National Park Service
U.S. Department of the Interior



GRAND MARAIS USCG LIFE SAVING STATION
PICTURED ROCKS NATIONAL LAKESHORE
Historic Structures Report

PMIS #227908

October 2020



Cover Illustration: Station Dwelling (Anderson Hallas Architects, 2019)

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In compliance with Secretary's Order 3380, the overall project cost for this two volume study is $406,926.10.

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Grand Marais US Coast Guard Station
HISTORIC STRUCTURES REPORT
Pictured Rocks National Lakeshore

Grand Marais, Michigan

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Table of Contents

Table of Contents i

Executive Summary and Administrative Data

Historic Structures Report Summary 1-1
Project Purpose and Need 1-1
Methodology 1-2
Summary of Recommendations 1-3
Description of the Study Area 1-3
Location Data 1-4

Part 1. Developmental History

Building History 1-7
Summary Chronology 1-50
Statement of Significance 1-54

Part 1. Physical Description

Overview 1-57
Building Existing Conditions & Condition Assessments 1-59
Station Dwelling (HS-18) 1-61
  Existing Conditions & Condition Assessment
    General
    Character Defining Features
    Architecture
    Structural
    Mechanical
    Electrical
    Site
    Hazardous Materials
Officer in Charge Dwelling (HS-19) 1-129
  Existing Conditions & Condition Assessment
    General
    Character Defining Features
    Architecture
    Structural
    Mechanical
    Electrical
    Site
    Hazardous Materials

Harbor of Refuge Dwelling (HS-20) 1-169
Existing Conditions & Condition Assessment
General
Character Defining Features
Architecture
Structural
Mechanical
Electrical
Site
Hazardous Materials
Equipment Building 1-211
Existing Conditions & Condition Assessment
General
Character Defining Features
Architecture
Structural
Mechanical
Electrical
Site
Hazardous Materials

Part 2. Treatment and Use

Overview 2-1
Treatment Priorities 2-1
Chapter Organization 2-1
Treatment and Use Alternatives 2-1
Station Dwelling (HS-18) 2-3
Treatment and Use
Architecture
Structural
Mechanical
Electrical
Site
Hazardous Materials
Officer in Charge Dwelling (HS-19) 2-17
Treatment and Use
Architecture
Structural
Mechanical
Electrical
Site
Hazardous Materials

Harbor of Refuge Dwelling (HS-20) 2-27
Treatment and Use
Architecture
Structural
Mechanical
Electrical
Site
Hazardous Materials
Equipment Building 2-39
Treatment and Use
Architecture
Structural
Mechanical
Electrical
Site
Hazardous Materials
Preferred Option Floor Plans 2-49

Appendices

Appendix A - Existing Condition Plans
Appendix B - Cost Estimate
Appendix C - Live Load Capacity Chart
Appendix D - Hazardous Material Test Results
Appendix E - Director's Order 58 Historic Property Assessment Matrix
Appendix F - Bibliography
Appendix G - Paint Sample Analysis

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Executive Summary and Administrative Data

Historic Structures Report Summary

This Historic Structures Report (HSR) presents a planning document for the four historic buildings at the Grand Marais United States Coast Guard Life Saving Station (Grand Marais USCG Life Saving Station) in Pictured Rocks National Lakeshore (PIRO) in Grand Marais, Michigan. This report identifies characteristics and features that convey the historic significance and character of the buildings and cultural landscape. It provides a plan for long term preservation and stewardship of these four buildings.

Pictured Rocks National Lakeshore was established in 1966 to preserve a portion of the Lake Superior shoreline for its geographic, scientific, scenic, and historic features. It protects the character and use of the shoreline zone while allowing economic utilization of the renewable resources of the inland buffer zone. PIRO provides opportunities for public recreation, education, enjoyment, and inspiration. Eighty percent of the land is covered by upland northern hardwoods. PIRO also contains 200 foot tall Pictured Rocks cliffs along Lake Superior, five square miles of sand dunes, twelve miles of undeveloped beach, and cultural resources related to the human use of Lake Superior.

Part of the land included in Pictured Rocks National Lakeshore was originally a United States Coast Guard (USCG) complex. Buildings addressed in this project were built between 1908 and 1938. The Coast Guard operated at this site until 1981 when the buildings were decommissioned. The Station Dwelling (HS-18), Officer in Charge Dwelling (HS-19) and Harbor of Refuge Dwelling (HS-20) were acquired by National Park Service (NPS) in 1996-1997. The Equipment Building is anticipated to be officially transfered to NPS ownership within the next few years.

The intent of the HSR is to document the physical evolution of each building, their current condition and recommend appropriate treatments. Documentation of historic significance and the evaluation of integrity provides the framework upon which treatment recommendations are based. All treatment recommendations follow Secretary of the Interior Standards for the Treatment of Historic Properties.

The condition assessment for each element/feature is documented in Part 1. The preferred option floor plans for future use for each building were determined with NPS staff in a treatment workshop. These plans include room configuration changes to accommodate anticipated future uses at each building. In addition to the required work for the preferred option plans, Part 2 includes treatments to address deteriorated elements and work to address code and life safety deficiencies.

Project Purpose and Need

This project addresses three buildings owned by the NPS and one building owned by the USCG and anticipated to be transferred to NPS. The purpose of this report is to document building development, evaluate current conditions and provide treatments for rehabilitation based on anticipated uses. The Station Dwelling (HS-18) will remain seasonal housing and the Officer in Charge Dwelling (HS-19) will also be used for seasonal housing. The Harbor of Refuge Dwelling (HS-20) will maintain the current museum use operated by the partner organization, the Grand Marais Historical Society. Once transfered to NPS ownership, the Equipment Building will provide garage bays and office space. The most significant changes to the structures will involve modifications required

by building codes, integration of Architecture Barriers Act Accessibility Standards (ABAAS), and upgrades to mechanical, plumbing, and electrical systems.

The HSR provides a planning tool to inform future park decisions related to rehabilitation/repair projects and support compliance as required by the National Historic Preservation Act (NHPA) of 1966, as amended and by the National Environmental Policy Act (NEPA) of 1969, as amended.

The HSR provides a plan that addresses operational needs while also recognizing that the mission of NPS is to provide a rich and authentic visitor experience for all and to ensure that long-term preservation and stewardship objectives are met to the maximum extent practicable.

The Cultural Landscape Report (CLR) developed in conjunction with this HSR provides a broad understanding of the area. It should be referenced for further guidance related to site development and the cultural landscape.

Methodology

History Methodology

The primary goals of the history section are to provide accurate information regarding the historic context and to clarify the evolution of the buildings. General research methods include a review of existing literature and on-site investigation. Available documents related to the history of the site were located and reviewed. Principal sources for the report's historic documentation include the Northern Michigan Archives, PIRO archives, U.S. Coast Guard and historic photographs. The building history provided in this report provides a general overview of the area's history for context and then a detailed chronology and use of the buildings.

Historic Structures Report Methodology

The HSR presents documentary, graphic, and physical information for the Station Dwelling (HS-18), Officer in Charge Dwelling (HS-19), Harbor of Refuge Dwelling (HS-20) and Equipment Building. Primary historic documents (original drawings, historic photographs, historic maps and other historic documentation), park maintenance records, material testing, and site investigations compile the record of each building's development, historic alterations, and current condition. The assessment process is a multidisciplinary approach to more fully document each building and its alterations. Disciplines include architectural, structural, electrical, mechanical, and hazardous material experts. The CLR addresses the development of the cultural landscape characteristics and features.

Notable dates and periods of construction assist to determine the relative significance of each building feature.

Existing Condition

This section provides a brief physical description of each building. This precedes a description of the individual building features and includes information related to massing, form, orientation, materiality, and general plan layout. Field observations contribute to descriptions of each extant feature and attendant condition rating. Elements observed at each building include the following:

Architecture: roofing, chimneys, exterior walls, exterior trim, windows, doors, porches, interior wall finishes, ceiling finishes, interior trim, flooring, stairs, and features/functions

related to building code, life safety, and accessibility.

Structure: foundation, floor framing, roof framing, ceiling framing, wall framing, lateral system, and load requirements.

Mechanical Systems: plumbing systems, heating, ventilation, air conditioning and fire protection systems.

Electrical Systems: infrastructure, branch circuits, electrical devices, general power outlets and equipment, lighting systems, telecommunications, fire alarm and security systems, and lightning protection.

Condition Assessment
Each feature was evaluated and assigned a condition rating. A general building condition assessment is presented first, followed by the condition assessment and ratings of each feature or component.

Character Defining Features
A list of the contributing features - those characteristics that embody the structure's special and notable qualities - follow the description of physical features.

Treatment and Use
Conceptual floor plan options for anticipated future uses were included in the 80% Draft HSR and discussed at a treatment workshop on April 2-3, 2020, with the park and regional staff. This workshop identified the preferred design options for each building and affirmed building uses and functions. The treatments are presented in this report describe work which correlates to anticipated floor plan changes. The treatments also address items identified in the condition assessment.

Summary of Recommendations

Rehabilitation is the recommended treatment for each of the four historic buildings that comprise the Grand Marais USGS Life Saving Station. Rehabilitation acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.

Treatment recommendations provide guidance to return exterior facades to their historic appearance. On the interior, treatments provide guidance associated with each building's preferred use. Where no floor plan modifications will occur, treatments generally retain existing materials in good condition and repair damaged finishes where necessary. The Station Dwelling (HS-18), Harbor of Refuge Dwelling (HS-20) and Equipment Building will require modifications to meet accessibility requirements. This HSR assumes treatment recommendations for the Officer in Charge Dwelling (HS-19) will not include alterations for accessibility. PIRO has determined that other park housing units will be modified to meet barrier free access requirements.

Description of the Study Area

All buildings addressed in this HSR are located in the historic Grand Marais United States Coast Guard Lifesaving Station. Pictured Rocks National Lakeshore is located along the south shore of Lake Superior within Michigan's Upper Peninsula. The park is forty-two miles of lakeshore and has fifteen miles of cliffs. Grand Marais is located on the eastern end of the park.

Location Data

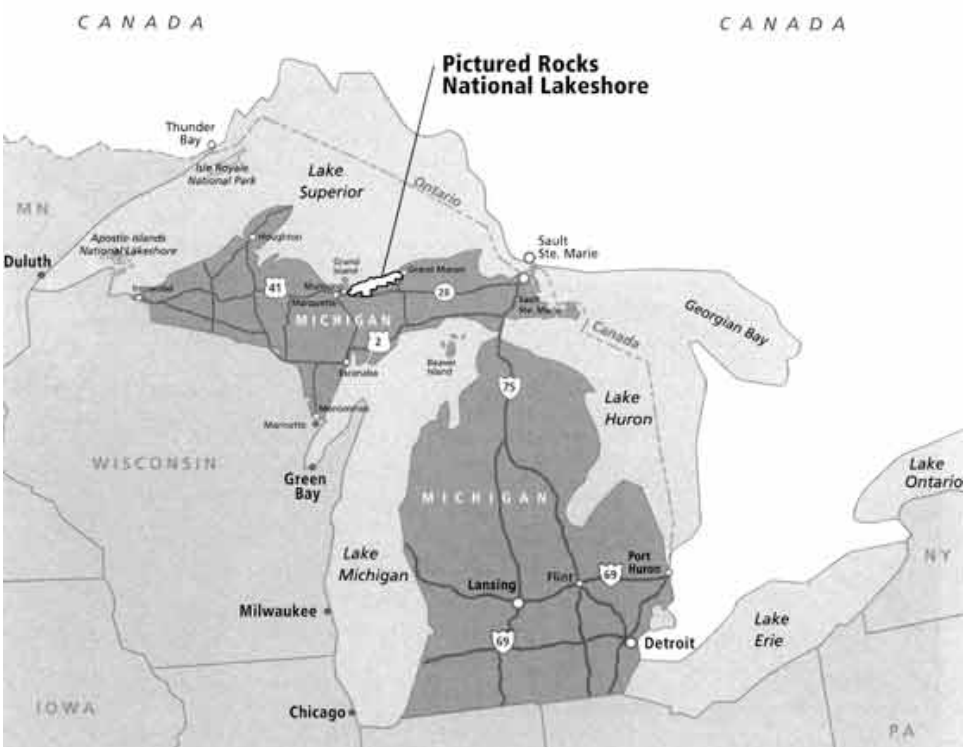


Figure 1-1. Area Map - Location of Pictured Rocks National Lakeshore within the state of Michigan (Source: Pictured Rocks National Lakeshore Map Page, 7/5/2016)

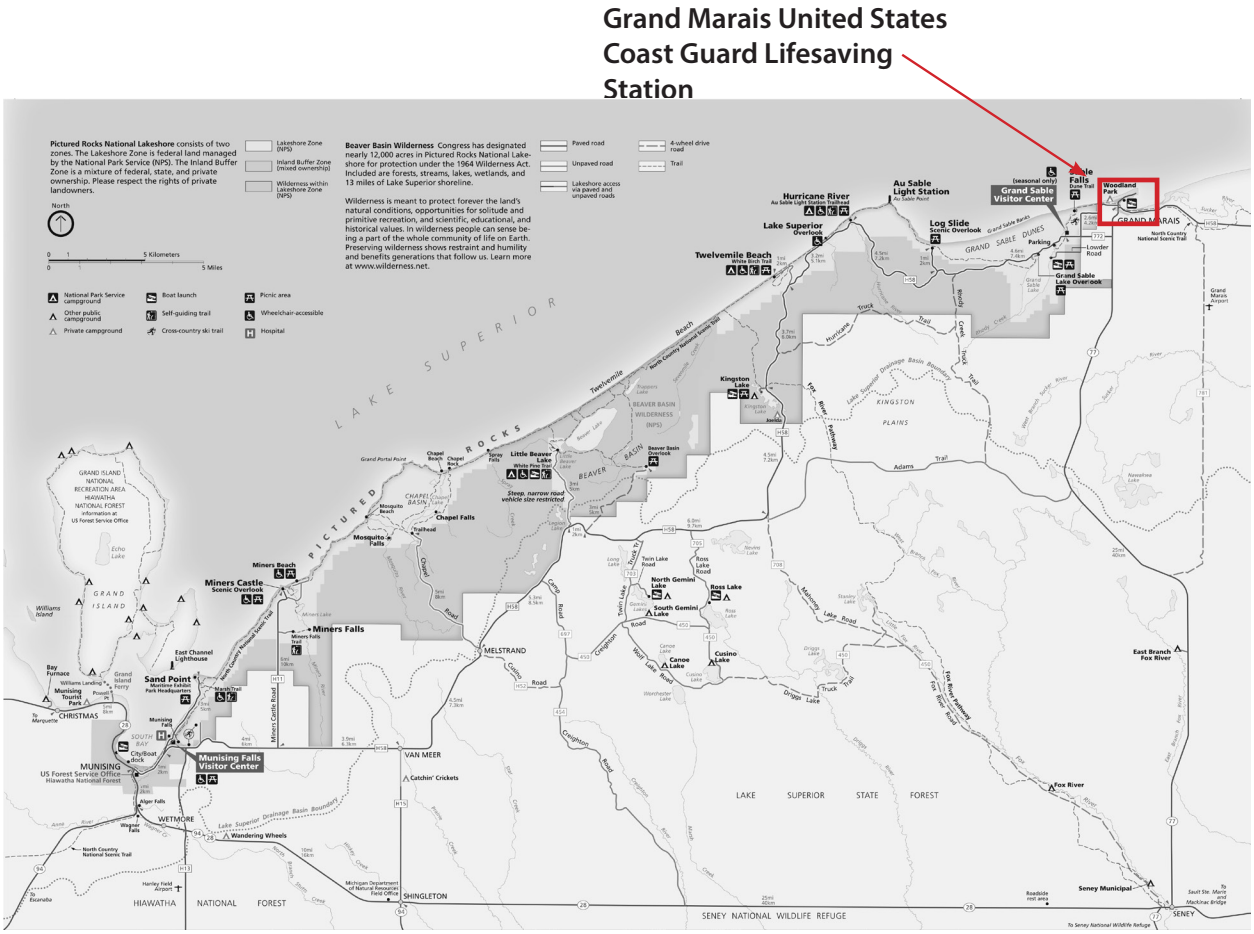


Figure 1-2. Location of the project area within Pictured Rocks National Lakeshore

(Source: Pictured Rocks National Lakeshore Park Map, 12/20/2019)



Figure 1-3. Study Area

(Source: Mundus Bishop, June 2020)

Part 1: Developmental History

Building History

Introduction

The Grand Marais USCG Lifesaving Station functioned to safeguard maritime activity on Lake Superior from its founding in the 1890s until it was decommissioned in 1981. The station was built on a peninsula that sheltered the natural harbor, which was designated as a Harbor of Refuge in 1880. A light station, including two range lights and a keeper's dwelling, was established in 1895. Five years later, a lifesaving station was built on adjacent land. The two properties came under one service in 1939 when the United States Lighthouse Service merged with the United States Coast Guard (USCG). Following the station's decommissioning, the Harbor of Refuge Dwelling (HS-20) was leased to the Grand Marais Historical Society (GMHS). Two of the USCG buildings were transferred to Pictured Rocks National Lakeshore (PIRO), which was established in 1966. The National Park Service (NPS) later took ownership of the Harbor of Refuge Dwelling (HS-20), which is currently operated as a museum by the GMHS. The Coast Guard is currently in the process of transferring the remaining Grand Marais USCG Lifesaving Station building (the Equipment Building) to the NPS.

Preconstruction

The natural harbor at Grand Marais has long been a haven for travelers along the southern coast of Lake Superior. Ojibwe people used sheltered bays like the one at Grand Marais as camps during their seasonal travels along the lakeshore. In July 1826 the United States Superintendent of Indian Affairs, while on a tour of the Great Lakes, observed the remains of an Ojibwe encampment in Grand Marais Bay and speculated that they had camped at Grand Marais on their way to Drummond Island.[1.1] Maps by eighteenth century French explorers and traders identified the harbor as "Le Grand Marais." This translates to "The Great Marsh" but may be a mistranslation for the term "Le Grand Mare" or "Big Pond," as Ojibwe people called the harbor "Kitch-bitobig," or "Great Pond."[1.2]

The United States Government took control of the area around Grand Marais in 1836, following the Treaty of Washington between the federal government and some representatives of Ojibwe and Odawa tribes. By the 1840s Michigan's Upper Peninsula was at the start of an industrial boom as the iron and copper mining companies began extraction of ore and the lumber and commercial fishing industries also began to develop. In 1855 the St. Mary's Falls Ship Canal opened at Sault Ste. Marie, enabling ships to travel between Lake Superior and the lower Great Lakes.

With shipping becoming a major activity on the Great Lakes, the federal government began to develop aids to navigation, namely lighthouses, throughout the Great Lakes. The harbor at Grand Marais, the only natural harbor along a ninety-mile stretch of Lake Superior shoreline between Grand Island and

1.1 Thomas L. McKenney, *Sketches of a Tour to the Lakes* (Baltimore: Fielding Lucas, Jr., 1827), 221. See also M. Nieves Zedeno, Richard W. Stoffle, Fabio Pittaluga, Genevieve Dewey-Hefley, R. Christopher Basaldu, and Maria Porter, "Traditional Ojibway Resources in the Western Great Lakes: An Ethnographic Inventory in the States of Michigan, Minnesota, and Wisconsin," (Tucson, Arizona: University of Arizona in Tucson Bureau of Applied Research in Anthropology, prepared for the National Park Service Midwest Regional Office, 2001), 72, 123, 131. An Ojibway consultant interviewed for the Zedeno, et. al. study mentioned the village of a fishing clan at Grand Marais but it was not clear where this was located or when it was occupied.

1.2 Grand Marais Historical Society, *Grand Marais* (Arcadia Publishing Co, 2009), 7.

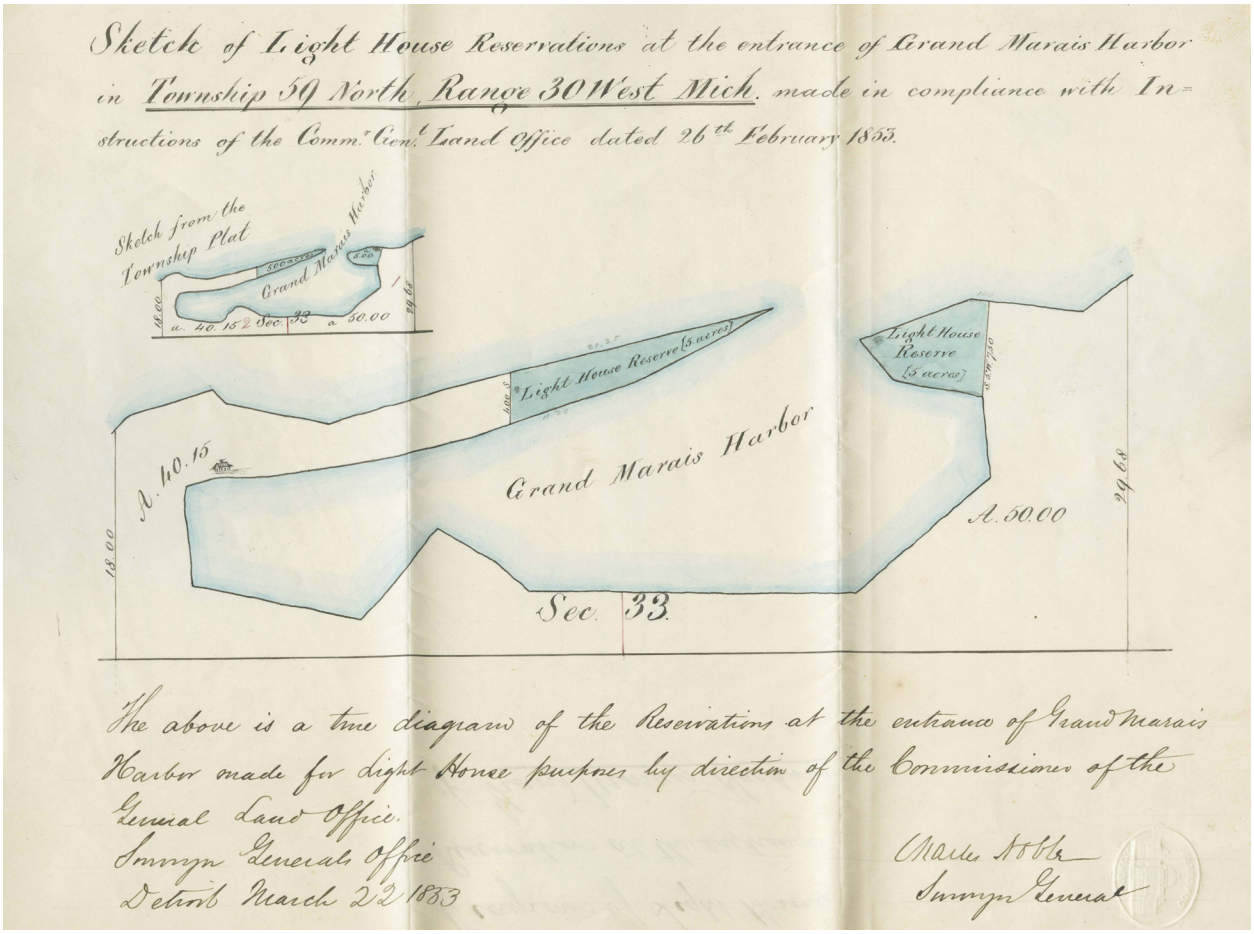


Figure 1-4. 1853 diagram of the lighthouse reservation at Grand Marais (source: Archives of Michigan).

Whitefish Point, was recognized as a potential site for a lighthouse in 1853, leading the federal government to reserve ten acres in Grand Marais for this purpose. The reserved land was located on two sandy peninsulas extending from the east and west ends of the harbor that formed a natural breakwater (Figure 1-4).[1.3]

The European American community at Grand Marais began in the 1860s when Peter Barbeau built a trading post on East Bay, where Ojibwe people came to trade. As the commercial fishing industry developed in the area, the firm of Conable and Son built a fishery on the sandy point on the west side of the harbor. A small village of residents engaged in fishing and lumbering began to emerge on the south side of the harbor.[1.4] In 1879, the first sawmill began operating in the village.[1.5]

1.3 "Diagram of Light House Reservations at the Entrance of Grand Marais Harbor," March 22, 1853," on Seeking Michigan.org.

1.4 Grand Marais Historical Society, *Grand Marais,* 7, 9.

1.5 Daniel Koski-Karell and Jayne Aaron, "Grand Marais Harbor of Refuge Inner and Outer Lights," National Register of Historic Places nomination, listed May 2, 2012.

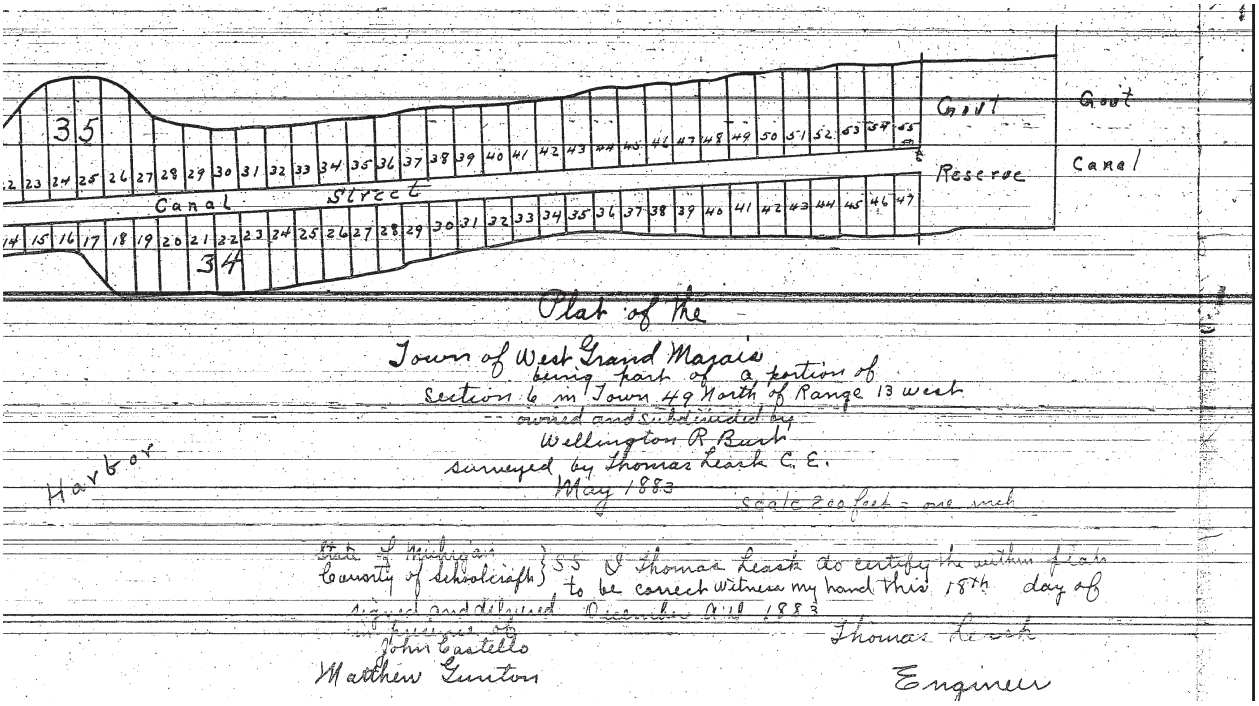


Figure 1-5. Detail from 1883 plat of the Town of West Grand Marais (source: State of Michigan).

Burt Township was established in 1882. It was originally within Schoolcraft County but became part of Alger County when the latter was set off from the north end of Schoolcraft County in 1885. Wellington Burt, one of the early landowners in Burt Township, platted the town of West Grand Marais, including the west end of the harbor and the peninsula west of the lighthouse reservation, in 1883 (Figure 1-5). [1.6]

Although Grand Marais had been identified as the potential site for a lighthouse as early as 1853, federal government work at the harbor did not begin until the 1880s. In June 1880 the River and Harbors Act of 1880 designated Grand Marais as a Harbor of Refuge and authorized the construction of a protected channel into the harbor. This included building two parallel piers set 500 feet apart and dredging a deep channel between. This navigational channel bisected a portion of the west peninsula adjacent to the lighthouse reservation (Figure 1-6).[1.7]

Episode 1: 1895 to1932

The United States Lighthouse Board, which was in charge of aids to navigation, requested an appropriation to build a light at Grand Marais in the early 1890s. Its annual report for 1891 notes

1.6 "Plat of the Town of West Grand Marais, Michigan," original dated May 1883 with annotations by Office of the Lighthouse Board, August 1895, scanned document provided by United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio.

1.7 Preliminary Assessment Screening, Proposed Real Estate Outgrant DACW35-4-97-3001, Grand Marais Harbor Federal Navigation Channel, August 5, 1997, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

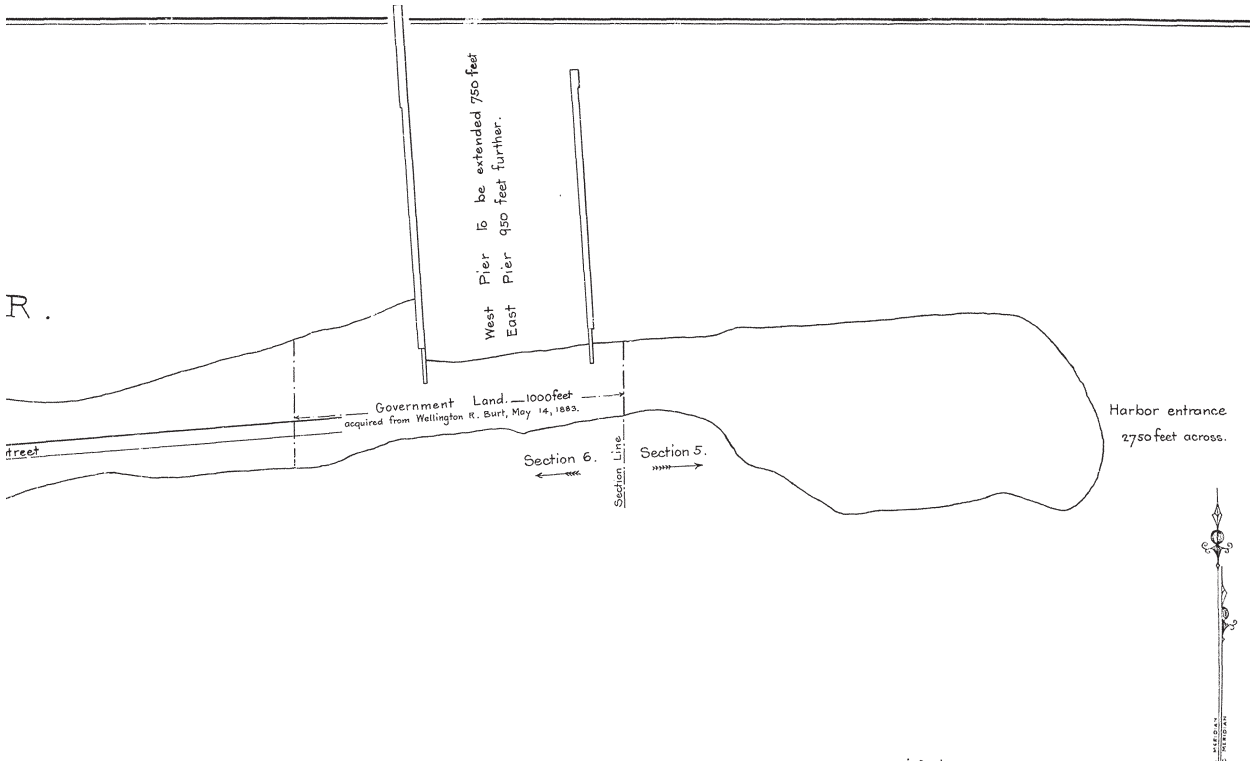


Figure 1-6. Detail from 1883 plan of the navigational channel (source: United States Coast Guard, Civil Engineering Unit, Cleveland, OH).

> There is no harbor between White Fish Bay and Grand Island. Grand Marais has been for some time under improvement by the United States as a harbor of refuge and the work has now advanced to a point where it is desirable to light it. It is estimated that a suitable light and bell can be established here at a cost not exceeding $15,000, and it is recommended that an appropriation of this amount be made therefor.[1.8]

The board repeated this request for the next several years. Establishment of the light was authorized in February 1893, but funds were not appropriated until March 1895, permitting the board to proceed with plans for building the station.[1.9]

That September, the War Department (which had gained authority over the lighthouse reservation, likely when the Harbor of Refuge was established), gave permission to the Treasury Department (from which the Lighthouse Board was administered) to occupy the outer end of the West Pier and part of the government reservation to

1.8 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1891," (Washington: Government Printing Office), 170.

1.9 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1893," (Washington: Government Printing Office), 153.

build the light tower and a dwelling for the keeper.[1.10]

The Lighthouse Board's report of the following June (1896) described the work at the new station:

> Plans were made for the pierhead tower and elevated walk, and the greater portion of the material was ordered. Bids were obtained for furnishing the metal work and fog bell of the pierhead light. The bell tower at Point Iroquois was taken down and transported to this station. The material for the beacon tower and fog bell was purchased and delivered. The framework of the bell tower was raised and securely bolted on the pier, the iron work was placed, and an elevated walk was completed from the tower to the shoreline. The work was completed during November, and on December 10, 1895, the sixth order fixed white light and the fog bell were established… A surveyor was sent to make a survey of this light-house reservation and to mark the boundary. Five permanent stone monuments were placed. [1.11]

The Lighthouse Board had apparently intended the $15,000 appropriation to cover the construction not only of the light and fog bell, but also an additional light to serve as a range light and a keeper's dwelling. However, they noted "the wording of the act is ambiguous" and requested authorization to use the remainder of the money to build the range light and keeper's dwelling. The following year's report noted that a "sundry civil appropriation act" on June 4, 1897, approved the use of the unexpended balance for the completion of the range light with a contract made for the skeleton tower on September 27, 1897.[1.12]

By the time the contract was completed it was too late in the season to build the tower, and construction was deferred to the following spring. The 1898 report noted "The tower was erected in June 1898, on the inner end of the west harbor pier, which was strengthened by additional timbers to give a secure foundation. Data for notice to mariners announced the establishment of this light on or about July 15, 1898."[1.13] However, there is some confusion as to whether the Inner Range Light was actually completed that year, as the following year's report noted "The construction of the rear beacon, including the erection of the lens, was completed and the light was exhibited on July 18, 1899."[1.14] A wood boardwalk connected the two lights.

At the same time the Lighthouse Board was completing its new station at Grand Marais, its sister organization, the United States Lifesaving Service (USLSS), established a lifesaving station there. The USLSS, founded in 1878, was also under the aegis of the Treasury Department, but was a separate

1.10 Daniel S. Lamont, Secretary of War, letter to the Secretary of the Treasury, September 23, 1895, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

1.11 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1896," (Washington: Government Printing Office), 145-146.

1.12 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1897," (Washington: Government Printing Office), 158, 162.

1.13 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1898," (Washington: Government Printing Office), 174.

1.14 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1899," (Washington: Government Printing Office), 169.

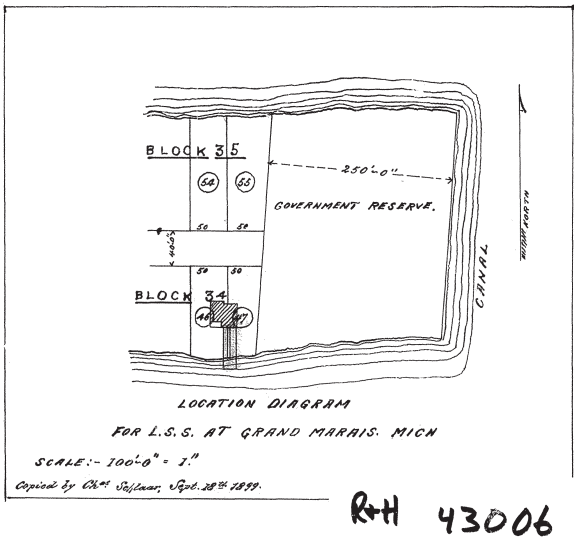


Figure 1-7. 1899 Location Diagram for Lifesaving Station (source: United States Coast Guard, Civil Engineering Unit, Cleveland, OH).

organization from the Lighthouse Board. In December 1897 the Secretary of the Treasury purchased four lots in Wellington Burt's plat of West Grand Marais adjacent to the lighthouse property from the Marais Lumber Company for use as a lifesaving station (Figure 1-7).[1.15] Construction of the station began in 1899 after Charles Hoertz of Grand Rapids, Michigan, submitted the low bid in August of that year.[1.16]

The Lifesaving Service employed standard designs for its stations. The 1900 station at Grand Marais was based on a Shingle style building architect George R. Tolman had first designed for a station in Duluth, Minnesota, in 1893. It was an "integral station" (one that included both boat storage and living quarters under one roof as well as the watch tower) and was

> rectangular in plan with a clipped side gable roof and shed roof dormers. A large, rectangular, four-story watch tower with a pyramidal roof is centered on the front facade and divides the dwelling space from the boat room. The dwelling section's entrance includes a recessed shed roof porch with simple post supports and balusters. The boat room includes two large doors.[1.17]



Figure 1-8. Grand Marais Lifesaving Station, ca. early 1900s (source: Grand Marais Historical Society).

Grand Marais (Figure 1-8) was one of twenty-eight stations across the United States built to the 1893 Duluth design. Other examples in Michigan included Charlevoix (1899) and Grand Pointe Au Sable (1904) (neither are extant). The Grand Marais Lifesaving Station officially opened in the spring of 1900.[1.18]

1.15 The lots were lots 46 and 47 of block 34 and lots 54 and 55 of block 35. Deed dated December 13, 1897, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

1.16 "Life Saving Stations: Bids Opened for One at Charlevoix and One at Grand Marais," *Detroit Free Press*, August 17, 1899, 3.

1.17 Daniel Koski-Karell, et. al., "US Government Lifesaving Stations, Houses of Refuge, and Pre-1950 US Coast Guard Lifeboat Stations," (Multiple Property Documentation Form), 2013, 15.

1.18 "Notice to Mariners," *Detroit Free Press*, April 11, 1900, 6.

The final decade of the nineteenth century and the first of the twentieth century represented the height of economic activity in Grand Marais. In 1893 a rail line was established between the village and Seney, about twenty-five miles south, facilitating the movement of lumber from the interior of the peninsula to the saw mills of Grand Marais, where it was then shipped from the harbor to ports farther south on the Great Lakes.[1.19]

At the light station, the first decade of the twentieth century was characterized by increasingly urgent calls for the construction of a dwelling for the keeper. Although the Lighthouse Board's annual report for 1897 had recorded that a dwelling was completed in October 1896,[1.20] in fact this building was little more than a shack that the first keeper, Samuel Rogers, later claimed he had funded himself (Figure 1-9). [1.21]

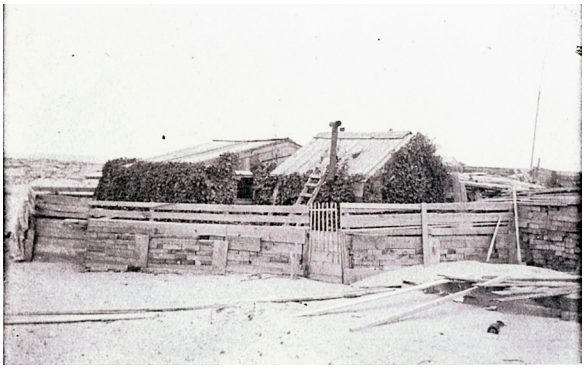


Figure 1-9. The "shack" occupied by the first lighthouse keeper, ca. 1906 (source: Grand Marais Historical Society).

In 1901 the Lighthouse Board's engineer recommended $3,500 be appropriated to construct a dwelling.[1.22] The annual report for 1902 noted the following:

> This station has two lights, one on the outer and the other on the inner end of the west pier, at the entrance to the Grand Marais Harbor of Refuge, on the southerly shore of the easterly part of Lake Superior, Michigan. It also has a fog signal. The lights and the fog signal are attended by but one keeper. It is necessary that he should be at his post most of the time, and particularly at night. There are no quarters provided for him, and he now lives near his rear light in a shanty built by the former keeper. A suitable keeper's dwelling should be erected here as soon as practicable. There is a strip of Government land near the light station, in charge of the War Department. It is estimated that a proper structure can be built thereon for $5,000, and it is recommended that an appropriation of that amount be made therefor.[1.23]

The Lighthouse Board's engineer noted that the land would be free, as it was already owned by the government and the War Department had indicated it would grant permission to use it for this purpose.[1.24] The board's plea was repeated annually for the

1.19 Grand Marais Historical Society, *Grand Marais*, 8.

1.20 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1897," (Washington: Government Printing Office), 158, 162.

1.21 Samuel Rogers to Light House Inspector, Eleventh District, September 23, 1905, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.

1.22 Engineer, Eleventh Lighthouse District, to Light House Board, October 26, 1901, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.

1.23 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1902," (Washington: Government Printing Office), 208.

1.24 Engineer, Eleventh Lighthouse District, to Light House Board, September 15, 1902, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group

next several years, with the existing keeper's dwelling described variously as "a shanty erected under the lee of a pile of driftwood," and "a disgrace to the Lighthouse Service."[1.25]

In the meantime other improvements were going forward at the light station. In 1901-1902, an elevated trestle was built to the Outer Range Light along with a platform at the light for the keeper to reach the light when waves washed over the pier. A weather signal tower was also built at the station by the Department of Agriculture.[1.26] In 1903-1904 the East and West Piers were extended and a breakwall built to shelter the harbor. The harbor itself was dredged to accommodate larger vessels. The walkway to the Outer Range Light was extended and the light relocated to the new end of the pier. A gas beacon on a steel tower was installed on the end of the breakwater. [1.27] In January 1906 a storm washed out part of the new iron elevated walkway, and repairs were made the following May.[1.28]

In 1904 lighthouse keeper Samuel Rogers resigned due to poor health and George Barkley was appointed in his place. This brought the need for a new dwelling to a more urgent level. Rogers did not immediately move out of the shack that had been serving as his dwelling, and in fact claimed that as he had purchased the building the Lighthouse Service did not own it. Barkley rented a shed from Rogers until Rogers moved. The Lighthouse Board's engineer requested $200 in June 1904 to build a shed for Barkley, noting that Rogers' "hut" was uninhabitable and the shed could be used as a temporary camp for Barkley and converted to a woodshed when a new dwelling was constructed. [1.29]

Three years later, money for the dwelling had still not been appropriated when the Lighthouse Board engineer wrote: "At the present time, the keeper and his family live in two woodsheds and an old fish hut, barely fit for occupancy in the summer time," and requested again an appropriation of $5,000.[1.30] The repeated efforts of the Lighthouse Board were finally acknowledged in late 1907 when the funds were appropriated. In December the War Department gave formal permission for the Lighthouse Board to occupy a 5,000 square foot parcel of land near the inner end of the West Pier at Grand Marais.[1.31]

26, Records of the United States Coast Guard, National Archives.

1.25 Inspector, Eleventh Lighthouse District, to Light House Board, November 4, 1902, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.

1.26 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1902," (Washington: Government Printing Office), 208.

1.27 Daniel Koski-Karell and Jayne Aaron, "Grand Marais Harbor of Refuge Inner and Outer Lights," National Register of Historic Places nomination, listed May 2, 2012; "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1903," (Washington: Government Printing Office), 75.

1.28 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1906," (Washington: Government Printing Office), 114.

1.29 Engineer, Eleventh Lighthouse District, to Light House Board, June 23, 1904, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives; Samuel Rogers to Light House Inspector, Eleventh District, September 23, 1905, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.

1.30 Engineer, Eleventh Lighthouse District, to Light House Board, August 7, 1907, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.

1.31 Robert Shaw Oliver, Acting Secretary of War, letter to the Secretary, Department of Commerce and Labor, December 17, 1907, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

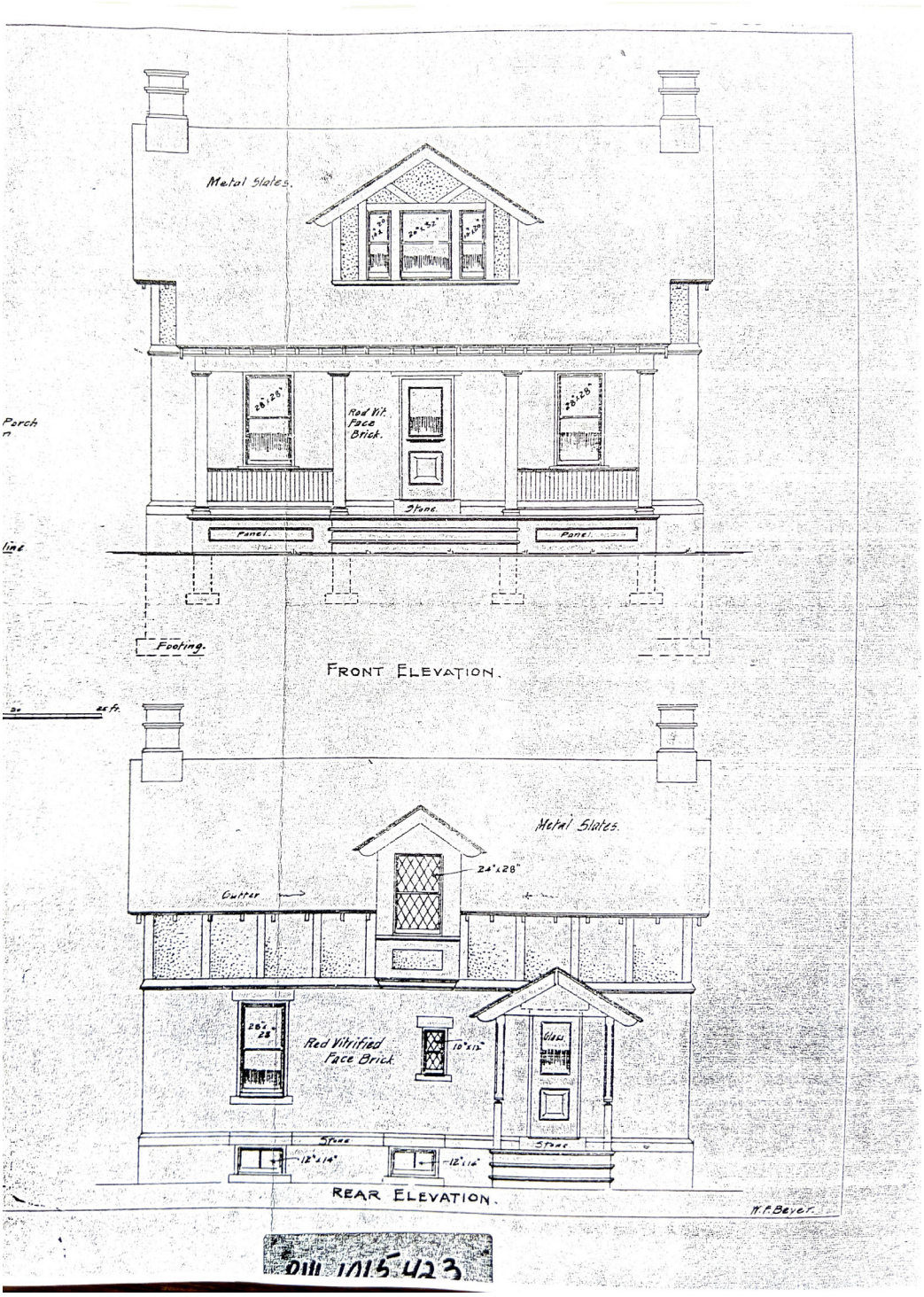


Figure 1-10. East and west elevations of Harbor of Refuge Dwelling (HS-20), 1908 plans (source: National Park Service).

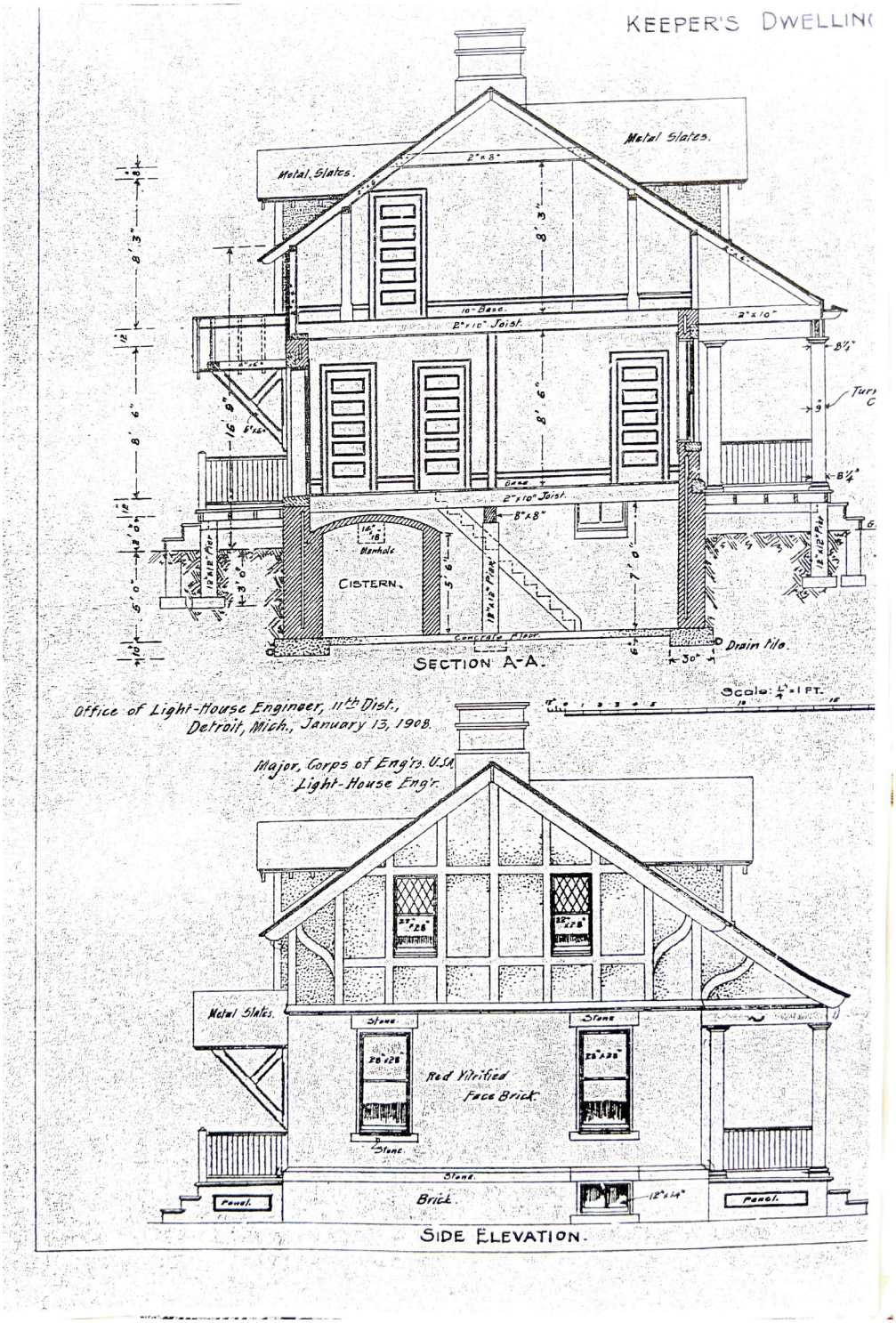


Figure 1-11. Section and south elevation of Harbor of Refuge Dwelling (HS-20), 1908 plans (source: National Park Service).

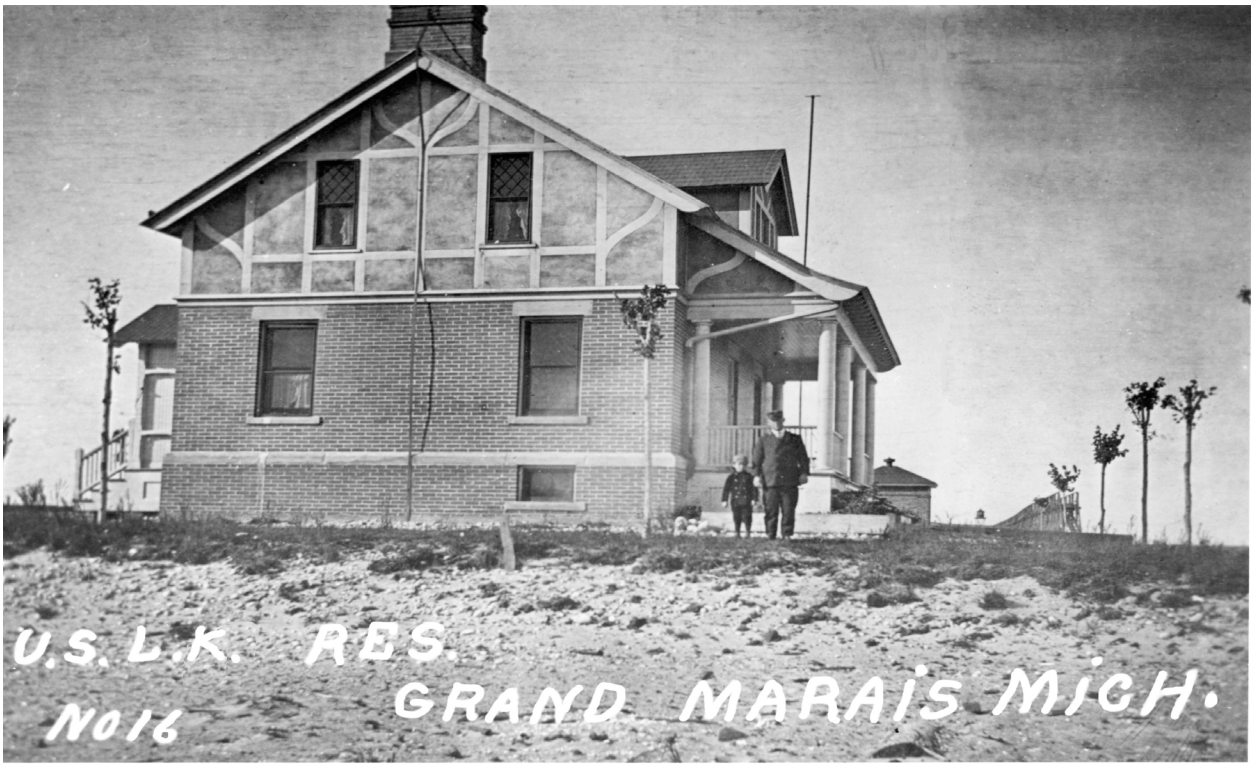


Figure 1-12. Harbor of Refuge Dwelling (HS-20) shortly after construction, ca. 1908 (source: Grand Marais Historical Society).

For the building's design, the Lighthouse Board duplicated the plans for the Munising Range Lights keeper's dwelling, which was built at the same time (Figure 1-10 and Figure 1-11). It was a rectangular, two-story building with brick walls on the basement and first floor, stucco on metal lath on the second floor, and a metal slate roof. The interior was divided into four rooms on the first floor and three on the second, and was outfitted with steam heating, oil lamps, a well and cistern, and a tile sewer drain to the lake. The Lighthouse Board had estimated construction at $5,000. Bids were accepted in April 1908 from the following suppliers:

F. B. Holmes and Co, Detroit, Brick $443.38
H. Houghton, Detroit, Cement, Lime, etc: $258.39
Cortright Metal Roofing Co, Philadelphia, metal slates: $89.60
Hunton and Weeks, Detroit, Lumber, $452.45
Huebner Manuf Co, Factory work, $364.00
Charles Klein, Detroit, Hardware, $205.03
Schroeder Paint and Glass, Detroit, Paint and oils, $52.35
Harry J. Dean Co., Detroit, Window shades, $9.70

No bid was received for the cut stone contract, so the board allocated $98 for the stone to be purchased without a contract.[1.32] Labor for constructing the dwelling was contracted by

1.32 Engineer Secretary, Army Corps of Engineers to Engineer of the Eleventh Lighthouse District, July 21, 1908, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.



Figure 1-13. Another view of the Harbor of Refuge Dwelling (HS-20) shortly after construction. Note storm enclosure entry on the east elevation (likely installed only during winter to form an airlock) and the privy at the west side (source: Grand Marais Historical Society).

the Lighthouse Board to Michael J. Shirley of Sault Ste. Marie. No general contractor was identified, suggesting that construction was overseen directly by the Eleventh Lighthouse District's engineers.[1.33] The final cost of the building was $4,831.47. Work began in June and was completed later that year.[1.34] The Lighthouse Board that year also authorized $180 to build a privy and $400 to build an oil house (Figure 1-12 and Figure 1-13).[1.35]

Not long after the completion of the dwelling (called hereafter in this document the Harbor of Refuge Dwelling, HS-20), Grand Marais experienced a significant economic downturn. The region's white pine had been largely cut by this point, and the town's logging and sawmill operations closed. The railroad to Seney had also suspended operations, and many of the town's inhabitants had left.[1.36]

1.33 Chief Clerk, Light House Board to Engineer of the Eleventh Lighthouse District, May 8, 1908, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.

1.34 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1908," (Washington: Government Printing Office), 23.

1.35 Engineer, Eleventh Lighthouse District, to Light House Board, August 1, 1908, in Box 346, "Correspondence of the Lighthouse Board, 1901-1910," Record Group 26, Records of the United States Coast Guard, National Archives.

1.36 Grand Marais Historical Society, *Grand Marais*, 8.

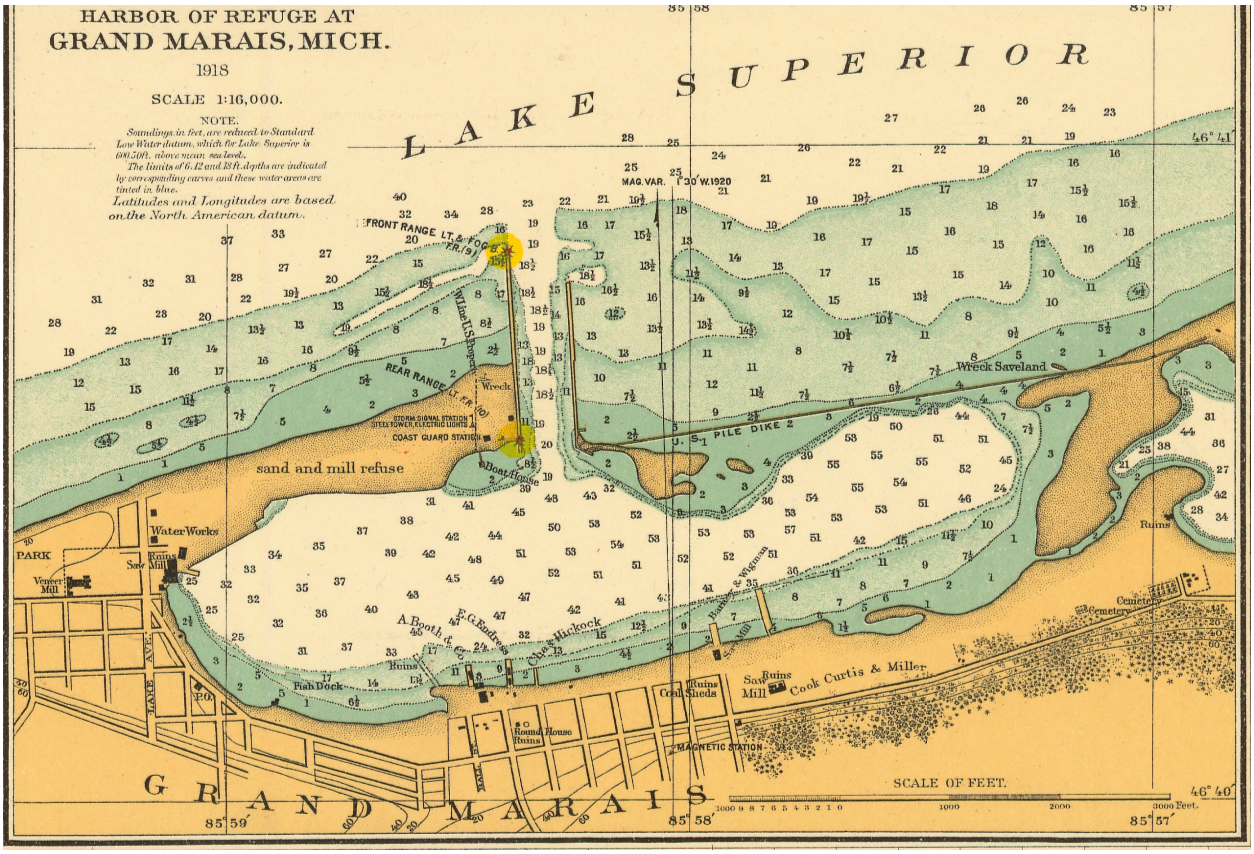


Figure 1-14. Detail of a 1918 lake chart, showing the Grand Marais Harbor of Refuge. Note the "wreck" just north of the station (source: National Oceanic and Atmospheric Administration).

Over the next several decades, commercial fishing and tourism became the mainstays of the regional economy, assisted by the opening of highway M-77 between Grand Marais and Seney in 1925. With shipping still an important activity on the lake, the lifesaving station remained busy. In 1915, the Lifesaving Service merged with the U. S. Revenue Cutter Service to form the United States Coast Guard (USCG), and the Grand Marais Lifesaving Station was redesignated as a Coast Guard station. The Lighthouse Service remained a separate, civilian organization for the time being. The peninsula on which the Lifesaving Station stands eventually became known as Coast Guard Point. Among the station's most well-known rescues was that of the steamer H. E. Runnels, which foundered just outside the channel in November 1919. The station's crew rescued all thirteen members of the Runnels' crew at great personal risk, and were awarded gold lifesaving medals.

Likely at some point in the 1920s, a new building was constructed as a dwelling for the Coast Guard's Officer in Charge (HS-19). Research to date has not verified a date of construction for the building. It appears to have been built to standard plans for a "Radio Station Building" issued by the U. S. Naval Training Station, Great Lakes, Illinois, in 1920 (Figure 1-15 to Figure 1-19). It is unclear

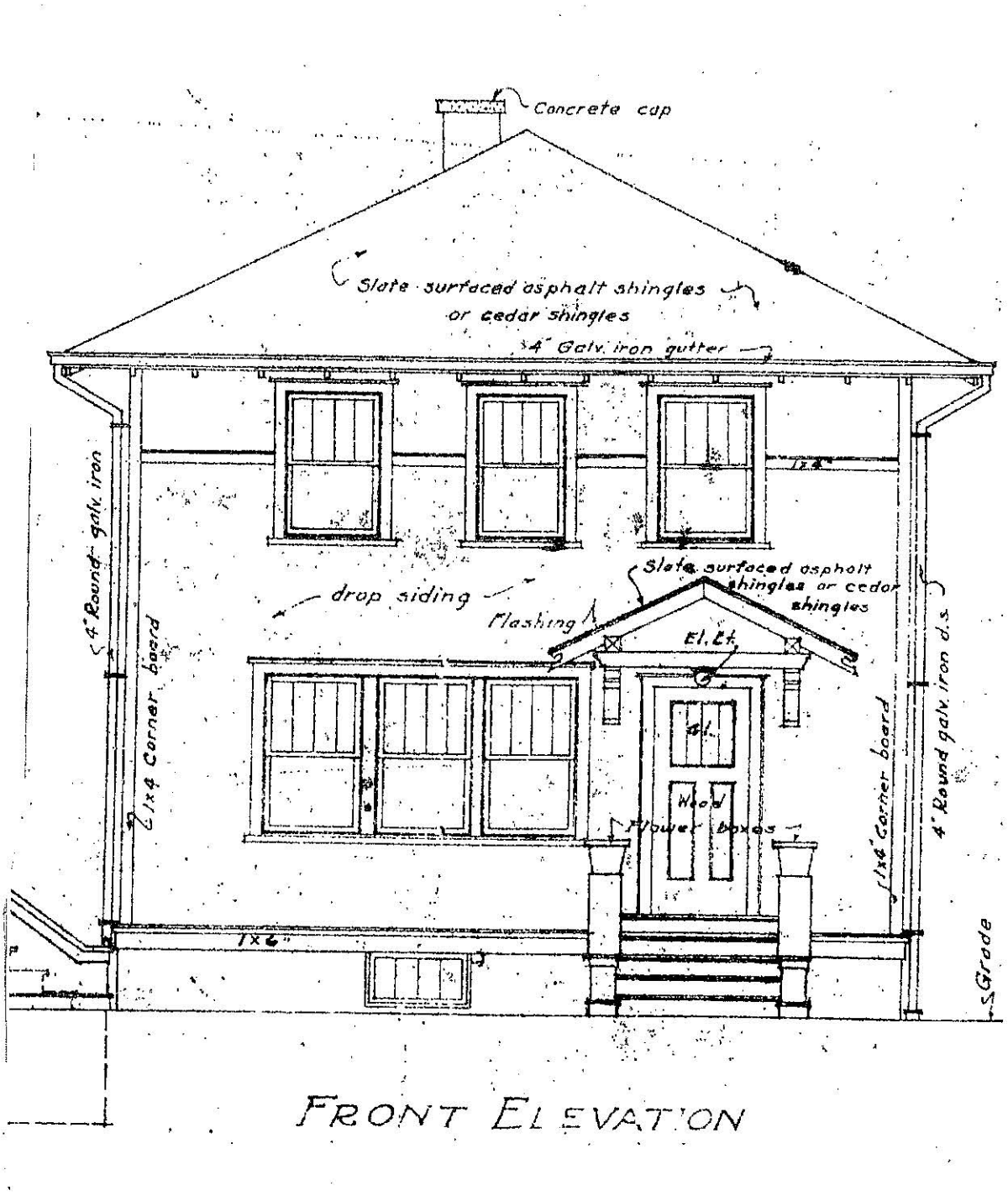


Figure 1-15. 1920 front elevation plan for "Radio Station Building" used for the Grand Marais Officer in Charge Dwelling (HS-19) (source: National Park Service).

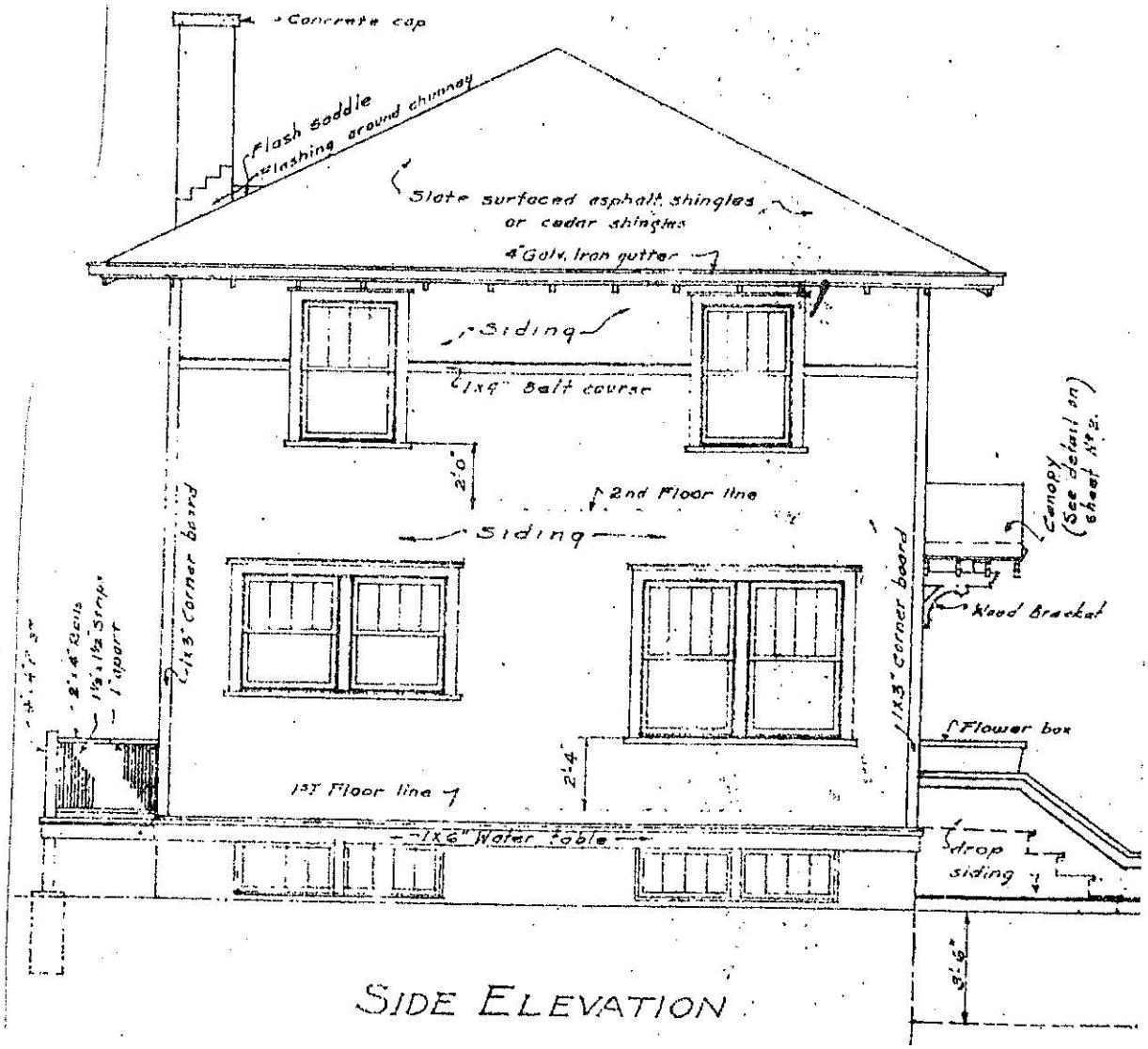


Figure 1-16. 1920 side elevation plan for "Radio Station Building" used for the Grand Marais Officer in Charge Dwelling (HS-19) (source: National Park Service).

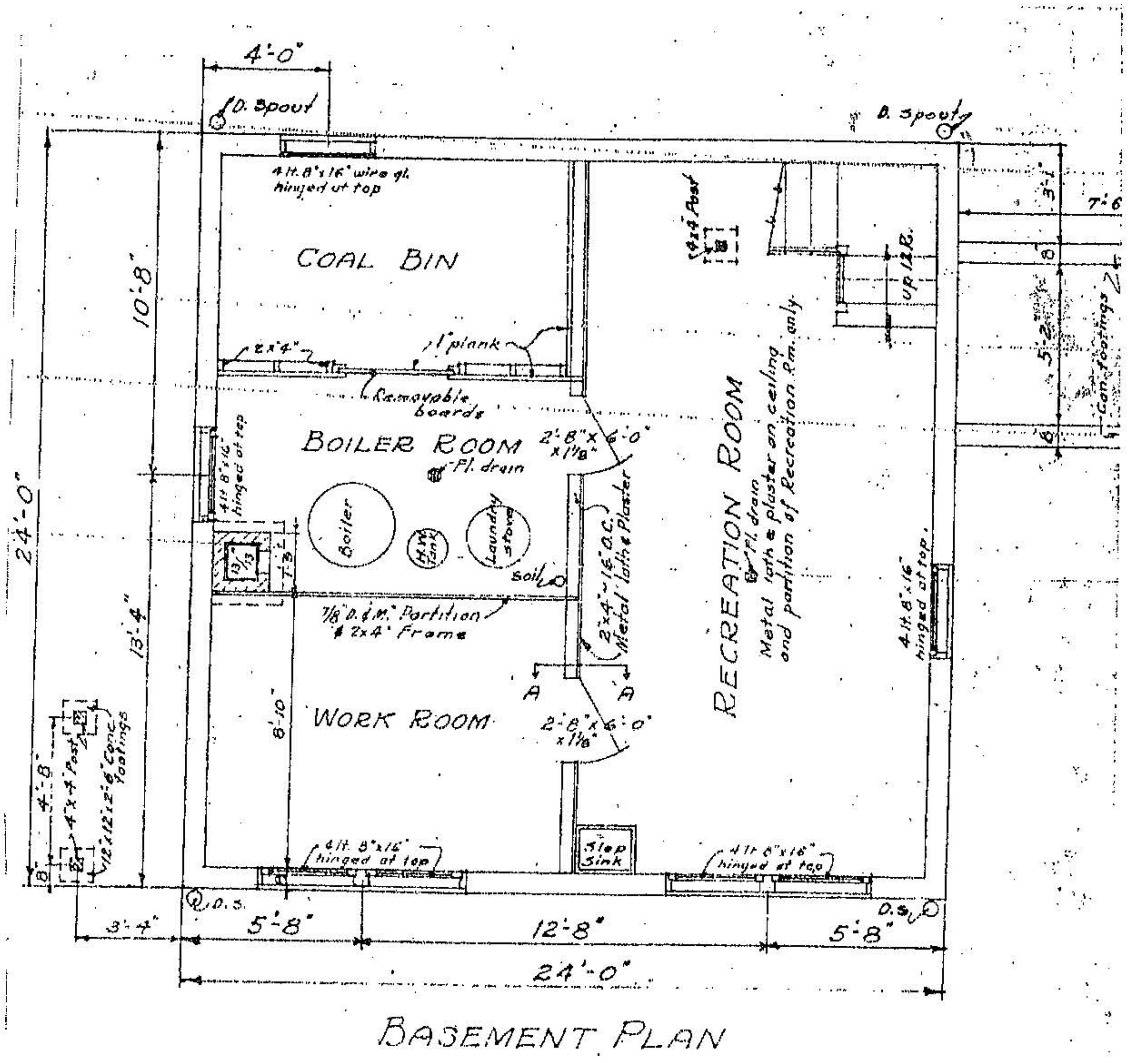


Figure 1-17. 1920 basement plan for "Radio Station Building" used for the Grand Marais Officer in Charge Dwelling (HS-19) (source: National Park Service).

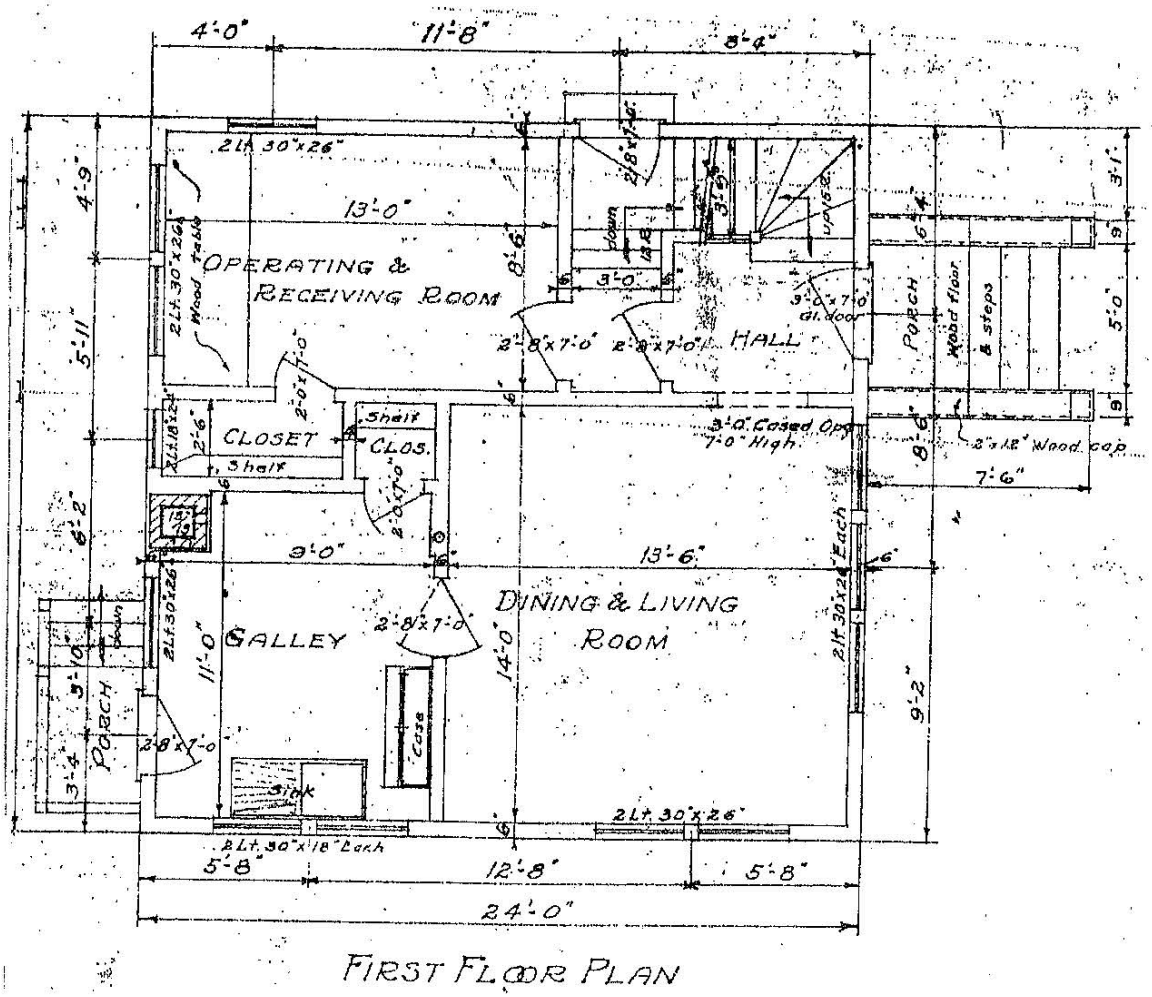


Figure 1-18. 1920 first floor plan for "Radio Station Building" used for the Grand Marais Officer in Charge Dwelling (HS-19) (source: National Park Service).

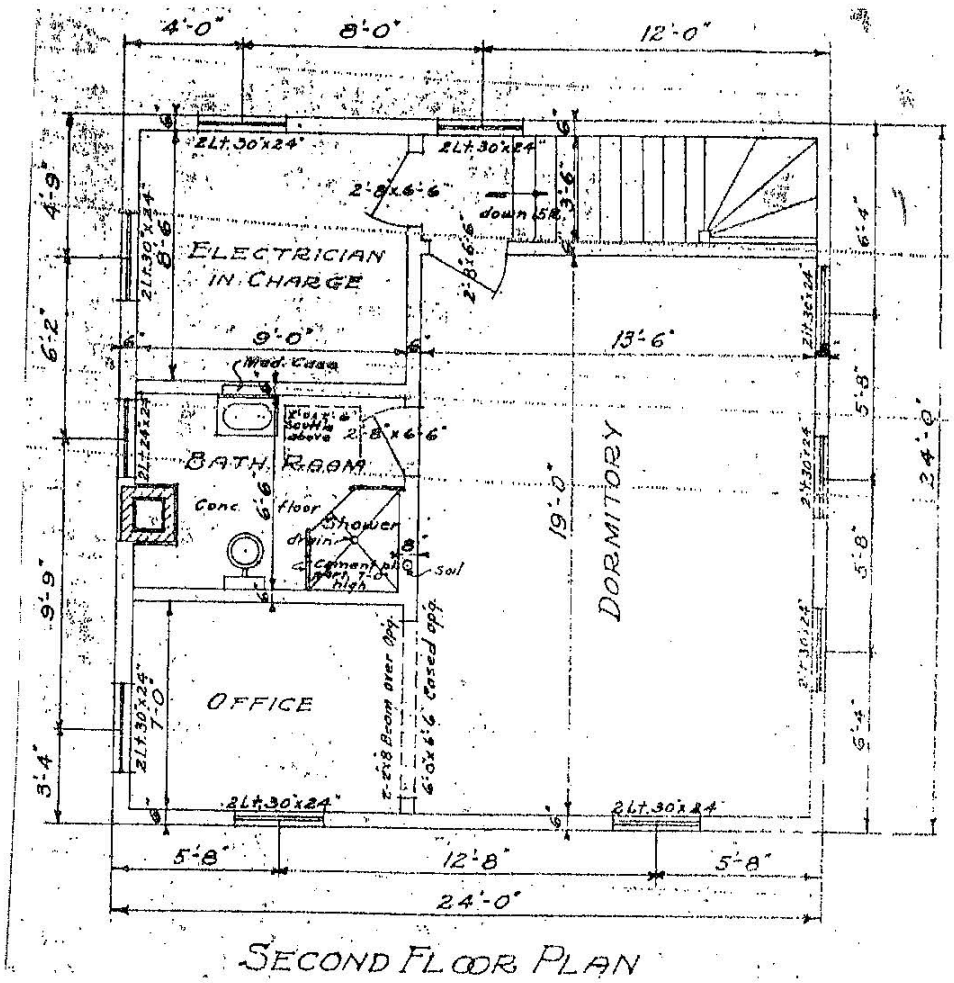


Figure 1-19. 1920 second floor plan for "Radio Station Building" used for the Grand Marais Officer-in-Charge Dwelling (HS-19) (source: National Park Service).



Figure 1-20. Detail of photograph showing the Coast Guard and light stations, dated 1927. The Officer in Charge Dwelling (HS-19) is just to the right of the Coast Guard Station building (source: Grand Marais Historical Society).

if the dwelling was built then or later. A photograph from the Grand Marais Historical Society dated 1927 (Figure 1-20) documents the building in place. Its design, which is in the form of an American foursquare house with Craftsman detailing, is characteristic of the 1920s. Historic photographs show a two-story building with a masonry foundation, horizontal clapboard siding, and a hipped roof with exposed rafter tails. It had three-over-one lite double-hung wood windows and a gabled hood over the front entry. It sat north and slightly east of the 1900 Lifesaving Station building, and to the west of the Harbor of Refuge Dwelling (HS-20).

A few alterations occurred at the light station in the 1920s. The most significant was the replacement of the original wood Outer Range Light with a steel light tower in 1927.[1.37] Other changes included the alteration of the lights' fuel source to acetylene and the replacement of the old fog bell with an air diaphone in 1923.[1.38]

Episode 2: 1932 to1981

The 1930s had the most significant changes to the buildings and landscape at Coast Guard Point since the stations were established three decades earlier. In 1932 the Coast Guard built a new Boathouse and Launchway on a spit of land pointing into the harbor, south and west of the station (Figure 1-21). Drawings for the new facility were issued in 1931. In February 1932 the Coast Guard purchased a portion of lot 35, block 34, "from a line about 300 feet southward from the road to the shore line." A provision in the deed noted that, if abandoned by the Coast Guard, the land would revert to owner Hugo E. Maki

1.37 Daniel Koski-Karell and Jayne Aaron, "Grand Marais Harbor of Refuge Inner and Outer Lights," National Register of Historic Places nomination, listed May 2, 2012.

1.38 "Annual Report of the Commissioner of Lighthouses to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1923," (Washington: Government Printing Office), 33, 34, 50.



Figure 1-21. New Boathouse and Launchway under construction, 1932 (source: Grand Marais Historical Society).

or his heirs.[1.39] The Boathouse was completed in 1932. In 1934 the Coast Guard produced drawings for changes to the radiators and the rear entrance of the Officer in Charge Dwelling (HS-19).[1.40]

In 1938 the Coast Guard decided to replace the nearly forty-year old station building, which likely could not accommodate the staff and equipment of the modern Coast Guard even with the construction of the new Boathouse several years earlier. The new Station Dwelling (HS-18) was built north of the existing building, to the west of the Officer in Charge Dwelling (HS-19). The Coast Guard also added a new Equipment Building between the old and new stations.

Just as the 1900 station building was built to a standard design, so were the new Station Dwelling (HS-18) and Equipment Building. The Station Dwelling (HS-18) was a Colonial Revival style building categorized as the "1934 Roosevelt Design" (Figure 1-22 to Figure 1-24). The Roosevelt Design

> …was used during the 1930s and 1940s for the construction of 46 Coast Guard stations on the Atlantic and Pacific coasts and in the Great Lakes. The Roosevelt Design is not attributed to

1.39 Purchase Voucher dated February 11, 1932, scanned document provided by United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio.
1.40 Scanned document provided by United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio.

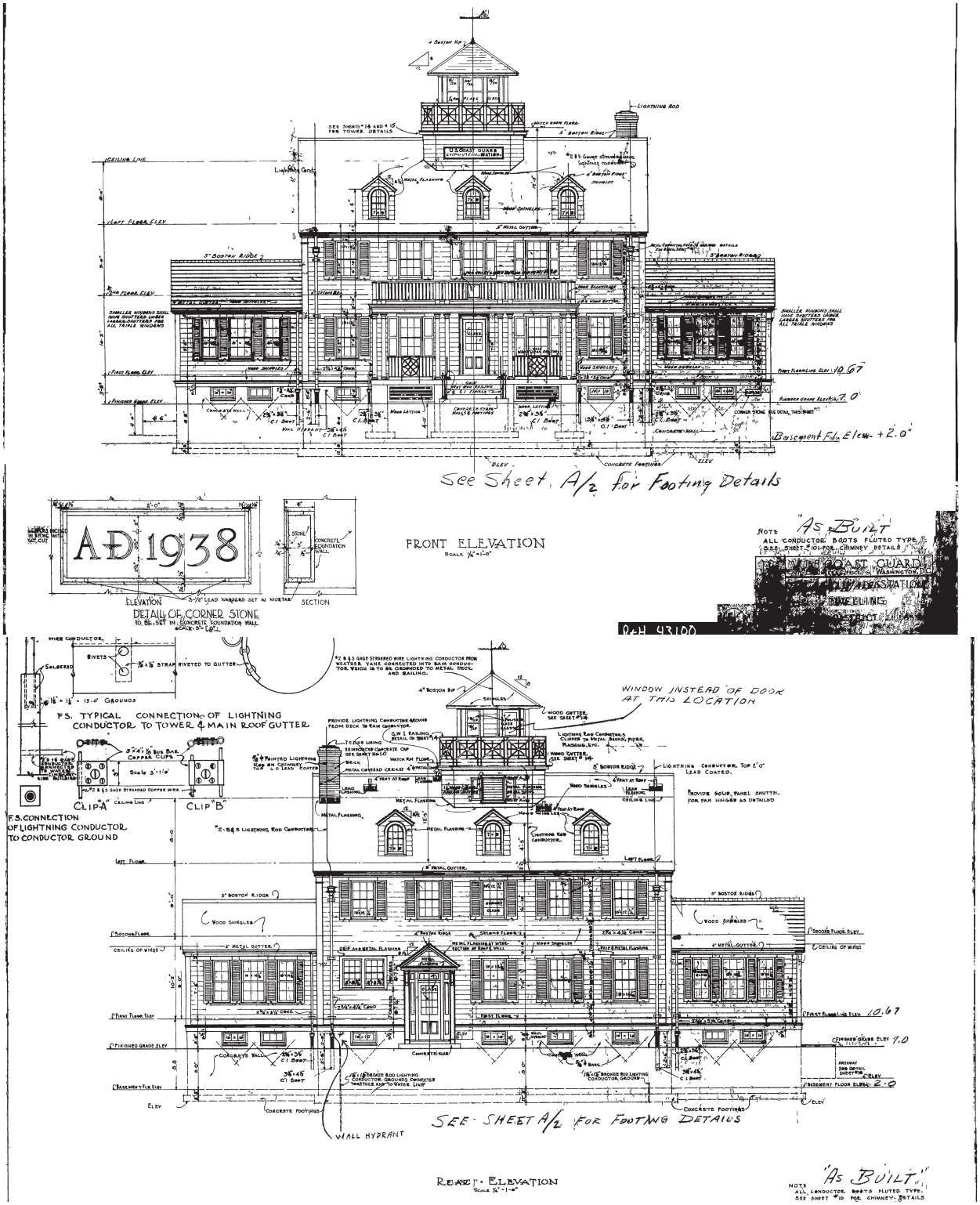


Figure 1-22. Coast Guard Station Dwelling (HS-18), front and rear elevations as-built drawing, 1938 (source: United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio).

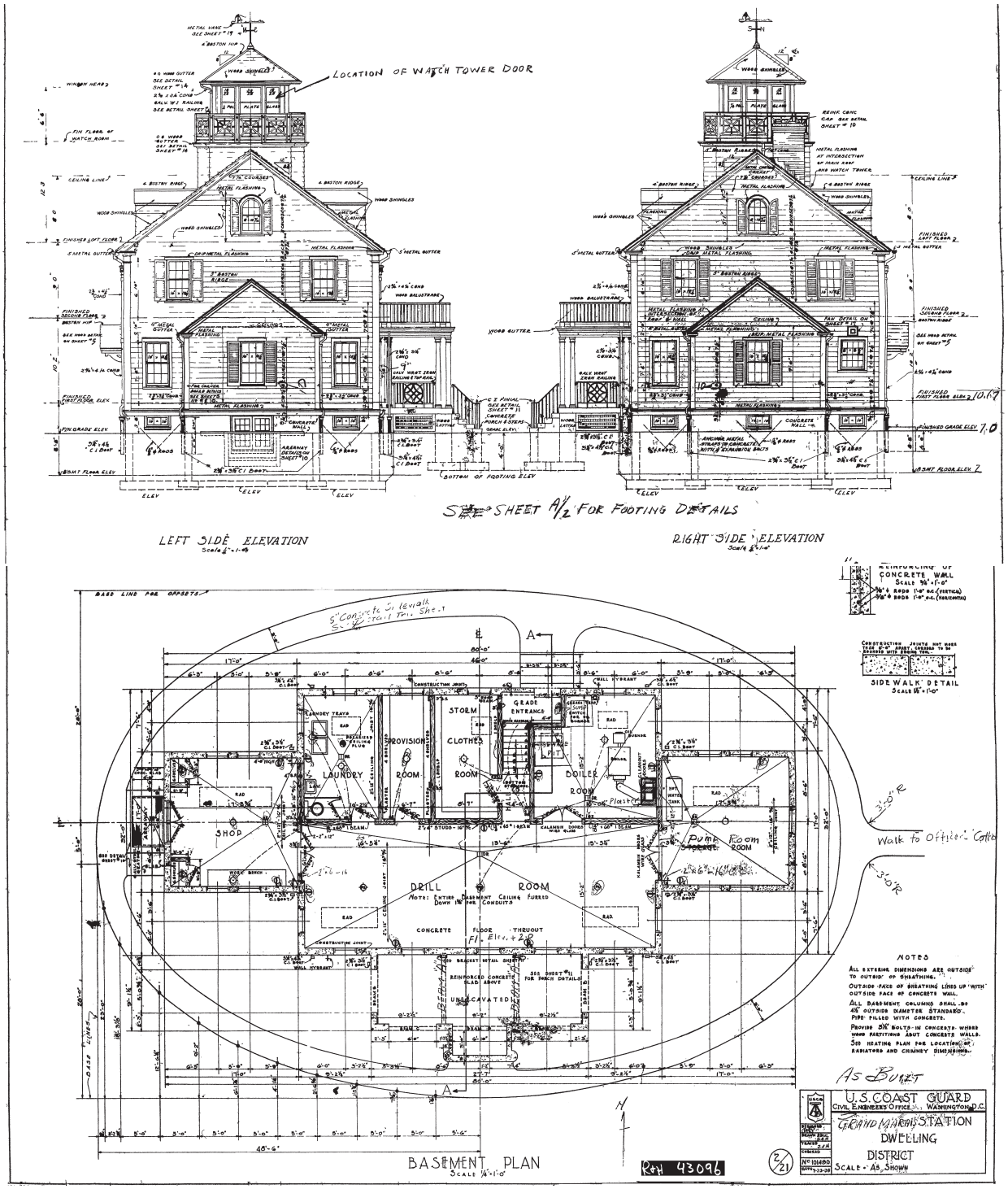


Figure 1-23. Coast Guard Station Dwelling (HS-18), side elevations and basement plan as-built drawings, 1938 (source: United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio).

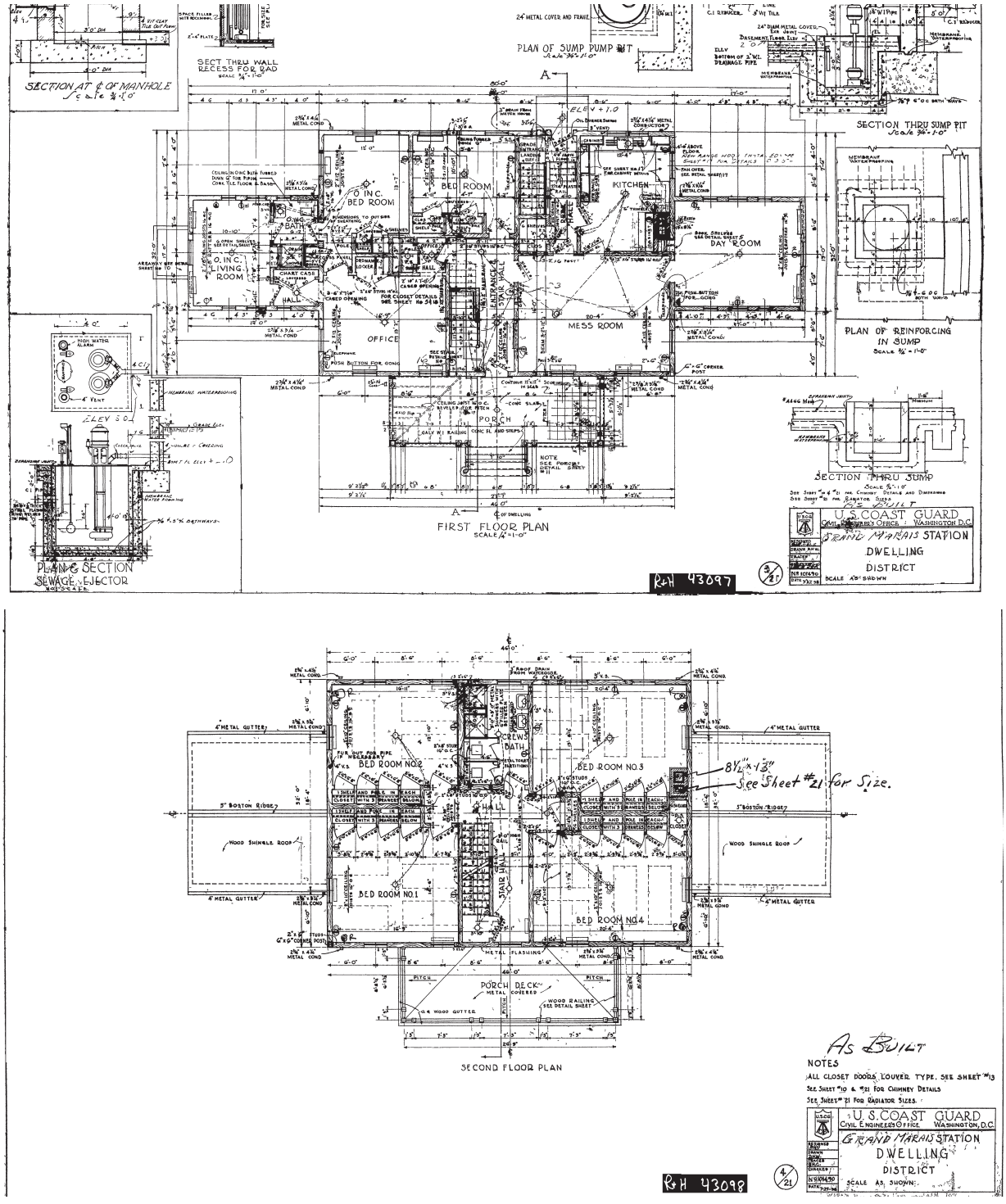


Figure 1-24. Coast Guard Station Dwelling (HS-18), first and second floor plans as-built drawings, 1938 (source: United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio).

> any single architect and is similar to the 1914 Chatham Design. It includes a rectangular plan, two full stories, symmetrical elevations, a three-bay wide front porch with classical columns, and an optional rectangular watch room cupola centered atop the roof. It incorporates additional Colonial Revival elements such as a pitched roof with side gables, an attic halfstory with pitched roof dormers, window shutters, and clapboard siding that is painted white. A number of Roosevelt Design station buildings were constructed with one story wings flanking the main two-and- a-half-story central block. The basic Roosevelt Design's interior includes a mess, kitchen, office, two bedrooms, and a bath on the first story. The second story includes four small bedrooms and one bath. The attic was used for storage. The boat house at a Roosevelt Design station was separate from the main building.[1.41]

The only other station of this design in Michigan was built at the Eagle Harbor Coast Guard Station and is no longer extant. Unlike the integral station design of the original Grand Marais Lifesaving Station, the new buildings were part of the station complex facility type where station functions were dispersed into separate structures. The Station Dwelling itself still combined dormitory, office, and watch tower functions, but the boathouse and equipment/ vehicle storage functions were in different buildings. The Equipment Building was also a standardized design (Figure 1-25 and Figure 1-26). It had at least one twin at the Port Huron Coast Guard Station, also built in 1938. These standardized designs were adapted for local conditions; the Grand Marais Station Dwelling (HS-18) was built with spread footings in lieu of the piles specified in the standard plans.

Bidding for the two new buildings at Grand Marais took place in August 1938. H. Proksch, of Iron River, Michigan, had the low bid of $39,912 for the Station Dwelling (HS-18), while John Senese Company of Grosse Pointe, Michigan, submitted the low bid of $9,999 for the Equipment Building.[1.42]

Construction began in late 1938 and was completed in the spring of 1939. A regional newspaper noted "The new buildings are very fine looking, finished outside with a white cedar shingle, and include many features within which are an improvement over the old station building."[1.43] The original station building remained on the site until 1943, when it was finally razed.[1.44]

Also in 1939, the Bureau of Lighthouses (successor of the Lighthouse Board and Lighthouse Service) merged with the United States Coast Guard, bringing both station properties under one service for the first time since their establishments. Relatively few changes were made to the combined station for the next few decades. This was likely due at first to the Second World War, since many Coast Guard Stations were run by auxiliary organizations as men were called into war service. However, in the decades following the end of the war, decreasing maritime activity

1.41 Daniel Koski-Karell, et. al., "US Government Lifesaving Stations, Houses of Refuge, and Pre-1950 US Coast Guard Lifeboat Stations," (Multiple Property Documentation Form), 2013, 17-18.

1.42 "Proksch, Iron River, Gets Federal Jobs," *The Escanaba (Michigan) Daily Press*, August 16, 1938, 1.

1.43 "Coast Guard Job Rushed," *The Escanaba (Michigan) Daily Press*, March 5, 1939, 7.

1.44 "Coast Guard Station, Built in 1900, Razed," *The Escanaba (Michigan) Daily Press,* August 27, 1943, 5.

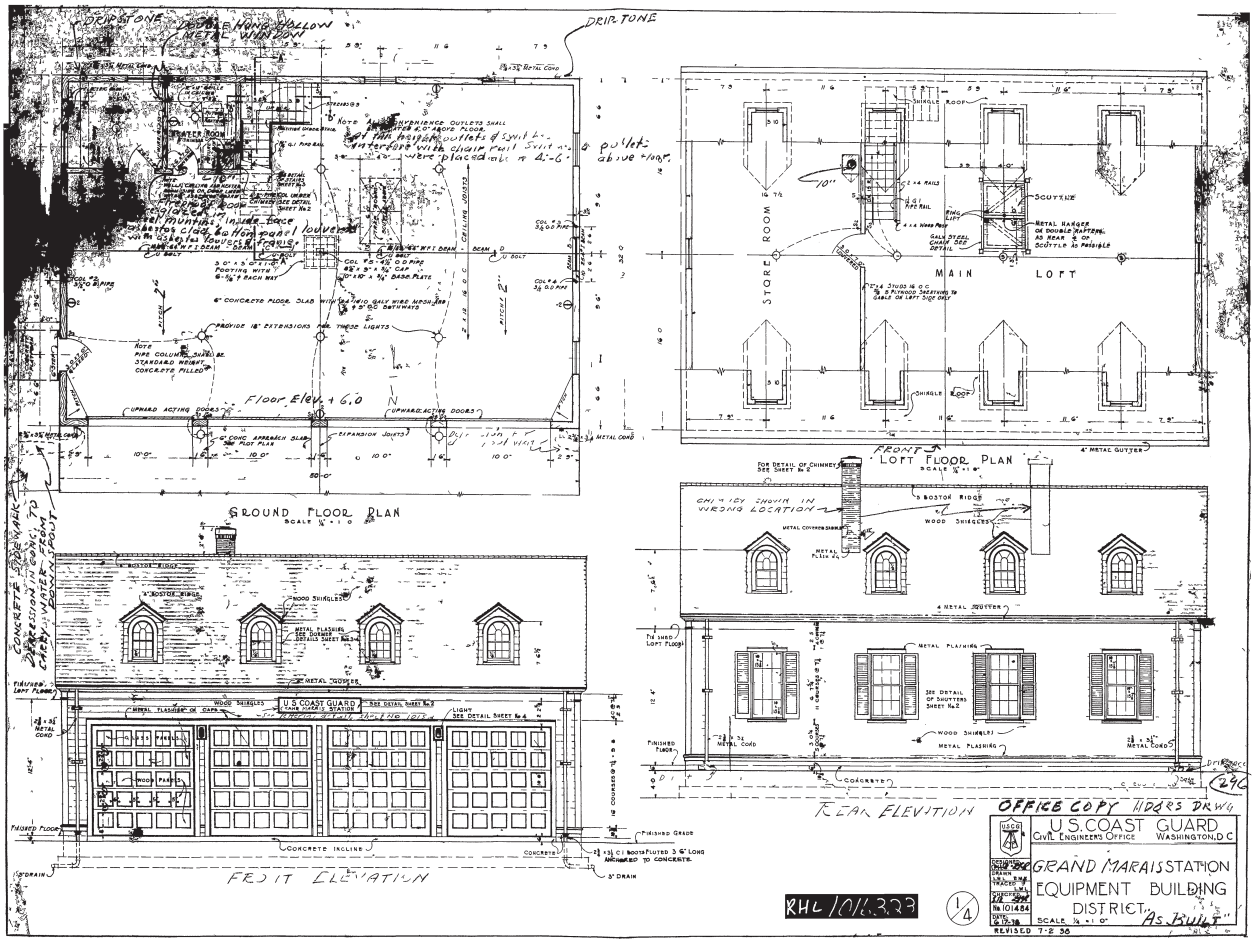


Figure 1-25. (Above) Equipment Building front and rear elevations and floor plans, as-built drawing, 1938 (source: United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio).

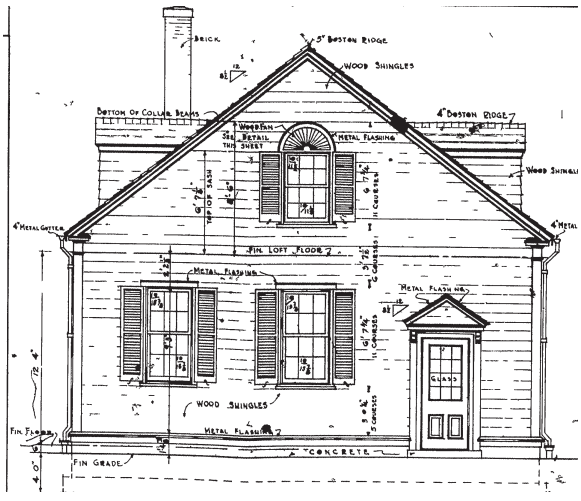


Figure 1-26. (Right) Equipment Building side (east) elevation, as-built drawing, 1938 (source: United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio).

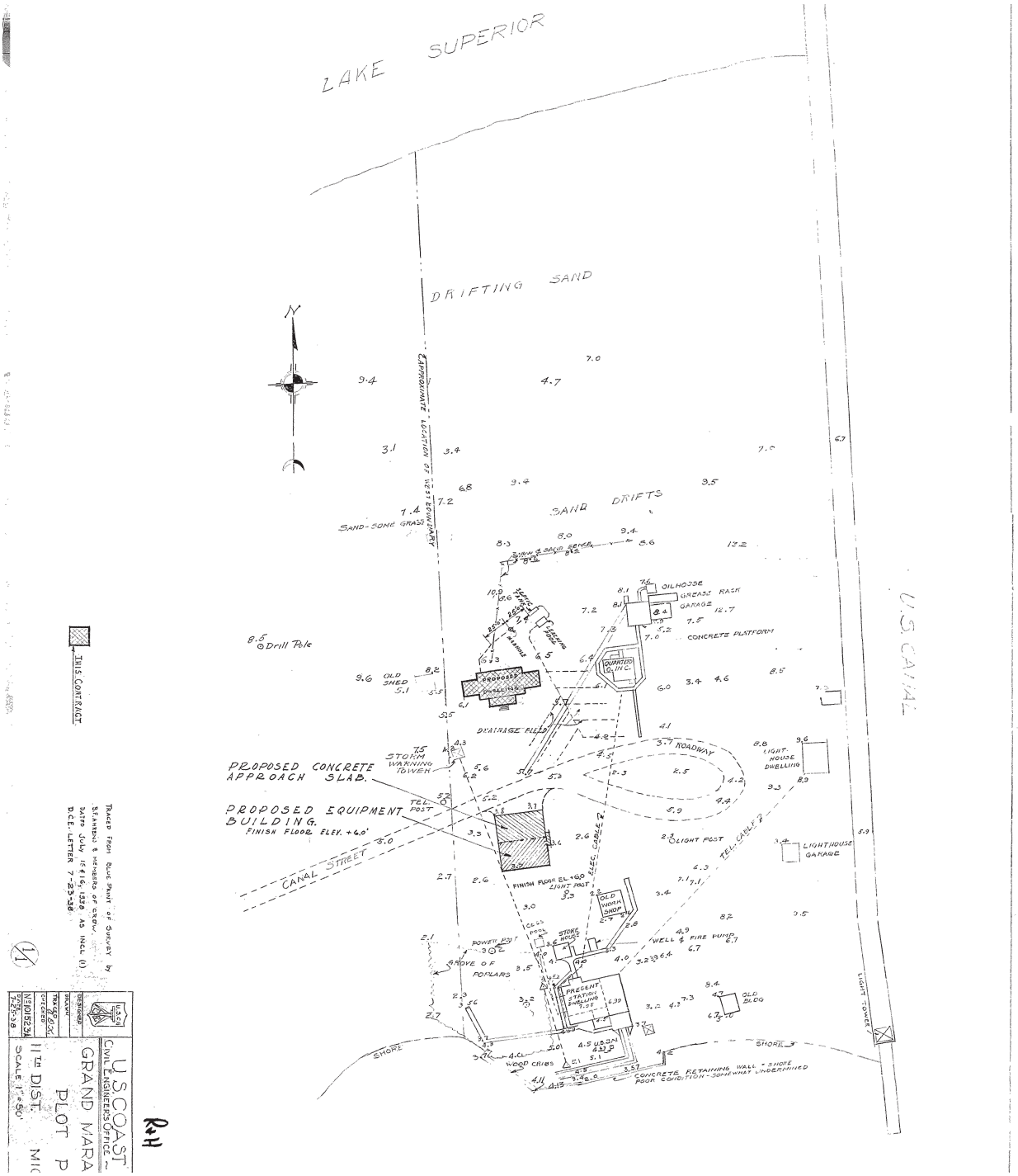


Figure 1-27. Plot plan of station with new Coast Guard Station Dwelling (HS-18) and Equipment Building shaded, 1938 (source: United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio).



Figure 1-28. Aerial views taken from the Inner Range Light. The 1900 Lifesaving Station building is still in place, dating these photographs to between 1939 and 1943, when the building was removed (source: Grand Marais Historical Society).





Figure 1-29. (Above) Station Dwelling (HS-18) after completion, ca. 1939 (Officer-in-Charge Dwelling (HS-19) at far right) (source: Grand Marais Historical Society).

Figure 1-30. (Left) Harbor of Refuge Dwelling (HS-20), west elevation, dated 1940 (source: Grand Marais Historical Society).



Figure 1-31. Aerial view of the station from the northeast, dated 1947. The original Lifesaving Station building has been removed, but the ring of trees within which it sat is still visible on the upper left (source: Grand Marais Historical Society).

and the development of new technology resulted in a decline in the need for both lighthouses and lifesaving activity.

In the 1950s the commercial fishing industry on Lake Superior virtually collapsed. There were two main factors for the industry's demise: the long-term effects of overharvesting, and the accidental introduction of two invasive species, the sea lamprey, a parasitic fish that preyed on native fish, and the alewife, which devastated the natural food sources of native species.[1.45] The Coast Guard began decommissioning stations across the Great Lakes. The station just west of Grand Marais, at Sand Point in Munising, was targeted for closure as early as 1949 although the local community managed to postpone its closure for another

1.45 "Collapse of Commercial Fishing," Clarke Historical Library, Central Michigan University. https://www.cmich.edu/library/clarke/ResearchResources/Native_American_Material/Treaty_Rights/Contemporary_Issues/Fishing_Rights/Background_1600-1966/Pages/Collapse-of-Commmercial-Fishing.aspx, accessed August 13, 2020.

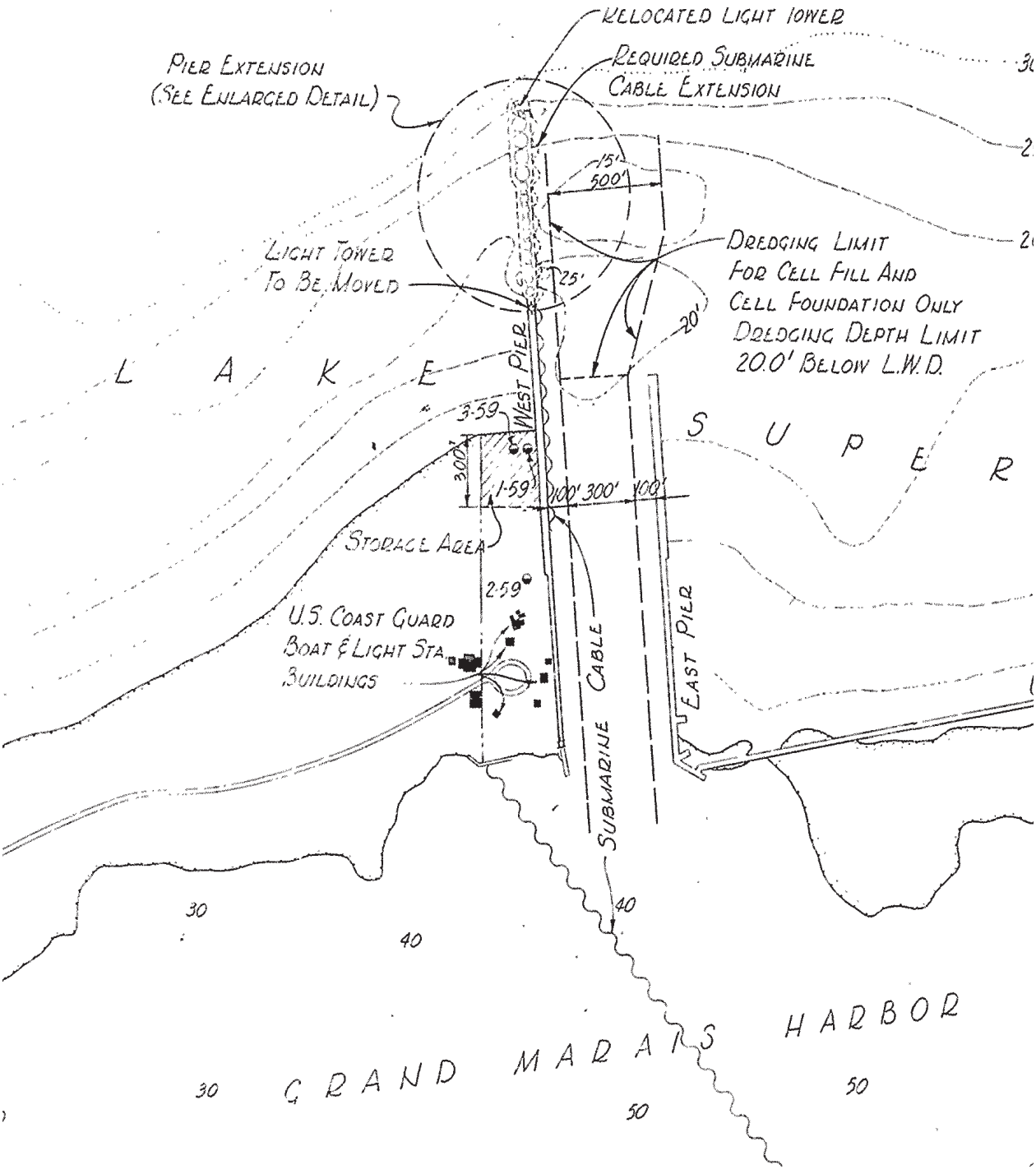


Figure 1-32. Detail of pier extension plans, 1961 (source: United States Coast Guard, Civil Engineering Unit, Cleveland, Ohio).



Figure 1-33. Harbor of Refuge Dwelling (HS-20), west elevation during residing of upper level, 1969 (source: United States Coast Guard Historian's Office).

nine years. By 1966 Grand Marais was one of only a handful of stations operating on Lake Superior.[1.46]

Despite this, the Coast Guard showed no signs of closing the Grand Marais station. They invested in a number of improvements and alterations in the 1960s and early 1970s. These included window and door replacements and re-siding of all four main buildings (Station Dwelling (HS-18), Equipment Building, Officer in Charge Dwelling (HS-19), Harbor of Refuge Dwelling (HS-20)). Other work included the installation of new heating in the Harbor of Refuge Dwelling (HS-20) in 1961, and a new generator and fire alarm system in the Station Dwelling (HS-18), as well as repairs to the galley, and construction of a new radio room in 1973. In addition, the United States Army Corps of Engineers rebuilt the West Pier, and the Inner and Outer Range Lights were placed

1.46 E. J. "Shine" Sundstrom, "Three Long, Two Short," *The (Sault Ste. Marie) Evening News,* July 16, 1966, 7.

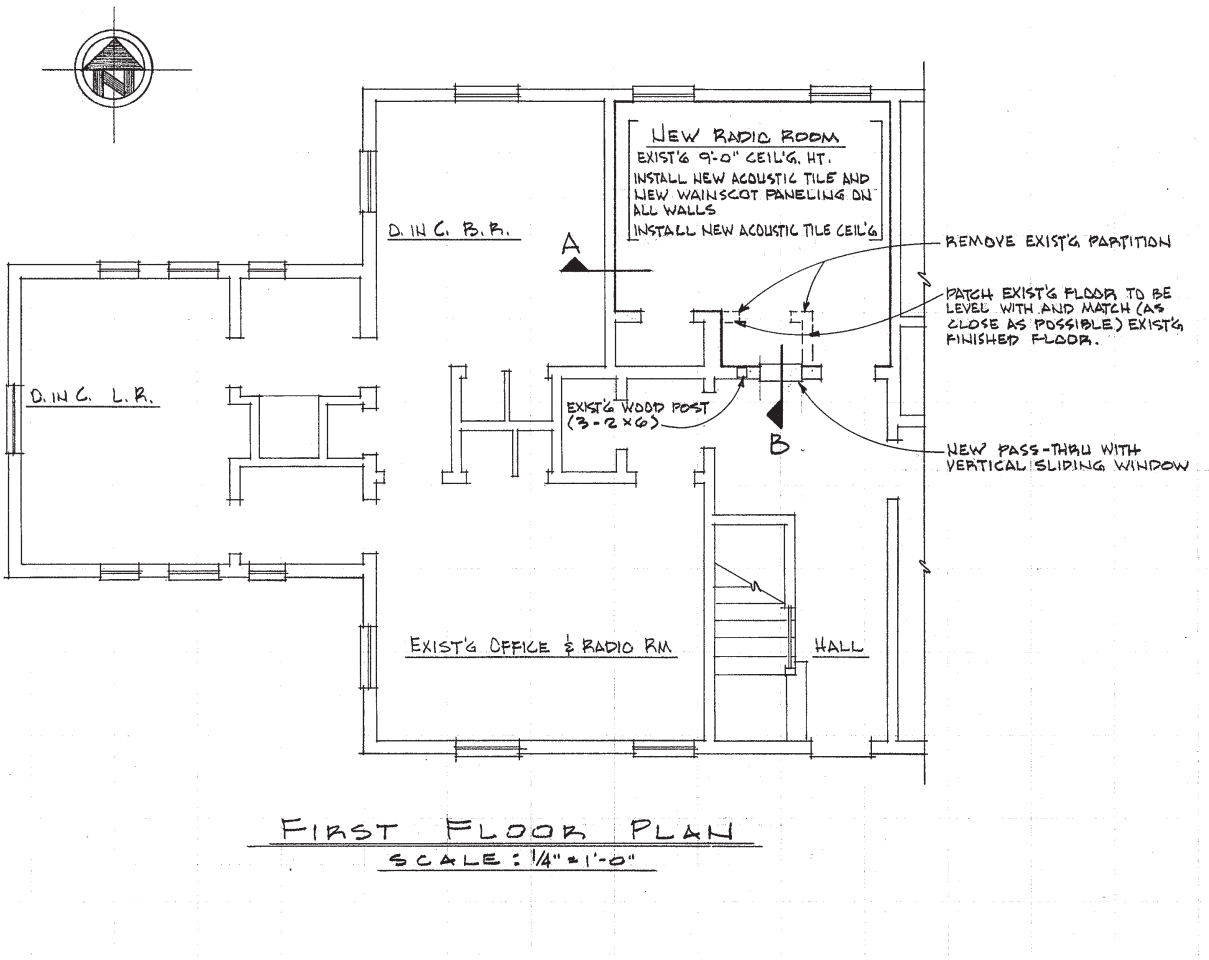


Figure 1-34. Detail from 1973 plan for installation of a new radio room in the Station Dwelling (HS-18) (source: United States Coast Guard, Civil Engineering Unit, Cleveland, OH).

in their current positions in 1961 (Figure 1-32).[1.47]

Although the Grand Marais Coast Guard Station had lasted longer than most other Great Lakes stations, by the mid-1970s it was handling very few emergency calls. In November 1975 the station was the last land-based contact with the freighter *Edmund Fitzgerald* before it sank several hours later near Whitefish Point. The station crew was only able to confirm that the Whitefish Point light was not working, and never had the opportunity to attempt a rescue.

In the late 1970s the Coast Guard began considering decommissioning the station at Grand Marais. Despite this, the USCG continued to operate the station, conduct

1.47 Daniel Koski-Karell and Jayne Aaron, "Grand Marais Harbor of Refuge Inner and Outer Lights," National Register of Historic Places nomination, listed May 2, 2012.

regular maintenance, and implement some upgrades. In 1978 the Coast Guard built a new Boathouse and Launchway.[1.48] The same year a fire in the Equipment Building necessitated repairs.[1.49] Inspections that year noted work needed, including replacement of the heating system in the Officer in Charge Dwelling (HS-19) and the "Executive Petty Officer's residence" (probably the Harbor of Refuge Dwelling (HS-20)), concrete steps to the rear door of the Executive Petty Officer's residence,[1.50] and repairs to the chimneys around both buildings with roof repair or replacement suggested.[1.51]

In July 1979 the USCG Commander visited the station to evaluate the feasibility of closing it. His report noted, as many inspection reports leading up to the station's closure did, that the station was "beautifully clean and well maintained" but that crew morale was a persistent issue due to the remote location of the station.[1.52]

The following year, the USCG announced its intention to decommission the Grand Marais Coast Guard Station, which by this time was the only operating USCG station between Sault Ste. Marie and Marquette. The local community, which saw the station as an important part of their community, objected to the closure. Michigan Governor William Millikin requested the Coast Guard operate the station on a seasonal basis rather than close it.[1.53]

Episode 3: 1982 to Present

The Coast Guard again issued a closing order for the station in May 1981, but 11th District U. S. Congressman Bob Davis convinced the USCG to keep the station open until the fall. The USCG developed a transition plan to transfer operation of some station functions to a volunteer auxiliary force. While most Coast Guard personnel were transferred after October 1, 1981, some officers remained in place to assist in the transition.[1.54]

As part of the transition plan, the Coast Guard intended initially to retain only the Harbor of Refuge Dwelling (HS-20) and the Equipment Building. In 1982-1983 the Equipment Building was modified to serve as offices, a meeting room, and garage for the Coast Guard and the Grand Marais Auxiliary Flotilla (Figure 1-35).[1.55] This work included enclosure of the two east bays of the garage and finishing these spaces as offices. The garage doors in these bays were removed, the side door and windows relocated, and a new entry door installed. The newly-enclosed bays were partitioned on the first floor and portions of the second floor renovated. The remodeling was completed by the staff of Coast Guard Base Sault Ste. Marie.[1.56]

1.48 "Record of Inspections, USCG Station Grand Marais," January 3 and August 31, 1978, record book found in Equipment Building at Grand Marais Station.

1.49 "Record of Inspections, USCG Station Grand Marais," August 31, 1978, record book found in Equipment Building at Grand Marais Station.

1.50 "Record of Inspections, USCG Station Grand Marais," July 11, 1978, record book found in Equipment Building at Grand Marais Station.

1.51 "Record of Inspections, USCG Station Grand Marais," August 31, 1978, record book found in Equipment Building at Grand Marais Station.

1.52 "Record of Inspections, USCG Station Grand Marais," July 31, 1979, record book found in Equipment Building at Grand Marais Station.

1.53 "Plea Made to retain USCG Station," *Lansing State Journal*, July 11, 1980, B-5.

1.54 "Coast Guard Station Won't Be Mothballed," unattributed newspaper clipping dated May 7, 1981, and "After 81 Years of Service Coast Guard Deserts Grand Marais," unattributed newspaper clipping, probably circa September 1981, both in Coast Guard Auxiliary Scrapbook found in Equipment Building at Grand Marais station.

1.55 "Headquarters, Boat Now Operational," *Grand Marais Pilot and Pictured Rocks Review,* November 4, 1982, 1.

1.56 "Record of Inspections, USCG Station Grand Marais," July 14, 1983, record book found in Equipment Building at



Figure 1-35. Equipment Building renovation in progress, ca. 1982-1983 (source: "Coast Guard Auxiliary Holds Open House," unattributed newspaper article in Coast Guard Auxiliary Scrapbook found in Equipment Building at Grand Marais station).

Furnishings, equipment, and other Coast Guard property in the Station Dwelling (HS-18) were either moved to the Equipment Building or distributed to other stations.[1.57] By the end of 1982 the Coast Guard inspector reported that it was "…sad to see so much Coast Guard history being closed."[1.58] The Range Lights, however, remained in operation, although they were automated.

The fate of the decommissioned Station Dwelling (HS-18) and Officer in Charge Dwelling (HS-19) were not long in doubt. While many decommissioned Coast Guard stations across the Great Lakes were demolished following their closure, Grand Marais benefited from its location on the eastern end of Pictured Rocks National Lakeshore (PIRO). A unit of the National Park Service, Pictured Rocks had been established

Grand Marais Station.

1.57 "Record of Inspections, USCG Station Grand Marais," July 13, 1982 record book found in Equipment Building at Grand Marais Station.

1.58 "Record of Inspections, USCG Station Grand Marais," October 9, 1982, record book found in Equipment Building at Grand Marais Station.

in 1966 "in order to preserve for the benefit, inspiration, education, recreational use, and enjoyment of the public a significant portion of the diminishing shoreline of the United States and its related geographic and scientific features…"[1.59] Among its other purposes, Pictured Rocks National Lakeshore served to preserve and interpret the region's maritime heritage, and its resources already included the Sand Point Coast Guard Station in Munising and the Au Sable Light Station (the Munising Range Lights and Dwelling were acquired by the park in 2002).

The Coast Guard almost immediately offered the Station Dwelling (HS-18) and Officer in Charge Dwelling (HS-19) to NPS for inclusion in Pictured Rocks National Lakeshore, but the deal was initially stymied because the buildings were outside the National Lakeshore's official boundaries. In the meantime the NPS negotiated a 99-year lease on the property. Following this, the park developed a small maritime museum in the Station Dwelling (HS-18), designed by local staff and using artifacts donated by the local community. The museum opened in 1985. Around this time, the park also moved its museum collections storage to the third floor of the Station Dwelling. [1.60]

As noted above, the Coast Guard initially intended to retain ownership of the Harbor of Refuge Dwelling (HS-20), and in fact in 1983 issued plans to install a new asphalt shingle roof on the building (then being called "Family Quarters B"; the Officer in Charge Dwelling (HS-19) had been designated



Figure 1-36. In progress photographs of Station Dwelling (HS-18) interior painting, 1985 (source: "Interior Painting HS-18 1985," folder in Maintenance Files, Pictured Rocks National Lakeshore).

1.59 Public Law 89-668, "An Act to establish in the State of Michigan the Pictured Rocks National Lakeshore," enacted October 15, 1966.

1.60 Theodore Karmanksi, *The Pictured Rocks: An Administrative History of Pictured Rocks National Lakeshore* (Omaha, NE: National Park Service Midwest Regional Office, 1995), Ch. 6.

"Family Quarters A.").[1.61] However, the following year the Coast Guard instead leased the building to Burt Township, which planned to open a museum in the building to be operated by the local Grand Marais Historical Society.[1.62] With this lease, and the transfer of the Station Dwelling (HS-18) and Officer in Charge Dwelling (HS-19) to the National Park Service, the Coast Guard only retained control of the Equipment Building.

The National Park Service immediately began rehabilitation work on both buildings. Among the first projects was re-roofing. The Station Dwelling (HS-18) still had wood shingles, but the roof on the Officer in Charge Dwelling (HS-19) had been replaced at some point with asphalt shingles. In 1985 the roofs on both buildings were removed and cedar shingles (specified as No. 1 Blue Label 24" Certigrade Red Cedar with a 7 ½ inch weather exposure) were installed and stained.[1.63] Additional work at the Station Dwelling (HS-18) that year included interior painting of the basement, first floor, and the second floor ceilings (Figure 1-36). Fungi buildup on the basement walls necessitated use of a stain-killing primer.[1.64]

In 1988 the heating and septic systems at the Station Dwelling (HS-18) were replaced and a fire suppression system installed. Correspondence related to the contract for these systems indicated the NPS had relocated the outside fire hydrant to the southeast corner of the building prior to the work. It also required that two 750 gallon holding tanks be used for the septic system, instead of one 1200 gallon tank. The sprinkler system was, on the recommendation of the contractor and concurrence of the NPS, a pre-action, dry pipe system.[1.65]

The focus of both the USCG and the NPS in the 1990s was to complete the transfer of the station buildings. As part of the documentation process, the USCG requested in late 1989 that the Michigan State Historic Preservation Office (SHPO) determine the buildings at the station to "have no archeological, cultural or historic significance and are not listed nor eligible for the National Register of Historic Places (NRHP)." This included the four historic buildings as well as a picnic pavilion on the property built around 1979.[1.66] However, the SHPO did determine the four historic buildings to be eligible for the NRHP.[1.67] The USCG also performed environmental hazard testing for PCBs, underground tanks, and hazardous waste, all of which was negative, although asbestos-containing pipe wrap was found in the Station Dwelling (HS-18) basement.[1.68] Lead paint testing performed in 1992 found

1.61 United States Coast Guard, "Specifications for New Asphalt Shingle Roofing on Family Quarters "B"," April 1983, copy found in Equipment Building at Grand Marais Station.

1.62 License for Non-Federal Use of Real Property, May 1, 1984, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore.

1.63 Requests for Quotation dated February 1 and February 20, 1985, copies in folder "Reroof HS-18, 19 (1985)," Maintenance Files, Pictured Rocks National Lakeshore.

1.64 Contract documents and photographs in folder "Interior Painting HS-18 1985," Maintenance Files, Pictured Rocks National Lakeshore.

1.65 Contract documents and correspondence in folder "A&E Contract HS#1 and HS#18, 1988 Replace Heat," Maintenance Files, Pictured Rocks National Lakeshore.

1.66 B. S. White, Lieutenant Commander, USCG, to Martha Bigelow, Director, SHPO, October 15, 1989, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

1.67 Kathryn Eckert, Acting SHPO, to B. S. White, Lieutenant Commander, USCG, November 15, 1990, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

1.68 Preliminary Assessment Screening, Proposed Real Estate Outgrant DACW35-4-97-3001, Grand Marais Harbor Federal Navigation Channel, August 5, 1997, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

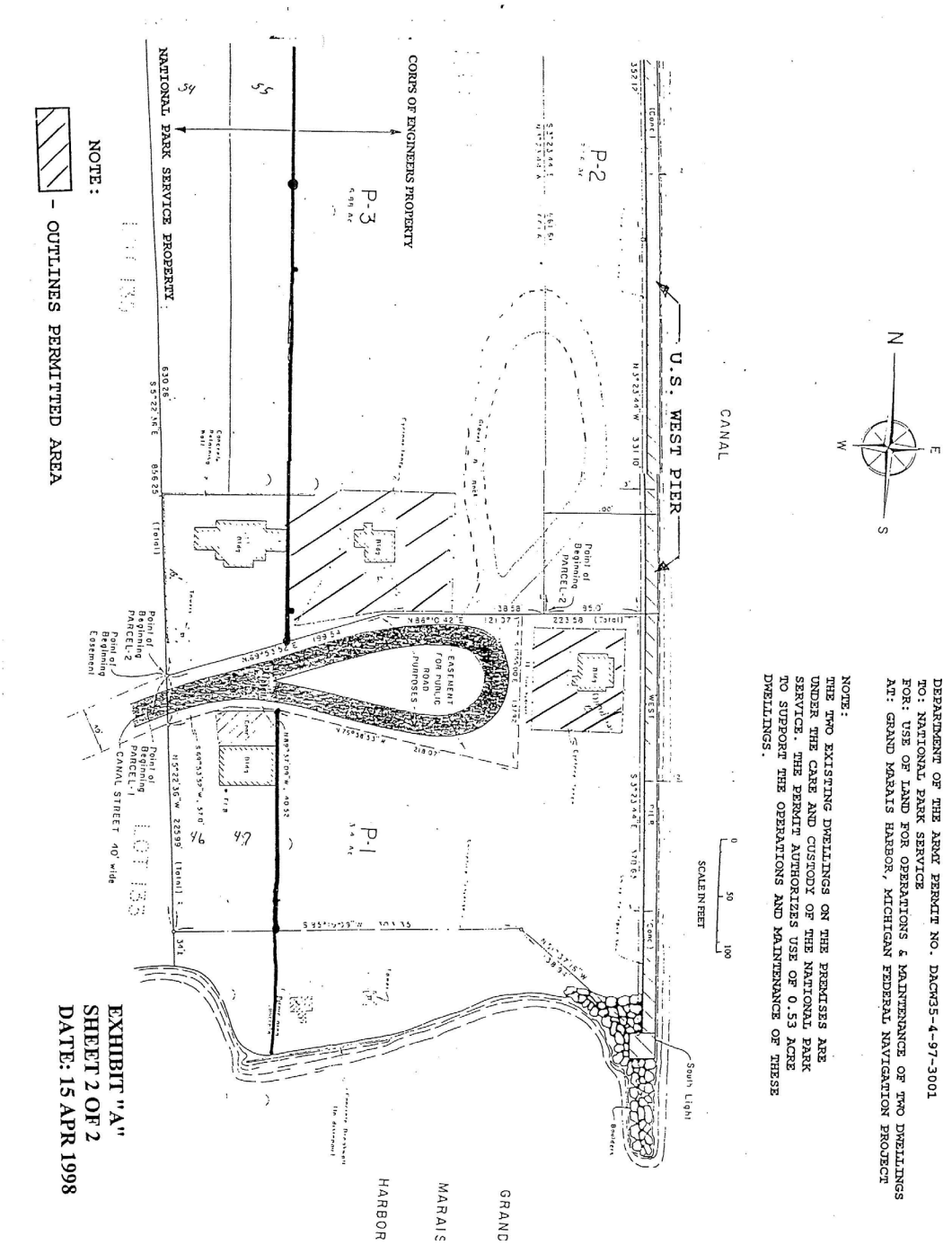


Figure 1-37. Sketch plan showing National Park Service controlled and leased property, 1998 (source: Preliminary Assessment Screening, Proposed Real Estate Outgrant DACW35-4-97-3001, Grand Marais Harbor Federal Navigation Channel, August 5, 1997, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

lead on windows, doors, trim, basement ceiling tile and wall coatings, and the bathtub of the Officer in Charge Dwelling (HS-19). The residents were advised of the findings and a monitoring program was implemented.[1.69]

Transfer of the buildings from the Coast Guard to the NPS was complicated by the ownership history of the land. The Harbor of Refuge Dwelling (HS-20) and the Officer in Charge Dwelling (HS-19) had been in the custody of the Coast Guard but built on land still owned by the U. S. Army Corps of Engineers, requiring the Corps to issue a ten year lease to the National Park Service for the land (Figure 1-37).[1.70] In November 1996 the United States Congress passed the Omnibus Parks and Public Land Management Act enabling the acquisition of the Grand Marais buildings by the NPS. As part of the transfer process, the lease for the Harbor of Refuge Dwelling (HS-20) was also transferred to the NPS in June 1997. With this transfer, the Coast Guard retained only the Equipment Building and 4.16 acres of land.[1.71]

As the NPS was now the licensor of the Harbor of Refuge Dwelling (HS-20), park staff began meeting with the Grand Marais Historical Society (GMHS) to discuss long-term maintenance and operation of the building.[1.72] The GMHS noted a number of areas needing attention including electrical wiring, repair of the brickwork on the southeast corner of the house, basement ventilation (sealed windows were causing humidity issues), new roofing material and drainage, window repair, removal of ceilings damaged by a plumbing-caused flood, and refinishing floors and stairs.[1.73] Also in 1997 the lead-containing ceiling tile in the basement of the Officer in Charge Dwelling (HS-19) was removed. [1.74]

A conditions evaluation was conducted at the Harbor of Refuge Dwelling (HS-20) in September 1999. While the exterior was in good condition overall, a few specific areas of concern were noted, including deficient flashing around the chimneys, which had been caulked but were still leaking. More critical items in the interior were replacement of the electrical system and mitigation of moisture in the basement. In general, though, the report stated that the GMHS had been keeping the building in good condition.[1.75] A visit by the NPS to the building in March 2001 revealed peeling lead paint in the basement; the park immediately contracted

1.69 "Reduction in lead containing paint hazard (HS-19)," Memorandum dated April 24, 2003, copy in folder "HS-19," Maintenance Files, Pictured Rocks National Lakeshore.

1.70 Preliminary Assessment Screening, Proposed Real Estate Outgrant DACW35-4-97-3001, Grand Marais Harbor Federal Navigation Channel, August 5, 1997, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

1.71 Grant Petersen, Superintendent, Pictured Rocks National Lakeshore, to Bob Gardner, Supervisor, Burt Township, September 11, 1997, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore; Lucrezia Patruno, Property Disposal Division, Midwest Branch, General Services Administration, to Alfred M. Suarez, Realty Officer, United States Department of the Interior, National Park Service, December 12, 1996, copy in folder "Coast Guard Point," Maintenance Files, Pictured Rocks National Lakeshore.

1.72 Grant Petersen, Superintendent, Pictured Rocks National Lakeshore, to Bob Gardner, Supervisory, Burt Township, September 11, 1997, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore.

1.73 Frances Nielson to Grant Petersen, October 7, 1997, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore.

1.74 "Reduction in lead containing paint hazard (HS-19)," Memorandum dated April 24, 2003, copy in folder "HS-19," Maintenance Files, Pictured Rocks National Lakeshore.

1.75 Chris Case, Facility Manager, "Inspections and Recommended Actions Report, Leased Structure: Grand Marais Historical Society," September 1999, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore.



Figure 1-38. Officer in Charge Dwelling (HS-19) re-siding in progress, ca. 2002 (source: "HS-19 Insulation and Siding 2001," folder in Maintenance Files, Pictured Rocks National Lakeshore).

for lead abatement.[1.76] Later that year the NPS approved removal of non-historic linoleum and plywood flooring from the kitchen, dining room, and hall, and restoration of the original wood floors.

A major rehabilitation program was completed at the Officer in Charge Dwelling (HS-19) in 2001-2002. The circa 1960s doors and windows were removed and replaced with new units replicating the historic ones as documented in historic photographs.[1.77] This work was completed in the summer of 2001. A second project replaced the non-historic aluminum siding (Figure 1-38). As part of this work, park staff proposed insulating the building. Historical architects at the NPS Midwest Regional Office worked closely with the park to develop an approach to provide adequate insulation without damaging the historic fabric or causing future deterioration. In August 2001 the park developed a scope of work that included removing the existing

1.76 Chris Case, Facility Manager, to Pat Munger, Grand Marais Historical Society, March 19, 2001, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore. A note at the back of the file states that the Coast Guard used red lead as a primer on wood.

1.77 Section 106 documentation, "Replace non-historic windows, insulate exterior walls, HS-19," copy in folder "HS-19 Insulation and Siding 2001," Maintenance Files, Pictured Rocks National Lakeshore.

siding to bare sheathing, adding blown-in insulation, installing Tyvek building wrap and rigid Styrofoam insulation, and reinstalling 1x6 drop siding, as well as restoring the rafter tails. [1.78] Again on the advice of the regional office, the park amended the scope of work to change the vapor barrier to "wind barrier type construction paper on exterior," deleted the rigid insulation, and specified the use of furring strips to create drainage between the siding and the wind barrier.[1.79] Photographs taken during the siding project the following year show that Tyvek wrap was used, but the furring strips were installed over it to facilitate drainage behind the siding. During this work, the non-historic concrete front porch steps were also removed and replaced with a stair to match the historic one. [1.80]

Interior work included in the rehabilitation of the Officer in Charge Dwelling (HS-19) in 2001 involved reconfiguration of the kitchen to accommodate the change in the windows from the previous year, replacement of fixtures and finishes in the kitchen and bathroom, replacement of trim and floor coverings, and painting. The door in the bathroom was enlarged to meet life safety codes. The steam boiler heating system was replaced with a hot water unit including replacement of system piping, steam radiators, and convectors. [1.81]

Work was completed in the Station Dwelling (HS-18) in 2001-2002. This included interior painting encompassing the first floor museum, sales area, hallway, restrooms, and offices and rear stairwell to the basement including the inside of hallway closet; and the second floor bedrooms, hallway, bathroom, kitchen, and stairwell from first floor and inside of hallway closet.[1.82] The porch roof and watchtower deck membrane roofs were removed and replaced with a reinforced mechanically fastened membrane roof system with underlayment. [1.83] An evaluation of the Station Dwelling's (HS-18) building systems around the same time noted the wiring was in good condition but old and likely to deteriorate with time; it did not meet current codes and there were some life safety priorities. The electrical system was rehabilitated in 2002-2003. This project included replacement of wiring, additional circuits, removal of obsolete and abandoned systems, balancing of the loads, and replacement of some fixtures.[1.84]

In the early 2000s the Grand Marais Historical Society was anxious to continue rehabilitation of the Harbor of Refuge Dwelling (HS-20) to secure the exterior envelope and restore

1.78 Request for Quotation and Scope of Work, "Insulate Building and Install Wood Siding, Grand Marais Coast Guard Officer's Quarters (HS-19)," August 22, 2001, copy in folder "HS-19 Insulation and Siding 2001," Maintenance Files, Pictured Rocks National Lakeshore.

1.79 Section 106 documentation, "Rehabilitate bathroom, exterior siding, and kitchen in HS-19," copy in folder "HS-19 Insulation and Siding 2001," Maintenance Files, Pictured Rocks National Lakeshore.

1.80 "Remove Concrete Steps and Construct Wooden Stairway at Coast Guard Officer's Quarters," August 15, 2002, copy in folder "HS-19 Porch Contract 2002," Maintenance Files, Pictured Rocks National Lakeshore.

1.81 Section 106 documentation, "Rehabilitate bathroom, exterior siding, and kitchen in HS-19," copy in folder "HS-19 Insulation and Siding 2001"; "Heating System Renovation," Scope of Work dated January 25, 2002, copy in folder "HS-19 Heat System Rehab 2002"; and "Reduction in lead containing paint hazard (HS-19)," Memorandum dated April 24, 2003, copy in folder "HS-19," all in Maintenance Files, Pictured Rocks National Lakeshore.

1.82 "Interior Surface Preparation and Painting, Grand Marais Maritime Museum (HS-18) and Grand Sable Visitor Center," February 14, 2001, copy in folder "HS-18 and GSVS Interior Painting, 2001," Maintenance Files, Pictured Rocks National Lakeshore.

1.83 "Grand Marais Maritime Museum, Porch Roof and Watchtower Deck Membrane Replacement," February 14, 2001, copy in folder "HS-18 Cupola Roof 2001," Maintenance Files, Pictured Rocks National Lakeshore.

1.84 Project documents, copy in folder "HS-18 Electrical Rehab 2003," Maintenance Files, Pictured Rocks National Lakeshore.

it to its historic appearance. In January 2003 the GMHS and the NPS executed a new operating agreement, defining responsibilities and protocols for work. GMHS would be responsible for minor and routine maintenance, providing park staff with a yearly list of scheduled repairs and giving the park sufficient lead time to obtain appropriate clearances. For its part, the NPS committed to meeting with the GMHS to discuss upcoming work, be responsible for exterior and major building and structural work, and provide oversight and clearances for work.[1.85]

Among the work the GMHS proposed was removing wallboard from the first and second floor halls and stairway and replacing it with new drywall, wainscoting, and paint/wallpaper. Other work included removal of non-historic trim (most installed since 1984) and replacement with trim more in keeping with the original (based on original trim in the attic), and new electrical wiring and lighting in hallways. GMHS requested the NPS install a new roof, paint and repair the porch and outside trim, replace the non-historic windows with historically-appropriate windows, and replace the wide aluminum siding above the brick with more compatible material.[1.86]

Park staff worked with the GMHS to source historically appropriate wood trim, which was installed in 2003. The building's roof was replaced in 2004-2005. The NPS had originally intended to replace the non-historic asphalt shingles with a metal slate roof to match the historic roof, but staff could not determine the original roof material with sufficient detail to replicate it with confidence.[1.87] The contractor, with the NPS' approval, used Certainteed brand "Hatteras" shingles in "Lighthouse Red" in lieu of the originally specified twenty-five year shingle.[1.88] The window screens were repaired or replaced in 2004-2005, and a storm door and missing downspout were also replaced.[1.89] In the following years, the GMHS' wish list included restoring the depth of the roof overhang, which had been shortened by the Coast Guard; replacing the windows and doors; repairing the porch; and restoring the beams and stucco exterior on the second story.[1.90]

A comprehensive hazardous materials survey was undertaken for the three historic buildings in NPS ownership in 2010. It appears that most such materials had been abated in previous years. Among the few materials found were asbestos in the joint compound and pipe coverings in the Harbor of Refuge Dwelling (HS-20); asbestos in the transite sheeting of the laundry room, on the pipe covering in the mechanical room, and tile and mastic on the second floor of the Officer

1.85 "Mutual Agreement Between the National Park Service, Pictured Rocks National Lakeshore and the Grand Marais Historical Society," executed January 28, 2003, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore.

1.86 Pat Munger, Grand Marais Historical Society, to Karen Gustin, Superintendent, Pictured Rocks National Lakeshore, October 15, 2002, copy in folder "Grand Marais Harbor of Refuge Building," Maintenance Files, Pictured Rocks National Lakeshore.

1.87 "Replace Roof – Harbor of Refuge Keeper's Quarters," PMIS 73625, December 5, 2005, copy in folder "Grand Marais Historical Society Correspondence"; Scope of work dated August 6, 2004 and correspondence dated June-July 2004 in folder "HOR Shingle Roof 2004," both in Maintenance Files, Pictured Rocks National Lakeshore.

1.88 Proposal for Additional Work dated September 13, 2004, in folder "Harbor of Refuge Roof 2004," Maintenance Files, Pictured Rocks National Lakeshore.

1.89 "Repair Window Screens," dated August 13, 2004, in folder "Harbor of Refuge Windows, Storm Window Repair, 2005," Maintenance Files, Pictured Rocks National Lakeshore.

1.90 Correspondence dated 2005-2006 in folder "HOR Resto Proposal," Maintenance Files, Pictured Rocks National Lakeshore.



Figure 1-39. Photographs documenting deteriorated porch conditions on the Harbor of Refuge Dwelling (HS-20) prior to restoration, 2009-2010 (source: "Rehabilitate Porch-GM Harbor of Refuge Kprs Dwelling," 2011-2012, Folder in Maintenance Files, Pictured Rocks National Lakeshore).

in Charge Dwelling (HS-19); and asbestos in red VFT tile in the watchtower and green VFT in the storage room of the Station Dwelling (HS-18).[1.91]

In 2011 the porch on the Harbor of Refuge Dwelling, which had been on the GMHS' list of critical repairs for some time, was replaced (Figure 1-39). Porch repair began in 2011 and continued into 2012. The scope of work included replacement of structural members; raising and realignment of the porch deck to the main structure; replacement of wood columns, porch decking, railings and steps; and preparation and painting. Demolition of the porch revealed a damaged section of brick on the main building that was repaired. The concrete stoop the steps rested on was

1.91 Prizim, Inc., "Asbestos Containing Materials Surveys (Harbor of Refuge Museum, Ranger Quarters (HS-19), and Ranger Station (HS-18))," August-September 2010, copy in Maintenance Files, Pictured Rocks National Lakeshore.

removed and repoured.[1.92] The NPS was not, however, able to provide an accessible ramp at the time of this work due to the need to develop an accessible route that met historic rehabilitation standards.

In May 2012 the Grand Marais Harbor Inner and Outer Lights were listed in the National Register of Historic Places with a period of significance from 1898 (the date of the oldest extant light) to 1961 (fifty years prior to the date of listing, but also representing the rebuilding of the West Pier). [1.93] Although the remainder of the complex was determined eligible for listing by the Michigan SHPO, and a Multiple Property Submission exists for Life Saving and Coast Guard Stations, this is the only designation currently associated with the station. The boiler in the Station Dwelling (HS-18) was replaced and the single zone system was reconfigured to a two zone system in 2012.[1.94]

After reports over several years of leaking in the second floor of the Harbor of Refuge Dwelling (HS-20), the NPS issued an emergency scope of work for replacement of the roof in 2015. Water damage was first detected in 2012, only seven years after the asphalt roof was installed in 2005. An inspection found that the flashing at the chimneys and dormers had been inadequate and the valleys between the main building and the dormers were improperly installed. During construction, it was found that the entire west dormer needed to be rebuilt, and rotted rafters needed to be replaced. Although restoration of the original half-timbered siding on the upper level remained a priority for the GMHS, the emergency project only included the removal and reinstallation of the existing siding to correct water leaks.[1.95]

In the fall of 2014 a gale damaged the roof of the Station Dwelling (HS-18), causing leaking into the third floor. The museum collections storage, which had been on the third floor of the building since around 1985, were moved out of the building the following spring. with some materials sent to the Isle Royale National Park mainland headquarters in Houghton, and others moved to the museum storage facilities at Keweenaw National Historical Park in Calumet. The Station Dwelling roof was replaced that year. [1.96]

At the time of the preparation of this HSR, the National Park Service is in the process of acquiring the Equipment Building from the United States Coast Guard.

1.92 Correspondence and other project documents in folder "Rehabilitate Porch-GM Harbor of Refuge Kprs Dwelling," 2011-2012, Maintenance Files, Pictured Rocks National Lakeshore.

1.93 Daniel Koski-Karell and Jayne Aaron, "Grand Marais Harbor of Refuge Inner and Outer Lights," National Register of Historic Places nomination, listed May 2, 2012.

1.94 Project documentation and correspondence in folder "HS-18 Boiler and Heat, 2011-2012," Maintenance Files, Pictured Rocks National Lakeshore.

1.95 Project description and correspondence dated 2015-2016 in folder "HOR Roof Replacement 2016," Maintenance Files, Pictured Rocks National Lakeshore.

1.96 Brian Hoduski, Museum Curator/Chief, Museum and Archival Services, Lake Superior Collection Management Center, email dated May 11, 2015, forwarded to authors August 28, 2020.

Summary Chronology

A brief history of important events are as follows:

Date	Event
Precontact	Ojibwe people use sheltered bays like the one at Grand Marais as camps during their seasonal travels along the lakeshore.
18th Century	Ojibwe village and cemetery located in the Grand Marais area. French explorers identify the harbor on their maps as "Le Grand Marais" or Great Marsh, but this may be a mistranslation of "Le Grand Mare" or Great Pond, the Ojibwe name for the harbor.
1836	The United States Government takes control of the area around Grand Marais following the Treaty of Washington between the federal government and some representatives of Ojibwe and Odawa tribes.
1853	The US Government identifies the harbor at Grand Marais as a potential site for a lighthouse and reserves ten acres for this purpose.
1860s	European American community first settles Grand Marais. Conable and Son build a fishery on the sandy point on the west side of the harbor.
1880	The River and Harbors Act of 1880 establishes Grand Marais as a Harbor of Refuge and authorizes the construction of a protected channel into the harbor.
1883	Wellington Burt, one of the early landowners in Burt Township, plats the town of West Grand Marais, including the west end of the harbor and the peninsula west of the lighthouse reservation.
1891	United States Lighthouse Board's first request for a lighthouse at Grand Marais.
1895	The federal government appropriates funds to build the lighthouse at Grand Marais. The War Department authorizes use of some of its land for building the tower and dwelling. The Outer Range Light goes into service.
1897-1899	The Inner Range Light is constructed and goes into service.
1897	Purchase of four lots in Burt's plat of West Grand Marais for establishment of a lifesaving station.

Date	Event
1899-1900	Grand Marais Lifesaving Station constructed and put into service.
1901	The Lighthouse Board requests an appropriation to build a lighthouse keeper's dwelling. Request renewed every year until 1907.
1901-1902	An elevated trestle is built to the Outer Range Light along with a platform at the light. A weather signal tower is built at the station by the Department of Agriculture.
1903-1904	The East and West Piers are extended, a breakwall is constructed to shelter the harbor, and the harbor is dredged. The walkway to the Outer Range Light is also extended and the light relocated to the new end of the pier. A gas beacon on a steel tower is installed on the end of the breakwater.
1906-1907	A storm washes out part of the new iron elevated walkway, and repairs are made the following May.
1907	$5,000 appropriated for the construction of a keeper's dwelling.
1908	Harbor of Refuge Dwelling (HS-20) constructed, as well as a privy and oil house.
1915	The Lifesaving Service merges with the U. S. Revenue Cutter Service to form the US Coast Guard; the Grand Marais station is redesignated as a Coast Guard station.
1919	Steamer H. E. Runnels founders outside the Grand Marais channel, and the station's crew rescues everyone on board.
1920s	Officer in Charge Dwelling (HS-19) constructed.
1923	Lights' fuel source changed to acetylene and the fog bell is replaced with an air diaphone.
1927	Original wood Outer Range Light replaced with a steel tower.
1932	Coast Guard builds new Boathouse and Launchway southwest of the station building.
1934	Alterations to radiators and rear entrance of Officer in Charge Dwelling.
1938-1939	New Station Dwelling (HS-18) and Equipment Building constructed.
1939	Bureau of Lighthouses merges with the United States Coast Guard; the light towers and Harbor of Refuge Dwelling are brought under Coast Guard authority.

Date	Event
1943	Original Lifesaving Station building demolished.
1960s	Station Dwelling, Equipment Building, Officer in Charge Dwelling, and Harbor of Refuge Dwelling are altered with new windows, doors, and siding.
1961	New heating system in the Harbor of Refuge Dwelling; New generator and fire alarm system and galley renovations in the Station Dwelling. Army Corps of Engineers rebuilds the West Pier and relocates the Inner and Outer Range Lights.
1973	New radio room installed in Station Dwelling.
1975	Grand Marais Station has the last land-based contact with the Edmund Fitzgerald before it sinks.
1978	New Boathouse and Launchway constructed. Fire in the Equipment Building, with repairs the same year.
1979	Coast Guard begins evaluating the feasibility of closing the Grand Marais Station. Picnic pavilion built southwest of Equipment Building.
1980	Coast Guard announces intention to close the Grand Marais Station.
1981	Coast Guard decommissions Grand Marais Station and implements a transition plan for operation by a Coast Guard Auxiliary (volunteer) unit.
1982-1983	The Equipment Building is renovated to serve as offices, a meeting room, and garage for the Coast Guard and Auxiliary.
1984	The Harbor of Refuge Dwelling is leased to Burt Township for use as a museum by the Grand Marais Historical Society. The Station Dwelling and Officer in Charge Dwelling are leased to the National Park Service.
1985	Re-roofing of the Station Dwelling and Officer in Charge Dwelling, and painting of the Station Dwelling interior. The NPS opens a maritime museum in the Station Dwelling.
1988	Heating and septic systems replaced and a fire suppression system installed in the Station Dwelling.

Date	Event
1990	Grand Marais Station Dwelling, Officer in Charge Dwelling, Equipment Building, and Harbor of Refuge Dwelling determined eligible for the National Register of Historic Places by the Michigan State Historic Preservation Office. Environmental hazard testing for PCBs, underground tanks, and hazardous waste are negative except for asbestos-containing pipe wrap found in the Station Dwelling basement.
1996-1997	The National Park Service officially acquires the Station Dwelling, Officer in Charge Dwelling, and Harbor of Refuge Dwelling.
1997	Lead-containing ceiling in basement of the Officer in Charge Dwelling removed.
2001	Lead abatement of paint in the Harbor of Refuge Dwelling.
2001-2002	Major exterior and interior rehabilitation of the Officer in Charge Dwelling including re-siding, window and door replacement, insulation, and interior reconfiguration and fixture and finish replacement. The Station Dwelling interior is painted, the porch and watchtower roofs replaced, and the electrical system rehabilitated.
2003	The NPS executes a new operating agreement with the Grand Marais Historical Society for the Harbor of Refuge Dwelling. Interior trim is replaced with historically appropriate trim.
2004-2005	New asphalt-shingle roof installed on the Harbor of Refuge Dwelling.
2010	A hazardous materials survey is undertaken for the Station Dwelling, Harbor of Refuge Dwelling, and Officer in Charge Dwelling.
2011-2012	The Harbor of Refuge Dwelling porch is replaced. A new boiler and zoned heating installed in the Station Dwelling.
2012	The Grand Marais Harbor Inner and Outer Range Lights are listed in the National Register of Historic Places. The boiler is replaced in the Station Dwelling, and the system is reconfigured from one to two zones.
2015-2016	The Harbor of Refuge Dwelling roof is replaced on an emergency basis.
2019	The National Park Service is in the process of acquiring the Equipment Building from the United States Coast Guard.

Statement of Significance

The Grand Marais Harbor of Refuge Inner and Outer Range Lights were listed in the National Register of Historic Places in 2012. However, the boundary of that nomination was limited to the footprint of the two light tower structures, and the West Pier on which the two structures sit. The towers are listed under Criterion A, for their "association with local events in Alger County related to Federal efforts to provide for an integrated system of navigational aids throughout the United States," and under Criterion C, as "embodying and exemplifying distinctive aspects of architectural design and engineering characteristic of skeletal tower lighthouses built on crib and pier foundations in the Great Lakes from the late nineteenth century to the early twentieth century."

In a letter dated November 15, 1990, the Acting State Historic Preservation Officer determined that the "intact historic buildings" are eligible for the National Register of Historic Places, but did not list the criteria or a period of significance for the station. The Scope of Work for this project notes that the station is significant under Criteria A and C as a fine example of light station design, and that component features are determined eligible as part of the cultural landscape.

The Grand Marais USCG Lifesaving Station is potentially eligible for listing under the "U. S. Government Lifesaving Stations, Houses of Refuge, and Pre-1950 U. S. Coast Guard Lifeboat Stations" Multiple Property listing. Under this MPDF, certified by the Keeper of the National Register in 2013, the Grand Marais Station meets the registration requirements for listing.

The Grand Marais Harbor of Refuge was established in 1880 by the Rivers and Harbors Act of 1880. A protected channel was constructed in 1883. The station originally consisted of two separate components, a light station and a lifesaving station, both established in the late 1890s. The light station consisted of two range lights, an outer (1895) and inner (1898) light tower on either end of the West Pier. A keeper's dwelling was added in 1908. The original lifesaving station was built in 1900; that building, which was an integrated dwelling and boathouse, was replaced in the 1930s by a Boathouse and Launchway (1932, in ruins and outside the project boundary), a combined Station Dwelling (1938) and an Equipment Building (1938). The old station building was torn down in 1943. The Coast Guard decommissioned the station in 1981.

The Grand Marais Station is significant under National Register Criterion A, at the local level, for its association with the history of lighthouse and lifesaving activities on Lake Superior. Grand Marais was the only natural harbor along a ninety-mile stretch of shoreline between Grand Island and Whitefish Point, and it served as a haven for the lake's original inhabitants, Ojibwe people, as well as French explorers in the eighteenth century. The United States Government confirmed its strategic importance by reserving the land for a lighthouse in 1853, and then designating it as a Harbor of Refuge in 1880. The light station has guided mariners into the harbor for over a hundred years, from the lumber industry of the turn of the twentieth century, through the commercial fishing industry of the early to mid twentieth century, to the sportfishers and pleasure boaters of the late twentieth century and today. The Coast Guard (originally the Lifesaving Service) monitored and protected

ships and their crews for over eighty years, saving many lives in the process.

The Grand Marais Station is also significant under National Register Criterion C, for embodying the distinctive characteristics of light station and Coast Guard station design from the late nineteenth century to the 1930s. The Harbor of Refuge Dwelling is a good example of an early twentieth century dwelling built to facilitate the work of the station's keeper. Due to the relative isolation of the station and the harsh conditions at the exposed end of Coast Guard Point, a sturdy, weather-tight dwelling was critical to the function of keeping the towers lit and the fog signal active. The building retains a moderate level of integrity, with the most significant impacts being the alterations to the upper level siding and the windows. The National Park Service and the Grand Marais Historical Society have been gradually restoring the building, based on historic documentation, with the intention to address these areas of integrity in the future.

The Coast Guard Station buildings, including the Station Dwelling, Officer in Charge Dwelling, and Equipment Building, embody the distinctive characteristics of the station complex form of landscape design. The Station Dwelling is the only remaining example of the 1934 Roosevelt station design in Michigan, and the Officer in Charge Dwelling and Equipment Building were also built to standard Coast Guard designs. The station overall retains a high degree of integrity. The Officer in Charge Dwelling has been restored to its general 1920s appearance. The Station Dwelling has some impacts to its integrity, including aluminum siding and window and door replacement, but overall exhibits the characteristics of its original design. The Equipment Building, which is not yet in National Park Service custody, has the lowest degree of integrity, having been extensively remodeled in the early 1980s. However, its form and massing contribute to the overall integrity of the station landscape, and the National Park Service intends to restore the building's historic appearance in the future.

The recommended period of significance for the Grand Maris USCG Lifesaving Station is 1895 to 1961. The beginning date represents the date when the United States Lighthouse Board was granted permission to occupy the outer end of the West Pier and built a beacon tower equipped with a light and bell. The Range Lights nomination selected 1961 as the end of the period of significance both because it was 50 years before the nomination was written, and because the East and West Piers were rebuilt and the lights relocated that year. After this period, the Coast Guard began altering the buildings and landscape in ways that were inconsistent with the station's original design and materials.

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Part 1: Physical Description

Overview

This HSR addresses conditions for the four buildings at the Grand Marais USCG Lifesaving Station. This section includes a brief overview of the buildings followed by a detailed evaluation and analysis of each element at each building. Figures throughout this report are related to text on that page spread, except where specifically called out.

Station Dwelling (HS-18)

Station Dwelling (HS-18) is rectangular in plan and symmetrical in form with two one story wings flanking the three story central core. The primary facade faces south with a covered porch at the main entry. A shallow gable hood roof projects out over the back door. Foundations are concrete, exposed to the raised first floor level. From the first floor up, the building has horizontal siding - originally wood shingles but now concealed by aluminum siding. It has a side gabled, wood shingle roof with three gable dormers on the south and north roof slopes. A square, hipped watchtower is located at the center of the roof.



Figure 1-40. Station Dwelling (HS-18) (KAC, 9/11/2019)



Figure 1-41. Officer in Charge Dwelling (HS-19) (KAC, 9/11/2019)

Officer in Charge Dwelling (HS-19)

Officer in Charge Dwelling (HS-19) is square in plan with two stories plus a full basement with a half story appurtenance to the west. The primary facade faces south and has a projecting gable roof overhang at the main entry door. The north elevation has a one story gable addition. The foundation is painted concrete, siding on the upper two floors is horizontal wood siding. It has a hipped roof with wood shingles.

Harbor of Refuge Dwelling (HS-20)

Harbor of Refuge Dwelling (HS-20) is a two story building with brick veneer at the first floor and currently has horizontal wood siding at the second story. Historic photos



Figure 1-42. Harbor of Refuge Dwelling (HS-20) (KAC, 9/11/2019))

show false timbering and stucco at the second floor. A covered porch keep along the east side of the building with the main entrance door. A one story addition with a south-facing entry door is located at the west elevation. The building has a gabled roof with a single gable dormer facing the east side and west.

Equipment Building

Equipment Building is a two story building, rectangular in plan with a gable roof. Roofing is asphalt shingles and there are four dormers on the front and back sides. Horizontal aluminum siding is installed over the wood shingles and trim. Four overhead garage doors were originally located on the main, north, elevation. Today only two doors remain.



Figure 1-43. Equipment Building (KAC, 9/11/2019)

Building Existing Conditions & Condition Assessments

Existing Conditions

The Existing Conditions section describes the current conditions, by discipline and by component, as observed during the September 2019 site visit.

Condition Assessment

Immediately following the Existing Condition, each feature/system is evaluated and assigned an attendant condition rating. The condition rating system is as follows. (Note: Buildings are rated by evaluating the combined condition of all features/systems.)

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

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

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

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

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

Unknown - Not enough information is available to make an evaluation.

NA - The feature is not present within the building.

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Station Dwelling (HS-18)

Existing Conditions & Condition Assessment - General

General Building Description

The Station Dwelling (HS-18), constructed from 1938 through 1939, is rectangular in plan and symmetrical in form with two single story wings flanking the three story central core. The primary facade faces south and there is a covered porch at the main entry. A one room tower extends up from the center of the gable roof of the main roof. The tower has a square hipped roof and the side wings have gable roofs. Three small dormers are located on the north and the south sides of the main roof. All roofing is wood shingles with a red stained finish.

Foundations are concrete, exposed to the raised first floor level and painted grey. From the first floor up, the building has horizontal siding - originally wood shingles but now concealed by aluminum siding.

Entrances are located at the south porch and north facade. Paired wood columns support the flat roof over the porch, which has a railing around it at the second floor level that continues the paired pattern in the balusters. The north entry door is sheltered by a gable hood roof supported by brackets.

Inside the building, the basement is a mostly utilitarian space with a large open room with mechanical and work spaces off it. The first through third floors generally retain the original layout, with minimal modifications made where use changes have occurred. Modifications have been made to the first floor to accommodate the change of use from residential to office space, including the removal of the kitchen and restroom alterations. One room has been modified on the second floor where the use was changed



Figure 1-44. Main facade (KAC, 9/11/2019)



Figure 1-45. Exterior finishes on the north facade (EMH, 9/11/2019)



Figure 1-46. Interior finishes (KAC, 9/11/2019)

from sleeping room to kitchen. Original plaster ceiling and wall finishes with painted wood base and chair rail are intact in most rooms.

Condition: **Fair**
Overall the building is in fair condition with select areas in need of repair and rehabilitation, to prevent further deterioration. This includes the reintroduction of the roof drainage system, removal of the aluminum siding to restore the wood shingle siding, trim, systems and code upgrades.

Character Defining Features

Mass/Form

The rectangular and symmetrical mass and form of the building with the three story central core topped by the square lookout tower and flanked by one story wings is a character defining feature. The gable roof over the core with three dormers on each side, the gable roof at the wings and the hipped roof of the tower contribute to the building character. Similarly, the open porch supported by columns on the south elevation and the small projecting roof over the south entry all contribute to the building character.

Exterior Materials

The primary exterior material, painted wood shingles and trim, is concealed by aluminum siding. The shingle siding is a character defining feature of this building. Materials which remain visible and contribute to the character of the building are:

- Wood shingle roofing
- Metal railing around the tower walkway
- Wood balustrade at the second floor level of the south porch
- Exposed concrete foundation



Figure 1-47. Rectangular building form (KAC, 9/11/2019)



Figure 1-48. Intact building massing (KAC, 9/11/2019)



Figure 1-49. Railings at the south porch and tower (DM, 9/11/2019)

Openings
The regular, symmetrical window openings on each facade contributes to the character of the building. At the tower, the large windows on all walls providing views out speak to the original function of the building.

Entry doors on the north and south facade are emphasized by roof extensions which protect them. The five main door styles, which occur throughout the building and are intact at most openings, contribute to the character of the building. The front (south) entrance door is historic and in situ.

Interior Materials
Plaster wall and ceiling finishes, along with the wood wall base and chair rail are extant and contribute to the character of the building. Wood paneled doors are also character defining features on interior.

Integrity
Station Dwelling (HS-18) retains good integrity of design, location and feeling on the exterior. The restoration of the wood shingle siding would return integrity of materials to the exterior. On the interior, the building retains integrity of design, feeling and materials since the majority of the interior retains the original configuration. Some areas have been modified but overall, the building retains integrity.

Existing Conditions & Condition Assessment - Architecture

Architecture - Roofing
The roofing consists of newer wood shingles with a red coating and what appears to be an 8" exposure. The ridges have a replicated "Boston ridge" as called for on the original drawings. No drip edge flashing is evident at the eaves or rake.



Figure 1-50. Main entry door (KAC, 9/11/2019)



Figure 1-51. Intact interior finishes (KAC, 9/11/2019)



Figure 1-52. Looking at the new roofing from the Tower (KAC, 9/11/2019)

The flashing interface at the first story wings into the second story wall appears to have only been tucked under the aluminum siding. Newly installed flashing at the main roof is black prefinished at valleys and step flashing at the chimney.

The roof has two attic vents at either side of the tower but no eave/soffit venting is evident.

A weathervane is mounted on the top of the tower roof. Only the fixed compass portion of original the weathervane exists.

There are several areas of flat roof (the tower perimeter and the balcony of the front porch) which have a new black membrane roofing.

Condition: Good/Fair
While the roofing is very recent, there are several installation details that are of concern and may indicate an accelerated need for repair/replacement of the roof. The shingle installation does not appear to have been installed on battons to promote breathability. Likewise, the red coating may limit the longevity of the shingles.

The installation of flashing above the wing at the west wing/north slope shows exposed step flashing where the painted shingles are uncovered. The southern exposure of the east wing is likewise a "wobbly/uneven" installation.

No tie offs are visible on the roof.

The upper portion of the weathervane is no longer in situ.

The membrane roofing appears to be in good condition, though there is some ponding at the tower where the water does not drain to



Figure 1-53. Roofing at the Tower walkway (KAC, 9/11/2019)



Figure 1-54. Poor flashing interface at the wall (KAC, 9/11/2019)



Figure 1-55. Disconnected drainage element (KAC, 9/11/2019)

the outer edge.

The lightning protection system seems to have been dismantled during the last roofing project (see Electrical section).

Architecture - Roof Drainage
It appears that the previous gutter system has been removed with the recent reroofing project. Remnant downspouts (disconnected) remain in several locations around the building. There are also several splash blocks which exist at the corners of the building.

Originally the drawings called for a metal half round gutter draining into 2-¾" x 4-¼" metal conductors to a cast iron boot. Gutters were to be 4" at the wing roof and 5" at the main roof.

The original wood ogee trim concealed gutter is intact at the tower roof perimeter and has one downspout.

Originally there was a built in wood gutter at the front porch, but it is now covered over. A half round gutter is now attached to the porch trim over the stair.

Condition: Poor
The main and wing roofs originally had a gutter system which has been removed which will accelerate deterioration on the building.

The tower gutter is extant, however it is ineffective with failed membrane layers at the interior and a series of holes of drilled through it at regular spacing, likely an attachment from previous conduit. The gutter at the front porch is in poor condition.

Architecture - Chimney
The chimney on the east end of the building penetrates the roof with neatly installed step



Figure 1-56. Tower ogee gutter (KAC, 9/11/2019)



Figure 1-57. Gutter over the front porch (KAC, 9/11/2019)



Figure 1-58. Chimney (KAC, 9/11/2019)

flashing. With a running bond coursing, the chimney corbels out at the top three courses and is topped with a precast cap. A clay pipe is visible on the north side, while the south side has been capped with a mechanical ventilator. The mortar appears to have a reddish coloration.

Condition: Good
The precast cap has a crack at the west side. The step flashing and a cricket appear to be in good condition. The brick and mortar appear to be in fair condition.

Architecture - Tower
Located in the center of the main roof, the tower is encircled by a narrow walkway that wraps around it. A securely fastened, painted metal guardrail with a geometric pattern encloses the walk which has membrane roofing. Refer also to Exterior Windows and Exterior Door Sections.

Condition: Poor
Paint on the guardrail is peeling and raw metal is exposed. Refer to Exterior Wall and Roofing Sections.

Architecture - Exterior Walls and Trim
Exterior finishes from the first floor up have been wrapped with aluminum siding and trim elements, which conceal the original wood cedar shingles below. The concealed wood shingles were measured to have 7-½" exposure and were painted white.

Much of the exterior trim elements of the building have likewise been wrapped in aluminum trim and could not be assessed. There is a concern (as is seen in select exposed window sill areas) that moisture has been trapped behind the aluminum and damage to historic wood elements could be significant.


Figure 1-59. Tower and walkway (EMH, 9/11/2019)


Figure 1-60. Exterior wall finishes (EMH, 9/11/2019)


Figure 1-61. Wood trim and siding shingles (EMH, 9/11/2019))

The foundation is exposed +/- 2'-6" concrete with a ledge and is painted steel grey. The original trim (where exposed) shows a band at the base of the siding and wide coverboard.

One area of exposed wood trim exists at the tower soffit which is 1'-3" deep and is painted tongue and groove.

There is a basement hatch appurtenance on the west elevation. Walls, like the foundation, are painted concrete. The hatch is covered by plywood.

Condition: Poor
There is as desire to remove the 1960s era aluminum siding. Two areas of exposed shingles appear to be in good condition and show a low profile painted shingle finish. There is a concern that water may have been trapped behind the siding and damage may exist which is concealed.

The aluminum siding / trim interfaces of wall to roof and base of wall or trim area has failed and gaps exist. For example, at the Tower membrane roof installation the bottom of wall siding was damaged.

The Tower soffit is in fair condition but needs to be scrapped, prepped and repointed to arrest further deterioration. This work would need to be coordinated with the needed Tower gutter repairs.

The plywood boards over the west appurtenance are in poor condition with significant deterioration.

Architecture - Front Porch
Located on the south facade at the main entrance, the front porch is symmetrical with wood trimmed porch elements and concrete slab footings. Painted wood lattice elements



Figure 1-62. Front porch (EMH, 9/11/2019)



Figure 1-63. Deterioration at a column base (EMH, 9/11/2019)



Figure 1-64. Typical window (EMH, 9/11/2019)

infill the space between piers. Concrete stairs lead up to the porch which has a scored concrete floor. Paired Doric columns are spaced along the edges of the porch, with square columns located at the two outer corners. Columns sit on a cast iron base to hold them above the concrete. A galvanized wrought iron railing spans the space between the pairs of columns. Historic drawings called for a screened-in porch and early historic photographs show the screening in place. Currently there is no screening.

The flat roof over the front porch has a new membrane roofing and it appears to drain toward the exterior with a subtle hip slope. A 33-1/2" tall wood guardrail wraps around the three outer edges. It has paired square posts which align with the Doric columns at the porch level below, and square wooden balusters.

Condition: Poor
Wood columns are in very poor condition with significant wood deterioration, especially at the bottom. Paint is deteriorated on all finishes - railings, concrete and wood - at the porch. The guardrail around the flat roof is in very poor condition with areas of rot, poor structural attachment to the point of failure and is currently "secured" by a turnbuckle and cable system.

Architecture - Windows
Windows are primarily a vinyl replacement double hung system with integral screens and insulated glazing units. First floor windows are a mix of narrow (1'-11-1/2" x 5'-0") and wide (2'-10" x 5'-0") double hungs. Second floor windows are 2'-9" x 4'-8" double hungs. Third floor windows are a mix of 2'-4" x 3'-10" double hungs and the end gables have 2'-1" x 3'-6" windows in the dormers. Dormer windows have an arched upper lite. (Note that



Figure 1-65. Basement window (EMH, 9/11/2019)



Figure 1-66. Deteriorated window sill (EMH, 9/11/2019)

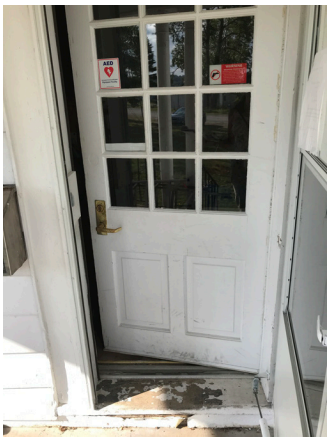


Figure 1-67. Front entry door (EMH, 9/11/2019)

the Equipment Building arched windows are intact and were likely similar, if not the same, window originally.) The tower has ten double hung vinyl windows at the tower in two sizes: (3) 2'-9" wide x 3'-8" high and (7) 1'-9" wide x 3'-8" high. Windows have an integral screen system and track on the exterior. Windows have painted wood sills.

Basement windows are three lite sash with a slider storm/screen. Sash are inward opening awning windows with hooks mounted to the basement ceiling to hold them open.

Original drawings indicate the windows were a 6-over-6 lite pattern, other than the tower which was plate glass to aid in visibility. Basement windows had a 3 lite sash.

Condition: Poor
All windows are in fair condition with "sticky" operation and peeling paint on the trim and failing sealant.

Paint is peeling on all sills, varying degrees of biological growth exists on most exposed window sills. Several of the window sills are exhibiting significant rot. It is unknown if it is due to wind/leeward exposure of wood or moisture being trapped behind the aluminum. Affected window sills include four south facing windows on the eastern end of the first floor and two south facing windows on the second floor.

Architecture - Exterior Doors
There are three exterior doors on the building of varying sizes and material.

Door 101 (front door): Original twelve lite two panel wood 3'-0" x 6'-11" front door. Hardware consists of three original ball tip hinges and a replacement lockset. It has a modern door threshold and various



Figure 1-68. Back door (EMH, 9/11/2019)



Figure 1-69. Interior side of Door 401 (KAC, 9/11/2019)

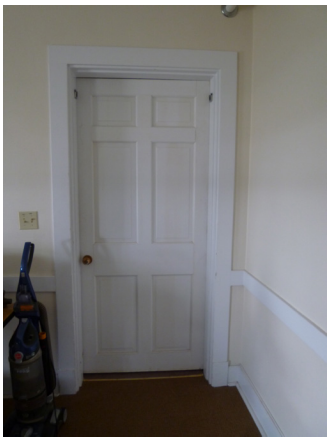


Figure 1-70. Type A door (KAC, 9/11/2019)

weatherstripping materials. An exterior vinyl screen storm door has been installed. Trim on the interior is 5-1/2" painted wood which is notched at the intersection of the chair rail.

Door 104 (rear door): Replacement solid core slab door with an original transom above at the north building entrance. Hardware consists of three original ball tip hinges, a replacement lockset and various types of weatherstripping. Original drawings show that the door was originally a 12 lite over two panel door, similar to the front door. It was flanked by glazed side panels which are no longer intact. The original four lite transom and wood trim is still intact.

Door 401 (Tower door): Wood half lite door with two raised panels. Hardware consists of three ball tipped hinges, a knob with a black plate and weatherstripping at the threshold. It has an exterior storm door with plexiglas lites, which replaced the original glazing.

Condition: Fair

Door 101: Paint is worn in places on the wood door. The new lockset is not in keeping with the building character. Weatherstripping is not continuous.

Door 104: The door is in fair condition with deteriorated wood, however it is not compatible with the historic. Wood trim is chipped and has peeling paint on the interior side of the door. This flush slab door with replacement hardware detracts from the historic character of the building.

Door 401: Paint is peeling on the door and the weatherstripping is worn. Plexiglas on the storm door is foggy.

Architecture - Interior Doors

The station has five historic door types, all



Figure 1-71. Type B doors (KAC, 9/11/2019)



Figure 1-72. Door 005 (KAC, 9/11/2019)



Figure 1-73. Door 008 (KAC, 9/11/2019)

but Type D are used in single and paired configuration. Trim is painted 4" x 3/4" wood with an eased outside edge. Doors have a 7-1/2" plinth block.

Type A - Six vertical panel painted wood door.

Type B - Six vertical panel painted with door with louvered top and bottom panels.

Type C - Three horizontal panel painted wood door.

Type D - Painted wood locker doors in two different heights, 6'-8" and 5'-0" at the end walls in the third floor. The taller door has three panels, the top and bottom are louvered. The shorter door has two panels and the lower is louvered.

Type E - Twelve lite, two vertical panel wood door.

Type F - 2'-0" wide x 3'-5" tall single panel painted wood access panels with standard door trim. Doors have no hardware.

Door 002 - Type E paired doors with original three hinges per leaf and an escutcheon and knob on the primary leaf. Lites have clear glass.

Door 003 - Type E paired doors with original three hinges per leaf and an escutcheon and knob on the primary leaf. Lites have wire glass.

Door 005 - Type E with original hardware. Lites are textured, tinted glass.

Door 006 - Type E door with textured, obscured glass and original hardware.

Door 007 - Door and hardware are not extant



Figure 1-74. Door 008B (KAC, 9/11/2019)



Figure 1-75. Door 106 (KAC 9/11/2019)



Figure 1-76. Doors 110 and 111 (KAC, 9/11/2019)

but trim remains.

Door 008 - Type E double doors with clear lites and original hardware. A hasp and eyehook for a padlock has been installed on the Drill Room side of the doors.

Door 008A & 008C - Type C doors with original hinges, escutcheon and knob.

Door 008B - Two layers of paired doors - one opens into the Shop and the other opens outward. Each sash is wood stile and rail with two panels containing six lites. Hinges are original and more heavy duty than others in the building. The sill between the two sets of doors is steeply sloped to the exterior.

Door 102 - Type A with original brass hinges. It has a replacement brass knob. Metal supports for a pull-up bar are mounted to the door frame.

Door 103 - Type B with three original hinges, escutcheon and knob, wood threshold and a new lock.

Door 105 & 106 - Modern, hollow core flush panel doors with a painted finish. Hardware consists of a doorstop, three brass hinges and a brass knob.

Door 107 - Type B with original brass escutcheon and three hinges. A chain door stop prevents it from opening into the wall. A new brass deadbolt has been installed. There is a wood threshold.

Door 109 - Type B with three original hinges and escutcheon and a new keyed lock. It has a wood threshold.

Door 110 - Pair of Type C doors, each has the three original hinges and the primary door



Figure 1-77. Door 113 (KAC, 9/11/2019)



Figure 1-78. Cased Opening 02, 03 and 04 (KAC, 9/11/2019)



Figure 1-79. Door 117 (KAC, 9/11/2019)

has the original escutcheon, and knob. There is a new key lock and an eyehook and padlock has been installed.

Door 111 - Type A door with three original hinges, escutcheon, door knob and lock. A new deadbolt has been installed.

Door 112 - Type A door with three original hinges, escutcheon and knob and a new lock.

Door 113 - Pair of Type B doors with original three hinges, escutcheon and knob and a new lock. The threshold is wood.

Doors 114 & 115 - Type A doors with three original hinges, escutcheon and knobs. Hardware on the bathroom side of the doors is chrome and on the adjacent side is brass. Thresholds are wood.

Door 116 - Type A doors with three original hinges, escutcheon and knobs.

Door 117 - Pair of Type B doors with original three hinges, escutcheon and knob. The threshold is wood.

Cased Opening 01 - Originally a door was mounted in this frame but has now been removed and hardware locations on the frame are patched.

Cased Opening 02 - This functioned as a pass through from the original kitchen to the mess hall. It has the same 4" wide trim as the windows but a 2" apron. This opening does not appear on the original drawings.

Cased Opening 03 - This opening is curved at the head and has no trim, the wall base and chair rail are continuous through the opening. Original drawings indicate a door at this location.



Figure 1-80. Cased Opening 117 (KAC, 9/11/2019)



Figure 1-81. Cased Opening 01 (KAC, 9/11/2019)

Cased Opening 04 - Opening with painted wood trim and no evidence of patching from removed hardware. Metal plates are mounted to both sides of the trim which allowed a cable to be hooked across the opening to indicate access to the stair was restricted. Original drawings indicate a door at this location.

Cased Opening 05 - Painted trim around the opening, the door frame has been removed. Original drawings indicate a door at this location.

Cased Opening 06 - Painted wood trim is extant at this original cased opening.

Cased Opening 07 - Painted wood trim is extant at this original cased opening.

Door 201 - Type B door with plywood attached behind the louvers on the stair side. Three original hinges and the escutcheon with knob are intact. An eye hook and hasp have been installed on the door and frame. A sign on the door indicates it should be kept closed for fire safety.

Door 203 - Type A door and hardware consists of three original hinges, escutcheon and knob and a new lock. An original door stop is mounted to the wall base.

Doors 204, 205, 206, 207, 208 - Type B doors at the lockers. Each has the original three hinges, escutcheon, knob and a new lock.

Door 209 - Type B door with three original hinges, escutcheon and knob and a new lock. The threshold is wood.

Door 210 - Type A door. Hardware consists of three original hinges, escutcheon and knob and a new lock. An original door stop is



Figure 1-82. Door 209 (KAC, 9/11/2019)

mounted to the wall base.

Door 214 - Type B door at the locker has the original three hinges, escutcheon, and knob.

Door 215 - Type A with three original hinges, and escutcheon and knob. Hardware on the bathroom side of the door has a chrome finish and a brass finish on the other side of the door. A brass doorstop is mounted to the wall inside the bathroom. A sliding latch has been installed on the bathroom side of the door and frame. Two chrome towel bars are mounted to the bathroom side of the door.

Door 216 - Type A door with three original hinges, escutcheon and knob and a new lock. An original door stop is mounted to the wall base.

Doors 217, 218, 219, 220 - Type B doors at the lockers. Each has the original three hinges, escutcheon, knob and a new lock.

Door 221 - Type A door. Hardware consists of three original hinges, escutcheon and knob and a new lock. An original door stop is mounted to the wall base.

Doors 222, 223, 224, 225 - Type B doors at the lockers. Each has the original three hinges, escutcheon, knob and a new lock.

Door 301 - Wood 2'-0" x 4'-8" four vertical panel door with two original hinges and a keyed lock.

Door 302 - Type A door with original three hinges, escutcheon and knob. Threshold is wood.

Door 304 - Type F door/access panel.



Figure 1-83. Door 221 - 225 (KAC, 9/11/2019)

Door 305/306 - Type D doors with original hardware.

Door 307 & 308 - Type F doors/access panels.

Door 309 - Type B door with the original three hinges, escutcheon, knob and lock.

Door 310 - Type B door with the original three hinges, escutcheon, knob and lock.

Door 311 - Type A door with original three hinges, escutcheon and knob. A new deadbolt has been added above the original hardware. Threshold is wood.

Door 312 & 313 - Type F doors/access panels, secured in place with screws.

Door 314/315 and 316/317 - Type D doors with original hardware.

Door 318 - Type F door/access panel, secured in place with screws.

Condition: Good and Fair
Door 002 - Good condition.

Door 003 - Fair condition, with doors sticking in the frame and not easy to open. Doors also hit the bottom portion of pipe insulation within the Boiler Room.

Door 005 - Fair condition with a crack on the latch side of the door. Also, the door does not close and it hits the underside of the pipe insulation when opened.

Door 006 - Fair condition since the door does not close and one lite is cracked.

Door 007 - Missing. Door frame is damaged on the south side of the opening.



Figure 1-84. Door 314 and 315 (KAC, 9/11/2019)



Figure 1-85. Door 318 (KAC, 9/11/2019)

Door 008 - Doors are in fair condition and do not easily close.

Door 008A & 008C - Doors are in fair condition and are difficult to close.

Door 008B - Doors are in fair condition. They do not close and the outer layer of doors is covered in dirt. Hardware on the interior pair of doors is partly missing and what is extant has been modified.

Door 102 - Good condition with minor paint chips.

Door 103 - Good condition.

Door 105 & 106 - Good condition, however the flush doors detract from the historic character of the building.

Door 107 - Good condition though the replacement hardware should be repaired/ replaced.

Door 109 - Good condition.

Door 110 - Good condition.

Door 111 - Good condition.

Door 112 - Good condition.

Door 113 - Good condition.

Doors 114 & 115 - Good condition.

Door 116 - Good condition.

Door 117 - Good condition.

Cased Opening 01 - Fair condition with some chips in the wood frame and paint. Original door has been removed. A pull up bar is

mounted to the door frame.

Cased Opening 02 - Good condition.

Cased Opening 03 - Good condition.

Cased Opening 04 - Good condition, with a few areas of chipped paint.

Cased Opening 05 - Good condition.

Cased Opening 06 - Good condition.

Cased Opening 07 - Good condition.

Door 201 - Fair condition with chipping and peeling areas of paint. The door does not close easily and there are scuffs on the latch side from the friction between the door and frame. Despite signs indicating this provides fire separation, this door is not a fire door.

Door 203 - Good condition.

Doors 204, 205, 206, 207, 208 - Fair condition with some doors difficult to open and close. Hardware is in fair condition with a few elements missing.

Door 209 - Good condition with a few chips in the paint.

Door 210 - Fair condition with a split in the wood on the latch side of the door.

Door 214 - Good condition though the lock mechanism has been removed.

Door 215 - Fair condition with peeling paint and the towel bar which is mounted to it is no longer securely attached.

Door 216 - Fair condition with some scratches and chips in the door and trim.



Figure 1-86. Door 210 (KAC, 9/11/2019)

Doors 217, 218, 219, 220 - Good condition.

Door 221 - Good condition.

Doors 222, 223, 224, 225 - Fair condition, door do not open or close easily.

Door 301 - Good condition.

Door 302 - Fair condition, the door does not open or close easily. Paint on the door and trim is chipped.

Door 304 - Good condition.

Door 305/306 - Fair condition, doors do not open or close easily. Door 306 is missing the door knob.

Door 307 & 308 - Good condition.

Door 309 - Good condition, though the lock has been removed.

Door 310 - Good condition.

Door 311 - Fair condition, the door does not open or close easily. There is a crack on the latch side of the door and paint on the door and trim is chipped.

Door 312 & 313 - Fair condition with chips and dents in the doors and trim.

Door 314/315 - Good condition.

Door 316/317 - Fair condition with door 317 missing the knob, lock and escutcheon. Door 316 has a replacement knob with a chrome finish that does not match the rest of the brass hardware.

Door 318 - Fair condition with chips and dents in the door and trim.



Figure 1-87. Doors 314 - 317 (KAC, 9/11/2019)



Figure 1-88. Door 311 (KAC, 9/11/2019)

Architecture - Basement Interior Finishes
Finishes in the basement are simple, utilitarian. Base is composed of 6" concrete base with a 4" wood base directly above it. Basement windows have 4" wood trim on all four sides and no sill.

Hall (001)
Ceiling and wall finish is painted plaster. Base is concrete with a wood base installed above it. Flooring is painted concrete.

Boiler (002)
Ceiling finish is painted plaster. The north and part of the east wall are exposed concrete foundation with a painted finish. Remaining walls are painted plaster with the typical concrete and wood base. A chimney extending full height on the east wall is painted concrete. Flooring is painted concrete.

Storage Room (003)
Ceiling finish is painted plaster. North, south and east walls are unfinished, with paint on the concrete foundation and no base. The west wall has a painted plaster finish with typical wall base. Flooring is concrete with raised concrete equipment pads.

Drill Room (004)
Ceiling and wall finish is painted plaster. Walls have a 6" concrete base with the standard 4-1/2" base installed above that. Flooring is painted concrete.

Shop (005)
Ceiling finish is painted plaster. North, west and south walls are the concrete foundation wall with a plaster skim coat and painted finish. The east wall has a painted plaster finish with the typical concrete and wood base. Flooring is painted concrete.

Closets at the west side of the room have the



Figure 1-89. Painted finishes in the Storage Room (KAC, 9/11/2019)



Figure 1-90. Drill Room finishes (KAC, 9/11/2019)



Figure 1-91. Finishes in the Shop (KAC, 9/11/2019)

same finishes and built-in painted plywood shelves.

Laundry Room (006)
Ceiling finish is painted plaster. The north and part of the west wall are the exposed concrete foundation, painted. Remaining walls have a painted plaster finish and the standard concrete and wood base. Flooring is painted concrete.

Provisions Room (007)
Ceiling finish is painted plaster. The north wall is the exposed concrete foundation wall, painted. Remaining walls have painted plywood installed 2" in front of the original painted plaster finish. There are gaps around the edges of the plywood and cutouts for pipes and the light switch. Flooring is painted concrete.

Clothes Room (008)
Ceiling finish is painted plaster. The north wall is the painted concrete foundation wall. The remaining three walls have a painted plaster finish with the typical concrete and wood base. Flooring is painted concrete.

Condition: Fair
Hall (001)
Ceiling finish is in good condition. Wall finish is in fair condition with patched areas around pipes that are run through the wall. Concrete flooring is in good condition, though the paint is peeling in places.

Boiler (002)
Ceiling finish is in fair condition with holes drilled in it and cracks in places. Wall finish is in good condition. There are cracks near the base of the chimney on the east wall. Flooring is good condition, with the exception of the area affected by spilled material which is eating the paint. There is staining on the



Figure 1-92. Painted plywood finishes in Provisions Room (KAC, 9/11/2019)



Figure 1-93. Flooring stains and spilled material in Boiler room (KAC, 9/11/2019)

flooring throughout the room.

Storage Room (003)
Ceiling finish is in good condition, though there is a small hole on the west side of the room. North, south and east walls are in good condition. West wall finish is in good condition, though there are a few holes in it for conduit. Flooring is in fair condition with staining in a few areas.

Drill Room (004)
Ceiling finish is in poor condition with a delaminated section which is fallen significantly from the ceiling plane. Wall finish is in good condition. Flooring is in fair condition with water stains in places and peeling paint.

Shop (005)
Ceiling finish is in fair condition with cracks in the plaster. Wall finish is in fair condition with areas of delaminating skim coat. Flooring is in good condition.

Laundry Room (006)
Ceiling and wall finishes are in good condition. Flooring is in good condition with a few minor cracks and a two small divots out of it.

Provisions Room (007)
Ceiling and north wall finish is in good condition. Plywood finish on the walls in is good condition, though it detracts from the building character. Condition of the original plaster finish behind the plywood is unknown. Paint on the floor is in fair condition with significant peeling.

Clothes Room (008)
Ceiling finish is in fair condition with cracks in the plaster. Wall finishes are in good condition with the exception of part of the east walls


Figure 1-94. Delaminating ceiling finish in Drill Room (KAC, 9/11/2019)


Figure 1-95. Cracking ceiling finish in Drill Room (KAC, 9/11/2019)


Figure 1-96. Holes in the Provisions Room wall (KAC, 9/11/2019)

which has holes in it. Painted concrete floor is in good condition.

Architecture - First Floor Interior Finishes
The first through third floors have similar finishes with consistent painted wood trim throughout. Wall base is 6-1/2" tall with a quarter-round shoe and a decorative profile at the top. Chair rail measures 4-1/2" x 3/4" and on the first floor is located 2'-9-3/4" from the flooring to the top of the rail.

Windows have 4" trim on the sides and a wood sill with a 4" apron. Window shades have been installed on the trim or within the frame in most windows on the first floor.

Hall (101)
Ceiling and wall finish is painted plaster. Walls have painted base and chair rail. A notch is built into the wall to accommodate the radiator. Flooring at the hall, landings and stair is carpet.

Painted plaster ceiling and wall finishes continue up the stair to the second floor. Painted wood wall base at each floor level and at the landing aligns with the top of the painted wood stringer. Painted wood chair rail is continuous up the stair and the 1-1/2" diameter wood handrail is bracket mounted to the chair rail on the east wall.

Mess Room (102)
Ceiling and wall finish is painted plaster and flooring is carpet. Walls have painted base and chair rail. Fire sprinklers are run below the ceiling and conduit is surface mounted on the ceiling and walls.

Day Room (103)
Painted plaster ceiling curves down to meet the north and south walls and has the typical ninety-degree edge at the east and west walls.



Figure 1-97. First floor hall finishes (KAC, 9/11/2019)



Figure 1-98. Stair to the second floor (KAC, 9/11/2019)



Figure 1-99. Finishes in the Day Room (KAC, 9/11/2019)

Sprinkler pipes are run below the ceiling and surface mounted conduit runs along the ceiling to fixtures. Walls are painted plaster with a painted wood chair rail and wall base. There is an original built in wood bookshelf on the west wall. Flooring is carpet.

Office (104)
Ceiling finish is painted plaster. Walls have a painted plaster finish with painted wood base and chair rail. Originally this room was the Kitchen. The walls have been refinished and trim infilled so there is no evidence of the original cabinets, or the door opening indicated on the west wall in the original drawings. Flooring is carpet.

Hall (105)
Ceiling and wall finish is painted plaster. Walls have typical painted wood base and chair rail. The half wall divider at the stair has a painted plaster finish and a stained wood cap mounted directly above the chair rail. Wood handrails on the outside wall of the stair are bracket mounted. Flooring from the landing at the exterior door up to the first floor is carpeting, which is installed in waterfall configuration at the stair. Stairs from the landing down to the basement have wood risers and treads with a stained finish and metal applied nosing and rubber tread covers. The bottom step is concrete, painted yellow.

The closet at the top of the stair has the same finishes as the Hall and built in wood shelving.

RR Foyer (106)
Ceiling finish is 2' x 4' acoustic ceiling tiles in a metal grid, suspended below the plaster ceiling. Walls are painted plaster and gypsum board with the same wood chair rail and base used throughout the building. Floor is carpet.

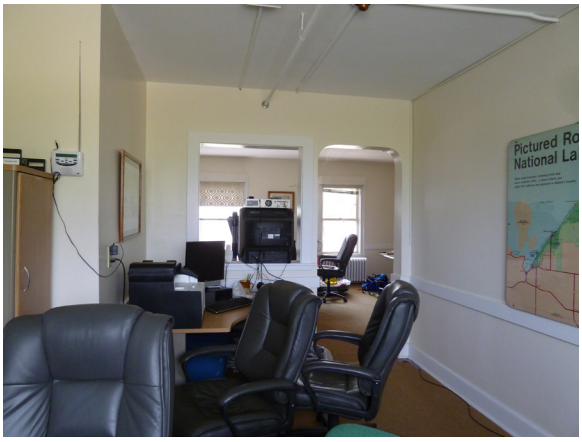


Figure 1-100. Office104finishes(KAC,9/11/2019)



Figure 1-101. Stair and finishes in Hall 105 (KAC, 9/11/2019)



Figure 1-102. Finishes in the Women's Restroom (KAC, 9/11/2019)

Womens (107)
Ceiling finish is 2' x 4' acoustic ceiling tiles in a metal grid. Walls are painted gypsum board with a painted wood base with quarter-round shoe. Flooring is sheet vinyl. Paper towel dispenser and the mirror are wall mounted. The toilet paper dispenser is mounted on the window apron. Plexiglas has been installed in the lower portion of the window and one end of the grab bar is mounted to it, with remaining connections on the side and back wall. See also Accessibility Section.

Mens (108)
Ceiling finish is 2' x 4' acoustic ceiling tiles in a metal grid. Walls are painted gypsum board with a painted wood base with quarter-round shoe. Flooring is sheet vinyl. Paper towel dispenser and the mirror are wall mounted. The toilet paper dispenser is mounted on the window apron. Plexiglas has been installed in the lower portion of the window and one end of the grab bar is mounted to it, with remaining connections on the side and back wall. See also Accessibility Section.

A storage/cleaning supply closet is located off the mens restroom. The closet has painted plaster ceiling and wall finish with original painted wood base. It has built-in painted wood shelves. Flooring is carpet, with a metal transition strip at the threshold.

Office (109)
Ceiling and wall finish is painted plaster. Walls have the typical painted wood base and chair rail. Flooring is carpet.

Bathroom (110)
Ceiling and walls have a painted plaster finish. Walls have typical painted wood base and chair rail. In this room the chair rail is mounted higher than usual with the top of the rail located at 4'-6" above the floor. Flooring



Figure 1-103. Men's Restroom finishes (KAC, 9/11/2019)

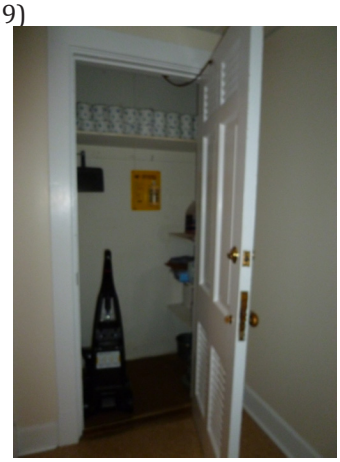


Figure 1-104. Storage closet located off the Men's restroom (KAC, 9/11/2019)



Figure 1-105. Bathroom (110) finishes (KAC, 9/11/2019)

is sheet vinyl with metal transition strips at the threshold. Wall mounted restroom accessories include a mirror with a chrome frame, paper towel dispenser and soap dispenser. The toilet dispenser is mounted to the window apron. The shower enclosure is metal.

Office (111)
The painted plaster ceiling has a coved edge at the north and south walls and typical straight edges at the east and west. Walls have a painted plaster finish with typical painted wood base and chair rail. There are built in notches in the walls for the radiators. An original built in shelving recess with an arched top is located on the east wall, though the shelving within it is not original. Flooring is carpet. This room originally served as the Officer In Charge's Living Room.

Hall (112)
Ceiling finish is painted plaster which is coved to meet the south wall. The other three walls have the typical ninety degree edges. Walls are painted plaster with painted wood base and chair rail. Flooring is carpet. The Chart Closet has painted plaster ceiling and wall finish with modern shelving built into it. Flooring is carpet.

Office (115)
Ceiling and wall finish is painted plaster and walls have painted wood base and chair rail. Flooring is carpet.

Hall (116)
Ceiling and wall finish is painted plaster. Walls have the standard painted wood chair rail and base. Flooring is carpet. The Closet located off the west wall of the Hall has the same finishes. Painted wood shelves are built into the Closet.



Figure 1-106. Built in shelving in Office (111) (KAC, 9/11/2019)



Figure 1-107. Coved ceiling in Hall (112) (KAC, 9/11/2019)



Figure 1-108. Finishes in Office (115) (KAC, 9/11/2019)

Condition: **Fair**

Hall (101)
Ceiling finish in the Hall is in fair condition with holes drilled in places. Hall wall finish is in good condition with a few paint chips and some scuffs and chips in the chair rail. Wall and ceiling finish at the stair is in good condition. Carpeting in the Hall and on the stair is in fair condition with stains and wear.

Mess Room (102)
Ceiling finish is in good condition. Wall finish is generally in good condition, though patch locations are visible in places and there is cracking on the south wall. Flooring is in fair condition with a visible seam and areas of wear.

Day Room (103)
Plaster ceiling finish is in good condition. Wall finishes at the north, south and west walls are in good condition with a small horizontal crack on the west wall. At the east wall, the plaster is buckling at the north corner of the window. Trim around the window is also cracking and pulling away from the plaster finish. Carpet flooring is in fair condition with areas of wear and staining.

Office (104)
Plaster ceiling finish is in fair condition with cracks in a few places. Wall finishes are in good condition with a few paint chips. Carpeting is in fair condition with some wear and a visible seam at the doorway.

Hall (105)
Ceiling finish is in fair condition. Wall finish is in fair condition with some chips and scuffs, especially on the lower portion of the wall. Carpet flooring is in fair condition with staining in places. From the landing down, stair treads and risers are in fair condition with some splits in the wood.



Figure 1-109. Cracked stair tread (KAC, 9/11/2019)

RR Foyer (106)
Suspended ceiling is in fair condition with cracked and water damaged tiles. The plaster ceiling above is in poor condition with significant damage and missing plaster. Wall finish is in good condition. Carpeting is in fair condition with some wear and staining.

Womens (107)
Suspended ceiling is in fair condition with water damaged tiles and the metal grid rusting in places. The plaster ceiling above is in poor condition with significant damage and missing plaster. Wall finish is in fair condition with small holes in the gypsum board in places. Sheet vinyl flooring is in good condition, though the edges are pulling up in corners where the quarter-round shoe at the wall base is missing. See also Accessibility Section.

Mens (108)
Suspended ceiling finish is in good condition, though some tiles have been replaced and do not match the rest. Wall finish is in good condition. Sheet vinyl flooring is in fair condition with visible gaps between some of the sheets. See also Accessibility Section.

In the closet, wall and ceiling finishes are in good condition with minor scuffs. Flooring is in fair condition with stains and a section peeling up at the south wall.

Office (109)
Ceiling and wall finish is in good condition. Flooring is in fair condition with staining and wear.

Bathroom (110)
Ceiling and wall finishes are in good condition. Flooring is in fair condition with staining. The metal shower enclosure is in fair condition with mold growth.



Figure 1-110. Plaster damage above the suspended ceiling (KAC, 9/11/2019)

Office (111)
Ceiling, wall and floor finishes are in good condition.

Hall (112)
Ceiling and wall finishes are in good condition. Carpet flooring in the Closet is in good condition but in the Hall is in fair condition with fraying at the seams.

Office (115)
Ceiling and wall finishes are in good condition. Carpet flooring is in fair condition with stains and worn areas.

Hall (116)
Ceiling finish in the Hall is in good condition. Wall finish is in fair condition with an area of bubbling paint by the east door and some scuffs. Carpeting is in good condition. Finishes in the Closet are in good condition.

Architecture - Second Floor Interior Finishes
Like the first floor, wall base on the second floor is 6-1/2" tall with a quarter-round shoe and a decorative profile at the top. Chair rail measures 4-1/2" x 3/4" and is located 2'-9-3/4" from the flooring to the top of the rail.

Windows have 4" trim on the sides and a wood sill with a 4" apron. Window shades have been installed on the trim or within the frame in most windows on the second floor.

Hall (201)
Painted plaster ceiling and wall finish. Walls have typical painted wood base and chair rail. Flooring is carpet. There a non-original bulletin board mounted on one wall.

Dorm Room No. 1 (202)
Ceiling and wall finish is painted plaster. Walls have standard base and chair rail. Flooring is carpet. Five lockers are built into the north



Figure 1-111. Finishes in the second floor hall (KAC, 9/11/2019)



Figure 1-112. Finishes in a sleeping room (KAC, 9/11/2019)

wall. Lockers have Type B doors (see Door section) and inside each are three built in wood drawers with a wood shelf and clothes rod above them. All wood elements are painted. Drawers have brass pulls.

Kitchen (203)
Ceiling and wall finish is painted plaster. Walls have painted wood base and chair rail on walls without cabinets. Upper and lower cabinets with a dark stain and a plastic laminate countertop with a 4" backsplash have been installed on the west wall. Originally there were four lockers on the south wall. Three of those have had the doors, drawers, shelf and closet rod removed but the door trim remains. The fourth has the door and drawers but the shelf and closet rod have been removed. See also Accessibility Section.

Bathroom (204)
Ceiling and wall finish is painted plaster. Wood chair rail is mounted with the top 4'-6" above the floor and base is rubber. Showers are plastic units with glass doors. Partition walls around the showers have a fiberboard finish. Toilet stall partitions are floor mounted metal with painted wood doors. Flooring is sheet vinyl. A mirror with an integral shelf is mounted above the sinks. Additional wall mounted accessories in the space are a paper towel dispenser, trash receptacle, soap dispenser and two chrome towel bars. See Code Section.

Dorm Room No. 2 (205)
Ceiling and wall finish is painted plaster. Walls have standard base and chair rail. Flooring is carpet. A pipe extends through the floor and is stubbed off at the west side of the room. Four lockers are built into the south wall. Lockers have Type B doors (see Door section) and inside each are three built in wood drawers with a wood shelf and clothes rod



Figure 1-113. Contemporary kitchen cabinets in Kitchen (203) (KAC, 9/11/2019)



Figure 1-114. Shower in the Bathroom (KAC, 9/11/2019)

above them. All wood elements are painted. Drawers have brass pulls.

Dorm Room No. 3 (206)
Ceiling and wall finish is painted plaster. Walls have standard base and chair rail. Flooring is carpet. Four lockers are built into the north wall. Lockers have Type B doors (see Door section) and inside each are three built in wood drawers with a wood shelf and clothes rod above them. All wood elements are painted. Drawers have brass pulls.


Figure 1-115. Dorm Room No. 3 finishes (KAC, 9/11/2019)

Condition: Good and Fair
Hall (201)
Ceiling and wall finishes are in good condition, though there are a few chips on the wall base. Carpet is in fair condition with stains.

Dorm Room No. 1 (202)
Ceiling and wall finishes are in good condition and carpeting is in fair condition with stains. A few of the locker drawers do not slide easily.

Kitchen (203)
Ceiling and wall finishes are in good condition. Carpeting is in fair condition with stains. Kitchen cabinets are in fair condition with some staining and water damage and a few doors not hanging straight. The remaining locker has a broken drawer.

Bathroom (204)
Plaster ceiling finish is in fair condition with peeling paint in the area above and around the showers. Plaster wall finish is in good condition. Fiber board wall finish around he showers is in fair condition with water damage at floor and ceiling level. Shower enclosures are in poor condition with significant mold growth. Metal partitions are in fair condition. See Code and Accessibility Sections.

Dorm Room No. 2 (205)
Ceiling and wall finishes are in good condition. Flooring is in fair condition with stains on the carpet.

Dorm Room No. 3 (206)
Ceiling and wall finishes are in good condition. Flooring is in fair condition with stains. Some of the locker shelves are missing and a few drawers do not operate smoothly.

Architecture - Third Floor Interior Finishes
The third floor has the same wall base as the first and second. Base is 6-1/2" tall with a quarter-round shoe and a decorative profile at the top. The third floor has 4" chair rail mounted at 2'-9-1/4" above the floor.

Windows have 4" trim on the sides and a wood sill with a 4" apron. Window shades have been installed on the trim or within the frame in most windows on the third floor.

Hall (301)
Ceiling and wall finish is painted gypsum board. Walls have painted wood chair rail and base. Flooring is carpet. The center of this room is a full height space with a very high ceiling, but the connections out to the dormer windows have very low ceilings, to accommodate the roof slope.

The stair between the second and third floors is located on the west side of hall 301. The only enclosure around the stair is a low dividing wall with a painted wood cap. Finishes at the stair are painted plaster walls with typical chair rail and at the landings, the standard painted base. Stairs have carpeting flooring on the risers and treads and the stringers are painted wood with the same decorative ogee forms on the top as the wall base. The handrail is an oval shape, measuring 2" across at the widest point,



Figure 1-116. Hall (301) finishes (KAC, 9/11/2019)



Figure 1-117. Stair down to the second floor (KAC, 9/11/2019)

bracket mounted to the chair rail.

The original ladder to the Tower is located in the center of the room. It is a wood ladder with rubber tread covers and metal nosings. A 1'-1/2" diameter metal pipe handrail extends from the floor to the ceiling on both sides of the ladder. The hatch opening at the ceiling has wood trim.

Closets on the north side of the room have the same ceiling, wall and floor finishes. Built-in wood shelves have a stained finish.

Loft Room No. 2 (302)
Ceiling and wall finish is painted plaster. Walls have typical trim. The ceiling follows the slope of the gable roof above, with a flat section in the center and the north and south thirds sloping down to where it meets the wall. Flooring is carpet. A fire ladder is located at the south dormer (window 302).

One set of paired lockers is located on the east wall, with one short and one tall due to the ceiling slope. Wall and ceiling finishes in them are plaster. The short locker has sheet vinyl flooring, pained wood base and built-in plywood shelving. The tall locker has built-in wood drawers below a clothes rod.

Spaces north and south of the room have 5-1/2" plank wood flooring and rock wool insulation is visible between the roof rafters.

Loft Room No. 1 (303)
Ceiling and wall finish is painted plaster. Walls have typical trim. The ceiling follows the slope of the gable roof above, with a flat section in the center and the north and south thirds sloping down to where it meets the wall. An attic hatch has wood trim around it. A metal vent has been installed in the ceiling, though insulation has been laid over it in the



Figure 1-118. Ladder to the Tower (KAC, 9/11/2019)



Figure 1-119. Loft Room No. 2 finishes (KAC, 9/11/2019)



Figure 1-120. Finishes in Loft Room No. 1 (KAC, 9/11/2019)

attic. Flooring is carpet in the main portion of the room with metal transition strips. Within the gable extensions to the north and south windows, flooring is sheet vinyl. Sheet vinyl flooring appears to continue under the carpeting.

Two sets of paired lockers are located on the west wall, with one short and one tall due to the ceiling slope. Wall and ceiling finishes are plaster. The short locker has sheet vinyl flooring, pained wood base and built-in plywood shelving. The tall locker has built-in wood drawers below a clothes rod.



Figure 1-121. Carpet to sheet vinyl flooring in the gable extension (KAC, 9/11/2019)

Condition: Good to Poor

Hall (301)

Ceiling finish is in fair condition with cracks from water damage and water stains at the north end of the room. Wall finish is in good condition, though the quarter-round shoe has been removed from the wall base. Carpeting in the Hall and on the stair is in fair condition with stains in places.



Figure 1-122. Ceiling damage in Hall (301) (KAC, 9/11/2019)

The ladder is in good condition. Paint on the handrail is chipped in a few places.

Loft Room No. 2 (302)

Ceiling finish is in fair condition with water staining in places. Quarter-round shoe has been removed from the wall base. Carpet flooring is in fair condition with staining. Sheet flooring in the lockers is in fair condition with scuffs.

Loft Room No. 1 (303)

Ceiling finish is in fair condition with cracks in areas. Wall finishes are in fair condition with the quarter-round shoe removed from the base and a section of cracked base on the east wall. Carpeting is in fair condition with some wear. Sheet flooring is in fair condition with

some scuffs and gaps at the joints between sheets.

Ceiling and wall finish in the north locker is in poor condition with plaster delamination and water damage at the location of the roof drain which runs through it. Ceiling and wall finishes in the south lockers are in good condition. In the In the short lockers, the sheet flooring is in fair condition with some wear and staining in the north locker. Quarter-round shoe has been removed from the base in both the north and south short lockers.

Architecture - Tower Interior Finishes
Tower (401)
Ceiling finish is painted plaster with a painted wood crown molding. Walls are painted plaster with the standard painted wood base. The window apron is continuous throughout the room, since windows are the predominant wall element. A wood desk is built into the west wall with a wood shelf mounted above it. The desk frame is painted and the desktop and shelf have a stained finish. Flooring is 2-1/4" tongue and groove wood boards. Mastic remains on the boards from removed 9" x 9" tile flooring. The room is accessed via an opening in the floor which has a wood trim surround and operable hatch. An original tread cover with a metal nosing is located at the top of the hatch. A 1-1/2" diameter painted metal bar surround at 2'-9" above the floor encloses the north and part of the west side of the opening. A 1" pipe is mounted to the window apron on the south wall centered on the ladder below.

<u>Condition</u>: Good and Fair
Tower (401)
Ceiling finish is in good condition. Plaster wall finish is in fair condition with many hairline cracks. Flooring is in fair condition with the



Figure 1-123. Tower interior finishes (KAC, 9/11/2019)



Figure 1-124. Tower hatch (KAC, 9/11/2019)



Figure 1-125. Damaged flooring in the Tower (KAC, 9/11/2019)

remaining mastic on the wood boards. Some boards, especially near the exterior door, are warping from water damage.

Architecture - Code/Life Safety
As a National Park Service building, any proposed rehabilitation is governed by the 2018 International Building Code (IBC) and its related family of codes.

Existing Building Code
The IEBC, International Existing Building Code, applies to the repair, alteration, change of occupancy, addition to and relocation of existing buildings. Within this code, work is categorized into Alteration Levels 1, 2 and 3 depending on the amount of work anticipated within the building. Additional categories include Change of Occupancy, Additions, Historic Buildings and Relocated Buildings. Requirements of the code are limited to work areas of the project for Levels 1-3. This means that Alteration projects are not required to upgrade the entire building per current code, just elements that are within the project work area dependent on the nature of the alteration work. Change of Use projects trigger more thorough upgrades and the building must be brought up to current code requirements for the new use. Proposed use for this building would not trigger a change of use.

Construction Type
Buildings and structures are classified as one of the five construction types in the IBC. The construction type defines the fire resistance rating of the building structure, exterior walls and interior walls.

The Station Dwelling (HS-18) is construction type VB non-sprinklered. Per section 602.5 "Type V construction is that type of construction in which the structural elements, exterior walls and interior walls are any material permitted by this code."

Existing Area

Basement:	1,871 gsf
First Floor:	1,966 gsf
Second Floor:	1,423 gsf
Third Floor:	1,379 gsf
Tower:	78 gsf
Total:	6,717 gsf

Use and Occupancy Classification
Currently the Station Dwelling (HS-18) is in use as non-separated office use and NPS staff housing and these are anticipated to be maintained.

Office: Business Group B - which includes the use of a building or portion of a building for office, professional or service-type transactions including storage of records and accounts.

Staff Housing: Residential Group R-2 - which includes sleeping units where the occupants are primarily permanent in nature, including boarding house (nontransient) with more than 16 occupants and dormitories.

Building Height
Table 504.3 limits allowable building height. Since this building is sprinklered, it is allowed to be 60' tall.

Table 504.4 indicates allowable height in stories. Per that table, with a B occupancy, this building is allowed three stories above grade and R occupancy is allowed four stories above grade. Since B is more restrictive, the building is limited to three stories above grade.

Occupant Load
Occupant load is dependent on the function of

the space. Per IBC section 1004, the following occupant load factors apply:

Function of Space	Load Factor
- Business areas	150 gross
- Residential	200 gross

Based on this, assuming business occupancy for the basement and first floor (26 people) and residential occupancy for the upper floors (15 people), the occupant load is 41 people.

Means of Egress
Occupant load determines the required size of the egress pathway, along with the number of exits. Currently there is only one code compliant exit from the second and third floors. The second floor has a second route out a window and down a ladder but it is not code compliant. Per Table 1006.3.3(2), R-2 occupancy with only one exit is not permitted except at the first story above or below grade plane.

Stairs & Raised Walking Spaces
Per IBC section 1011, stairways serving occupied portions of the building shall have a minimum width of not less than 44" and shall comply with Section 1005.1. If the occupant load of the floor is less than 50, then the requirement is 36" minimum width.

Stairs risers are required to be solid and shall be 7" maximum and 4" minimum. Rectangular treads shall be a minimum of 11". Stairway landings are required at the top and bottom of each stairway.

Stairway handrails are required to be not less than 34" and not more than 38" above the stair nosing and shall have an outside diameter of not less than 1-1/4" or greater than 2". Per IBC section 1014, handrails are required to return to the wall, guard or walking surface. Handrails "shall extend horizontally not less than 12" beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser."

Per IBC section 1015, guards are required at open sided walking spaces which are located more than 30" above the floor or grade below and shall not be less than 42" high. Guards shall not have an opening that allows the passage of a 4" diameter sphere within the required guard height.

Fire Suppression
NPS Director's Order 58 section 9.1.8 requires consideration for fire suppression of structures to "prevent loss of human life and minimize damage to historic property resources."

Condition: Poor
Prior to undertaking any alterations, a full code study should be undertaken to address impacts and code requirements triggered by the project. Note: This section will be updated once the treatment alternative and uses are defined.

Existing Building Code
Several of the current conditions do not comply with code requirements stated above, so if a full building rehabilitation and change of use is undertaken, many of the deficiencies will be required to be addressed. However, IEBC allowances for historic buildings allow for provisions in the context of the historic character of the building. This code is "founded on broad-based principles intended to encourage the use and reuse of existing buildings while requiring reasonable upgrades and improvements." This also limits extents of required upgrades to the work area(s).

Construction Type
Since there are no restrictions within the VB construction type, the Station Dwelling (HS-18) is in compliance.

Use and Occupancy Classification
If the occupancy were to change in the future, a full code study would be required.

Building Height
The building is less than 60' tall and therefore is in compliance.

Means of Egress
Residential use on the second floor requires a second exit. The current exit is via an operable window and down a ladder at the east side of the main entry porch roof. The third floor use will be limited due to only one egress route. Likewise the Tower use should be limited.

Stairs & Raised Walking Spaces
The tower access/egress is only by means of a stair ladder (1'-9-1/2" clear with 6" deep treads and 13" risers and a 3:12 pitch) to access a floor hatch opening to the Tower level. The hatch has a limited "guardrail" of a threaded pipe mounted to the floor and east wall at 32" above finished floor with no intermediate rails to protect the hatch opening.

The stair to the third floor is 3'-5" wide with (14) 7-1/2" risers and 11" treads. The low wall serving as a guardrail is only 2'-10" high. Handrails exist of both sides with a clear width of 2'-8", however handrail extensions do not exist.

The stair from the first to second floor is "L" shaped and 3'-5" wide with (16) risers at 7-1/2" and 11-1/2" deep treads and a landing near the front door. A handrail exists on

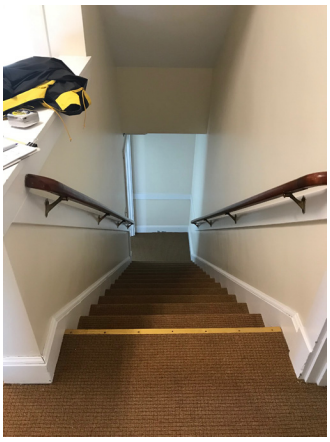


Figure 1-126. Non-compliant handrails (KAC, 9/11/2019)

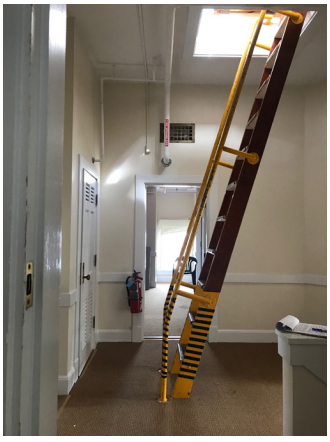


Figure 1-127. Ladder to the Tower (KAC, 9/11/2019)

both sides however it is discontinuous at the landing. The low wall serving as a guardrail at the top of the stair is only 2'-10" high.

There have been a secondary egress route retrofitted which requires existing out a casement window (2'-7-1/2" wide x 4'-7-1/2" high) to the balcony of the front porch and down an unstable ladder to grade. This route is not code compliant and has safety risks to occupants.

The second floor bedroom windows of the sleeping rooms have wood double hung windows of 2'-9" wide x 2'-1" (lower sash height) and a sill of 2'-3" above finish floor.

The basement stair is a scissor stair with a mid-level landing (only 3'-4" deep) to the rear exit. Both runs of the stair have a width of 3'-6" and a handrail (one at the east run; two at the west run). The risers are 8" and treads vary from 10-1/2" - 11". The low rail serving as a guardrail is 2'-11" above finish floor.

The exterior doors (front and rear) both swing into the building. With an occupant load of less than 49 this is in compliance.

The basement only has one egress route out but with use of storage / mechanical likely will remain in compliance. However, there is no egress signage at the basement.

Current riser and tread configuration does not comply with the code requirements. The handrails are not compliant with code, they do not have appropriate extensions and many do not return to the wall. Some runs of stairs within the building do not have a handrail. Where handrails exist, they do not have code required extensions.

Guardrails throughout the building do not



Figure 1-128. Egress window at the second floor (KAC, 9/11/2019)



Figure 1-129. Ladder at the porch roof (KAC, 9/11/2019)

meet the required code height. The second floor balcony over the porch has a guardrail of 33-1/2".

Fire Suppression
A fire suppression system is installed in the building. See Mechanical - Fire Suppression for additional information.

Other Code Items
The existing dormitory function of the second floor only has a single restroom serving it with multiple users (2 water closets/2 showers/2 lavatories). If the dormitory function is coed, the restrooms provided do not meet distribution requirements.

For kitchen and bathroom ventilation - see Mechanical Section.

Glass in basement door varies between clear (2 sets), obscured (1 set) and wire (1 set). It could not be verified if these are tempered.

Architecture - Accessibility
Per the Architectural Barriers Act (ABA), the Station Dwelling (HS-18) is required to meet accessibility requirements. Buildings are required to provide one universal access point to the building entrance, universal access routes from the entrance to the public spaces on the level of the main entry and a universal access restroom.

Currently access to the building is via concrete sidewalks to exterior stairs. The first floor restrooms have grab bars but doors and hallways do not provide an ABA compliant route, nor do the fixtures and accessories meet required clearances.

Non accessible door hardware exists throughout the building with the exception of



Figure 1-130. South entry door (KAC, 9/11/2019)



Figure 1-131. Lever hardware on the south entry door (KAC, 9/11/2019)

the two exterior door which both have a lever set.

The front porch consists of (5) risers with an additional 6" step at the front door.

The back door path has a 5" step to the landing and then a 9" step at the door. Note that this entry only gets users into the building at the landing elevation of the back stair.

The drinking fountain provided is 36" above the floor and the kitchen provided for occupants is not accessible.

Additionally, employee housing must include accessible units. ABA provides guidance for lodging guest rooms. Per ABA Table F224.2, when rooms number between 1-25, then a minimum of 1 ABA compliant rooms are required but none are required to have roll-in showers. However, this compliance must be considered within the context of the entire Pictured Rocks National Lakeshore staff housing count which would require greater number of ABA compliant units within the housing as a whole.

Condition: Poor

There is no accessible access to the building, both entrances have stairs. Within the building, the sleeping quarters are located on the second floor and the associate bathroom and showers do not meet ABA requirements.

If equitable accessible housing is provided in another building for NPS staff at Pictured Rocks National Lakeshore, then this requirement may be met elsewhere.



Figure 1-132. Steps up to north entry door (KAC, 9/11/2019)



Figure 1-133. Grab bar mounted on plexiglas in window (KAC, 9/11/2019)



Figure 1-134. Drinking fountain which is not ABA compliant (KAC, 9/11/2019)

Existing Conditions & Condition Assessment - Structural

Structural - General System Description

The Station Dwelling (HS-18) is a gabled roof, wood framed structure with a reinforced concrete foundation. Each of the north and south facets of the roof bear three gabled dormers and on top of the center of the structure is a one story tower. Two gabled roof wings extend from the east and west elevations of the central portion of the building and the south, main entrance is accessible via a porch. Off of the west elevation at the basement level extends a small addition labeled 'areaway' on the original drawings. The structure was constructed using a prototype building construction drawing that was created for the US Coast Guard that was slightly adapted based on the geographical location of the structure. Where visible, it appears that the existing structure was constructed in conformance with the drawings.

Structural - Foundation

Per the Coast Guard drawings, the exterior perimeter walls are founded on 10" wide reinforced concrete stem walls on 2'-0" wide by 1'-2" thick continuous footings. The bases of the footings are approximately 6'-7" below grade. The centered interior columns are founded on 3'-6" x 3'-6" square footings integral with a 2'-6" girder beam that spans between the footings. The front porch is founded on concrete stem walls and footings, similar to the perimeter foundation.

Condition: Good

The foundations of the Station Dwelling (HS-18) are in good condition with no major signs of distress such as excessive movement or cracking.



Figure 1-135. South elevation of the Station Dwelling (HS-18). Note the two wings located on the east and west elevations, the dormers, and the tower (CBB, 9/10/2019)

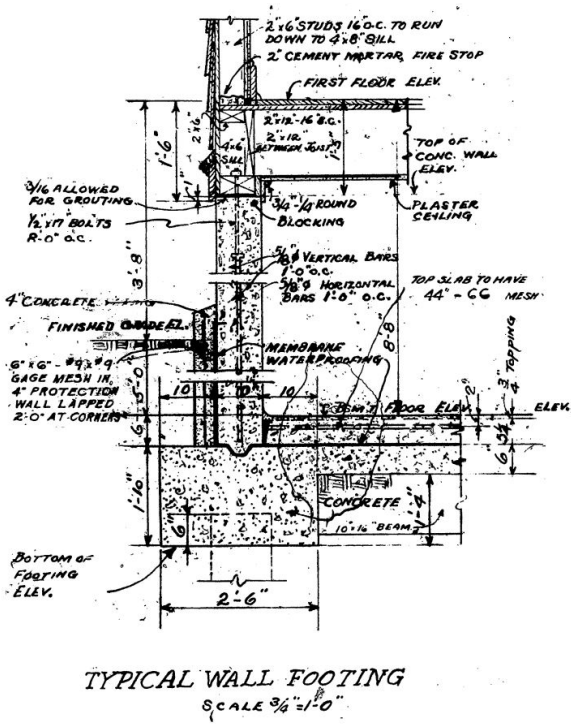


Figure 1-136. Typical Wall Footing Detail from the original 1938 as-built drawings of the Station Dwelling (HS-18) (USCG)

Structural - Floor & Ceiling Framing

The basement floor of the Station Dwelling (HS-18) is a two layer reinforced concrete slab that is integral with the perimeter foundation walls. The bottom 3" slab is reinforced with wire mesh reinforcing. This bottom slab was topped with a waterproofing membrane and then topped with a 9" thick slab reinforced with reinforcing bar. The topping slab is integral with the top slab.

The first floor is framed with 2x12 dimensional lumber joists spaced at 16" on center that are braced by wooden cross-bridging at the quarter points of the joist span. The joists span in the north-south direction between the exterior foundation walls and a series of W14 steel wide flange beams located along the center of the building running east-west. The steel beams are supported by four 4-1/2" diameter pipe columns: one each located in line with the east and west walls of the center portion of the building and two flanking the area encompassing Clothes Room (210) and Hall (001) with the staircase. The beams and columns are concealed within the centered partition wall.

The plaster ceiling is attached to furring on the underside of the floor joists. The top side of the joists are sheathed with diagonal 1x6 tongue and groove wood decking and a layer of flooring.

The second floor is framed similarly to the first floor with 2x12 joists spaced at 16" on center that are braced by wood cross-bridging at the quarter points. The joists span in the north-south direction between the exterior walls and interior center bearing walls.

The third floor is framed with 2x10 joists spaced at 16" on center that are braced by

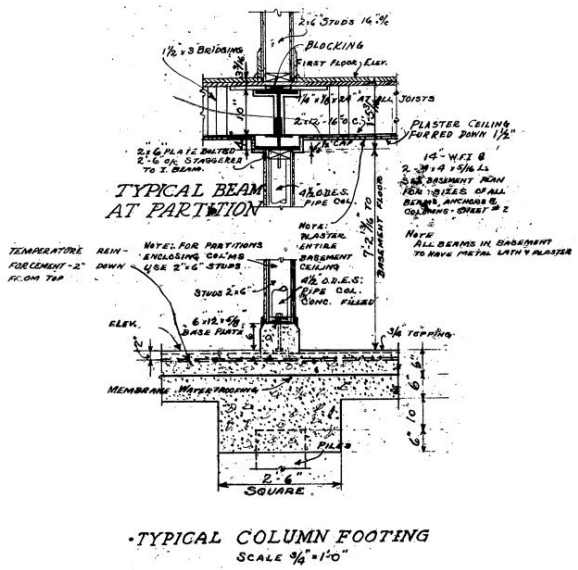


Figure 1-137. Typical Column Footing Detail from the original 1938 as-built drawings of the Station Dwelling (HS-18) (USCG)

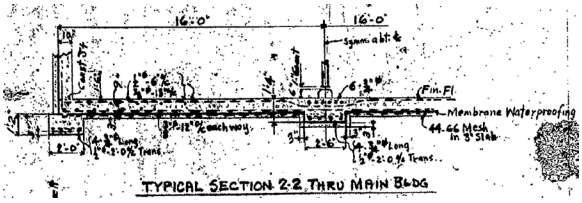


Figure 1-138. Typical Slab Detail from the original 1938 as-built drawings of the Station Dwelling (HS-18) (USCG)

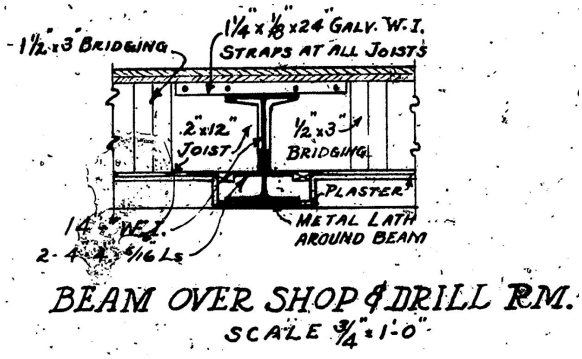


Figure 1-139. Beam Over Shop & Drill Room Detail from the original 1938 as-built drawings of the Station Dwelling (HS-18) (USCG)

wood cross-bridging at the quarter points. The joists span in the north-south direction between the exterior walls and interior center bearing walls.

The floor of the tower is framed with 2x10 joists at 16" spanning north to south supporting perpendicular 2x4 joists at 16".

The floor of the front porch is framed with a 4-1/2" thick concrete slab that is integral with the supporting concrete beams measuring at 8" wide and 15" deep.

Condition: Good to Fair

The basement concrete slab-on-grade of the Station Dwelling (HS-18) is generally in good condition with no signs of major subsidence or distress. However in one location near a drain in the Boiler Room (002), the concrete slab is disintegrating where a liquid of unknown contents collects. See the Mechanical section for further discussion on the unknown liquid.

The first, second, and third floors of the Station Dwelling (HS-18), in addition to the tower and front porch floors, are in good condition showing no signs of structural distress such as sagging or sloping floors. Since there are no changes in use proposed for the building and therefore no changes in the Risk Category classification of the building, there are no elements or systems deemed to be dangerous, and the floor framing has been performing well over the lifetime of the structure, no upgrades or changes to the floor framing are necessary.

One item to note is the sagging plaster ceiling in the Drill Room (004). This is occurring because the ceiling lath is delaminating or detaching from the bottom face of the first floor joists. There is not a structural concern



Figure 1-140. Delaminating plaster ceiling in the Drill Room (004) - looking east (CBB, 9/10/2019)

with the floor framing, however the failing plaster ceiling should be reattached to the floor framing to prevent debris from falling if the ceiling fractures and becomes completely detached from the floor structure.

Structural - Roof Framing

The gabled roofs of the structure (both the center building and the two wings) are framed with 2x10 rafters spaced at 16" on center at an 8-1/2:12 slope. At the ridge spans a double 1x12 ridge board. Approximately 8'-0" above the finish floor level, 2x6 collar ties span across each rafter pair. The roof rafters are sheathed on the top face with 1x6 tongue and groove sheathing. The ceiling finishes are attached to the underside of the rafters and collar ties.

The areaway off the west elevation of the west wing at the basement level is topped with a plywood structure which replaced the original metal grate called out on the original drawings.

The gable roofs of the dormers on both sides of the gable roof are framed with 2x4 rafters spaced at 16" on center. At the ridge of each dormer is a 2x6 ridge board, the inside end of which bears on a triple 2x12 beam where the dormers meet the rafters.

The pyramid hipped roof of the tower is framed with 2x6 rafters spaced at 16" on center. 2x6 ceiling joists span north-south across the top of wall elevation.

The roof of the porch is framed with 2x10 joists spaced at 16" on center, the tops of which are ripped to slope away from the building for drainage purposes. The joists are supported on the southern exterior bearing wall of the main structure, and a triple 2x6 beam that runs across the south elevation of



Figure 1-141. Roof framing visible from a storage area on the third floor of the Station Dwelling (HS-18) (CBB, 9/10/2019)



Figure 1-142. Decaying plywood cover over the areaway on the west elevation of the Station Dwelling (HS-18) (CBB, 9/11/2019)

the porch. This plied beam is supported by built-up round and square columns.

Attached to the east side of the porch is a metal fire escape ladder.

Condition: Good to Poor

The roof framing of the Station Dwelling (HS-18) is in good condition. Since there are no changes in use and therefore no changes in the Risk Category classification of the building, there are no elements or systems deemed to be dangerous, and the roof framing has been performing well over the lifetime of the structure, no upgrades or changes to the roof framing are necessary.

There are several areas in fair to poor condition: the plywood cover over the areaway, the fire escape ladder at the front porch, the deteriorating bases of the front porch columns, and areas where water is infiltrating the building envelope.

One area that is in poor condition is the plywood cover over the areaway at the west end of the building. The plywood is severely decayed due to exposure to weather and moisture. The system is not secure or structurally sound and poses a risk to the occupants.

Another area in poor condition is the fire escape ladder attached to the east side of the front porch. The attachments to the main structure are not secure and the ladder is in fact two ladders spliced together with a bolted plate. The splice plate acts as a hinge making it unstable, and unsuitable for an egress route.

In several locations, the bases of the front porch columns are starting to deteriorate. This deterioration is caused by prolonged



Figure 1-143. Fire escape ladder attached to the east side of the front porch (CBB, 9/10/2019)



Figure 1-144. Base of front porch column that is deteriorating (CBB, 9/10/2019)

exposure to high moisture levels that encourage decay fungi to flourish and deteriorate the wood. This has also been a problem in the past as several of the wood columns have been completely replaced in kind already.

On the third floor, there are several areas that show signs of water infiltration, likely through the roof or interfaces between the tower and the main structure. These are manifesting as water stains on the surface of the finishes or the deterioration of the finishes themselves. Although this is not currently of structural concern, if the water leaks are active and moisture continues to infiltrate the space, it could raise the likelihood that the wood structural members could deteriorate due to attack by decay fungi.

Structural - Wall Framing
The walls of the Station Dwelling (HS-18) are constructed of 2x6 wood studs spaced at 16" on center. The exterior face of the studs is sheathed with 3/4" sheathing. The studs bear on a 4x6 sill anchored to the concrete stem wall with 1/2" diameter bolts that are spaced at 8' on center. At each floor, between the joists in the wall cavity is a single layer of flat 2x6 blocking that supports 2" of mortar that acts as a firestop.

Condition: Good
The wall framing of the Station Dwelling (HS-18) is in good condition showing no signs of structural distress such as bowing or racking.

Structural - Lateral System
The lateral system of the Station Dwelling (HS-18) consists of the horizontally sheathed roof diaphragm, the sheathed floor diaphragms, the sheathed wood stud walls, and their connections to the foundation.



Figure 1-145. Water staining visible on the ceiling of the third floor, likely from a past leak in the roof (CBB, 9/11/2019)



Figure 1-146. Delaminating and blistering interior wall finishes on third floor, likely from the past leak in the roof (CBB, 9/10/2019)



Figure 1-147. Site wall found around three sides of the perimeter of the Station Dwelling (HS-18), seen here along the north elevation (LMG, 9/10/2019)

Condition: Good
The lateral force resisting system of the structure is in good condition. Since no change in use is planned for this structure, the Risk Category remains the same. Per code, since the Risk Category is not changing and there are no elements or systems deemed dangerous, no upgrades to the lateral elements of the building are required.

One area in need of further investigation that was not accessible during the observation visit is at the bearing walls where the rafters bear on the walls. Typically the nailed connection between the roof framing and the wall framing of buildings constructed during this era is inadequate to resist wind from lifting up the roof structure and it is in best practice to upgrade this connection.

Structural - Applicable Codes & Loads
The code references for this assessment include the 2018 International Building Code (IBC), the 2018 International Existing Building Code (IEBC), and ASCE 7-16 Minimum Design Loads for Buildings and Other Structures.

The load requirements for the Station Dwelling (HS-18) at the Grand Marais USCG Station are based on the type of occupancy and geographical location of the building. The required floor live load capacities per ASCE 7-16 for office use is 50 pounds per square foot (psf) and for residential use is 40 psf. These building uses classify the structure as Risk Category II for standard occupancy. A brief review was completed to compare the current design and current code required live load capacities of the floors (see the PIRO HSR Live Load Capacity Chart in Appendix C).

The ground snow load required for the Grand Marais USCG Station per ASCE 7-16 is 70 psf.



Figure 1-148. Cracks in the perimeter site wall near the northwest corner likely caused by the close proximity of the trees to the west and their root systems (LMG, 9/10/2019)

This ground snow load translates to a flat roof snow load on the Station Dwelling (HS-18) of 40 psf per ASCE 7-16 when wind exposure and thermal conditions are considered. Given the slope of the roof and the texture of the roof surface, a 10% reduction is allowed resulting in a roof snow load of 36 psf.

The ultimate design wind speed at the Grand Marais USCG Station site per ASCE 7-16 Figure 26.5-1B is 104 miles per hour (mph). The equivalent nominal wind speed is 90 mph.

The Grand Marais USCG Station site falls within Seismic Design Category A. The Seismic Design Category is a classification given to a structure that is based on the Risk Category of the building and the severity of the design earthquake ground motion at the site. The earthquake ground motion properties of the site are cataloged by the United States Geological Survey (USGS). The two mapped acceleration parameters for the site per USGS are short period (Ss = 0.044 g) and 1 second period (S1 = 0.020 g). Without site specific soil testing, site soil conditions are assumed to comply with Site Class D resulting in a Seismic Design Category for the Station Dwelling (HS-18) as A. Since the structure falls within Seismic Design Category A, no seismic analysis is necessary per code.

Southern pine design values were used to evaluate the load capacity of the Station Dwelling (HS-18) structural members based on visual inspection of the material on site. Most of the members had only some sporadically located grade-limiting defects, such as small knots, resulting in Select Structural analysis values.

Condition: Good
The structural elements of the structure are

adequate for imposed loads on the structure and are therefore in good condition.

Existing Conditions & Condition Assessment - Mechanical

Mechanical - General System Description

The original drawings for the building provide for a fuel-fired boiler located in Boiler Room #002. The boiler provided heating water for radiators located throughout the building for space heating as well as heating water for the indirect domestic water heater. The hydronic heating water was pumped from the Boiler Room to the north and south with main lines to the exterior walls of the basement. The hydronic lines then rose through the walls to the floors above in multiple locations to feed the radiators. The boiler flue was ducted to a chimney in the southeast corner of the Boiler Room and out through the roof.

Today, the fuel-fired boiler has been removed, and two (2) new high-efficiency propane-fired boilers have been installed in the Boiler Room #002 on the east wall. The boilers are each a Trinity Model Lx200 with a BTUH input of 199,000. The boilers were installed in +/- 2012. However, the burner on Boiler #2 was replaced in January 2019. Each boiler has individual direct vented combustion air and flue vent to the outside on the east wall. New copper piping was installed within the Boiler Room for the boiler installation along with primary circulation pumps at each boiler, isolation valves, and secondary loop pumps. Immediately downstream of the secondary loop pumps, the new copper pipe connects to the original 3-1/2" steel pipe and with older gate valves. The original pipe is insulated while the newer copper pipe is not insulated. A strainer with drain down and isolation is provided on the main loop that



Figure 1-149. Boilers, pumps, and expansion tank on east wall of boiler room. (DMD, 9/11/2019)



Figure 1-150. Boiler venting and combustion air out window opening on east wall. (DMD, 9/11/2019)



Figure 1-151. Connection point of new lines to older system. (DMD, 9/11/2019)

serves the entire building. The air separator is original to the hydronic system, while a new expansion tank was provided when the boilers were replaced. Pipe temperature sensors are attached to the new copper pipes and connected back to the boiler control panel. The boiler control panels control the firing of the boilers to maintain loop temperature and the operation of the primary and secondary pumps. The system pressure is approximately 12 psi.

The basement area has ceiling mounted radiator panels. The Boiler Room #002 has one radiator, Storage Room #003 has two radiators, Drill Room #004 has three radiators, Shop #005 has two radiators, Laundry Room #006 has one radiator, and Clothes Room #210 has one radiator. The Provisions Room #007 has no heat. The hydronic heating water piping is routed as exposed piping in the basement area.

The 1st floor heating is via floor mounted radiators. The hydronic heating water piping provides supply and return lines to the radiators from the floor below. Hall #101 has a radiator recessed in the wall. Mess Room #102 has two radiators under the south windows, Day Room #103 has two radiators under the east windows, Office #104 has no heat, the Grade Entrance has one radiator on the north wall to west of the entry door, Women's #107 and Men's #108 have no heat, Office #109 has one radiator under the north wall and a second radiator under the west wall, Bathroom #110 has a small radiator on the north wall, and Office #111 has two radiators on the west wall on either side of the west window. There is a single thermostat located in Hall #116. All radiators have manual valves to turn the heat on and off.



Figure 1-152. Grab bar attached to plexiglas at window. (DMD, 9/11/2019)



Figure 1-153. Diesel generator and venting, photo taken looking east. (DMD, 9/11/2019)



Figure 1-154. Open shutters in basement Storage Room #003 on south wall. (DMD, 9/11/2019)

The 2nd floor heating is via floor mounted radiators. There are four (4) previous bedroom units on this floor with one of the bedrooms converted into a Kitchen. Only one of the three (3) remaining bedrooms was available for access during the site visit, and it is was stated that the other bedrooms are similar. Based on this information, there are two (2) floor mounted radiators in each Dorm Room #202, #205, and #206 with a radiator on each exterior wall of the Dorm Room. Kitchen #203 has two radiators with one under the east window and the second under the easternmost north window. Hall #201 is heated via a radiator located on the south end by the stair door. There is no heat in Bathroom #204.

The 3rd floor heating is three (3) floor mounted radiators with one in each north dormer. This is consistent with the original drawings. The radiator in Loft #303 is a newer (+/-2019) radiator manufactured by Buderus.

The cupola is heated via a radiator on the north wall under the middle window.

There is no mechanical cooling within the building.

Ventilation is provided via operable windows throughout the building. There are a couple of windows on the 1st floor that are noted to not be opened. The Bathrooms on the 1st floor also are inoperable and have the ABAAS grab bar at the water closets attach to plexiglass at the window.

In the basement Boiler Room #002 there is a portable dehumidifier plugged into an outlet and located in the southwest corner.

In the basement Storage Room #003 there



Figure 1-155. Exposed hydronic piping in basement. (DMD, 9/11/2019)



Figure 1-156. Typical floor mounted radiator. (DMD, 9/11/2019)



Figure 1-157. Replaced radiator on 3rd floor. (DMD, 9/11/2019)

is an abandoned diesel generator. The generator is still vented to the outside through the east wall. There are also two (2) 12x12 automatic shutters on the south wall that have had the controls removed and are in the open position.

In the basement Laundry Room #006 there is a dryer with a 4" ducted exhaust out the north wall.

There are no exhaust fans in the Women's Room #107, Men's Room #108 or Bathroom #110.

There is a small exhaust fan in Bathroom #204, but there is no control of the fan. During the site visit the fan ran continuously.

Kitchen #203 has an electric range with a recirculating hood manufactured by Broan.

The 3rd floor has two (2) 18"x6" grilles in the ceiling with on the east end in Loft #302 and another on the west end in #303. The grilles have insulation laying on top of them in the attic. There is also a grille above the door leading from Hall #301 into Loft #303.

Condition: Fair to Good

The central heating plant consisting of the boilers and pumps in the Boiler Room are in good condition. However, the heating water piping is original to the building past its expected service life of 50 years. There is a section of piping in the Basement Laundry Room #006 that has been replaced with electrical conduit and non-pressure rated fittings.

The heating radiators are also past their anticipated service life of 25-50 years, and the one unit on the 3rd floor has failed. The failed unit was on-site during the visit, and



Figure 1-158. Grab bar attached to plexiglas at window. (DMD, 9/11/2019)



Figure 1-159. Diesel generator and venting. (DMD, 9/11/2019)



Figure 1-160. Open shutters in basement Storage Room #003. (DMD, 9/11/2019)

the failure of the unit was on the side where a leak had started. Observing the interior of the radiator and a removed valve, both the radiator and valve show signs of dirt buildup within the hydronic system.

The copper heating water pipe in the Boiler Room is not insulated and is an energy loss as well as the heating capacity loss for the system.

Storage Room #003 has two (2) shutters that are in the open position with no controls. These open shutters pose a risk to freezing pipes in the room. This room is also where the domestic water heater is located.

Thermal control of the radiators is minimal, and during the site visit, it was stated that the radiators provide heat in the middle of the summer.

There is a lack of heat in Office #104, Women's Restroom #107, Men's Restroom #108, and Bathroom #204.

There is no International Mechanical Code (IMC) required exhaust in Women's Restroom #107 and Men's Restroom #108, and the windows in these restrooms are inoperable. Section 402.2.1.1 requires a minimum of 70 CFM (cubic feet per minute) of airflow in toilet rooms. There is also no exhaust fan in Bathroom #110. There is an operable window in Bathroom #110; however, this has been ineffective in relieving the humidity in the space, as noted by the mold buildup in the shower.

The exhaust fan in Bathroom #204 is ineffective based on the mold growth in the showers.



Figure 1-161. Small exhaust fan in Bathroom #204. (DMD, 9/11/2019)



Figure 1-162. Electric range and recirculating hood in Kitchen #203 on west wall. (DMD, 9/11/2019)

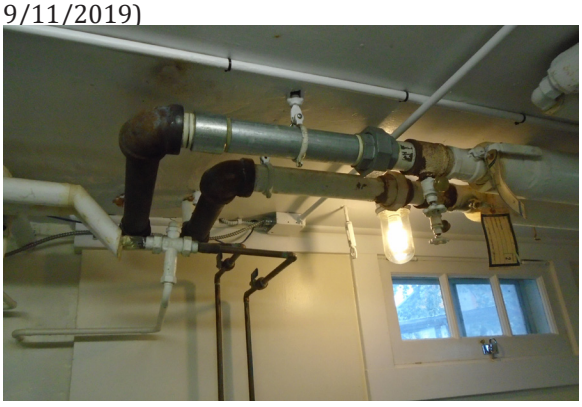


Figure 1-163. Hydronic piping in Laundry Room #006 replaced with electrical conduit. (DMD, 9/11/2019)

Existing Conditions & Condition Assessment - Plumbing

Plumbing- General System Description

The main water line enters the basement in Storage Room #003 in the northeast corner. The main line into the building is a 4" line that has a blind flange, and then a 1-1/2" water line is tapped into the blind flange. The 1-1/2" line is immediately reduced to a ¾" line. The ¾" water line feeds all the plumbing fixtures in the building. There is a modern-day water meter on the line and isolation valves for drain down. Downstream of the meter is a pressure reducing valve. The entering water pressure is +/- 90 psi as tested at the fire entry in the basement. There is no backflow preventer on the main water line.

There is a chlorination system in Storage Room #003 that has been turned off. The water line then is routed into a Well Mate pressure tank. It is unknown why this tank exists with the high entering water pressure. After the pressurization tank, the water line is routed to a modern-day high-efficiency propane-fired water heater on the north wall.

The cold, hot, and hot water recirculation mains, all ¾", are routed parallel to each other from the Storage Room #003 west to Shop #005. There are multiple water branch connections to plumbing fixtures above with a mix of gate valves and ball valves. Many modifications to the water lines have occurred over the years to retrofit areas or repair leaks.

The hot water recirculation line starts in Laundry Room #006 and is routed back to Storage Room #003, where it then connects directly to the hot water line with no recirculation pump.



Figure 1-164. Interior of removed radiator valve on 3rd floor. (DMD, 9/11/2019)



Figure 1-165. Interior of failed radiator on 3rd floor. (DMD, 9/11/2019)

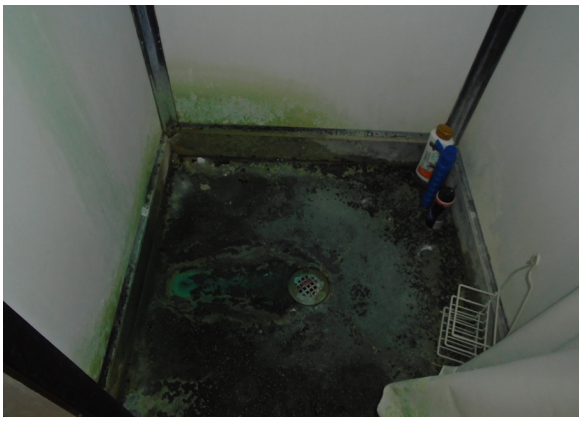


Figure 1-166. Shower floor in Bathroom #110. (DMD, 9/11/2019)

The piping material on the domestic water line consists of galvanized, copper, and PEX.

There are minimal plumbing fixtures in the Basement with a clothes washer in Laundry #006, a hose bibb feed to the north outside Boiler Room #002. There is also a make-up water line to the hydronic boiler system. There is no backflow preventer on the make-up water line or meter.

There are three (3) bathrooms on the 1st floor. The Women's and Men's room were recently renovated and contains a tank type water closet and wall hung lavatory. There is also a drinking fountain installed in the foyer outside the restrooms. The third bathroom is between Office #109 and #111 and contains a tank type water closet, wall hung lavatory, and a small shower.

The 2nd floor has a multi-user restroom with two tank type water closets, two wall hung lavatories, and two showers. Kitchen #203 has a stainless steel double compartment sink.

There are no plumbing fixtures on the 3rd floor or in the cupola.

There are two locations in the basement where sanitary lines are routed out the north wall towards the septic system. There is one line that exits under the stair that is a 6" line, and the other line exits out of Shop #005. The sanitary lines are route exposed in the ceiling of the basement to these two locations where they connect through a series of wye fittings. The sanitary line has been repaired and replaced in many locations and is a mixture of cast iron and PVC. In several locations the original cast iron lines have been abandoned and new routes of PVC lines installed. The venting of the building is problematic as



Figure 1-167. Water entry with water meter on east wall of storage room. (DMD, 9/11/2019)

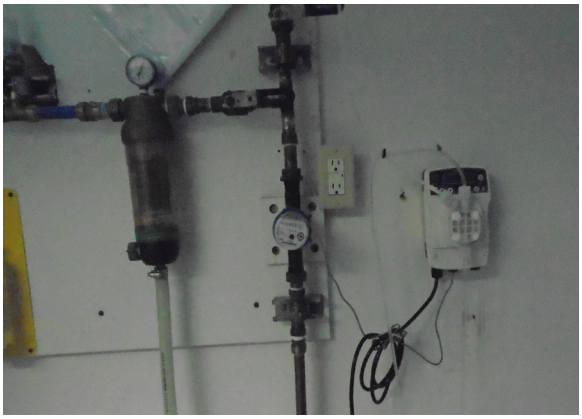


Figure 1-168. Disconnected chlorination system. (DMD, 9/11/2019)



Figure 1-169. Water heater, Well Mate pressure tank, and chlorination system on north wall of Storage Room #003. (DMD, 9/11/2019)



Figure 1-170. Water lines routed parallel to each other. (DMD, 9/11/2019)

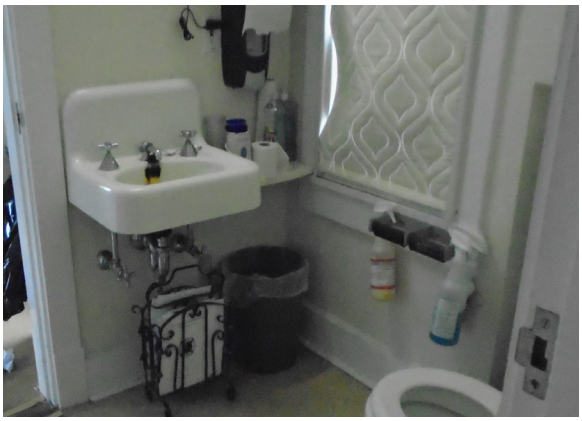


Figure 1-173. Plumbing fixtures in Bathroom #110 on west wall. (DMD, 9/11/2019)



Figure 1-171. Multiple water line routes and valving. (DMD, 9/11/2019)



Figure 1-174. Lavatories in 2nd floor restroom on east wall. (DMD, 9/11/2019)



Figure 1-172. Plumbing fixtures Women's Room #107 on west wall. (DMD, 9/11/2019)



Figure 1-175. Shower in 2nd floor restroom. (DMD, 9/11/2019)

evidence of gooseneck fittings at the Vent-Through-Roof locations and several air admittance valves installed on the sanitary main in the basement.

There are floor drains in the basement, including in the Boiler Room #002, Storage Room #003, Drill Room #004, Shop #005, and Laundry #006. The original drawings show these drains routed to a sump in the southwest corner of Drill Room #004. However, that sump basin and pump does not exist today. There is a sump basin and pump in the Boiler Room #002 near the north wall. During the site visit there was a continuous trickle of water into the basin yet there was only a small amount of water on the floor of the Boiler Room #002. It is unknown if the floor drains in the basement all route to the sump basin in the Boiler Room. Additional scoping of these lines needs to be completed. The sump pump cycled on and off when the float was manually lifted. The sump pump is routed to the sanitary line that exits under the stairs to the west of the Boiler Room #002. The piping on the discharge of the pump was a mixture of piping materials and included a flexible coupling that offset the pipe.

North of the building is a new leach field and septic system. New PVC sanitary lines are routed from the septic system to the building.

In Boiler Room #002, there was an unidentified liquid on the floor that was causing the paint to peel off the floor. The source of this liquid is unknown, and reports were made that it sometimes comes up through the floor drain. Camera scoping of the floor drains should be completed to determine routing of lines under the floor and potential source of the unidentified liquid.

North of the building is a 1,000-gallon



Figure 1-176. Cleanouts for the septic system north of building. (DMD, 9/11/2019)



Figure 1-177. View of septic field from above looking north. (DMD, 9/11/2019)



Figure 1-178. 6” PVC line under stair to septic system. Existing cast iron lines abandoned and capped. Sanitary lines exit to the north. (DMD, 9/11/2019)



Figure 1-182. Example of air admittance valve on sanitary line. (DMD, 9/11/2019)



Figure 1-183. Sump pump in basement. (DMD, 9/11/2019)



Figure 1-184. Floor drain in Boiler Room #002 with unidentified liquid and floor paint peeling. (DMD, 9/11/2019)



Figure 1-179. Sanitary line with multiple connections existing Shop #005. (DMD, 9/11/2019)



Figure 1-180. Location where cast iron line has been abandoned and new PVC line installed with new route. (DMD, 9/11/2019)



Figure 1-181. Vent-Through-Roof on west side with retrofitted PVC gooseneck fitting. (DMD, 9/11/2019)

propane tank manufactured in 1957. Off the tank is a ¼" copper line that routes south to the building where there is a pressure regulator outside the Boiler Room #002. The propane piping is a 1-1/2" Schedule 40 steel pipe after the regulator and provides propane gas to the two boilers and one water heater in the basement.

Condition: Poor to Fair

The main water line is undersized for the building plumbing fixtures and has no backflow protection. The water lines have been repaired and rerouted with numerous valves and unknown termination points through the years. On the 1st floor Bathroom #110, the shower has hot water however the lavatory in the same bathroom has no hot water. The hot water recirculation line is not a true recirculation line, and wait times for hot water is long. The showers have mold growth and need to be replaced. The plumbing fixtures in the 1st floor Bathroom #110 are in poor condition while the plumbing fixtures in Women's #107 and Men's #108 are in good condition.

The lavatories do not have insulation underneath for ABAAS protection in the 1st floor restrooms. The water heater is a newer modern-day heater and is in good condition.

The sanitary lines that are PVC are in good condition; however, the cast iron lines are failing and causing clutter and confusion within the basement ceiling area. There are problems with the venting of the plumbing system as noted above. There is a mysterious liquid in the Boiler Room #002 that needs further investigation. The sump pump is operational but nearing the end of its service life.

The propane line is in good condition, and the



Figure 1-185. Propane tank north of building. (DMD, 9/11/2019)



Figure 1-186. Propane regulator on north side of building. (DMD, 9/11/2019)



Figure 1-187. Fire entry, dry pipe valve, and air compressor on south wall in basement. (DMD, 9/11/2019)

tank appears to be good. Recertification of the propane tank is recommended.

Existing Conditions & Condition Assessment - Fire Protection

Fire Protection- General System Description

The main 4" fire line enters the building in the southwest corner of Drill Room #004. The system is split into a wet sprinkler system and a dry sprinkler system. The dry sprinkler system has an air compressor located adjacent to the fire riser. The wet sprinkler provides protection for the basement, 1st floor, 2nd floor, 3rd floor, and cupola occupied areas. The dry pipe system provides protection for the attic areas. The incoming water pressure was measuring 95 psi on the pressure gauge. The dry pipe system was recently tested on June 18, 2019. The air pressure in the dry pipe system is at 40 psi and trips when the air pressure drops to 12 psi. There is a fire testing station at the fire entry that drains out the south wall to the exterior. There are (13) low points that need to be drained on the dry pipe system when tested and for maintenance.

The wet fire sprinkler lines in the basement and on the upper floors are typically routed as exposed piping that is painted. The exception is the lay-in ceiling area on the 1st floor in the Foyer, Women's restroom, and Men's restroom. The fire sprinkler line for the cupola enters the area just north of the ship ladder and is routed up near the ceiling to a single sprinkler head.

Condition: Good

The fire sprinkler system is in good condition, and no areas of leaking were found during the site visit. Any dry pipe system that is pressurized with air has a faster deterioration



Figure 1-188. Sprinkler head in the attic area. (DMD, 9/11/2019)

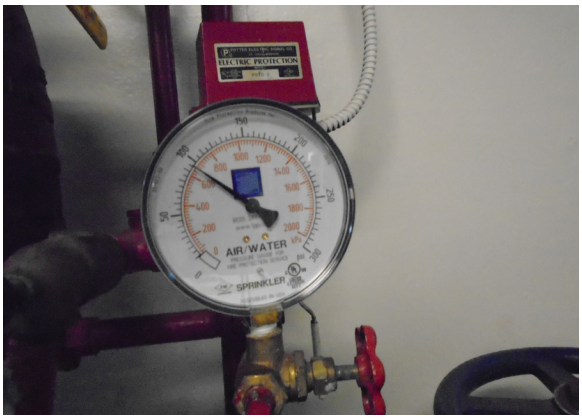


Figure 1-189. Water pressure on fire system. (DMD, 9/11/2019)



Figure 1-190. Typical exposed fire line with protected sprinkler head and axillary drain. (DMD, 9/11/2019)



Figure 1-191. Typical exposed fire sprinkler line on the 2nd floor. (DMD, 9/11/2019)



Figure 1-192. Sprinkler head in lay-in ceiling. (DMD, 9/11/2019)



Figure 1-193. Sprinkler riser and head in tower. (DMD, 9/11/2019)

rate of piping material due to the oxygen that is inherent in the system.

Existing Conditions & Condition Assessment - Electrical

Electrical Service and Panels

The existing electrical service for the Station Dwelling (HS-18) is 240/120v, 1PH, 200A, with the utility meter and service disconnect located on the building exterior. This feeds a 300 amp rated disconnect and two panels 'A & AA'. Panels 'A and AA' serve branch circuits for the entire building. Also, there are five disconnects located adjacent to the panels, a 12KW emergency generator and ATS; all appear to be abandoned in place.

A second utility meter and 100 amp service disconnect are mounted on the building exterior that appear to feed the adjacent Officer in Charge Building. The overhead power line serves both 200A and 100A services. This does not appear to be compliant with the National Electrical Code (NEC) as the services are not independent and both buildings need to be de-energized for meter maintenance.

With regard to grounding, there is no bonding jumper installed across the water meter, which is a violation of NEC.

Condition: Poor

There are no updated electrical drawings available, however, drawings reflect electrical revisions for the electrical distribution in 1966 & 1981. Initially the Station Dwelling (HS-18) provided both normal and emergency power to the four buildings. The electrical has been revised so that all four buildings are separately metered. The emergency 12.5kVA generator in the

basement has been decommissioned and remains in place, reference Figure 1-198.

Electrical Distribution System
Branch circuits are run in conduit. Surface wiremold raceway is in some areas for spot smoke detectors. In some areas, conductors are run from the wiremold directly into the wall without conduit, in violation of NEC. Receptacles are installed recessed within walls. The fire alarm was added in more recent years and is installed in surface wiremold raceway.

Improvements appear to have been made in more recent years, including additional additions of devices to support equipment such as washer and dryer units, and additional refrigerators. The overall wiring systems are anticipated to be of mixed vintage.

The dormitory sleeping rooms do not have arc fault circuit breaker protection as required by current NEC.

Condition: Poor
The branch circuit wiring overall and overcurrent protection do not meet requirements of NEC and National Park Service requirements.

Lighting, Emergency Lighting, and Exit Signs
Interior lighting is inefficient using both fluorescent and incandescent fixtures. Manual wall switches are used throughout. None of the observed lighting within the Station Dwelling (HS-18) appeared to be original, but of mixed modern vintages.

Emergency lighting is provided by frog eye battery fixtures. Exterior egress lighting was not observed.



Figure 1-194. Station Dwelling (HS-18) (SJH, 09/11/2019)


Figure 1-195. Two electric services (SJH, 09/11/2019)


Figure 1-196. Existing basement electrical equipment in use and some abandoned (SJH, 09/11/2019)

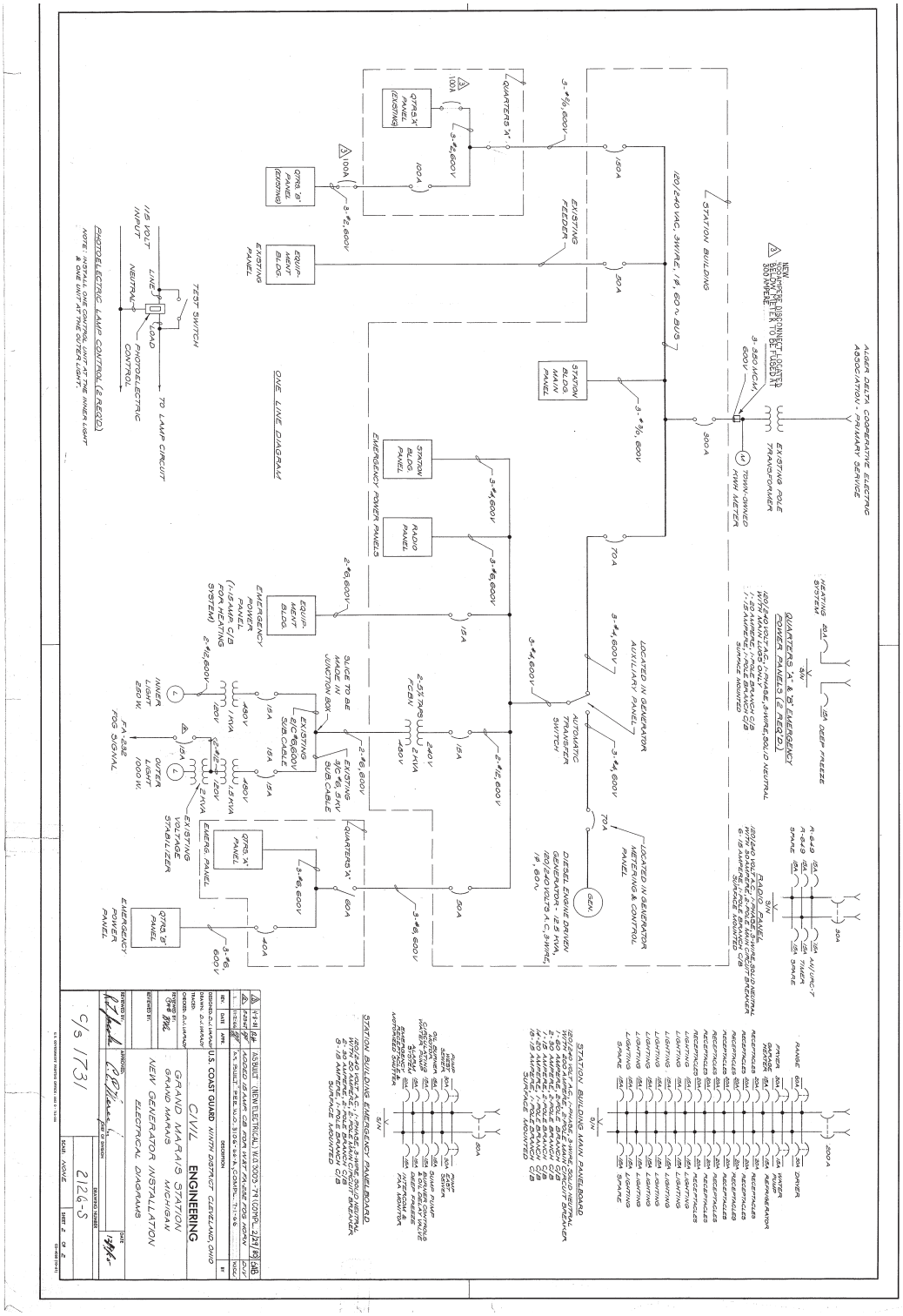


Figure 1-197. Electrical Diagrams for 1967-1981

Exterior lighting is minimal, and are not Dark Sky compliant. The existing fixtures do not appear to be historic.

There are limited exit signs in use.

Condition: Fair
All fixtures are obsolete, inefficient, and none appear to be historic in nature, but instead of various modern vintages. While dated and inefficient, the fixture were operational.

Fire Protection & Detection System
There is an existing fire alarm system in the building. The fire alarm control panel is located on the basement level, and the building appears to have some visual notification system in common stairways only. Smoke detectors are only located in the sleeping rooms and kitchen. There is no notification in the rest room common to the sleeping areas. Coverage is lacking on Third floor and First Floors almost entirely.

Condition: Poor
Fire protection is existing but not installed comprehensively throughout the building. General coverage thought out is lacking both in notification and detection, and therefore the system is not code compliant nor meeting National Park Service Standards.

Tele/Data Communications Systems
The existing telephone line is overhead from the utility. The punch down location was not observed.

Condition: Poor
The overhead telephone line provides telephone and DSL internet only. No equipment was observed and devices were very limited throughout.



Figure 1-198. NEC violation showing 120v conductors run without raceway 3rd floor (SJH, 09/11/2019)



Figure 1-199. Existing emergency egress lighting (SJH, 09/11/2019)



Figure 1-200. Basement Fire Alarm Control Panel location (SJH, 09/11/2019)

Lightning Protection System
The existing lightning protection system in need of repair and recertification. It appears the lightning protection on the watchtower was damaged during the recent roof replacement and was not repaired. Downleads and terminations are broken, the metal handrail and other metal equipment are not bonded, and there is no surge protection in place as required per NPFA 780. It is likely the old ground rods will need to be replaced as well.



Figure 1-201. Station Dwelling (HS-18) (SJH, 09/11/2019)

Condition: Poor
The existing system requires reinstallation, some replacement, and recertified to a UL Listed Lightning Protection System.

Existing Conditions & Condition Assessment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Existing Conditions - Hazardous Materials

Hazardous Materials - General Description
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
Asbestos inspection services were performed to identify the presence, location, quantity, friability, and condition of Asbestos Containing Material (ACM) located at the project site. Bulk samples were collected and analyzed of suspect ACM.

Lead Containing Paint
Readings of suspect Lead Containing Paint (LCP) were collected in a representative manner as determined by the inspector based on identifying testing combinations where the surface color, substrate, or building component were visibly different. Sampling was limited to materials that were visible and readily accessible to the inspector.

Regulated Building Materials
Inspectors provided visual survey for Regulated Building Materials (RBM) throughout all buildings.

Biological Hazards
Inspectors provided visual survey for biological hazards including rodents and mold growth throughout all buildings.

Hazardous Materials - General Description
Condition: Good or Poor
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
ACM is defined as a material containing greater than one percent asbestos by weight, volume or surface area. Regulations distinguish treatment requirements between friable and non-friable forms of ACM. Test results confirmed ACM in the following locations:

- White flexible duct connector located in the basement generator room contained 85% chrysotile asbestos (one observed).
- Green floor tiles with white streaks located on the first-floor storage room, second floor under carpet, and in other locations throughout under carpet contained 4.3-12% chrysotile asbestos=. The mastic associated with this tile was non-detect for asbestos (1,360 SF).

Lead Containing Paint
Lead Based Paint (LBP) is defined as a paint containing 0.5% lead by weight or 1.0 milligram per cubic centimeter by both the EPA and HUD.

The following locations have LBP or LCP:

- Yellow and Red paint on concrete basement stairs and curbing in basement.
- Gray and red paint on concrete floors in basement.
- Green and yellow paint on concrete walls in basement.
- Beige and yellow paint on plaster walls on throughout.
- White and light-yellow paint on door frames.
- Yellow and gray paint on metal ladder to the observatory on the third floor.

- White paint on wooden siding and windows on the exterior of building.
- Gray paint on the concrete foundation walls on the exterior of building.
- Black and red paint on metal railings on the front porch.

Soil was collected from the dripline of the building and had 1,040 mg/kg of lead. This does not exceed the EPA non-play area bare soil level of 1,200 mg/kg for lead. Paint chips were noted in the soil.

Regulated Building Materials
RBM found throughout the building were fluorescent light tubes and compact florescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire suppressant chemicals; smoke detectors, emergency lighting, and emergency exit signs which contain batteries, and many contain radiation sources; deep-cycle batteries which contain lead and acid; and a 1,000-gallon propane tank.

Biological Hazards
No water infiltration or evidence of rodents was observed at the time of the inspection. The NPS escort did mention that the basement floor drain does backup occasionally with water.

Officer in Charge Dwelling (HS-19)

Existing Conditions & Condition Assessment - General

General Building Description

The Officer in Charge Dwelling (HS-19), built in the 1920s, is square in plan with two stories plus a full basement. It has a hipped roof with wood shingles. Exterior walls have painted horizontal wood siding above the painted concrete foundation. A concrete stair leads up to the main entry door which has a projecting gable hood roof protecting it. Another exterior stair leads up to the secondary eastern entrance. A small one story gable addition on the north also has a set of exterior stairs leading up to the rear door. A partially subgrade root cellar with a shed roof extends to the west of the main mass.

The interior has been remodeled from the original layout which provided offices and dormitory space, to a single family residence. Select elements, such as the stair to the second floor, retain their original location. Walls on the first floor appear to generally retain the original configuration though openings have been modified. Bathroom and kitchen fixtures and finishes have been replaced.

Condition: Fair

The exterior siding is a modern replacement in the style of the original which return the building to the historic appearance. Historic interior finishes have been modified but select elements that provide historic character, such as the stair to the second floor, remain intact.



Figure 1-202. South facade (KAC, 9/11/2019)

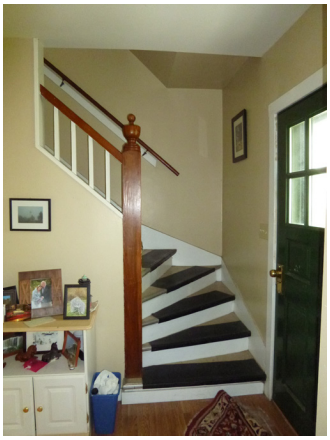


Figure 1-203. Stair to the second floor (KAC, 9/11/2019)



Figure 1-204. Square building mass with hipped roof (EMH, 9/11/2019)

Character Defining Features

Mass/Form

The square shape of the building capped by a hipped roof is a character defining feature. The small gable roof over the front door and

concrete stair leading to it also contribute to the building character.

Exterior Materials
The majority of the exterior materials are not original, however they are in-kind replacements. The exterior materials which contribute to the Craftsman era character of the building are:

- Exposed concrete foundation
- Painted wood lap siding: selected in 2001 to match the historic and restore the building to the original appearance
- South concrete stair: reconstructed in 2001 to replicate the historic appearance
- Wood shingle roofing: in-kind replacement
- Exposed rafter tails and open soffit

Openings
The regular, window openings in single, paired and triple configurations contribute to the character of the building. Windows have been completely replaced, though the current windows installed are similar in appearance to the historic sash.

The entry door on the main facade is emphasized by the gable roof hood comprised of exposed painted timber framing in keeping with the Craftsman detailing. Original door locations on the front, side and back of the building have been retained. Doors in these openings are replacements which are similar in appearance to the historic.

Interior Materials
The majority of the original materials have been removed and replaced with contemporary finishes. The stair between the first and second floor is intact and retains the original wood baluster.



Figure 1-205. Exterior materials (EMH, 9/11/2019)



Figure 1-206. Window openings and gable roof hood over the main entry (EMH, 9/11/2019)



Figure 1-207. Intact exterior integrity of design, location, materials and feeling (KAC, 9/11/2019)

Integrity

The Officer in Charge Dwelling (HS-19) retains good integrity of design, location, materials and feeling on the exterior. On the interior, the building has been modified to function as a single family dwelling and finishes have generally been replaced throughout which has resulted in a loss of interior integrity.

Existing Conditions & Condition Assessment - Architecture

Architecture - Roofing System

There are three types of roofing on the building. The hipped main roof and north gable have wood shingles with a red staved coating. The front door gable opening has a newer wood shingle (likely installed ca. 2019 with the adjacent station building roof install), also within a red coating. And the west "roof" cellar shed roof has newer (date unknown) red asphalt shingles. Historic photos indicate the wood shingles had a hipped ridge cap – likely metal. The wood shingles as installed today have a shingled ridge detail. Flashing where exposed at the main roof appears to be a prefinished metal drip edge. The chimney penetration has a red metal flashing which appears to be of an earlier era. There are roof vents near the crest of the hip roof one on each slope. The plywood sheathing was likely installed over the historic skipped sheathing during the most recent roofing project. It is unknown if the current wood shingles are installed on battens.

The north gable roof has an overframed painted wood "walk" at the ridge to lead to an egress ladder down the wall.

The root cellar's shed roof has newer asphalt



Figure 1-208. Main entry gable hood with expressed timber framing (EMH, 9/11/2019)



Figure 1-209. Underside of spaced roof sheathing and attic insulation (EMH, 9/11/2019)



Figure 1-210. Root cellar shed roof (EMH, 9/11/2019)

roofing and a white prefinished metal drip edge at the eave and tucked up at the house wall intersection. A flashing at the side "wing" walls is not evident.

The front entry gable hood does not appear to have a flashing. A metal wrapped wood 1x is installed at the hood to wall intersection.

There are currently no gutters or downspouts on the building. Historic photos indicate that a gutter and downspout did exist at one point. It is unknown if a roofing project or significant icicles once the attic insulation was installed prompted removal of the roof drainage system.

Condition: Poor and Good
The main roof is in poor condition with biological growth. The root cellar and front gable hood roofing are in good condition.

Architecture - Chimney
A square red brick chimney with a concrete cap protrudes through the roof on the north square facing hip. There is no corbeling or ornamental coursing. The cap appears flush to the brick face. A significant amount of tar substance exists above the ochre red metal flashing, up about two feet of the chimney.

Condition: Fair
The chimney and mortar appear uneven but this could be due to the older clay brick and weathering of the mortar. The concrete cap has some cracking evident.

Architecture - Exterior Stairs
The front (south) stair appears to have been recently rebuilt and has wing walls of lapsiding on either side of the stair and a 2x wood cap, all painted white. There are six risers at 8" each with 11-½" deep treads and a 3'-3" deep landing at the door. The stair



Figure 1-211. View from Station Dwelling showing worn wood shingles (EMH, 9/11/2019)



Figure 1-212. Chimney (EMH, 9/11/2019)



Figure 1-213. Front entry stair (EMH, 9/11/2019)

width is 4'-10" and there are no handrails or guardrails.

The side (east) stair has a poured concrete landing and stair with a rustic wood frame "guardrail" on either side, with no handrail. The width is 4'-9" with three risers varying in height from 8-½"-9-½". The treads are 10" deep and the landing is 3'-5" deep.

The rear (north) stair is a 4"-0" wide wood stair assembly with 8" risers and 11" deep treads. The "landing" at the door is 2'-0" deep and there is a rustic "guardrail" assembly in the north edge.

Condition: Good/Fair
The front stair is in good condition. The side and rear stairs are in fair condition with handrails and guardrails needed.

Architecture - Exterior Walls and Trim
At the front door opening, the gable roof is supported by a timber frame 4x and 6x wood bracket with exposed radiused edged rafter tails.

The exterior walls consist of a 2001 replacement shiplap siding of 3-½" high before a ¼" deep x ¼" high groove with simple 1x trim at the base, corners, windows and doors and root cellar sidewall cap. All are painted white, however earlier 1920's era photos indicate a two tone paint scheme. Note that the wall reportedly has had insulation installed during the 2001 work.

The main house and roof cellar foundation are exposed board formed concrete, painted a steel blue, while the north gable addition has a CMU exposed foundation painted the same steel blue color. The north gable has a wood boxed eave, whereas the main roof and front overhang have exposed raftertails. The fascia,



Figure 1-214. Rear entry stair (KAC, 9/11/2019)



Figure 1-215. Painted board formed foundation at the main house and root cellar (EMH, 9/11/2019)



Figure 1-216. Difference eave configurations (EMH, 9/11/2019)

eaves and exposed rafter tails are all painted a dark green color which matches the windows. Much of the wood trim has been wrapped in aluminum flashing which may conceal a moisture trapping issue.

Siding was replaced in 2001 and documentation on that project indicates materials were chosen create a similar appearance to the historic. Anecdotal reports suggest the building previously had aluminum siding installed (now removed), similar to the other buildings at the site.

Condition: Good
Walls and exterior materials are in good condition. Concealed wood members were not assessed. Minor debris of insects is pervasive across the walls.

Architecture - Exterior Windows
Windows have been replaced with wood clad windows infilled into previous openings. New windows are a mix of double hung with exterior screens and awning with interior screens.

The exterior window trim is a simple wood 1x casing in keeping with craftsman detailing of this era. On the interior, windows have painted 3-1/2" wood trim with a wood sill and 3-1/2" apron. The sill at Windows 106 and 107 is thicker and has a more detailed profile than the rest of the sills.

There are five types of windows:
- Type A (15) 2'-6" x 4'-4" double hung sash at the first and second floors
- Type B (2) 2'-4" x 3'-3" double hung sash in the kitchen
- Type C (1) 2'-6" x 1'-9" hopper sash
- Type D (6) 3'-2" x 1'-9" awning sash
- Type E (1) 2'-6" x 1'-9" fixed sash



Figure 1-217. View from the southeast (EMH, 9/11/2019)



Figure 1-218. Interior window trim (KAC, 9/11/2019)



Figure 1-219. Front door (KAC, 9/11/2019)

Condition: Good
Windows are in good condition with the exception that the interior sill on Window 202 is cracked in half.

Architecture - Exterior Doors
Door 101 (Front Door)
Newer six lite over four panel wood door 3'-0" side x 6'-8" high. Lites are insulated glass and the door has weatherstripping. Hardware consists of a knob, escutcheon and three hinges. There is a newer contemporary full lite storm door at the exterior.

Door 103 (Rear Door)
Half lite over three panel wood door. Lites are singe pane but the door has weatherstripping. Hardware consists of a newer knob, hinges, and threshold. There is a newer metal storm/screen door.

Door 104 (Side Door)
Replacement six lite over four panel wood door. Hardware consists of hinges, doorknob and escutcheon, painted green on the exterior side, and an aluminum threshold. No storm/screen door is currently installed but there is evidence of one previously at the opening.

Condition: Good to Poor
Door 101: Good condition.

Door 103: Fair condition due to warping wood panels which show gaps and separation at the joints. Finish on the door knob is worn off.

Door 104: Poor condition with the lower rail rotting. Paint is peeling.

Architecture - Interior Doors
All second floor doors and some basement doors are non-historic and openings have 2-1/4" painted wood trim with a contemporary profile.



Figure 1-220. Rear door (EMH 9/11/2019)



Figure 1-221. Side door (EMH, 9/11/2019)



Figure 1-222. Door 001 (KAC, 9/11/2019)

Door 001: 2'-0" x 5'-6" x 1-1/2" four panel painted wood door. Hardware consists of three hinges, a door knob and a keyhole. The door leads to storage space under the stair and there is no trim at the opening.

Door 102: 2'-8" x 6'-8" x 1-3/4" three vertical lite over two panel painted door. Lites are insulated glass. Hardware consists of three hinges, an escutcheon and a knob. The threshold is aluminum.

Door 201: Door has been removed but trim remains.

Door 202: 1'-10" x 6'-8" flush veneer door with a knob and two hinges.

Doors 203 and 204: 2'-6" x 6'-8" x 1-1/4" hollow core wood door with a flush veneer. Hardware consists of two hinges, a door knob and metal threshold.

Door 203a and 204a: Pair of bi-fold flush wood doors with a track and the head and chrome pull.

Door 205: 2'-0" x 6'-8" x 1-1/4" hollow core wood door with a flush veneer. Hardware consists of two hinges, a door knob and metal threshold.

Door 205a: Bifold flush stained doors with a chrome door pull and a track at the head.

Doors 206: 2'-6" x 6'-8" x 1-1/4" hollow core wood door with a flush veneer. Hardware consists of three hinges, a door knob and metal threshold.

Condition: Good and Fair
Door 001: Good condition.

Door 102: Good condition.



Figure 1-223. Door 203 (KAC, 9/11/2019)



Figure 1-224. Door 203A (KAC, 9/11/2019)



Figure 1-225. Door 002 (KAC, 9/11/2019)

Door 201: Door is missing.

Door 202: Good condition on the bedroom side, furniture prevented the door from being opened so the condition of the closet side is unknown.

Door 203: Fair condition with a chip out of the wood on the latch side and paint splatters on the door.

Door 203a: Good condition.

Door 204: Good condition, with a few cracks in the trim.

Door 204a: Fair condition/missing. The door on the east side is hanging crooked and the other door has been removed.

Door 205: Good condition.

Door 205a: Good condition.

Door 206: Good condition.

Architecture - Basement Interior Finishes

Laundry (001)

Ceiling finish in this room has been removed and the first floor framing is exposed. Walls have a painted plaster finish with no base. Painted plywood encloses the space under the stair. Floor finish is paint on concrete.

The space under the stairs is accessed from the Laundry and has a painted beadboard ceiling finish. Walls are a mix of painted concrete, painted gypsum board, vertical boards and exposed framing. The concrete floor is painted.

Storage No. 1 (002)

There is no ceiling finish, so floor structure is exposed. The west end of the north wall

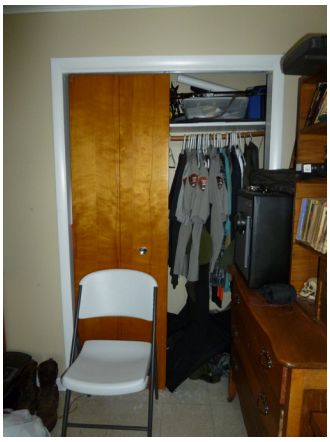


Figure 1-226. Door 204a with one door missing (KAC, 9/11/2019)



Figure 1-227. Finishes in the Laundry (KAC, 9/11/2019)



Figure 1-228. Storage No. 1 finishes (KAC, 9/11/2019)

is painted concrete. Finish on the remaining walls is paneling with the appearance of vertical wood boards of varying widths. The paneling wraps around the beam at the ceiling. Walls have a 2-1/4" base and the west wall has a concrete base. The concrete floor is painted.

Mechanical (003)
There is no ceiling finish so the first floor structure is visible. The north wall is board formed painted concrete. The east wall is a mix of painted fiberboard and horizontal wood boards above a concrete base. The south wall has a painted gypsum board finish. A cased opening with 3-1/2" wood trim leads to the Laundry Room. The west wall is painted concrete and CMU.

Storage No. 2 (004)
There is no ceiling finish. Walls are painted concrete except for the section of CMU in the middle of the east wall. North, west and south walls have wood framing above the concrete foundation wall. Batt insulation is installed between the wood framing. The concrete floor is painted.

Stair between Basement and First Floor
A landing at the east side entry has two steps up to the first floor level and a flight of steps down to the basement. Ceiling finish is painted plaster. Wall finish from the level of the first floor up is painted plaster with 3-1/2" painted trim boards at floor level. The remaining wall finish is vertical wood paneling of varying widths. Stairs have carpeting with a waterfall wrap. A wood handrail with a stained finish is mounted on brackets. The handrail does not have extensions (see Code section).



Figure 1-229. Finishes in mechanical (KAC, 9/11/2019)



Figure 1-230. Finishes and exposed insulation in Storage No. 2 (KAC, 9/11/2019)

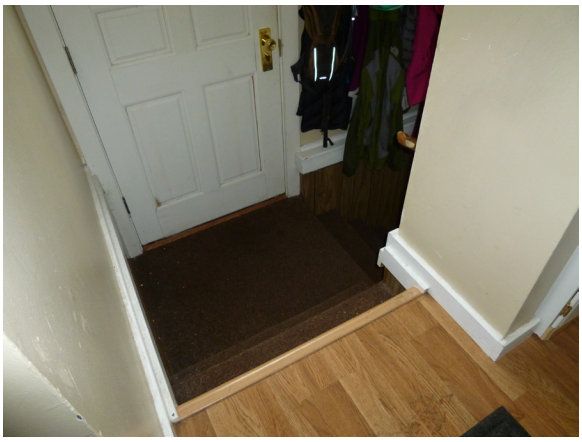


Figure 1-231. Landing at the east entry and steps up to the first floor (KAC, 9/11/2019)

Condition: Fair

Laundry (001)

Wall finish is in fair condition with cracks, holes and patching. Paint on the floor is in fair condition with areas of extreme wear. (See Structural for condition of the concrete.)

Ceiling finish in the storage area under the stair is in fair condition with some warping of the wood. Wall finishes are in good condition. The paint on the floor is worn and in fair condition.

Storage No. 1 (002)

See Structural for condition of the exposed ceiling floor structure. Wall finishes are in fair condition with wood paneling missing in places. Paint on the floor is peeling and in fair condition.

Mechanical (003)

See Structural for condition of the exposed ceiling floor structure. Wall finishes are in good condition. Floor finish is in fair condition with peeling paint and stains.

Storage No. 2 (004)

See Structural for condition of framing ceiling elements. CMU at the east wall is in fair condition with broken and missing units. Paint on the concrete floor is faded.

Stair between Basement and First Floor

Ceiling finish is in fair condition with some chips in it. Wall finish and carpeting are in good condition.

Architecture - First Floor Interior Finishes

Entry (101)

Ceiling and wall finish is painted plaster. Walls have 3-1/2" painted wood base. Flooring is laminate with the appearance of 2-1/2" wood boards, though the laminate strips are 7-1/2"



Figure 1-232. Warping ceiling finish in the storage area under the stair (KAC, 9/11/2019)



Figure 1-233. Staining on the Mechanical flooring (KAC, 9/11/2019)



Figure 1-234. Finishes in the Entry (KAC, 9/11/2019)

wide. Trim around the exterior door is 3-1/2" painted wood.

Living Room (102)
Ceiling and wall finish is painted plaster and base is 3-1/2" painted wood. Flooring is the same laminate as in the Entry with the 2-1/2" board appearance. There is no door between the Living Room and Entry, so the plaster wraps around the opening and trim is continuous between the two rooms.

Dining Room (103)
Ceiling finish is 12" x 12" ceiling tiles with quarter-round trim at the edges. Beams with a plaster finish extend east-west in the room below the tiles. Wall finish is painted plaster with 3-1/2" painted wood base. Flooring is the same laminate as in the Entry, with 2-1/2" board appearance.

Kitchen (104)
Ceiling finish is 12" x 12" ceiling tiles with trim at the edges. Walls have a painted plaster finish with 3-1/2" painted wood base. Cabinets have a stained finish and the countertop is plastic laminate with a 4" backsplash. Flooring is the laminate flooring as the entry with the 2-1/2" wide board appearance.

Mud Room (105)
This room is in the north entry addition. Ceiling and wall finish is painted gypsum board. Wall base is painted 3-1/2" painted wood with a quarter-round shoe. A painted wood shelf on metal brackets is mounted on the west wall. Flooring is carpet. Trim at the exterior door and the north window is painted 2-1/4" with a contemporary profile.

Stair between First and Second Floors
Ceiling and walls have a painted gypsum board finish. Partway down the stair, the



Figure 1-235. Dining Room finishes (KAC, 9/11/2019)



Figure 1-236. Kitchen cabinets and finishes (KAC, 9/11/2019)



Figure 1-237. Mud Room finishes (KAC, 9/11/2019)

west wall stops and there is a stained wood balustrade with 1" x 1" square balusters spaced 3-1/2" apart and a 5" x 5" baluster. Stairs have a painted wood stringer on both sides and wood treads and risers. VCT was installed on the treads, along with rubber tread covers and metal nosings. A handrail is bracket mounted on wood board on the outer wall of the stair.

Condition: Fair

Entry (101)
Ceiling and wall finish is in good condition, though there are a few chips at the wall corners. Flooring is in fair condition with scuffs at the entry door.

Living Room (102)
Ceiling and wall finish is in good condition. Flooring is in fair condition with gaps between some of the laminate planks.

Dining Room (103)
Ceiling finish is in fair condition with staining at the edges. Wall and floor finishes are in good condition.

Kitchen (104)
Ceiling and wall finishes are in good condition. Flooring is in fair condition with gaps between the laminate planks.

Mud Room (105)
Ceiling finish is in fair condition with water stains. Wall finish is in good condition, though there is some gapping between the base and the gypsum board. Carpeting is in fair condition with stains.

Stair between First and Second Floors
Wall and ceiling finishes are in good condition. Stair finishes are in fair condition with gaps between the tiles and VCT missing in places. The rubber tread covers are peeling

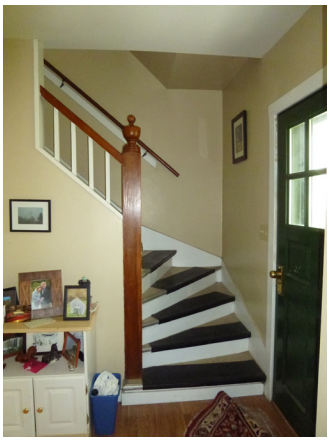


Figure 1-238. Stair up to the second floor (KAC, 9/11/2019)



Figure 1-239. Scuffs in the flooring at the entry door (KAC, 9/11/2019)



Figure 1-240. Gaps between laminate flooring planks (KAC, 9/11/2019)

up. The handrail is not securely mounted.

Architecture - Second Floor Interior Finishes

Hall (201)
Ceiling finish is painted plaster. Wall finish is painted gypsum board and has a painted wood 3-3/4" base with a quarter-round shoe. Flooring is 12" x 12" vinyl composition tile (VCT).

Bedroom No. 3 (202)
Ceiling and wall finish is painted gypsum board. Walls have a painted 3-3/4" wood base with a quarter-round shoe. Flooring is 12" x 12" VCT. Closet finishes are unknown since furniture prevented the door from being opened.

Bedroom No. 2 (203)
Ceiling and wall finish is painted gypsum board. Walls have a painted 3-3/4" wood base with a quarter-round shoe. Flooring is 12" x 12" VCT. Finishes in the closet are the same as the bedroom. The closet has a painted wood shelf and a wood closet rod on metal brackets.

Bedroom No. 1 (204)
Ceiling finish is 12" x 12" surface applied tiles with a ceiling hatch at the east end of the room. Walls have a painted gypsum board finish with a painted 3-3/4" wood base with a quarter-round shoe. Flooring is 12" x 12" VCT. Finishes in the closet are the same as the bedroom. The closet has a painted wood shelf and a wood closet rod on metal brackets.

Powder Room (205)
Ceiling and wall finish is painted gypsum board. Walls have a 4" x 4" tile wainscot to 4'-4" above the finish floor. Tiles are pink with a decorative white and patterned accent tiles. Flooring is 12" x 12" VCT. The contemporary wood vanity has a countertop with an integral sink. A medicine cabinet is recessed into the



Figure 1-241. Bedroom No. 3 finishes (KAC, 9/11/2019)



Figure 1-242. Finishes in Bedroom No. 1 (KAC, 9/11/2019)



Figure 1-243. Powder room finishes and fixtures (KAC, 9/11/2019)

wall above the sink and the door is a chrome edge mirror. Chrome finished soap holder, toothbrush holder, towel bar and toilet paper dispenser are wall mounted. Wall, ceiling and floor finishes continue into the closet which has built-in painted wood shelving.

Bathroom (205)
Ceiling and wall finish is painted gypsum board. Flooring is 9" x 9" vinyl composition tile. The contemporary wood vanity has a countertop with an integral sink. A medicine cabinet is recessed into the wall above the sink and the door is a chrome edge mirror. The bathtub has an acrylic surround and a chrome wall mounted shower curtain rod. Wall mounted accessories include a wood towel rack and toilet paper dispenser and a chrome grab bar.

Condition: Fair
Hall (201)
Ceiling finish is in fair condition with cracking at the east end and a few holes. Wall finish is in good condition with a few visible patches. Flooring is in fair condition with some staining.

Bedroom No. 3 (202)
Ceiling and wall finishes are in good condition. Flooring is in fair condition with gaps at the joints between some tiles.

Bedroom No. 2 (203)
Finishes are in good condition where visible, a portion of the flooring was covered by a large area rug. The closet rod is extremely bent under the current weight applied to it.

Bedroom No. 1 (204)
Ceiling finish is in fair condition with water damage at the north side of the room, near the chimney. Wall finish is in good condition. Flooring is in fair condition with some scuffs.

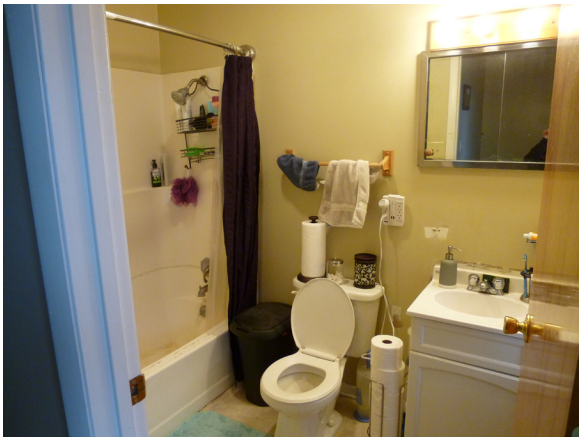


Figure 1-244. Fixtures and finishes in the Bathroom (KAC, 9/11/2019)

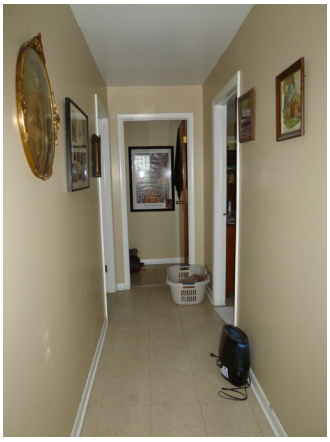


Figure 1-245. Looking west down the Hall (KAC, 9/11/2019)



Figure 1-246. Cracking and holes in the Hall ceiling (KAC, 9/11/2019)

The closet rod is extremely bent under the current weight applied to it.

Powder Room (205)
Ceiling and wall finishes are in good condition. Flooring is in fair condition with some uneven areas and the VCT coming loose at the north wall. The vanity is in fair condition with staining. Closet finishes are in good condition.

Bathroom (205)
Ceiling finish is in good condition. Wall finish is in fair condition with a few holes, some of which are partially patched. Flooring is in fair condition with missing and peeling tiles at the east and west sides of the room. The bathtub and surround are in fair condition with stains. Refer to Structural.

Architecture - Code/Life Safety
As a National Park Service building, any proposed rehabilitation is governed by the 2018 International Building Code (IBC) and its related family of codes.

Existing Building Code
The IEBC, International Existing Building Code, applies to the repair, alteration, change of occupancy, addition to and relocation of existing buildings. Within this code, work is categorized into Alteration Levels 1, 2 and 3 depending on the amount of work anticipated within the building. Additional categories include Change of Occupancy, Additions, Historic Buildings and Relocated Buildings. Requirements of the code are limited to work areas of the project for Levels 1-3. This means that Alteration projects are not required to upgrade the entire building per current code, just elements that are within the project work area dependent on the nature of the alteration work. Change of Use projects trigger more thorough upgrades and the building must be brought up to current code requirements for the new use. Proposed use for this building would not trigger a change of use.

Construction Type
Buildings and structures are classified as one of the five construction types in the IBC. The construction type defines the fire resistance rating of the building structure, exterior walls and interior walls.

The Officer in Charge Dwelling (HS-19) is construction type VB non-sprinklered. Per section 602.5 “Type V construction is that type of construction in which the structural elements, exterior walls and interior walls are any material permitted by this code.”

Existing Area

Basement:	623 gsf
First Floor:	586 gsf
Second Floor:	565 gsf
Total:	1,774 gsf

Use and Occupancy Classification
Currently the Officer in Charge Dwelling (HS-19) is in use as single family housing. There are no plans at this time to change the use of the building.

Housing: Residential Group R-3 - which includes sleeping units where the occupants are primarily permanent in nature, including buildings which do not contain more than two dwelling units.

Building Height
Table 504.3 limits allowable building height. Since this building is non-sprinklered, it is allowed to be 40’ tall.

Table 504.4 indicates allowable height in stories. Per that table, with an non-

sprinklered R-3 occupancy is allowed three stories above grade.

Occupant Load
Occupant load is dependent on the function of the space. Per IBC section 1004, the following occupant load factors are possible:

Function of Space	Load Factor
- Residential	200 gross

Based on this, the occupant load is 6 people.

Means of Egress
Occupant load determines the required size of the egress pathway, along with the number of exits. Currently there is only one stair to the second floor. A second exit is provided by a roof walkway to a ladder which is accessed via a second floor window. IBC Section 1006.3.3.4 allows single exits from any story in Group R-3 occupancies.

Stairs & Raised Walking Spaces
Per IBC section 1011, stairways serving occupied portions of the building shall have a minimum width of not less than 36" when the occupant load is less than 50 and shall comply with Section 1005.1.

Stairs risers are required to be solid and shall be 7" maximum and 4" minimum. Rectangular treads shall be a minimum of 11". Stairway landings are required at the top and bottom of each stairway.

Stairway handrails are required to be not less than 34" and not more than 38" above the stair nosing and shall have an outside diameter of not less than 1-1/4" or greater than 2". Per IBC section 1014, handrails are required to return to the wall, guard or walking surface. Handrails "shall extend horizontally not less than 12" beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser."

Per IBC section 1015, guards are required at open sided walking spaces which are located more than 30" above the floor or grade below and shall not be less than 42" high. Guards shall not have an opening that allows the passage of a 4" diameter sphere within the required guard height.

Fire Suppression
New buildings with an R-3 occupancy are required by the IBC to have an automatic sprinkler system. Additionally, NPS Director's Order 58 section 9.1.8 requires consideration for fire suppression of structures to "prevent loss of human life and minimize damage to historic property resources." Appendix 7 from this Director's Order contains a Historic Property Assessment Matrix which provides a scoring matrix to help assess if a fire suppression system is needed. See Appendix for the matrix and scoring for the Officer in Charge Dwelling (HS-19). The score for the building put it in a range requiring a fire suppression system.

Condition: Good and Poor
Prior to undertaking any alterations or if a change of use occurs, a full code study should be undertaken to address impacts and code requirements triggered by the project. Note: This section will be updated once the treatment alternative and uses are defined.

Existing Building Code
Several of the current conditions do not comply with code requirements stated above, so if a full building rehabilitation and change of use is undertaken, many of the deficiencies will be required to be addressed. However, IEBC allowances for historic buildings allow for provisions in the context of the historic character of the building. This

code is "founded on broad-based principles intended to encourage the use and reuse of existing buildings while requiring reasonable upgrades and improvements." This also limits extents of required upgrades to the work area(s).

Construction Type
Since there are no restrictions within the VB construction type, the Officer in Charge Dwelling (HS-19) is in compliance.

Use and Occupancy Classification
If the occupancy were to change in the future, a full code study would be required.

Building Height
The building is less than 40' tall and therefore is in compliance.

Means of Egress
The building is in compliance with code.

Stairs
Interior and exterior stairs are not code complaint due to rise/run dimensions, handrail configurations, lack of landings and guardrails with openings greater than 4".

The stair from the basement to the first floor has two runs from the side entry door - one up to the first floor and one down to the basement. The run to the first floor has two 7" treads and three 7-1/2" risers. There is no handrail. The run down to the basement has a winder configuration and is 2'-8" wide which is less than the required 36". Headroom at the bottom of the stair drops to 5'-9" clear which is less than the 6'-8" required. There is a handrail at this run of the stair, though it does not have required extensions.

The stair from the first floor to the second floor is a winder configuration with 7-1/2"



Figure 1-247. Handrail at stair from First Floor to Basement (EMH, 9/11/2019)



Figure 1-248. Low head clearance at the stair down to the Basement (EMH, 9/11/2019)



Figure 1-249. Height of the baluster at the stair from the first to second floor (EMH, 9/11/2019)

risers and 10-3/4" treads. The guardrail at the open side of the stair is 2'-0" above the treads. The handrail on the outside of the stair does not have required extensions.

Exterior stairs are also not compliant. The front stairs have 8" risers and 11-1/2" treads and there is no handrail or guardrail. The landing is 3'-3" and the stair is 40" wide, both of which meet requirements.

The east stair risers vary from 8-1/2" to 9-1/2" and treads are 10", which makes the stair non-compliant. The guardrail is also non-compliant because openings are greater than 4" nor is there a handrail. The landing at the top of the stair is 3'-5" deep.

The back stair is not code compliant with no landing and no extension on the handrail. Treads are 11-1/2", risers are 8" and the stair is 4'-0" wide, nor is there a handrail.

Fire Suppression
There is no fire suppression system and one is required by the IBC and Director's Order 58.



Figure 1-250. No handrail or guardrail at the main entry stair (DM, 9/11/2019)



Figure 1-251. Non-compliant guardrail at the side stair (DM, 9/11/2019)

Architecture - Accessibility
To be compliant with the Architectural Barriers Act (ABA), a building is required to provide one universal access point to the building entrance, universal access routes from the entrance to the public spaces on the level of the main entry and a universal access restroom.

Currently access to the building is via exterior stairs. Living spaces within the building are up half a flight of stairs. There is no restroom which provides accessible clearances and both restrooms are located on the second floor. Hardware throughout the building does not meet ABA requirements.

Condition: Poor
There is no accessible route to the building, nor is the interior configuration ABA compliant. None of the doors meet accessibility requirements. However, this must be considered within the context of all NPS provided employee housing at Pictured Rocks National Lakeshore. If the required number of accessible units is provided elsewhere, then this building does not need to be ABA compliant.



Figure 1-252. Side stair configuration (EMH, 9/11/2019)

Existing Conditions & Condition Assessment - Structural

Structural - General System Description

The Officer in Charge Dwelling (HS-19) is a hipped roof, wood framed structure with a concrete foundation. Off the north end of the west elevation is a partially underground addition containing Storage No. 2 (004) that is constructed with board formed concrete walls supporting wood stud cripple walls and a wood framed roof. Off the west end of the north elevation is an addition containing the Mud Room (105) at the level of the first floor that is constructed of CMU foundations and wood framed floors, walls, and roof. The room layouts, including bearing wall framing, have changed several times over the life of the building.

Structural - Foundation

The exterior perimeter walls of the Officer in Charge Dwelling (HS-19) are founded on 8" thick board formed concrete walls. These walls also act as the perimeter basement walls. The depth of these walls beneath the basement floor and the existence of a footing are unknown. It is also unknown whether or not the concrete walls are reinforced.

Two intermediate pipe columns in the Mechanical room (003) were added to support the previously unsupported bearing wall above where it was offset to the north of the bearing wall in the basement. These columns bear on 36" square isolated concrete footings of unknown thickness and reinforcement. The east-west running bearing wall between the Mechanical room (003) and the Laundry (001) is founded on a 4" wide by 6" tall concrete curb.

At the interface between the original structure and the Storage No. 2 (004)



Figure 1-253. Southwest corner of the Officer in Charge Dwelling (HS-19) (CBB, 9/11/2019)



Figure 1-254. Storage No. 2 (004) Addition on the north end of the west elevation (CBB, 9/11/2019)



Figure 1-255. Mud Room (105) off the west end of the north elevation (CBB, 9/11/2019)

addition, both sides of the door opening have been infilled with CMU units.

The perimeter walls of the Storage No. 2 (004) addition are constructed of 8" thick board formed concrete walls. The depth of these walls beneath the basement floor and the existence of a footing are unknown. It is also unknown whether or not the concrete walls are reinforced.

The Mud Room (105) addition is founded on CMU stem walls. The depth of these walls beneath the basement floor and the existence of a footing are unknown. It is also unknown whether or not the CMU walls are grouted or reinforced.

Condition: Good
The foundations of the Officer in Charge Dwelling (HS-19) are in good condition with no major visible signs of structural distress such as excessive movement or cracking from differential settlement.

Structural - Floor & Ceiling Framing
The basement floor of the Officer in Charge Dwelling (HS-19) is a concrete slab-on-grade. The thickness and presence of reinforcing is unknown

The first floor of the building is framed with 2x8 dimensional lumber joists spaced at 16" on center, spanning in the north-south direction between the north and south exterior walls, with intermediate supports at an interior bearing wall and a wide flange steel beam. The joists are continuous across the span, but are notched at the steel beam and blocked solid at the bearing wall. Both the bearing wall and steel beam run in the east-west direction and are located near the center of the building, with the steel beam approximately 2'-5" north of the bearing wall.



Figure 1-256. Isolated square footing under adjustable pipe column (CBB, 9/11/2019)



Figure 1-257. First floor framing of the Officer in Charge Dwelling (HS-19) at the interior bearing wall (CBB, 9/11/2019)



Figure 1-258. Steel wide flange beam and adjustable pipe columns supporting the first floor joists and the bearing wall above (CBB, 9/11/2019)

The steel wide flange beam is a W8x31 that is 8" deep and 8" wide and is supported at the foundation walls on either end and two intermediate, adjustable pipe columns in the Mechanical room (003). The pipe columns are 3-1/2" in diameter and support the steel beam with 8" x 8" bearing plates. The beam and pipe columns were added in the 1971 renovation to support the bearing wall above.



Figure 1-259. Notched joists at the steel wide flange beam in the framing of the first floor (CBB, 9/11/2019)

The top side of the joists are sheathed with 7/8" thick horizontal board sheathing. At the quarter points of the joist spans, the joists are braced by rows of cross-bridging.

Although not accessible during the observation visit, the second floor is likely framed similarly to the first floor with 2x joists spanning in the north-south direction. The joists are supported by the north and south exterior walls, as well as an interior bearing line. At the west portion of the building, the bearing line is supported by the wall between the Kitchen (104) and the Living Room (102). At the east, a soffited beam that runs through the Dining Room supports the second floor joists. The exact size and composition of this beam is unknown, however the soffit measures 6" wide and 7" deep.



Figure 1-260. Dropped second floor beam surrounded by soffit through the Dining Room (103) (CBB, 9/11/2019)

<u>Condition</u>: Good to Fair

The basement concrete slab-on-grade floor of the Officer in Charge Dwelling (HS-19) is in good condition with no signs of major subsidence or distress. There are a few minor cracks in the slab, however they are not of structural concern.



Figure 1-261. Crack in the basement concrete slab-on-grade (CBB, 9/11/2019)

The first floor framing of the Officer in Charge Dwelling (HS-19) is in good condition. Prior to the installation of the steel beam in the 1971 renovation, the bearing wall between the Kitchen (104) and the Living Room (102)

was loading the first floor joists beyond their capacity. The steel beam alleviated this issue and there are no longer any structural concerns with the first floor joists.

However, there are two small areas of concern associated with the steel beam itself: the holes cut through the flanges of the beam in the Mechanical (003) room and the bearing condition of the beam in the foundation wall at the east end.

There are holes in the top flange and through the vertical web of the steel beam that were created to allow pipes to pass through the plane of the beam. Preliminary analysis indicates that both the hole located in the web or vertical portion of the steel beam and the hole through the top flange of the steel beam weaken the beam beyond its capacity.

At the east end of the steel beam, the beam bears in the concrete foundation wall, however, it overlaps with a window opening in the wall and therefore does not fully bear in the wall. The exact condition could not be properly assessed because of the finishes.

The second floor framing of the Officer in Charge Dwelling (HS-19) is in fair condition. The joists are overstressed under typical residential loading, and the magnitude of distress is exasperated by the weight of the non-original bathtub at the top of the stairs. The dropped beam in the Dining Room (103) is also affected. See the Applicable Codes and Loads section below for further discussion.

Structural - Roof Framing

The pyramid hipped roof of the Officer in Charge Dwelling (HS-19) is framed with 2x6 rafters spaced at 24" on center at a 7-1/2:12 slope spanning between single 2x6 hip beams and the four exterior bearing walls.



Figure 1-262. Hole in top flange of wide flange steel beam in the first floor framing (CBB, 9/11/2019)



Figure 1-263. Bearing condition of the east end of the steel wide flange beam in the foundation wall (CBB, 9/11/2019)



Figure 1-264. Peak of pyramid hipped roof of the Officer in Charge Dwelling (HS-19) (CBB, 9/11/2019)

The rafters are sheathed with 1x skipped sheathing of variable width, with a layer of plywood on top. The plywood sheathing is not original and was likely introduced at the time of the latest shingle re-roofing.

The shed roof of the Storage No. 2 (004) addition is constructed of 2x6 rafters spaced at 16" on center at a 1-1/2 on 12 slope down from the west wall of the structure. At the east, the rafters are supported by a 2x ledger attached to the west wall of the main building and at the west they bear on a wood framed stud wall.

The gable roof of the Mud Room (105) addition was not accessible during the observation visit, however it is likely framed with dimensional lumber. Atop the roof framing of this addition is a wood framed deck and ladder intended as a second floor fire escape.

The small gable roof over the entry is framed with 2x6 rafters supported by cantilevered timber brackets and beams.

Condition: Good

The roof framing of the Officer in Charge Dwelling (HS-19) is in good condition. Since there are no changes in use and therefore no changes in the Risk Category classification of the building, there are no elements or systems deemed to be dangerous, and the roof framing has been performing well over the lifetime of the structure, no upgrades or changes to the roof framing are necessary.

The one area that is in fair condition is the eaves on the south and west elevations. They slightly sag downward in the center of the elevation. This is likely caused by snow drifts that accumulate on the leeward sides of the building (the west and south).



Figure 1-265. Hip beam of the pyramid hipped roof of the Officer in Charge Dwelling (HS-19) (CBB, 9/11/2019)



Figure 1-266. East end of Storage No. 2 (004) roof rafters to the ledger attached to the exterior of the west elevation of the original structure (CBB, 9/11/2019)



Figure 1-267. Gable roof over the entry on the south elevation (CBB, 9/11/2019)

The wood elements of the fire escape deck atop the Mud Room (105) addition are especially prone to deterioration by decay fungi. This is because of their large amount of surface area exposed to weather and moisture.

Structural - Wall Framing
The walls of the Officer in Charge Building were concealed by finishes at the time of the observation visit, but they are likely constructed of 2x4 wood studs supported on the concrete foundation walls. They are also likely sheathed with horizontal board sheathing on the exterior face of the studs beneath the siding. The Mud Room (105) addition is also likely constructed of 2x4 wood studs.

The walls of the Storage No. 2 (004) addition are constructed of 2x4 wood studs spaced at 16" on center and bear on a 2x6 sill plate attached to the top of the concrete foundation wall.

The interior bearing walls in the basement and on the first floor are framed with 2x4 studs at 16" on center.

Condition: Good to Fair
The wall framing of the Officer in Charge Dwelling (HS-19) is generally in good condition showing no signs of structural distress such as bowing or settlement.

There are several cracks in the interior plaster wall finishes above the larger windows in the south and west walls of the Living Room (102). Although not accessible during the observation visit because they are concealed by finishes, it is likely that the headers over these windows are undersized and deflecting under the roof and second floor loads.



Figure 1-268. Stud wall construction of the Storage No. 2 (004). Note the 2x6 sill plate and the concrete foundation walls below (CBB, 9/11/2019)



Figure 1-269. Cracks in the plaster above the window openings in the south wall of the Living Room (102) (outlined in red for readability) (CBB, 9/11/2019)

At the interface of Storage No. 2 (004) and the original building, the sill plates under the north and south walls are deteriorating. This deterioration is caused by decay fungi which flourish when there is excess moisture in close proximity to the wood members. This moisture may be entering through the interface of the addition and the original structure.



Figure 1-270. Deteriorating sill plate at the interface of the Storage No. 2 (004) addition and the original building (CBB, 9/11/2019)

Structural - Lateral System
The lateral system of the Officer in Charge Dwelling (HS-19) consists of the sheathed roof diaphragm, the sheathed first and second floor diaphragms, the sheathed wood stud walls, and their connections to the foundation.

Condition: Good
The lateral force resisting system of the structure is in good condition. The lateral elements are adequate for the environmental loads associated with the site given the modest footprint of the structure. Additionally, since no change in use is planned for this structure, the Risk Category remains the same. Per code, since the Risk Category is not changing and there are no elements or systems deemed dangerous, no upgrades to the lateral elements of the building are required.

One area in need of further investigation that was not accessible during the observation visit is at the perimeter bearing walls where the rafters bear. Typically, the nailed connection between the roof framing and the wall framing for buildings from this era of construction is inadequate to resist wind from lifting up the roof structure and it is in best practice to upgrade this connection, especially at this highly exposed lakeshore site.

Structural - Applicable Codes & Loads
The code references for this assessment include the 2018 International Building Code (IBC), the 2018 International Existing Building Code (IEBC), and ASCE 7-16 Minimum Design Loads for Buildings and Other Structures.

The load requirements for the Officer in Charge Dwelling (HS-19) at the Grand Marais USCG Station are based on the type of occupancy and geographical location of the building. The required floor live load capacity per ASCE 7-16 for residential use is 40 pounds per square foot (psf). This building use classifies the structure as Risk Category II for standard occupancy. A brief review was completed to compare the current design and current code required live load capacities of the floors (see the PIRO HSR Live Load Capacity Chart in Appendix C).

The ground snow load required for the Grand Marais USCG Station per ASCE 7-16 is 70 psf. This ground snow load translates to a flat roof snow load on the Officer in Charge Dwelling (HS-19) of 40 psf per ASCE 7-16 when wind exposure and thermal conditions are considered. Given the slope of the roof and the texture of the roof surface, a 10% reduction is allowed resulting in a roof snow load of 36 psf. At the shed roof over the Storage No. 2 (004), no reduction applies given the shallow slope of the roof so the roof snow load is 40 psf.

The ultimate design wind speed at the Grand Marais USCG Station site per ASCE 7-15 Figure 26.5-1B is 104 miles per hour (mph). The equivalent nominal wind speed is 90 mph.

The Grand Marais USCG Station site falls within Seismic Design Category A. The



Figure 1-271. The floor is sloping downwards towards the bathtub located on the second floor in the Bathroom (206) (CBB, 9/11/2019)



Figure 1-272. Crack in ceiling finishes of the Hall (201) near the tub and the overloaded second floor joists and beams (CBB, 9/11/2019)

Seismic Design Category is a classification given to a structure that is based on the Risk Category of the building and the severity of the design earthquake ground motion at the site. The earthquake ground motion properties of the site are cataloged by the United States Geological Survey (USGS). The two mapped acceleration parameters for the site per USGS are short period (Ss = 0.044 g) and 1 second period (S1 = 0.020 g). Without site specific soil testing, site soil conditions are assumed to comply with Site Class D resulting in a Seismic Design Category for the Officer in Charge Dwelling (HS-19) as A. Since the structure falls within Seismic Design Category A, no seismic analysis is necessary per code.

Southern pine design values were used to evaluate the load capacity of the Officer in Charge Dwelling (HS-19) structural members based on wood samples taken from a first floor joists. Most of the members had only some sporadically located grade-limiting defects, such as small knots, resulting in Select Structural analysis values.

Condition: Good to Fair

Generally, the structural elements of the structure are adequate for imposed loads on the structure and are therefore in good condition unless noted otherwise. The one exception is the second floor framing which is in fair condition. The joists are overstressed under typical residential loading, and the magnitude of distress is exasperated by the non-original bathtub at the top of the stairs. From the top of the stairs to the vanity inside the Bathroom (206), the floor slopes downwards about 1-1/2" over 6'. The slope intensifies to the west where the bathtub is located, indicating that the dead load of the bathtub and the weight when full of water is causing the floor joists to deflect. This increased load also transfers to the dropped beam in the Dining Room (103).

Existing Conditions & Condition Assessment - Mechanical

Mechanical - General System Description

There is an abandoned chimney in the building with the chimney cleanout located on the north wall of Mechanical Room #003. The chimney extends from the basement up through the floors above and out of the roof.

The current heating system in the building is a heating water radiant system consisting of a propane-fired boiler, baseboard heaters, pump, and piping distribution. The heating system is a replacement system that is evident by the amount of pipe that is routed exposed outside walls and cut through steel supports. The boiler is a 100,000 BTUH input Weil McLain boiler located in the basement Mechanical Room #003. The heating water is distributed from the boiler with a 1" heating supply main routed in the basement where it splits into three zones. Two of the three zones split into two separate pipe routes to floors above. The three zones are divided by floor with one zone on the Main level, another zone on the Upper level, and the third zone in the Basement. The boiler's circulating system contains an expansion tank and air separator along with the main circulating pump all in the basement Mechanical Room #003. There is a ½" make-up water line for the system on the upstream side of the circulating pump with a manual override for a "fast fill." The heating water temperature is set to 200°F and an operating pressure of 20 psi. The boiler vent line is a 3" stainless steel duct that is routed to the west into Storage #004, where it elbows to the north and out through the building. The combustion air vent is a 3" PVC line that is routed from the boiler and follows the same route as the vent line. There is a carbon monoxide detector located in Mechanical Room #003. The P&T



Figure 1-273. Example of modified structure for heating water pipe. (DMD, 9/11/2019)



Figure 1-274. Boiler system on west wall. (DMD, 9/11/2019)



Figure 1-275. (3) heating zone control valves. (DMD, 9/11/2019)

from the boiler is routed down to the floor but not to a floor drain. The condensate drain line from the boiler flue vent is a polyethylene tube that is looped before routing to the floor. The condensate has collected in the bottom of the loop and been stagnant allowing mold to grow. This loop is necessary to prevent exhaust fumes from the boiler vent entering into the basement. The condensate drain should maintain an air block of liquid but not be a solid block with mold.

The majority of the heating water piping is uninsulated copper; however, there are sections of PEX piping that have been used in areas where the installation was tight, and PEX allowed more flexibility to install in existing walls.

The basement heating system consists of three (3) hydronic baseboard heaters with a 6' heater in the Mechanical Room #003, a 12' section in Laundry #001, and an 8' section in Storage #002. The thermostat for the baseboard heaters is located in Laundry #001 on the north wall.

The Main floor has three main rooms, the Living Room, Dining Room, and Kitchen. The Living Room #102 has a baseboard heater on the west and north walls, and the thermostat for the entire floor is located on the north wall of the Living Room. In addition to the baseboard heaters in the Living Room, there is a 30x12 vent on the east wall with a fan that moves air from the Living Room to the Dining Room. The Dining Room has a 7' section of baseboard on the north wall under the window. The Kitchen has no direct source of heat but is open to the Dining Room.

The Upper level is split into three rooms and two bathrooms. Bathroom #206 has a 5' section of baseboard on the east wall.



Figure 1-276. Boiler vent and combustion air to outside of building on north wall. (DMD, 9/11/2019)



Figure 1-277. Copper to PEX on heating water lines in east side of basement. (DMD, 9/11/2019)



Figure 1-278. Typical baseboard heater. (DMD, 9/11/2019)

Bedroom #202 has an 8' section of baseboard on the south wall. Bedroom #203 has baseboard heaters on both the south and west walls, which were not accessible. Bedroom #204 has baseboard heaters on the west and north walls, which were also inaccessible. Powder Room #205 has a 4' baseboard section on the north wall. The thermostat for the Upper level is located in Bedroom #204 on the south wall.

In the basement, there is a portable dehumidification unit located in the northwest corner of Laundry #001. There is also a 3" dryer vent off the dryer on the west wall of the Laundry room routed to the south and out the south exterior to a rain cap.

The Kitchen has a range hood over the gas stove that is vented out the west wall to a rain cap.

There is no mechanical cooling within the building.

There is an exhaust fan in Bathroom #206; however, the fan was not operational during the site trip. There is also no exhaust point to the outside from the exhaust fan. There is no exhaust fan in the Powder Room #205.

In the attic, there are four (4) passive vents, one on each angle of the roof exposure.

Condition: Fair - Good

The boiler appears to be in good condition, the expansion tank is in good condition, the piping is in good condition, and the circulating pump is in fair condition. The zone control valves are in good condition, and the branch zones can be individually isolated and drained down without needing to shut down or drain down the entire system. The baseboard heaters are in good condition. The



Figure 1-279. Exhaust fan in ceiling of Bathroom #206. (DMD, 9/11/2019)



Figure 1-280. Water entry with older gate valve, first water meter, and newer shut-off valve in southwest corner of basement. (DMD, 9/11/2019)



Figure 1-281. 2nd Water meter located in Mechanical Room #003 on south wall. (DMD, 9/11/2019)

thermostats are in good condition.

The heating water lines are uninsulated, which causes the pipes to lose heat energy to the basement and the interior walls where the pipes are located. Lack of insulation is an energy loss of heat that is uncontrolled.

The exhaust system for the Upper level Bathroom #206 is non-operational and needs to be replaced. There is a significant amount of mold growth in the bathroom, which indicates that there are high humidity levels for extended periods. Additional exhaust for the shower area is needed to help mitigate mold growth.

Existing Conditions & Condition Assessment - Plumbing

Plumbing- General System Description

The main water line enters into the basement on the west wall and is a 4" steel line. The 4" line is flanged with a blank-off plate. In the middle of the blank-off plate is a line that quickly reduces to a ¾" line with an older gate valve. Downstream of the gate valve is all copper piping with new isolation valves and water meter. The water line is then routed as a copper line to the plumbing fixtures in the basement, main level, upper level, and water heater in the basement. There is a second water meter on the wall of the Mechanical Room #003, that is on the same water line as the other water meter and therefore measuring the same water flow.

There is a 50-gallon, 4500 watt electric water heater in the northeast corner of Mechanical Room #003 in the basement. There is a plywood platform and abandoned water lines that indicate that a previous water heater was located along the south wall of Mechanical Room #003. The new water heater (2016)



Figure 1-282. Electric water heater in corner and main waste line exit from building looking southeast. (DMD, 9/11/2019)



Figure 1-283. Wood platform for previous water heater on south wall. (DMD, 9/11/2019)



Figure 1-284. Basement sump pump, 2-compartment utility sink, and clothes washer, looking southwest (DMD, 9/11/2019)

does not have an expansion tank or hot water recirculation pump. The domestic hot water lines are copper lines and are routed adjacent to the cold water lines to the plumbing fixtures throughout the building. Both the cold and hot water lines have valves for drain down.

The basement has a 2-compartment utility sink along the west wall of Laundry #001 along with a clothes washer connection. The Main level has a double compartment sink in Kitchen #104. The Upper level has a water closet, lavatory, and tub/shower combination in Bathroom #205 and a water closet and lavatory in Powder Room #206. On the south exterior is a hose bibb that appears to be original to the building.

The main waste line for the building exits the basement out the north wall +/-30" above the basement floor. The waste line is a 6" PVC line that is connected to a 6" cast iron hub & spigot line and a 3" copper line in the basement. The cast iron line appears to be original to the building, whereas the copper line is newer.

The sanitary line is routed to a septic system north of the building.

There is a sump pump located in the southwest corner of Laundry #001 in the basement. The discharge line is routed through a check valve in Mechanical Room #003 and then to the main waste line in Mechanical Room #003. There is a floor drain by the water heater and another floor drain the middle of Laundry #001 that is currently covered up by a large piece of carpet. The floor drains are believed to be routed to the sump pump in the Laundry Room #001. There is no vent pipe from the sump pump system. There is a deteriorating pipe on the

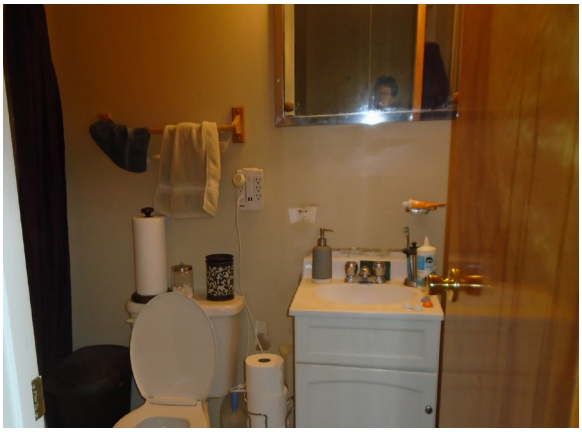


Figure 1-285. Water Closet and Lavatory in Bathroom #206 on north wall. (DMD, 9/11/2019)



Figure 1-286. Tub/Shower combination in Bathroom #206. (DMD, 9/11/2019)



Figure 1-287. Sump pump discharge connection to main waste line at southeast corner of basement. (DMD, 9/11/2019)

discharge side of the pump within the sump basin that decreases the amount of water that can be ejected. However, the pump was tested and the water level in the basin dropped so, the leak is not large enough to render the sump pump ineffective.

There is a 500 gallon propane tank located above ground northeast of the building behind a wooden fence. A ½" propane gas line is routed underground to the north side of the building where it rises above ground and goes through a propane regulator and then enters the building. Once the propane line enters the building, it is routed to the boiler in the basement and up to the gas cooking stove on the main level.

Condition: Fair - Good

The cold and hot water lines are copper lines in good condition. The domestic hot water lines are partially insulated with open ended seams. This is not compliant with current building codes. There is no hot water recirculation line on the hot water system.

The plumbing fixtures are modern day fixtures and the water closets and the lavatory in Bathroom #206 are in good condition. The lavatory in Powder Room #205 and the tub/shower combination fixture in Bathroom #206 are in poor condition. The tub/shower combination has mold growth and discoloration.

The condition of the sanitary line is unknown as well as the condition of the septic system.

The sump pump discharge pipe has failed and needs to be replaced.



Figure 1-288. Floor drain under piece of carpet in Basement. (DMD, 9/11/2019)



Figure 1-289. Interior to sump basin with deteriorated discharge pipe. (DMD, 9/11/2019)



Figure 1-290. Propane tank location south of building. (DMD, 9/11/2019)

Existing Conditions & Condition Assessment - Fire Protection

Fire Protection- General System Description
There is no fire protection system in the building today.

Condition: N/A

Existing Conditions & Condition Assessment - Electrical

Electrical - Electrical Service and Panels
The existing electrical service for the Officer in Charge Dwelling (HS-19) is 240/120v, 1PH, 100A; the service meter appears to be located on the Station Dwelling (HS18). This meter/ disconnect is rated 100A and feeds the 150A load center in the dwelling basement, but is limited by the 100A meter / disconnect. This electric rating should be field verified by an electrician. If the 100A rating is confirmed, the 100A electric service likely is undersized per NEC standards. The cooking and heat are gas, but the water heater and dryer are electric.

Condition: Poor
Original drawings indicate the building was originally fed from the Station Dwelling. Currently, the building has its own electrical meter and service. Based on available documents, it appears the meter and service was installed in 1981 and is in need of replacement. Evidence of various remodels over the years have yielded some variations from the original vintage, however, the equipment throughout is near the end of it's useful life.

Electrical - Electrical Distribution System
Receptacles for general power/convenience are in poor to fair condition. Type NM



Figure 1-291. Propane from underground to regulator and into basement. (DMD, 9/11/2019)



Figure 1-292. Officer in Charge Dwelling (HS-19) (SJH, 09/11/2019)



Figure 1-293. Basement panel (SJH, 09/11/2019)

(Romex) cable is used for branch circuits. Arc fault circuit protection (AFCI) is not provided as required by current NEC codes.

Condition: Poor
Devices are generally in poor condition and in need of replacement. Overcurrent protection and branch circuiting not meet NEC or National Park Service requirements requiring arc fault protection in dwellings.

Additional receptacles have been added since the original construction documents to meet the 12ft spacing requirements. There are some spaces that do not meet the spacing requirements such as the dining area.

Electrical - Lighting, Emergency Lighting, and Exit Signs
Interior lighting is mostly inefficient fluorescent and incandescent lighting. Wall switches are used throughout. None of the observed lighting within the Station Dwelling appeared to be original, but of mixed modern vintages.

Exterior lighting is minimal, limited to fixtures at each of the exterior doors, and are not Dark Sky compliant.

Exit signs are not required for residential dwelling units per code. Egress lighting was not observed.

Condition: Fair
All fixtures are inefficient, and none appear to be historic in nature, but instead of various modern vintages. While dated and inefficient, the fixture were operational.

Electrical - Fire Protection & Detection System
There are spot smoke detectors in the dwelling unit in some of the bedroom spaces, some observed in hallways. and carbon monoxide detectors near appliances are compliant, however, coverage is lacking across all levels to meet code requirements for a dwelling, and carbon monoxide detectors appeared to be lacking in the basement level adjacent to mechanical equipment.

Condition: Poor
Fire protection is existing but not installed comprehensively througout the building. General coverage thought out is lacking both in notification and detection, and therefore the system is not code compliant nor meeting National Park Service Standards.

Electrical - Tele/Data Communications
The existing telephone line is overhead from the utility.

Condition: Poor
The overhead telephone line provides telephone and DSL internet only. No equipment was observed and devices were very limited throughout.

Electrical - Lightning Protection System
No lightning protection system was observed at this building.

Condition: N/A
There is no existing system.

Existing Conditions & Condition Assessment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Existing Conditions - Hazardous Materials

Hazardous Materials - General Description
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
Asbestos inspection services were performed to identify the presence, location, quantity, friability, and condition of Asbestos Containing Material (ACM) located at the project site. Bulk samples were collected and analyzed of suspect ACM.

Lead Containing Paint
Readings of suspect Lead Containing Paint (LCP) were collected in a representative manner as determined by the inspector based on identifying testing combinations where the surface color, substrate, or building component were visibly different. Sampling was limited to materials that were visible and readily accessible to the inspector.

Regulated Building Materials
Inspectors provided visual survey for Regulated Building Materials (RBM) throughout all buildings.

Biological Hazards
Inspectors provided visual survey for biological hazards including rodents and mold growth throughout all buildings.

Hazardous Materials - General Description
Condition: Good or Poor
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
ACM is defined as a material containing greater than one percent asbestos by weight, volume or surface area. Regulations distinguish treatment requirements between friable and non-friable forms of ACM. Test results confirmed ACM in the following locations:

- Joint compound associated with drywall on the second level hallways and basement dividing walls contains 4% chrysotile asbestos [~450 square feet (SF)]. The composite drywall sample (drywall, paper, joint compound) contained less than 1% asbestos.
- Cream-colored floor tile with gray streaks and the associated mastic located on the stairs to the second floor and in the entire second floor hallways and bedrooms contain 5-7% chrysotile asbestos (~550 SF).
- A white mudded pipe fitting was found in the basement on the north wall next to the brick chimney on the pipe. This fitting contains 20% chrysotile asbestos. While only one fitting was observed, there is a potential that additional fittings could be found in wall, floor, and ceiling cavities throughout the building.
- Gray granular plaster with white skim coating located on walls and ceilings throughout including under CDW01 in many locations. One of five samples indicated that an additional compound was laid on top of the plaster which contained 3% chrysotile asbestos. This could be a patching material, but until further investigations can be performed,

the entire wall/ceiling material must be treated as asbestos (~2,500 SF).

Lead Containing Paint
Lead Based Paint (LBP) is defined as a paint containing 0.5% lead by weight or 1.0 milligram per cubic centimeter by both the EPA and HUD.

The following locations have LBP or LCP:
- White paint on plaster walls in the basement.
- Gray and red paints on the concrete floors in the basement.
- Green paint on concrete walls in basement.
- Gray paint on the exterior of the building, along the concrete foundation.

The lead content of soils surrounding the building was tested and had 5,180 mg/kg of lead. This exceeds the EPA non-play area bare soil level of 1,200 mg/kg for lead.

Regulated Building Materials
RBM found throughout the building were fluorescent light tubes and compact fluorescent light bulbs which can contain mercury; light ballasts which can contain PCBs; and a refrigerator which can contain controlled refrigerants (CFCs). These items are subject to special handling and disposal requirements if impacted by renovation activities.

Biological Hazards
No water infiltration or evidence of rodents was observed at the time of the inspection.

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Harbor of Refuge Dwelling (HS-20)

Existing Conditions & Condition Assessment - General

General Building Description

The Harbor of Refuge Dwelling (HS-20) is a two-story residential structure, rectangular in plan, with a full basement, it consists of two stories plus a full basement. It has a simple gabled roof along the north-south axis with dormers facing east and west. The upper story is partially engaged within the gable roof. The roof is clad in red asphalt shingles. Exterior walls are red brick at the exposed foundation and first story, and now covered in aluminum siding above. The eastern slope of the roof extends to cover the front porch, which runs most of the length of the front facade. A wood stair leads up to the porch. At the west side, a single story vestibule extend out and is clad in the same aluminum siding and red shingle roofing. A wood stair steps down directly from the door.

The interior floor plan has been altered over time, but the general configuration has been retained. Plaster wall and ceiling finishes, however, have been largely replaced with gypsum board.

Condition: Fair

The brick walls have stood up to the elements, but the original stucco and wood half-timbering of the second story is now largely gone. Rising water levels in the soil threaten long term preservation of the brick masonry foundation. The roofing, also a replacement, is fair with one area of active moisture infiltration. The historic windows and most interior finishes have also been lost, but the scale, feeling and most importantly the views to the water have been maintained.



Figure 1-294. The Harbor of Refuge Dwelling (HS-20) alone on the shore of Lake Superior (LHM, 9/11/2019)



Figure 1-295. The Refuge viewed from the rocky shore line, looking northwest (LHM, 9/11/2019)



Figure 1-296. Simple gable roof form with porch extension and dormer, view to south with lighthouse beyond (LHM, 9/11/2019)

Character Defining Features

Mass/Form

The rectangular shape of the building with its elongated gable roof is a character defining feature. The dormers to the east and west contribute to the building character, as does the front porch that runs most of the length of the east facade. Partial engagement of the gable roof and dormers with the upper story defines exterior massing and interior spaces.



Figure 1-297. Rectangular building massing (LHM, 9/11/2019)

Exterior Materials

The red brick, with its smooth, hard finish and sandy white mortar, are primary character defining features. The concrete accent features -- watertable, door and window lintels and window sills -- further define the character.

The original stucco and wood half-timbering veneer of the upper story, also character defining, is now concealed and presumed to be mostly removed or deteriorated.

The roofing and much of the porch has been replaced or reconstructed and so are defining in their form but not material.



Figure 1-298. South wall, showing brick foundation, concrete water table, brick walls, and aluminum siding (LHM, 9/11/2019)

Openings

The symmetrical arrangement of window openings contribute to the character of the building. The concrete thresholds at the original door opening are character defining, as is the relocated rear entry door.



Figure 1-299. Kitchen looking southwest, wood floors and gypsum board walls and ceilings (LHM, 9/11/2019)

Interior Materials

Wood flooring throughout does much to retain the interior character of the original dwelling. Plaster wall and ceiling finishes, in the few places still found, are also character defining.. Vestiges of the wood wall base and door casing also contribute to the character of the building. Wood paneled doors, though

removed, are defining where extant.

Integrity
Standing solid against wind and water, the Harbor of Refuge Dwelling (HS-20) retains good integrity of design, location and feeling on the exterior despite the loss of its upper story materiality. On the interior, the building retains integrity of design, configuration and feeling, but most of its original materials are lost.

Existing Conditions & Condition Assessment - Architecture

Architecture - Roofing and Drainage
The gabled roof is covered in red asphalt shingles. A box of extra stock in the cellar identifies the shingles as "Cedar Crest" by Certainteed. Ridges at the main roof and at the dormers have vented ridge shingles. A construction record from 1916 shows that the original roofing was metal "slate".

Flashing where visible at the chimneys, valleys and eaves is a prefinished red metal. Modern white prefinished flashing was used at the drip edge, at the eaves and at the k-profile gutters and downspouts. The downspouts in some locations terminate prematurely, exacerbating moisture conditions at the base of building corners, discussed below.

Condition: Fair
The roofing is not historic and is in fair condition but is nearing its anticipated life. Extensive moisture damage below the west dormer, visible from the interior, suggests that the valley flashing condition is suspect.

Architecture - Chimney
Two red brick chimneys flank the ends of the



Figure 1-300. Asphalt shingle roofing and flashing at the eastern dormer (EMH, 9/11/2019)



Figure 1-301. Roof of the west vestibule with gutters and downspouts (EMH, 9/11/2019)



Figure 1-302. Deterioration of brick at downspout, northwest corner (EMH, 9/11/2019)

main gable, visible only above the roofline. The brick steps and corbels to form a stately profile. Clay flues protrude from the precast concrete cap, which also has metal screening as a bird/pest deterrent. Flashing at the roof appears to be surface applied rather than stepped and let into the mortar joints. This interface is likely how moisture interred the attic, it is unknown if this is an active leak. See Structural Section for additional information.

Condition: Fair
The chimney brick exhibits some biological growth at the north chimney and mortar deterioration is prevalent at all surfaces.

Architecture - Exterior Walls and Trim
The exterior walls consist of brick masonry at the exposed foundation and the first floor and siding on the second. A precast concrete water table, painted white, delineates the transition from foundation to first floor and serves as the header for the cellar windows. The paint of the water table is loose in select areas. This transition is structural as well; the wall is three wythes of brick below the band and brick veneer on wood framing above.

The red brick is laid in a running bond pattern. Finish brick with a smooth baked finish was used where exposed to view. The barely tooled mortar joints show a sand-heavy mortar mix. Areas of past repointing appear to have a very hard mortar. In addition to the water table, painted concrete headers and sills are found at the first floor windows, and the sills have a coped slope for drainage.

Above a concrete masonry unit foundation, the walls of the newer porch enclosure on the west elevation is clad in aluminum lap siding. The same treatment is also used at the second story, including the side walls of the dormers and the front porch roof. Aluminum



Figure 1-303. Southern chimney with clay flues visible (EMH, 9/11/2019)



Figure 1-304. Aluminum siding and precise mortar joints at south facade (EMH, 9/11/2019)



Figure 1-305. South facade showing foundation damage (EMH, 9/11/2019)

trim covers the corners and wraps up the eaves, as well as vented panels at the narrow soffits. The historic finish of the second story was stucco and timber for a half-timbered effect. Photographs from 1969 show that the timbers were removed for installation of the siding.

Condition: Fair
The brick is in overall fair condition. Spalling is notable at the south foundation where common brick has been exposed, likely the result of a garden area adjacent to this southern foundation wall. Moisture staining is visible at the west elevation. Refer to structural for discussion of related moisture issues. As mentioned in the Roofing and Drainage section, brick below the outlet of downspouts at the northwest and, to a lesser degree, the northeast corner has been subject to freeze-thaw damage. This cyclical process caused the hard outer layer of the brick to come off, leaving the softer insides of the brick exposed to weather.

The mortar has performed well in this climate, but erosion is notable on some elevations and suggests repointing is in order. Where mortar has eroded, the adjacent brick tends to chip at the corners, losing the benefit of its hard finish. Similar issues are found at the site of former penetrations.

The exterior trim is concealed by the aluminum siding/trim and is was not able to be assessed. Several areas of missing aluminum trim reveal painted wood trim elements. As noted above, the half timber/ trim is assumed to be removed.

Architecture - Porch
The character-defining covered front porch overlooking the harbor was reconstructed recently. Six round wood columns with



Figure 1-306. Enclosed porch encased in aluminum siding, west facade (EMH, 9/11/2019)



Figure 1-307. Peeling paint at the east porch and stair (EMH, 9/11/2019)

simple Doric capitals support unadorned wood beams at the perimeter. A simple wood railing with squared balusters runs between columns. The beadboard ceiling overhead, like all the wood elements, is painted white.

A newer glass-infused lumber product (Timbersill) was used for the decking and steps (painted gray)and the wood skirt below. A pipe steel handrail painted black flanks the stairs.

Condition: Good/Poor
The new lumber product, while stable, does not hold paint well, and bubbling and peeling is notable throughout.

Architecture - Back Stair
The south-facing back door opens to a wood open riser stair run with no landing or guardrails. A black metal handrail was added to the west side.

Condition: Poor
The souths stair does not meet code and appears to be at the end of its life span.

Architecture - Windows
The windows are not historic, though most follow the historic configuration within the original openings. There are six extant types of windows. All have an integral storm/screen system. Of particular note: most original second story windows included sashes with diagonally divided panes.

Type A, which includes six windows at the first floor, is a one-over-one double hung, 2'-7" wide by 5'-1" high. The historic windows were single pane and similarly configured, but with a diamond pattern on the upper sash of the window.

Type B at the south elevation has clearly been



Figure 1-308. Typical replacement window (Type A) including integral storm/screen sash (EMH, 9/11/2019)



Figure 1-309. Type F sliding cellar window below the water table (EMH, 9/11/2019)

partially bricked in and hosts a shorter (3'-8") window that is also wood double-hung. It has a wood sill instead of the typical concrete. Yet another opening has been completely filled at the west elevation. This space once hosted a smaller window into the pantry.

Type C is a one-over-one double hung at the west enclosed porch and is 2'-4" wide by 3'-8" high.

Type D is a one-over-one double hung with four of these occurring at the second level. They are 2'-2" wide by 4'-11" high and historically had the diamond pattern on the upper sash.

Type E is a pair of replacement windows (two total), 3'-0"wide by 3'-7" high at the dormer where a tripartite window was historically.

Type F are the cellar windows and align vertically with the first floor openings. These are 2'-5" wide by 1'-6" high sliders.

Condition: Poor
Replacement windows are not consistent with original windows in materials or, in some instances, configuration. They are difficult to operate or completely inoperable, and biological growth is occurring at several storm assemblies. It was noted to the park that several windows at the time of the site visit appeared to be stuck in an open position.

Architecture - Exterior Doors
The structure has two exterior doors. The front door at the east porch is a replacement door. It is of wood stile and rail construction with six lites arranged above two long inset panels. Hardware includes three butt-tipped hinges and knob and plate lockset that may predate the door. This 3'-0" by 7'-0" door is



Figure 1-310. Close up of window stuck in the open position (EMH, 9/11/2019)



Figure 1-311. Front door, which is a replacement (EMH, 9/11/2019)

painted to the exterior and has a modern storm door.

The door at the west enclosed porch may well be the original back door relocated to this position. This 2'-8" by 6'-7" door is wood stile and rail in a common six-panel configuration. The bottom rail has clearly been trimmed, supporting the relocation theory. Hardware includes three ball-tipped hinges and a knob lockset with a backplate, plus a modern deadbolt. Interestingly, hinges remain at the now-empty door opening to the kitchen, and the hinges now on the door are at a slightly shifted location. There is no storm door.

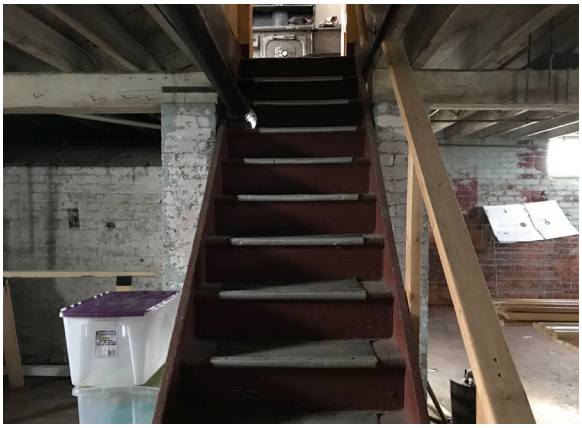
Condition: Good/Poor
The front door is in good condition, newer and protected from the elements showing minor peeling paint. The back door fares poorly, with weathered wood separating at stile and rail.


Figure 1-312. Rear door; note modified bottom rail (EMH, 9/11/2019)

Architecture - Interior Finishes - Cellar
The cellar is largely one open room, with the exception of a vault in the southwest corner. The stair to the basement is enclosed by walls above the floor plate and open below to the cellar.

The floor is concrete throughout, painted though only some of that paint remains. The floor of the vault is covered in an additional 3-1/2" of concrete.

The walls of the stairwell at the first wall are painted plaster. This is likely the historic wall finish that has been removed almost everywhere else. The exterior walls of the cellar are the exposed interior wythe of brick, which has been painted at least twice. Windows sit high on the wall atop a sloped cement sill. The brick flues at the center of


Figure 1-313. Cellar stair with sanitary line punched through the stair on the left side, typical cellar finishes beyond (EMH, 9/11/2019)

the north and south walls, also painted, house small steel doors stamped: "DETRIOT MI". The walls of the vault are three wythes of brick on all four sides. The brick is covered with plaster to the interior and painted on both sides.

The cellar stair is a simple wood construction with eleven 10-1/2" treads and twelve 8" risers between 2x12 stringers. A rickety 2x handrail is a later addition. A large pipe cuts across the stair and through one riser.

The cellar proper has no ceiling and is open to the diagonal floor sheathing boards and wood joist structure. At the cellar stair, the underside of the next flight of stairs has been furred out and plastered. The ceiling of the vault is brick in the form of a barrel vault and, like the rest of the vault, was painted by an enthusiastic muralist.

Condition: Fair

The floor is in fair condition. Much of the paint has peeled and the surface is gouged. Other holes show the location of former partitions.

The cellar walls are in overall poor condition. Brick is deteriorating behind layers of paint; widespread paint failure indicates that paint coatings have trapped moisture within the wall. This condition is worst at north and west walls, where moisture migration through the wall has caused efflorescence, brick powdering and delamination. Erosion of brick is considerable in some areas, with mortar erosion also occurring at the worst locales. The east wall shows less deterioration, but there is a prominent step crack in the vicinity of pipe penetrations.

At the plastered stairway walls, the finish is chipped and surface mildew is widespread.



Figure 1-314. Brick ceiling in the cellar vault (LHM, 9/11/2019)



Figure 1-315. Efflorescence, powdering and erosion at the north wall brick (LHM, 9/11/2019)



Figure 1-316. Typical finishes at the first floor, as seen in the Parlor (LHM, 9/11/2019)

The stair is in fair condition despite the encroaching pipe.

Architecture - Interior Finishes - First Floor
The finishes on the first floor generally follow this description, with exceptions discussed room by room below.

Flooring is 2-1/4" wood strip running east-west, continuous through thresholds.

Walls have had the plaster removed and have been refinished with gypsum board and painted or papered as described later. Wall trim is also not historic. Trim includes a 10" high baseboard comprised of seven-inch piece of flat stock with a 3" coved profile above and a 3/4" base shoe. Face casing at windows and doors is 5" stock molding with a convex "belly" profile and, at corners, square blocks with a rosette motif. Windows have a 5-inch molding for the apron. All this trim is unfinished.

The interior casing (head/jamb extensions) and sills at the window openings may be historic. Sills, which sit typically at 27-3/4" above the floor, are 1x wood with a lightly bull-nosed edge protruding 1-1/2" in front of the opening and 2" to either side. These casings and sills are painted.

Ceilings have been replaced with gypsum board and painted. Typical ceiling height on this floor is 8'-5".

Lower Hall
Floor, wall and ceiling finishes are typical as discussed above. The 6-lite stile and rail front entry door is stained to the interior. A wood transition strip bridges between the metal threshold and the wood flooring.

The stair is constructed from hardwood



Figure 1-317. New window trim against the white casing and sill, which are likely original (LHM, 9/11/2019)



Figure 1-318. In the Hall, newer trim is discernible from the older woodwork at the stair (LHM, 9/11/2019)

(assumed oak)that has been varnished and possibly stained. There are 13 treads, 34" wide, of 1-inch thickness with a bullnose profile at the nosing. The treads are 10-1/4" deep and overhang the risers by 1.5 inches. A piece of 3/4" cove trim runs below the overhang at the top of the riser. Fourteen risers are built from 7" high flat stock, which with the tread gives an overall riser height of eight inches and a floor to floor height of 9'-3.

The south stringer along the wall is 1x oak extending 2" above the nosing line. The north stinger is exposed and is trimmed with two pieces of 1x6 reeded molding to the outside. Two more pieces of such molding run below the stringer. The rail assembly sits above the stringer. The base rail is 3-1/2" wide and hosts 1'' round spindle balusters with square bases at 3" spacing. The top rail is 4" wide in a common stock profile. The height of the rail is 30-1/2" above treads. The newel post at the bottom of stair is square in section, 7-1/2" wide at the base tapering to 6" at the fluted upper section. A built-up cap is 9-1/2" at its widest point.

Condition: Fair

Flooring is in fair condition. There is some gapping between boards, and dents, scrapes and scuffs can be found across the surface. Two floor boards near the entry have been patched. A board below the newel post is damaged; perhaps there was trim at this location previously.

Walls are also in fair condition despite the newer gypsum board finish. The north wall sports scrapes 18" above the floor in several locations. The east wall is also scraped near the door. The south wall is scuffed above the stair, and seam tape underneath the paint is separating from the wall at its base. The wall below the stair is in good condition.



Figure 1-319. Wood stair with some tread covers removed (LHM, 9/11/2019)

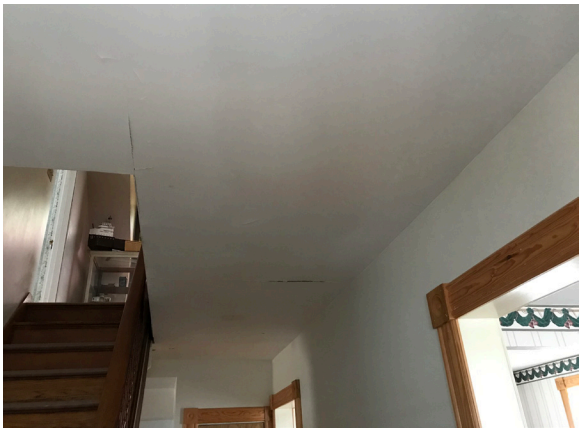


Figure 1-320. Cracks and peeling paint at the gypsum ceiling of the Hall (LHM, 9/11/2019)



Figure 1-321. Wallpaper at the ceiling beam and chimney in the Parlor (LHM, 9/11/2019)

The ceiling, also newer gypsum, is in poor condition with cracking at seams and peeling paint.

The stair is in fair condition. Treads have vinyl covers but are worn where visible. The finish is worn at the base of most risers.

Parlor
Flooring is the typical wood strip. The 1945 drawings show this room as divided into two rooms by a wall. The later renovation drawings indicate the removal of the wall, shoring (3 2x10s) at the ceiling and patching of floors.

Walls have been covered with vinyl wallpaper in a light floral pattern with a border at the top. At the north wall, the chimney is also covered with gypsum board and paper. From the historic drawings, it seems there was never any kind of a fireplace here, only vents to distribute hot air from the furnace in the basement.

Window, door and base trim is as typical. There are no interior doors, just two cased openings. Like the windows, casing at the openings is painted and might be original.

The ceiling in this room is also typical. A beam across the middle of the room at the former wall location is papered on three sides.

Condition: Fair
Flooring is in fair condition where observed beyond and beneath a large carpet. Gaps, staining and scratches were observed, in addition to damaged at the door thresholds. Walls seem to be in good condition, with no water staining visible through the pale wallpaper. The paper is peeling at the seams. The ceiling is in good condition.



Figure 1-322. Worn but serviceable floor boards below the rug in the Parlor (LHM, 9/11/2019)



Figure 1-323. Wood ceiling in the Dining Room is inconsistent with original plaster ceilings (LHM, 9/11/2019)



Figure 1-324. Staining at nail holes in the Dining Room flooring (LHM, 9/11/2019)

Dining Room
Flooring is the typical wood strip. Walls have been covered with vinyl wallpaper in a dark floral pattern. Window, door and base trim is as typical, but there is also 3-1/2" crown molding below the ceiling. There are no interior doors, just two cased openings. The ceiling in this room is atypical, finished with newer 1x6 v-groove tongue and groove planks. Ceiling height in this room is 8'-6" suggesting there is no gypsum board above the planks.

Condition: Fair
Flooring is in fair condition. There is some gapping between boards, and numerous holes from nails that have since been removed. The wood is stained in these location. Wall condition behind the paper was not assessed; the paper is peeling at some seams. The ceiling condition was not observed beyond the planks, which are in good condition.

Kitchen
Flooring is the typical wood strip, but the walls have the added feature of a wood wainscot. The wainscot is 42-1/2" high and consists of 1x4 tongue and groove planks that are divided vertically to create beadboard. A deeper molded wood cap tops the assembly; the walls are covered in gypsum board above. There is no reason to think this an original finish as the layout of this room has changed. As of 1945, the kitchen was closed off from the hall and had access to a pantry that contained the west window which has since been relocated. A closet filled the recess of space where the small bathroom now sits.

The wainscot is continuous below the modified south window, which has none of the typical trim that is found at all the doorways. The interior doors to the basement and restroom are newer, flush hollow core



Figure 1-325. Wainscot, soffits and modified window in the Kitchen (LHM, 9/11/2019)



Figure 1-326. Water damage to the wainscot visible beyond the sink (LHM, 9/11/2019)



Figure 1-327. Replaced flooring in the corner by he new bathroom (LHM, 9/11/2019)

wood doors with knob hardware. The door to the mudroom, once an exterior door, has been removed and possibly relocated to the exterior (see Doors section); its hinges remain on the trim. The ceiling is gypsum board, with soffits framed out along each wall. The soffits are shown on the 1966(?) renovation drawings.

Condition: Fair
Flooring is in poor condition but largely salvageable. There are larger gaps between boards, which themselves are marred and scuffed. A 4x6 section at the former pantry location has been replaced. Floor boards are chipped along the west wall, south of the door, where the sink was once located. The walls are in fair condition, exhibiting scratches and stains in the gypsum finish and staining at the wainscot, most notably in the form of water damage near the current sink location. The ceiling is in good condition except for some cracking near the soffit at the stair.

Bathroom
This small bathroom is a fairly recent construction. The floor is slightly raised and covered in a vinyl tile. Walls are typical, to include the baseboard. The ceiling is gypsum board.

Condition: Fair
The flooring is in fair condition, cupping some at the edges. The wall has cracked near the light fixture, but the ceiling is in good condition.

Mudroom
This room is a later addition, essentially the enclosure/modification of a historic back porch. A previous enclosure is shown but not detailed on the renovation drawings; the current configuration is larger and opens to the south.



Figure 1-328. Utilitarian mudroom finishes viewed through the wide doorway from the kitchen, with hinges visible (LHM, 9/11/2019)



Figure 1-329. Modified and relocated door with historic knob hardware (LHM, 9/11/2019)

Finishes are atypical. The floor sits six inches lower than the kitchen and is covered in vinyl tile. The threshold at the doorway from the kitchen is painted concrete.

The east wall is the historic exterior brick wall, now painted over. The others walls are clad in a thin wood sheathing, perhaps 3/8" plywood, with visible seams. A 3-1/2" stock baseboard runs across the bottom of these walls. The window, a later vinyl construction, is cased in stock trim similar to the baseboard. The door to the exterior has similar trim. This six panel stile and rail door is painted to the interior and has historic hardware. It may have been relocated to this position. The ceiling is also painted wood sheathing at a height of 7'-3", with small cove trim at the wall.

Condition: Fair
The vinyl flooring is in poor condition, chipped near the door, water stained and discolored. The walls are also in poor condition, with the east wall posing cause for concern. The paint on the brick is blistering and peeling, suggesting the paint is trapping moisture within the wall. The ceiling is in good condition.

Architecture - Interior Finishes - Second Floor
The finishes on the upper floor generally follow this description, with exceptions discussed room by room below. The layout of this floor has been altered. Historically, there were only two large bedrooms, one at each side of the central hall. Each bedroom had sizable closets built into the eaves at the east and west ends. At the east end of the hall, over the main entry, a bathroom was accessible from both the hall and the northeastern closet. The later drawings show the division of the northern bedroom, the eave closets replaced by a central pair.



Figure 1-330. Peeling paint over the brick which was once exterior (LHM, 9/11/2019)



Figure 1-331. Typical finishes at the upper floor; Bedroom 2 is shown (LHM, 9/11/2019)



Figure 1-332. Second floor Stair Hall looking west. (LHM, 9/11/2019)

Flooring is varnished 2-1/4" wood strip running north-south,.

Walls have had the plaster removed and have been refinished with gypsum board and painted or papered as described later. The baseboard condition varies, and there is no crown molding. At the windows, gypsum board wraps into the opening at the head and jamb with no trim. A 1' thick wood sill extends 1" beyond the wall and 1-1/2" to either side; there is no apron trim.

Ceilings have been replaced with gypsum board and painted. Typical ceiling height on this floor is 8'-2", sloping with the eaves to the east and west.

Upper Hall
Floor, wall and ceiling finishes are typical as discussed above. The baseboard has been removed. A piece of stained glass hangs in front of the large western window; the window is intact behind the glass. The ceiling houses a hatch to the attic.

At the stair, the upper newel post is 4-1/2" square in section with a built up cap similar to that below. The railing at the opening is 35" high with a wide cap over the same spindle-type balusters seen on the stair rail.

Condition: Poor/Fair
The floor here is in poor condition due to staining at the top of the stair and several long scratches down the hall.

The walls are in fair condition. Gypsum board seams are visible, and board is cracked above the doorway of the north wall. The stair rail is in good condition.

The ceiling is in poor condition, with water staining and bubbling at the west dormer.



Figure 1-333. Water stains at the ceiling of the Upper Hall (LHM, 9/11/2019)



Figure 1-334. Further water damage on the wall of the west dormer (LHM, 9/11/2019)



Figure 1-335. Wallpaper wraps the chimney of Bedroom 1, once two rooms (LHM, 9/11/2019)

Bedroom 1
This bedroom was once divided into two. It has retained its original west closet. The flooring is typical, except that the wood floor in the closet has been painted.

In the bedroom, the walls are papered and the baseboard has been removed. The door to the bedroom has been removed. The door to the closet is in the historic location but is itself a new, hollow core construction.

The closet reveals much more about the historic condition. The walls are plastered at both the brick exterior walls and the interior stud partition. Along this partition wall, the baseboard remains; its profile seems to have been reproduced for the newer base used on the first floor. The same can be said for the door trim, though the corner medallions were not observed here.

The ceiling in both the bedroom and closet are now painted gypsum board.

Condition: Fair
The flooring is in fair condition. Boards are damaged near the chimney at the site of a former penetration and worn and scuffed elsewhere.

The walls are in poor condition. Water has stained through the paper along the east wall. In the closet, a leak at the dormer has caused separation of the plaster finish. Cracking is severe in this northwest corner. Mildew is visible at the southwest corner.

The ceiling is also in poor condition, with water damage and finish separation at the east wall. In the closet, the gypsum finish is splitting at the seams.



Figure 1-336. Original finishes still preserved in the closet include wall plaster and baseboard profile (LHM, 9/11/2019)



Figure 1-337. Water damage at the wall and sloped ceiling in Bedroom 1 (LHM, 9/11/2019)

Bedroom 2
The flooring is typical and continues into the eastern closet.

Walls are papered to include the gypsum-covered chimney. There is a baseboard in this room, a simple painted 1x6 with no shoe. The trim at the one window is typical.

The ceiling is typical.

Condition: Fair
The flooring is in fair condition. There is gapping between boards and a rough hole at the site of a former penetration. The walls are in fair condition. There is a crack through the gypsum board above the door and signs of leaking at the chimney. The ceiling, too, is in fair condition with cracking visible at the seams.

Bedroom 3
This room has seen multiple alterations. The flooring is typical and continues into the western closet.

Walls are papered and have the same 1x6 baseboard. The ceiling is typical.

Condition: Fair
The flooring is in fair condition with progressed staining and gapping partially obscured by a carpet. The same penetration near the chimney is visible here but this hole is neatly cut. The ceiling is in fair condition. A hole has been patched near the closet, and inside the closet severe water staining is visible.

Office
This former bathroom was reconfigured fairly recently for use as an exhibit space of a harbor master's office. At the floor, new tongue and groove seems to have been



Figure 1-338. Crumbling plaster in the closet further suggests dormer leaks (LHM, 9/11/2019)



Figure 1-339. Closet opening and applied baseboard in Bedroom 3 (LHM, 9/11/2019)

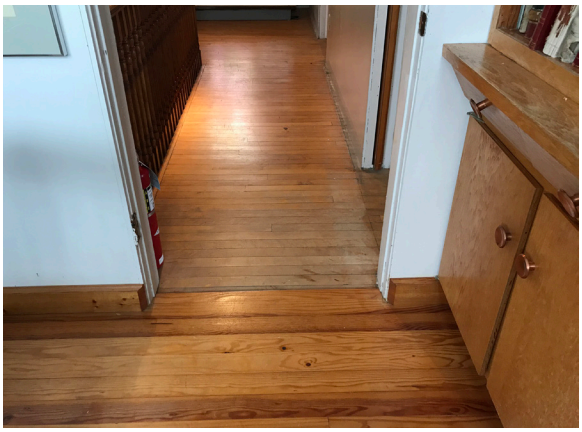


Figure 1-340. Newer flooring and trim at the raised floor of the office (LHM, 9/11/2019)

laid over the existing floor, and is heavily varnished.

Walls are painted gypsum board and have a 1x4 base, also varnished. The ceiling is typical gypsum board but with a notably glossier paint.

Condition: Fair
The new flooring is in good condition. The walls show cracks a the seams and also between the windows on the eastern dormer wall. Damage has been patched near the door. The ceiling has cracks at the seams and some minor peeling of paint.

Architecture - Interior Doors
As most interior doors have been removed from their openings, the few disparate remaining doors found around the house are discussed separately here.

The cellar contains, in addition to a replica of the newer exterior front door, a wood single panel door, painted white, with two hinges and historic knob hardware. The door to the cellar vault is in site; it is a thin five-panel door with two strap hinges and no knob. Inside the vault sits another five panel door, stained rather than painted. It has an older brass knob and its hinges have been removed. It sits next to a wider white three-panel door with a newer brass knob and no hinges. In the Bedroom 1 closet, there are two modern hollow core doors similar to the door to the closet. They have half-hinges and likely recently hung at the bedroom doorways.

Condition: Fair
All these doors have worn finishes but seem to be of serviceable condition. Further study would required to match doors with their historic location.

Architecture - Code/Life Safety
As a National Park Service building, any proposed rehabilitation is governed by the 2018 International Building Code (IBC) and its related family of codes.

Existing Building Code
The IEBC, International Existing Building Code, applies to the repair, alteration, change of occupancy, addition to and relocation of existing buildings. Within this code, work is categorized into Alteration Levels 1, 2 and 3 depending on the amount of work anticipated within the building. Additional categories include Change of Occupancy, Additions, Historic Buildings and Relocated Buildings. Requirements of the code are limited to work areas of the project for Levels 1-3. This means that Alteration projects are not required to upgrade the entire building per current code, just elements that are within the project work area dependent on the nature of the alteration work. Change of Use projects trigger more thorough upgrades and the building must be brought up to current code requirements for the new use. Proposed use for this building is retaining the current use.

Construction Type
Buildings and structures are classified as one of the five construction types in the IBC. The construction type defines the fire resistance rating of the building structure, exterior walls and interior walls.

The Harbor of Refuge Dwelling (HS-20) is currently construction type VB non-sprinklered. Per section 602.5 “Type V construction is that type of construction in which the structural elements, exterior walls and interior walls are any material permitted by this code.”

Existing Area

Basement:	660 gsf
First Floor:	731 gsf
Second Floor:	756 gsf
Total:	2,147 gsf

Use and Occupancy Classification
Currently, the Harbor of Refuge Dwelling (HS-20) is a house museum. There are no plans at this time to change the use of the building.

Museum: Assembly Group A-3 - which includes uses intended for recreation including museums. However, an A occupancy with an occupant load of less than 50 persons shall be classified as a Group B occupancy. This building qualifies for that and is therefore classified as Group B.

Building Height
Table 504.3 limits allowable building height. Since this building is non-sprinklered, it is allowed to be 40' tall.

Table 504.4 indicates allowable height in stories. Per that table, with non-sprinklered, a B occupancy is allowed two stories above grade.

Occupant Load
Occupant load is dependent on the function of the space. Per IBC section 1004, the following occupant load factor applies:

Function of Space	Load Factor
- Assembly: museum	30 net

Since the basement functions as mechanical space, it is not part of the museum net sf calculation. Stairways are also excluded from this calculation. Based on this, the occupant load is less than 50 people.

Means of Egress
Occupant load determines the required size of the egress pathway, along with the number of exits. Currently there is only one stair to the second floor. IBC table 1006.3.3(2) allows single exits from the first and second story above grade plane with a B occupancy and an occupant load per story of less than 49. The main door is 2-10 1/2" clear. The rear door is 2'-6" clear.

Stairs & Raised Walking Spaces
Per IBC section 1011, stairways serving occupied portions of the building shall have a minimum width of not less than 36" when the occupant load is less than 50 and shall comply with Section 1005.1. The existing main stair is 2'-10 1/2" clear, as is the cellar stair.

Stairs risers are required to be solid and shall be 7" maximum and 4" minimum. Rectangular treads shall be a minimum of 11". Stairway landings are required at the top and bottom of each stairway. The front porch stair has six risers at 7" height. The rear exterior stair has five risers which vary in height from six to 7 1/2". There is no landing at the exterior side of the door. The interior main stair has thirteen 10-1/4" treads and fourteen 8" risers. The cellar stair has eleven 10-1/2" treads and twelve 8" risers.

Stairway handrails are required to be not less than 34" and not more than 38" above the stair nosing and shall have an outside diameter of not less than 1-1/4" or greater than 2". Per IBC section 1014, handrails are required to return to the wall, guard or walking surface. Handrails "shall extend horizontally not less than 12" beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser."

Per IBC section 1015, guards are required at open sided walking spaces which are located more than 30" above the floor or grade below

and shall not be less than 42" high. Guards shall not have an opening that allows the passage of a 4" diameter sphere within the required guard height. The cellar stair is 2x lumber and is unstable. The main stair only has a handrail spanning between newel posts.

Fire Suppression
NPS Director's Order 58 section 9.1.8 requires consideration for fire suppression of structures to "prevent loss of human life and minimize damage to historic property resources." Appendix 7 from this Director's Order contains a Historic Property Assessment Matrix which provides a scoring matrix to help assess if a fire suppression system is needed. See Appendix for the matrix and scoring for the Harbor of Refuge Dwelling (HS-20). The score for the building put it in a range requiring a fire suppression system.

Condition: Good and Poor
Prior to undertaking any alterations or if a change of use occurs, a full code study should be undertaken to address impacts and code requirements triggered by the project. Note: This section will be updated once the treatment alternative and uses are defined.

Existing Building Code
The current conditions do not comply with code requirements stated above, so if a full building rehabilitation and change of use is undertaken, many of the deficiencies will be required to be addressed. However, IEBC allowances for historic buildings allow for provisions in the context of the historic character of the building. This code is "founded on broad-based principles intended to encourage the use and reuse of existing buildings while requiring reasonable upgrades and improvements." This also limits extents of required upgrades to the work area(s).



Figure 1-341. Main interior stair, note no handrail (EMH, 9/11/2019)

Construction Type
Since there are no restrictions within the VB construction type, the Harbor of Refuge Dwelling (HS-20) is in compliance.

Use and Occupancy Classification
If the occupancy were to change in the future, a full code study would be required.

Building Height
The building is less than 40' tall and therefore is in compliance.

Means of Egress
The building is in compliance with code.

Stairs
The main interior stairs are not code compliant due to rise/run dimensions of 8" risers and 10 1/2" treads, the width of 2'-10 1/2" where 36" is required, and handrail configurations.

The stair from the basement to the first floor has a guardrail/handrail constructed of 2x4 boards. There is no handrail on the wall side of the stair from the first to the second floor. The handrail on the baluster on the opposite side of the stair does not meet code size requirements.

The rear exterior stair does not meet code. The front stair would meet code with handrail modifications.

Fire Suppression
There is no fire suppression system and one is required by Director's Order 58.

Architecture - Accessibility
To be compliant with the Architectural Barriers Act (ABA), a building is required to provide one universal access point to the building entrance, universal access routes



Figure 1-342. The main entry with stair and step to the finish floor from the porch (EMH, 9/11/2019)

from the entrance to the public spaces on the level of the main entry and a universal access restroom.

Currently access to the building is via exterior stairs. A small room which does not meet ABAAS space requirements contains a water closet. No door hardware is ABAAS compliant.

Condition: Poor
There is no accessible route to the building. However, once inside the building, with minor modifications and the removal of the restroom, the building could have an interior accessible path at the main level.

Existing Conditions & Condition Assessment - Structural

Structural - General System Description

The Harbor of Refuge Dwelling (HS-20) is a gabled roof structure framed with wood floor and roof systems. Below grade, the basement/ foundation walls are constructed of three wythes of red clay brick masonry. The walls of the first floor are constructed of dimensional lumber studs to the interior with an exterior face of red clay brick masonry. The exterior walls of the second floor are constructed of dimensional lumber studs. On the east face of the structure is the original entry porch that has recently been repaired. On the south end of the west elevation, a small gable framed entry structure now acting as the Mud Room (106) was added to house after the original construction of the remainder of the building.



Figure 1-343. Southeast corner of the Harbor of Refuge Dwelling (HS-20) (CBB, 9/10/2019)

Structural - Foundation

The basement walls of the Harbor of Refuge Dwelling (HS-20) act as the foundation system of the building. The walls are constructed of three wythes of red clay common brick masonry. The depth of these walls beneath the basement floor and the existence of a footing are unknown.



Figure 1-344. Basement brick foundation walls. Note the deterioration caused by rising damp (CBB, 9/10/2019)

The Mud Room (106) addition of the structure is founded on a concrete masonry unit (CMU) stem wall. The depth of the walls beneath grade and the existence of footings are unknown.



Figure 1-345. Deteriorating brick and mortar near base of basement walls caused by water infiltration (CBB, 9/10/2019)

Condition: Good to Fair

The foundation of the Harbor of Refuge Dwelling (HS-20) is generally in good condition with no major signs of structural distress such as bulging or cracking from differential settlement. However, there is some minor damage occurring in the foundation walls caused by moisture

infiltration. Because of the high water table at the site immediately adjacent to the boat channel, moisture enters the base of the basement foundation walls and wicks up the walls via capillary action. This movement of water through the foundation walls is called rising damp. At some point in the building's history, the interior faces of the foundation walls were coated in a non-breathable coating. This non-breathable coating traps the rising damp moisture in the wall rather than letting it evaporate to the interior of the building. While it is trapped in the wall, the moisture deteriorates the lime binder in the mortar joints and brick units behind the non-breathable coating, causing the material to powder. The extent of the damage is not currently structurally significant at this time.

Additionally, along the west wall is a pipe that appears to be leaking water that is collecting at the base of the wall and wicking upwards.

See the Wall Framing section below for further discussion.



Figure 1-346. Excess moisture accumulating near pipe on the west basement wall (CBB, 9/10/2019)



Figure 1-347. First floor framing (joists, center timber beam, and brick piers) as seen from the northwest corner of the basement (CBB, 9/10/2019)

Structural - Floor & Ceiling Framing

The basement floor of the Harbor of Refuge Dwelling (HS-20) is a concrete slab-on-grade. The thickness and presence of reinforcing is unknown.

The first floor of the building is framed with 2" x 9-1/2" joists spaced at 16" on center. These joists continuously span between the east and west foundation walls where they pocket into the perimeter brick masonry walls and are supported at the midspan by an 8-1/2" x 8-1/2" timber beam. The timber beam spans in the north-south direction and is supported by three interior 12-1/2" x 12-1/2" brick piers and 4" brick pilasters at the north and south foundation walls. This center timber beam is cut at the stair opening. The



Figure 1-348. First floor joist pocketed into exterior brick masonry wall (CBB, 9/10/2019)

joists are braced by a continuous row of wood cross-bridging at the quarter points of the span. The joists are sheathed above with 1" x 10" diagonal board sheathing serving as the subfloor.

At the window openings in the walls of the basement, the floor joists are supported by a doubled up 2x6 header beam that is tenoned into the joists on either side of the window opening.

The floor of the porch is framed with 2x10 nominal dimensional lumber joists spaced at 16" on center. The joists span north-south between triple 2x8 beams that span east-west between CMU piers located at the corners and at the third points of the length of the deck. This porch was recently repaired in the last decade and is detailed on drawings dated 05.27.2011 (see Appendix C).

The floor of the Mud Room (106) addition is framed with wood joists, however the configuration is concealed by finishes and the sizes and exact configuration could not be confirmed.

Although not visible at the time of the observation visit aside from a small opening in the flooring, it is likely that second floor is framed with 2" x 9-1/2" joists running in the east-west direction, similar to the first floor. The floor joists are supported by the bearing wall between the Kitchen (105) and Dining Room (104) as well as a triple 2x10 bolted beam that is soffited down the center of the Parlor (102). This triple beam was installed in 1966 when the bearing wall previously in this location was removed. The only sheathing on the tops of the joists is the 3/4" x 2-1/4" wood flooring with no sub-floor layer.



Figure 1-349. North end of the first floor center timber beam bearing on brick pilaster integral to the north chimney (CBB, 9/10/2019)



Figure 1-350. Break in the center timber beam at the staircase from the first floor down to the basement (CBB, 9/10/2019)



Figure 1-351. First floor joists, cross-bridging, and diagonal sheathing (CBB, 9/10/2019)

Condition: Good to Fair

The basement concrete slab-on-grade of the Harbor of Refuge Dwelling (HS-20) is in good condition with no signs of major subsidence or distress.

The first floor framing of the Harbor of Refuge Dwelling (HS-20) is generally in good condition, with several areas in fair condition. Overall, the floor has adequate capacity for the imposed loads showing no major signs of structural distress. However, the center timber beam has been severely notched near one end, the southern section of the timber beam is overstressed, the same timber beam is crushing at a bearing point, and there is some moisture damage beneath the Restroom (102).

Near the north end of the center timber beam, there is a notch that is 3-1/2" tall and 6-1/2" long. This notch does not meet the acceptable criteria for notches and holes in timber beams as laid out in the National Design Specification for Wood Construction and significantly weakens the beam.

South of the staircase, the 8-1/2" square timber is overstressed. See the Applicable Codes and Loads section below for further discussion.

At the south end of the timber beam where it bears on a pilaster built into the brick chimney, the bottom of the timber is crushing. This is caused by too much load being concentrated on the small bearing area at the end of the beam.

Under the Restroom (102) there is evidence of moisture manifesting as staining on the wood decking and joists. This is an indication that there is or may have been a water leak in this area. If not remedied, exposure to



Figure 1-352. Tenoned header supporting first floor framing at a basement window (CBB, 9/10/2019)



Figure 1-353. Dropped beam in the Parlor (102) supporting the second floor joists (CBB, 9/11/2019)



Figure 1-354. Flooring that is also the structural sheathing of the second floor (CBB, 9/11/2019)

excess moisture can encourage decay fungi to flourish and deteriorate the wood material, which reduces the structural integrity and capacity of wood structural members.

The first floors of the front porch and the Mud Room (106) addition are in good condition with no signs of structural distress such as sagging or sloping floors.

The second floor framing is generally in good condition with several areas in fair condition as described below, including the undersized beam in the Parlor (102), the significantly deflecting joists just north of the staircase, and the single layer of flooring.

The triple 2x10 beam that was installed in the Parlor (102) per the 1966 renovation drawings to support the second floor joists is undersized. See the Applicable Codes and Loads section below for further discussion.

North of the staircase, the second floor joists span all the way between the east and west exterior bearing walls with no intermediate support. Although they have enough bending capacity to span this far, the calculated deflection at the center of the joists is approximately 1-3/8". This deflection is likely causing the crack in the drywall ceiling seen at this location. These rafters are not at risk of failure, rather this issue is more of a finishes damage concern.

The 1x wood flooring material of the second floor of the Harbor of Refuge Dwelling (HS-20) is not structurally adequate to support the code required loads. See the Applicable Codes and Loads section below for further discussion.

Structural - Roof Framing
The Harbor of Refuge Dwelling (HS-20) is topped with a gable roof with the ridge running in the north-south direction. There are single gable dormers on both the east and west aspects of the roof. The roof is framed with 1-5/8" x 5-1/4" rafters spaced at 16 inches on center at an 8 on 12 slope. At the peak of the roof runs a 1x10 ridge board. Approximately 4'-4" below the ridge, 1-5/8" x 7-1/4" collar ties span across each rafter pair. The ceiling is attached to the bottom of the collar ties at the center of the building and to the bottom of the rafters at the east and west sides. The rafters are sheathed on the top face with 1x variable width horizontal board sheathing.

The roofs of the dormers on both sides of the gable roof are framed with rafters spaced at 16" on center. The valleys on either side of each dormer are framed with a double 1-5/8" x 7-1/4" valley beam.

The roof framing configuration and sizes for both the front porch and the Mud Room (106) are concealed by finishes and could not be confirmed.

Condition: Good
The roof framing of the Harbor of Refuge Dwelling (HS-20) is in good condition showing no signs of structural distress such as sagging or thrust-induced spreading. Even though the structural systems of the front porch and the Mud Room (106) roofs were not directly observed, there are no signs of structural distress that are propagating through the finishes such as sagging or displacement.

Structural - Wall Framing
Below grade, the exterior walls of the Harbor of Refuge Dwelling (HS-20) are constructed of three wythes of common brick. See

the Foundation section above for further discussion.

The three wythe walls extend above grade approximately 2', however, above grade the exterior wythe of brick is constructed with face brick. The top of the three wythe wall is capped with a concrete water table.

Above the water table, the wall is constructed of two wythes brick to the exterior with 2" x 4" dimensional lumber studs spaced at 12" to the interior. The studs bear on a 2" x 4" plate set on top of the joist ends, which are notched down to receive the plate. There is a 1-1/2" gap between outside face of studs and inside face of brick.

At the second floor, the walls transition to stud wall construction.

The one interior bearing wall between the Kitchen (105) and Dining Room (104) is likely framed with 2" x 4" studs spaced at 12" on center.

At the center of the north and south elevations, brick chimneys extend up from the basement through the roof of the structure.

The walls of the Mud Room (106) addition are constructed of wood stud framing supported on the CMU foundations. Due to finishes, the configuration of the framing could not be confirmed.

Condition: Good to Fair
The wall framing of the Harbor of Refuge Dwelling (HS-20) is generally in good condition with no signs of widespread structural distress such as bowing or displacement. However, there are several localized areas in fair condition for different reasons.



Figure 1-355. Notch in first floor center timber beam near the north bearing point (CBB, 9/10/2019)



Figure 1-356. Bearing of first floor center timber beam at the south end. Note that the bottom of the timber beam has crushed where it is bearing on the brick pilaster (CBB, 9/10/2019)



Figure 1-357. Crack in drywall ceiling north of the staircase caused by deflection of the second floor joists (CBB, 9/11/2019)

Along the south elevation at grade, two courses of common brick are visible that would have traditionally been located below grade. These two courses of brick are showing signs of deterioration such as loss of mortar joints and discoloration. This area has also been repointed at least once with a cementitious mortar which can damage the surrounding brick units since it is harder than the bricks which become the sacrificial element of the wall assembly. This deterioration is likely caused by excess moisture introduced at this location while watering the garden planted along this elevation.



Figure 1-358. Roof framing of the Harbor of Refuge Dwelling (HS-20) (CBB, 9/10/2019)

At the northwest corner of the structure below the water table, the corners of the brick units have popped off. This deterioration mechanism likely occurred because excess moisture was introduced to the wall from the downspout above. Then the building site experienced a series of freeze-thaw cycles, during which the excess moisture in the wall would freeze and expand imparting internal pressure in the brick unit, causing the corners to pop off.

On the interior faces of the chimneys there are signs of moisture infiltration evidenced as water staining and efflorescence in the attic. The moisture likely entered the structure through the interface between the roofing and the chimney. It is unknown if this moisture infiltration is active or not.

The wall framing of the Mud Room (106) addition is in good condition showing no signs of structural distress such as bulging or racking.



Figure 1-359. Concrete water table at transition in the exterior wall from three wythes of brick masonry to two wythes with a wood stud wall on the interior face (CBB, 9/10/2019)

Structural - Lateral System

The lateral system of the Harbor of Refuge Dwelling (HS-20) consists of the sheathed

roof and floor diaphragms, the exterior walls of the structure, and their connections to the brick foundation walls.

Condition: Good
The lateral force resisting system of the structure is in good condition. Since no change in use is planned for this structure, the Risk Category remains the same. Per code, since the Risk Category is not changing and there are no elements or systems deemed dangerous, no upgrades to the lateral elements of the building are required.

One area in need of further investigation that was not accessible during the observation visit is at the east and west bearing walls where the rafters bear on the walls. Typically, the nailed connection between the roof framing and the wall framing for buildings from this era of construction is inadequate to resist wind from lifting up the roof structure and it is in best practice to upgrade this connection, especially at this highly exposed lakeshore site.



Figure 1-361. Bottom plate of the first floor stud wall notched into the tops of the first floor joists (CBB, 9/10/2019)

Structural - Applicable Codes & Loads
The code references for this assessment include the 2018 International Building Code (IBC), the 2018 International Existing Building Code (IEBC), and ASCE 7-16 Minimum Design Loads for Buildings and Other Structures.

The load requirements for the Harbor of Refuge Dwelling (HS-20) at the Grand Marais USCG Station are based on the type of occupancy and geographical location of the building. Originally this structure was used as a residence, but since the mid-1980s the structure has be utilized as a seasonal house museum. It is understood that the structure will continue to be used as a house museum. Both of these building uses



Figure 1-360. Deteriorating bricks and mortar joints at the garden along the south elevation of the building (CBB, 9/12/2019)

classify the structure as Risk Category II for standard occupancy. The required floor live load capacity per ASCE 7-16 for residential use is 40 pounds per square foot (psf) while for museum or public use it is 100 psf. Since the typical loads on the floor are imposed by small groups moving through the rooms independently at different times rather than people gathering in one location and there have been no reported issues up to this point, the 100 psf requirement seems heavy-handed. Per chapter 12 of the 2018 IEBC, this building classifies as a Historic Building and with code official approval, the approved lower live load capacity can be posted in a conspicuous location. Therefore, a live load of 40 psf was utilized to complete preliminary structural analyses on the structural systems of the building. A brief review was completed to compare the current design and current code required live load capacities of the floors (see the PIRO HSR Live Load Capacity Chart in Appendix C).

The ground snow load required for the Grand Marais USCG Station per ASCE 7-16 is 70 psf. This ground snow load translates to a flat roof snow load on the Harbor of Refuge Dwelling (HS-20) of 40 psf per ASCE 7-16 when wind exposure and thermal conditions are considered. Given the slope of the roof and the texture of the roof surface, a 10% reduction is allowed resulting in a roof snow load of 36 psf.

The ultimate design wind speed at the Grand Marais USCG Station site per ASCE 7-16 Figure 26.5-1B is 104 miles per hour (mph). The equivalent nominal wind speed is 90 mph.

The Grand Marais USCG Station site falls within Seismic Design Category A. The Seismic Design Category is a classification



Figure 1-362. At the northwest corner of the building, some brick faces have popped off due to freeze-thaw cycles in the brick (CBB, 9/10/2019)



Figure 1-363. Water staining and efflorescence visible on the interior face of the brick chimney as seen from the interior of the attic (CBB, 9/10/2019)

given to a structure that is based on the Risk Category of the building and the severity of the design earthquake ground motion at the site. The earthquake ground motion properties of the site are cataloged by the United States Geological Survey (USGS). The two mapped acceleration parameters for the site per USGS are short period (Ss = 0.044 g) and 1 second period (S1 = 0.020 g). Without site specific soil testing, site soil conditions are assumed to comply with Site Class D resulting in a Seismic Design Category for the Harbor of Refuge Dwelling (HS-20) as A. Since the structure falls within Seismic Design Category A, no seismic analysis is necessary per code.

Southern pine design values were used to evaluate the load capacity of the Harbor of Refuge Dwelling (HS-20) structural members based on wood samples taken from a first floor joist and the first floor timber beam. Most of the members had only some sporadically located grade-limiting defects, such as small knots, resulting in Select Structural analysis values.

Condition: Good to Fair

The structural elements of the structure are adequate for imposed loads on the structure and are therefore in good condition unless noted below.

The southern section of the timber beam in the first floor framing system is 25% overstressed under the residential museum loading associated with the function of the building. This is an issue at this location because not only is the beam loaded by the first floor joists, but it also supports the bearing wall directly above that supports the second floor in this area. This is not the case to the north of the staircase because the second floor joists are supported by a beam that spans across the Parlor (102).

The second floor beam (a triple 2x10) that spans across the Parlor (102) does not have adequate bending capacity to support the residential museum load if it was constructed per the 1966 renovation drawings. However, since there are no changes in use and therefore no changes in Risk Category, and the situation is not deemed dangerous as the beam is only slightly overstressed per preliminary analysis, no work is necessary at this location per code requirements. However, it would be prudent to visibly post the allowable live load.

Typically floors of this era of construction are sheathed with two layers of material: a bottom layer of structural sub-floor tongue and groove sheathing and a top layer of architectural flooring boards. In the case of the second floor of the Harbor of Refuge, there is only one layer of material and it is the finish floor boards. Although these boards run perpendicular to the joists as the structural layer of sheathing typically would, the small dimensions of the boards are not structurally adequate to handle larger point loads on their own, such as a person standing on one foot directly between two joists or the leg of a bookcase. There has likely been no failures up to this point because the loads even of a single human foot are spread out over two or more individual boards.

Existing Conditions & Condition Assessment - Mechanical

Mechanical - General System Description

The original heating source for the building were fireplaces located on the north and south walls of the first and second floors. The chimneys are still existing, and the fireplace cleanouts in the basement are still in place.

Located in the basement along the south wall is an oil fired boiler, Weil McLain rated for 146.1 MBH of heating water. The boiler provided heating water to radiators on the floors above. The flue off of the boiler has an inline fan and in routed up through the abandoned fireplace chimney on the south wall. The vent is routed up through the top of the chimney, where it is protected with a bird screen. The fuel oil lines are disconnected at the boiler and curled up by the boiler. There are also fuel oil lines that exited on the south wall that has been cut off at the wall. There are copper heating water supply and return lines routed from the boiler up to the upper floors. There are two isolation valves on the heating water lines that are manually controlled for thermal zone isolation. There is no insulation on the heating water pipes.

The first floor has no radiators today. There is evidence on the 1st floor that radiators were once present and have been removed. This is evident by the holes in the 1st floor that have not yet been repaired at locations by the windows where radiators would be present.

The second floor has hot water baseboard routed through the three bedrooms along all the walls. The supply line and return line are both located in the baseboard enclosures. There are no baseboard heaters in the Upper Hall #201, Closet #203, Closet #204, and Office #207.



Figure 1-364. Boiler with powered venting and disconnected fuel oil lines. (DMD, 9/11/2019)



Figure 1-365. Disconnected and curled up fuel oil lines to boiler on south wall. (DMD, 9/11/2019)



Figure 1-366. Holes from previous hot water piping routes from 1st Floor to Basement. (DMD, 9/11/2019)

On the first floor in Restroom #102, there is no exhaust fan or operable window.

There is a 5"x2.5" vent line routed off the top of the Vault #002 out to the west where it terminates outside the building in a portion of vent that is a gutter section used to turn the vent down.

There is no mechanical cooling within the building.

There is no mechanical ventilation in the building. Ventilation in the past has been provided by operable windows in the Basement, 1st Floor, and 2nd Floor.

Condition: Poor
The heating system for the building is not operational. There are no sources of heat on the 1st Floor or in the Basement. The 2nd floor baseboard radiators are in good condition however they do not have a heating source. The baseboard radiators do not cover the entire 2nd floor and leave areas such as the Upper Hall #201 and Office #207 with no heat.

There is no exhaust in Restroom #102.



Figure 1-367. Typical baseboard heaters in bedrooms (non-operational) (DMD, 9/11/2019)



Figure 1-368. New water entry with water meter on west wall. (DMD, 9/11/2019)

Existing Conditions & Condition Assessment - Plumbing

Plumbing- General System Description

The main ¾" copper water line enters the Basement from the west and is routed through a newer water meter. The old galvanized water main into the building has been cut off at the wall and is abandoned.

The cold water feeds one water closet on the 1st floor and two exterior hose bibbs, one on the north side and one on the south side.



Figure 1-369. South hose bibb. (DMD, 9/11/2019)

The water lines that serve these fixtures are copper and portions of PEX lines. The other cold water lines and hot water lines in the basement are a mixture of galvanized and copper and are all abandoned.

There is an electric 50-gallon water heater in the basement that is abandoned. There is no domestic hot water in the building.

The main sanitary line exits the basement on the west side and is a 4" hub-and-spigot line. A new 4" PVC line is connected at the exit and is from the water closet in Restroom #102. There are no other active sanitary lines in the building. There is a manhole cover located outside the building on the west side that aligns with the sanitary exit location from within the Basement. The routing of the sanitary line past this point is unknown.

There is a 4" cast iron hub-and-spigot line that is routed from the east of the building to the west end through the stairs and ties into the new 4" PVC line. This routing is a re-routing of the sanitary line in the basement. The original sanitary line extended from the 1st floor down on the east wall and below the basement slab. This original line has been cut off and capped.

There is a 1-1/2" vent line that exits the roof line above Office #207.

There is a two-compartment utility sink in the basement that drained into a sump basin where it was pumped up and into the sanitary waste line. The sump pump is not operational.

There is a kitchen sink on the 1st floor in Kitchen #105 that is not connected to any water or waste lines.



Figure 1-370. Newer copper and PEX cold water line. (DMD, 9/11/2019)



Figure 1-371. Abandoned electric water heater on south wall. (DMD, 9/11/2019)



Figure 1-372. Sanitary main exit to the west. (DMD, 9/11/2019)

There is a ½" propane line with a shut-off valve and regulator located outside on the west side. The propane line enters into the building where it reduces to a ¼" tube and is routed south over the Vault. The propane line does not connect to any appliances in the building. Drawings from 1965-1970 show that the propane is fed from the propane tank that is located behind the Officer in Charge Dwelling (HS-19) and feeds both the Officer in Charge Dwelling (HS-19) and the Harbor of Refuge Dwelling (HS-20).

Condition: Poor

The overall condition of the plumbing system is poor. The water closet requires a handwashing facility with hot water, and there are no handwashing capabilities within the building. The water lines that feed the water closet and two hose bibbs are in fair condition with repairs on the lines being completed wth PEX piping; however, these lines are very minimal for the overall building plumbing system.

The main water line into the building does not have cross-contamination protection as required by code.

The sanitary main at the building exit appears to be in good condition, and the new PVC line is in good condition. All the other sanitary lines are minimal and in poor condition.

The propane line into the building serves no appliances and therefore has no current use.

The sump pump discharge piping is not code compliant. The discharge from a sump pump is required to have a check valve and to connect to a gravity sanitary line via an indirect connection. The current sump pump discharge is a direct connection to the sanitary line and therefore changes the



Figure 1-373. Sanitary line through stair. (DMD, 9/11/2019)



Figure 1-374. Two-compartment utility sink with sump pump underneath and capped sanitary line to left. (DMD, 9/11/2019)



Figure 1-375. Propane shut-off and regulator on the west exterior. (DMD, 9/11/2019)

sanitary line from a gravity-fed system to a forced main system. A forced main system is not acceptable with a hub-and-spigot system, which is the current sanitary piping material that the sump pump connects.

The routing of the vent line from the water closet to the 1-1/2" line above Office #207 is unknown and is undersized for a snow load climate. The vent line should be a minimum of 3" to prevent snow buildup and blocking of airflow.

Existing Conditions & Condition Assessment - Fire Protection

Fire Protection- General System Description
There is no fire protection system in the building.

Condition: N/A

Existing Conditions & Condition Assessment - Electrical

Electrical - Electrical Service and Panels
The existing electrical service meter for the Harbor of Refuge is located on the exterior, and is rated 240/1PH, 100A. A 100A main disconnect is located in the basement and feeds the load center.

Condition: Poor
Original drawings indicate the building was originally fed from the Station Dwelling (HS-18). Currently, the building has its own electrical meter and service. Based on available documents, it appears the meter and service were installed in 1981 and is in need of replacement.

Electrical - Electrical Distribution System
Receptacles for general power/convenience use are in critical to poor condition. Existing basement distribution equipment has surface rust, and some items are painted over. There is a mix of metal raceway, non-metallic cabling (NM), and very old fiber insulated wiring. No knob and tube wiring was observed at visible locations.

Condition: Poor
Receptacles for general power/convenience use are in inadequate condition. Type NM (Romex) cable is used for branch circuits in some areas that were remodeled. There is a mix of Type NM cable, metal raceway, and obsolete insulated wiring is exposed in basement level. Many of the raceway fittings and raceways have visible damage due to high humidity. Branch circuits do not meet NPS requirements.

Electrical - Lighting, Emergency Lighting, and Exit Signs
Interior lighting is inefficient using both



Figure 1-378. Harbor of Refuge Dwelling (HS-20) (SJH, 09/11/2019)



Figure 1-377. Overhead to electrical service meter (SJH, 09/11/2019)



Figure 1-376. Electrical panels located in basement (SJH, 09/11/2019)

fluorescent and incandescent fixtures. Some appear to be damaged and were not tested to determine if tehy are working. Manual wall switches are used throughout.

Exterior lighting is minimal, and are not Dark Sky compliant.There are no exit signs or egress lighting currently in use, although required in musuems.

Condition: Poor
All fixtures are inefficient, and several non-historic fixtures appear to be damaged. Some of the existing fixtures observed appear to be historic.

Electrical - Fire Protection & Detection System
There is one smoke detector located on each level, and do not appear to be interconnected as required by the IRC. A full fire alarm/ detection system does not exist within the building.

Condition: Poor
The existing system is inadequate. NPS Standards require a supervised smoke detection system to be installed.

Electrical - Tele/Data Communications System
The existing telephone line is overhead from utility.

Condition: Poor
The existing overhead line is for a telephone only.

Electrical - Lightning Protection System
No lightning protection system was observed at this building.

Condition: N/A
There is no existing system.


Figure 1-379. Electrical wiring in basement (SJH, 09/11/2019)


Figure 1-381. Lighting fixture (SJH, 09/11/2019)


Figure 1-380. Obsolete smoke detector yellowed from age (SJH, 09/11/2019)

Existing Conditions & Condition Assessment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Existing Conditions - Hazardous Materials

Hazardous Materials - General Description
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
Asbestos inspection services were performed to identify the presence, location, quantity, friability, and condition of Asbestos Containing Material (ACM) located at the project site. Bulk samples were collected and analyzed of suspect ACM.

Lead Containing Paint
Readings of suspect Lead Containing Paint (LCP) were collected in a representative manner as determined by the inspector based on identifying testing combinations where the surface color, substrate, or building component were visibly different. Sampling was limited to materials that were visible and readily accessible to the inspector.

Regulated Building Materials
Inspectors provided visual survey for Regulated Building Materials (RBM) throughout all buildings.

Biological Hazards
Inspectors provided visual survey for biological hazards including rodents and mold growth throughout all buildings.

Hazardous Materials - General Description
Condition: Good or Poor
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
ACM is defined as a material containing greater than one percent asbestos by weight, volume or surface area. Regulations distinguish treatment requirements between friable and non-friable forms of ACM. Test results confirmed ACM in the following locations:

- Joint compound on the drywall system throughout the building contains 2.1-2.2% chrysotile asbestos (3,500 SF). The composite drywall system (drywall, paper, and joint compound) contained less than 1% asbestos.
- White flue packing material associated with the gray pipe on the basement south wall contains 1.8% chrysotile asbestos (~1 SF).
- White window caulking on exterior windows contain 4% chrysotile asbestos (19 each).

Lead Containing Paint
Lead Based Paint (LBP) is defined as a paint containing 0.5% lead by weight or 1.0 milligram per cubic centimeter by both the EPA and HUD.

The following locations have LBP or LCP:

- Gray and red paint on concrete floors in basement.
- Green and white paint on brick walls.
- Yellow and blue paint on brick wall/ ceiling in storm shelter.
- Red and gray paint on wooden stairs.
- Yellow paint on plaster walls.
- Gray paint on wood porch.
- White paint on wooden window casing.

Soil was collected from the dripline of the building and had 706 mg/kg of lead. This does not exceed the EPA non-play area bare soil level of 1,200 mg/kg for lead. Paint chips were noted in the soil.

Regulated Building Materials
RBM found throughout the building were fluorescent light tubes and compact florescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire-suppressant chemicals; and a 10-gallon bucket of paint which could contain lead or other chemicals.

Biological Hazards
No water infiltration or evidence of rodents was observed at the time of the inspection.

Equipment Building

Existing Conditions & Condition Assessment - General

General Building Description

The Equipment Building, constructed in 1938-1939, is rectangular in plan with one and one-half stories; the upper fully engaged within the gable. Its simple gable roof, elongated on the east-west axis, is punctuated by four gabled dormers on each slope. The roof is clad in red asphalt shingles. Above the painted concrete foundation, exterior walls have been covered with aluminum siding, but the original wood shingle cladding seems largely intact behind it. There are no porches or appurtenances.

Half of the first floor serves its historic role as a service or storage bay, with overhead doors providing access and original utilitarian finishes maintained. The other half has been reconfigured into offices with newer finishes. The upper floor loft, served by a central stair, has likewise been partially renovated as a meeting room and otherwise utilitarian storage.

Condition: Fair

The aluminum siding is in poor condition, but hopefully has protected the historic shingles behind it. The roofing fairs quite well given the conditions, with some flashing issues, complicated by the siding, meriting attention. Much of the historic finishes, however utilitarian, have been retained in serviceable condition.



Figure 1-382. The Equipment Building as viewed from the tower of the Station House (KAC 9/10/2019)



Figure 1-383. Simple form of the Equipment Building against the complexity of the grand Station House beyond, view from the south (KAC 9/10/2019)



Figure 1-384. Roof gable and dormer configuration, view from SW (KAC 9/10/2019)

Character Defining Features

Mass/Form

The simple rectangular shape of the building below its elongated gable roof is a character defining feature. The eight dormer windows,

symmetrically and rhythmically placed, contribute to the building character. The engagement of the second story fully into the roof gable defines the scale of the structure and alludes to the Cape Cod / Colonial Revival tradition.

Exterior Materials

The primary exterior material, painted wood shingles, is concealed throughout by aluminum siding. The use of shingles is a character defining feature of this building. The red asphalt shingle roofing is not materially character defining but the shingle concept is. Also contributing is the visible woodwork at the gable and window openings. Two original light fixtures on the otherwise modified north facade are absolutely character defining, along with the wood trim around them. Finally, the exposed concrete foundation recalls the utilitarian function of the building.

Openings

Openings on the north and east facades have been modified, resulting in a loss of the original balance and symmetry. The two overhead door openings that remain are character defining. The rhythm and spacing of the remaining first-floor windows contribute to the character of the building as do the squatter gable-end windows at the second story. The arched dormer windows elevate the style of this utilitarian structure and connects it visually to the Station House across the way.

Interior Materials

The functional plywood wall finish where extant contributes to the character of the building. The interior window trim, much of which remains, refines the finish and is character defining. While not actually a finish, the opposed diagonal floor boards of



Figure 1-386. Aluminum siding installed over wood shingles (LHM 9/11/2019)



Figure 1-387. Openings on the north and east facades have been modified (KAC 9/11/2019)



Figure 1-385. Interior window trim and modern wood paneling (LHM 9/11/2019)

the Stove Room further define the rugged character. Remnants of a former hatchway or scuttle in the main loft floor are visible at the ceiling of the Storage Bay and should be considered character defining.

Integrity
The Equipment Building retains good integrity of design, location and feeling on the exterior despite the loss of two of the garage bays. The restoration of the wood shingle siding would return integrity of materials to the exterior. On the interior, half of the building on each floor retains integrity of design, feeling, materials and configuration.

Existing Conditions & Condition Assessment - Architecture

Architecture - Roofing and Drainage
The roof is gabled along the east-west axis at a 9:12 pitch. Four gabled dormers extend from each slope. Roofing is red asphalt shingle with asphalt shingle ridge caps at the main and dormer ridges.

Overhangs are short at both the rake and eave. At the eaves, the narrow soffits are clad in vented cement board. The soffits have a short 1" return at the rake; the awkwardness here is explained by the extra thickness of the cladding, described below.

Gutters at both eaves are aluminum in an ogee profile. The gutters discharge at each corner into a 3" fluted aluminum downspout.

Condition: Fair
The shingles overall are in good condition, but some of the complicated geometry at the dormers does give cause for concern. Fortunately, kickout flashing at the dormer valleys does an effective job of deflecting



Figure 1-388. Darker areas show the pattern of water shed away from the dormers, where some curling has nonetheless prevailed, north elevation (LHM 9/11/2019)



Figure 1-389. Aluminum siding at the altered north (front) elevation (LHM 9/11/2019)



Figure 1-390. Wood shingles visible behind the aluminum siding (LHM 9/11/2019)

most water away from the side walls of the dormers, where the flashing is not well executed. In some places particularly on the north slope, enough water has crept in to cause curling of the shingles and some moss growth.

The gutters and downspouts are bent beyond repair. Downspouts discharge rainwater too close to the building foundation.

Architecture - Exterior Walls
Walls are now covered in aluminum lap siding with a 7-3/4" reveal. Corners are edged in L-profile aluminum trim while C-shapes are found at edges and jambs. The same materials are used at the walls of the dormers.

Where a stretch of this newer siding has been removed, the historic wood shingle siding is visible and seemingly intact. The shingles are of varying widths with an approximate 8" exposure. The shingles are painted white.

Much of the historic wood trim is visible. At each gable, a simple wood bargeboard follows the roof line, accented by an ogee profile trim board. At the historic windows, the siding stop is held back to reveal the wood face trim or casing. This consists of a 5/4 x 4 trim flat board at head and jamb and a simply sloped sill, all coated with several layers of white paint. At doors, wood casing at the head and jamb line the openings beyond the superficial aluminum trim. None of the door conditions is original.

At the ground, about one foot of foundation is visible below the siding. The foundation is concrete with a thick gray coating.

Condition: Poor
The condition of the wood shingles behind the aluminum siding was not assessed. The



Figure 1-393. Typical issue with missing or broken trim, southwest corner (KAC 9/10/2019)



Figure 1-391. Foundation and wood trim visible at an original window and newer door, east elevation (LHM 9/11/2019)



Figure 1-392. Typical denting and tearing of siding and detaching trim (LHM 9/11/2019)

siding itself is in overall poor condition.

At the north (front) elevation, the siding is dented and torn. Holes remain at the site of former penetrations. The aluminum trim at the outside corners and jambs is coming loose at the base.

A wood frame around a significant historic light fixture has decayed. The wood casing at the single man door is decayed at the base. At the overhead doors, which are not original, the wood jamb casing is heavily painted and seems to be in good condition except at the left jamb of the west door, where the frame has separated leaving an open joint. Paint is peeling at the at the fascia of the dormers, revealing deterioration of those members.

At the west elevation, the siding exhibits the same dents, but several of the holes here have been patched.

The wood trim at the gable is weathered but not yet deteriorated. The wood casing at the four windows are covered in uneven and peeling paint. Some decay has begun at the wood sills.

At the south elevation, the siding suffers badly from corrosion and warping, especially at the site of a conduit penetration. The siding at the westernmost dormer is bent inward; the underlying framing should be observed for imposture damage at this location.

The wood trim at this southern exposure fairs better. At the window casing and sills, there are finish issues but only minor decay. The exception is the second window from the west, where decay at the jamb is severe.

At the east elevation, the siding is dented and



Figure 1-394. Deterioration of the wood jamb casing, west elevation (LHM 9/11/2019)



Figure 1-395. Corrosion of siding and trim, south elevation (LHM 9/11/2019)



Figure 1-396. Weathering of bargeboard and trim at the eastern gable end (LHM 9/11/2019)

warped and much of the aluminum trim is torn.

The condition of wood elements varies at this elevation. The wood jamb is decayed at the door, which has been relocated from its original position. Wood casing at the windows shows only paint issues. The bargeboard at the gable is well weathered, with some separation of the trim from the bargeboard.

Architecture - Windows
Eight windows, called here Type A, are six-over-six wood double-hung. A newer fixed aluminum storm window sits flush with the exterior.

The two Type B windows sit in the gable ends. These are also six-over-six wood double-hung but in a squatter proportion. They also have exterior aluminum storm windows.

The Type C windows in each of the eight dormers have a palladian (rounded at top) upper sash and an operable lower sash. They have operable aluminum storms as well.

At the north elevation, two Type D windows are modern vinyl sliding windows with aluminum storm windows.

Condition: Fair
The Type A windows are in overall poor condition. Most have one or two broken panes; all are missing chains. Paint at the mullions and frames is deteriorating, and most of the glazing compound is gone. Two have compromised storm windows, one stuck in the open position.

Type B windows fair a little better.
One is missing its chains, the other its hardware. Glazing compound is messy and compromised.



Figure 1-397. Historic window arrangement at the west elevation (LHM 9/11/2019)



Figure 1-398. All windows now have storm windows; those at the dormer windows alter the historic configuration (LHM 9/11/2019)



Figure 1-399. Cracking of mullions at dormer windows (LHM 9/11/2019)

Type C windows are also suffering. All have deteriorated finishes at the wood elements so operation is unsurprisingly poor. Mullions are cracked and separated at the joints. All have missing or broken chains though only lack its pull hardware. The storms are in decent condition but visually incompatible with the historic condition.

Type D windows are modern, in good condition but incompatible with the historic.

Architecture - Exterior Doors
The exterior doors are not original to the structure. The north elevation once hosted four overhead doors. The two remaining overhead doors are flat panel with no lites. Original doors were paneled and had glazing in the upper panels. There have been modifications made to the trim around these two doors, though the rough openings appear to have been maintained. The man door on this elevation is also a recent add. It is a hollow metal door in a wood frame and has modern lever hardware. The door on the east wall is similar but with knob hardware. Historically the door sat further to the north, protected by a gabled hood.

Condition: Fair
The overhead doors are in good condition while the swinging doors are dented and bent.

Architecture - Interior Finishes - 1st Floor
The first floor originally hosted four garage bays with a stair, shop and heater room in the southeast corner. The eastern two bays have been modified for office use, while the western bays have maintained much of their original condition.

Storage Bay
The floor in this area is unfinished concrete.



Figure 1-400. Non-historic door and window conditions, north elevation (LHM 9/11/2019)



Figure 1-401. Historic walls and floor, new ceiling in the Storage Bay (LHM 9/11/2019)



Figure 1-402. Plywood siding above the concrete curb, baseboard removed (LHM 9/11/2019)

The north, south and west exterior walls have retained their original condition. Wall construction consists of a 7-1/2" high concrete curb, beveled at upper inch, below a 2x6 stud wall clad to the interior with grooved plywood. Above the curb and in front of the plywood runs a 3-1/2" molded wood baseboard. At sill height (52"), 1x4 trim runs continuously, except at the windows where a 1x6 board serves as both sill and apron. The windows are trimmed with the same 1x6 at head and jambs; slim trim molding sits inside this trim, wrapping into the opening at head, jamb and sill. The plywood is painted white above the chair rail and dark gray below.

The east wall is a newer plywood partition, unpainted, and hosts a single hollow core door with stock casing.

The original v-groove ceiling has been overlaid with ribbed metal panels. These panels also cover the historic overhead hatch or scuttle opening in the floor above.

Condition: Fair

The concrete floor is stained but shows no major cracking; see structural for settling issues. The walls are dirty, but in fair condition with the exception of the south wall, where broad staining and separating trim indicate water penetration at the window opening. The metal panels at the ceiling are in good condition.

Offices and Stair

The flooring in this area is sheet carpeting in the offices, with vinyl tile in the vestibules and ceramic tile in the newly renovated restroom.

The interior walls at the historic shop, heater room and stair remain with new finishes. Like the exterior walls, these partitions have a 7-1/2" beveled concrete curb. Above the curb,



Figure 1-403. Typical sill condition with continuous trim board. (LHM 9/11/2019)



Figure 1-404. Ceiling tile, paneling and carpet typical of the office renovation (LHM 9/11/2019)



Figure 1-405. Concrete curb visible at the base of the historic partitions (LHM 9/11/2019)

the wall are clad in wood veneer paneling; close inspection reveals that the historic plywood was removed. At the newer walls, this paneling continues to the floor with a 4-1/2" wood base. The restroom walls are finished with fiber-reinforced plastic (FRP)

The original windows have the same 1x6 trim described for the other side, while the two new sliders at the north elevation are untrimmed. All interior doors are now hollow core wood with stock casing and brass knob hardware.

The stair was historically open to the inside but is now enclosed with stud walls sporting the same veneer paneling. Paneling also covers the underside of the upper run of stair. Carpet covers the treads, but the outside 2x stringer is visible and suggests that the stair itself might be the original. The nineteen risers are 7-3/4" high; treads are 10-1/4' deep and 35-1/4" wide. There is a handrail on one side only, interrupted at the window at the landing, The lower sash of this window has been covered with plywood.

Ceilings are suspended 2x4 acoustic ceiling tile throughout. Ceilings in most spaces are 7'-10" in most spaces, but rise to 10'-6" in the corner office to allow the full height of the windows to be exposed.

Condition: Fair
The carpeting is loose, buckling and stained. The vinyl tile is chipped and worn as well, but the ceramic tile fairs well. The paneled walls are in good condition but historically inappropriate. The ceiling tiles show water staining in the corner office and the bathroom and may conceal more serious deterioration above.



Figure 1-406. Historic window (and view) in what is now the radio room (LHM 9/11/2019)



Figure 1-407. Raised ceiling in the radio room to accommodate the window height; the ceiling is water stained here (LHM 9/11/2019)



Figure 1-408. Typical finishes in the main loft (LHM 9/11/2019)

Architecture - Interior Finishes - 2nd Floor
The second floor has retained its original configuration, though the main loft to the west has newer finishes.

Main Loft
The flooring in this room is sheet carpeting. Walls are clad in the same veneer paneling seen below and are anchored with a 3-1/2" wood base. This veneer wraps in to the side walls of the dormers, the underside of the dormer vaults, and lines the sloped eaves between dormers up to the dropped 2x4 acoustic tiles at the ceiling.

The wood trim at the dormer and gable windows is historic. It is similar to that on the first floor at a smaller scale. Flat stock 4/4 board at4-1/2' wide trims the head and jamb, with the same curved trim to the interior. The 1x sill extends 1/2" beyond the apron, which is 3-1/2' flat stock.
The wood rail at the stair opening is a newer, 2x4 construction. The east wall hosts a hollow core door leading to the storage room.

Condition: Fair
The carpeting is loose and tearing at the seams with some localized staining. The flooring beneath the carpet was not observed. The paneled walls are in good condition but historically inappropriate. The ceiling tiles are stained in some locations and one is cracked.

Store Room
The flooring in this room is the original diagonal wood boards, unfinished.

Walls are clad in 3/8" plywood panels. This is the original condition but may not be the original plywood. Plywood also covers the side walls of the dormers, the underside of the dormer vaults. The plywood wraps up the sloped eaves and then runs flat at ceiling



Figure 1-409. Paneling wraps into the dormer and up the underside of the gables (LHM 9/11/2019)



Figure 1-410. Historic finishes of the store room seen through the modern door (LHM 9/11/2019)



Figure 1-411. Patching at a former penetration in the Store Room floor (LHM 9/11/2019)

height, at the underside of the truss collar ties. Removal of one panel shows that foil-faced batt insulation has been placed between the 2x10 rafters.

The wood trim at the dormer and gable windows is historic and the same as discussed for the main loft.

Condition: Fair
The floor boards are stained but in otherwise good condition. Three large penetrations above the heater room have been patched. The unfinished walls and ceiling indicate little water damage.

Architecture - Code/Life Safety
As a National Park Service building, any proposed rehabilitation is governed by the 2018 International Building Code (IBC) and its related family of codes.

Existing Building Code
The IEBC, International Existing Building Code, applies to the repair, alteration, change of occupancy, addition to and relocation of existing buildings. Within this code, work is categorized into Alteration Levels 1, 2 and 3 depending on the amount of work anticipated within the building. Additional categories include Change of Occupancy, Additions, Historic Buildings and Relocated Buildings. Requirements of the code are limited to work areas of the project for Levels 1-3. This means that Alteration projects are not required to upgrade the entire building per current code, just elements that are within the project work area dependent on the nature of the alteration work. Change of Use projects trigger more thorough upgrades and the building must be brought up to current code requirements for the new use. The proposed use for this building would not trigger a change of use.

Construction Type
Buildings and structures are classified as one of the five construction types in the IBC. The construction type defines the fire resistance rating of the building structure, exterior walls and interior walls.

The Equipment Building is construction type VB non-sprinklered. Per section 602.5 "Type V construction is that type of construction in which the structural elements, exterior walls and interior walls are any material permitted by this code."

Existing Area

First Floor:	1,604 gsf
Second Floor:	1,573 gsf
Total:	3,177 gsf

Use and Occupancy Classification
Currently, the Equipment Building is in use as offices and garage space. These uses are anticipated to be continued.

Offices: Business Group B - which includes the use of a building for office, including storage of records and accounts.

Garage: Utility and Miscellaneous Group U - which includes miscellaneous structures including private garages (versus motor vehicle repair garages which are considered Storage Group S).

Current code for the mixed use of the building without a fire suppression system may require a rated assembly between the Office and Garage uses.

The door separating the remodeled office functions and the original garage functions is marked as a 90min door. However, verifying the door frame and wall assembly's rating was not possible.

Building Height
Table 504.3 limits allowable building height. Since this building is non-sprinklered, it is allowed to be 40' tall.

Table 504.4 indicates allowable height in stories. Per that table, a non-sprinklered B occupancy is allowed two stories above grade. A non-sprinklered U occupancy is only allowed one story, but if it is sprinklered that increases to two stories. See below re: fire suppression.

Occupant Load
Occupant load is dependent on the function of the space. Per IBC section 1004, the following occupant load factors are possible:

Function of Space	Load Factor
- Business	150 gross
- Parking garage	200 gross

Currently less than half of the first floor is garage use (4 people) and the remainder of the building is business use (16 people). Based on this, the occupant load is 20 people.

Means of Egress
Occupant load determines the required size of the egress pathway, along with the number of exits. Currently there is only one stair to the second floor. Per IBC table 1006.3.3(2) Business use with less than 29 occupants per story may have a single exit from the second story above grade plane. The north and east existing doors are both 36" wide.

Stairs & Raised Walking Spaces
Per IBC section 1011, stairways serving occupied portions of the building shall have a minimum width of not less than 36" when the occupant load is less than 50 and shall comply with Section 1005.1.

Stairs risers are required to be solid and shall be 7" maximum and 4" minimum. Rectangular treads shall be a minimum of 11". Stairway landings are required at the top and bottom of each stairway.

Stairway handrails are required to be not less than 34" and not more than 38" above the stair nosing and shall have an outside diameter of not less than 1-1/4" or greater than 2". Per IBC section 1014, handrails are required to return to the wall, guard or walking surface. Handrails "shall extend horizontally not less than 12" beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser."

The existing stairway is 36-½" wide overall and 31-½" clear where the handrail exists. The risers are 7-¾" high (18 total) with 10-½" deep treads. The L-shaped stair has a 36" x 36" landing at midpoint, however the adjacent window does not have tempered glass. The handrail is discontinuous at the landing.

Per IBC section 1015, guards are required at open sided walking spaces which are located more than 30" above the floor or grade below and shall not be less than 42" high. Guards shall not have an opening that allows the passage of a 4" diameter sphere within the required guard height.

The existing guard at the top of stair is only 37" a.f.f. and has openings greater than 4".

Fire Suppression
NPS Director's Order 58 section 9.1.8 requires consideration for fire suppression of structures to "prevent loss of human life and minimize damage to historic property resources." Appendix 7 from this Director's Order contains a Historic Property Assessment Matrix which provides a scoring

matrix to help assess if a fire suppression system is needed. See Appendix for the matrix and scoring for the Equipment Building. The score for the building put it in a range requiring a fire suppression system.

Condition: Fair and Poor
Prior to undertaking any alterations or if a change of use occurs, a full code study should be undertaken to address impacts and code requirements triggered by the project. Note: This section will be updated once the treatment alternative and uses are defined.

Existing Building Code
The current conditions do not comply with code requirements stated above, so if a full building rehabilitation and change of use is undertaken, many of the deficiencies will be required to be addressed. However, IEBC allowances for historic buildings allow for provisions in the context of the historic character of the building. This code is "founded on broad-based principles intended to encourage the use and reuse of existing buildings while requiring reasonable upgrades and improvements." This also limits extents of required upgrades to the work area(s).

Construction Type
There are no restrictions within the VB construction type, however the mixed use of office and garage may require rated assemblies and for separation.

Use and Occupancy Classification
If the occupancy were to change in the future, a full code study would be required.

Building Height
The building is less than 40' tall and therefore is in compliance.

Means of Egress
The building is in compliance with code.

Stairs
Interior stair is not code complaint due to not having a handrail at one flight, no extensions where handrails are installed, lack of a landing at the first floor and a guardrail at the second floor with openings greater than 4".

Fire Suppression
There is no fire suppression system and one is required by Director's Order 58.

Architecture - Accessibility
To be compliant with the Architectural Barriers Act (ABA), a building is required to provide one universal access point to the building entrance, universal access routes from the entrance to the public spaces on the level of the main entry and a universal access restroom. Business use must also provide an equitable office space along the accessible route.

Currently access into the building is through either the north door or the east door, both are 2'-9½" clear.

Both doors also have a vestibule with an interior door of the same clear width. However, the doors in a series depth is 5"-11½" at the north and 5'-2" at the east where 7'-0 is required. At the interior, the restroom and offices are located on the first floor. Door hardware throughout the building does not meet ABAAS requirements.

The restroom, while large in footprint, has no grab bars, no knee clearance at the sink nor any accessible restroom accessories provided.

The north door has a 1" lip front driveway and a threshold greater than ½" elevation

change. The east door has a dirt path and concrete step of approximately 6" as well as a threshold.

Condition: Poor
There is no accessible route to the building and none of the doors meet accessibility requirements.

Existing Conditions & Condition Assessment - Structural

Structural - General System Description

The Equipment Building is a gabled roof, wood framed structure with a concrete slab-on-grade first floor and reinforced concrete foundation. The structure was constructed using a prototype building design drawing created for the US Coast Guard that was slightly adapted based on the geographical location of the structure. Where visible, it appears that the existing structure was constructed in conformance with the drawings. The drawings can be found in Appendix C.

Structural - Foundation

Per the Coast Guard (USCG) drawings, the exterior perimeter walls are founded on 9" wide reinforced concrete stem walls on 1'-9" wide by 1'-0" thick continuous footings. The bases of the footings are approximately 4'-0" below grade. The single interior column is founded on a 3'-0" by 3'-0" by 1'-0" thick reinforced concrete footing.

Condition: Good
The foundation of the Equipment Building is in good condition with no major signs of distress such as excessive movement or cracking. However, near the downspouts, there is evidence that the foundations are settling slightly. This is likely caused by



Figure 1-412. Northwest corner of the Equipment Building (CBB, 9/10/2019)



Figure 1-413. Northeast corner of the Equipment Building that is slightly settling due to the concentrated roof drainage from the downspout (CBB, 9/12/2019)



Figure 1-414. Northwest corner of the Equipment Building that is slightly settling due to the concentrated roof drainage from the downspout (CBB, 9/12/2019)

localized consolidation or erosion of the soil where the downspouts from the roof discharge water in close proximity to the foundations. The excess moisture focused at these locations causes the surrounding soils to consolidate or locally erode more easily in these areas.

Additionally of note, the frost depth in the area is 48" to 56" below grade which is below the base of the footings. This means that the footings are potentially susceptible to frost heave if the building is left unheated through the winter.

Structural - Floor & Ceiling Framing

The first floor of the Equipment Building is a 6" thick concrete slab-on-grade reinforced with a layer of galvanized wire mesh and a mat of #5 reinforcing bar spaced at 9" each way.

The second floor is framed with 2x12 joists spaced at 16" on center. The joists span in the north-south direction between the exterior walls and a W18x64 steel wide flange beam with two welded L4x4x5/16 angles located along the center of the building running east-west. The steel beam is likely painted with a base coat of International Orange paint (which is typically lead based) that has since been overcoated with a black colored paint. This steel beam is supported by a steel header and posts at either end of the building, as well as a steel post at the center of the building. At the center of each garage bay, a series of U-bolt attachments are bolted to the bottom flange of the beam to allow for the installation of several chainfalls.

Just to the southwest of the center column, a 4' by 6' trap door for a scuttle above is framed with 2x8 joists instead of the 2x12 joists found elsewhere.



Figure 1-415. Exposed concrete slab-on-grade in eastern bay of the Equipment Building (LMG, 9/11/2019)



Figure 1-416. Steel wide flange beam supporting the second floor joists and the chainfalls (CBB, 9/10/2019)

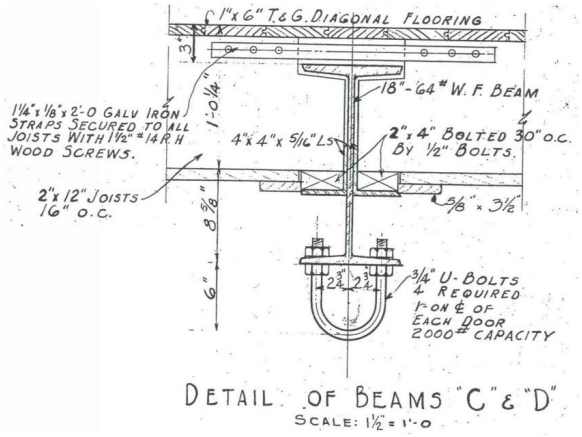


Figure 1-417. Detail of the center built-up steel beam and the U-bolt chainfall attachment from the original 1938 drawings. Note the 2000 lb capacity of the U-bolt connection (USCG)

In the western two bays, metal ceiling panels are directly attached to the underside of the joists. In the eastern two bays, a panelized dropped acoustic ceiling is hung from the underside of the ceiling joists. The top side of the joists are sheathed with diagonal 1x6 tongue and groove wood decking that acts as both the structural sheathing and the flooring.

Condition: Good

The first floor concrete slab-on-grade of the Equipment Building is in good condition with only minor settlement (3/4" of an inch over 20') towards the northwest corner where the exterior sidewalks have also settled.

The second floor framing of the Equipment Building is in good condition showing no signs of structural distress such as sagging or sloping floors.

However, there are two areas of concern regarding the second floor: the possibly lead-containing orange paint on the steel beam and the current 3-ton chainfall attached to a lower capacity anchor.

At several areas along the steel beam, the most-recently applied black paint is starting to chip, revealing that the coating layer below is orange colored. Typically this orange paint, known as International Orange, was used to coat steel that would be utilized in marine environments to protect it from oxidization and rusting. International Orange paint is typically lead based.

The original U-bolt attachment to the steel beam was rated for 2,000 lbs, however, the current 3-ton chainfall is rated for 6,000 lbs. If loaded beyond the 2,000 lb rating of the U-bolt attachment, the loaded chainfall could fail the U-bolt attachment to the steel floor beam.

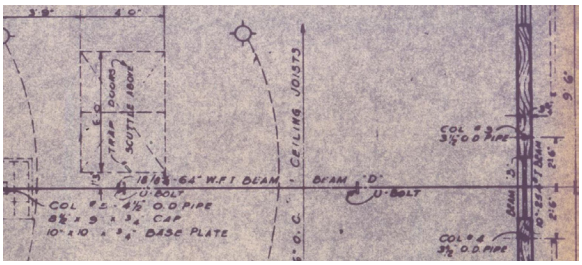


Figure 1-418. Portion of the original 1938 second floor plan drawing. Note the steel beam bearing on another steel beam in the bearing wall and the two supporting pipe columns (USCG)



Figure 1-419. Diagonal floor sheathing on second floor of the Equipment Building (CBB, 9/10/2019)



Figure 1-420. Black paint on steel beam is chipping revealing International Orange paint below (CBB, 9/12/2019)

Structural - Roof Framing
The gable roof of the Equipment Building is framed with 2x10 rafters spaced at 16" on center at an 8 1/2 on 12 slope. At the peak of the roof runs a double 1x12 ridge board. Approximately 8'-6" above the finish floor level, 2x6 collar ties span across each rafter pair. These collar ties are attached to the rafters with 1x6 sister members that are spiked together. At the base of each rafter, a twisted metal strap ties the roof system down to the wall system. The roof rafters are sheathed on the top face with 1x6 tongue and groove sheathing while the bottom face is sheathed with plywood paneling as the ceiling finish.

The roofs of the dormers on both sides of the gable roof are framed with 2x4 rafters spaced at 16" on center. At the ridge of each dormer is a 2x6 ridge board, the inside end of which bears on a double 2x12 beam where the dormers meet the rafters. The valleys on either side of each dormer are framed with a single 2x10 rafter.

Condition: Good
The roof framing of the Equipment Building is in good condition showing no signs of structural distress such as sagging or thrust-induced spreading.

Structural - Wall Framing
The walls of the Equipment Building are constructed of 2x6 wood studs spaced at 16" on center. The studs bear on a 4x6 sill anchored to the concrete stem wall with 1/2" diameter bolts that are 1'-6" long and spaced at 8' on center. The walls are topped with a double 2x6 top plate. Between the second floor joists in the wall cavity is a single layer of flat 2x6 blocking that supports 2" of mortar meant to act as a firestop.



Figure 1-421. Infill framed area for trap door to scuttle above (CBB, 9/12/2019)



Figure 1-422. Existing chainfall installed is rated for 3 tons or 6,000 lbs, considerably more than the 2,000 lbs rating of the U-bolt attachment (CBB, 9/12/2019)

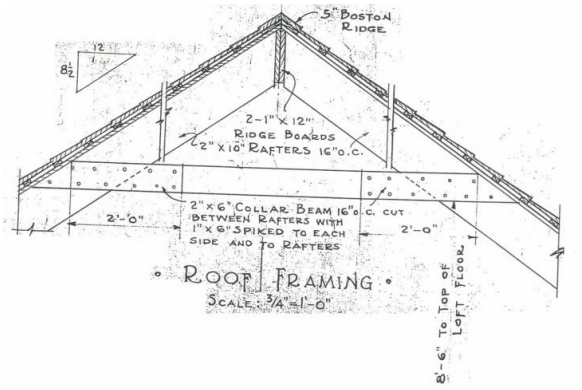


Figure 1-423. Detail of the roof framing from the original 1938 drawings (USCG)

Along the north elevation of the building at the garage door openings, each opening is supported by a 6x14 timber beam header supported on 4x6 jambs.

Condition: Good
The wall framing of the Equipment Building is in good condition showing no signs of structural distress such as bowing or settlement.

Structural - Lateral System
The lateral system of the Equipment Building consists of the horizontally sheathed roof diaphragm, the diagonally sheathed second floor diaphragm, the horizontally sheathed wood stud walls, and their connections to the foundation. The steal beam-column line running east-west along the center of the structure also contributes to the lateral force resisting system of the structure.

At the ends of the roof rafters are twisted metal ties that tie the roof diaphragm to the wall structure. This is likely one of the earliest applications of this type of connection which is now required by code and was likely included as part of the standard US Coast Guard designs because of the large wind loads typically associated with coastal sites.

Condition: Good
The lateral force resisting system of the structure is in good condition. The lateral elements are adequate for the environmental loads associated with the site given the modest footprint of the structure. Additionally, the change of use of the building does not trigger a change in the Risk Category (see the Applicable Codes & Loads section below for further discussion). Therefore, per code, since the Risk Category is not changing and there are no elements or systems deemed dangerous, no upgrades to the lateral



Figure 1-424. Plywood ceiling attached to underside of rafters (CBB, 9/12/2019)

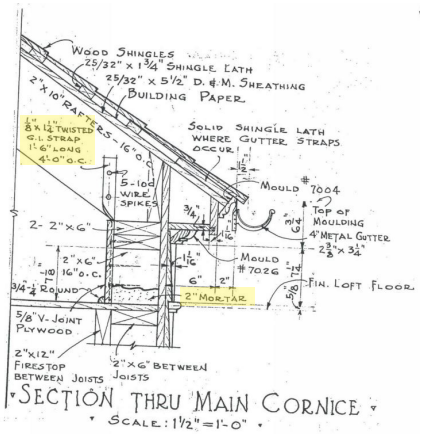


Figure 1-425. Section through the Main Cornice from the original 1938 drawings. Note the 2" of mortar installed as a firestop, as well as the twisted metal straps intended to hold the roof structure down to the wall structure under wind uplift. This is a very early example of a hurricane wall tie (USCG)

elements of the building are required.

Structural - Applicable Codes & Loads
The code references for this assessment include the 2018 International Building Code (IBC), the 2018 International Existing Building Code (IEBC), and ASCE 7-16 Minimum Design Loads for Buildings and Other Structures.

The load requirements for the Equipment Building at the Grand Marais USCG Station are based on the type of occupancy and geographical location of the building. The required floor live load capacities per ASCE 7-16 for office use is 50 pounds per square foot (psf) and for light storage is 125 psf. These building uses classify the structure as Risk Category II for standard occupancy. A brief review was completed to compare the current design and current code required live load capacities of the floors (see the PIRO HSR Live Load Capacity Chart in Appendix C).

The ground snow load required for the Grand Marais USCG Station per ASCE 7-16 is 70 psf. This ground snow load translates to a flat roof snow load on the Equipment Building of 40 psf per ASCE 7-16 when wind exposure and thermal conditions are considered. Given the slope of the roof and the texture of the roof surface, a 10% reduction is allowed resulting in a roof snow load of 36 psf.

The ultimate design wind speed at the Grand Marais USCG Station site per ASCE 7-16 Figure 26.5-1B is 104 miles per hour (mph). The equivalent nominal wind speed is 90 mph.

The Grand Marais USCG Station site falls within Seismic Design Category A. The Seismic Design Category is a classification given to a structure that is based on the Risk

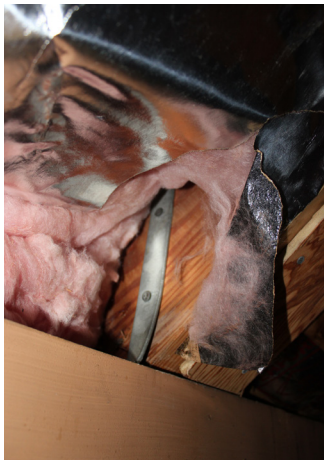


Figure 1-426. Twisted metal hurricane strap installed at base of rafter (CBB, 9/12/2019)

Category of the building and the severity of the design earthquake ground motion at the site. The earthquake ground motion properties of the site are cataloged by the United States Geological Survey (USGS). The two mapped acceleration parameters for the site per USGS are short period (Ss = 0.044 g) and 1 second period (S1 = 0.020 g). Without site specific soil testing, site soil conditions are assumed to comply with Site Class D resulting in a Seismic Design Category for the Equipment Building of A. Since the structure falls within Seismic Design Category A, no seismic analysis is necessary per code.

Southern pine design values were used to evaluate the load capacity of the Equipment Building structural members based on visual inspection of the material on site. Most of the members had only some sporadically located grade-limiting defects, such as small knots, resulting in Select Structural analysis values.

Condition: Good
The structural elements of the structure are adequate for imposed loads on the structure and are therefore in good condition.

Existing Conditions & Condition Assessment - Mechanical

Mechanical - General System Description
The heating system for the building is all electric. The 1st floor has electric baseboard heaters located in the North Vestibule #101, Hall #102, Office #103, Office #104, East Vestibule #105, Office #106, and Restroom #107.

The baseboard heaters in the vestibules, hall, and bathroom have thermal control at the baseboard. The baseboards in the Offices are controlled via thermostats located on the wall. The wall mounted thermostats have an added on night setback control.

The Garage Bays #108 have two electric infra-red heaters. The heaters are rated for 3kw-4kw output and controlled via a wall switch.

The second floor has electric baseboard heaters in both the Conference Room #201 and Storage #202. The heaters in the Conference Room are controlled via a wall mounted thermostat.

Restroom #107 has a small ceiling exhaust fan that is ducted to the south and out the exterior wall and protected with a rain cap. The fan is controlled via a wall switch.

There is no mechanical cooling in the building.

There is no mechanical ventilation in the building. Ventilation is provided via operable windows.

Condition: Good
The baseboards and infrared heaters are all operable. The bathroom exhaust fan is a newer fan and operational.



Figure 1-427. North Vestibule baseboard. (DMD, 9/11/2019)



Figure 1-428. Typical office baseboard heater. (DMD, 9/11/2019)



Figure 1-429. Thermal control on baseboard. (DMD, 9/11/2019)



Figure 1-430. Wall mounted thermostat. (DMD, 9/11/2019)



Figure 1-433. Typical baseboard heater in Storage #202. (DMD, 9/11/2019)



Figure 1-431. Infra-red heater in garage. (DMD, 9/11/2019)

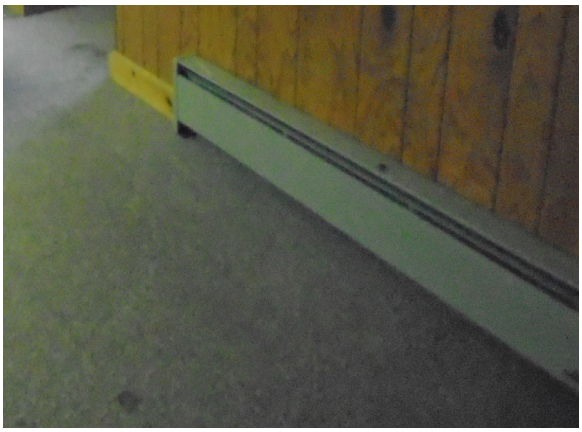


Figure 1-434. Typical baseboards in Conference Room #201. (DMD, 9/11/2019)

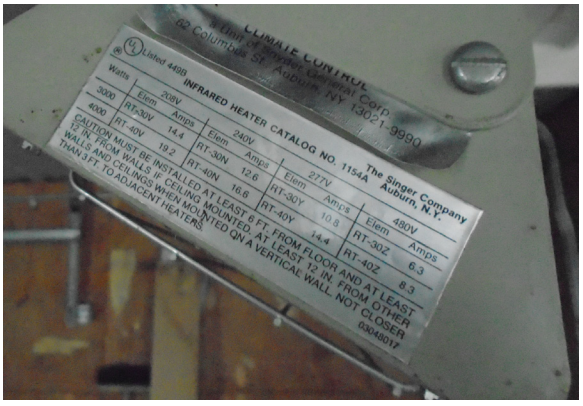


Figure 1-432. Nameplate on infra-red heater. (DMD, 9/11/2019)



Figure 1-435. Ceiling exhaust fan. (DMD, 9/11/2019)

Existing Conditions & Condition Assessment - Plumbing

Plumbing- General System Description
Restroom #107 was recently remodeled and includes a tank type water closet and a lavatory in a cabinet base. There is a on-demand electric water heater below the lavatory contained in the cabinet. There is an exposed vent line that is routed up through the bathroom and through the second floor and out through the roof.

There is no water to the building. The existing plumbing fixtures have not been connected to a water source.

There is no sanitary sewer to the building or operational septic system.

Condition: Good
The existing plumbing fixtures, piping, and water heater are all in good condition. A water source and sanitary source needs to be brought into the building to make the system operable.



Figure 1-436. Restroom plumbing fixtures on west wall. (DMD, 9/11/2019)



Figure 1-437. Water Heater not connected under lavatory. (DMD, 9/11/2019)

Existing Conditions & Condition Assessment - Fire Protection

Fire Protection- General System Description
There is no fire protection system in the building.

Condition: N/A



Figure 1-438. Exposed vent line in Restroom. (DMD, 9/11/2019)

Existing Conditions & Condition Assessment - Electrical

Electrical - Electrical Service and Panels

The existing electrical service meter and service disconnect are located on a utility pole about 50 feet from the building. The load center is mounted inside the maintenance garage area, and is rated 120/240/1PH, 200A.

Condition: Poor

There are no updated electrical drawings available, however, drawings reflect electrical revisions for the electrical distribution in 1966 & 1981. Initially the Station Dwelling (HS-18) provided both normal and emergency power to the four buildings. The electrical system has been revised so that all four buildings are seperately metered. The Equipment Building electrical equipment appears to be 40 years old and in need of replacement.

Electrical - Electrical Distribution System

Receptacles in the maintenance bay areas are not the Ground Fault Circuit Interupter (GFCI) type as required by current electrical codes. The branch circuits are concealed within walls in the offices and upper levels, so visual observation was not possible.

There are two branch circuit breakers located in the rest room, not in compliance with current National Electrical Code as only supplemental overcurrent protection is allowed in rest rooms.

Condition: Poor

The existing system requires updates for safety and use. Layouts of devices are overall, inadequate for intended use, and many components of the system do not meet the requirements of the NEC or the National Park Service Standards.



Figure 1-439. Equipment Building (SJH, 09/11/2019)



Figure 1-440. Electric utility meter and disconnect (SJH, 09/11/2019)



Figure 1-441. Electrical panel located in Equipment Building (SJH, 09/11/2019)

Electrical - Lighting, Emergency Lighting, and Exit Signs
Interior lighting is inefficient using both fluorescent and incandescent fixtures. Manual wall switches are used throughout.

There are no powered exit signs or egress lighting in the building.

There are three original exterior flood light fixtures installed in 1938 that the Park would like to retain. They appear to be operational and may need some minor repairs, however, they are not Dark Sky compliant.

Condition: Poor
All fixtures and wiring appear to be in working, but poor condition. This assessment is based on appearance and age.

Electrical - Fire Protection & Detection System
There is no fire alarm system in the building.

Condition: Poor
There is no existing system.

Electrical - Tele/Data Communications System
The existing telephone line is overhead from utility. The punch down location was not observed.

Condition: Poor
The existing system is limited.

Electrical - Lightning Protection System
No lightning protection system was observed at this building.

Condition: N/A
There is no existing system.


Figure 1-442. Lighting fixture (SJH, 09/11/2019)


Figure 1-443. Exterior sconce (SJH, 09/11/2019)


Figure 1-444. Exterior sconce (SJH, 09/11/2019)

Existing Conditions & Condition Assessment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Existing Conditions - Hazardous Materials

Hazardous Materials - General Description
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
Asbestos inspection services were performed to identify the presence, location, quantity, friability, and condition of Asbestos Containing Material (ACM) located at the project site. Bulk samples were collected and analyzed of suspect ACM.

Lead Containing Paint
Readings of suspect Lead Containing Paint (LCP) were collected in a representative manner as determined by the inspector based on identifying testing combinations where the surface color, substrate, or building component were visibly different. Sampling was limited to materials that were visible and readily accessible to the inspector.

Regulated Building Materials
Inspectors provided visual survey for Regulated Building Materials (RBM) throughout all buildings.

Biological Hazards
Inspectors provided visual survey for biological hazards including rodents and mold growth throughout all buildings.

Hazardous Materials - General Description
Condition: Good or Poor
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix.

Asbestos Assessment
ACM is defined as a material containing greater than one percent asbestos by weight, volume or surface area. Regulations distinguish treatment requirements between friable and non-friable forms of ACM. Test results confirmed ACM in the following locations:

- Fire door located at the south entrance of the garage is presumed to contain asbestos. It was not sampled to maintain the integrity of the door.
- The mastic associated with white 12-inch by 12-inch floor tiles with gray and tan speckles contains chrysotile asbestos (50 SF).

Lead Containing Paint
Lead Based Paint (LBP) is defined as a paint containing 0.5% lead by weight or 1.0 milligram per cubic centimeter by both the EPA and HUD.

The following locations have LBP or LCP:

- Brown and gray paint on the concrete foundation in the interior.
- Gray paint on wooden walls.
- White paint on wooden walls.
- Brown paint on wooden window frames.
- White paint on exterior wood siding.

Soil was collected from the dripline of the building and had less than 6 mg/kg of lead. This does not exceed the EPA non-play area bare soil level of 1,200 mg/kg for lead.

Regulated Building Materials
RBM found throughout the building were fluorescent light tubes and compact

fluorescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire-suppressant chemicals; a 1-gallon bucket of paint which could contain lead or other chemicals; and 1-gallon of waste oil.

Biological Hazards
No water infiltration or evidence of rodents was observed at the time of the inspection.

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Part 2: Treatment and Use

Overview

Presented after the Existing Conditions and Condition Assessment, the Treatment section presents recommendations for the repair, protection and stewardship of the buildings. Treatment recommendations are based on review of historic documentation, assessment of existing conditions, potential future building use, review of the building codes and accessibility, and the application of the Secretary of the Interior's Standards as they apply to the treatment of historic buildings. Preferred option plans for each building which inform the recommended treatments, were developed with NPS staff during a treatment workshop on April 3. 2020. These plans provide a preferred treatment option for ABA access to the Station Dwelling (HS-18), Harbor of Refuge Dwelling (HS-20) and Equipment Building. For all four buildings in this HSR, the preferred option plans include interior modifications to meet planned use and space needs of the park.

Treatment Priorities

Treatment priorities are classified as one of three options:

- Critical
- Serious
- Minor

A Critical Deficiency of a feature or elements exists where:

- There is advanced deterioration that has resulted in failure of the building feature or element or will result in its failure if not corrected within 2 years, and/or;
- There is accelerated deterioration of adjacent or related building materials as a result of the feature or element's deficiency, and/or;
- There is a threat to the health and safety of the user.

A Serious Deficiency of a feature or element exists where:

- There is deterioration that if not corrected within 2 to 5 years will result in the failure of the building feature or element, and/or;
- A threat to the health and/or safety of the user may occur within 2 to 5 years if the deterioration is not corrected, and/or;
- There is deterioration of adjacent or related building materials and/or systems as a result of the deficiency of the feature or element.

A Minor Deficiency of a feature or element exists where:

- Standard preventative maintenance practices and building conservation methods have not been followed, and/or;
- There is a reduced life expectancy of affected or related building materials and/or systems, and/or;
- There is a condition with long-term impact beyond 5 years.

Chapter Organization

Part 2 contains recommended Treatments. Each element that was addressed for each building in Part 1 is identified and assigned a priority. Then a description of the recommended Treatment(s) is provided. Preferred option floor plans are included at the end of this section.

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Station Dwelling (HS-18)

Treatment and Use

The recommended treatment for the Station Dwelling (HS-18) is rehabilitation. This allows for altering a building to adapt to changing or continuing uses while preserving the historic character. The building use has remained the same - residential and offices - since it was originally constructed. Future planned use will maintain the residential use with the building providing seasonal housing.

The exterior of the building has been changed over the years with aluminum siding installed over the original wood shingles. Interior spaces have been modified in places to provide for new space needs, however in general, the layout and finishes have been retained.

A treatment workshop was conducted with NPS staff on April 3. 2020, to determine a preferred treatment option for ABA access to the building and interior modifications to meet planned use and space needs of the park. The Station Dwelling (HS-18) will be transitioning to only residential use with modifications made to provide an ABA sleeping unit and common areas at the first floor. See Treatment floor plans for proposed reconfiguration. Recommended treatments in this report incorporate work required for implementation of the modifications shown on the treatment floor plans, along with life safety and code required modifications. Where interior work will not be required, the general recommendation approach in this report is to repair damaged materials and finishes and leave undamaged interior surfaces in their current state whether they are historic or modern to retain existing conditions as is. Exterior treatments provide guidance for rehabilitating finishes to return the building to the historic appearance.

Treatment - Architecture

Architecture - Roofing
Priority : Serious
Monitor the roofing to determine if the lack of breathabilty due to the coating and not having battens is increasing the speed of shingle deterioration. When replacement is required, remove all roofing and associated flashing, underlayments and accessories. Provide full roofing replacement in cost estimate as a bid option.

Examine roof substrate with special attention to the dormer valleys. Where substrate is deteriorated, remove and replace damaged material in kind, along with any framing elements that are found to be deteriorated in the course of this inspection. Estimate that 10% of substrate will require replacement. Provide tie offs on roof when the roofing is replaced. Once material repairs are made, install new underlayment, battens, wood shingles and flashing. Provide pre-finished metal flashing with a high-performance finish. At chimneys, embed counterflashing into mortar joints. Consider installing fall protection during the reroofing project, see Structural section.

Monitor the membrane roofing at the Tower level. When it is replaced, evaluate the substrate and replaced any deteriorated areas. Ensure all areas of the flat roof drain to the exterior to prevent ponding.

With the siding project, investigate the possibility of tucking a drip edge finish at the eaves.

Replace the missing portions of the weathervane to match historic configuration.

Repair/reinstall the lightning protection

system, see Electrical section.

Architecture - Roof Drainage
Priority : Critical
Install a new gutter and downspout system. Gutter to be prefinished 4" half round at wing roofs and 5" at main roof, connecting to fluted metal conductors to a cast iron booth. Original drawings call for 2-3/4" x 4-1/4" conductors. Direct downspouts to splash blocks and verify grade slopes to direct water away from the building.

Replace the failed membrane at the tower gutter and replace in kind the ogee wood gutters which have holes drilled through them.

Remove the gutter at the front porch and provide half round gutter system and downspouts to matches the original.

Architecture - Chimney
Priority : Minor
Monitor the chimney crack to determine if it is actively moving. Monitor the mortar and when it deteriorates, repoint all faces of the brick chimneys with a mortar that is compatible to the original in strength, composition and color. Tool mortar joints to match original. Install pre-finished chimney cap.

Architecture - Tower
Priority : Critical
Remove loose and peeling paint from the metal guardrail, apply a rust-inhibiting primer to all exposed metal and repaint the guardrail.

Architecture - Exterior Walls and Trim
Priority : Serious
Remove the aluminum siding and evaluate the condition of the concealed wood shingle siding and trim elements. Assume 60% replacement for cost estimating purposes (Cedar shingle with 7-1/2" exposure). Scrap, prep and repaint all shingles and trim elements. Reseal all joints. Paint on the siding was found to be lead containing. See hazardous material section.

Scrape, prep and repaint the Tower soffit to arrest further deterioration. This work should be coordinated with the needed Tower gutter repairs recommended above.

Remove and replace the plywood cover at the west appurtenance, see Structural. Scrap, prep and repaint exposed concrete foundation. Paint on the foundation was found to be lead containing. See hazardous material section.

At the new accessible entry, provide new roof projection which matches the overall profile of the one over the north entry but uses simplified detailing to differentiate it.

Architecture - Front Porch
Priority : Critical
Remove all deteriorated wood material at the columns. Replace all bases in kind and dutchman repair the lower portions of the column or replace entire column in kind.

Rebuild the guardrail at the porch roof using existing as guide for dimensions and design. Ensuring secure connections for safety and carefully reflash at existing new.

Repaint all elements on the porch and stair. Paint on select porch elements was found to be lead containing. See hazardous material section.

Architecture - Windows
Priority : Critical
Remove all vinyl replacement windows and replace with insulated glass wood windows or a metal clad wood windows. New sash should match the configuration of the original as shown in the original drawings and seen in historic photographs. Original drawings indicate the windows were a 6-over-6 lite pattern, other than the tower which was plate glass to aid in visibility. Dormer windows have an arched upper lite. Basement windows had a 3 lite sash.

Deterioration at wood window frames and sills should be repaired. Remove biological growth, epoxy stabilize, prep and repaint. Replace four south facing first floor window sills and two second floor sills at the east wing. Provide drip flashing at all window headers. Peeling and loose paint should be removed and the frames and sills repainted. Paint on the windows was found to be lead containing. See hazardous material section.

Original drawings and photographs show the windows at the first and second floors and third floor windows at the gable ends had louvered wood shutters. Shutters matching the historic should be installed as part of the exterior rehabilitation. Wood composite options should be considered for durability during design.

On the interior, install new two inch blinds at all first, second and third floor windows.

Architecture - Exterior Doors
Priority : Serious
Door 101: Remove loose and peeling paint and repaint the door on the interior and exterior. Install a new lockset/leverset and provide continuous weatherstripping around the door. Provide pricing allowance for hardware refurbishment.

Door 104: Replace the door with one that matches the original (twelve lite, two panel) wood door Provide new hardware and continuous weatherstripping. Repair or replace in kind the damaged areas of wood trim. Replicate side panels at this door, per original drawings. Remove loose and peeling paint and repaint the trim.

New ABA Entry Door: Provide a wood door with simplified detailing to the historic entry doors with a glazed transom above. Provide new ABA compliant hardware and continuous weatherstripping.

Door 401: Remove loose and peeling paint and repaint the door. Install new weatherstripping. Provide pricing allowance for hardware refurbishment. Replace the storm door.

Architecture - Interior Doors
Priority : Minor
Basement doors should be adjusted so they all close easily. Missing and damaged hardware should be replaced in kind.

Historic first, second and third floor doors at openings which remain in the new floor plan design should be retained and the doors, trim and hardware repaired as needed. Verify door and cased openings throughout the first floor provide ABA clear width and widen if needed. Salvage door trim and reinstall at openings which are widened. Historic doors and trim in openings/walls to be removed should be salvaged and reused where possible in the new design. When new doors are required, they should be paneled wood doors which are compatible with the building character.

Architecture - Basement Interior Finishes
Priority : Critical and Minor
In the basement, asbestos containing materials were detected at one duct connector. Lead containing paint was found on the concrete floor and walls and the plaster wall finish. See hazardous material section for additional detail.

The delaminating plaster ceiling in the Drill Room should be re-secured to the substrate or removed and replaced in kind if it is too damaged to be repaired.

Ensure source of caustic material in the Boiler Room is addressed and the spill fully mitigated. Replace concrete per Structural recommendations.

Repair all wall and ceiling finishes required for structural, mechanical and electrical work. All new electrical conduit shall be concealed and not surface mounted, except at the concrete foundation walls. Patch finishes at affected surfaces. Paint all wall and ceiling finishes and wood trim elements when rehabilitation work is completed.

Chips and cracks in the plaster ceiling and walls in rooms throughout the basement should be repaired and the finishes repainted.

Architecture - First Floor Interior Finishes
Priority : Minor
Repair all wall and ceiling finishes required for structural, mechanical and electrical work. All new electrical conduit shall be concealed and not surface mounted. Patch finishes at affected surfaces. Paint all wall and ceiling finishes and wood trim elements when rehabilitation work is completed.

At the first floor, asbestos containing materials were detected at tile in one room. Lead containing paint was found on the plaster wall finish and door frames. See hazardous material section for additional detail.

Hall (101)
Existing wall and ceiling finishes, including wood chair rail and base, should have any holes or cracks patched. Carpet flooring should be removed and the hardwood flooring refinished.

Mess Room (102) (new use: Dining Room)
Repair crack in plaster on the south wall. Skim coat areas of visible patches to blend them into the adjacent finish. Repaint wall and ceiling finishes. Remove carpet flooring and install hardwood flooring which will be easier to clean in a dining room.

Day Room (103) (new use: Kitchen)
Investigate the cause of buckling plaster at the east wall and repair/resolve it. Repair areas of damaged and cracked plaster finish on the walls. Remove carpet flooring and install hardwood flooring which will be easier to maintain in a kitchen. Provide new wood upper and ABA complaint lower cabinets with a plastic laminate countertop Provide ABA complaint dishwasher, oven, microwave, refrigerators and freezers to meet resident needs.

Office (104) (new use: egress stair)
This space will be remodeled to contain the second egress stair and additional food storage area. Patch ceiling and wall finishes. Salvage and reinstall wood wall base and chair rail or install in kind trim at new walls. Refinish existing hardwood flooring which remains and install new hardwood flooring at new surfaces and where existing flooring is damaged.

Hall (105)
Patch holes and cracks in the existing wall and ceiling plaster finish. Carpet flooring should be removed and the hardwood flooring refinished. Repair or replace cracked wood stair treads between the landing and basement level.

RR Foyer, Women's & Men's (106, 107, 108) (new use: ABA entry/lift & ABA restroom)
Reconfigure this space at the first floor and basement level to provide a new 90 degree ABA lift from the new grade level entrance to the first floor level. New wall and ceiling finishes to be gypsum board with painted wood base and chair rail that matches the original. Patch all damaged plaster finishes impacted by construction work. Carpet flooring should be removed and the hardwood flooring refinished and new in kind hardwood flooring installed where needed in entry and hall.

In the new ABA restroom, provide the same wall and ceiling finishes as the entry and hall and install laminate flooring. New fixtures and restrooms accessories to be ABA compliant.

Office (109), Bathroom (110), Office (111) and Hall (112) (new use: ABAAS Sleeping Unit, Bathroom and Laundry)
Reconfigure these rooms to provide new ABA sleeping unit, bathroom and laundry. Retain built in closet off Hall (112) and built in bookcase on the east wall of Office (109). Patch all historic plaster finishes impacted by construction. Salvage and reinstall wood base and chair rail at new walls. Carpet flooring should be removed and the hardwood flooring refinished in sleeping rooms and closets. Finishes in bathrooms to be Type X gypsum board with tile wainscots at wet areas. Install tile flooring. Provide new ABA compliant shower, water closet, lavatory and accessories in the bathroom. (See Plumbing section.)Washing machine and dryer in the laundry room should be ABA compliant.

Office (115) and Hall 116 (new use: Common Lounge Room)
Carpet flooring should be removed and the hardwood flooring refinished.

Architecture - Second Floor Interior Finishes
Priority : Minor
Repair all wall and ceiling finishes required for structural, mechanical and electrical work. All new electrical conduit shall be concealed and not surface mounted. Patch finishes at affected surfaces. Paint all wall and ceiling finishes and wood trim elements when rehabilitation work is completed.

At the second floor, asbestos containing materials were detected at tile under the carpet. Lead containing paint was found on the plaster wall finish and door frames. See hazardous material section for additional detail.

Hall (201)
Modify walls to provide new bathroom configuration and egress stair access. New sections of walls to have wood base and chair rail that matches the profile of the adjacent historic. Carpet flooring should be removed and the hardwood flooring refinished.

Dorm Room No. 1 (202)
Carpet flooring should be removed and the hardwood flooring refinished. Adjust historic wood drawers in closets to slide freely.

Kitchen (203) (new use: egress stair)
Remove the modern kitchen cabinets and appliances. Construct new egress stair. Retain historic closets under stair to third level to

the extent possible. Repair all ceiling and wall finishes and provide wood base and chair rail. Carpet flooring should be removed and the hardwood flooring refinished and new in kind hardwood flooring installed where needed. Stair to have code complaint guardrail/ handrail.

Bathroom (204) and Dorm Room No. 3 (206) (new use: Women's Bathroom, Men's Bathroom and Dorm Room No. 3)
Demo all existing fixtures and finishes and reconfigure the Bathroom and Dorm Room No. 3 to provide two separate bathrooms. Finishes in bathrooms to be Type X gypsum board with tile wainscots at wet areas. Install tile flooring. Provide fixtures per Plumbing section. Water closet partitions to be HDPE. Provide restrooms accessories including soap dispensers, mirrors, towel racks, toilet paper dispensers and trash cans.

Retain historic closets and built in drawers to the extent possible. Adjust drawers so they operate smoothly and replace missing shelves. Remove carpet flooring and refinish hardwood flooring.

Dorm Room No. 2 (205)
Remove carpet flooring and refinish hardwood flooring.

Architecture - Third Floor Interior Finishes
Priority : Minor
Repair all wall and ceiling finishes required for structural, mechanical and electrical work. All new electrical conduit shall be concealed and not surface mounted. Patch finishes at affected surfaces. Paint all wall and ceiling finishes and wood trim elements when rehabilitation work is completed.

At the third floor, lead containing paint was found on the plaster wall finish, door frames and on the ladder to the Tower. See hazardous material section for additional detail.

Hall (301)
Ensure source of leak has been repaired with the recent re-roofing project. Repair or replace areas of ceiling finish which has water damage. Where base shoe is missing, install new which matches the profile of the historic. Install new linoleum to return it to the historic appearance or new carpet flooring.

Retain the ladder to the Tower and repaint the handrail.

Loft Room No. 2 (302) (new use: egress stair)
Construct new egress stair to provide second means of exiting this level. Provide code compliant guardrails around the opening for the and handrails at the stair.

Ensure source of leak has been repaired with the recent re-roofing project. Repair or replace areas of ceiling finish which has water damage. Install new base shoe that matches the historic profile, as seen elsewhere in the building. Retain the historic sheet flooring in the lockers. In the remainder of the room, install new linoleum to return it to the historic appearance or new carpet flooring.

Loft Room No. 1 (303) (new use: Common Lounge Room)
Ensure source of leaks have been repaired with the recent re-roofing project. Repair or replace areas of ceiling finish which have water damage. Install new base shoe that matches the historic profile, as seen elsewhere in the building. Retain the historic sheet flooring in the lockers. In the remainder of the room, install new linoleum to return it to the historic appearance or new carpet flooring.

Architecture - Tower Interior Finishes
Priority : Minor
Paint all wall and ceiling finishes and wood trim elements when rehabilitation work is completed. Lead containing paint was found on the plaster wall finish, door frames and on the ladder to the Tower. See hazardous material section for additional detail.

Tower (401)
Retain built in furniture. Repair or skim coat the cracks in the plaster wall finish. Remove the damaged wood floor boards and replace in kind. Refinish the wood flooring.

Architecture - Code/Life Safety
Priority : Critical
There are currently multiple building code and life safety issues as identified in Part 1 Condition Assessment text. Current building codes were taken into consideration during the development of the treatment floor plan option which addresses code and life safety issues that were identified. However, when this project moves forward into design for the rehabilitation project, it shall include a full code study using applicate building codes at that time. Allowances to preserve historic fabric as allowed within the IEBC shall be utilized to minimize impact to the historic fabric where possible.

Means of Egress
Residential use on the second and third floors require a second exit. This is provided via a second egress stair in the preferred option floor plan. The current exit is via an operable window and down a ladder at the east side of the main entry porch roof. Until the second stair is constructed, the current egress path should be maintained. In the current condition, this exit poses life safety concerns and should be reconstructed per recommendation in Structural. Tower use should be limited.

Stairs & Raised Walking Spaces
The tower access/egress is only by means of a stair ladder (1'-9-1/2" clear with 6" deep treads and 13" risers and a 3:12 pitch) to access a floor hatch opening to the Tower level. The hatch has a limited "guardrail" of a threaded pipe mounted to the floor and east wall at 32" above finished floor with no intermediate rails to protect the hatch opening. This is an existing condition and contributes to the character of the space so it should be retained and use limited.

Install new code compliant, continuous handrails with extensions at the existing stair.

The new second stair in the preferred alternative floor plan should meet current code when constructed for all elements - rise/run, handrails, guardrails, etc.

When new windows are installed, the design team should ensure they provide required clear openings for bedrooms.

Egress signage should be installed throughout the building, see Electrical.

Fire Suppression
The current fire suppression system will need to be configured to accommodate the new floor plan. See Mechanical - Fire Suppression for additional information.

Other Code Items
The preferred alternative floor plan provides a restroom for each gender at the second floor, bringing the building into compliance with IBC requirements.

For kitchen and bathroom ventilation - see Mechanical Section.

Architecture - Accessibility
Priority : Critical
Currently there is no accessible access, however the preferred option floor plan design provides accessible access to the first floor. It also provides an ABA compliant sleeping room, bathroom, laundry and common spaces.

ABA building access is to be provided via a lift accessed via a new exterior entry on the north side of the building. As noted in above sections, an ABA sleeping unit will be created on the west side of the first floor. Resident common areas are to be relocated to the first floor and an ABA compliant path created between them. All fixtures and furnishings within this space will be ABA compliant.

Treatment - Structural

Structural - Foundation
Priority: N/A
No structural work at the foundation is required at this time.

Structural - Floor & Ceiling Framing
Priority : Minor
Once the source of the unknown liquid is capped, replace the disintegrating section of the slab in kind (approximately 2' by 2').

Reattach the delaminating ceiling in the Drill Room (004) to the underside of the structure, per Architecture.

Reframe the main floor where the new lift is to be installed.

Reframe the second and third floors in the northeast area where the new egress stair is to be installed.

Structural - Roof Framing
Priority : Serious
Replace the plywood cover over the areaway with a new pressure treated plywood assembly or reinstate a metal grate similar to the one shown on the original drawings.

Remove the existing fire escape ladder. The new design provides a second egress stair, however until that is provided a compliant ladder should be provided in this location. Install a new ladder that meets code requirements and provide proper attachment to the roof structure.

Replace the columns at the front porch per Architectural.

Arrest the infiltration of moisture through the roof if found to be active per architectural recommendations.

During the next reroofing project, install fall protection anchors. At the anchor points, locally strengthen the roof framing with sisters and blocking

Structural - Wall Framing
Priority : Minor
Provide headers at any new or relocated openings in interior bearing walls on the main and second floors.

Structural - Lateral System
Priority : Minor
If the finishes are removed where the roof framing meets the wall framing, verify or provide an adequate connection of the roof framing to the walls to prevent uplift during a large wind event. This connection could consist of lag screws or hurricane ties.

Treatment - Mechanical

Mechanical - System - Heating
Priority : Serious
The existing central plant heating system is in good condition with new high-efficiency propane-fired boilers and new pumps.

The heating system outside of the boiler room is in poor condition. The piping is original to the building. One of the radiators has failed due to the failure of the radiator structure, and there is limited control of the radiators. The existing piping and radiators outside of the boiler room should be removed and disposed of in a proper format. New piping and new radiators shall be installed. The location of the radiators shall be coordinated with the new architectural layout and ABA clearances.

Each new radiator shall be provided with a thermostatic valve that can be manually controlled. All new piping and existing piping in the boiler room shall be insulated and labeled.

Mechanical - System - Cooling
Priority : N/A
There is no mechanical cooling system in the building today. The northern location of the building facility and cooler evenings provide for the building to be cooled off at night. Provide for a whole house fan on the third floor to help move the cool air from the lower levels up and the hot air at the upper level out of the building.

Mechanical - System - Ventilation
Priority : Critical
The existing exhaust fans for the restrooms are ineffective, and the newer restrooms on the main floor do not have mechanical ventilation.

The existing exhaust fans and ductwork shall be removed and disposed of in a proper format. Provide a new exhaust fan for the laundry room in the basement, a new exhaust fan in each of the new restrooms on the main level, and a new exhaust fan in each of the shower rooms on the second level.
Provide dryer exhaust venting to the outside for the dryers located in the basement and main level.

Provide a range hood and venting to the outside over the stove/oven on the main level.

Outside air ventilation is provided via operable openings including windows and doors. All windows shall be made operational, including the basement windows to meet code required ventilation.

Treatment - Plumbing

Plumbing - System - Water
Priority : Critical
The domestic water line enters the building in the basement at Storage Room where it reduces from 1-1/2" to ¾" and then services all the plumbing fixtures in the building. This size is not in compliance with IPC (International Plumbing Code) sizing criteria. There is no backflow on the water entry which is also non-compliant with the IPC.

The existing water heater is newer and in good condition. There is no hot water reciruclation pump, however there are hot water recirculation lines that are not effective.

Remove all the plumbing fixtures throughout the building along with all the domestic cold, hot, and hot water recirculation piping.

Provide a new 1-1/2" reduced pressure

backflow preventer in the basement boiler room. Route new 1-1/2" cold water line to the existing water heater. Continue the 1-1/2" water line into the basement and route to the following fixtures:

Basement:	(2) clothes washers
	(1) exterior hose bibb
	(1) utility sink
Main Level:	(2) water closets
	(2) lavatories
	(1) shower
	(1) clothes washer
	(1) kitchen sink
	(1) dishwasher
	(2) refrigerators
	(1) drinking fountain
2nd Floor:	(3) water closets
	(1) urinal
	(4) lavatories
	(4) showers

Provide a new hot water recirculation line that is routed from the 2nd floor down to the basement and back to the water heater. Provide an inline hot water recirculation pump that is controlled via water line temperature.

Plumbing - System - Sanitary/Vent
Priority : Critical
The septic leach field has been recently updated to serve the building and new PVC lines routed from the leach field into the building. This system is in good condition outside the building.

The sanitary lines within the building are in poor condition. Multiple piping materials and signs of previous repairs are present throughout the basement. Provide for the removal of all sanitary and vent piping within the building. Properly dispose of all items.

Provide new cast iron sanitary and vent piping throughout the building to the new plumbing fixtures noted previously. In addition to these fixtures, provide a floor drain in each restroom for general cleaning, provide a floor drain in each laundry area, provide a new floor drain in the boiler room.

Remove the existing sump pump in the boiler room sump basin. Provide a new sump pump sized to accommodate the new floor drain in the basement and the new floor drain in the laundry room. The floor drains in the boiler room and laundry room shall be routed to the sump basin in the boiler room. The discharge of the sump can connect to the main sanitary line prior to exiting the building.

Plumbing - System - Propane
Priority : Minor
The existing propane tank and lines are in good condition. Tank and lines shall be pressure tested and recertified.

Treatment - Fire Protection

Fire Protection - System
Priority : Serious
There is a wet sprinkler system for the majority of the building and a dry sprinkler system for the attic area. Overall the systems are in good condition.

In order to accommodate the architectural wall changes, the wet sprinkler system will need to be modified and heads added/ removed. In addition, the sprinkler pipe is currently sagging in the basement and after structural repairs will need to be resupported.

Treatment - Electrical

Electrical Service and Panels
Priority : Critical
A new electrical service should be provided as the existing electrical service has nearly reached the end of its rated life. The new service shall be 200A, 240/120V 1-Phase. The new service is recommended to be underground from the utility pole to the same location of the existing disconnect, which will also be replaced with the new service and provided with a new exterior disconnect and metering equipment. A new grounding system shall be provided.

It was also noted that this area has frequent power outages, and considerations for generator backup are desired, however the existing abandoned generator and associated equipment is not in a condition for reuse. The generator should be removed unless any historical value has been assessed, but it is not believed to be of historical significance. Two options for generator backup considerations are anticipated for this site: One central generator to support the Station Dwelling (HS-18), Officer in Charge Dwelling (HS-19), Harbor of Refuge Dwelling (HS-20), and Equipment Building or a dedicated generator per building.

For the central generator, a 80kW generator, with a 48-hour backup (500 gallon propane tank) is recommended, and would be located on the site (exterior). Refer to Cultural Landscape Report for exterior location considerations.

For a dedicated generator option for this building, in lieu of the central generator, a 30kVA generator, with a 48-hour backup (325 gallon propane tank) would be located exterior of the Station Dwelling (HS-18). Refer to Cultural Landscape Report for exterior location considerations. Diesel may also be considered as a fuel option.

Either generator option is intended to provide full back up, anticipating some load shedding may take place, to support the facility during the frequent outages.

Electrical Distribution System
Priority : Critical
The electrical distribution is in critical condition. For the wiring and raceways, the mixed vintages, as well as what conditions could be observed do not meet NEC requirements, nor the requirements of the National Park Service, and therefore all existing electrical raceways, wiring, devices, lighting, sub panels, and wiring are recommended to be replaced with new.

Ground fault and arc fault protection shall be installed per NEC requirements.

As the anticipated use for the Station Dwelling (HS-18) is transitioning to a residential use only, therefore receptacles will be provided to meet the layouts as required for dwelling units. Devices will also be placed to accommodate anticipated furniture and equipment as required, including laundry room equipment in the basement, large kitchen on the main level, bathrooms and common areas on all floors, and ABAAS lifts as required. Raceways will be installed in EMT conduit and concealed to the greatest extent possible. Any un-used wiring and conduit shall be removed from the building.

Lighting, Emergency Lighting, and Exit Signs
Priority : Critical
A full review of all existing fixtures will be coordinated with park staff to determine if any historic fixtures are to be refurbished and

reused, however the fixtures observed appear to be of modern vintage and non-historic. It is anticipated, that all lighting inside and outside will be replaced with new energy efficient LED lighting. New fixtures shall be selected based on the uses for each space, and controls provided in consideration of energy efficiency. For the anticipated residential use, exit signage and emergency lighting may be provided in select areas, but limited. All new exterior lighting shall be Dark Sky Compliant, full cut-off, and provided for adequate egress at exits.

Interior lighting controls will be by manual on/auto off after 20 minutes. Exterior lighting will be controlled via timeclock or photocell.

Fire Alarm & Detection System
Priority : Critical
Per the requirements of National Park Service for residential occupancies; Anytime a remodel, change of occupancy, rehab, or new construction, it must meet code requirements for new construction (relating to structural fire). Arc Fault Circuit Interrupters (AFCI) (Section 200 of NFPA 70) shall be provided and a new code compliant monitored fire alarm system will be required to be installed. Smoke detectors and notification shall be placed per code and alarm to an exterior monitoring site.

Tele/Data Communications System
Priority : Serious
High speed internet is recommended to be installed in the building for telephone and data. As the use is intended to be residential in nature, it is recommended that cable and data jacks be provided in all common areas for connections to anticipated television and phone equipment, as well as provide wifi for internet access by occupants. Phones should be anticipated in all common areas, and general use spaces such as the kitchen. All new cabling and equipment shall meet National Park Service latest standards for technology. New equipment is recommended to provide accommodate for security systems to be provided if desired by the National Park Service.

Lightning Protection System
Priority : Critical
The lightning protection system is in critical condition and will be repaired and recertified or replaced with new.

Treatment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Treatment - Hazardous Materials

Priority : Critical
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix. Additional hazardous material testing should be conducted in conjunction with production of construction documents to fully investigate all areas and materials which will be impacted by construction activities.

Asbestos Assessment
The identified ACM should be abated (removed, enclosed, encapsulated, or properly managed) in accordance with all applicable federal, state and local regulations if renovation activities will disturb these materials or if demolition is planned for the structure. Abatement of ACM requires EPA-certified trained workers and permits. Abatement must include the appropriate

controls and waste disposal at a certified landfill.

If ACM is to remain in-place, it is recommended that an Operations and Maintenance (O&M) Program be adopted. The O&M Program includes a listing of known asbestos within the buildings and procedures to minimize the potential for disturbance of ACM. O&M Programs are designed to present processes for communication and planning regarding ACM management, reduce the potential for unplanned impacts that may cause ACM disturbance or damage, consolidate and organize data collected related to ACM to facilitate planning and management, training requirements, notifications, and monitor the condition of ACM over time.

Test results confirmed ACM in the following locations:

- White flexible duct connector located in the basement generator room contained 85% chrysotile asbestos (one observed).
- Green floor tiles with white streaks located on the first-floor storage room, second floor under carpet, and in other locations throughout under carpet contained 4.3-12% chrysotile asbestos=. The mastic associated with this tile was non-detect for asbestos (1,360 SF).

Lead Containing Paint

Renovation activities that will impact LCP or LBP and lead-containing soils will require OSHA trained workers and safety programs. Personal protective equipment (PPE) will be required to handle these items until negative exposure assessments are completed that shows work activities do not result in exposures above the OSHA permissible exposure limit (PEL). Additionally, an appropriate waste management plan should be developed for the disposal of the LCP and lead-containing soil materials. Paint chips in soil that contain lead and lead-containing soils should be removed. Some lead components were identified as having paint in poor condition. All exterior LCP or LBP should be removed by OSHA-trained workers as part of rehabilitation work. On the interior, the LCP or LBP listed in poor condition should be repaired/removed by OSHA-trained workers as part of the renovation activities. Additionally, LCP and LBP should be removed by OSHA-trained workers at friction areas along the perimeter of interior doors, along with a portion of the jamb and stop – all contact areas at doors which are prone to chipping and abrasion. Any interior LCP or LBP not in friction areas which is in good condition and will not be impacted by renovation activities can be left in the building and encapsulated.

The following locations have LBP or LCP:

- Yellow and Red paint on concrete basement stairs and curbing in basement.
- Gray and red paint on concrete floors in basement.
- Green and yellow paint on concrete walls in basement.
- Beige and yellow paint on plaster walls on throughout.
- White and light-yellow paint on door frames.
- Yellow and gray paint on metal ladder to the observatory on the third floor.
- White paint on wooden siding and windows on the exterior of building.
- Gray paint on the concrete foundation walls on the exterior of building.
- Black and red paint on metal railings on the front porch.

Regulated Building Materials

Renovation activities that will impact RBM

will require proper removal, disposal, and management. These materials must be removed prior to remodeling and then either reused, recycled, or properly disposed in full accordance with EPA and state regulations. Some of the RBMs identified in this inventory may be reused or recycled. Recycling programs exist for lights, light fixtures, bulbs and ballasts, aerosols, mercury switches and gauges, paints, oils, refrigerants, electrical wiring, empty metal containers, and empty plastic containers.

Biological Hazards

The NPS escort indicated that the Station Dwelling (HS-18) does occasionally experience water-backups in the basement floor drain. This condition should be addressed as part of renovations or as part of regular building maintenance. See Mechanical section.

Officer in Charge Dwelling (HS-19)

Treatment and Use

The recommended treatment for the Office in Charge Dwelling is rehabilitation. This allows for altering a building to adapt to changing or continuing uses while preserving the historic character.

The exterior of the building has been changed over the years but was rehabilitated to return it to the historic appearance. Interior spaces have been modified to adjust to changing housing needs at the park.

A treatment workshop was conducted with NPS staff on April 3. 2020, to determine preferred treatment guidance for the building. The Officer in Charge Dwelling (HS-19) will continue to serve as residential use, though it will be transitioning to seasonal housing from single family housing. The only anticipated room reconfiguration is combining the second floor bathroom and powder room into one larger bathroom. Throughout the rest of the building, the general recommendation approach in this report is to repair damaged materials and finishes and leave undamaged surfaces in their current state whether they are historic or modern. ABAAS housing for staff is being provided elsewhere in the park, so this building is not intented to meet accessibility requirements.

Treatment - Architecture

Architecture - Roofing System
Priority : Critical
At the main roof, remove all roofing and associated flashing, underlayments and accessories. Examine roof substrate and where substrate is deteriorated, remove and replace in kind. Estimate that 10% of substrate will require replacement. Reinforce the eaves per Structural recommendations. Historic photos indicate that a gutter and downspout did exist at one point on the building. It is unknown when this was removed but a gutter and downspout matching the original configuration could be installed. Install new wood cedar shingles with metal ridge caps on skipped sheathing. Match shingle exposure or utilize historic photographs to determine exposure. Consider installing fall protection during the reroofing project, see Structural section.

Investigate the connections between the roofing and wall at Storage 102 to determine the source of water infiltration. Repair the flashing connection and replace any impacted wall and roof finishes in kind.

Add drip edge flashing at the front gable hood.

Architecture - Chimney
Priority : Serious
Mortar at the chimney should be evaluated and deteriorated mortar removed. Repoint with a mortar that is compatible to the original in strength, composition and color. Tool mortar joints to match original. Remove the cracking concrete cap and replace in kind. At time of reroofing, install step flashing minimum 12". Verify if flue is active and if it is not, consider installing a chimney cap.

Architecture - Exterior Stairs
Priority : Critical and Minor
At the east stair, remove the wood frame guardrail and install with a new wood code complaint handrail/guardrail.

Remove the wood north stair and replace with a code compliant stair and landing. Provide complaint guardrail on the open,

north side of the stair and handrails on both sides.

No work required at the front stair.

Architecture - Exterior Walls and Trim
Priority : Minor
No work required at this time. Clean the facade to remove accumulated debris of insects.

Architecture - Exterior Windows
Priority : Minor
Replace the cracked wood sill at Window 202 in kind. No other work required at this time.

On the interior, install new two inch blinds at all first and second floor windows.

Architecture - Exterior Doors
Priority : Serious and Minor
Door 101: No work required.

Door 103: Remove the door for rehabilitation. Repair warped panel and tighten up joints. Gently sand and refinish wood elements and repaint. Clean and oil hinges and reinstall. Provide new lockset and lever handle. Reinstall door with new weatherstripping.

Door 104: Replace door in kind. Provide new hardware.

Architecture - Interior Doors
Priority : Minor
No work required at most doors. Doors which require work are:

Door 201: Provide new hollow core door with a wood veneer matching the other second floor doors to provide a consistent finish in the building.

Door 203: Provide new hollow core door with a wood veneer matching the other second floor doors to provide a consistent finish in the building.

Door 204a: Rehang the loose east bi-fold door and provide new bi-fold door at the west side of the door opening.

Architecture - Basement Interior Finishes
Priority : Minor
In the basement, asbestos containing materials were detected at some pipe fittings, in drywall compound and in plaster finishes. Lead containing paint was found on the plaster wall finish, concrete walls and concrete floor. See hazardous material section for additional detail.

Laundry (001)
Patch holes in the walls of the Laundry. Remove loose and peeling paint from the concrete floor and repaint.

Storage No. 1 (002)
Replace in kind the missing paneling in Storage No. 1. Remove loose and peeling paint from the concrete floor and repaint.

Mechanical (003)
Remove loose and peeling paint from the concrete floor and repaint.

Storage No. 2 (004)
Remove loose and peeling paint from the concrete floor and repaint.

Stair between Basement and First Floor
Install code compliant handrail at the stair up to the first floor.

Architecture - First Floor Interior Finishes
Priority : Minor
At the first floor, asbestos containing materials were detected in drywall compound, in plaster finishes and on the floor tile at the stair to the second floor. See hazardous material section for additional detail.

Entry (101), Living Room (102), Dining Room (103), Kitchen (104) and Mud Room (105)
Investigate the areas of staining on the ceiling finish in Living Room, Kitchen, Dining Room and Mud Room to determine if there are any active leaks. Repair the source of any active leaks and patch areas of removed ceiling finish in kind. Patch areas of ceiling and wall finish impacted by structural repair work and installation of the fire sprinkler system. Patch all chips and divots in the wall finishes. Repaint ceiling and wall finishes. Flooring throughout the first floor is showing signs of wear and there are visible gaps. Consider replacing with a more durable laminate flooring or hardwood flooring. Final depth of flooring may require transition strips.

Stair between First and Second Floors
Remove the rubber tread covers and VCT tiles on the stairs. Replace with laminate wood plank flooring and matching nosings. Remove the handrail and provide a new code compliant handrail.

Architecture - Second Floor Interior Finishes
Priority : Minor
At the second floor, asbestos containing materials were detected in drywall compound, plaster finishes and on the floor tile throughout this level. See hazardous material section for additional detail.

Hall (201), Bedroom No. 3 (202), Bedroom No. 2 (203)
Patch areas of ceiling and wall finish impacted by structural repair work and installation of the fire sprinkler system. Patch all chips and cracks in the wall and ceiling finishes. Repaint ceiling and wall finishes. Flooring is showing signs of wear and there are visible gaps between tiles. Consider replacing with a more durable laminate flooring or hardwood flooring. Final depth of flooring may require transition strips.

Bedroom No. 1 (204)
Investigate the source of water staining in Bedroom No. 1 and if the leak is active, determine the source of the water (potentially flashing at the roof chimney intersection) and repair it. Patch areas of ceiling and wall finish impacted by structural repair work and installation of the fire sprinkler system. Patch all chips and cracks in the wall and ceiling finishes. Repaint ceiling and wall finishes. Flooring is showing signs of wear and there are visible gaps. Consider replacing with a more durable laminate flooring or hardwood flooring. Final depth of flooring may require transition strips.

Powder Room (205) and Bathroom (206)
Remove all fixtures and finishes and demo walls to provide one larger bathroom. As needed, patch and provide new gypsum board ceiling and wall finish. Install wood 3-3/4" base with quarter round shoe throughout the room. Install tile flooring or water resistant laminate flooring. Final depth of flooring may require transition strips. Provide new bathtub and tile shower surround, water closet and lavatory. Provide new bathroom accessories including towel racks, toilet paper dispenser, soap dispenser, mirror, etc..

Architecture - Code/Life Safety
Priority : Critical
Provide modifications to stair railings/ guardrails as described above. Utilize IEBC to allow non compliant stair elements to remain (treads, risers, guardrails, etc.). Under this occupancy, only one egress is required so the fire escape deck is not required and should be removed.

Install fire suppression system, see Mechanical.

Architecture - Accessibility
Priority : Minor
Per direction from NPS, accessible employee housing is to be provided elsewhere, so this building does not need to provide accessible units.

Treatment - Structural

Structural - Foundation
Priority: Minor
Provide a square, isolated footing beneath the new adjustable steel pipe column just inboard of the east wall of the Storage No. 1 (002) room

Structural - Floor & Ceiling Framing
Priority : Minor
Weld a plate across the notch in the top flange of the first floor steel beam.

Weld a steel pipe sleeve to reinforce the hole in the first floor steel beam web.

Further investigate the bearing condition of the east end of the steel wide flange beam in the first floor framing by removing the finishes. It is anticipated that it will be necessary to provide an additional adjustable steel pipe column just inboard of the east foundation wall or enhance the bearing condition with prefabricated hangers or straps to support the steel beam.

Sister the second floor joists with dimensional lumber to match the depth of the existing joists, especially under the bathtub in the bathroom. Further investigate the dropped beam in the Dining Room (103). Install a steel sister to strengthen the beam if confirmed to be overstressed after investigation.

Structural - Roof Framing
Priority : Minor
Reinforce the eaves of the west and south elevations with steel to counteract the effects of the drifting snow causing the eaves to sag.

During the next reroofing project, consider installing fall protection anchors. At the anchor points, locally strengthen the roof framing with sisters and blocking

Structural - Wall Framing
Priority : Minor
Further investigate the presence and size of any headers over the window openings in the Living Room (102). If after the investigation the headers are found to be inadequate, reinforce the members by replacing with LVL or steel members as necessary.

Once the source of moisture between the Storage No. 2 (004) addition and the original structure is sealed off, replace the deteriorating sill plates under the north and south walls of the addition.

Structural - Lateral System
Priority : Minor
If the finishes are removed where the roof framing meets the wall framing, verify or provide an adequate connection of the roof framing to the walls to prevent uplift during

a large wind event. This connection could consist of lag screws or hurricane ties.

Treatment - Mechanical

Mechanical - System - Heating
Priority : Minor
The existing system is a hydronic heating system with the boiler in the basement and multiple heating zones in the building. The system is in good condition however, the 2nd level bathroom reconfiguration will require the baseboards to be modified to accommodate the new wall layout.

The existing hydronic heating lines are not insulated and should be insulated for energy savings.

When the boiler fails in the future, it should be replaced with a high efficiency boiler. The expansion tank and circulating pump should also be replaced.

As an alternative treatment, if the Office in Charge Dwelling is to be used only seasonally and winterized the mechanical system will need adjustment. Winterizing a building can be labor intensive with draining down a hydronic system and refilling every year along with the challenges of getting all the water out of the boiler, pipes, and hydronic accessories. Also, the introduction of air/oxygen into the hydronic system pipes every year decreases the life of the piping system. In place of draining the hydronic system, the hydronic water could be treated with glycol at a percentage that prevents freezing of the pipes. Adding glycol into a system does decrease the heating capacity of the system; however, if the facility is winterized and only used during summer and shoulder seasons, the amount of heating capacity needed is reduced. The other option for easy winterization would be to remove the hydronic system and install an electric baseboard system throughout which allows for an easy on/off winterization program but would require additional upfront construction costs.

Mechanical - System - Cooling
Priority : N/A
There is no mechanical cooling system in the building today. The northern location of the building facility and cooler evenings provide for the building to be cooled off at night. Provide for a whole house fan on the second floor to help move the cool air from the first floor up and the hot air at the second floor out of the building.

Mechanical - System - Ventilation
Priority : Critical
The existing exhaust fan in Bathroom #206 is ineffective and there is no exhaust fan in Powder Room #205.

Remove the existing exhaust fan in Bathroom #206 and dispose of properly. Provide a new exhaust fan for the new Bathroom on the Second Floor and vent to the outside.

Remove the existing dryer venting in the basement and provide new dryer venting for the new dryer location.

Outside air ventilation is provided via operable openings including windows and doors. All windows shall be made operational, including the basement windows to meet code required ventilation.

Treatment - Plumbing

Plumbing - System - Water
Priority : Serious

The domestic water line enters the building the basement where it reduces from 4" to ¾" and then services all the plumbing fixtures in the building. The water line should be increased to a 2" line with a reduced pressure backflow preventer. The new 2" line will provide domestic water for the building in addition to a NFPA 13D compliant fire protection system for residential dwelling. Remove all existing plumbing fixtures except for the kitchen sink. Properly dispose of fixtures.

Provide new cold water line to the existing water heater. Modify existing cold and hot water lines on the second floor to accommodate the new bathroom layout. Provide a new ¾" hot water recirculation line from the 2nd level bathroom down to the basement. Provide a new hot water recirculation pump and connect to water heater supply line. Hot water recirculation pump to be controlled by water line temperature.

The existing water heater is newer and in good condition.

Provide removal of existing clothes washer connections on west wall of basement and provide new clothes washer connection on south wall.

Plumbing – System – Sanitary/Vent
Priority : Serious
The septic leach field is to the north of the building and the condition is unknown. The septic system shall be investigated and condition determined. The sanitary sewer line from the building to the septic system shall also be scoped for condition.
The sanitary lines within the building are mainly original hub and spigot cast iron lines. The existing sanitary lines shall be scoped for condition and replacement should be considered.

The existing sump pump piping is leaking and the sump pump is an older pump. Remove the existing sump pump in the boiler room sump basin. Provide a new sump pump sized to accommodate the floor drains in the basement, a utility sink, and a clothes washer. The existing 3" copper piping to the main sanitary discharge can be reused.

Plumbing – System – Propane
Priority : Minor
The existing propane tank and lines are in good condition. Tank and lines shall be pressure tested and recertified.

Treatment - Fire Protection

Fire Protection - System
Priority : Critical
There is no existing fire protection system within the building today. Provide a new fire sprinkler system in compliance with NFPA 13 D (National Fire Protection Association). The new sprinkler system shall utilize the existing 4" water line into the building as the source of water. Provide sprinkler system water line complete with check valve, flow indicating alarm, pressure gauges, and test/ drain station. Route new fire sprinkler lines in the basement, first floor and second floor. Fire sprinkler lines in the upper level shall be routed exposed as to prevent freezing of lines.

Provide a small dry pipe system with air compressor for the attic space. Air

compressor to be located in basement along with dry pipe valve and alarming.

Treatment - Electrical

Electrical Service and Panels
Priority : Critical
A new electrical service should be provided as the existing electrical service has nearly reached the end of its rated life, and is likely undersized. The new service shall be 100A, 240/120V 1-Phase. The new service is recommended to be underground from the utility pole to the same location of the existing disconnect, which will also be replaced with the new service and provided with a new exterior disconnect and metering equipment. A new grounding system shall be provided.

It was also noted that this area has frequent power outages, and considerations for generator backup are desired. Two options for generator backup considerations are anticipated for this site: One central generator to support the Station Dwelling (HS-18), Officer in Charge Dwelling (HS-19), Harbor of Refuge Dwelling (HS-20), and Equipment Building or a dedicated generator per building.

For the central generator, a 80kW generator, with a 48-hour backup (500 gallon propane tank) is recommended, and would be located on the site (exterior). Refer to Cultural Landscape Report for exterior location considerations.

For a dedicated generator option for this building, in lieu of the central generator, a 16kVA generator, with a 48-hour backup (100 gallon propane tank) would be located exterior of the OIC Dwelling. Refer to Cultural Landscape Report for exterior location considerations. Diesel may also be considered as a fuel option.

Either generator option is intended to provide full back up, anticipating some load shedding may take place, to support the facility during the frequent outages.

Electrical Distribution System
Priority : Critical
The electrical distribution is in critical condition. For the wiring and raceways, the mixed vintages, as well as what conditions could be observed do not meet NEC requirements, nor the requirements of the National Park Service, and therefore all existing electrical raceways, wiring, devices, lighting, sub panels, and wiring are recommended to be replaced with new.

Ground fault and arc fault protection shall be installed per NEC requirements.

As the anticipated use for the OIC Dwelling is transitioning from a single family residential to seasonal residential housing, therefore receptacles will be provided to meet the layouts as required for dwelling units. Devices will also be placed to accommodate anticipated furniture and equipment as required, including laundry room equipment in the basement, kitchen on the main level, bathrooms and common areas on all floors, and general storage and mechanical spaces. Raceways will be installed in EMT conduit and concealed to the greatest extent possible. Any un-used wiring and conduit shall be removed from the building.

Lighting, Emergency Lighting, and Exit Signs
Priority : Critical
A full review of all existing fixtures will be coordinated with park staff to determine if any historic fixtures are to be refurbished

and reused. It is anticipated however, that all lighting inside and outside will be replaced with new energy efficient LED lighting.

All new exterior lighting shall be Dark Sky Compliant, full cut-off, and provided for adequate egress at exits.

Interior lighting controls will be by manual on/auto off after 20 minutes to prevent lights from remaining on after use, unintentionally. Exterior lighting will be controlled via timeclock or photocell.

Fire Alarm & Detection System
Priority : Critical
Per the requirements of National Park Service for residential occupancies; Anytime a remodel, change of occupancy, rehab, or new construction, it must meet code requirements for new construction (relating to structural fire). Arc Fault Circuit Interrupters (AFCI) (Section 200 of NFPA 70) shall be provided and a new code compliant monitored fire alarm system will be required to be installed. Smoke detectors and notification shall be placed per code and alarm to an exterior monitoring site.

Tele/Data Communications System
Priority : Serious
High speed internet is recommended to be installed in the building for telephone and data. As the use is intended to be residential in nature, it is recommended that cable and data jacks be provided in all common areas for connections to anticipated television and phone equipment, as well as provide wifi for internet access by occupants. Phones should be anticipated in all common areas, and general use spaces such as the kitchen and laundry spaces. All new cabling and equipment shall meet National Park Service latest standards for technology.

New equipment is recommended to provide accommodate for security systems to be provided if desired by the National Park Service.

Lightning Protection System
Priority : Minor
There is no existing system. Based on the NFPA calculations for risk level associated with recommendations for lightning protection, the risk is above tolerable levels and a lightning protection system is recommended for this building.

Treatment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Treatment - Hazardous Materials

Priority : Critical
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix. Additional hazardous material testing should be conducted in conjunction with production of construction documents to fully investigate all areas and materials which will be impacted by construction activities.

Asbestos Assessment
The identified ACM should be abated (removed, enclosed, encapsulated, or properly managed) in accordance with all applicable federal, state and local regulations if renovation activities will disturb these materials or if demolition is planned for the structure. Abatement of ACM requires EPA-certified trained workers and permits. Abatement must include the appropriate

controls and waste disposal at a certified landfill.

If ACM is to remain in-place, it is recommended that an Operations and Maintenance (O&M) Program be adopted. The O&M Program includes a listing of known asbestos within the buildings and procedures to minimize the potential for disturbance of ACM. O&M Programs are designed to present processes for communication and planning regarding ACM management, reduce the potential for unplanned impacts that may cause ACM disturbance or damage, consolidate and organize data collected related to ACM to facilitate planning and management, training requirements, notifications, and monitor the condition of ACM over time.

ACM was found in the following locations:

- Joint compound associated with drywall on the second level hallways and basement dividing walls contains 4% chrysotile asbestos [~450 square feet (SF)]. The composite drywall sample (drywall, paper, joint compound) contained less than 1% asbestos.
- Cream-colored floor tile with gray streaks and the associated mastic located on the stairs to the second floor and in the entire second floor hallways and bedrooms contain 5-7% chrysotile asbestos (~550 SF).
- A white mudded pipe fitting was found in the basement on the north wall next to the brick chimney on the pipe. This fitting contains 20% chrysotile asbestos. While only one fitting was observed, there is a potential that additional fittings could be found in wall, floor, and ceiling cavities throughout the building.
- Gray granular plaster with white skim coating located on walls and ceilings throughout including under CDW01 in many locations. One of five samples indicated that an additional compound was laid on top of the plaster which contained 3% chrysotile asbestos. This could be a patching material, but until further investigations can be performed, the entire wall/ceiling material must be treated as asbestos (~2,500 SF).

Lead Containing Paint

Renovation activities that will impact LCP or LBP and lead-containing soils will require OSHA trained workers and safety programs. Personal protective equipment (PPE) will be required to handle these items until negative exposure assessments are completed that shows work activities do not result in exposures above the OSHA permissible exposure limit (PEL). Additionally, an appropriate waste management plan should be developed for the disposal of the LCP and lead-containing soil materials. Paint chips in soil that contain lead and lead-containing soils should be removed. Some lead components were identified as having paint in poor condition. All exterior LCP or LBP should be removed by OSHA-trained workers as part of rehabilitation work. On the interior, the LCP or LBP listed in poor condition should be repaired/removed by OSHA-trained workers as part of the renovation activities. Additionally, LCP and LBP should be removed by OSHA-trained workers at friction areas along the perimeter of interior doors, along with a portion of the jamb and stop – all contact areas at doors which are prone to chipping and abrasion. Any interior LCP or LBP not in friction areas which is in good condition and will not be impacted by renovation activities can be left in the building and encapsulated.

The following locations have LBP or LCP:

- White paint on plaster walls in the basement.
- Gray and red paints on the concrete floors in the basement.
- Green paint on concrete walls in basement.
- Gray paint on the exterior of the building, along the concrete foundation.

Lead content in the soil surrounding the building exceeds the EPA non-play area bare soil level of 1,200 mg/kg for lead.

Regulated Building Materials

Renovation activities that will impact RBM will require proper removal, disposal, and management. These materials must be removed prior to remodeling and then either reused, recycled, or properly disposed in full accordance with EPA and state regulations. Some of the RBMs identified in this inventory may be reused or recycled. Recycling programs exist for lights, light fixtures, bulbs and ballasts, aerosols, mercury switches and gauges, paints, oils, refrigerants, electrical wiring, empty metal containers, and empty plastic containers.

Identified RBMs found throughout the building were fluorescent light tubes and compact florescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire suppressant chemicals; smoke detectors, emergency lighting, and emergency exit signs which contain batteries, and many contain radiation sources; deep-cycle batteries which contain lead and acid; and a 1,000-gallon propane tank.

Biological Hazards

None identified at this time.

Harbor of Refuge Dwelling (HS-20)

Treatment and Use

The recommended treatment for the Harbor of Refuge Dwelling (HS-20) is rehabilitation. This allows for altering a building to adapt to changing or continuing uses while preserving the historic character. Building use has changed since it was originally constructed as a residence and it now serves as a house museum.

The exterior of the building has been changed over the years with aluminum siding installed over the original stucco and timber finish on the second floor. Exterior recommendations will recommend rehabilitation work to return the facade to the original appearance.

A treatment workshop was conducted with NPS staff on April 3. 2020, to determine preferred treatment guidance for ABA access to the building and interior modifications to provide an ABA route through the first floor. Treatments incorporate the work required for implementation of this plan. Where work will not be required, the general recommendation approach in this report is to repair damaged materials and finishes and leave undamaged interior surfaces in their current state whether they are historic or modern. Exterior treatments provide guidance for rehabilitating finishes to return the building to the historic appearance. Updates for life safety and code required work are also included in the treatments.

Demolition work associated with these treatments include the removal of the small toilet room at the first floor and removal of the existing west entry. The new west entry will be longer than the current space to provide the interior space required for the ABA lift.

Currently this building is used only during warm months and is winterized during cold months and does not require a heating system. However NPS requested guidance for system options if that changes in the future, so heating system options for future consideration are provided in the treatments.

Treatment - Architecture

Architecture - Roofing
Priority : Serious
At the existing west addition (Mudroom), demolish roof in its entirety (in conjunction with the demolition of the rest of this appurtenance). Safeguard the historic brick east wall of the house when removing roof-wall connections and flashing.

At the main roof, remove all roofing and associated flashing, underlayments and accessories to the substrate. Remove gutters and downspouts.

Examine roof substrate with special attention to the dormer valleys. Where substrate is deteriorated, remove and replace in kind damaged material as well as any framing elements that have been shown to be deteriorated in the course of this inspection. Estimate that 10% of substrate will require replacement, see structural for framing replacement.

Anticipate significant damage to the wood fascia when removing the metal flashing that obscures it; estimate 50% will require replacement.

Once material repairs are made, install new underlayment, metal shingles in a similar shape to the original “metal slate” shingles and flashing. Provide pre-finished metal

flashing with a high-performance finish. At chimneys, embed counterflashing into mortar joints. Consider installing fall protection during the reroofing project, see Structural section.

Provide same roofing system at new west addition.

Provide all new half round gutters and downspouts. Provide downspout extensions to discharge water at least four feet from the foundation.

Architecture - Chimney
Priority : Minor
Clean chimney to remove biological growth. Repoint all faces of the brick chimneys with a mortar that is compatible to the original in strength, composition and color. Tool mortar joints to match original. Install a prefinished chimney cap. Install step flashing in coordination with reroofing.

Architecture - Exterior Walls
Priority : Critical
At the existing mudroom, demolish exterior north, west and south walls. Protect historic brick at east wall.

At second story, remove all aluminum siding and associated trims and soffit panels.

Install a new stucco wall assembly with timber accents to match historic configuration. Refer to the 2011 construction documents for the rehabilitation of the similar Munising Range Light Station. This similar stucco and timber reconstruction was performed at the Munising Range Light Station which provided drainage with a specific "rain screen" material. Similar detailing should be considered as it seems to be holding up well after nearly a decade.

Common wood trim elements at the gables and dormers were not visible behind the aluminum siding. Assume replacement of 1x fascia or trim at rakes, eaves and gables.

At the brick wall on the first floor, replace brick where seriously compromised. Estimate four square feet of brick will require replacement at the northeast and northwest corners. Replacement bricks should have the same color and smooth baked finish of the historic brick. See Structural for treatment of spalled common brick at the south foundation. Brick deterioration at this location is caused by watering for the garden added adjacent to the exterior wall. Watering should be discontinued and the garden removed.

Remove any incompatible mortar. Repoint deteriorated joints with a mortar that is compatible to the original in strength, composition and color. Tool mortar joints to match original. Match mortar taken from a sample on the west elevation where protected by the porch, where the sand and fine aggregate of the mix is readily visible. Estimate that 20% of the brick surface will require repointing.

At the precast watertable and lintels, remove loose paint and repaint.

Construct new west entry addition, with finishes compatible with the historic character and building finishes - brick, stucco, or wood siding.

Architecture - Porch
Priority : Serious
Lightly sand and repaint the wood columns, railing and beadboard ceiling of the porch.

Where the glass-infused lumber product was

used at the deck, skirt, and steps, remove the product and replace with a rot-resistant wood species. Paint with a marine grade coating that is formulated for this location. Alternatively, consider thermally-treated hardwood decking.

Architecture - Windows
Priority : Serious
The windows are not historic and are in poor condition. Replace all windows with high quality wood clad units that match the historic in number, configuration and proportion. Second floor windows had a diamond pattern in the upper sash. The new tripartite window at the east dormer should also match the historic configuration. Refer to historic drawings (Figure 1-10 and 1-11).

As these windows are replacements, consider insulated double-pane glass in lieu of storm windows and aluminum-clad wood sash and frames. These approaches should be studied carefully during the design phase.

Provide a new window of Type B proportions at the historic location on the west elevation. Provide two new windows of Type A proportions at the new west addition.

On the interior, install dark cloth shades at all first and second floor windows to protect historic furnishings from UV damage.

Architecture - Exterior Doors
Priority : Serious
Repaint the front door. Provide new lockset and lever handle and clean and oil hinges. Install new weatherstripping.

At the new west addition, provide a new wood stile and rail door with accessible hardware.

Architecture - Interior Finishes
Priority : Serious
Hazardous material testing identified asbestos containing material in the gypsum board and lead based and lead containing paint on plaster finishes, concrete floors, brick walls and the basement stair. See Hazardous Material section for additional information.

Cellar
Remove any remaining paint on the brick walls to allow the brick to dry on the interior. Do not apply any new paints or coatings. See structural for full treatment of this wall.

At the walls of the stairway, rehabilitate the historic plaster. Treat mildew using gentlest means and paint with a breathable paint.

1st Floor - Lower Hall
Repair the wood flooring where damaged near the newel post. Patch floor at wall modifications. Refinish the floor.

At the north wall, enlarge the cased openings to the parlor to comply with ABAAS, reusing the historic casing. Salvage and reinstall baseboards and door trim, installing a longer piece of the same profile at the head. Note that all this trim is not historic but mimics historic profiles. Replacement pieces should maintain these profiles. At other gypsum board walls, clean surfaces and repaint.

At the stair, gently sand and refinish treads and risers. Protect adjacent trim and railing elements during this work.

Remove the gypsum board ceiling. Inspect source of water damage and repair if active. Install new gypsum board and paint.

1st Floor - Parlor
Repair the wood flooring where damaged at the thresholds and at wall modifications; refinish.

At the south wall, enlarge the cased openings to the hall as discussed above; restore trim. At all walls, remove the existing wallpaper and apply a new paper in a pattern appropriate to the period of significance, or paint. Finish the new trim to match the historic trim at the stair or paint as deemed appropriate for interpretation.

Repaint the gypsum board ceiling.

1st Floor - Dining Room
Refinish the wood floors.

At all walls, remove the existing wall paper and apply a new paper in a pattern appropriate to the period of significance, or paint. Finish the new trim to match the historic trim at the stair or paint as deemed appropriate for interpretation.

Retain the atypical wood plank ceiling, which is in good condition, but consider painting if that approach is used for the trim.

1st Floor - Kitchen
Remove the small bathroom and all finishes completely.

Repair the wood flooring where damaged near the bathroom. Install new wood flooring to match in the area reclaimed from the bathroom. Patch the trim at locations where walls are modified. Refinish the wood floors.

Repair the gypsum board wall at the former bathroom location, around the restored window and behind the sink. Repaint all walls. Refinish beadboard wainscot, baseboard and door trim. Retain the hinges at the door to the former mudroom as an interpretive gesture.

Repair ceiling and soffit at former bathroom and repaint ceiling and soffits.

1st Floor - Mudroom
Demolish former mudroom addition as noted previously and install new west entry addition as shown on drawings. Provide a bi-level wood floor that meets finish floor elevation at threshold to the main house, retaining the historic threshold if possible to do so while meeting ABAAS.

At the east wall, which is the exterior wall of the main house, remove all paint from brick. Do not apply any new paint or coatings. Repoint as needed.

Provide a new gypsum board ceiling in the west addition.

2nd Floor - Upper Hall
See structural section regarding floor framing. Either limit the number of people on the second floor and refinish the wood floor. Or remove the existing floor boards, install subflooring and reinstall floor boards and refinish. If subfloor is installed, design should consider how best to address the increased thickness at wall base, door openings, etc.

At the west dormer, remove gypsum board ceiling where water staining is evident. Replace any water -damaged framing elements in conjunction with the reroofing work at the dormer valleys. Install new gypsum board and repaint. Paint remaining gypsum walls.

Baseboard trim is inconsistent in the hall. Install new baseboard trim in the same profile

being used downstairs throughout.

Investigate water staining at the ceiling in the same manner as described for the dormer. Anticipate replacing the ceiling throughout this space.

2nd Floor - Bedrooms 1, 2 and 3
Repair the small sections of flooring in each room that have been damaged at former floor penetrations. See structural section regarding floor framing. Either limit the number of people on the second floor and refinish the wood floor. Or remove the existing floor boards, install subflooring and reinstall floor boards and refinish. If subfloor is installed, design should consider how best to address the increased thickness at wall base, door openings, etc.

At all walls, remove the existing wallpaper and replace gypsum board at locations of water staining or deterioration as identified in the conditions section. Apply a new paper in a pattern appropriate to the period of significance, or paint. Install the taller, historic baseboard profile throughout.

Anticipate replacing the gypsum board ceilings throughout these rooms.

At the closet in Bedroom 1, preserve the stretches of historic trim as historic record. At the damaged plaster below the dormer, selectively remove damaged plaster to investigate the leak and replace any water -damaged framing elements in conjunction with the exterior work at the dormer valleys. Otherwise, conserve as much historic plaster as practical for historic record.

2nd Floor - Office
See structural section regarding floor framing. Either limit the number of people on the second floor and refinish the wood floor. Or remove the existing floor boards, install subflooring and reinstall floor boards and refinish. If subfloor is installed, design should consider how best to address the increased thickness at wall base, door openings, etc.

New window installation and returning this window to the original tripartite configuration will likely require reconfiguration of the window trim. Repaint gypsum board at walls and ceilings.

Architecture - Code/Life Safety
Priority : Critical
There are currently building code and life safety issues identified in Part 1 Condition Assessment text. Current building codes were taken into consideration during the development of the treatment floor plan option which addresses life safety and code issues that were identified. However, when this project moves forward into design for the rehabilitation project, it shall include a full code study using applicable building codes at that time. Allowances to preserve historic fabric as allowed within the IEBC shall be utilized to minimize impact to the historic fabric where possible.

Per the requirements of National Park Service, buildings that exhibit or store museum objects must have automatic fire suppression and detection systems. See mechanical and plumbing sections.

Architecture - Accessibility
Priority : Critical
Currently there is no accessible access to the building. The preferred option floor plan design provides accessible access to the first floor via a new west entrance with an ABA lift. It also provides an ABA compliant path through the first floor.

Treatment - Structural

Structural - Foundation
Priority: Minor
Remove the remaining non-breathable coating on the interior face of the foundation walls. Install a capillary break near the base of the walls. Rake out and repoint the deteriorated mortar joints with a compatible mortar as determined by a mortar analysis of a sample of the existing material as noted in Architectural. Replace or flip any brick units that have significantly deteriorated. Leave the brick uncoated or recoat the interior surface of the foundation walls with a breathable coating.

Remove the existing foundations of the Mud Room addition to the west. Install a new concrete stem wall and continuous footing foundation system at frost depth for the new west addition.

Structural - Floor & Ceiling Framing
Priority : Minor
Sister the center timber beam of the first floor with an 8" deep steel channel where the timber is notched.

Sister the center timber beam of the first floor south of the staircase with an 8" deep steel channel bolted to the side.

Provide additional bearing area at the south end of the center timber beam by installing a 3" diameter screw jack with an 8 1/2" by 8 1/2" square bearing plate, or construct a larger brick pier adjacent to the existing brick piers to increase the bearing area.

Once the moisture source has been cut off under Restroom (102), remove any deteriorated wood material. Sister the remaining member or replace in kind as necessary.

Post the limited load capacity of the structure of 40 psf in a conspicuous location easily visible to all visitors.

If it is desired to keep the crack in the drywall ceiling from reoccurring to the north of the staircase, sister the full-length joists. This is not required structurally as this is a serviceability concern.

Remove and salvage the existing second floor flooring. Install a layer of 3/4" tongue and groove plywood on the tops of the second floor joists then reinstall the existing finish floor boards. Alternatively, since the floors have performed up to date, place a limit on the number of people on the second floor.

Provide wood floor and ceiling framing at the new west addition that is supported on the new concrete foundation.

Structural - Roof Framing
Priority : Minor
Provide wood roof framing at the new west addition.

During the next reroofing project, consider installing fall protection anchors. At the anchor points, locally strengthen the roof framing with sisters and blocking

Structural - Wall Framing
Priority : Minor
Remove the garden along the south elevation of the structure.

Ensure that the roof drainage is expelled away from the building per architectural recommendations. Replace the broken units at the northwest corner of the structure

below the water table with face bricks to match the existing exposed brick units.

Ensure that the interface between the chimneys and roof do not allow water to enter the structure per architectural recommendations.

Provide wood wall framing at the new west addition.

Structural - Lateral System
Priority : Minor
If the finishes are removed where the roof framing meets the wall framing, verify or provide an adequate connection of the roof framing to the walls to prevent uplift during a large wind event. This connection could consist of lag screws or hurricane ties.

Treatment - Mechanical

Mechanical - System - Heating
Priority : Critical
The existing heating system in the building is no longer functional and there is no heat provided to the building. This is acceptable for the current, seasonal only use at this building. However, park staff requested this report present options for consideration if the use changes in the future.

There are multiple options to provide heating to the building, for the purpose of this report, it will outline two options to consider. Neither of these options provide museum level of temperature and humidity control. If museum levels of temperature and humidity control are needed, Option #1 outlined below provides a good foundation for the system and additional airflow dehumidification and mechanical cooling would need to be integrated.

For both options, the existing boiler, hydronic piping, baseboard heaters, controls, and accessories shall be removed and properly disposed.

OPTION #1:
Provide a new propane fired boiler in the basement with expansion tank, gylcol feeder, and circulating pump. Route new hydronic lines from the basement up to the main level and upper level. Provide zoning valves in the basement that provides one zone for the main level and a second zone for the upper level. Provide new baseboard heaters or floor standing radiant heaters in all the rooms on the main and upper levels. Provide 40% glycol in the heating water system to prevent freezing in the wintertime. An alternative to the glycol could be the seasonal draining of the heating system. For the basement, provide a hydronic unit heater for freeze protection. This system would be similar to the Officer in Charge Dwelling (HS-19).

OPTION #2:
Provide all new electric baseboard heaters throughout the main and upper levels of the facility. Provide integral thermostats to the baseboard heaters that allow manual control of the temperature. For the basement level, provide an electric unit heater for freeze protection. This system would be similar to the Equipment Building.

Mechanical - System - Cooling
Priority : N/A
There is no mechanical cooling system in the building today. The northern location of the building facility and cooler evenings provide for the building to be cooled off at night. Consider the installation of ceiling fans in the upper bedrooms to help move air during the warmer summer days.

Mechanical - System - Ventilation
Priority : Critical
Outside air ventilation is provided via operable openings including windows and doors. All windows shall be made operational, including the basement windows to meet code required ventilation.

Treatment - Plumbing

Plumbing - System - Water
Priority : Serious
The domestic water line enters the building in the basement on the west side. This is a new ¾" line and is adequate for the installation of a mop sink and to support the existing hose bibbs.

The existing water line distribution to the water closet on the main level and the hose bibbs on the exterior of the building is a mixture of piping material. Remove all domestic water piping within the building back to the existing water meter. Remove the existing non-functioning water heater in the basement and the existing water closet on the main level. Properly dispose of all removed plumbing materials.

If desired by park staff, provide a new ¾" cold water line to provide service to the two existing hose bibbs on the exterior of the building and to a new mop sink in the Cellar. Provide a new 5-gallon electric tank water heater at the new mop sink. Provide a hot water line to the new mop sink.

Plumbing - System - Sanitary/Vent
Priority : Serious
The sanitary line that exits the building to the west is a newer 4" PVC line that is in good condition. However, it is not known where this line is routed or how it connects to the sanitary system. Scoping of the new line should be done to confirm routing of the line.

Provide a new sump pump basin and sump pump in the basement level for the mop sink. Route a 2" discharge line up and connect to the existing 4" PVC line.

Plumbing - System - Propane
Priority : Critical
There is no existing propane system for the building today. If Mechanical Option #1 is the preferred mechanical solution, a new propane tank will need to be located on site and propane routed to the building underground. One option would be to increase the size of the existing propane tank servicing the Harbor of Refuge Dwelling (HS-20) and install meters to each of the buildings. This limits the propane tanks to the existing locations and keeps number of fill stops the same.

If Mechanical Option #2 is selected, no propane is needed and no propane tank is needed.

Treatment - Fire Protection

Fire Protection - System
Priority : Critical
There is no existing fire protection system within the building today. Provide a new fire sprinkler system in compliance with NFPA 13 (National Fire Protection Association). Provide a new 4" fire line into the basement of the building.

Provide with a new double-check backflow preventer and required flow alarms, fire department connections, and pressure gauges. Route the new lines throughout the basement, main level, and upper level. The upper level lines shall be routed exposed so as

to be in the heated section of the building.

Provide a small dry pipe system with air compressor for the attic space. Air compressor to be located in basement along with dry pipe valve and alarming.

Treatment - Electrical

Electrical Service and Panels
Priority : Critical
A new electrical service should be provided as the existing electrical service has nearly reached the end of its rated life, and is likely undersized. The new service shall be 100A, 240/120V 1-Phase. The new service is recommended to be underground from the utility pole to the same location of the existing disconnect, which will also be replaced with the new service and provided with a new exterior disconnect and metering equipment. A new grounding system shall be provided. It was also noted that this area has frequent power outages, and considerations for generator backup are desired. Two options for generator backup considerations are anticipated for this site: One central generator to support the Station Dwelling (HS-18), Officer in Charge Dwelling (HS-19), Harbor of Refuge Dwelling (HS-20), and Equipment Building or a dedicated generator per building.

For the central generator, a 80kW generator, with a 48-hour backup (500 gallon propane tank) is recommended, and would be located on the site (exterior). Refer to Cultural Landscape Report for exterior location considerations.

For a dedicated generator option for this building, in lieu of the central generator, a 16kVA generator, with a 48-hour backup (100 gallon propane tank) would be located exterior of the Harbor of Refuge Dwelling (HS-20). Refer to Cultural Landscape Report for exterior location considerations. Diesel may also be considered as a fuel option.

Either generator option is intended to provide full back up, anticipating some load shedding may take place, to support the facility during the frequent outages.

Electrical Distribution System
Priority : Critical
The electrical distribution is in critical condition. For the wiring and raceways, the mixed vintages, as well as what conditions could be observed do not meet NEC requirements, nor the requirements of the National Park Service, and therefore all existing electrical raceways, wiring, devices, lighting, sub panels, and wiring are recommended to be replaced with new. Ground fault and arc fault protection shall be installed per NEC requirements.
As the anticipated use for the Harbor of Refuse Dwelling to remain of museum use of the residence, therefore receptacles will be provided to meet the layouts as required for dwelling units. Devices will also be placed to accommodate anticipated furniture and equipment as required, including kitchen on the main level, bathrooms and common areas on the upper levels, mechanical equipment in the basement and main levels, ABAAS lift. Raceways will be installed in EMT conduit and concealed to the greatest extent possible. Any un-used wiring and conduit shall be removed from the building.

If a heating system is installed in the future and mechanical option #2 is selected, it will require associated electrical work for the electric baseboard heaters throughout.

Lighting, Emergency Lighting, and Exit Signs
Priority : Critical
A full review of all existing fixtures will be coordinated with park staff to determine if any historic fixtures are to be refurbished and reused, however the fixtures of modern vintage and non-historic shall be replaced with new energy efficient LED lighting. LED lamping for historic fixtures is recommended for energy efficiency. New fixtures shall be selected based on the uses for each space, and controls provided in consideration of energy efficiency. For the anticipated museum use, exit signage and emergency lighting shall be provided throughout along paths of egress as required.

All new exterior lighting shall be Dark Sky Compliant, full cut-off, and provided for adequate egress at exits.

Interior lighting controls will be by manual on/auto off after 20 minutes. Exterior lighting will be controlled via timeclock or photocell.

Fire Alarm & Detection System
Priority : Critical
Per the requirements of National Park Service for Buildings (new or historic), that exhibit or store museum objects MUST have automatic fire suppression and detection systems. Quantity of objects does NOT influence those requirements. Arc Fault Circuit Interrupters (AFCI) (Section 200 of NFPA 70) shall be provided and a new code compliant monitored fire alarm system will be required to be installed. Smoke detectors and notification shall be placed per code and alarm to an exterior monitoring site.

Tele/Data Communications System
Priority : Critical
High speed internet is recommended to be installed in the building for telephone and data. As the use is intended to be administrative in nature, it is recommended for improved telephone equipment as well as provide wifi for internet access by occupants if desired by the National Park Service.
All new cabling and equipment shall meet National Park Service latest standards for technology.

New equipment is recommended to accommodate new security systems for the building.

Security System
Priority : Critical
Provide new security system for the building. Security system is anticipated to include access control (card readers and monitoring of access), specific locations for security surveillance cameras at designated locations, and intrusion detection within secured spaces where sensitive equipment may be stored.

Lightning Protection System
Priority : Minor
There is no existing system. Based on the NFPA calculations for risk level associated with recommendations for lightning protection, the risk is above tolerable levels and a lightning protection system is recommended for this building.

Treatment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Treatment - Hazardous Materials

Priority : Critical
See the full Hazardous Materials Evaluation

by Landmark Environmental in the Appendix. Additional hazardous material testing should be conducted in conjunction with production of construction documents to fully investigate all areas and materials which will be impacted by construction activities.

Asbestos Assessment
The identified ACM should be abated (removed, enclosed, encapsulated, or properly managed) in accordance with all applicable federal, state and local regulations if renovation activities will disturb these materials or if demolition is planned for the structure. Abatement of ACM requires EPA-certified trained workers and permits. Abatement must include the appropriate controls and waste disposal at a certified landfill.

If ACM is to remain in-place, it is recommended that an Operations and Maintenance (O&M) Program be adopted. The O&M Program includes a listing of known asbestos within the buildings and procedures to minimize the potential for disturbance of ACM. O&M Programs are designed to present processes for communication and planning regarding ACM management, reduce the potential for unplanned impacts that may cause ACM disturbance or damage, consolidate and organize data collected related to ACM to facilitate planning and management, training requirements, notifications, and monitor the condition of ACM over time.

Test results confirmed ACM in the following locations:

- Joint compound on the drywall system throughout the building contains 2.1-2.2% chrysotile asbestos (3,500 SF). The composite drywall system (drywall, paper, and joint compound) contained less than 1% asbestos.
- White flue packing material associated with the gray pipe on the basement south wall contains 1.8% chrysotile asbestos (~1 SF).
- White window caulking on exterior windows contain 4% chrysotile asbestos (19 each).

Lead Containing Paint
Renovation activities that will impact LCP or LBP and lead-containing soils will require OSHA trained workers and safety programs. Personal protective equipment (PPE) will be required to handle these items until negative exposure assessments are completed that shows work activities do not result in exposures above the OSHA permissible exposure limit (PEL). Additionally, an appropriate waste management plan should be developed for the disposal of the LCP and lead-containing soil materials. Paint chips in soil that contain lead and lead-containing soils should be removed. Some lead components were identified as having paint in poor condition. All exterior LCP or LBP should be removed by OSHA-trained workers as part of rehabilitation work. On the interior, the LCP or LBP listed in poor condition should be repaired/removed by OSHA-trained workers as part of the renovation activities. Additionally, LCP and LBP should be removed by OSHA-trained workers at friction areas along the perimeter of interior doors, along with a portion of the jamb and stop – all contact areas at doors which are prone to chipping and abrasion. Any interior LCP or LBP not in friction areas which is in good condition and will not be impacted by renovation activities can be left in the building and encapsulated.

The following locations have LBP or LCP:

- Gray and red paint on concrete floors in

basement.
- Green and white paint on brick walls.
- Yellow and blue paint on brick wall/ ceiling in storm shelter.
- Red and gray paint on wooden stairs.
- Yellow paint on plaster walls.
- Gray paint on wood porch.
- White paint on wooden window casing.

Regulated Building Materials
Renovation activities that will impact RBM will require proper removal, disposal, and management. These materials must be removed prior to remodeling and then either reused, recycled, or properly disposed in full accordance with EPA and state regulations. Some of the RBMs identified in this inventory may be reused or recycled. Recycling programs exist for lights, light fixtures, bulbs and ballasts, aerosols, mercury switches and gauges, paints, oils, refrigerants, electrical wiring, empty metal containers, and empty plastic containers.

Biological Hazards
None identified at this time.

Equipment Building

Treatment and Use

The recommended treatment for the Equipment Building is rehabilitation. This allows for altering a building to adapt to changing or continuing uses while preserving the historic character. The building use has changed over the years and is anticipated to be changed again when NPS takes ownership. It was originally a four garage bay equipment building. The Coast Guard remodeled it to the current two garage bay and office configuration.

The exterior of the building currently has horizontal aluminum siding installed over the original wood shingle siding. Openings have also been modified on the first floor with two garage doors removed and the exterior entry door relocated. Interior configurations have been altered to accommodate first floor office space in the original garage bays.

A treatment workshop was conducted with NPS staff on April 3. 2020, to determine preferred treatment guidance for ABA access to the building and interior modifications to meet future use plans. The Equipment Building is anticipated to contain garage bays, office space and storage areas. Treatments incorporate work required for implementation of this plan. Where work on the interior will not be required, the general recommendation approach in this report is to repair damaged materials and finishes and leave undamaged interior surfaces in their current state whether they are historic or modern. Exterior treatments provide guidance for rehabilitating finishes to return the building to the historic appearance. Updates for life safety and code required work are also included in the treatments.

Treatment - Architecture

Architecture - Roofing
Priority : Serious
While much of the roofing is in fair condition, the connections with the aluminum siding at the gables and dormers are problematic. Hence the recommendation to replace all roofing in conjunction with the aluminum siding removal, carefully readdressing the flashing condition as it relates to the shingle cladding.

Remove all roofing and associated flashing, underlayments and accessories. Remove gutters.

Some water staining on upper floor ceiling materials indicate that past leaking is possible. With roofing removed, examine roof substrate in the areas of staining, likely near the dormer valleys. Where substrate is deteriorated, remove and replace in kind damaged material as well as any framing members that have been shown to be deteriorated in the course of this inspection. Estimate that 5% of substrate will require replacement.

Install new underlayment, battens, wood shingles and flashing. Provide pre-finished metal flashing with a high-performance finish. Consider installing fall protection when the roofing is replaced, see Structural section.

Provide all new gutters and downspouts. Provide downspout extensions to discharge water at least four feet from the foundation.

Architecture - Exterior Walls
Priority : Critical
Remove infill walls on north and east elevations as required for the reintroduced garage doors and man door.

Remove all aluminum siding, associated trims and soffit panels. Protect the historic light fixtures on the north elevation during this work.

Assess condition of the original wood shingles revealed by the siding removal. Replace sections of missing or damaged wood shingles in kind. Estimate 60% of shingle area requires replacement. Paint on shingle is lead based paint, see Hazardous Material section.

Historic wood trim and fascia at the end gables likely needs only to be refinished, while deterioration is likely at the dormers. Replace deteriorated elements in kind (estimate 15%) and sand and repaint all.

For wood window trim and sills, anticipate replacement or repair of deteriorated elements, which varies by exposure, at 20% overall. Sand and repaint all window trim and sills. Match historic trim profiles at new window on east elevation.

For wood casing and trim (at the existing man door and two overhead doors, anticipate replacement or repair of deteriorated elements at 50% overall. Match historic trim profiles at two reintroduced overhead doors and new man door on the east elevation.

At north elevation, refinish the wood trim around the historic light fixtures.

Architecture - Windows
Priority : Critical
At twelve Type A and B double-hung windows: remove windows for rehabilitation. Replace any broken panes in kind and provide all new glazing putty. Replace broken or missing sash chains. Lightly sand wood sash and mullions and paint. Install with new sealant at perimeter. Provide all new storm windows at each location.

Install a wood reproduction of a Type A window at the east elevation as indicated on the drawings. Provide tempered glazing in the window at the stair to the second floor.

At ten Type C windows: remove windows for rehabilitation. Replace any broken panes in kind and provide all new glazing putty. Replace broken or missing sash chains. Repair or replace cracked mullions Lightly sand wood sash and mullions and paint. Install with new sealant at perimeter. Provide all new storm windows that match the profile of the opening at each location.

Demolish the two vinyl Type D windows at the north elevation.

Original drawings and photographs show the windows at the first floor and gable ends of the second floor had louvered wood shutters. Shutters matching the historic should be installed as part of the exterior rehabilitation. Wood composite options should be considered for durability during design.

On the interior, install new two inch blinds at all first and second floor windows.

Architecture - Exterior Doors
Priority : Serious
Replace existing door and provide new door on east elevation. Provide wood stile and rail doors to match historic half-lite door, using archive drawings as documentation (Figure 1-25).

Install two new (10’-0” x 10’-0”) overhead doors in the historic locations at the north elevation. Door should match the historic configuration, paneled doors with glazing in the upper panels. At the two extant openings,

replace the existing flush panel doors with new doors in the historic configuration.

Architecture - Interior Finishes - 1st Floor
Priority : Minor
At the first floor, asbestos containing materials were detected in the 12"x12" floor tiles. Paint on the wooden walls is lead containing. See hazardous material section for additional detail.

Garage
Generally speaking, the wall finishes in this room are utilitarian but original. The objective is to preserve as much of this character as possible.

Moisture has infiltrated the south wall at the eastern window. Remove plywood and trim in the damaged area (6 sq ft), inspect and replace any deteriorated framing elements, and reinstall any salvageable plywood and trim. Replace any deteriorated plywood (estimate 4 sq ft), window trim and baseboard, including a section of missing baseboard, (6 lf) in kind, matching historic profiles.

Clean and repaint all wall surfaces matching sampled historic colors.

Hall and Stair, Office No. 1, Office No. 2, East Vestibule (new use: Storage / Meeting Room, Storage, Janitor and Stair)
Demolish all flooring and tile ceilings throughout these spaces. Demolish the non-historic interior partitions along with the three doors located in these walls. At the west wall to the garage and all exterior walls, which are to remain, remove all veneer paneling. Provide new batt insulation at exterior walls while finishes are removed.

At the east and south walls, which are to remain, remove all veneer paneling. Protect and retain the concrete curb at the base of these walls. Provide new batt insulation at exterior walls while finishes are removed.

Demolish the non-historic north wall and east wall that creates the vestibule. Demolish the three doors located in these walls.

Construct new walls to the north (see plan) to create the new Storage/Meeting Room, storage closet and janitor's closet. Also frame in a closet under the stairs.

For wall finish throughout these spaces, provide v-groove jointed plywood panels; paint. Install continuous 1x4 chair rail trim at all walls; this should align with the historic sill aprons in the office. At walls that do not have the historic concrete curb, install molded 3-1/2" baseboard trim to match that in the garage. At the new window and door in the east wall, trim with 1x6 at head and jamb.

Provide new (3'-0" x 6'-8") doors with the same trim to the office, restroom and three closets.

At the stair, remove the carpet from the stair and refinish the historic treads, risers and stringers. Provide slip-resistant tread covers. Remove the existing handrail and provide new wall mounted galvanized pipe handrails (a nod to the historic condition) that are code and ABAAS compliant.

At floors throughout, expose concrete slab with a new ground finish.

Leave ceilings exposed to underside of floor boards.

Wall and ceiling assembly at the new Storage / Meeting Room to vary from the rest of

theses spaces. At the west and south walls, create a fire barrier assembly to separate the potential storage room from other occupancies. Provide two-hour fire resistance rated wood stud construction that includes or allows application of the finish plywood to either side.

Provide a 90 minute fire resistant rated door in the south wall.

At the north and east walls, provide v-groove jointed plywood panels as wall finish; paint. Install trim elements as previously described at new garage doors and man door.

At floor, expose concrete slab with a new ground finish.

At ceiling, provide a two-hour fire resistant rated construction at the existing joists.

Office No. 3
Remove paneling at walls and acoustic tiles and grid from the ceiling. Inspect areas of staining (near the south window) for moisture damage to framing elements; replace any deteriorated elements (estimate 4 sq ft).

Provide v-groove jointed plywood panels as wall finish; paint. Install trim elements as previously described, aligning chair rail with historic apron at window sills.

Expose ceiling to underside of floor boards.

Restroom
Remove FRP and substrate from walls and the acoustic tiles and grid from the ceiling. Inspect areas of staining for moisture damage to framing elements; replace any deteriorated elements (estimate 8 sq ft).

Install new-moisture-resistant gypsum board at all walls and at ceiling. Provide new FRP or other moisture resistant materials to five feet above the finish floor.

Install grab bars and accessible accessories.

Architecture - Interior Finishes - 2nd Floor
Priority : Minor
Paint on the wooden walls is lead containing. See hazardous material section for additional detail.

Conference Room (new use: Seasonal Staff)
Demolish all flooring, veneer paneling and ceiling tile. Demolish the wood railing at the stair. Protect and retain the historic wood window trim.

Provide new batt insulation at exterior walls and attic while finishes are removed.

Refinish exposed floor boards.

For wall finish through out these spaces, provide v-groove jointed plywood panels and the same base as used below; paint. Refinish wood trim at windows.

Install a galvanized pipe rail guard rail at the opening to the stairs.

At the ceiling, install a new acoustic ceiling tile system.

Store Room (new use: Ranger Offices)
Protect and retain the historic wood window trim.

Remove historic plywood panels at walls and ceiling to replace batt insulation; replace plywood and paint. Alternatively, if a more finished look is desired, install gypsum board finish. Install new baseboards, and paint all

trim elements.

Refinish exposed floor boards, replacing boards at patched locations (8 sq ft).

Treatment - Structural

Structural - Foundation
Priority: Minor
Once the roof drainage has been directed away from the structure per architectural recommendations, no structural work is required.

Consider minimally heating the building to prevent freeze-thaw heaving of the foundations until the building is fully occupied.

Structural - Floor & Ceiling Framing
Priority : Serious
Encapsulate or abate the exposed International Orange paint on the second floor steel beam.

Remove and replace the existing 6,000 lb chainfall with one that is rated for 2,000 lbs to match the capacity of the U-bolt attachment per the original design specifications.

Structural - Roof Framing
Priority : N/A
No structural recommendations for the roof framing at this time.

During the next reroofing project, consider installing fall protection anchors. At the anchor points, locally strengthen the roof framing with sisters and blocking

Structural - Wall Framing
Priority : N/A
No structural recommendations for the wall framing at this time.

Structural - Lateral System
Priority : N/A
No structural recommendations for the lateral force resisting system at this time.

Treatment - Mechanical

Mechanical - System - Heating
Priority : Serious
The existing heating system in the building is all electric heat. The non-garage areas of the building have electric baseboard heaters while the garage has electric infrared heaters.

The heating system will need to be modified to accommodate the new walls and usage of the building. The main level will need to have baseboard heaters removed/relocated from the north side of the building to accommodate the new garage doors. Provide new electric baseboard heaters for the new Storage/ Meeting room on the north side with the new garage doors. Existing infrared heaters in the garage shall remain.

Mechanical - System - Cooling
Priority : N/A
There is no mechanical cooling system in the building today. The northern location of the building facility and cooler evenings provide for the building to be cooled off at night.

Consider the installation of ceiling fans in the upper level to provide better circulation of air in the summer time.

Mechanical - System - Ventilation
Priority : Critical
Existing exhaust fan in bathroom is operational and no changes needed.

Outside air ventilation is provided via operable openings including windows and doors. All windows shall be made operational to meet code required ventilation.

Treatment - Plumbing

Plumbing - System - Water
Priority : Critical
There is a recently completed restroom on the main level however, there is no active water to the restroom. Provide a new 1" water line into the building Janitor Room. Provide a new reduced pressure backflow preventer. Route new cold water line to the bathroom and connect to water line. Provide cold water connection to mop sink. Provide a 5-gallon tank type water heater in the Janitor's room for the mop sink. Existing restroom has a water heater under the sink that needs to be connected once water is provided to the building.

Plumbing - System - Sanitary/Vent
Priority : Critical
There is no active sanitary line for the building. Further investigation shall be done to determine where the previous septic system was located and to make the system operational.

Plumbing - System - Propane
Priority : N/A

Treatment - Fire Protection

Fire Protection - General Description
Priority : Critical
There is no existing fire protection system within the building today. Provide a new fire sprinkler system in compliance with NFPA 13 (National Fire Protection Association).

Provide a new 4" fire line into the Janitor's Room of the building. Provide with a new double-check backflow preventer and required flow alarms, fire department connections, and pressure gauges. Route the new lines throughout the main level and upper level. The upper level lines shall be routed exposed so as to be in the heated section of the building.

Treatment - Electrical

Electrical Service and Panels
Priority : Critical
A new electrical service should be provided as the existing electrical service has nearly reached the end of its rated life. The new service shall be 200A, 240/120V 1-Phase. The new service is recommended to be underground from the utility pole to the same location of the existing disconnect, which will also be replaced with the new service and provided with a new exterior disconnect and metering equipment. A new grounding system shall be provided.

It was also noted that this area has frequent power outages, and considerations for generator backup are desired. Two options for generator backup considerations are anticipated for this site: One central generator to support the Station Dwelling (HS-18), Officer in Charge Dwelling (HS-19),Harbor of Refuge Dwelling (HS-20) and Equipment Building or a dedicated generator per building.

For the central generator, a 80kW generator, with a 48-hour backup (500 gallon propane tank) is recommended, and would be located on the site (exterior). Refer to Cultural Landscape Report for exterior location considerations.

For a dedicated generator option for this building, in lieu of the central generator, a 16kVA generator, with a 48-hour backup (100 gallon propane tank) would be located exterior of the Equipment Building. Refer to Cultural Landscape Report for exterior location considerations. Diesel may also be considered as a fuel option.

Either generator option is intended to provide full back up, anticipating some load shedding may take place, to support the facility during the frequent outages.

Electrical Distribution System
Priority : Critical
The electrical distribution is in critical condition. For the wiring and raceways, the mixed vintages, as well as what conditions could be observed do not meet NEC requirements, nor the requirements of the National Park Service, and therefore all existing electrical raceways, wiring, devices, lighting, sub panels, and wiring are recommended to be replaced with new. The existing layouts are also inadequate to support the new anticipated use.

Ground fault and arc fault protection shall be installed per NEC requirements.

As the anticipated use for the Equipment Building is transitioning from a general storage equipment facility with offices to a new office/administrative use, including new uses on both the main level and second level. New spaces are anticipated to include two bay garage space, flexible storage/meeting room with reintroduced garage doors to the exterior, a new ABAAS Restroom and office. Automatic garage door openers for the four garage doors shall be provided for the users, provided with anticipated 120/20A connection per opener. The new spaces on the upper level/2nd floor are anticipated to include seasonal staff open office workstation space, and ranger offices. Receptacles shall be provided to meet the layouts as required for equipment workstation layouts.

Raceways will be installed in EMT conduit and concealed to the greatest extent possible. Any un-used wiring and conduit shall be removed from the building.

Lighting, Emergency Lighting, and Exit Signs
Priority : Critical
A full review of all existing fixtures will be coordinated with park staff to determine if any historic fixtures are to be refurbished and reused. The three unique exterior waterproof wall sconces on the front of the building are anticipated to be historic, and shall be retained per the Park's desire to retain. It is recommended that they be cleaned, revitalized, and preserved as required. It is anticipated however, that all lighting inside will be replaced with new energy efficient LED lighting.

Interior lighting controls will be by manual on/auto off after 20 minutes, provided via vacancy sensor local sensor devices accompanied by local switching means. Exterior lighting will be controlled via timeclock or photocell.

All new exterior lighting will be Energy Efficient Dark Sky Compliant.

Fire Alarm & Detection System
Priority : Critical
Per the requirements of National Park Service for Historic structures, a collaborative discussion between stakeholders (including AHJ) to provide best protection to the building with considerations to the historic fabric - may/may not include fire protection

systems. It is however recommended that a full code compliant monitored fire alarm system will be installed. Arc Fault Circuit Interrupters (AFCI) (Section 200 of NFPA 70) shall be provided and a Smoke detectors and notification shall be placed per code and alarm to an exterior monitoring site.

Tele/Data Communications System
Priority : Critical
High speed internet is recommended to be installed in the building for telephone and data. As the use is intended to be office/ administrative in nature, it is anticipated that tele/data will be required for all workstation locations and offices, as well as for general use in garage space. Wifi for internet access by users is also recommended. All new cabling and equipment shall meet National Park Service latest standards for technology. New equipment is recommended to accommodate security system.

Security System
Priority : Critical
A security system should be installed at the building. System needs should be coordinated with Ranger requirements to ensure sufficient level of protection is provided. Security system is anticipated to include access control (card readers and monitoring of access), specific locations for security surveillance cameras at designated locations, and intrusion detection within secured spaces where sensitive equipment may be stored.

Lightning Protection System
Priority : Minor
There is no existing system. Based on the NFPA calculations for risk level associated with recommendations for lightning protection, the risk is above tolerable levels and a lightning protection system is recommended for this building.

Treatment - Site

Site Context
See the 2020 Cultural Landscape Report for more detailed site information.

Treatment - Hazardous Materials

Priority : Critical
See the full Hazardous Materials Evaluation by Landmark Environmental in the Appendix. Additional hazardous material testing should be conducted in conjunction with production of construction documents to fully investigate all areas and materials which will be impacted by construction activities.

Asbestos Assessment
The identified ACM should be abated (removed, enclosed, encapsulated, or properly managed) in accordance with all applicable federal, state and local regulations if renovation activities will disturb these materials or if demolition is planned for the structure. Abatement of ACM requires EPA-certified trained workers and permits. Abatement must include the appropriate controls and waste disposal at a certified landfill.

If ACM is to remain in-place, it is recommended that an Operations and Maintenance (O&M) Program be adopted. The O&M Program includes a listing of known asbestos within the buildings and procedures to minimize the potential for disturbance of ACM. O&M Programs are designed to present processes for communication and planning regarding ACM management, reduce the potential for unplanned impacts that may cause ACM disturbance or damage, consolidate and organize data collected related to ACM to facilitate planning and

management, training requirements, notifications, and monitor the condition of ACM over time.

Test results confirmed ACM in the following locations:

- Fire door located at the south entrance of the garage is presumed to contain asbestos. It was not sampled to maintain the integrity of the door.
- The mastic associated with white 12-inch by 12-inch floor tiles with gray and tan speckles contains chrysotile asbestos (50 SF).

Lead Containing Paint

Renovation activities that will impact LCP or LBP and lead-containing soils will require OSHA trained workers and safety programs. Personal protective equipment (PPE) will be required to handle these items until negative exposure assessments are completed that shows work activities do not result in exposures above the OSHA permissible exposure limit (PEL). Additionally, an appropriate waste management plan should be developed for the disposal of the LCP and lead-containing soil materials. Paint chips in soil that contain lead and lead-containing soils should be removed. Some lead components were identified as having paint in poor condition. All exterior LCP or LBP should be removed by OSHA-trained workers as part of rehabilitation work. On the interior, the LCP or LBP listed in poor condition should be repaired/removed by OSHA-trained workers as part of the renovation activities. Additionally, LCP and LBP should be removed by OSHA-trained workers at friction areas along the perimeter of interior doors, along with a portion of the jamb and stop – all contact areas at doors which are prone to chipping and abrasion. Any interior LCP or LBP not in friction areas which is in good condition and will not be impacted by renovation activities can be left in the building and encapsulated.

The following locations have LBP or LCP:

- Brown and gray paint on the concrete foundation in the interior.
- Gray paint on wooden walls.
- White paint on wooden walls.
- Brown paint on wooden window frames.
- White paint on exterior wood siding.

Regulated Building Materials

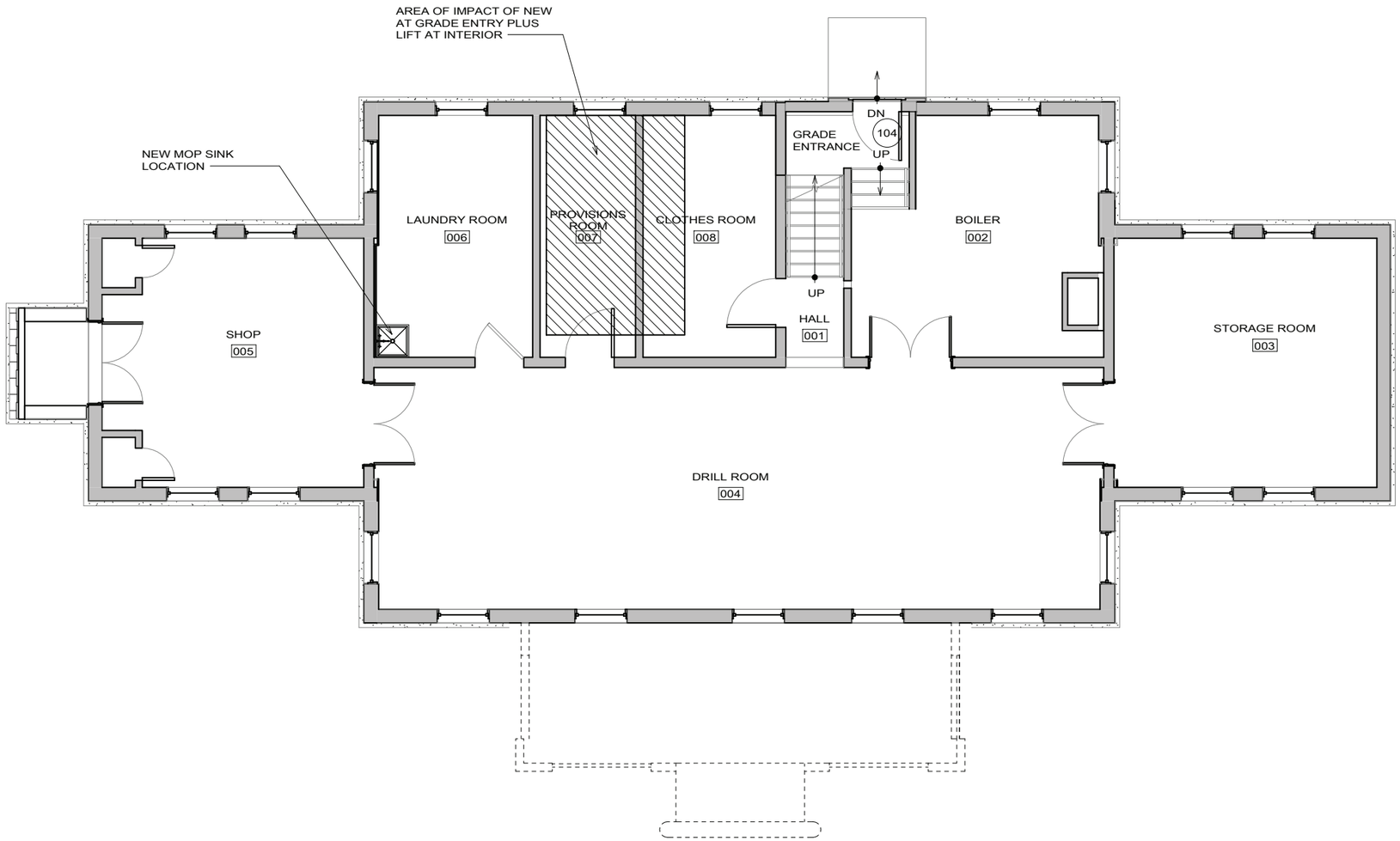
Renovation activities that will impact RBM will require proper removal, disposal, and management. These materials must be removed prior to remodeling and then either reused, recycled, or properly disposed in full accordance with EPA and state regulations. Some of the RBMs identified in this inventory may be reused or recycled. Recycling programs exist for lights, light fixtures, bulbs and ballasts, aerosols, mercury switches and gauges, paints, oils, refrigerants, electrical wiring, empty metal containers, and empty plastic containers.

RBM found throughout the building were fluorescent light tubes and compact fluorescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire-suppressant chemicals; a 1-gallon bucket of paint which could contain lead or other chemicals; and 1-gallon of waste oil.

Biological Hazards

None identified at this time.

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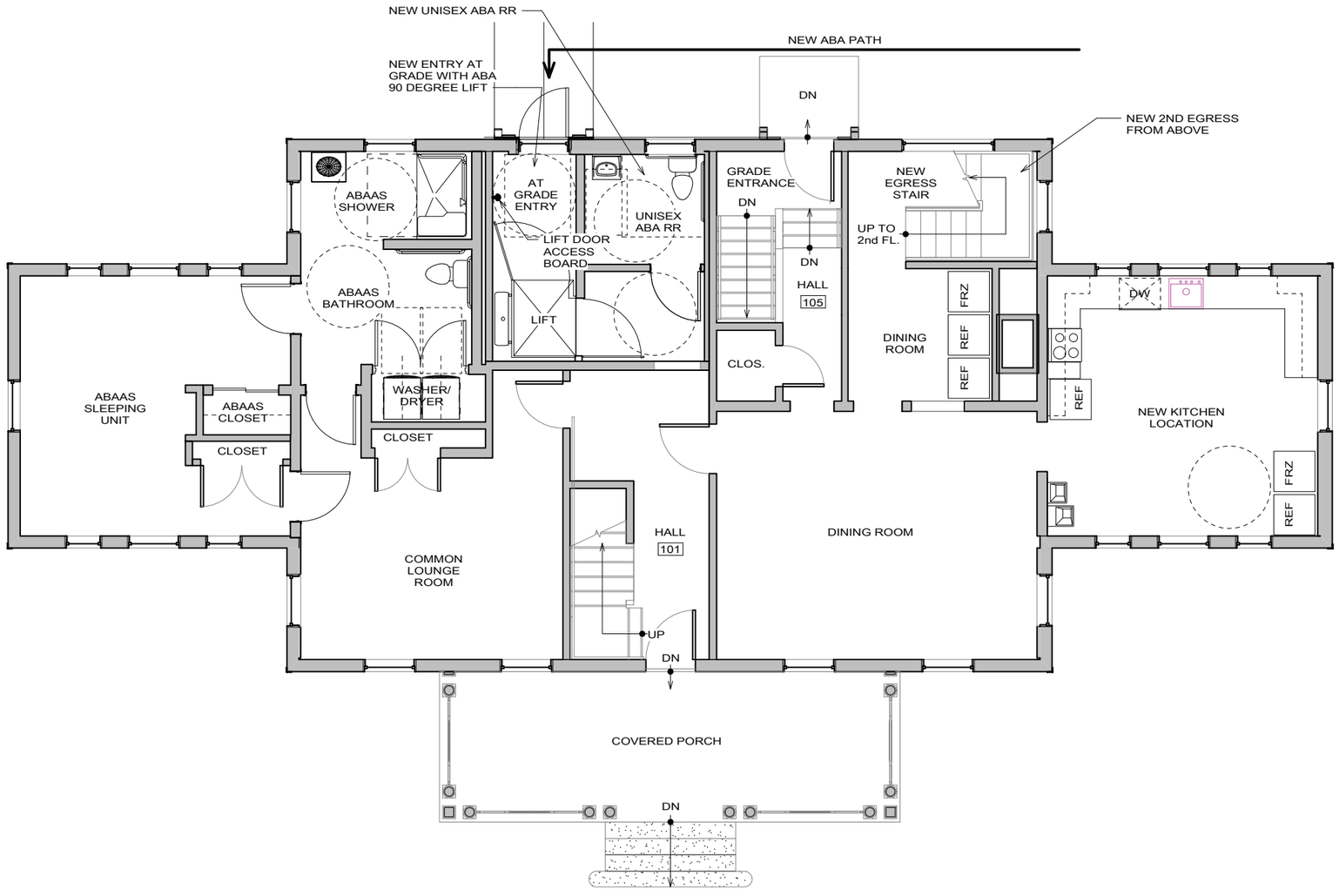
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STATION DWELLING - MAIN FLOOR PLAN
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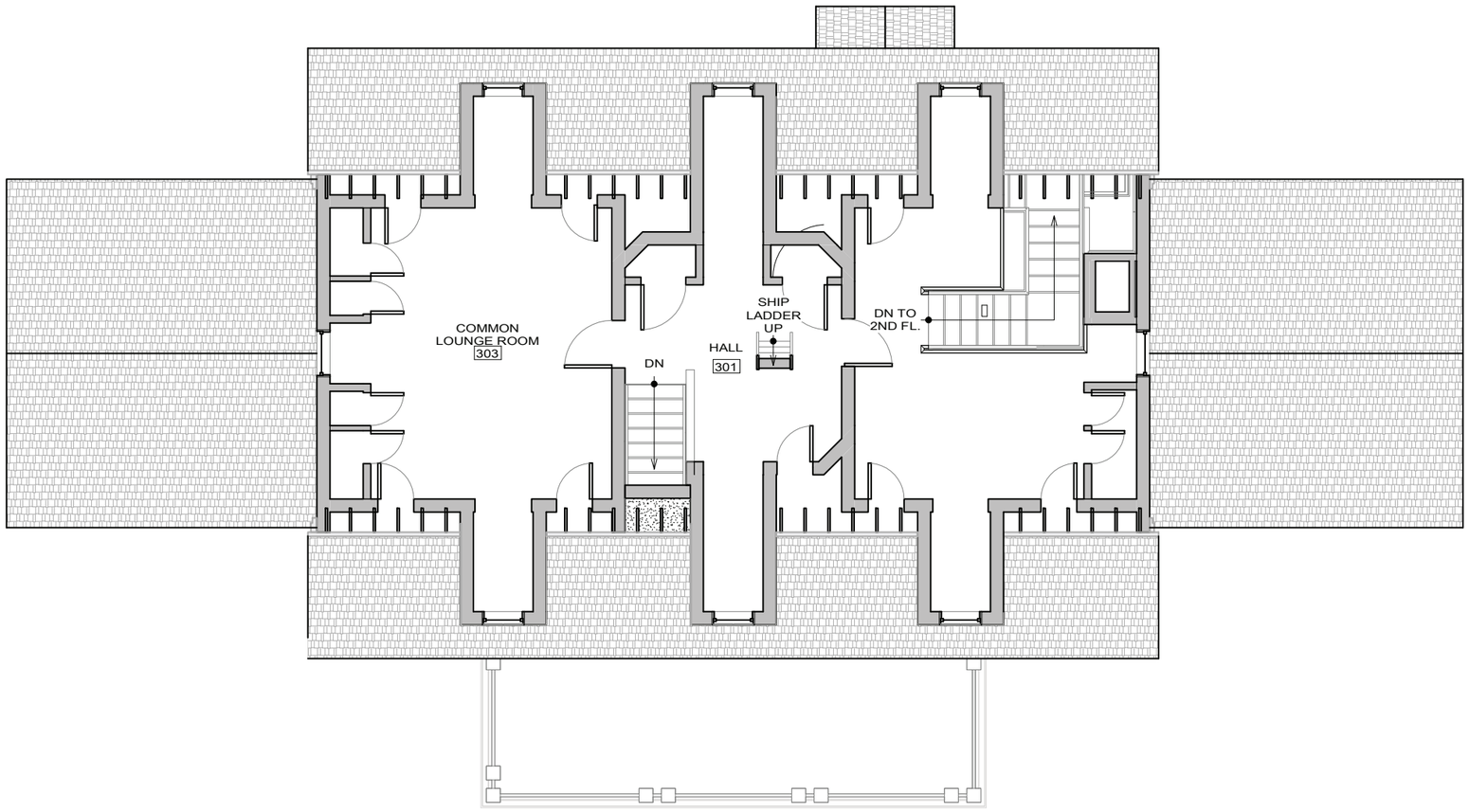
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STATION DWELLING - 3RD FLOOR PLAN
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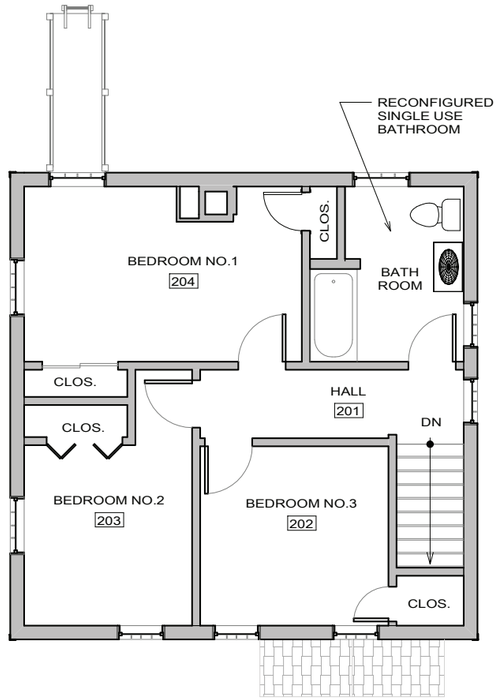
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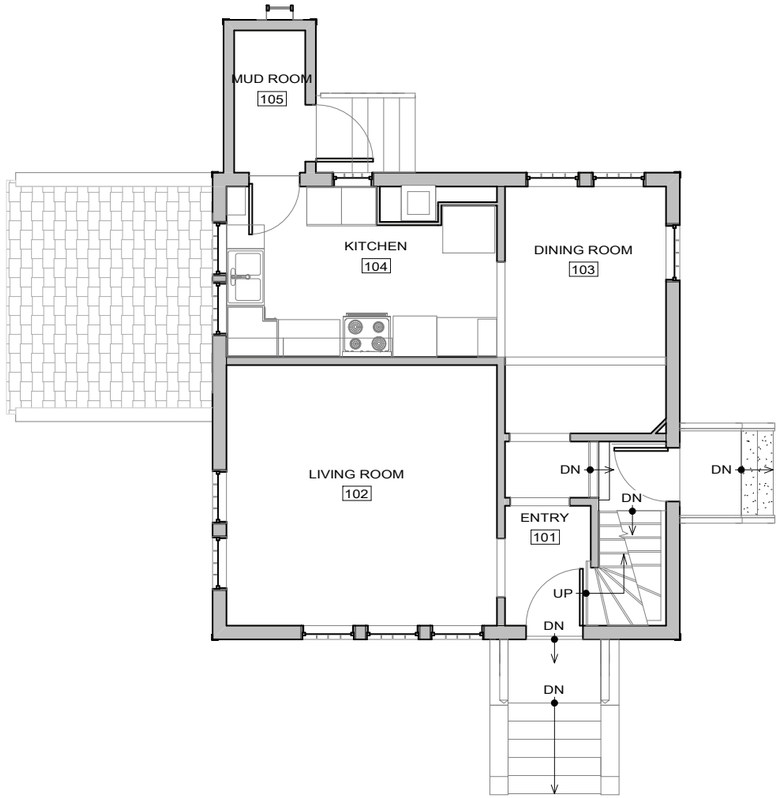
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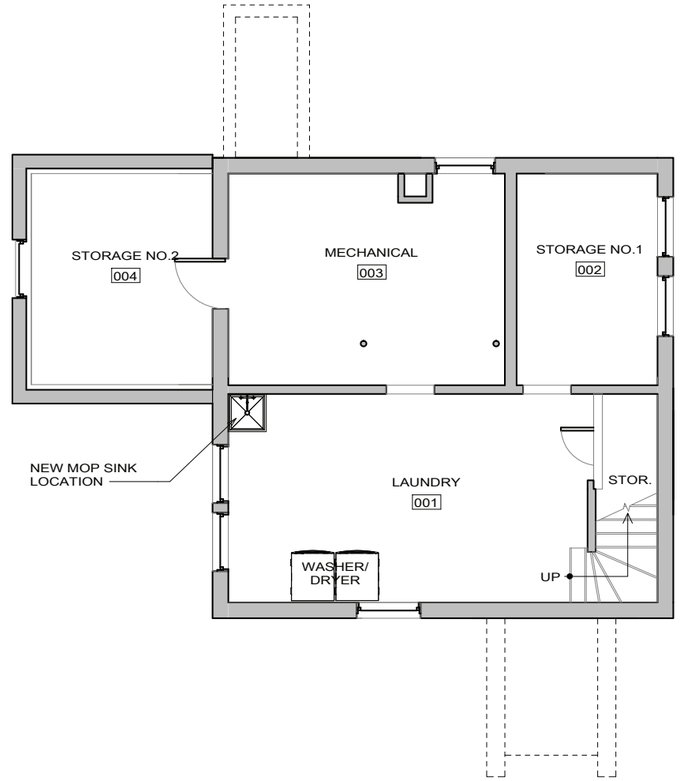
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3 A2.1P — O.I.C. DWELLING - UPPER FLOOR PLAN - PREFERRED OPTION

SCALE Ⓐ

2 A2.1P — O.I.C. DWELLING - MAIN FLOOR PLAN - PREFERRED OPTION

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1 A2.1P — O.I.C. DWELLING - BASEMENT FLOOR PLAN - PREFERRED OPTION

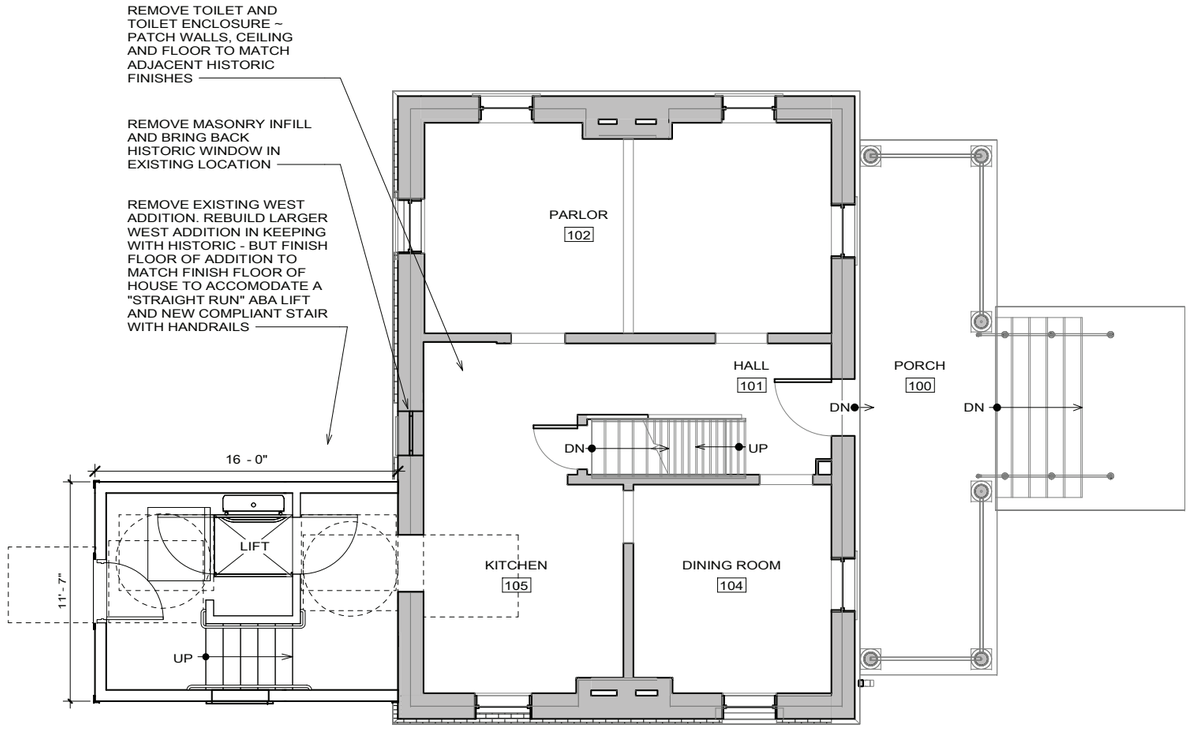
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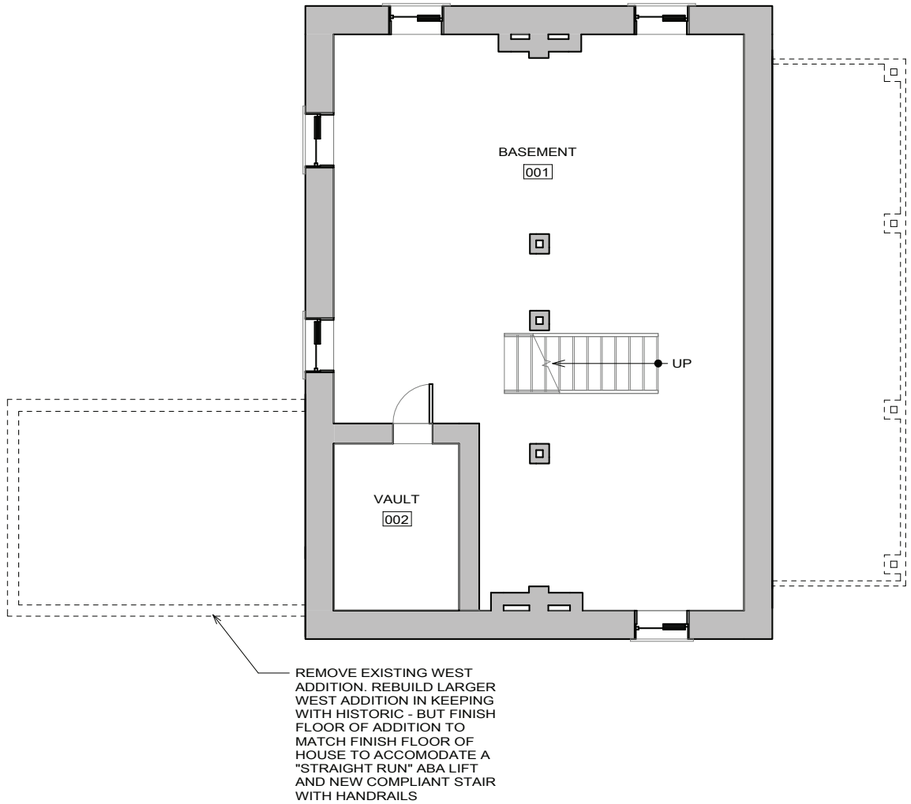
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HARBOR OF REFUGE DWELLING - MAIN FLOOR PLAN - PREFERRED OPTION

2 A3.1P SCALE A



HARBOR OF REFUGE DWELLING - BASEMENT FLOOR PLAN - PREFERRED OPTION

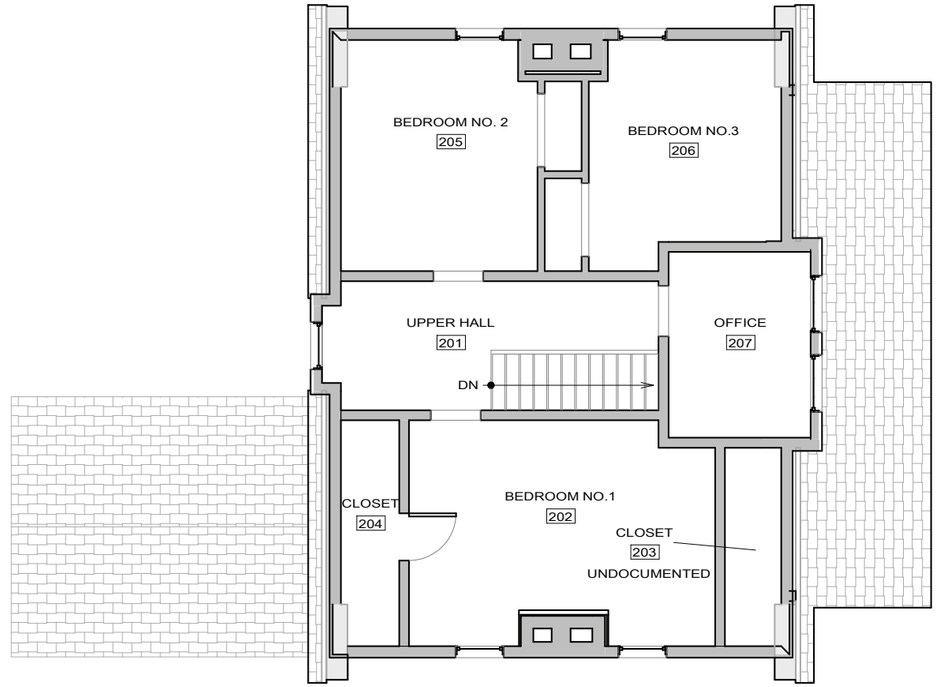
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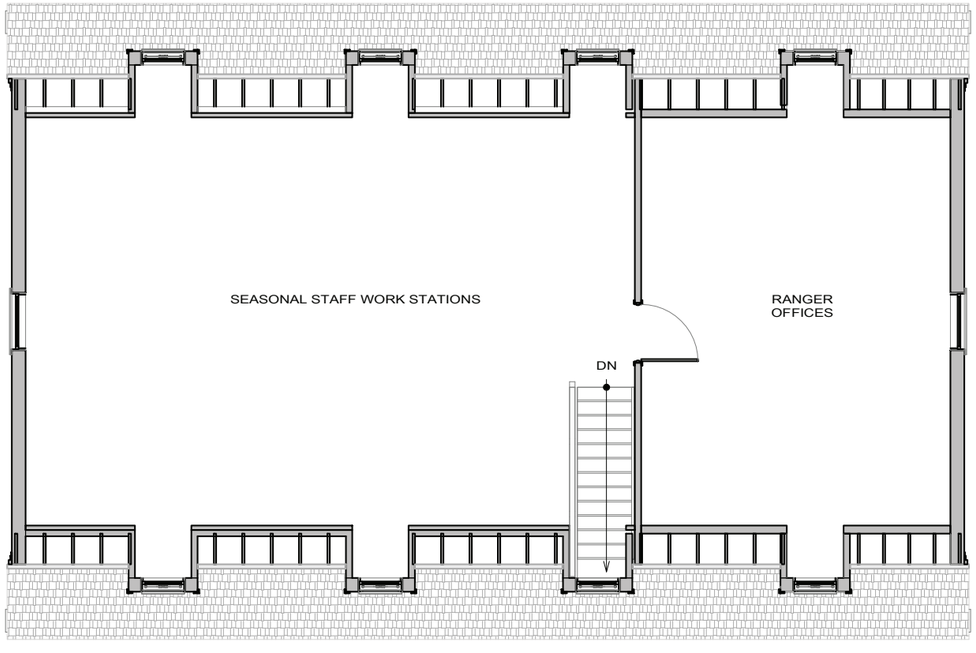
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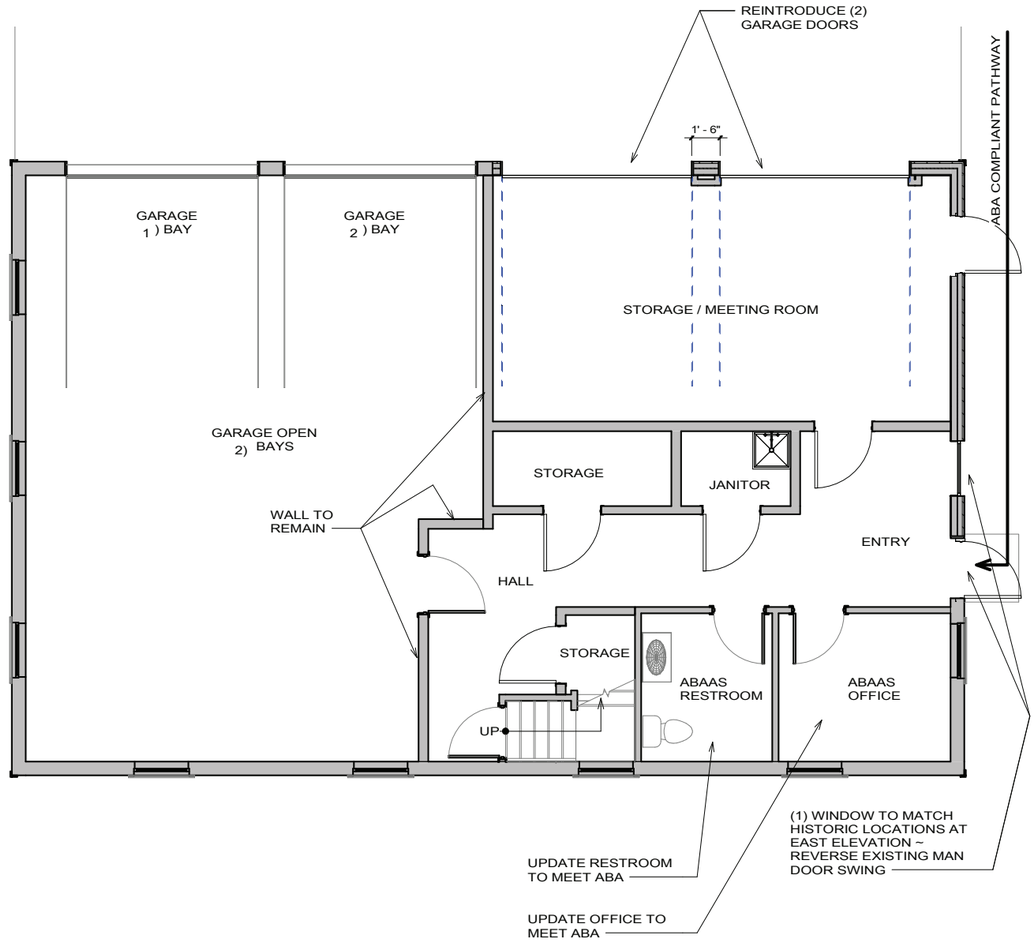
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2 A4.1P EQUIPMENT BUILDING - 2ND FLOOR PLAN - PREFERRED OPTION

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1 A4.1P EQUIPMENT BUILDING - MAIN FLOOR PLAN - PREFERRED OPTION

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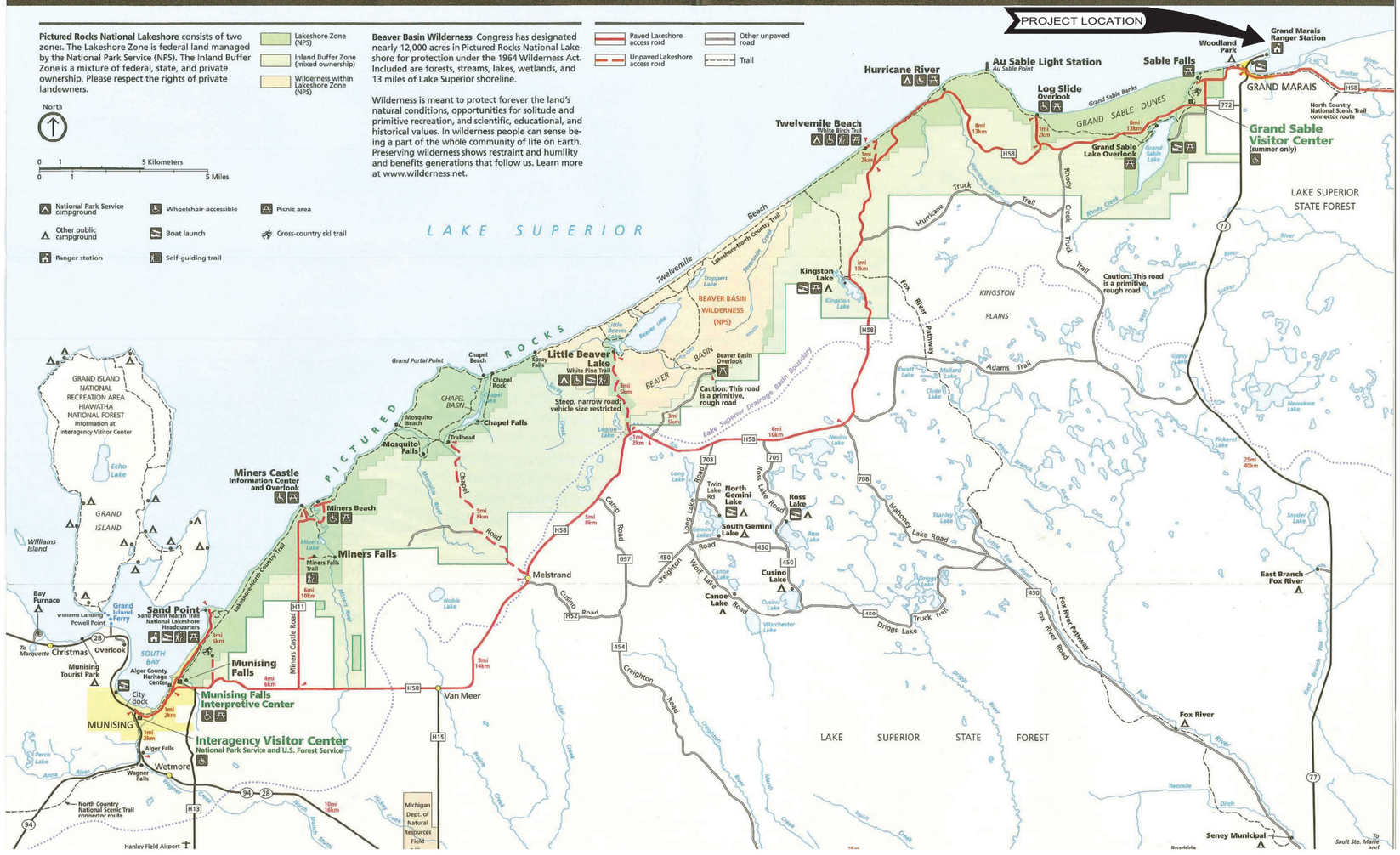
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Appendix

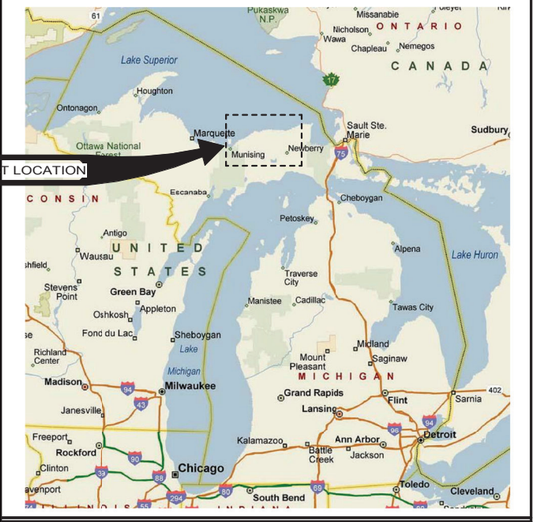
Appendix A - Existing Condition Plans
Appendix B - Cost Estimate
Appendix C - Live Load Capacity Chart
Appendix D - Hazardous Material Test Results
Appendix E - Director's Order 58 Historic Property Assessment Matrix
Appendix F - Bibliography
Appendix G - Paint Sample Analysis

Appendix A. Existing Condition Plans

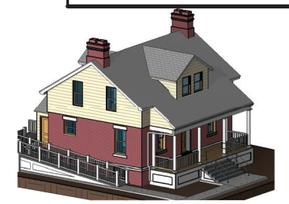
Exploring Pictured Rocks



PROJECT LOCATION



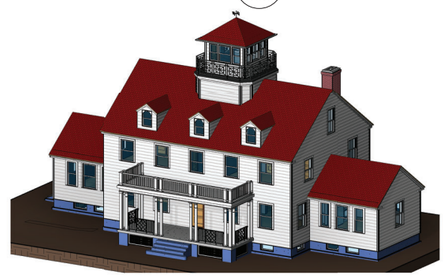
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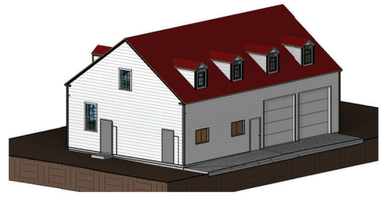
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O.I.C. DWELLING
2 G0.0



STATION DWELLING
3 G0.0



EQUIPMENT BUILDING
4 G0.0

PICTURED ROCKS NATIONAL LAKESHORE

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

PMIS 227908

ARCHITECT
ANDERSON HALLAS ARCHITECTS, PC
GOLDEN, CO 80401

Mark	Sheet	REVISION	Date	Initial

QUALITY DESIGN CERTIFICATION

- ☐ Prepared in Accordance with Preliminary Design (Title I OR Drawing No.
- ☐ Variance from Preliminary Design Title I Approved by Superintendent on OR Date
- ☐ Construction Drawing Not Preceded by Preliminary Design (Title I

Project Manager Date

EXISTING CONDITIONS

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
DENVER SERVICE CENTER

TITLE OF DRAWING
GRAND MARAIS USCG STATION
LOCATION WITHIN PARK
GRAND MARAIS HARBOR
NAME OF PARK
PICTURED ROCKS NATIONAL LAKESHORE

REGION	COUNTY	STATE
MIDWEST	ALGER	MICHIGAN

DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 1 OF 33

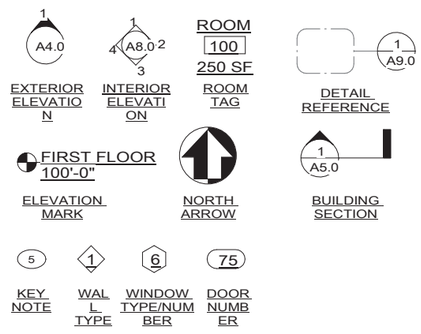
BASIC DATA: USGS TOPO MAP; PARK MINI FOLDER 1991; COVER SHEET REVISED REDRAWN 8/94. UPDATED 11/98. SGS.

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ABBREVIATIONS

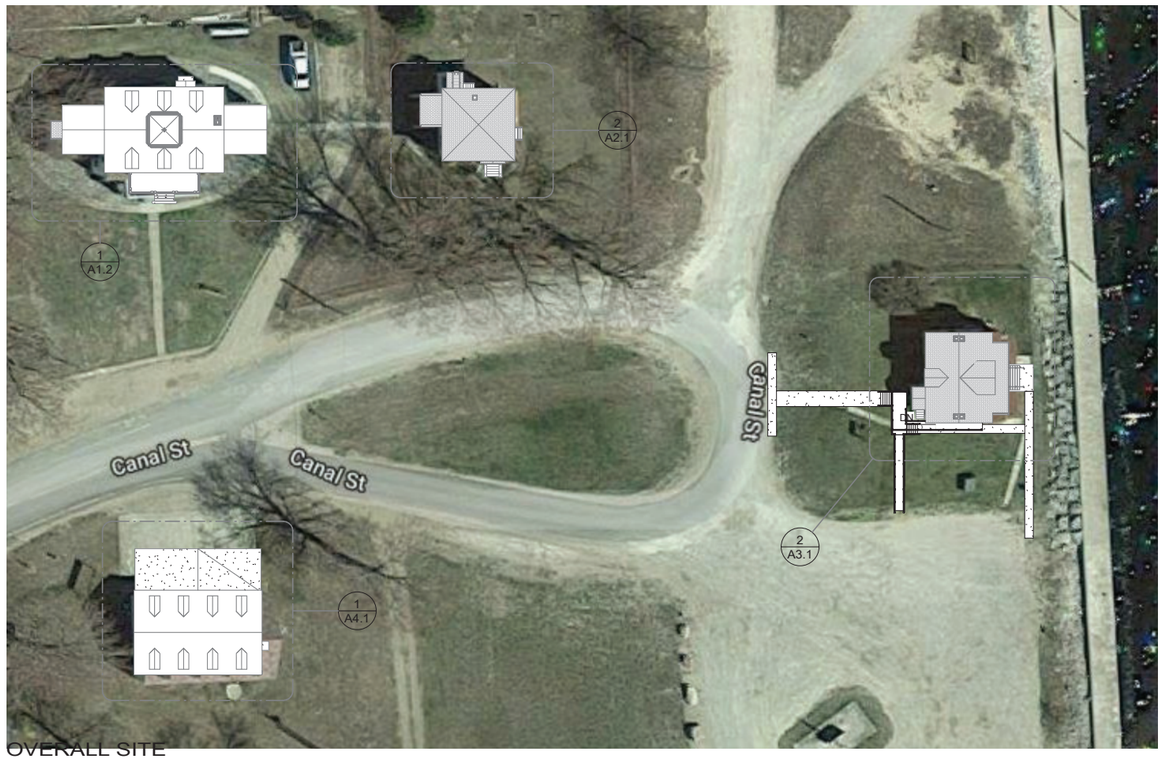
#	POUND(S) or NUMBER
&	AND
<	ANGLE
@	AT
A/V	AUDIO VISUAL
ABA	AMERICAN BARRIERS ACT
ABV	ABOVE
ACM	ASBESTOS CONTAINING MATERIAL
ACT	ACCOUSTICAL CEILING TILE
ADD	ADDENDUM
ADJ	ADJACENT or ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ALT	ALTERNATE
APPROX	APPROXIMATE(LY)
ARCH	ARCHITECTURAL
ASPH	ASPHALT
B.O.	BOTTOM OF
BLDG	BUILDING
BLKG	BLOCKING
BR	BACKER ROD
BTWN	BETWEEN
C.O.	CONTRACTING OFFICER
CAB	CABINET
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTBB	CEMENTITIOUS TILE BACKER BOARD
CTR	CENTER
DBL	DOUBLE
DEMO	DEMOLITION
DET	DETAIL
DF	DRINKING FOUNTAIN
DIAM	DIAMETER
DIM	DIMENSION
DN	DOWN
DS	DOWNSPOUT
<E>	EXISTING
E	EAST
EA	EACH
EG	FOR EXAMPLE
ELEC	ELECTRICAL
ELEV	ELEVATION
EMER	EMERGENCY
ENGR	ENGINEER
EQ	EQUAL
EQP	EQUIPMENT
ETR	EXISTING TO REMAIN
EXT	EXTERIOR
FACP	FIRE ALARM CONTROL PANEL
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FIN	FINISH(ED)
FIXT	FIXTURE
FLR	FLOOR(ING)
FO	FACE OF
FP	FIRE PROTECTION
FRP	FIBERGLASS REINFORCED PANEL(ING)
FT	FEET
FTG	FOOTING
FURR	FURRING
GA	GAUGE OR GYPSUM ASSOCIATION
GALV	GLAVANIZED
GC	GENERAL CONTRACTOR
GD	GRADE
GL	GLASS or GLAZING
GND	GROUND
GWB	GYPSUM WALLBOARD
HM	HOLLOW METAL
HAZMAT	HAZARDOUS MATERIAL
HDR	HEADER
HDW	HARDWARE
HORIZ	HORIZONTAL
HT	HEIGHT
HVAC	HEATING, VENTILATION and AIR CONDITIONING
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
INFO	INFORMATION
INS	INSULATION or INSULATED
INT	INTERIOR
JT	JOINT
LAV	LAVATORY
LIN	LINOLEUM
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MEP	MECHANICAL, ELECTRICAL and PLUMBING
MFG	MANUFACTURING
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTD	MOUNTED
MTL	METAL
<N>	NEW
N	NORTH
NA	NOT APPLICABLE
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OSB	ORIENTED STRAND BOARD
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLUMB	PLUMBING
PT	PAINT
PTD	PAINTED
PWD	PLYWOOD
QT	QUARRY TILE
RAD	RADIUS
RB	RUBBER BASE
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REF	REFER TO or REFERENCE
REINF	REINFORCED
RELOC	RELOCATE(D)
REQ	REQUIRED
REV	REVISE, REVISED or REVISION
RM	ROOM
RO	ROUGH OPENING
RS	ROUGH SAWN
S)	SEALANT
S	SOUTH
SCHED	SCHEDULE
SF	SQUARE FEET
SHTG	SHEATHING
SIM	SIMILAR
SOG	SLAB ON GRADE
SPEC	SPECIFICATION(S)
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STN	STAIN
STRUC	STRUCTURE or STRUCTURAL
T)	TEMPERED
T&G	TONGUE AND GROOVE
T.O.	TOP OF
TD	THRESHOLD
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
VB	VAPOR BARRIER
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VIF	VERIFY IN FIELD
VIN	VINYL
VTR	VENT THROUGH ROOF
W	WEST
W/	WITH
W/O	WITHOUT
WD	WOOD
WIN	WINDOW

SYMBOLS



INDEX

SHEET #	SUB. SHEET	SHEET NAME
GENERAL		
1	G0.0	COVER SHEET
2	G0.1	GENERAL INFORMATION & INDEX
ARCHITECTURAL		
3	A1.0	STATION DWELLING - BUILDING ISO's
4	A1.0.1	STATION DWELLING - BUILDING ISO's
5	A1.1	STATION DWELLING - BASEMENT FLOOR PLAN
6	A1.2	STATION DWELLING - MAIN FLOOR PLAN
7	A1.3	STATION DWELLING - 2ND FLOOR PLAN
8	A1.4	STATION DWELLING - 3RD FLOOR AND CUPOLA PLANS
9	A1.5	STATION DWELLING - ROOF PLAN
10	A1.6	STATION DWELLING - EXTERIOR BUILDING ELEVATIONS
11	A1.7	STATION DWELLING - EXTERIOR BUILDING ELEVATIONS
12	A1.8	STATION DWELLING - EXTERIOR BUILDING ELEVATIONS
13	A1.9	STATION DWELLING - BUILDING SECTIONS
14	A1.10	STATION DWELLING - BUILDING SECTION
15	A1.11	STATION DWELLING - BUILDING SECTION
16	A2.0	OFFICER IN CHARGE DWELLING - BUILDING ISO's
17	A2.1	OFFICER IN CHARGE DWELLING-BASEMENT AND MAIN FL. PL.
18	A2.2	OFFICER IN CHARGE DWELLING - UPPER AND ROOF PLANS
19	A2.3	OFFICER IN CHARGE DWELLING-EXTERIOR BUILD. ELEV.
20	A2.4	OFFICER IN CHARGE DWELLING-EXTERIOR BUILD. ELEV.
21	A2.5	OFFICER IN CHARGE DWELLING - BUILDING SECTIONS
22	A3.0	HARBOR OF REFUGE DWELLING - ISO's
23	A3.1	HARBOR OF REFUGE DWELLING - BASE AND MAIN FL. PL.
24	A3.2	HARBOR OF REFUGE DWELLING - UPPER FL. AND ROOF PL.
25	A3.3	HARBOR OF REFUGE DWELLING - EXT. BUILDING ELEV.
26	A3.4	HARBOR OF REFUGE DWELLING - EXT. BUILDING ELEV.
27	A3.5	HARBOR OF REFUGE DWELLING - BUILDING SECTIONS
28	A4.0	EQUIPMENT BUILDING - BUILING ISO's
29	A4.1	EQUIPMENT BUILDING - MAIN FLOOR AND UPPER PLANS
30	A4.2	EQUIPMENT BUILDING - ROOF PLAN
31	A4.3	EQUIPMENT BUILDING - EXTERIOR BUILDING ELEVATIONS
32	A4.4	EQUIPMENT BUILDING - EXTERIOR BUILING ELEVATIONS
33	A4.5	EQUIPMENT BUILDING - BUILDING SECTIONS



1 G0.1 OVERALL SITE

PRELIMINARY 100 % EXIST. COND. NOT FOR CONSTRUCTION	DESIGNED: KC CADD: DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. G0.1	TITLE OF SHEET GENERAL INFORMATION & INDEX GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 2 OF 33

5/1/2020 6:41:16 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 A1.0 STATION DWELLIN

N.T.S.



2 A1.0 STATION DWELLING -ISO-2

N.T.S.

SCALE (A) 6 3 0 6

SCALE OF INCH

PRELIMINARY 100 % EXIST. COND. NOT FOR CONSTRUCTION	DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A1.0	TITLE OF SHEET STATION DWELLING - BUILDING ISO s GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 3 OF 33

5/1/2020 6:36:33 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 A1.0.1 STATION DWELLIN

N.T.S.

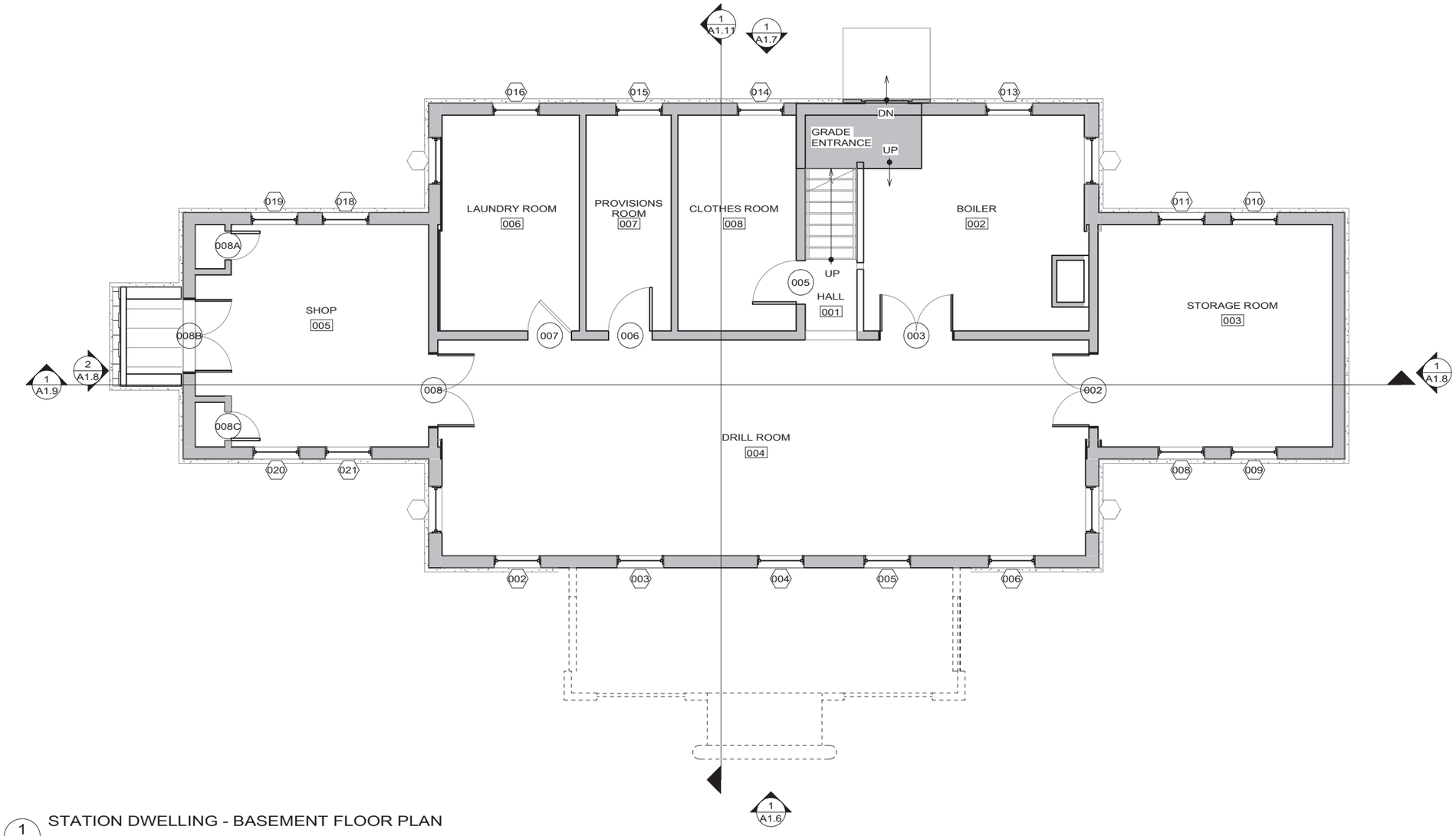


2 A1.0.1 STATION DWELLING - ISO-4

N.T.S.

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DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A1.0.1	TITLE OF SHEET STATION DWELLING - BUILDING ISO s GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 4 OF 33



1 A1.1 STATION DWELLING - BASEMENT FLOOR PLAN

SCALE (A)

SCALE (A) 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

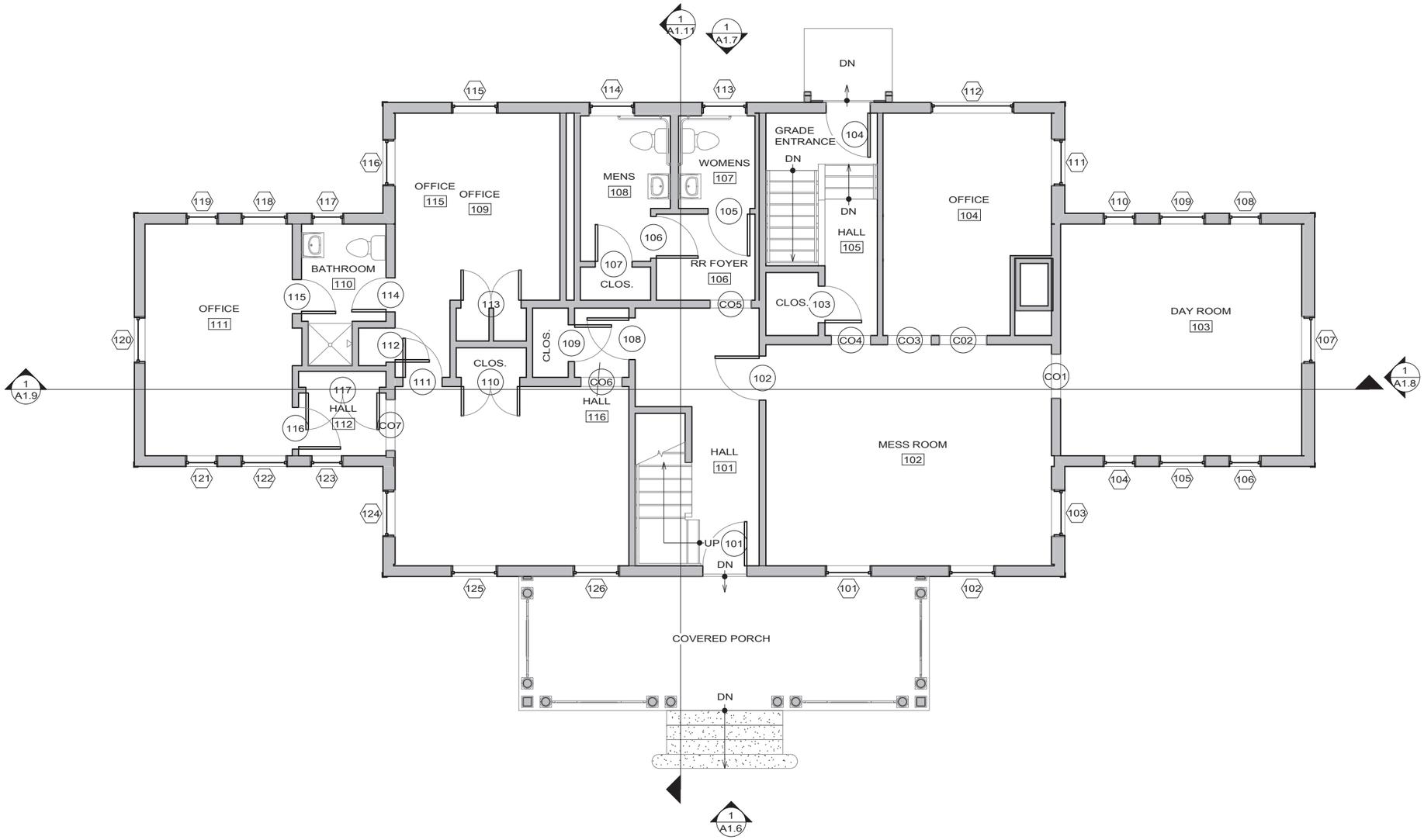
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CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

SUB SHEET NO. A1.1

TITLE OF SHEET
STATION DWELLING - BASEMENT FLOOR PLAN
GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 5 OF 33

5/1/2020 6:36:52 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 A1.2 STATION DWELLING - MAIN FLOOR PLAN

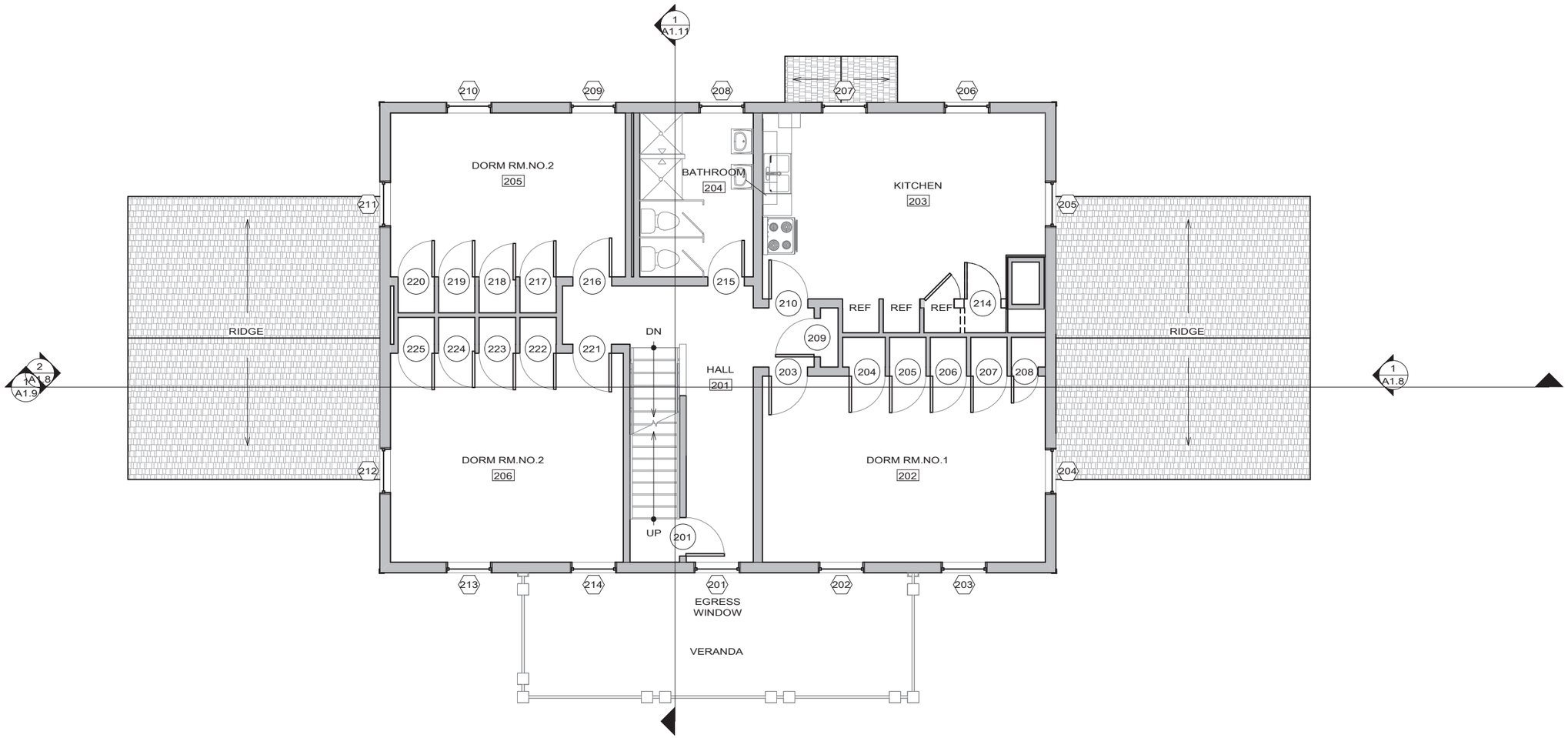
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

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5/1/2020 6:36:54 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 / A1.3 STATION DWELLING - 2ND FLOOR PLAN

SCALE (A)

SCALE (A) 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

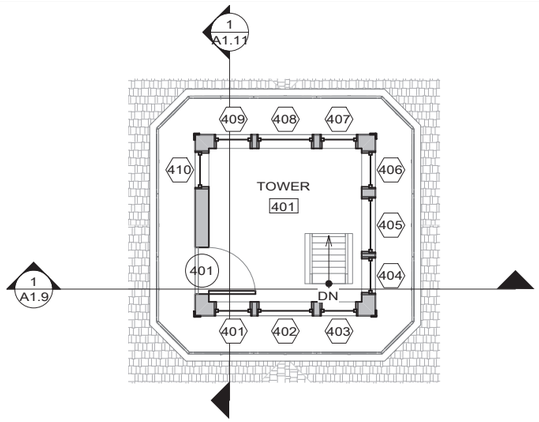
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TITLE OF SHEET
STATION DWELLING - 2ND FLOOR PLAN

GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

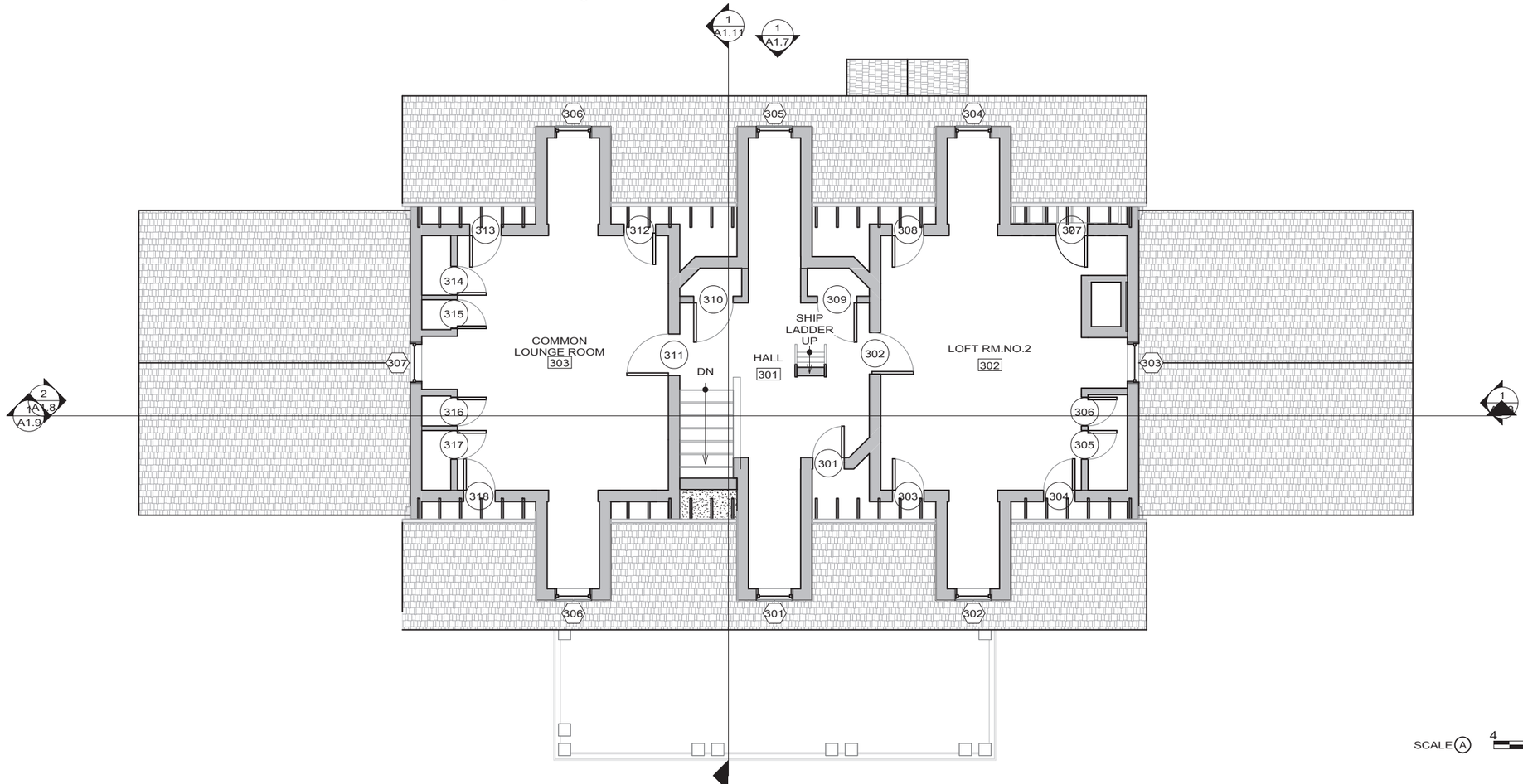
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PMIS/PKG NO. 227908
SHEET 7 OF 33

5/1/2020 6:36:54 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



2 A1.4 STATION DWELLING - TOWER FLOOR PLAN

SCALE A



1 A1.4 STATION DWELLING - 3RD FLOOR PLAN

SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

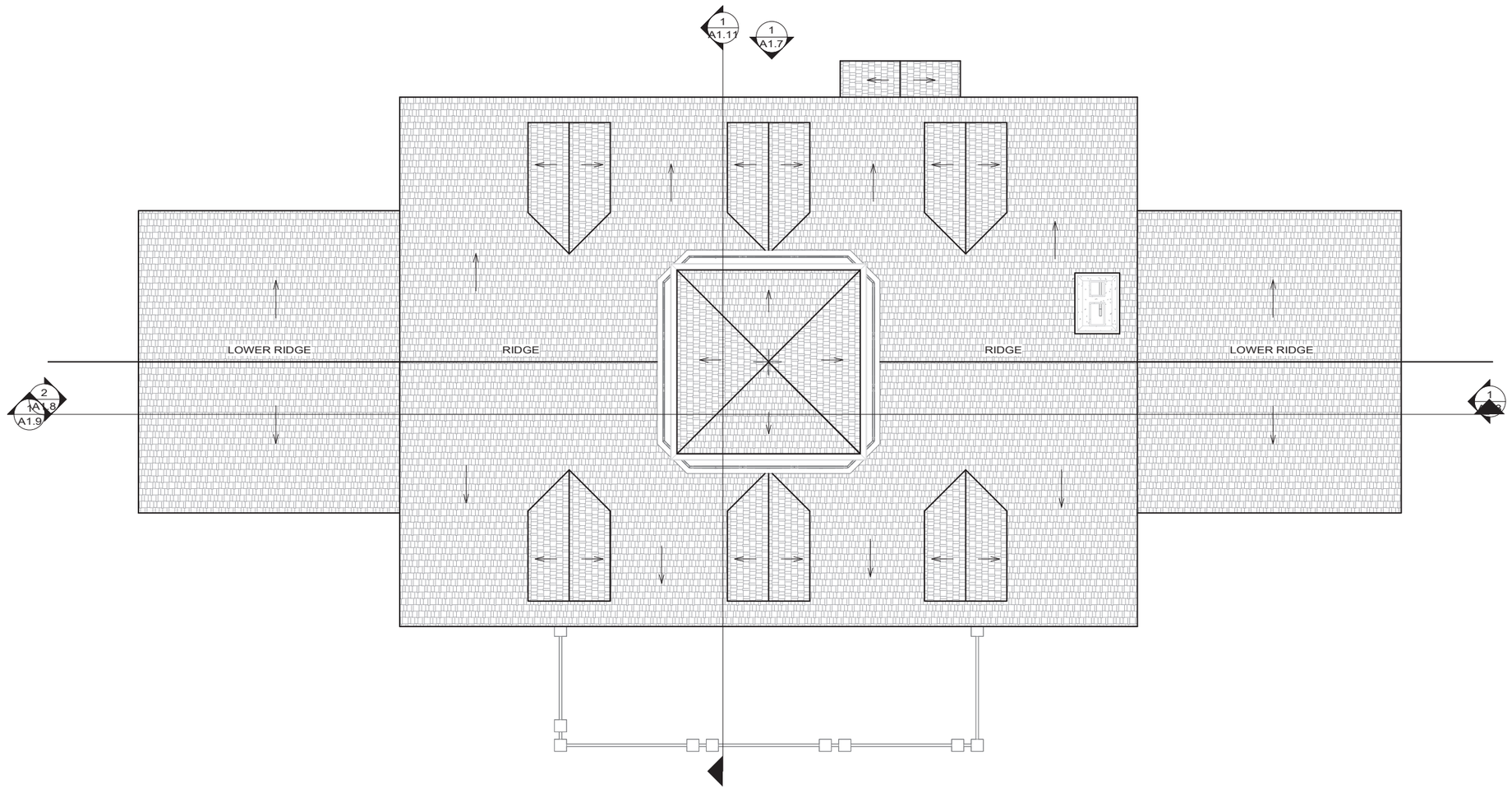
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CADD DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

SUB SHEET NO. A1.4

TITLE OF SHEET
STATION DWELLING - 3RD FLOOR AND CUPOLA PLANS
GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 8 OF 33

5/1/2020 6:36:56 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 A1.5 STATION DWELLING - ROOF PLAN

SCALE A

SCALE A 1 0 1 2

SCALE OF FEET

PRELIMINARY 100 % EXIST. COND. NOT FOR CONSTRUCTION	DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A1.5	TITLE OF SHEET STATION DWELLING - ROOF PLAN GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 9 OF 33

5/1/2020 6:36:57 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 / A1.6 STATION DWELLING - SOUTH ELEVATION

SCALE Ⓐ

SCALE Ⓐ 1 0 1 2

SCALE OF FEET

DESIGNED: KC CADD: DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A1.6	TITLE OF SHEET STATION DWELLING - EXTERIOR BUILDING ELEVATIONS GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 10 OF 33

5/1/2020 6:36:58 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1
A1.7

STATION DWELLING - NORTH ELEVATION

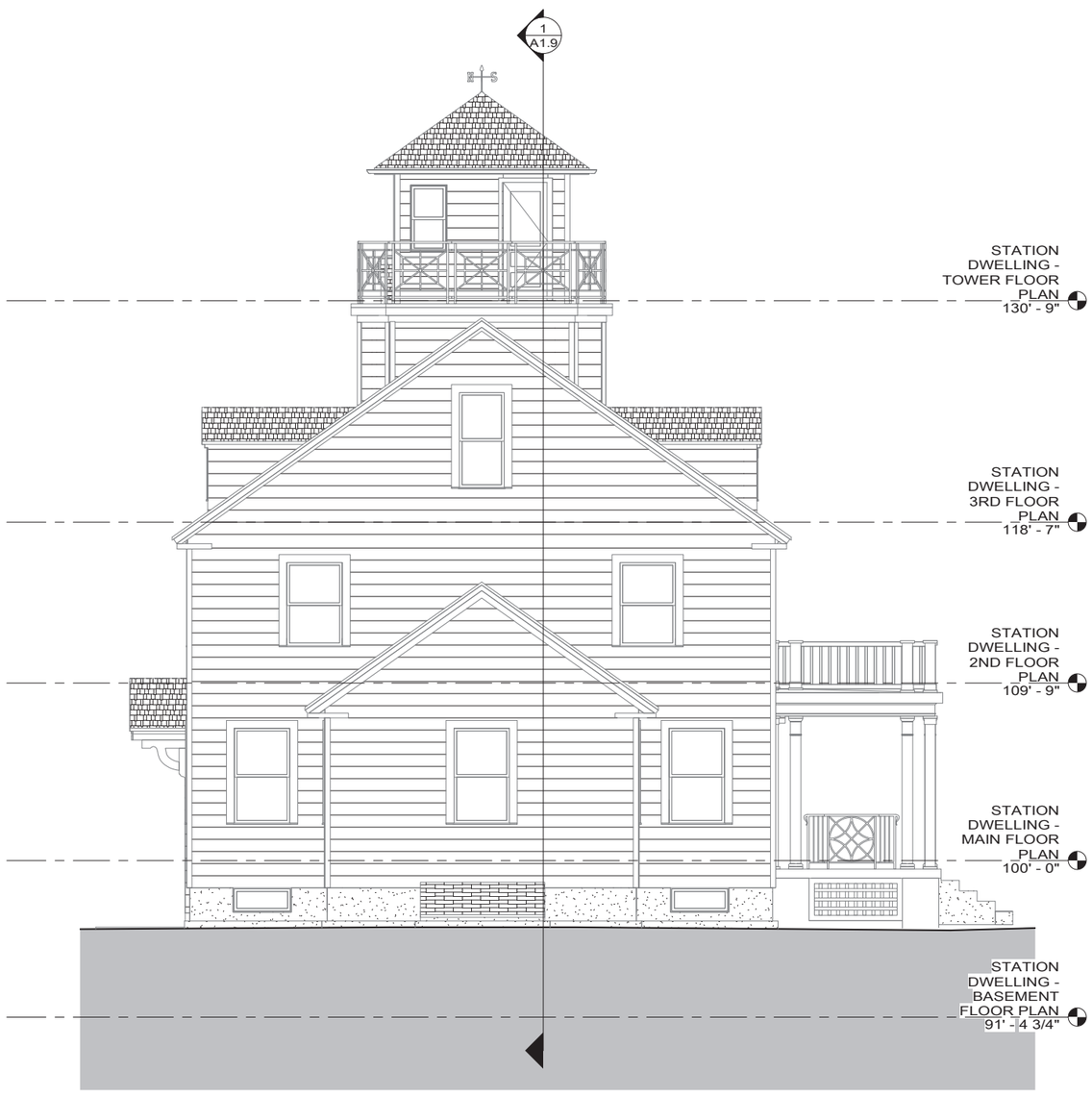
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SCALE (A) 1 0 1 2

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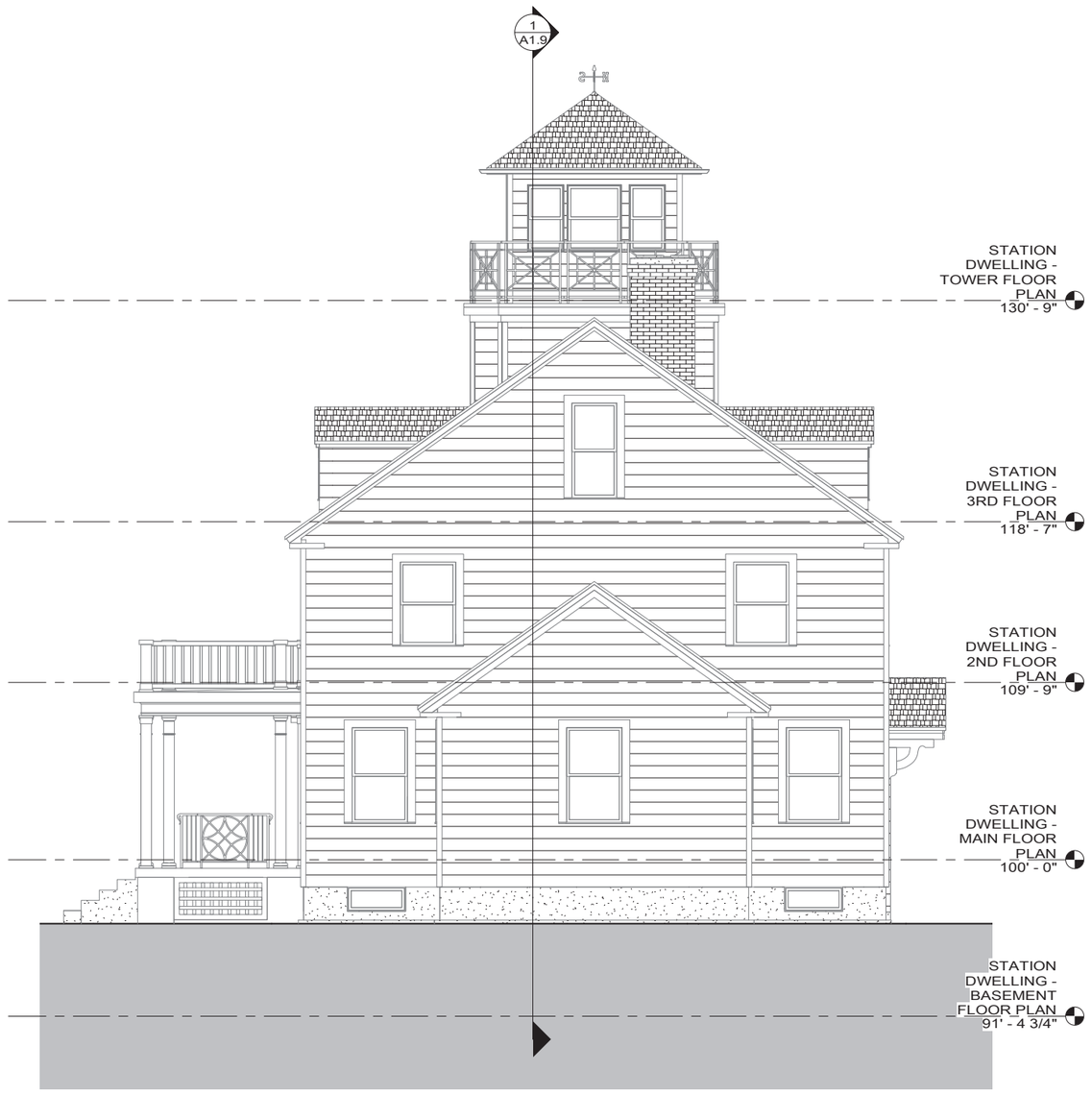
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5/1/2020 6:36:59 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



2 A1.8 STATION DWELLING - WEST ELEVATION

SCALE A



1 A1.8 STATION DWELLING - EAST ELEVATION

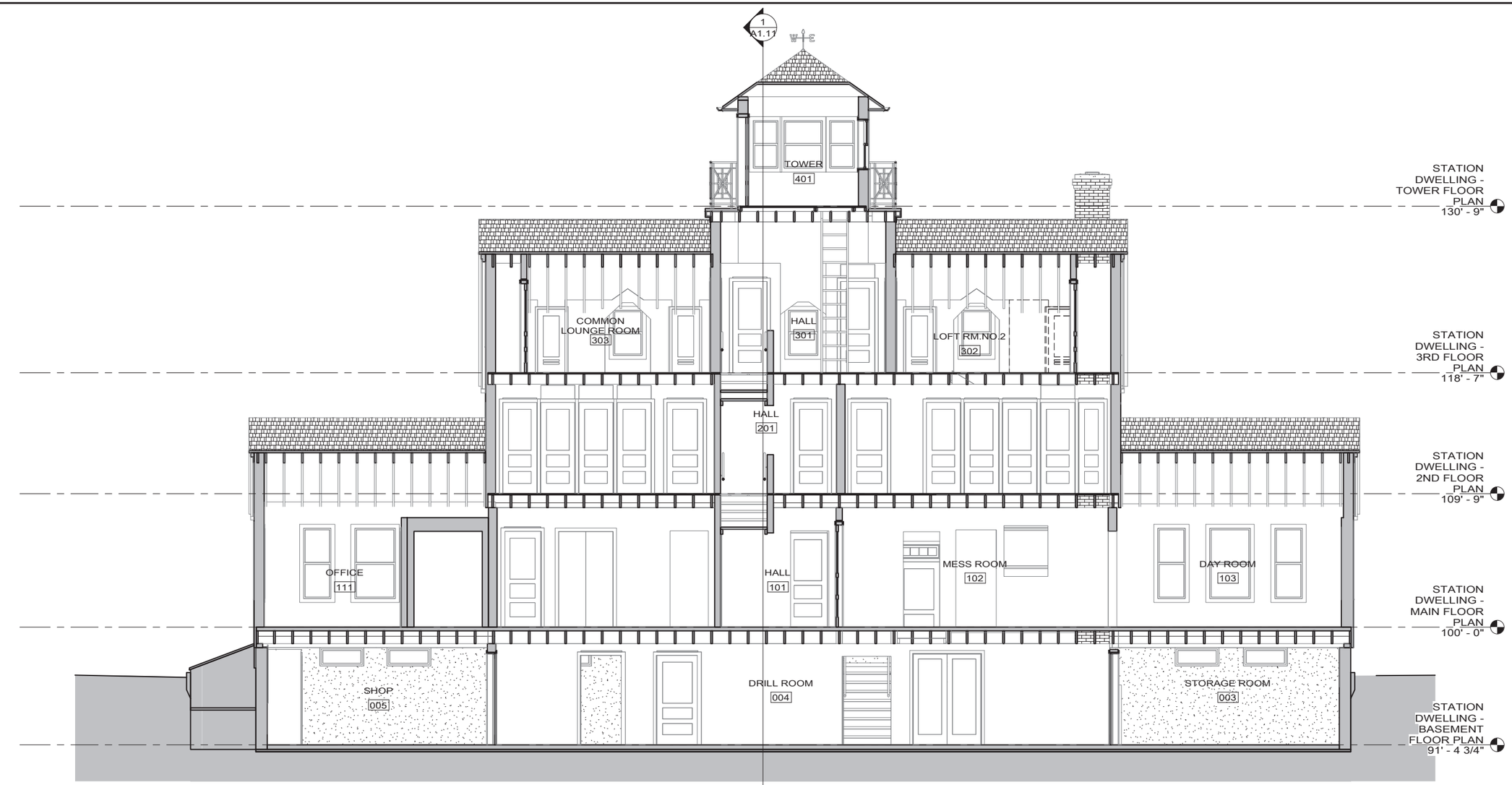
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SCALE OF FEET

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5/1/2020 6:37:00 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1
A1.9
STATION DWELLING - BUILDING SECTION - LONGITUDNAL
SCALE A

SCALE A 1 0 1 2
SCALE OF FEET

DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A1.9	TITLE OF SHEET STATION DWELLING - BUILDING SECTIONS GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 13 OF 33

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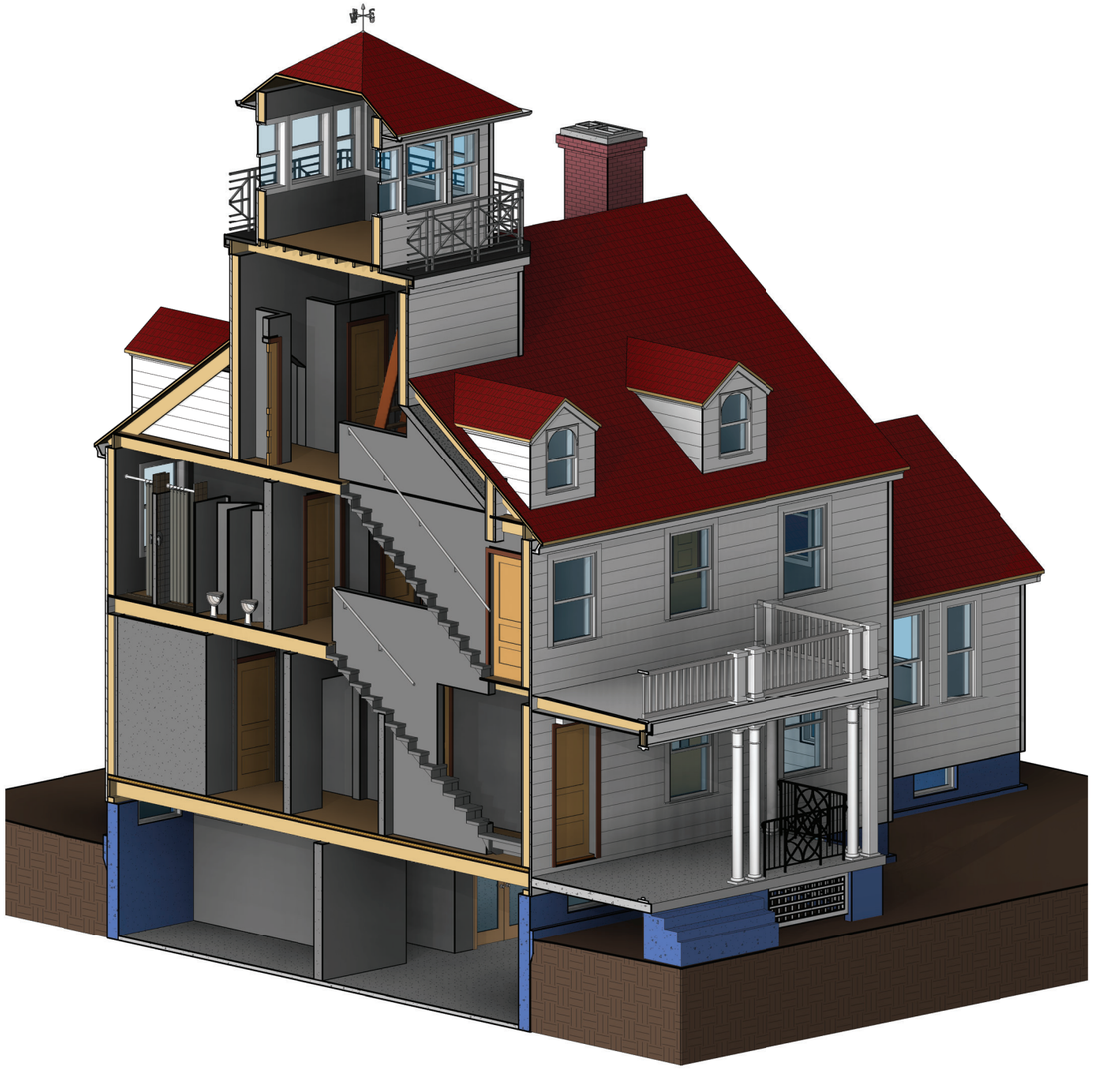
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1 A1.10 STATION DWELLING - ISO-2 SEC

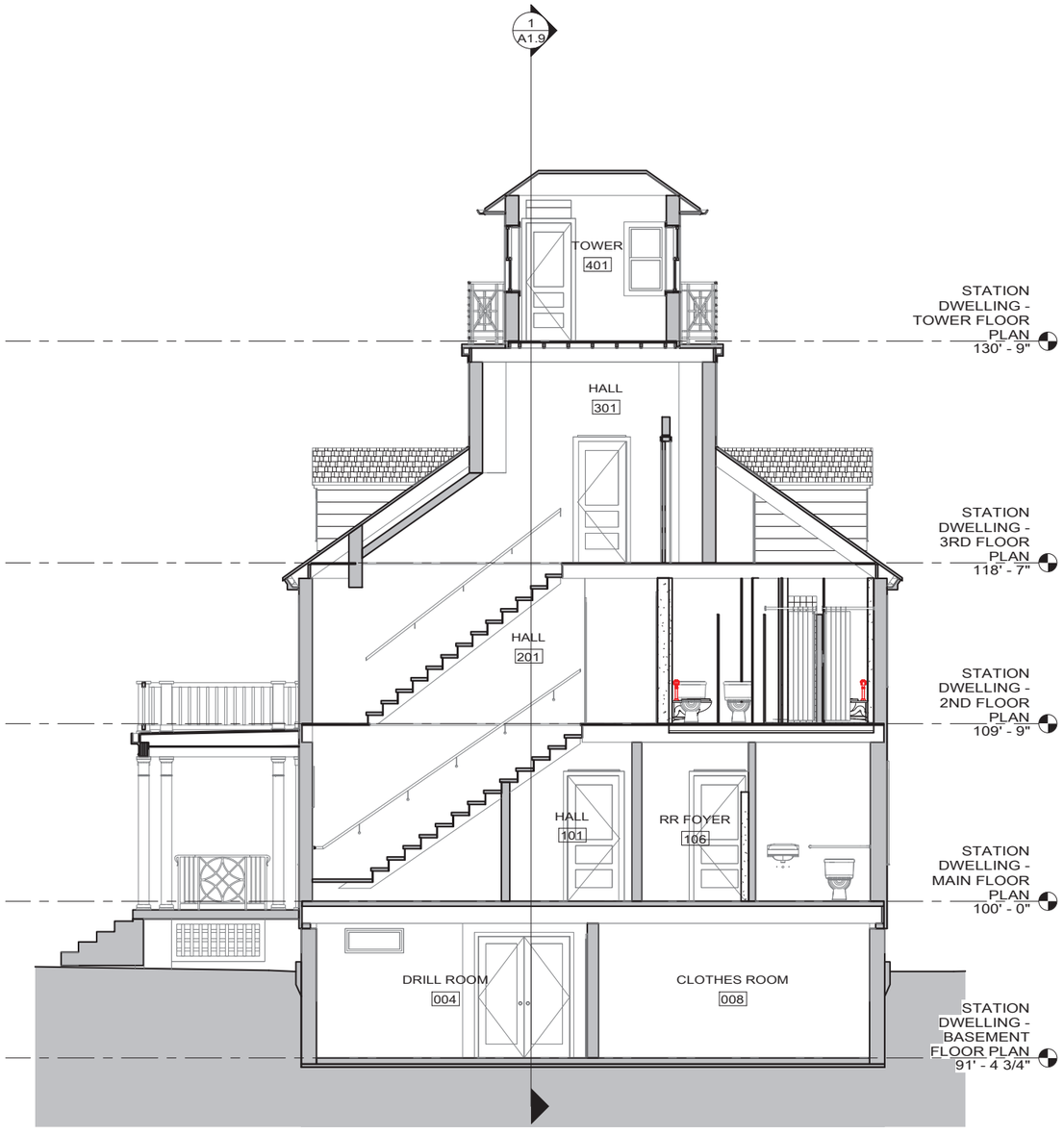
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2 A1.11 STATION DWELLING - ISO-1 SECTION

N.T.S.



1 A1.11 STATION DWELLING - BUILDING SECTION - TRANSVERSE

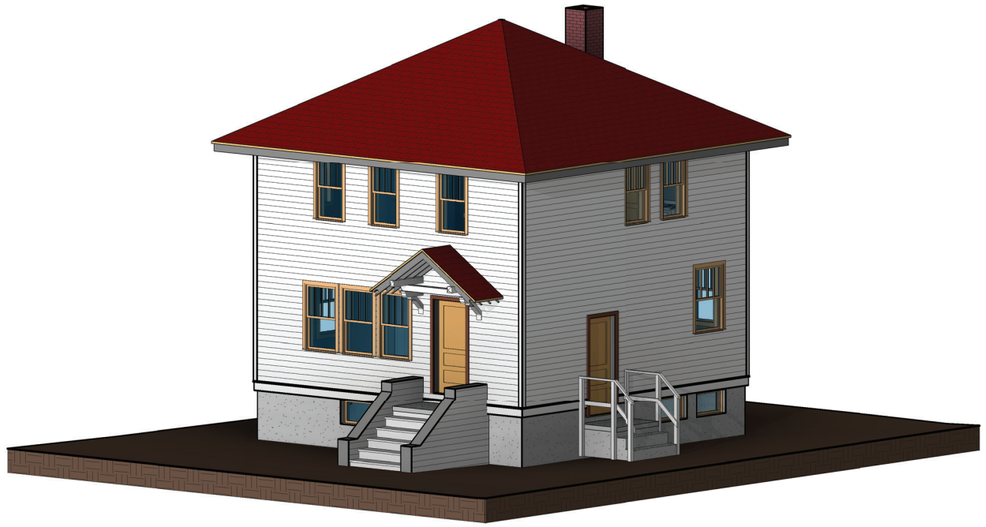
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SCALE (A) 1 0 1 2

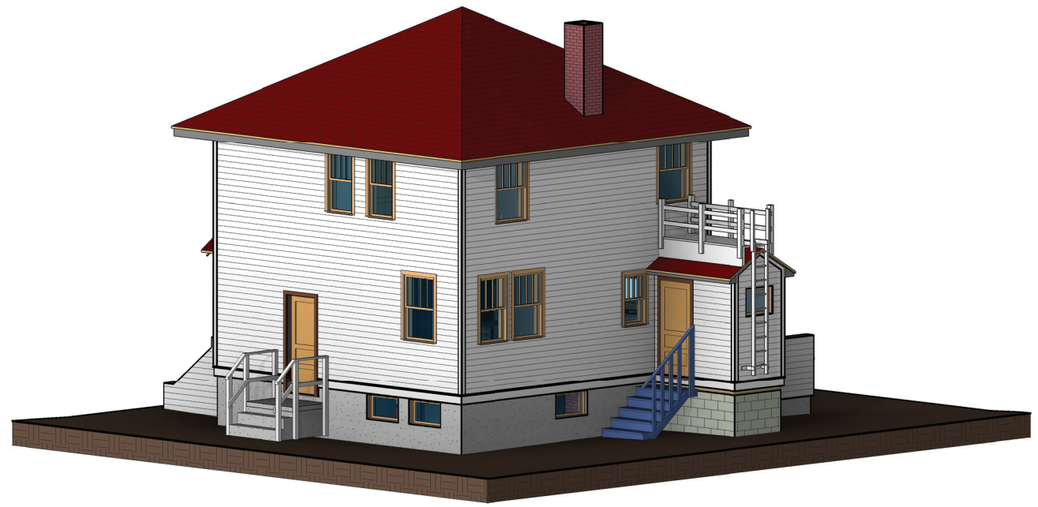
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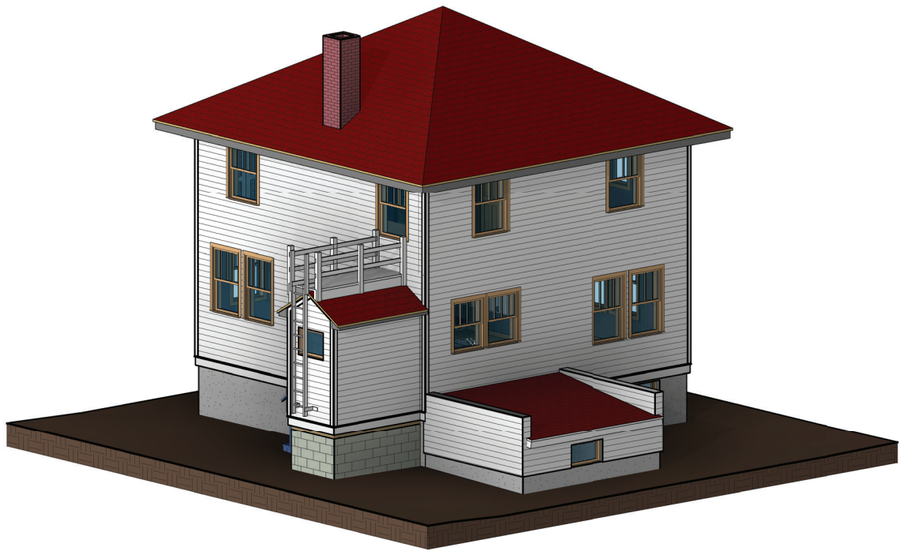
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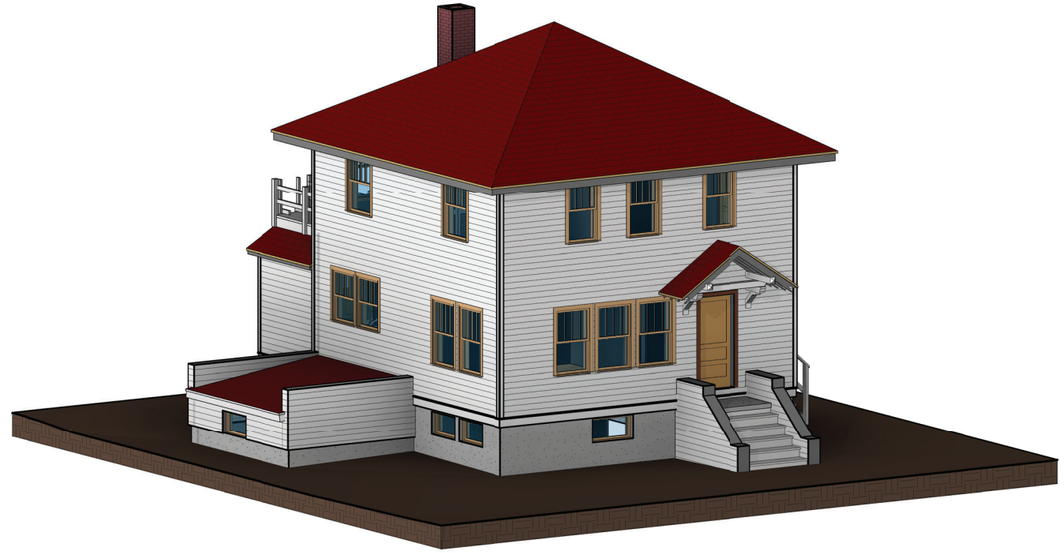
1 A2.0 O.I.C. DWELLING - ISO-1
N.T.S.



2 A2.0 O.I.C. DWELLING - ISO-2
N.T.S.



3 A2.0 O.I.C. DWELLING - ISO-3
N.T.S.



4 A2.0 O.I.C. DWELLING - ISO-4
N.T.S.

PRELIMINARY
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NOT FOR CONSTRUCTION

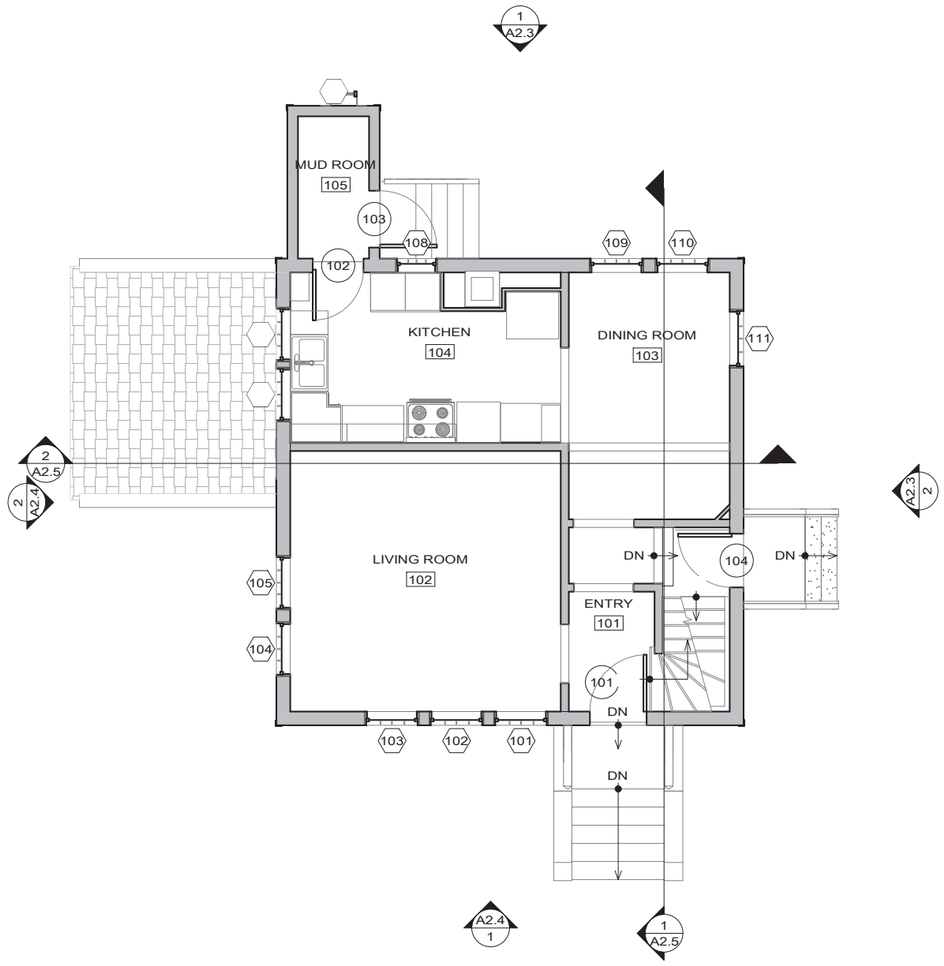
DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

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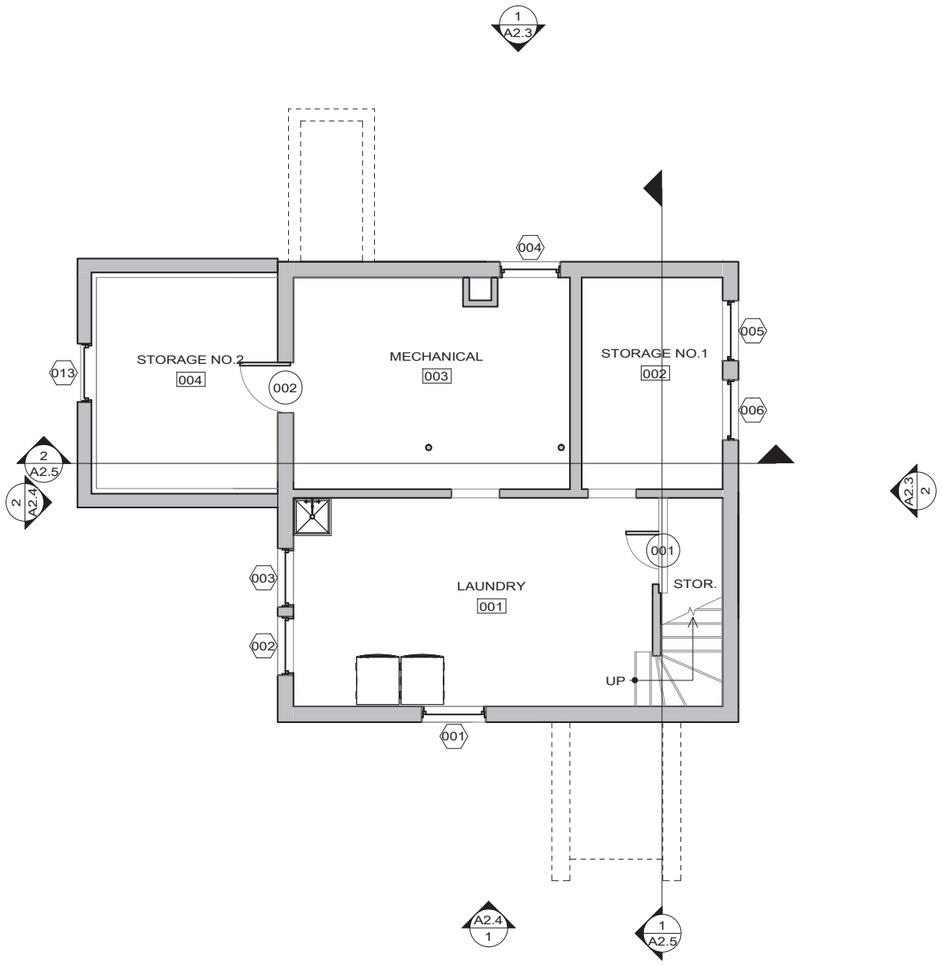
TITLE OF SHEET
OFFICER IN CHARGE DWELLING - BUILDING ISO's
GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 16 OF 33

5/1/2020 6:37:39 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



2 A2.1 O.I.C. DWELLING - MAIN FLOOR PLAN



1 A2.1 O.I.C. DWELLING - BASEMENT FLOOR PLAN

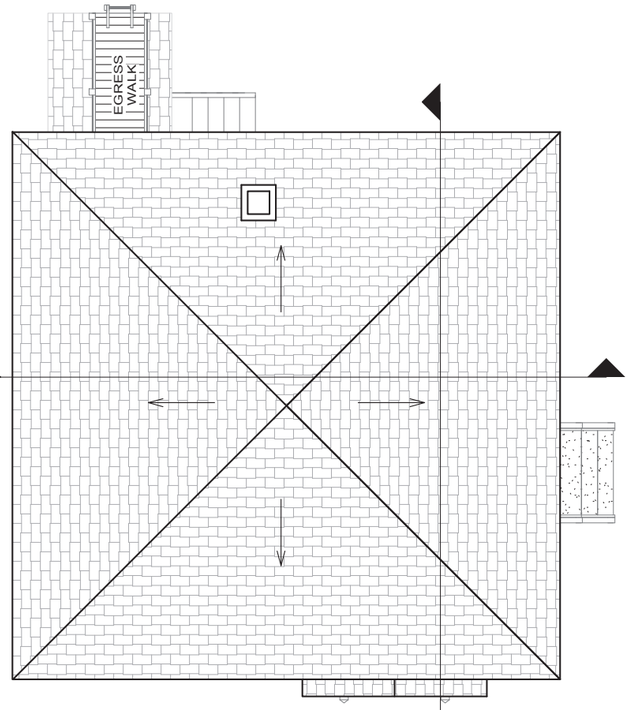
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

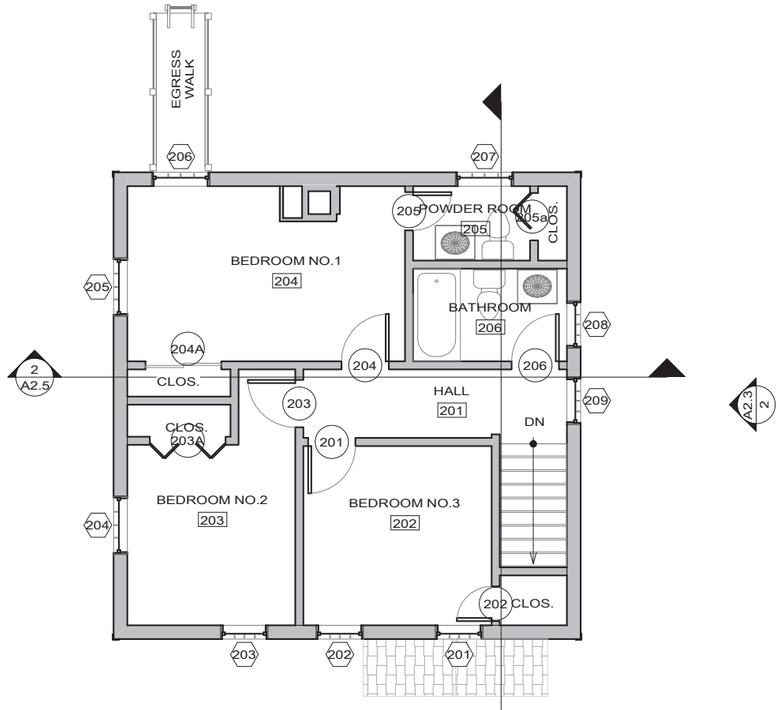
PRELIMINARY **100 % EXIST. COND.** NOT FOR CONSTRUCTION	DESIGNED: KC CADD: DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A2.1	TITLE OF SHEET OFFICER IN CHARGE DWELLING-BASEMENT AND MAIN FL. PL. GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 17 OF 33

5/1/2020 6:37:40 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



2 A2.2 O.I.C. DWELLING - ROOF PLAN

SCALE A



1 A2.2 O.I.C. DWELLING - UPPER FLOOR PLAN

SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

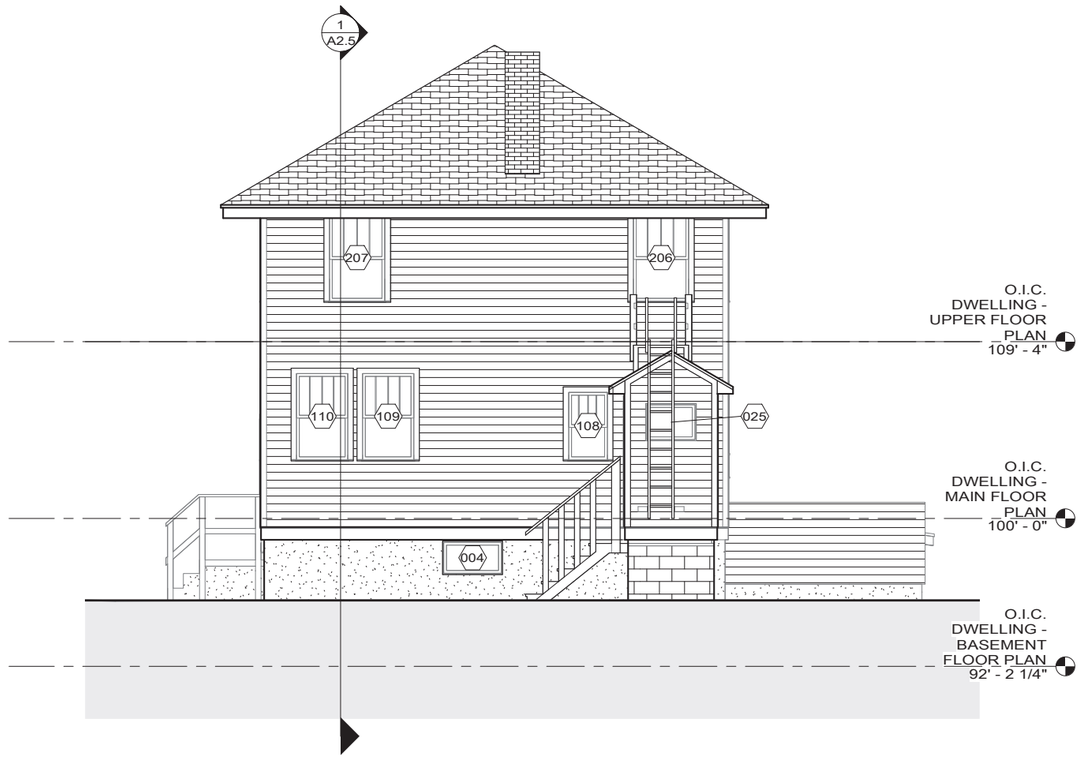
DESIGNED: KC
CADD DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

SUB SHEET NO. A2.2

TITLE OF SHEET
OFFICER IN CHARGE DWELLING - UPPER AND ROOF PLANS
GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

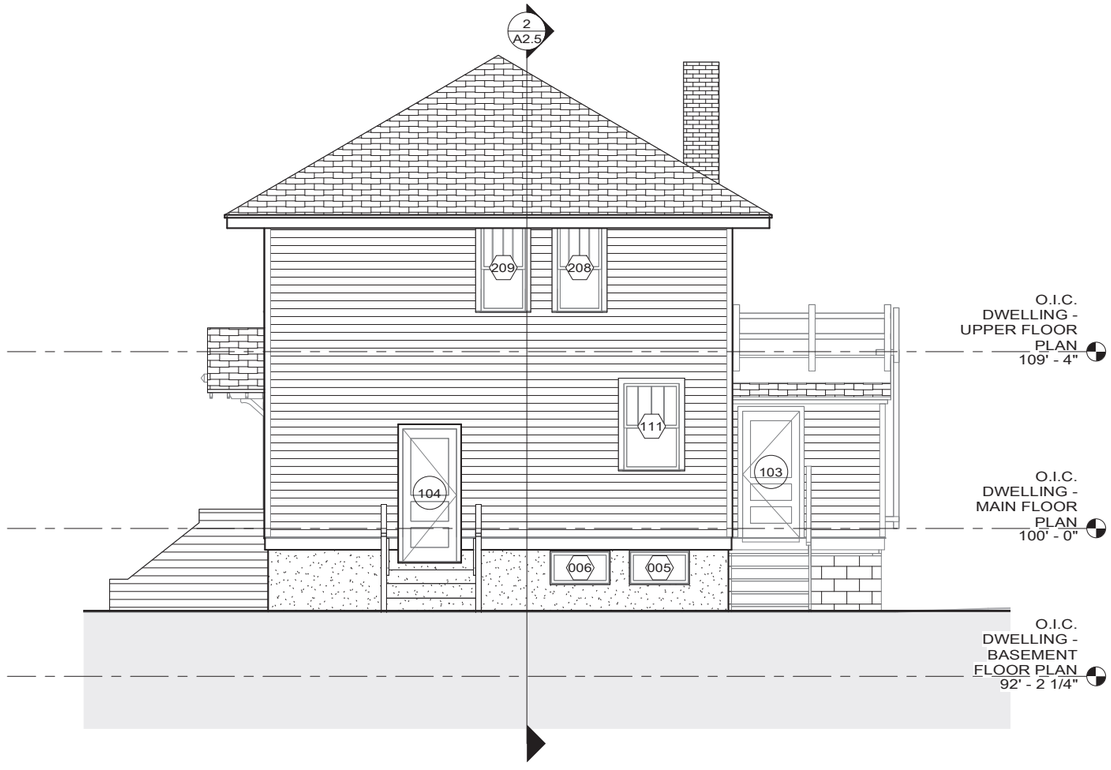
DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 18 OF 33

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1 A2.3 O.I.C. DWELLING - NORTH ELEVATION

SCALE A



2 A2.3 O.I.C. DWELLING - EAST ELEVATION

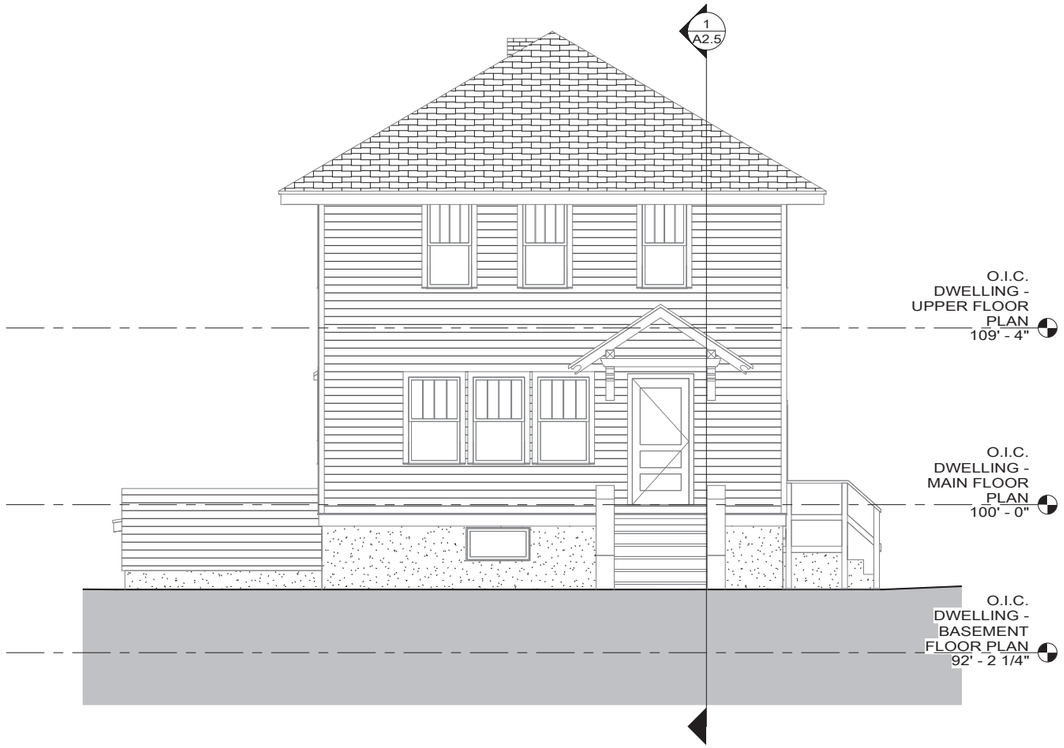
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

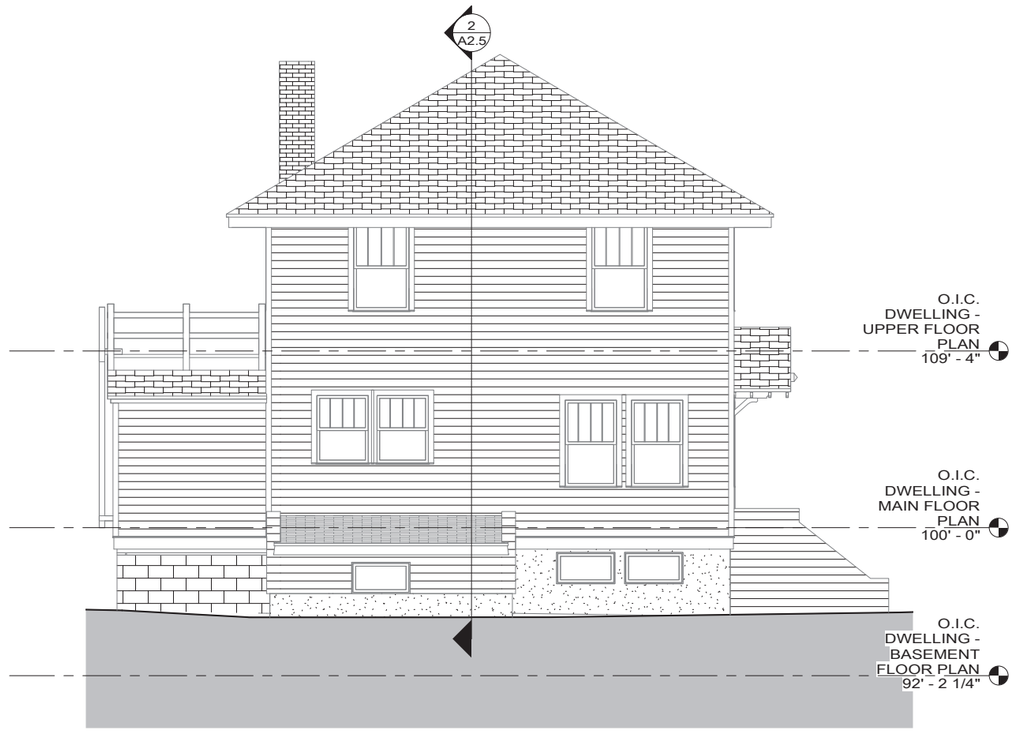
DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A2.3	TITLE OF SHEET OFFICER IN CHARGE DWELLING-EXTERIOR BUILD. ELEV. GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 19 OF 33

5/1/2020 6:37:42 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 A2.4 O.I.C. DWELLING - SOUTH ELEVATION

SCALE A



2 A2.4 O.I.C. DWELLING - WEST ELEVATION

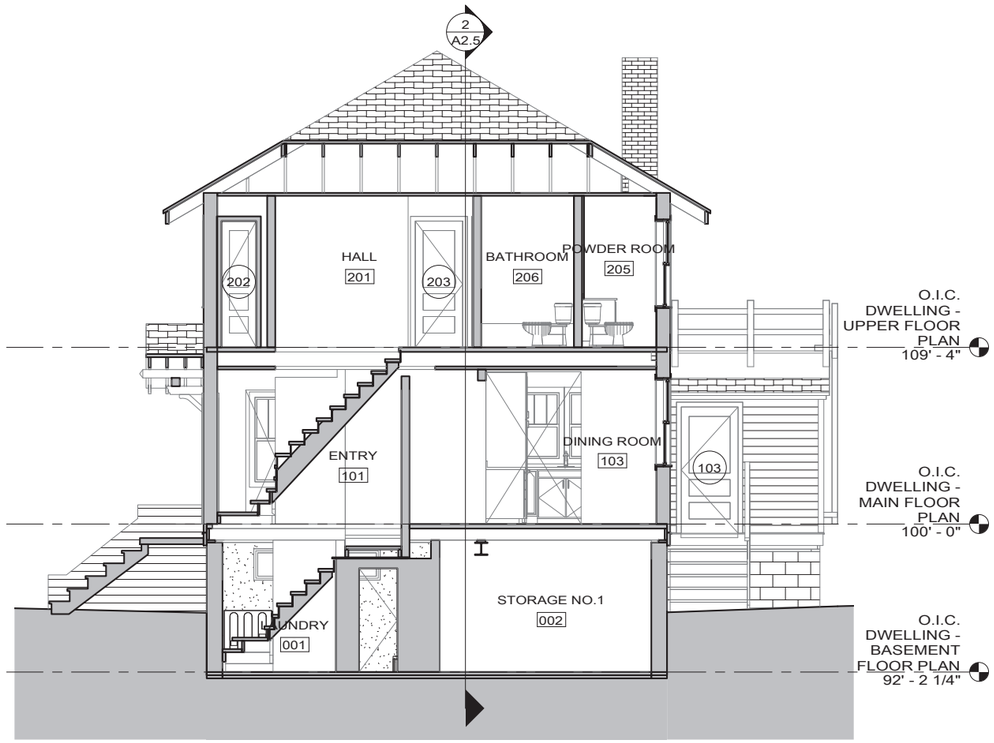
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

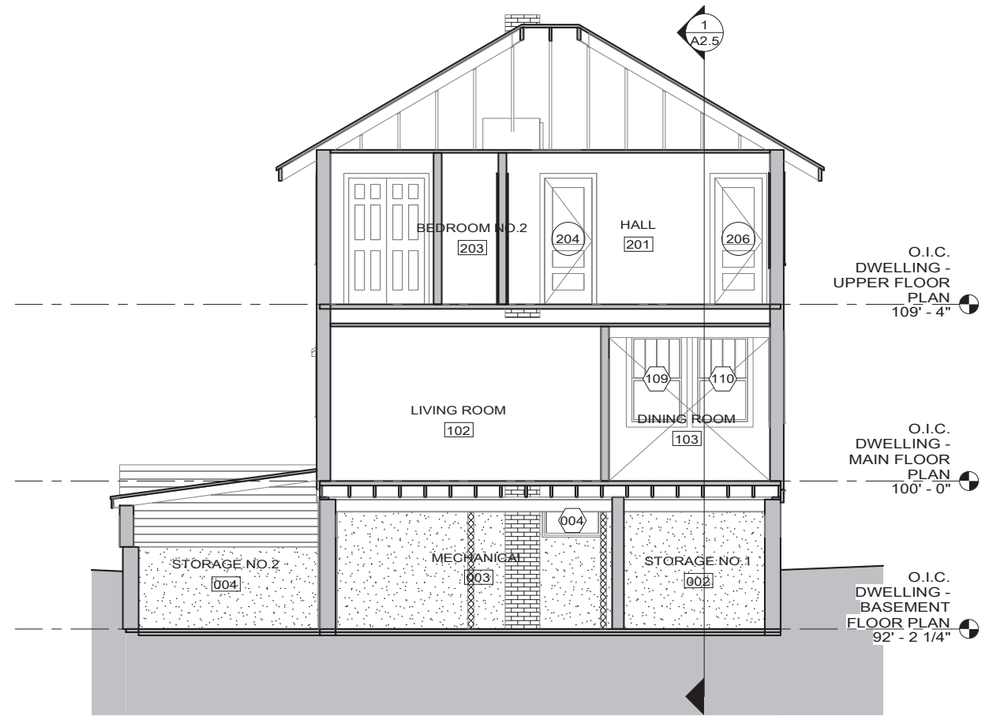
DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A2.4	TITLE OF SHEET OFFICER IN CHARGE DWELLING-EXTERIOR BUILD. ELEV. GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 20 OF 33

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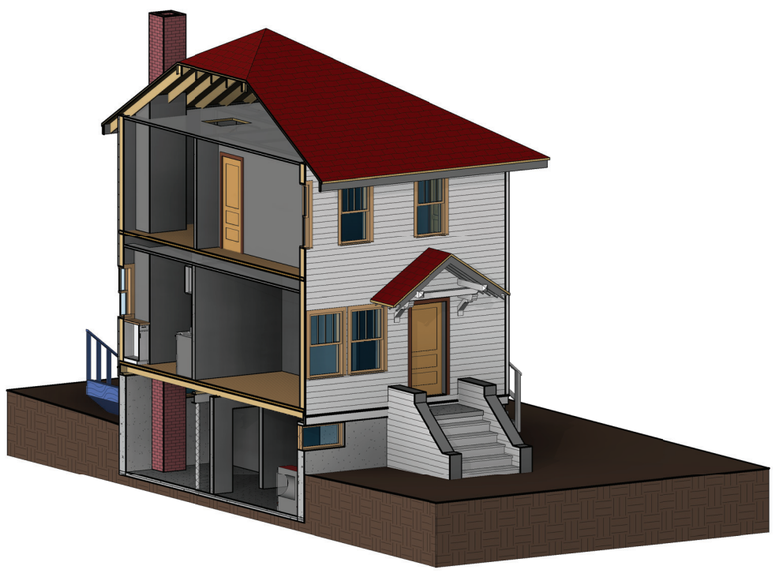
1 A2.5 O.I.C. DWELLING - BUILDING SECTION - LONGITUDNAL

SCALE A



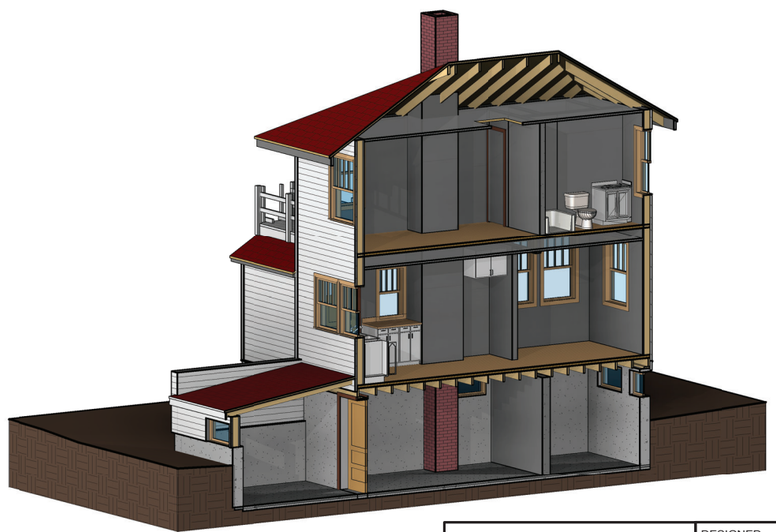
2 A2.5 O.I.C. DWELLING - BUILDING SECTION - TRANSVERSE

SCALE A



3 A2.5 O.I.C. DWELLING - ISO-1 SECTION

N.T.S.



4 A2.5 O.I.C. DWELLING - ISO-2 SECTION

N.T.S.

SCALE A 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

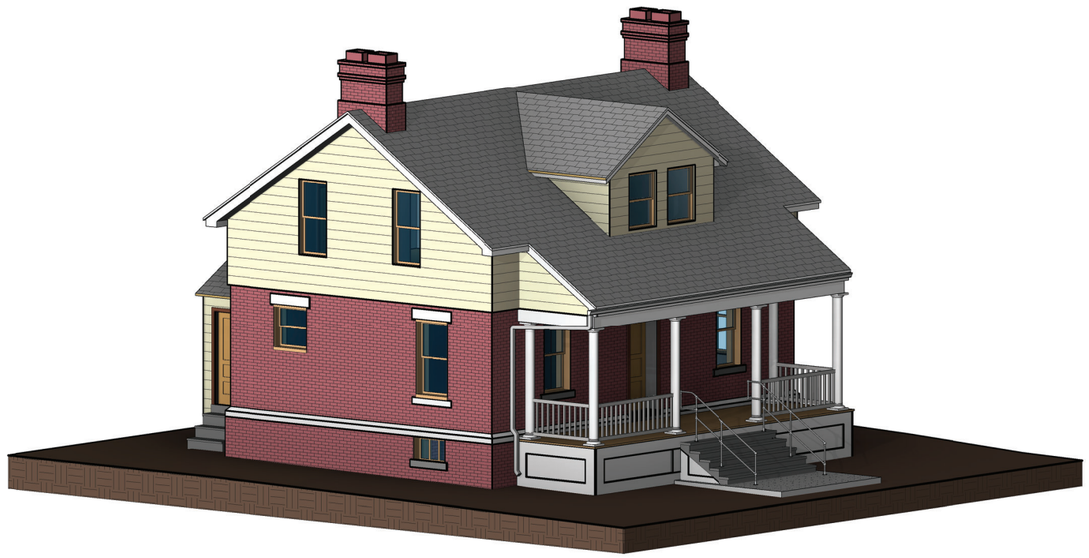
DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

SUB SHEET NO. A2.5

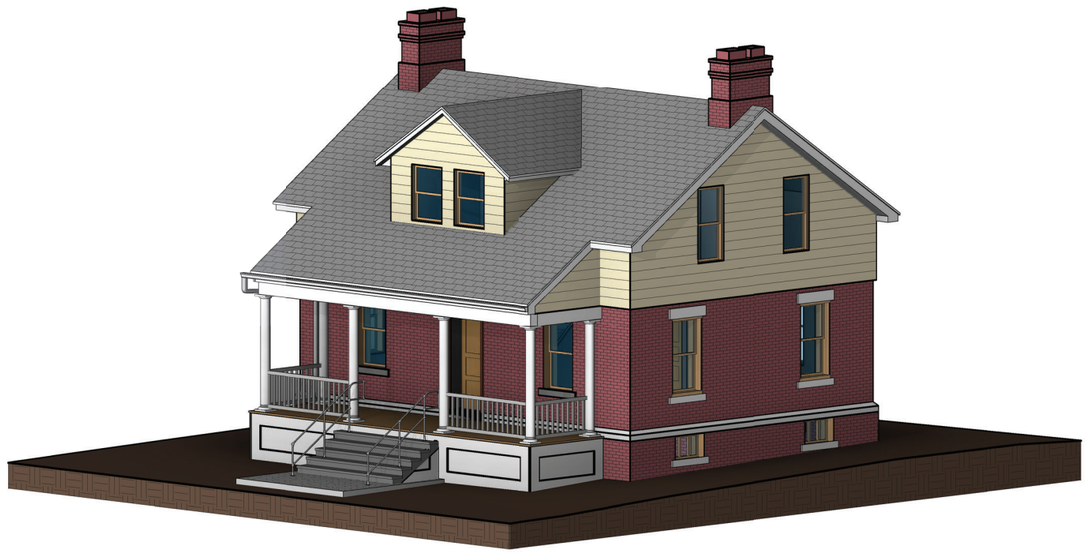
TITLE OF SHEET
OFFICER IN CHARGE DWELLING - BUILDING SECTIONS
GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 21 OF 33

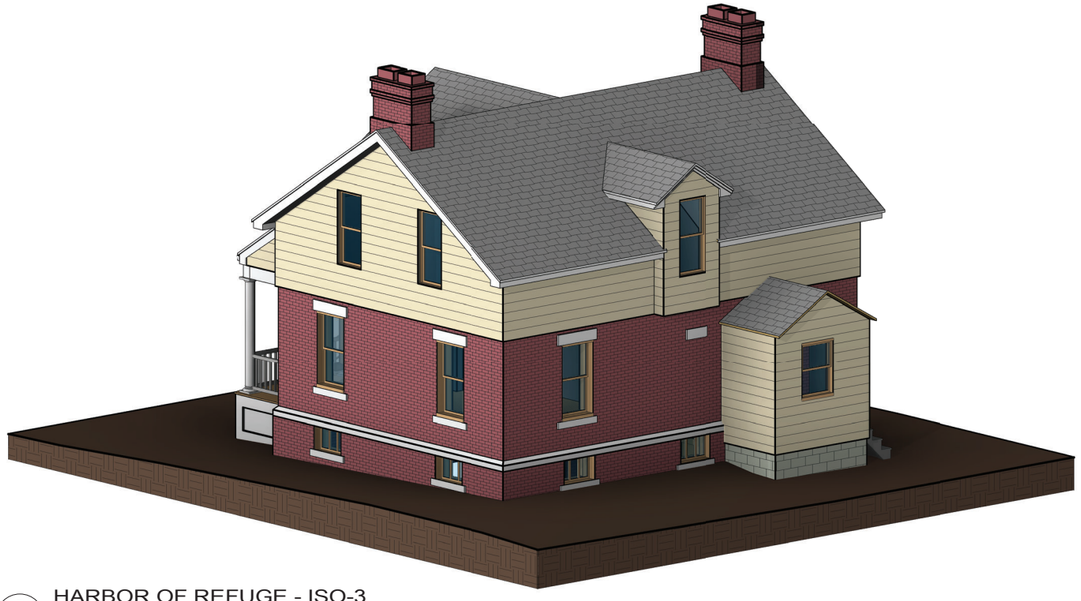
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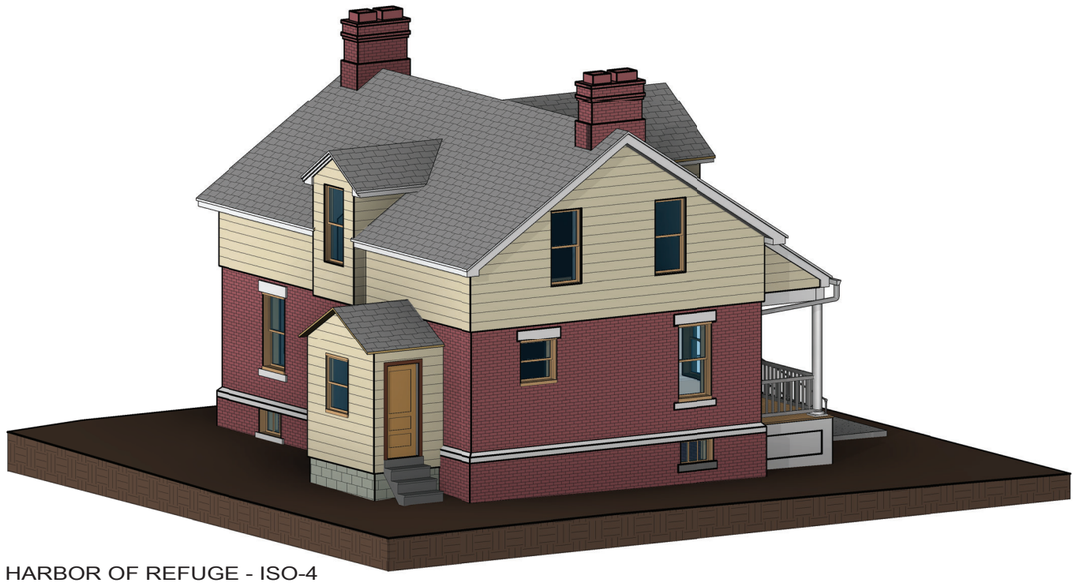
1 A3.0 HARBOR OF REFUGE - ISO-1



2 A3.0 HARBOR OF REFUGE - ISO-2



3 A3.0 HARBOR OF REFUGE - ISO-3



4 A3.0 HARBOR OF REFUGE - ISO-4

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

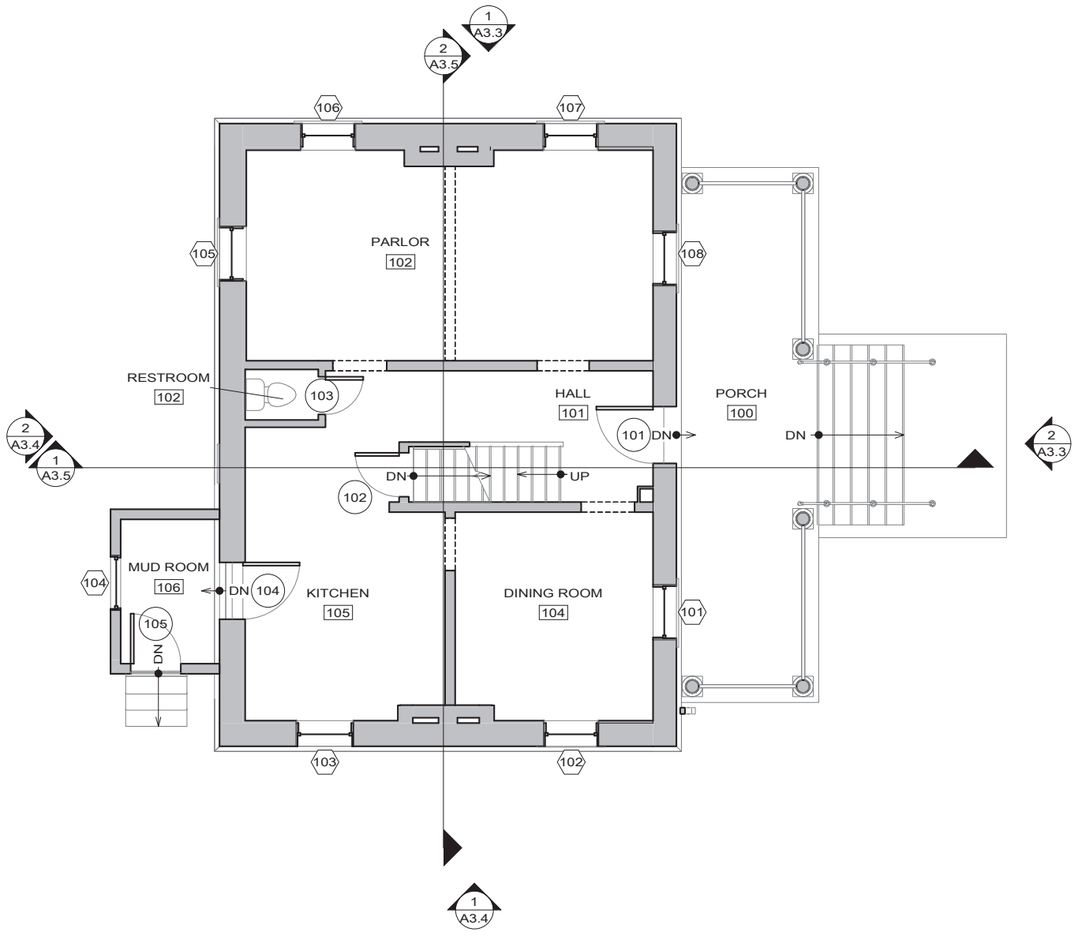
SUB SHEET NO. A3.0

TITLE OF SHEET
HARBOR OF REFUGE DWELLING - ISO's

GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

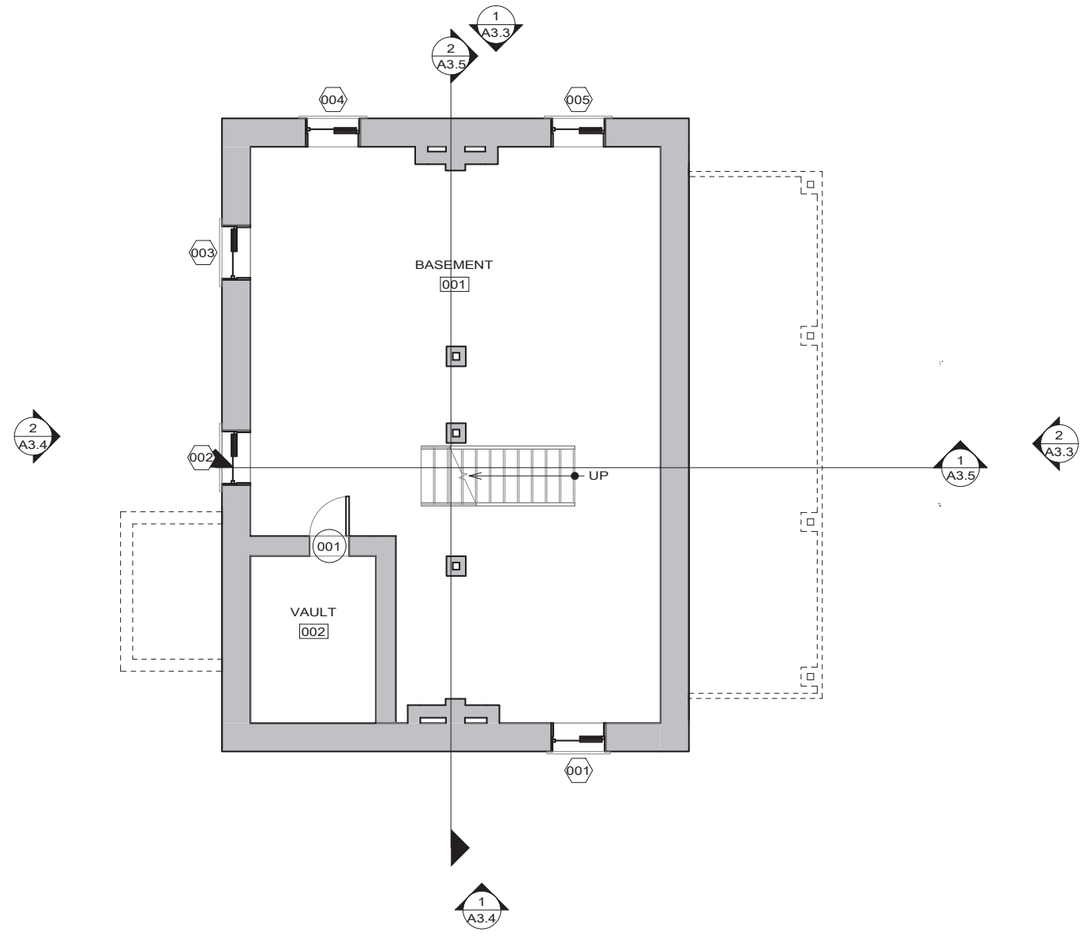
DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 22 OF 33

5/1/2020 6:38:05 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



2 A3.1 HARBOR OF REFUGE DWELLING - MAIN FLOOR PLAN

SCALE A



1 A3.1 HARBOR OF REFUGE DWELLING - BASEMENT FLOOR PLAN

SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

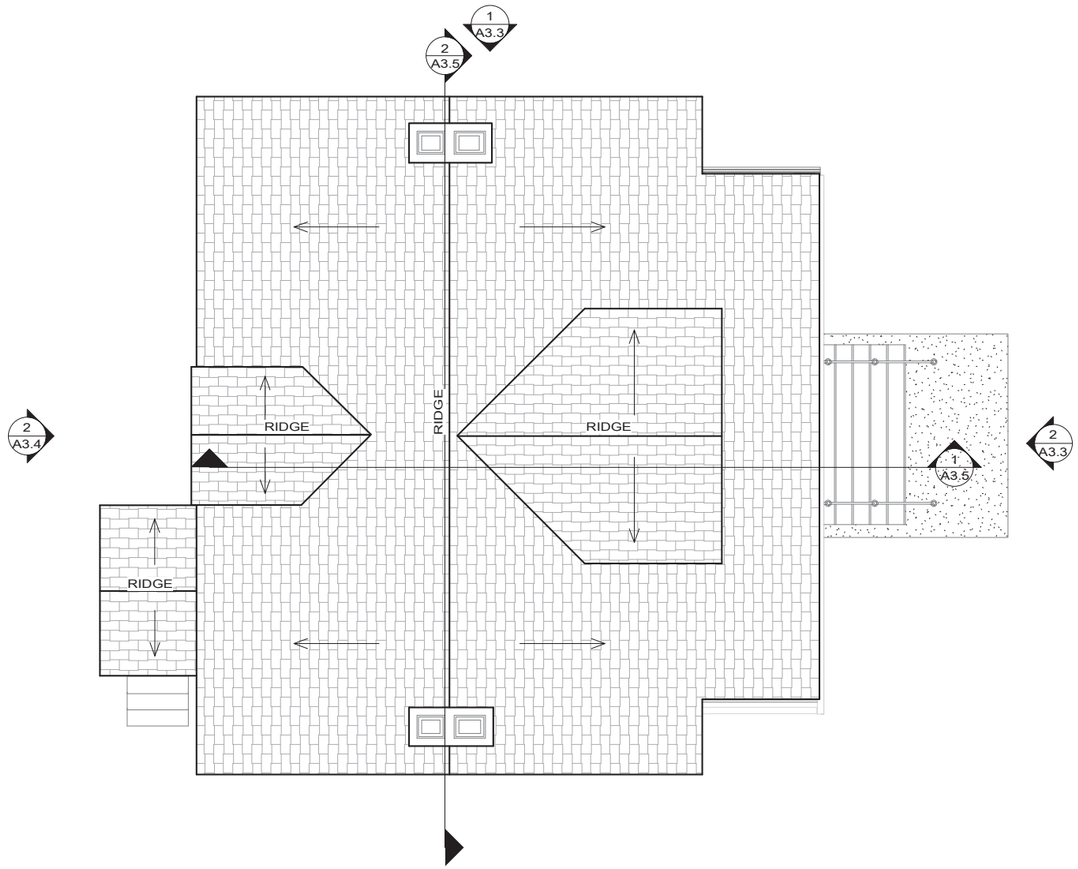
DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

SUB SHEET NO. A3.1

TITLE OF SHEET
HARBOR OF REFUGE DWELLING - BASE AND MAIN FL. PL.
GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

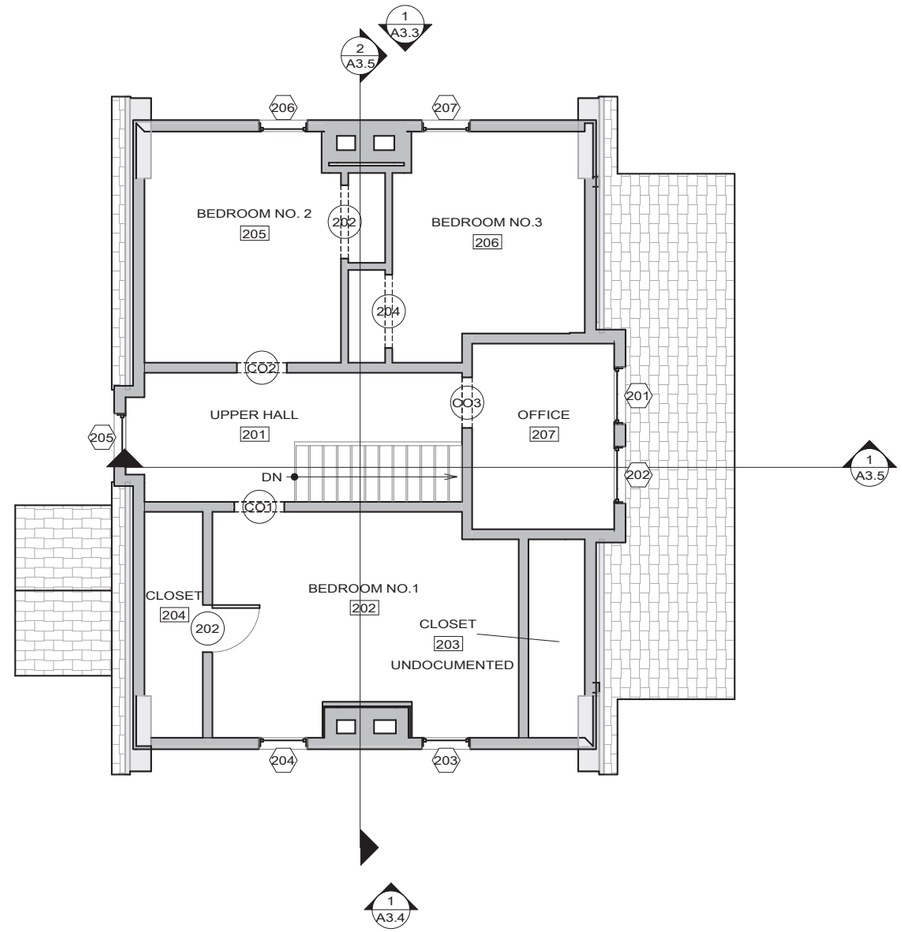
DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 23 OF 33

5/1/2020 6:38:06 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



2 A3.2 HARBOR OF REFUGE DWELLING - ROOF PLAN

SCALE A



1 A3.2 HARBOR OF REFUGE - UPPER FLOOR PLAN

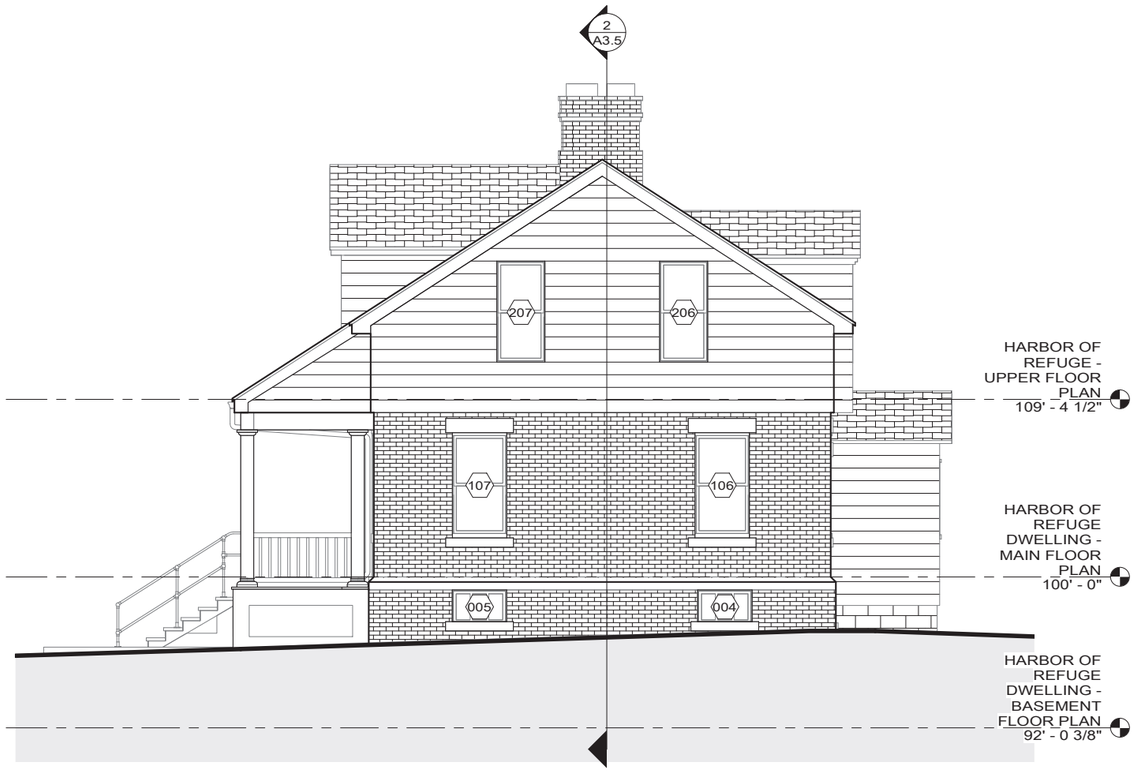
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

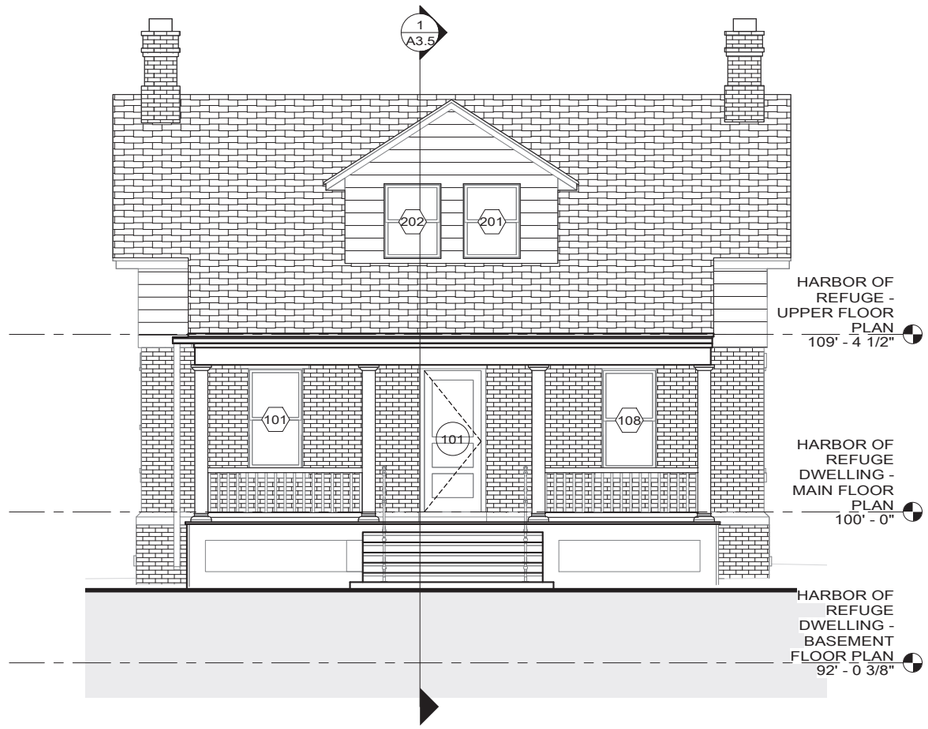
PRELIMINARY 100 % EXIST. COND. NOT FOR CONSTRUCTION	DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A3.2	TITLE OF SHEET HARBOR OF REFUGE DWELLING - UPPER FL. AND ROOF PL. GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 24 OF 33

5/1/2020 6:38:07 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 A3.3 HARBOR OF REFUGE - NORTH ELEVATION

SCALE A



2 A3.3 HARBOR OF REFUGE - EAST ELEVATION

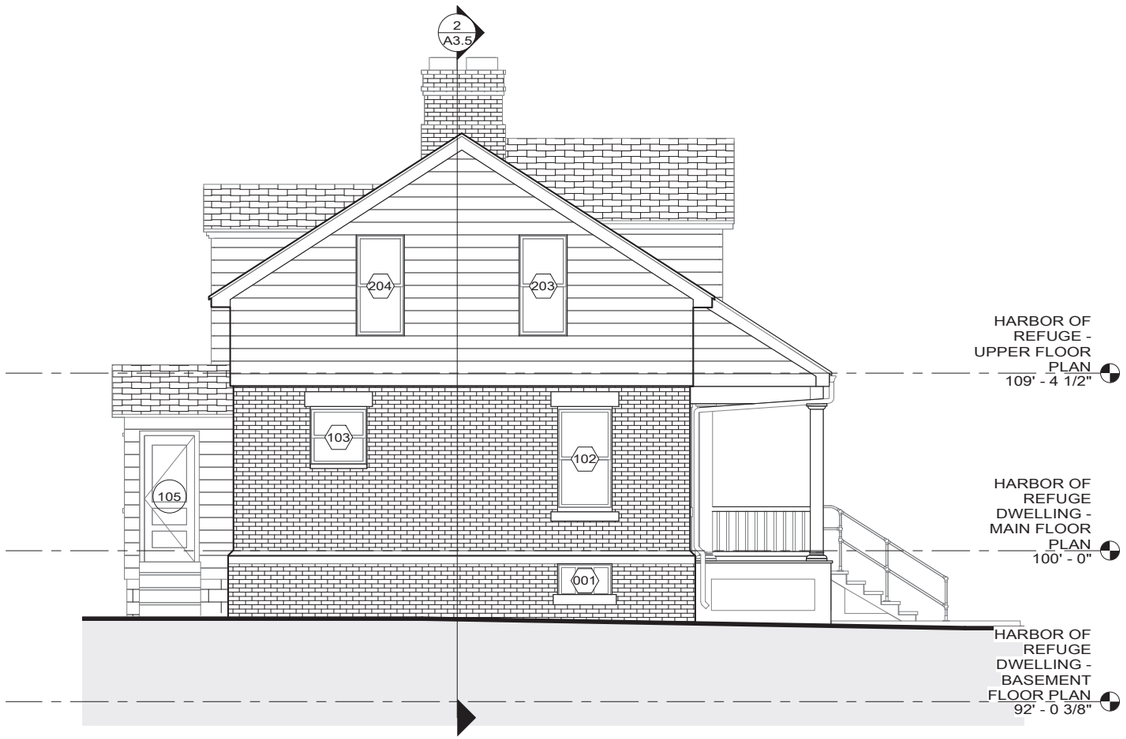
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

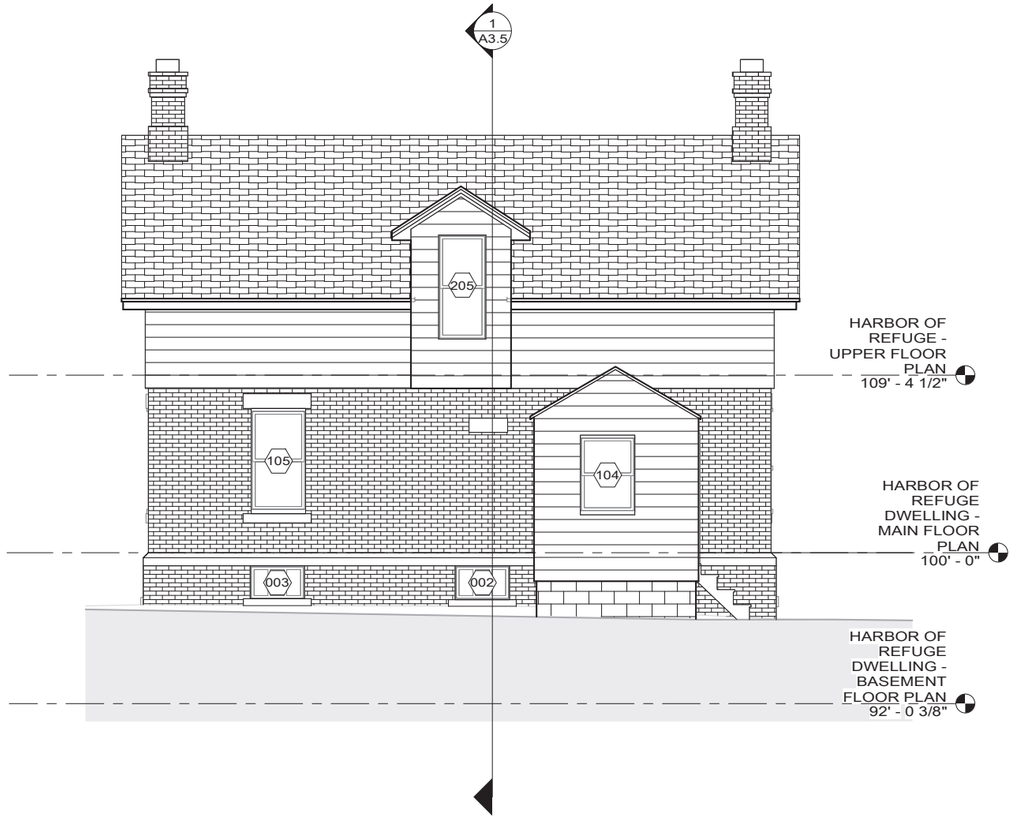
DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A3.3	TITLE OF SHEET HARBOR OF REFUGE DWELLING - EXT. BUILDING ELEV. GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 25 OF 33

5/1/2020 6:38:08 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 A3.4 HARBOR OF REFUGE - SOUTH ELEVATION

SCALE A



2 A3.4 HARBOR OF REFUGE - WEST ELEVATION

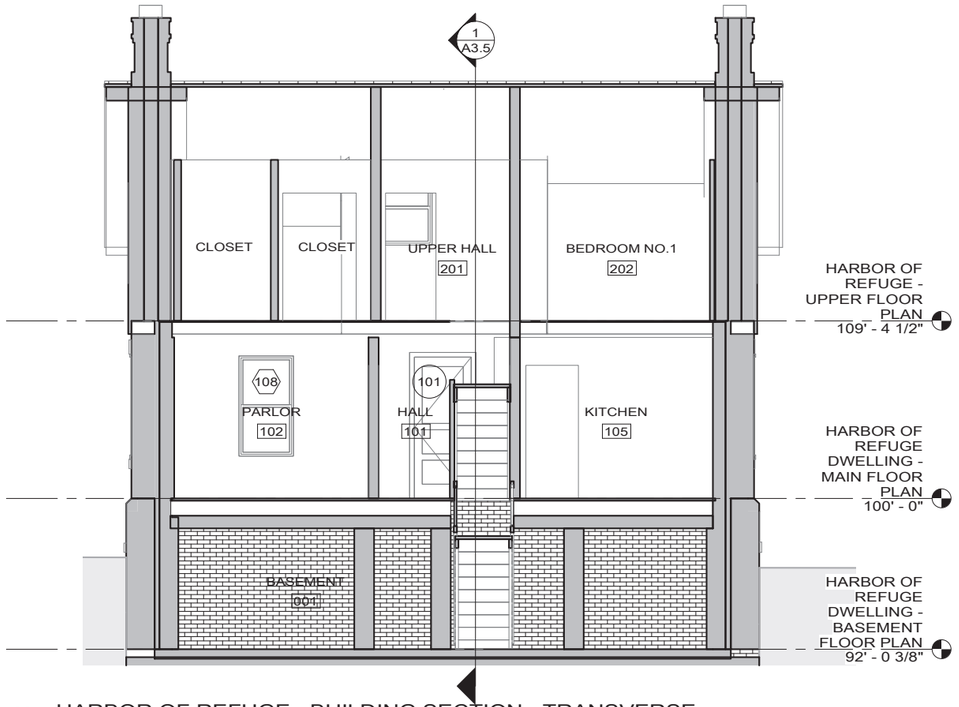
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

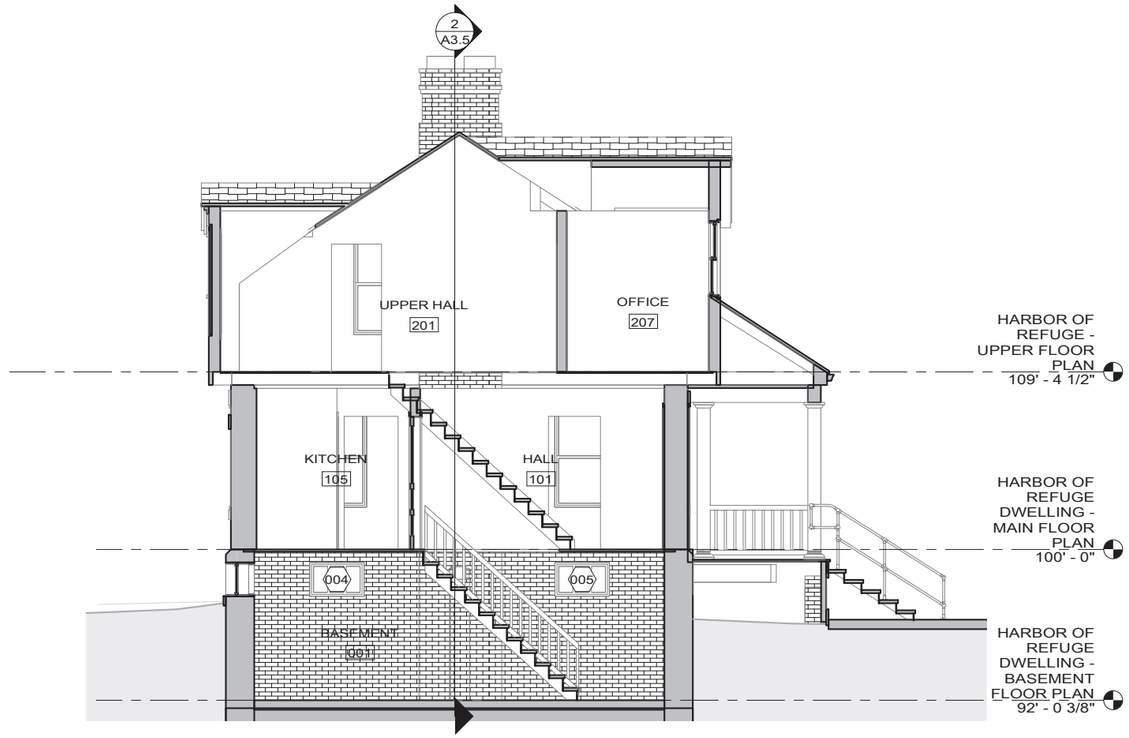
DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A3.4	TITLE OF SHEET HARBOR OF REFUGE DWELLING - EXT. BUILDING ELEV. GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 26 OF 33

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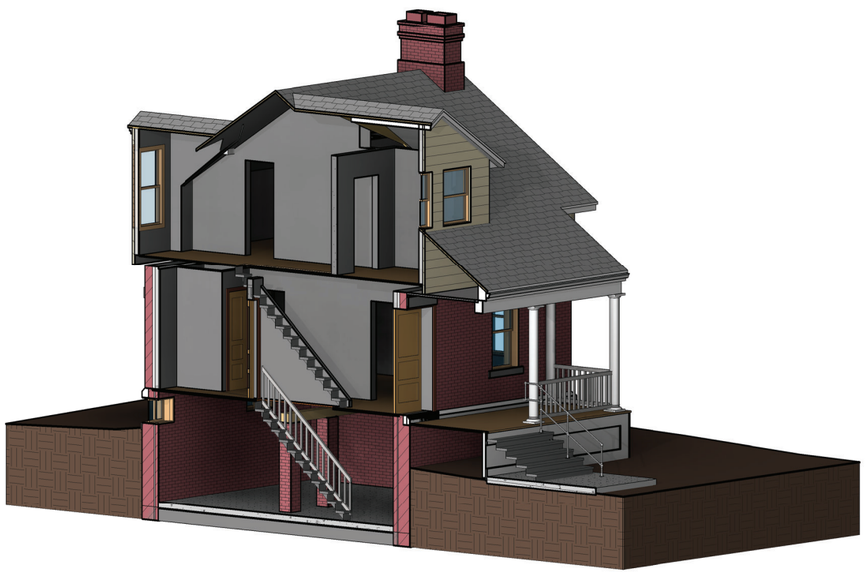
2 A3.5 HARBOR OF REFUGE - BUILDING SECTION - TRANSVERSE

SCALE A



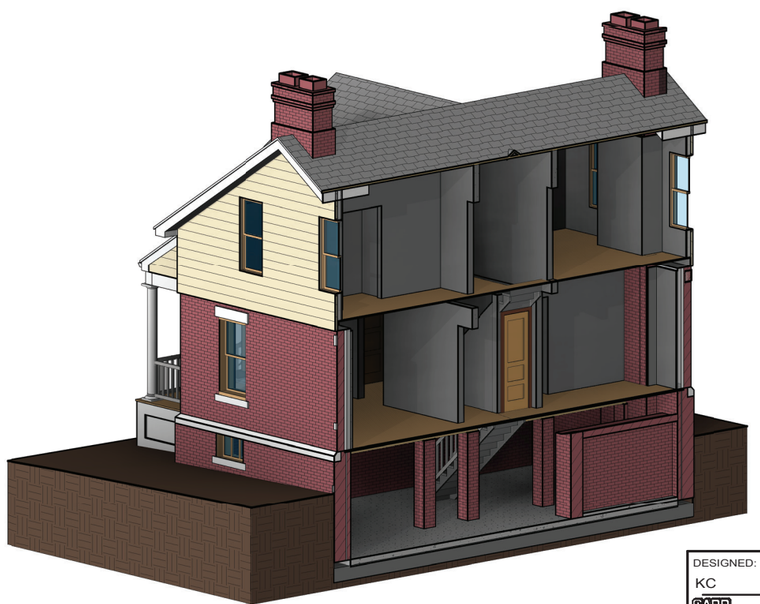
1 A3.5 HARBOR OF REFUGE - BUILDING SECTION - LONGITUDNAL

SCALE A



3 A3.5 HARBOR OF REFUGE - ISO-1 SECTION

N.T.S.



4 A3.5 HARBOR OF REFUGE - ISO-2 SECTION

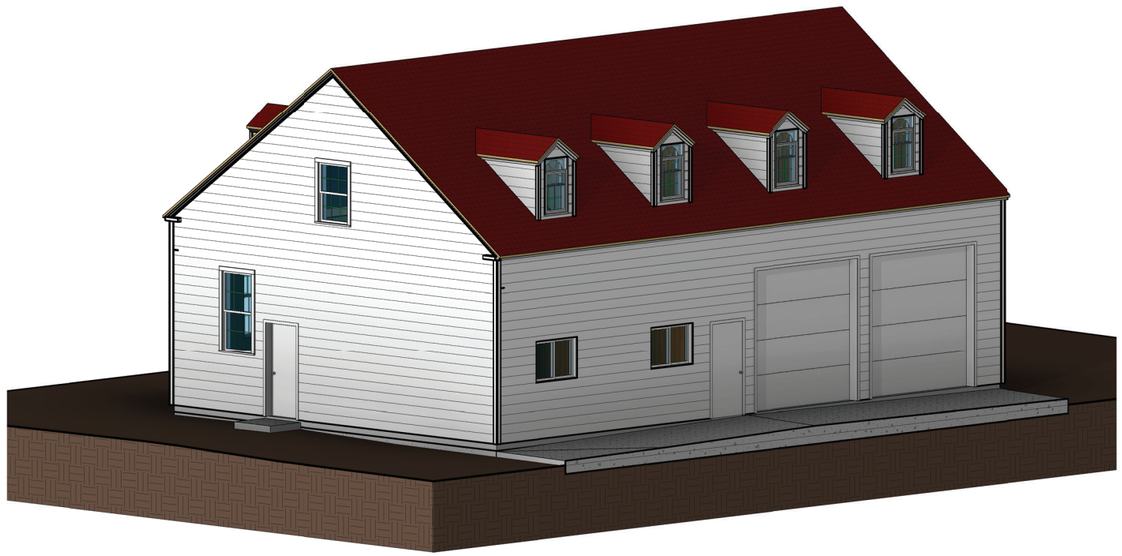
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SCALE A 4 0 4 8

SCALE OF FEET

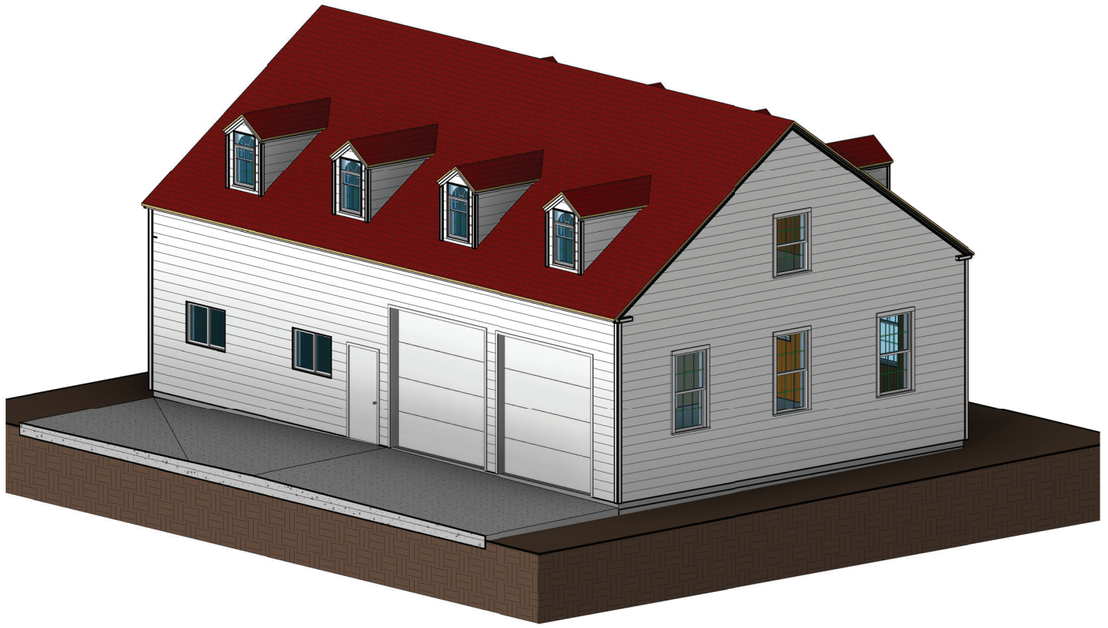
DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A3.5	TITLE OF SHEET HARBOR OF REFUGE DWELLING - BUILDING SECTIONS GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 27 OF 33

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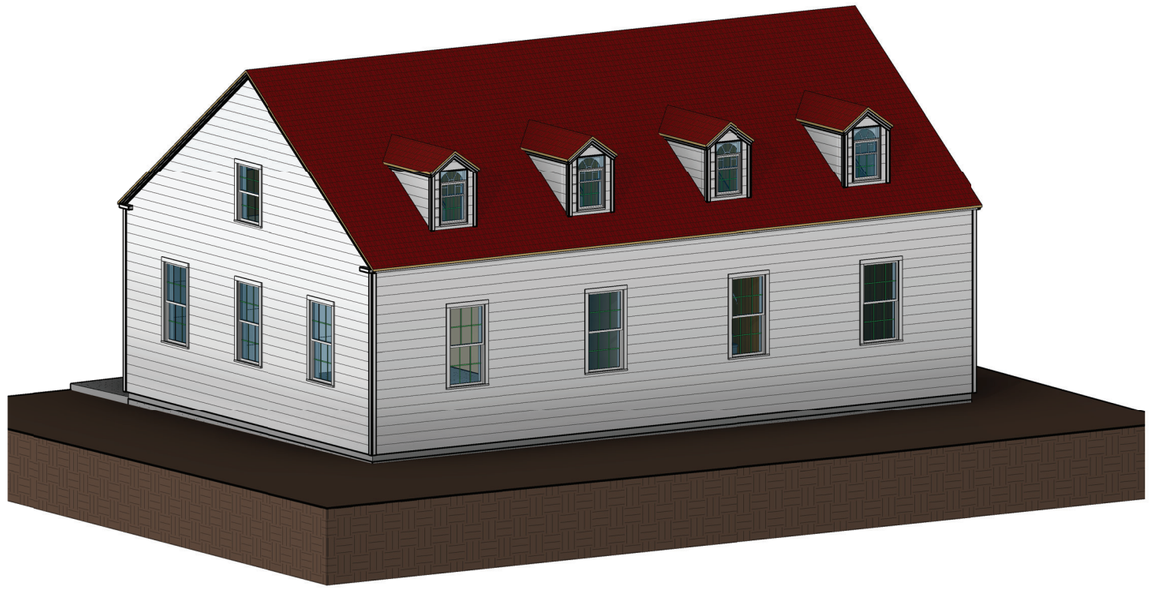
2 A4.0 EQUIPMENT BUILDING -ISO-2

N.T.S.



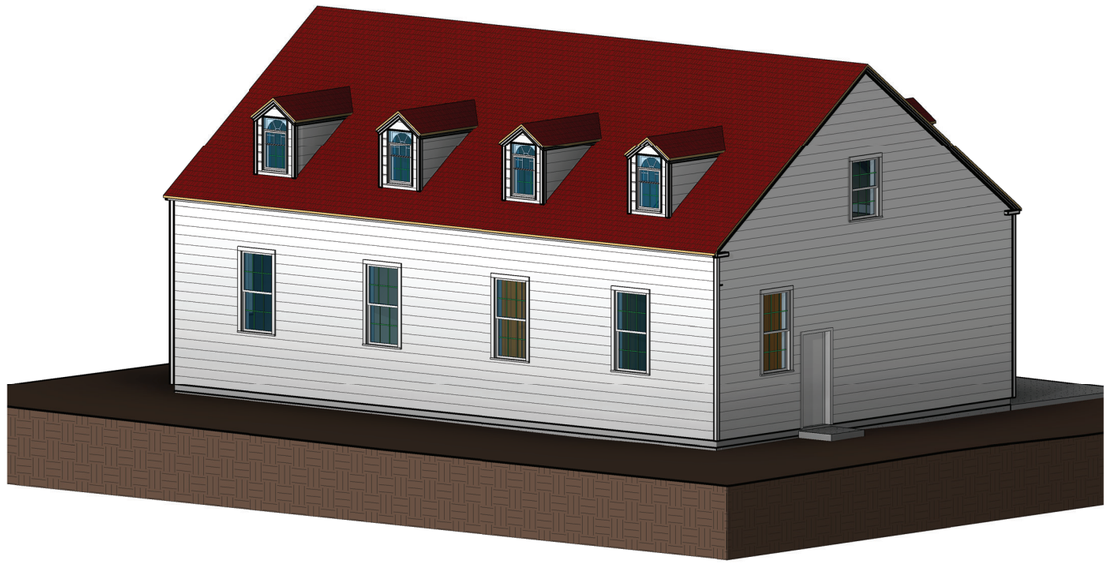
3 A4.0 EQUIPMENT BUILDING - ISO-3

N.T.S.



4 A4.0 EQUIPMENT BUILDING - ISO-4

N.T.S.



1 A4.0 EQUIPMENT BUILDING - ISO-1

N.T.S.

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

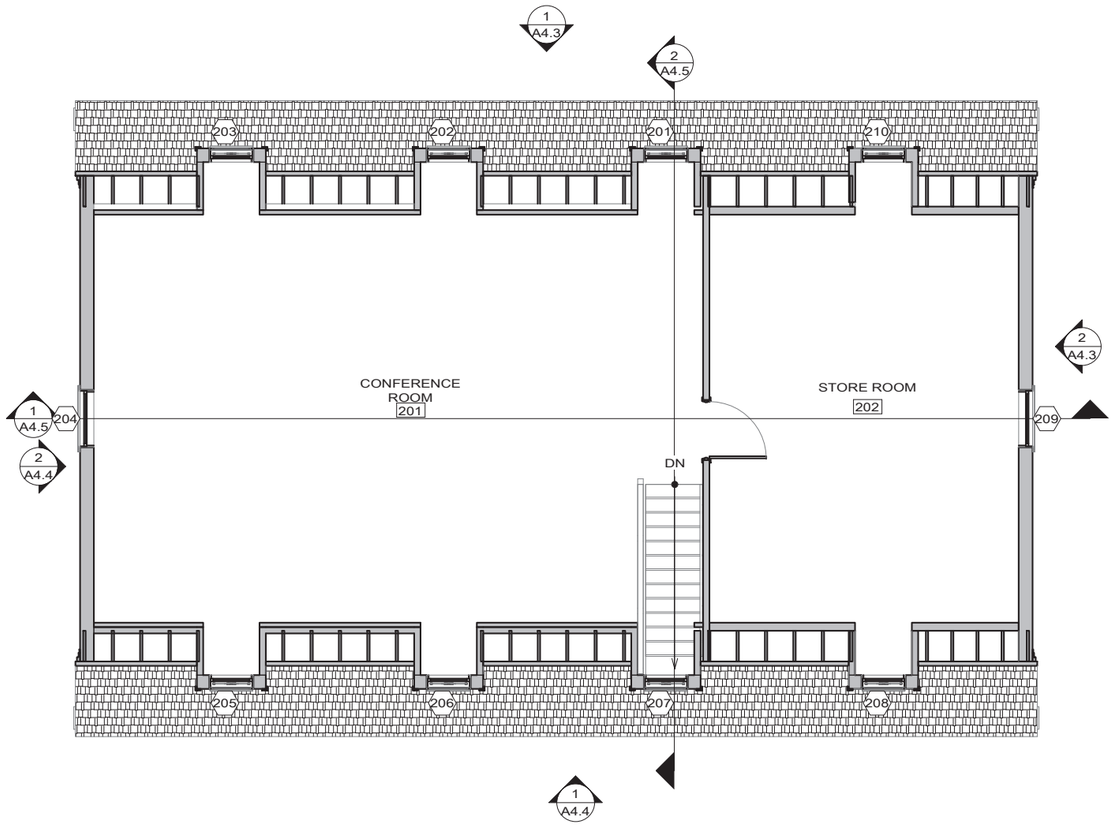
SUB SHEET NO. A4.0

TITLE OF SHEET
EQUIPMENT BUILDING - BUILING ISO s

GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

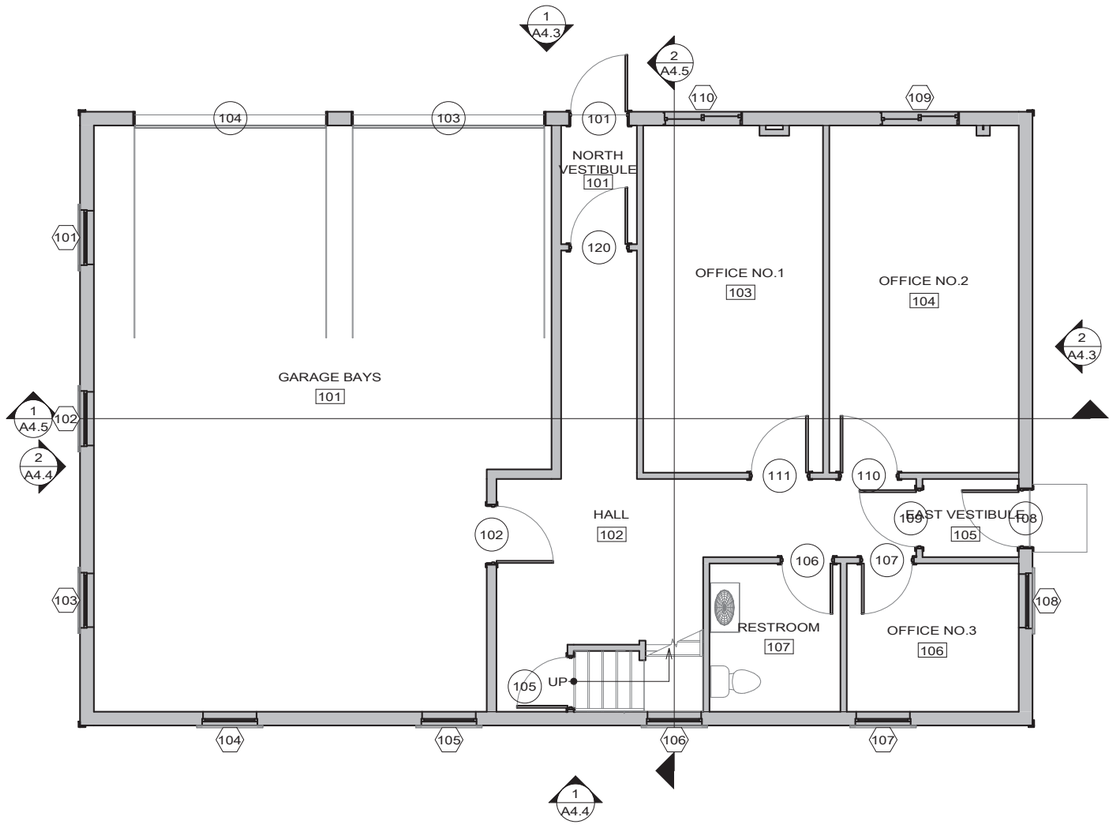
DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 28 OF 33

5/1/2020 6:38:25 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



2 A4.1 EQUIPMENT BUILDING - 2ND FLOOR PLAN

SCALE A



1 A4.1 EQUIPMENT BUILDING - MAIN FLOOR PLAN

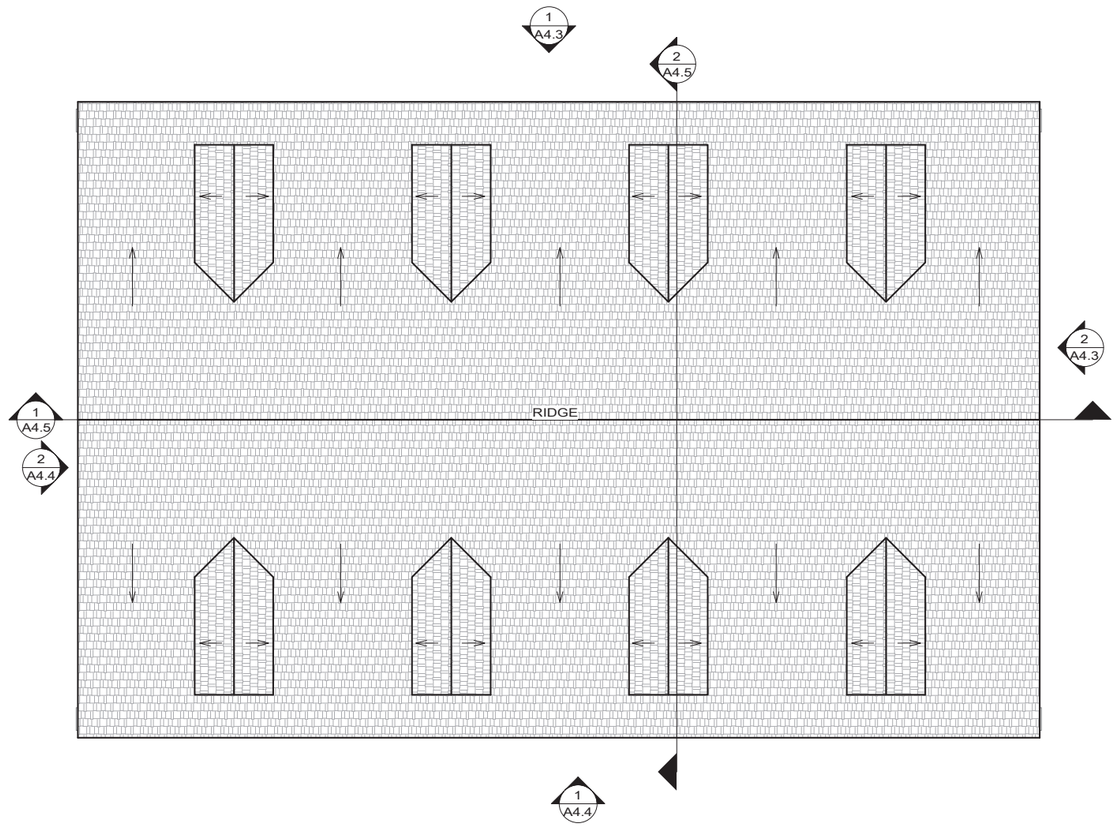
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

PRELIMINARY **100 % EXIST. COND.** NOT FOR CONSTRUCTION	DESIGNED: KC CADD: DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A4.1	TITLE OF SHEET EQUIPMENT BUILDING - MAIN FLOOR AND UPPER PLANS GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 29 OF 33

5/1/2020 6:38:26 PM C:\DAM-Stuff\Autocad Save Location\Revit\2019150 - Grand Marais - Master Plan - v18_millerdam.rvt



1 / A4.2 EQUIPMENT BUILDING - ROOF PLAN

SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

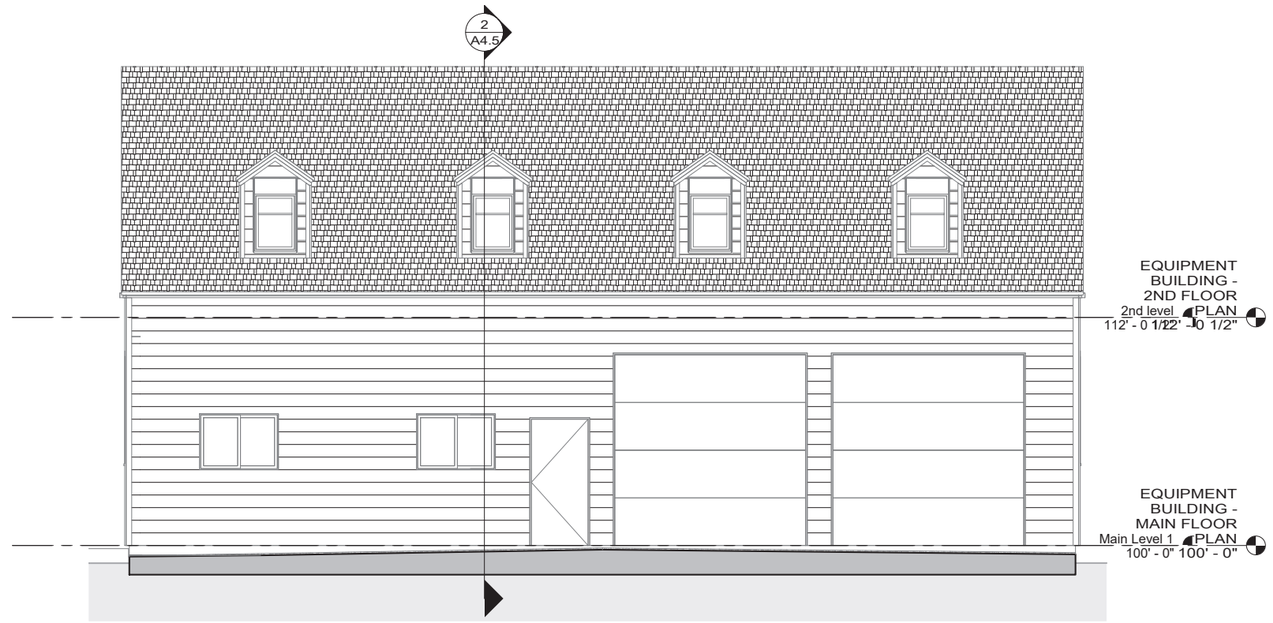
SUB SHEET NO. A4.2

TITLE OF SHEET
EQUIPMENT BUILDING - ROOF PLAN

GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

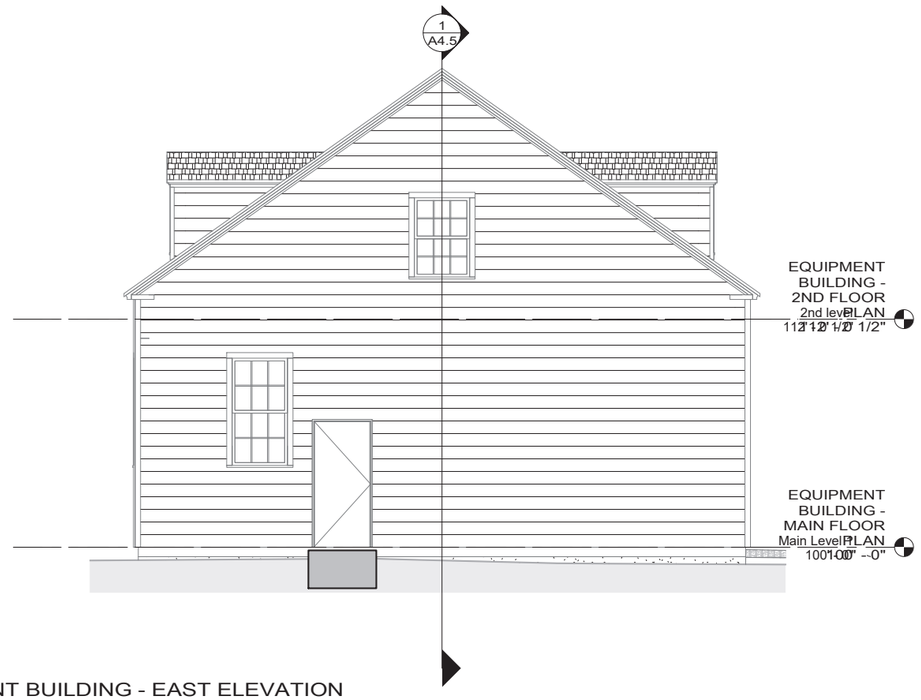
DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 30 OF 33

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1 A4.3 EQUIPMENT BUILDING - NORTH ELEVATION

SCALE A



2 A4.3 EQUIPMENT BUILDING - EAST ELEVATION

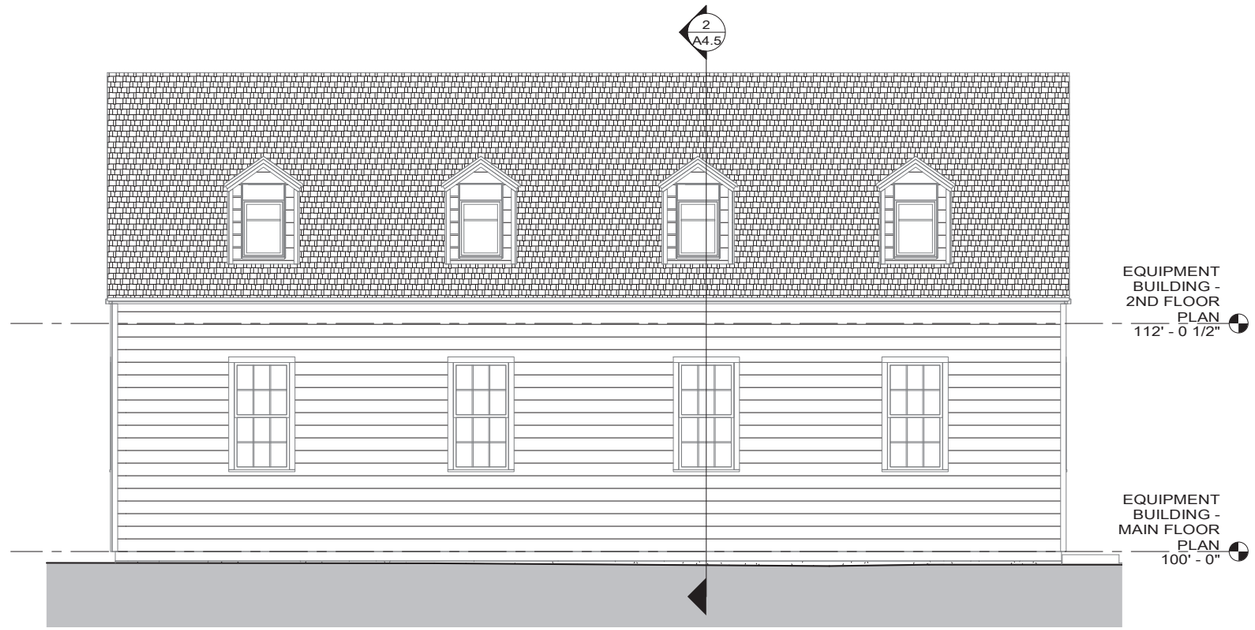
SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A4.3	TITLE OF SHEET EQUIPMENT BUILDING - EXTERIOR BUILDING ELEVATIONS GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 31 OF 33

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1 A4.4 EQUIPMENT BUILDING - SOUTH ELEVATION

SCALE A



2 A4.4 EQUIPMENT BUILDING - WEST ELEVATION

SCALE A

SCALE A 4 0 4 8

SCALE OF FEET

PRELIMINARY
100 % EXIST. COND.
NOT FOR CONSTRUCTION

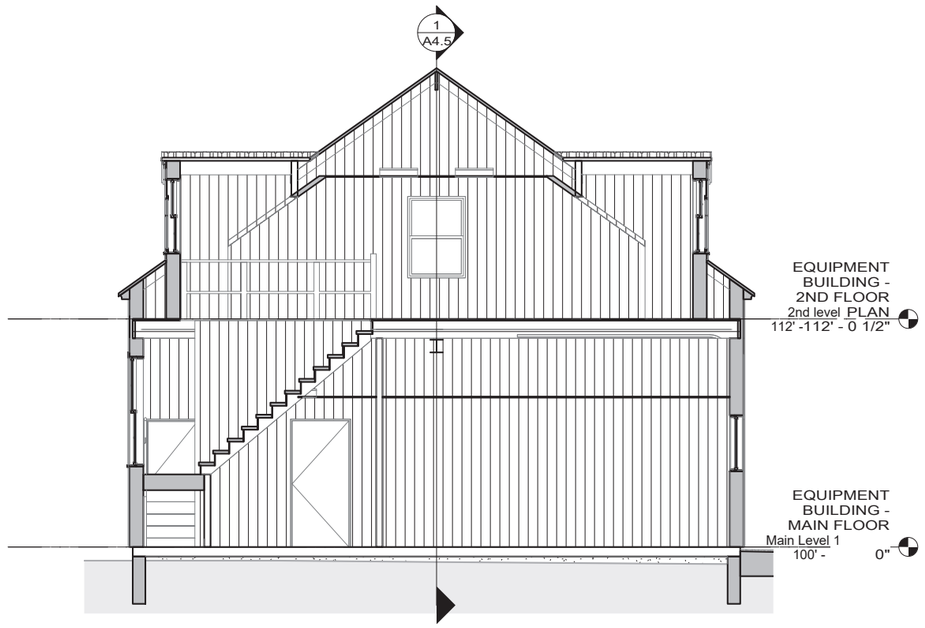
DESIGNED: KC
CADD: DAM
TECH REVIEW: KC & EH
DATE: 05/01/2020

SUB SHEET NO. A4.4

TITLE OF SHEET
EQUIPMENT BUILDING - EXTERIOR BUILING ELEVATIONS
GRAND MARAIS HARBOR
PICTURED ROCK NATIONAL LAKESHORE

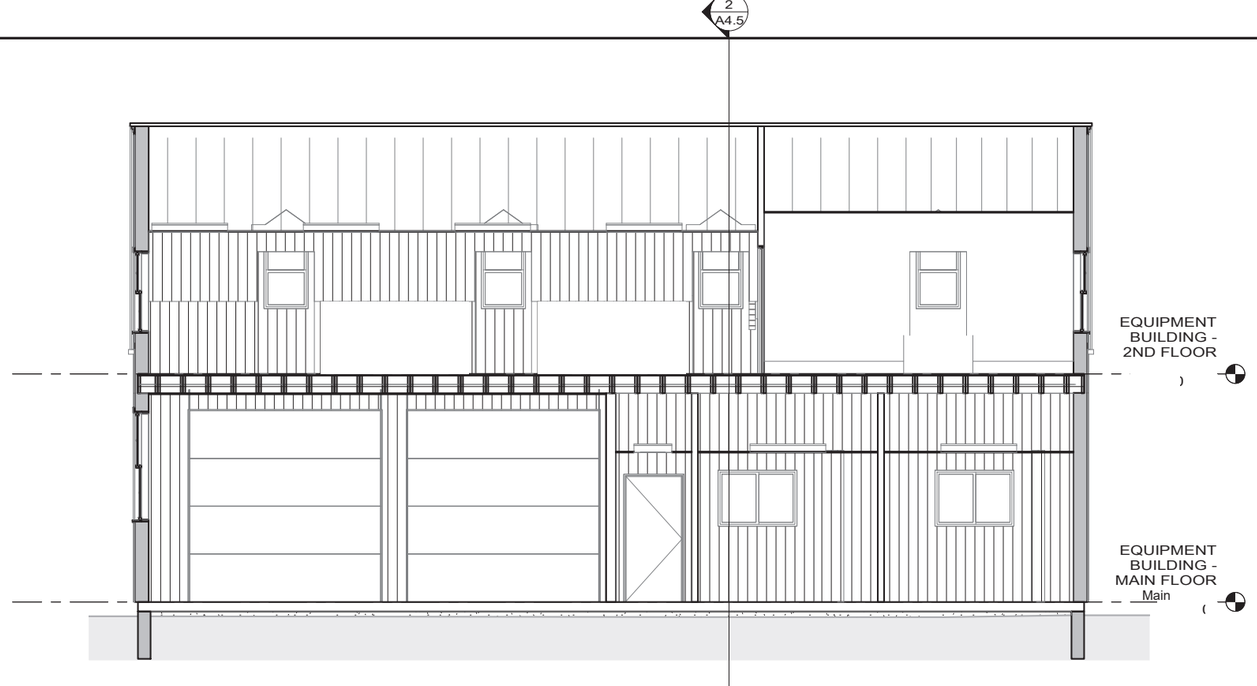
DRAWING NO. 625 XXX
PMIS/PKG NO. 227908
SHEET 32 OF 33

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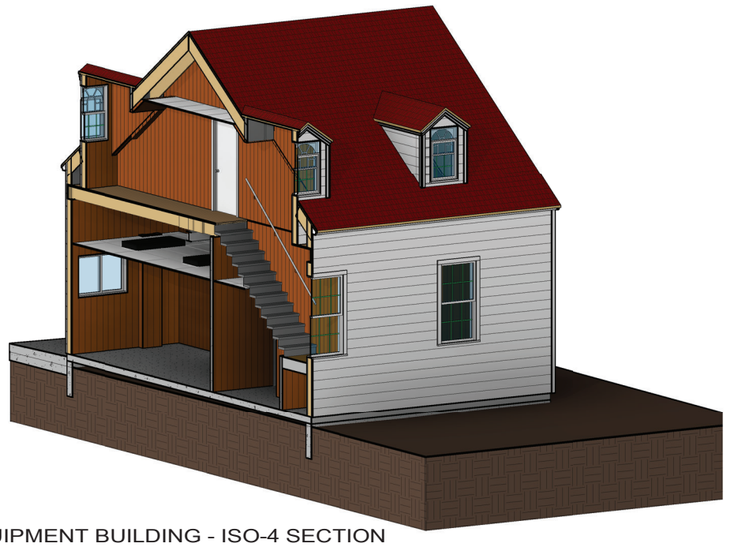
2 A4.5 EQUIPMENT BUILDING - BUILDING SECTION - TRANSVERE

SCALE A

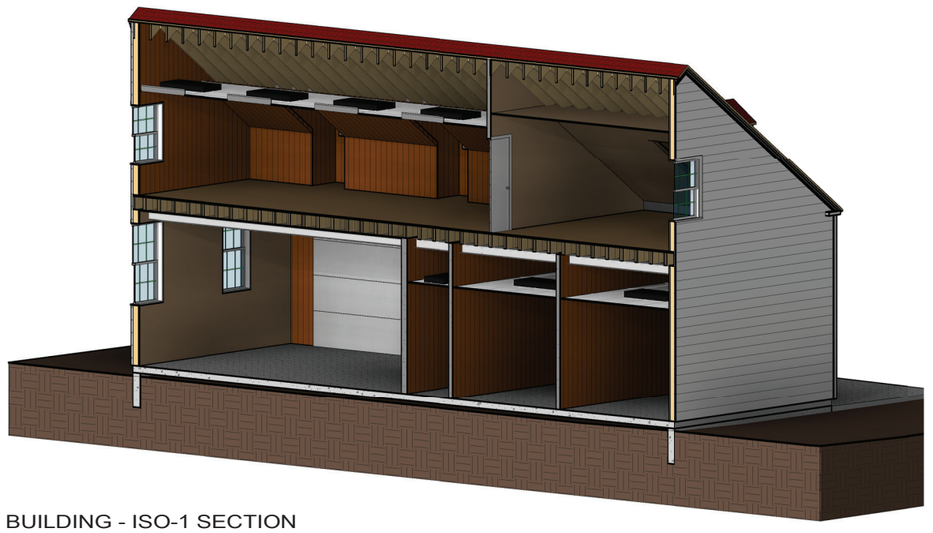


1 A4.5 EQUIPMENT BUILDING - BUILDING SECTION - LONGITUDNAL

SCALE A



4 A4.5 EQUIPMENT BUILDING - ISO-4 SECTION



3 A4.5 EQUIPMENT BUILDING - ISO-1 SECTION

SCALE A 4 0 4 8

SCALE OF FEET

	DESIGNED: KC CADD DAM TECH REVIEW: KC & EH DATE: 05/01/2020	SUB SHEET NO. A4.5	TITLE OF SHEET EQUIPMENT BUILDING - BUILDING SECTIONS GRAND MARAIS HARBOR PICTURED ROCK NATIONAL LAKESHORE	DRAWING NO. 625 XXX PMIS/PKG NO. 227908 SHEET 33 OF 33

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Appendix B. Cost Estimate

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

BASIS OF ESTIMATE

PROJECT INFORMATION

Project:	Grand Marais USCG Life Saving Station - HSR
Park:	Pictured Rock National Lakeshore
Park Alpha:	PIRO
PMIS Number:	227908
Estimate Date:	Nov 05, 2020 - v1.7
Prepared By:	Mark D. Hinrichs
Company:	ACC Cost Consultants, LLC
Address:	8060 SW Pfaffle St., Suite 110
City, State Zip:	Tigard, Oregon 97223
Phone:	503-718-0075

BACKGROUND SUPPORTING MATERIAL (Scope of Work):

This Historic Structures Report (HSR) presents a planning document for the historic buildings at Pictured Rocks National Lakeshore in Munising, Michigan. It identifies characteristics and features that convey the historic significance and character of the Station Dwelling, Officer in Charge Dwelling, Harbor of Refuge Dwelling, and Equipment Building and provides a plan for long term preservation and stewardship.

SOURCE OF COST DATA:

Source of cost data is based on ACC's work history along with ACC's database of past and current projects. The Means City Cost Index adjusts for location factor and pricing. Pricing involves contacting local suppliers and vendors for price checks. This estimate is formulated on the estimator's professional judgment and experience. This estimate makes no warranty, expressed or implied, that the quantities, bids or the negotiated cost of the work will not vary from the estimator's opinion of probable construction cost.

ESTIMATE ASSUMPTIONS:

The cost estimate is based on the 95% HSR dated June 2020 and the recommended treatments within the HSR. Estimate assumes construction to take place 2021 for escalation purposes.

MAJOR CHANGES FROM PREVIOUS ESTIMATE:

N/A

DESCRIPTION OF MARK-UP & ADD-ONS:

Location Factor:	-18.00%	Basis of 2020 RS means = 102.4. Published Index Location, assume Traverse City, MI 86.8. Factor = 102.4/86.8= -1.18
Remoteness Factor:	21.60%	Site is 216 miles from published commercial center. Allow 1% per 10 miles - 216 / 10 = 21.6%
Wage Rate Factor:	0.00%	Not Required
State & Local Taxes:	6.00%	State (6.0%) Local (0%) Total 6.0%
Design Contingency:	25.00%	Preliminary Design (PD) documents consist of a Historic Structures Report and Treatment Report . Relatively simple scope but not completely defined, warrants a 25% contingency.
Standard. General Conditions:	17.50%	Typical range 10% to 20%, use 15% assuming all buildings to be done as one project.

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

BASIS OF ESTIMATE

PROJECT INFORMATION

Project: Grand Marais USCG Life Saving Station - HSR
Park: Pictured Rock National Lakeshore
Park Alpha: PIRO
PMIS Number: 227908
Estimate Date: Nov 05, 2020 - v1.7

Government General Conditions:	5.00%	Typical range 5% to 10%, assume 5% for this project.
Historic Preservation Factor:	5.00%	All structures are historical and care will need to be taken during construction.
Contractor Overhead:	10.00%	Range is 10% to 25%. Use 10% for this submittal. Should be medium sized project.
Contractor Profit:	15.00%	Range is 10% to 25%. Use 10% for this submittal. There will be custom remodeling work.
Bonds and Permits:	3.176%	Bonds 1.105%, Insurance 1.039% & Permits 1.032%
Contracting Method Adjustment:	15.00%	verify procurement method
Annual Inflation Escalation Factor:	4.00%	Projected annual inflation rate.
Time Until Project Midpoint (Months)	12	Assume mid-point is November 2021.

OTHER COMMENTS:

This estimate is for direct construction cost only. It does not include furnishings & equipment, architect and engineer design fees, consultant fees, inspection and testing fees, plan check fees, hazardous material testing and removal, financing costs, nor any other normally associated development costs. This estimate assumes a sole-source general contractor. This is a probable cost estimate based on in-progress documentation provided by the architect. The actual bid documents will vary from this estimate due to document completion, detailing, specification, addendum, etc. The estimator has no control over the cost or availability of labor, equipment, materials, over market conditions or contractor's method of pricing, contractor's construction logistics and scheduling.

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

PROJECT COST SUMMARY

Project: Grand Marais USCG Life Saving Station - HSR
Park: Pictured Rock National Lakeshore
Alpha: PIRO
PMIS: 227908

Estimate By: Mark D. Hinrichs
Date: Nov 05, 2020 - v1.7

Reviewed By: SJP
Date: 11/05/20

Item No.	Description	Quantity	Unit	Cost/Unit	Total	Total	Total	Total	Total
1	Station Dwelling	6,614	SF	$202	$1,334,204				
2	O.I.C. Dwelling	1,988	SF	$184		$365,145			
3	Harbor of Refuge Dwelling	2,496	SF	$219			$545,826		
4	Equipment Building	2,861	SF	$221				$631,414	
5	Alternate 1 - Central Generator	1	VALUE	$24,720					$24,720
6	Not Used								
	Subtotal Direct Construction Costs				**$1,334,204**	**$365,145**	**$545,826**	**$631,414**	**$24,720**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**	**$0**	**$0**	**$0**	**$0**
	Direct Cost Subtotal without GFP				**$1,334,204**	**$365,145**	**$545,826**	**$631,414**	**$24,720**
	Published Location Factor	-18.00%			-$240,157	-$65,726	-$98,249	-$113,655	-$4,450
	Remoteness Factor	21.60%			$288,188	$78,871	$117,898	$136,386	$5,340
	Federal Wage Rate Factor	0.00%			$0	$0	$0	$0	$0
	State & Local Taxes - 40% of Direct Costs	6.00%			$32,021	$8,763	$13,100	$15,154	$593
	Design Contingency	25.00%			$333,551	$91,286	$136,456	$157,854	$6,180
	Total Direct Construction Costs				**$1,747,807**	**$478,340**	**$715,031**	**$827,153**	**$32,383**
	Standard General Conditions	17.50%			$305,866	$83,710	$125,131	$144,752	$5,667
	Government General Conditions	5.00%			$87,390	$23,917	$35,752	$41,358	$1,619
	Historic Preservation Factor	5.00%			$87,390	$23,917	$35,752	$41,358	$1,619
	Subtotal NET Construction Cost				**$2,228,454**	**$609,884**	**$911,665**	**$1,054,620**	**$41,289**
	Overhead	10.00%			$222,845	$60,988	$91,167	$105,462	$4,129
	Profit	15.00%			$334,268	$91,483	$136,750	$158,193	$6,193
	Estimated NET Construction Cost				**$2,785,567**	**$762,355**	**$1,139,581**	**$1,318,275**	**$51,611**
	Bonds & Permits	3.18%			**$88,470**	**$24,212**	**$36,193**	**$41,868**	**$1,639**
	Contracting Method Adjustment	15.00%			$417,835	$114,353	$170,937	$197,741	$7,742
	Inflation Escalation	12	Months	4.00%	$131,675	$36,037	$53,868	$62,315	$2,440
	Total Estimated NET Cost of Construction				**$3,423,547**	**$936,957**	**$1,400,580**	**$1,620,200**	**$63,431**

* GFP costs are only used when the Government pre-purchases items, or provides other materials out of Government inventory, to be installed by contractor. Adjustments and Markup on GFP only include Inflation Escalation; No other adjustment factors or O&P markup have been applied.

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item 1	**Station Dwelling**	**Total Cost:**	$1,334,204

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
A10		**FOUNDATIONS**					
Level 3 Code	**L**	**pour back at concrete slab**	**4**	**SF**	$ 55.00	$220	
Level 3 Code	M	pour back at concrete slab	4	SF	$ 40.00	$160	
Level 3 Code	E	pour back at concrete slab	4	SF	$ 5.00	$20	
Level 3 Code	**L**	**dowel slab - new to existing**	**8**	**EA**	$ 27.50	$220	2 ea side at 16"oc
Level 3 Code	M	dowel slab - new to existing	8	EA	$ 20.00	$160	
Level 3 Code	E	dowel slab - new to existing	8	EA	$ 2.50	$20	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FOUNDATIONS	**1**	**VALUE**	**$ 800.00**	**$800**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B20		**EXTERIOR CLOSURE**					
Level 3 Code	**L**	**new roof portico over ABA entry**	**30**	**SF**	$ 82.50	$2,475	
Level 3 Code	M	new roof portico over ABA entry	30	SF	$ 60.00	$1,800	
Level 3 Code	E	new roof portico over ABA entry	30	SF	$ 7.50	$225	
Level 3 Code	**L**	**replace column bases at front porch**	**12**	**EA**	$ 68.75	$825	
Level 3 Code	M	replace column bases at front porch	12	EA	$ 50.00	$600	
Level 3 Code	E	replace column bases at front porch	12	EA	$ 6.25	$75	
Level 3 Code	**L**	**repair lower portion of columns**	**12**	**EA**	$ 137.50	$1,650	
Level 3 Code	M	repair lower portion of columns	12	EA	$ 100.00	$1,200	
Level 3 Code	E	repair lower portion of columns	12	EA	$ 12.50	$150	
Level 3 Code	**L**	**repair / repaint guardrail at front porch**	**25**	**LF**	$ 13.75	$344	
Level 3 Code	M	repair / repaint guardrail at front porch	25	LF	$ 10.00	$250	
Level 3 Code	E	repair / repaint guardrail at front porch	25	LF	$ 1.25	$31	
Level 3 Code	**L**	**rebuild guardrail above front porch**	**40**	**LF**	$ 27.50	$1,100	
Level 3 Code	M	rebuild guardrail above front porch	40	LF	$ 20.00	$800	
Level 3 Code	E	rebuild guardrail above front porch	40	LF	$ 2.50	$100	
Level 3 Code	**L**	**paint guardrail above front porch**	**40**	**LF**	$ 11.00	$440	
Level 3 Code	M	paint guardrail above front porch	40	LF	$ 8.00	$320	
Level 3 Code	E	paint guardrail above front porch	40	LF	$ 1.00	$40	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**add custom metal cap at top of guardrail**	**40**	**LF**	$ 22.00	$880
Level 3 Code	M	add custom metal cap at top of guardrail	40	LF	$ 16.00	$640
Level 3 Code	E	add custom metal cap at top of guardrail	40	LF	$ 2.00	$80
Level 3 Code	**L**	**install shingle siding**	**2350**	**SF**	$ 8.25	$19,388
Level 3 Code	M	install shingle siding	2350	SF	$ 6.00	$14,100
Level 3 Code	E	install shingle siding	2350	SF	$ 0.75	$1,763
Level 3 Code	**L**	**paint shingle siding**	**2350**	**SF**	$ 0.83	$1,939
Level 3 Code	M	paint shingle siding	2350	SF	$ 0.60	$1,410
Level 3 Code	E	paint shingle siding	2350	SF	$ 0.08	$176
Level 3 Code	**L**	**install p.t. plywood cover at west appurtenance**	**40**	**SF**	$ 6.88	$275
Level 3 Code	M	install p.t. plywood cover at west appurtenance	40	SF	$ 5.00	$200
Level 3 Code	E	install p.t. plywood cover at west appurtenance	40	SF	$ 0.63	$25
Level 3 Code	**L**	**paint foundation walls**	**460**	**SF**	$ 0.83	$380
Level 3 Code	M	paint foundation walls	460	SF	$ 0.60	$276
Level 3 Code	E	paint foundation walls	460	SF	$ 0.08	$35
Level 3 Code	**L**	**repair window frames / sills**	**825**	**LF**	$ 5.50	$4,538
Level 3 Code	M	repair window frames / sills	825	LF	$ 4.00	$3,300
Level 3 Code	E	repair window frames / sills	825	LF	$ 0.50	$413
Level 3 Code	**L**	**replace windows - insulated wood**	**55**	**EA**	$ 990.00	$54,450
Level 3 Code	M	replace windows - insulated wood	55	EA	$ 720.00	$39,600
Level 3 Code	E	replace windows - insulated wood	55	EA	$ 90.00	$4,950
Level 3 Code	**L**	**door 101 - rehabilitate**	**1**	**EA**	$ 550.00	$550
Level 3 Code	M	door 101 - rehabilitate	1	EA	$ 400.00	$400
Level 3 Code	E	door 101 - rehabilitate	1	EA	$ 50.00	$50
Level 3 Code	**L**	**door 104 - rehabilitate**	**1**	**EA**	$ 1,925.00	$1,925
Level 3 Code	M	door 104 - rehabilitate	1	EA	$ 1,400.00	$1,400
Level 3 Code	E	door 104 - rehabilitate	1	EA	$ 175.00	$175
Level 3 Code	**L**	**new ABA entry door**	**1**	**EA**	$ 1,650.00	$1,650
Level 3 Code	M	new ABA entry door	1	EA	$ 1,200.00	$1,200
Level 3 Code	E	new ABA entry door	1	EA	$ 150.00	$150
Level 3 Code	**L**	**door 401 - rehabilitate - new storm door**	**1**	**EA**	$ 1,925.00	$1,925
Level 3 Code	M	door 401 - rehabilitate - new storm door	1	EA	$ 1,400.00	$1,400
Level 3 Code	E	door 401 - rehabilitate - new storm door	1	EA	$ 175.00	$175
Level 3 Code	**L**	**head flashing at windows**	**165**	**LF**	$ 8.25	$1,361
Level 3 Code	M	head flashing at windows	165	LF	$ 6.00	$990
Level 3 Code	E	head flashing at windows	165	LF	$ 0.75	$124
Level 3 Code	**L**	**install new fire escape ladder**	**1**	**EA**	$ 1,925.00	$1,925

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	M	install new fire escape ladder	1	EA	$ 1,400.00	$1,400	
Level 3 Code	E	install new fire escape ladder	1	EA	$ 175.00	$175	
Level 3 Code	**L**	**paint soffit at tower**	**112**	**SF**	$ 0.83	$92	
Level 3 Code	M	paint soffit at tower	112	SF	$ 0.60	$67	
Level 3 Code	E	paint soffit at tower	112	SF	$ 0.08	$8	
Level 3 Code	**L**	**repoint all faces of chimney**	**70**	**SF**	$ 16.50	$1,155	
Level 3 Code	M	repoint all faces of chimney	70	SF	$ 12.00	$840	
Level 3 Code	E	repoint all faces of chimney	70	SF	$ 1.50	$105	
Level 3 Code	**L**	**install chimney cap**	**1**	**EA**	$ 316.25	$316	
Level 3 Code	M	install chimney cap	1	EA	$ 230.00	$230	
Level 3 Code	E	install chimney cap	1	EA	$ 28.75	$29	
Level 3 Code	**L**	**paint guardrail at tower exterior**	**60**	**LF**	$ 5.50	$330	
Level 3 Code	M	paint guardrail at tower exterior	60	LF	$ 4.00	$240	includes rust inhibitor
Level 3 Code	E	paint guardrail at tower exterior	60	LF	$ 0.50	$30	includes rust inhibitor
Level 3 Code	**L**	**paint columns**	**12**	**EA**	$ 137.50	$1,650	
Level 3 Code	M	paint columns	12	EA	$ 100.00	$1,200	
Level 3 Code	E	paint columns	12	EA	$ 12.50	$150	
Level 3 Code	**L**	**install louvered wood shutters**	**1008**	**SF**	$ 44.00	$44,352	
Level 3 Code	M	install louvered wood shutters	1008	SF	$ 32.00	$32,256	
Level 3 Code	E	install louvered wood shutters	1008	SF	$ 4.00	$4,032	
Level 3 Code	**L**	**lead based paint abatement**	**4450**	**SF**	$ 1.38	$6,119	
Level 3 Code	M	lead based paint abatement	4450	SF	$ 1.00	$4,450	
Level 3 Code	E	lead based paint abatement	4450	SF	$ 0.13	$556	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL EXTERIOR CLOSURE	**1**	**VALUE**	**$ 276,423.00**	**$276,423**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B30		**ROOFING**					
Level 3 Code	**L**	**replace damaged roof sheathing**	**310**	**SF**	$ 3.03	$938	
Level 3 Code	M	replace damaged roof sheathing	310	SF	$ 2.20	$682	
Level 3 Code	E	replace damaged roof sheathing	310	SF	$ 0.28	$85	
Level 3 Code	**L**	**install new roofing**	**3100**	**SF**	$ 11.00	$34,100	
Level 3 Code	M	install new roofing	3100	SF	$ 8.00	$24,800	
Level 3 Code	E	install new roofing	3100	SF	$ 1.00	$3,100	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**install new membrane roofing**	**112**	**SF**	**$ 11.00**	$1,232	
Level 3 Code	M	install new membrane roofing	112	SF	$ 8.00	$896	
Level 3 Code	E	install new membrane roofing	112	SF	$ 1.00	$112	
Level 3 Code	**L**	**install fall protection**	**6**	**EA**	**$ 247.50**	$1,485	
Level 3 Code	M	install fall protection	6	EA	$ 180.00	$1,080	
Level 3 Code	E	install fall protection	6	EA	$ 22.50	$135	
Level 3 Code	**L**	**gutters - 4" half round**	**125**	**LF**	**$ 5.50**	$688	
Level 3 Code	M	gutters - 4" half round	125	LF	$ 4.00	$500	
Level 3 Code	E	gutters - 4" half round	125	LF	$ 0.50	$63	
Level 3 Code	**L**	**gutters - 5" half round**	**95**	**LF**	**$ 6.60**	$627	
Level 3 Code	M	gutters - 5" half round	95	LF	$ 4.80	$456	
Level 3 Code	E	gutters - 5" half round	95	LF	$ 0.60	$57	
Level 3 Code	**L**	**gutter - 4" ogee**	**56**	**LF**	**$ 7.43**	$416	tower gutter
Level 3 Code	M	gutter - 4" ogee	56	LF	$ 5.40	$302	
Level 3 Code	E	gutter - 4" ogee	56	LF	$ 0.68	$38	
Level 3 Code	**L**	**replace flashing**	**3100**	**SF**	**$ 1.38**	$4,263	
Level 3 Code	M	replace flashing	3100	SF	$ 1.00	$3,100	
Level 3 Code	E	replace flashing	3100	SF	$ 0.13	$388	
Level 3 Code	**L**	**downspouts**	**132**	**LF**	**$ 8.25**	$1,089	
Level 3 Code	M	downspouts	132	LF	$ 6.00	$792	
Level 3 Code	E	downspouts	132	LF	$ 0.75	$99	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL ROOFING	**1**	**VALUE**	**$ 81,521.00**	**$81,521**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C10		**INTERIOR CONSTRUCTION**					
Level 3 Code	**L**	**casework - adjust drawers**	**4**	**EA**	**$ 55.00**	$220	
Level 3 Code	M	casework - adjust drawers	4	EA	$ 40.00	$160	
Level 3 Code	E	casework - adjust drawers	4	EA	$ 5.00	$20	
Level 3 Code	**L**	**casework - wood base cabinets**	**23**	**LF**	**$ 220.00**	$5,060	
Level 3 Code	M	casework - wood base cabinets	23	LF	$ 160.00	$3,680	
Level 3 Code	E	casework - wood base cabinets	23	LF	$ 20.00	$460	
Level 3 Code	**L**	**casework - wood upper cabinets**	**18**	**LF**	**$ 137.50**	$2,475	
Level 3 Code	M	casework - wood upper cabinets	18	LF	$ 100.00	$1,800	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	E	casework - wood upper cabinets	18	LF	$ 12.50	$225	
Level 3 Code	**L**	**plam counter tops**	**46**	**SF**	$ 24.75	$1,139	
Level 3 Code	M	plam counter tops	46	SF	$ 18.00	$828	
Level 3 Code	E	plam counter tops	46	SF	$ 2.25	$104	
Level 3 Code	**L**	**new floor framing at new ABA entry**	**90**	**SF**	$ 11.00	$990	
Level 3 Code	M	new floor framing at new ABA entry	90	SF	$ 8.00	$720	includes floor sheathing
Level 3 Code	E	new floor framing at new ABA entry	90	SF	$ 1.00	$90	includes floor sheathing
Level 3 Code	**L**	**new floor framing at new stairs**	**180**	**SF**	$ 11.00	$1,980	
Level 3 Code	M	new floor framing at new stairs	180	SF	$ 8.00	$1,440	2nd & 3rd floors
Level 3 Code	E	new floor framing at new stairs	180	SF	$ 1.00	$180	2nd & 3rd floors
Level 3 Code	**L**	**install hurricane clips at roof framing**	**20**	**EA**	$ 19.25	$385	
Level 3 Code	M	install hurricane clips at roof framing	20	EA	$ 14.00	$280	at 32"oc
Level 3 Code	E	install hurricane clips at roof framing	20	EA	$ 1.75	$35	at 32"oc
Level 3 Code	**L**	**new interior doors - single**	**7**	**EA**	$ 990.00	$6,930	
Level 3 Code	M	new interior doors - single	7	EA	$ 720.00	$5,040	interior doors
Level 3 Code	E	new interior doors - single	7	EA	$ 90.00	$630	interior doors
Level 3 Code	**L**	**new interior doors - pair**	**1**	**PAIR**	$ 1,210.00	$1,210	
Level 3 Code	M	new interior doors - pair	1	PAIR	$ 880.00	$880	interior doors
Level 3 Code	E	new interior doors - pair	1	PAIR	$ 110.00	$110	interior doors
Level 3 Code	**L**	**adjust door / replace hardware - single door**	**9**	**EA**	$ 192.50	$1,733	
Level 3 Code	M	adjust door / replace hardware - single door	9	EA	$ 140.00	$1,260	interior doors
Level 3 Code	E	adjust door / replace hardware - single door	9	EA	$ 17.50	$158	interior doors
Level 3 Code	**L**	**adjust door / replace hardware - double door**	**4**	**PAIR**	$ 385.00	$1,540	
Level 3 Code	M	adjust door / replace hardware - double door	4	PAIR	$ 280.00	$1,120	interior doors
Level 3 Code	E	adjust door / replace hardware - double door	4	PAIR	$ 35.00	$140	interior doors
Level 3 Code	**L**	**full height partitions, 8' ht.**	**1200**	**SF**	$ 11.00	$13,200	
Level 3 Code	M	full height partitions, 8' ht.	1200	SF	$ 8.00	$9,600	
Level 3 Code	E	full height partitions, 8' ht.	1200	SF	$ 1.00	$1,200	
Level 3 Code	**L**	**install headers at new / relocated openings**	**5**	**EA**	$ 192.50	$963	
Level 3 Code	M	install headers at new / relocated openings	5	EA	$ 140.00	$700	
Level 3 Code	E	install headers at new / relocated openings	5	EA	$ 17.50	$88	
Level 3 Code	**L**	**bathroom accessories - package per restroom**	**4**	**SUM**	$ 412.50	$1,650	
Level 3 Code	M	bathroom accessories - package per restroom	4	SUM	$ 300.00	$1,200	
Level 3 Code	E	bathroom accessories - package per restroom	4	SUM	$ 37.50	$150	
Level 3 Code	**L**	**toilet partition - single standard HDPE**	**3**	**EA**	$ 660.00	$1,980	
Level 3 Code	M	toilet partition - single standard HDPE	3	EA	$ 480.00	$1,440	
Level 3 Code	E	toilet partition - single standard HDPE	3	EA	$ 60.00	$180	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**paint interior walls**	**12500**	**SF**	$ 1.10	$13,750	
Level 3 Code	M	paint interior walls	12500	SF	$ 0.80	$10,000	
Level 3 Code	E	paint interior walls	12500	SF	$ 0.10	$1,250	
Level 3 Code	**L**	**paint interior wood base, window, and door trim**	**1**	**SUM**	$ 2,750.00	$2,750	
Level 3 Code	M	paint interior wood base, window, and door trim	1	SUM	$ 2,000.00	$2,000	
Level 3 Code	E	paint interior wood base, window, and door trim	1	SUM	$ 250.00	$250	
Level 3 Code	**L**	**paint existing interior wood doors, including locker interi**	**42**	**EA**	$ 137.50	$5,775	
Level 3 Code	M	paint existing interior wood doors, including locker interiors	42	EA	$ 100.00	$4,200	
Level 3 Code	E	paint existing interior wood doors, including locker interiors	42	EA	$ 12.50	$525	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL INTERIOR CONSTRUCTION	**1**	**VALUE**	**$ 115,870.00**	**$115,870**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C20		**STAIRCASES**					
Level 3 Code	**L**	**construct egress stair**	**2**	**FLIGHT**	$ 6,600.00	$13,200	
Level 3 Code	M	construct egress stair	2	FLIGHT	$ 4,800.00	$9,600	
Level 3 Code	e	construct egress stair	2	FLIGHT	$ 600.00	$1,200	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL STAIRCASES	**1**	**VALUE**	**$ 24,000.00**	**$24,000**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C30		**INTERIOR FINISHES**					
Level 3 Code	**L**	**handrail at new stairs**	**95**	**LF**	$ 27.50	$2,613	
Level 3 Code	M	handrail at new stairs	95	LF	$ 20.00	$1,900	
Level 3 Code	E	handrail at new stairs	95	LF	$ 2.50	$238	
Level 3 Code	**L**	**handrail at existing stairs**	**50**	**LF**	$ 27.50	$1,375	
Level 3 Code	M	handrail at existing stairs	50	LF	$ 20.00	$1,000	
Level 3 Code	E	handrail at existing stairs	50	LF	$ 2.50	$125	
Level 3 Code	**L**	**guardrail at new stairs**	**26**	**LF**	$ 27.50	$715	
Level 3 Code	M	guardrail at new stairs	26	LF	$ 20.00	$520	
Level 3 Code	E	guardrail at new stairs	26	LF	$ 2.50	$65	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**reattach / repair ceiling in Drill room**	**695**	**SF**	$ 5.50	$3,823	
Level 3 Code	M	reattach / repair ceiling in Drill room	695	SF	$ 4.00	$2,780	
Level 3 Code	E	reattach / repair ceiling in Drill room	695	SF	$ 0.50	$348	
Level 3 Code	**L**	**repaint ladder handrail at tower access**	**15**	**LF**	$ 13.75	$206	
Level 3 Code	M	repaint ladder handrail at tower access	15	LF	$ 10.00	$150	
Level 3 Code	E	repaint ladder handrail at tower access	15	LF	$ 1.25	$19	
Level 3 Code	**L**	**patch ceilings at water damage**	**88**	**SF**	$ 5.50	$484	assume 10% of total
Level 3 Code	M	patch ceilings at water damage	88	SF	$ 4.00	$352	
Level 3 Code	E	patch ceilings at water damage	88	SF	$ 0.50	$44	
Level 3 Code	**L**	**gyp bd ceiling**	**165**	**SF**	$ 2.75	$454	
Level 3 Code	M	gyp bd ceiling	165	SF	$ 2.00	$330	
Level 3 Code	E	gyp bd ceiling	165	SF	$ 0.25	$41	
Level 3 Code	**L**	**paint ceilings**	**948**	**SF**	$ 1.10	$1,043	
Level 3 Code	M	paint ceilings	948	SF	$ 0.80	$758	
Level 3 Code	E	paint ceilings	948	SF	$ 0.10	$95	
Level 3 Code	**L**	**refinish hardwood flooring**	**2448**	**SF**	$ 2.75	$6,732	
Level 3 Code	M	refinish hardwood flooring	2448	SF	$ 2.00	$4,896	
Level 3 Code	E	refinish hardwood flooring	2448	SF	$ 0.25	$612	
Level 3 Code	**L**	**replace hardwood flooring**	**612**	**SF**	$ 8.25	$5,049	
Level 3 Code	M	replace hardwood flooring	612	SF	$ 6.00	$3,672	
Level 3 Code	E	replace hardwood flooring	612	SF	$ 0.75	$459	
Level 3 Code	**L**	**install laminate flooring**	**1429**	**SF**	$ 5.50	$7,860	
Level 3 Code	M	install laminate flooring	1429	SF	$ 4.00	$5,716	
Level 3 Code	E	install laminate flooring	1429	SF	$ 0.50	$715	
Level 3 Code	**L**	**install tile flooring**	**325**	**SF**	$ 13.75	$4,469	
Level 3 Code	M	install tile flooring	325	SF	$ 10.00	$3,250	
Level 3 Code	E	install tile flooring	325	SF	$ 1.25	$406	
Level 3 Code	**L**	**install tile wainscot, 4' ht.**	**120**	**SF**	$ 12.10	$1,452	
Level 3 Code	M	install tile wainscot, 4' ht.	120	SF	$ 8.80	$1,056	
Level 3 Code	E	install tile wainscot, 4' ht.	120	SF	$ 1.10	$132	
Level 3 Code	**L**	**install base trim / base shoe**	**1382**	**LF**	$ 3.85	$5,321	
Level 3 Code	M	install base trim / base shoe	1382	LF	$ 2.80	$3,870	
Level 3 Code	E	install base trim / base shoe	1382	LF	$ 0.35	$484	
Level 3 Code	**L**	**install chair rail**	**1382**	**LF**	$ 5.50	$7,601	
Level 3 Code	M	install chair rail	1382	LF	$ 4.00	$5,528	
Level 3 Code	E	install chair rail	1382	LF	$ 0.50	$691	
Level 3 Code	**L**	**patch wall finishes**	**1660**	**SF**	$ 0.83	$1,370	assume 15% of total

United States Department of the Interior
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Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	M	patch wall finishes	1660	SF	$ 0.60	$996	
Level 3 Code	E	patch wall finishes	1660	SF	$ 0.08	$125	
Level 3 Code	**L**	**install wood flooring**	**515**	**SF**	$ 8.25	$4,249	
Level 3 Code	M	install wood flooring	515	SF	$ 6.00	$3,090	
Level 3 Code	E	install wood flooring	515	SF	$ 0.75	$386	
Level 3 Code	**L**	**install wood flooring - at tower floor**	**15**	**SF**	$ 8.25	$124	at tower floor
Level 3 Code	M	install wood flooring - at tower floor	15	SF	$ 6.00	$90	
Level 3 Code	E	install wood flooring - at tower floor	15	SF	$ 0.75	$11	
Level 3 Code	**L**	**refinish wood flooring**	**530**	**SF**	$ 2.75	$1,458	
Level 3 Code	M	refinish wood flooring	530	SF	$ 2.00	$1,060	
Level 3 Code	E	refinish wood flooring	530	SF	$ 0.25	$133	
Level 3 Code	**L**	**miscellaneous interior finishes, allowance**	**6614**	**SF**	$ 0.83	$5,457	
Level 3 Code	M	miscellaneous interior finishes, allowance	6614	SF	$ 0.60	$3,968	
Level 3 Code	E	miscellaneous interior finishes, allowance	6614	SF	$ 0.08	$496	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL INTERIOR FINISHES	**1**	**VALUE**	**$ 112,456.00**	**$112,456**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D10		**CONVEYING SYSTEMS**					
Level 3 Code	**L**	**ABA lift**	**1**	**EA**	$ 5,500.00	$5,500	
Level 3 Code	M	ABA lift	1	EA	$ 4,000.00	$4,000	
Level 3 Code	E	ABA lift	1	EA	$ 500.00	$500	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL CONVEYING SYSTEMS	**1**	**VALUE**	**$ 10,000.00**	**$10,000**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D20		**PLUMBING**					
		demolition					
Level 3 Code	**L**	**remove all plumbing fixtures**	**14**	**EA**	$ 103.13	$1,444	
Level 3 Code	M	remove all plumbing fixtures	14	EA	$ 75.00	$1,050	
Level 3 Code	E	remove all plumbing fixtures	14	EA	$ 9.38	$131	

United States Department of the Interior
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LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**remove all water and dwv piping**	**6614**	**SF**	$ 3.44	$22,736
Level 3 Code	M	remove all water and dwv piping	6614	SF	$ 2.50	$16,535
Level 3 Code	E	remove all water and dwv piping	6614	SF	$ 0.31	$2,067
Level 3 Code	**L**	**dispose of materials**	**1**	**SUM**	$ 4,125.00	$4,125
Level 3 Code	M	dispose of materials	1	SUM	$ 3,000.00	$3,000
Level 3 Code	E	dispose of materials	1	SUM	$ 375.00	$375
		plumbing fixtures				
Level 3 Code	**L**	**water closet**	**5**	**EA**	$ 756.25	$3,781
Level 3 Code	M	water closet	5	EA	$ 550.00	$2,750
Level 3 Code	E	water closet	5	EA	$ 68.75	$344
Level 3 Code	**L**	**urinal**	**1**	**EA**	$ 790.63	$791
Level 3 Code	M	urinal	1	EA	$ 575.00	$575
Level 3 Code	E	urinal	1	EA	$ 71.88	$72
Level 3 Code	**L**	**lavatories**	**6**	**EA**	$ 790.63	$4,744
Level 3 Code	M	lavatories	6	EA	$ 575.00	$3,450
Level 3 Code	E	lavatories	6	EA	$ 71.88	$431
Level 3 Code	**L**	**double drinking fountain**	**1**	**EA**	$ 1,718.75	$1,719
Level 3 Code	M	double drinking fountain	1	EA	$ 1,250.00	$1,250
Level 3 Code	E	double drinking fountain	1	EA	$ 156.25	$156
Level 3 Code	**L**	**showers**	**5**	**EA**	$ 1,512.50	$7,563
Level 3 Code	M	showers	5	EA	$ 1,100.00	$5,500
Level 3 Code	E	showers	5	EA	$ 137.50	$688
Level 3 Code	**L**	**mop sinks**	**1**	**EA**	$ 825.00	$825
Level 3 Code	M	mop sinks	1	EA	$ 600.00	$600
Level 3 Code	E	mop sinks	1	EA	$ 75.00	$75
Level 3 Code	**L**	**hose bib**	**1**	**EA**	$ 292.19	$292
Level 3 Code	M	hose bib	1	EA	$ 212.50	$213
Level 3 Code	E	hose bib	1	EA	$ 26.56	$27
Level 3 Code	**L**	**floor drains**	**7**	**EA**	$ 412.50	$2,888
Level 3 Code	M	floor drains	7	EA	$ 300.00	$2,100
Level 3 Code	E	floor drains	7	EA	$ 37.50	$263
Level 3 Code	**L**	**trap primers, allowance**	**5**	**EA**	$ 185.63	$928
Level 3 Code	M	trap primers, allowance	5	EA	$ 135.00	$675
Level 3 Code	E	trap primers, allowance	5	EA	$ 16.88	$84
Level 3 Code	**L**	**kitchen sinks**	**1**	**EA**	$ 1,443.75	$1,444
Level 3 Code	M	kitchen sinks	1	EA	$ 1,050.00	$1,050
Level 3 Code	E	kitchen sinks	1	EA	$ 131.25	$131

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Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**dishwasher connections**	**1**	**EA**	$ 120.31	$120	
Level 3 Code	M	dishwasher connections	1	EA	$ 87.50	$88	
Level 3 Code	E	dishwasher connections	1	EA	$ 10.94	$11	
Level 3 Code	**L**	**ice maker box**	**2**	**EA**	$ 206.25	$413	
Level 3 Code	M	ice maker box	2	EA	$ 150.00	$300	
Level 3 Code	E	ice maker box	2	EA	$ 18.75	$38	
Level 3 Code	**L**	**laundry box**	**3**	**EA**	$ 292.19	$877	
Level 3 Code	M	laundry box	3	EA	$ 212.50	$638	
Level 3 Code	E	laundry box	3	EA	$ 26.56	$80	
Level 3 Code	**L**	**hot water circ pump**	**1**	**EA**	$ 704.69	$705	
Level 3 Code	M	hot water circ pump	1	EA	$ 512.50	$513	
Level 3 Code	E	hot water circ pump	1	EA	$ 64.06	$64	
Level 3 Code	**L**	**1-1/2" rpbfp**	**1**	**EA**	$ 567.19	$567	
Level 3 Code	M	1-1/2" rpbfp	1	EA	$ 412.50	$413	
Level 3 Code	E	1-1/2" rpbfp	1	EA	$ 51.56	$52	
Level 3 Code	**L**	**boiler room sump pump**	**1**	**EA**	$ 1,031.25	$1,031	
Level 3 Code	M	boiler room sump pump	1	EA	$ 750.00	$750	
Level 3 Code	E	boiler room sump pump	1	EA	$ 93.75	$94	
Level 3 Code	**L**	**drain / waste / vent piping, cast iron**	**30**	**FIXT**	$ 916.67	$27,500	
Level 3 Code	M	drain / waste / vent piping, cast iron	30	FIXT	$ 666.67	$20,000	
Level 3 Code	E	drain / waste / vent piping, cast iron	30	FIXT	$ 83.33	$2,500	
Level 3 Code	**L**	**copper potable water piping (insulated)**	**31**	**FIXT**	$ 620.97	$19,250	
Level 3 Code	M	copper potable water piping (insulated)	31	FIXT	$ 451.61	$14,000	
Level 3 Code	E	copper potable water piping (insulated)	31	FIXT	$ 56.45	$1,750	
Level 3 Code	**L**	**clean and flush potable water systems**	**1**	**SUM**	$ 962.50	$963	
Level 3 Code	M	clean and flush potable water systems	1	SUM	$ 700.00	$700	
Level 3 Code	E	clean and flush potable water systems	1	SUM	$ 87.50	$88	
Level 3 Code	**L**	**factor for historic renovation, add 15% labor**	**1**	**SUM**	$ 15,375.00	$15,375	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL PLUMBING	**1**	**VALUE**	**$ 205,743.78**	**$205,744**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	**Description**	**Quantity**	**Unit**	**Cost/Unit**	**Total Cost**	**Remarks**
D30		**HVAC**					
		demolition					

United States Department of the Interior
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Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**remove heating system, except boiler room**	**6614**	**SF**	**$**	**2.41**	$15,933
Level 3 Code	M	remove heating system, except boiler room	6614	SF	$	1.75	$11,588
Level 3 Code	E	remove heating system, except boiler room	6614	SF	$	0.22	$1,448
		hvac equipment					
Level 3 Code	**L**	**new radiators / control valves, allowance**	**40**	**EA**	**$**	**350.63**	$14,025
Level 3 Code	M	new radiators / control valves, allowance	40	EA	$	255.00	$10,200
Level 3 Code	E	new radiators / control valves, allowance	40	EA	$	31.88	$1,275
Level 3 Code	**L**	**whole house fan on 3rd floor**	**1**	**EA**	**$**	**1,271.88**	$1,272
Level 3 Code	M	whole house fan on 3rd floor	1	EA	$	925.00	$925
Level 3 Code	E	whole house fan on 3rd floor	1	EA	$	115.63	$116
Level 3 Code	**L**	**restroom and laundry room fans**	**5**	**EA**	**$**	**440.00**	$2,200
Level 3 Code	M	restroom and laundry room fans	5	EA	$	320.00	$1,600
Level 3 Code	E	restroom and laundry room fans	5	EA	$	40.00	$200
Level 3 Code	**L**	**dryer venting**	**2**	**EA**	**$**	**220.00**	$440
Level 3 Code	M	dryer venting	2	EA	$	160.00	$320
Level 3 Code	E	dryer venting	2	EA	$	20.00	$40
Level 3 Code	**L**	**range hood / fan**	**1**	**EA**	**$**	**969.38**	$969
Level 3 Code	M	range hood / fan	1	EA	$	705.00	$705
Level 3 Code	E	range hood / fan	1	EA	$	88.13	$88
Level 3 Code	**L**	**ducting / caps for fans**	**6**	**EA**	**$**	**398.75**	$2,393
Level 3 Code	M	ducting / caps for fans	6	EA	$	290.00	$1,740
Level 3 Code	E	ducting / caps for fans	6	EA	$	36.25	$218
Level 3 Code	**L**	**hydronic piping**	**40**	**EA**	**$**	**749.38**	$29,975
Level 3 Code	M	hydronic piping	40	EA	$	545.00	$21,800
Level 3 Code	E	hydronic piping	40	EA	$	68.13	$2,725
Level 3 Code	**L**	**testing and balancing**	**1**	**SUM**	**$**	**1,012.50**	$1,013
Level 3 Code	M	testing and balancing	1	SUM	$	750.00	$750
Level 3 Code	E	testing and balancing	1	SUM	$	112.50	$113
Level 3 Code	L	factor for historic renovation, add 15% labor	1	SUM	$	10,412.50	$10,413
Level 3 Code		Description	0	Unit	$	-	$0
		SUBTOTAL HVAC	**1**	**VALUE**	**$**	**134,481.82**	**$134,482**

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D40		**Fire Protection**					

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	**L**	**fire sprinkler system - NFPA 13**	**2496**	**SF**	$ 1.79	$4,462	adjust existing system
Level 3 Code	M	fire sprinkler system - NFPA 13	2496	SF	$ 1.30	$3,245	
Level 3 Code	E	fire sprinkler system - NFPA 13	2496	SF	$ 0.16	$406	
Level 3 Code	**L**	**dry pipe system in attic**	**525**	**SF**	$ 5.50	$2,888	
Level 3 Code	M	dry pipe system in attic	525	SF	$ 4.00	$2,100	
Level 3 Code	E	dry pipe system in attic	525	SF	$ 0.50	$263	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FIRE PROTECTION	**1**	**VALUE**	**$ 13,362.00**	**$13,362**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D50		**ELECTRICAL**					
Level 3 Code	**L**	**demo**	**1**	**SUM**	$ 1,584.00	$1,584	
Level 3 Code	M	demo	1	SUM	$ 1,152.00	$1,152	
Level 3 Code	E	demo	1	SUM	$ 144.00	$144	
Level 3 Code	**L**	**temp power / lighting**	**1**	**SUM**	$ 1,834.80	$1,835	
Level 3 Code	M	temp power / lighting	1	SUM	$ 1,334.40	$1,334	
Level 3 Code	E	temp power / lighting	1	SUM	$ 166.80	$167	
Level 3 Code	**L**	**200 amp main panel / spd**	**1**	**EA**	$ 2,838.00	$2,838	
Level 3 Code	M	200 amp main panel / spd	1	EA	$ 2,064.00	$2,064	
Level 3 Code	E	200 amp main panel / spd	1	EA	$ 258.00	$258	
Level 3 Code	**L**	**grounding**	**1**	**EA**	$ 409.20	$409	
Level 3 Code	M	grounding	1	EA	$ 297.60	$298	
Level 3 Code	E	grounding	1	EA	$ 37.20	$37	
Level 3 Code	**L**	**100 amp panel**	**1**	**EA**	$ 1,359.60	$1,360	
Level 3 Code	M	100 amp panel	1	EA	$ 988.80	$989	
Level 3 Code	E	100 amp panel	1	EA	$ 123.60	$124	
Level 3 Code	**L**	**200 a ats**	**1**	**EA**	$ 1,966.80	$1,967	
Level 3 Code	M	200 a ats	1	EA	$ 1,430.40	$1,430	
Level 3 Code	E	200 a ats	1	EA	$ 178.80	$179	
Level 3 Code	**L**	**install 100 amp feeders**	**60**	**LF**	$ 21.12	$1,267	
Level 3 Code	M	install 100 amp feeders	60	LF	$ 15.36	$922	
Level 3 Code	E	install 100 amp feeders	60	LF	$ 1.92	$115	
Level 3 Code	**L**	**electrical testing**	**1**	**SUM**	$ 415.00	$415	
Level 3 Code	M	electrical testing	1	SUM	$ 307.00	$307	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Level 3 Code	E	electrical testing	1	SUM	$ 46.10	$46
Level 3 Code	**L**	**coordination / arc flash study**	**1**	**SUM**	$ 1,296.00	$1,296
Level 3 Code	M	coordination / arc flash study	1	SUM	$ 960.00	$960
Level 3 Code	E	coordination / arc flash study	1	SUM	$ 144.00	$144
Level 3 Code	**L**	**ada lift circuit / disconnect**	**1**	**SUM**	$ 1,335.00	$1,335
Level 3 Code	M	ada lift circuit / disconnect	1	SUM	$ 989.00	$989
Level 3 Code	E	ada lift circuit / disconnect	1	SUM	$ 148.00	$148
Level 3 Code	**L**	**lightning protection**	**1**	**SUM**	$ 11,167.20	$11,167
Level 3 Code	M	lightning protection	1	SUM	$ 8,121.60	$8,122
Level 3 Code	E	lightning protection	1	SUM	$ 1,015.20	$1,015
Level 3 Code	**L**	**duplex outlets**	**50**	**EA**	$ 145.20	$7,260
Level 3 Code	M	duplex outlets	50	EA	$ 105.60	$5,280
Level 3 Code	E	duplex outlets	50	EA	$ 13.20	$660
Level 3 Code	**L**	**dedicated duplex outlets**	**5**	**EA**	$ 158.40	$792
Level 3 Code	M	dedicated duplex outlets	5	EA	$ 115.20	$576
Level 3 Code	E	dedicated duplex outlets	5	EA	$ 14.40	$72
Level 3 Code	**L**	**ada door connection**	**1**	**EA**	$ 448.80	$449
Level 3 Code	M	ada door connection	1	EA	$ 326.40	$326
Level 3 Code	E	ada door connection	1	EA	$ 40.80	$41
Level 3 Code	**L**	**gfci outlets**	**7**	**EA**	$ 165.00	$1,155
Level 3 Code	M	gfci outlets	7	EA	$ 120.00	$840
Level 3 Code	E	gfci outlets	7	EA	$ 15.00	$105
Level 3 Code	**L**	**wp outlets**	**1**	**EA**	$ 257.40	$257
Level 3 Code	M	wp outlets	1	EA	$ 187.20	$187
Level 3 Code	E	wp outlets	1	EA	$ 23.40	$23
Level 3 Code	**L**	**dryer circuit / receptacle**	**1**	**EA**	$ 432.30	$432
Level 3 Code	M	dryer circuit / receptacle	1	EA	$ 314.40	$314
Level 3 Code	E	dryer circuit / receptacle	1	EA	$ 39.30	$39
Level 3 Code	**L**	**stove connection**	**1**	**EA**	$ 448.80	$449
Level 3 Code	M	stove connection	1	EA	$ 326.40	$326
Level 3 Code	E	stove connection	1	EA	$ 40.80	$41
Level 3 Code	**L**	**120 v j-box connection**	**2**	**EA**	$ 138.60	$277
Level 3 Code	M	120 v j-box connection	2	EA	$ 100.80	$202
Level 3 Code	E	120 v j-box connection	2	EA	$ 12.60	$25
Level 3 Code	**L**	**home runs / lighting circuits / supports**	**1**	**SUM**	$ 17,688.00	$17,688
Level 3 Code	M	home runs / lighting circuits / supports	1	SUM	$ 12,864.00	$12,864
Level 3 Code	E	home runs / lighting circuits / supports	1	SUM	$ 1,608.00	$1,608

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Level 3 Code	**L**	**circuit / connect attic exhaust fan**	**1**	**EA**	$ 504.90	$505
Level 3 Code	M	circuit / connect attic exhaust fan	1	EA	$ 367.20	$367
Level 3 Code	E	circuit / connect attic exhaust fan	1	EA	$ 45.90	$46
Level 3 Code	**L**	**circuit / connect exhaust fan**	**5**	**EA**	$ 224.40	$1,122
Level 3 Code	M	circuit / connect exhaust fan	5	EA	$ 163.20	$816
Level 3 Code	E	circuit / connect exhaust fan	5	EA	$ 20.40	$102
Level 3 Code	**L**	**circuit rcp**	**1**	**EA**	$ 257.40	$257
Level 3 Code	M	circuit rcp	1	EA	$ 187.20	$187
Level 3 Code	E	circuit rcp	1	EA	$ 23.40	$23
		- furnish / install lighting -				
Level 3 Code	**L**	**lighting**	**6614**	**SF**	$ 4.13	$27,283
Level 3 Code	M	lighting	6614	SF	$ 3.00	$19,842
Level 3 Code	E	lighting	6614	SF	$ 0.38	$2,480
Level 3 Code	**L**	**exterior lighting wall pacs**	**3**	**EA**	$ 462.00	$1,386
Level 3 Code	M	exterior lighting wall pacs	3	EA	$ 336.00	$1,008
Level 3 Code	E	exterior lighting wall pacs	3	EA	$ 42.00	$126
Level 3 Code	**L**	**exterior canopy lights**	**4**	**EA**	$ 244.20	$977
Level 3 Code	M	exterior canopy lights	4	EA	$ 177.60	$710
Level 3 Code	E	exterior canopy lights	4	EA	$ 22.20	$89
Level 3 Code	**L**	**switch**	**15**	**EA**	$ 75.90	$1,139
Level 3 Code	M	switch	15	EA	$ 55.20	$828
Level 3 Code	E	switch	15	EA	$ 6.90	$104
Level 3 Code	**L**	**occ sensor**	**18**	**EA**	$ 151.80	$2,732
Level 3 Code	M	occ sensor	18	EA	$ 110.40	$1,987
Level 3 Code	E	occ sensor	18	EA	$ 13.80	$248
Level 3 Code	**L**	**commissioning**	**1**	**SUM**	$ 259.00	$259
Level 3 Code	M	commissioning	1	SUM	$ 192.00	$192
Level 3 Code	E	commissioning	1	SUM	$ 28.80	$29
		- low voltage -				
Level 3 Code	**L**	**data wall rough in / conduits**	**12**	**EA**	$ 132.00	$1,584
Level 3 Code	M	data wall rough in / conduits	12	EA	$ 96.00	$1,152
Level 3 Code	E	data wall rough in / conduits	12	EA	$ 12.00	$144
Level 3 Code	**L**	**data / tv cabling**	**12**	**EA**	$ 211.20	$2,534
Level 3 Code	M	data / tv cabling	12	EA	$ 153.60	$1,843
Level 3 Code	E	data / tv cabling	12	EA	$ 19.20	$230
Level 3 Code	**L**	**wall rack / patch panel / grounding**	**1**	**SUM**	$ 950.40	$950
Level 3 Code	M	wall rack / patch panel / grounding	1	SUM	$ 691.20	$691

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
Level 3 Code	E	wall rack / patch panel / grounding	1	SUM	$ 86.40	$86	
Level 3 Code	**L**	**wap cabling**	**6**	**EA**	$ 171.60	$1,030	
Level 3 Code	M	wap cabling	6	EA	$ 124.80	$749	
Level 3 Code	E	wap cabling	6	EA	$ 15.60	$94	
		- fire alarm -					
Level 3 Code	**L**	**fa detection**	**29**	**EA**	$ 181.50	$5,264	
Level 3 Code	M	fa detection	29	EA	$ 132.00	$3,828	
Level 3 Code	E	fa detection	29	EA	$ 16.50	$479	
Level 3 Code	**L**	**fa notification**	**18**	**EA**	$ 204.60	$3,683	
Level 3 Code	M	fa notification	18	EA	$ 148.80	$2,678	
Level 3 Code	E	fa notification	18	EA	$ 18.60	$335	
Level 3 Code	**L**	**fa remote annunciator**	**1**	**EA**	$ 297.00	$297	
Level 3 Code	M	fa remote annunciator	1	EA	$ 216.00	$216	
Level 3 Code	E	fa remote annunciator	1	EA	$ 27.00	$27	
Level 3 Code	**L**	**fa pull station**	**7**	**EA**	$ 240.90	$1,686	
Level 3 Code	M	fa pull station	7	EA	$ 175.20	$1,226	
Level 3 Code	E	fa pull station	7	EA	$ 21.90	$153	
Level 3 Code	**L**	**fa modules / relays**	**2**	**EA**	$ 280.50	$561	
Level 3 Code	M	fa modules / relays	2	EA	$ 204.00	$408	
Level 3 Code	E	fa modules / relays	2	EA	$ 25.50	$51	
Level 3 Code	**L**	**fa control panel**	**1**	**EA**	$ 1,465.20	$1,465	
Level 3 Code	M	fa control panel	1	EA	$ 1,065.60	$1,066	
Level 3 Code	E	fa control panel	1	EA	$ 133.20	$133	
Level 3 Code	**L**	**furnish fire alarm design / programming**	**1**	**SUM**	$ 792.00	$792	
Level 3 Code	M	furnish fire alarm design / programming	1	SUM	$ 576.00	$576	
Level 3 Code	E	furnish fire alarm design / programming	1	SUM	$ 72.00	$72	
		SUBTOTAL ELECTRICAL	**1**	**VALUE**	**$ 199,634.90**	**$199,635**	
E10		**EQUIPMENT**					
Level 3 Code		ABA dishwasher - owner furnished	1	EA	$ -	$0	
Level 3 Code		range - owner furnished	1	EA	$ -	$0	
Level 3 Code	**L**	**vent hood**	**1**	**EA**	$ 825.00	$825	
Level 3 Code	M	vent hood	1	EA	$ 600.00	$600	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Level 3 Code	E	vent hood	1	EA	$ 75.00	$75	
Level 3 Code		microwave - owner furnished	1	EA	$ -	$0	
Level 3 Code		full height refrigerator - owner furnished	2	EA	$ -	$0	
Level 3 Code		full height freezer - owner furnished	1	EA	$ -	$0	
Level 3 Code		ABA Washer - owner furnished	1	EA	$ -	$0	
Level 3 Code		ABA Dryer - owner furnished	1	EA	$ -	$0	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL EQUIPMENT	**1**	**VALUE**	**$ 1,500.00**	**$1,500**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
E20		**FURNISHINGS**					
Level 3 Code	**L**	**2" window blinds at all windows**	**640**	**SF**	$ 8.25	$5,280	
Level 3 Code	M	2" window blinds at all windows	640	SF	$ 6.00	$3,840	
Level 3 Code	E	2" window blinds at all windows	640	SF	$ 0.75	$480	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FURNISHINGS	**1**	**VALUE**	**$ 9,600.00**	**$9,600**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
F20		**SELECTIVE BUILDING DEMOLITION**					
Level 3 Code	**L**	**demo roofing**	**3100**	**SF**	$ 1.10	$3,410	
Level 3 Code	M	demo roofing	3100	SF	$ 0.80	$2,480	
Level 3 Code	E	demo roofing	3100	SF	$ 0.10	$310	
Level 3 Code	**L**	**demo roof edge flashing**	**390**	**LF**	$ 0.55	$215	
Level 3 Code	M	demo roof edge flashing	390	LF	$ 0.40	$156	
Level 3 Code	E	demo roof edge flashing	390	LF	$ 0.05	$20	
Level 3 Code	**L**	**demo roof to wall flashing**	**207**	**LF**	$ 0.55	$114	
Level 3 Code	M	demo roof to wall flashing	207	LF	$ 0.40	$83	
Level 3 Code	E	demo roof to wall flashing	207	LF	$ 0.05	$10	
Level 3 Code	**L**	**demo gutters**	**276**	**LF**	$ 1.10	$304	
Level 3 Code	M	demo gutters	276	LF	$ 0.80	$221	
Level 3 Code	E	demo gutters	276	LF	$ 0.10	$28	

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National Park Service
Class C Construction Cost Estimate

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Level 3 Code	**L**	**demo downspouts**	**132**	**LF**	$ 0.69	$91	
Level 3 Code	M	demo downspouts	132	LF	$ 0.50	$66	
Level 3 Code	E	demo downspouts	132	LF	$ 0.06	$8	
Level 3 Code	**L**	**demo lower casework**	**7**	**LF**	$ 11.00	$77	
Level 3 Code	M	demo lower casework	7	LF	$ 8.00	$56	
Level 3 Code	E	demo lower casework	7	LF	$ 1.00	$7	
Level 3 Code	**L**	**demo porch railing**	**40**	**LF**	$ 11.00	$440	
Level 3 Code	M	demo porch railing	40	LF	$ 8.00	$320	
Level 3 Code	E	demo porch railing	40	LF	$ 1.00	$40	
Level 3 Code	**L**	**demo wall casework**	**5**	**LF**	$ 8.25	$41	
Level 3 Code	M	demo wall casework	5	LF	$ 6.00	$30	
Level 3 Code	E	demo wall casework	5	LF	$ 0.75	$4	
Level 3 Code	**L**	**demo aluminum siding**	**3730**	**SF**	$ 1.10	$4,103	
Level 3 Code	M	demo aluminum siding	3730	SF	$ 0.80	$2,984	
Level 3 Code	E	demo aluminum siding	3730	SF	$ 0.10	$373	
Level 3 Code	**L**	**demo shingle siding**	**2238**	**SF**	$ 1.10	$2,462	60% of total area
Level 3 Code	M	demo shingle siding	2238	SF	$ 0.80	$1,790	
Level 3 Code	E	demo shingle siding	2238	SF	$ 0.10	$224	
Level 3 Code	**L**	**scrape / prep for paint**	**1492**	**SF**	$ 1.38	$2,052	40% of total area
Level 3 Code	M	scrape / prep for paint	1492	SF	$ 1.00	$1,492	
Level 3 Code	E	scrape / prep for paint	1492	SF	$ 0.13	$187	
Level 3 Code	**L**	**remove plywood cover at west appurtenance**	**40**	**SF**	$ 2.75	$110	
Level 3 Code	M	remove plywood cover at west appurtenance	40	SF	$ 2.00	$80	
Level 3 Code	E	remove plywood cover at west appurtenance	40	SF	$ 0.25	$10	
Level 3 Code	**L**	**scrape / prep for paint at foundation walls**	**460**	**SF**	$ 1.38	$633	
Level 3 Code	M	scrape / prep for paint at foundation walls	460	SF	$ 1.00	$460	
Level 3 Code	E	scrape / prep for paint at foundation walls	460	SF	$ 0.13	$58	
Level 3 Code	**L**	**remove windows**	**55**	**EA**	$ 68.75	$3,781	
Level 3 Code	M	remove windows	55	EA	$ 50.00	$2,750	
Level 3 Code	E	remove windows	55	EA	$ 6.25	$344	
Level 3 Code	**L**	**scrape / prep for paint at window openings**	**825**	**SF**	$ 1.38	$1,134	
Level 3 Code	M	scrape / prep for paint at window openings	825	SF	$ 1.00	$825	
Level 3 Code	E	scrape / prep for paint at window openings	825	SF	$ 0.13	$103	
Level 3 Code	**L**	**remove ceiling at area of new ABA entry**	**90**	**SF**	$ 0.55	$50	
Level 3 Code	M	remove ceiling at area of new ABA entry	90	SF	$ 0.40	$36	
Level 3 Code	E	remove ceiling at area of new ABA entry	90	SF	$ 0.05	$5	
Level 3 Code	**L**	**demo floor framing at area of new ABA entry**	**90**	**SF**	$ 8.25	$743	

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Class C Construction Cost Estimate

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Level 3 Code	M	demo floor framing at area of new ABA entry	90	SF	$ 6.00	$540	
Level 3 Code	E	demo floor framing at area of new ABA entry	90	SF	$ 0.75	$68	
Level 3 Code	**L**	**remove interior partitions, 8' ht.**	**1280**	**SF**	$ 1.65	$2,112	
Level 3 Code	M	remove interior partitions, 8' ht.	1280	SF	$ 1.20	$1,536	
Level 3 Code	E	remove interior partitions, 8' ht.	1280	SF	$ 0.15	$192	
Level 3 Code	**L**	**remove exterior doors - single**	**2**	**EA**	$ 44.00	$88	
Level 3 Code	M	remove exterior doors - single	2	EA	$ 32.00	$64	
Level 3 Code	E	remove exterior doors - single	2	EA	$ 4.00	$8	
Level 3 Code	**L**	**remove interior doors - single**	**18**	**EA**	$ 44.00	$792	
Level 3 Code	M	remove interior doors - single	18	EA	$ 32.00	$576	
Level 3 Code	E	remove interior doors - single	18	EA	$ 4.00	$72	
Level 3 Code	**L**	**remove interior doors - double**	**1**	**EA**	$ 66.00	$66	
Level 3 Code	M	remove interior doors - double	1	EA	$ 48.00	$48	
Level 3 Code	E	remove interior doors - double	1	EA	$ 6.00	$6	
Level 3 Code	**L**	**remove ceiling finishes**	**170**	**SF**	$ 0.55	$94	
Level 3 Code	M	remove ceiling finishes	170	SF	$ 0.40	$68	
Level 3 Code	E	remove ceiling finishes	170	SF	$ 0.05	$9	
Level 3 Code	**L**	**remove exterior wall - to enlarge door opening**	**10**	**SF**	$ 55.00	$550	for new ABA entry
Level 3 Code	M	remove exterior wall - to enlarge door opening	10	SF	$ 40.00	$400	
Level 3 Code	E	remove exterior wall - to enlarge door opening	10	SF	$ 5.00	$50	
Level 3 Code	**L**	**remove bathroom accessories**	**1**	**SUM**	$ 412.50	$413	
Level 3 Code	M	remove bathroom accessories	1	SUM	$ 300.00	$300	
Level 3 Code	E	remove bathroom accessories	1	SUM	$ 37.50	$38	
Level 3 Code	**L**	**demo toilet partitions**	**2**	**EA**	$ 35.75	$72	
Level 3 Code	M	demo toilet partitions	2	EA	$ 26.00	$52	
Level 3 Code	E	demo toilet partitions	2	EA	$ 3.25	$7	
Level 3 Code	**L**	**remove range**	**1**	**EA**	$ 137.50	$138	
Level 3 Code	M	remove range	1	EA	$ 100.00	$100	
Level 3 Code	E	remove range	1	EA	$ 12.50	$13	
Level 3 Code	**L**	**remove floor finish**	**855**	**SF**	$ 0.55	$470	
Level 3 Code	M	remove floor finish	855	SF	$ 0.40	$342	
Level 3 Code	E	remove floor finish	855	SF	$ 0.05	$43	
Level 3 Code	**L**	**remove / salvage base trim**	**290**	**LF**	$ 1.10	$319	
Level 3 Code	M	remove / salvage base trim	290	LF	$ 0.80	$232	
Level 3 Code	E	remove / salvage base trim	290	LF	$ 0.10	$29	
Level 3 Code	**L**	**remove floor framing**	**80**	**SF**	$ 8.25	$660	for 3rd floor stairs
Level 3 Code	M	remove floor framing	80	SF	$ 6.00	$480	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 1 **Station Dwelling** **Total Cost:** $1,334,204

Level 3 Code	E	remove floor framing	80	SF	$ 0.75	$60	
Level 3 Code	**L**	**sawcut concrete floor slab**	**8**	**LF**	$ 8.25	$66	
Level 3 Code	M	sawcut concrete floor slab	8	LF	$ 6.00	$48	
Level 3 Code	E	sawcut concrete floor slab	8	LF	$ 0.75	$6	
Level 3 Code	**L**	**remove concrete floor slab**	**4**	**SF**	$ 1.93	$8	
Level 3 Code	M	remove concrete floor slab	4	SF	$ 1.40	$6	
Level 3 Code	E	remove concrete floor slab	4	SF	$ 0.18	$1	
Level 3 Code	**L**	**remove fire escape ladder**	**1**	**EA**	$ 192.50	$193	
Level 3 Code	M	remove fire escape ladder	1	EA	$ 140.00	$140	
Level 3 Code	E	remove fire escape ladder	1	EA	$ 17.50	$18	
Level 3 Code	**L**	**remove carpeting - at areas to receive new carpet**	**910**	**SF**	$ 0.83	$751	
Level 3 Code	M	remove carpeting - at areas to receive new carpet	910	SF	$ 0.60	$546	
Level 3 Code	E	remove carpeting - at areas to receive new carpet	910	SF	$ 0.08	$68	
Level 3 Code	**L**	**remove carpeting - at areas to receive new wood flooring**	**515**	**SF**	$ 0.83	$425	
Level 3 Code	M	remove carpeting - at areas to receive new wood flooring	515	SF	$ 0.60	$309	
Level 3 Code	E	remove carpeting - at areas to receive new wood flooring	515	SF	$ 0.08	$39	
Level 3 Code	**L**	**remove damage wood flooring - at tower floor**	**15**	**SF**	$ 0.96	$14	10% of room area
Level 3 Code	M	remove damage wood flooring - at tower floor	15	SF	$ 0.70	$11	
Level 3 Code	E	remove damage wood flooring - at tower floor	15	SF	$ 0.09	$1	
Level 3 Code	**L**	**remove failed roof membrane**	**112**	**SF**	$ 1.10	$123	
Level 3 Code	M	remove failed roof membrane	112	SF	$ 0.80	$90	
Level 3 Code	E	remove failed roof membrane	112	SF	$ 0.10	$11	
Level 3 Code	**L**	**scrape / prep soffit at tower**	**112**	**SF**	$ 1.38	$154	
Level 3 Code	M	scrape / prep soffit at tower	112	SF	$ 1.00	$112	
Level 3 Code	E	scrape / prep soffit at tower	112	SF	$ 0.13	$14	
Level 3 Code	**L**	**scrape / prep soffit guardrail**	**60**	**LF**	$ 1.38	$83	
Level 3 Code	M	scrape / prep soffit guardrail	60	LF	$ 1.00	$60	
Level 3 Code	E	scrape / prep soffit guardrail	60	LF	$ 0.13	$8	
Level 3 Code	**L**	**shoring support at framing demolition**	**170**	**SF**	$ 16.50	$2,805	at demo'd floor framing
Level 3 Code	M	shoring support at framing demolition	170	SF	$ 12.00	$2,040	
Level 3 Code	E	shoring support at framing demolition	170	SF	$ 1.50	$255	
Level 3 Code	**L, M, E**	**hazardous materials abatement**	**1**	**SUM**	$ 27,500.00	$27,500	allowance
Level 3 Code	L, M, E	hazardous materials abatement	1	SUM	$ 20,000.00	$20,000	allowance
Level 3 Code	L, M, E	hazardous materials abatement	1	SUM	$ 2,500.00	$2,500	allowance
SUBTOTAL SELECTIVE BUILDING DEMOLITION			**1**	**VALUE**	**$ 104,819.25**	**$104,819**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item 1	**Station Dwelling**	**Total Cost:**	$1,334,204

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
G 40		**SITE ELECTRICAL UTILITIES**					
Level 3 Code	**L**	**ug feeder**	**80**	**LF**	$ 17.16	$1,373	
Level 3 Code	M	ug feeder	80	LF	$ 12.48	$998	
Level 3 Code	E	ug feeder	80	LF	$ 1.56	$125	
Level 3 Code	**L**	**meter base / disconnect**	**1**	**EA**	$ 554.40	$554	
Level 3 Code	M	meter base / disconnect	1	EA	$ 403.20	$403	
Level 3 Code	E	meter base / disconnect	1	EA	$ 50.40	$50	
Level 3 Code	L	30 kw generator / offload / fuel	1	SUM	$ 17,560.80	$17,561	
Level 3 Code	M	30 kw generator / offload / fuel	1	SUM	$ 11,707.20	$11,707	
Level 3 Code	E	30 kw generator / offload / fuel	1	SUM	$ 1,500.00	$1,500	
Level 3 Code	**L**	**generator feeder**	**30**	**LF**	$ 17.82	$535	
Level 3 Code	M	generator feeder	30	LF	$ 12.96	$389	
Level 3 Code	E	generator feeder	30	LF	$ 1.62	$49	
Level 3 Code	**L**	**generator controls / circuits**	**30**	**LF**	$ 15.18	$455	
Level 3 Code	M	generator controls / circuits	30	LF	$ 11.04	$331	
Level 3 Code	E	generator controls / circuits	30	LF	$ 1.38	$41	
Level 3 Code	**L**	**trenching**	**110**	**LF**	$ 42.00	$4,620	
Level 3 Code	M	trenching	110	LF	$ 15.00	$1,650	
Level 3 Code	E	trenching	110	LF	$ 15.00	$1,650	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL SITE ELECTRICAL UTILITIES	**1**	**VALUE**	**$ 43,992.00**	**$43,992**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
TOTAL COST -		**Station Dwelling**	**6614**	**SF**	**$ 201.72**	**$1,334,204**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item 2	**O.I.C. Dwelling**	**Total Cost:**	$365,145

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
A10		**FOUNDATIONS**					
Level 3 Code	**L**	**new spread footing**	**1**	**SF**	$ 137.50	$138	
Level 3 Code	M	new spread footing	1	SF	$ 100.00	$100	
Level 3 Code	E	new spread footing	1	SF	$ 12.50	$13	
Level 3 Code	**L**	**dowel slab - to new footing**	**8**	**EA**	$ 27.50	$220	2 ea side at 16"oc
Level 3 Code	M	dowel slab - to new footing	8	EA	$ 20.00	$160	
Level 3 Code	E	dowel slab - to new footing	8	EA	$ 2.50	$20	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FOUNDATIONS	**1**	**VALUE**	**$ 650.00**	**$650**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B20		**EXTERIOR CLOSURE**					
Level 3 Code	**L**	**reinforce eaves with metal framing**	**350**	**SF**	$ 11.00	$3,850	
Level 3 Code	M	reinforce eaves with metal framing	350	SF	$ 8.00	$2,800	
Level 3 Code	E	reinforce eaves with metal framing	350	SF	$ 1.00	$350	
Level 3 Code	**L**	**wood guardrail at east entry**	**25**	**LF**	$ 41.25	$1,031	
Level 3 Code	M	wood guardrail at east entry	25	LF	$ 30.00	$750	
Level 3 Code	E	wood guardrail at east entry	25	LF	$ 3.75	$94	
Level 3 Code	**L**	**door 103 - rehabilitate**	**1**	**EA**	$ 550.00	$550	
Level 3 Code	M	door 103 - rehabilitate	1	EA	$ 400.00	$400	
Level 3 Code	E	door 103 - rehabilitate	1	EA	$ 50.00	$50	
Level 3 Code	**L**	**door 104 - replace existing in kind**	**1**	**EA**	$ 1,650.00	$1,650	
Level 3 Code	M	door 104 - replace existing in kind	1	EA	$ 1,200.00	$1,200	
Level 3 Code	E	door 104 - replace existing in kind	1	EA	$ 150.00	$150	
Level 3 Code	**L**	**door 201 - new hc door, wood veneer**	**1**	**EA**	$ 825.00	$825	
Level 3 Code	M	door 201 - new hc door, wood veneer	1	EA	$ 600.00	$600	
Level 3 Code	E	door 201 - new hc door, wood veneer	1	EA	$ 75.00	$75	
Level 3 Code	**L**	**door 203 - new hc door, wood veneer**	**1**	**EA**	$ 825.00	$825	
Level 3 Code	M	door 203 - new hc door, wood veneer	1	EA	$ 600.00	$600	
Level 3 Code	E	door 203 - new hc door, wood veneer	1	EA	$ 75.00	$75	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	**L**	**door 204A - adjust / re-hang bi-fold door**	**1**	**EA**	$ 275.00	$275	
Level 3 Code	M	door 204A - adjust / re-hang bi-fold door	1	EA	$ 200.00	$200	
Level 3 Code	E	door 204A - adjust / re-hang bi-fold door	1	EA	$ 25.00	$25	
Level 3 Code	**L**	**repoint all faces of chimney**	**180**	**SF**	$ 16.50	$2,970	
Level 3 Code	M	repoint all faces of chimney	180	SF	$ 12.00	$2,160	
Level 3 Code	E	repoint all faces of chimney	180	SF	$ 1.50	$270	
Level 3 Code	**L**	**lead based paint abatement**	**1880**	**SF**	$ 1.37	$2,576	
Level 3 Code	M	lead based paint abatement	1880	SF	$ 1.00	$1,880	
Level 3 Code	E	lead based paint abatement	1880	SF	$ 0.13	$244	
Level 3 Code	**L**	**replace concrete chimney cap**	**1**	**SUM**	$ 316.25	$316	
Level 3 Code	M	replace concrete chimney cap	1	SUM	$ 230.00	$230	
Level 3 Code	E	replace concrete chimney cap	1	SUM	$ 28.75	$29	
		SUBTOTAL EXTERIOR CLOSURE	**1**	**VALUE**	**$ 27,050.00**	**$27,050**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B30		**ROOFING**					
Level 3 Code	**L**	**metal ridge cap flashing**	**95**	**LF**	$ 8.25	$784	
Level 3 Code	M	metal ridge cap flashing	95	LF	$ 6.00	$570	
Level 3 Code	E	metal ridge cap flashing	95	LF	$ 0.75	$71	
Level 3 Code	**L**	**replace damaged roof sheathing**	**110**	**SF**	$ 3.03	$333	
Level 3 Code	M	replace damaged roof sheathing	110	SF	$ 2.20	$242	
Level 3 Code	E	replace damaged roof sheathing	110	SF	$ 0.28	$30	
Level 3 Code	**L**	**install wood cedar shingles**	**1130**	**SF**	$ 11.00	$12,430	
Level 3 Code	M	install wood cedar shingles	1130	SF	$ 8.00	$9,040	
Level 3 Code	E	install wood cedar shingles	1130	SF	$ 1.00	$1,130	
Level 3 Code	**L**	**replace damaged skip sheathing**	**113**	**SF**	$ 3.03	$342	assume 10% of roof
Level 3 Code	M	replace damaged skip sheathing	113	SF	$ 2.20	$249	
Level 3 Code	E	replace damaged skip sheathing	113	SF	$ 0.28	$31	
Level 3 Code	**L**	**gutters**	**175**	**LF**	$ 5.50	$963	
Level 3 Code	M	gutters	175	LF	$ 0.50	$88	
Level 3 Code	M	gutters	175	LF	$ 0.50	$88	
Level 3 Code	**L**	**downspouts**	**80**	**LF**	$ 8.25	$660	
Level 3 Code	M	downspouts	80	LF	$ 6.00	$480	
Level 3 Code	E	downspouts	80	LF	$ 0.75	$60	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
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Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	**L**	**install 12" step flashing at chimney**	**15**	**LF**	$ 8.25	$124	
Level 3 Code	M	install 12" step flashing at chimney	15	LF	$ 6.00	$90	
Level 3 Code	M	install 12" step flashing at chimney	15	LF	$ 0.75	$11	
Level 3 Code	**L**	**install coping at roof above storage 004**	**12**	**LF**	$ 12.10	$145	
Level 3 Code	M	install coping at roof above storage 004	12	LF	$ 8.80	$106	
Level 3 Code	E	install coping at roof above storage 004	12	LF	$ 1.10	$13	
Level 3 Code	**L**	**add drip edge flashing at entry**	**25**	**LF**	$ 8.25	$206	
Level 3 Code	M	add drip edge flashing at entry	25	LF	$ 6.00	$150	
Level 3 Code	E	add drip edge flashing at entry	25	LF	$ 0.75	$19	
Level 3 Code	**L**	**roof tie-offs**	**8**	**EA**	$ 275.00	$2,200	verify if required
Level 3 Code	M	roof tie-offs	8	EA	$ 200.00	$1,600	
Level 3 Code	E	roof tie-offs	8	EA	$ 25.00	$200	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL ROOFING	**1**	**VALUE**	**$ 32,453.00**	**$32,453**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C10		**INTERIOR CONSTRUCTION**					
Level 3 Code	**L**	**weld plate at first floor beam**	**1**	**SUM**	$ 192.50	$193	
Level 3 Code	M	weld plate at first floor beam	1	SUM	$ 140.00	$140	
Level 3 Code	E	weld plate at first floor beam	1	SUM	$ 17.50	$18	
Level 3 Code	**L**	**weld steel pipe sleeve**	**1**	**SUM**	$ 467.50	$468	
Level 3 Code	M	weld steel pipe sleeve	1	SUM	$ 340.00	$340	
Level 3 Code	E	weld steel pipe sleeve	1	SUM	$ 42.50	$43	
Level 3 Code	**L**	**adjustable steel pipe column**	**1**	**SUM**	$ 123.75	$124	
Level 3 Code	M	adjustable steel pipe column	1	SUM	$ 90.00	$90	
Level 3 Code	E	adjustable steel pipe column	1	SUM	$ 11.25	$11	
Level 3 Code	**L**	**steel beam sistered to existing**	**10**	**LF**	$ 412.50	$4,125	
Level 3 Code	M	steel beam sistered to existing	10	LF	$ 300.00	$3,000	
Level 3 Code	E	steel beam sistered to existing	10	LF	$ 37.50	$375	
Level 3 Code	**L**	**full height partitions, 8' ht.**	**70**	**SF**	$ 11.00	$770	
Level 3 Code	M	full height partitions, 8' ht.	70	SF	$ 8.00	$560	
Level 3 Code	E	full height partitions, 8' ht.	70	SF	$ 1.00	$70	
Level 3 Code	**L**	**2 x 10 floor joists, sistered to existing**	**50**	**SF**	$ 16.50	$825	under rehab'd bathroom
Level 3 Code	M	2 x 10 floor joists, sistered to existing	50	SF	$ 12.00	$600	

United States Department of the Interior
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Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	E	2 x 10 floor joists, sistered to existing	50	SF	$ 1.50	$75	
Level 3 Code	**L**	**LVL window headers**	**20**	**LF**	$ 41.25	$825	
Level 3 Code	M	LVL window headers	20	LF	$ 30.00	$600	
Level 3 Code	E	LVL window headers	20	LF	$ 3.75	$75	
Level 3 Code	**L**	**install p.t. sill plates**	**20**	**LF**	$ 8.25	$165	
Level 3 Code	M	install p.t. sill plates	20	LF	$ 6.00	$120	
Level 3 Code	E	install p.t. sill plates	20	LF	$ 0.75	$15	
Level 3 Code	**L**	**install hurricane clips at roof framing**	**40**	**EA**	$ 19.25	$770	at 32"oc
Level 3 Code	M	install hurricane clips at roof framing	40	EA	$ 14.00	$560	
Level 3 Code	E	install hurricane clips at roof framing	40	EA	$ 1.75	$70	
Level 3 Code	**L**	**bathroom accessories - package per restroom**	**4**	**SUM**	$ 412.50	$1,650	
Level 3 Code	M	bathroom accessories - package per restroom	4	SUM	$ 300.00	$1,200	
Level 3 Code	E	bathroom accessories - package per restroom	4	SUM	$ 37.50	$150	
Level 3 Code	**L**	**hoisting / rigging**	**1**	**SUM**	$ 192.50	$193	
Level 3 Code	M	hoisting / rigging	1	SUM	$ 140.00	$140	
Level 3 Code	E	hoisting / rigging	1	SUM	$ 17.50	$18	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL INTERIOR CONSTRUCTION	**1**	**VALUE**	**$ 18,375.00**	**$18,375**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C20		**STAIRCASES**					
Level 3 Code	**L**	**install exterior stair / landing**	**25**	**SF**	$ 11.00	$275	
Level 3 Code	M	install exterior stair / landing	25	SF	$ 8.00	$200	
Level 3 Code	E	install exterior stair / landing	25	SF	$ 1.00	$25	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL STAIRCASES	**1**	**VALUE**	**$ 500.00**	**$500**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C30		**INTERIOR FINISHES**					
Level 3 Code	**L**	**install handrail at existing stair**	**35**	**LF**	$ 27.50	$963	
Level 3 Code	M	install handrail at existing stair	35	LF	$ 20.00	$700	

United States Department of the Interior
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Class C Construction Cost Estimate

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PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	E	install handrail at existing stair	35	LF	$ 2.50	$88	
Level 3 Code	**L**	**patch / repair holes in walls**	**490**	**SF**	$ 0.83	$404	assume 10% of wall
Level 3 Code	M	patch / repair holes in walls	490	SF	$ 0.60	$294	
Level 3 Code	E	patch / repair holes in walls	490	SF	$ 0.08	$37	
Level 3 Code	**L**	**replace missing wall paneling**	**16**	**SF**	$ 22.00	$352	assume 10% of wall
Level 3 Code	M	replace missing wall paneling	16	SF	$ 16.00	$256	
Level 3 Code	E	replace missing wall paneling	16	SF	$ 2.00	$32	
Level 3 Code	**L**	**install new wood window sill**	**2**	**LF**	$ 27.50	$55	
Level 3 Code	M	install new wood window sill	2	LF	$ 20.00	$40	
Level 3 Code	E	install new wood window sill	2	LF	$ 2.50	$5	
Level 3 Code	**L**	**paint basement floor**	**575**	**SF**	$ 1.10	$633	
Level 3 Code	M	paint basement floor	575	SF	$ 0.80	$460	
Level 3 Code	E	paint basement floor	575	SF	$ 0.10	$58	
Level 3 Code	**L**	**patch / repair ceiling**	**123**	**SF**	$ 5.50	$677	15% of ceiling area
Level 3 Code	M	patch / repair ceiling	123	SF	$ 4.00	$492	
Level 3 Code	E	patch / repair ceiling	123	SF	$ 0.50	$62	
Level 3 Code	**L**	**new gyp bd at restroom / powder room walls**	**280**	**SF**	$ 2.75	$770	
Level 3 Code	M	new gyp bd at restroom / powder room walls	280	SF	$ 2.00	$560	
Level 3 Code	E	new gyp bd at restroom / powder room walls	280	SF	$ 0.25	$70	
Level 3 Code	**L**	**paint interior walls**	**2912**	**SF**	$ 1.10	$3,203	
Level 3 Code	M	paint interior walls	2912	SF	$ 0.80	$2,330	
Level 3 Code	E	paint interior walls	2912	SF	$ 0.10	$291	
Level 3 Code	**L**	**paint ceiling**	**820**	**SF**	$ 1.10	$902	
Level 3 Code	M	paint ceiling	820	SF	$ 0.80	$656	
Level 3 Code	E	paint ceiling	820	SF	$ 0.10	$82	
Level 3 Code	**L**	**laminate wood flooring at stairs**	**40**	**SF**	$ 5.50	$220	includes stair nosings
Level 3 Code	M	laminate wood flooring at stairs	40	SF	$ 4.00	$160	
Level 3 Code	E	laminate wood flooring at stairs	40	SF	$ 0.50	$20	
Level 3 Code	**L**	**laminate flooring**	**866**	**SF**	$ 5.50	$4,763	general
Level 3 Code	M	laminate flooring	866	SF	$ 4.00	$3,464	
Level 3 Code	E	laminate flooring	866	SF	$ 0.50	$433	
Level 3 Code	**L**	**tile flooring**	**63**	**SF**	$ 13.75	$866	
Level 3 Code	M	tile flooring	63	SF	$ 10.00	$630	
Level 3 Code	E	tile flooring	63	SF	$ 1.25	$79	
Level 3 Code	**L**	**tile shower surround**	**50**	**SF**	$ 12.10	$605	
Level 3 Code	M	tile shower surround	50	SF	$ 8.80	$440	
Level 3 Code	E	tile shower surround	50	SF	$ 1.10	$55	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	**L**	**install 3-3/4" wood base**	**35**	**LF**	$ 3.85	$135	
Level 3 Code	M	install 3-3/4" wood base	35	LF	$ 2.80	$98	
Level 3 Code	E	install 3-3/4" wood base	35	LF	$ 0.35	$12	
Level 3 Code	**L**	**floor base**	**360**	**LF**	$ 3.85	$1,386	
Level 3 Code	M	floor base	360	LF	$ 2.80	$1,008	
Level 3 Code	E	floor base	360	LF	$ 0.35	$126	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL INTERIOR FINISHES	**1**	**VALUE**	**$ 28,969.00**	**$28,969**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D20		**PLUMBING**					
		demolition					
Level 3 Code	**L**	**remove all plumbing fixtures**	**7**	**EA**	$ 103.13	$722	
Level 3 Code	M	remove all plumbing fixtures	7	EA	$ 75.00	$525	
Level 3 Code	E	remove all plumbing fixtures	7	EA	$ 9.38	$66	
Level 3 Code	**L**	**remove water and dwv piping as necessary.**	**1988**	**SF**	$ 1.21	$2,405	
Level 3 Code	M	remove water and dwv piping as necessary.	1988	SF	$ 0.88	$1,749	
Level 3 Code	E	remove water and dwv piping as necessary.	1988	SF	$ 0.11	$219	
Level 3 Code	**L**	**dispose of materials**	**1**	**SUM**	$ 1,375.00	$1,375	
Level 3 Code	M	dispose of materials	1	SUM	$ 1,000.00	$1,000	
Level 3 Code	E	dispose of materials	1	SUM	$ 125.00	$125	
		plumbing fixtures					
Level 3 Code	**L**	**water closet**	**1**	**EA**	$ 756.25	$756	
Level 3 Code	M	water closet	1	EA	$ 550.00	$550	
Level 3 Code	E	water closet	1	EA	$ 68.75	$69	
Level 3 Code	**L**	**bath tub / shower**	**1**	**EA**	$ 1,443.75	$1,444	
Level 3 Code	M	bath tub / shower	1	EA	$ 1,050.00	$1,050	
Level 3 Code	E	bath tub / shower	1	EA	$ 131.25	$131	
Level 3 Code	**L**	**lavatories**	**1**	**EA**	$ 790.63	$791	
Level 3 Code	M	lavatories	1	EA	$ 575.00	$575	
Level 3 Code	E	lavatories	1	EA	$ 71.88	$72	
Level 3 Code	**L**	**mop sinks**	**1**	**EA**	$ 825.00	$825	
Level 3 Code	M	mop sinks	1	EA	$ 600.00	$600	
Level 3 Code	E	mop sinks	1	EA	$ 75.00	$75	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	**L**	**laundry box**	**1**	**EA**	$ 292.19	$292	
Level 3 Code	M	laundry box	1	EA	$ 212.50	$213	
Level 3 Code	E	laundry box	1	EA	$ 26.56	$27	
Level 3 Code	**L**	**hot water circ pump**	**1**	**EA**	$ 704.69	$705	
Level 3 Code	M	hot water circ pump	1	EA	$ 512.50	$513	
Level 3 Code	E	hot water circ pump	1	EA	$ 64.06	$64	
Level 3 Code	**L**	**2" rpbfp**	**1**	**EA**	$ 1,031.25	$1,031	
Level 3 Code	M	2" rpbfp	1	EA	$ 750.00	$750	
Level 3 Code	E	2" rpbfp	1	EA	$ 93.75	$94	
Level 3 Code	**L**	**boiler room sump pump**	**1**	**EA**	$ 1,031.25	$1,031	
Level 3 Code	M	boiler room sump pump	1	EA	$ 750.00	$750	
Level 3 Code	E	boiler room sump pump	1	EA	$ 93.75	$94	
Level 3 Code	**L**	**drain / waste / vent piping modifications, allowance**	**6**	**FIXT**	$ 825.00	$4,950	
Level 3 Code	M	drain / waste / vent piping modifications, allowance	6	FIXT	$ 600.00	$3,600	
Level 3 Code	E	drain / waste / vent piping modifications, allowance	6	FIXT	$ 75.00	$450	
Level 3 Code	**L**	**copper potable water piping (insulated)**	**6**	**FIXT**	$ 532.81	$3,197	
Level 3 Code	M	copper potable water piping (insulated)	6	FIXT	$ 387.50	$2,325	
Level 3 Code	E	copper potable water piping (insulated)	6	FIXT	$ 48.44	$291	
Level 3 Code	**L**	**allow for recirc line**	**1**	**SUM**	$ 2,062.50	$2,063	
Level 3 Code	M	allow for recirc line	1	SUM	$ 1,500.00	$1,500	
Level 3 Code	E	allow for recirc line	1	SUM	$ 187.50	$188	
Level 3 Code	**L**	**clean and flush potable water systems**	**1**	**SUM**	$ 378.13	$378	
Level 3 Code	M	clean and flush potable water systems	1	SUM	$ 275.00	$275	
Level 3 Code	E	clean and flush potable water systems	1	SUM	$ 34.38	$34	
Level 3 Code	L	factor for historic renovation, add 15% labor	1	SUM	$ 2,343.75	$2,344	
Level 3 Code	**L**	**scoping of sanitary lines**	**1**	**SUM**	$ 550.00	$550	
Level 3 Code	M	scoping of sanitary lines	1	SUM	$ 400.00	$400	
Level 3 Code	E	scoping of sanitary lines	1	SUM	$ 50.00	$50	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL PLUMBING	**1**	**VALUE**	**$ 43,279.85**	**$43,280**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D30		**HVAC**					
		demolition					

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	**L**	**allow for demo at 2nd level bathroom**	**1**	**SUM**	$ 288.75	$289	
Level 3 Code	M	allow for demo at 2nd level bathroom	1	SUM	$ 210.00	$210	
Level 3 Code	E	allow for demo at 2nd level bathroom	1	SUM	$ 26.25	$26	
		hvac equipment					
Level 3 Code	**L**	**2nd level baseboard work, allow**	**1**	**SUM**	$ 728.75	$729	
Level 3 Code	M	2nd level baseboard work, allow	1	SUM	$ 530.00	$530	
Level 3 Code	E	2nd level baseboard work, allow	1	SUM	$ 66.25	$66	
Level 3 Code	**L**	**whole house fan on 2nd floor**	**1**	**EA**	$ 742.50	$743	
Level 3 Code	M	whole house fan on 2nd floor	1	EA	$ 540.00	$540	
Level 3 Code	E	whole house fan on 2nd floor	1	EA	$ 67.50	$68	
Level 3 Code	**L**	**restroom fans**	**1**	**EA**	$ 440.00	$440	
Level 3 Code	M	restroom fans	1	EA	$ 320.00	$320	
Level 3 Code	E	restroom fans	1	EA	$ 40.00	$40	
Level 3 Code	**L**	**ducting / caps for fan and dryer**	**2**	**EA**	$ 398.75	$798	
Level 3 Code	M	ducting / caps for fan and dryer	2	EA	$ 290.00	$580	
Level 3 Code	E	ducting / caps for fan and dryer	2	EA	$ 36.25	$73	
Level 3 Code	**L**	**hydronic piping, insulate all lines**	**1**	**SUM**	$ 3,162.50	$3,163	
Level 3 Code	M	hydronic piping, insulate all lines	1	SUM	$ 2,300.00	$2,300	
Level 3 Code	E	hydronic piping, insulate all lines	1	SUM	$ 287.50	$288	
Level 3 Code	**L**	**testing and balancing**	**1**	**SUM**	$ 226.88	$227	
Level 3 Code	M	testing and balancing	1	SUM	$ 165.00	$165	
Level 3 Code	E	testing and balancing	1	SUM	$ 20.63	$21	
Level 3 Code	L	factor for historic renovation, add 15% labor	1	SUM	$ 962.50	$963	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL HVAC	**1**	**VALUE**	**$ 12,575.00**	**$12,575**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D40		**Fire Protection**					
Level 3 Code	**L**	**fire sprinkler system - NFPA 13**	**1988**	**SF**	$ 3.58	$7,107	whole building
Level 3 Code	M	fire sprinkler system - NFPA 13	1988	SF	$ 2.60	$5,169	
Level 3 Code	E	fire sprinkler system - NFPA 13	1988	SF	$ 0.33	$646	
Level 3 Code	**L**	**dry pipe system in attic**	**410**	**SF**	$ 5.50	$2,255	w/ air compressor
Level 3 Code	M	dry pipe system in attic	410	SF	$ 4.00	$1,640	
Level 3 Code	E	dry pipe system in attic	410	SF	$ 0.50	$205	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Summary Item 2	**O.I.C. Dwelling**	**Total Cost:**	$365,145

Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FIRE PROTECTION	**1**	**VALUE**	**$ 17,022.00**	**$17,022**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D50		**ELECTRICAL**					
Level 3 Code	**L**	**demo**	**1**	**SUM**	$ 1,161.60	$1,162	
Level 3 Code	M	demo	1	SUM	$ 844.80	$845	
Level 3 Code	E	demo	1	SUM	$ 105.60	$106	
Level 3 Code	**L**	**temp power / lighting**	**1**	**SUM**	$ 1,293.60	$1,294	
Level 3 Code	M	temp power / lighting	1	SUM	$ 940.80	$941	
Level 3 Code	E	temp power / lighting	1	SUM	$ 117.60	$118	
Level 3 Code	**L**	**100 amp main panel / spd**	**1**	**EA**	$ 2,468.40	$2,468	
Level 3 Code	M	100 amp main panel / spd	1	EA	$ 1,795.20	$1,795	
Level 3 Code	E	100 amp main panel / spd	1	EA	$ 224.40	$224	
Level 3 Code	**L**	**grounding**	**1**	**EA**	$ 409.75	$410	
Level 3 Code	M	grounding	1	EA	298.00	$298	
Level 3 Code	E	grounding	1	EA	$ 37.25	$37	
Level 3 Code	**L**	**100 a ats**	**1**	**EA**	$ 1,201.20	$1,201	
Level 3 Code	M	100 a ats	1	EA	$ 873.60	$874	
Level 3 Code	E	100 a ats	1	EA	$ 109.20	$109	
Level 3 Code	**L**	**electrical testing**	**1**	**SUM**	$ 211.20	$211	
Level 3 Code	M	electrical testing	1	SUM	$ 153.60	$154	
Level 3 Code	E	electrical testing	1	SUM	$ 19.20	$19	
Level 3 Code	**L**	**coordination / arc flash study**	**1**	**SUM**	$ 330.00	$330	
Level 3 Code	M	coordination / arc flash study	1	SUM	$ 240.00	$240	
Level 3 Code	E	coordination / arc flash study	1	SUM	$ 30.00	$30	
Level 3 Code	**L**	**lightning protection**	**1**	**SUM**	$ 8,764.80	$8,765	
Level 3 Code	M	lightning protection	1	SUM	$ 6,374.40	$6,374	
Level 3 Code	M	lightning protection	1	SUM	$ 796.80	$797	
Level 3 Code	**L**	**duplex outlets**	**28**	**EA**	$ 145.20	$4,066	
Level 3 Code	M	duplex outlets	28	EA	$ 105.60	$2,957	
Level 3 Code	E	duplex outlets	28	EA	$ 13.20	$370	
Level 3 Code	**L**	**dedicated duplex outlets**	**4**	**EA**	$ 158.40	$634	
Level 3 Code	M	dedicated duplex outlets	4	EA	$ 115.20	$461	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	E	dedicated duplex outlets	4	EA	$ 14.40	$58
Level 3 Code	**L**	**ada door connection**	**1**	**EA**	$ 448.80	$449
Level 3 Code	M	ada door connection	1	EA	$ 326.40	$326
Level 3 Code	E	ada door connection	1	EA	$ 40.80	$41
Level 3 Code	**L**	**gfci outlets**	**4**	**EA**	$ 165.00	$660
Level 3 Code	M	gfci outlets	4	EA	$ 120.00	$480
Level 3 Code	E	gfci outlets	4	EA	$ 15.00	$60
Level 3 Code	**L**	**wp outlets**	**1**	**EA**	$ 257.40	$257
Level 3 Code	M	wp outlets	1	EA	$ 187.20	$187
Level 3 Code	E	wp outlets	1	EA	$ 23.40	$23
Level 3 Code	**L**	**dryer circuit / receptacle**	**1**	**EA**	$ 432.30	$432
Level 3 Code	M	dryer circuit / receptacle	1	EA	$ 314.40	$314
Level 3 Code	E	dryer circuit / receptacle	1	EA	$ 39.30	$39
Level 3 Code	**L**	**stove connection**	**1**	**EA**	$ 448.80	$449
Level 3 Code	M	stove connection	1	EA	$ 326.40	$326
Level 3 Code	E	stove connection	1	EA	$ 40.80	$41
Level 3 Code	**L**	**120 v j-box connection**	**2**	**EA**	$ 138.60	$277
Level 3 Code	M	120 v j-box connection	2	EA	$ 100.80	$202
Level 3 Code	E	120 v j-box connection	2	EA	$ 12.60	$25
Level 3 Code	**L**	**home runs / lighting circuits / supports**	**1**	**SUM**	$ 9,570.00	$9,570
Level 3 Code	M	home runs / lighting circuits / supports	1	SUM	$ 6,960.00	$6,960
Level 3 Code	E	home runs / lighting circuits / supports	1	SUM	$ 870.00	$870
Level 3 Code	**L**	**circuit / connect attic exhaust fan**	**1**	**EA**	$ 504.90	$505
Level 3 Code	M	circuit / connect attic exhaust fan	1	EA	$ 367.20	$367
Level 3 Code	E	circuit / connect attic exhaust fan	1	EA	$ 45.90	$46
Level 3 Code	**L**	**circuit / connect exhaust fan**	**1**	**EA**	$ 224.40	$224
Level 3 Code	M	circuit / connect exhaust fan	1	EA	$ 163.20	$163
Level 3 Code	E	circuit / connect exhaust fan	1	EA	$ 20.40	$20
Level 3 Code	**L**	**circuit / connect air compressor**	**1**	**EA**	$ 277.20	$277
Level 3 Code	M	circuit / connect air compressor	1	EA	$ 201.60	$202
Level 3 Code	E	circuit / connect air compressor	1	EA	$ 25.20	$25
Level 3 Code	**L**	**circuit rcp**	**1**	**EA**	$ 257.40	$257
Level 3 Code	M	circuit rcp	1	EA	$ 187.20	$187
Level 3 Code	E	circuit rcp	1	EA	$ 23.40	$23
		- furnish / install lighting -				
Level 3 Code	**L**	**lighting**	**1988**	**SF**	$ 4.13	$8,201
Level 3 Code	M	lighting	1988	SF	$ 3.00	$5,964

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Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	E	lighting	1988	SF	$ 0.38	$746
Level 3 Code	**L**	**exterior lighting wall pacs**	**3**	**EA**	$ 462.00	$1,386
Level 3 Code	M	exterior lighting wall pacs	3	EA	$ 336.00	$1,008
Level 3 Code	E	exterior lighting wall pacs	3	EA	$ 42.00	$126
Level 3 Code	**L**	**switch**	**5**	**EA**	$ 75.90	$380
Level 3 Code	M	switch	5	EA	$ 55.20	$276
Level 3 Code	E	switch	5	EA	$ 6.90	$35
Level 3 Code	**L**	**occ sensor**	**10**	**EA**	$ 151.80	$1,518
Level 3 Code	M	occ sensor	10	EA	$ 110.40	$1,104
Level 3 Code	E	occ sensor	10	EA	$ 13.80	$138
Level 3 Code	**L**	**commissioning**	**1**	**SUM**	$ 211.20	$211
Level 3 Code	M	commissioning	1	SUM	$ 153.60	$154
Level 3 Code	E	commissioning	1	SUM	$ 19.20	$19
		- low voltage -				
Level 3 Code	**L**	**data wall rough in / conduits**	**7**	**EA**	$ 132.00	$924
Level 3 Code	M	data wall rough in / conduits	7	EA	$ 96.00	$672
Level 3 Code	E	data wall rough in / conduits	7	EA	$ 12.00	$84
Level 3 Code	**L**	**data / tv cabling**	**7**	**EA**	$ 211.20	$1,478
Level 3 Code	M	data / tv cabling	7	EA	$ 153.60	$1,075
Level 3 Code	E	data / tv cabling	7	EA	$ 19.20	$134
Level 3 Code	**L**	**wall rack / patch panel / grounding**	**1**	**SUM**	$ 950.40	$950
Level 3 Code	M	wall rack / patch panel / grounding	1	SUM	$ 691.20	$691
Level 3 Code	E	wall rack / patch panel / grounding	1	SUM	$ 86.40	$86
Level 3 Code	**L**	**wap cabling**	**3**	**EA**	$ 171.60	$515
Level 3 Code	M	wap cabling	3	EA	$ 124.80	$374
Level 3 Code	E	wap cabling	3	EA	$ 15.60	$47
		- fire alarm -				
Level 3 Code	**L**	**fa detection**	**13**	**EA**	$ 181.50	$2,360
Level 3 Code	M	fa detection	13	EA	$ 132.00	$1,716
Level 3 Code	E	fa detection	13	EA	$ 16.50	$215
Level 3 Code	**L**	**fa notification**	**5**	**EA**	$ 204.60	$1,023
Level 3 Code	M	fa notification	5	EA	$ 148.80	$744
Level 3 Code	E	fa notification	5	EA	$ 18.60	$93
Level 3 Code	**L**	**fa remote annunciator**	**1**	**EA**	$ 297.00	$297
Level 3 Code	M	fa remote annunciator	1	EA	$ 216.00	$216
Level 3 Code	E	fa remote annunciator	1	EA	$ 27.00	$27
Level 3 Code	**L**	**fa pull station**	**5**	**EA**	$ 240.90	$1,205

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Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	M	fa pull station	5	EA	$ 175.20	$876	
Level 3 Code	E	fa pull station	5	EA	$ 21.90	$110	
Level 3 Code	**L**	**fa modules / relays**	**2**	**EA**	$ 280.50	$561	
Level 3 Code	M	fa modules / relays	2	EA	$ 204.00	$408	
Level 3 Code	E	fa modules / relays	2	EA	$ 25.50	$51	
Level 3 Code	**L**	**fa control panel**	**1**	**EA**	$ 1,465.20	$1,465	
Level 3 Code	M	fa control panel	1	EA	$ 1,065.60	$1,066	
Level 3 Code	E	fa control panel	1	EA	$ 133.20	$133	
Level 3 Code	**L**	**furnish fire alarm design/programming**	**1**	**SUM**	$ 660.00	$660	
Level 3 Code	M	furnish fire alarm design/programming	1	SUM	$ 480.00	$480	
Level 3 Code	E	furnish fire alarm design/programming	1	SUM	$ 60.00	$60	
		SUBTOTAL ELECTRICAL	**1**	**VALUE**	**$ 103,693.00**	**$103,693**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
E10		**EQUIPMENT**					
Level 3 Code	**L**	**vent hood**	**1**	**EA**	$ 825.00	$825	
Level 3 Code	M	vent hood	1	EA	$ 600.00	$600	
Level 3 Code	E	vent hood	1	EA	$ 75.00	$75	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL EQUIPMENT	**1**	**VALUE**	**$ 1,500.00**	**$1,500**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
E20		**FURNISHINGS**					
Level 3 Code	**L**	**2" window blinds at all windows**	**290**	**SF**	$ 8.25	$2,393	
Level 3 Code	M	2" window blinds at all windows	290	SF	$ 6.00	$1,740	
Level 3 Code	E	2" window blinds at all windows	290	SF	$ 0.75	$218	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FURNISHINGS	**1**	**VALUE**	**$ 4,350.00**	**$4,350**	

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Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
F20		**SELECTIVE BUILDING DEMOLITION**					
Level 3 Code	**L**	**demo roofing**	**1067**	**SF**	$ 1.10	$1,174	
Level 3 Code	M	demo roofing	1067	SF	$ 0.80	$854	
Level 3 Code	E	demo roofing	1067	SF	$ 0.10	$107	
Level 3 Code	**L**	**remove damaged skip sheathing**	**113**	**SF**	$ 2.75	$311	
Level 3 Code	M	remove damaged skip sheathing	113	SF	$ 2.00	$226	
Level 3 Code	E	remove damaged skip sheathing	113	SF	$ 0.25	$28	
Level 3 Code	**L**	**remove roof edge flashing**	**175**	**LF**	$ 0.55	$96	
Level 3 Code	M	remove roof edge flashing	175	LF	$ 0.40	$70	
Level 3 Code	E	remove roof edge flashing	175	LF	$ 0.05	$9	
Level 3 Code	**L**	**demo gutters**	**175**	**LF**	$ 1.10	$193	
Level 3 Code	M	demo gutters	175	LF	$ 0.80	$140	
Level 3 Code	E	demo gutters	175	LF	$ 0.10	$18	
Level 3 Code	**L**	**demo downspouts**	**80**	**LF**	$ 0.69	$55	
Level 3 Code	M	demo downspouts	80	LF	$ 0.50	$40	
Level 3 Code	E	demo downspouts	80	LF	$ 0.06	$5	
Level 3 Code	**L**	**remove partitions**	**96**	**SF**	$ 1.65	$158	
Level 3 Code	M	remove partitions	96	SF	$ 1.20	$115	
Level 3 Code	E	remove partitions	96	SF	$ 0.15	$14	
Level 3 Code	**L**	**remove ceiling in dining room**	**112**	**SF**	$ 0.55	$62	
Level 3 Code	M	remove ceiling in dining room	112	SF	$ 0.40	$45	
Level 3 Code	E	remove ceiling in dining room	112	SF	$ 0.05	$6	
Level 3 Code	**L**	**remove floor finishes**	**935**	**SF**	$ 0.55	$514	
Level 3 Code	M	remove floor finishes	935	SF	$ 0.40	$374	
Level 3 Code	E	remove floor finishes	935	SF	$ 0.05	$47	
Level 3 Code	**L**	**remove / salvage base trim**	**410**	**LF**	$ 1.10	$451	
Level 3 Code	M	remove / salvage base trim	410	LF	$ 0.80	$328	
Level 3 Code	E	remove / salvage base trim	410	LF	$ 0.10	$41	
Level 3 Code	**L**	**sawcut concrete slab**	**6**	**LF**	$ 8.25	$50	
Level 3 Code	M	sawcut concrete slab	6	LF	$ 6.00	$36	
Level 3 Code	E	sawcut concrete slab	6	LF	$ 0.75	$5	
Level 3 Code	**L**	**remove concrete slab**	**1**	**SF**	$ 27.50	$28	
Level 3 Code	M	remove concrete slab	1	SF	$ 20.00	$20	
Level 3 Code	E	remove concrete slab	1	SF	$ 2.50	$3	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	**L**	**remove fire escape ladder**	**1**	**EA**	$ 192.50	$193	
Level 3 Code	M	remove fire escape ladder	1	EA	$ 140.00	$140	
Level 3 Code	E	remove fire escape ladder	1	EA	$ 17.50	$18	
Level 3 Code	**L**	**remove egress deck**	**25**	**SF**	$ 11.00	$275	
Level 3 Code	M	remove egress deck	25	SF	$ 8.00	$200	
Level 3 Code	E	remove egress deck	25	SF	$ 1.00	$25	
Level 3 Code	**L**	**demo wood guardrail at east entry**	**25**	**LF**	$ 11.00	$275	
Level 3 Code	M	demo wood guardrail at east entry	25	LF	$ 8.00	$200	
Level 3 Code	E	demo wood guardrail at east entry	25	LF	$ 1.00	$25	
Level 3 Code	**L**	**demo stairs / landing**	**25**	**SF**	$ 8.25	$206	at north façade
Level 3 Code	M	demo stairs / landing	25	SF	$ 6.00	$150	
Level 3 Code	E	demo stairs / landing	25	SF	$ 0.75	$19	
Level 3 Code	**L**	**clean facades of accumulated debris**	**3726**	**SF**	$ 0.69	$2,562	
Level 3 Code	M	clean facades of accumulated debris	3726	SF	$ 0.50	$1,863	
Level 3 Code	E	clean facades of accumulated debris	3726	SF	$ 0.06	$233	
Level 3 Code	**L**	**remove paint from basement floor**	**575**	**SF**	$ 0.69	$395	
Level 3 Code	M	remove paint from basement floor	575	SF	$ 0.50	$288	
Level 3 Code	E	remove paint from basement floor	575	SF	$ 0.06	$36	
Level 3 Code	**L**	**remove vct finish at stairs**	**40**	**SF**	$ 0.83	$33	includes rubber treads
Level 3 Code	M	remove vct finish at stairs	40	SF	$ 0.60	$24	
Level 3 Code	E	remove vct finish at stairs	40	SF	$ 0.08	$3	
Level 3 Code	**L**	**demo wall finishes at restroom**	**280**	**SF**	$ 0.69	$193	
Level 3 Code	M	demo wall finishes at restroom	280	SF	$ 0.50	$140	
Level 3 Code	E	demo wall finishes at restroom	280	SF	$ 0.06	$18	
Level 3 Code	**L**	**remove bathroom accessories**	**1**	**SUM**	$ 412.50	$413	
Level 3 Code	M	remove bathroom accessories	1	SUM	$ 300.00	$300	
Level 3 Code	E	remove bathroom accessories	1	SUM	$ 37.50	$38	
Level 3 Code	**L**	**remove exterior doors - single**	**2**	**EA**	$ 44.00	$88	doors 103, 104
Level 3 Code	M	remove exterior doors - single	2	EA	$ 32.00	$64	
Level 3 Code	E	remove exterior doors - single	2	EA	$ 4.00	$8	
Level 3 Code	**L**	**remove interior doors - single**	**2**	**EA**	$ 44.00	$88	doors 201, 203
Level 3 Code	M	remove interior doors - single	2	EA	$ 32.00	$64	
Level 3 Code	E	remove interior doors - single	2	EA	$ 4.00	$8	
Level 3 Code	**L**	**remove concrete chimney cap**	**1**	**SUM**	$ 68.75	$69	
Level 3 Code	M	remove concrete chimney cap	1	SUM	$ 50.00	$50	
Level 3 Code	E	remove concrete chimney cap	1	SUM	$ 6.25	$6	
Level 3 Code	**L**	**remove window headers**	**20**	**LF**	$ 11.00	$220	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	M	remove window headers	20	LF	$ 8.00	$160	
Level 3 Code	E	remove window headers	20	LF	$ 1.00	$20	
Level 3 Code	**L**	**remove damaged sill plates**	**20**	**LF**	$ 8.25	$165	
Level 3 Code	M	remove damaged sill plates	20	LF	$ 6.00	$120	
Level 3 Code	E	remove damaged sill plates	20	LF	$ 0.75	$15	
Level 3 Code	**L**	**provide shoring at wall reframing**	**20**	**LF**	$ 16.50	$330	
Level 3 Code	M	provide shoring at wall reframing	20	LF	$ 12.00	$240	
Level 3 Code	E	provide shoring at wall reframing	20	LF	$ 1.50	$30	
Level 3 Code	**L**	**remove existing handrail at existing stair**	**35**	**LF**	$ 2.75	$96	
Level 3 Code	M	remove existing handrail at existing stair	35	LF	$ 2.00	$70	
Level 3 Code	E	remove existing handrail at existing stair	35	LF	$ 0.25	$9	
Level 3 Code	**L**	**hazardous materials abatement**	**1**	**SUM**	$ 19,250.00	$19,250	allowance
Level 3 Code	M	hazardous materials abatement	1	SUM	$ 14,000.00	$14,000	allowance
Level 3 Code	E	hazardous materials abatement	1	SUM	$ 1,750.00	$1,750	allowance
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL SELECTIVE BUILDING DEMOLITION	**1**	**VALUE**	**$ 50,800.25**	**$50,800**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
G 40		**SITE ELECTRICAL UTILITIES**					
Level 3 Code	**L**	**ug feeder**	**80**	**LF**	$ 14.52	$1,162	
Level 3 Code	M	ug feeder	80	LF	$ 10.56	$845	
Level 3 Code	E	ug feeder	80	LF	$ 1.32	$106	
Level 3 Code	**L**	**meter base / disconnect**	**1**	**EA**	$ 488.40	$488	
Level 3 Code	M	meter base / disconnect	1	EA	$ 355.20	$355	
Level 3 Code	E	meter base / disconnect	1	EA	$ 44.40	$44	
Level 3 Code	**L**	**16 kw generator / offload / fuel**	**1**	**SUM**	$ 6,703.20	$6,703	
Level 3 Code	M	16 kw generator / offload / fuel	1	SUM	$ 4,468.80	$4,469	
Level 3 Code	E	16 kw generator / offload / fuel	1	SUM	$ 1,500.00	$1,500	
Level 3 Code	**L**	**generator feeder**	**20**	**LF**	$ 13.86	$277	
Level 3 Code	M	generator feeder	20	LF	$ 10.08	$202	
Level 3 Code	E	generator feeder	20	LF	$ 1.26	$25	
Level 3 Code	**L**	**generator controls/circuits**	**20**	**LF**	$ 15.18	$304	
Level 3 Code	M	generator controls/circuits	20	LF	$ 11.04	$221	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item 2 **O.I.C. Dwelling** **Total Cost:** $365,145

Level 3 Code	E	generator controls/circuits	20	LF	$ 1.38	$28	
Level 3 Code	**L**	**trenching**	**100**	**LF**	$ 39.60	$3,960	
Level 3 Code	M	trenching	100	LF	$ 3.60	$360	
Level 3 Code	E	trenching	100	LF	$ 28.80	$2,880	
		SUBTOTAL SITE ELECTRICAL UTILITIES	**1**	**VALUE**	**$ 23,928.00**	**$23,928**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
TOTAL COST -		**O.I.C. Dwelling**	**1988**	**SF**	**$ 183.67**	**$365,145**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item	**Harbor of Refuge Dwelling**	**Total Cost:**	$545,826

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
A10		**FOUNDATIONS**					
Level 3 Code	**L**	**continuous footing at west addition**	**2.5**	**CY**	$ 275.00	$688	
Level 3 Code	M	continuous footing at west addition	2.5	CY	$ 200.00	$500	
Level 3 Code	E	continuous footing at west addition	2.5	CY	$ 25.00	$63	
Level 3 Code	**L**	**8" stem wall, 2' ht.**	**1.1**	**CY**	$ 275.00	$303	
Level 3 Code	M	8" stem wall, 2' ht.	1.1	CY	$ 200.00	$220	
Level 3 Code	E	8" stem wall, 2' ht.	1.1	CY	$ 25.00	$28	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FOUNDATIONS	**1**	**VALUE**	**$ 1,800.00**	**$1,800**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
A20		**BASEMENT CONSTRUCTION**					
Level 3 Code	**L**	**capillary break at basement walls**	**100**	**LF**	$ 11.00	$1,100	
Level 3 Code	M	capillary break at basement walls	100	LF	$ 8.00	$800	
Level 3 Code	E	capillary break at basement walls	100	LF	$ 1.00	$100	
Level 3 Code	**L**	**repoint mortar joint**	**120**	**SF**	$ 16.50	$1,980	15% of total wall area
Level 3 Code	M	repoint mortar joint	120	SF	$ 12.00	$1,440	
Level 3 Code	E	repoint mortar joint	120	SF	$ 1.50	$180	
Level 3 Code	**L**	**flip or replace deteriorated brick**	**80**	**SF**	$ 27.50	$2,200	10% of total wall area
Level 3 Code	M	flip or replace deteriorated brick	80	SF	$ 20.00	$1,600	
Level 3 Code	E	flip or replace deteriorated brick	80	SF	$ 2.50	$200	
Level 3 Code	**L**	**apply breathable coating at basement walls**	**800**	**SF**	$ 2.75	$2,200	
Level 3 Code	M	apply breathable coating at basement walls	800	SF	$ 2.00	$1,600	
Level 3 Code	E	apply breathable coating at basement walls	800	SF	$ 0.25	$200	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL BASEMENT CONSTRUCTION	**1**	**VALUE**	**$ 13,600.00**	**$13,600**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item	**Harbor of Refuge Dwelling**	**Total Cost:**	$545,826

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B10		**SUPERSTRUCTURE**					
Level 3 Code	**L**	**steel channel, 8" deep**	**3**	**LF**	$ 82.50	$248	at notched location
Level 3 Code	M	steel channel, 8" deep	3	LF	$ 60.00	$180	
Level 3 Code	E	steel channel, 8" deep	3	LF	$ 7.50	$23	
Level 3 Code	**L**	**steel channel, 8" deep**	**10**	**LF**	$ 82.50	$825	south of staircase
Level 3 Code	M	steel channel, 8" deep	10	LF	$ 60.00	$600	
Level 3 Code	E	steel channel, 8" deep	10	LF	$ 7.50	$75	
Level 3 Code	**L**	**screw jack, 3" dia**	**1**	**EA**	$ 206.25	$206	
Level 3 Code	M	screw jack, 3" dia	1	EA	$ 150.00	$150	
Level 3 Code	E	screw jack, 3" dia	1	EA	$ 18.75	$19	
Level 3 Code	**L**	**8.5" x 8.5" square bearing plate**	**1**	**EA**	$ 82.50	$83	
Level 3 Code	M	8.5" x 8.5" square bearing plate	1	EA	$ 60.00	$60	
Level 3 Code	E	8.5" x 8.5" square bearing plate	1	EA	$ 7.50	$8	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL SUPESTRUCTURE	**1**	**VALUE**	**$ 2,475.00**	**$2,475**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B20		**EXTERIOR CLOSURE**					
Level 3 Code	**L**	**paint lintels**	**100**	**SF**	$ 1.38	$138	
Level 3 Code	M	paint lintels	100	SF	$ 1.00	$100	
Level 3 Code	E	paint lintels	100	SF	$ 0.13	$13	
Level 3 Code	**L**	**2x6 exterior framed wall**	**420**	**SF**	$ 3.03	$1,271	
Level 3 Code	M	2x6 exterior framed wall	420	SF	$ 2.20	$924	
Level 3 Code	E	2x6 exterior framed wall	420	SF	$ 0.28	$116	
Level 3 Code	**L**	**exterior sheathing**	**420**	**SF**	$ 1.38	$578	
Level 3 Code	M	exterior sheathing	420	SF	$ 1.00	$420	
Level 3 Code	E	exterior sheathing	420	SF	$ 0.13	$53	
Level 3 Code	**L**	**exterior wall insulation**	**420**	**SF**	$ 0.69	$289	
Level 3 Code	M	exterior wall insulation	420	SF	$ 0.50	$210	
Level 3 Code	E	exterior wall insulation	420	SF	$ 0.06	$26	
Level 3 Code	**L**	**exterior stucco**	**320**	**SF**	$ 5.50	$1,760	

United States Department of the Interior
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Summary Item		**Harbor of Refuge Dwelling**					**Total Cost:**	$545,826
Level 3 Code	M	exterior stucco	320	SF	$	4.00	$1,280	
Level 3 Code	E	exterior stucco	320	SF	$	0.50	$160	
Level 3 Code	**L**	**repoint exterior masonry**	**214**	**SF**	$	16.50	$3,531	20% of total masonry
Level 3 Code	M	repoint exterior masonry	214	SF	$	12.00	$2,568	
Level 3 Code	E	repoint exterior masonry	214	SF	$	1.50	$321	
Level 3 Code	**L**	**repoint all faces of chimney**	**115**	**SF**	$	16.50	$1,898	
Level 3 Code	M	repoint all faces of chimney	115	SF	$	12.00	$1,380	
Level 3 Code	E	repoint all faces of chimney	115	SF	$	1.50	$173	
Level 3 Code	**L**	**install chimney cap**	**2**	**EA**	$	316.25	$633	
Level 3 Code	M	install chimney cap	2	EA	$	230.00	$460	
Level 3 Code	E	install chimney cap	2	EA	$	28.75	$58	
Level 3 Code	**L**	**roof framing**	**180**	**SF**	$	11.00	$1,980	
Level 3 Code	M	roof framing	180	SF	$	8.00	$1,440	
Level 3 Code	E	roof framing	180	SF	$	1.00	$180	
Level 3 Code	**L**	**install shingle siding**	**495**	**SF**	$	8.25	$4,084	
Level 3 Code	M	install shingle siding	495	SF	$	6.00	$2,970	
Level 3 Code	E	install shingle siding	495	SF	$	0.75	$371	
Level 3 Code	**L**	**paint shingle siding**	**825**	**SF**	$	1.38	$1,134	
Level 3 Code	M	paint shingle siding	825	SF	$	1.00	$825	
Level 3 Code	E	paint shingle siding	825	SF	$	0.13	$103	
Level 3 Code	**L**	**install 12" step flashing**	**28**	**LF**	$	5.50	$154	
Level 3 Code	M	install 12" step flashing	28	LF	$	4.00	$112	
Level 3 Code	E	install 12" step flashing	28	LF	$	0.50	$14	
Level 3 Code	**L**	**install new roofing substrate**	**140**	**SF**	$	3.03	$424	
Level 3 Code	M	install new roofing substrate	140	SF	$	2.20	$308	
Level 3 Code	E	install new roofing substrate	140	SF	$	0.28	$39	
Level 3 Code	**L**	**install new fascia**	**100**	**LF**	$	4.68	$468	
Level 3 Code	M	install new fascia	100	LF	$	3.40	$340	
Level 3 Code	E	install new fascia	100	LF	$	0.43	$43	
Level 3 Code	**L**	**replace demo'd masonry**	**74**	**SF**	$	19.25	$1,425	
Level 3 Code	M	replace demo'd masonry	74	SF	$	14.00	$1,036	
Level 3 Code	E	replace demo'd masonry	74	SF	$	1.75	$130	
Level 3 Code	**L**	**install wood trim at front porch**	**365**	**SF**	$	4.68	$1,706	
Level 3 Code	M	install wood trim at front porch	365	SF	$	3.40	$1,241	
Level 3 Code	E	install wood trim at front porch	365	SF	$	0.43	$155	
Level 3 Code	**L**	**paint wood trim with marine grade paint**	**365**	**SF**	$	0.83	$301	
Level 3 Code	M	paint wood trim with marine grade paint	365	SF	$	0.60	$219	

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Summary Item **Harbor of Refuge Dwelling** **Total Cost:** $545,826

Level 3 Code	E	paint wood trim with marine grade paint	365	SF	$ 0.08	$27
Level 3 Code	**L**	**paint porch ceiling**	**210**	**SF**	$ 0.69	$144
Level 3 Code	M	paint porch ceiling	210	SF	$ 0.50	$105
Level 3 Code	E	paint porch ceiling	210	SF	$ 0.06	$13
Level 3 Code	**L**	**sand / prep / paint columns**	**6**	**EA**	$ 137.50	$825
Level 3 Code	M	sand / prep / paint columns	6	EA	$ 100.00	$600
Level 3 Code	E	sand / prep / paint columns	6	EA	$ 12.50	$75
Level 3 Code	**L**	**reinstall exterior door / new lockset / weatherstripping**	**1**	**EA**	$ 550.00	$550
Level 3 Code	M	reinstall exterior door / new lockset / weatherstripping	1	EA	$ 400.00	$400
Level 3 Code	E	reinstall exterior door / new lockset / weatherstripping	1	EA	$ 50.00	$50
Level 3 Code	**L**	**install new wood ABA door at west addition**	**1**	**EA**	$ 880.00	$880
Level 3 Code	M	install new wood ABA door at west addition	1	EA	$ 640.00	$640
Level 3 Code	E	install new wood ABA door at west addition	1	EA	$ 80.00	$80
Level 3 Code	**L**	**install glazed transom above new ABA door**	**1**	**EA**	$ 275.00	$275
Level 3 Code	M	install glazed transom above new ABA door	1	EA	$ 200.00	$200
Level 3 Code	E	install glazed transom above new ABA door	1	EA	$ 25.00	$25
Level 3 Code	**L**	**install flashing at window openings**	**220**	**LF**	$ 8.25	$1,815
Level 3 Code	M	install flashing at window openings	220	LF	$ 6.00	$1,320
Level 3 Code	E	install flashing at window openings	220	LF	$ 0.75	$165
Level 3 Code	**L**	**install new windows**	**14**	**EA**	$ 990.00	$13,860
Level 3 Code	M	install new windows	14	EA	$ 720.00	$10,080
Level 3 Code	E	install new windows	14	EA	$ 90.00	$1,260
Level 3 Code	**L**	**paint fascia boards**	**100**	**LF**	$ 1.65	$165
Level 3 Code	M	paint fascia boards	100	LF	$ 1.20	$120
Level 3 Code	E	paint fascia boards	100	LF	$ 0.15	$15
Level 3 Code	**L**	**lead based paint abatement**	**575**	**SF**	$ 1.38	$791
Level 3 Code	M	lead based paint abatement	575	SF	$ 1.00	$575
Level 3 Code	E	lead based paint abatement	575	SF	$ 0.13	$72
Level 3 Code		Description	0	SF	$ -	$0
		SUBTOTAL EXTERIOR CLOSURE	**1**	**VALUE**	**$ 74,682.50**	**$74,683**

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B30		**ROOFING**					
Level 3 Code	**L**	**install metal shingles**	**1578**	**SF**	$ 11.00	$17,358	

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Summary Item **Harbor of Refuge Dwelling** **Total Cost:** $545,826

Level 3 Code	M	install metal shingles	1578	SF	$ 8.00	$12,624	
Level 3 Code	E	install metal shingles	1578	SF	$ 1.00	$1,578	
Level 3 Code	**L**	**install fall protection**	**8**	**EA**	$ 247.50	$1,980	
Level 3 Code	M	install fall protection	8	EA	$ 180.00	$1,440	
Level 3 Code	E	install fall protection	8	EA	$ 22.50	$180	
Level 3 Code	**L**	**install roof edge flashing**	**198**	**LF**	$ 8.25	$1,634	w/ HPC finish
Level 3 Code	M	install roof edge flashing	198	LF	$ 6.00	$1,188	
Level 3 Code	E	install roof edge flashing	198	LF	$ 0.75	$149	
Level 3 Code	**L**	**install gutters, half round**	**40**	**LF**	$ 5.50	$220	
Level 3 Code	M	install gutters, half round	40	LF	$ 4.00	$160	
Level 3 Code	E	install gutters, half round	40	LF	$ 0.50	$20	
Level 3 Code	**L**	**install downspouts with 4' long extensions**	**68**	**LF**	$ 8.25	$561	includes 4' extensions
Level 3 Code	M	install downspouts with 4' long extensions	68	LF	$ 6.00	$408	
Level 3 Code	E	install downspouts with 4' long extensions	68	LF	$ 0.75	$51	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL ROOFING	**1**	**VALUE**	**$ 39,550.00**	**$39,550**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C10		**INTERIOR CONSTRUCTION**					
Level 3 Code	**L**	**install LVL header**	**8**	**LF**	$ 6.88	$55	
Level 3 Code	M	install LVL header	8	LF	$ 5.00	$40	
Level 3 Code	E	install LVL header	8	LF	$ 0.63	$5	
Level 3 Code	**L**	**full height partitions, 8' ht.**	**120**	**SF**	$ 11.00	$1,320	
Level 3 Code	M	full height partitions, 8' ht.	120	SF	$ 8.00	$960	
Level 3 Code	E	full height partitions, 8' ht.	120	SF	$ 1.00	$120	
Level 3 Code	**L**	**2 x 10 floor joists, sistered to existing**	**25**	**SF**	$ 11.00	$275	under rehab'd bathroom
Level 3 Code	M	2 x 10 floor joists, sistered to existing	25	SF	$ 8.00	$200	
Level 3 Code	E	2 x 10 floor joists, sistered to existing	25	SF	$ 1.00	$25	
Level 3 Code	**L**	**install hurricane clips at roof framing**	**30**	**EA**	$ 19.25	$578	at 32"oc
Level 3 Code	M	install hurricane clips at roof framing	30	EA	$ 14.00	$420	
Level 3 Code	E	install hurricane clips at roof framing	30	EA	$ 1.75	$53	
Level 3 Code	**L**	**framed floor at west addition**	**180**	**SF**	$ 11.00	$1,980	
Level 3 Code	M	framed floor at west addition	180	SF	$ 8.00	$1,440	
Level 3 Code	E	framed floor at west addition	180	SF	$ 1.00	$180	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item		**Harbor of Refuge Dwelling**				**Total Cost:**	$545,826
Level 3 Code	**L**	**add 3/4" t&g plywood at wood floor**	**435**	**SF**	$ 3.30	$1,436	
Level 3 Code	M	add 3/4" t&g plywood at wood floor	435	SF	$ 2.40	$1,044	
Level 3 Code	E	add 3/4" t&g plywood at wood floor	435	SF	$ 0.30	$131	
Level 3 Code	**L**	**reinstall salvaged wood flooring**	**435**	**SF**	$ 8.25	$3,589	
Level 3 Code	M	reinstall salvaged wood flooring	435	SF	$ 6.00	$2,610	
Level 3 Code	E	reinstall salvaged wood flooring	435	SF	$ 0.75	$326	
Level 3 Code	**L**	**reinstall salvaged wood base**	**175**	**LF**	$ 1.38	$241	
Level 3 Code	M	reinstall salvaged wood base	175	LF	$ 1.00	$175	
Level 3 Code	E	reinstall salvaged wood base	175	LF	$ 0.13	$22	
Level 3 Code	**L**	**replace damaged roof / ceiling framing**	**80**	**SF**	$ 11.00	$880	
Level 3 Code	M	replace damaged roof / ceiling framing	80	SF	$ 8.00	$640	
Level 3 Code	E	replace damaged roof / ceiling framing	80	SF	$ 1.00	$80	
Level 3 Code	**L**	**hoisting / rigging**	**1**	**SUM**	$ 192.50	$193	
Level 3 Code	M	hoisting / rigging	1	SUM	$ 140.00	$140	
Level 3 Code	E	hoisting / rigging	1	SUM	$ 17.50	$18	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL INTERIOR CONSTRUCTION	**1**	**VALUE**	**$ 19,172.50**	**$19,173**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	**Description**	**Quantity**	**Unit**	**Cost/Unit**	**Total Cost**	**Remarks**
C20		**STAIRCASES**					
Level 3 Code	**L**	**stairs adjacent to ABA lift**	**1**	**FLIGHT**	$ 2,750.00	$2,750	
Level 3 Code	M	stairs adjacent to ABA lift	1	FLIGHT	$ 2,000.00	$2,000	
Level 3 Code	E	stairs adjacent to ABA lift	1	FLIGHT	$ 250.00	$250	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL STAIRCASES	**1**	**VALUE**	**$ 5,000.00**	**$5,000**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	**Description**	**Quantity**	**Unit**	**Cost/Unit**	**Total Cost**	**Remarks**
C30		**INTERIOR FINISHES**					
Level 3 Code	**L**	**refinish wood flooring**	**1015**	**SF**	$ 2.75	$2,791	
Level 3 Code	M	refinish wood flooring	1015	SF	$ 2.00	$2,030	
Level 3 Code	E	refinish wood flooring	1015	SF	$ 0.25	$254	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item		**Harbor of Refuge Dwelling**					**Total Cost:**	$545,826
Level 3 Code	**L**	**install handrails at new stairs**	**15**	**LF**	$	27.50	$413	
Level 3 Code	M	install handrails at new stairs	15	LF	$	20.00	$300	
Level 3 Code	E	install handrails at new stairs	15	LF	$	2.50	$38	
Level 3 Code	**L**	**install guardrail at existing stairs**	**10**	**LF**	$	27.50	$275	
Level 3 Code	M	install guardrail at existing stairs	10	LF	$	20.00	$200	
Level 3 Code	E	install guardrail at existing stairs	10	LF	$	2.50	$25	
Level 3 Code	**L**	**repaint ceiling**	**2295**	**SF**	$	1.10	$2,525	
Level 3 Code	M	repaint ceiling	2295	SF	$	0.80	$1,836	
Level 3 Code	E	repaint ceiling	2295	SF	$	0.10	$230	
Level 3 Code	**L**	**repair gyp bd. ceiling**	**80**	**SF**	$	5.50	$440	
Level 3 Code	M	repair gyp bd. ceiling	80	SF	$	4.00	$320	
Level 3 Code	E	repair gyp bd. ceiling	80	SF	$	0.50	$40	
Level 3 Code	**L**	**new gyp bd. ceiling**	**2070**	**SF**	$	2.75	$5,693	
Level 3 Code	M	new gyp bd. ceiling	2070	SF	$	2.00	$4,140	
Level 3 Code	E	new gyp bd. ceiling	2070	SF	$	0.25	$518	
Level 3 Code	**L**	**patch holes in walls**	**60**	**SF**	$	5.50	$330	15% of wall area
Level 3 Code	M	patch holes in walls	60	SF	$	4.00	$240	
Level 3 Code	E	patch holes in walls	60	SF	$	0.50	$30	
Level 3 Code	**L**	**repair wood floor at demo'd restroom**	**32**	**SF**	$	8.25	$264	
Level 3 Code	M	repair wood floor at demo'd restroom	32	SF	$	6.00	$192	
Level 3 Code	E	repair wood floor at demo'd restroom	32	SF	$	0.75	$24	
Level 3 Code	**L**	**install wood floor**	**180**	**SF**	$	8.25	$1,485	at west addition
Level 3 Code	M	install wood floor	180	SF	$	6.00	$1,080	
Level 3 Code	E	install wood floor	180	SF	$	0.75	$135	
Level 3 Code	**L**	**install wood base trim to match existing**	**270**	**LF**	$	3.85	$1,040	
Level 3 Code	M	install wood base trim to match existing	270	LF	$	2.80	$756	
Level 3 Code	E	install wood base trim to match existing	270	LF	$	0.35	$95	
Level 3 Code	**L**	**repair gyp bd. walls at demo'd restroom**	**200**	**SF**	$	5.50	$1,100	
Level 3 Code	M	repair gyp bd. walls at demo'd restroom	200	SF	$	4.00	$800	
Level 3 Code	E	repair gyp bd. walls at demo'd restroom	200	SF	$	0.50	$100	
Level 3 Code	**L**	**replace water stained gyp bd. at kitchen**	**168**	**SF**	$	2.75	$462	
Level 3 Code	M	replace water stained gyp bd. at kitchen	168	SF	$	2.00	$336	
Level 3 Code	E	replace water stained gyp bd. at kitchen	168	SF	$	0.25	$42	
Level 3 Code	**L**	**install taller base trim at bedrooms**	**80**	**LF**	$	5.23	$418	
Level 3 Code	M	install taller base trim at bedrooms	80	LF	$	3.80	$304	
Level 3 Code	E	install taller base trim at bedrooms	80	LF	$	0.48	$38	
Level 3 Code	**L**	**sand / refinish stair treads / risers**	**72**	**SF**	$	3.58	$257	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Harbor of Refuge Dwelling** **Total Cost:** $545,826

Level 3 Code	M	sand / refinish stair treads / risers	72	SF	$ 2.60	$187	
Level 3 Code	E	sand / refinish stair treads / risers	72	SF	$ 0.33	$23	
Level 3 Code	**L**	**refinish beadboard wainscot, 4' ht.**	**980**	**SF**	$ 2.75	$2,695	
Level 3 Code	M	refinish beadboard wainscot, 4' ht.	980	SF	$ 2.00	$1,960	
Level 3 Code	E	refinish beadboard wainscot, 4' ht.	980	SF	$ 0.25	$245	
Level 3 Code	**L**	**refinish baseboard**	**245**	**LF**	$ 2.75	$674	
Level 3 Code	M	refinish baseboard	245	LF	$ 2.00	$490	
Level 3 Code	E	refinish baseboard	245	LF	$ 0.25	$61	
Level 3 Code	**L**	**reinstall baseboards / casing trim at existing opening**	**126**	**EA**	$ 80.85	$10,187	at enlarged opening
Level 3 Code	M	reinstall baseboards / casing trim at existing opening	126	EA	$ 58.80	$7,409	
Level 3 Code	E	reinstall baseboards / casing trim at existing opening	126	EA	$ 7.35	$926	
Level 3 Code	**L**	**reinstall casing trim at window**	**30**	**EA**	$ 88.55	$2,657	
Level 3 Code	M	reinstall casing trim at window	30	EA	$ 64.40	$1,932	
Level 3 Code	E	reinstall casing trim at window	30	EA	$ 8.05	$242	
Level 3 Code	**L**	**install new wall paper**	**352**	**SF**	$ 5.50	$1,936	
Level 3 Code	M	install new wall paper	352	SF	$ 4.00	$1,408	
Level 3 Code	E	install new wall paper	352	SF	$ 0.50	$176	
Level 3 Code	**L**	**reinstall casing trim at window**	**220**	**LF**	$ 3.85	$847	
Level 3 Code	M	reinstall casing trim at window	220	LF	$ 2.80	$616	
Level 3 Code	E	reinstall casing trim at window	220	LF	$ 0.35	$77	
Level 3 Code	**L**	**repaint wood ceiling**	**115**	**SF**	$ 1.10	$127	
Level 3 Code	M	repaint wood ceiling	115	SF	$ 0.80	$92	
Level 3 Code	E	repaint wood ceiling	115	SF	$ 0.10	$12	
Level 3 Code	**L**	**clean / repaint walls**	**1864**	**SF**	$ 1.79	$3,337	
Level 3 Code	M	clean / repaint walls	1864	SF	$ 1.30	$2,423	
Level 3 Code	E	clean / repaint walls	1864	SF	$ 0.17	$317	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL INTERIOR FINISHES	**1**	**VALUE**	**$ 72,646.64**	**$72,647**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D10		**CONVEYING SYSTEMS**					
Level 3 Code	**L**	**platform lift**	**1**	**EA**	$ 5,500.00	$5,500	
Level 3 Code	M	platform lift	1	EA	$ 4,000.00	$4,000	
Level 3 Code	E	platform lift	1	EA	$ 500.00	$500	

United States Department of the Interior
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Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL CONVEYING SYSTEMS	**1**	**VALUE**	**$ 10,000.00**	**$10,000**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D20		**PLUMBING**					
		demolition					
Level 3 Code	**L**	**remove all plumbing fixtures**	**2**	**EA**	$ 103.13	$206	
Level 3 Code	M	remove all plumbing fixtures	2	EA	$ 75.00	$150	
Level 3 Code	E	remove all plumbing fixtures	2	EA	$ 9.38	$19	
Level 3 Code	**L**	**remove all water piping**	**2496**	**SF**	$ 0.55	$1,373	
Level 3 Code	M	remove all water piping	2496	SF	$ 0.40	$998	
Level 3 Code	E	remove all water piping	2496	SF	$ 0.05	$125	
Level 3 Code	**L**	**dispose of materials**	**1**	**SUM**	$ 275.00	$275	
Level 3 Code	M	dispose of materials	1	SUM	$ 200.00	$200	
Level 3 Code	E	dispose of materials	1	SUM	$ 25.00	$25	
		plumbing fixtures					
Level 3 Code	**L**	**mop sinks**	**1**	**EA**	$ 825.00	$825	
Level 3 Code	M	mop sinks	1	EA	$ 600.00	$600	
Level 3 Code	E	mop sinks	1	EA	$ 75.00	$75	
Level 3 Code	**L**	**5 gallon electric water heater**	**1**	**EA**	$ 412.50	$413	
Level 3 Code	M	5 gallon electric water heater	1	EA	$ 300.00	$300	
Level 3 Code	E	5 gallon electric water heater	1	EA	$ 37.50	$38	
Level 3 Code	**L**	**basement sump pump/basin**	**1**	**EA**	$ 1,443.75	$1,444	
Level 3 Code	M	basement sump pump/basin	1	EA	$ 1,050.00	$1,050	
Level 3 Code	E	basement sump pump/basin	1	EA	$ 131.25	$131	
Level 3 Code	**L**	**drain / waste / vent piping, cast iron**	**2**	**FIXT**	$ 825.00	$1,650	
Level 3 Code	M	drain / waste / vent piping, cast iron	2	FIXT	$ 600.00	$1,200	
Level 3 Code	E	drain / waste / vent piping, cast iron	2	FIXT	$ 75.00	$150	
Level 3 Code	**L**	**copper potable water piping (insulated)**	**2**	**FIXT**	$ 532.82	$1,066	
Level 3 Code	M	copper potable water piping (insulated)	2	FIXT	$ 387.50	$775	
Level 3 Code	E	copper potable water piping (insulated)	2	FIXT	$ 48.44	$97	
Level 3 Code	**L**	**clean and flush potable water systems**	**1**	**SUM**	$ 275.00	$275	
Level 3 Code	M	clean and flush potable water systems	1	SUM	$ 200.00	$200	
Level 3 Code	E	clean and flush potable water systems	1	SUM	$ 25.00	$25	

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National Park Service
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Summary Item **Harbor of Refuge Dwelling** **Total Cost:** $545,826

Level 3 Code	**L**	**propane gas piping**	**30**	**LF**	**$ 15.47**	$464	
Level 3 Code	M	propane gas piping	30	LF	$ 11.25	$338	
Level 3 Code	E	propane gas piping	30	LF	$ 1.41	$42	
Level 3 Code	**L**	**propane tank**	**1**	**EA**	**$ 1,340.63**	$1,341	
Level 3 Code	M	propane tank	1	EA	$ 975.00	$975	
Level 3 Code	E	propane tank	1	EA	$ 121.88	$122	
Level 3 Code	L	factor for historic renovation, add 15% labor	1	SUM	$ 1,312.50	$1,313	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL PLUMBING	**1**	**VALUE**	**$ 18,277.42**	**$18,277**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D30		**HVAC**					
		demolition					
Level 3 Code	**L**	**remove heating system,**	**2496**	**SF**	**$ 2.41**	$6,013	
Level 3 Code	M	remove heating system,	2496	SF	$ 1.75	$4,373	
Level 3 Code	E	remove heating system,	2496	SF	$ 0.22	$547	
		hvac equipment					
Level 3 Code	**L**	**new propane boiler**	**1**	**EA**	**$ 2,351.25**	$2,351	
Level 3 Code	M	new propane boiler	1	EA	$ 1,710.00	$1,710	
Level 3 Code	E	new propane boiler	1	EA	$ 213.75	$214	
Level 3 Code	**L**	**expansion tank**	**1**	**EA**	**$ 508.75**	$509	
Level 3 Code	M	expansion tank	1	EA	$ 370.00	$370	
Level 3 Code	E	expansion tank	1	EA	$ 46.25	$46	
Level 3 Code	**L**	**circ pump**	**1**	**EA**	**$ 577.50**	$578	
Level 3 Code	M	circ pump	1	EA	$ 420.00	$420	
Level 3 Code	E	circ pump	1	EA	$ 52.50	$53	
Level 3 Code	**L**	**glycol feed system**	**1**	**EA**	**$ 508.75**	$509	
Level 3 Code	M	glycol feed system	1	EA	$ 370.00	$370	
Level 3 Code	E	glycol feed system	1	EA	$ 46.25	$46	
Level 3 Code	**L**	**hydronic baseboard heaters, allowance**	**13**	**EA**	**$ 350.63**	$4,558	
Level 3 Code	M	hydronic baseboard heaters, allowance	13	EA	$ 255.00	$3,315	
Level 3 Code	E	hydronic baseboard heaters, allowance	13	EA	$ 31.88	$414	
Level 3 Code	**L**	**hydronic piping**	**14**	**EA**	**$ 749.38**	$10,491	
Level 3 Code	M	hydronic piping	14	EA	$ 545.00	$7,630	

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Level 3 Code	E	hydronic piping	14	EA	$ 68.13	$954	
Level 3 Code	**L**	**testing and balancing**	**1**	**SUM**	$ 550.00	$550	
Level 3 Code	M	testing and balancing	1	SUM	$ 400.00	$400	
Level 3 Code	E	testing and balancing	1	SUM	$ 50.00	$50	
Level 3 Code	**L**	**commissioning**	**1**	**SUM**	$ 165.00	$165	
Level 3 Code	M	commissioning	1	SUM	$ 120.00	$120	
Level 3 Code	E	commissioning	1	SUM	$ 15.00	$15	
Level 3 Code	**L**	**scoping of sanitary lines**	**1**	**SUM**	$ 550.00	$550	
Level 3 Code	M	scoping of sanitary lines	1	SUM	$ 400.00	$400	
Level 3 Code	E	scoping of sanitary lines	1	SUM	$ 50.00	$50	
Level 3 Code	**L**	**factor for historic renovation, add 15% labor**	**1**	**SUM**	$ 3,762.50	$3,763	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL HVAC	**1**	**VALUE**	**$ 51,532.48**	**$51,532**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	**Description**	**Quantity**	**Unit**	**Cost/Unit**	**Total Cost**	**Remarks**
D40		**FIRE PROTECTION**					
Level 3 Code	**L**	**fire sprinkler system - NFPA 13**	**2496**	**SF**	$ 3.44	$8,580	whole building
Level 3 Code	M	fire sprinkler system - NFPA 13	2496	SF	$ 2.50	$6,240	
Level 3 Code	E	fire sprinkler system - NFPA 13	2496	SF	$ 0.31	$780	
Level 3 Code	**L**	**dry pipe system in attic**	**1500**	**SF**	$ 5.50	$8,250	w/ air compressor
Level 3 Code	M	dry pipe system in attic	1500	SF	$ 4.00	$6,000	
Level 3 Code	M	dry pipe system in attic	1500	SF	$ 0.50	$750	
		SUBTOTAL FIRE PROTECTION	**1**	**VALUE**	**$ 30,600.00**	**$30,600**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	**Description**	**Quantity**	**Unit**	**Cost/Unit**	**Total Cost**	**Remarks**
D50		**ELECTRICAL**					
Level 3 Code	**L**	**demo**	**1**	**SUM**	$ 844.80	$845	
Level 3 Code	M	demo	1	SUM	$ 614.40	$614	
Level 3 Code	E	demo	1	SUM	$ 76.80	$77	
Level 3 Code	**L**	**temp power / lighting**	**1**	**SUM**	$ 884.40	$884	
Level 3 Code	M	temp power / lighting	1	SUM	$ 643.20	$643	

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Level 3 Code	E	temp power / lighting	1	SUM	$ 80.40	$80
Level 3 Code	**L**	**100 amp main panel / spd**	**1**	**EA**	$ 2,468.40	$2,468
Level 3 Code	M	100 amp main panel / spd	1	EA	$ 1,795.20	$1,795
Level 3 Code	E	100 amp main panel / spd	1	EA	$ 224.40	$224
Level 3 Code	**L**	**grounding**	**1**	**EA**	$ 409.20	$409
Level 3 Code	M	grounding	1	EA	$ 297.60	$298
Level 3 Code	E	grounding	1	EA	$ 37.20	$37
Level 3 Code	**L**	**100 a ats**	**1**	**EA**	$ 1,201.20	$1,201
Level 3 Code	M	100 a ats	1	EA	$ 873.60	$874
Level 3 Code	E	100 a ats	1	EA	$ 109.20	$109
Level 3 Code	**L**	**electrical testing**	**1**	**SUM**	$ 211.20	$211
Level 3 Code	M	electrical testing	1	SUM	$ 153.60	$154
Level 3 Code	E	electrical testing	1	SUM	$ 19.20	$19
Level 3 Code	**L**	**coordination / arc flash study**	**1**	**SUM**	$ 330.00	$330
Level 3 Code	M	coordination / arc flash study	1	SUM	$ 240.00	$240
Level 3 Code	E	coordination / arc flash study	1	SUM	$ 30.00	$30
Level 3 Code	**L**	**lightning protection**	**1**	**SUM**	$ 8,764.80	$8,765
Level 3 Code	M	lightning protection	1	SUM	$ 6,374.40	$6,374
Level 3 Code	E	lightning protection	1	SUM	$ 796.80	$797
Level 3 Code	**L**	**duplex outlets**	**28**	**EA**	$ 145.20	$4,066
Level 3 Code	M	duplex outlets	28	EA	$ 105.60	$2,957
Level 3 Code	E	duplex outlets	28	EA	$ 13.20	$370
Level 3 Code	**L**	**dedicated duplex outlets**	**2**	**EA**	$ 158.40	$317
Level 3 Code	M	dedicated duplex outlets	2	EA	$ 115.20	$230
Level 3 Code	E	dedicated duplex outlets	2	EA	$ 14.40	$29
Level 3 Code	**L**	**ada lift circuit / disconnect**	**1**	**SUM**	$ 950.40	$950
Level 3 Code	M	ada lift circuit / disconnect	1	SUM	$ 691.20	$691
Level 3 Code	E	ada lift circuit / disconnect	1	SUM	$ 86.40	$86
Level 3 Code	**L**	**ada door connection**	**1**	**EA**	$ 448.80	$449
Level 3 Code	M	ada door connection	1	EA	$ 326.40	$326
Level 3 Code	E	ada door connection	1	EA	$ 40.80	$41
Level 3 Code	**L**	**gfci outlets**	**2**	**EA**	$ 165.00	$330
Level 3 Code	M	gfci outlets	2	EA	$ 120.00	$240
Level 3 Code	E	gfci outlets	2	EA	$ 15.00	$30
Level 3 Code	**L**	**wp outlets**	**1**	**EA**	$ 257.40	$257
Level 3 Code	M	wp outlets	1	EA	$ 187.20	$187
Level 3 Code	E	wp outlets	1	EA	$ 23.40	$23

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Harbor of Refuge Dwelling** **Total Cost:** $545,826

Level 3 Code	**L**	**120 v j-box connection**	**2**	**EA**	$ 138.60	$277
Level 3 Code	M	120 v j-box connection	2	EA	$ 100.80	$202
Level 3 Code	E	120 v j-box connection	2	EA	$ 12.60	$25
Level 3 Code	**L**	**home runs / lighting circuits / supports**	**1**	**SUM**	$ 4,818.00	$4,818
Level 3 Code	M	home runs / lighting circuits / supports	1	SUM	$ 3,504.00	$3,504
Level 3 Code	E	home runs / lighting circuits / supports	1	SUM	$ 438.00	$438
Level 3 Code	**L**	**circuit / connect boiler-option 1**	**1**	**EA**	$ 320.10	$320
Level 3 Code	M	circuit / connect boiler-option 1	1	EA	$ 232.80	$233
Level 3 Code	E	circuit / connect boiler-option 1	1	EA	$ 29.10	$29
Level 3 Code	**L**	**circuit / connect boiler rcp-option 1**	**1**	**EA**	$ 290.40	$290
Level 3 Code	M	circuit / connect boiler rcp-option 1	1	EA	$ 211.20	$211
Level 3 Code	E	circuit / connect boiler rcp-option 1	1	EA	$ 26.40	$26
Level 3 Code	**L**	**circuit / connect elec water heater**	**1**	**EA**	$ 346.50	$347
Level 3 Code	M	circuit / connect elec water heater	1	EA	$ 252.00	$252
Level 3 Code	E	circuit / connect elec water heater	1	EA	$ 31.50	$32
Level 3 Code	**L**	**circuit sump pump**	**1**	**EA**	$ 290.40	$290
Level 3 Code	M	circuit sump pump	1	EA	$ 211.20	$211
Level 3 Code	E	circuit sump pump	1	EA	$ 26.40	$26
Level 3 Code	**L**	**circuit / connect ceiling fan**	**3**	**EA**	$ 217.80	$653
Level 3 Code	M	circuit / connect ceiling fan	3	EA	$ 158.40	$475
Level 3 Code	E	circuit / connect ceiling fan	3	EA	$ 19.80	$59
Level 3 Code	**L**	**circuit / connect air compressor**	**1**	**EA**	$ 277.20	$277
Level 3 Code	M	circuit / connect air compressor	1	EA	$ 201.60	$202
Level 3 Code	E	circuit / connect air compressor	1	EA	$ 25.20	$25
		- furnish / install lighting -				
Level 3 Code	**L**	**lighting**	**2496**	**SF**	$ 4.13	$10,296
Level 3 Code	M	lighting	2496	SF	$ 3.00	$7,488
Level 3 Code	E	lighting	2496	SF	$ 0.38	$936
Level 3 Code	**L**	**exterior lighting wall pacs**	**1**	**EA**	$ 462.00	$462
Level 3 Code	M	exterior lighting wall pacs	1	EA	$ 336.00	$336
Level 3 Code	E	exterior lighting wall pacs	1	EA	$ 42.00	$42
Level 3 Code	**L**	**exterior canopy lights**	**4**	**EA**	$ 244.20	$977
Level 3 Code	M	exterior canopy lights	4	EA	$ 177.60	$710
Level 3 Code	E	exterior canopy lights	4	EA	$ 22.20	$89
Level 3 Code	**L**	**ceiling fan for upper level**	**4**	**EA**	$ 192.50	$770
Level 3 Code	M	ceiling fan for upper level	4	EA	$ 140.00	$560
Level 3 Code	E	ceiling fan for upper level	4	EA	$ 17.50	$70

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Level 3 Code	**L**	**switch**	**4**	**EA**	$ 75.90	$304
Level 3 Code	M	switch	4	EA	$ 55.20	$221
Level 3 Code	E	switch	4	EA	$ 6.90	$28
Level 3 Code	**L**	**occ sensor**	**11**	**EA**	$ 151.80	$1,670
Level 3 Code	M	occ sensor	11	EA	$ 110.40	$1,214
Level 3 Code	E	occ sensor	11	EA	$ 13.80	$152
Level 3 Code	**L**	**commissioning**	**1**	**SUM**	$ 211.20	$211
Level 3 Code	M	commissioning	1	SUM	$ 153.60	$154
Level 3 Code	E	commissioning	1	SUM	$ 19.20	$19
		- low voltage -				
Level 3 Code	**L**	**data wall rough in / conduits**	**8**	**EA**	$ 132.00	$1,056
Level 3 Code	M	data wall rough in / conduits	8	EA	$ 96.00	$768
Level 3 Code	E	data wall rough in / conduits	8	EA	$ 12.00	$96
Level 3 Code	**L**	**data / tv cabling**	**8**	**EA**	$ 211.20	$1,690
Level 3 Code	M	data / tv cabling	8	EA	$ 153.60	$1,229
Level 3 Code	E	data / tv cabling	8	EA	$ 19.20	$154
Level 3 Code	**L**	**wall rack / patch panel / grounding**	**1**	**SUM**	$ 950.40	$950
Level 3 Code	M	wall rack / patch panel / grounding	1	SUM	$ 691.20	$691
Level 3 Code	E	wall rack / patch panel / grounding	1	SUM	$ 86.40	$86
Level 3 Code	**L**	**wap cabling**	**3**	**EA**	$ 171.60	$515
Level 3 Code	M	wap cabling	3	EA	$ 124.80	$374
Level 3 Code	E	wap cabling	3	EA	$ 15.60	$47
		- fire alarm -				
Level 3 Code	**L**	**security system allowance**	**1**	**SUM**	$ 5,794.80	$5,795
Level 3 Code	M	security system allowance	1	SUM	$ 4,214.40	$4,214
Level 3 Code	E	security system allowance	1	SUM	$ 526.80	$527
Level 3 Code	**L**	**fa detection**	**11**	**EA**	$ 181.50	$1,997
Level 3 Code	M	fa detection	11	EA	$ 132.00	$1,452
Level 3 Code	E	fa detection	11	EA	$ 16.50	$182
Level 3 Code	**L**	**fa notification**	**6**	**EA**	$ 204.60	$1,228
Level 3 Code	M	fa notification	6	EA	$ 148.80	$893
Level 3 Code	E	fa notification	6	EA	$ 18.60	$112
Level 3 Code	**L**	**fa remote annunciator**	**1**	**EA**	$ 297.00	$297
Level 3 Code	M	fa remote annunciator	1	EA	$ 216.00	$216
Level 3 Code	E	fa remote annunciator	1	EA	$ 27.00	$27
Level 3 Code	**L**	**fa pull station**	**3**	**EA**	$ 240.90	$723
Level 3 Code	M	fa pull station	3	EA	$ 175.20	$526

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Level 3 Code	E	fa pull station	3	EA	$ 21.90	$66	
Level 3 Code	**L**	**fa modules / relays**	**2**	**EA**	$ 280.50	$561	
Level 3 Code	M	fa modules / relays	2	EA	$ 204.00	$408	
Level 3 Code	E	fa modules / relays	2	EA	$ 25.50	$51	
Level 3 Code	**L**	**fa control panel**	**1**	**EA**	$ 1,465.20	$1,465	
Level 3 Code	M	fa control panel	1	EA	$ 1,065.60	$1,066	
Level 3 Code	E	fa control panel	1	EA	$ 133.20	$133	
Level 3 Code	**L**	**furnish fire alarm design / programming**	**1**	**SUM**	$ 660.00	$660	
Level 3 Code	M	furnish fire alarm design / programming	1	SUM	$ 480.00	$480	
Level 3 Code	E	furnish fire alarm design / programming	1	SUM	$ 60.00	$60	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL ELECTRICAL	**1**	**VALUE**	**$ 109,784.00**	**$109,784**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
E20		**FURNISHINGS**					
Level 3 Code	**L**	**load capacity signage**	**1**	**SUM**	$ 220.00	$220	
Level 3 Code	M	load capacity signage	1	SUM	$ 160.00	$160	
Level 3 Code	E	load capacity signage	1	SUM	$ 20.00	$20	
Level 3 Code	**L**	**2" window blinds at all windows**	**680**	**SF**	$ 8.25	$5,610	
Level 3 Code	M	2" window blinds at all windows	680	SF	$ 6.00	$4,080	
Level 3 Code	E	2" window blinds at all windows	680	SF	$ 0.75	$510	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FURNISHINGS	**1**	**VALUE**	**$ 10,600.00**	**$10,600**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
F20		**SELECTIVE BUILDING DEMOLITION**					
Level 3 Code	**L**	**demo mudroom complete**	**60**	**SF**	$ 19.25	$1,155	
Level 3 Code	M	demo mudroom complete	60	SF	$ 14.00	$840	
Level 3 Code	E	demo mudroom complete	60	SF	$ 1.75	$105	
Level 3 Code	**L**	**remove paint from lintels**	**100**	**SF**	$ 1.38	$138	
Level 3 Code	M	remove paint from lintels	100	SF	$ 1.00	$100	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Summary Item **Harbor of Refuge Dwelling** **Total Cost:** $545,826

Level 3 Code	E	remove paint from lintels	100	SF	$ 0.13	$13	
Level 3 Code	**L**	**remove paint from exterior masonry**	**235**	**SF**	$ 1.93	$452	
Level 3 Code	M	remove paint from exterior masonry	235	SF	$ 1.40	$329	
Level 3 Code	E	remove paint from exterior masonry	235	SF	$ 0.18	$41	
Level 3 Code	**L**	**remove paint from interior basement masonry walls**	**1080**	**SF**	$ 1.93	$2,079	
Level 3 Code	M	remove paint from interior basement masonry walls	1080	SF	$ 1.40	$1,512	
Level 3 Code	E	remove paint from interior basement masonry walls	1080	SF	$ 0.18	$189	
Level 3 Code	**L**	**clean mildew from plaster walls**	**128**	**SF**	$ 2.75	$352	
Level 3 Code	M	clean mildew from plaster walls	128	SF	$ 2.00	$256	
Level 3 Code	E	clean mildew from plaster walls	128	SF	$ 0.25	$32	
Level 3 Code	**L**	**remove existing window headers**	**8**	**LF**	$ 11.00	$88	
Level 3 Code	M	remove existing window headers	8	LF	$ 8.00	$64	
Level 3 Code	E	remove existing window headers	8	LF	$ 1.00	$8	
Level 3 Code	**L**	**remove / salvage wood floor**	**435**	**SF**	$ 1.24	$538	
Level 3 Code	M	remove / salvage wood floor	435	SF	$ 0.90	$392	
Level 3 Code	E	remove / salvage wood floor	435	SF	$ 0.11	$49	
Level 3 Code	**L**	**remove / salvage wood base trim**	**175**	**LF**	$ 1.10	$193	
Level 3 Code	M	remove / salvage wood base trim	175	LF	$ 0.80	$140	
Level 3 Code	E	remove / salvage wood base trim	175	LF	$ 0.10	$18	
Level 3 Code	**L**	**remove floor finish at restroom**	**21**	**SF**	$ 0.55	$12	
Level 3 Code	M	remove floor finish at restroom	21	SF	$ 0.40	$8	
Level 3 Code	E	remove floor finish at restroom	21	SF	$ 0.05	$1	
Level 3 Code	**L**	**remove / salvage base trim**	**19**	**LF**	$ 1.10	$21	at demo'd restroom
Level 3 Code	M	remove / salvage base trim	19	LF	$ 0.80	$15	
Level 3 Code	E	remove / salvage base trim	19	LF	$ 0.10	$2	
Level 3 Code	**L**	**remove gyp bd ceiling at water stains**	**80**	**SF**	$ 0.69	$55	allowance
Level 3 Code	M	remove gyp bd ceiling at water stains	80	SF	$ 0.50	$40	
Level 3 Code	E	remove gyp bd ceiling at water stains	80	SF	$ 0.06	$5	
Level 3 Code	**L**	**remove gyp bd ceiling at exterior perimeter**	**125**	**SF**	$ 0.69	$86	for hurricane clips
Level 3 Code	M	remove gyp bd ceiling at exterior perimeter	125	SF	$ 0.50	$63	
Level 3 Code	E	remove gyp bd ceiling at exterior perimeter	125	SF	$ 0.06	$8	
Level 3 Code	**L**	**demo roof-to-wall flashing**	**42**	**LF**	$ 2.75	$116	
Level 3 Code	M	demo roof-to-wall flashing	42	LF	$ 2.00	$84	
Level 3 Code	E	demo roof-to-wall flashing	42	LF	$ 0.25	$11	
Level 3 Code	**L**	**demo flashing at chimney**	**28**	**LF**	$ 2.75	$77	
Level 3 Code	M	demo flashing at chimney	28	LF	$ 2.00	$56	
Level 3 Code	E	demo flashing at chimney	28	LF	$ 0.25	$7	

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Summary Item		**Harbor of Refuge Dwelling**					**Total Cost:**	$545,826
Level 3 Code	**L**	**demo aluminum siding**	**825**	**SF**	$	1.10	$908	
Level 3 Code	M	demo aluminum siding	825	SF	$	0.80	$660	
Level 3 Code	E	demo aluminum siding	825	SF	$	0.10	$83	
Level 3 Code	**L**	**demo shingle siding**	**495**	**SF**	$	1.10	$545	60% of total wall area
Level 3 Code	M	demo shingle siding	495	SF	$	0.80	$396	
Level 3 Code	E	demo shingle siding	495	SF	$	0.10	$50	
Level 3 Code	**L**	**scrape / prep for paint shingle siding**	**330**	**SF**	$	1.38	$454	40% of total wall area
Level 3 Code	M	scrape / prep for paint shingle siding	330	SF	$	1.00	$330	
Level 3 Code	E	scrape / prep for paint shingle siding	330	SF	$	0.13	$41	
Level 3 Code	**L**	**remove partition to enlarge door opening**	**16**	**SF**	$	55.00	$880	
Level 3 Code	M	remove partition to enlarge door opening	16	SF	$	40.00	$640	
Level 3 Code	E	remove partition to enlarge door opening	16	SF	$	5.00	$80	
Level 3 Code	**L**	**demo roofing**	**1313**	**SF**	$	1.10	$1,444	
Level 3 Code	M	demo roofing	1313	SF	$	0.80	$1,050	
Level 3 Code	E	demo roofing	1313	SF	$	0.10	$131	
Level 3 Code	**L**	**remove roof edge flashing**	**138**	**LF**	$	0.55	$76	
Level 3 Code	M	remove roof edge flashing	138	LF	$	0.40	$55	
Level 3 Code	E	remove roof edge flashing	138	LF	$	0.05	$7	
Level 3 Code	**L**	**demo substrate at roof**	**140**	**SF**	$	2.75	$385	10% of total roof area
Level 3 Code	M	demo substrate at roof	140	SF	$	2.00	$280	
Level 3 Code	E	demo substrate at roof	140	SF	$	0.25	$35	
Level 3 Code	**L**	**demo gutters**	**40**	**LF**	$	1.10	$44	
Level 3 Code	M	demo gutters	40	LF	$	0.80	$32	
Level 3 Code	E	demo gutters	40	LF	$	0.10	$4	
Level 3 Code	**L**	**demo downspouts**	**4**	**EA**	$	13.75	$55	
Level 3 Code	M	demo downspouts	4	EA	$	10.00	$40	
Level 3 Code	E	demo downspouts	4	EA	$	1.25	$5	
Level 3 Code	**L**	**protect historic brick at area of demo**	**130**	**SF**	$	1.10	$143	
Level 3 Code	M	protect historic brick at area of demo	130	SF	$	0.80	$104	
Level 3 Code	E	protect historic brick at area of demo	130	SF	$	0.10	$13	
Level 3 Code	**L**	**demo fascia**	**100**	**LF**	$	1.38	$138	50% of total length
Level 3 Code	M	demo fascia	100	LF	$	1.00	$100	
Level 3 Code	E	demo fascia	100	LF	$	0.13	$13	
Level 3 Code	**L**	**demo masonry**	**74**	**SF**	$	1.65	$122	incl. below water table
Level 3 Code	M	demo masonry	74	SF	$	1.20	$89	
Level 3 Code	E	demo masonry	74	SF	$	0.15	$11	
Level 3 Code	**L**	**sawcut masonry at existing window opening**	**15**	**LF**	$	5.50	$83	

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Level 3 Code	M	sawcut masonry at existing window opening	15	LF	$ 4.00	$60	
Level 3 Code	E	sawcut masonry at existing window opening	15	LF	$ 0.50	$8	
Level 3 Code	**L**	**demo glass-infused trim**	**365**	**SF**	$ 3.85	$1,405	at front deck
Level 3 Code	M	demo glass-infused trim	365	SF	$ 2.80	$1,022	
Level 3 Code	E	demo glass-infused trim	365	SF	$ 0.35	$128	
Level 3 Code	**L**	**remove wall paper**	**320**	**SF**	$ 2.06	$660	
Level 3 Code	M	remove wall paper	320	SF	$ 1.50	$480	
Level 3 Code	E	remove wall paper	320	SF	$ 0.19	$60	
Level 3 Code	**L**	**remove baseboards / casing trim at existing opening**	**126**	**LF**	$ 1.10	$139	at enlarged opening
Level 3 Code	M	remove baseboards / casing trim at existing opening	126	LF	$ 0.80	$101	
Level 3 Code	E	remove baseboards / casing trim at existing opening	126	LF	$ 0.10	$13	
Level 3 Code	**L**	**remove casing trim at window**	**30**	**LF**	$ 2.75	$83	tripartite window
Level 3 Code	M	remove casing trim at window	30	LF	$ 2.00	$60	
Level 3 Code	E	remove casing trim at window	30	LF	$ 0.25	$8	
Level 3 Code	**L**	**remove casing trim at windows**	**220**	**LF**	$ 1.10	$242	general
Level 3 Code	M	remove casing trim at windows	220	LF	$ 0.80	$176	
Level 3 Code	E	remove casing trim at windows	220	LF	$ 0.10	$22	
Level 3 Code	**L**	**remove interior doors - single**	**1**	**EA**	$ 44.00	$44	
Level 3 Code	M	remove interior doors - single	1	EA	$ 32.00	$32	
Level 3 Code	E	remove interior doors - single	1	EA	$ 4.00	$4	
Level 3 Code	**L**	**remove windows**	**14**	**EA**	$ 68.75	$963	
Level 3 Code	M	remove windows	14	EA	$ 50.00	$700	
Level 3 Code	E	remove windows	14	EA	$ 6.25	$88	
Level 3 Code	**L**	**remove garden along south elevation**	**165**	**SF**	$ 1.38	$227	
Level 3 Code	M	remove garden along south elevation	165	SF	$ 1.00	$165	
Level 3 Code	E	remove garden along south elevation	165	SF	$ 0.13	$21	
Level 3 Code	**L**	**hazardous materials abatement**	**1**	**SUM**	$ 19,250.00	$19,250	allowance
Level 3 Code	M	hazardous materials abatement	1	SUM	$ 14,000.00	$14,000	allowance
Level 3 Code	E	hazardous materials abatement	1	SUM	$ 1,750.00	$1,750	allowance
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL SELECTIVE BUILDING DEMOLITION	**1**	**VALUE**	**$ 61,177.00**	**$61,177**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	**Description**	**Quantity**	**Unit**	**Cost/Unit**	**Total Cost**	**Remarks**

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G10		**SITE PREPARATION**						
Level 3 Code	**L**	**excavate for footings**	**5**	**CY**	**$**	**110.00**	$550	
Level 3 Code	M	excavate for footings	5	CY	$	80.00	$400	
Level 3 Code	M	excavate for footings	5	CY	$	10.00	$50	
Level 3 Code		Description	0	Unit	$	-	$0	
		SUBTOTAL SITE PREPARATION	**1**	**VALUE**	**$**	**1,000.00**	**$1,000**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
G 40		**SITE ELECTRICAL UTILITIES**					
Level 3 Code	**L**	**ug feeder**	**80**	**LF**	$ 14.52	$1,162	
Level 3 Code	M	ug feeder	80	LF	$ 10.56	$845	
Level 3 Code	E	ug feeder	80	LF	$ 1.32	$106	
Level 3 Code	**L**	**meter base / disconnect**	**1**	**EA**	$ 488.40	$488	
Level 3 Code	M	meter base / disconnect	1	EA	$ 355.20	$355	
Level 3 Code	E	meter base / disconnect	1	EA	$ 44.40	$44	
Level 3 Code	**L**	**16 kw generator / offload / fuel**	**1**	**SUM**	$ 6,703.20	$6,703	
Level 3 Code	M	16 kw generator / offload / fuel	1	SUM	$ 4,468.80	$4,469	
Level 3 Code	E	16 kw generator / offload / fuel	1	SUM	$ 1,500.00	$1,500	
Level 3 Code	**L**	**generator feeder**	**20**	**LF**	$ 13.86	$277	
Level 3 Code	M	generator feeder	20	LF	$ 10.08	$202	
Level 3 Code	E	generator feeder	20	LF	$ 1.26	$25	
Level 3 Code	**L**	**generator controls/circuits**	**20**	**LF**	$ 15.18	$304	
Level 3 Code	M	generator controls/circuits	20	LF	$ 11.04	$221	
Level 3 Code	E	generator controls/circuits	20	LF	$ 1.38	$28	
Level 3 Code	**L**	**trenching**	**100**	**LF**	$ 39.60	$3,960	
Level 3 Code	M	trenching	100	LF	$ 3.60	$360	
Level 3 Code	E	trenching	100	LF	$ 28.80	$2,880	
	E		**1**	**VALUE**	**$ 23,928.00**	**$23,928**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item	**Harbor of Refuge Dwelling**	**Total Cost:**	$545,826

TOTAL COST -	**Harbor of Refuge Dwelling**	**2496**	**SF**	**$ 218.68**	**$545,826**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item	**Equipment Building**	**Total Cost:**	$631,414

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B20		**EXTERIOR CLOSURE**					
Level 3 Code	**L**	**install new roof sheathing**	**110**	**SF**	$ 3.03	$333	
Level 3 Code	M	install new roof sheathing	110	SF	$ 2.20	$242	
Level 3 Code	E	install new roof sheathing	110	SF	$ 0.28	$30	
Level 3 Code	**L**	**replace damaged framing elements**	**12**	**SF**	$ 11.00	$132	qty by narrative
Level 3 Code	M	replace damaged framing elements	12	SF	$ 8.00	$96	
Level 3 Code	E	replace damaged framing elements	12	SF	$ 1.00	$12	
Level 3 Code	**L**	**refinish wood trim at historic light fixtures**	**5**	**SF**	$ 13.75	$69	
Level 3 Code	M	refinish wood trim at historic light fixtures	5	SF	$ 10.00	$50	
Level 3 Code	E	refinish wood trim at historic light fixtures	5	SF	$ 1.25	$6	
Level 3 Code	**L**	**sand / repaint fascia**	**380**	**LF**	$ 1.38	$523	
Level 3 Code	M	sand / repaint fascia	380	LF	$ 1.00	$380	
Level 3 Code	E	sand / repaint fascia	380	LF	$ 0.13	$48	
Level 3 Code	**L**	**replace damaged framing elements**	**6**	**SF**	$ 11.00	$66	
Level 3 Code	M	replace damaged framing elements	57	SF	$ 8.00	$456	
Level 3 Code	E	replace damaged framing elements	6	SF	$ 1.00	$6	
Level 3 Code	**L**	**install new plywood**	**6**	**SF**	$ 3.30	$20	
Level 3 Code	M	install new plywood	57	SF	$ 2.40	$137	
Level 3 Code	E	install new plywood	6	SF	$ 0.30	$2	
Level 3 Code	**L**	**install batt insulation in exterior walls**	**4714**	**SF**	$ 1.10	$5,185	
Level 3 Code	M	install batt insulation in exterior walls	4714	SF	$ 0.80	$3,771	
Level 3 Code	E	install batt insulation in exterior walls	4714	SF	$ 0.10	$471	
Level 3 Code	**L**	**install 3' x 7' sc wd half-lite door**	**2**	**EA**	$ 962.50	$1,925	
Level 3 Code	M	install 3' x 7' sc wd half-lite door	2	EA	$ 700.00	$1,400	
Level 3 Code	E	install 3' x 7' sc wd half-lite door	2	EA	$ 87.50	$175	
Level 3 Code	**L**	**install 10' x 10' overhead doors at north wall**	**4**	**EA**	$ 3,025.00	$12,100	
Level 3 Code	M	install 10' x 10' overhead doors at north wall	4	EA	$ 2,200.00	$8,800	
Level 3 Code	E	install 10' x 10' overhead doors at north wall	4	EA	$ 275.00	$1,100	
Level 3 Code	**L**	**install windows**	**20**	**EA**	$ 990.00	$19,800	
Level 3 Code	M	install windows	20	EA	$ 720.00	$14,400	
Level 3 Code	E	install windows	20	EA	$ 90.00	$1,800	
Level 3 Code	**L**	**install new sealant at window openings**	**270**	**LF**	$ 2.75	$743	
Level 3 Code	M	install new sealant at window openings	20	LF	$ 2.00	$40	
Level 3 Code	E	install new sealant at window openings	270	LF	$ 0.25	$68	
Level 3 Code	**L**	**reinstall salvaged window trim**	**216**	**LF**	$ 4.68	$1,010	80% of total
Level 3 Code	M	reinstall salvaged window trim	216	LF	$ 3.40	$734	
Level 3 Code	E	reinstall salvaged window trim	216	LF	$ 0.43	$92	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Equipment Building** **Total Cost:** $631,414

Level 3 Code	**L**	**install new window trim**	**69**	**LF**	$ 4.68	$323	20% of total
Level 3 Code	M	install new window trim	69	LF	$ 3.40	$235	
Level 3 Code	E	install new window trim	69	LF	$ 0.43	$29	
Level 3 Code	**L**	**sand / paint window trim**	**270**	**LF**	$ 1.38	$371	
Level 3 Code	M	sand / paint window trim	270	LF	$ 1.00	$270	
Level 3 Code	E	sand / paint window trim	270	LF	$ 0.13	$34	
Level 3 Code	**L**	**paint windows**	**20**	**EA**	$ 68.75	$1,375	
Level 3 Code	M	paint windows	20	EA	$ 50.00	$1,000	
Level 3 Code	E	paint windows	20	EA	$ 6.25	$125	
Level 3 Code	**L**	**install trim at new overhead doors**	**60**	**LF**	$ 4.68	$281	
Level 3 Code	M	install trim at new overhead doors	60	LF	$ 3.40	$204	
Level 3 Code	E	install trim at new overhead doors	60	LF	$ 0.43	$26	
Level 3 Code	**L**	**install salvaged trim at overhead doors**	**30**	**LF**	$ 4.68	$140	50% of total
Level 3 Code	M	install salvaged trim at overhead doors	30	LF	$ 3.40	$102	
Level 3 Code	E	install salvaged trim at overhead doors	30	LF	$ 0.43	$13	
Level 3 Code	**L**	**install trim at new man door**	**17**	**LF**	$ 4.68	$79	
Level 3 Code	M	install trim at new man door	17	LF	$ 3.40	$58	
Level 3 Code	E	install trim at new man door	17	LF	$ 0.43	$7	
Level 3 Code	**L**	**install salvaged historic window**	**1**	**EA**	$ 990.00	$990	
Level 3 Code	M	install salvaged historic window	1	EA	$ 720.00	$720	
Level 3 Code	E	install salvaged historic window	1	EA	$ 90.00	$90	
Level 3 Code	**L**	**replace glazing with tempered glazing**	**20**	**SF**	$ 13.75	$275	
Level 3 Code	M	replace glazing with tempered glazing	20	SF	$ 10.00	$200	
Level 3 Code	E	replace glazing with tempered glazing	20	SF	$ 1.25	$25	
Level 3 Code	**L**	**install new storm windows**	**240**	**SF**	$ 11.00	$2,640	
Level 3 Code	M	install new storm windows	240	SF	$ 8.00	$1,920	
Level 3 Code	E	install new storm windows	240	SF	$ 1.00	$240	
Level 3 Code	**L**	**remove and replace glazing compound @ windows**	**20**	**EA**	$ 55.00	$1,100	
Level 3 Code	M	remove and replace glazing compound @ windows	20	EA	$ 40.00	$800	
Level 3 Code	E	remove and replace glazing compound @ windows	20	EA	$ 5.00	$100	
Level 3 Code	**L**	**remove and replace cracked panes**	**60**	**EA**	$ 22.00	$1,320	assume 25%
Level 3 Code	M	remove and replace cracked panes	60	EA	$ 16.00	$960	
Level 3 Code	E	remove and replace cracked panes	60	EA	$ 2.00	$120	
Level 3 Code	**L**	**install louvered wood shutters**	**288**	**SF**	$ 44.00	$12,672	
Level 3 Code	M	install louvered wood shutters	288	SF	$ 32.00	$9,216	
Level 3 Code	E	install louvered wood shutters	288	SF	$ 4.00	$1,152	
Level 3 Code	**L**	**lead based paint abatement**	**3155**	**SF**	$ 1.38	$4,338	
Level 3 Code	M	lead based paint abatement	3155	SF	$ 1.00	$3,155	
Level 3 Code	E	lead based paint abatement	3155	SF	$ 0.13	$394	
Level 3 Code		Description	0	Unit	$ -	$0	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item	**Equipment Building**	**Total Cost:**	$631,414

SUBTOTAL EXTERIOR CLOSURE	**1**	**VALUE**	**$ 123,318.90**	**$123,319**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
B30		**ROOFING**					
Level 3 Code	**L**	**install wood shingle roofing**	**2321**	**SF**	$ 11.00	$25,531	
Level 3 Code	M	install wood shingle roofing	2321	SF	$ 8.00	$18,568	
Level 3 Code	E	install wood shingle roofing	2321	SF	$ 1.00	$2,321	
Level 3 Code	**L**	**roof edge flashing**	**170**	**LF**	$ 8.25	$1,403	w/ hpc finish
Level 3 Code	M	roof edge flashing	170	LF	$ 6.00	$1,020	
Level 3 Code	E	roof edge flashing	170	LF	$ 0.75	$128	
Level 3 Code	**L**	**roof to wall flashing**	**125**	**LF**	$ 8.25	$1,031	w/ hpc finish
Level 3 Code	M	roof to wall flashing	170	LF	$ 6.00	$1,020	
Level 3 Code	E	roof to wall flashing	125	LF	$ 0.75	$94	
Level 3 Code	**L**	**install gutters, half round**	**200**	**LF**	$ 5.50	$1,100	
Level 3 Code	M	install gutters, half round	125	LF	$ 4.00	$500	
Level 3 Code	E	install gutters, half round	200	LF	$ 0.50	$100	
Level 3 Code	**L**	**install downspouts with 4' long extensions**	**54**	**LF**	$ 8.25	$446	
Level 3 Code	M	install downspouts with 4' long extensions	54	LF	$ 6.00	$324	
Level 3 Code	E	install downspouts with 4' long extensions	54	LF	$ 0.75	$41	
Level 3 Code	**L**	**install fall protection**	**8**	**EA**	$ 247.50	$1,980	
Level 3 Code	M	install fall protection	8	EA	$ 180.00	$1,440	
Level 3 Code	E	install fall protection	8	EA	$ 22.50	$180	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL ROOFING	**1**	**VALUE**	**$ 57,225.00**	**$57,225**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C10		**INTERIOR CONSTRUCTION**					
Level 3 Code	**L**	**install 2,000 lb. chainfall**	**1**	**EA**	$ 275.00	$275	
Level 3 Code	M	install 2,000 lb. chainfall	1	EA	$ 200.00	$200	
Level 3 Code	E	install 2,000 lb. chainfall	1	EA	$ 25.00	$25	
Level 3 Code	**L**	**install casing and trim at door opening**	**168**	**LF**	$ 3.85	$647	
Level 3 Code	M	install casing and trim at door opening	168	LF	$ 2.80	$470	
Level 3 Code	E	install casing and trim at door opening	168	LF	$ 0.35	$59	
Level 3 Code	**L**	**install window trim**	**1**	**EA**	$ 3.85	$4	
Level 3 Code	M	install window trim	1	EA	$ 2.80	$3	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Equipment Building** **Total Cost:** $631,414

Level 3 Code	E	install window trim	1	EA	$ 0.35	$0
Level 3 Code	**L**	**install base trim**	**6**	**LF**	$ 3.85	$23
Level 3 Code	M	install base trim	6	LF	$ 2.80	$17
Level 3 Code	E	install base trim	6	LF	$ 0.35	$2
Level 3 Code	**L**	**install 3' x 7' sc wood door**	**4**	**EA**	$ 825.00	$3,300
Level 3 Code	M	install 3' x 7' sc wood door	4	EA	$ 600.00	$2,400
Level 3 Code	E	install 3' x 7' sc wood door	4	EA	$ 75.00	$300
Level 3 Code	**L**	**Install 3' x 7' sc wood 90-min rated door**	**1**	**EA**	$ 1,017.50	$1,018
Level 3 Code	M	Install 3' x 7' sc wood 90-min rated door	1	EA	$ 740.00	$740
Level 3 Code	E	Install 3' x 7' sc wood 90-min rated door	1	EA	$ 92.50	$93
Level 3 Code	**L**	**full height partitions, 12' ht.**	**396**	**SF**	$ 11.00	$4,356
Level 3 Code	M	full height partitions, 12' ht.	396	SF	$ 8.00	$3,168
Level 3 Code	E	full height partitions, 12' ht.	396	SF	$ 1.00	$396
Level 3 Code	**L**	**full height partitions, 12' ht. - 2 hr. rated**	**444**	**SF**	$ 12.38	$5,495
Level 3 Code	M	full height partitions, 12' ht. - 2 hr. rated	444	SF	$ 9.00	$3,996
Level 3 Code	E	full height partitions, 12' ht. - 2 hr. rated	444	SF	$ 1.13	$500
Level 3 Code	**L**	**bathroom accessories - package per restroom**	**1**	**EA**	$ 412.50	$413
Level 3 Code	M	bathroom accessories - package per restroom	1	EA	$ 300.00	$300
Level 3 Code	E	bathroom accessories - package per restroom	1	EA	$ 37.50	$38
Level 3 Code		Description	0	Unit	$ -	$0
		SUBTOTAL INTERIOR CONSTRUCTION	**1**	**VALUE**	**$ 28,235.00**	**$28,235**

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
C30		**INTERIOR FINISHES**					
Level 3 Code	**L**	**refinish wood trim at windows**	**6**	**ea**	$ 137.50	$825	seasonal staff room
Level 3 Code	M	refinish wood trim at windows	6	ea	$ 100.00	$600	
Level 3 Code	E	refinish wood trim at windows	6	ea	$ 12.50	$75	
Level 3 Code	**L**	**replace wood flooring**	**8**	**sf**	$ 8.25	$66	store room
Level 3 Code	M	replace wood flooring	8	sf	$ 6.00	$48	
Level 3 Code	E	replace wood flooring	8	sf	$ 0.75	$6	
Level 3 Code	**L**	**paint 2nd floor beam**	**32**	**lf**	$ 2.75	$88	
Level 3 Code	M	paint 2nd floor beam	32	lf	$ 2.00	$64	
Level 3 Code	E	paint 2nd floor beam	32	lf	$ 0.25	$8	
Level 3 Code	**L**	**refinish wood floor**	**1075**	**sf**	$ 2.75	$2,956	
Level 3 Code	M	refinish wood floor	1075	sf	$ 2.00	$2,150	
Level 3 Code	E	refinish wood floor	1075	sf	$ 0.25	$269	
Level 3 Code	**L**	**clean / repaint walls**	**3720**	**sf**	$ 1.79	$6,650	
Level 3 Code	M	clean / repaint walls	3720	sf	$ 1.30	$4,836	

United States Department of the Interior
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Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Equipment Building** **Total Cost:** $631,414

Level 3 Code	E	clean / repaint walls	3720	sf	$	0.16	$605	
Level 3 Code	**L**	**paint ceiling exposed to structure**	**365**	**sf**	$	1.10	$402	
Level 3 Code	M	paint ceiling exposed to structure	365	sf	$	0.80	$292	
Level 3 Code	E	paint ceiling exposed to structure	365	sf	$	0.10	$37	
Level 3 Code	**L**	**install 2-hr ceiling**	**315**	**sf**	$	4.13	$1,299	
Level 3 Code	M	install 2-hr ceiling	315	sf	$	3.00	$945	
Level 3 Code	E	install 2-hr ceiling	315	sf	$	0.38	$118	
Level 3 Code	**L**	**install ACT ceiling**	**1415**	**sf**	$	3.58	$5,059	
Level 3 Code	M	install ACT ceiling	1415	sf	$	2.60	$3,679	
Level 3 Code	E	install ACT ceiling	1415	sf	$	0.33	$460	
Level 3 Code	**L**	**sand / refinish stair treads and risers**	**102**	**sf**	$	3.58	$365	
Level 3 Code	M	sand / refinish stair treads and risers	102	sf	$	2.60	$265	
Level 3 Code	E	sand / refinish stair treads and risers	102	sf	$	0.33	$33	
Level 3 Code	**L**	**install galvanized pipe handrail at stairs to 2nd floor**	**32**	**lf**	$	68.75	$2,200	
Level 3 Code	M	install galvanized pipe handrail at stairs to 2nd floor	32	lf	$	50.00	$1,600	
Level 3 Code	E	install galvanized pipe handrail at stairs to 2nd floor	32	lf	$	6.25	$200	
Level 3 Code	**L**	**install frp wall panel**	**145**	**sf**	$	4.40	$638	at restroom
Level 3 Code	M	install frp wall panel	145	sf	$	3.20	$464	
Level 3 Code	E	install frp wall panel	145	sf	$	0.40	$58	
Level 3 Code	**L**	**install gyp bd. at restroom walls**	**348**	**sf**	$	2.75	$957	
Level 3 Code	M	install gyp bd. at restroom walls	348	sf	$	2.00	$696	
Level 3 Code	E	install gyp bd. at restroom walls	348	sf	$	0.25	$87	
Level 3 Code	**L**	**install plywood paneling**	**1044**	**sf**	$	3.30	$3,445	
Level 3 Code	M	install plywood paneling	1044	sf	$	2.40	$2,506	
Level 3 Code	E	install plywood paneling	1044	sf	$	0.30	$313	
Level 3 Code	**L**	**paint plywood paneling**	**1044**	**sf**	$	1.10	$1,148	
Level 3 Code	M	paint plywood paneling	1044	sf	$	0.80	$835	
Level 3 Code	E	paint plywood paneling	1044	sf	$	0.10	$104	
Level 3 Code	**L**	**install base trim**	**90**	**lf**	$	3.85	$347	seasonal staff workroom
Level 3 Code	M	install base trim	90	lf	$	2.80	$252	
Level 3 Code	E	install base trim	90	lf	$	0.35	$32	
Level 3 Code	**L**	**paint base trim**	**90**	**lf**	$	0.83	$74	
Level 3 Code	M	paint base trim	90	lf	$	0.60	$54	
Level 3 Code	E	paint base trim	90	lf	$	0.08	$7	
Level 3 Code	**L**	**install plywood ceiling**	**370**	**sf**	$	3.30	$1,221	seasonal staff workroom
Level 3 Code	M	install plywood ceiling	370	sf	$	2.40	$888	
Level 3 Code	E	install plywood ceiling	370	sf	$	0.30	$111	
Level 3 Code	**L**	**paint plywood ceiling**	**370**	**sf**	$	1.10	$407	
Level 3 Code	M	paint plywood ceiling	370	sf	$	0.80	$296	
Level 3 Code	E	paint plywood ceiling	370	sf	$	0.10	$37	
Level 3 Code	**L**	**exposed concrete floor with ground finish**	**600**	**sf**	$	3.44	$2,063	

United States Department of the Interior
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Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Equipment Building** **Total Cost:** $631,414

Level 3 Code	M	exposed concrete floor with ground finish	600	sf	$ 2.50	$1,500	
Level 3 Code	E	exposed concrete floor with ground finish	600	sf	$ 0.31	$188	
Level 3 Code	**L**	**install 3-1/2" wood base**	**343**	**lf**	$ 3.85	$1,321	
Level 3 Code	M	install 3-1/2" wood base	343	lf	$ 2.80	$960	
Level 3 Code	E	install 3-1/2" wood base	343	lf	$ 0.35	$120	
Level 3 Code	**L**	**install 1x4 chair rail**	**343**	**lf**	$ 3.85	$1,321	
Level 3 Code	M	install 1x4 chair rail	343	lf	$ 2.80	$960	
Level 3 Code	E	install 1x4 chair rail	343	lf	$ 0.35	$120	
Level 3 Code	**L**	**install v-groove jointed plywood panels**	**3430**	**sf**	$ 3.85	$13,206	
Level 3 Code	M	install v-groove jointed plywood panels	3430	sf	$ 2.80	$9,604	
Level 3 Code	E	install v-groove jointed plywood panels	3430	sf	$ 0.35	$1,201	
Level 3 Code	**L**	**paint v-groove plywood panels**	**3430**	**sf**	$ 1.10	$3,773	
Level 3 Code	M	paint v-groove plywood panels	3430	sf	$ 0.80	$2,744	
Level 3 Code	E	paint v-groove plywood panels	3430	sf	$ 0.10	$343	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL INTERIOR FINISHES	**1**	**VALUE**	**$ 90,597.00**	**$90,597**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D20		**PLUMBING**					
		demolition					
Level 3 Code	**L**	**allow for misc. demolition**	**1**	**SUM**	$ 515.63	$516	
Level 3 Code	M	allow for misc. demolition	1	SUM	$ 375.00	$375	
Level 3 Code	E	allow for misc. demolition	1	SUM	$ 46.88	$47	
Level 3 Code	**L**	**allow for update restroom for aba**	**1**	**SUM**	$ 1,375.00	$1,375	
Level 3 Code	M	allow for update restroom for aba	1	SUM	$ 1,000.00	$1,000	
Level 3 Code	E	allow for update restroom for aba	1	SUM	$ 125.00	$125	
		plumbing fixtures					
Level 3 Code	**L**	**mop sinks**	**1**	**EA**	$ 825.00	$825	
Level 3 Code	M	mop sinks	1	EA	$ 600.00	$600	
Level 3 Code	E	mop sinks	1	EA	$ 75.00	$75	
Level 3 Code	**L**	**5 gallon electric water heater**	**1**	**EA**	$ 412.50	$413	
Level 3 Code	M	5 gallon electric water heater	1	EA	$ 300.00	$300	
Level 3 Code	E	5 gallon electric water heater	1	EA	$ 37.50	$38	
Level 3 Code	**L**	**1" rpbfp**	**1**	**EA**	$ 446.88	$447	
Level 3 Code	M	1" rpbfp	1	EA	$ 325.00	$325	
Level 3 Code	E	1" rpbfp	1	EA	$ 40.63	$41	
Level 3 Code	**L**	**drain / waste / vent piping, cast iron**	**1**	**FIXT**	$ 825.00	$825	
Level 3 Code	M	drain / waste / vent piping, cast iron	1	FIXT	$ 600.00	$600	

United States Department of the Interior
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Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item		**Equipment Building**					**Total Cost:**	$631,414
Level 3 Code	E	drain / waste / vent piping, cast iron	1	FIXT	$	75.00	$75	
Level 3 Code	**L**	**copper potable water piping (insulated)**	**2**	**FIXT**	$	532.81	$1,066	
Level 3 Code	M	copper potable water piping (insulated)	2	FIXT	$	387.50	$775	
Level 3 Code	E	copper potable water piping (insulated)	2	FIXT	$	48.44	$97	
Level 3 Code	**L**	**clean and flush potable water systems**	**1**	**SUM**	$	275.00	$275	
Level 3 Code	M	clean and flush potable water systems	1	SUM	$	200.00	$200	
Level 3 Code	E	clean and flush potable water systems	1	SUM	$	25.00	$25	
Level 3 Code	**L**	**install septic drain field**	**1**	**SUM**	$	16,500.00	$16,500	
Level 3 Code	M	install septic drain field	1	SUM	$	12,000.00	$12,000	
Level 3 Code	E	install septic drain field	1	SUM	$	1,500.00	$1,500	
Level 3 Code	**L**	**factor for historic renovation, add 15% labor**	**1**	**SUM**	$	937.50	$938	
Level 3 Code		Description	0	Unit	$	-	$0	
		SUBTOTAL PLUMBING	**1**	**VALUE**	**$**	**41,375.00**	**$41,375**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D30		**HVAC**					
		demolition					
Level 3 Code	**L**	**allow for misc. demolition of heating systems**	**1**	**SUM**	$ 288.75	$289	
Level 3 Code	M	allow for misc. demolition of heating systems	1	SUM	$ 210.00	$210	
Level 3 Code	E	allow for misc. demolition of heating systems	1	SUM	$ 26.25	$26	
		hvac equipment					
Level 3 Code	**L**	**electric baseboard heaters**	**2**	**EA**	$ 302.50	$605	
Level 3 Code	M	electric baseboard heaters	2	EA	$ 220.00	$440	
Level 3 Code	E	electric baseboard heaters	2	EA	$ 27.50	$55	
Level 3 Code	**L**	**misc. other adjustments, allow**	**1**	**SUM**	$ 921.25	$921	
Level 3 Code	M	misc. other adjustments, allow	1	SUM	$ 670.00	$670	
Level 3 Code	E	misc. other adjustments, allow	1	SUM	$ 83.75	$84	
Level 3 Code	**L**	**testing and balancing**	**1**	**SUM**	$ 226.88	$227	
Level 3 Code	M	testing and balancing	1	SUM	$ 165.00	$165	
Level 3 Code	E	testing and balancing	1	SUM	$ 20.63	$21	
Level 3 Code	L	factor for historic renovation, add 15% labor	1	SUM	$ 350.00	$350	
Level 3 Code		description	0	Unit	$ -	$0	
		SUBTOTAL HVAC	**1**	**VALUE**	**$ 4,062.50**	**$4,063**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Equipment Building** **Total Cost:** $631,414

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D40		**FIRE PROTECTION**					
Level 3 Code	**L**	**fire sprinkler system - NFPA 13**	**2861**	**SF**	$ 3.44	$9,835	whole building
Level 3 Code	M	fire sprinkler system - NFPA 13	2861	SF	$ 2.50	$7,153	
Level 3 Code	E	fire sprinkler system - NFPA 13	2861	SF	$ 0.31	$894	
Level 3 Code	**L**	**dry pipe system in attic**	**800**	**SF**	$ 5.50	$4,400	w/ air compressor
Level 3 Code	M	dry pipe system in attic	800	SF	$ 4.00	$3,200	
Level 3 Code	E	dry pipe system in attic	800	SF	$ 0.50	$400	
Level 3 Code		description	0	Unit	$ -	$0	
		SUBTOTAL FIRE PROTECTION	**1**	**VALUE**	**$ 25,881.25**	**$25,881**	
D50		**ELECTRICAL**					
Level 3 Code	**L**	**demo**	**1**	**SUM**	$ 1,689.60	$1,690	
Level 3 Code	M	demo	1	SUM	$ 1,228.80	$1,229	
Level 3 Code	E	demo	1	SUM	$ 153.60	$154	
Level 3 Code	**L**	**temp power / lighting**	**1**	**SUM**	$ 1,293.60	$1,294	
Level 3 Code	M	temp power / lighting	1	SUM	$ 940.80	$941	
Level 3 Code	E	temp power / lighting	1	SUM	$ 117.60	$118	
Level 3 Code	**L**	**200 amp main panel / spd**	**1**	**EA**	$ 2,838.00	$2,838	
Level 3 Code	M	200 amp main panel / spd	1	EA	$ 2,064.00	$2,064	
Level 3 Code	E	200 amp main panel / spd	1	EA	$ 258.00	$258	
Level 3 Code	**L**	**grounding**	**1**	**EA**	$ 409.20	$409	
Level 3 Code	M	grounding	1	EA	$ 297.60	$298	
Level 3 Code	E	grounding	1	EA	$ 37.20	$37	
Level 3 Code	**L**	**100 a ats**	**1**	**EA**	$ 1,201.20	$1,201	
Level 3 Code	M	100 a ats	1	EA	$ 873.60	$874	
Level 3 Code	E	100 a ats	1	EA	$ 109.20	$109	
Level 3 Code	**L**	**electrical testing**	**1**	**SUM**	$ 211.20	$211	
Level 3 Code	M	electrical testing	1	SUM	$ 153.60	$154	
Level 3 Code	E	electrical testing	1	SUM	$ 19.20	$19	
Level 3 Code	**L**	**coordination / arc flash study**	**1**	**SUM**	$ 330.00	$330	
Level 3 Code	M	coordination / arc flash study	1	SUM	$ 240.00	$240	
Level 3 Code	E	coordination / arc flash study	1	SUM	$ 30.00	$30	
Level 3 Code	**L**	**lightning protection**	**1**	**SUM**	$ 10,296.00	$10,296	
Level 3 Code	M	lightning protection	1	SUM	$ 7,488.00	$7,488	
Level 3 Code	E	lightning protection	1	SUM	$ 936.00	$936	
Level 3 Code	**L**	**duplex outlets**	**32**	**EA**	$ 145.20	$4,646	
Level 3 Code	M	duplex outlets	32	EA	$ 105.60	$3,379	

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Level 3 Code	E	duplex outlets	32	EA	$ 13.20	$422
Level 3 Code	**L**	**dedicated duplex outlets**	**2**	**EA**	$ 158.40	$317
Level 3 Code	M	dedicated duplex outlets	2	EA	$ 115.20	$230
Level 3 Code	E	dedicated duplex outlets	2	EA	$ 14.40	$29
Level 3 Code	**L**	**ada door connection**	**1**	**EA**	$ 448.80	$449
Level 3 Code	M	ada door connection	1	EA	$ 326.40	$326
Level 3 Code	E	ada door connection	1	EA	$ 40.80	$41
Level 3 Code	**L**	**gfci outlets**	**1**	**EA**	$ 165.00	$165
Level 3 Code	M	gfci outlets	1	EA	$ 120.00	$120
Level 3 Code	E	gfci outlets	1	EA	$ 15.00	$15
Level 3 Code	**L**	**wp outlets**	**1**	**EA**	$ 257.40	$257
Level 3 Code	M	wp outlets	1	EA	$ 187.20	$187
Level 3 Code	E	wp outlets	1	EA	$ 23.40	$23
Level 3 Code	**L**	**flush poke through device**	**2**	**EA**	$ 323.40	$647
Level 3 Code	M	flush poke through device	2	EA	$ 235.20	$470
Level 3 Code	E	flush poke through device	2	EA	$ 29.40	$59
Level 3 Code	**L**	**120 v j-box connection**	**2**	**EA**	$ 138.60	$277
Level 3 Code	M	120 v j-box connection	2	EA	$ 100.80	$202
Level 3 Code	E	120 v j-box connection	2	EA	$ 12.60	$25
Level 3 Code	**L**	**home runs / lighting circuits / supports**	**1**	**SUM**	$ 6,930.00	$6,930
Level 3 Code	M	home runs / lighting circuits / supports	1	SUM	$ 5,040.00	$5,040
Level 3 Code	E	home runs / lighting circuits / supports	1	SUM	$ 630.00	$630
Level 3 Code	**L**	**circuit / connect ceiling fan**	**6**	**EA**	$ 217.80	$1,307
Level 3 Code	M	circuit / connect ceiling fan	6	EA	$ 158.40	$950
Level 3 Code	E	circuit / connect ceiling fan	6	EA	$ 19.80	$119
Level 3 Code	**L**	**circuit / connect elec water heater**	**1**	**EA**	$ 346.50	$347
Level 3 Code	M	circuit / connect elec water heater	1	EA	$ 252.00	$252
Level 3 Code	E	circuit / connect elec water heater	1	EA	$ 31.50	$32
Level 3 Code	**L**	**circuit / install baseboard heaters**	**3**	**EA**	$ 429.00	$1,287
Level 3 Code	M	circuit / install baseboard heaters	3	EA	$ 312.00	$936
Level 3 Code	E	circuit / install baseboard heaters	3	EA	$ 39.00	$117
Level 3 Code	**L**	**automatic garage door openers**	**4**	**EA**	$ 1,375.00	$5,500
Level 3 Code	M	automatic garage door openers	4	EA	$ 1,000.00	$4,000
Level 3 Code	E	automatic garage door openers	4	EA	$ 125.00	$500
		- furnish / install lighting				
Level 3 Code	**L**	**lighting**	**2861**	**SF**	$ 4.13	$11,802
Level 3 Code	M	lighting	2861	SF	$ 3.00	$8,583
Level 3 Code	E	lighting	2861	SF	$ 0.38	$1,073
Level 3 Code	**L**	**exterior lighting wall pacs-refurbish**	**3**	**EA**	$ 145.20	$436
Level 3 Code	M	exterior lighting wall pacs-refurbish	3	EA	$ 105.60	$317
Level 3 Code	E	exterior lighting wall pacs-refurbish	3	EA	$ 13.20	$40

United States Department of the Interior
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Summary Item **Equipment Building** **Total Cost:** $631,414

Level 3 Code	**L**	**switch**	**5**	**EA**	$ 75.90	$380
Level 3 Code	M	switch	5	EA	$ 55.20	$276
Level 3 Code	E	switch	5	EA	$ 6.90	$35
Level 3 Code	**L**	**occ sensor**	**9**	**EA**	$ 151.80	$1,366
Level 3 Code	M	occ sensor	9	EA	$ 110.40	$994
Level 3 Code	E	occ sensor	9	EA	$ 13.80	$124
Level 3 Code	**L**	**commissioning**	**1**	**SUM**	$ 211.20	$211
Level 3 Code	M	commissioning	1	SUM	$ 153.60	$154
Level 3 Code	E	commissioning	1	SUM	$ 19.20	$19
		- low voltage -				
Level 3 Code	**L**	**data wall rough in / conduits**	**14**	**EA**	$ 132.00	$1,848
Level 3 Code	M	data wall rough in / conduits	14	EA	$ 96.00	$1,344
Level 3 Code	E	data wall rough in / conduits	14	EA	$ 12.00	$168
Level 3 Code	**L**	**data cables**	**40**	**EA**	$ 178.20	$7,128
Level 3 Code	M	data cables	40	EA	$ 129.60	$5,184
Level 3 Code	E	data cables	40	EA	$ 16.20	$648
Level 3 Code	**L**	**catv cabling**	**2**	**EA**	$ 211.20	$422
Level 3 Code	M	catv cabling	2	EA	$ 153.60	$307
Level 3 Code	E	catv cabling	2	EA	$ 19.20	$38
Level 3 Code	**L**	**wall rack / patch panel / grounding**	**1**	**SUM**	$ 1,425.60	$1,426
Level 3 Code	M	wall rack / patch panel / grounding	1	SUM	$ 1,036.80	$1,037
Level 3 Code	E	wall rack / patch panel / grounding	1	SUM	$ 129.60	$130
Level 3 Code	**L**	**wap cabling**	**4**	**EA**	$ 171.60	$686
Level 3 Code	M	wap cabling	4	EA	$ 124.80	$499
Level 3 Code	E	wap cabling	4	EA	$ 15.60	$62
		- fire alarm -				
Level 3 Code	**L**	**security system allowance**	**1**	**SUM**	$ 6,124.80	$6,125
Level 3 Code	M	security system allowance	1	SUM	$ 4,454.40	$4,454
Level 3 Code	E	security system allowance	1	SUM	$ 556.80	$557
Level 3 Code	**L**	**fa detection**	**1**	**EA**	$ 181.50	$182
Level 3 Code	M	fa detection	1	EA	$ 132.00	$132
Level 3 Code	E	fa detection	1	EA	$ 16.50	$17
Level 3 Code	**L**	**fa notification**	**6**	**EA**	$ 204.60	$1,228
Level 3 Code	M	fa notification	6	EA	$ 148.80	$893
Level 3 Code	E	fa notification	6	EA	$ 18.60	$112
Level 3 Code	**L**	**fa remote annunciator**	**1**	**EA**	$ 297.00	$297
Level 3 Code	M	fa remote annunciator	1	EA	$ 216.00	$216
Level 3 Code	E	fa remote annunciator	1	EA	$ 27.00	$27
Level 3 Code	**L**	**fa pull station**	**1**	**EA**	$ 240.90	$241
Level 3 Code	M	fa pull station	1	EA	$ 175.20	$175
Level 3 Code	E	fa pull station	1	EA	$ 21.90	$22

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Level 3 Code	**L**	**fa modules / relays**	**2**	**EA**	$ 280.50	$561	
Level 3 Code	M	fa modules / relays	2	EA	$ 204.00	$408	
Level 3 Code	E	fa modules / relays	2	EA	$ 25.50	$51	
Level 3 Code	**L**	**fa control panel**	**1**	**EA**	$ 1,465.20	$1,465	
Level 3 Code	M	fa control panel	1	EA	$ 1,065.60	$1,066	
Level 3 Code	E	fa control panel	1	EA	$ 133.20	$133	
Level 3 Code	**L**	**furnish fire alarm design / programming**	**1**	**SUM**	$ 660.00	$660	
Level 3 Code	M	furnish fire alarm design / programming	1	SUM	$ 480.00	$480	
Level 3 Code	E	furnish fire alarm design / programming	1	SUM	$ 60.00	$60	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL ELECTRICAL	**1**	**VALUE**	**$ 139,745.50**	**$139,746**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
E20		**FURNISHINGS**					
Level 3 Code	**L**	**2" window blinds at all windows**	**240**	**SF**	$ 8.25	$1,980	
Level 3 Code	M	2" window blinds at all windows	240	SF	$ 6.00	$1,440	
Level 3 Code	E	2" window blinds at all windows	240	SF	$ 0.75	$180	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL FURNISHINGS	**1**	**VALUE**	**$ 3,600.00**	**$3,600**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
F20		**SELECTIVE BUILDING DEMOLITION**					
Level 3 Code	**L**	**demo roofing**	**2110**	**SF**	$ 1.10	$2,321	
Level 3 Code	M	demo roofing	2110	SF	$ 0.80	$1,688	
Level 3 Code	E	demo roofing	2110	SF	$ 0.10	$211	
Level 3 Code	**L**	**demo roof edge flashing**	**170**	**LF**	$ 1.10	$187	
Level 3 Code	M	demo roof edge flashing	170	LF	$ 0.80	$136	
Level 3 Code	E	demo roof edge flashing	170	LF	$ 0.10	$17	
Level 3 Code	**L**	**demo roof-to-wall flashing**	**125**	**LF**	$ 1.10	$138	
Level 3 Code	M	demo roof-to-wall flashing	125	LF	$ 0.80	$100	
Level 3 Code	E	demo roof-to-wall flashing	125	LF	$ 0.10	$13	
Level 3 Code	**L**	**demo gutters**	**200**	**LF**	$ 1.10	$220	
Level 3 Code	M	demo gutters	200	LF	$ 0.80	$160	
Level 3 Code	E	demo gutters	200	LF	$ 0.10	$20	
Level 3 Code	**L**	**demo downspouts**	**54**	**LF**	$ 0.69	$37	

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Level 3 Code	M	demo downspouts	54	LF	$ 0.50	$27	
Level 3 Code	E	demo downspouts	54	LF	$ 0.06	$3	
Level 3 Code	**L**	**remove damaged substrate**	**110**	**SF**	$ 2.75	$303	5% of total roof area
Level 3 Code	M	remove damaged substrate	110	SF	$ 2.00	$220	
Level 3 Code	E	remove damaged substrate	110	SF	$ 0.25	$28	
Level 3 Code	**L**	**remove 6,000 lb. chainfall**	**1**	**EA**	$ 137.50	$138	
Level 3 Code	M	remove 6,000 lb. chainfall	1	EA	$ 100.00	$100	
Level 3 Code	E	remove 6,000 lb. chainfall	1	EA	$ 12.50	$13	
Level 3 Code	**L**	**remove aluminum siding**	**2350**	**SF**	$ 1.10	$2,585	
Level 3 Code	M	remove aluminum siding	2350	SF	$ 0.80	$1,880	
Level 3 Code	E	remove aluminum siding	2350	SF	$ 0.10	$235	
Level 3 Code	**L**	**remove shingle siding**	**1410**	**SF**	$ 1.10	$1,551	60% of total roof area
Level 3 Code	M	remove shingle siding	1410	SF	$ 0.80	$1,128	
Level 3 Code	E	remove shingle siding	1410	SF	$ 0.10	$141	
Level 3 Code	**L**	**scrape / prep shingle siding for paint**	**940**	**SF**	$ 1.38	$1,293	40% of total roof area
Level 3 Code	M	scrape / prep shingle siding for paint	940	SF	$ 1.00	$940	
Level 3 Code	E	scrape / prep shingle siding for paint	940	SF	$ 0.13	$118	
Level 3 Code	**L**	**remove partition, 12' ht.**	**792**	**SF**	$ 1.65	$1,307	
Level 3 Code	M	remove partition, 12' ht.	792	SF	$ 1.20	$950	
Level 3 Code	E	remove partition, 12' ht.	792	SF	$ 0.15	$119	
Level 3 Code	**L**	**demo floor finish**	**1345**	**SF**	$ 0.55	$740	
Level 3 Code	M	demo floor finish	1345	SF	$ 0.40	$538	
Level 3 Code	E	demo floor finish	1345	SF	$ 0.05	$67	
Level 3 Code	**L**	**remove / salvage base trim**	**380**	**LF**	$ 1.10	$418	
Level 3 Code	M	remove / salvage base trim	380	LF	$ 0.80	$304	
Level 3 Code	E	remove / salvage base trim	380	LF	$ 0.10	$38	
Level 3 Code	**L**	**remove windows**	**2**	**EA**	$ 68.75	$138	
Level 3 Code	M	remove windows	2	EA	$ 50.00	$100	
Level 3 Code	E	remove windows	2	EA	$ 6.25	$13	
Level 3 Code	**L**	**remove exterior wall**	**200**	**SF**	$ 55.00	$11,000	
Level 3 Code	M	remove exterior wall	200	SF	$ 40.00	$8,000	
Level 3 Code	E	remove exterior wall	200	SF	$ 5.00	$1,000	
Level 3 Code	**L**	**sawcut / remove ext. wall for new 3'x7' door opening**	**1**	**EA**	$ 275.00	$275	
Level 3 Code	M	sawcut / remove ext. wall for new 3'x7' door opening	1	EA	$ 200.00	$200	
Level 3 Code	E	sawcut / remove ext. wall for new 3'x7' door opening	1	EA	$ 25.00	$25	
Level 3 Code	**L**	**remove damaged fascia**	**57**	**LF**	$ 1.38	$78	15% of total
Level 3 Code	M	remove damaged fascia	57	LF	$ 1.00	$57	
Level 3 Code	E	remove damaged fascia	57	LF	$ 0.13	$7	
Level 3 Code	**L**	**remove plywood at leak stained wall**	**6**	**SF**	$ 2.75	$17	
Level 3 Code	M	remove plywood at leak stained wall	6	SF	$ 2.00	$12	
Level 3 Code	E	remove plywood at leak stained wall	6	SF	$ 0.25	$2	

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Level 3 Code	**L**	**remove ACT ceiling**	**1415**	**SF**	$ 0.55	$778	
Level 3 Code	M	remove ACT ceiling	1415	SF	$ 0.40	$566	
Level 3 Code	E	remove ACT ceiling	1415	SF	$ 0.05	$71	
Level 3 Code	**L**	**remove veneer paneling**	**3300**	**SF**	$ 0.69	$2,269	
Level 3 Code	M	remove veneer paneling	3300	SF	$ 0.50	$1,650	
Level 3 Code	E	remove veneer paneling	3300	SF	$ 0.06	$206	
Level 3 Code	**L**	**demo handrail at stairs to 2nd floor**	**32**	**LF**	$ 0.83	$26	
Level 3 Code	M	demo handrail at stairs to 2nd floor	32	LF	$ 0.60	$19	
Level 3 Code	E	demo handrail at stairs to 2nd floor	32	LF	$ 0.08	$2	
Level 3 Code	**L**	**remove frp, 5' ht.**	**145**	**SF**	$ 0.69	$100	
Level 3 Code	M	remove frp, 5' ht.	145	SF	$ 0.50	$73	
Level 3 Code	E	remove frp, 5' ht.	145	SF	$ 0.06	$9	
Level 3 Code	**L**	**remove gyp bd at restroom walls**	**348**	**SF**	$ 0.69	$239	
Level 3 Code	M	remove gyp bd at restroom walls	348	SF	$ 0.50	$174	
Level 3 Code	E	remove gyp bd at restroom walls	348	SF	$ 0.06	$22	
Level 3 Code	**L**	**remove plywood paneling at walls**	**1044**	**SF**	$ 2.75	$2,871	seasonal staff workroom
Level 3 Code	M	remove plywood paneling at walls	1044	SF	$ 2.00	$2,088	
Level 3 Code	E	remove plywood paneling at walls	1044	SF	$ 0.25	$261	
Level 3 Code	**L**	**remove plywood ceiling**	**370**	**SF**	$ 2.75	$1,018	seasonal staff workroom
Level 3 Code	M	remove plywood ceiling	370	SF	$ 2.00	$740	
Level 3 Code	E	remove plywood ceiling	370	SF	$ 0.25	$93	
Level 3 Code	**L**	**remove interior doors - single**	**4**	**EA**	$ 44.00	$176	main floor
Level 3 Code	M	remove interior doors - single	4	EA	$ 32.00	$128	
Level 3 Code	E	remove interior doors - single	4	EA	$ 32.00	$128	
Level 3 Code	**L**	**remove windows**	**20**	**EA**	$ 68.75	$1,375	
Level 3 Code	M	remove windows	20	EA	$ 50.00	$1,000	
Level 3 Code	E	remove windows	20	EA	$ 6.25	$125	
Level 3 Code	**L**	**remove window trim**	**270**	**LF**	$ 1.10	$297	
Level 3 Code	M	remove window trim	270	LF	$ 0.80	$216	
Level 3 Code	E	remove window trim	270	LF	$ 0.10	$27	
Level 3 Code	**L**	**remove overhead door trim**	**60**	**LF**	$ 1.10	$66	at existing oh doors
Level 3 Code	M	remove overhead door trim	60	LF	$ 0.80	$48	
Level 3 Code	E	remove overhead door trim	60	LF	$ 0.10	$6	
Level 3 Code	**L**	**remove door trim**	**17**	**LF**	$ 1.10	$19	
Level 3 Code	M	remove door trim	17	LF	$ 0.80	$14	
Level 3 Code	E	remove door trim	17	LF	$ 0.10	$2	
Level 3 Code	**L**	**protect historic light fixtures**	**3**	**EA**	$ 13.75	$41	verify quantity
Level 3 Code	M	protect historic light fixtures	3	EA	$ 10.00	$30	
Level 3 Code	E	protect historic light fixtures	3	EA	$ 1.25	$4	
Level 3 Code	**L**	**hazardous materials abatement**	**1**	**SUM**	$ 19,250.00	$19,250	allowance
Level 3 Code	M	hazardous materials abatement	1	SUM	$ 14,000.00	$14,000	allowance

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20

Summary Item **Equipment Building** **Total Cost:** $631,414

Level 3 Code	E	hazardous materials abatement	1	SUM	$ 1,750.00	$1,750	allowance
Level 3 Code		Description	0	Unit	$ -	$0	
SUBTOTAL SELECTIVE BUILDING DEMOLITION			**1**	**VALUE**	**$ 93,326.25**	**$93,326**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
G 40		**SITE ELECTRICAL UTILITIES**					
Level 3 Code	**L**	**ug feeder**	**80**	**LF**	$ 14.52	$1,162	
Level 3 Code	M	ug feeder	80	LF	$ 10.56	$845	
Level 3 Code	E	ug feeder	80	LF	$ 1.32	$106	
Level 3 Code	**L**	**meter base / disconnect**	**1**	**EA**	$ 554.40	$554	
Level 3 Code	M	meter base / disconnect	1	EA	$ 403.20	$403	
Level 3 Code	E	meter base / disconnect	1	EA	$ 50.40	$50	
Level 3 Code	**L**	**16 kw generator / offload / fuel**	**1**	**SUM**	$ 6,703.20	$6,703	
Level 3 Code	M	16 kw generator / offload / fuel	1	SUM	$ 4,468.80	$4,469	
Level 3 Code	E	16 kw generator / offload / fuel	1	SUM	$ 1,500.00	$1,500	
Level 3 Code	**L**	**generator feeder**	**20**	**LF**	$ 13.86	$277	
Level 3 Code	M	generator feeder	20	LF	$ 10.08	$202	
Level 3 Code	E	generator feeder	20	LF	$ 1.26	$25	
Level 3 Code	**L**	**generator controls / circuits**	**20**	**LF**	$ 15.18	$304	
Level 3 Code	M	generator controls / circuits	20	LF	$ 11.04	$221	
Level 3 Code	E	generator controls / circuits	20	LF	$ 1.38	$28	
Level 3 Code	**L**	**trenching**	**100**	**LF**	$ 42.00	$4,200	
Level 3 Code	M	trenching	100	LF	$ 15.00	$1,500	
Level 3 Code	E	trenching	100	LF	$ 15.00	$1,500	
Level 3 Code		Description	0	Unit	$ -	$0	
SUBTOTAL SITE ELECTRICAL UTILITIES			**1**	**VALUE**	**$ 24,048.00**	**$24,048**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
TOTAL COST -		**Equipment Building**	**2861**	**SF**	**$ 220.70**	**$631,414**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project:	**Grand Marais USCG Life Saving Station - HSR**	**Estimate By:**	Mark D. Hinrichs
Park:	**Pictured Rock National Lakeshore**	**Date:**	Nov 05, 2020 - v1.7
Park Alpha:	**PIRO**	**Reviewed By:**	SJP
PMIS Number:	**227908**	**Date:**	11/05/20
Summary Item	**Alternate 1 - Central Generator**	**Total Cost:**	$24,720

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
D50		**ELECTRICAL**					
Level 3 Code	**L**	**deduct Station Dwelling generator**	**-1**	**SUM**	$ 24,195.60	-$24,196	
Level 3 Code	M	deduct Station Dwelling generator	-1	SUM	$ 17,596.80	-$17,597	
Level 3 Code	E	deduct Station Dwelling generator	-1	SUM	$ 2,199.60	-$2,200	
Level 3 Code	**L**	**deduct OIC Dwelling generator**	**-1**	**SUM**	$ 13,160.40	-$13,160	
Level 3 Code	M	deduct OIC Dwelling generator	-1	SUM	$ 9,571.20	-$9,571	
Level 3 Code	E	deduct OIC Dwelling generator	-1	SUM	$ 1,196.40	-$1,196	
Level 3 Code	**L**	**deduct Harbor Dwelling generator**	**-1**	**SUM**	$ 13,160.40	-$13,160	
Level 3 Code	M	deduct Harbor Dwelling generator	-1	SUM	$ 9,571.20	-$9,571	
Level 3 Code	E	deduct Harbor Dwelling generator	-1	SUM	$ 1,196.40	-$1,196	
Level 3 Code	**L**	**deduct Equipment Building generator**	**-1**	**SUM**	$ 13,226.40	-$13,226	
Level 3 Code	M	deduct Equipment Building generator	-1	SUM	$ 9,619.20	-$9,619	
Level 3 Code	E	deduct Equipment Building generator	-1	SUM	$ 1,202.40	-$1,202	
Level 3 Code	**L**	**80 kw generator / offload / fuel / ats**	**1**	**SUM**	$ 35,587.20	$35,587	
Level 3 Code	M	80 kw generator / offload / fuel / ats	1	SUM	$ 25,881.60	$25,882	
Level 3 Code	E	80 kw generator / offload / fuel / ats	1	SUM	$ 3,235.20	$3,235	
Level 3 Code	**L**	**generator output panel**	**1**	**EA**	$ 4,263.60	$4,264	
Level 3 Code	M	generator output panel	1	EA	$ 3,100.80	$3,101	
Level 3 Code	E	generator output panel	1	EA	$ 387.60	$388	
Level 3 Code	**L**	**generator feeder - 100 amp**	**800**	**LF**	$ 13.86	$11,088	
Level 3 Code	M	generator feeder - 100 amp	800	LF	$ 10.08	$8,064	
Level 3 Code	E	generator feeder - 100 amp	800	LF	$ 1.26	$1,008	
Level 3 Code	**L**	**generator feeder - 200 amp**	**20**	**LF**	$ 17.82	$356	
Level 3 Code	M	generator feeder - 200 amp	20	LF	$ 12.96	$259	
Level 3 Code	E	generator feeder - 200 amp	20	LF	$ 1.62	$32	
Level 3 Code	**L**	**generator controls / circuits**	**20**	**LF**	$ 15.18	$304	
Level 3 Code	M	generator controls / circuits	20	LF	$ 11.04	$221	
Level 3 Code	E	generator controls / circuits	20	LF	$ 1.38	$28	
Level 3 Code	**L**	**trenching**	**650**	**LF**	$ 42.00	$27,300	
Level 3 Code	M	trenching	650	LF	$ 15.00	$9,750	
Level 3 Code	E	trenching	650	LF	$ 15.00	$9,750	
Level 3 Code		Description	0	Unit	$ -	$0	
		SUBTOTAL ELECTRICAL	**1**	**VALUE**	**$ 24,720.00**	**$24,720**	

Uniformat II WBS Code	Labor (L), Material (M), or Equipment (E)	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
TOTAL COST -		**Alternate 1 - Central Generator**	**1**	**VALUE**	**$ 24,720.00**	**$24,720**	

Appendix C. Live Load Capacity Chart

PIRO Grand Marais USCG Buildings Live Load Capacities

80% HSR - 2019 - JVA, Inc.

Building	Area	Controlling Element of Structural System	Material	Calculated Live Load Capacity (psf)	Current		Future	
					Current Use	Code Required Live Load Capacity (psf)[A]	Proposed Future Use	Code Required Live Load Capacity (psf)[A]
Station Dwelling	Basement	Concrete Slab-on-Grade	Concrete	1200[B]	Light Storage	125	Light Storage	125
	1st Floor & 1st Floor Porch	1-1/2" x 11-1/4" Wood Joists	Southern Pine, Select Structural[C]	110	Offices	50	Residential	40
	2nd Floor	1-1/2" x 11-1/4" Wood Joists	Southern Pine, Select Structural[C]	85	Residential	40	Residential	40
	3rd Floor	1-1/2" x 9-1/4" Wood Joists	Southern Pine, Select Structural[C]	65	Residential	40	Residential	40
Officer in Charge Dwelling	Basement	Concrete Slab-on-Grade	Concrete	700[B]	Light Storage	125	Light Storage	125
	1st Floor	1-1/2" x 9-1/4" Wood Joists	Southern Pine, Select Structural[D]	50	Residential	40	Residential	40
	2nd Floor	1-1/2" x 9-1/4" Wood Joists	Southern Pine, Select Structural[E]	30	Residential	40	Residential	40
Harbor of Refuge	Basement	Concrete Slab-on-Grade	Concrete	700[B]	Light Storage	125	Light Storage	125
	1st Floor	8-1/2" x 8-1/2" Timber Beam	Southern Pine, Select Structural[F]	25	House Museum	40[G]	House Museum	40[G]
	2nd Floor	Triple 2x10 bolted beam	Southern Pine, Select Structural[E]	30	House Museum	40[G]	House Museum	40[G]
Equipment Building	1st Floor	Concrete Slab-on-Grade	Concrete	850[B]	Boathouse	100	Garage	100
	2nd Floor	1-1/2" x 11-1/4" Wood Joists	Southern Pine, Select Structural[C]	75	Nonresidential Attic, Storage	80	Office	50

A: 2018 International Building Code (IBC)

B: From Table 3-1 "Maximum Allowable Stationary Live Load" from Technical Manual 5-809-1/Air Force Manual 88-3, Chapter 15 "Concrete Floor Slabs on Grade Subjected to Heavy Loads

C: Based on visual inspection of exposed structural members

D: Based on wood species identification of a sample taken from a first floor joist

E: Material extrapolated from sample taken from similar member elsewhere in the building

F: Based on wood species identifcation of a smaple taken from the first floor timber beam

G: Originally this structure was used as a residence, but since the 1980s it has been used as a house museum. Given the performance of the structural systems under this loading for the last 30+ years, 40 psf was used for structural analysis

Appendix D. Hazardous Material Test Results

ASBESTOS, LEAD, REGULATED BUILDING MATERIAL, AND BIOLOGICAL HAZARD INSPECTION REPORT FOR GRAND MARAIS USCG LIFE SAVING STATION, PICTURE ROCKS NATIONAL SEASHORE, MUNISING, MICHIGAN

Prepared for:

Mundus Bishop Design, Inc.
1525 Raleigh Street, Suite 310
Denver, CO 80204

Prepared by:

Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton, CO 80127

Landmark Project Number 19096.001.001

10/24/2019

LANDMARK ENVIRONMENTAL, INC.
INNOVATION. SOLUTIONS. EXPERTISE.

CONTENTS

EXECUTIVE SUMMARY ..... A

ASBESTOS ..... A

LEAD ..... A

REGULATED BUILDING MATERIALS ..... B

BIOLOGICAL HAZARDS ..... B

1.0 INTRODUCTION 1-1

1.1 PURPOSE 1-1

1.2 SITE DESCRIPTION 1-1

1.3 REPORT ORGANIZATION 1-1

2.0 ASBESTOS 2-1

2.1 ASBESTOS REGULATORY CRITERIA 2-1

2.2 ASBESTOS INSPECTION TECHNICAL APPROACH 2-2

2.3 ASBESTOS LABORATORY ANALYSIS 2-3

3.0 LEAD 3-1

3.1 REGULATORY CRITERIA 3-1

3.2 TECHNICAL APPROACH 3-2

3.3 LABORATORY ANALYSIS 3-2

4.0 REGULATED BUILDING MATERIALS 4-1

4.1 REGULATORY CRITERIA 4-1

4.2 TECHNICAL APPROACH 4-1

5.0 BIOLOGICAL HAZARDS 5-1

6.0 FINDINGS 6-1

6.1 HS-18 – STATION DWELLING 6-1

6.2 HS-19 – OFFICER IN CHARGE DWELLING 6-2

6.3 HS-20 – HARBOR OF REFUGE DWELLING 6-3

6.4 EQUIPMENT BUILDING 6-4

7.0 RECOMMENDATIONS 7-1

8.0 LIMITATIONS 8-1

9.0 ENDORSEMENTS 9-1

APPENDICES

APPENDIX A HS-18: STATION DWELLING

APPENDIX B HS-19: OFFICER IN CHARGE DWELLING

APPENDIX C HS-20: HARBOR OF REFUGE DWELLING

APPENDIX D EQUIPMENT BUILDING

APPENDIX E CERTIFICATIONS

EXECUTIVE SUMMARY

Landmark Environmental, Inc. (Landmark) was retained by Mundus Bishop Design, Inc. (Mundus Bishop) to conduct an asbestos-containing material (ACM), lead-containing paint (LCP), regulated building material (RBM), and biological hazards (including rodents, mold growth, and water damage) inspections at the Grand Marais United States Coast Guard (USCG) Life Saving Station inside the Pictured Rocks National Seashore in Munising, Michigan (Project Site). The purpose of the inspections was to identify and quantify ACM, LCP, RBM, and biological hazards to develop cost estimates to be used for planning purposes during the National Park Service (NPS) Historical Structures Report process.

Asbestos

Asbestos inspection services were performed to identify the presence, location, quantity, friability, and condition of ACM located at the Project Site. Bulk samples were collected and analyzed of suspect ACM. Several ACMs were identified. The individual building information is detailed in the Findings (Section 6.0) and in the Appendices A through D.

Prior to renovation or demolition activities in any public or commercial building, which may disturb greater than 160 square feet, 260 linear feet, or the equivalent of 35-cubic feet of ACM, a notification must be submitted to the State under the National Emission Standards for Hazardous Air Pollutants (NESHAP) program. All ACM that will be disturbed during renovation or demolition must be abated in accordance with all applicable United States (U.S.) Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and federal, state and local regulations.

Lead

Readings of suspect LCP were collected in a representative manner as determined by the inspector based on identifying testing combinations where the surface color, substrate, or building component were visibly different. Sampling was limited to materials that were visible and readily accessible to the inspector. Several painting combinations were found to be LCP or LBP. Information about individual building results are available in the Findings (Section 6.0) and in Appendices A through D.

LCP must be handled by OSHA-trained workers. Disclosure requirements are necessary prior to any renovation activities and all waste generated that contains an LCP must be profiled, handled appropriately, and properly disposed.

The lead content of soils within the drip line of the HS-18 Station Dwelling, HS-19 Officer in Charge Dwelling , HS-20 Harbor of Refuge Dwelling , and Equipment Building was tested. The results were above the EPA limit for bare soils, non-child play areas of 1,200 parts per million (ppm) in HS-18 (Appendix A) and below the EPA limit in HS-19, HS-20, and the Equipment Building (Appendix B-D). The soil in the 4-feet surrounding HS-18 should be removed and replace with clean soil. Additionally, visible paint chips were identified in the soil in locations around HS-18, HS-19, and HS-20. The paint chips should be removed. These soils and paint chips must be handled by OSHA-trained workers. Disclosure requirements are necessary prior to any renovation activities and all waste generated during this event must be profiled, handled appropriately, and properly disposed.

Regulated Building Materials

Typical RBMs found throughout the cabins were fire detectors (radioactive sources, batteries), emergency lighting (batteries), fire extinguishers (chemicals), refrigerators (Chlorofluorocarbons [CFCs]), and florescent light bulbs (mercury)/ballasts (PCBs) were observed during the Project Site visit in many buildings. A waste oil container and a 1,000-gallon propane tank were also observed. RBMs have special disposal and handling requirements that must be followed if they are impacted by renovation or demolition activities.

Biological Hazards

No evidence of rodents, birds, or bat infestations were observed in any of the structures. No signs of water damage or mold were observed. NPS staff told the inspector that in HS-19 there is an occasional back-up of the floor drain in the basement. This condition should be addressed as part of renovations or as part of regular building maintenance.

1.0 INTRODUCTION

This asbestos-containing materials (ACM), lead-based paint (LBP), regulated building materials (RBM), and biological hazards report for the Grand Marais United States Coast Guard (USCG) Life Saving Station inside the Pictured Rocks National Seashore in Munising, Michigan (Project Site) has been prepared by Landmark Environmental, Inc. (Landmark) for Mundus Bishop Design, Inc. (Mundus Bishop).

1.1 Purpose

The purpose of Landmark's inspection of the Project Site was to assess and identify ACM, LBP, RBM, and biological hazards as part of the programming and planning phase of the Historical Structures Report being prepared by Mundus Bishop for the National Park Service (NPS). Accordingly, our screening-level environmental inspection was designed to provide appropriate information to support project planning and budgeting for eventual renovation. Landmark conducted the inspection of the Project Site and associated buildings between September 18 and September 19, 2019. ACM and RBM must be identified, abated and properly disposed prior to renovation activities. LBP and lead-containing paint (LCP) must be properly identified as it has special handling and disposal requirements, if impacted by renovation activities. Lastly, Landmark visually assessed the site for water intrusion and biological hazards which should be addressed as part of the renovation as these can have impacts on occupant and/or workers who are working in the space.

1.2 Site Description

The Project Site consists of four buildings. Three of the buildings have been assigned historic structure numbers (HS). The buildings are HS-18 Station Dwelling, HS-19 Officer in Charge Dwelling , HS-20 Harbor of Refuge Dwelling , and Equipment Building.

1.3 Report Organization

This report presents the general findings of the inspection and sampling efforts for the Project Site. Further detail is provided on a building specific basis in Appendices A through D. Each building Appendix includes: 1) Homogenous Materials report; 2) Asbestos Laboratory Results; 3) Lead Inspection Form; 4) Lead Laboratory Results; and 5) RBM Summary. Appendix E contains inspector credentials. The purpose of this format, for report organization, is to allow individual presentation of the findings for each building.

2.0 ASBESTOS

In this section, the regulatory criteria, technical approach, laboratory analysis, and findings as they pertain to asbestos are discussed. The asbestos inspection was performed at the Project Site on September 18 and September 19, 2019.

2.1 Asbestos Regulatory Criteria

Asbestos is a naturally occurring fibrous mineral, historically used in thousands of construction and commercial applications due to its properties of tensile strength, heat resistance, non-conductivity and acoustical absorption. Asbestos is a confirmed human carcinogen that can cause diseases such as asbestosis, lung cancer, and mesothelioma; therefore, asbestos is regulated by the United States (U.S) Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA). This brief overview of certain applicable asbestos regulatory criteria is general and for informational purposes only.

In general, removal/repair of ACM is required by regulation if the potential exists for an airborne release of asbestos fibers or if the ACM will be disturbed. Typically, the potential for an airborne release of asbestos fibers exists in three circumstances:

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

Applicable asbestos regulations define ACM as material containing greater than 1% asbestos by weight, volume or visual surface area and distinguish between friable and non-friable forms of ACM. Friable ACMs can be crumbled or reduced to powder by hand pressure when dry. Non-friable materials cannot be crumbled, pulverized, or reduced to powder by hand pressure.

The EPA and National Emission Standards for Hazardous Air Pollutants (NESHAP) further classify non-friable ACM as Category I and II. Category I non-friable ACMs include ACM packings, gaskets, resilient floor coverings, and asphalt roofing products. Category II non-friable ACMs are defined as all other non-friable ACM, such as cement board, window putty, etc. Category I non-friable ACMs may remain in a building during demolition if demolition activities will not render the ACMs friable. All other ACMs (non-Category I) must be removed prior to demolition.

The OSHA regulations in 29 Code of Federal Regulations (CFR) 1926.1101 require that building owners inform prospective contractors, employees, and tenants of the presence, location, and quantity of ACM or assumed ACM, in their buildings and facilities. OSHA requires the protection of workers from exposure to asbestos through notification, training, proper work practices, and use of personal protection equipment.

If the amount of ACM to be disturbed exceeds the following trigger levels, then a certified abatement contractor must remove the ACM prior to renovation or demolition. Trigger levels of ACMs are 260 linear feet on pipes, 160 square feet on other surfaces, or the volume equivalent of 35-cubic feet. Although certain non-friable ACMs may remain in a building during demolition, the presence of non-friable ACM may impact disposal and will preclude recycling of materials. Recycling of materials, such as concrete or wood that are bonded or contaminated with ACM, is not permitted.

Demolition of a building that has non-friable ACM vinyl asbestos tile (VAT), tar-impregnated roofing materials, or trace drywall joint compound in composite wallboard systems must be completed without causing the ACM to become friable. Operations such as crushing, pneumatic jacking, etc. that renders the ACM friable are not permitted. When imploding or burning a building, all ACM, regardless of quantity, must be removed prior to these activities.

2.2 Asbestos Inspection Technical Approach

The ACM inspection was conducted September 18 and September 19, 2019. Sampling was conducted in accordance with the EPA Asbestos Hazard and Emergency Response Act (AHERA) and OSHA 29 CFR 1926.1101 requirements, as well as generally accepted industry standards. Asbestos activities were conducted by AHERA-accredited personnel. Copies of the inspector's credentials are included in Appendix E.

The inspection included visually assessing the Project Site facilities for homogenous areas, performing a physical assessment of the material, and sampling suspect ACM. Bulk samples of accessible suspect ACMs were collected in a representative manner as determined by the inspector. Bulk material samples were collected by taking representative samples that included all layers within the suspect ACM. Sampling was limited to materials that were visible and readily accessible to the inspector. No intrusive investigation was conducted. Representative sampling was based on the distribution of the suspect material throughout the homogeneous area, and the suspect material's physical characteristics and application.

Friable suspect ACMs were separated into the following three classifications with specific sampling

requirements. These classifications and respective sampling requirements are as follows:

- Surfacing Materials – Trowel or sprayed applied materials:
  - Three samples of each homogeneous area 1,000 square feet or less.
  - Five samples of each homogeneous area greater than 1,000 square feet and less than 5,000 square feet.
  - Seven samples of each homogeneous area greater than 5,000 square feet.
- Thermal System Insulation (TSI):
  - Three samples of each homogeneous area.
  - Two samples of a patching material which is less than six foot in length.
- Miscellaneous Materials – Other suspect materials not classified in the above categories:
  - Sufficient number to determine asbestos content with a minimum of two samples.

Bulk ACM samples were given unique numeric identifiers for project tracking and identification purposes. The first set of numbers is the Facility Management Software System (FMSS) number assigned to the building by the National Park Service (NPS). The second set of letter/number combinations identifies the type of material the sample was collected from and the homogenous material identifier for the functional space. The last set of numbers represents the sequential sample acquired for the homogeneous material.

As suspect asbestos materials were identified, the materials were also quantified and the condition of the suspect ACM assessed (i.e., friability was assessed, and ACM was evaluated for damage or deterioration).

2.3 Asbestos Laboratory Analysis

The bulk suspect ACM samples were submitted to Reservoirs Environmental, Inc. (Reservoirs) located in Denver, Colorado. Reservoirs is a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory for Bulk Asbestos Fiber Analysis. The bulk samples were analyzed by utilizing polarized-light microscopy (PLM) coupled with dispersion staining techniques as detailed in the EPA's "Interim Method for Determination of Asbestos in Bulk Insulation Samples" (EPA 40 CFR Part 763 Subpart F, Appendix A). Detection limits for PLM analysis are approximately 1% (by surface area). Materials containing greater than 1% asbestos are classified as ACM.

Asbestos content is reported by the laboratory for each unique layer. Analytical results report asbestos by mineral type and concentration as a percent by weight both by layer and in the composite sample. An individual asbestos report was generated per building. Asbestos analytical data is presented in Appendices A through D.

3.0 LEAD

The regulatory criteria, technical approach, laboratory analysis, and findings as they pertain to lead paint, lead in soil, and additional lead samples are discussed below. The lead inspection was conducted concurrently with the ACM inspection at the Project Site on September 18 and September 19, 2019.

3.1 Regulatory Criteria

The EPA and United States (U.S.) Department of Housing and Urban Development (HUD) regulate LBP abatement activities in target housing and child-occupied facilities. Target housing is defined as any housing constructed prior to 1978 that is occupied by a child under six years old. A child-occupied facility is a building constructed prior to 1978 that is visited regularly by the same child under six years of age.

The EPA and HUD regulations related to LBP abatement do not apply to the Project Site unless lead abatement activities occur (specifically designed to permanently remove LBP). LBP is defined as paint containing 0.5 percent by weight or 1.0 milligram per square cubic centimeter (mg/cm^2) by EPA and HUD. OSHA regulates worker exposure to lead for coatings with any detectable lead.

The EPA also developed a program for renovation activities in child-occupied/target housing and child-care facilities called the Lead Renovation, Repair, and Paint Rule (RRP Rule). This rule requires that firms performing renovation, repair, and painting projects that disturb LBP in homes, child-care facilities and preschools built before 1978 have their firm certified by EPA (or an EPA authorized state), use certified renovators who are trained by EPA-approved training providers and follow lead-safe work practices.

The EPA and HUD regulate LBP abatement activities in target housing and child-occupied facilities. Landmark's understanding is that EPA and HUD regulations related to LBP abatement and RRP do not apply to the Project Site since the buildings are not considered target housing or a child-occupied facility. If NPS does allow the rental of the dwellings to families including children under the age of 6, then these rules may apply. Landmark did not perform a HUD/EPA lead inspection under the understanding that the dwellings were only used by adult employees.

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

The EPA has established screening levels/cleanup criteria for lead in soils based on expected residential usage. The levels are 400 milligrams per kilogram (mg/kg) for high contact play areas, and 1200 mg/kg for non-play area residential yard soil.

3.2 Technical Approach

The LBP/LCP inspection was performed by a trained lead inspector. Bulk paint chip samples of suspect LCP were collected in a representative manner as determined by the inspector based on identified testing combinations where the surface color, substrate or building component were visibly different. Sampling was limited to materials that were visible and readily accessible to the inspector. Paint is considered LBP if it contains more than 0.5% lead. Paint is considered LCP if it has any detectable quantity of lead. A summary of the sampling event and the laboratory reports by building are included in Appendices A through D.

Areas of exposed soil adjacent to typical painted external building surfaces (e.g., window frames, trim and siding, soffits and fascia boards, etc.) were visually inspected for paint chips. In addition, representative composited soil samples were collected from the perimeters the buildings and analyzed for total lead content. The sampling strategy consisted of collecting a composite sample from the drip line of the buildings and submitting to Reservoirs. Soil sampling results are included in Appendices A through D.

3.3 Laboratory Analysis

The paint and soil samples were submitted to Reservoirs, which is an Environmental Lead Laboratory Accreditation Program (ELLAP) accredited laboratory that uses procedures developed in compliance with the guidelines established by the National Institute of Occupational Safety and Health (NIOSH) Method 7420. The samples were analyzed by Atomic Absorption (AA) / Inductively Coupled Plasma (ICP) protocol to determine lead content. The total lead concentration reported for paint chip samples is the average of all layers in the sample. Lead content is reported as a percentage lead by weight. Lead content for soil samples is reported as milligrams lead per the total weight of the sample in kilograms (mg/kg). The laboratory analytical reports are included by building in Appendices A-D.

4.0 REGULATED BUILDING MATERIALS

The regulatory criteria, technical approach, and findings as they pertain to RBM are discussed below. The RBM inventory was performed at the Project Site on September 18 and September 19, 2019.

4.1 Regulatory Criteria

RBMs include regulated materials that contain lead, acid, electronic wastes, mercury, chlorofluorocarbons (CFCs), polychlorinated biphenyls (PCBs), radioactive materials, or chemicals. The RBMs must be properly managed and may either be recycled, reused, or properly disposed at a licensed landfill facility.

The federal standards for managing RBMs are at 40 Code of Federal Regulations (CFR) Part 273. The RBM regulations define two classes of participants in the hazardous waste management program: small quantity handlers and large quantity handlers. The classification of, and applicable management requirements for, RBMs are determined by the quantity of hazardous waste accumulated. Facilities that accumulate less than 5,000 kilograms (kg) of Universal Waste (UW) at any time are classified as Small Quantity Handlers of UW (SQHUW). Facilities that accumulate less than 100 kg/month of Resource Conversation and Recovery Act (RCRA)-regulated wastes are considered Conditionally Exempt Small Quantity Generators (CESQG) and as such are not subject to UW waste rules.

The EPA classifies fluorescent bulbs containing concentrations of mercury greater than or equal to 0.2 milligrams per liter (mg/l) as potentially hazardous waste based on management practices. The fluorescent light bulbs identified at the Project Site are assumed to contain concentrations of mercury greater than 0.2 mg/L (fluorescent and high intensity discharge (HID) bulbs).

4.2 Technical Approach

Landmark conducted a presumptive survey for RBM that were observed at the site. This limited investigation included the identification and quantification of RBMs that must be managed and appropriately disposed of during renovation or demolition. The RBM inspection included the visual identification and quantification of the following: refrigerants (CFCs); waste oils or chemicals; fluorescent bulbs and ballasts potentially containing mercury and PCBs, respectively; utility switches and thermostats potentially containing mercury; high intensity discharge exterior lighting; and fixtures that contain or may contain batteries and/or radiation sources.

This inventory was limited to materials that were visible and readily accessible to the inspector, and additional RBM may be discovered during renovation or demolition. An inventory for each building is included in Appendices A through D.

5.0 BIOLOGICAL HAZARDS

The biohazard walkthrough inspection was performed concurrently with the ACM, RBM, and LBP inspection on September 18 and September 19, 2019. Landmark conducted limited observations for biological hazards during the Project Site walk. These observations were primarily limited to rodent, bird, bat or insect infestations, water intrusion, or visual evidence of mold growth through the structures. A summary of findings by building is included in Section 6.0 - Findings.

6.0 FINDINGS

A brief summary of the findings for each category (ACM, LCP, RBM, and biological) are included by the NPS FMSS number below. Data tables and more in-depth summaries are included in Appendices A through V. Each building has its own Appendix which includes: 1) ACM summary; 2) ACM laboratory report; 3) LCP data summary; 4) LCP laboratory results; and 5) RBM summary.

6.1 HS-18 – Station Dwelling

ACM – Landmark collected 17 suspect ACM samples from 11 homogenous materials. Landmark reviewed a report by Boggs Environmental Consultants, Inc. dated September 22, 2010 for this structure and included the historical report's results in the HA form. The following materials contain asbestos:

- FDC01 – White flexible duct connector located in the basement generator room contained 85% chrysotile asbestos (one observed).
- FTC01 – Green floor tiles with white streaks located on the first-floor storage room, second floor under carpet, and in other locations throughout under carpet contained 4.3-12% chrysotile asbestos. The mastic associated with this tile was non-detect for asbestos (1,360 SF).

Lead – Paint chips were collected from nine different painted components and all nine contain detectable lead. The following items are considered LBP or LCP:

- Yellow and Red paint on concrete basement stairs and curbing in basement.
- Gray and red paint on concrete floors in basement.
- Green and yellow paint on concrete walls in basement.
- Beige and yellow paint on plaster walls on throughout.
- White and light-yellow paint on door frames.
- Yellow and gray paint on metal ladder to the observatory on the third floor.
- White paint on wooden siding and windows on the exterior of building.
- Gray paint on the concrete foundation walls on the exterior of building.
- Black and red paint on metal railings on the front porch.

Additionally, soil was collected from the dripline of the building and had 1,040 mg/kg of lead. This does not exceed the EPA non-play area bare soil level of 1,200 mg/kg for lead. Paint chips were noted in the soil and should be removed.

RBM – Several RBMs were observed in HS-19 including: fluorescent light tubes and compact florescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire suppressant chemicals; smoke detectors, emergency lighting, and emergency exit signs which contain batteries, and many contain radiation sources; deep-cycle batteries which contain lead and acid; and a 1,000-gallon propane tank. These items are subject to special handling and disposal requirements if impacted by renovation activities.

Biological – No visible water damage or evidence of rodent intrusion was observed. The NPS escort did mention that the basement floor drain does backup occasionally with water.

6.2 HS-19 – Officer in Charge Dwelling

ACM – Twenty-three suspect ACM samples were collected from nine homogenous materials. The following materials contain asbestos:

- CDW01 – Joint compound associated with drywall on the second level hallways and basement dividing walls contains 4% chrysotile asbestos [~450 square feet (SF)]. The composite drywall sample (drywall, paper, joint compound) contained less than 1% asbestos.
- FTC01 – Cream-colored floor tile with gray streaks and the associated mastic located on the stairs to the second floor and in the entire second floor hallways and bedrooms contain 5-7% chrysotile asbestos (~550 SF).
- PF01 – A white mudded pipe fitting was found in the basement on the north wall next to the brick chimney on the pipe. This fitting contains 20% chrysotile asbestos. While only one fitting was observed, there is a potential that additional fittings could be found in wall, floor, and ceiling cavities throughout the building.
- PL01 – Gray granular plaster with white skim coating located on walls and ceilings throughout including under CDW01 in many locations. One of five samples indicated that an additional compound was laid on top of the plaster which contained 3% chrysotile asbestos. This could be a patching material, but until further investigations can be performed, the entire wall/ceiling material must be treated as asbestos (~2,500 SF).

Lead – Paint chips were collected from seven different painted components. Four painted components had detectable levels of lead. The following items are considered LCP or LBP:

- White paint on plaster walls in the basement.
- Gray and red paints on the concrete floors in the basement.

- Green paint on concrete walls in basement.
- Gray paint on the exterior of the building, along the concrete foundation.

Additionally, soil was collected from the dripline of the building and had 5,180 mg/kg of lead. This exceeds the EPA non-play area bare soil level of 1,200 mg/kg for lead.

RBM –Several RBMs were identified in HS-18. These include fluorescent light tubes and compact fluorescent light bulbs which can contain mercury; light ballasts which can contain PCBs; and a refrigerator which can contain controlled refrigerants (CFCs). These items are subject to special handling and disposal requirements if impacted by renovation activities.

Biological – No water infiltration or evidence of rodents was observed at the time of the inspection.

6.3 HS-20 – Harbor of Refuge Dwelling

ACM – Landmark collected 11 suspect ACM samples from nine homogenous materials. Landmark reviewed a report by Boggs Environmental Consultants, Inc. dated August 20, 2010 for this structure and included the historical report's results in the HA form. The following materials contain asbestos:

- CDW01 – Joint compound on the drywall system throughout the building contains 2.1-2.2% chrysotile asbestos (3,500 SF). The composite drywall system (drywall, paper, and joint compound) contained less than 1% asbestos.
- FP01 – White flue packing material associated with the gray pipe on the basement south wall contains 1.8% chrysotile asbestos (~1 SF).
- WC01 – White window caulking on exterior windows contain 4% chrysotile asbestos (19 each).

Lead – Paint chips were collected from seven different painted components and all seven samples contain detectable lead. The following items are considered LBP or LCP:

- Gray and red paint on concrete floors in basement.
- Green and white paint on brick walls.
- Yellow and blue paint on brick wall/ceiling in storm shelter.
- Red and gray paint on wooden stairs.
- Yellow paint on plaster walls.
- Gray paint on wood porch.
- White paint on wooden window casing.

Additionally, soil was collected from the dripline of the building and had 706 mg/kg of lead. This does not exceed the EPA non-play area bare soil level of 1,200 mg/kg for lead. Paint chips were noted in the soil and should be removed during any renovation project.

RBM – Several RBMs were observed in HS-20 including: fluorescent light tubes and compact florescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire-suppressant chemicals; and a 10-gallon bucket of paint which could contain lead or other chemicals. These items are subject to special handling and disposal requirements if impacted by renovation activities.

Biological – No water damage or evidence of rodent infiltration was observed.

6.4 Equipment Building

ACM – Fourteen suspect ACM samples were collected from seven homogenous materials. The following materials contain asbestos:

- FD01 – Fire door located at the south entrance of the garage is presumed to contain asbestos. It was not sampled to maintain the integrity of the door.
- FTC01 – The mastic associated with white 12-inch by 12-inch floor tiles with gray and tan speckles contains chrysotile asbestos (50 SF).

Lead – Paint chips were collected from five different painted components and all five samples contain detectable lead. The following items are considered LBP or LCP:

- Brown and gray paint on the concrete foundation in the interior.
- Gray paint on wooden walls.
- White paint on wooden walls.
- Brown paint on wooden window frames.
- White paint on exterior wood siding.

Additionally, soil was collected from the dripline of the building and had less than six mg/kg of lead. This does not exceed the EPA non-play area bare soil level of 1,200 mg/kg for lead.

RBM – Several RBMs were observed in the Equipment Building including: fluorescent light tubes and compact florescent light bulbs which may contain mercury; light ballasts which may contain PCBs; fire extinguishers which may contain controlled fire-suppressant chemicals; a 1-gallon bucket of paint which could contain lead or other chemicals; and 1-gallon of waste oil. These items are subject to special handling and disposal requirements if impacted by renovation activities.

Biological – No water damage or evidence of rodent infiltration was observed.

7.0 RECOMMENDATIONS

Asbestos: The identified ACM should be abated (removed, enclosed, encapsulated, or properly managed) in accordance with all applicable federal, state and local regulations if renovation activities will disturb these materials or if demolition is planned for the structure. Abatement of ACM requires EPA-certified trained workers and permits. Abatement must include the appropriate controls and waste disposal at a certified landfill.

If ACM is to remain in-place, it is recommended that an Operations and Maintenance (O&M) Program be adopted. The O&M Program includes a listing of known asbestos within the buildings and procedures to minimize the potential for disturbance of ACM. O&M Programs are designed to present processes for communication and planning regarding ACM management, reduce the potential for unplanned impacts that may cause ACM disturbance or damage, consolidate and organize data collected related to ACM to facilitate planning and management, training requirements, notifications, and monitor the condition of ACM over time.

Lead: Renovation activities that will impact LCP or LBP and lead-containing soils will require OSHA-trained workers and safety programs. Personal protective equipment (PPE) will be required to handle these items until negative exposure assessments are completed that shows work activities do not result in exposures above the OSHA permissible exposure limit (PEL). Additionally, an appropriate waste management plan should be developed for the disposal of the LCP and lead-containing soil materials. Paint chips in soil that contain lead and lead-containing soils should be removed. Some lead components were identified as having paint in poor condition. The LCP or LBP listed in poor condition should be repaired/removed by OSHA-trained workers as part of the renovation activities. Any LCP or LBP in good condition that will not be impacted by renovation activities can be left in the building.

RBM: Renovation activities that will impact RBM will require proper removal, disposal, and management. These materials must be removed prior to remodeling and then either reused, recycled, or properly disposed in full accordance with EPA and state regulations. Some of the RBMs identified in this inventory may be reused or recycled. Recycling programs exist for lights, light fixtures, bulbs and ballasts, aerosols, mercury switches and gauges, paints, oils, refrigerants, electrical wiring, empty metal containers, and empty plastic containers.

Biological Hazards: The NPS escort indicated that HS-19 does occasionally experience water-backups in

the basement floor drain. This condition should be addressed as part of renovations or as part of regular building maintenance.

8.0 LIMITATIONS

Landmark performed this hazardous materials inspection in a manner consistent with the level of care and expertise exercised by members of the industrial hygiene inspection and assessment profession. Landmark does not imply or guarantee that every suspect ACM, LCP, RBM, or biological hazard on or in the Project Site has been identified or sampled.

This report does not warrant against operations or conditions present of a type or at locations not investigated during this study. This inspection is intended to identify those components that are reasonably suspect and are most likely to be hazardous in quantities subject to regulation based on existing industry and regulatory standards.

Landmark's assessment effort was limited to accessible areas within buildings. Landmark was not retained to conduct engineering, plumbing, mechanical or roof studies within the subject buildings. Landmark's efforts, although related in some respects to such forensic studies, are not to be considered "in lieu" of these forensic reviews in establishing the nature of building construction or material applications within the subject buildings.

It should be noted that intrusive inspections of building cavities were not performed and below grade structures were not investigated. In the event of demolition, ACMs, RBMs, or LBP could be discovered that was not identified during this inspection.

This report is intended for the sole reliance and use of the Client. Work performed in conjunction with this assessment and data developed are intended as a description of available information at the dates and locations that inspections and sampling were performed.

The findings presented in this report are professional opinions based solely upon visual observations and supplemental testing of materials within the study areas. Landmark is not responsible for independent conclusions, opinions or recommendations made by others regarding the summary of field sampling and laboratory test data presented in this report. This report is not intended to be an abatement design, a technical specification or used for solicitation of bids for abatement.

9.0 ENDORSEMENTS

Preparation of this report was conducted by the following Landmark personnel:



Brandy Howard, CIH, CSP
Project Manager

Review of this report was conducted by the following Landmark personnel:



Thomas S Norman, PE
Northern Colorado Regional Manager

Appendix A

HS-18: STATION DWELLING

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Station Dwelling	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Black 4” cove base			
Material Code:	**Material Sequence:**	**Size:**	
CBA	01	4”	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Black		Tan adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
35 LF	M	Type II Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on second floor restroom on walls			

Sample Number:	Sample Location Description:	Analytical Results:
CBA01-01	Second level restroom north wall at entryway	None Detected
30490B-5-H1a	Historical Result – Bathroom	None Detected
30490B-5-H1b	Historical Result – Bathroom	None Detected

Homogeneous Material Description:			Photo
12” X 12” white glue on ceiling tile			
Material Code:	**Material Sequence:**	**Size:**	
CT	01	12” X 12”	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Fissures	Tan adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
150 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Fair	Low	NA	
Material Notes:			
Located in first level restrooms			

Sample Number:	Sample Location Description:	Analytical Results:
CT01-01	First level North restroom at East wall on ceiling	None Detected
30490B-7-K1a	Historical Result – Bathroom	None Detected
30490B-7-K1b	Historical Result – Bathroom	None Detected
30490B-7-K1c	Historical Result – Bathroom	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Station Dwelling	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White flexible duct connector			
Material Code:	**Material Sequence:**	**Size:**	
FDC	01	2' X 2'	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Fibrous	Sheet metal duct	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1 EA	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Moderate	#5	
Material Notes:			
Located in basement generator room			

Sample Number:	Sample Location Description:	Analytical Results:
FDC01-01	Basement generator room from bottom of flexible duct connector	Chrysotile 85%
FDC-01-02	Basement generator room from bottom of flexible duct connector	Not Analyzed

Homogeneous Material Description:			Photo
9"X 9" floor tile			
Material Code:	**Material Sequence:**	**Size:**	
FTC	01	9" x 9"	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Green	White streaks	Black Mastic	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1,360 SF	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located first floor storage, second level under carpet, and other locations under carpet.			

Sample Number:	Sample Location Description:	Analytical Results:
FTC01-01	On floor at East entrance first level	Tile - Chrysotile 12% Mastic – None Detected
30490S-8-M1	Historical Result – Storage	Chrysotile 4.3%

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

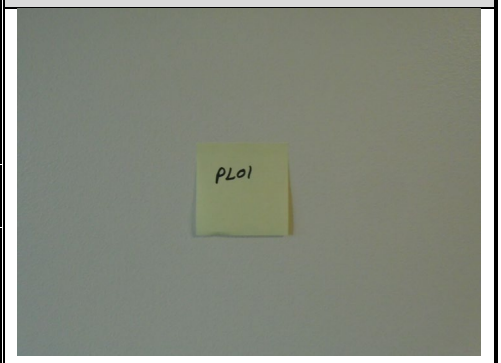
Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Station Dwelling	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Black mastic			
Material Code:	**Material Sequence:**	**Size:**	
MA	01		
Color:	**Pattern / Texture:**	**Associated Materials:**	
Black	Trowel applied	Wood	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
60 SF	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Fair	Moderate	NA	
Material Notes:			
Red floor tile previously identified in tower removed. Black mastic remaining			

Sample Number:	Sample Location Description:	Analytical Results:
MA01-01	Observatory lookout Northeast corner	None Detected
MA01-02	Observatory lookout center of room	None Detected
3090S-2-C1b	Historical Result – Lookout Tower – Mastic	None Detected

Homogeneous Material Description:			Photo
Gray plaster with white skim coat			
Material Code:	**Material Sequence:**	**Size:**	
PL	01	½" thick	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Gray/White	Trowel applied	Wood	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
14,000 SF	S	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on walls and ceilings throughout structure			

Sample Number:	Sample Location Description:	Analytical Results:
PL01-01	Third level North bedroom closet West wall	None Detected
PL01-02	Basement sump room South wall 6', from West wall	None Detected
30490S-1-A1	Historical Result – Storage	None Detected
30490S-1-A2	Historical Result – Storage	None Detected
30490S-1-A3	Historical Result – Storage	None Detected
30490S-1-A4	Historical Result – Storage	None Detected
30490B-7-A7a	Historical Result – Bathroom	None Detected
20490B-7-A7b	Historical Result – Bathroom	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

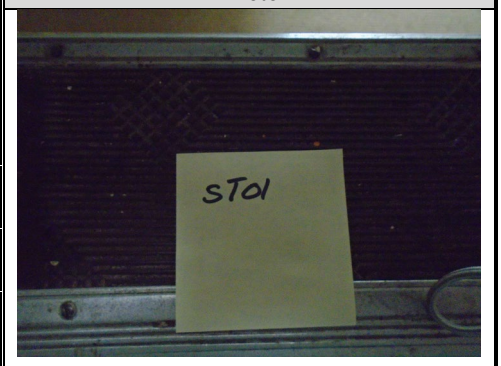
Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

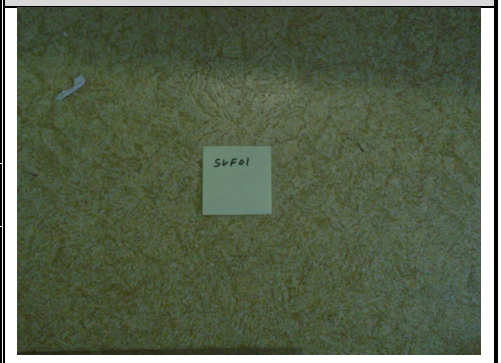
Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Station Dwelling	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Brown rubber stair tread			
Material Code:	**Material Sequence:**	**Size:**	
ST	01	4" X 10 "	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Brown			
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
15 EA	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on ladder to lookout observatory			

Sample Number:	Sample Location Description:	Analytical Results:
ST01-01	Third level bottom of ladder to observatory	None Detected
30490S-4-D1	Historical Result – Storage	None Detected

Homogeneous Material Description:			Photo
Tan sheet vinyl flooring			
Material Code:	**Material Sequence:**	**Size:**	
SVF	01		
Color:	**Pattern / Texture:**	**Associated Materials:**	
Tan	Brown streaks	Yellow adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
200 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located in three first level restrooms			

Sample Number:	Sample Location Description:	Analytical Results:
SVF01-01	First level North restroom at entry	None Detected
SVF01-02	First level South restroom at entry	None Detected
30490B-7-N1	Historical Result – Bathroom	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

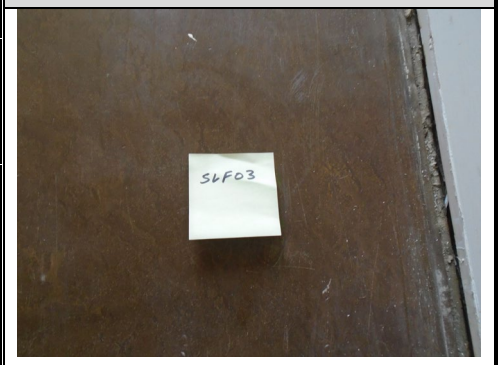
Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Station Dwelling	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Tan sheet vinyl flooring with small squares			
Material Code:	**Material Sequence:**	**Size:**	
SVF	02		
Color:	**Pattern / Texture:**	**Associated Materials:**	
Tan	Small squares	Yellow adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
100 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on second floor restroom			

Sample Number:	Sample Location Description:	Analytical Results:
SVF02-01	Second level restroom at entry	None Detected
SFV02-02	Second level restroom under radiator West wall	None Detected
30490B-7-L1	Historical Result - Bathroom	None Detected

Homogeneous Material Description:			Photo
Brown sheet flooring with burlap backing			
Material Code:	**Material Sequence:**	**Size:**	
SVF	03		
Color:	**Pattern / Texture:**	**Associated Materials:**	
Brown		Tan adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
750 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on third level under carpet			

Sample Number:	Sample Location Description:	Analytical Results:
SVF03-01	Third level South room at east dormer on floor	None Detected
SVF03-02	Third level North room closet on floor	None Detected
20490S-1-B1a	Historical Result – Storage	None Detected
20490S-1-B1b	Historical Result – Storage	None Detected
20490S-1-B1c	Historical Result – Storage	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Station Dwelling	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:		
White window caulking		
Material Code:	**Material Sequence:**	**Size:**
WC	01	¼" bead
Color:	**Pattern / Texture:**	**Associated Materials:**
White	Smooth pliable	Wood windows
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**
90 windows EA	M	Type II Non-Friable
Condition:	**Disturbance Potential:**	**Assessment Category:**
Fair	Low	NA
Material Notes:		
Located around newer windows throughout		

Photo



Sample Number:	Sample Location Description:	Analytical Results:
WC01-01	West window main level at North end of structure	None Detected
30490E-E-G1	Historical Result – White Window Joint Sealant	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

REI LAB **Reservoirs Environmental, Inc.**

September 23, 2019

Subcontract Number: **NA**
Laboratory Report: **RES 445435-1**
Project # / P.O. # **19096.001.001**
Project Description: **USCG Michigan, Station Dwelling**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 445435-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

AnneMarie R. Kieffer for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445435-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Station Dwelling**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
MA01-01	A	Black mastic w/ brown adhesive	100		**ND**	20	80
MA01-02	A	Black mastic w/ brown adhesive	100		**ND**	20	80
FTC01-01	A	Yellow adhesive w/ black mastic	18		**ND**	0	100
	B	Green tile	82	**Chrysotile**	**12**	0	88
SVF01-01	A	Yellow adhesive	3		**ND**	0	100
	B	Tan/multi-colored sheet vinyl w/ tan fibrous backing material	97		**ND**	15	85
SVF01-02	A	Tan/multi-colored sheet vinyl w/ tan fibrous backing material	100		**ND**	15	85
SVF02-01	A	Tan/multi-colored sheet vinyl w/ gray fibrous backing material	100		**ND**	15	85
SVF02-02	A	Tan/multi-colored sheet vinyl w/ gray fibrous backing material	100		**ND**	15	85

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445435-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Station Dwelling**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SVF03-01	A	Brown adhesive	5		**ND**	0	100
	B	Brown sheet vinyl w/ tan fibrous woven material	95		**ND**	35	65
SVF03-02	A	Brown adhesive	6		**ND**	0	100
	B	Brown sheet vinyl w/ tan fibrous woven material	94		**ND**	35	65
CBA01-01	A	Cream adhesive	6		**ND**	0	100
	B	Gray cove base	94		**ND**	0	100
ST01-01	A	Brown resinous material	100		**ND**	20	80
PL01-01	A	White plaster w/ blue/multi-colored paint	40		**ND**	0	100
	B	Gray granular plaster	60		**ND**	2	98
PL01-02	A	Gray granular material	45		**ND**	2	98
	B	White plaster w/ off white/multi-colored paint	55		**ND**	0	100
CT01-01	A	Brown adhesive	35		**ND**	0	100
	B	Gray/white ceiling tile	65		**ND**	65	35

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445435-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Station Dwelling**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
FDC01-01	A	Gray fibrous woven material	100	**Chrysotile**	**85**	10	5
FDC01-02		Not Analyzed per Client Request.					
WC01-01 (Not on Original COC)	A	Off white caulk w/ white paint	100		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Piper-Lenore O. Murphy

Analyst / Data QA

RES 445435

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 2

Pager : 303-509-2098

	INVOICE TO: (IF DIFFERENT)	CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127	*Station Dwelling*	Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address: iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com	
Project Description/Location: USCG Michigan, Ranger Station			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) X PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust ___ RUSH ___ 24 hr. ___3-5 Day
RCRA 8 / Metals & Welding Fume Scan / TCLP ___ RUSH ___ 5 day ___10 day
Organics 24 hr. 3 day 5 Day

****Prior notification is required for RUSH turnarounds.****

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus ___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M ___ 48 Hr. ___3-5 Day
Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

****Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.****

REQUESTED ANALYSIS

Client sample ID number (Sample IDs must be unique)	PLM - Short report, Long report, Point Quant	TEM - AHERA, Level II, 7402, ISO, +/-, Semi-quant. Micro-	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s)	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	E.coli O157:H7: +/-	Listeria: +/-	Aerobic Plate Count: +/- or Quantification	E.coli: +/- or Quantification	Coliforms: +/- or Quantification	S.aureus: +/- or Quantification	Y & M: +/- or Quantification	Mold: +/- Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1 MA01-01	X																				
2 ↓ -02																					
3 FTC01-01																					
4 SVF01-01																					
5 ↓ -02																					
6 SVF02-01																					
7 ↓ -02																					
8 SVF03-01																					
9 -02																					
10 cBA01-01																					

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

called to confirm additional sample not listed on COC HM

Number of samples received: 16 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: [signature] Date/Time: 9/20/19 1140 Carrier: hand

Sample Condition: On Ice Yes / No Sealed Yes / No Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Reservoirs Environmental, Inc.

RES Job # 445435 Page 2 of 2

Submitted by: Landmark Environmental, Inc

Station Dwelling

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant. Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	E.coli O157:H7: +/-	Listeria: +/-	Aerobic Plate Count: +/- or Quantification	E.coli: +/- or Quantification	Coliforms: +/- or Quantification	S.aureus: +/- or Quantification	Y & M: +/- or Quantification	Mold: +/- or Quantification	OTHER -	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
11 STO1-01	X																					
12 PL01-01	↓																					
13 ↓ -02	↓																					
14 CTO1-01	↓																					
15 FDC01-01 → progressive	↓																					
16 ↓ -02	↓																					
17 WC01-01 (Not on Original COC) JM																						
18																						
19																						
20																						
21																						
22																						
23																						
24																						
25																						
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36																						
37																						
38																						
39																						
40																						
41																						

REQUESTED ANALYSIS

VALID MATRIX CODES

Air = A | Bulk = B
Dust = D | Paint = P
Soil = S | Wipe = W
Swab = SW | F = Food
Drinking Water = DW | Waste Water = WW
O = Other
ASTM E1792 approved wipe media only

LAB NOTES:

7-2011 version 1

Lead-Paint Inspection Form

Client: Mundus Bishop - HS-18 Station Dwelling						Date: 9/19/19		
Project No. 19096.001.001						Inspector: G. Estes		
Sample No.	Location	Component	Substrate	Feature	Condition	Color	Result	Screen Result
1	Basement	Stair & Curb	Concrete	On concrete Stair & Baseboard	Good	Yellow|Red	2.90%	LBP
2	Basement	Floor	Concrete	Floor	Fair	Gray|Red	0.34%	LCP
3	Basement	Wall	Concrete	South Storage Rm	Good	Green|Yellow	1.60%	LBP
4	First Level	Wall	Plaster	Plaster Throughout	Good	Beige|Yellow	0.93%	LBP
5	Second Level	Door Frame	Wood	On Interior Wood Trim	Good	White|Light Yellow	0.10%	LCP
6	Third Level	Ladder	Metal	On Observatory Ladder	Fair	Yellow|Gray Black	20.50%	LBP
7	Exterior	Siding & Windows	Wood	Original - Under Wood Siding	Fair|Poor	White	8.40%	LBP
8	Exterior	Foundation	Concrete	Foundation	Fair	Gray	1.20%	LBP
9	Exterior	Railing	Metal	On Front Porch	Fair	Black|Red	0.21%	LCP
10	Exterior	Drip Line	Soil	Chips|Soil	Poor	White	1040 (mg/kg)	NA

Notes:

BRL - Below Reporting Limit

NL - Not Lead Containing

LBP - Lead Based Paint

LCP - Lead Containing Paint

NA - Not Applicable

LANDMARK ENVIRONMENTAL INC.

REI LAB **Reservoirs Environmental, Inc.**

September 23, 2019

Subcontractor Number: **RES** **445436-1**
Laboratory Report: **19096.001.001**
Project #/P.O. #: **USCG Michigan, Station Dwelling**
Project Description:

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Greg,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the American Industrial Hygiene Association, Lab ID 101533 - Accreditation Certificate #480. The laboratory is currently proficient in both IHPAT & ELPAT programs respectively.

Reservoirs has analyzed the following sample(s) using Atomic Absorption Spectroscopy (AAS) / Atomic Emission Spectroscopy - Mass Spectrometry (ICP-MS) per your request. Reported sample results were not blank corrected. The analysis has been completed in general accordance with the appropriate methodology as stated in the analysis table. Results have been sent to your office.

RES 445436-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

David E. Monagle

For Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: I ANALYSIS: LEAD IN SOIL

RES Job Number:	**RES 445436-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Station Dwelling**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (mg/kg)	LEAD CONCENTRATION (mg/kg)
LBP-10	5.8	1040

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: II ANALYSIS: LEAD IN PAINT

RES Job Number:	**RES 445436-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Station Dwelling**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (%)	LEAD CONCENTRATION (%)
LBP-01	0.0032	2.9
LBP-02	0.0032	0.034
LBP-03	0.0034	1.6
LBP-04	0.0029	0.93
LBP-05	0.0045	0.10
LBP-06	0.0036	20.5
LBP-07	0.0037	8.4
LBP-08	0.0032	1.2
LBP-09	0.0033	0.21

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RES 445436

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 1

Pager : 303-509-2098

	INVOICE TO: (IF DIFFERENT)	CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway Littleton, CO 80127	Address: Station Dwelling	Phone:	Phone:
		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address:	gestes@landmarkenviro.com bhoward@landmarkenviro.com
Project Description/Location: USCG Michigan, Ranger Station			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) ___ PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust ___RUSH ___ 24 hr ___3-5 Day

RCRA 8 / Metals & Welding Fume Scan / TCLP ___RUSH ___ 5 day ___10 day

Organics ___24 hr ___ 3 day ___5 Day

"Prior notification is required for RUSH turnarounds."

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus ___ 24 hr. ___2 Day ___3-5 Day

Salmonella, Listeria, E.coli, APC, Y & M ___ 48 Hr. ___3-5 Day

Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

"Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays."

REQUESTED ANALYSIS

PLM - Short report, Long report, Point
TEM - AHERA, Level II, 7402, ISO, +/-, Semi-quant, Micro-Quant,
PCM - 7400A, 7400B, OSHA
DUST - Total, Respirable
METALS - Analyte(s) PB
ORGANICS - METH
MICROBIOLOGY: Salmonella +/-; E.coli O157:H7: +/-; Listeria: +/-; Aerobic Plate Count: +/- or Quantification; E.coli: +/- or Quantification; Coliforms: +/- or Quantification; S.aureus: +/- or Quantification; Y & M: +/- or Quantification; Mold: +/-, Identification, Quantification
SAMPLER'S INITIALS OR OTHER NOTES

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

**"ASTM E1792 approved wipe media only"

LAB NOTES:

Client sample ID number (Sample ID's must be unique)	METALS - Analyte(s) PB	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1 CBP-01	X						
2 -02							
3 -03							
4 -04							
5 -05							
6 -06							
7 -07							
8 -08							
9 -09							
10 -10							

Number of samples received: 10 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days. failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: Hunter Hurd Date/Time: 92019 1140 Carrier: Hand

Sample Condition: On Ice Yes / No; Sealed Yes / No; Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Regulated Building Material - Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 HS-18 Station Dwelling	Date: 09/19/2019 Inspector(s): G Estes

Area	Material	Material Location	Quantity (Each)	Potential Constituent of Concern
Basement	Fluorescent Tubes	C	16	Mercury
Basement	Light Ballasts	C	8	PCBs
Basement	Compact Fluorescent Tubes	C	3	Mercury
Basement	Fire Extinguisher	W	1	Fire Extinguisher Chemicals
First Level	Fluorescent Tubes	C	6	Mercury
First Level	Light Ballasts	C	3	PCBs
First Level	Compact Fluorescent Tubes	C	10	Mercury
First Level	Battery Light	W	5	Batteries
First Level	Emergency Exit Lighting	W	2	Batteries
Second Level	Fluorescent Tubes	C	14	Mercury
Second Level	Light Ballasts	C	7	PCBs
Second Level	Smoke Detector	C	5	Batteries, Radiation Source
Second Level	Compact Fluorescent Tubes	C	2	Mercury
Second Level	Battery Light	C	1	Batteries
Second Level	Fire Extinguisher	W	1	Fire Extinguisher Chemicals
Third Level	Compact Fluorescent Tubes	C	6	Mercury
Third Level	Battery Backup Light	W	1	Batteries
Third Level	Fire Extinguisher	W	1	Fire Extinguisher Chemicals
Observatory	Deep Cycle Battery	**F**	1	Lead and Acid
West Exterior	1000 Gallon Propane Tank	W	1	Hydrocarbons

F=Floor, C=Ceiling, W=Wall

LANDMARK ENVIRONMENTAL INC.

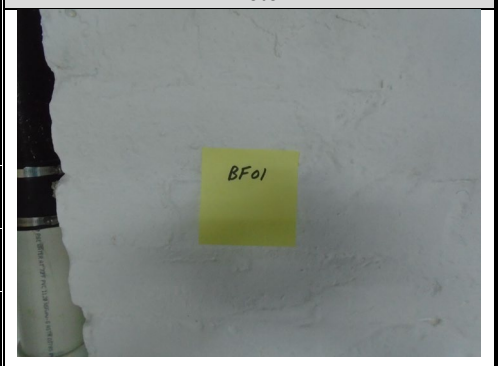
Appendix B

HS-19: Officer In Charge Dwelling

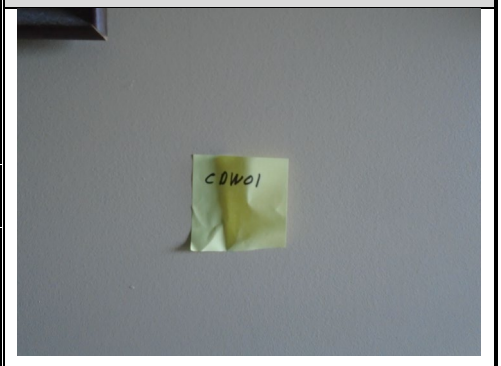
LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Officer in Charge Dwelling Station	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White filler on concrete			
Material Code:	**Material Sequence:**	**Size:**	
BF	01	NA	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Smooth	Block and concrete	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
250 SF	S	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on brick and foundation walls in basement			

Sample Number:	Sample Location Description:	Analytical Results:
BF01-01	Basement North wall under stairs	None Detected
BF01-02	Basement furnace room West wall center	None Detected
BF01-03	Basement furnace room South wall	None Detected

Homogeneous Material Description:			Photo
½" White drywall and joint compound			
Material Code:	**Material Sequence:**	**Size:**	
CDW01	01	½"	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Smooth	Joint compound	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
450 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	#5	
Material Notes:			
Located on second level hallway walls and basement center dividing wall			

Sample Number:	Sample Location Description:	Analytical Results:
CDW01-01	Basement center West wall 7' up	None Detected
CDW01-02	Second level East wall at top of stairs 4" up	Joint Compound - Chrysotile 4%

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Officer in Charge Dwelling Station	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White 12" X 12" ceiling tile spline system			
Material Code:	**Material Sequence:**	**Size:**	
CT	01	12" X 12"	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Random fissure	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
500 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on first and second levels with remnant material in basement			

Sample Number:	Sample Location Description:	Analytical Results:
CT01-01	Second level Southwest bedroom at attic access hatch	None Detected
CT01-02	First level kitchen above sink	None Detected

Homogeneous Material Description:			Photo
White painted fiber board			
Material Code:	**Material Sequence:**	**Size:**	
FB	01	4' X 8'	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Fibrous	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
80 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located in basement furnace room North wall			

Sample Number:	Sample Location Description:	Analytical Results:
FB01-01	Basement furnace room North wall West end	None Detected
FB01-02	Basement furnace room North wall East end	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

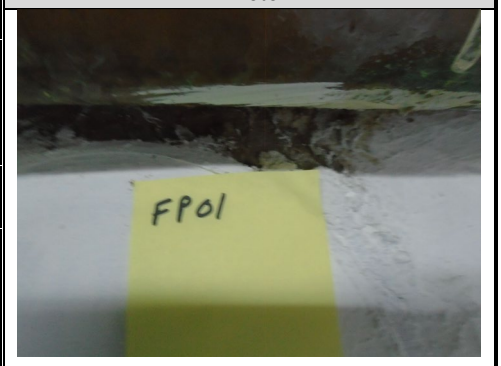
Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

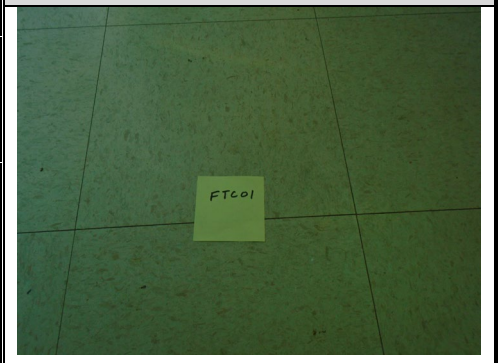
Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Officer in Charge Dwelling Station	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Flue packing material			
Material Code:	**Material Sequence:**	**Size:**	
FP	01	¼" thick	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Gray	Fibrous	Brick	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Moderate	NA	
Material Notes:			
Located on north brick wall for chimney clean out.			

Sample Number:	Sample Location Description:	Analytical Results:
FP01-01	Basement furnace room West wall	None Detected
FP01-02	Basement furnace room West wall	None Detected

Homogeneous Material Description:			Photo
12" X 12" Cream Floor Tile with Gray Streaks			
Material Code:	**Material Sequence:**	**Size:**	
FTC	01	12" x 12"	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Cream	Gray Streaks	Black Mastic	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
550 SF	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on stairs to second level and entire second hallway and bedrooms			

Sample Number:	Sample Location Description:	Analytical Results:
FTC01-01	Stair landing first level	Floor Tile – 7% Chrysotile Mastic – 5% Chrysotile
FTC01-02	Bathroom next to Northwest bedroom	Floor Tile – 5% Chrysotile Mastic – 6%Chrysotile

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Officer in Charge Dwelling Station	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:

White mudded pipe fitting

Material Code:	Material Sequence:	Size:
PF	01	NA
Color:	**Pattern / Texture:**	**Associated Materials:**
White	Fibrous	NA
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**
1 EA	TSI	Friable (F)
Condition:	**Disturbance Potential:**	**Assessment Category:**
Fair	Moderate	#3

Material Notes:

Located in basement North wall next to brick chimney on pipe

Photo



Sample Number:	Sample Location Description:	Analytical Results:
PF01-01	Basement furnace room West wall 7' up	Chrysotile 20%
PF01-02	Basement furnace room West wall 7' up	Not Analyzed
PF01-03	Basement furnace room West wall 7' up	Not Analyzed

Homogeneous Material Description:

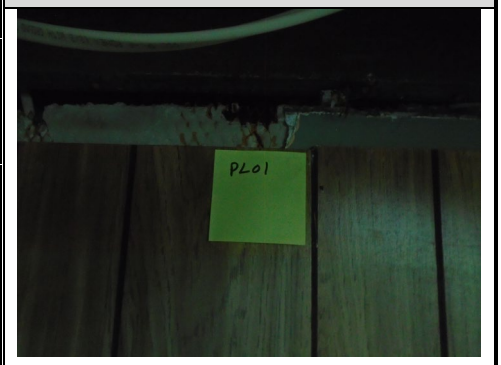
Gray granular plaster with white skim coat

Material Code:	Material Sequence:	Size:
PL	01	½" thick
Color:	**Pattern / Texture:**	**Associated Materials:**
Gray	Smooth	White skim coat
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**
2,500 SF	S	Friable (F)
Condition:	**Disturbance Potential:**	**Assessment Category:**
Good	Low	#5

Material Notes:

Located on walls and ceilings throughout under CDW01 in many locations

Photo



Sample Number:	Sample Location Description:	Analytical Results:
PL01-01	Basement North room South wall	None Detected
PL01-02	Basement East room bottom of stairs remnant ceiling plaster	None Detected
PL01-03	First level top of stairs south wall	None Detected
PL01-04	First level living room North wall at main entry	Chrysotile 3%
PL01-05	Second level Southwest bedroom South wall in corner 3' up	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

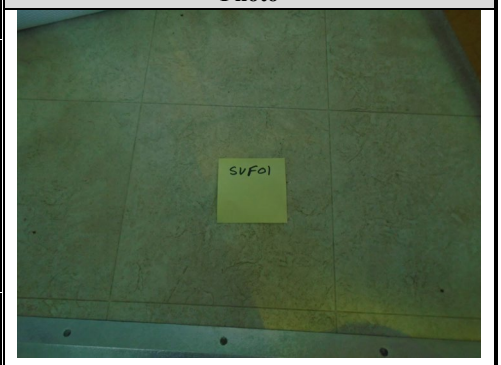
LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Officer in Charge Dwelling Station	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:		
Cream sheet vinyl flooring		
Material Code:	**Material Sequence:**	**Size:**
SVF	01	10 “pattern
Color:	**Pattern / Texture:**	**Associated Materials:**
Cream	Brown streaks	Yellow Adhesive
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**
20 SF	M	Friable (F)
Condition:	**Disturbance Potential:**	**Assessment Category:**
Good	Low	NA
Material Notes:		
Located on second floor bathroom at top of stairs		

Photo



Sample Number:	Sample Location Description:	Analytical Results:
SVF01-01	Second level main bathroom at door	None Detected
SFV01-02	Second level main bathroom near sink	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Reservoirs Environmental, Inc.

September 23, 2019

Subcontract Number: **NA**
Laboratory Report: **RES 445431-1**
Project # / P.O. # **19096.001.001**
Project Description: **USCG Michigan, Officer in Charge Dwelling Station**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 445431-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

AnneMarie R. Kieffer for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc. 19096.001.001**
Client Project Number / P.O.: **USCG Michigan, Officer in Charge Dwelling**
Client Project Description: **Station September 20, 2019**
Date Samples Received: **EPA 600/R-93/116 - Short Report, Bulk Priority**
Method: **September 23, 2019**
Turnaround:
Date Samples Analyzed:

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
FTC01-01	A	Black mastic	6	**Chrysotile**	**7**	0	93
	B	Gray/multi-colored tile	94	**Chrysotile**	**5**	0	95
FTC01-02	A	Black mastic	4	**Chrysotile**	**6**	0	94
	B	Tan adhesive	6		**ND**	0	100
	C	Gray/multi-colored tile	90	**Chrysotile**	**5**	0	95
SVF01-01	A	Tan adhesive	12		**ND**	0	100
	B	Beige/gray sheet vinyl w/ gray fibrous backing material	88		**ND**	20	80
SVF01-02	A	Tan adhesive	17		**ND**	0	100
	B	Beige/gray sheet vinyl w/ gray fibrous backing material	83		**ND**	25	75
PL01-01	A	White plaster w/ brown/multi-colored paint	35		**ND**	0	100
	B	Gray granular plaster	65		**ND**	2	98
PL01-02	A	Gray granular plaster w/ white/multi-colored paint	100		**ND**	2	98
PL01-03	A	Gray granular plaster	30		**ND**	4	96
	B	Off white plaster w/ gray/multi-colored paint	70		**ND**	TR	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc. 19096.001.001**
Client Project Number / P.O.: **USCG Michigan, Officer in Charge Dwelling Station**
Client Project Description: **September 20, 2019**
Date Samples Received: **EPA 600/R-93/116 - Short Report, Bulk Priority**
Method: **September 23, 2019**
Turnaround:
Date Samples Analyzed:

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
PL01-04	A	Gray granular plaster	30		**ND**	2	98
	B	Gray/multi-colored paint	35		**ND**	0	100
	C	Off white compound	35	**Chrysotile**	**3**	0	97
PL01-05	A	White plaster	35		**ND**	0	100
	B	Gray granular plaster	65		**ND**	2	98
CDW01-01	A	White compound w/ white paint	20		**ND**	0	100
	B	Gray/tan drywall	80		**ND**	25	75
CDW01-02	A	Gray/multi-colored paint	7		**ND**	0	100
	B	Off white compound	13	**Chrysotile**	**4**	0	96
	C	Gray/tan drywall	80		**ND**	20	80
CT01-01	A	Tan/white ceiling tile	100		**ND**	80	20
CT01-02	A	Tan/white ceiling tile	100		**ND**	80	20
BF01-01	A	White/multi-colored paint w/ gray block filler	10		**ND**	0	100
	B	Gray granular cementitious material	90		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Officer in Charge Dwelling**
Date Samples Received: **Station September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
BF01-02	A	Gray block filler w/ gray/yellow paint	10		**ND**	0	100
	B	Colorless resinous material w/ white paint	15		**ND**	0	100
	C	Gray granular cementitious material w/ gray/yellow paint	75		**ND**	0	100
BF01-03	A	Colorless adhesive w/ white paint	10		**ND**	0	100
	B	Gray block filler w/ gray/yellow paint	25		**ND**	0	100
	C	Gray granular cementitious material	65		**ND**	0	100
FP01-01	A	Brown insulation	100		**ND**	95	5
FP01-02	A	Brown insulation	100		**ND**	95	5
PF01-01	A	Gray insulation	100	**Chrysotile**	**20**	10	70
PF01-02		Not Analyzed per Client Request.					
PF01-03		Not Analyzed per Client Request.					
FB-01	A	White compound w/ white paint	5		**ND**	0	100
	B	Tan fiberboard	95		**ND**	95	5

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc. 19096.001.001**
Client Project Number / P.O.: **USCG Michigan, Officer in Charge Dwelling Station**
Client Project Description: **September 20, 2019**
Date Samples Received: **EPA 600/R-93/116 - Short Report, Bulk Priority**
Method: **September 23, 2019**
Turnaround:
Date Samples Analyzed:

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
FB-02	A	White compound w/ white paint	8		**ND**	0	100
	B	Tan fiberboard	92		**ND**	95	5

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Andrew Roberts
Analyst / Data QA

RES 445431

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 2

Pager : 303-509-2098

INVOICE TO: (IF DIFFERENT)		CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address: iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com	
Project Description/Location: USCG Michigan, Life Boat Dwelling Station			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) X PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust	___ RUSH ___ 24 hr. ___3-5 Day	
RCRA 8 / Metals & Welding Fume Scan / TCLP	___ RUSH ___ 5 day ___10 day	**Prior notification is required for RUSH turnarounds.**
Organics	___ 24 hr. ___ 3 day ___5 Day	

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus	___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M	___ 48 Hr. ___3-5 Day
Mold	___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

REQUESTED ANALYSIS

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Quant,	TEM - AHERA, Level II, 7402, ISO, +/-, Semi-quant, Micro-	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s)	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1	FTC01-01	X																			
2	-02																				
3	SVF01-01																				
4	-02																				
5	PL01-01																				
6	-02																				
7	-03																				
8	-04																				
9	-05																				
10	CDW01-01																				

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

Number of samples received: 23 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: [signature] Date/Time: 9/20/19 1140 Carrier: hand

Sample Condition: On Ice Yes / No | Sealed Yes / No | Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials
	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials

Reservoirs Environmental, Inc.

RES Job # 445431 Page 2 of 2

Submitted by: Landmark Environmental, Inc

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/- or Quantification	OTHER -	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
11 CDW01-02	X																				
12 CT01-01	↓																				
13 -02	↓																				
14 BF01-01	↓																				
15 -02	↓																				
16 -03	↓																				
17 FP01-01	↓																				
18 -02	↓																				
19 PF01-01	↓																				
20 -02	↓																				
21 -03	↓																				
22 FB-01	↓																				
23 -02	↓																				
24																					
25																					
26																					
27																					
28																					
29																					
30																					
31																					
32																					
33																					
34																					
35																					
36																					
37																					
38																					
39																					
40																					
41																					

> progressive

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW

O = Other

ASTM E1792 approved wipe media only

LAB NOTES:

Lead-Paint Inspection Form

Client: Mundus Bishop - Lifeboat Dwelling Station HS-18						Date: 9/18/19		
Project No. 19096.001.001						Inspector: G. Estes		
Sample No.	Location	Component	Substrate	Feature	Condition	Color	Result	Screen Result
1	Interior Basement	Plaster Wall	Plaster	Wall	Good	White	0.21%	LCP
2	Interior Basement	Gray|Red Paint	Concrete	Floor	Poor	Gray|Red	0.19%	LCP
3	Interior Basement	Green Wall Paint	Concrete	Wall	Good	Green	0.01%	LCP
4	First Interior Level	Beige Paint Wall	Drywall Plaster	wall	good	Beige	BRL	NL
5	Second Interior Level	White Wall Paint	Wood Windows	Walls	Good	White	BRL	NL
6	Exterior	White Siding	Wood	Wall	Good	White	BRL	NL
7	Exterior	Concrete Foundation	Concrete	Foundation	Good	Gray	0.22%	LCP
8	Exterior	Drip Line	Soil	Chips|Soil	Poor	White	5180 (mg/kg)	E

Notes:

BRL - Below Reporting Limit

NL - Not Lead Containing

LBP - Lead Based Paint

LCP - Lead Containing Paint

E - Exceeds Regulatory Critera

LANDMARK ENVIRONMENTAL INC.

Reservoirs Environmental, Inc.

September 23, 2019

Subcontractor Number:
Laboratory Report: **RES 445432-1**
Project #/P.O. #: **19096.001.001**
Project Description: **USCG Michigan, Life Boat Dwelling Station**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Greg,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the American Industrial Hygiene Association, Lab ID 101533 - Accreditation Certificate #480. The laboratory is currently proficient in both IHPAT & ELPAT programs respectively.

Reservoirs has analyzed the following sample(s) using Atomic Absorption Spectroscopy (AAS) / Atomic Emission Spectroscopy - Mass Spectrometry (ICP-MS) per your request. Reported sample results were not blank corrected. The analysis has been completed in general accordance with the appropriate methodology as stated in the analysis table. Results have been sent to your office.

RES 445432-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

David E. Monagle

For Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: I ANALYSIS: LEAD IN SOIL

RES Job Number:	**RES 445432-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Life Boat Dwelling Station**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (mg/kg)	LEAD CONCENTRATION (mg/kg)
LBP-08	5.2	5180

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: II ANALYSIS: LEAD IN PAINT

RES Job Number:	**RES 445432-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Life Boat Dwelling Station**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (%)	LEAD CONCENTRATION (%)
LBP-01	0.0044	0.21
LBP-02	0.0030	0.19
LBP-03	0.0036	0.014
LBP-04	0.0029	BRL
LBP-05	0.0051	BRL
LBP-06	0.0030	BRL
LBP-07	0.0030	0.22

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RES 445432

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page ___1___ of ___1___

Pager : 303-509-2098

INVOICE TO: (IF DIFFERENT)		CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address:	iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com
Project Description/Location: USCG Michigan, Life Boat Dwelling Station			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) ___ PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust ___ RUSH ___ 24 hr. X 3-5 Day
RCRA 8 / Metals & Welding Fume Scan / TCLP ___ RUSH ___ 5 day ___10 day
Organics ___ 24 hr. ___ 3 day ___5 Day

Prior notification is required for RUSH turnarounds.

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus ___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M ___ 48 Hr. ___3-5 Day
Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

REQUESTED ANALYSIS

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) PB	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1 LBP-01					X																
2 -02					↓																
3 -03																					
4 -04																					
5 -05																					
6 -06																					
7 -07																					
8 -08																					
9																					
10																					

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

Number of samples received: 8 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-18 Date/Time: 11:40 AM

Laboratory Use Only
Received By: [signature] Date/Time: 92019 1140 Carrier: hand

Sample Condition: On Ice Yes / No Sealed Yes / No Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Regulated Building Material - Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Lifeboat Dwelling Station HS-18	Date: 09/18/2019 Inspector(s): G Estes

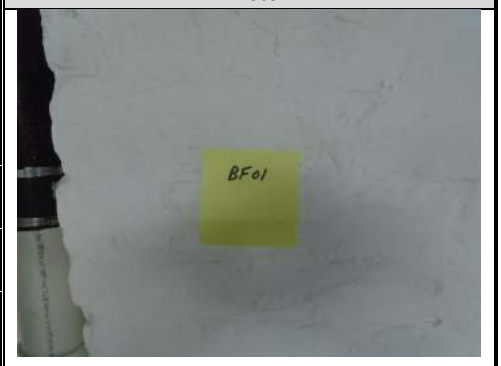
Area	Material	Material Location	Quantity (Each)	Potential Constituent of Concern
Basement	Fluorescent Tubes	C	8	Mercury
Basement	Light Ballasts	C	4	PCBs
Basement	Compact Fluorescent Tubes	C	3	Mercury
First Level	Fluorescent Tubes	C	2	Mercury
First Level	Light Ballasts	C	2	PCBs
First Level	Compact Fluorescent Tubes	C	6	Mercury
First Level	Refrigerators	W	2	CFC
Second Level	CFL	C & W	13	Mercury

F=Floor, C=Ceiling, W=Wall, O=Other

LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Lifeboat Dwelling Station	Date: 9-18-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White filler on concrete			
Material Code:	**Material Sequence:**	**Size:**	
BF	01	NA	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Smooth	Block and concrete	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
250 SF	S	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on brick and foundation walls in basement			

Sample Number:	Sample Location Description:	Analytical Results:
BF01-01	Basement North wall under stairs	None Detected
BF01-02	Basement furnace room West wall center	None Detected
BF01-03	Basement furnace room South wall	None Detected

Homogeneous Material Description:			Photo
½" White drywall and joint compound			
Material Code:	**Material Sequence:**	**Size:**	
CDW01	01	½"	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Smooth	Joint compound	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
450 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	#5	
Material Notes:			
Located on second level hallway walls and basement center dividing wall			

Sample Number:	Sample Location Description:	Analytical Results:
CDW01-01	Basement center West wall 7' up	None Detected
CDW01-02	Second level East wall at top of stairs 4" up	Joint Compound - Chrysotile 4%

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Lifeboat Dwelling Station	Date: 9-18-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White 12” X 12” ceiling tile spline system			
Material Code:	**Material Sequence:**	**Size:**	
CT	01	12” X 12”	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Random fissure	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
500 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on first and second levels with remnant material in basement			

Sample Number:	Sample Location Description:	Analytical Results:
CT01-01	Second level Southwest bedroom at attic access hatch	None Detected
CT01-02	First level kitchen above sink	None Detected

Homogeneous Material Description:			Photo
White painted fiber board			
Material Code:	**Material Sequence:**	**Size:**	
FB	01	4’ X 8’	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Fibrous	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
80 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located in basement furnace room North wall			

Sample Number:	Sample Location Description:	Analytical Results:
FB01-01	Basement furnace room North wall West end	None Detected
FB01-02	Basement furnace room North wall East end	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Lifeboat Dwelling Station	Date: 9-18-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Flue packing material			
Material Code:	**Material Sequence:**	**Size:**	
FP	01	¼" thick	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Gray	Fibrous	Brick	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Moderate	NA	
Material Notes:			
Located on north brick wall for chimney clean out.			

Sample Number:	Sample Location Description:	Analytical Results:
FP01-01	Basement furnace room West wall	None Detected
FP01-02	Basement furnace room West wall	None Detected

Homogeneous Material Description:			Photo
12" X 12" Cream Floor Tile with Gray Streaks			
Material Code:	**Material Sequence:**	**Size:**	
FTC	01	12" x 12"	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Cream	Gray Streaks	Black Mastic	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
550 SF	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on stairs to second level and entire second hallway and bedrooms			

Sample Number:	Sample Location Description:	Analytical Results:
FTC01-01	Stair landing first level	Floor Tile – 7% Chrysotile Mastic – 5% Chrysotile
FTC01-02	Bathroom next to Northwest bedroom	Floor Tile – 5% Chrysotile Mastic – 6%Chrysotile

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

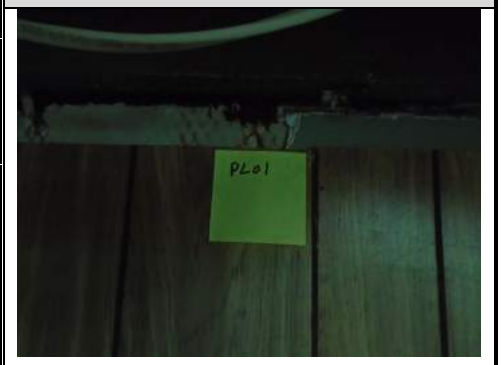
Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Lifeboat Dwelling Station	Date: 9-18-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White mudded pipe fitting			
Material Code:	**Material Sequence:**	**Size:**	
PF	01	NA	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Fibrous	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1 EA	TSI	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Fair	Moderate	#3	
Material Notes:			
Located in basement North wall next to brick chimney on pipe			

Sample Number:	Sample Location Description:	Analytical Results:
PF01-01	Basement furnace room West wall 7' up	Chrysotile 20%
PF01-02	Basement furnace room West wall 7' up	Not Analyzed
PF01-03	Basement furnace room West wall 7' up	Not Analyzed

Homogeneous Material Description:			Photo
Gray granular plaster with white skim coat			
Material Code:	**Material Sequence:**	**Size:**	
PL	01	½" thick	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Gray	Smooth	White skim coat	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
2,500 SF	S	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	#5	
Material Notes:			
Located on walls and ceilings throughout under CDW01 in many locations			

Sample Number:	Sample Location Description:	Analytical Results:
PL01-01	Basement North room South wall	None Detected
PL01-02	Basement East room bottom of stairs remnant ceiling plaster	None Detected
PL01-03	First level top of stairs south wall	None Detected
PL01-04	First level living room North wall at main entry	Chrysotile 3%
PL01-05	Second level Southwest bedroom South wall in corner 3' up	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Lifeboat Dwelling Station	Date: 9-18-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:		
Cream sheet vinyl flooring		
Material Code:	**Material Sequence:**	**Size:**
SVF	01	10 “pattern
Color:	**Pattern / Texture:**	**Associated Materials:**
Cream	Brown streaks	Yellow Adhesive
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**
20 SF	M	Friable (F)
Condition:	**Disturbance Potential:**	**Assessment Category:**
Good	Low	NA
Material Notes:		
Located on second floor bathroom at top of stairs		

Photo



Sample Number:	Sample Location Description:	Analytical Results:
SVF01-01	Second level main bathroom at door	None Detected
SFV01-02	Second level main bathroom near sink	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

REI LAB **Reservoirs Environmental, Inc.**

September 23, 2019

Subcontract Number: **NA**
Laboratory Report: **RES 445431-1**
Project # / P.O. # **19096.001.001**
Project Description: **USCG Michigan, Life Boat Dwelling Station**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 445431-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,



Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Life Boat Dwelling Station**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
FTC01-01	A	Black mastic	6	**Chrysotile**	**7**	0	93
	B	Gray/multi-colored tile	94	**Chrysotile**	**5**	0	95
FTC01-02	A	Black mastic	4	**Chrysotile**	**6**	0	94
	B	Tan adhesive	6		**ND**	0	100
	C	Gray/multi-colored tile	90	**Chrysotile**	**5**	0	95
SVF01-01	A	Tan adhesive	12		**ND**	0	100
	B	Beige/gray sheet vinyl w/ gray fibrous backing material	88		**ND**	20	80
SVF01-02	A	Tan adhesive	17		**ND**	0	100
	B	Beige/gray sheet vinyl w/ gray fibrous backing material	83		**ND**	25	75
PL01-01	A	White plaster w/ brown/multi-colored paint	35		**ND**	0	100
	B	Gray granular plaster	65		**ND**	2	98
PL01-02	A	Gray granular plaster w/ white/multi-colored paint	100		**ND**	2	98
PL01-03	A	Gray granular plaster	30		**ND**	4	96
	B	Off white plaster w/ gray/multi-colored paint	70		**ND**	TR	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Life Boat Dwelling Station**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
PL01-04	A	Gray granular plaster	30		**ND**	2	98
	B	Gray/multi-colored paint	35		**ND**	0	100
	C	Off white compound	35	**Chrysotile**	**3**	0	97
PL01-05	A	White plaster	35		**ND**	0	100
	B	Gray granular plaster	65		**ND**	2	98
CDW01-01	A	White compound w/ white paint	20		**ND**	0	100
	B	Gray/tan drywall	80		**ND**	25	75
CDW01-02	A	Gray/multi-colored paint	7		**ND**	0	100
	B	Off white compound	13	**Chrysotile**	**4**	0	96
	C	Gray/tan drywall	80		**ND**	20	80
CT01-01	A	Tan/white ceiling tile	100		**ND**	80	20
CT01-02	A	Tan/white ceiling tile	100		**ND**	80	20
BF01-01	A	White/multi-colored paint w/ gray block filler	10		**ND**	0	100
	B	Gray granular cementitious material	90		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Life Boat Dwelling Station**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
BF01-02	A	Gray block filler w/ gray/yellow paint	10		**ND**	0	100
	B	Colorless resinous material w/ white paint	15		**ND**	0	100
	C	Gray granular cementitious material w/ gray/yellow paint	75		**ND**	0	100
BF01-03	A	Colorless adhesive w/ white paint	10		**ND**	0	100
	B	Gray block filler w/ gray/yellow paint	25		**ND**	0	100
	C	Gray granular cementitious material	65		**ND**	0	100
FP01-01	A	Brown insulation	100		**ND**	95	5
FP01-02	A	Brown insulation	100		**ND**	95	5
PF01-01	A	Gray insulation	100	**Chrysotile**	**20**	10	70
PF01-02		Not Analyzed per Client Request.					
PF01-03		Not Analyzed per Client Request.					
FB-01	A	White compound w/ white paint	5		**ND**	0	100
	B	Tan fiberboard	95		**ND**	95	5

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445431-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Life Boat Dwelling Station**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
FB-02	A	White compound w/ white paint	8		**ND**	0	100
	B	Tan fiberboard	92		**ND**	95	5

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Andrew Roberts
Analyst / Data QA

RES 445431

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 2

Pager : 303-509-2098

INVOICE TO: (IF DIFFERENT)		CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address: iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com	
Project Description/Location: USCG Michigan, Life Boat Dwelling Station			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) X PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust	___ RUSH ___ 24 hr. ___3-5 Day	**Prior notification is required for RUSH turnarounds.**
RCRA 8 / Metals & Welding Fume Scan / TCLP	___ RUSH ___ 5 day ___10 day	
Organics	___ 24 hr. ___ 3 day ___5 Day	

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus	___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M	___ 48 Hr. ___3-5 Day
Mold	___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

REQUESTED ANALYSIS

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s)	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1 FTC01-01	X																				
2 -02																					
3 SVF01-01																					
4 -02																					
5 PL01-01																					
6 -02																					
7 -03																					
8 -04																					
9 -05																					
10 CDW01-01																					

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

Number of samples received: 23 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: _____ Date/Time: 9/20/19 1140 Carrier: hand

Sample Condition: On Ice Yes / No | Sealed Yes / No | Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials
	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials

Reservoirs Environmental, Inc.

RES Job # 445431 Page 2 of 2

Submitted by: Landmark Environmental, Inc

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/- or Quantification	OTHER -	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
11 CDW01-02	X																				
12 CT01-01	↓																				
13 -02	↓																				
14 BF01-01	↓																				
15 -02	↓																				
16 -03	↓																				
17 FP01-01	↓																				
18 -02	↓																				
19 PF01-01	↓																				
20 -02	↓																				
21 -03	↓																				
22 FB-01	↓																				
23 -02	↓																				
24	↓																				
25	↓																				
26	↓																				
27	↓																				
28	↓																				
29	↓																				
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35	↓																				
36	↓																				
37	↓																				
38	↓																				
39	↓																				
40	↓																				
41	↓																				

> progressive

REQUESTED ANALYSIS

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

7-2011_version 1

Lead-Paint Inspection Form

Client: Mundus Bishop - Lifeboat Dwelling Station HS-18						Date: 9/18/19		
Project No. 19096.001.001						Inspector: G. Estes		
Sample No.	Location	Component	Substrate	Feature	Condition	Color	Result	Screen Result
1	Interior Basement	Plaster Wall	Plaster	Wall	Good	White	0.21%	LCP
2	Interior Basement	Gray|Red Paint	Concrete	Floor	Poor	Gray|Red	0.19%	LCP
3	Interior Basement	Green Wall Paint	Concrete	Wall	Good	Green	0.01%	LCP
4	First Interior Level	Beige Paint Wall	Drywall Plaster	wall	good	Beige	BRL	NL
5	Second Interior Level	White Wall Paint	Wood Windows	Walls	Good	White	BRL	NL
6	Exterior	White Siding	Wood	Wall	Good	White	BRL	NL
7	Exterior	Concrete Foundation	Concrete	Foundation	Good	Gray	0.22%	LCP
8	Exterior	Drip Line	Soil	Chips|Soil	Poor	White	5180 (mg/kg)	E

Notes:

BRL - Below Reporting Limit

NL - Not Lead Containing

LBP - Lead Based Paint

LCP - Lead Containing Paint

E - Exceeds Regulatory Critera

LANDMARK ENVIRONMENTAL INC.

REI LAB **Reservoirs Environmental, Inc.**

September 23, 2019

Subcontractor Number:
Laboratory Report: **RES 445432-1**
Project #/P.O. #: **19096.001.001**
Project Description: **USCG Michigan, Life Boat Dwelling Station**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Greg,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the American Industrial Hygiene Association, Lab ID 101533 - Accreditation Certificate #480. The laboratory is currently proficient in both IHPAT & ELPAT programs respectively.

Reservoirs has analyzed the following sample(s) using Atomic Absorption Spectroscopy (AAS) / Atomic Emission Spectroscopy - Mass Spectrometry (ICP-MS) per your request. Reported sample results were not blank corrected. The analysis has been completed in general accordance with the appropriate methodology as stated in the analysis table. Results have been sent to your office.

RES 445432-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

David E. Monagle

For Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: I ANALYSIS: LEAD IN SOIL

RES Job Number:	**RES 445432-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Officer in Charge Dwelling Station**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (mg/kg)	LEAD CONCENTRATION (mg/kg)
LBP-08	5.2	5180

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: II ANALYSIS: LEAD IN PAINT

RES Job Number:	**RES 445432-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Officer in Charge Dwelling Station**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (%)	LEAD CONCENTRATION (%)
LBP-01	0.0044	0.21
LBP-02	0.0030	0.19
LBP-03	0.0036	0.014
LBP-04	0.0029	BRL
LBP-05	0.0051	BRL
LBP-06	0.0030	BRL
LBP-07	0.0030	0.22

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RES 445432

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 1

Pager : 303-509-2098

INVOICE TO: (IF DIFFERENT)		CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address:	iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com
Project Description/Location: USCG Michigan, Life Boat Dwelling Station			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) ___ PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust ___ RUSH ___ 24 hr. X 3-5 Day
RCRA 8 / Metals & Welding Fume Scan / TCLP ___ RUSH ___ 5 day ___10 day
Organics ___ 24 hr. ___ 3 day ___5 Day

Prior notification is required for RUSH turnarounds.

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus ___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M ___ 48 Hr. ___3-5 Day
Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

REQUESTED ANALYSIS

PLM - Short report, Long report, Point
TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-
PCM - 7400A, 7400B, OSHA
DUST - Total, Respirable
METALS - Analyte(s) PB
ORGANICS - METH
MICROBIOLOGY: Salmonella: +/-; E.coli O157:H7: +/-; Listeria: +/-; Aerobic Plate Count: +/- or Quantification; E.coli: +/- or Quantification; Coliforms: +/- or Quantification; S.aureus: +/- or Quantification; Y & M: +/- or Quantification; Mold: +/-, Identification, Quantification
SAMPLER'S INITIALS OR OTHER NOTES

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

	Client sample ID number (Sample ID's must be unique)	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1	LBP-01						
2	-02						
3	-03						
4	-04						
5	-05						
6	-06						
7	-07						
8	-08						
9							
10							

Number of samples received: 8 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-18 Date/Time: 11:40 AM

Laboratory Use Only
Received By: [signature] Date/Time: 92019 1140 Carrier: hand

Sample Condition: On Ice Yes / No Sealed Yes / No Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Regulated Building Material - Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 HS-19 Officer in Charge Dwelling Station	Date: 09/18/2019 Inspector(s): G Estes

Area	Material	Material Location	Quantity (Each)	Potential Constituent of Concern
Basement	Fluorescent Tubes	C	8	Mercury
Basement	Light Ballasts	C	4	PCBs
Basement	Compact Fluorescent Tubes	C	3	Mercury
First Level	Fluorescent Tubes	C	2	Mercury
First Level	Light Ballasts	C	2	PCBs
First Level	Compact Fluorescent Tubes	C	6	Mercury
First Level	Refrigerators	W	2	CFC
Second Level	CFL	C & W	13	Mercury

F=Floor, C=Ceiling, W=Wall, O=Other

LANDMARK ENVIRONMENTAL INC.

Appendix C

HS-20: HARBOR REFUGE DWELLING

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Harbor Refuge Dwelling HS-20	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Drywall System			
Material Code:	**Material Sequence:**	**Size:**	
CDW	01		
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Drywall and Joint Compound		
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
3500 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	#5	
Material Notes:			
Drywall throughout.			

Sample Number:	Sample Location Description:	Analytical Results:
Not Sampled		ACM
30495B-2-B1	Historical Result – Bedroom	Joint Compound – 2.2% Chrysotile (PC)
30495S-4-C1	Historical Result – Storage	Joint Compound – 2.1% Chrysotile (PC)

Homogeneous Material Description:			Photo
White flue packing material			
Material Code:	**Material Sequence:**	**Size:**	
FP	01		
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Fibrous	Brick	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	#5	
Material Notes:			
Located on South wall basement.			
Identified as ACM previous report.			

Sample Number:	Sample Location Description:	Analytical Results:
Not Sampled		ACM
30495A-1-G1	Historical Result – Basement – Gray pipe packing	1.8% Chrysotile - PC

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Harbor Refuge Dwelling HS-20	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
12” x 12” white floor tile with green and brown specs			
Material Code:	**Material Sequence:**	**Size:**	
FT	01	12” X 12”	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Green and brown specs	Tan adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
10 SF	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located in first floor restroom			

Sample Number:	Sample Location Description:	Analytical Results:
FT01-01	First level at entryway to bathroom	None Detected
30495S-4-E1	Historical Result - Storage	None Detected

Homogeneous Material Description:			Photo
12” X 12” Beige floor tile with brown and white streaks			
Material Code:	**Material Sequence:**	**Size:**	
FT	02	12” X 12”	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Brown and white streaks	Tan adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
30 SF	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on main level at South entry			

Sample Number:	Sample Location Description:	Analytical Results:
FT02-01	First level at South entry	None Detected
30495S-5-F1	Historical Result – Storage	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Harbor Refuge Dwelling HS-20	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Gray plaster with white skim coat			
Material Code:	**Material Sequence:**	**Size:**	
PL	01	½" thick	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Gray/White	Smooth	Wood	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
3,500 SF	S	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on walls and ceilings throughout (Under CDW01 in many locations)			

Sample Number:	Sample Location Description:	Analytical Results:
PL01-01	First level behind door North wall	None Detected
PL01-02	Second level Southwest bedroom closet	None Detected
30495T-1-A1	Historical Result – Stairwell Basement	None Detected
30495T-1-A2	Historical Result – Stairwell Basement	None Detected
30495T-1-A3	Historical Result – Stairwell Basement	None Detected

Homogeneous Material Description:			Photo
Light brown stair tread			
Material Code:	**Material Sequence:**	**Size:**	
ST	01	1'X 3'	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Light Brown		Tan adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
15 SF	M	Type II Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on stairs leading to second floor			

Sample Number:	Sample Location Description:	Analytical Results:
ST01-01	First level bottom stair	None Detected
30495T-3-D1	Historical Result – Stairwell 1st floor	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

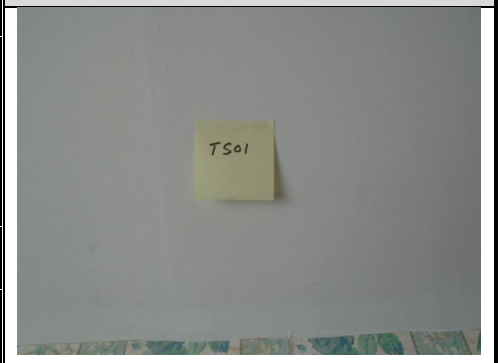
Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Harbor Refuge Dwelling HS-20	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Brown stair tread			
Material Code:	**Material Sequence:**	**Size:**	
ST	02	1' X 2'	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Brown			
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
12 SF	M	Type II Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on stairs to basement			

Sample Number:	Sample Location Description:	Analytical Results:
ST02-01	Basement top stair	None Detected
30495T-1-H1	Historical Result – Stairwell basement	None Detected

Homogeneous Material Description:			Photo
Light texture on drywall			
Material Code:	**Material Sequence:**	**Size:**	
TS	01		
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Light sand texture	Drywall/Plaster	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
750 SF	S	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Fair	Low	NA	
Material Notes:			
Located on second floor Southwest bedroom and closet			
Located in storage			

Sample Number:	Sample Location Description:	Analytical Results:
TS01-01	Second level ceiling Southwest room closet ceiling	None Detected
TS01-02	Second level ceiling Southwest room East side	None Detected
TS01-03	Second level ceiling Southwest room West side	None Detected
30495S-6-I1	Historical Results – Storage	None Detected
30495S-6-I2	Historical Results – Storage	None Detected
30495S-6-I3	Historical Results – Storage	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Harbor Refuge Dwelling HS-20	Date: 9-19-2019
		Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White window caulking			
Material Code:	**Material Sequence:**	**Size:**	
WC	01	¼’ bead	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Smooth pliable	Wood/brick	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
19 EA	M	Type II Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	NA	
Material Notes:			
Located on window frames			

Sample Number:	Sample Location Description:	Analytical Results:
WC01-01	Southeast window front porch first level	4% Chrysotile
WC01-02	Northwest window first level	None Detected
30495-Ext-J1	Historical Result – Exterior Window	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Reservoirs Environmental, Inc.

September 23, 2019

Subcontract Number:	**NA**
Laboratory Report:	**RES 445433-1**
Project # / P.O. #	**19096.001.001**
Project Description:	**USCG Michigan, Harbor Refuge Dwelling**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 445433-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Lierra Coburn for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445433-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Harbor Refuge Dwelling**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
FT01-01	A	Tan adhesive	10		**ND**	0	100
	B	White/multi-colored tile	90		**ND**	0	100
FT02-01	A	Gray granular plaster	45		**ND**	0	100
	B	White plaster	55		**ND**	0	100
PL01-01	A	White plaster w/ brown/multi-colored paint	50		**ND**	0	100
	B	Gray granular plaster	50		**ND**	0	100
PL01-02	A	White plaster w/ brown/multi-colored paint	40		**ND**	0	100
	B	Gray granular plaster	60		**ND**	0	100
TS01-01	A	White plaster w/ white/multi-colored paint	100		**ND**	0	100
TS01-02	A	Tan fibrous material w/ white granular paint	100		**ND**	60	40
TS01-03	A	Tan/white drywall w/ white granular paint	100		**ND**	60	40
ST01-01	A	Brown resinous material w/ tan adhesive	100		**ND**	0	100
ST02-01	A	Black/multi-colored resinous material	100		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445433-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan, Harbor Refuge Dwelling**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
WC01-01	A	White/multi-colored paint	25		**ND**	0	100
	B	Off white glazing	75	**Chrysotile**	**4**	0	96
WC01-02	A	White resinous material w/ white/multi-colored paint	100		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Landon Spells

Landon Spells

Analyst / Data QA

RES 445433

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 2

Pager : 303-509-2098

INVOICE TO: (IF DIFFERENT)		CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address: iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com	
Project Description/Location: USCG Michigan, Harbor Refuge Museum			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) X PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust	___ RUSH ___ 24 hr. ___3-5 Day	**Prior notification is required for RUSH turnarounds.**
RCRA 8 / Metals & Welding Fume Scan / TCLP	___ RUSH ___ 5 day ___10 day	
Organics	___ 24 hr. ___ 3 day ___5 Day	

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus	___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M	___ 48 Hr. ___3-5 Day
Mold	___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

REQUESTED ANALYSIS

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s)	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	E.coli O157:H7: +/-	Listeria: +/-	Aerobic Plate Count: +/- or Quantification	E.coli: +/- or Quantification	Coliforms: +/- or Quantification	S.aureus: +/- or Quantification	Y & M: +/- or Quantification	Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1 FT01-01	X																				
2 FT02-01																					
3 PL01-01																					
4 ↓ -02																					
5 TS01-01																					
6 ↓ -02																					
7 ↓ -03																					
8 ST01-01																					
9 ST02-01																					
10 WC01-01																					

Matrix Codes: Air = A; Bulk = B; Dust = D; Paint = P; Soil = S; Wipe = W; Swab = SW; F = Food; Drinking Water = DW; Waste Water = WW; O = Other
ASTM E1792 approved wipe media only

LAB NOTES:

Number of samples received: 11 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: [signature] Date/Time: 9/20/19 1140 Carrier: hand

Sample Condition: On Ice Yes / No; Sealed Yes / No; Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials
	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials

REI LAB Reservoirs Environmental, Inc.

RES Job # 415433 Page 2 of 2

Submitted by: **Landmark Environmental, Inc**

Client sample ID number (Sample ID's must be unique)		REQUESTED ANALYSIS: PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) _____ RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/- or Quantification	OTHER -	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
11	WC01-02	X																				
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
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38																						
39																						
40																						
41																						

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

Lead-Paint Inspection Form

Client: Mundus Bishop - Harbor Refuge Dwelling HS-20						Date: 9/19/19		
Project No. 19096.001.001						Inspector: G. Estes		
Sample No.	Location	Component	Substrate	Feature	Condition	Color	Result	Screen Result
1	Basement	Paint|Floor	Concrete Floor	Floor	Poor	Red|Gray	0.13%	LCP
2	Basement	Wall	Brick	Wall	Poor	Green|White	0.10%	LCP
3	Basement	Wall|Ceiling	Brick	Storm Shelter	Good	Yellow|Blue	0.06%	LCP
4	Basement	Stairs	Wood	Stairs	Fair	Red|Gray	3.80%	LBP
5	Basement	Plaster Wall	Plaster	Walls	Good	Yellow	0.91%	LBP
6	Exterior	Porch Paint	Wood	Porch	Fair	Gray	0.016%	LCP
7	Exterior	Wood Windows	Wood	Window Casings	Fair	White	0.0091%	LCP
8	Exterior	Drip Line	Soil	Chips|Soil	Poor	White	706 mg/kg	NA

Notes:

BRL - Below Reporting Limit

LANDMARK ENVIRONMENTAL INC.

Reservoirs Environmental, Inc.

September 23, 2019

Subcontractor Number:
Laboratory Report: **RES 445434-1**
Project #/P.O. #: **19096.001.001**
Project Description: **USCG Michigan, Harbor Refuge Dwelling**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Greg,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the American Industrial Hygiene Association, Lab ID 101533 - Accreditation Certificate #480. The laboratory is currently proficient in both IHPAT & ELPAT programs respectively.

Reservoirs has analyzed the following sample(s) using Atomic Absorption Spectroscopy (AAS) / Atomic Emission Spectroscopy - Mass Spectrometry (ICP-MS) per your request. Reported sample results were not blank corrected. The analysis has been completed in general accordance with the appropriate methodology as stated in the analysis table. Results have been sent to your office.

RES 445434-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

David E. Monagle

For Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: I ANALYSIS: LEAD IN SOIL

RES Job Number:	**RES 445434-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Harbor Refuge Dwelling**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (mg/kg)	LEAD CONCENTRATION (mg/kg)
LBP-08	7.8	706

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: II ANALYSIS: LEAD IN PAINT

RES Job Number:	**RES 445434-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Harbor Refuge Dwelling**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (%)	LEAD CONCENTRATION (%)
LBP-01	0.0044	0.13
LBP-02	0.0028	0.10
LBP-03	0.0025	0.063
LBP-04	0.0025	3.8
LBP-05	0.0043	0.91
LBP-06	0.0042	0.016
LBP-07	0.0030	0.0091

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RES 445434

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 1

Pager : 303-509-2098

INVOICE TO: (IF DIFFERENT)		CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address:	iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com
Project Description/Location: USCG Michigan, Harbor Refuge Museum			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) ___ PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust ___ RUSH ___ 24 hr. X 3-5 Day
RCRA 8 / Metals & Welding Fume Scan / TCLP ___ RUSH ___ 5 day ___10 day
Organics ___ 24 hr. ___ 3 day ___5 Day

Prior notification is required for RUSH turnarounds.

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus ___24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M ___ 48 Hr. ___3-5 Day
Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

Client sample ID number (Sample ID's must be unique)	REQUESTED ANALYSIS: PLM - Short report, Long report, Point	TEM - AHERA, Level II, 7402, ISO, +/-, Semi-quant, Micro-Quant,	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) PB	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	E.coli O157:H7: +/-	Listeria: +/-	Aerobic Plate Count: +/- or Quantification	E.coli: +/- or Quantification	Coliforms: +/- or Quantification	S.aureus: +/- or Quantification	Y & M: +/- or Quantification	Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	LAB NOTES: EM Number (Laboratory Use Only)
1 LBP-01					X																	
2 -02																						
3 -03																						
4 -04																						
5 -05																						
6 -06																						
7 -07																						
8 -08																						
9																						
10																						

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

Number of samples received: 8 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: Date/Time: 092019 1140 Carrier: hand

Sample Condition: On Ice Yes / No Sealed Yes / No Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Regulated Building Material Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Harbor Refuge Dwelling HS-20	Date: 09/19/2019 Inspector(s): G Estes

Area	Material	Material Location	Quantity (Each)	Potential Constituent of Concern
Basement	Fluorescent Light Tubes	C	2	Mercury
Basement	Light Ballasts	C	2	PCBs
Basement	Fire Extinguisher	W	2	Fire Extinguisher Chemicals
Basement	Paint	F	10 gallons	Lead or other chemicals
First Level	Compact Fluorescent Tubes	C	1	Mercury
Second Level	Fire Extinguisher	F	1	Fire Extinguisher Chemicals

F=Floor, C=Ceiling, W=Wall, O=Other

LANDMARK ENVIRONMENTAL INC.

Appendix D

EQUIPMENT BUILDING

LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Equipment Building	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Yellow carpet adhesive			
Material Code:	**Material Sequence:**	**Size:**	
CA	01	NA	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Yellow	Trowel applied	Foam carpet pad	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1,200 SF	M	Type II Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	N/A	
Material Notes:			
Located on concrete and wood first and second level			

Sample Number:	Sample Location Description:	Analytical Results:
CA01-01	Second level at top of stairs	None Detected
CA01-02	Main level Northwest office at door	None Detected
CA01-03	Main level Hallway at West entrance	None Detected

Homogeneous Material Description:			Photo
Black 4” cove base with yellow adhesive			
Material Code:	**Material Sequence:**	**Size:**	
CBA	01	4”	
Color:	**Pattern / Texture:**	**Associated Materials:**	
Black	Trowel applied	Yellow adhesive	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
12 LF	M	Type II Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	N/A	
Material Notes:			
Located on walls main level restroom			

Sample Number:	Sample Location Description:	Analytical Results:
CBA01-01	On West wall at entrance to restroom	None Detected
CBA01-02	On East wall Northeast corner	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Equipment Building	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
Metal fire door			
Material Code:	**Material Sequence:**	**Size:**	
FD	01	NA	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Metal	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1 EA	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Low	#7	
Material Notes:			
Fire door assumed ACM 1 ½ hour rated. Located at entrance to South garage			

Sample Number:	Sample Location Description:	Analytical Results:
Not Sampled	Presumed	

Homogeneous Material Description:			Photo
12” X 12” White floor tile with gray and tan specs			
Material Code:	**Material Sequence:**	**Size:**	
FTC	01	12” x 12”	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Gray and tan specs	Black mastic	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
50 SF	M	Type I Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Fair	Moderate	N/A	
Material Notes:			
Located at entry ways main level			

Sample Number:	Sample Location Description:	Analytical Results:
FTC01-01	At doorway to North entrance	Mastic – Chrysotile Trace
FTC01-02	At doorway to West entrance	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

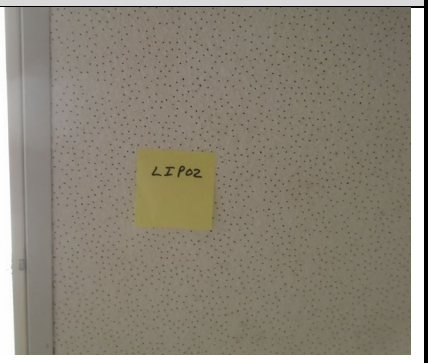
LANDMARK ENVIRONMENTAL INC.

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Equipment Building	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
2' X 4' white lay in panels widthwise fissure and wormhole			
Material Code:	**Material Sequence:**	**Size:**	
LIP	01	2' X 4'	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	NA	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
1,300 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Moderate	N/A	
Material Notes:			
Located on main level hallways and offices and second level conference room			

Sample Number:	Sample Location Description:	Analytical Results:
LIP01-01	Main level North center office middle of room	None Detected
LIP01-02	Main level hallway East end of hallway	None Detected
LIP01-03	Second level center of room	None Detected

Homogeneous Material Description:			Photo
2' X 4' white lay in panels with wormhole			
Material Code:	**Material Sequence:**	**Size:**	
LIP	02	2' X 4'	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	NA	NA	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
100 SF	M	Friable (F)	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Good	Moderate	N/A	
Material Notes:			
Located in restroom main level			

Sample Number:	Sample Location Description:	Analytical Results:
LIP02-01	Main level restroom Center of room	None Detected
LIP02-02	Main level restroom Northeast corner	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

Homogeneous Area Building Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Equipment Building	Date: 9-18-2019 Inspector(s): Greg Estes

Homogeneous Material Description:			Photo
White window glazing			
Material Code:	**Material Sequence:**	**Size:**	
WG	01	NA	
Color:	**Pattern / Texture:**	**Associated Materials:**	
White	Chalky	Windows	
Quantity (SF/LF/EA):	**Material Type:**	**Friability:**	
15 EA	M	Type II Non-Friable	
Condition:	**Disturbance Potential:**	**Assessment Category:**	
Fair	Low	N/A	
Material Notes:			
Located on windows behind storm windows			

Sample Number:	Sample Location Description:	Analytical Results:
WG01-01	Second level conference room second window from North wall	None Detected
WG01-02	Main level Northeast office North window	None Detected

Material Type:
- Surfacing (S)
- Thermal System Insulation (TSI)
- Miscellaneous (M)

Friability:
- Friable (F)
- Type I Non-Friable (I)
- Type II Non-Friable (II)

Condition:
- Good (G)
- Fair (F)
- Poor (P)

Disturbance Potential:
- Low (L)
- Moderate (M)
- High (H)

Assessment Categories:
1. Damaged or significantly damaged TSI ACM
2. Damaged friable surfacing ACM
3. Significantly damaged friable surfacing ACM
4. Damaged or significantly damaged friable miscellaneous ACM
5. ACBM with potential for damage
6. ACBM with potential for significant damage
7. Any remaining friable ACBM of friable suspected ACBM

REI LAB **Reservoirs Environmental, Inc.**

September 23, 2019

Subcontract Number: **NA**
Laboratory Report: **RES 445438-1**
Project # / P.O. # **19096.001.001**
Project Description: **USCG Michigan-Equipment Building**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 445438-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

AnneMarie R. Kieffer for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445438-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan Equipment Building**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
FTC01-01	A	Black mastic	5	**Chrysotile**	**TR**	0	100
	B	Off white/multi-colored tile	95		**ND**	0	100
FTC01-02	A	Black mastic	3		**ND**	0	100
	B	Off white/multi-colored tile	97		**ND**	0	100
CA01-01	A	Off white adhesive	5		**ND**	0	100
	B	Tan adhesive	20		**ND**	0	100
	C	Yellow foam	75		**ND**	0	100
CA01-02	A	Tan adhesive	10		**ND**	0	100
	B	Yellow foam	90		**ND**	0	100
CA01-03	A	Tan adhesive	7		**ND**	0	100
	B	Yellow foam	93		**ND**	0	100
CBA01-01	A	Cream adhesive	3		**ND**	0	100
	B	Black cove base	97		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 445438-1**
Client: **Landmark Environmental, Inc.**
Client Project Number / P.O.: **19096.001.001**
Client Project Description: **USCG Michigan-Equipment Building**
Date Samples Received: **September 20, 2019**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Priority**
Date Samples Analyzed: **September 23, 2019**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
CBA01-02	A	Cream adhesive	5		**ND**	0	100
	B	Black cove base	95		**ND**	0	100
WG01-01	A	Beige/multi-colored glazing w/ green/multi-colored paint	100		**ND**	TR	100
WG01-02	A	Beige/multi-colored glazing w/ green/multi-colored paint	100		**ND**	TR	100
LIP01-01	A	White/light gray ceiling tile	100		**ND**	60	40
LIP01-02	A	White/light gray ceiling tile	100		**ND**	60	40
LIP01-03	A	White/light gray ceiling tile	100		**ND**	60	40
LIP02-01	A	White/light gray ceiling tile	100		**ND**	60	40
LIP02-02	A	White/light gray ceiling tile	100		**ND**	60	40

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Ryan Shilling
Analyst / Data QA

RES 445438

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page 1 of 2

Pager : 303-509-2098

INVOICE TO: (IF DIFFERENT)		CONTACT INFORMATION:	
Company: Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes	Contact:
Address: 7881 Shaffer Parkway	Address:	Phone:	Phone:
Littleton, CO 80127		Fax:	Fax:
		Cell/pager: 970-373-7928	Cell/pager:
Project Number and/or P.O. #: 19096.001.001		Final Data Deliverable Email Address:	iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com
Project Description/Location: USCG Michigan - Enridge			

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) X PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust	___ RUSH ___ 24 hr. ___3-5 Day	**Prior notification is required for RUSH turnarounds.**
RCRA 8 / Metals & Welding Fume Scan / TCLP	___ RUSH ___ 5 day ___10 day	
Organics	___ 24 hr. ___ 3 day ___5 Day	

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus	___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M	___ 48 Hr. ___3-5 Day
Mold	___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s)	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	LAB NOTES: / EM Number (Laboratory Use Only)
1 FTC01-01	X																				
2 ↓ -02																					
3 CA01-01																					
4 ↓ -02																					
5 ↓ -03																					
6 CBA01-01																					
7 ↓ -02																					
8 WC01-01																					
9 ↓ -02																					
10 LIP01-01 14																					

Number of samples received: _____ (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: [signature] 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: [signature] Date/Time: 92019 1140 Carrier: Hand

Sample Condition: On Ice Yes / No | Sealed Yes / No | Intact Yes / No

Temp. (F°) _____

Results:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Reservoirs Environmental, Inc.

RES Job # 445438 Page 2 of 2

Submitted by: **Landmark Environmental, Inc**

Client sample ID number (Sample ID's must be unique)	REQUESTED ANALYSIS: PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	E.coli O157:H7: +/-	Listeria: +/-	Aerobic Plate Count: +/- or Quantification	E.coli: +/- or Quantification	Coliforms: +/- or Quantification	S.aureus: +/- or Quantification	Y & M: +/- or Quantification	Mold: +/- or Quantification	OTHER -	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
11 LIP01-02	X																					
12 ↓ -03	↓																					
13 LIP02-01																						
14 ↓ -02																						
15																						
16																						
17																						
18																						
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38																						
39																						
40																						
41																						

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES:

7-2011 version 1

Lead-Paint Inspection Form

Client: Mundus Bishop - Equipment Building						Date: 9/18/19		
Project No. 19096.001.001						Inspector: G. Estes		
Sample No.	Location	Component	Substrate	Feature	Condition	Color	Result	Screen Result
1	Interior Concrete	Foundation	Concrete	Foundation	Good	Brown|Gray	0.86%	LBP
2	Interior Wood S. Garage Bay	Wall	Wood	Wood on wall	Fair	Gray	0.03%	LCP
3	Interior Wood S. Garage Bay	Wall	Wood	Wood on wall	Good	White	0.61%	LBP
4	Interior wood window	Windows	Wood	On Windows	Good	Brown	0.04%	LCP
5	Exterior	Siding Wood	Wood	Siding & Window	Poor	White	5.60%	LBP
6	Exterior	Drip Line	Soil	Soil	Fair	Brown	<6.0 mg/kg	NA

Notes:

LANDMARK ENVIRONMENTAL INC.

Reservoirs Environmental, Inc.

September 23, 2019

Subcontractor Number:
Laboratory Report: **RES 445437-1 19096.001.001**
Project #/P.O. #: **USCG Michigan, Equipment**
Project Description: **Building**

Greg Estes
Landmark Environmental, Inc.
7881 Shaffer Parkway
Littleton CO 80127

Dear Greg,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the American Industrial Hygiene Association, Lab ID 101533 - Accreditation Certificate #480. The laboratory is currently proficient in both IHPAT & ELPAT programs respectively.

Reservoirs has analyzed the following sample(s) using Atomic Absorption Spectroscopy (AAS) / Atomic Emission Spectroscopy - Mass Spectrometry (ICP-MS) per your request. Reported sample results were not blank corrected. The analysis has been completed in general accordance with the appropriate methodology as stated in the analysis table. Results have been sent to your office.

RES 445437-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

David E. Monagle

For Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: I ANALYSIS: LEAD IN SOIL

RES Job Number:	**RES 445437-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Equipment Building**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (mg/kg)	LEAD CONCENTRATION (mg/kg)
LBP-06	6.0	BRL

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA Certificate of Accreditation #480 LAB ID 101533

TABLE: II ANALYSIS: LEAD IN PAINT

RES Job Number:	**RES 445437-1**
Client:	**Landmark Environmental, Inc.**
Client Project/P.O.:	**19096.001.001**
Client Project Description:	**USCG Michigan, Equipment Building**
Date Samples Received:	**September 20, 2019**
Analysis Type:	**REI CHEMISTRY SOP / USEPA SW846 3050B/7420-M**
Turnaround:	**Standard**
Date Samples Analyzed:	**September 23, 2019**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite
BAS = Below Analytical Sensitivity
BRL = Below Reporting Limit

Client ID Number	Reporting Limit (%)	LEAD CONCENTRATION (%)
LBP-01	0.0034	0.86
LBP-02	0.0040	0.030
LBP-03	0.0038	0.61
LBP-04	0.0037	0.041
LBP-05	0.0030	5.6

* Unless otherwise noted all quality control samples performed within specifications established by the laboratory

David E. Monagle
Analyst/Data QA

RES 445437

Due Date:_____
Due Time:_____

REI LAB Reservoirs Environmental, Inc.

Job #_____
Page ___1___ of ___1___

Pager : 303-509-2098

	INVOICE TO: (IF DIFFERENT)	CONTACT INFORMATION:	
Company:	Landmark Environmental, Inc.	Company: Same	Contact: Greg Estes
Address:	7881 Shaffer Parkway Littleton, CO 80127	Address:	Phone: Fax: Cell/pager: 970-373-7928
Project Number and/or P.O. #:	19096.001.001		Contact: Phone: Fax: Cell/pager:
Project Description/Location:	USCG Michigan, Garage	Final Data Deliverable Email Address:	iduffy@landmarkenviro.c gestes@landmarkenviro.com bhoward@landmarkenviro.com

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM _____ RUSH (Same Day) ___ PRIORITY (Next Day) ___STAND
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust ___ RUSH ___ 24 hr. X 3-5 Day

RCRA 8 / Metals & Welding Fume Scan / TCLP ___ RUSH ___ 5 day ___10 day

Organics ___ 24 hr. ___ 3 day ___5 Day

****Prior notification is required for RUSH turnarounds.****

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus ___ 24 hr. ___2 Day ___3-5 Day

Salmonella, Listeria, E.coli, APC, Y & M ___ 48 Hr. ___3-5 Day

Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

****Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.****

REQUESTED ANALYSIS

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

****ASTM E1792 approved wipe media only****

LAB NOTES:

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) PB	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	MICROBIOLOGY: E.coli O157:H7: +/-	MICROBIOLOGY: Listeria: +/-	MICROBIOLOGY: Aerobic Plate Count: +/- or Quantification	MICROBIOLOGY: E.coli: +/- or Quantification	MICROBIOLOGY: Coliforms: +/- or Quantification	MICROBIOLOGY: S.aureus: +/- or Quantification	MICROBIOLOGY: Y & M: +/- or Quantification	MICROBIOLOGY: Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1 LBP-01					X																
2 -02																					
3 -03																					
4 -04																					
5 -05																					
6 -06																					
7																					
8																					
9																					
10																					

Number of samples received: ___6___ (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Greg Estes 9-20-19 Date/Time: 11:40 AM

Laboratory Use Only
Received By: Howard Howard Date/Time: 92019 1140 Carrier: Hand

Sample Condition: On Ice Yes / No; Sealed Yes / No; Intact Yes / No

Temp. (F°) _____

Results:	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials
	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials

Regulated Building Material Inspection Form

Client: Mundus Bishop	Project: 19096.001.001 Equipment Building	Date: 09/18/2019 Inspector(s): G Estes

Area	Material	Material Location	Quantity	Potential Constituent of Concern
Main Level	Fluorescent Tubes	C	40	Mercury
Main Level	Light Ballasts	C	20	PCBs
Main Level	Fire Extinguisher	W	2	Fire extinguisher chemicals
Main Level	SD	C	1	Smoke Detector
Second Level	Fluorescent Tubes	C	24	Mercury
Second Level	Light Ballasts	C	12	PCBs
Second Level	Fire Extinguisher	W	1	Fire extinguisher chemicals
South Garage Bay	Waste Oil	F	1 gallon	Waste oil
South Garage Bay	Paint	O	1 gallon	Lead and other chemicals

F=Floor, C=Ceiling, W=Wall, O=Other

Appendix E

CERTIFICATIONS

CHC Training
Nationwide Training & Certification Experts

www.chctraining.com
303.412.6360
855.60.CERTIFY

1775 West 55th Avenue
Denver, CO 80221,
United States of America
Colorado State Approval No. 22651

Certificate of Achievement

This certificate is awarded to:

Greg Estes

3329

In recognition of satisfactory completion of the EPA-approved annual asbestos refresher training course under section 206 of the Toxic Substance Control Act (TSCA), Title II entitled:

Building Inspector

Course Date:	July 10, 2019
Expiration Date	July 10, 2020
Course Hours:	4.0

Verify this Credential

Danaya N. Benedetto
CEO & Training Program Manager

Credential License ID:
13344575

CHC Training — Safety, Quality, Compliance, Integrity — Est. 2007 — Accredited Alumni

Frank Hulce
Instructor

CHC Training Certificate No.
R19-0853-AI-CO

Visit our Website

State of Michigan

Department of Labor and Economic Opportunity

Michigan Occupational Safety & Health Administration - Asbestos Program

Asbestos Inspector

Greg S. Estes
3475 Silver Leaf Drive
Loveland, CO 80538



Accreditation Number
A48980

Expiration Date
09/04/2020

DOB: **06/07/1963**

This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.

Accreditation card is not valid if altered

143066

Appendix E - Director's Order 58 Historic Property Assessment Matrix

PIRO HSR
Officer in Charge Dwelling (HS-19)
May 2020

HISTORIC PROPERTY ASSESSMENT MATRIX

Not all NPS properties may require the same level of fire protection. Use this chart to help establish criteria for selecting different levels of protection appropriate to the significance and integrity of historic structures or collections. This chart serves as a reference guide only; it does not establish design criteria for historic structures or collection facilities. **Note:** Determining the proper fire protection for each specific application should be a collaboration between the resource manager and the Regional AHJ (process team). Depending on the complexity of the resource, the services of a fire protection engineer may be required by the process team. All final plans must be reviewed and approved by the Regional AHJ.

HOW TO USE THIS MATRIX

Rate each historic structure or other collections facility according to the 7 elements above, using a score of 1-5 (levels 1-5).

For a total score of:	**Scoring Recommendations**	
1 – 14	Fire alarm system should be considered; however, Fire Suppression System May Not Be Needed for this Structure *(variance request would be required if no system installed).*	
15 – 21	Fire alarm system required; Park may Want to Install a Fire Suppression System in this Structure *(variance request would be required if no system installed).*	
22 – 28	Fire alarm system required; Park should Install a Fire Suppression System in this Structure *(variance request would be required if no system installed).*	
29 – 35	Fire alarm system required; Suppression System Required *(variance request would be required if no system installed).*	

PIRO HSR
Officer in Charge Dwelling (HS-19)
May 2020

HISTORIC PROPERTY ASSESSMENT MATRIX

	LEVEL 5 (Five Points)	LEVEL 4 (Four Points)	LEVEL 3 (Three Points)	LEVEL 2 (Two Points)	LEVEL 1 (One Point)
1. Significance	National Register Eligible or part of park's enabling legislation	Nationally Significant	Regionally Significant and/or a primary park theme	Locally Significant	Common; little or no local significance, associative, design, construction, or information value.
2. Integrity	Good	Fair	Poor	Reconstruction	Little remaining historic fabric
3. Use	Exhibit Building open to the public: Self-guided tours only; may include assembly, overnight accommodation, cooking facility	Open to the public: Staff-guided tours only; controlled access; storage	Mixed Use: Public access and offices, retail, and/or storage	NPS or partner offices	Storage only
4. Location: Response	No brigade response available. No road access; developed utility service w/ topo. Access difficulties. High visitation; large crowds may impede responders.	Brigade response > 30 minutes. Rural road; reasonable topo. Access without developed utility services. Seasonal road access difficulties	Rural road access with developed utility services	Brigade response < 20 minutes. Urban access with minor vegetative or physical constraints	Brigade response <10 minute. Urban access, no vegetative or physical constraints
5. Location: Accessibility	High crime area: Perimeter easily accessible after-hours	High crime area: Perimeter not easily accessible after-hours	Low crime area: Perimeter easily accessible	Low crime area: not easily accessible	Low crime area: Secured Perimeter 24/7 or difficult to access
6. Construction Type (See *International Building Code (IBC)*, for additional information)	Type V: Wood Frame (Light Combustible Construction)	Type IV: Heavy Timber (Heavy Combustible Construction)	Type III: Masonry walls, wood floors (partial Combustible Construction)	Type II: Non-combustible (Non-combustible Construction)	Type I: Fire Resistive (Non-combustible Construction).
7. Fuel Load: Proximity	High: Adjacent, attached buildings not in owned by NPS; Forest/ grasslands in fire-prone area	High: Adjacent, attached buildings owned by NPS; OR Forest/grasslands in fire-prone area	High: Adjacent, attached buildings not in owned by NPS, OR Forest/ grasslands in fire-prone area	Adequate: Defensible space based on historic models	Not prone to fires
SCORE	20	0	3	4	0

TOTAL SCORE = 27

HISTORIC PROPERTY ASSESSMENT MATRIX		
Not all NPS properties may require the same level of fire protection. Use this chart to help establish criteria for selecting different levels of protection appropriate to the significance and integrity of historic structures or collections. This chart serves as a reference guide only; it does not establish design criteria for historic structures or collection facilities. **Note:** Determining the proper fire protection for each specific application should be a collaboration between the resource manager and the Regional AHJ (process team). Depending on the complexity of the resource, the services of a fire protection engineer may be required by the process team. All final plans must be reviewed and approved by the Regional AHJ.		
HOW TO USE THIS MATRIX Rate each historic structure or other collections facility according to the 7 elements above, using a score of 1-5 (levels 1-5).		
For a total score of:	**Scoring Recommendations**	
1 – 14	Fire alarm system should be considered; however, Fire Suppression System May Not Be Needed for this Structure *(variance request would be required if no system installed).*	
15 – 21	Fire alarm system required; Park may Want to Install a Fire Suppression System in this Structure *(variance request would be required if no system installed).*	
22 – 28	Fire alarm system required; Park should Install a Fire Suppression System in this Structure *(variance request would be required if no system installed).*	
29 – 35	Fire alarm system required; Suppression System Required *(variance request would be required if no system installed).*	

PIRO HSR
Harbor of Refuge Dwelling (HS-20)
May 2020

HISTORIC PROPERTY ASSESSMENT MATRIX

	LEVEL 5 (Five Points)	LEVEL 4 (Four Points)	LEVEL 3 (Three Points)	LEVEL 2 (Two Points)	LEVEL 1 (One Point)
1. Significance	National Register Eligible or part of park's enabling legislation	Nationally Significant	Regionally Significant and/or a primary park theme	Locally Significant	Common; little or no local significance, associative, design, construction, or information value.
2. Integrity	Good	Fair	Poor	Reconstruction	Little remaining historic fabric
3. Use	Exhibit Building open to the public: Self-guided tours only; may include assembly, overnight accommodation, cooking facility	Open to the public: Staff-guided tours only; controlled access; storage	Mixed Use: Public access and offices, retail, and/or storage	NPS or partner offices	Storage only
4. Location: Response	No brigade response available. No road access; developed utility service w/ topo. Access difficulties. High visitation; large crowds may impede responders.	Brigade response > 30 minutes. Rural road; reasonable topo. Access without developed utility services. Seasonal road access difficulties	Rural road access with developed utility services	Brigade response < 20 minutes. Urban access with minor vegetative or physical constraints	Brigade response <10 minute. Urban access, no vegetative or physical constraints
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6. Construction Type (See *International Building Code (IBC)*, for additional information)	Type V: Wood Frame (Light Combustible Construction)	Type IV: Heavy Timber (Heavy Combustible Construction)	Type III: Masonry walls, wood floors (partial Combustible Construction)	Type II: Non-combustible (Non-combustible Construction)	Type I: Fire Resistive (Non-combustible Construction).
7. Fuel Load: Proximity	High: Adjacent, attached buildings not in owned by NPS; Forest/ grasslands in fire-prone area	High: Adjacent, attached buildings owned by NPS; OR Forest/grasslands in fire-prone area	High: Adjacent, attached buildings not in owned by NPS, OR Forest/ grasslands in fire-prone area	Adequate: Defensible space based on historic models	Not prone to fires
SCORE	20	0	3	4	0

TOTAL SCORE = 27

HISTORIC PROPERTY ASSESSMENT MATRIX		
Not all NPS properties may require the same level of fire protection. Use this chart to help establish criteria for selecting different levels of protection appropriate to the significance and integrity of historic structures or collections. This chart serves as a reference guide only; it does not establish design criteria for historic structures or collection facilities. **Note:** Determining the proper fire protection for each specific application should be a collaboration between the resource manager and the Regional AHJ (process team). Depending on the complexity of the resource, the services of a fire protection engineer may be required by the process team. All final plans must be reviewed and approved by the Regional AHJ.		
HOW TO USE THIS MATRIX Rate each historic structure or other collections facility according to the 7 elements above, using a score of 1-5 (levels 1-5).		
For a total score of:	**Scoring Recommendations**	
1 – 14	Fire alarm system should be considered; however, Fire Suppression System May Not Be Needed for this Structure *(variance request would be required if no system installed).*	
15 – 21	Fire alarm system required; Park may Want to Install a Fire Suppression System in this Structure *(variance request would be required if no system installed).*	
22 – 28	Fire alarm system required; Park should Install a Fire Suppression System in this Structure *(variance request would be required if no system installed).*	
29 – 35	Fire alarm system required; Suppression System Required *(variance request would be required if no system installed).*	

HISTORIC PROPERTY ASSESSMENT MATRIX					
	LEVEL 5 (Five Points)	**LEVEL 4 (Four Points)**	**LEVEL 3 (Three Points)**	**LEVEL 2 (Two Points)**	**LEVEL 1 (One Point)**
1. Significance	National Register Eligible or part of park's enabling legislation	Nationally Significant	Regionally Significant and/or a primary park theme	Locally Significant	Common; little or no local significance, associative, design, construction, or information value.
2. Integrity	Good	Fair	Poor	Reconstruction	Little remaining historic fabric
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6. Construction Type (See *International Building Code (IBC)*, for additional information)	Type V: Wood Frame (Light Combustible Construction)	Type IV: Heavy Timber (Heavy Combustible Construction)	Type III: Masonry walls, wood floors (partial Combustible Construction)	Type II: Non-combustible (Non-combustible Construction)	Type I: Fire Resistive (Non-combustible Construction).
7. Fuel Load: Proximity	High: Adjacent, attached buildings not in owned by NPS; Forest/ grasslands in fire-prone area	High: Adjacent, attached buildings owned by NPS; OR Forest/grasslands in fire-prone area	High: Adjacent, attached buildings not in owned by NPS, OR Forest/ grasslands in fire-prone area	Adequate: Defensible space based on historic models	Not prone to fires
SCORE	10	5	3	6	0

TOTAL SCORE = 24

Appendix F - Bibliography

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Appendix G - Paint Sample Analysis

BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PICTURED ROCKS NATIONAL LAKESHORE
Lake Superior, Grand Marais, MI



Pictured Rocks cliffs in autumn viewed from the North Country Scenic Trail

Craig Blacklock © photo

CROSS SECTION MICROSCOPY PAINT ANALYSIS REPORT

Prepared for

Anderson Hallas Architects

December 19, 2019

By BUILT ENVIRONMENT EVOLUTION

PO BOX 21433 BOULDER, CO 80308 303.562.5872

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INTRODUCTION

Paint has been used for millennia to beautify and protect the surfaces of structures, both the interiors and exteriors. The mixes, binders, pigments, solvents and techniques have evolved. Knowledge of these changes over time informs the investigation process when analyzing a structure, and when analyzing paint.

COMMON TERMS AND DEFINITIONS

- Oil – binds the pigment together, affects gloss, and dry time. Common oils used in structural coatings include linseed oil, Tung oil, in some areas fish oil, etc.
- Distemper – pigment, casein or animal glue, water.
- Milk Paint – milk (casein binder), lime, pigment.
- Calcimine – pigment, lime, water, animal glue or casein.
- Lime wash, Color wash – water and lime, with pigment added for colors.
- Encaustic – hot wax painting.
- Tempera – water and pigment, egg yolk can be added.
- Turpentine, - originally distilled from the resign of the terebinth or turpentine tree, found in the Mediterranean. Later distilled from various pines.
- Mineral spirits – distilled from petroleum.
- Varnish – Damar Varnish from Dammar gum.
- Metal coatings – such as alkyd enamels, exposure to oxygen polymerizes the binder.
- Modern Paints
    - Latex – water-borne sub-micrometre polymer particles (rubber latex is not a component)
    - Epoxies and Polyurethanes – cures via catalyzed polymerization forming a hard plastic surface
    - Powder coatings – little or no solvent used, applied to a surface that has been treated with an electrostatic application of dry powder and heated.
    - May contain additives – can affect surface tension, improve flow, control skinning, fight bacterial growth, etc.

PERFORMANCE

Paint has been used to protect both interior and exterior surfaces, and to express the style of the time and the tastes of the owner. Using paint as a protective coating can help prevent moisture penetration of the substrate, prevent deterioration of the substrate from Ultra Violet light, and can also prevent scuffs and abrasive damage. It is easy to maintain paint coatings and cheap to use for this purpose. Color has been part of paint from the earliest signs of its use. Used to express the style of the period, paint has been used to decorate for millennia. Often it is used as an indication of important space, a public space, or a sacred space. Expense of the paint treatment is related to the pigments included in the paint, and the techniques employed.

A BRIEF HISTORY OF PAINT

As paint has developed over time, so have the formulas. The search for pigments that have lasting color continues today. Some of the first pigments were earth, clay, and plant products. The Egyptians were the first recorded to use ground glass as pigments. White lead and red lead have been used for over four thousand years. Distant travel to the Far East and the Americas yielded new pigments made from items such as semi-precious gemstones, and beetles. The industrial revolution yielded new colors and pigments, but the most radical changes came during and after WWII as the world embraced chemistry and changed paint formulas and pigments. With the knowledge of paint history, it can be possible to identify the time of the paint application from the pigments used, the binders, and the color.

PAINT ANALYSIS AND USES

Paint Analysis can allow a conservator to understand the original paint scheme, identify newer materials and/or additions to a structure, and the correct identification of the various layers can tell the history and care of the space. Once the paint has been sampled it is viewed through the microscope, the original treatment of the substrate becomes clear. The sampling of the structure is critical to correctly identify the paint scheme. Sampling in areas with the least exposure to causes of deterioration, such as sunlight, the elements, smoke, and abrasions, yields the most intact and informative samples. Knowledge of the style of the period informs the sampling process, instructing the conservator as to where it is most likely to find color changes or decorative painting. Items that

seem out of place can be sampled to see where the paint layers match or diverge. The number of paint layers can indicate an elements approximate age, and show where new materials have been introduced. The layers of paint can also show periods of neglect and deterioration, fading or darkening due to UV or smoke, and it can show a change in what type of paint was used.

PROJECT SPECIFICS AND RESULTS

Twenty-two paint samples were taken from various structures at Pictured Rocks National Lakeshore, by Anderson Hallas Architects. BEE received the samples, and examined them using cross section microscopy at 100x to 300x magnification. The samples showed 1-6 paint layers. The first three layer of paint of each sample were matched to the Munsell color system, if three were intact. Munsell color matching is used in accordance with ASTM standards. Munsell color sheets may be purchased for color matching to the specified paint for the restoration purposes, or BEE can be contacted for additional color matching services.

The samples were taken from the PIRO Officer in Charge Dwelling (Samples 1-3b), PIRO Equipment Building (4-7), PIRO Harbor of Refuge (8-11), PIRO Station Dwelling (12-20). Paint layers appeared to be in good condition with very few exceptions, indicating that each structure was well maintained and in use. Often a low numbers of layers of paint indicate sampling from an area that is a new addition or a remodel, while high numbers of layers can indicate the sample location is original to period of construction. Generally all the structures showed only 2-3 layers of paint, with bright whites that often are related to titanium white pigments vs older lead pigments. Areas that had only a few layers of paint and were older than thirty years of age must have had successful paint removal, such as with mechanical or chemical stripping of the original paints. Additionally, it is possible that an area with low numbers of layers could indicate an original element has been replaced. No areas of decorative paint were found. No signs of extensive deterioration were found. All periods for various paint campaigns show a variety of bright whites and grays, without much variation over time. One interior sample showed more colors, Sample #20, from the Station Dwelling interior.

CHART OF FIRST PAINT LAYERS

SAMPLE #	LOCATION	1ST LAYER (ORIGINAL)	2ND LAYER	3RD	TOTAL # OF LAYERS
1	Officer in Charge Dwelling Exterior Siding`	White N8.75/ 73.4%R	White N8.75/ 73.4%R		**2**
2	Officer in Charge Dwelling Exterior Door	White N8.75/ 73.4%R	Green 5G 3/1		**2**
3a	Officer in Charge Dwelling Roof Rake Trim / Equipment Building	Red 10R 2/6	White N8.75/ 73.4%R	Green 5G 3/1	**3**
3b	Officer in Charge Dwelling Exterior Wood Trim	White N8.75/ 73.4%R	White N8.75/ 73.4%R		**2**
4	Equipment Building Exterior Window Sash	Pale Pink Cream 10YR 9/2	Green 5G 3/1	Light Neutral Gray N7.5/50.7%R	**3**
5	Equipment Building Exterior O.H. Door Jamb	Cream 2.5Y 9/4	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**3**
6	Equipment Building Exterior Wood Window Trim	White N8.75/ 73.4%R			**1**
7	Equipment Building Exterior Wood Shingles	White N8.75/ 73.4%R	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**4**
8	Harbor of Refuge Window Trim, North Elevation	Cream 2.5Y 9/4	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**3**

9	Harbor of Refuge Concrete Water Table	Gray Pea Green 5Y 4/1	Neutral Medium Gray N4.5/15.6%R	Medium Pine Gray 10G 6/1	**4**
10	Harbor of Refuge Porch Column	White N8.75/ 73.4%R	White N8.75/ 73.4%R		**2**
11	Harbor of Refuge Porch Decking	Neutral Medium Gray N4.5/15.6%R	Neutral Medium Gray N4.5/15.6%R		**2**
12	Station Dwelling Front Porch Column	White N8.75/ 73.4%R	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**3**
13	Station Dwelling Exterior Window Trim (Basement, N. Elev)	White N8.75/ 73.4%R	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**3**
14	Station Dwelling Exterior Wood Shingles, West Elevation	White N8.75/ 73.4%R	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**3**
15	Station Dwelling Interior Doors. 3rd Fl Closet	White N8.75/ 73.4%R	White N8.75/ 73.4%R		**2**
16	Station Dwelling Exterior Tower Soffit	Cream 2.5Y 9/4	White N8.75/ 73.4%R	Medium Pine Gray 10G 6/1	**3**
17	Station Dwelling Exterior Tower Rail	Primer Red 10R 4/8	Neutral Light Gray N6/30.0%R	Neutral Almost Black N2.5/4.6%R	**6**
18	Station Dwelling Interior Window Sill - Tower	Cream 2.5Y 9/4	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**3**
19	Station Dwelling Interior Window Trim, 1st Fl	White N8.75/ 73.4%R	White N8.75/ 73.4%R	White N8.75/ 73.4%R	**3**

20	Station Dwelling Interior - Gyp Board, 1st Fl	Warm Light Brown 10YR 8/6	Bright Medium Peach 7.5YR 7/6	Blue Gray 5B 4/1	**6**
21	Station Dwelling Interior Wood Base, 1st Floor	Neutral Medium Gray N4.5/15.6%R	Cream 2.5Y 9/4	White N8.75/ 73.4%R	**3**

GLOSS LEVELS		*Gloss at 60°*	*Sheen at 60°*
High Gloss	Gloss Level 7	85+ units	Min 35 units
Traditional Gloss	Gloss Level 6	70-85 units	Min 35 units
Traditional Semi-gloss	Gloss Level 5	5-70 units	Min 35 units
Satin-like' Finish	Gloss Level 4	25-35 units	Min 35 units
Traditional 'eggshell-like' Finish	Gloss Level 3	10-25 units	10-35 units
Sheen Flat 'velvet-like' Finish	Gloss Level 2	10 units	10-35 units
Traditional Matte Finish - flat	Gloss Level 1	5 units	10 units

Gloss levels recorded on the analysis forms are visual estimates.

BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 1			
Officer in Charge Dwelling			
Exterior Siding`			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	3	
3				
4				
5				
6				
7				
8				

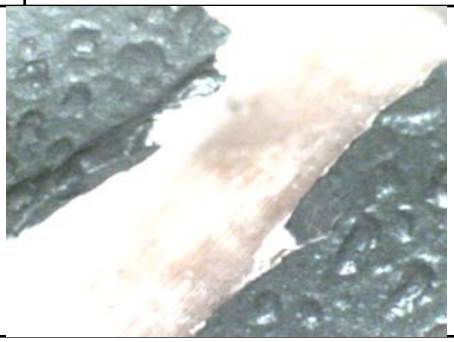


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 2			
Officer in Charge Dwelling			
Exterior Door			
Substrate:	Wood	Top Color:	Green

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	Green	5G 3/1	1	
3				
4				
5				
6				
7				
8				

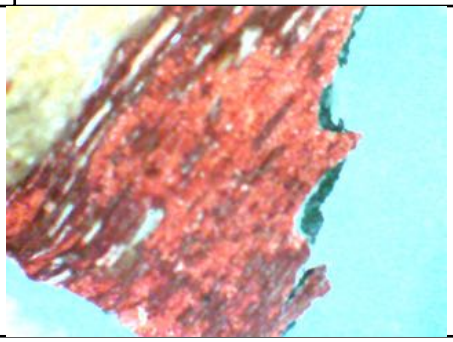


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 3a			
Officer in Charge Dwelling			
Roof Rake Trim / Equipment Building			
Substrate:	Wood	Top Color:	Green

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Red	10R 2/6	4	
2	White	N8.75/ 73.4%R	2	
3	Green	5G 3/1	4	
4				
5				
6				
7				
8				



BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 3b			
Officer in Charge Dwelling			
Exterior Wood Trim			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	4	
3				
4				
5				
6				
7				
8				

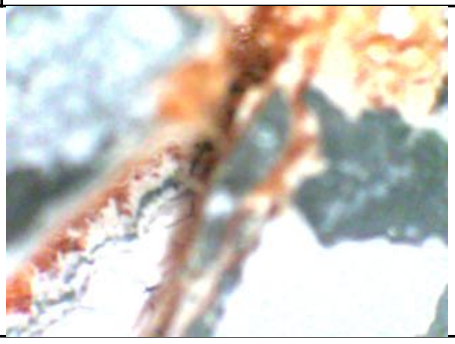


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 4			
Equipment Building			
Exterior Window Sash			
Substrate:	Wood	Top Color:	Gray

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Pale Pink Cream	10YR 9/2	2	
2	Green	5G 3/1	2	Deteriorated
3	Light Neutral Gray	N7.5/50.7%R	1	Deteriorated
4				
5				
6				
7				
8				



BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 5			
Equipment Building			
Exterior O.H. Door Jamb			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Cream	2.5Y 9/4	2	
2	White	N8.75/ 73.4%R	3	
3	White	N8.75/ 73.4%R	4	
4				
5				
6				
7				
8				

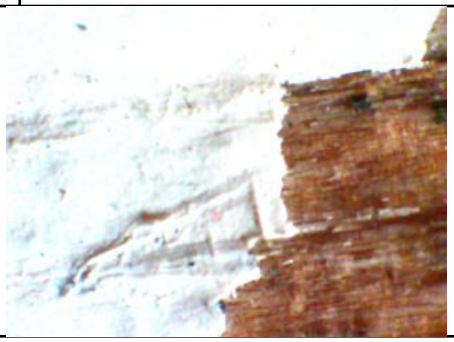


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 6			
Equipment Building			
Exterior Wood Window Trim			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	3	
2				
3				
4				
5				
6				
7				
8				

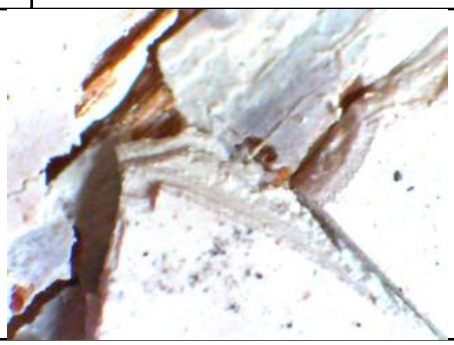


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 7			
Equipment Building			
Exterior Wood Shingles			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	2	
3	White	N8.75/ 73.4%R	2	
4	White	N8.75/ 73.4%R	2	
5				
6				
7				
8				

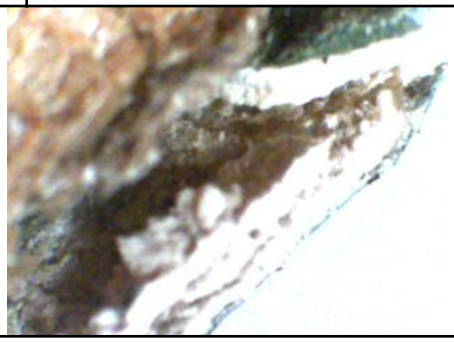


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 8			
Harbor of Refuge			
Window Trim, North Elevation			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Cream	2.5Y 9/4	2	****
2	White	N8.75/ 73.4%R	2	
3	White	N8.75/ 73.4%R	3	
4				
5				
6				
7				
8				



**** Signs of dirt, deterioration and small area of Green, 5G 3/1

BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 9			
Harbor of Refuge			
Concrete Water Table			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Gray Pea Green	5Y 4/1	2	
2	Neutral Medium Gray	N4.5/15.6%R	2	
3	Medium Pine Gray	10G 6/1	2	
4	White	N8.75/ 73.4%R	4	
5				
6				
7				
8				



BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 10			
Harbor of Refuge			
Porch Column			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	2	
3				
4				
5				
6				
7				
8				

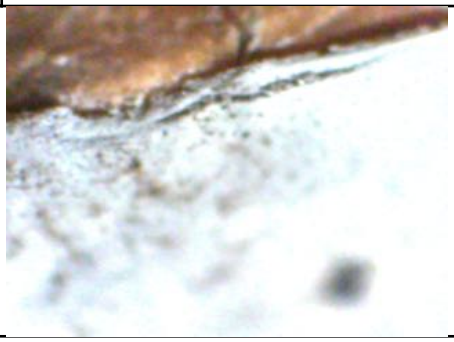


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 11			
Harbor of Refuge			
Porch Decking			
Substrate:	Wood	Top Color:	Gray

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Neutral Medium Gray	N4.5/15.6%R	2	
2	Neutral Medium Gray	N4.5/15.6%R	2	
3				
4				
5				
6				
7				
8				



BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 12			
Station Dwelling			
Front Porch Column			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	2	
3	White	N8.75/ 73.4%R	4	
4				
5				
6				
7				
8				

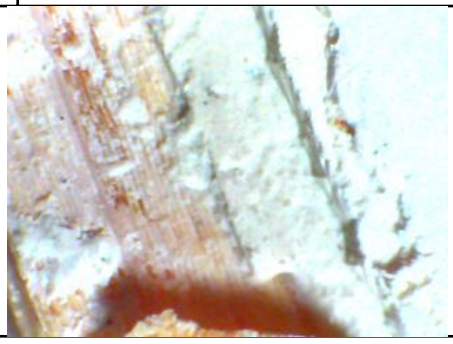


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PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 13			
Station Dwelling			
Exterior Window Trim (Basement, N. Elev)			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	2	
3	White	N8.75/ 73.4%R	4	
4				
5				
6				
7				
8				



BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 14			
Station Dwelling			
Exterior Wood Shingles, West Elevation			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	2	
3	White	N8.75/ 73.4%R	4	
4				
5				
6				
7				
8				

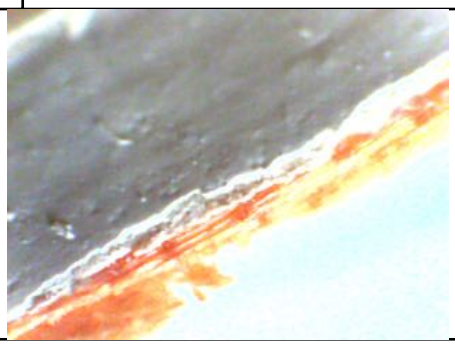


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 15			
Station Dwelling			
Interior Doors. 3rd Fl Closet			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	4	
3				
4				
5				
6				
7				
8				

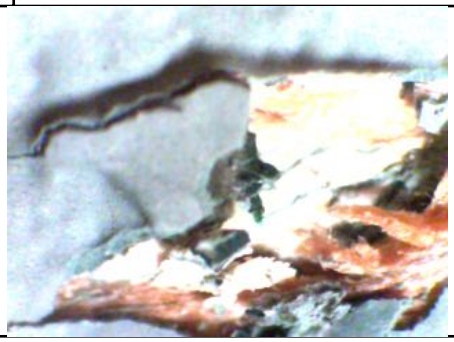


BUILT ENVIRONMENT EVOLUTION
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PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 16			
Station Dwelling			
Exterior Tower Soffit			
Substrate:	Wood	Top Color:	Gray

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Cream	2.5Y 9/4		
2	White	N8.75/ 73.4%R		
3	Medium Pine Gray	10G 6/1		
4				
5				
6				
7				
8				

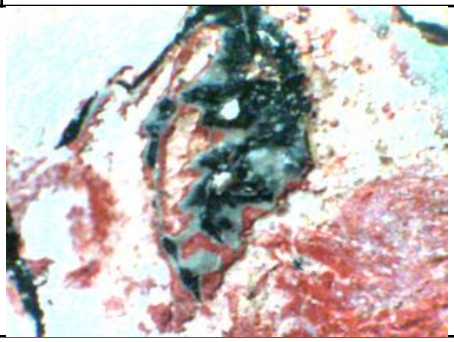


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PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 17			
Station Dwelling			
Exterior Tower Rail			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Primer Red	10R 4/8	2	efflorescence
2	Neutral Light Gray	N6/30.0%R	3	
3	Neutral Almost Black	N2.5/4.6%R	5	
4	Cream			
5	White			
6	Gray			
7				
8				

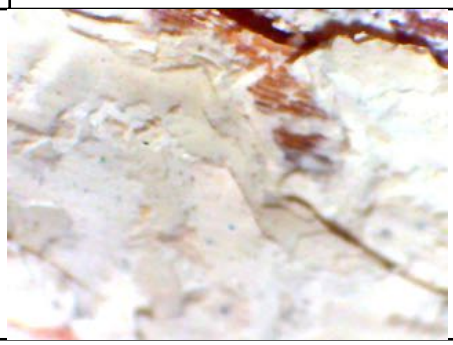


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PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 18			
Station Dwelling			
Interior Window Sill - Tower			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Cream	2.5Y 9/4	2	
2	White	N8.75/ 73.4%R	2	
3	White	N8.75/ 73.4%R	3	
4				
5				
6				
7				
8				

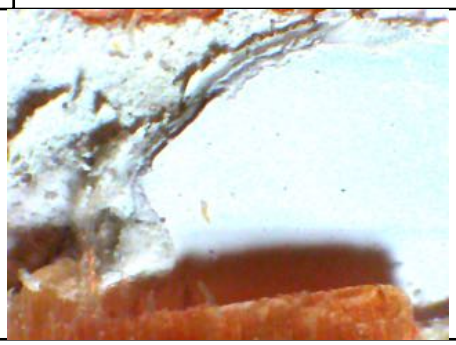


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 19			
Station Dwelling			
Interior Window Trim, 1st Fl			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	White	N8.75/ 73.4%R	2	
2	White	N8.75/ 73.4%R	2	
3	White	N8.75/ 73.4%R	4	
4				
5				
6				
7				
8				

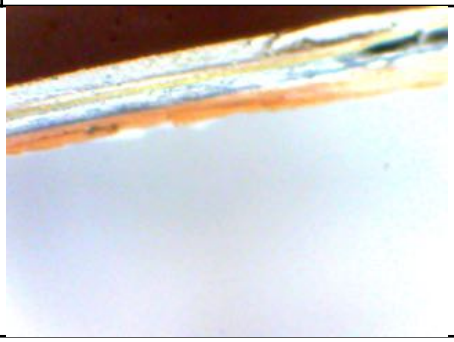


BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 20			
Station Dwelling			
Interior - Gyp Board, 1st Fl			
Substrate:	Plaster	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Warm Light Brown	10YR 8/6		
2	Bright Medium Peach	7.5YR 7/6		
3	Blue Gray	5B 4/1		
4	Pale Yellow			
5	White			
6	White			
7				
8				

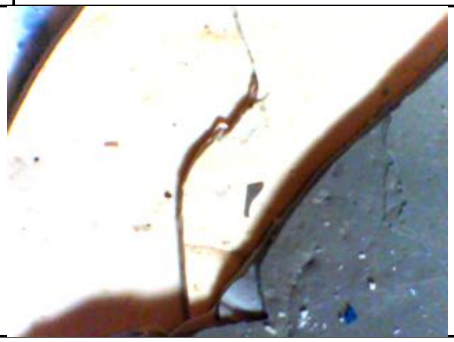


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PAINT ANALYSIS FORM			
Project Name:	PIRO Pictured Rocks National Lakeshore		
Project Location:	Grand Marais, MI		
Sampled by:	Anderson Hallas	Date:	Oct 4
Analyzed by:	BEE	Date:	Dec 1-7, 2019

Sample Description: 21			
Station Dwelling			
Interior Wood Base, 1st Floor			
Substrate:	Wood	Top Color:	White

LAYER #	COLOR DESCRIPTION	MUNSELL #	GLOSS LEVEL	NOTES
1	Neutral Medium Gray	N4.5/15.6%R	3	
2	Cream	2.5Y 9/4	2	
3	White	N8.75/ 73.4%R	2	
4				
5				
6				
7				
8				



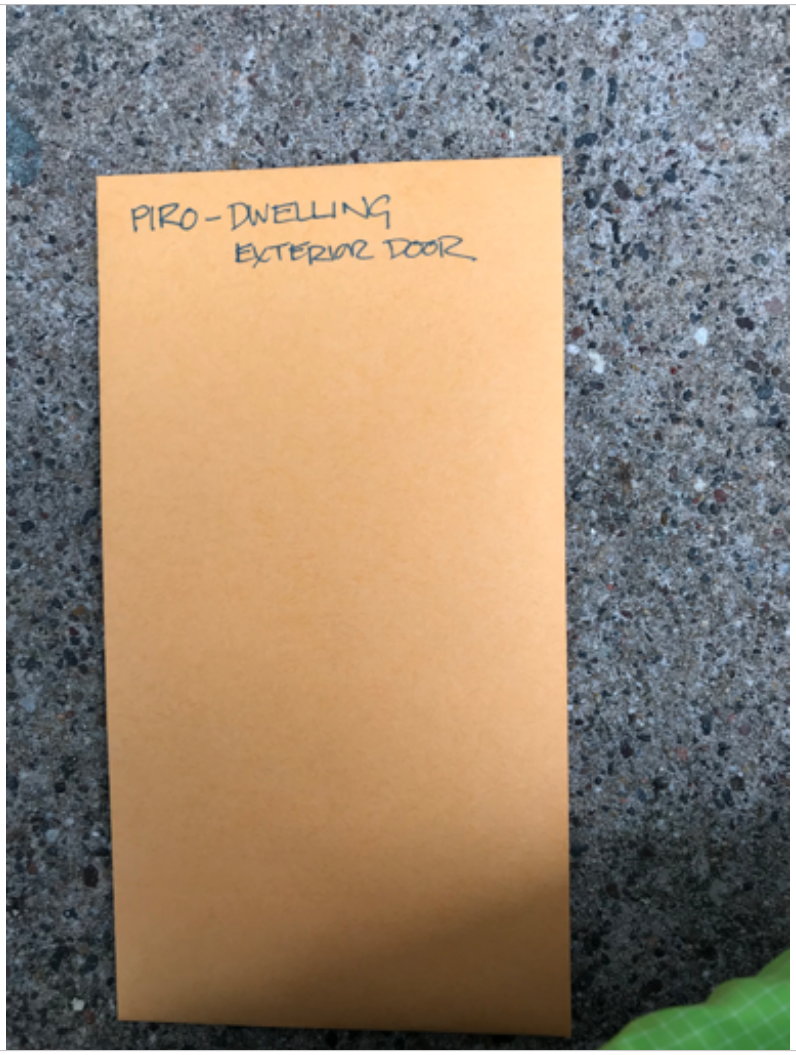


Photo 1: Location of Sample 2. Photo by Anderson Hallas, October 2019



Photo 2: Location of Sample 2. Photo by Anderson Hallas, October 2019



Photo 3: Location of Sample 2. Photo by Anderson Hallas, October 2019

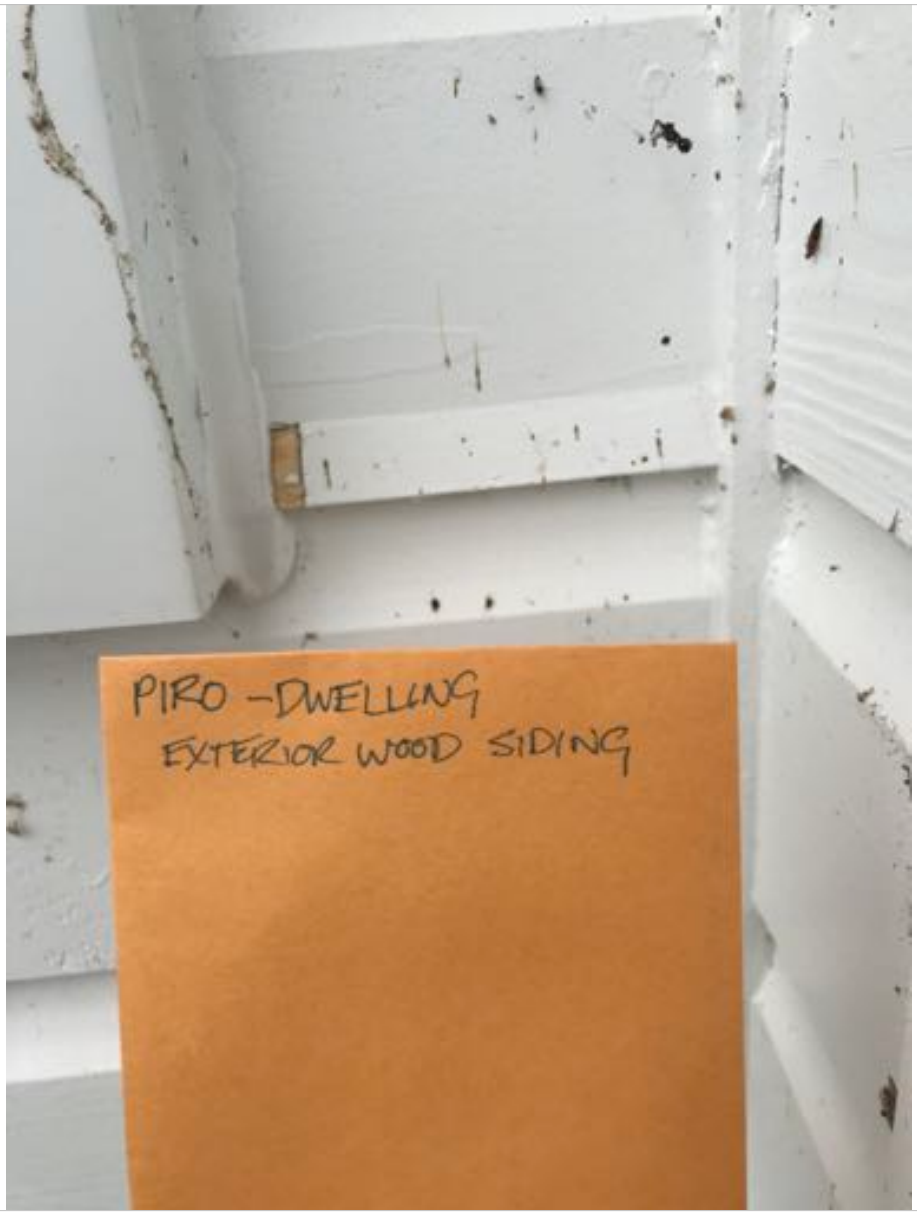


Photo 4: Location of Sample 1. Photo by Anderson Hallas, October 2019



Photo 5: Location of Sample 3b. Photo by Anderson Hallas, October 2019

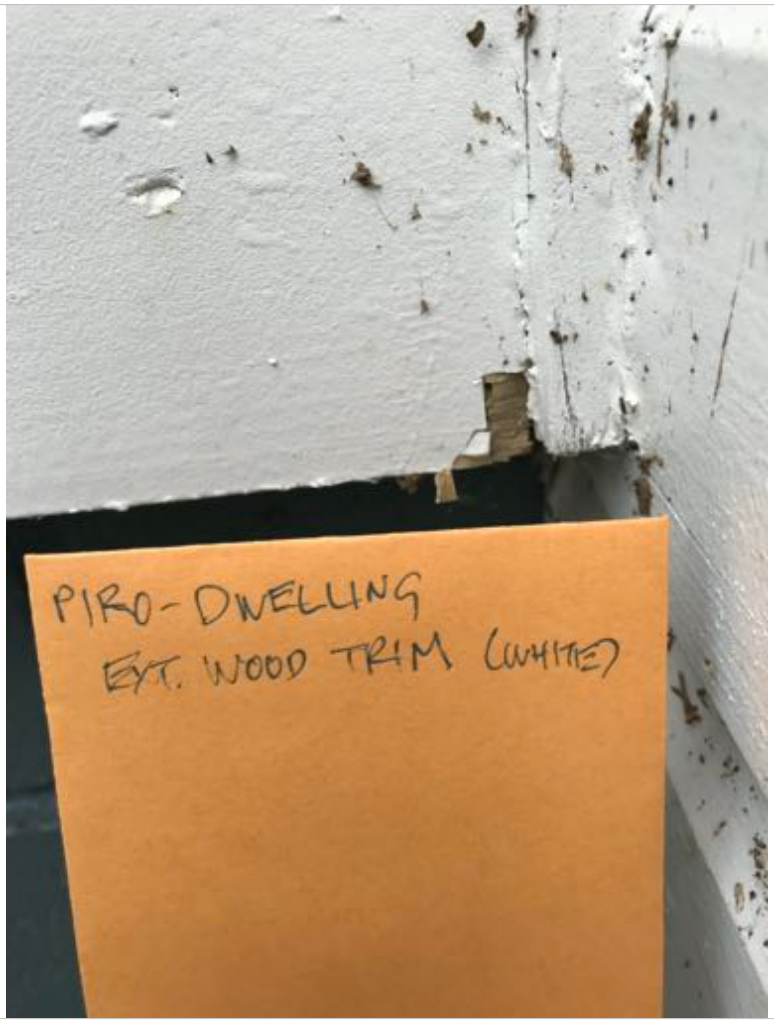


Photo 6: Location of Sample 3b. Photo by Anderson Hallas, October 2019



Photo 7: Location of Sample 1. Photo by Anderson Hallas, October 2019

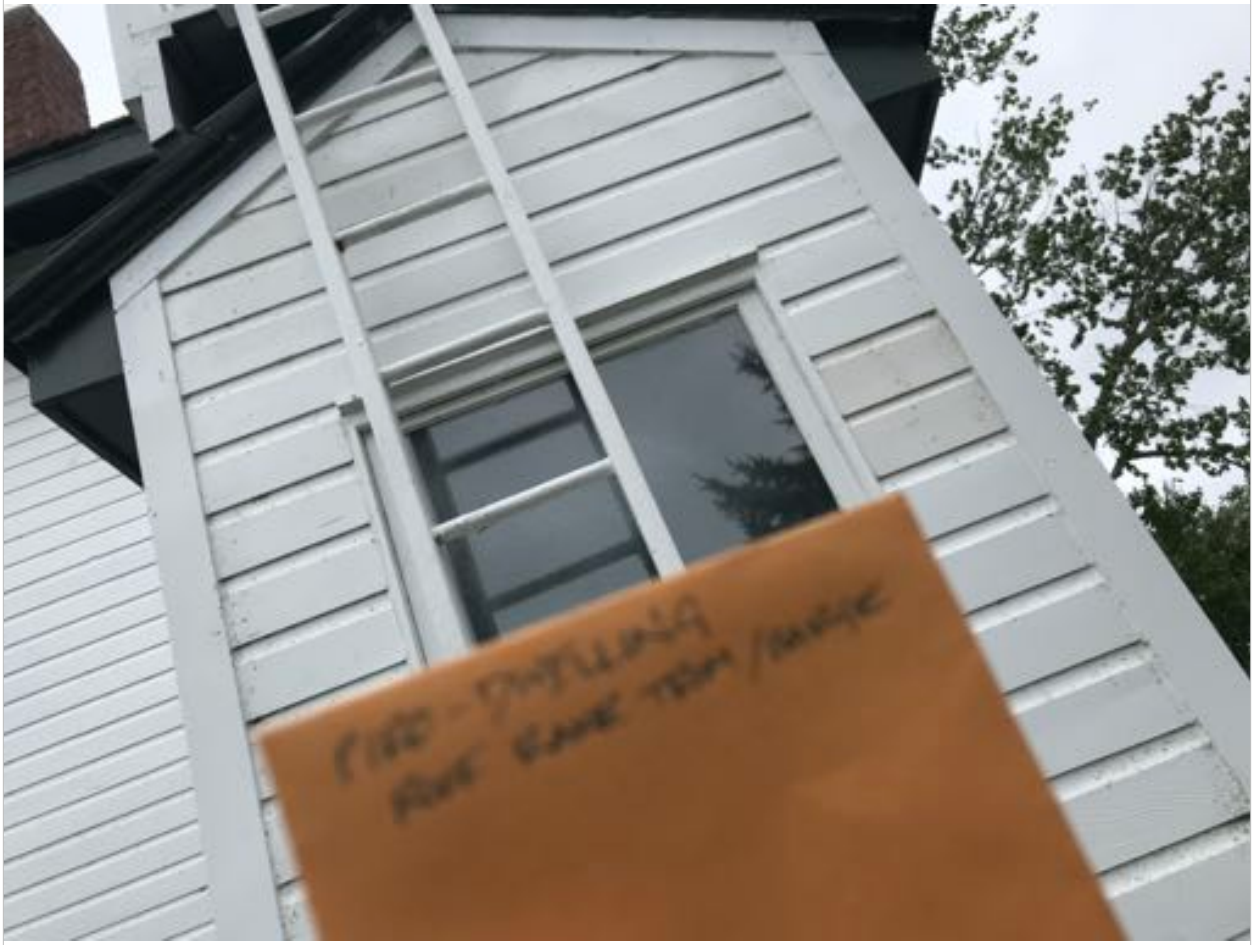


Photo 8: Location of Sample 3a (PIRO Officer in Charge Dwelling, Ext Wood Trim (White). Photo by Anderson Hallas, October 2019



Photo 9: Location of Sample 3a. Photo by Anderson Hallas, October 2019

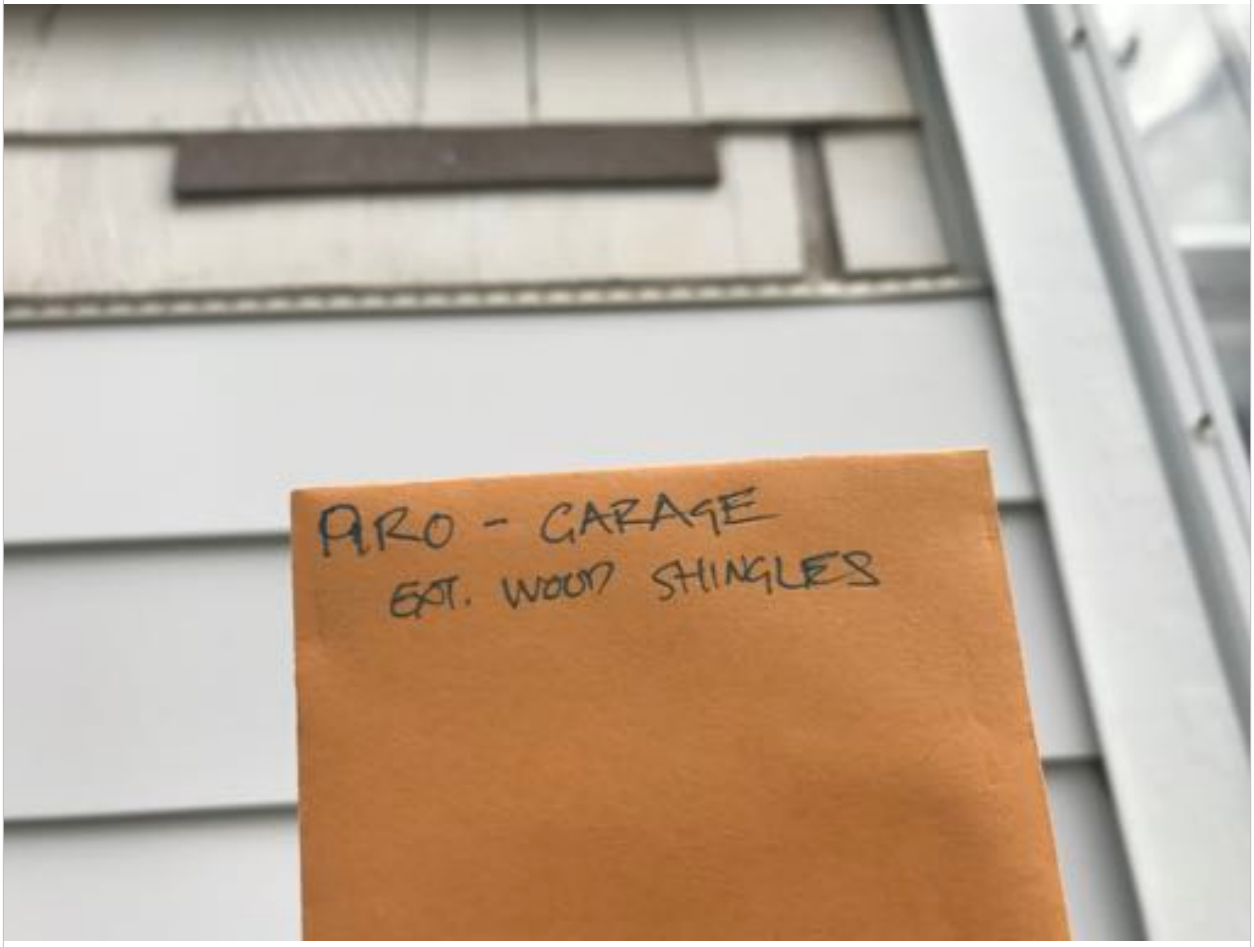


Photo 10: Location of Sample 7. Photo by Anderson Hallas, October 2019

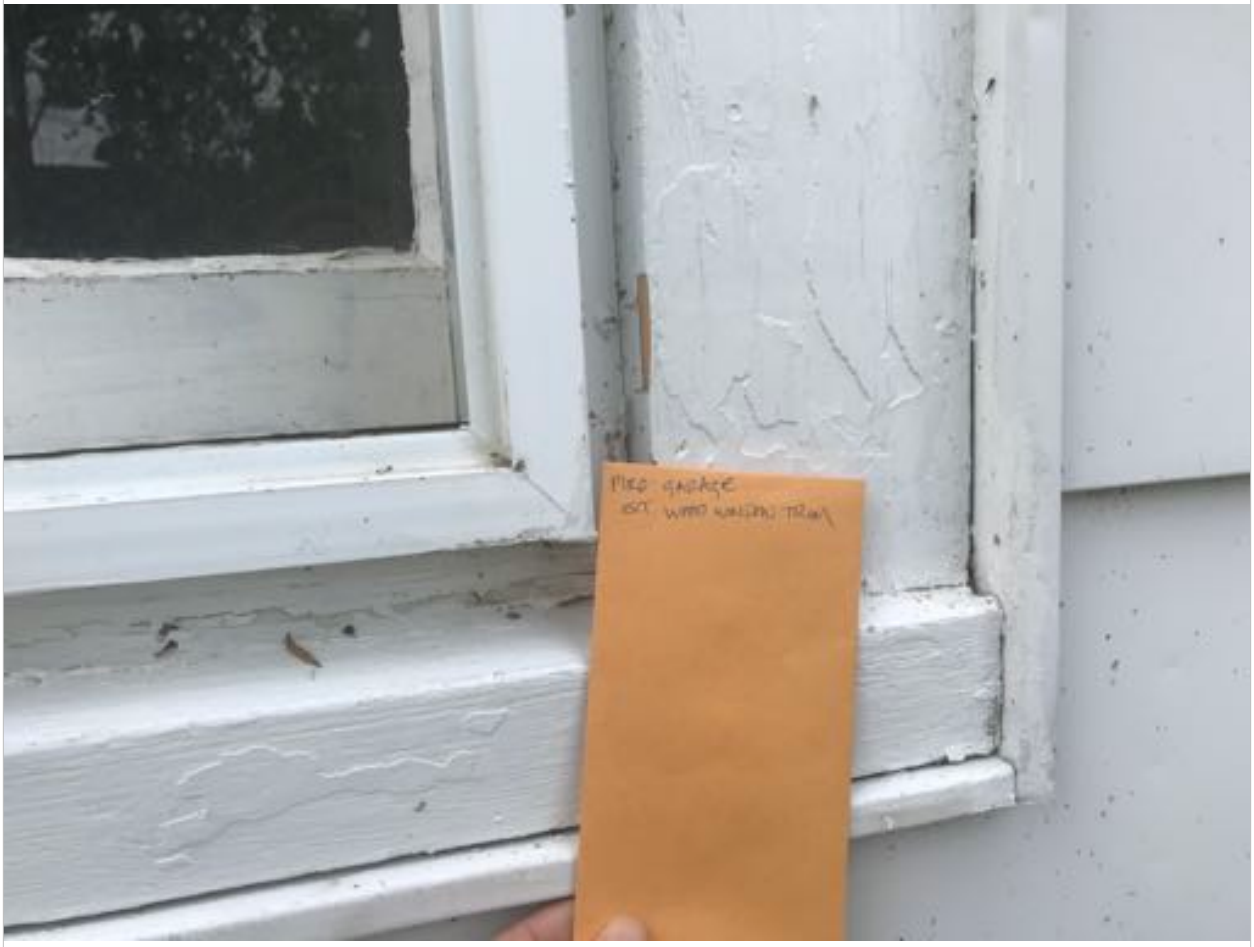


Photo 11: Location of Sample 6. Photo by Anderson Hallas, October 2019



Photo 12: Location of Sample 5. Photo by Anderson Hallas, October 2019

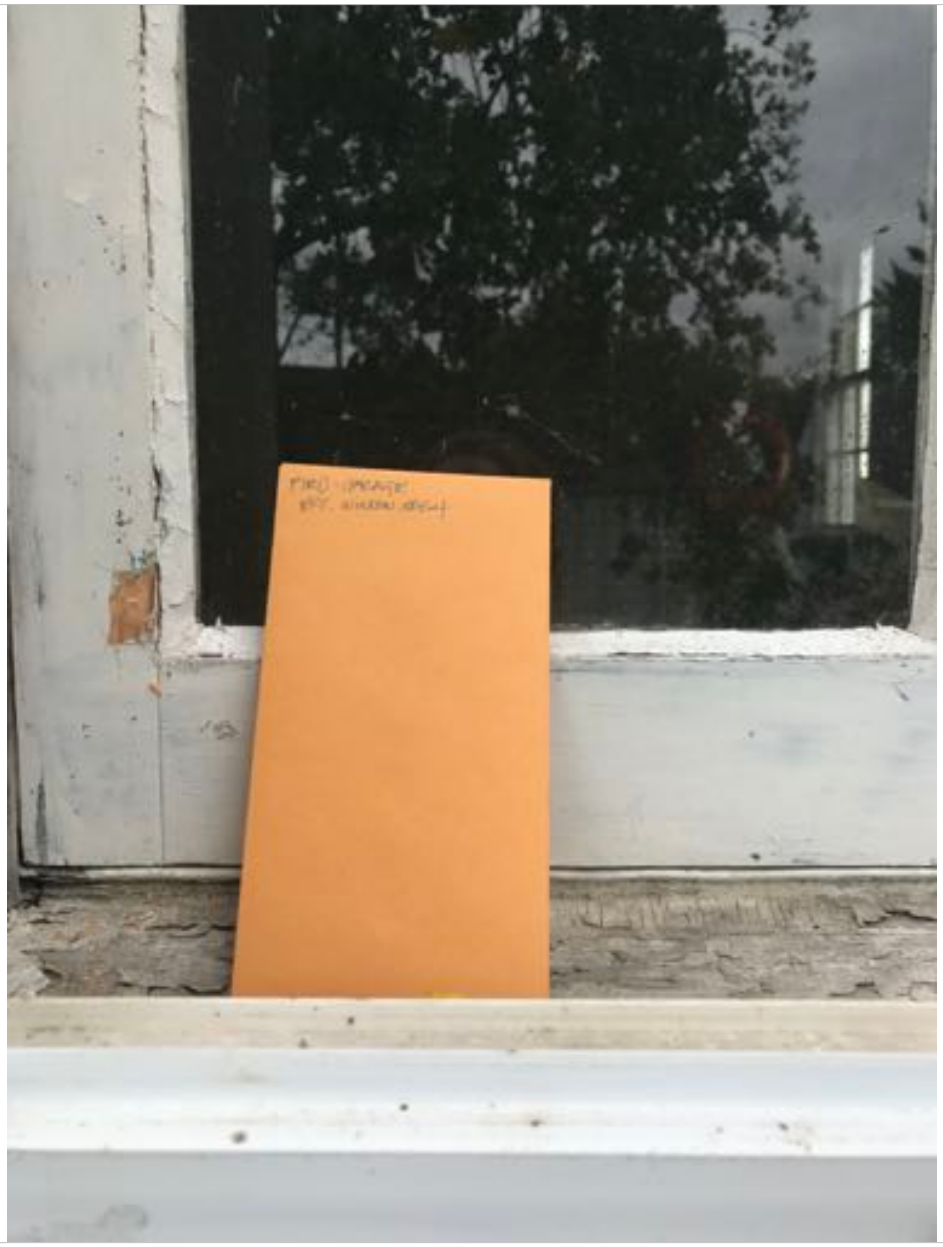


Photo 13: Location of Sample 4. Photo by Anderson Hallas, October 2019

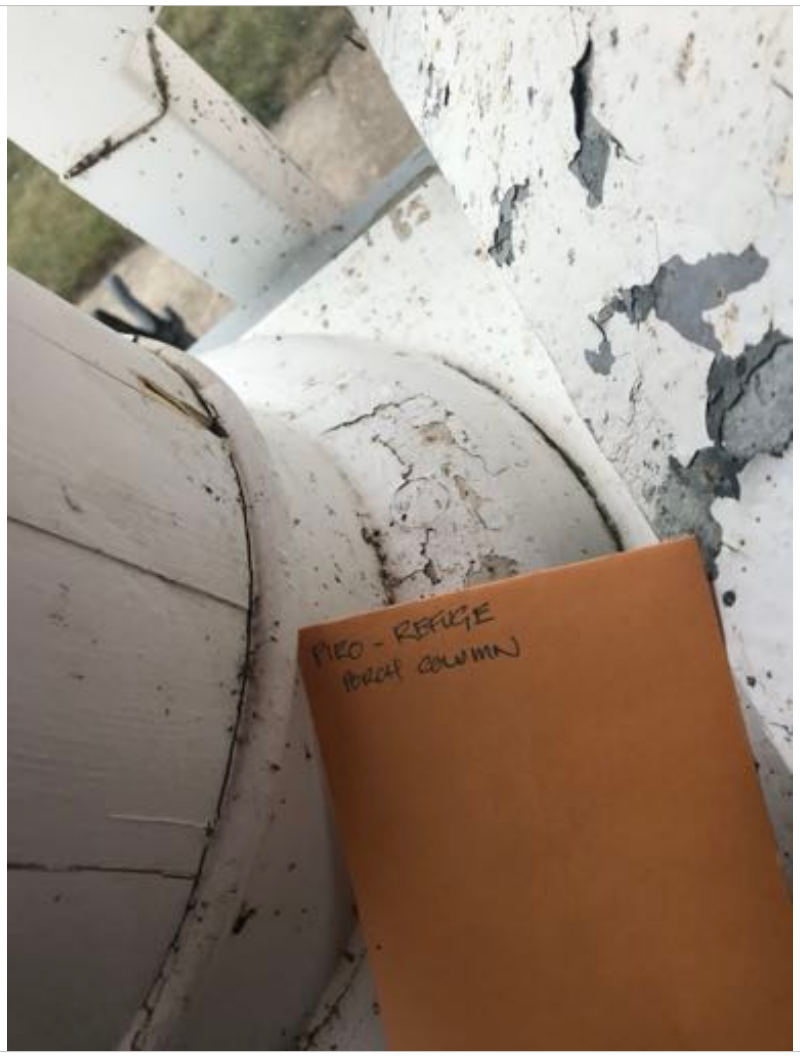


Photo 14: Location of Sample 10. Photo by Anderson Hallas, October 2019



Photo 15: Location of Sample 9. Photo by Anderson Hallas, October 2019

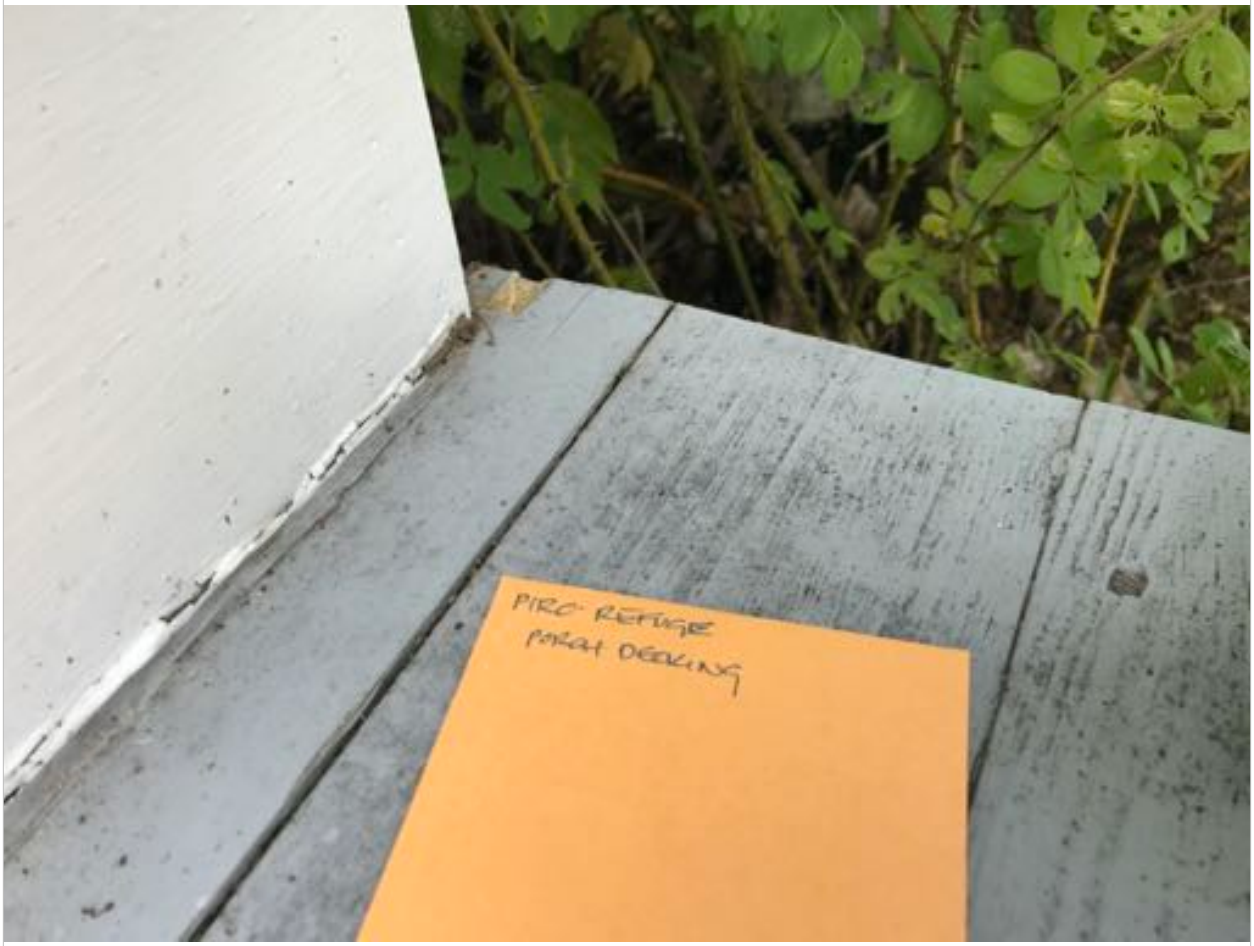


Photo 16: Location of Sample 11. Photo by Anderson Hallas, October 2019

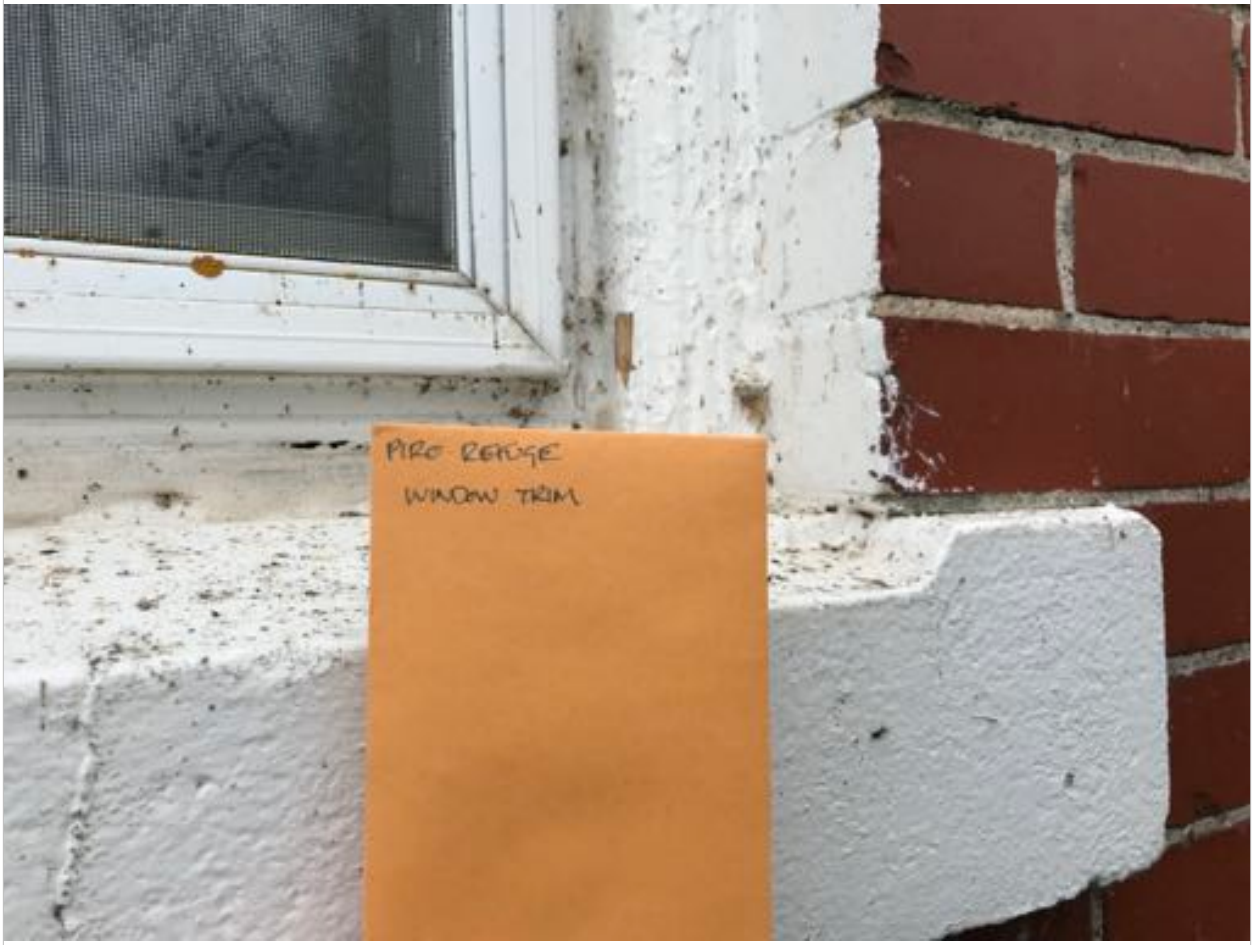


Photo 17: Location of Sample 8. Photo by Anderson Hallas, October 2019

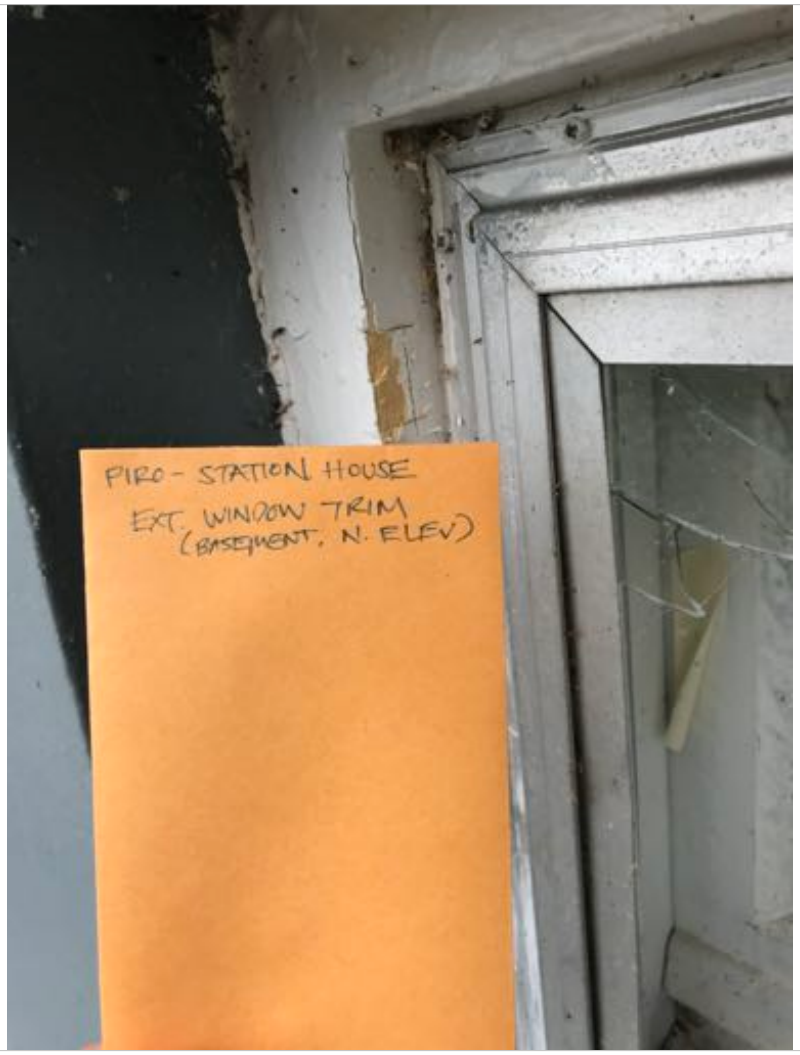


Photo 18: Location of Sample 13. Photo by Anderson Hallas, October 2019

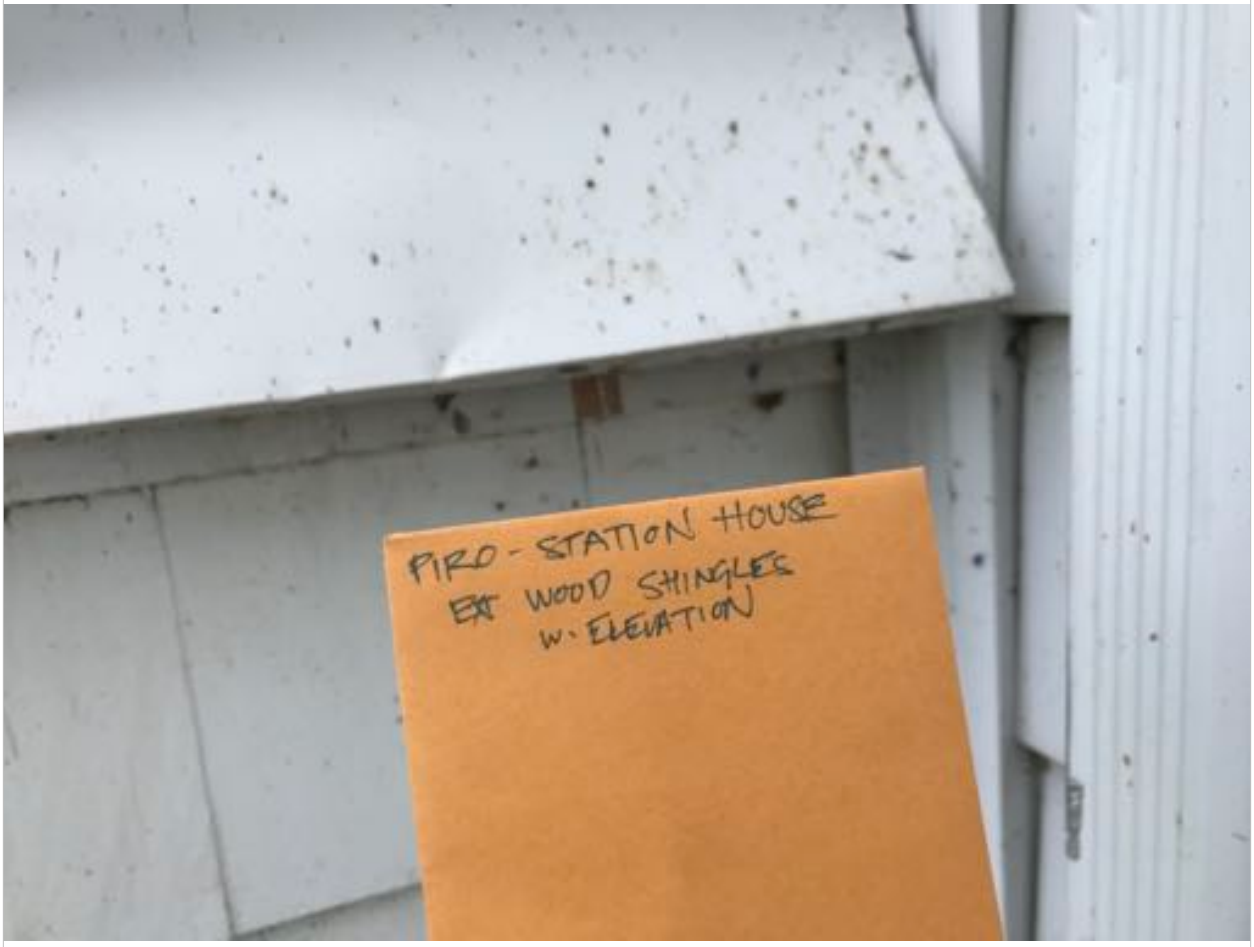


Photo 19: Location of Sample 14. Photo by Anderson Hallas, October 2019

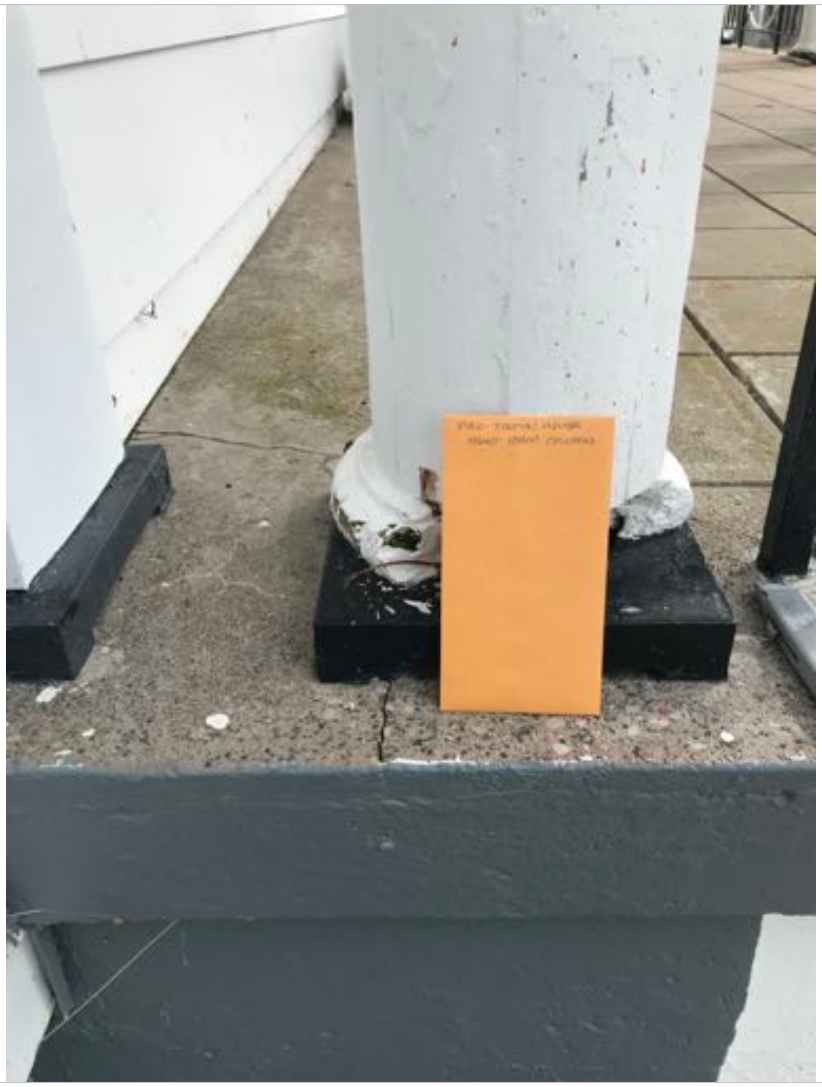


Photo 20: Location of Sample 12. Photo by Anderson Hallas, October 2019

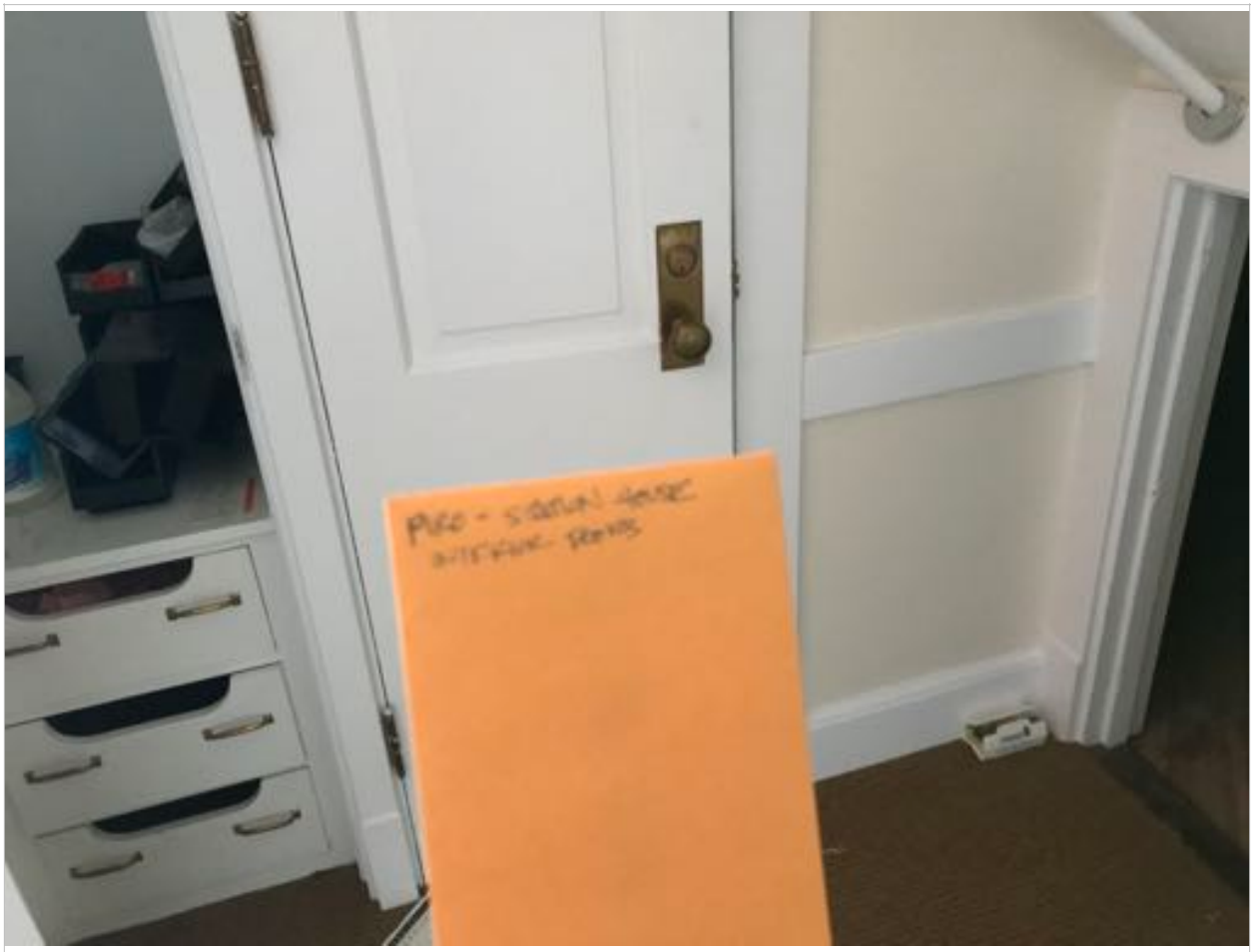


Photo 21: Location of Sample 15 (Station Dwelling, Interior doors). Photo by Anderson Hallas, October 2019

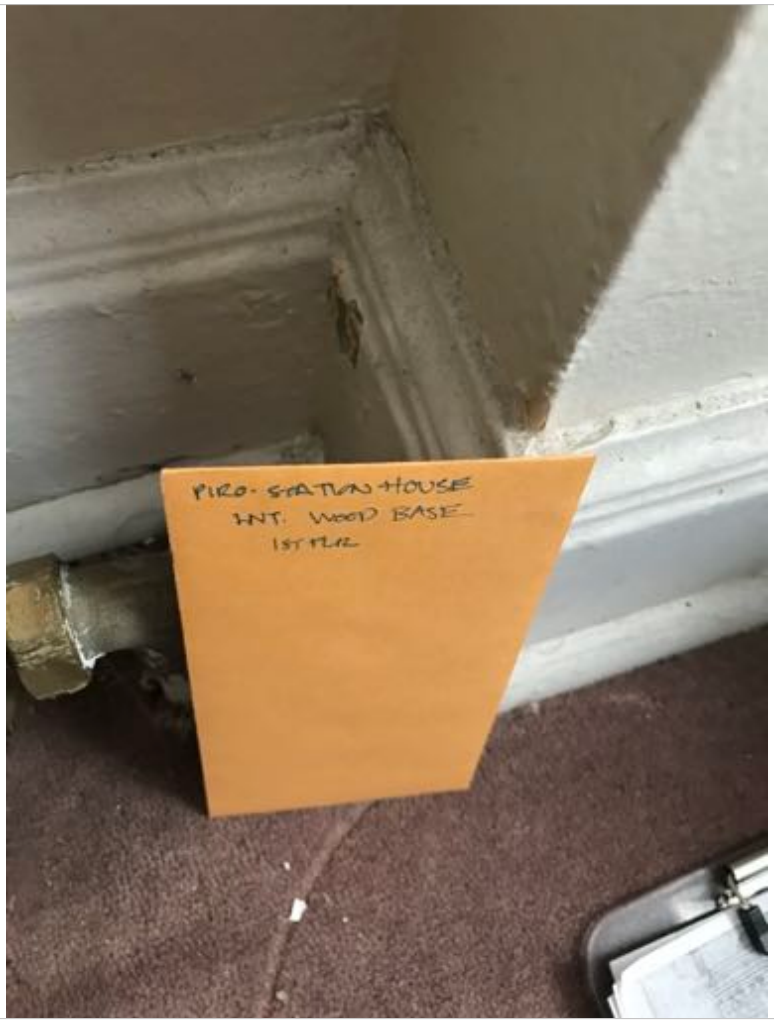


Photo 22: Location of Sample 21. Photo by Anderson Hallas, October 2019



Photo 23: Location of Sample 20. Photo by Anderson Hallas, October 2019



Photo 24: Location of Sample 19. Photo by Anderson Hallas, October 2019



Photo 25: Location of Sample 18. Photo by Anderson Hallas, October 2019



Photo 26: Location of Sample 16. Photo by Anderson Hallas, October 2019



Photo 27: Location of Sample 17. Photo by Anderson Hallas, October 2019



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PICTURED ROCKS NATIONAL LAKESHORE
Historic Structures Report

2020