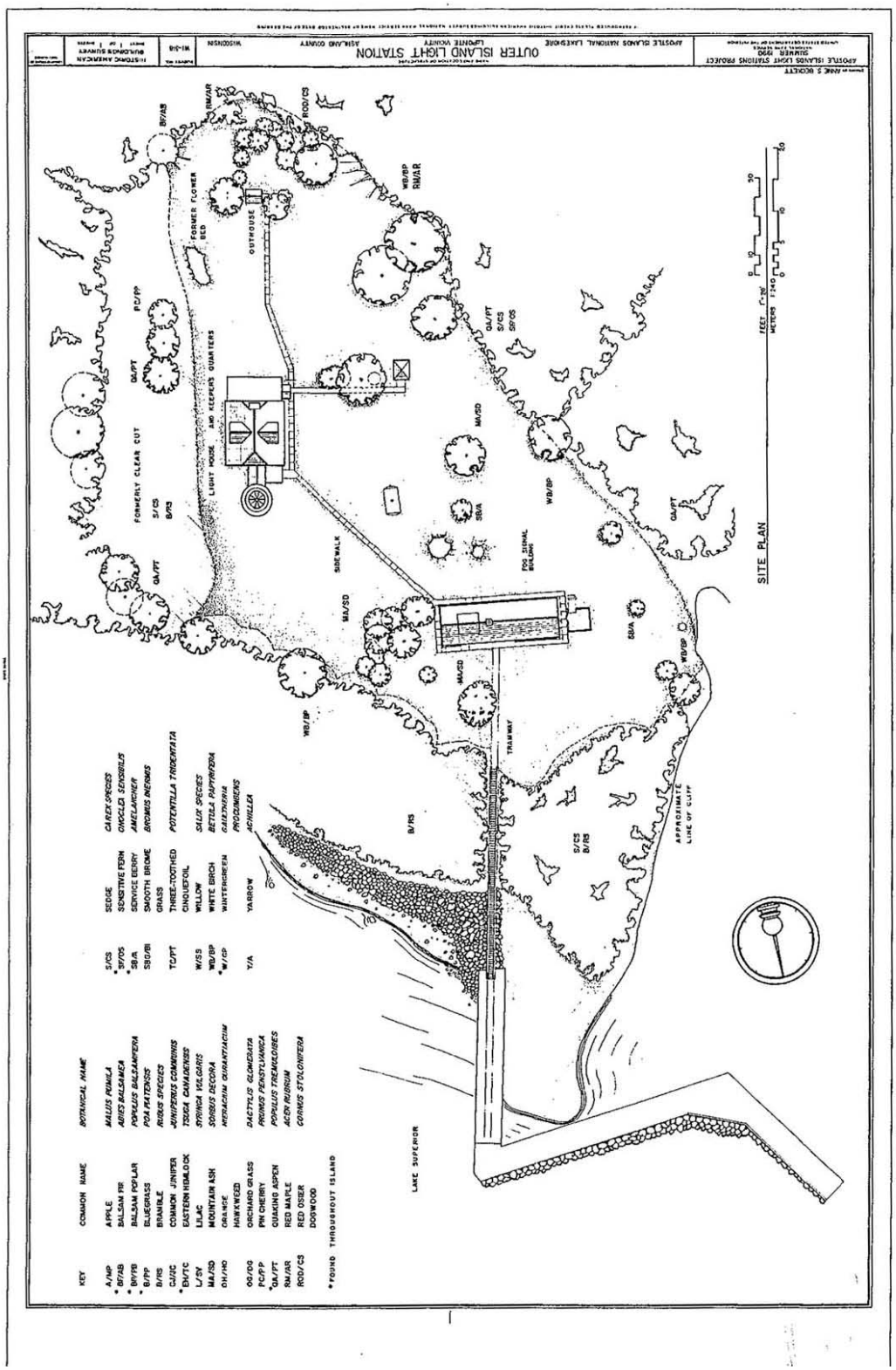
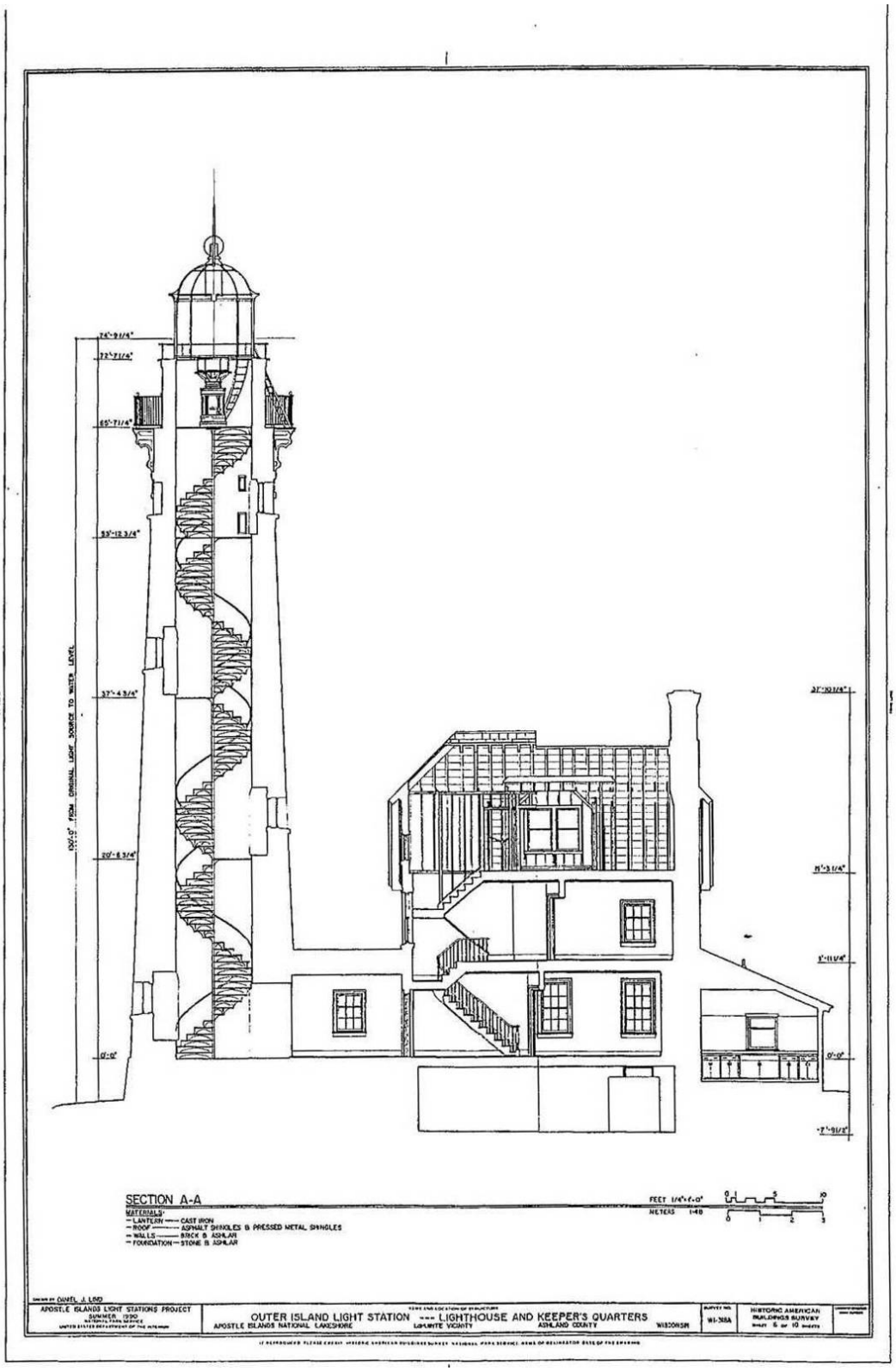
Existing Condition Drawings

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, multi-format 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.

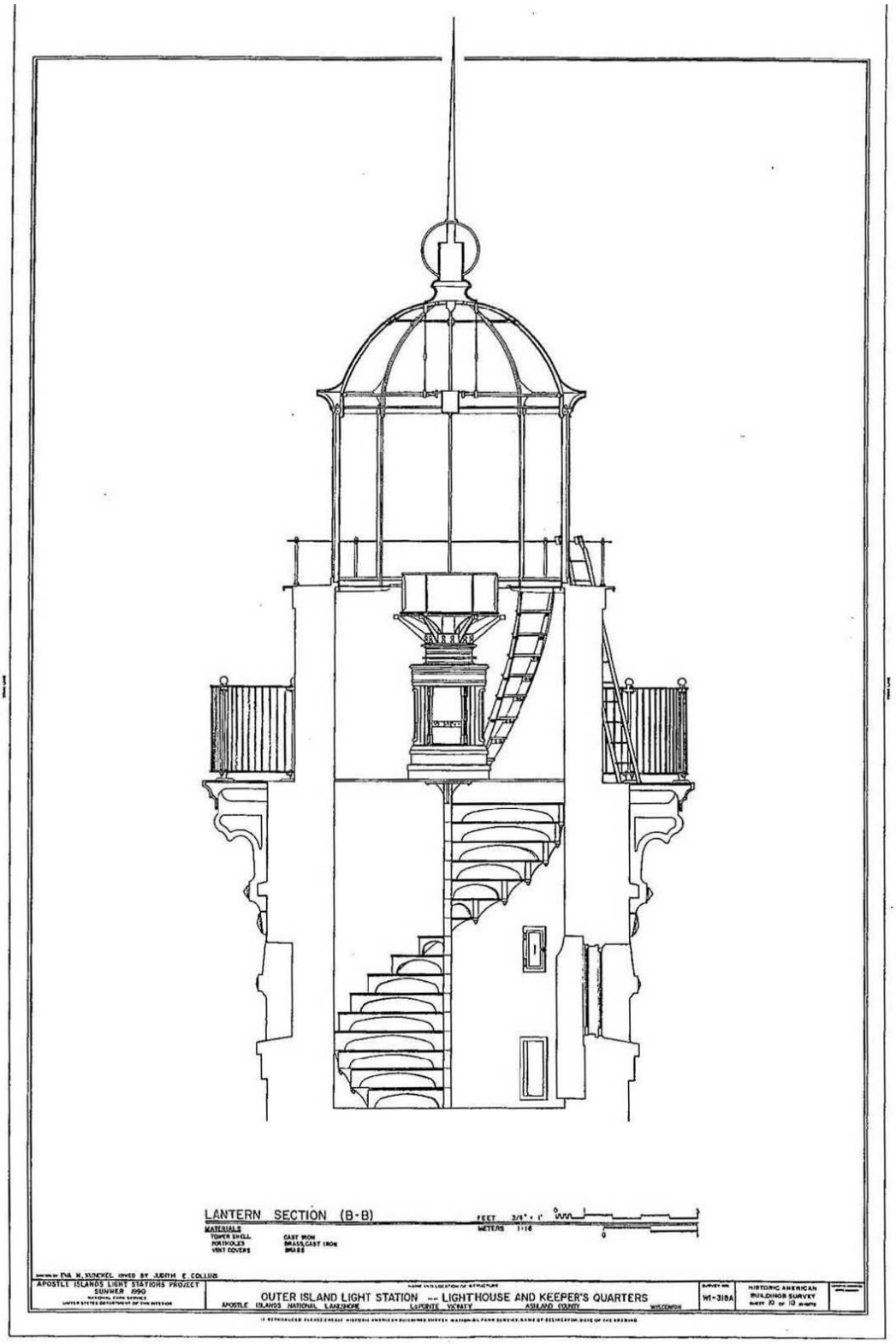
Typically, utilitarian buildings are not included in the HABS survey. In September of 2009, the architects and historic preservation specialists from Andrews and Anderson Architects, PC surveyed the Oil Storage and Privy on Outer Island. These measured drawings have been included following the HABS drawings.

1

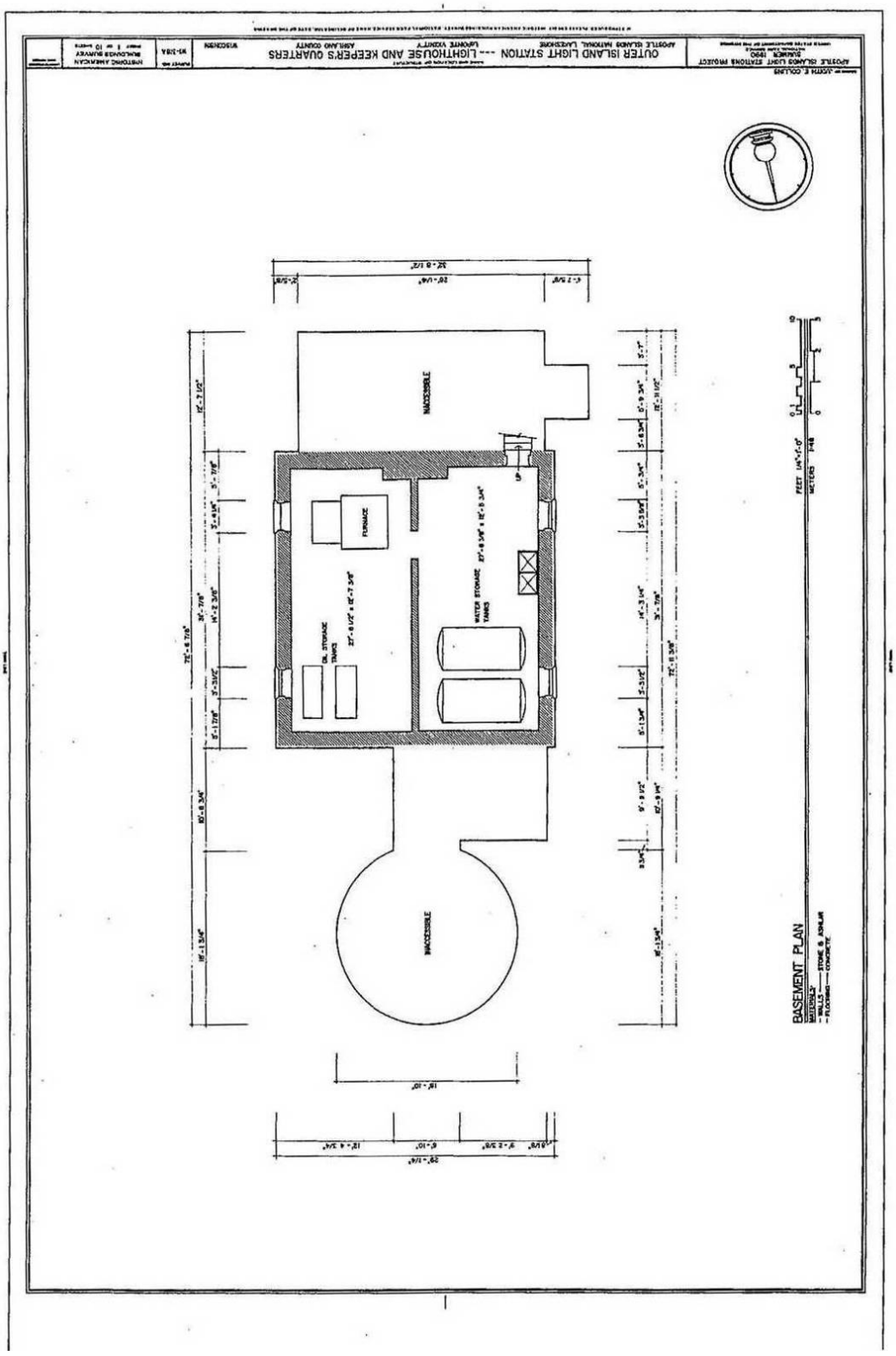

OUTER ISLAND LIGHT STATION
APOSTLE ISLANDS NATIONAL LAKESHORE
ASHLAND COUNTY
WISCONSIN
SITE PLAN
LAKE SUPERIOR
FORMER FLOWER BED
OUTHOUSE
FORMERLY CLEAR CUT
LIGHT HOUSE AND KEEPERS QUARTERS
SIDEWALK
TRAMWAY
APPROXIMATE LINE OF CLIFF
KEY
COMMON NAME
BOTANICAL NAME
SEDGE
CAREX SPECIES
SENSITIVE FERN
ONOCLEA SENSIBILIS
SERVICE BERRY
AMELANCHIER
SMOOTH BROME
BROMUS INERMIS
GRASS
THREE-TOOTHED CINQUEFOIL
POTENTILLA TRIDENTATA
WILLOW
SALIX SPECIES
WHITE BIRCH
BETULA PAPYRIFERA
WINTERGREEN
GAULTHERIA PROCUMBENS
YARROW
ACHILLEA
Y/A
ORCHARD GRASS
DACTYLIS GLOMERATA
PIN CHERRY
PRUNUS PENSYLVANICA
QUAKING ASPEN
POPULUS TREMULOIDES
RED MAPLE
ACER RUBRUM
RED OSIER
CORNUS STOLONIFERA
DOGWOOD
* FOUND THROUGHOUT ISLAND


SECTION A-A
MATERIALS:
— LANTERN —— CAST IRON
— ROOF —— ASPHALT SHINGLES & PRESSED METAL SHINGLES
— WALLS —— BRICK & ASHLAR
— FOUNDATION — STONE & ASHLAR
APOSTLE ISLANDS LIGHT STATIONS PROJECT
OUTER ISLAND LIGHT STATION — LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
LAKESHORE VICINITY
ASHLAND COUNTY
WISCONSIN
WI-388
HISTORIC AMERICAN BUILDINGS SURVEY

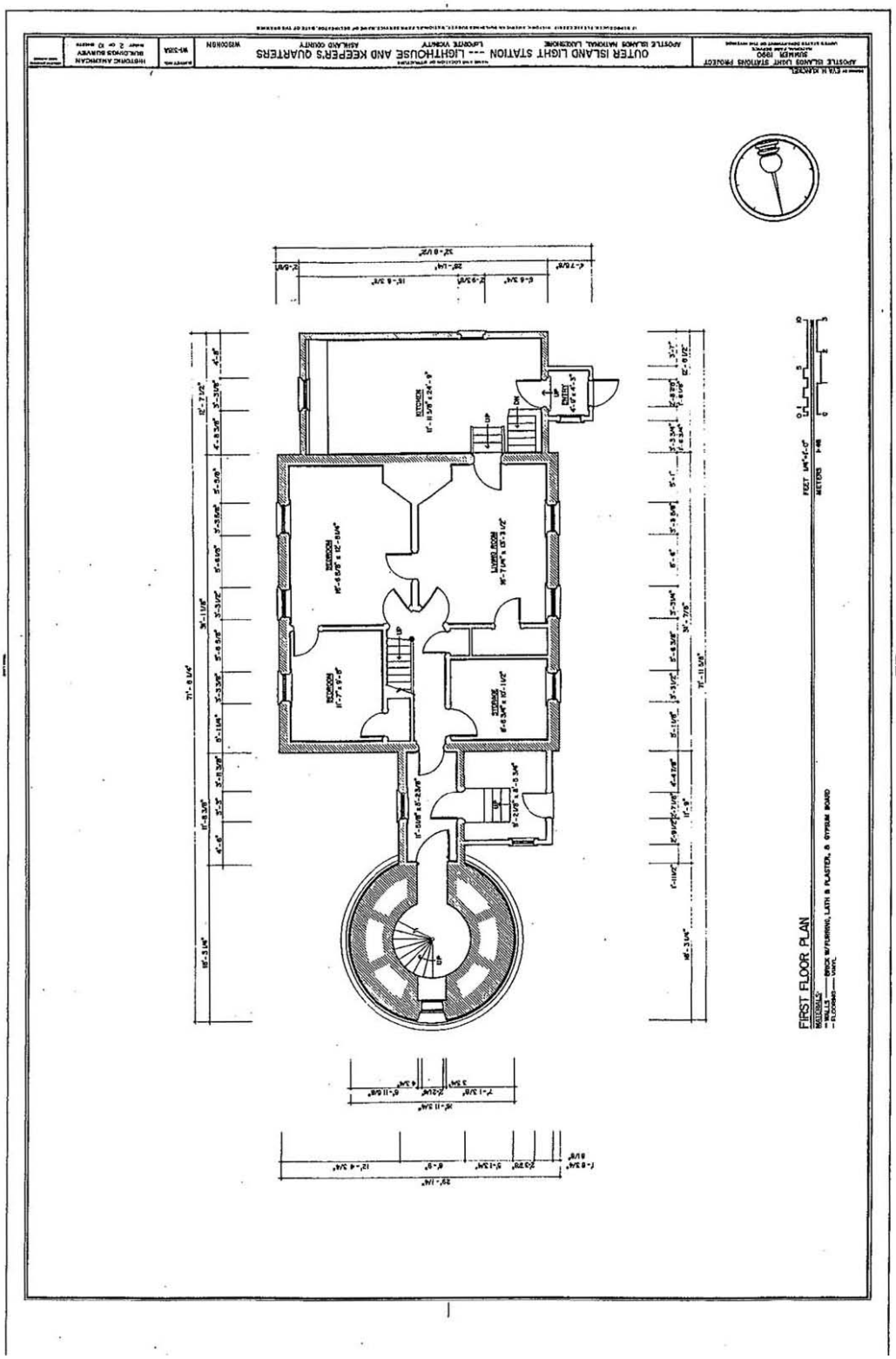
1


LANTERN SECTION (B-B)
FEET
METERS
MATERIALS
TOWER SHELL
PORTHOLES
VENT COVERS
CAST IRON
BRASS, CAST IRON
BRASS
APOSTLE ISLANDS LIGHT STATIONS PROJECT
SUMMER 1990
OUTER ISLAND LIGHT STATION — LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
LA POINTE VICINITY
ASHLAND COUNTY
WISCONSIN
WI-318A
HISTORIC AMERICAN BUILDINGS SURVEY

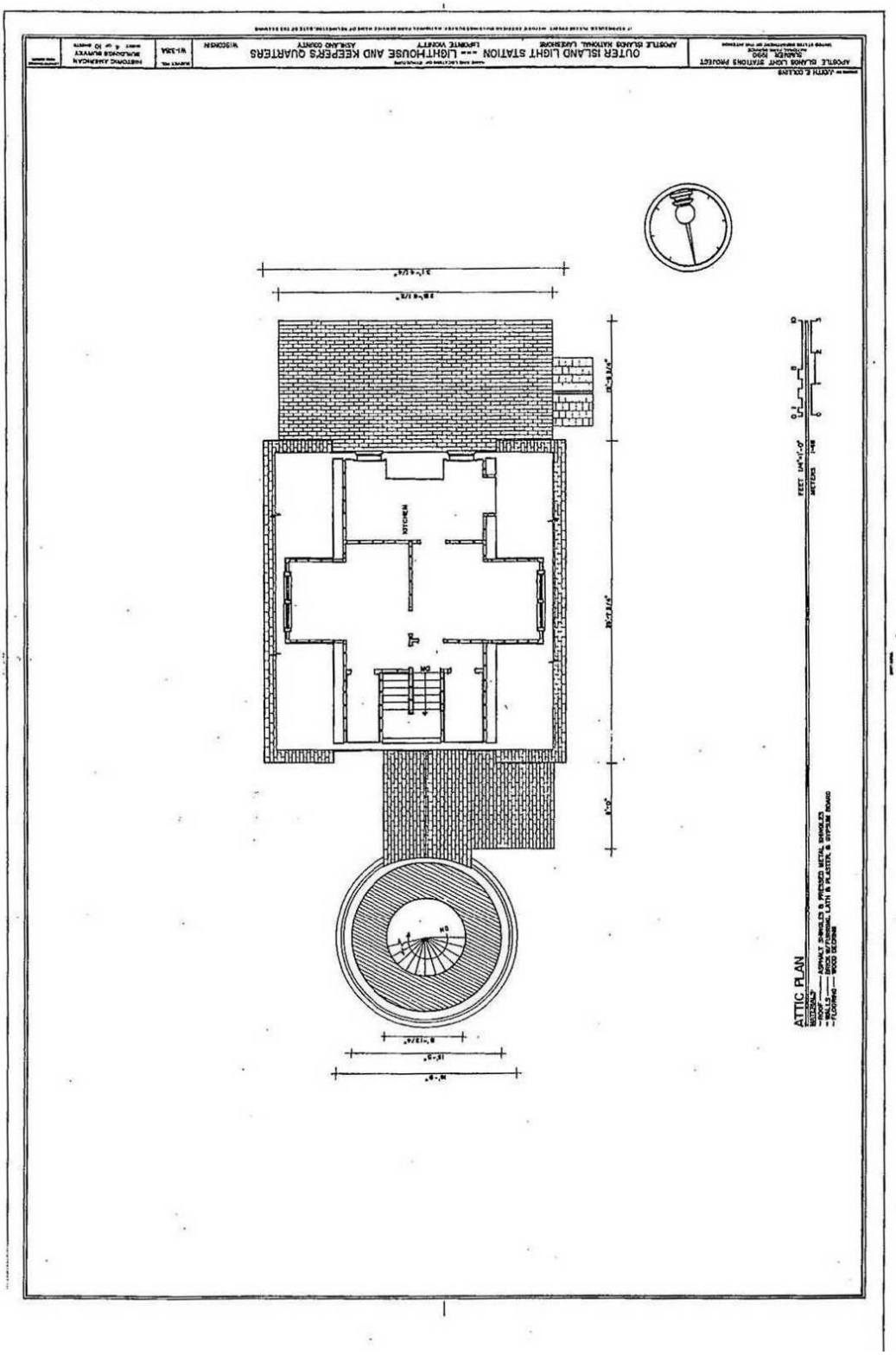
1


OUTER ISLAND LIGHT STATION --- LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
ASHLAND COUNTY
WISCONSIN
HISTORIC AMERICAN BUILDINGS SURVEY
WI-38A
APOSTLE ISLANDS LIGHT STATIONS PROJECT
BASEMENT PLAN
MATERIALS
- WALLS ---- STONE & ASHLAR
- FLOORING ---- CONCRETE
INACCESSIBLE
INACCESSIBLE
FURNACE
OIL STORAGE TANKS
WATER STORAGE TANKS
FEET
METERS

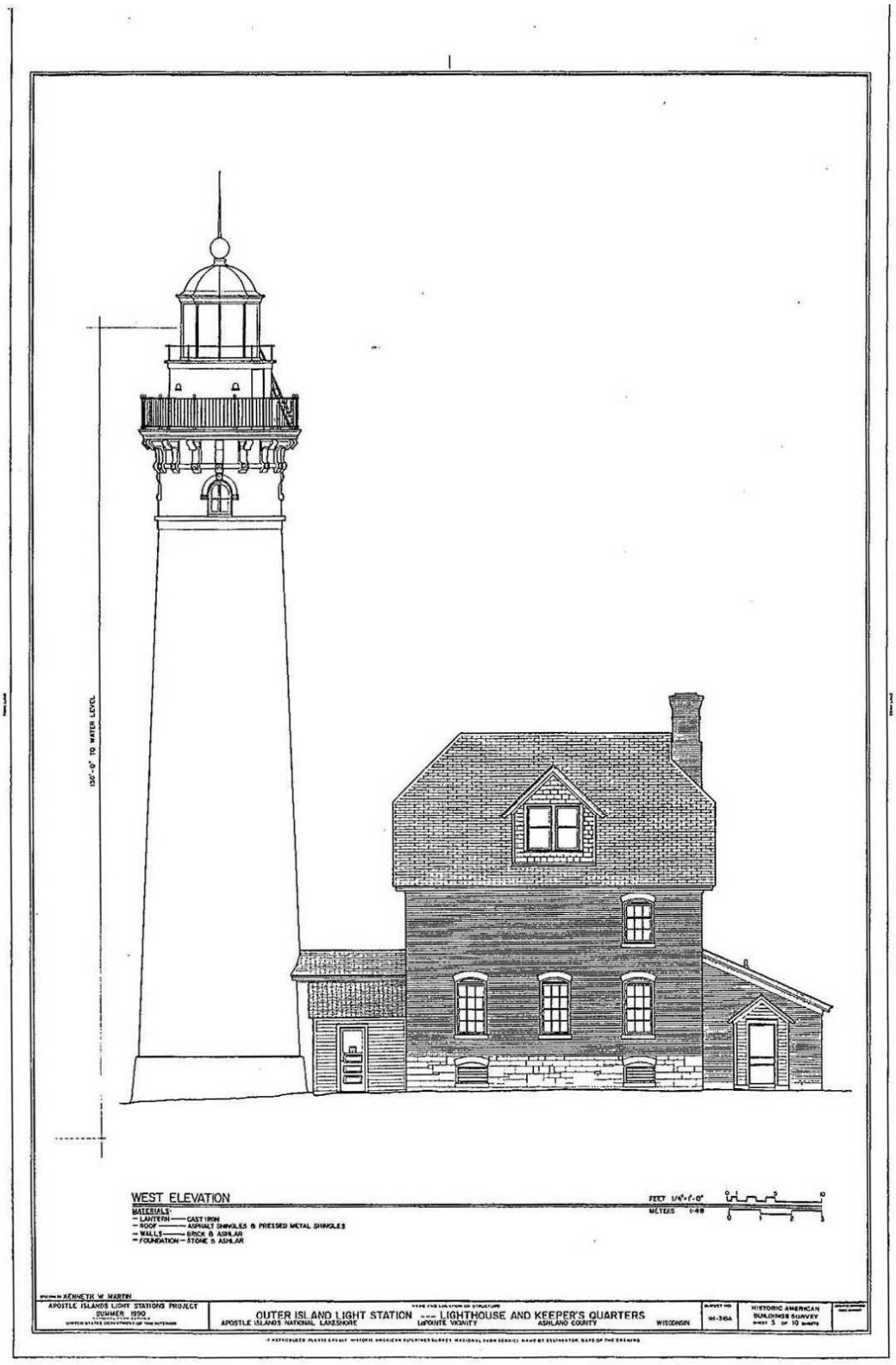
1


OUTER ISLAND LIGHT STATION --- LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
LaPOINTE VICINITY
ASHLAND COUNTY
WISCONSIN
HISTORIC AMERICAN BUILDINGS SURVEY
WI-326A
APOSTLE ISLANDS LIGHT STATIONS PROJECT
SUMMER 1990
NATIONAL PARK SERVICE
KITCHEN
BEDROOM
LIVING ROOM
BEDROOM
STORAGE
ENTRY
FIRST FLOOR PLAN
BRICK W/FURRING, LATH & PLASTER, & GYPSUM BOARD
VINYL

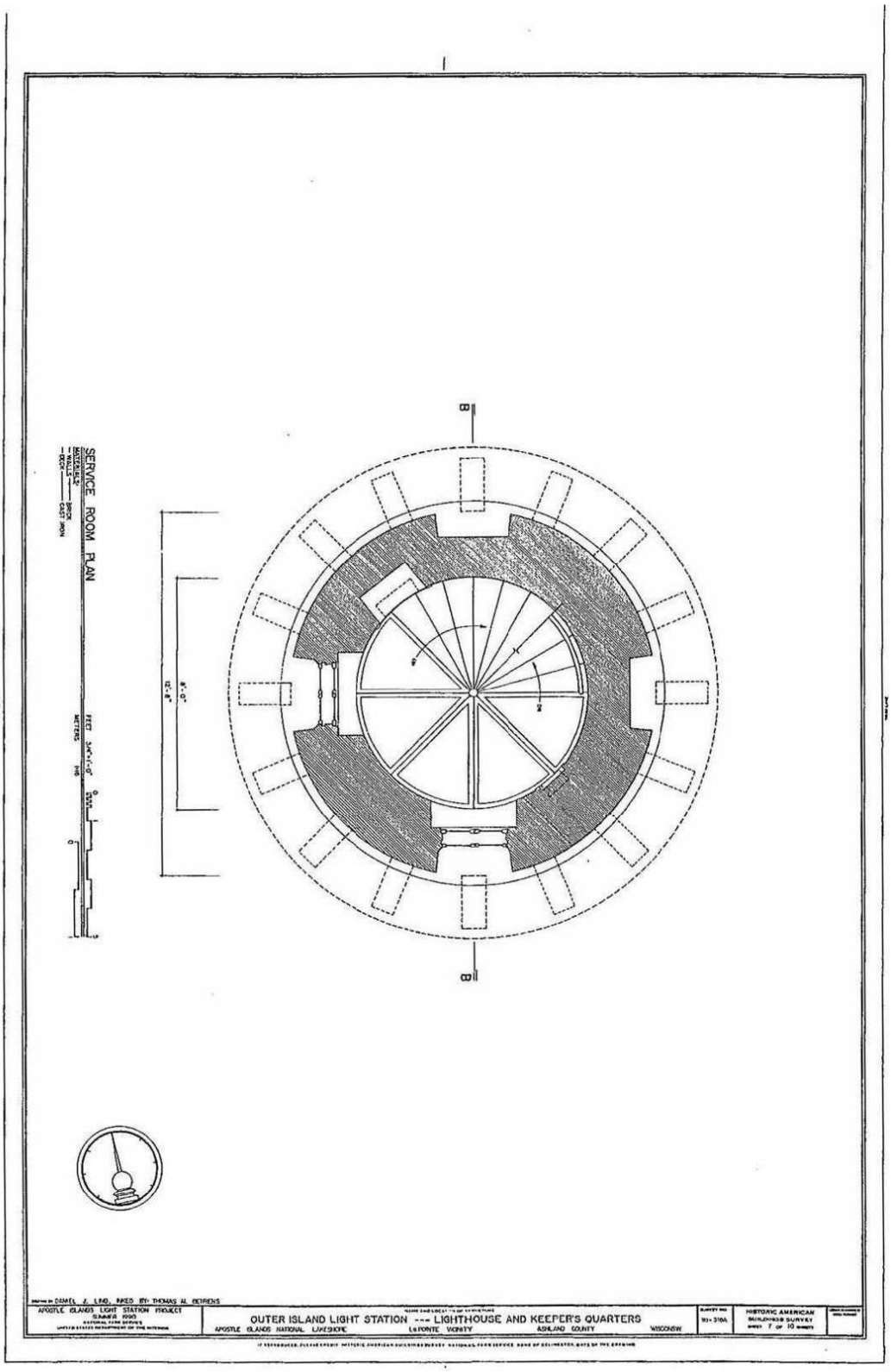
1


OUTER ISLAND LIGHT STATION --- LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
ASHLAND COUNTY
LIGHTNTE VICNTTY
WISCONSIN
APOSTLE ISLANDS LIGHT STATIONS PROJECT
HISTORIC AMERICAN BUILDINGS SURVEY
KITCHEN
DN
ATTIC PLAN
FEET
METERS

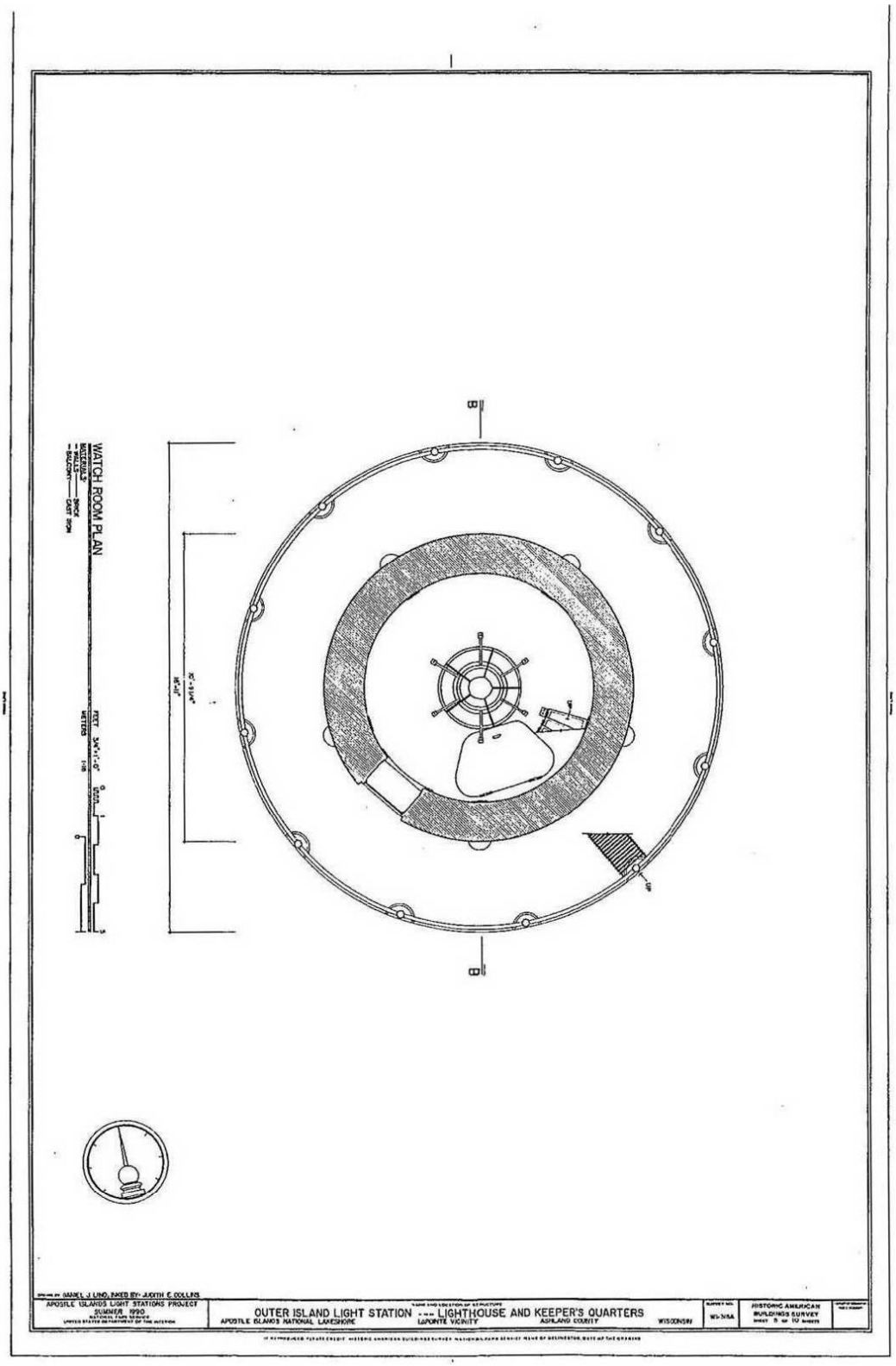
1


WEST ELEVATION
MATERIALS:
– LANTERN —— CAST IRON
– ROOF —— ASPHALT SHINGLES & PRESSED METAL SHINGLES
– WALLS —— BRICK & ASHLAR
– FOUNDATION – STONE & ASHLAR
APOSTLE ISLANDS LIGHT STATIONS PROJECT
SUMMER 1990
OUTER ISLAND LIGHT STATION — LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
LaPOINTE VICINITY
ASHLAND COUNTY
WISCONSIN
HISTORIC AMERICAN BUILDINGS SURVEY

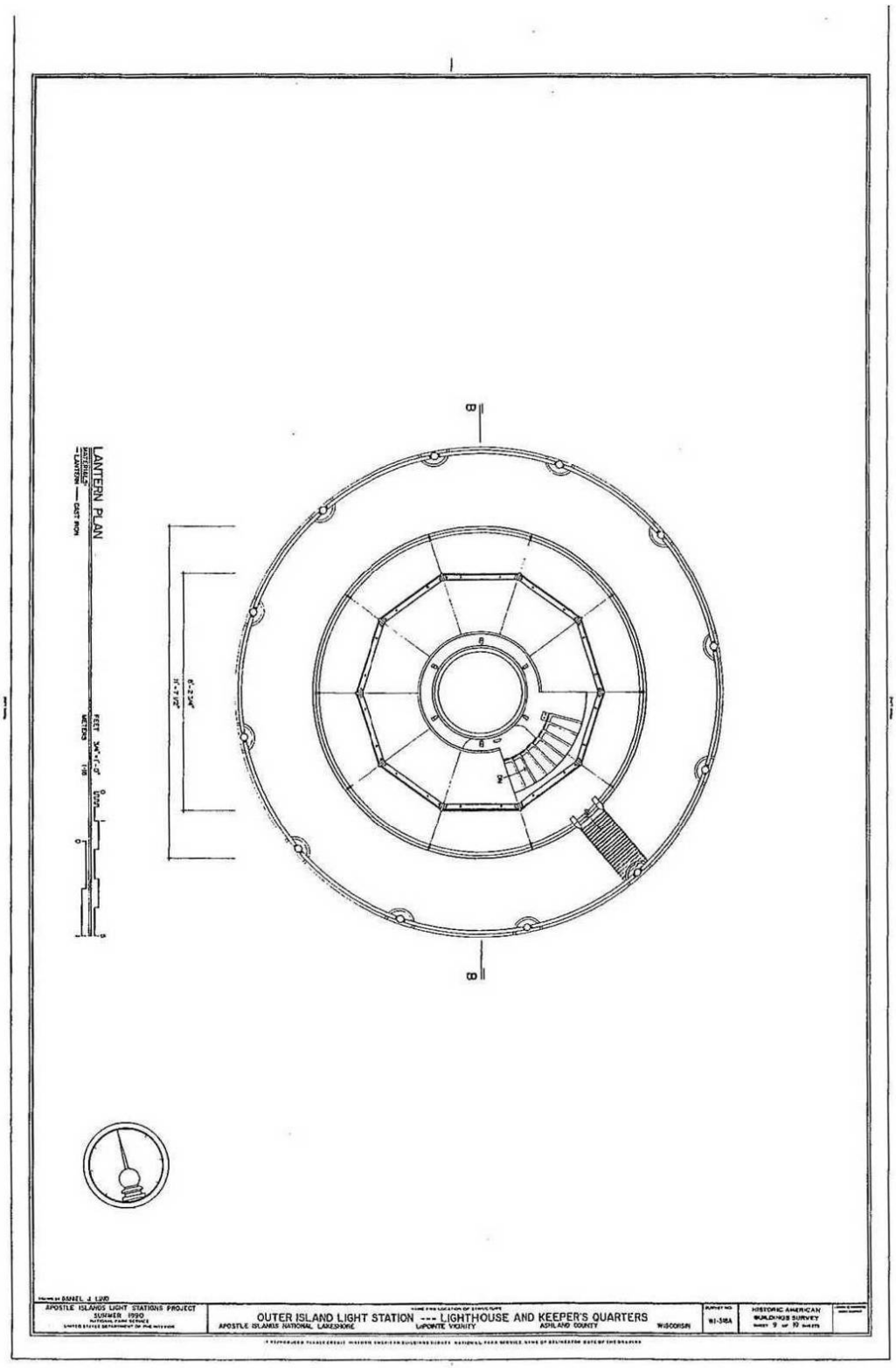
1


SERVICE ROOM PLAN
B
B
OUTER ISLAND LIGHT STATION --- LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
LAFONTE VICINITY
ASHLAND COUNTY
WISCONSIN
APOSTLE ISLANDS LIGHT STATION PROJECT
HISTORIC AMERICAN BUILDINGS SURVEY

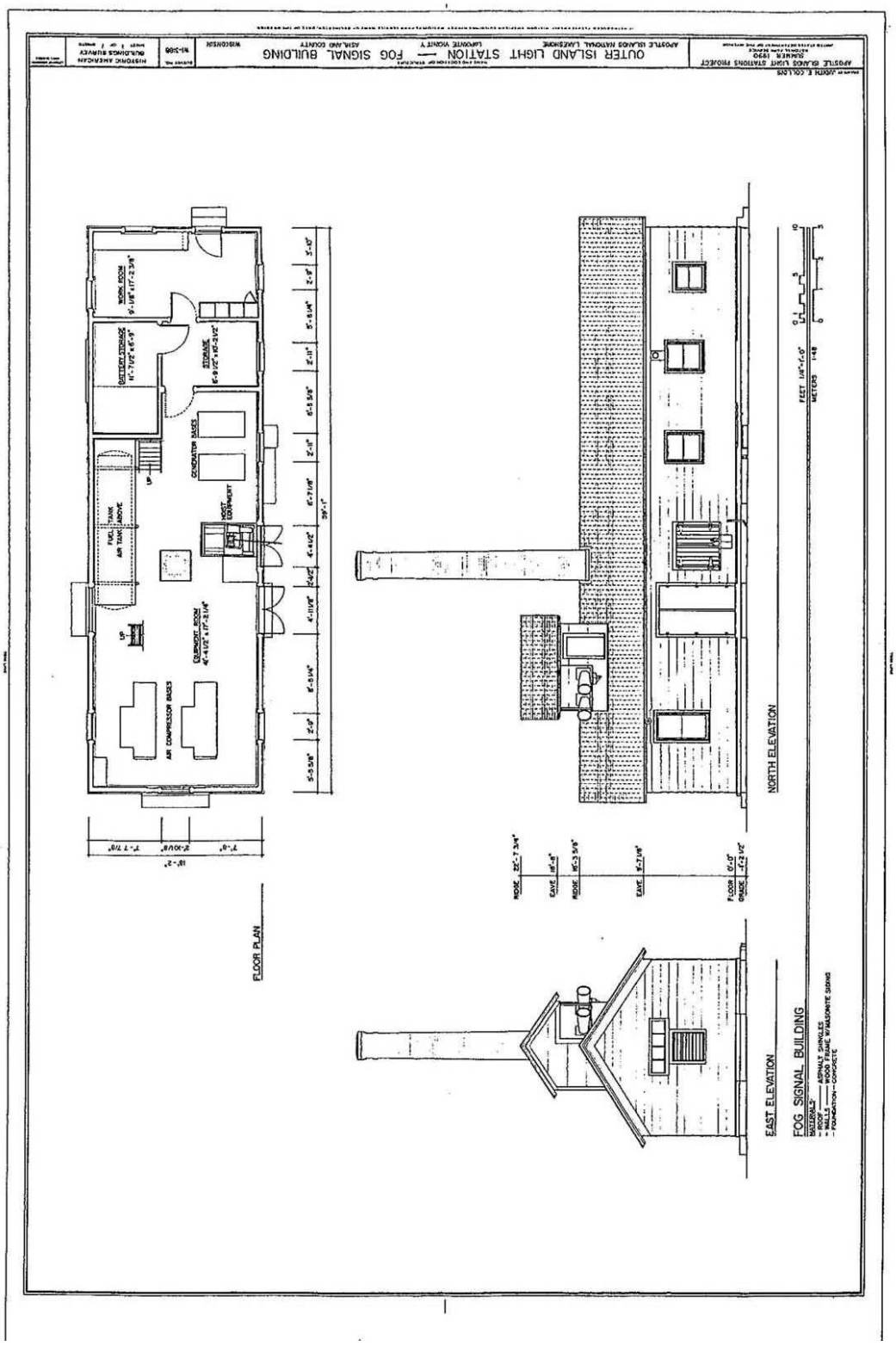
1


WATCH ROOM PLAN
B
B
OUTER ISLAND LIGHT STATION --- LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
LAPONTE VICINITY
ASHLAND COUNTY
WISCONSIN
WI-N-14
HISTORIC AMERICAN BUILDINGS SURVEY
APOSTLE ISLANDS LIGHT STATIONS PROJECT
SUMMER 1990

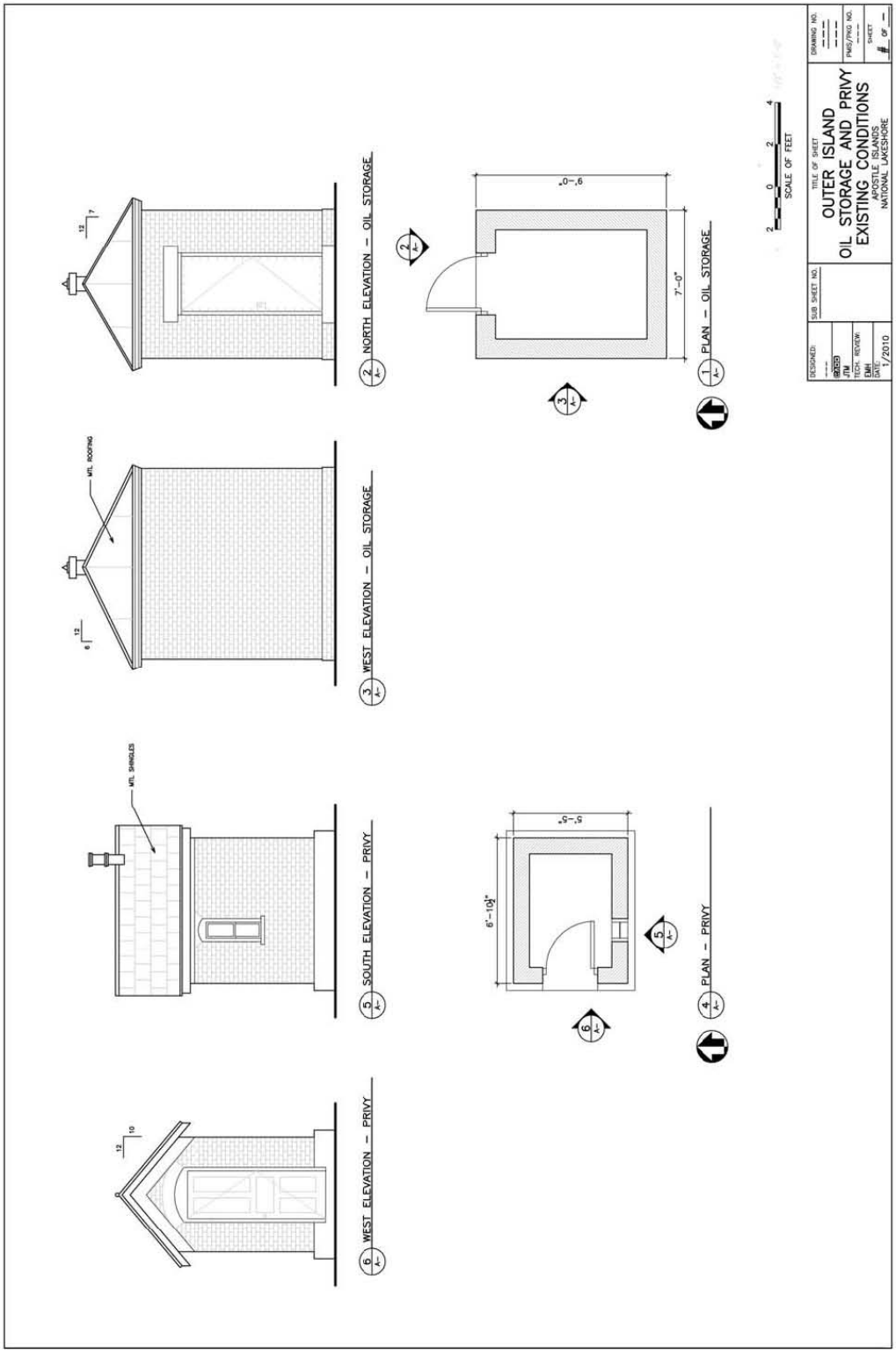
1


LANTERN PLAN
APOSTLE ISLANDS LIGHT STATIONS PROJECT
SUMMER 1990
OUTER ISLAND LIGHT STATION --- LIGHTHOUSE AND KEEPER'S QUARTERS
APOSTLE ISLANDS NATIONAL LAKESHORE
LaPOINTE VICINITY
ASHLAND COUNTY
WISCONSIN
HISTORIC AMERICAN BUILDINGS SURVEY

1


OUTER ISLAND LIGHT STATION — FOG SIGNAL BUILDING
APOSTLE ISLANDS NATIONAL LAKESHORE
LAPOINTE VICINITY
ASHLAND COUNTY
WISCONSIN
APOSTLE ISLANDS LIGHT STATIONS PROJECT
HISTORIC AMERICAN BUILDINGS SURVEY
WI-288
FLOOR PLAN
NORTH ELEVATION
EAST ELEVATION
FOG SIGNAL BUILDING
WORK ROOM
BATTERY STORAGE
STORAGE
CONDENSOR BASES
FUEL TANK ABOVE
HOIST EQUIPMENT
AIR COMPRESSOR BASES
COMPRESSOR ROOM
RIDGE
EAVE
FLOOR
GRADE

1


2 NORTH ELEVATION – OIL STORAGE
3 WEST ELEVATION – OIL STORAGE
MTL ROOFING
5 SOUTH ELEVATION – PRIVY
MTL SHINGLES
6 WEST ELEVATION – PRIVY
1 PLAN – OIL STORAGE
9'-0"
7'-0"
4 PLAN – PRIVY
5'-5"
6'-10½"
SCALE OF FEET
DESIGNED:
JTW
TECH. REVIEW:
DATE: 1/2010
SUB SHEET NO.
TITLE OF SHEET
OUTER ISLAND
OIL STORAGE AND PRIVY
EXISTING CONDITIONS
APOSTLE ISLANDS
NATIONAL LAKESHORE
DRAWING NO.
PMIS/PKG NO.
SHEET
OF

OUTER ISLAND TOWER

Chronology of Alterations and Use

Original Construction

The Outer Island Tower was constructed in 1874 in the Italianate style, as influenced by District Engineer, Major Orlando M. Poe. The conical brick tower is over 80' tall, painted white, and once contained the most powerful light in the Apostle Islands.

The Tower originally had a third order Fresnel lens with a focal plane 130' above Lake Superior. By 1941, the Outer Island Light Station was converted to electricity and the original lens was replaced when the Station was automated in 1961. [37] An automated light with a plastic lens powered by a solar array preceded the optic installed in 2009: a SABIK LED beacon with a glass lens.[38]

Historic photos indicate little change to the Tower over time, other than paint accents. The 1893 images of the Tower indicate the exterior trim in a light shade. (Historic Image OI-01) By 1916 to 1925, the service level exterior trim is painted black but the lower level trim remains white. (Historic Image OI-06*)* By 1937, all of the Tower's exterior trim is painted black. (Historic Image OI-09)

A historic drawing from an unknown date shows the elevations and plans for the Tower. (Historic Drawing OI-04)

Significant Alterations / Current condition

The only significant alterations to the Outer Island Tower involved its lighting technology. In 1961, the light was automated, and 1992, a VEGA VRB-25 solar powered optic replaced the12 volt DC optic. In May of 2009, an LED-powered beacon was installed in the Tower.

The only mechanical components in the 1874 Tower are round, passive air vents near the top of the lantern.

No alternating current electrical service or utilization equipment exists within the Tower.

The Outer Island Tower is currently in good condition.

[37] 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.
[38] List of Classified Structures, National Park Service, 2009.

1 Summary of Documented Work on the Building

Date	Work Described	Source of Information
Annual Report of 1873	*"Outer Island, Lake Superior, Wisconsin.* – Under the appropriation made by act of March 3, 1873, the construction of the buildings required at this new station will be begun during the present season and pushed to completion as soon as possible."	"1873 Annual Report of the Lighthouse Board," Outer Island Light in annual reports 1850-1920
1880, October 16	"The cap on top of the chimney blowed off…The Tower swayed like the top of a tree; and the Lens, well, it is a wonder to me that a piece of it is left."	H.A. Kuchli, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol I
1889, November 2	"A small chip chiped from the lens by accident November 2."	John Leonard, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol I
1892	Lard oil lamp replaced by kerosene wick lamp	J. Busch, 2008
1909, August 16	"One of the plate glass frames cracked up in the Tower while we were polishing the Lens."	Otto Olson, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1910, August 2	"John W. Miller arrived with a carpenter …they come here to … put hand rail in Tower."	Otto Olson, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1912, November 20	"Brought new Vapor Light soap and Timemarker, and stove fittings."	Otto Olson, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1913, June 5	"Tryed out new Light. Lit it up at 7:45 PM. Worked fine. Had no trouble with it until Midnight when I went to put more pressure on the tank. It flashed up and smoked so bad that were compelled to put it out at 3 AM." Kerosene wick lamp replaced by incandescent oil vapor lamp July 5: "Had a serious fire in Tower Lantern between 1 and 2 AM. The heat was so intense that it cracked the four top prisms on the Lens and also one of the plate glass in Lantern."	Otto Olson, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1927, June 3	"Washed and ironed curtains for Watch Room."	Daniels, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1933, November	Nov 18: "Devils [boat] arrived with O. Joiner to install Winter Light." Nov 20: "Winter Light in commission."	Daniels, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1934, July 25	"…and give new door in Tower a coat of paint…" New Tower door installed	Daniels, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1936, May	May 14: "Red leaded inside of door in Tower." Red lead, or lead tetroxide, when used with linseed oil, would produce a thick, long-lasting anti-corrosive paint. Due to lead tetroxide's toxicity, it is no longer used as a paint.	A. G. Carpenter, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II

Date	Work Described	Source of Information
1937, April	April 22: "Mr. F. C. Biesel came out with us to work on engines and put in new Light." April 23: "Put in new Light…"	A. G. Carpenter, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1939, May	May 19: "Amaranth" arrives with supplies and "Mr. R.H. Robson came ashore at 6:45 A.M. to put [in] electric motor to drive Lens." May 24: "Raised Lens and put in new motor drive ball bearings under Lens, and lowered the Lens and tested it out. Working fine."	A. G. Carpenter, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1941, August 23	"Put glass in pedestal door in Tower."	V.T. Barningham, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1942, May	May 13: "Worked in Fog Signal and Tower. Wiring and putting partition in." May 15: "Put partition in…Turned Light on to electricity for the first time. Now is a full pledge [fledge] Coast Guard Station." Tower and Fog Signal electrified	V.T. Barningham, OI Log, Sept 17, 1874 – Dec 10, 1947, Vol II
1961	Light automated	J. Busch, 2008 and LCS, 2009
1992	VEGA VRB-25 solar powered optic replaced 12 volt DC optic	J. Busch, 2008 and LCS, 2009
2009, May	SABIK LED -powered beacon installed in the Tower	NPS Records, 2009

General Physical Description

The Light Tower is a load bearing conical brick structure with an outside diameter of 16' at the base and 12'8" at the service level. The lantern is ten-sided with a cast iron stair access. It is oriented closest to the bluff/lake. The Tower's Italianate stylistic features include hooded, arched windows between two bands of corbelled brick and heavy brackets immediately below the service level walkway.

Physical Description -- Architecture

Architecture – Roof

The roof consists of painted cast iron panels bolted together with an orb-shaped venting finial at the center. The roof system includes five 1" cast iron roof drains. (OI-T-15)

Architecture – Exterior Walls and Wall Finishes

Red brick was seen beneath peeling whitewash. Although obscured by the many layers of whitewash, the running bond, and concave-tooled joint construction can still be seen. The exterior and interior walls are original to the building. The ground level entry area has the original plaster over brick wall finish.

Architecture – Windows

Rectangular Window. There are three windows of this type located at various levels within the Tower. Each window is a two-leaf, two-lite casement, with a matching storm window. The window that is located

at the second-to-the-top landing does not have a storm set, but the other two windows of this type are complete. The interior trim for each window is simple wood 1x, painted. The dimension of each casement pair is 2'2" x 3'1 ½". All windows are painted and original to the Tower. (OI-T-09)

Arched Window. This type of window is a two-leaf, two-lite casement, with an arched top, and a matching storm window. There are two of these windows located at the top landing. The interior trim for each window is the same simple 1x as the rectangular windows, but arched at the top, following the profile of the window opening. The dimensions of each casement pair is 2'4" x 3'1 ½". Both windows are painted and are original to the Tower. (OI-T-08)

Architecture – Doors

There are no remaining doors in the interior of the Tower. There was originally a door at the service level where one hinge remains. The opening size is 1'9" wide x 5'6 ½" high. There is a door located at the Tower base between the hyphen to the Quarters and the Tower that is made of metal plate, painted, and is original to the building. The door has strap hinges and ceramic knobs. There is metal trim on both wall faces. The dimensions for the door are 3'0" x 7'9". (OI-T-02)

Architecture – Exterior Trim

The exterior trim consists of banding detailing and arched window hood trim and the brackets; all located at the top of the Tower. These features are currently painted black.

Architecture – Walk and Railing

Lantern Level. The diamond plate cast iron deck walkway is 1'8" wide and continues to the interior of the lantern. A metal railing is 1'7" high and is supported by metal posts with ball finials. The metal rail is 5/8" rod. The deck has a 4" overhang beyond a trim ring surrounding the deck that is 9" tall x 1 ½" thick. All metal is original and is painted black.

Service Level. The diamond plate cast iron deck walkway is 3'1" wide. A metal railing is 3'4" high with 5/8" metal pickets located at 4 ¾" on center. Metal posts with ball finials are located after every ten pickets. The metal rails (one near base, one at top of pickets and rails) are 5/8" rod. There are four weep holes located beneath the decking in the brick walls. All metal is original and is painted black. There is a curved ladder from the service level to the lantern level, painted black.

Architecture – Lantern

The lantern is a decagonal glass and metal structure with diamond plate cast iron decking continued from the lantern level deck. The rectangular glazing is stamped "AGC 279J -1975 CFR 1201 CII 218U ASI 84." (OI-T-11, 12 and 13)

Architecture – Ceiling Finishes

The ceiling finish for the lantern is the underside of the cast iron decagonal roof. The ceiling has painted metal cross-bracing and structural members along the roof line. (OI-T-14)

Architecture – Interior Trim

There are remnants of "trim" where the stairs meet the wall, at the floor-level, and at some of the window openings. The remnants have a blackish hue and a thick, paint-like texture. It can be assumed that these trim remains, and possibly even the stairs, were coated with coal tar. In the Outer Island Log Book for the

year 1885, the light keeper, John Armbruster, wrote on June 22nd, "Coaltared the Tower steps today." This entry is significant as it supports the assumption that the light keepers at one time used a form of tar to coat the stairs, window sills, and trim. Tar was used during the late 19th century as a water-proofing agent and as a sealant.

Architecture – Floor

The floor at the entry is made of concrete slabs with a concrete square slab in the center with a metal plate anchoring the spiral staircases center pole. (OI-T-03)

Architecture – Stairs

This spiral staircase is cast iron. There are 30 treads from the base to the first landing (1/2 of circle shape), 24 treads from the first landing to the second landing (1/2 of circle shape), another 24 treads from the second landing to the third landing (5/8 of circle shape), and finally 16 treads from the third landing to the top floor. The top floor has a hatch to the lantern level. The top of the stairs railing is 2'0" above the nosing and has a 2" diameter. There are no railings at the landings or leading to the hatch. The stair risers are 8", the tread overhang is ½", and the tread depth goes from 1 ½" to 12 ½" with a width of 3'10". (OI-T-04)

Architecture – Accessibility

This Tower is currently entered only from the interior of the Keepers Quarters. The entry door from the first floor interior is 3'0" clear with no elevation change. However, the Keepers Quarters is not accessible from grade.

Physical Description -- Structural

Structural – Foundation

The foundation system consists of stone masonry.

Structural – Floor Framing

The floor of the Tower is a concrete slab-on-grade.

The floor of the lantern and the service level is constructed of cast iron plates that are bolted together. The plates are supported on the masonry walls of the Tower. The floors are accessed via a spiral cast iron stair.

Structural – Roof Framing

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

Structural – Wall Framing

The walls of the Tower 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 floor load capacity of the watch room is 40 psf, the required floor load capacity of the lantern is 100 psf and the required snow load capacity is 32 psf.

Physical Description -- Mechanical

Mechanical – Plumbing Systems
None in the Tower.

Mechanical – HVAC
The only mechanical components in the 1874 Tower are the circular passive air vents in the lantern room.

Mechanical – Fire Suppression
None in the Tower.

Physical Description -- Electrical

Electrical – System Configuration
The only electrical equipment in the Tower is the USCG's Light Beacon system. This consists of three 12 volt dc batteries that feed power to an LED powered beacon. The system employs a photo-voltaic array, approximately 14" by 20" to charge the battery system.

Electrical – Conductor Insulation
None in the Tower.

Electrical – Overcurrent Protection
None in the Tower.

Electrical – Lighting Systems
None in the Tower.

Electrical – Telecommunications
None in the Tower.

Electrical – Fire Alarm System
None in the Tower.

Electrical – Lightning Protection

Lightning protection for the Tower consists of one air terminal on the top of the Tower and a single down cable which connects the air terminal to an underground electrode system. The Tower lightning protection system is bonded to the Keepers Quarters lightning protection system via a cable connection.

Physical Description -- Hazardous Materials

Landmark Environmental collected ten bulk samples from a total of ten different types of suspected asbestos containing materials (ACMs) at Outer Island. Of the ten suspect ACMs that were sampled and analyzed, a total of one suspect ACM resulted in a concentration of greater than one percent (positive for asbestos).

Hazardous Materials – Asbestos

The following suspect ACMs were not sampled due to inaccessibility or park limitation regarding potential for damage to structures. Asbestos is assumed to be present in:

1. Ceiling Insulation (Black matting or felt paper observed above ceilings, this suspect ACM may also be present in wall interiors),
2. Plaster,
3. Adhesives (Multiple varieties of miscellaneous adhesives were seen on around windows, doors and penetrations),
4. 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),
5. Caulk (Caulking was observed around window and door penetrations, which can also include gasket applications between the window assembly and the structure),
6. 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), and,
7. Roofing Materials.

The assumed ACMs were observed to be in fair condition.

Hazardous Materials – Lead Containing Paint (LCP)

The LCP inspection included a visual inspection of the structure. A previous inspection and testing for LCP was conducted using an x-ray florescence (XRF) detector coupled with bulk sampling and laboratory analysis for conformation. The XRF inspection was conducted by the NPS Staff in 1993.The findings of this study are incorporated into this study by reference.

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

1. Window Sash (Metal and stone substrate with white paint), and,
2. Window Trims (Metal and stone substrate with white paint).

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

1. Interior Painted Surfaces (Based on testing of the interior window sash, trim, and top lighthouse entry LCP is assumed to be present throughout the structure), and,
2. Exterior Painted Surfaces (Based on testing of the exterior window sash and trim LCP is assumed to be present throughout the structure).

Based on the estimated dates of construction of the various structures and the available testing data LCP is assumed to be present throughout the structure. The confirmed LCP was observed to be in fair condition and the assumed LCP was observed to be in fair condition.

Loose/flaking LCP is identified on the exterior walls of the structure. Paint chip debris is noted on localized areas of surface soils.

Hazardous Materials – Lead Dust

Surface wipe-sampling for lead dust analysis was not conducted in the Tower because lead dust was assumed to be present due to the poor condition of the confirmed and assumed LCP.

Hazardous Materials – Lead in Soils

Historical paint maintenance activities such as manual scraping, power-washing, sanding, abrasive blasting or the general poor and peeling condition of exterior LCP may have created the potential to impact the surrounding soil. Areas of the surface soils adjacent to the structure were observed to have LCP debris and additional areas may exhibit LCP debris or lead-contaminated soils. Preliminary lead-in-soil sampling was performed to assess whether these near-structure soils contain lead concentrations above applicable soil standards.

One three-aliquot soil sample was collected from ground-surface soils at the roof (drip-line), approximately 3' from the foundation wall. One sample aliquot was collected from each side of the structure and these aliquots are composited together for analysis.

1. Analysis of the composite drip line soil sample resulted in 116.5 milligrams of lead per kilogram of soil (mg/kg).

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 visually identified in the Tower.

Character Defining Features

Mass/Form. A conical masonry tower painted white attached to the Keepers Quarters with a one-story gable/shed link.

Exterior Materials. Masonry painted white with black trim accents.

Openings. A mix of arched and rectangular pairs of wood two lite casements painted black.

Interior Materials. Painted plaster masonry walls and concrete floor.

General Condition Assessment

In general the Outer Island Tower is in good condition. The spiral, cast iron staircase is in good condition with some rusting and peeling paint. The brick interior walls are in fair condition with rust stains (from the stairway) and cracked and peeling paint.

Structurally, the Tower is in good condition, though due to the disparity of opinion between park personnel and the engineer, monitoring of the cracks would offer more data.

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: *Fair*
The roof appears to be in fair condition though small patches of rust are evident.

Architecture – Walls and Wall Finishes
Condition: *Fair to Poor*
The brick Tower's exterior walls are in fair condition. The wall finishes are in poor condition as there are many layers of paint peeling at various locations and severities. The interior wall finishes are in fair condition due to the same many-layered paint issue, rust stains, cracking around each vent opening, and cracks in the paint. (Park staff has reported concerns of the structure of the wall system. Refer to "Structural - Wall Framing" recommendations section.)

Architecture – Windows
Condition: *Good*
Rectangular Window. This type of window is in good condition except that one of the three windows has a missing storm window.

Arched Window. This type of window is in good condition.

Architecture – Doors
Condition: *Fair*
The Tower base door made of metal is in fair condition as it and its door frame have rust and badly peeling paint.

Architecture – Exterior Trim
Condition: *Good*
The exterior trim is in good condition, though the paint is peeling.

Architecture – Walk and Railing
Condition: *Good and Fair*
Lantern Level. This deck is overall in good condition.

Service Level. This deck has badly peeling paint and patches of rust. It is in fair condition overall.

Architecture – Lantern
Condition: *Poor*
The lantern has nonhistoric glazing with failing seals and frame system. The paint is peeling on the remainder of the interior elements.

Architecture – Ceiling Finish
Condition: *Fair*
The ceiling finish for the lantern is in fair condition as there is rusting and peeling paint.

Architecture – Interior Trim
Condition: *Fair*
The trim remnants, possibly made of coal tar, are in fair condition as they are peeling and disappearing.

Architecture – Floor
Condition: *Good*
The concrete floor is in good condition.

Architecture – Stairs
Condition: *Good*
This spiral staircase is in good condition with some rusting and peeling paint. The railings are also in good condition with some rusting. There are no railings at the landings or near the hatch door.

Architecture – Accessibility
Condition: *Poor*
The Tower is not accessible.

Condition Assessment -- Structural

Structural – Foundation
Condition: *Good*
The visible portion of the foundation is in good condition. Sub-vertical cracks in the masonry are not structural and may be due to brick growth, the tendency of fired clay bricks to expand as they age, or differential thermal movement between the brick and the stone (OI-T-16).

Structural – Floor Framing
Condition: *Good*
The floors are in good condition.

Structural – Roof Framing
Condition: *Good*
The roof is in good condition.

Structural – Wall Framing
Condition: *Good*
The masonry and cast iron walls are in good condition. Sub-vertical cracks at the base of the masonry walls are not structural and may be due to brick growth or differential thermal movement.

Structural – Lateral System
Condition: *Good*
Lateral stability of the Tower is good.

Structural – Load Requirements
Condition: *Good*
The roof and floor framing have adequate capacity to support the required loads.

Condition Assessment -- Mechanical

Mechanical – Plumbing Systems and Fire Suppression
Condition: *N/A*

Mechanical – HVAC
Condition: *Fair to Poor*
The passive air vents at the top of the Tower are in fair to poor condition, with the brass vent covers missing and do not provide adequate ventilation to prevent condensation in the tower.

Condition Assessment -- Electrical

Electrical – System Configuration, Conductor Insulation, Overcurrent Protection, Lighting Systems, Telecommunications, and Fire Alarm System
Condition: *N/A*

Electrical – Lightning Protection
Condition: *Fair to Poor*
Lightning protection systems for the Tower are intact, and appear to be in fair condition, however, over time, connections deteriorate and components corrode. The integrity of the system cannot be assured.

Condition Assessment -- Hazardous Materials

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

Ultimate Treatment and Use

The Outer Island Tower was constructed in 1874 as part of the lighthouse which included an attached keepers quarters. In 1961, the light was automated and a keeper was no longer needed to man the light.

The Tower is currently open to visitors on a limited basis and only by guided access. The proposed use for the building is to continue the current arrangement – providing limited/guided visitor access.

Rehabilitation is the proposed treatment for the Tower.

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 treatments proposed for the rehabilitation of the building. Refer to Volume I, Chapter 2: Methodology for the priority rating definitions.

Treatment Recommendations -- Architecture

Architecture – Roof
Priority: *Moderate*
Patch and prep areas of rust. Prime and repaint entire roof.

Architecture – Walls and Wall Finishes
Priority: *Moderate*
Strip existing coating, repair masonry and joints. Repaint with a proper coating allowing vapor permeability. Coordinate with overall ventilation enhancements. (Refer to "Structural – Wall Framing" section.)

Architecture – Windows
Priority: *Low*
Reconstruct the missing storm window from one of the rectangular windows to match the existing storms. Verify/provide operability to all lower sash to facilitate ventilation.

Architecture – Doors
Priority: *Moderate*
Remove existing paint and remove and patch rust areas and recoat. Coordinate with overall ventilation enhancements. Study effects of allowing door to remain open to promote ventilation from basement to the Tower. Investigate adding a security gate at the base of the stair or adjacent to the Tower door.

Architecture – Exterior Trim
Priority: *Low*
Scrape, sand and repaint. Coordinate with recoating of exterior walls.

Architecture – Walk and Railing
Priority: *Moderate*
Remove existing paint, remove and patch areas of rust and repaint at the service level deck. Investigate alternatives to discretely upgrade the existing railing to become a code compliant guardrail.

Architecture – Lantern
Priority: *Severe*
Remove the existing glass and failing seals. Reinstall glass with new seals. Scrape, prep and repaint.

Architecture – Ceiling Finish
Priority: *Low*
Remove existing paint, remove and patch areas of rust, prep and repaint.

Architecture – Interior Trim
Priority: *Low*
Preserve original coal tar trim as much as possible. Historically, coal tar was used as a slip-resistant material and water-proofing agent used in nautical applications.

Architecture – Floor
Priority: *Low*
No recommendations at this time.

Architecture – Stairs
Priority: *Low*
Remove existing paint, remove and patch areas of rust and repaint. Add code compliant handrails at the landings and near the hatch door that match existing railings.

Architecture – Passageway
Priority: *Low*
No recommendations at this time.

Architecture – Accessibility
Priority: *Low*
Provide program access through interpretive exhibits and waysides at the Visitor Center.

Treatment Recommendations -- Structural

Structural – Foundation
Priority: *Low*
No recommendations at this time.

Structural – Floor Framing
Priority: *Low*

No recommendations at this time.

Structural – Roof Framing
Priority: *Low*
No recommendations at this time.

Structural – Wall Framing
Priority: *Low*
No recommendations at this time. (Architects' note: Due to the disparity of opinion of the condition of the walls between the Structural Engineer and APIS staff, it is suggested to install crack and vibration monitors to further assess the existing cracks to determine if they are active.)

Structural – Lateral System
Priority: *Low*
No recommendations at this time.

Treatment Recommendations -- Mechanical

Mechanical – Plumbing Systems and Fire Suppression
Priority: *N/A*

Mechanical – HVAC
Priority: *Moderate*
The existing passive air vents at the top of the lantern room do not provide sufficient ventilation to prevent condensation and moisture damage inside the tower. Additional passive ventilation is recommended.

Treatment Recommendations -- Electrical

Electrical – System Configuration, Conductor Insulation, Overcurrent Protection, Lighting Systems, Telecommunications, and Fire Alarm System
Priority: *N/A*

Electrical – Lightning Protection
Priority: *Moderate*
Existing lightning protection is old and its effectiveness has not been established. It is recommended that a LPI (Lightning Protection Institute) certified inspector perform an inspection of the lightning system and provide findings and recommendations in accordance with LPI-175.

Treatment Recommendations -- Hazardous materials

Hazardous Materials – Asbestos
Priority: *Low*
Recommend sampling of suspect asbestos containing materials, including plaster, caulking and adhesives.

Hazardous Materials – Lead-Containing Paint and Lead Dust
Priority: *Low*
Recommend stabilization or abatement of Lead-Containing Paint. Wipe sampling for lead dust is not recommended.

Hazardous Materials – Lead In Soils
Priority: *Low*
Recommend further soils characterization to confirm applicable regulatory requirements.

Hazardous Materials – Mold/Biological
Priority: *Low*
No action is recommended.

Hazardous Materials – Petroleum Hydrocarbons
Priority: *Low*
No action is recommended.

Alternatives for Treatment

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

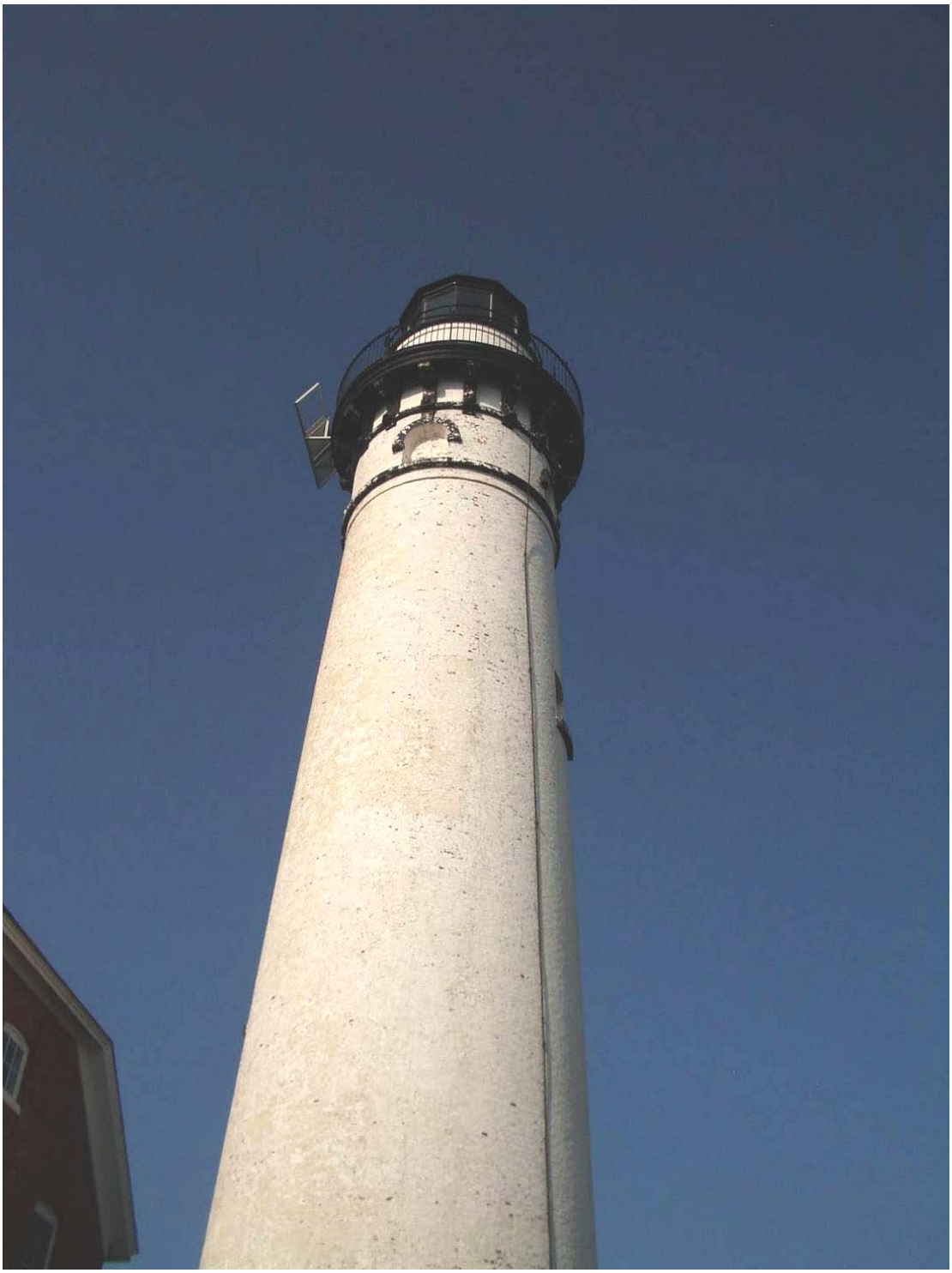
1. If it is decided to allow public access to the catwalk, careful study will be needed for introducing a code compliant guard rail at the Tower walk that will not be visually disruptive to the historic character nor be a long term maintenance burden for park staff.

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

Assessment of Effects for Recommended Treatments

Recommended Treatment	Potential Effects	Mitigating Measures	Beneficial Effects
1. Additional Hazardous Testing and Mitigation	Mitigation of hazardous material may require removal of historic materials.	Any mitigation will need to be evaluated for benefit and implemented sensitively to minimize damage to the resource.	- Improves safety for visitors and staff - Removes hazards from the cultural resource
2. Add new ventilation elements (i.e. replace sash with secure louvers)	Removal of character defining feature (sash) and replacing with a modern material.	Verify operation and efficiency of existing ventilation elements prior to introduction of new.	- Increased ventilation will aid in the preservation/longevity of the historic fabric
3. Interior: Add code compliant handrails at landings and near the hatch	The addition of the handrail adds a modern element to the historic fabric.	Design a handrail similar to the existing. Paint to match.	- Improves safety for visitors and staff

Outer Island Tower Photographs, 2009



OI-T-01: East view, 2009 (Source: A&A IMGP3095)

OI-T-02: Door from quarters to Tower (Source: A&A IMGP3236)

OI-T-03: Tower floor and stair base (Source: A&A IMGP3234)

OI-T-04: Tower stairs and railing (Source: A&A DSC01567)

OI-T-05: Tower metal framed access opening (Source: A&A IMGP3228)

OI-T-06: Tower metal access detail of interior (Source: A&A IMGP3229)

OI-T-07: Tower wood cabinet with missing door (Source: A&A IMGP3230)

OI-T-08: Tower arched window (Source: A&A IMGP3227)

OI-T-09: Tower rectangular window (Source: A&A IMGP3232)

OI-T-10: Lantern south view, 2009 (Source: A&A IMGP3101)

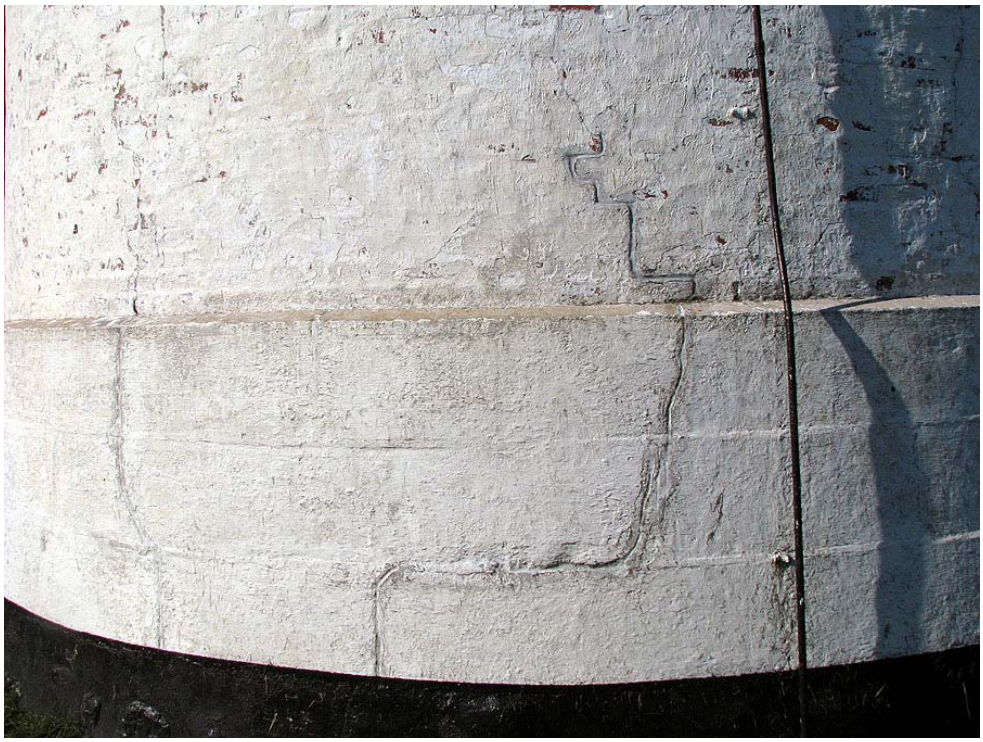
OI-T-11: Lantern with ladder to access lantern walkway (Source: A&A IMGP3210)

OI-T-12: Lantern floor hatch and ladder (Source: A&A IMGP3221)

OI-T-13: Lantern glazing and upper interior and exterior walkway and railing (Source: A&A IMGP3214)

OI-T-14: Lantern ceiling (Source: A&A IMGP3220)

OI-T-15: Lantern roof (Source: A&A IMGP3200)



OI-T-16: Foundation and wall cracks (Source: Martin/Martin)