NPS Form 10-900
(Oct.1990)

OMB No. 1024-0018

467

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Great Beds Light Station

other names/site number Great Beds Light

2. Location

street & number Offshore in Raritan Bay at NJ-NY line, approx 1 mile E of South Amboy ☐ not for publication

city or town South Amboy ☒ vicinity

state New Jersey code NJ county Middlesex code 023 zip code 08879

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register Criteria. I recommend that this property be considered significant ☐ nationally ☐ statewide ☒ locally. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date 2/1/08

United States Coast Guard
State or Federal agency and bureau

In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of commenting or other official — Date 3/6/08

Amy Cradic, Assistant Commissioner Natural & Historic Resources/DSHPO
State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that this property is:

☒ entered in the National Register — Signature of the Keeper — Date of Action 5-29-08
☐ See continuation sheet.
☐ determined eligible for the National Register
☐ See continuation sheet.
☐ determined not eligible for the National Register
☐ removed from the National Register
☐ other (explain): _____

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☐ private
- ☐ public-local
- ☐ public-State
- ☒ public-Federal

Category of Property
(Check only one box)

- ☐ building(s)
- ☐ district
- ☐ site
- ☒ structure
- ☐ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		sites
1		structures
		objects
1	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

Light Stations of the United States

Number of contributing resources previously listed in the National Register

0

6. Function or Use

Historic Functions
(Enter categories from instructions)

Transportation
Water-related

Current Functions
(Enter categories from instructions)

Transportation
Water-related

7. Description

Architectural Classification
(Enter categories from instructions)

No Style

Materials
(Enter categories from instructions)

foundation Caisson: Iron, Concrete, Stone
roof Iron
walls Iron
other Lantern: Iron and Glass

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

☒ A Property is associated with events that have made a significant contribution to the broad patterns of our history.

☐ B Property is associated with the lives of persons significant in our past.

☒ C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

☐ D Property has yielded, or is likely to yield information important in prehistory or history.

Criteria Considerations
(Mark "X" in all the boxes that apply.)

Property is:

☐ A owned by a religious institution or used for religious purposes.

☐ B removed from its original location.

☐ C a birthplace or a grave.

☐ D a cemetery.

☐ E a reconstructed building, object, or structure.

☐ F a commemorative property.

☐ G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)
Maritime History
Transportation
Architecture
Engineering

Period of Significance
1880 to 1957

Significant Dates
1880

Significant Person
(Complete if Criterion B is marked above)

Cultural Affiliation
N/A

Architect/Builder
U.S. Lighthouse Board

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):
- ☐ preliminary determination of individual listing (36 CFR 67) has been requested.
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey # _____
- ☐ recorded by Historic American Engineering record # _____

Primary Location of Additional Data
- ☐ State Historic Preservation Office
- ☐ Other State agency
- ☒ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Name of repository:

US National Archives; NPS Maritime Heritage Program; USCG Headquarters, Historian's Office, Washington, DC

10. Geographical Data

Acreage of Property Less than one acre

UTM References:	Zone	Easting	Northing
1	18	563300	4882025

Verbal Boundary Description: The boundary aligns with the outer perimeter of the riprap surrounding the structure's cylindrical caisson foundation.

Boundary Justification: The boundary completely encompasses the light station and includes the cultural features associated with this lighthouse structure.

11. Form Prepared By

name/title Daniel Koski-Karell, Ph.D., USCG Architectural Historian, and Jennifer Perunko, Maritime Historian, National Park Service

organization Environmental Management Division (CG-443), U.S. Coast Guard Headquarters date 5 December 2007

street & number 1900 Half Street, SW, 9th Floor telephone 202.475.5683

city or town Washington state DC zip code 20593-0004

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps: **Floor plans** of the lighthouse property.
USGS map (7.5 or 15 minute series) indicating the property's location.

Photographs: Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name U.S. Coast Guard Headquarters

street & number 2100 Second Street SW telephone 202.267.1587

city or town Washington state DC zip code 20593

Narrative Description

Great Beds Light Station was built in 1880 to mark Great Beds Shoal, a hazardous area of shallow water in Raritan Bay. It sits surrounded by water approximately one mile from the shoreline of South Amboy in Middlesex County, New Jersey. This lighthouse is an important aid to navigation for vessels using the shipping channel that traverses Raritan Bay between the Atlantic Ocean and port facilities along the Arthur Kill waterway between Perth Amboy and Staten Island, as well as facilities along New Jersey's Raritan River. This structure includes a cast iron caisson foundation filled with concrete, a five-story cast iron conical tower, and a decagonal lantern. The caisson tapers inward at the top and rises to approximately 15 feet above sea level. It is painted black. The tower and lantern are 47 feet tall. They are painted white. This lighthouse property is owned by the U.S. Coast Guard. It is operated as an automated aid to navigation identified as number 36430 on the Coast Guard's regional Light List. The signal light flashes red once every six seconds and is visible for six miles in clear weather. The only access to Great Beds Light Station is by boat.

Exterior

The lighthouse's foundation is a conical caisson that sits on Great Beds Shoal in approximately 11 feet of water. It is built with three rows of 10-foot tall cast iron plates. The caisson foundation has an overall height of 30 feet and is 30 feet in diameter at its base. Its upper part tapers inward to a diameter of 26 feet at the top. The caisson's interior is filled with concrete. The light tower sits centered atop the caisson. It is surrounded by an open-air main gallery that is four feet wide. The main gallery is enclosed by a two-tiered chain railing strung between metal pipe stanchions attached to the gallery's outer perimeter. A metal ladder is attached to the side of the caisson. This extends from below the high tide waterline to the main gallery. The caisson's base is surrounded by riprap placed for protection from erosion and to enhance its stability.

The conical light tower is composed of five rows of 7.5 foot-tall iron plates. It tapers inward slightly towards the top. The tower's diameter is 21 feet at the bottom and 18 feet at the top. The tower's entry is a doorway facing the main gallery. This entrance is to the right from the metal ladder attached to the caisson foundation. The doorway opening retains its original decorative iron surround topped with a pedimented crown. The existing door is a modern metal replacement.

The light tower is five stories tall. Each story is clearly delineated on the structure's exterior by prominent seams at the joints between each row of metal plates. Each of the first four stories has a single window opening. These have segmental arches and feature metal Italianate-style pedimented crowns and projecting sills. The first floor window is covered with a metal sheet on its outer side. The second, third, and fourth story window openings are each fitted with a single piece of Plexiglas. The fifth story, where the watch room is located, has four round port-light windows.

The lighthouse's ten-sided fourth order lantern sits centered atop the light tower's fifth story. It is surrounded by an open-air gallery. The lantern gallery has a metal floor that overhangs the tower. This floor is supported by decorative metal brackets attached to the tower's exterior. A two-tiered metal pipe railing encloses the lantern gallery. The lantern includes a lower parapet wall composed of ten cast iron rectangular panels. One panel contains a small doorway providing access to the lantern gallery. Above the parapet, the lantern's glazing is composed of ten panes of glass held in place by metal mullions. The lantern roof is made of ten triangular iron plates that rise from the soffit above the lantern's glazing. They meet at an apex in the center.

A small circular platform of circa 1945 vintage is attached to the central peak of the lantern roof. It is accessed by a metal ladder attached to the lantern's exterior. This platform supported a modern beacon that served as the lighthouse's optic for several years after the lighthouse was automated in 1945. This optic was replaced by a modern optic installed inside the lantern. Today, the platform supports a solar array used for charging the existing optic's battery power system.

Interior

The light tower's doorway opens directly into the first story room. There is no foyer or transition space inside the doorway. Inside the doorway, a stairway on the right leads to the second story. The stair treads and risers are iron with the treads embossed with a diamond pattern. The stairway winds upward counter-clockwise and includes four flights of stairs providing access from one story to the next. Each stairway flight is directly above the one below. The stairs are separated from the rooms on each story by iron wall partitions. The stairway ends at the fifth story watch room where a metal ship's ladder provides access to the lantern.

First Story:

The first story's interior wall is lined with unpainted brick. The floor is paved with unpainted brick. There is a large round opening at the center of the floor that is filled with soot and ashes. The ceiling is composed of twelve triangular iron plates that meet in the center. These plates form the floor of the second story, above. The ceiling and the metal partition wall separating this room from the stairway are painted white. The first story's single window is covered on the outside with a metal sheet that prevents any light from entering the room. The interior of this window opening is flanked on either side with tall, round-arched alcoves that extend from the floor to the ceiling. These two alcoves were originally fitted with drawers and shelves for storing clothes, dishes, and other items.[1]

Second Story:

The second story is similar to the first one. The iron plates that compose the floor are embossed with the same diamond pattern as the stairs. The single window opening is fitted with a sheet of Plexiglas. The tower wall's interior is lined with brick. There are three alcoves in the second story room's wall, one more than on the first story.

Third Story:

The third story is similar to the first and second. The floor is metal and the tower wall is brick-lined. There are two alcoves in the brick wall. Some bricks have been removed from the alcoves, exposing the tower's metal plates. A hole has been cut through the floor near the metal partition wall separating this room from the stairway.

[1] "Descriptive Lists of Lighthouse Stations. 1858-1889, 1876-1939," [Great Beds Light Station, 1 January 1887.], Entry 63, RG 26, National Archives.

Fourth Story:

The fourth story's floor, ceiling, and walls are similar to the second and third stories, except there are no alcoves built into the brick walls.

Fifth Story (Watch Room):

The tower's staircase ends at the fifth story, which served as the lighthouse's watch room. The tower's interior brick lining ends at the last stair on the underside of the watch room's floor. Hanging above the last stair is part of a pulley. The fifth story room's surrounding wall consists of the exposed interior of the tower's iron plates. This room is lighted with four round port-light windows. Two of these windows have octagonal wood trim surrounding them on the inside. The other two are framed with circular wood trim. A metal ship's ladder provides access to the lantern room through an opening in the ceiling. The rungs of the ladder are attached to the partition wall on one side and to a railing on the other side. These rungs are imprinted with the same diamond pattern as the floors and stairs.

Lantern:

A trapdoor provides access to the interior of the decagonal lantern. The lantern room's floor is composed of cast iron plates. The parapet wall enclosing the lantern room is approximately three feet tall and is made with ten rectangular iron panels. One parapet panel holds a small double-door providing access to the lantern gallery. Vent openings pierce five of the parapet panels. Their covers are missing and have been replaced with wire-mesh screens. These vents were used to regulate airflow inside the lantern. The lantern's glazing includes ten rectangular glass panes held in place by metal mullions. There is a soffit above the glass windows. The ceiling is made with ten triangular metal plates that extend from this soffit and meet at a circular exhaust vent in the roof's center. This vent is closed off with a metal plate.

The lighthouse's existing optic sits on a pedestal at the center of the lantern room. It is a modern automated 300-millimeter acrylic beacon that signals a red flash every six seconds.

Changes over Time

Historical photographs of Great Beds Light Station in the past show that the main gallery atop the caisson foundation formerly supported sheds, an outhouse, and davits for lifting a boat. These utilitarian features no longer exist. The sheds and outhouse occupied the gallery floor and extended outward beyond its perimeter, supported by brackets. The existing two-chain railing surrounding the main gallery appears to be of middle twentieth century vintage. The original railing consisted of pipe stanchions connected by two levels of pipe railing. Other features original to the structure included a flagpole on the lantern gallery and a metal smokestack that formerly protruded through the lantern gallery floor. Also, a vertical rectangular chimney was formerly attached to the tower's exterior by brackets. It extended from the lighthouse's main gallery to the lantern gallery. The flagpole, smokestack and chimney features have been removed.

The lighthouse's original optic was a fourth order Fresnel lens. This was removed when the signal light was automated in 1945. Its present location is unknown. The existing optic is a modern 300-millimeter beacon.

Narrative Statement of Significance

Great Beds Light Station has been an important lighthouse and prominent offshore landmark in Raritan Bay since its establishment in 1880. It is one of the principal aids to navigation for vessels passing between the Atlantic Ocean and New Jersey ports in the Raritan Bay vicinity. This property is significant to the local history of Middlesex County under National Register Criteria A and C. Its significance under Criterion A is associated with events that have made a significant contribution to the broad patterns of New Jersey's maritime history. This lighthouse is representative of the Federal government's efforts to provide for an integrated system of navigational aids to promote maritime transportation safety in and around Raritan Bay. It is also significant under Criterion C because it embodies the distinctive characteristics and methods of construction employed for offshore lighthouses during the late nineteenth century. It exemplifies two important achievements in offshore lighthouse architecture and engineering in the United States. These are the use of a cast iron caisson filled with concrete for the foundation, along with a prefabricated cast iron conical light tower for the superstructure. This lighthouse's foundation is unusual in that its lower part is cylindrical while its upper part is conical. This represents a design variant that differs from the cylindrical caisson foundation usually associated with later offshore lighthouses. Great Beds Light Station's period of significance begins when it was established in 1880 and ends in 1957, its most recent year of operation 50 years before the present. Today, this light station operates as an automated aid to navigation and continues to serve its original function. It also continues to evoke the traditional character and feeling of dedication to duty associated with the history of American lighthouses and their keepers.

This property meets the registration requirements outlined in the *Light Stations of the United States* multiple property documentation form. It remains in its original location, its setting is unchanged, and it continues to serve its original function as an operating Federal aid to navigation. This light station's character and general appearance are essentially unchanged from its period of significance. The changes that have occurred are limited and consist largely of the loss of some minor exterior features such as a smokestack, two sheds, an outhouse, a flag pole and boat davits. The addition of modern updates has been limited and does not detract significantly from the property's historic integrity. This lighthouse's existing configuration and appearance accurately reflect its character during the period of significance. Its most important original structural components, the caisson and light tower, are well-preserved.

Lighthouse Architecture

The first lighthouse in the U.S. constructed offshore using a cylindrical foundation made of cast iron plates was Duxbury Light Station in Massachusetts, completed in 1872. Its foundation was built using a cofferdam to keep out water while the location for the cylinder was excavated. A caisson was first used to position an offshore lighthouse's foundation cylinder in 1873 when the Craighill Channel Lower Range Front Light Station was built in Maryland's Chesapeake Bay. A box caisson was employed there. In box caisson construction, the bottom of the iron cylinder is enclosed in a wood grillage that provides a stable base for the cylindrical foundation on the structure's submerged site. Once in place, the water is pumped out and the cylinder is filled with rock and concrete.

A subsequent engineering development was the use of a pneumatic caisson. This was first employed for U.S. lighthouse construction in 1887 during construction of the Fourteen Foot Bank Light Station in the Delaware River. A pneumatic caisson has an airtight room at the open bottom of the cylinder. This room was usually constructed of wood and was kept filled with pressurized air to keep water from leaking in. This pressurized enclosure allowed workmen to excavate into the submerged land beneath the caisson while keeping dry. The caisson sank further into the subsurface as the bottom material beneath it was dug out.

The open caisson was another type employed in offshore lighthouse construction. In this procedure, a cast iron cylinder open at both top and bottom was lowered into position and allowed to sink into the bottom by its own weight. The cylinder's bottom edge was sharpened to form a cutting edge. Excavation of bottom materials within the caisson was also performed to ensure that the cylinder sank several feet into the seabed. In any of the various caisson construction methods, wooden piles might also be driven into the bottom to provide a firmer footing.[2]

During the late nineteenth century, cylindrical caissons became the preferred foundation design used in building offshore lighthouses in the United States. These caissons were made of prefabricated cast iron plates bolted together in courses. They were assembled partially or entirely onshore, brought to the designated offshore location, and sunk into place with excavation if necessary. After any remaining assembly was completed, the caisson was commonly filled with concrete. Using a cylindrical caisson for constructing offshore lights was especially well-suited for the Northeast and Mid-Atlantic regions of the U.S. because this foundation design resisted damage from ice floes.

Before caissons were adopted, other construction methods were used to build offshore lighthouses in the U.S. One approach for constructing foundations was to use straight piles or screw piles. Structures built using pilings were inexpensive and relatively quick and easy to construct. However, they were not strong enough to withstand the force of moving ice floes or impacts from out-of-control vessels. Another approach was to construct a stone pier. While this was well-suited to the physical stresses at exposed offshore locations, stone pier foundations were expensive and time-consuming to build. Cylindrical caisson foundations made from cast iron plates could be built more quickly and at less cost than stone piers.

Various circumstances had to develop before cast iron became a feasible building material for caisson foundations and light towers. Its use depended on both ample production and the development of efficient designs. It was not until the middle nineteenth century that the occurrence and convergence of these factors took place in the United States.

Cast iron was employed in Europe for decorative and structural architectural purposes from the early eighteenth century. However, it was not used extensively for architecture in the United States until after 1840. Factors that inhibited its use before then included limited production of pig iron and difficulties with transporting it to urban centers where it could most readily be used. In addition, iron masters had not yet discovered how to reduce iron ore using the readily available anthracite (hard) coal.

---

[2] "Caisson," *Britannica Concise Encyclopedia*, 2004, Encyclopædia Britannica, 13 September 2004, *http://concise.britannica.com/ebc/article?eu=384790*; "Caisson," *Columbia Encyclopedia*, Sixth Edition, 2004, 13 September 2004, <*http://www.encyclopedia.com/html/c1/caisson.asp*>; F. Ross Holland, *Lighthouses* (New York: MetroBooks, 1995), 71-72; U.S. Department of the Treasury, Lighthouse Board, *Annual Report of the Light-House Board to the Secretary of the Treasury for the Fiscal Year Ending June 30, 1873* (Washington, D.C.: GPO, 1873), 45-46; and *Annual Report of the Lighthouse Board ... 1874*, 45-46.

During the 1840s, pig iron production increased in the U.S. and railway lines were extended to areas near the foundries where it was cast. These developments motivated founders, businessmen, and architects to devise new uses to which this material could be applied.[3]

The early use of cast iron for United States lighthouses was largely limited to the lanterns placed atop masonry or wooden light towers. It was not until the 1860's that iron began to be used extensively in the design and construction of entire towers. The first iron light towers designed and constructed by engineers and architects working for the U.S. Lighthouse Board resembled earlier ones made of stone or brick. This was followed by the development and adoption of a variety of designs for iron lighthouses. One variant employed the elegant Second Empire architectural style. Examples of this include Southwest Ledge Light Station in Connecticut and Ship John Shoal Light Station in New Jersey, both completed in 1877. Other variants included conical and cylindrical towers. Great Beds Light, built in 1880, is an example of one of the earlier designs for a conical cast iron light tower. Cast iron towers were often lined with brick for added stability and increased insulation. Another design type was the skeletal tower. This generally consisted of a central vertical stairway cylinder and four to eight angular structural and peripheral columns. Skeletal towers were designed to be built in areas with sandy or loamy soil, including offshore locations.

The Lighthouse Board employed various superstructure designs during the early stages of constructing offshore light towers atop cast iron caisson foundations. However, it soon shifted to emphasizing a standardized design that was utilized extensively throughout the Northeast and Mid-Atlantic regions. This came to be called the "sparkplug" lighthouse type because, when seen from afar, it appears similar to the profile of a sparkplug for an internal combustion engine. The *Annual Report of the Lighthouse Board* for 1898 contains a plate showing a cross-section plan of the newly constructed New Haven Outer Breakwater Lighthouse in Connecticut. It is an example of the "sparkplug" design. New Haven Outer Breakwater Light is similar to the plans used in the 1884 construction of Latimer Reef Light Station in New York more than a decade earlier. This same design scheme continued to be used into the early twentieth century. It was used for the 1901 construction of the West Bank Light Station in New York, as well as others.

The specifications and plans for sparkplug-type lighthouses were printed in large quantities and distributed to companies interested in competing for Federal light station construction jobs. The cast iron parts used for the caissons, towers and interior floors, as well as architectural details such as hoods, brackets and posts, were manufactured by companies such as Variety Iron Works of Cleveland, Ohio, and West Side Foundry of Troy, New York. The various parts were fitted together at onshore locations for preliminary approval by lighthouse engineers. After passing inspection, the components were numbered before being dismantled and then shipped to the job site, or consigned to the lighthouse district that contracted the work. Foundation caissons were normally assembled in whole or in part onshore, and then brought to the designated offshore location. After the foundation had been put in place and any remaining assembly finished, it was filled with concrete. When this was completed, the lighthouse superstructure could be erected in a matter of days. Subsequent finishing work extended the construction time. This included installing the brick lining, interior partitions, stairways, flooring, windows and doors.

[3] Antoinette J. Lee, "Cast Iron in American Architecture: A Synoptic View," in *The Technology of Historic American Buildings: Studies of the Materials, Craft Processes, and the Mechanization of Building Construction*, H. Ward Jandl, Ed. (Washington, D.C.: Foundation for Preservation Technology, 1983), 100-101.

Raritan Bay, Lower New York Bay, the Port of New York and Aids to Navigation

The early part of the nineteenth century marked the rise of the port of New York and to a lesser degree the ports of northern New Jersey. The port of New York provided a safe harbor for vessels because it was virtually landlocked. It was ideally situated to take advantage of transatlantic, coastal and inland trade due to its geographical location. New Jersey ports such as Newark with access to Upper New York Bay, and such as Perth Amboy with access to Lower New York Bay, also presented opportunities for maritime trade. Perth Amboy was especially well situated because it was located three miles closer to the open sea than New York City. New Jersey ports were also associated with various economic and administrative incentives to shipping such as avoidance of New York's customs, quarantine and immigration regulations.

The port of New York could be reached through several entrances including channels from the Atlantic Ocean, Long Island Sound, the Hudson River, as well as from Raritan Bay. Prior to 1912 when the Ambrose Channel's completion provided a short cut, maritime traffic entering Lower New York Bay from the Atlantic would navigate by way of the old Main Channel, a naturally navigable passage situated north of Sandy Hook. Once inside Lower New York Bay, vessels would either continue westward into Raritan Bay towards Perth Amboy or turn north towards the Narrows, the strait between Staten Island and the western end of Long Island. Through the Narrows is only two miles long and at one place only 0.75 mile wide, more than a third of the world's foreign commerce during the late nineteenth century passed through it.[4]

Prior to the early twentieth century, the East River was the principal scene of maritime business at the port of New York. However, the Hudson River is broader with less turbulent waters and provided a better berthing place for ocean-going steamers. It eventually became predominant in the area's maritime traffic.

Although ports in the New York Bay vicinity are endowed with an abundance of natural features and characteristics, it has been improved upon by human ingenuity. In the early 1760s, the port of New York conducted a lottery to raise funds for a light station at Sandy Hook. The tall, masonry lighthouse completed there in 1764 is today the oldest existing lighthouse in the United States. More lights were added following the American Revolution. Following adopting of the U.S. Constitution, one of the new Federal government's earliest accomplishments was to establish a lighthouse service. For the most part, the earlier lighthouses erected by the Federal government were land-based, masonry towers. Subsequent advances in engineering led to lighthouses being built offshore directly upon or nearby hazards to navigation such as shoals and rocks. The first offshore lighthouse built in port of New York waters was at Robbins Reef, located offshore of Bayonne, New Jersey. A light tower constructed there in 1839 sat upon a pier built of granite blocks atop a rocky ledge. By the mid-1870s, the Lighthouse Board was constructing offshore light stations on iron foundation cylinders set into the seabed. One example of these is Raritan Bay's Great Beds Light Station, built in 1880.

In 1922, the Lighthouse Service[5] reported on its facilities in waters of the port of New York and vicinity. This includes approximately 200 nautical miles of shoreline and about 170 square miles of water area.

---

[4] Robert Greenhalgh Albion, *The Rise of New York Port [1815-1860]* (New York: Charles Scribner's Sons, 1939), 16-19.

[5] The Lighthouse Board was disbanded in 1910. Its successor was the Bureau of Lighthouses, often referred to as the Lighthouse Service, which assumed responsibility for aids to navigation.

The Lighthouse Service stated that the harbor and vicinity were marked with 387 aids to navigation. These included lighthouses, lighted beacons, lightships, and unlighted beacons and buoys. This was an increase of nearly 80 percent from 1905 when nautical charts showed only 217 aids.[6]

History of Great Beds Light Station

On 20 June 1878, Congress appropriated $34,000 for the construction of a lighthouse at Great Beds Shoal in Raritan Bay. Its purpose was to mark a hazardous area offshore of southern Staten Island near the junction of the Raritan River and Arthur Kill shipping channels. The *Annual Reports of the Light-House Board* for the years 1878, 1879 and 1880 address the planning and construction for this light station.

One task in the Lighthouse Board's planning process was to obtain a cession of submerged land that would provide Federal jurisdiction over the site. At first, the U.S government applied to the State of New Jersey for rights and was granted such. Plans for construction proceeded, including ordering and receiving the iron tower, importing 1,000 barrels of cement and preparing the cement mixers. However, a slight change in the proposed location for the light station required the Federal government to reapply to New Jersey for jurisdiction. This action promoted further investigation into ownership of the two sites, and resulted in discovering that an agreement in 1834 between the states of New York and New Jersey, consented to by Congress, meant the submerged land at the two proposed lighthouse locations belonged to New York. As a consequence, all work on the lighthouse ceased until the Lighthouse Board obtained title to the submerged land from the State of New York. A subsequent investigation of the Raritan Bay boundary line between the states, however, confirmed that the lighthouse site is on the New Jersey side of the boundary. By 1880, the Lighthouse Board annual report stated that the construction of the Great Beds Lighthouse was "well under way, with every prospect of early completion."[7]

The lighthouse's first Keeper, David C. Johnson, was appointed on 3 November 1880. Shortly afterwards, John W. Totten was appointed Assistant Keeper on 8 November. Both were listed as "Acting" in the personnel register. The station's signal light was exhibited for the first time on 15 November 1880.

The lighthouse's original optic was a fourth order Fresnel lens. Fresnel lenses were invented by a French physicist in the late eighteenth century. Throughout most of the nineteenth century, they were used internationally as the standard state-of-the-art in lighthouse optical technology. The first Fresnel lens installed at a U.S. lighthouse was mounted in 1841 at the Navesink Light Station in New Jersey. Fresnel lenses came into widespread use in United States lighthouses during the early 1850s, and remained commonplace until replaced by modern technology during the second half of the twentieth century. A fourth order lens, such as the one mounted at Great Beds Light Station in 1880, was 2 feet, 4 inches in height and had an inside diameter of 19-11/16 inches. Fourth order lenses were generally installed in lighthouses used for marking shoals, reefs and harbors, as well as islands in rivers and harbors.

---

[6] U.S. Department of Commerce, Bureau of Lighthouses, *Lighthouse Service Bulletin*, Vol. II, No. 61, 2 January 1923 (Washington, D.C.: GPO, 1923), 261-262. At the beginning of 1923, the *Lighthouse Service Bulletin* printed an article entitled "New York Harbor and its Lights and Buoys." An editor's note states that the material was taken from an address given by George Putnam, Commissioner of Lighthouses, at the November 1922 Marine Show in New York at which the Lighthouse Service exhibited lenses, fog signals, lanterns and charts of New York Harbor.

[7] U.S. Department of the Treasury, Lighthouse Board, *Annual Report of the Lighthouse Board for the fiscal year ending June 30, 1878* (Washington, D.C.: GPO, 1878), 21; *Annual Report ... 1879*, 21; and *Annual Report ... 1880*, 22.

The Great Beds Light Station's original signal was a fixed red light with a focal plane 57 feet above sea level. It was visible for 13 miles in clear weather. The optic's light source was a Hains lamp that burned mineral oil.[8] The signal's red color was created by placing a red chimney over the light source's flame.

The light station's caisson foundation and tower were originally painted red, with the lantern painted black. This daymark remained in use until circa 1890. The 1890 regional *Light List* describes the station as having a different coloration from the original daymark. The new daymark consisted of a brown-painted light tower and black-painted lantern and caisson foundation. The daymark was changed again circa 1892 when the tower and lantern were repainted entirely white. This made it easier to see against the dark background of the lands lying to the north, west and south. The lighthouse's daymark has remained a white tower and lantern atop a black-painted foundation since then.

The light station's early years were characterized by a series of keepers who tended to have relatively short tours of duty. Assistant Keeper Totten was removed in February 1881 after having served less than four months. He was replaced by Joseph F. Morey. Assistant Keeper Morey's appointment lasted just six months. The station's assistant keeper position was abolished 1 September 1882. The first Keeper, David C. Johnson, resigned on 3 October 1882 after serving not quite two years. The Keeper appointed to replace him was George Brennan. He is recorded in the station logbook as being missing on 24 April 1883. The log entry for 15 May 1883 reports that his body was found. The man appointed to replace Brennan was John Johnson. The station's log book entries for 25 and 26 August 1883 report that Keeper John Johnson had drowned. He left behind a widow with four children.

The next two keepers were John T. Prentiss and Uriah Seely. They were followed by a series of acting keepers, including Edward McDonough, Phineas Mundy, Peter Coyne, Jacob Sutliff, Mortimer Wood and David J. Johnson. The last four keepers received permanent appointments. During Johnson's tenure, the position of assistant keeper was reinstated. In April 1898, John Osterdahl became the Keeper and served at Great Beds Light Station for over eleven years until September 1909. After the station's assistant keeper was transferred to the Highland (Navesink) Light Station on the New Jersey mainland in 1902, Keeper Osterdahl's wife, Olivia, became Assistant Keeper. She served in this position until 1909.[9]

The salaries for light station personnel varied during the late nineteenth century and early twentieth century. This was based on a number of factors, including the lighthouse's location. When Great Beds Light Station was established, the annual salaries for the keeper and assistant keeper were $600 and $400, respectively. The keeper's salary was decreased in October 1888 to $560. In May 1890, it was raised to $580 in lieu of rations. When the assistant keeper position was reestablished in 1897, the position's salary was set at $400. This was increased to $425 a little over a year later. Salaries remained the same through 1912, except that the assistant keeper's position was abolished again in September 1909. This coincided with the provision that the keeper was henceforth allowed to bring his family to live at the lighthouse.[10]

---

[8] "Registers of Lighthouse Keepers, 1845-1912," M1373, RG 26, National Archives; *Annual Report ... 1881*, 24; U.S. Coast and Geodetic Survey, *Atlantic Coast Pilot Boston to New York*, Second Edition (Washington, DC: GPO, 1880), Errata.

[9] "Registers of Lighthouse Keepers ..."

[10] Letter from Lt. Col., Corps of Engineers, U.S.A., Engineer Secretary to The Engineer of The Third Light-House District, Tompkinsville, N.Y. quoting a letter to the Light-House Board from K. Niles, Captain, U.S.N., Chairman on Pay and Allowances, 24 September 1909, "Correspondence of the Light-House Board, January 1, 1901-June 6, 1910," File 3229, Box 358, RG 26, National Archives. The letter states, "This station is a fixed red light with fog bell, and as it is not in an exposed part of the bay, and is close to the shore presents no difficulty in being maintained by one keeper, if his family is permitted to live with him."

From 1880 to 1898, the keeper's duties consisted largely of assuring the light remained lit and the station was in good order. This changed in June 1898 when a fog signal was established at the light station. The sound source for this signal was a machine-operated 1,227-pound bell. The Lighthouse Board's annual report for 1898 described this fog signal as sounding a double strike every 15 seconds. By 1901, the *Light List* stated that the signal was one strike every 15 seconds.

Great Beds Light Station is located near the cities of Perth Amboy and South Amboy. Both developed during the late nineteenth century and early twentieth century into busy railway hubs with substantial maritime traffic. This led to incidents of vessels colliding with the lighthouse. The station's logbooks and Lighthouse Board correspondence between 1901 and 1914 document no fewer than 10 occasions on which barges under tow or other vessels struck the station, sometimes with damage and other times without. In several cases the ladder attached to the pier was damaged or completely torn away, or the boat suspended from davits on the lighthouse's main gallery was destroyed. In one collision the light station's privy fell into the water.[11]

Out-of-control vessels were not the only causes of damage at Great Beds Light Station. In October 1918 there was an explosion at a munitions plant in Morgan, New Jersey, south of the lighthouse. The tower vibrated from successive explosions at the plant, debris from the explosion landed in waters around the lighthouse, and three panes of glass in the lantern were broken. The broken windows caused the signal light to be extinguished six times during the subsequent night. Keeper George W. Denton, Jr., stayed in the lantern throughout the ordeal, watching the lens and relighting the lamp whenever necessary. Denton later received a commendation for his valiant effort to keep the light lit throughout the night.[12]

In early 1922 the Mayor of Perth Amboy wrote to Congressman T. Frank Appleby asking that the visibility of Great Beds Light be improved. He stated that in dense fog the light could not be seen until the tower itself was almost in view. Congressman Appleby's subsequent inquiry resulted in the Lighthouse Service investigating the matter. Its report on this concluded that increasing the power of the light would have little effect on the range of visibility in smoky or foggy conditions. It was suggested that the signal light might be seen more easily if its color was changed from red to white. However, this was determined to be unsuitable because there were already a number of white lights emanating from the shore. A white signal light at the lighthouse could be easily confused with one of those onshore. An alternative solution was to increase the signal's candlepower by installing an incandescent oil vapor (I.O.V.) lamp as the light source. However, the Lighthouse Service decided that the expense associated with this approach was not warranted at Great Beds Light. The investigation report concluded that the problem was not the signal light's visibility but its location relative to shipping channels in the area. The light was of no benefit to vessels at distances greater than approximately 0.25 mile to 1.25 miles, depending on their direction from the lighthouse. The report noted a lack of additional small unmanned lights for marking entrances and turns in the various channels nearby, and recommended that appropriations for additional lights be sought to meet navigational needs in the area.[13]

---

[11] "Correspondence of the Light-House Board, January 1, 1901-June 6, 1910"; "Correspondence of the Bureau of Light-Houses, January 1911-December 1939," File 1786; Box 1124, Entry 50, RG 26, National Archives; and "Lighthouse Station Logs, 1897-1941," [Great Beds Light Station Log Books – 1 March 1881 to 30 June 1897; 1 July 1897 to 31 July 1905; and 1 August 1905 to 31 January 1914], Box 173, Entry 80, RG 26, National Archives.

[12] Memorandum – Report of Damage Done to Light Stations By Explosion of Munition Plant on October 4th and 5th, 1918, J.T. Yates, Office of the Superintendent of Lighthouses, 3d. Dist., Tompkinsville, N.Y., 9 October 1918, "Correspondence of the Bureau of Light-Houses, January 1911-December 1939."

[13] Letters and memorandum dated January 19, 26, 28 and February 3 and 27, 1922, "Correspondence of the Bureau of Light-Houses, January 1911-December 1939."

In 1929, the Office of the Superintendent of Lighthouses for the Third District wrote a "Recommendation as to Aids to Navigation" for Great Beds Light Station. He proposed increasing the brightness of the station's fixed red light from 150 to 870 candlepower by changing its wick lamp to a 35-millimeter I.O.V lamp. Fortunately, the Lighthouse Service was in the process of updating old technology at that time. This recommendation was approved by Lighthouse Service Commissioner George R. Putnam on 16 January 1929.

The Lighthouse Service was abolished as a separate federal agency in 1939 and its duties were subsumed by the U.S. Coast Guard. In the years that followed, Great Beds Light Station underwent a series of changes. The Coast Guard removed the lighthouse's fourth order Fresnel lens in 1942 and replaced it with a modern 300-millimeter optic lighted with an electric lamp. This decreased the signal light's brightness from 870 to 200 candlepower. In 1945, the signal light was automated and the fog signal discontinued. This automation included installing a 150-millimeter optic atop a platform attached to the top of the lantern roof, thus raising the optic's focal plane to an elevation of 61 feet above sea level. The new optic also increased the signal light's candlepower.

Today, Great Beds Light is operated as an automated aid to navigation identified as number 36430 on the Coast Guard's Light List for the region. It is equipped with a modern 300-milimeter acrylic beacon installed inside the lantern. This signals a red light that flashes every six seconds and is visible for six miles in clear weather. The lighthouse structure today is largely unaltered from when it was originally built. This property continues to fulfill the same function as when it was initially established as manned light station in 1880.

Primary Sources

Annual Reports (in chronological order)

U.S. Department of the Treasury. Lighthouse Board. *Annual Report of the Light-House Board to the Secretary of the Treasury for the fiscal year ended June 30, 1878.* Washington, D.C.: GPO, 1878. Also for the years 1879, 1880 and 1881.

Light Lists (in chronological order)

U.S. Department of the Treasury. Lighthouse Board. *List of Lights and Fog Signals on the Atlantic and Gulf Coasts of the United States. Corrected to June 30, 1901.* Washington, D.C.: GPO, 1901.

U.S. Department of Homeland Security. U.S. Coast Guard. *Light List, Volume I, Atlantic Coast, 2004.* Washington, D.C.: GPO, 2004.

Unpublished Documents (in entry # order)

National Archives. RG 26. Entries 17-24 "Letters Received by the Lighthouse Board, 1852-1900." Letters Books 507 and 562. [Great Beds.]

National Archives. RG26. Entry 38 "List of General Correspondence, 1791-1900." [Great Beds.]

National Archives. RG 26. Entry 48 "Correspondence of the Light-House Board, January 1, 1901-June 6, 1910." File 3229. [Great Beds.]

National Archives. RG 26. Entry 50 "Correspondence of the Bureau of Light-Houses, January 1911-December 1939." File 1786. [Great Beds.]

National Archives. RG 26. Entry 63 "Descriptive Lists of Lighthouse Stations. 1858-1889, 1876-1939." [Great Beds Light Station, 1 January 1887.]

National Archives. RG 26. Entry 66 "Lighthouse Site Files, 1790-1939." File 25 [Great Beds Light Station].

National Archives. RG. 26. Entry 80 "Lighthouse Station Logs, 1897-1941." Box 173. [Great Beds Light Station Log Books – 1 March 1881 to 30 June 1897; 1 July 1897 to 31 July 1905; and 1 August 1905 to 31 January 1914].

National Archives. RG 26. M1373 "Registers of Lighthouse Keepers, 1845-1912." [Great Beds.]

Other

Putnam, George R., Commissioner of Lighthouses. "Beacons of the Sea, Lighting the Coasts of the United States." *National Geographic Magazine*, Vol. XXIV, No. 1 (January 1913).

U.S. Department of Commerce, Lighthouse Service. "New York Harbor and its Lights and Buoys." [Taken from an address given by George Putnam, Commissioner of Lighthouses, at the November 1922 Marine Show in New York.] *Lighthouse Service Bulletin*, Vol. II, No. 61(January 2, 1923): 261-262.

Secondary Sources

Albion, Robert Greenhalgh Albion. *The Rise of New York Port [1815-1860].* New York: Charles Scribner's Sons, 1939.

"Caisson." Britannica Concise Encyclopedia, 2004. Internet, accessed 13 September 2004, <http://concise.britannica.com/ebc/article?eu=384790>.

"Caisson." Columbia Encyclopedia, Sixth Edition, 2004. Internet, accessed 13 September 2004, <http://www.encyclopedia.com/html/c1/caisson.asp>.

Holland, F. Ross. *Lighthouses.* New York: MetroBooks, 1995.

Lee, Antoinette J. "Cast Iron in American Architecture: A Synoptic View," in *The Technology of Historic American Buildings: Studies of the Materials, Craft Processes, and the Mechanization of Building Construction*, H. Ward Jandl, ed. Washington, DC: Foundation for Preservation Technology, 1983.

NPS Form 10-900-A
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

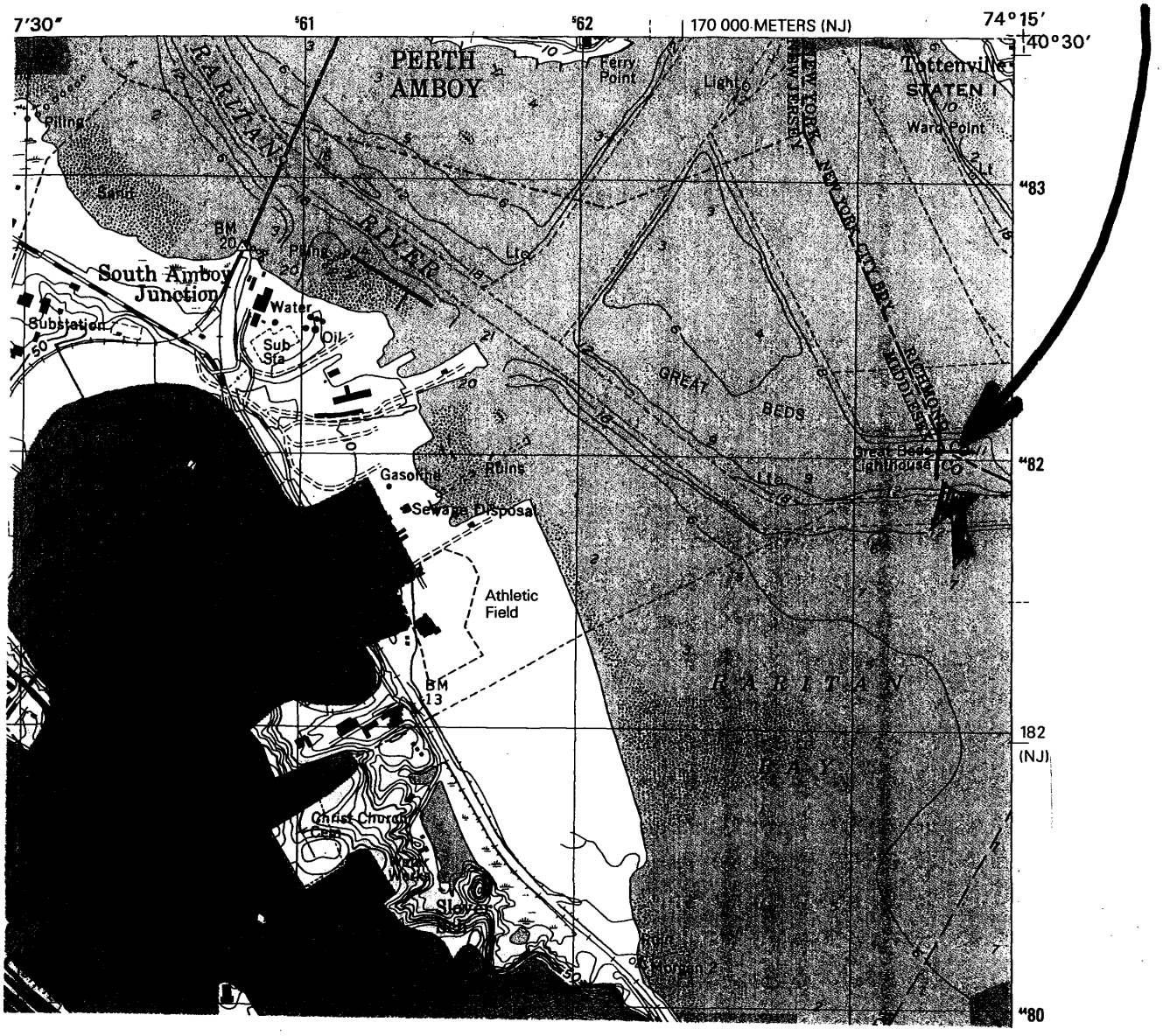
Great Beds Light Station
Middlesex County, NJ
(Light Stations of the United States
Multiple Property Listing)

LOCATION MAP

This is a portion of the "South Amboy, NJ-NY" 7.5 minute quadrangle topographic map, scale 1:24,000
(United States Geological Survey 1995).

0 2000 ▲
|___Feet___| North

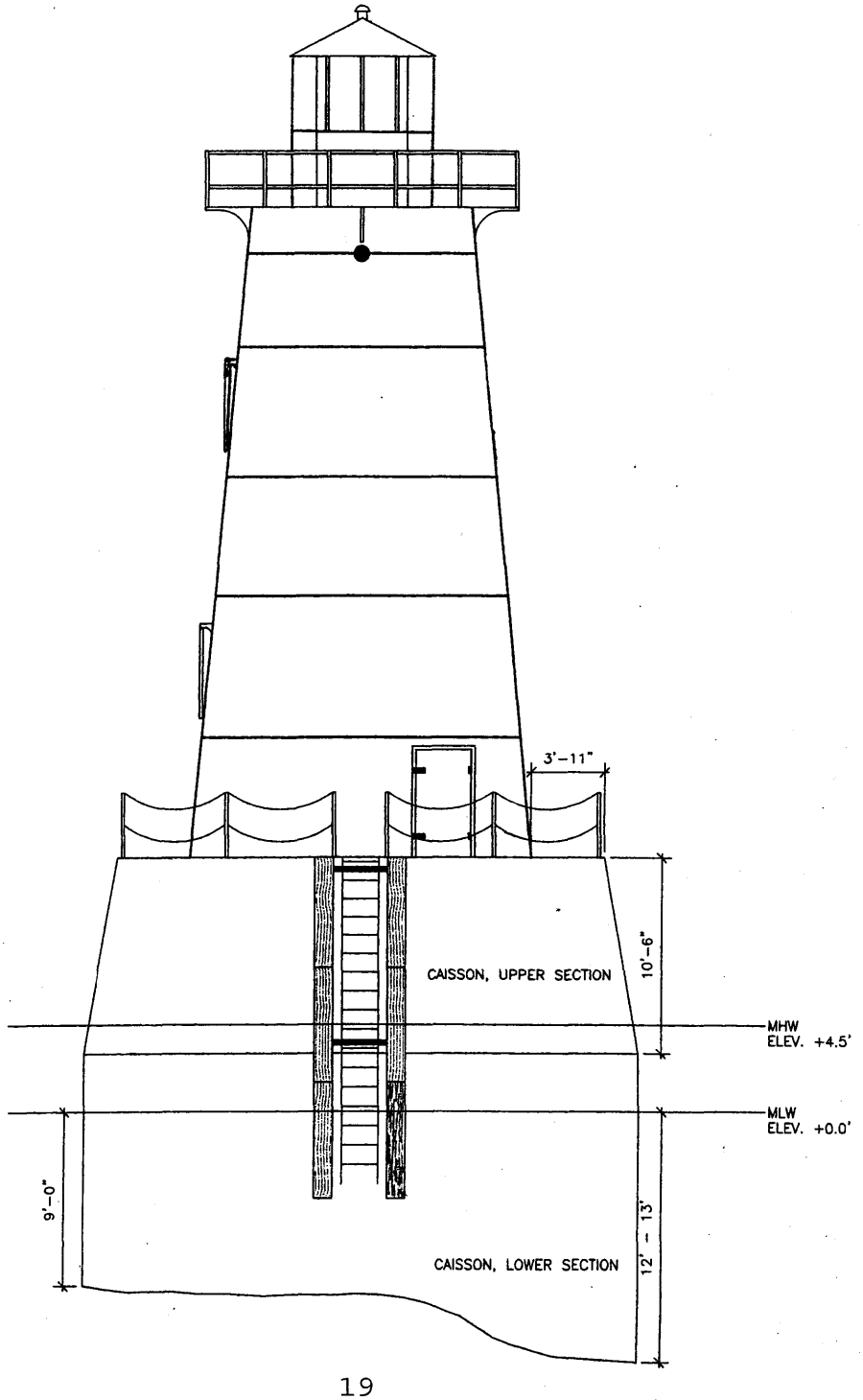
Great Beds Light Station
Middlesex County, NJ
UTM 18 / 563300 / 4882025



0 10

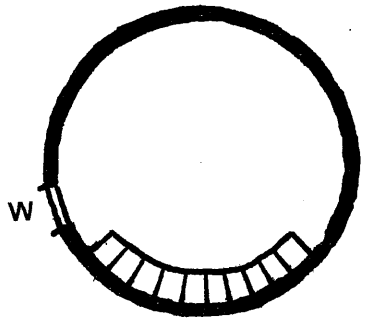
◄ North

WEST ELEVATION

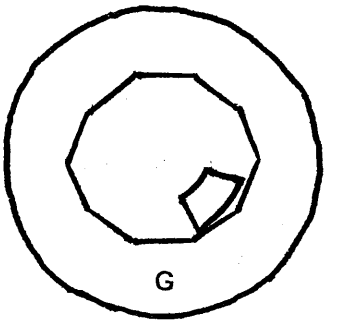


FLOOR PLANS

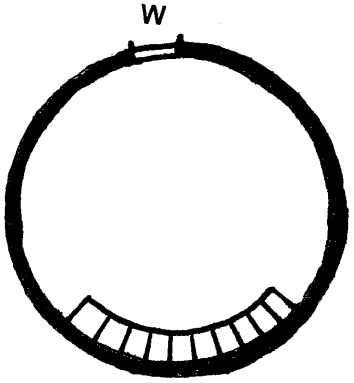
THIRD STORY



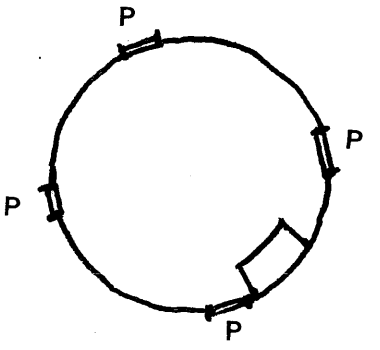
LANTERN AND LANTERN GALLERY



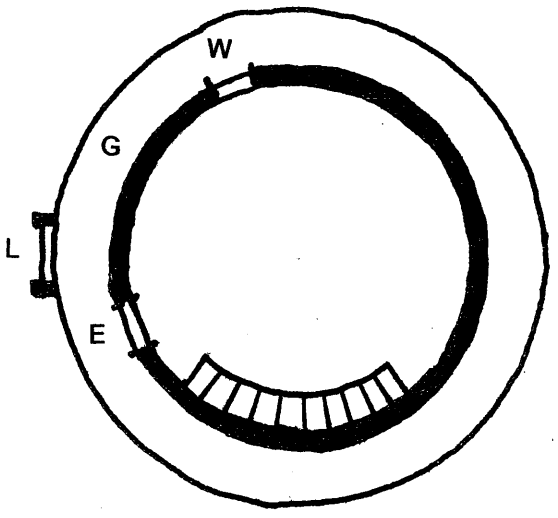
SECOND STORY



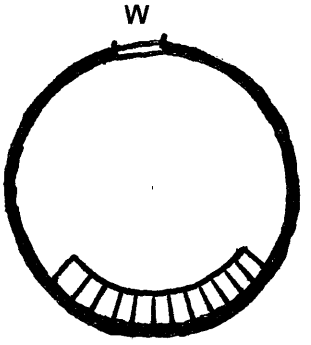
FIFTH STORY (WATCH ROOM)

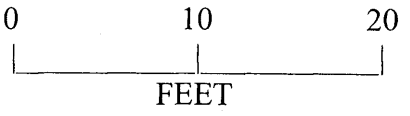


FIRST STORY AND MAIN GALLERY



FOURTH STORY





North

KEY
E = Entrance
G = Gallery
L = Ladder
P = Port-light
W = Window

LIST OF PHOTOGRAPHS

Name of Property: Great Beds Light Station
County and state: Middlesex County, New Jersey.

Contemporary Photographs (# 1 to # 4):

Name of photographer: Jennifer Perunko
Date of photographs: September 2003
Location of original negatives: Maritime Heritage Program, National Park Service, Washington, D.C.

1. View, looking northeast, showing boarding ladder and tower entrance.

2. View, looking south.

3. Interior, first story room showing alcove.

4. View of interior stairway showing brick lining on wall.

Historical Photographs (# 5 and # 6):

Location of original negative: U.S. Coast Guard Historian's Office
U.S. Coast Guard Headquarters, Washington, D.C.

5. Name of photographer: Yates (possibly J.T. Yates, Supt. of Lighthouses, 3rd Dist., Tompkinsville, NY).
   Date of photograph: 12 October 1916.
   View, looking east-northeast.

6. Name of photographer: Unknown
   Date of photograph: Circa 1945.
   View, looking east.