Wall - Repair Existing	200 SF	$5,576	GOOD (shingles); POOR (foundation brick)	LOW	N
Roofing, Repair Existing	1,222 SF	$10,221	GOOD to FAIR	LOW	N
Windows, Paint Frame & Sash	108 SF	$6,625	FAIR to POOR	MODERATE	N
Paint, Roof & Trim	1,222 SF	$10,221	GOOD	LOW	N
					$57,561

BOATHOUSE					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$5,000 (No lead soil mitigation)			N
Exterior Wall - Repair Existing	1,070 SF	$14,917	GOOD to FAIR	LOW	N
					$19,917

Total for Devils Island Pref. Alt.:	$644,649

LONG ISLAND

TRIPLEX					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Rehabilitation per Park Decision		$92,295			Y - per Park discussions
Reroof		$57,705			
					$150,000

Total for Long Island Pref. Alt.:	$150,000

SAND ISLAND

SAND ISLAND SITE					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
SITE/CULTURAL LANDSCAPE					
Site Clearing	1 ACRE	$8,680	POOR	SEVERE	N
Site Circulation/ Accessibility	1 LS	$20,592 (Accessible boardwalk not included)	FAIR	MODERATE	N

$29,272

SAND ISLAND LIGHT STATION QUARTERS					
	Quantity	Total Net	CLR/HSR Report Condition	CLR/HSR Report Priority	Change from 2010.12.16 VA?
ARCHITECTURAL					
Hazmat Mitigation: Asbestos, lead containing paint, lead dust, lead in soils, and mold were identified or assumed to be present.	1 LS	$100,000 (No lead soil mitigation)		MODERATE	
Repair or Remove Finishes	2,132 SF	$14,861	GOOD to FAIR to POOR	MODERATE	
Wood Ramp, ADA	16 SF	$5,576	POOR	MODERATE	
Install Handrails	42 L F	$10,539	GOOD to FAIR	SEVERE	
Millwork, Refinish Existing	15 LF	$6,273	GOOD to FAIR to POOR	LOW	
Windows, Paint Frame & Sash	314 SF	$13,132	GOOD to FAIR	MODERATE	
Door, Refinish & Replace Hardware - Existing	17 LEAF	$33,179	GOOD	MODERATE	

Rain gutter & Downspouts	156 LF	$19,573	POOR	SEVERE	
Wood Flooring, Refinish Existing	1,384 SF	$19,294	GOOD to FAIR to POOR	LOW	
Flooring, Repair Existing	192 SF	$1,606	GOOD to FAIR to POOR	LOW	
Paint & Repair Plaster, Interior Wall & Ceiling	3,078 SF	$34,328	GOOD to FAIR to POOR	MODERATE	
Paint, Stairs	1 FLT	$2,788	GOOD to FAIR	MODERATE	
Paint Miscellaneous	1 LS	$5,261			
STRUCTURAL					
Floor Sheathing	99 SF	$1,656	GOOD	LOW	
Floor Structure, Reinforce Existing	96 SF	$9,368	GOOD	LOW	
Roof Structure, Reinforce Existing	272 SF	$15,168	UNKNOWN	UNKNOWN (evaluate further)	
MECHANICAL					
Remove Piping	20 LF	$1,115	FAIR to POOR	MODERATE	
Cistern - Clean, Paint & Seal Existing	1 EA	$13,941	FAIR to POOR	MODERATE	
HVAC - Increase Ventilation	2,132 SF	$50,527	GOOD	MODERATE	
ELECTRICAL					
Replace Lightning Protection System	2,132 SF	$23,777	POOR	LOW	
Photovoltaic System (Ventilation)	2,132 SF	$35,666	FAIR	MODERATE	
Overcurrent Protection	1 LS	$6,576	N/A	MODERATE	

$424,204

Total for Sand Island Pref. Alt.:	$453,476

PREFERRED ALTERNATIVE TOTAL:	$4,089,845

APPENDIX B: ACCESSIBILITY PLAN FOR RASPBERRY, MICHIGAN, OUTER, DEVILS, LONG AND SAND ISLANDS, JUNE 8-10, 2010

The following plan was developed by the NPS staff. As an outcome of this plan, a wholesale Accessibility Transition Plan is underway and in progress as of 6/2011.

National Park Service
Apostle Islands National Lakeshore
Bayfield, Wisconsin

Accessibility Plan For Raspberry, Michigan, Outer, Devils, Long and Sand Islands

Site Visits and VA Session June 8 – 10, 2010

Prepared for:
Apostle Islands National Lakeshore
Route 1, Box 4
Bayfield, Wisconsin 54814
Phone: 715.779.3398

Prepared by:
Nancy Baker, Denver Service Center Project Manager
Joanne Cody, Denver Service Center Accessibility Technical Expert

SECTION A: INTRODUCTION AND BACKGROUND

Introduction

This report summarizes recommendations for providing physical and programmatic access to the islands with light stations at Apostle Islands National Lakeshore. The national lakeshore will be referred to as the park in this document.

The recommendations in this report were developed during site visits to selected locations in the park and an accessibility assessment session held at park headquarters in Bayfield, Wisconsin. The site visits and the assessment took place June 8-10, 2010.

The Superintendent and staff of Apostle Islands National Lakeshore recognize the need to improve accessibility to sites within the park. It is a high priority to provide physical and programmatic access to the unique programs included on these islands.

This report describes a plan for providing accessibility improvements to the islands with light stations managed by Apostle Islands National Lakeshore: Raspberry, Michigan, Outer, Devils, Long and Sand Islands.

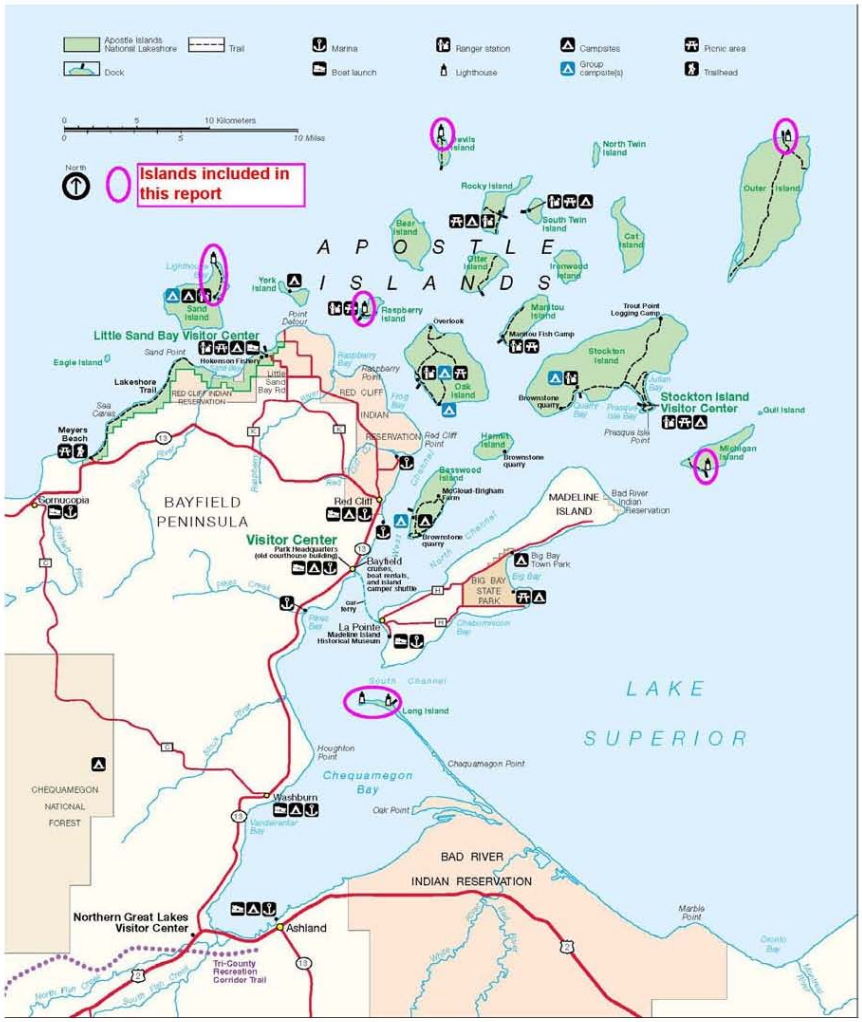
Accessibility laws, regulations and policies are not repeated in this document. See the Appendix for a list of references related to accessibility.

Background

Apostle Islands National Lakeshore is located in Ashland and Bayfield counties in northern Wisconsin. The following introduction is on the main page of the park website:

> *Jewels of Lake Superior*
>
> *Along windswept beaches and cliffs, visitors experience where water meets land and sky, culture meets culture, and past meets present. The 21 islands and 12 miles of mainland host a unique blend of cultural and natural resources. Lighthouses shine over Lake Superior and the new wilderness areas. Visitors can hike, paddle, sail, or cruise to experience these Jewels of Lake Superior.*

The park was established in 1970 *"in order to conserve and develop for the benefit, inspiration, education, recreational use, and enjoyment of the public certain significant islands and shoreline of the United States and their related geographic, scenic, and scientific values…"* (Public Law 91-424, September 26, 1970).



Islands Included in this Report

Public access to the islands is provided by a cruise service from Bayfield. The cruise boats are accessible and provide accessible restrooms. The cruise boats provide a scenic cruise passing by many islands and lighthouses. The cruise service stops at only one light station (at the south end of Raspberry Island) and National Park Service staff interpreters provide a two-hour tour of the light station.

Access to the various programs available on these islands will align with the Draft General Management Plan (GMP) and Wilderness Management Plan (WMP) for the park.

Raspberry, Michigan, Outer, and Devils Islands are designated wilderness areas except for the cultural landscape areas directly adjacent to the light stations. A majority of the Long Island site is a cultural landscape area.

Sand Island is the only light station island with a broad range of programs offered. With no designated wilderness area and close proximity to the mainland, making the activities provided on Sand Island accessible is a high priority for the park.

Apostle Islands Gaylord Nelson Wilderness Area (Light green areas)

SECTION B: THE ISLANDS

Raspberry Island Light Station

Raspberry Island – Raspberry Island Light Station has been rehabilitated and is the only light station at which guided tours are provided to the public on a regularly scheduled basis. Tours are available to the public arriving by cruise boat as well as those arriving at the island via private boats. Because this is the only island that is accessible to the public via cruise boat and also has public tours staffed by NPS interpretive employees, it is a high priority to provide physical access to the light station and program access at this site.

Physical Access - Physical access will be provided to the light station site with a mechanical lift from the dock to top of the bluff. Access to the first floor of the lighthouse will be provided via a ramp or other means of access. Accessible routes will be provided from the lift to an accessible vault toilet and to the lighthouse.

Program Access - Exhibits and media presentation on the first floor will provide program access to the second floor and light tower of the lighthouse for visitors with mobility impairments. Exterior programs will be made accessible through

interpretive waysides. Program access for visitors who are blind or have low vision will be available through tactile exhibits, alternative format media and descriptive tour by the trained interpretive staff at the light station. Assistive listening devices will be available for ranger led programs and tours by the trained interpretive staff.

Michigan Island Tramway

Michigan Island – Michigan Island is currently accessed only by private boat or charter. Program access to this island for visitors with disabilities will be provided through exhibits and literature available at a mainland visitor center.

Physical access - Physical access to the light station, including its buildings and structures, is limited due to the extreme topography of the site and extreme weather conditions that make docking unreliable and maintaining a lift very difficult. There are 123 steps on the tramway connecting the boat dock to the light station. Step on west side of light station will be replaced with a graded walk and accessible threshold. When the existing pit toilet is replaced, an accessible vault toilet will be installed.

The trails and campsite in the wilderness area will remain primitive; the existing pit toilet at the campsite will be replaced with an accessible vault toilet through the cyclic maintenance program.

Program Access – Exterior waysides/exhibits will include tactile elements and alternative formats for visitors who are blind or have low vision. If/when, this light station is open to the public, exhibits and media will provide program access for visitors with disabilities.

Outer Island Light Station and Tramway

Outer Island – Outer Island is currently accessed only by private boat or charter. Program access to this island for visitors with disabilities will be provided through exhibits and literature available at a mainland visitor center.

Physical access - Physical access to the light station, including its buildings and structures, is limited due to the extreme topography of the site and extreme weather conditions that make maintaining a lift very difficult. There are 108 steps on the tramway connecting the boat dock to the light station. When the existing pit toilet is replaced, an accessible vault toilet will be installed.

The trails and campsite in the wilderness area will remain primitive; the existing pit toilet at the campsite will be replaced with an accessible vault toilet through the cyclic maintenance program.

Program Access – Exterior waysides/exhibits will include tactile elements and alternative formats for visitors who are blind or have low vision. If/when, this light station is open to the public, exhibits and media will provide program access for visitors with disabilities.

Devils Island Rocky Cliffs and Light Station

Devils Island – Devils Island is currently accessed only by private boat or charter. The buildings on this island are not planned to be open to the public. Program access to this island for visitors with disabilities will be provided through exhibits and literature available at a mainland visitor center.

Physical access - Physical access to the Light Station, including its buildings and structures, is limited due to the topography of the site, rocky cliffs at the boat landings near the Light Station and steps leading into and through the structures. When the existing pit toilet is replaced, an accessible vault toilet will be installed.

Program Access – Exterior waysides/exhibits will include tactile elements and alternative formats for visitors who are blind or have low vision. If/when, this light station is open to the public, exhibits and media will provide program access for visitors with disabilities.

Sand Island Light Station

Sand Island – Sand Island provides several programs for visitors due to its relative close proximity to the mainland, gentle terrain and beach access. Programs include hiking, camping, visiting historic light station and historic farm, boating and sea kayaking, beach and water play, visiting an area of virgin white pines and viewing the sea caves on the islands' cliffs. Providing access to all of these activities is a high priority for the park.

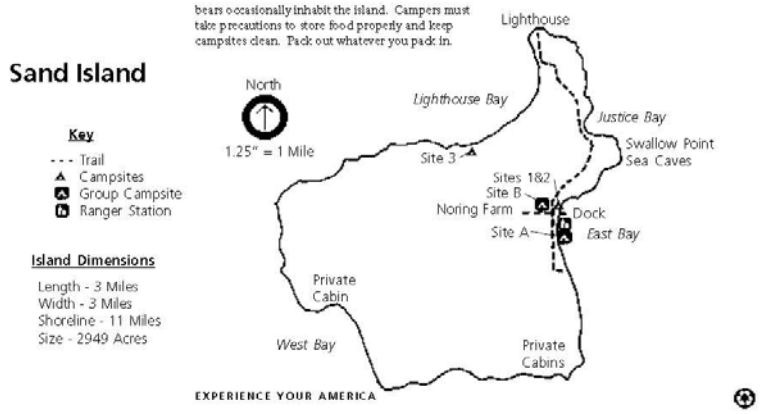
Physical Access - Physical access to the light station, farm, and overlooks will be provided by making the trail/boardwalk from the East Bay dock to the light station and farm accessible to trail standards. Accessible routes will be provided at the light

station to an accessible vault toilet and to the lighthouse. Access to the first floor of the lighthouse will be provided via a ramp or other means of access.

The dock at East Bay will be made accessible for cruise boats and private boats for visitors with disabilities. Accessible trails will be provided from the dock area to an accessible vault toilet, accessible campsite and accessible group campsite. A beach access route will be provided from the dock area to beach and water for beach and water access and sea kayaking.

Program Access - Exhibits and media presentation on the first floor will provide program access to the second floor and light tower of the lighthouse for visitors with mobility impairments. Exterior programs will be made accessible through interpretive waysides. Program access for visitors who are blind or have low vision will be available through tactile exhibits, alternative format media and descriptive tour by the trained interpretive staff at the light station. Assistive listening devices should be available for ranger led programs.

Excerpt from the Sand Island brochure:



The Apostle Islands have a complex human history that is an integral part of the natural landscape. Sand Island is an outstanding place to view the return of wild nature to lands that have experienced many complex and changing human uses. Second growth forests, old farm clearings, foundations, and existing structures all tell stories about the people who used, and continue to use Sand Island. Today's visitors experience these stories in several ways.

A two-mile trail connects the campground at East Bay with the Sand Island Lighthouse. A half mile north of East Bay the trail passes through an overgrown field (part of the Hansen farm). Justice Bay and a view of the Swallow Point sea caves are found at the trail's midpoint. A mile and a half north of the campground, the trail passes through an

area of virgin white pines. These 250-year-old trees were protected within a lighthouse reservation. An overlook with a panoramic view of Lighthouse Bay is a quarter mile south of the lighthouse. A second trail begins at the East Bay campground and leads west for one third of a mile to a farmsite once occupied by the Noring family. The site contains some historic farm equipment and remnants of buildings. Beware of the old well located among the ruins.

Permits are required for all camping in the national lakeshore. A camping fee is charged. The campground near the dock at East Bay has a group campsite and two individual campsites. Another group campsite is located 200 yards south of the dock. A third individual campsite is located at the west end of the Lighthouse Bay beach. For detailed information, request the free "Camping" brochure.

A wooden dock is available for public use adjacent to the campground in East Bay. Docks at the west side and southeastern tip of the island are for private use. Please avoid using these docks. A rock shelf near the lighthouse is fitted with mooring cleats. Submerged rocks make extreme caution necessary when using this landing. Boats often anchor at East Bay, Justice Bay, and Lighthouse Bay, depending on wind conditions. Visitors exploring the sea caves in sea kayaks or small boats should note weather conditions and use caution.

SECTION C: ASSESSMENT TEAM

The accessibility assessment team consisted of NPS employees from Apostle Islands National Lakeshore and Denver Service Center as well as two accessibility consultants from the Minneapolis-St. Paul area. The list of team participants follows:

Name/Role:	Title	Address	Phone/ Fax
Bob Krumenaker	Superintendent	Apostle Islands National Lakeshore Route 1, Box 4 Bayfield, WI 54814	715.779.3398 ext. 101
Jim Nepstad	Chief of Planning & Resource Management	Apostle Islands National Lakeshore Route 1, Box 4 Bayfield, WI 54814	715.779.3398 ext. 102
Myra Foster	Resource Education Chief	Apostle Islands National Lakeshore Route 1, Box 4 Bayfield, WI 54814	715.779.3398 ext. 301
Randy Ross	Facility Manager	Apostle Islands National Lakeshore Route 1, Box 4 Bayfield, WI 54814	715.779.3398 ext. 401
Dave Brunsvold	Park Accessibility Coordinator	Apostle Islands National Lakeshore Route 1, Box 4 Bayfield, WI 54814	715.779.5994
Nancy Baker	Project Manager	Denver Service Center 12795 West Alameda Pkwy PO Box 25287 Denver, CO 80225-0287	303.969.2275
Joanne Cody	Accessibility & Landscape Arch. Technical Expert	Denver Service Center 12795 West Alameda Pkwy PO Box 25287 Denver, CO 80225-0287	303.969.2278

Name/Role:	Title	Address	Phone/ Fax
Glenn Lamoree	Design & Construction Branch Chief	Denver Service Center 12795 West Alameda Pkwy PO Box 25287 Denver, CO 80225-0287	303.969.2434
Julee Q. Peterson	Accessibility Consultant	Need contact info	
Mara Peterson	Accessibility	Need contact info	

APPENDIX
ACCESSIBLITY LAWS, REGULATIONS AND POLICIES

ABAAS – Architectural Barriers Act Accessibility Standard. See http://www.access-board.gov/ada-aba/final.cfm

ADAAG – ADA Accessibility Guidelines

Draft Final Accessibility Guidelines for Outdoor Developed Areas – Guidelines for providing access to:

Camping Facilities, Picnic Facilities, Viewing Areas, Outdoor Recreation Access Routes, Trailheads, Trails, and Beach Access Routes

Harpers Ferry Programmatic Accessibility Guidelines for National Park Service Interpretive Media – See http://www.nps.gov/hfc/accessibility/index.htm#

Section 504 of the Rehabilitation Act of 1973, as amended 29 U.S.C. § 794

Section 504 of the Rehabilitation Act is a civil rights law. It was the first civil rights legislation in the United States designed to protect individuals with disabilities from discrimination based on their disability status. The nondiscrimination requirements of the law apply to employers and organizations that receive federal financial assistance. This statute was intended to prevent intentional or unintentional discrimination based on a person's disability. Included as an amendment to the Rehabilitation Act of 1973, the message of this section is concise; Section 504, 29 U.S.C.§794, states:

> "No otherwise qualified individual with a disability in the United States... shall, solely by reason of her or his disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

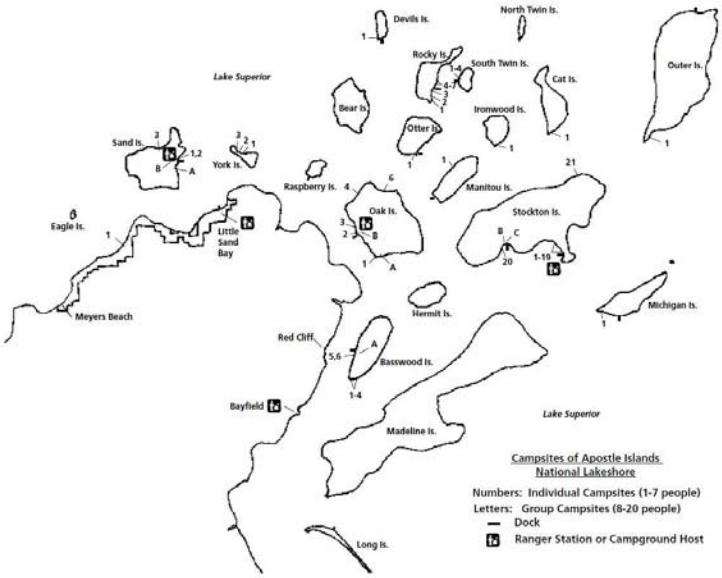
Department of the Interior regulations to implement Section 504 in federally-assisted programs can be found at 43 CFR17, Subpart B. See http://cfr.vlex.com/vid/appendix-subpart-part-17-19815557

Section 508 of the Rehabilitation Act of 1973, as amended 29 U.S.C. § 794

See http://www.section508.gov/index.cfm?FuseAction=Content&ID=11

Camping at Apostle Islands

There are currently 53 tent campsites and five group sites available in the park. Stockton provides two accessible campsites. All vault toilets will be replaced with accessible units through scheduled park maintenance updates. Campsites in designated wilderness will remain primitive sites. Sand Island campsites will provide an accessible camp site and an accessible group site with accessible amenities.



Island/ Location	Campsites	Sites	Well Water	Vault Toilet	Fire Ring	Tent Pad	Food Locker
Basswood	**1917 acres, 7.2 miles of trails**						
	South end of island	Sites 1-4:			X	X	X
	200 yards south of dock	Sites 5, 6:		X	X	X	X
	200 yards south of dock	Group Site A:		X	X		X
Cat	**1348 acres, no trails**						
	Near sandspit at south end of island	Site 1:		X	X		X
Devils	**318 acres, 1 mile of trail**						
	South end of island near dock	Site 1:		X	X		X
Ironwood	**659 acres, no trails**						
	Sandspit at south end of island	Site 1:			X	X	
Mainland Unit	**2568 acres, 4.5 miles of trails-**						

	On Lakeshore Trail, 4.5 miles NE of trailhead	Site 1:			X	X	X
Manitou	**1363 acres, 2.75 miles of trails**						
	Beach area 2 miles north of fish camp dock	Site 1:					X
Michigan	**1578 acres, 1.5 miles of trails**						
	Beach area 0.9 miles west of light station	Site 1:			X		X
Oak	**5078 acres, 11.85 miles of trails**						
	Sandspit, 1.5 miles SE of dock	Site 1:		X	X		X
	0.1 mile west of dock	Site 2:		X	X		X
	0.25 mile west of dock	Site 3:		at dock	X	X	X
	NW beach, 2.8 miles from dock	Site 4:		X	X	X	X
	North Bay, 3.9 miles from dock	Site 6:		X	X		X
	Clearing near sandspit	Group Site A:		X	X		X
	Clearing near dock	Group Site B:		X	X		X
Otter	**1333 acres, 1.9 miles of trails**						
	Sandspit near dock	Site 1:		X	X		X
Outer	**8000 acres, 8.7 miles of trails**						
	Southern tip of island on sandspit	Site 1:		X	X	X	X
Rocky	**1100 acres, 1.9 miles of trails**						
	On sandspit 0.5 miles south of NPS dock	Site 1:		X	X	X	
	Within 0.25 miles of NPS dock	Sites 2-7:		X	X	X	
Sand	**2949 acres, 2.6 miles of trails**						
	Grassy clearing near East Bay NPS dock	Sites 1, 2:	X	X	X		X
	West end of Lighthouse Bay	Site 3:			X	X	X
	200 yards south of East Bay dock	Group Site A:	X	X	X		X
	Clearing near East Bay dock	Group Site B:	X	X	X		X
South Twin	**360 acres, 0.35 miles of trails**						
	Sandspit near dock	Sites 1-4:		X	X	X	
Stockton	**10054 acres, 14.5 miles of trails**						
	Presque Isle Campground	Sites 1-19:	X	X	X	X	X
	Quarry Bay	Site 20:		X	X	X	X
	Trout Point	Site 21:			X	X	X
	Quarry Bay	Group Sites B, C:		X	X		X
York	**321 acres, no trails**						
	Beach on north side of island	Sites 1-3:		X	X		X
Totals	**Sites**	**53**					
	Group Sites	**7**					

Memorandum: "Disability Access in the National Park Service". See attached memorandum dated October 24, 2006

United States Department of the Interior

NATIONAL PARK SERVICE
1849 C Street, N.W.
Washington, D.C. 20240

IN REPLY REFER TO

D24(2420)

ELECTRONIC TRANSMISSION – NO HARD COPY TO FOLLOW

October 24, 2006

Memorandum

To: Directorate and Field Directorate
Director, Denver Service Center
Director, Harpers Ferry Center
Park Superintendents

From: ***(for)*** Director ***/s/ Steve Martin***

Subject: Disability Access in the National Park Service

The purpose of this memorandum is to provide ongoing guidance regarding the improvement of the level of accessibility within the National Park System. The National Park Service (NPS) is required by law to ensure that its constructed assets, programs and services are accessible to and usable by individuals with disabilities. These legal mandates, which have been in existence for over 30 years, require that the NPS modify and adapt these assets and programs to ensure that these individuals have access to the same opportunities and benefits available to all other visitors. However, over the past several months, the NPS has received a significant increase in the number of official and valid complaints alleging non-compliance with the legal mandates. Also, Congressman Stevan Pearce, Chairman of the House Subcommittee on National Parks, convened an oversight hearing in May 2006, to review the efforts of the NPS to ensure equal opportunity for the Nation's 54 million disabled citizens. Many of the participants attending the hearing were from organizations representing citizens with disabilities who related their experiences and observations regarding NPS efforts. The testimony presented and the official complaints that have been filed both emphasize the fact that in spite of the efforts that have been made and the successes achieved, the NPS is falling significantly short of meeting the minimum level of access that is

mandated by Federal law. There needs to be more accountability for actually achieving the goal of increased accessibility.

A review of the complaints filed and of the testimony received indicates that there are four critical areas where the NPS must show improved success. These areas are:

- **The NPS must ensure that all newly constructed assets are designed and constructed in compliance with the appropriate standards or guidelines.** There are findings that a number of newly constructed projects are falling short of compliance. In some cases, the design is appropriate, but the finished project is in noncompliance. Official guidelines and standards do exist and they are being amended and added to on an ongoing basis. Compliance with these standards is required and is not a choice. The NPS must ensure that all new designs conform to the appropriate standards. The NPS must also practice due diligence to ensure that the finished project is completed in conformance with the design. It has been proven over the years that incorporating accessibility standards into the design and construction of new facilities is the single most cost effective way to meet this requirement. Having to go back and make corrections after the project is completed is extremely costly.

- **The NPS must ensure that all rehabilitation and renovation projects incorporate accessibility corrections to the highest degree practicable. There are many Project Management Information System (PMIS) projects which indicate that accessibility compliance is being addressed, but the accomplishment reports do not reflect that action. There are also some projects in PMIS that could and should address access, but apparently do not.** As projects are formulated and selected for funding, no project should proceed without first assuring that current accessibility guidelines are being met. With the significant funds available through line-item construction, repair and rehabilitation, recreation fees, Operation of the National Park System, concession franchise fees equipment replacement, Federal Lands Highway and other programs, the NPS should be positioned to be a leader in providing access for all of our visitors.

- **The NPS must ensure that all interpretive programs, services and opportunities are provided in such a way as to ensure that they are accessible to all individuals with disabilities.** The NPS' legal obligations extend to individuals with visual impairments, hearing impairments, and cognitive impairments, as well as those with mobility impairments. This means that all interpretive and educational programs, exhibits, audio-visual programs, publications, and all other interpretive media must comply with Departmental Regulations 43 Part CFR 17, Subpart E. This must include ensuring that all audio-visual programs are captioned and that all assembly areas are equipped with assistive listening devices. In addition, the use of sign-language interpreters must be evaluated for all interpretive programs as a method to provide effective communication. It also means that the NPS must provide

audio-descriptive services for the audio-visual programs, Braille, and large-print versions of printed materials for those with visual or cognitive disabilities. In order to accomplish this, parks should use their recreation fee or other revenues where possible. Low revenue and non-collecting parks should identify 20 percent Recreation Fee funds.

- **The NPS must ensure that appropriate staff receives the necessary continuing education and technical assistance to enable them to better understand the legal requirements for accessibility, as well as the methods and techniques to more effectively meet the needs of citizens with disabilities.** The NPS has an ongoing partnership with Indiana University's Department of Park and Recreation Administration, which resulted in the establishment of the National Center on Accessibility (NCA). This cooperative agreement has been extended for an additional 5 years, through FY 2010. At the present time, NCA is working to provide a series of training courses focused on the role and function of the regional and individual park accessibility coordinators. The primary objectives of the training are to assist the coordinators in completing comprehensive evaluations of the degree to which the parks are currently accessible, and to develop and oversee a comprehensive action plan on how to correct access limitations that currently exist. It is requested that all units of the NPS provide the necessary financial assistance to ensure that the coordinators are able to attend and benefit from these continuing education opportunities.

As a means of addressing accessibility, each region should make a determination of the visitor use assets that are rated with an Asset Priority Index of 90 or higher, if they are accessible, and if not, what is required to make the asset accessible. Also, each region should address a strategy to begin to remedy the issues. We will be discussing your findings at upcoming National Leadership Council meetings.

In addition, the NPS has taken and will be taking other steps to raise the level of visibility and priority of accessibility and to assist all units in making continued progress. These actions include the following:

- The NPS has taken steps over the past several months to develop a comprehensive accessibility evaluation component to the Facility Management Software System. This component has been tested at five parks during an initial pilot test, and has been utilized in conducting access evaluations at six additional parks during FY 2006.

- The NPS is currently initiating accessibility evaluations utilizing fee revenue funds and outside accessibility contractors at a number of selected parks from each region during FY 2007.

- The NPS is planning a Servicewide TELNET broadcast on this subject during the first quarter of FY 2007. This broadcast will be targeting regional staff,

superintendents and division chiefs, and will be entitled "**Accessibility for People with Disabilities in the NPS: From Rhetoric to Reality.**"

- A presentation on this topic will be made at the next National Leadership Council meeting.

Your full cooperation in this matter is appreciated. Please contact your Regional Accessibility Coordinator, or David Park, Accessibility Management Program Coordinator, at 202/513-7027, for guidance and assistance in meeting this request. Thank you again for your past and continued support.

cc: Associate Regional Directors, Park Operations
Regional Accessibility Coordinators
Regional Equal Employment Opportunity Managers

APPENDIX C: FIRE SAFETY EMAIL CORRESPONDENCE

From: Brian_Olson@nps.gov [mailto:Brian_Olson@nps.gov]
Sent: Monday, June 28, 2010 4:59 PM
To: Martin, Scott
Cc: kip_schwabe@nps.gov; Nancy_Baker@nps.gov; Eades, Peter
Subject: RE: NPS Apostle Islands - Fire Suppression

Scott,
Since there is no infrastructure now (or planned for the near future) on these islands, don't include any costs for fire protection or fire detection.

Brian C. Olson, PE, CSP
Safety and Fire Protection Engineer
National Park Service
Denver Service Center
(303) 969-2196

From: "Martin, Scott" <smartin@rmhgroup.com>
To: "Brian_Olson@nps.gov" <Brian_Olson@nps.gov>
06/28/2010 03:26 PM
cc "Eades, Peter" peades@rmhgroup.com, Nancy_Baker@nps.gov <Nancy_Baker@nps.gov>, "kip_schwabe@nps.gov" <kip_schwabe@nps.gov>
Subject: RE: NPS Apostle Islands - Fire Suppression

Brian and/or Kip,
We happen to have the Raspberry Island report for example purposes and have gone through the fire protection, mechanical and electrical recommendations. It appears the there was existing electric and water infrastructure which was being supplemented and or upgraded to accomplish some level of fire suppression through the use of hydropneumatic tanks.

If we do not have the electrical generators at the Islands, are we to add this infrastructure even though we have been specifically directed to reduce/eliminate the use of fossil fuels?

Scott Martin, PE, LEED AP
Mechanical Engineer
The RMH Group, Inc.
Main: (303) 239-0909
Direct: (303) 312-4643
E-Mail: smartin@rmhgroup.com

-----Original Message-----
From: Brian_Olson@nps.gov [mailto:Brian_Olson@nps.gov]
Sent: Monday, June 28, 2010 2:09 PM
To: Martin, Scott
Cc: Eades, Peter; Nancy_Baker@nps.gov; kip_schwabe@nps.gov
Subject: Re: NPS Apostle Islands - Fire Suppression

Scott,
Typically we want to sprinkler all of these structures. Recently we sprinklered the Raspberry Island Lighthouse. This is a discussion that

we should have with the MWR AHJ (Kip Schwabe). I will be out of the office until Thursday.

In the future, all correspondence and coordination should be through Nancy Baker the DSC Project Manager.

Brian C. Olson, PE, CSP
Safety and Fire Protection Engineer
National Park Service
Denver Service Center
(303) 969-2196

From: "Martin, Scott" <smartin@rmhgroup.com>
To: "Brian_Olson@nps.gov" <Brian_Olson@nps.gov>
06/28/2010 01:48 PM
cc "Eades, Peter" <peades@rmhgroup.com>
Subject: NPS Apostle Islands - Fire Suppression

Brian,
RMH is working on a Historic Structures Report document for the NPS Apostle Islands. The question has been raised to us about the requirements for fire suppression at these facilities (mainly light houses and their support
buildings). The islands where these facilities are located do not have power or water supplies. We would like to discuss with you how we should handle these unique buildings and whether there may be a possibility of omitting fire suppression all together. Would you be available for a phone call tomorrow at approximately 10am? If not any time later in the day would work as well.

Scott Martin, PE, LEED AP
Mechanical Engineer
The RMH Group, Inc.
Main: (303) 239-0909
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APPENDIX D: HAZARDOUS MATERIALS SAMPLING METHODOLOGY

HAZARDOUS MATERIALS INVESTIGATION METHODOLOGY

The preliminary asbestos-containing material (ACM), lead-containing paint (LCP) and other regulated/hazardous material (RBM) assessment (assessment) has been performed by Landmark Environmental, Inc. (Landmark). This section focuses on the technical approach and findings of the observations and sampling associated with the assessment performed at the Apostle Islands National Lakeshore from September 15, 2009 through September 18, 2009.

The objective of this evaluation was to conduct ACM, LCP and RBM assessments in accordance with applicable regulations and project requirements to obtain preliminary data to support technical approach evaluations associated with the Historical Structures Report (HSR) and possible rehabilitation of several of the facilities.

Landmark's scope of services consisted of the following:

- Review of existing reports/data associated with ACM, LCP, etc.
- Preliminary screening of building materials for ACM and LBP as well as lead-contaminated soils (LCS) and perform analysis in support of the HSR,
- Observe structures for visible indications of mold growth; and
- Observe site surface soil for indications of staining or distressed vegetation associated with Petroleum Hydrocarbons.

BACKGROUND

ASBESTOS BACKGROUND

Asbestos is a confirmed human carcinogen and can cause diseases such as asbestosis, lung cancer, and mesothelioma; therefore, asbestos is regulated by the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Wisconsin Department of Natural Resources (WDNR). Typically these materials do not present an occupational hazard unless they are disturbed to the extent that an airborne release occurs, or they are in a significantly deteriorated condition in an occupied structure.

LEAD BACKGROUND

Lead-containing paints were used widely in construction until the mid-1980s. The routes of exposure for lead are ingestion and inhalation of dust. The target organs for lead exposure are kidneys, blood, gingival tissues, gastrointestinal system, and the central nervous system. Typically these materials do not present an occupational hazard unless they are disturbed to the extent that an airborne release occurs, or they are in a significantly deteriorated condition in an occupied structure.

MOLD BACKGROUND

Molds/fungi can grow (amplify) in building materials due to moisture infiltration from storm water or plumbing-related leaks. Applicable and relevant regulations identifying unhealthy concentrations of these biological materials have not been developed, however the presence of certain analytes such as Aspergillus have been reported in some specific instances to pose either and allergic or infective respiratory or contact dermatitis health risks to certain susceptible individuals.

Histoplasmosis is a disease caused by the fungus *Histoplasma capsulatum*. Its symptoms vary greatly, but the disease primarily affects the lungs. H. capsulatum grows in soil and material contaminated with bat or bird droppings. Spores become airborne when contaminated media is disturbed.

PETROLEUM HYDROCARBONS BACKGROUND

Petroleum Hydrocarbons sourced from gasoline, diesel, fuel oil, or various oils/lubricants have the potential to impact surface and subsurface soils and also ground water due to historical spills/releases. Petroleum hydrocarbons can include both aliphatic hydrocarbons, such as diesel-range organics (DRO) and gasoline range organics (GRO) and aromatic hydrocarbons such as benzene, xylene, etc. The health and environmental risks associated with petroleum hydrocarbons are widely and variously reported with inhalation and ingestion being the pathways of greatest concern. Combustible gas and vapor concentrations can also exist when vapor concentrations in air exceed the lower explosive limit.

PURPOSE AND OBJECTIVES

The purpose of the September 15-18, 2009 site visit was to conduct preliminary assessments of the Apostle Islands buildings and structures. The Hazardous Materials investigation was a preliminary screen performed to determine the scope of future investigations.

ASBESTOS

The asbestos inspection was limited in nature due to mandatory nondestructive testing and time constraints. Materials not tested are assumed to be asbestos containing. During this preliminary assessment, potential ACMs were inventoried and assumed to be asbestos containing. Materials that showed damage and that the Park Historic Preservation staff approved testing for were sampled for asbestos content.

LEAD CONTAINING PAINTS

Collection of paint chips for analysis to determine lead content was not conducted as part of the preliminary assessment. The park provided results of previous lead paint testing conducted in 1993. This testing was conducted using X-ray fluorescence analyzer (XRF). The results of the XRF testing showed that lead containing paints were present throughout the island structures tested. Results of the XRF testing showed that detectable lead was present in the majority of testing combinations.

LEAD IN SOILS

Soil samples were collected from roof driplines of lighthouses and selected Keepers Quarters. The soil sampling was conducted as a hazard screen to determine which of the structures sampled would require further soil characterization.

MOLD

Visible mold growth was observed in some of the inspected structures. The extent of the mold growth was highly variable among structures. The presence of mold and observed conditions were recognized as potentially contributing to poor indoor air quality.

PETROLEUM HYDROCARBONS

Landmark conducted a visual inspection of the ground surface adjacent to the site structures for the presence or likely presence of any petroleum products for conditions such as obvious soil staining, distressed vegetation or other conditions that indicate an existing release, a past release, or a potential threat of a release of petroleum products into structures on the property or into the ground.

EVALUATION CRITERIA

ASBESTOS EVALUATION CRITERIA

An ACM is defined by Wisconsin Statutes on Environmental Health Chapter 254, Subchapter II, Part 245.11(3) as asbestos or any material or product which contains more than 1% asbestos. ACMs are further classified as Friable and Nonfriable. Friable ACMs can be crumbled or reduced to powder by hand pressure when dry. Nonfriable materials cannot be crumbled, pulverized or reduced to powder by hand pressure.

The EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) further classify nonfriable ACM as Category I and II. Category I nonfriable ACMs include asbestos containing packings, gaskets, resilient floor coverings, and asphalt roofing products. Category II nonfriable ACMs are defined as all other nonfriable ACM, such as cement board, window putty, etc. During abatement and demolition projects, applicable regulations identify removal requirements based on the friability classification of an ACM.

Removal of ACM is not required by regulation unless the potential for an airborne release of asbestos fibers in excess of allowable levels exists. Typically, the potential for an airborne release of asbestos fibers exists in three circumstances:

1. The ACM will be impacted during maintenance, renovation, or demolition.
2. The material is significantly deteriorated to the extent that asbestos debris is present.
3. The ACM will be subject to future deterioration by vibration, airflow, or weathering.

The OSHA regulations in 29 Code of Federal Regulation (CFR) 1926.1101 require that building owners inform prospective contractors, employees, and tenants of the presence, location, and quantity of ACM or presumed ACM, in their buildings and facilities.

LEAD EVALUATION CRITERIA – PAINT

The EPA and U.S. Department of Housing and Urban Development (HUD) regulate Lead-Based Paint (LBP) abatement activities in target housing and child occupied facilities. OSHA regulates worker exposure to lead for coatings with any detectable lead. The EPA and HUD regulations related to LBP abatement do not apply to the project site unless abatement activities occur (specifically designed to permanently remove Lead-Based Paint). Wisconsin Administrative Rule DHS 163 defines lead-based paint as dried paint film containing greater than 0.7 milligrams of lead per square centimeter.

The OSHA lead in construction standard 29 CFR 1926.62 addresses requirements for sites where the employer has reason to believe that any employee may be exposed to lead in excess of OSHA's action level (AL) of 30 micrograms per cubic meter (30 µg/m3) over an eight-hour time weighted average. The OSHA standard applies to all construction activities that may impact lead containing paint (any detectable lead).

LEAD EVALUATION CRITERIA - SOIL

The WDNR regulates lead concentrations in soil that exceed 50 milligrams per kilogram (mg/kg), as provided in the Soil Cleanup Standards (January 2001), for residential/unrestricted land use if other contaminants (metals) are present, and 250 mg/kg if lead is the *only* contaminant present.

Elevated concentrations of lead in soils near some of the structures were expected due to historic paint management and rainfall runoff.

Because the September 2009 screening assessment confirms that lead in soils concentrations for certain structures exceed the default nonindustrial standard of 50 mg/kg [Wisconsin Administrative Code (WAC) Chapter NR 720.11], *site-specific evaluation criteria* can be and calculated by obtaining additional soil characterization samples and by using the EPA's Integrated Exposure Uptake Biokinetic (IEUBK) human health risk model, then submitted for WDNR approval.

Site-specific evaluation criteria that are protective of human health and the environment from direct contact with lead-affected soils can be higher than the default values, if the site-specific values chosen for the model for air, ingestion, and drinking water (with both soil and indoor dust values) are calculated from the required set of site-specific data. In certain circumstances the default levels provide a conservative estimation of the amount of biological lead uptake that a receptor (person) would receive at the site, and therefore the corresponding required default clean-up levels can be lower than those calculated on a site-specific basis.

By developing site-specific evaluation criteria it may be possible to identify more localized areas of elevated concentrations of lead in soils that exceed the site-specific criteria, and therefore minimize the extent of required soil excavation.

MOLD EVALUATION CRITERIA

Fungi such as Penicillium, Aspergillis, and Cladosporium are almost always found in the outdoor air and, due to moisture infiltration into structures, these and other molds can grow (amplify) in organic-based building materials such as wood and wallboard. Although an increase in mold concentrations from outdoor to indoor air is recognized in certain literature as typical, a consistent standard or Wisconsin-applicable regulation identifying unhealthy concentrations of biological materials has not been developed. Based on recommended guidance (not applicable standards) the comparative evaluation criterion utilized during initial mold assessments for this project is observable/visible growth in or on building substrates.

During the September 15-18, 2009 site assessment a visual inspection for the presence of mold and conditions that may contribute to mold was conducted. Moisture testing, air testing, and bulk sampling for mold were not conducted therefore these and associated air-quality related evaluation criteria are applicable only once corrective/construction (abatement) efforts are complete.

Evaluation criteria associated with possible future abatement strategies may include confirmation of correction of construction-related causes of the moisture intrusion with testing for acceptable indoor air quality (IAQ) prior to re-occupancy. The primary evaluation goal of the design for mold abatement would be to accomplish construction improvements in a safe manner that protects workers, occupants and visitors from adverse impacts to air quality and facilitates final assessment for re-occupancy by the Industrial Hygienist.

Abatement activities such as drying, surface treatment (potentially including sanding, biocide application, and encapsulation) would conceptually be performed in conjunction with interior/structural rehabilitation tasks, which may include removal of certain structural elements/building materials that are affected by moisture or mold. These removal or in-place treatment activities may require abatement controls such as enclosures, air filtration and personal protective equipment to be established and removed in sequence with construction requirements with key criteria/goals of: minimizing access and logistic constraints, ensuring that work occurs in a controlled fashion and attainment of post-project air quality to within recommended levels.

SAMPLING AND ANALYTICAL PROCEDURE

ASBESTOS

Asbestos analysis of bulk building material samples was limited during this evaluation. Only previously damaged materials were approved for sampling by the park historic preservation staff.

The bulk suspect asbestos samples were submitted to Reservoirs Environmental Services, Inc. (Reservoirs), located in Denver, Colorado. Reservoirs is a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory and is accredited by the American Industrial Hygiene Association (AIHA). The samples were analyzed by Polarized Light Microscopy (PLM) to determine asbestos type and percent.

The total asbestos reported is the average of all components in the material, with the asbestos content of separate layers also identified. Unused portions of samples are archived for 60 days unless the client requests special handling.

LEAD

Soil samples were collected from the roof dripline of selected lighthouses and Keepers Quarters. Samples were collected using a garden trowel from the top one inch of soil. One aliquot of soil per structure side was collected and composited for analysis. Samples were submitted to Reservoirs for Atomic Absorption Spectroscopy (AAS) / Atomic Emission Spectroscopy – Inductively Coupled Plasma (AES-ICP) to determine the amount of lead in each composite soil sample. Reservoirs is an AIHA accredited laboratory and is proficient in the Environmental Lead Proficiency Analytical Testing (ELPAT) program.

Wipe samples were collected in Keepers Quarters which were known to be seasonally inhabited by volunteers. The samples were three wipe composites collected from floor areas within the structure. The wipe samples were analyzed for lead dust by Reservoirs using AAS / AES-ICP to determine the amount of lead dust per square foot of floor space.

QUALITY ASSURANCE AND QUALITY CONTROL

Landmark performed an internal review of field data and laboratory analysis reports to ensure that data generated in these reports are accurate and complete. Quality control procedures were performed by EPA and WDNR certified inspection personnel that included cross referencing inspector field notes and sample logs with the laboratory analysis data to confirm sample numbers and material descriptions for each sample.

TEST RESULTS

Refer to each island’s text and appendices for results of the hazardous material sampling. Data sheets from the samples will be included in the appendix of each islands’ volume in the final document unless requested as otherwise. Laboratory data sheets are included in each islands’ appendix.

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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