

CHAPTER 4: HISTORIC STRUCTURE REPORT

SAND ISLAND INTRODUCTION

The following sections commence the HSR for Sand Island. Architectural, Structural, Mechanical (HVAC and plumbing), Electrical and Environmental systems and component parts are evaluated by the Study Team. Assessed buildings include:

- Sand Island Light Station Quarters
- Oil Building
- Privy

Original construction of each building is discussed, followed by its history/chronology of alterations (determined by studying historic photos, historic drawings, examining park records and archives and on site investigations and observations by the Study Team).

The Physical Description section describes the current conditions of building features and systems, as observed during the September 2009 site visit. Each component was given a condition rating (as outlined in Volume I, Chapter 2: Methodology). Treatment Recommendations were provided based on the Preferred Alternative, selected in the May 2010 Value Analysis/CBA conducted at the park.

Historic Photographs



Apparent Wood Shingle
Roofing

No Screen Door

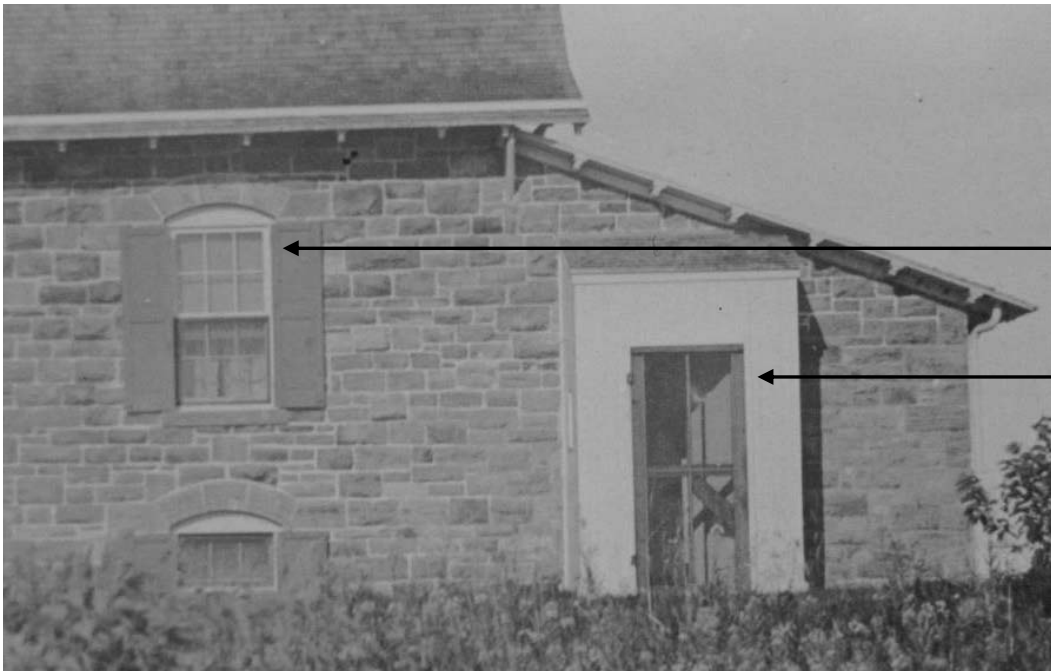
Kitchen Vestibule Visible

Historic Image SI-01: Keepers Quarters, looking southeast, 1890 (Source: NPS APIS Archives)



Brick
Chimney
with Stone
Cap

Historic Image SI-02: West elevation of the Keepers Quarters and chimney, c. 1900 (Source: NPS APIS Archives)



Shutters
Painted Dark
Color

Kitchen
Vestibule
with Screen
Door

Historic Image SI-03: West elevation of the Keepers Quarters kitchen vestibule, c. 1900 (Source: NPS APIS Archives)



Historic Image SI-04: Keepers Quarters and Privy, looking southeast, c. 1900 (Source: NPS APIS Archives)



Chimney
Cap

Wood
Shingles

Historic Image SI-05: East elevation of the Keepers Quarters, 1904 (Source: NPS APIS Archives)



Wood
Boardwalk

Historic Image SI-06: Main entry, 1905-1909 (Source: NPS APIS Archives)



Sheet
Metal Flue for
Extending
Chimney

Historic Image SI-07: Keepers Quarters, looking southeast from the lake, 1909 (Source: NPS APIS Archives)



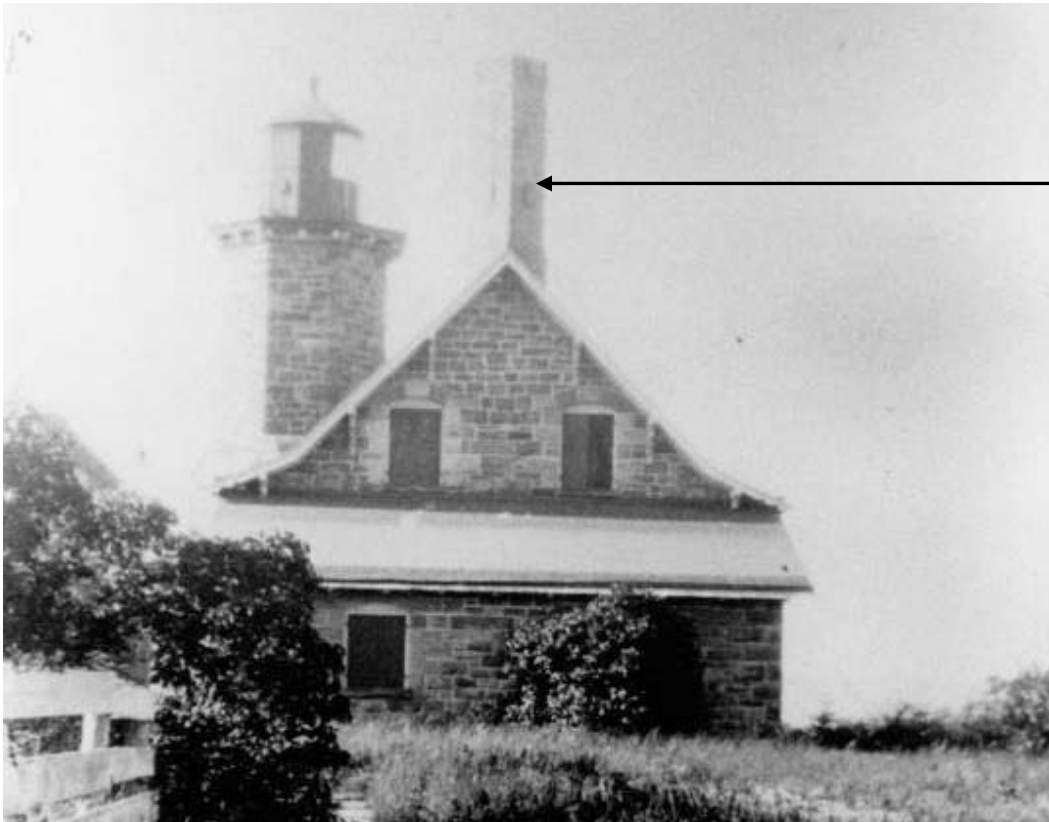
Concrete
Walkway

Historic Image SI-08: Keepers Quarters and Privy, looking southeast, post 1911 (Source: NPS APIS Archives)



Concrete
Walkway

Historic Image SI-09: West elevation of the Keepers Quarters, 1911 (Source: NPS APIS Archives)



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Historic Image SI-10: South elevation of the Keepers Quarters, 1921 (Source: NPS APIS Archives)



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Historic Image SI-11: Keepers Quarters and barn, looking north, 1925-1939 (Source: NPS APIS Archives, Gertrude Wellisch Collection)



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2 *Historic Image SI-12: Steel light tower constructed in 1933, unknown date (Source: NPS APIS Archives)*
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5 *Historic Image SI-13: Steel light tower in 1984, removed in 1985 (Source: NPS APIS Archives)*

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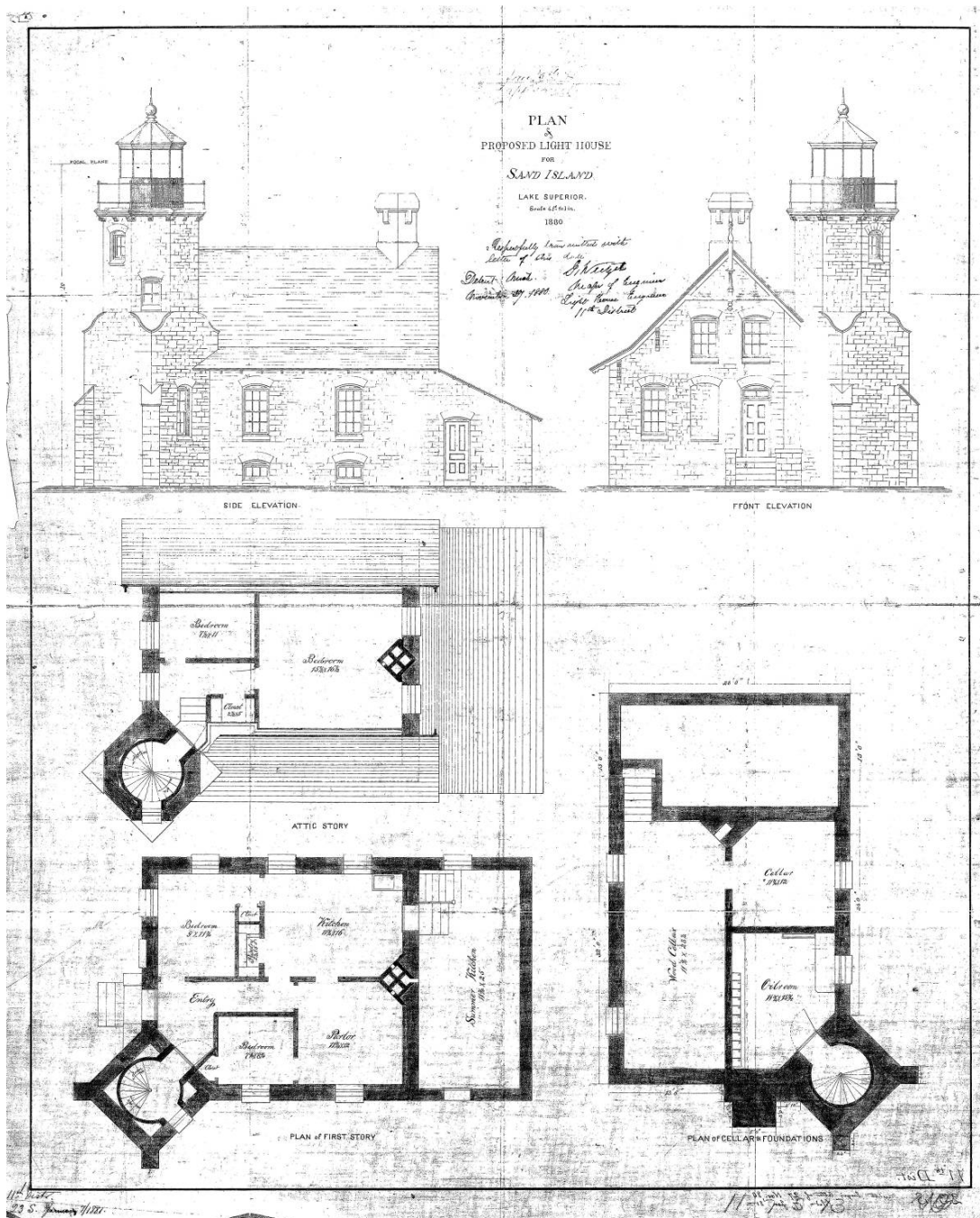


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Historic Image SI-14: North elevation of the Oil Building, 1978 (Source: NPS APIS Archives)

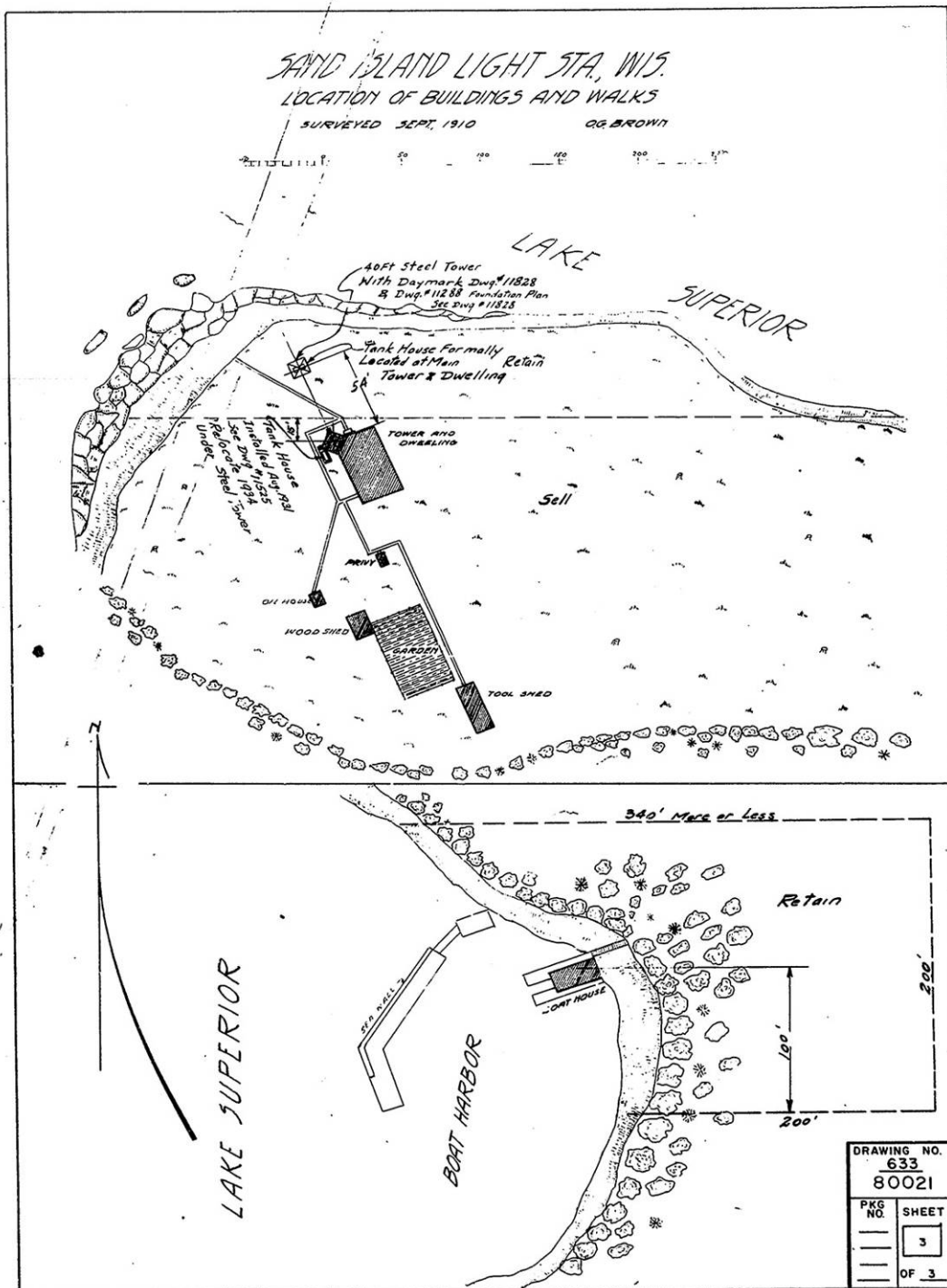


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Historic Image SI-15: Privy, looking southeast, 1978 (Source: NPS APIS Archives)

1 Historic Drawings



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3 Historic Drawing SI-01: 1880 plans and elevations of the Keepers Quarters and Tower



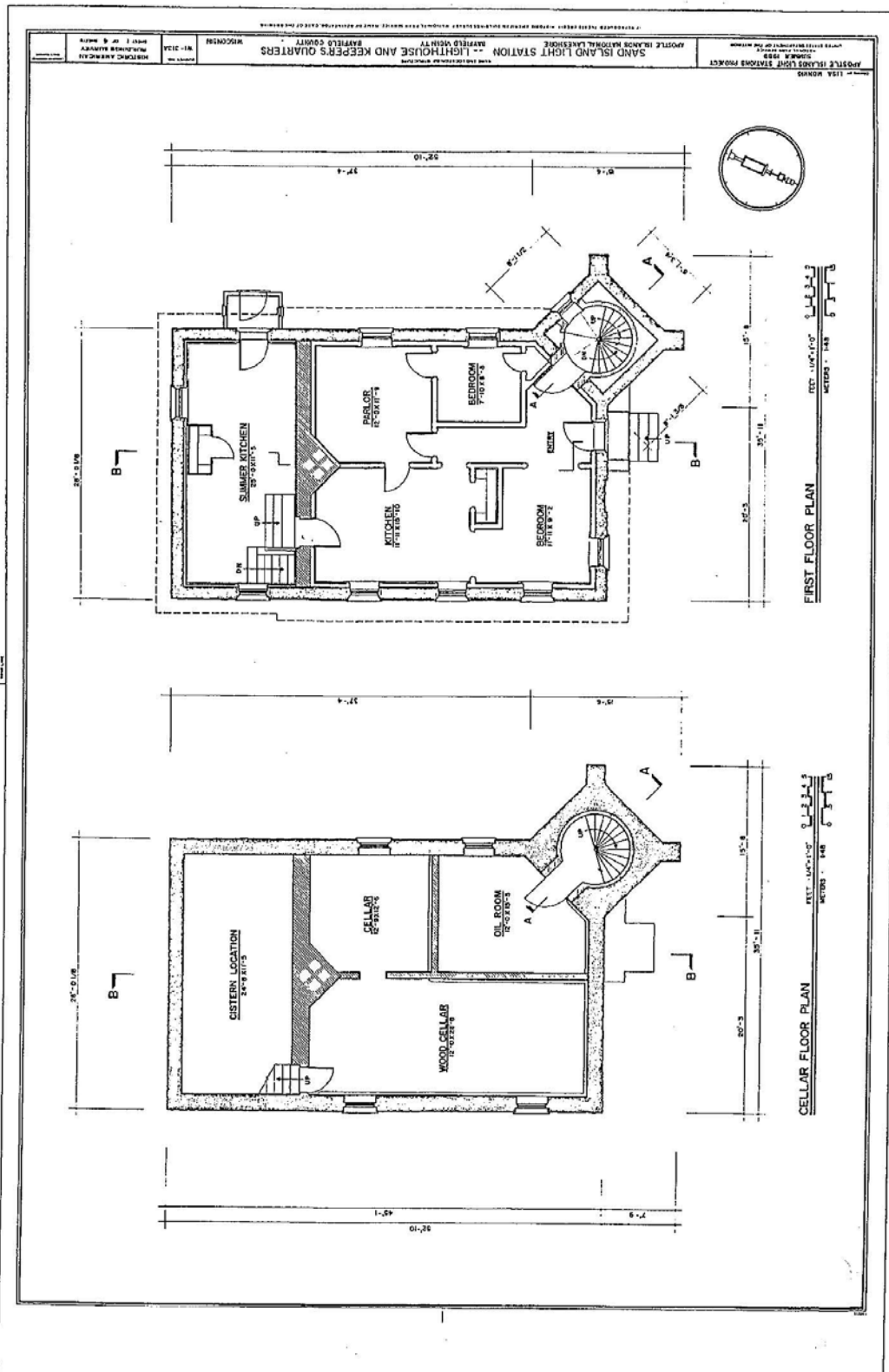
Historic Drawing SI-02: 1910 Site plan with notes

Existing Condition Drawings

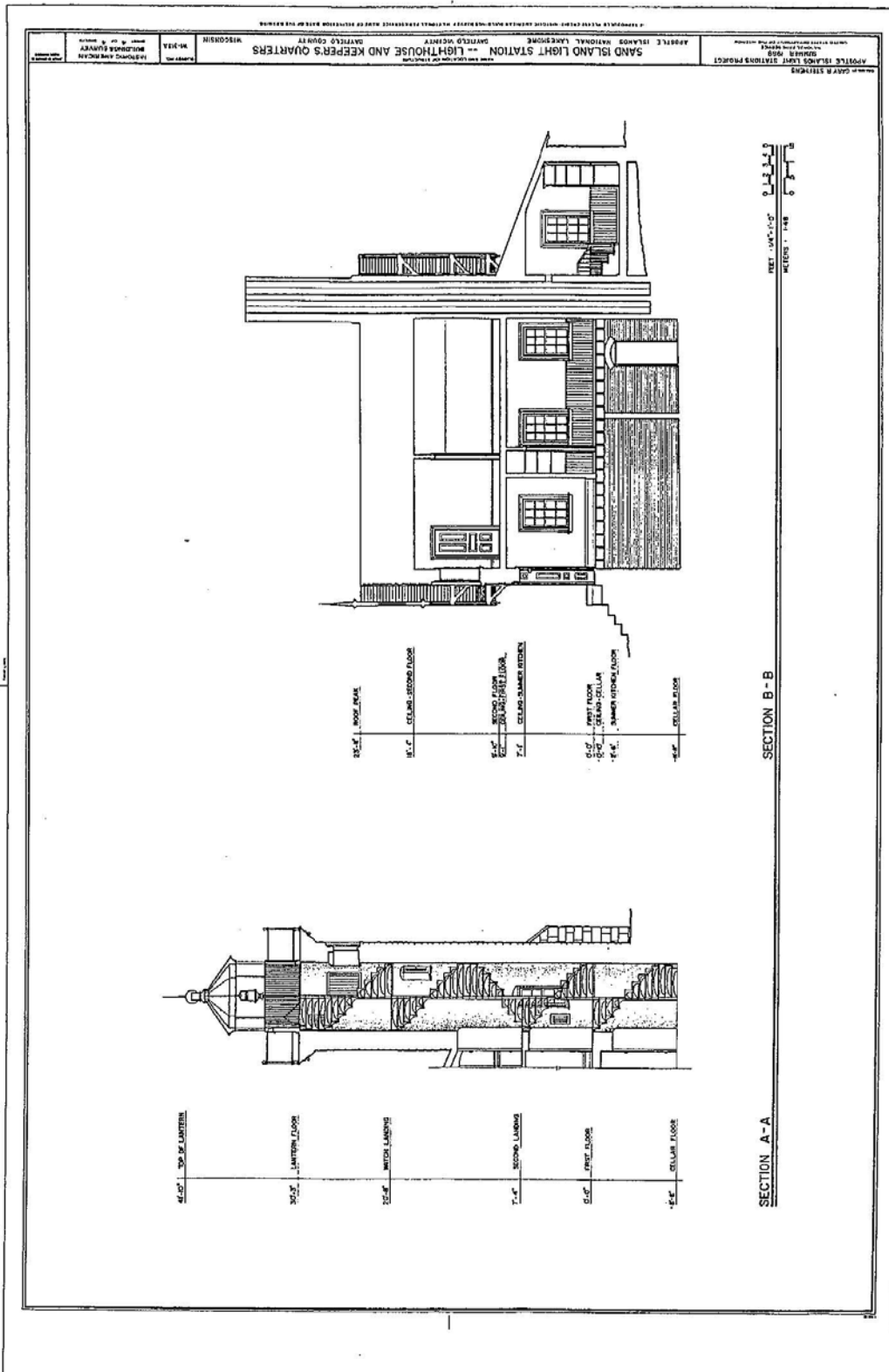
The primary and secondary buildings on Outer Island were documented in the summer of 1990 by a team from the Historic American Buildings Survey (HABS). Since 1933, multifformat surveys in cooperation with government agencies have recorded the built environment in the United States. Measured drawings, large-format photographs and written histories have defined the survey technique for historic structures. The HABS collection currently contains detailed surveys on more than 38,600 historic structures. The following eleven drawings contain the measured drawings produced by the HABS survey from 1990.

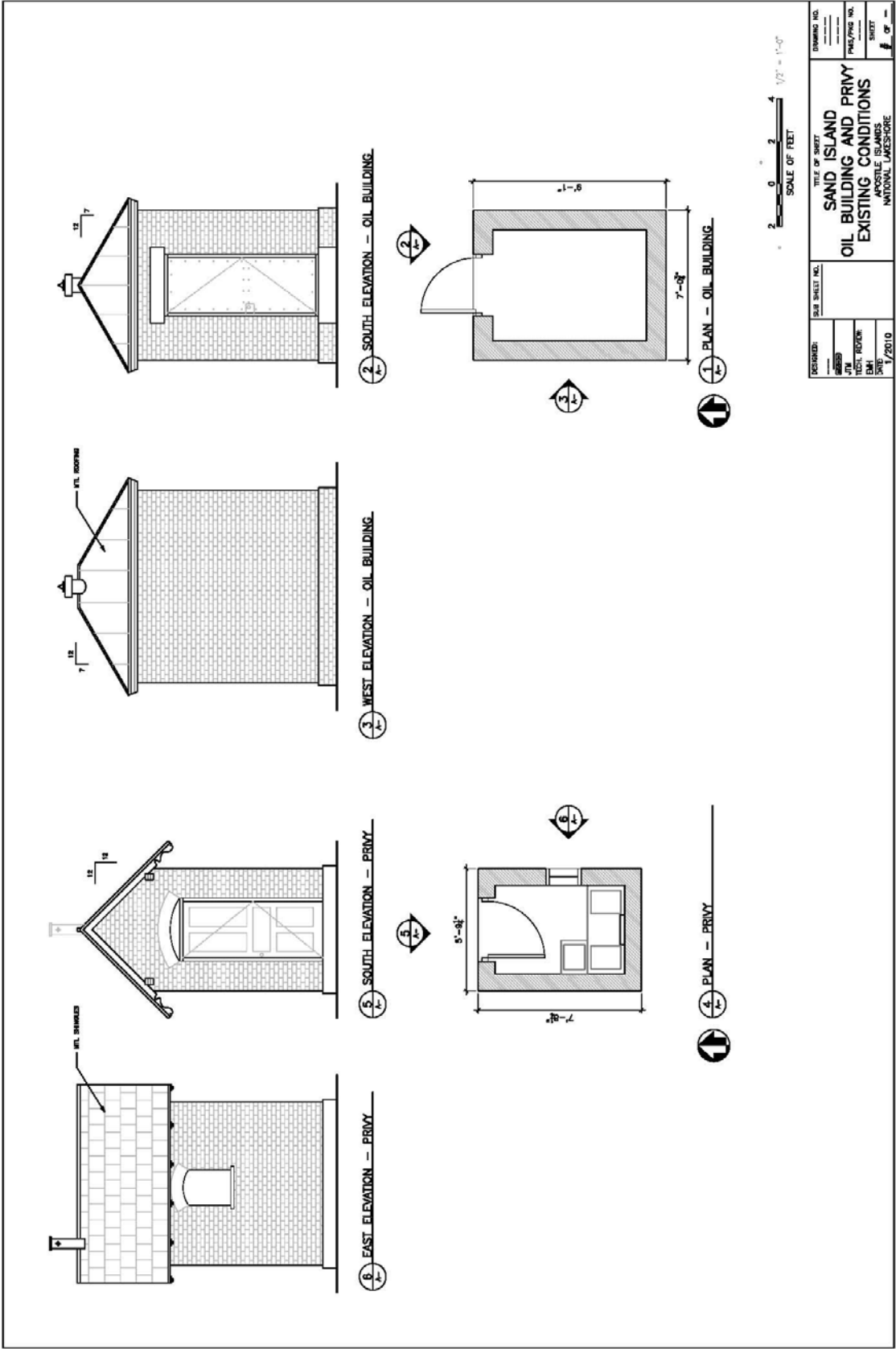
Typically, utilitarian buildings are not included in the HABS survey. In September of 2009, the architects and historic preservation specialists from Andrews and Anderson Architects, PC surveyed the Oil Building and Privy on Sand Island. These measured drawings have been included following the HABS drawings.











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SAND ISLAND LIGHT STATION QUARTERS

Chronology of Alterations and Use

Original Construction

The Sand Island Light Station Quarters was constructed in 1881. The tower and quarters were constructed of local brownstone in the Gothic Revival style (steeply pitched roof, wooden trim on the quarters, buttresses on the tower). In 1921, an acetylene gas burner was installed, making Sand Island Light Station the first automated light in the Apostle Islands. In 1933, a steel tower was built on the island and the historic Fresnel lens (with a focal plane of 52' above Lake Superior) was removed from the Light Station. (Historic Image SI-12) The steel tower remained on Sand Island for 50 years before it was removed in 1985.³⁵ (Historic Image SI-13)

Significant Alterations / Current Condition

Few intentional alterations have affected the building. In the late 1940s, early 1950s, lightning struck and broke through the roof. The roof went unrepaired for some time resulting in rain water damage to the wood floors. The occupant tried to dry out the floors by building a fire in the basement. What actually occurred was that the walls and ceiling caught fire, not only further damaging the floors but also damaging the walls and ceiling in the basement. In 1953, the Huling family took occupancy of the light station and hired a carpenter to gut and replace the first and second floors and walls at their own expense. The Hulings also had to replace the main door due to the moisture infiltration from the roof leak. The door was custom made in Minneapolis at Anderson Windows Wall.³⁶

Minor Observations of Alterations Include:

The 1890 photo illustrates the front door without a screen door and a glimpse of the wall of the kitchen vestibule. Therefore, the vestibule was either original to the structure or added to the house by 1890. (Historic Image S1-01) A photo from c. 1900 reveals the full vestibule with the structure as it appears currently. (Historic Image S1-03) The Quarters, in 1904, had a brick chimney with a stone chimney cap. (Historic Image S1-05) In 1909, a winter picture shows a "chimney pot" constructed of sheet metal atop the chimney. Chimney pots were used as inexpensive ways to extend the chimney, thus improving the draft. (Historic Image S1-07) In 1916, the chimney was extended to its current height and topped with a concrete cap. The 1921 historic image captures the new chimney structure. (Historic Image SI-10)

Historic drawings from the 1880 construction drawings indicate that the original design for the lighthouse incorporated the Tower and living quarters, connecting them through the Tower stair, which provided the only access to the basement and second floor bedrooms. The kitchen vestibule is not included on the original drawings. (Historic Drawing SI-01)

The roof was reroofed with metal shingles around 1988 by the NPS. New roofing shingles were chosen for their close match to the original metal shingles and the roof's original yankee gutter were retained or rebuilt but were not reconnected to the cistern system. Between 1998 and 2009, the Historic Structure Preservation Team of the NPS completed the tasks of reglazing the windows, replacing the broken glass, rehabilitating the windows, repointing the masonry, painting the exterior woodwork, rehabilitating the basement ventilation louvers, repairing the roof and flashings, and resloping the exterior lawn areas and leveled

³⁵ Busch, Jane, "People and Places: A Human History of the Apostle Islands," 2008, and, S. Mackreth, 2010.

³⁶ First-hand account from Warren Jensch

1 walkways. The shutters and the four caps on the brick buttresses were painted white in 2008-2009. The
2 shutters had previously been dark green and the caps had been painted black, matching the lantern trim.³⁷
3

4 A few of the mechanical systems in the Quarters have been upgraded to allow for seasonal housing of park
5 employees and volunteers. Portions of the original water and drain system remain in place, but are no
6 longer functional.
7

8 There are no alternating current electrical systems in the Light Station Quarters, as none were ever installed
9 prior to the automation of the Lighthouse and departure of the keeper in 1921.
10

11 The Light Station Quarters are in fair to good condition.
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14

³⁷ S. Mackreth recollections, January 2010

1 Summary of Documented Work on the Building

Date	Work Described	Source of Information
1901, July 31	"At 2:30 PM the Raspberry Island Light Keeper with a party of Laborers arrived, to repair the dock and put tile down around the house."	E. Luick, SI Log, Oct1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920
1904, July 27	"At 4:00 PM the Str <u>Bon Mia</u> came down from Duluth and landed Mr. Anderson Bennett and four workmen to repair the Breakwater and Boat house and house."	E. Luick, SI Log, Oct1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920
1905, September 11	"Keeper repaired the roof, replaced the tin shingles that the wind tore off Sept. second."	E. Luick, SI Log, Oct1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920
c.1909-1916	Chimney extended via sheet metal cap	Historic Image SI-07, 1909
1914, September 11	Sept 11: "The Assist C. Vanalstion reported to me that the tender <u>Amaranth</u> was here at 9:00 A.M. and landed a pump and sink and fittings while he was to the east side getting milk."	E. Luick, SI Log, Oct1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920
1916, August	Aug 18: "At 11:00am Mr. B. Hinckley and crew arrived to build the chimney higher. At 3:30pm they left to get a mason, as the one failed to arrive on the boat." Aug 21: "The Storm wrecked the Scaffold and falling planks drove two holes through the kitchen roof."	E. Luick, SI Log, Oct1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920
1916, September 2	"The mason got through with the chimney ..." The chimney extension was completed.	E. Luick, SI Log, Oct1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920
1920, June	June 19: "Keeper repaired screens and steps and painted them and the Toilet."	E. Luick, SI Log, Oct1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920
1921	Installation of acetylene gas burner	LCS, 2009
1925-1942	Light Station Quarters leased by Gertrude Wellisch for a summer home	APIS Records
1931	Tank house installed near Tower base	1931 Historic Drawings, TIC 633/80021
1933	New steel tower built, Fresnel lens removed from Light Station lantern	LCS, 2009
c. 1933	Tank house moved to under the steel tower	1933 Historic Drawings
1953-1975	Light Station Quarters leased by A.D. Hulings; in 1953, the interior of the building was in poor condition due to vandals and Mr. Hulings "installed new floor joists, new floors, plasterboard on walls and ceilings, painted..."	1972 letter from U.S. Forest Service official to the APIS superintendent, from S. Mackreth
1977	Stabilization of Light Station Quarters and Privy	NPS/APIS Business Office Records D3423 for Sand Island
1978	Repoint brick, basement, foundation, and tower and paint buildings; installed drainage rain gutters	NPS/APIS Business Office Records D3423 for Sand Island

Date	Work Described	Source of Information
1979	Paint and repair metal roof of Light Station Quarters	NPS/APIS Business Office Records D3423 for Sand Island
1981	Retuckpoint stonework and paint trim on Light Station Quarters and Privy	NPS/APIS Business Office Records D3423 for Sand Island
1985	Steel tower removed	S. Mackreth, 2010
1988	Light Station Quarters reroofed with metal shingles, painted on-site; main gable of Quarters roof replaced	HSPT Reports, 2009; NPS/APIS Business Office Records D3423 and photos for Sand Island
2000	Kitchen repainted	HSPT Reports, 2009
2008-2009	Replaced all window shutters with newly fabricated copies of the removed green shutters. Only one shutter, which is on the tower, not the housing unit, is not new material. New shutters painted white. New hardware installed to replicate old fasteners. Black buttress caps on tower painted white.	S. Mackreth, 2010

Notable Actions with Unknown Dates

Date Range	Work Described
Unknown	Overflow for cistern installed at basement (9/2009 on-site observations)
Unknown	Opening between the Entry and west Bedroom appears to have been enlarged at some point, difference in molding and historic floor plan
By 1925-1930	Wood shingle roofing replaced with metal shingles, Keeper's log from September 11, 1905 says keeper was replacing tin shingles the wind tore off September second (Sand Island Keepers Log Book , G. Wellisch Photo Collection)
1953-1972	Huling family occupancy- replaced portions of first floor framing, walls, and possibly ceiling as well as replaced main door at own expense
1998-2009	Reglazed windows and replaced broken glazing
1998-2009	Rehabilitated windows
1998-2009	Repointed masonry
1998-2009	Painted exterior woodwork
1998-2009	Rehabilitated basement ventilation louvers
1998-2009	Repaired roof and flashings
1998-2009	Resloped exterior lawn areas and leveled walkways

General Physical Description

The building is a 1½-story brownstone structure facing north on the point of the island. It has a gable roof with carved brackets, decorative gable drop and finial, and exposed rafter tails with decorative carvings. The octagonal Light Tower is located at the northwest corner of the building. A one-story shed-roofed kitchen extends to the rear of the building with a wood frame vestibule extending to the southwest. The main rectangular plan of the Quarters contains three rooms at the cellar, four room at the first floor, and two rooms at the second floor. The main quarters, kitchen shed and Tower are all per the original construction. The kitchen's vestibule shed was a very early addition; by 1890 it can be seen in Historic Image SI-01.

Physical Description -- Architecture

Architecture – Roof

The roof consists of painted metal shingles on the main roof (shingle exposure is 9" wide by 12" long). These shingles were installed in 1988-1989 and photos indicate the red paint was applied after installation. The south (kitchen) and west (kitchen vestibule) shed roofs have historic galvanized metal shingles, painted. Both the historic and the 1988 shingles have a stamped decorative double-curve patterns, indicating the shingle style's contemporary availability. Tie-off rings reside at the main ridge, though they do not appear to comply with OSHA requirements. Step flashings are historic except at the Tower, where the roof is uneven, and newer, taller, 8" prefinished step flashing is evident. (SI-LSQ-05) There is no attic hatch so the sheathing was not visible, but could be spaced, board sheathing, consistent with the original wood shingles. The flared soffit, extends +/- 1'-6" from the wall, and has 1x6 tongue and groove sheathing over exposed, shaped rafter tails and trim, but it is likely not the same as the overall roof sheathing since the soffit is more of a finish material. The south shed's tongue and groove soffit boards change direction from east-west to north-south as evident at the corners of the soffit. The Light Station Quarters also has a gable end finial, decorative wood brackets on the north and south gables, and wood fascia with scrolled detailing to match the "rafter tails."

Historic photos indicate that the original roofing was wood shingle but reveal metal shingles by +/- 1925. Due to the highly exposed site, it can be assumed that the wood shingles deteriorated quickly and were replaced by metal shingles as a longer term maintenance solution.

The Tower roof is made of cast iron with early flashing exposed. (SI-LSQ-33 and 34)

Architecture – Gutters and Downspouts

The gutter system for this building appears to be the original type, a shallow yankee gutter as visible in historic photos and evident at the original wood shingle roof. The yankee gutter detail is a difficult flashing assembly often plagued by loose joints and poor drainage. It was not observed under rainy conditions so the tightness of the joints is unknown. However, standing water at the south gutter within 24" of the western downspout and at the far (high) end of the west gutter was observed. A minimal amount was also observed at the east gutter. The east and west gutters were replaced in-kind with the 1988 reroofing work. The south shed appears to be a historic gutter, dating to the same era as the metal shingle roof.

The downspouts (located on the east and west) originally drained into an interior cast iron fill system for the cistern under the kitchen. Later, a split drain was installed to 3" diameter fluted downspouts located on the exterior. Currently, the downspouts only drain to the exterior – not the cistern, though it does have standing water. The downspouts utilize both older pieces and have been supplemented by a newer, galvanized fluted downspout to match. An older downspout is also found at the north elevation at the roof to Tower intersection. Historic photos show this as early as 1890. (SI-LSQ-11) Historic photos do not show the exterior downspouts at the east and west, only the cistern inlet at the wall. Historic photos do show a downspout on the south shed's west side that appears to drain to grade as early as c. 1915.

1 *Architecture – Chimney*

2 The original red brick chimney was extended to more than double its height in 1916, according to the
3 Keepers Logs. The brick of the original chimney appears to match the Privy. Beginning around 1909 until
4 1916 (when the chimney was permanently extended), a sheet metal extension flu was attached to the
5 earliest chimney. The brick, detailing, mortar tooling and color all differ between the two eras of the
6 chimney. Historic photos indicate the earliest chimney had a stone cap but currently there is a 4" concrete
7 cap at the top of the 1916 extension. (SI-LSQ-07 and 08)

10 *Architecture – Exterior Walls*

11 The exterior walls are rough ashlar brownstone blocks. The corner pieces are tooled, as seen by their
12 bottom edges' markings. Several iterations of previous repointing work are evident with both a lighter and
13 greyer mortar visible. The mortar and tooling that are visible in the protected kitchen entry are likely to
14 represent the original and appear to be a light grey with lightly tooled joints.

15
16 A mortar sample taken at an area of repointing had a standard composition of lime, Portland cement, and
17 sand used for restoration purposes. The mortar is tan in color, hard and brittle, and has average coarseness
18 sand. Another mortar sample at an area of repointing indicates a mixture of lime, Portland cement, and sand
19 used for restoration purposes (like the above sample). However, this mortar is grayish-tan in color,
20 moderately hard, and has fine sand.

23 *Architecture – Windows*

24 Painted six- over six-, four- over four-, and three- over six-lite are the three primary types of windows in
25 the Light Station Quarters. All are wood, double-hung, have stone sills with segmented arch stone headers,
26 and operate with spring pin sash locks. Muntins have an inset curve profile. The sash cords and pulley
27 hardware are extant. The interior trim is 1x 5 1/4" built-up with a decorative ogee profile. The sills are 1x
28 wood with an ogee profile, and the apron is built-up 1x material with a bead edge. Exterior trim is 1 1/8" x
29 2 3/8", and each window has paired wood shutters and one-over-one wood screens held in place with clips.
30 The shutters are raised panel (one-over-one), on long-throw hinges (two per shutter). Only one shutter was
31 not replaced with fabricated copies of the original shutters and hardware in 2008-2009, and this shutter is
32 located on the Tower. The replacement shutters are painted white, the older shutter is painted green. (SI-
33 LSQ-10) The six- over six-lite windows are 2'-10" x 5'-1"; the four- over four-lite are 2'-0" x 5'-1"; and
34 the three- over six-lite are 2'-10" x 4'-0". A paint sample taken from the interior window trim reveals that
35 the oldest color is the same as the oldest color revealed from the sample taken of the kitchen stairs. Historic
36 photos and the Sand Island Log Book during 1920 indicate wood screens at the lower sash, suggesting that
37 only the lower sash were operated.³⁸

38
39 **Tower Windows.** The Tower has one, four-lite casement window and one, four- over four-lite, double-
40 hung window. The casement has two hinges and a knob slider latch. Both windows have quarter round
41 interior trim, wood sill with an ogee profile and no stool. (SI-LSQ-30) exterior trim is similar to that of the
42 living quarters. All of the window elements are painted. The one remaining older shutter, painted green (see
43 description in paragraph above) is located on the Tower.

46 *Architecture – Exterior Doors*

47 **Main Entry and Kitchen Vestibule Doors.** The main entry and kitchen vestibule doors are two vertical
48 panels over one horizontal panel over two vertical panels (raised panel) wood doors. The main entry door
49 has a two-lite, 1'-0" tall transom. Both doors have a stone sill, wood threshold, ceramic knob with separate
50 skeleton key, and three steeple tip hinges. The exterior trim for both doors is 7/8" x 3" with bead edge

³⁸ Keeper E. Luick, Sand Island Log, Oct 1, 1898 - Nov 17, 1907 and June 1, 1914- July 31, 1920

(similar to the windows). All of the door elements are painted. The main entry door is 3'-0" x 6'-6" x 1 3/4" and the kitchen door is 3'-0" x 7'-0" x 1 3/4". (SI-LSQ-12 and 13)

Screen Doors. These doors are modern, stained wood, located at the main and kitchen vestibule entries. Both doors have a lever catch and spring, three modern hinges, and appear to be contemporary reconstructions (difficult to tell from the historic photos). The main entry's screen door is 3'-0" x 7'-0" x 1 1/8" while the kitchen vestibule's screen door is 3'-0" x 7'-10" x 1 1/8".

Plank Door. This door is located at the kitchen vestibule and is made of 3 1/2" tongue and groove wood, painted. The door has a knob mortise, strap hinges, and cross bracing. Trim is simple 1x, painted.

Architecture – Exterior Trim

The exterior trim is comprised of decorative gable drop and finial, decorative wood brackets at the gable ends and curved wood "buttress caps" at the top of the stepped stone buttresses of the Tower. All are painted white. (SI-LSQ-06, 07 and 09)

Architecture – Tower Walk and Railing

The deck, sidewalls, and railings of the Tower are painted cast iron. The walk is 3'-3" wide with an upper railing that is 1 3/4" x 3/4" bar stock (located 3'-3 1/2" from deck) and a lower railing that is 2 1/4" x 3/4" bar stock (located 8" from deck). There are 1 1/4" posts with ball finials at 5'-7" on center. A coated metal screening infills the open spaces. (SI-LSQ-36)

Architecture – Tower Lantern

The lantern is ten-sided with cast plates at the exterior (a pair of recessed Gothic arches is cast into each panel). The interior is 1x 3 3/8" wood tongue and groove with bead edge, oriented vertically, across the 2'-1 1/2" wide segments. From the lantern floor to the top of the wall is 3'-7". The glazing height is 2'-11". The glazing is secured by triangular (1 1/4" x 1 1/4") metal stops with a 1 1/4" x 2" triangular metal frame at the interior. There are five vents (5 1/2" diameter), each with a brass ring securing screening. The ceiling has a +/- 1'-0" diameter exhaust vent. A door to the exterior walk is integral to the lantern. It is 1'-11 1/2" x 2'-10" and is hung on heavy-duty brass hinges with a throw bolt latch. The hatch in the lantern floor is 3'-10" x 2'-0". All of the lantern components, other than the glazing, are painted. (SI-LSQ-31, 32 and 35)

Architecture – Kitchen Vestibule

The kitchen vestibule is a painted wood frame structure attached to the west elevation of the Light Station Quarters. The original base trim has been replaced in the interior. A paint sample taken reveals that the structure has always been painted white and that the wood beneath the paint is sound.

Architecture – Interior Doors

Tower to Quarters Doors. These doors are located in the basement, first floor and second floor and are made of riveted steel, painted. The doors have strap hinges, jack arch top, steel frame, and a knob mortised passage set. The typical dimension for this door type is 2'-7" x 6'-6" x 1/4" frame with 1/8" plate. (SI-LSQ-14, 23 and 26)

Typical Interior Doors. This type of door is two vertical panels over one horizontal panel over two vertical panels (raised panel), wood. The doors have steeple tip hinges, ceramic knob hardware, and an ogee profile at panel edges. The kitchen door is 1 3/4" thick and has bead-edge trim (similar to the exterior

windows) and $\frac{3}{4}$ " round trim at the kitchen face. The typical size for these doors is 2'-8" x 6'-6" (second floor), 7'-0" (first floor) x 1 $\frac{3}{8}$ ".

Architecture – Wall Finishes

Basement (Cistern Room not Accessible). The oil room, wood cellar, and cellar have brownstone ashlar blocks for the exterior walls and whitewashed red brick for the interior walls.

Entry and East Bedroom. These two front rooms have a mix of wall finishes. The entry's west wall attached to the Tower has original plaster over masonry, while the north and south walls have original plaster over lath, and the east wall has modern gypsum board painted blue. A paint sample of the entry west wall could either suggest a very thin coat of plaster or a layer of whitewash with a layer of yellow calcimine paint over the masonry wall. The east Bedroom has modern gypsum board on the south and west walls but the north and east walls are the original plaster over lath. The gypsum board wall finishes were most likely installed between 1953 and 1975 when A.D. Hulings leased the Light Station Quarters.

Kitchen, Summer Kitchen, Parlor, Floor West Bedroom, and Associated Closets. These rooms have the original plaster over lath wall finishes. The kitchen's plaster is covered by wallpaper, which covers a coat of green paint. The wall paper is not original but may be historic. The kitchen, kitchen closet, and summer kitchen have wood beadboard wainscot, painted, that is 3 $\frac{1}{2}$ " wide.

Second Floor Hall and Closet and Second Floor Bedrooms (Two). These four rooms have the original plaster over lath as their wall finishes, except the hall's west wall attached to the Tower, which is plaster over masonry. A paint sample from the hall reveals that the light blue paint visible is the only layer of paint on the plaster. A plaster sample from the closet indicates that the skim coat (thin white layer that is painted) was pure lime while the thicker, brownish-tan colored finish is probably gypsum.

Architecture – Ceiling Finishes

Basement (Cistern Room Not Accessible). The oil room has no ceiling finish as the framing is exposed. The wood cellar has the same exposed framing as the oil room, but the cellar has an older framing system (based on the wood joist size and finish) with remnants of a lath and plaster ceiling. It can be assumed that the cellar and possibly the wood cellar once had lath and plaster ceiling finishes that were removed when joist stabilization work was performed during the Huling family occupancy (1953-1972). (SI-LSQ-16)

Entry, Kitchen Closet, West Bedroom Closet, Second Floor Hall and Closet and Second Floor North Bedroom. These six rooms have the original plaster over lath ceiling finishes.

East Bedroom, Kitchen, Summer Kitchen, Parlor, West Bedroom and Second Floor South Bedroom. These six rooms have a gypsum board ceiling finish that was most likely installed by A.D. Hulings, who leased the property from 1953 to 1975.

Architecture – Interior Trim

Entry, East Bedroom, Parlor, West Bedroom and Closet, Second Floor Hall and Second Floor Bedrooms. These eight rooms have 11" tall wood base trim, simple ogee profile at the top, with a 2 $\frac{1}{4}$ " base shoe. The wood is painted. The east bedroom, parlor, and west bedroom also have the same cove molding seen at Long Island and Outer Island. The molding is painted wood.

Kitchen. The kitchen has a simple rounded wood base trim, 2 $\frac{1}{2}$ " tall, painted white, with no base shoe. The kitchen also has cove molding.

Summer Kitchen and Kitchen Closet. These two rooms have a simple wood base shoe, painted, at the base of the wood wainscot. The summer kitchen also has cove molding.

Architecture – Floor

Basement. The three basement room's floors are concrete slab-on-grade. The oil room, wood cellar, and cellar have integral concrete drainage gutters along two of their walls, connected through interior walls by holes in the northeast corners of the cellar and oil room. The gutters allow water passage through all rooms. They are 4 ½" wide, 2" deep, and connect to a metal pipe inserted into the bottom north-east corner of the wood cellar that leads to the exterior. It appears there is also a hole (now covered by debris) at the southeast corner of the cellar connecting to the cistern. This system of gutters and pipe was used to control over-flow from the cistern and redirect it to the exterior of the building.

Entry, East Bedroom, and Kitchen and Closet. These four rooms have 7" wide wood plank flooring, painted blue. The flooring is not original to the building as it was most likely installed by A.D. Hulings, who leased the property from 1953 to 1975.

Summer Kitchen. This room has original 3 ¼" wide wood flooring, tongue and groove, painted blue, with modern resilient sheet flooring covering the wood.

Parlor, West Bedroom and Closet, Second Floor Hall and Closet, Second Floor Bedrooms (Two). These seven rooms have the original 3 ½" wood board flooring, painted. A paint sample was taken in the second floor south bedroom that reveals many more layers than the wall and baseboard samples due to the heavy wear floors accumulate. This floor was originally painted gray.

Architecture – Stairs

Exterior Stairs, North Elevation. These stone stairs have five risers, 8" high, with treads that are 1'-0" deep by 5'-0" wide. (SI-LSQ-11)

Circular Stair to Lantern, Oil Room, and Second Floor Quarters. This stair is integral to the Tower and Quarters. It is cast iron on a 3 ¾" center post (stacked treads) with an 8" rise. The treads are 1 ½" to 11 ½" deep and 3'-3" wide. This stair not only acts as the access to the lantern, it also is the only method of accessing the basement oil room and the second floor living quarters. (SI-LSQ-29)

Basement Stairs. These stairs are stone, have eight risers at 9" high, and have treads that are 10" deep and 2'-11 ½" wide. The stairs do not have a handrail and are heavily worn from foot traffic, as evidenced by the bowl-shaped center of the treads. (SI-LSQ-17)

Summer Kitchen to Kitchen Stairs. These stairs are painted wood and the top step is stone. The three wood risers are 7 ½" high, and the one stone riser is 8" high. The bottom two treads are 1'-0" deep, the third tread from the bottom is 1'-3" deep, and the top stone tread is 1'-7" deep (includes door opening). The treads have a 1 ½" nosing. The wood balustrade has six simple octagonal balusters that are 1 ¾" at the base and ¾" at the top. They are 5 ½" on center. The handrail is rectangular, 4" x 2 ½", and the newel is 5" x 5" at the base. The distances from the nosings to the top of the handrail are between 2'-1 5/8" x 2'-5". A paint sample taken from a stair riser reveals that all of the paint layers beneath the current paint are oil-based and range from white to gray to navy blue, gray being the most common and the oldest color. (SI-LSQ-19)

Second Floor to Tower Stairs. These wood stairs, painted blue, connect the Tower stairs with the second floor living quarters. There are four risers at 7 ½" and the treads are 11 ¼" deep and 2'-9" wide. The nosing overhang is 1 ¼". There is no handrail. (SI-LSQ-25)

Architecture – Casework

Entry and Kitchen. These rooms both have 2 ½” wood wall-mounted doorstops, painted, for entry, Tower entry, and interior doors.

Kitchen Closet. This closet has three, wrap-around, built-in wood shelves on the west, north, and east walls. There is one lower shelving system with supports for three shelves, only one of which is extant. All shelves are contemporary, unpainted wood, shelving units.

Summer Kitchen. The summer kitchen has a large, detached pantry constructed of 3 ½” beadboard, painted white, with 3 1/3” wood boards painted yellow on the interior. The pantry does not have a built-in floor. It is 2’-2 ½” deep, 4’-7” wide, and it has a 2’-7” door, centered. There are four, wrap-around, built-in shelves, which are 6” deep. It has an elaborate top molding and a simple base molding that is 8 ½” tall. The historic lockset has porcelain knobs. (SI-LSQ-20)

West Bedroom Closet. This closet has wrap-around wood shelves forming triangular shapes along the three walls, painted white. There are wood hook boards on the three walls below the shelves with four historic metal hooks extant. The shelving is historic. (SI-LSQ-24)

Second Floor Hall Closet. This closet has four built-in, painted wood shelves, wrapped-around the north, west, and east walls.

Second Floor North Bedroom. This room has two painted wood hook boards that line-up end to end along the west wall. The boards are 3 ½” wide with six historic metal hooks and one partial historic metal hook.

Second Floor South Bedroom. There is a painted wood hook board along the northwest wall that has several historic metal hooks.

Architecture – Accessibility

This building is currently not accessible. The north main entry door opening is 3’-0” clear with a grade to finished floor elevation change of 3’-8 ½”. The kitchen vestibule entry door opening is 3’-0” clear with a grade to finished floor elevation change of 2 ¼”. The kitchen door opening is also 3’-0” clear but with a grade to finished floor elevation change of 5”.

Physical Description -- Structural

Structural – Foundation

The perimeter foundation system consists of stone masonry. The foundations below the perimeter walls and the brick interior wall are covered by a concrete slab-on-grade in the basement and could not be observed.

Structural – Floor Framing

The first floor framing below the living room was measured to be full-sawn (FS) 2x10 joists spaced at about 16”. The joists span approximately 12’ and are sheathed with two layers of solid wood flooring. The balance of the first floor framing was measured to be newer 2x10 joists spaced at about 16” that were installed in the mid 1900’s after a fire. The joists span approximately 12’ and are sheathed with one layer of solid wood subflooring. The joists are supported on the perimeter foundation walls and interior brick walls.

The stepped down floor framing of the kitchen was measured at the cistern access point to be newer 2x10 joists spaced at about 16” that were installed in mid-1900’s. The joists span approximately 11.5’. The joists

are supported on the perimeter foundation walls and a brick interior wall. The joists are sheathed with 1x solid wood subflooring.

The second floor framing was not accessible and could not be observed. The joists span approximately 12'. The joists are supported on wood-framed partition walls and the exterior masonry walls.

The floors of the watch room and lantern are constructed of cast iron plates that are bolted together. The plates are supported on the masonry walls of the Tower. The floor is accessed via a spiral cast iron stair that extends to the basement.

Structural – Roof Framing

The roof framing of the main building was not accessible and could not be measured, although the rafters at the eaves were measured to be FS 2x6 joists spaced at about 32". The rafters span approximately 7'. The rafters are supported on the exterior masonry walls and interior partition walls on the second floor. The rafters are sheathed with 1x tongue and groove solid wood underlayment at the eaves.

The roof framing of the kitchen was not accessible and could not be measured, although the rafters at the eaves were measured to be FS 2x4's spaced at about 32". The rafters span approximately 11.5'. The rafters are supported on the exterior masonry walls and the masonry wall between the main building and the kitchen. The rafters are sheathed by 1x tongue and groove solid wood underlayment at the eaves.

The roof of the Tower lantern is constructed of cast iron panels that are bolted together. The panels are supported on the walls of the lantern.

Structural – Ceiling Framing

The ceiling framing of the second floor was not accessible and could not be measured. The joists span approximately 15'. The ceiling joists are supported on the interior partition walls.

The ceiling framing of the kitchen was not accessible and could not be measured. The joists span approximately 11.5'. The joists are supported on the exterior masonry walls and the masonry wall between the main building and the kitchen.

Structural – Wall Framing

The exterior walls are constructed of stone masonry. The original interior walls were not accessible and could not be measured.

The basement partition walls are constructed of brick masonry.

The walls of the lantern are cast iron panels that are bolted together. The panels bear directly on the floor of the lantern.

Structural – Lateral System

Lateral stability for the building is provided by the exterior masonry walls.

Structural – Load Requirements

The required watch room floor load capacity is 40 psf, the required lantern floor load capacity is 100 psf and the required roof snow load capacity is 40 psf.

Physical Description -- Mechanical

Mechanical – Plumbing Systems

There is currently no domestic water service to the building. A 24'x11' cistern is built into the basement under the summer kitchen. The cistern still contains water. (SI-LSQ-39) Several sections of a rainwater capture system remain in place with 1½" black steel piping from the second floor to the basement. The rainwater capture piping from the roof gutters has been disconnected and the runoff is now channeled into downspouts on the east and west side of the building. The original piping included a fill line for the cistern and an overflow line to divert excess runoff once the cistern was full. Sections of the overflow piping have been removed but a majority of both piping systems remain intact.

There is no active sewer system serving the building. The original waste piping drained to the lake. This drain system has been abandoned.

The only plumbing fixture in the building is an enameled cast iron sink with drain board located in the summer kitchen. The kitchen sink does not have water service, faucets, or an active drain connection. There are no other plumbing fixtures in the building.

Mechanical – HVAC

The original heating for the building would likely have been wood burning stoves. All that remains from this era is a brick chimney stack from the basement up through the roof. A new Empire 25,000 btuh (British thermal unit per hour) console type propane room heater has been installed in the first floor living room. The 4" aluminum flue pipe has been installed inside the original chimney stack. A single propane tank is located to the south of the building behind the Privy. The copper propane piping enters the building on the west side with a pressure regulator and copper distribution piping through the basement up to the first floor. The propane piping serves the heater, kitchen stove, and refrigerator.

Basement ventilation consists of a 24"x24" wood slat ground level louver on the east side of the building.

Mechanical – Fire Suppression

None in the building.

Mechanical – Other

In 1931, a tank house for kerosene storage was built on the southeast side of the Tower. All that remains of this structure is the concrete foundation.

Physical Description -- Electrical

Electrical – System Configuration

Battery operated single station security alarms were observed at windows on the lower level of the building.

A photovoltaic system consisting of a freestanding flat plate photovoltaic array approximately 60" x 42" and storage batteries provides power for fluorescent lighting and small loads in the building's kitchen. Wiring for lighting is housed in surface mounted raceway. No inverter exists, therefore only DC loads such as flashlights, walkie-talkie chargers etc. are able to be served.

Electrical – Conductor Insulation

None in the building.

Electrical – Overcurrent Protection

None in the building.

Electrical – Lighting Systems

None except for photovoltaic system indicated.

Electrical – Telecommunications

None in the building.

Electrical – Fire Alarm System

None in the building.

Electrical – Lightning Protection

Lightning protection consists of brass air terminals and brass or copper down- cables that appear to be terminated on buried ground rods. Air terminals are located along the peak of the roof, at the peak of each dormer, and on each chimney. One very interesting aspect of the lightning protection system is the existence of a very old lightning grounding system on the east side of the Tower. (SI-LSQ-40) Unlike more modern systems consisting of braided cable, this grounding system consists of a wrought iron rod extending from the lantern-level walkway down to the ground. The remnants of a glass insulator system to support the rod are also unusual. This system may very well date back to the original construction of the lighthouse in 1881 when lightning systems varied widely depending on the "lightning practitioner" that manufactured the system.

Physical Description -- Hazardous Materials

Landmark Environmental collected four bulk samples from a total of four different types of suspected asbestos containing materials (ACMs) at Sand Island. Of the four suspect ACMs that were sampled and analyzed, none of the sampled suspect ACMs resulted in concentrations of greater than one percent (positive for asbestos).

Hazardous Materials – Asbestos

Sheet flooring, backing materials and flooring adhesives at the Light Station Quarters were sampled and were found to be non-ACM. White wall plaster wall texture and white plaster over brick were also sampled and found to be non-ACM.

The following suspected ACMs were not sampled due to inaccessibility or park limitations regarding potential for damage to structures. Asbestos is assumed to be present at the following locations:

1. Wall and Ceiling Plaster,
2. Ceiling Insulation (Black matting or felt paper observed above ceilings, this suspect ACM may also be present in wall interiors),
3. Adhesives (Multiple varieties of miscellaneous adhesives were seen on heater components, under remnant flooring applications, and around windows),

4. Thermal System Insulation (TSI) (Was not observed. Asbestos is commonly present in insulation on water pipes, metal ducting for heating systems, behind floor registers, steam piping, etc.),
5. Roofing Materials (Roofing felt, tar, and shingles were observed that may contain asbestos),
6. Sub-Flooring (Suspect ACMs in flooring applications were not observed. Asbestos is commonly present in vapor barrier felts and tar-papers used in sub-flooring applications),
7. Brick and Block Filler (The exterior of the structure is stone and has the potential to have a block filler or grout that is potentially asbestos containing),
8. Caulk (Caulking was observed around window and door penetrations, which can also include gasket applications between the window assembly and the structure), and,
9. Asbestos-cement (Piping, wall-board, wall interior panels, roof flashing and roofing applications can be constructed of asbestos-cement. This type of application was not observed at the structure but may be present).

The assumed asbestos containing materials were observed to be in fair condition with localized areas of wall and ceiling systems observed to be in poor condition.

Hazardous Materials – Lead Containing Paint

The Lead Containing Paint (LCP) inspection included a visual inspection of the structure. A previous inspection and testing for LCP was conducted using an x-ray fluorescence (XRF) detector coupled with bulk paint sampling and laboratory analysis.

The XRF inspection was conducted by the NPS Staff in 1993. The findings of this study are incorporated into this report by reference.

Detectable lead in paint was confirmed for the following testing combinations:

1. Window Sash,
2. Window Trims,
3. Doors,
4. Painted Walls,
5. Ceilings, and,
6. Tower.

Detectable lead is assumed to be present at the following locations:

1. Interior Painted Surfaces, and,
2. Exterior Painted Surfaces.

Based on the estimated dates of construction of the various structures lead containing paint is assumed to be present throughout the structures. The confirmed LCP was observed to be in fair condition and the assumed LCP was observed to be in fair condition.

Paint chip debris was not observed on the ground surface.

Hazardous Materials – Lead Dust

Wipe sampling for lead dust was conducted in the Light Station Quarters. A three wipe composite sample was collected from both levels of the structure. On the first floor the composite was collected from the living room, bedroom, and main hall floors. On the second floor the composite wipe was collected from the hall and bedrooms. It should be noted that the structure was occupied by Park staff temporarily while conducting historical preservation work on Sand Island.

1. Analysis of the first floor composite resulted in 273 micrograms of lead dust per square foot of floor (ug/SF).
2. Analysis of the second floor composite resulted in 1000 ug/SF.

Hazardous Materials – Lead in Soils

The historical paint maintenance activities may have the potential to impact the surrounding soil. The surface soils adjacent to the structure were not observed to have lead paint debris. Preliminary lead-in-soil sampling was performed to assess whether these soils contain lead concentrations above applicable soil standards.

One four-aliquot soil sample was collected from ground surface at the roof drip line, approximately three ‘ from the foundation of the structure. One four-aliquot soil sample was collected from ground surface approximately five ‘ out from the structure.

1. Analysis of the drip line composite soil sample resulted in 18.8 milligrams of lead per kilogram of soil (mg/kg).
2. Analysis of the sample collected from five ‘ from the foundation resulted in 139 mg/kg.

Hazardous Materials – Petroleum Hydrocarbons

Remnant piping systems were observed in the basement that may have been associated with historical heating oil tank(s) or the acetylene gas system for the light. No areas of staining were observed on concrete floors in the basement and remnant piping appeared to be empty and dry. (*L.E. Note – these were likely cistern drain piping*)

Hazardous Materials – Mold

Inspections of the structure were performed to identify the readily ascertainable visual extent of the mold growth. Moisture testing in building materials was not performed nor was sampling of building materials performed for microbial analysis.

Mold was identified visually in:

1. Keepers Quarters Basement,
2. Tower Basement, and,
3. Kitchen floor above Cistern.
 - a. The hatch to the Cistern was opened during the assessment. The wood panel removed to gain visual access to the Cistern was wet and degrading so much that it began to disintegrate when removed.

Character Defining Features

Mass/Form. A one-and-a-half story brownstone flared gable roof structure with an octagonal tower attached and a one-story shed structure on the opposite end.

Layout of Spaces. Small, discrete rooms accessed from minimal hallways; one single stair for both Tower and quarters use; openings between rooms allow direct communication.

Exterior Materials. Ashlar brownstone, decorative wood trim work including exposed rafter tails, brackets and decorative gable drop trim, all painted white. The roof is covered with red metal shingles.

Openings. Arched window openings with divided-lite wood double-hung windows with wood shutters, painted white.

Interior Materials. Plaster, painted woodwork and wood flooring.

General Condition Assessment

In general, the Sand Island Light Station Quarters are in fair to good condition. Some of the ceiling and wall finishes on the first floor are covering up, or have replaced, the historic ceilings and walls, but the historic finishes that are extant in the building vary from fair to poor condition, depending upon the location. It appears the second floor has suffered the most from moisture issues, especially the south bedroom.

Structurally, the building is in good condition. The basement needs to be dried out to reduce moisture content of the first floor framing. The high moisture content promotes decay of the wood.

Mechanically, the upgraded systems in the Keepers Quarters are generally in good condition. The extant, historical mechanical components are in fair to poor condition.

Electrically, there are no alternating current electrical systems in the Light Station Quarters.

The following section is a discipline-by-discipline, component-by-component condition assessment of the building. Refer to Volume I, Chapter 2: Methodology for definitions of the condition ratings.

Condition Assessment -- Architecture

Architecture – Roof

Condition: *Poor*

The main roof is in poor condition with peeling of the metal shingles' red finish evident. The south and west shed roofs are in fair condition with paint peeling on the shingles, gutters, and flashing. Park staff reports poor flashing interfaces. The tie offs on the roof should not be used for life safety anchors until they can be certified as meeting OSHA requirements.

The Tower roof is in fair condition as the joint at the east panel is punctured, there are small amounts of delamination, and there are previous patches evident.

Architecture – Gutters and Downspouts

Condition: *Poor*

The gutter system is in poor condition given the standing water evident.

Architecture – Chimney

Condition: *Fair*

The chimney is in fair condition.

Architecture – Exterior Walls

Condition: *Good*

The exterior walls generally appear to be in good condition with past repointing evident.

Architecture – Windows

Condition: *Good to Fair*

The exterior of each window has been recently and thoroughly restored, including the original sash with repainting, wood restoration, and new glazing compound. Shutters were reconstructed based off of extant shutter components. Shutter hinges, where missing, were reconstructed and new shutter hardware was installed. The interior faces of the windows have not been restored as is evident by the peeling paint and missing latching hardware.

Architecture – Exterior Doors

Condition: *Good*

The doors are in good condition as they have been recently restored and repainted on the exterior faces. They generally have rusty hinges and the trim at the kitchen vestibule door is discontinuous.

Architecture – Exterior Trim

Condition: *Good*

All of the wood trim is in good condition.

Architecture – Tower Walk and Railing

Condition: *Good to Fair*

The cast iron deck and railings of the Tower are overall in fair condition with spot rusting and peeling paint. The deck is in good condition with some instances of rust where peeling paint is exposed.

Architecture – Tower Lantern

Condition: *Fair*

Overall, the lantern is in fair condition. The base of the lantern wall appears to have minor moisture damage, the paint at the sill is peeling, and there's minor rusting at the glazing frame. Within the glazing, one pane is cracked and two have been replaced with steel panels. Also, the intake vents, most likely configured like other lighthouse vents, are missing brass control caps. The access door to the walk is difficult to operate as the throw bolt is bent. There are also circular imprints from a metal object struck against the door on the interior face. This damage occurred in 2009 and it is believed the object may have been a 100-pound propane cylinder.³⁹ (SI-LSQ-35)

Architecture – Kitchen Vestibule

Condition: *Good*

The kitchen vestibule is generally in good condition. The bottom of the door casing is fairly weathered.

³⁹ Information from Randy Ross, 2010.

*Architecture – Interior Doors*Condition: *Good to Fair*

Tower to Quarters Doors. The plate steel doors at both levels have some rust on their surfaces and their knobs do not operate their catches.

Typical Interior Doors. These general interior doors are in good condition with some loose knobs, paint chipping, and peeling paint.

*Architecture – Wall Finishes*Condition: *Good to Fair to Poor*

The basement rooms' ashlar blocks are in fair condition as in the oil room there is visible mold along the west wall, the wood cellar has moisture issues along the north wall and the northeast and southwest corners and the cellar has efflorescence up to 2'-0" on the stone block walls. The interior brick walls are also in fair condition as the oil room has visible mold at the southwest corner. The wood cellar and the cellar have peeling paint at the base of their brick walls.

The original plaster wall finishes (over masonry and lath) in the entry and east bedroom are generally in fair to good condition. There are deep cracks in the plaster in the east bedroom's walls and there are holes in the plaster over masonry at the entry. The modern gypsum board that was installed during A.D. Hulings lease of the property from 1953 to 1975 is in good condition. The kitchen's wallpaper and wainscot are in fair condition as the wallpaper shows wear and tear and the wainscot has some separation of bead and board. The kitchen's closet is in poor condition as the plaster has cracks and separation at wall junctures. The summer kitchen's plaster is in fair condition except at the southwest corner above the sink as the plaster there has been badly damaged. The wainscot in this room is in fair condition as the east wall has warped wainscot. The plaster in the parlor and the west bedroom's closet are in poor condition as the plaster is cracking and the paint is alligatored and peeling. The west bedroom has wall plaster in fair condition with some cracks and peeling paint, mostly along the south wall. The plaster in the second floor hall and the second floor bedrooms (two) is in poor condition, while the hall's closet has plaster in fair condition. The north bedroom has a stress crack along the east wall and deflection around the crack. The south bedroom has cracks and deflection in the plaster as well as staining. (SI-LSQ-27 and 28)

*Architecture – Ceiling Finishes*Condition: *Good to Fair to Poor*

The oil room has a high moisture reading (see structural assessment) but visually appears to be in fair condition. The wood cellar and cellar appear to have good ceiling finishes. The entry's plaster ceiling is in good condition with cracks on the west sloped ceiling. Both closets' plaster ceiling finishes are in poor condition as the kitchen closet's ceiling plaster is almost all missing and the lath is visible and the bedroom closet's ceiling is peeling away at the junctures with the walls. The gypsum board ceiling finishes installed between 1953 and 1975 are generally in good condition in the east bedroom, kitchen, summer kitchen, parlor, and west bedroom, but have some visible seams and stains and holes from absent nails/metal hardware. The second floor hall and closet have plaster ceilings in poor condition as there are cracks in the plaster causing them to deflect and separate in areas from the walls and the other portions of the ceiling. The north bedroom has a plaster ceiling in fair condition with cracks along the north wall that may worsen in the future. The south bedroom's gypsum board ceiling is in poor condition with stains and deflection along the south wall, especially around the south seam in the gypsum board.

Architecture – Interior Trim

Condition: *Good to Fair to Poor*

The 11" tall base trim and shoe in the entry, east bedroom, parlor, and west bedroom and its closet are generally in good condition. The second floor hall and second floor bedrooms' trim is in fair to poor condition as there are vertical stress fractures at the wall corners that carry into the base trim and cause horizontal stress cracks in the base trim. There are some instances of misalignment as well. The cove molding in the east and west bedrooms and the parlor are in fair condition as there are instances of separation from the ceiling and walls. The kitchen's base trim is in good condition and the cove molding is in fair condition as there is separation from the ceiling at the corners. The summer kitchen and kitchen closet's base shoes are in fair condition as in the summer kitchen, the shoe is partially missing on the east wall and in the kitchen closet, the base shoe only exists on the east wall. The summer kitchen's cove molding is in fair condition.

Architecture – Floor

Condition: *Good to Fair to Poor*

The concrete floors for the wood cellar and cellar are in good condition while the concrete floor for the oil room is in fair to poor condition with flaking and crumbling concrete at the west wall. The drainage gutter system has debris collected in it, but otherwise is in good condition. The pipe in the wood cellar leading to the exterior is in fair condition as it is rusty. The entry, east bedroom, and kitchen and its closet wood flooring is overall in good condition. There is some wear, especially around the entry door, and some shallow scratches in the wood. The wood flooring in these rooms was most likely installed between 1953 and 1975 when A.D. Hulings leased the property. The summer kitchen's resilient flooring is in poor condition, while the visible wood is in fair condition with some paint peeling and wood splitting. The parlor, west bedroom and its closet, and second floor hall closet have wood flooring in good condition, with minor wear and separation of boards. The second floor hall and north bedroom are in fair condition as these wood floors are heavily worn and have deeper gouges and scratches. The south bedroom's wood floor is in poor condition as it is heavily worn, has water stains, and possible previous water damage at the southeast corner (this section of flooring feels bouncy).

Architecture – Stairs

Condition: *Good to Fair*

Exterior Stairs, North Elevation. The stair is in fair condition. It is rusted and does not have a handrail.

Circular Stair to Tower, Oil Room, and Second Floor Quarters. This stair does not have a handrail.

Basement Stairs. These stairs are in good condition but they do not have a handrail.

Summer Kitchen to Kitchen Stairs. The wood stairs with the top stone step are in good condition. The balustrade is on one side only, and the paint is peeling on the risers.

Second Floor to Tower Stairs. These stairs are in good condition, although there is no handrail and the paint is peeling.

Architecture – Casework

Condition: *Good to Fair to Poor*

The wood doorstops in the entry and kitchen are in good condition except for minor peeling paint. The wrap-around shelving unit in the kitchen closet is in good condition while the lower shelving unit is in poor condition as there are two missing shelves. The summer kitchen's pantry is in good condition with peeling paint and rusty hinges. The two-door wood cabinet is in poor condition as one of its doors is missing and it

has peeling paint and is stained. The west bedroom closet's shelving unit and hook boards are in good condition. The hook boards do have scars from missing hooks. The second floor hall closet's shelving unit is in poor condition as it is incomplete. The bottom two shelves on the west wall are missing. The second floor north bedroom hook boards along the west wall are in fair condition as they have hook scars and the boards themselves do not match. The second floor south bedroom's hook board is in fair condition with rust stains and partial hooks.

Architecture – Accessibility

Condition: *Poor*

This building is currently not accessible.

Condition Assessment -- Structural

Structural – Foundation

Condition: *Good*

The perimeter foundation walls are in good condition. The footings are covered by a concrete slab-on-grade and could not be observed, thus their condition is unknown. No obvious signs of distress or damage were observed.

Structural – Floor Framing

Condition: *Good*

The first floor framing in the Quarters is in good condition. Floor joists that are headed off above windows are not properly supported. (SI-LSQ-37) The moisture levels in the framing were above 18% and this can lead to deterioration of the wood. Two basement windows have been replaced with louvers to increase the ventilation but this does not appear to be enough. The newer stepped floor framing of the Kitchen could not be observed, thus its condition is unknown. No obvious signs of distress or damage were observed. The second floor framing could not be observed, thus its condition is unknown. No obvious signs of distress or damage were observed. The floor of the lantern is in good condition.

Structural – Roof Framing

Condition: *Unknown*

The wood roof framing of the quarters and kitchen could not be observed, thus its condition is unknown. No obvious signs of distress or damage were observed. The roof of the lantern could not be observed, thus its condition is unknown. The joints between the roof panels had been sealed but not painted which indicates rust jacking between the cast iron panels. (SI-LSQ-38) The extent of the damage should be checked at least annually and corrective action taken if the damage continues.

Structural – Ceiling Framing

Condition: *Unknown*

The ceiling framing of the second floor and kitchen could not be observed, thus its condition is unknown. No obvious signs of distress or damage were observed.

Structural – Wall Framing

Condition: *Good*

The basement and exterior walls are in good condition. The interior wall framing could not be observed, thus its condition is unknown. No obvious signs of distress or damage were observed.

1 *Structural – Lateral System*

2 Condition: *Good*

3 Lateral stability of the building is good.

6 *Structural – Load Requirements*

7 Condition: *Fair*

8 The roof and floor framing have adequate capacity to support the required loads with the exception of the
9 kitchen roof framing. The kitchen roof framing could not be directly observed, but the framing exposed at
10 the eaves does not have the required snow load capacity even if the spacing of the joists is half of what can
11 be measured.

14 ***Condition Assessment -- Mechanical***

15 *Mechanical – Plumbing Systems*

16 Condition: *Fair to Poor*

17 The cistern located in the basement under the summer kitchen is in fair condition and still contains water.
18 However, the water in the cistern is stagnant. The rainwater capture piping from the second floor to the
19 basement is in fair to poor condition with portions of the piping no longer in place.

21 There is no active sewer system serving the building.

23 The enameled cast iron sink located in the summer kitchen is in poor condition with large chips in the
24 enamel and rust damage.

27 *Mechanical – HVAC*

28 Condition: *Good; Severe (Chimney Stack)*

29 No wood burning stoves remain in the building. The original brick chimney stack from the basement up
30 through the roof is in fair condition. All unused vent openings have been sealed off. The new propane
31 heater in the first floor living room is in good condition. The new propane heater and associated flue vent
32 are in good condition. However, the existing chimney stack is not adequately lined and does not meet
33 current mechanical and building codes. The propane building entry, pressure regulator, and copper
34 distribution piping through the basement up to the first floor are also in good condition.

36 The ground level basement ventilation louver is in good condition, but does not provide adequate
37 ventilation for the space.

40 *Mechanical – Fire Suppression*

41 Condition: *N/A*

44 ***Condition Assessment -- Electrical***

45 *Electrical – System Configuration*

46 Condition: *Poor and Fair*

47 Battery operated security alarms are in poor condition and are non-functional. Batteries have been
48 removed. There is no connection to a central station.

50 The photovoltaic system is in fair condition. There is evidence that water occasionally covers the batteries
51 which reside in an underground cabinet.

Electrical – Conductor Insulation, Overcurrent Protection, Telecommunications, and Fire Alarm System

Condition: N/A

Electrical – Lighting Systems

Condition: Fair

The photovoltaic system is in fair condition. There is evidence that water occasionally covers the batteries which reside in an underground cabinet.

Electrical – Lightning Protection

Condition: Poor

Lightning protection is old and there is no evidence that any maintenance has been performed.

Condition Assessment -- Hazardous Materials

Refer to 'Physical Description -- Hazardous Materials' for detailed descriptions of locations and conditions of hazardous materials.

Ultimate Treatment and Use

This building operated as a lighthouse and primary residence from 1881 to 1921 when it became automated; the earliest automated lighthouse in the Apostle Islands. The Light Station Quarters were then rented out seasonally for private use until the 1950s.

The building is currently used as guided visitor access with no remaining furnishings or Fresnel lens in the tower. The preferred alternative is to restore the building to its pre-1921 condition and interpret the first and second floors for visitors with possible staff housing (with no new or improved utility services) on portions of the second floor. Further study on the interior finishes will be required for restoration, however the openings of the front bedroom are noted in the Treatment Recommendation Notes on page 126.

Restoration is the recommended treatment for the building.

Requirements for Treatment

Compliance requirements for treatment currently include laws, regulations, and standards as outlined by the NPS and listed in Volume I, Administrative Data section of this report.

The recommended treatments are tailored to the Preferred Alternative as the outcome of the Value Analysis/CBA for the project. As individual buildings are rehabilitated, specific alternatives will present themselves during design and construction. The following section is a discipline-by-discipline, component-by-component description of the treatment and work recommendations proposed for the restoration of the building. Refer to Volume I, Chapter 2: Methodology for the priority rating definitions.

Treatment Recommendations -- Architecture

Architecture – Roof

Priority: Severe

Reroof the main and shed roof using prefinished metal shingles to match existing historic in situ at the shed. Coordinate roof installation with the gutter repair work. Verify/provide proper blocking for roof tie offs. Verify/ provide proper flashings, underlayment and slip sheet.

Repair the punctured cast panel and delamination. Scrape, sand and repaint.

Architecture – Gutters and Downspouts

Priority: Severe

Replace the existing prefinished metal yankee gutter system and repair/shim to allow for proper slope for drainage. Coordinate with roofing repair work. Reuse existing 3” fluted downspouts as possible. Verify provide proper drainage away from the building.

Architecture – Chimney

Priority: Low

No recommendations at this time.

Architecture – Exterior Walls

Priority: Low

No recommendations at this time.

Architecture – Windows

Priority: *Moderate*

Scrape, sand and repaint the interior of the windows and replace missing latching hardware.

Architecture – Exterior Doors

Priority: *Moderate*

Replace hardware at the kitchen to allow for accessibility through the vestibule. Monitor rusty hinges. The trim at the kitchen vestibule door is discontinuous.

Architecture – Exterior Trim

Priority: *Low*

No recommendations at this time.

Architecture – Tower Walk and Railing

Priority: *Moderate; Severe (Railing)*

Repair spot rusting and peeling paint at walk and deck. Scrape sand and repaint. Investigate alternatives to discretely upgrade the existing railing to become a code compliant guard rail.

Architecture – Tower Lantern

Priority: *Moderate*

Repair patches of peeling paint and rust. Scrape, sand and repaint. Monitor the rust at the glazing frame. Replace cracked pane and reglaze. Replace missing brass control caps at the intake vents. Repair the throw bolt at the access door to the walk. Enhance ventilation throughout the lighthouse: basement atmosphere.

Architecture – Kitchen Vestibule

Priority: *Low*

Repair the bottom of the door casing with epoxy stabilization. Scrape, sand and repaint.

Architecture – Interior Doors

Priority: *Moderate*

Scrape areas of rust at steel doors, prep and repaint. Repair hardware to assure knobs and catches are operational. Scrape, sand and repaint wood doors and repair loose hardware.

Architecture – Wall Finishes

Priority: *Moderate*

No recommendations at this time for the basement exposed stone other than to enhance the overall ventilation of the building.

Further on site investigation is needed to determine extent of wall/opening and trim modifications from original layout at the front bedroom. Repair damaged plaster. Coordinate work with enhanced ventilation throughout the building. Patch sand and paint all plaster and gypsum board. Repair separation, scrape sand and repaint wainscot and bead board.

1
2 *Architecture – Ceiling Finishes*

3 Priority: *Moderate*

4 Repair damaged plaster. Coordinate work with enhanced ventilation throughout the building. Patch, sand
5 and paint all plaster and gypsum board.
6
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8 *Architecture – Interior Trim*

9 Priority: *Low*

10 Further on site investigation is needed to determine extent of wall/opening and trim modifications from
11 original layout at the front bedroom. Scrape, sand and repaint all interior trim.
12
13

14 *Architecture – Floor*

15 Priority: *Low*

16 Further on site investigation is needed to determine the extent of wood flooring alterations and whether
17 original materials are extant to consider uncovering them. Otherwise refinish existing wood floors. Remove
18 the resilient flooring at the kitchen and refinish the wood floor below.
19
20

21 *Architecture – Stairs*

22 Priority: *Moderate*

23 Install code compliant handrails at all stairs. Scrape, sand and repaint the kitchen and second floor to Tower
24 stairs.
25
26

27 *Architecture – Casework*

28 Priority: *Low*

29 Further on site investigation is needed to determine if the extant casework is original. Scrape, sand and
30 repaint all casework if previously painted (i.e. do not paint underside of shelves that have never been
31 painted.)
32
33

34 *Architecture – Accessibility*

35 Priority: *Moderate*

36 Retrofit the hardware of the series of doors at the kitchen to allow for accessibility into the kitchen area.
37 Freestanding ramping on the exterior would be required to mitigate the 7 ¼" elevation change. Provide
38 accessible path and ramp to kitchen. Add exhibits in kitchen to make the rest of the floor, second floor and
39 Tower programmatically accessible.
40
41

42 ***Treatment Recommendations -- Structural***

43 *Structural – Foundation*

44 Priority: *Low*

45 No recommendations at this time.
46
47
48

Structural – Floor Framing

Priority: *Low*

The moisture levels in the first floor framing should be reduced below 15%. The basement should be dried out. The framing of the headers for the first floor joists above doors and windows should be strengthened to meet IEBC and NPS requirements.

Structural – Roof Framing

Priority: *Unknown*

The roof framing of the kitchen needs to be investigated further. The snow load capacity could not be verified or adequately inferred from field measurements. Current data indicates that the roof has inadequate snow load capacity.

Rust-jacking is causing the roof panels of the lantern to separate. Further investigation is required to determine the extent of the corrosion to the cast iron panels or fasteners.

Structural – Ceiling Framing

Priority: *Low*

No recommendations at this time.

Structural – Wall Framing

Priority: *Low*

No recommendations at this time.

Structural – Lateral System

Priority: *Low*

No recommendations at this time.

Treatment Recommendations -- Mechanical

Mechanical – Plumbing Systems

Priority: *Moderate (Cistern); Low (Rainwater Capture)*

The cistern located at the basement level under the summer kitchen is in fair condition, but contains stagnant water. It is recommended that the cistern be pumped out and sealed to prevent possible water and moisture damage to the building structure.

It is recommended that the rainwater capture system piping from the second floor to the basement be cleaned and repainted for purposes of historic preservation.

Mechanical – HVAC

Priority: *Severe (Chimney Liner); Moderate (Ventilation and Piping)*

The existing chimney stack is not adequately lined and does not meet current mechanical and building codes. Installation of a chimney liner for the heater flue vent is highly recommended.

The existing basement ventilation louver does not provide adequate ventilation to prevent condensation and high humidity levels. The addition of mechanical and passive ventilation is recommended to prevent damage to the building structure.

It is recommended that rusted propane piping at the pressure regulator be replaced and that all unused propane piping be removed.

Mechanical – Fire Suppression

Priority: N/A

Treatment Recommendations -- Electrical

Electrical – System Configuration

Priority: Moderate

Existing wiring in the building for PV powered systems is limited. It is recommended to expand the existing system with new wiring to provide power for new ventilation systems, new refrigerator and stove.

Electrical – Conductor Insulation

Priority: Moderate

It is recommended that new conductor insulation be consistent with wiring methods for proposed PV systems. Conductor insulation shall be in accordance with the National Electrical Code, NPS and Federal Standards and Regulations.

Electrical – Overcurrent Protection

Priority: Moderate

It is recommended that overcurrent protection for new PV system wiring be in accordance with the National Electrical Code, NPS and Federal Standards and Regulations.

Electrical – Lighting Systems

Priority: Low

Lighting systems in the building are limited to one PV powered fixture in the kitchen. No recommendations at this time.

Electrical – Fire Alarm System

Priority: Moderate

It is recommended that battery operated smoke detectors be added inside and outside rooms intended for sleeping and that carbon monoxide detectors be added as required.

Electrical – Telecommunications

Priority: N/A

Electrical – Lightning Protection

Priority: Moderate

Existing lightning protection is old and its effectiveness has not been established. It is recommended that the existing lightning protection system be removed prior to roof replacement. It is recommended that a new LPI-175 compliant lightning protection system be installed after roof replacement.

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Treatment Recommendations – Hazardous Materials

Hazardous Materials – Asbestos

Priority: *Moderate*

Recommend sampling of suspect asbestos containing materials, including, wall and ceiling plaster, ceiling insulations, adhesives, Thermal Systems Insulation, roofing materials, sub-flooring, brick and block filler, asbestos cement, and caulking.

Hazardous Materials – Lead-Containing Paint and Lead Dust

Priority: *Moderate*

Recommend stabilization or abatement of Lead-Containing Paint.

Hazardous Materials – Lead In Soils

Priority: *Moderate*

Recommend further soils characterization to confirm applicable regulatory requirements.

Hazardous Materials – Mold/Biological

Priority: *Moderate*

Recommend water intrusion and mold mitigation.

Hazardous Materials – Petroleum Hydrocarbons

Priority: *Low*

No recommendations at this time.

Alternatives for Treatment

The following are several considerations of alternatives for the proposed treatments:

1. Careful study is needed for introducing a code compliant guard rail at the Tower walk that will not be visually disruptive to the historic character nor be a long term maintenance burden for park staff.
2. Consideration should be given of the possible reconstruction required to “restore” the walls and openings at the northeast bedroom. An alternative could include leaving the walls in situ and calling out the change of material(s) to the visitors. (See following Treatment Recommendation Notes)
3. Regarding the repair of the (yankee) gutter required, due to negative slope as evident with standing water, an alternative would be to forego the reintroduction of this challenging detail and roofing the eave without the yankee gutter.
4. Consideration might also be given to alter the interior stair from the kitchen level to the main floor level by way of adding a landing and mechanical lift due to the concern that if one were to make the 2 mile hike across the island would one want to access more of the building?

Assessment of Effects for Recommended Treatments

The following table includes an analysis of the major treatment recommendations which affect Section 106 Compliance:

Recommended Treatment	Potential Effects	Mitigating Measures	Beneficial Effects
1. Visitor access into the former light tower and quarters	Change in use: Upgrades for code safety and ABAAS will be required which will alter the historic fabric.	Integrate the upgrades to minimize damage to historic fabric and visual disruption. Study whether partial building access would suffice.	- Improves safety for visitors and staff. - Allows visitors to experience the Light Station Quarters first hand.
2. Accessibility Upgrades	Altering the kitchen vestibule entry (ramp) to accommodate a 7 ¼” elevation change will alter the landscape with the extension of a ramp where there is none currently, nor historically.	Study all of the various accessibility alternatives.	- Allows universal access to the cultural resource.
3. Possible use of the second floor as overflow housing with non-potable water	Reduces area for interpretive program and where visitors are allowed.	Examine the other housing options on Sand and how often this overflow space would be needed compared to its importance as a cultural resource for visitors.	- Provides overflow housing for staff and volunteers.

1 Sand Island Light Station Quarters Treatment Recommendation Notes

2

