NPS Form 10-900 OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form 56-992

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form*. 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.

RECEIVED
MAR 31 2017
Natl. Reg. of Historic Places
National Park Service

1. Name of Property Pensacola Harbor Defense Project
Historic name: Fort Pickens
Other names/site number:
Name of related multiple property listing: N/A
(Enter "N/A" if property is not part of a multiple property listing

2. Location
Street & number: Western end, Santa Rosa Island
City or town: Pensacola State: Florida County: Escambia
Not For Publication: ☐ Vicinity: ☐

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, 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 X meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

X national ___statewide ___local
Applicable National Register Criteria:

X A ___B X C ___D

Signature of certifying official/Title: Julie A. Lee for **Date** 3/23/2017

State or Federal agency/bureau or Tribal Government

In my opinion, the property meets does not meet the National Register criteria.

11/10/16

Signature of commenting official: **Date**

Title : SHPO **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

✓ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

Signature of the Keeper For — 5.15.2015 Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	☐
Public – Local	☐
Public – State	☐
Public – Federal	X

Category of Property

(Check only **one** box.)

Building(s)	☐
District	X
Site	☐
Structure	☐
Object	☐

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

Contributing	Noncontributing	
15	10	buildings
19	2	sites
35	15	structures
0	5	objects
69	31	Total

Number of contributing resources previously listed in the National Register 1

6. Function or Use
Historic Functions
(Enter categories from instructions.)

DEFENSE: fortification

Current Functions
(Enter categories from instructions.)

LANDSCAPE: national park

7. Description

Architectural Classification
(Enter categories from instructions.)

Utilitarian
Vernacular

Materials: (enter categories from instructions.)
Principal exterior materials of the property: Concrete, weatherboard, brick, iron, steel, asphalt shingles

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Pensacola Harbor Defense Project Historic District occupies the western end of Santa Rosa Island, a linear sand formation that frames Pensacola Harbor approximately one-and-one-half miles to the south of the city of Pensacola, Florida. The historic district falls within a unit of the National Park System known as Gulf Islands National Seashore that encompasses coastal areas of Mississippi and Florida. Gulf Islands National Seashore was established to "preserve the resources, while providing an exceptional variety of outdoor recreation for the enjoyment of present and future generations."[1]

The historic district preserves surviving examples of military defense structures and features that supported the protection of a Navy base and the deep water harbor at Pensacola. Santa Rosa Island edges the entry into Pensacola Harbor to the east. The harbor has been recognized as an important strategic locale for shipping and military purposes since the Spanish began to explore and settle West Florida during the seventeenth and eighteenth centuries. The present-day assemblage of Harbor Defense Structures, which were developed between 1893 and 1943 and remained in use until 1947, represent the latest in a series of military fortifications. The Pensacola Harbor Defense Project was conceived in response to the need to defend and protect American shipping interests and shores from the emerging weaponry during the late nineteenth century. Over time, the collection of defensive batteries and supporting structures continued to evolve in response to several new threats, including aircraft, battleships and long-range artillery, U-boats and submarines, and fast motor torpedo boats. The site was operated by the U.S. Army's Coast Artillery Branch, and later the Coast Artillery Corps (CAC). Innovations in range finding, observation, sonar and radar, and mining were also incorporated into the system between the Spanish American War and World War II. The development of the atomic bomb and its employment in ending World War II generally ended the usefulness of the Pensacola Harbor Defense Project, and the Army moved out of the post on Santa Rosa Island in 1947.

Surviving evidence of the Pensacola Harbor Defense Project includes adaptive reuse of an antebellum fortification, Fort Pickens, which was built as part of an earlier coastal defense initiative referred to as the "Third System."[2] The fort was updated through the siting of Battery Pensacola, an example of an Endicott battery, within its parade ground, and use of its casemates to house equipment associated with harbor mining operations. In addition to Battery Pensacola,

[1] National Park Service, "A Report for the Proposed Gulf Islands National Seashore," January 1968.
[2] Coastal defense systems have been established in four phases by the United States government. These are referred to throughout this document as the First, Second, Third, and Fourth Systems.

Santa Rosa Island features several additional batteries associated with the Pensacola Harbor Defense Project: Batteries Van Swearingen, Trueman, Payne, Cullum, Sevier, 234, Cooper, AMTB, GPF, Worth, Langdon, and Fixed. These reinforced structures, which included gun emplacements, were supported by a suite of structures, such as battery commander's stations, radar stations, coincidence range finders, magazines, searchlights and power houses, mine support structures, post housing and administration buildings, roads, a narrow-gauge rail line, a sea wall, and other support facilities.

The historic district encompasses an area 891acres in size that extends from several defensive structures located near a former U.S. Coast Guard Station and the western end of the island, a total distance of three miles. The district extends to the waterline within this area. The historic district is nationally significant under National Register Criteria A and C in the areas of Architecture, Engineering, and Military History, for its association with the design and engineering of coastal defense systems and their evolution to meet the emerging capabilities of military armaments between 1893 and 1947. The beginning date encompasses the introduction of features of the Endicott system, while the end date represents the year the U.S. Army closed the base at Santa Rosa Island. The historic district features 15 contributing buildings, 35 contributing structures, 19 contributing sites, and no contributing objects, representing two historic contexts: U.S. Military Coastal Defense, 1812–1947, and the Battle of the Atlantic, 1939–1945. The historic district also contains several contemporary features associated with its adaptation as a state park between 1949 and 1971, and a unit of the National Park System beginning in 1972. These features constitute non-contributing features. In total there are 9 non-contributing buildings, 15 non-contributing structures, 2 non-contributing sites, and 5 non-contributing objects. Although modest changes have been made to accommodate public use of the property for education/interpretation and recreation, the historic district possesses a good degree of integrity as one of the most complete surviving collections of late nineteenth and early twentieth century coastal defense structures in the United States. As such, it retains the ability to convey its historic associations with this significant military site and coastal defense operation.

Narrative Description

Setting

Pensacola Bay falls within Florida's northwest corner, along the Gulf of Mexico coastline. Santa Rosa Island is a forty-mile-long, narrow barrier island that parallels the Florida coast. Behind it is Santa Rosa Sound, which is edged to the north by the Fairpoint Peninsula, where the Gulf Breeze community is situated. The western end of Santa Rosa Island frames one side of the opening into Pensacola Bay; the city of Pensacola is located across the bay to the north. The open water body of Pensacola Bay extends north into Escambia Bay, located at the mouth of the Escambia River, and northeast into East Bay and Blackwater Bay. The Yellow River and the Blackwater River empty into these bodies of water.

The entrance into the bay is a narrow channel bounded by western Santa Rosa Island to the east, and Perdido Key to the west. Early nineteenth century fortifications were constructed by the American War Department to defend the deep water port of Pensacola Bay following acquisition of Florida from the Spanish in 1822. Of these, Fort Pickens occupies the western tip of Santa Rosa Island, while Fort McRee is located nearly opposite on Perdido Key, slightly farther seaward. Along the northern edge of the bay are the U.S.-built Advanced Redoubt and Fort Barrancas, which incorporate an earlier Spanish water battery, Bateria de San Antonio. A quarter-mile to the east lies the site of the seventeenth-century Spanish Fort San Carlos de Austria. Naval Air Station Pensacola now surrounds these sites.

The city of Pensacola is situated along the north shore of Pensacola Bay, approximately ten miles northeast of the harbor entrance. The city occupies the higher ground between Bayou Chico and Bayou Texar. Pensacola is the county seat of Escambia County; the western end of Santa Rosa Island falls within the administrative jurisdiction of the county. Access to Santa Rosa Island occurs via U.S. Highway 98, which crosses Pensacola Bay over a large bridge that extends to the Fairpoint Peninsula. A second bridge crosses Santa Rosa Sound between Gulf Breeze and Santa Rosa Island. To reach Fort Pickens and Gulf Islands National Seashore, visitors follow a two-lane road for several miles through the center of Santa Rosa Island.

Santa Rosa Island is part of a system of barrier islands that stretch for more than 150 miles along the Gulf shore between the Chandeleur Islands in Louisiana and western Florida. Santa Rosa Island is the eastern terminus of the system. The islands are fringed by white sand beaches, derived from white quartz, that are a popular destination for picnicking, sunbathing, and swimming. The islands also possess a rich natural history and diversity of flora and fauna. Santa Rosa Island is also subject to frequent storms and overwash. Hurricanes and other severe storms have contributed to regular displacement of vegetation as well as cultural features of the built environment since recorded history, including the road that leads to Fort Pickens from the bridge landing.

Overview Description

The Pensacola Harbor Defense Project Historic District extends for three miles from the western tip of the island, to just east of a former U.S. Coast Guard Station, encompassing two searchlights. The former Coast Guard Station now serves as a National Park Service Ranger Station and Campground Registration Station. The coastal defense structures stretch over the length of the district, and are found on both the gulf and bayfront sides of the island. Many of the features are located at the far western end of the island, which is encompassed by a seawall. The coastal defense structures and support features located within and just south of the walled area, indicated as the Fort Pickens Base, are described below in association with the following areas:

- Fort Pickens/Battery Pensacola
- Batteries Cullum and Sevier
- Battery AMTB
- Battery Van Swearingen

- Battery Payne
- Battery Trueman
- Housing area
- Administrative area
- Maintenance and mine support area
- Support area

The batteries and related features that edge the seawall enclosure to the east are also described by area. From west to east, the areas include:

- Battery 234
- Battery Cooper
- Battery Worth
- Campgrounds, picnic area, and beach facilities
- Battery Langdon
- Battery Fixed
- Ranger station

These areas are connected by the road system that passes through the center of the island, and a spur road that leads south to Batteries Cooper and 234. Also linking the structures is the historic narrow-gauge rail line, which has been adapted for use as a recreational trail. It parallels the access road for much of the length of the historic district. The coastal defense structures originated over several periods, beginning with the 1890s—Batteries Cullum and Sevier, Battery Van Swearingen, Battery Pensacola, and Battery Worth—and continuing in the early twentieth century—Battery Trueman, Battery Payne, and Battery Cooper. Battery Langdon was built following World War I, while Battery 234, its associated tower, and the casemates at Battery Langdon were constructed during World War II.

Resource Descriptions

FORT PICKENS BASE

Fort Pickens/Battery Pensacola

Fort Pickens (one contributing structure). Fort Pickens was constructed between 1829 and 1834 by the U.S. Army Corps of Engineers as a Third System coastal defense military fortification designed to protect the U.S. Navy Yard and deep water harbor at Pensacola Bay. Fort Pickens was the largest, and first completed, of four fortifications built on the two low-lying islands that formed the opening into the bay, and on either side of the peninsula where the navy yard was to be built, during the early to mid-nineteenth century.

Fort Pickens is a pentagonally shaped brick masonry fortification that measures approximately 780 feet north-south by 680 feet east-west in plan, and is composed of two long casemated vertical walls, or scarps, with bomb-proof openings for artillery that face west, two shorter

casemated scarps that face southeast and northeast, and a large scarp, counterscarp, and gallery system that faces east toward the island interior. The fort design featured a bastion at each corner that contained its own artillery emplacements. Two powder magazines survive within the easternmost bastions of Fort Pickens. Ventilator windows are part of the design of the rooms. Wood linings were installed to keep the powder dry, while the use of copper and brass hardware prevented sparks. The bastions project forward of the 40-foot-high, 12-foot-thick walls to allow for cross fire with the facing bastion. The so-called "Tower Bastion" faced the end of the island. A 15-inch Rodman sits atop the Tower Bastion today, while a rifled (or converted) 8-inch Rodman is located on the northwest wall where a similar weapon was mounted as late as 1901.

The fortification was built on a foundation that featured reverse arches on the two west walls, which are the longest and mounted the most cannon, in order to spread the weight of the structure and minimize settling within the sand substrate. The single tier of casemates that formed each front were composed of interior spaces designed to house emplaced artillery. The walls were topped with a sand parapet. The casemates have groined arch construction. Granite semicircles in the floor supported the heavy weight of the cast iron guns. Slots under the windows were used to lock gun carriages into the wall and provide a pivot point. Vents over the windows allowed the smoke produced by the black powder ammunition to disperse. An additional tier of guns was designed for emplacement atop the terreplein en barbette. The fort was designed for 205 guns of various types and calibers.[3]

A dry moat originally surrounded the fort, beyond which the land was graded to form a glacis, or downward sloped plain that facilitated viewing and firing from the fort. The masonry structure was also designed to include quarters for the officers in the southeast- and northeast-facing fronts. The quarters were plaster-lined rooms with wood window and door openings, and marble fireplace mantles. The officers' quarters were fronted with piazzas. No blindages were part of the design; the only remaining blindage was erected during the Civil War to protect a magazine.

The exterior walls formed an interior open space, known as the parade, which measures approximately 3 acres. The parade was used for drilling and quartering troops. The main gate, or sally port, is in the center of the northeast front and was secured with heavy oak doors. It was connected to a causeway that led to a wharf on the bay. Abatis once edged the fort in this direction to serve as an obstacle to attackers.

Two cisterns provided the water supply for the fort. Rainwater from the arches was channeled to the cisterns. The ruin of the remaining cistern is in the southwest bastion; the face of this bastion collapsed during demolition work conducted in 1916.

Since its original construction, several modifications have been made to Fort Pickens. Between 1893 and 1895, the U.S. Army Corps of Engineers converted casemates 86 and 87 in the northeast bastion of Fort Pickens into a bombproof shelter for electric batteries used to power a

[3] Edwin C. Bearss, *Historic Structure Report and Resource Study; Pensacola Harbor Defense Project* (Denver, Colorado: National Park Service, March 1982), 124, 184.

minefield in the harbor. Shelving was built in the gallery of Bastion E, and casemate floors next to the sally port were cemented for storing searchlights and cables for the mines. A cable gallery was constructed, connecting the fort with the bay. In 1894, several casemates were converted to shelter electric batteries. Dampness forced relocation of the batteries to a new brick mine casemate building that was constructed outside the fort in 1905–1907.

Battery Pensacola, an Endicott battery, was constructed over a portion of the interior parade ground circa 1898–1899. This battery is described separately below. Interior spaces and casemates of Fort Pickens were adapted for use to support the battery, including munitions storage, and a power plant built in 1903. The casemate that served as the power plant has a concrete floor today, used to support gas powered generators that provided electricity for searchlights and other equipment. Concrete shelf supports located within some of the casemates today held mine equipment and later extra ammunition for the guns of Battery Pensacola. A narrow-gauge rail line was built to pass through the sally port to convey building materials to the site for Battery Pensacola. In 1915, engineers removed the sand from the parapet of two of the Fort Pickens walls and then blasted away the upper 3 or 4 feet of portions of the masonry to enhance the field of fire associated with Battery Pensacola's 12-inch guns. The casemates and quarters associated with the south wall of the fort collapsed during the blasting.

On June 20, 1899, the northwestern corner bastion (Bastion D) was destroyed when the 8,000 pounds of black powder stored in the magazine exploded following spread of a fire in a nearby warehouse. The explosion also did extensive damage to the mine defense facilities.

A refrigeration room was added beneath the Tower Bastion circa 1900. On September 26, 1906, a severe hurricane struck Pensacola, inflicting heavy damage on the Santa Rosa Island installation. In response, U.S. Army Corps of Engineers District Engineer Cavanaugh recommended erecting a concrete seawall around the installation to protect the facility from future hurricanes. Within two years, a masonry and concrete structure measuring 11 feet high, 13 feet wide at the base, and 5 feet wide at the top had been completed, and the area within the seawall filled. A concrete-lined ramp was constructed over the seawall to allow rail access to the wharf.

The fort was further modified prior to 1942, when the U.S. Army Corps of Engineers constructed a road through the southeastern corner of the counterscarp. This was later connected to the road to Pensacola Beach, completed in 1954. The wall was reworked around the road in 1991 to enhance its appearance, including the addition of a plaque mounted in the new section of the wall that reads "Fort Pickens 1834."

The National Park Service restored several aspects of the fort as related to its original construction between 1972 and 1997, and addressed masonry conservation needs. The agency mounted several cannon on carriages within the fort in 1993; in 1994, a 15-inch Rodman provided by the Smithsonian Institution was placed within the fort.

Today, most of the scarp wall system, four of the original bastions, and the counterscarp and a portion of the dry moat survive from the original construction of Fort Pickens. During the late nineteenth and early twentieth century, several changes were made to Fort Pickens to accommodate the Pensacola Harbor Defense Project. Smoothbore cannon were replaced, recycled, or converted to rifled cannon, while sections of the breast-height masonry walls were lowered. The sand parapet wall was removed to enhance the field of fire associated with Battery Pensacola. Modifications to the Third System structure to accommodate the engineering technology associated with the Endicott System also survive with integrity. As such, Fort Pickens survives with sufficient integrity to contribute to the significance of the Pensacola Harbor Defense Project Historic District.

Battery Pensacola (one contributing structure). Battery Pensacola is located within and covers nearly half of the parade ground of Fort Pickens. This reinforced concrete structure was built in 1898–1899 in anticipation of Pensacola's involvement in the Spanish American War. Battery Pensacola was designed by the U.S. Army Corps of Engineers to emplace two breech-loading 12-inch rifles. The guns were Model 1895 and mounted on Model 1897 disappearing carriages. They were capable of firing 1,070 lb. shells approximately 8 miles into the Gulf. They were designed to protect the harbor entrance just beyond the curved section of Santa Rosa Island's south side.

The battery was constructed from concrete mixed on the island in a temporary concrete plant. Materials were conveyed to the interior of Fort Pickens via the narrow-gauge railroad. Battery Pensacola is a two-level battery with an open arcade with square columns on the north face, double stairways on the east and west that lead to the second level, and 25-foot-diameter open gun emplacements that flank the center arcade. The south side is earth covered.[4] The battery measures approximately 325 by 167 feet in plan, and reaches a height of 26 feet. The center of the structure is marked by a three-level reinforced concrete battery commander's station constructed in 1907. The structure has a flat concrete roof and a horizontal opening near the top of the upper level for viewing toward the ocean. Door openings are located near the center of the side walls (Photograph 1).

The first level consists of various rooms used to store projectiles, powder charges, and tools. Features of the structure that survive today include block and tackle beams, an overhead rail system, and ammunition elevators used to move the 1,070 lb. projectiles.

The upper level, reached by metal and concrete stairways from both inside and outside, contains two 25-foot-diameter pits for mounting the 12-inch disappearing rifles. A spotting tower can be reached by stairs between and to the rear of the pits. The outside of the battery is painted black to decrease glare, while the inside walls are white.

[4] National Park Service, List of Classified Structures, 2014.

To obtain proper command of the area fronting Fort Pickens, it was necessary to raise the interior crest of the proposed battery above the breast height wall of Fort Pickens.[5] Because the battery divided Fort Pickens into two and cut off the ability to pass between the south and north parades while blocking access to casemates on the south and southwest fronts, the U.S. Army Corps of Engineers constructed a tunnel, 8 feet wide and 9 feet high, in 1898 that extended around the left flank of the battery. The tunnel afforded access to warehouse areas on the south side of Fort Pickens. In 1915–1916, Fort Pickens was modified to enhance the field of fire of Battery Pensacola's guns through the lowering of the breast-height brick wall and sand parapet on the south scarp. In 1917, the two disappearing carriages were modified to improve their performance, including the cutting away of some concrete around their base rings. The crest of the parapet was modified in order to provide sufficient clearance when the guns were retracted.[6] A power station was built in 1920 to service the battery. Its placement, however, sealed the entrance to the tunnel.

In 1933, Battery Pensacola was listed as surplus. Its guns were shipped to the U.S. Army arsenal in Watervliet, New York, in 1934 and the carriages sold for scrap in 1942. The battery was used for storage during World War II. The National Park Service restored Battery Pensacola in 1985.

Although it no longer contains artillery pieces and has been modified to a degree since 1947 to address visitor access needs, Battery Pensacola retains sufficient integrity to convey its historic associations and contributes to the historic district.

Battery commander's station (one contributing structure). In 1907–1908, a splinter-proof battery commander's station was erected on the platform of Battery Pensacola, oriented to view south towards the ocean. In order to avoid siting the structure so that it would become a target for enemy fire while also ensuring a clear view from the station, portions of the Fort Pickens wall were lowered. The three-story structure is composed of concrete and measures approximately 10 feet square in plan. It features a flat concrete roof, a narrow opening along the top of the wall for viewing, and door openings on either side wall. The Battery Pensacola Battery Commander's Station is little changed from its original construction and retains sufficient integrity to convey its historic associations. The structure contributes to the significance of the historic district.

Mine casemate building (Building 9) (present-day restroom building) (one contributing building). Constructed in 1905–1907, the mine casemate building, later the fire control switchboard room, was used to store harbor mine batteries, mine equipment, and instruments following removal from the Fort Pickens casemates due to humidity and dampness problems that were detrimental to the sensitive electrical instruments. The brick building was constructed by the U.S. Army Corps of Engineers in the dry moat between the counterscarp and the scarp walls of Bastion E of Fort Pickens. A mine battery commander's station added to Fort Pickens above the building in 1909 was heavily damaged during a hurricane in 1926. The hurricane also

[5] Bearss, *Historic Structure Report and Resource Study*, 95.
[6] Ibid., 119.

destroyed elements of the mine system. In response, the program was discontinued and mine defense responsibilities were transferred to the Navy.

After the submarine mine defense system was eliminated from the Pensacola Harbor Defense Project in 1926, the mine casemate building was converted into the fire control switchboard room. The building was likely converted from a single-level structure into its present-day split-level design at this time given that the current level is exactly 4 feet higher than the original, which was the level of the water inside the seawall resulting from the 1926 hurricane. Also the fire control switchboard room was always divided into two or more sections.

The building was later adapted for use as a restroom during the State Park period (1949–1971) through its division into two sections. The east end was converted into a single interior room that is currently used for storage.[7]

The one-story brick building measures approximately 35 by 24 feet in plan. It is composed of two parts. The west end is lower in height, at 10-1/2 feet, and features a very shallow hipped standing seam metal roof. There are two door and window openings on the north face of this part of the building that afford access to restrooms. The eastern part of the building features a gable roof covered with standing seam metal that rises to a height of 14-1/2 feet. The building has a raised entry on the north face accessed via a double brick staircase. The double door entry is located near the western end of the north facade and is edged by two windows. The foundation of both parts of the building is concrete.[8]

Despite the interior changes to accommodate evolving uses, the exterior of the building remains relatively intact. The mine casemate structure retains sufficient integrity to convey its historic associations, and thus contributes to the significance of the historic district.

Concrete walks (one non-contributing structure). Concrete walks lead into Fort Pickens and through the parade ground to the casemates and stairs associated with Battery Pensacola and the Fort Pickens terreplein. These walks were built during the State Park era in 1953.[9] In 1991, the National Park Service improved the walk system to accommodate accessibility. The path system postdates the period of significance and thus does not contribute to the significance of the historic district.

Wood fencing (one non-contributing structure). Wood post-and-rail fencing limits access to the turf areas of the Fort Pickens parade ground and directs visitors to use the walks. This fencing was installed by the National Park Service. It thus postdates the period of significance and does not contribute to the significance of the historic district.

Wayside exhibits (one non-contributing object). A system of wayside exhibits provides interpretive information for visitors around the Fort Pickens base area. These signs are composed

[7] Personal communication, David Ogden, December 2015.
[8] National Park Service, List of Classified Structures, 2014.
[9] Resolution, July 27, 1953, Florida Board of Parks and Historic Memorials.

of metal carriers that support enamel panels. They have been installed along the walks within Fort Pickens and elsewhere around the base in association with several historic buildings and Pensacola Harbor Defense Project defensive structures. These exhibits were installed by the National Park Service and thus postdate the period of significance; they do not contribute to the significance of the historic district.

Flagpole (one non-contributing object). A flagpole that flies the United States flag is located on Bastion E in the northern part of Fort Pickens. A flagpole was erected at this location by the National Park Service in 1978; the current pole was erected in 2014, replacing the earlier one, which was destroyed by lightning. The flagpole postdates the period of significance and does not contribute to the significance of the historic district.

Artillery exhibits (one non-contributing object). Within the Fort Pickens base, the National Park Service has established several artillery exhibits for the education of visitors. Artillery exhibits are located around Fort Pickens as well as near the museum. Few, if any, of the artillery pieces were originally associated with Fort Pickens or the Pensacola Harbor Defense Project. It is possible that the two Rodman rifle conversions, comprising 8-inch rifles from 10-inch smoothbores—one located in the parade ground and the other mounted on a reproduction carriage on the northwest wall—were left by the U.S. Army.[10] Some of the artillery pieces currently displayed were acquired during the State Park era, while others were donated by the Smithsonian Institution, or otherwise acquired by the National Park Service. These exhibits postdate the period of significance and thus do not contribute to the significance of the historic district.

Batteries Cullum and Sevier

Battery George W. Cullum (one contributing structure). Battery Cullum is located along the south side of the main road west of Fort Pickens. It faces south toward the Gulf of Mexico. The battery is located in close proximity to Battery Van Swearingen. Constructed in 1896–1897 as part of the Harbor Defense Project based on the Endicott plan, this battery structure was originally built to emplace four 10-inch disappearing rifles. It was constructed of reinforced concrete and iron, with earth fill surrounding the sides and rear. The concrete was produced in a temporary cement plant established nearby by the U.S. Army Corps of Engineers. Materials used in its construction were delivered to the site via the narrow-gauge rail line.

Battery Cullum measures 325 by 167 feet in plan and features two levels. The upper level platform houses four round gun emplacements where the carriages and rifles were originally located, while the lower level includes concrete rooms that housed magazines, a dynamo room, and a lighting plant. The concrete loading platforms, reached via two sets of concrete steps, were edged by handrails, and connected to ammunition conveyors, shot cranes, and hoists. The gun carriages were edged by soil revetments and sand parapets (Photograph 2).

[10] If confirmed, these two features would fall within the period of significance and could be considered contributing objects.

Several modifications were made to the battery over the years. In 1900, two new rooms were added to the lower level to accommodate a generator and storage battery. In 1903, the loading platforms were determined to be too narrow for proper service of the guns. A plan for widening the platforms was coordinated with the building of rooms for additional shells and relocators on the lower level.

In 1914, the Chief of the Coast Artillery called for the division of Battery Cullum into two batteries, each to operate a pair of 10-inch rifles. Each battery would have its own fire control equipment, while sharing a single battery commander's station and plotting room. The second was known as Battery John Sevier. The reinforced concrete Battery Commander's Station, which measured 10 feet square, had a flat roof, and a narrow opening near the top for viewing out to sea, was located behind platforms 3 and 4, and the plotting room was sited on the lower level beneath the station. These changes were completed between 1914 and 1916 (see also Battery Sevier, below.)

In 1922–1923, a new power station was built to service both batteries. As noted below, a battery commander's station/coincidence range finder was added to the east flank of Battery Cullum to support Battery Payne in 1943.

Battery Cullum, although altered to accommodate evolving technology and military defense engineering practices, has been little changed since the end of the period of significance except for structural deterioration. As such, it retains sufficient integrity to convey its historic associations and contributes to the significance of the historic district.

Battery commander's station/coincidence range finder (one contributing structure). In 1943, a new battery commander's station/coincidence range finder was added on the east flank of Battery Cullum to serve Battery Trueman, which was relocated to this position to provide better coverage of the beach and water areas. In preparation for the transfer, Battery Cullum's two 10-inch rifles were removed in 1942, after which Battery Trueman's two 3-inch rapid fire guns were installed on concrete platforms between emplacements 1 and 2.

Battery John Sevier (one contributing structure). Battery Sevier was formed from the division of Battery Cullum into two batteries between 1914 and 1916. Battery Sevier measures 300 by 165 feet in plan. The features of the battery are consistent with those described above for Battery Cullum (refer to Photograph 2). The surviving 10-inch disappearing rifle positions are the only ones remaining within the area, and are unique to the United States.[11]

In 1943, the meteorological station was relocated to the new, three-story, Harbor Defense Signal Station built at Battery Sevier. The battery commander's station/coincidence range finder on the west flank of Sevier was for Battery Payne. It is also within the fence. Battery Sevier, although altered to accommodate evolving technology and military defense engineering practices, has been little changed since the end of the period of significance except for structural deterioration.

[11] Anne Castellina-Dudley, Draft National Register nomination: *Fort Pickens Historic District* (Pensacola, Florida: Gulf Islands National Seashore, May 27, 1977).

As such, it retains sufficient integrity to convey its historic associations and contributes to the significance of the historic district.

These battery structures are currently enclosed within chain link fencing to limit visitor access due to structural concerns.

Battery commander's station (one contributing structure). A battery commander's station was built on the west flank of Battery Sevier to support Battery Payne in 1943. This structure, which is located within the fence surrounding Batteries Cullum and Sevier, is little changed from its original construction and retains sufficient integrity to convey its historic associations. The structure contributes to the significance of the historic district.

Power station (one contributing structure). Built in 1922–1923 to service batteries Cullum and Sevier, the power station is a reinforced concrete structure located adjacent to the exterior slope of Battery Cullum near the midpoint between the two batteries. The structure measures approximately 24 by 16 feet.

The Battery Cullum and Sevier power station is little changed from its original construction and retains sufficient integrity to convey its historic associations. The structure contributes to the significance of the historic district.

Battery commander's station and coincidence range finder (one contributing structure). In 1943, the U.S. Army Corps of Engineers added a second battery commander's station and coincidence range finder to the Battery Cullum and Sevier complex in order to accommodate the relocation of Battery Trueman's two 3-inch rapid fire guns. The 10-foot-square reinforced concrete structure is located at the eastern edge of Battery Cullum. In order to construct the new feature, existing signal and meteorological stations were relocated to Battery Sevier.[12]

The Battery Trueman Battery Commander's Station and Coincidence Range Finder structure is little changed from its original construction and retains sufficient integrity to convey its historic associations. The structure contributes to the significance of the historic district.

Fencing (one non-contributing structure). Chain-link fencing surrounds Batteries Cullum and Sevier. It was installed by the National Park Service to limit access by visitors to the structure, which is in poor condition. The fencing postdates the period of significance and thus does not contribute to the significance of the historic district.

Battery AMTB

Battery AMTB 90 mm gun platforms (one contributing structure). In 1943, the U.S. War Department authorized the establishment of an AMTB battery for the Harbor Defense Project designed to protect against torpedo boats. The battery was composed of four 90 mm guns. Two were placed in front of the Fort Pickens seawall, 150 yards southeast of Battery Cullum, while

[12] Bearss, *Historic Structure Report and Resource Study*, 58.

the other two were mobile and without a fixed position. A magazine was built in the glacis of Battery Cullum to support use of Battery AMTB.

The ATMB gun emplacements are cylindrical, concrete platforms with flat outer concrete rims that measure 26 feet in diameter. They are spaced approximately 100 feet apart. The remains of several metal pipes extend from the platforms. While both of these gun emplacements exhibit evidence of deterioration, the northwest platform is more intact than the southeast platform. The guns themselves were removed after World War II.[13]

Although the battery no longer contains artillery pieces and has deteriorated to a degree since 1947, Battery AMTB retains sufficient integrity to convey its historic associations and contributes to the historic district.

Magazine (1 contributing structure). Located in the southeast glacis of Battery Cullum is the magazine for Battery AMTB.

Battery Van Swearingen

Battery Joseph Van Swearingen (one contributing structure). Battery Van Swearingen is located along the south side of the loop road west of Fort Pickens and oriented to face the Gulf of Mexico. The battery is located just west of Battery Sevier, and was constructed in response to the threat of war with Spain. Construction began on April 7, 1898, and the battery was turned over to the Coast Artillery Corps with guns mounted on June 29 of that year. Some finishing touches were added in the latter part of 1898. Battery Van Swearingen is an Endicott defense structure designed for the emplacement of two 4.7-inch rapid-fire guns mounted on pedestal carriages.[14] The U-shaped reinforced concrete structure, which measures 105 by 89 feet in plan and is edged by earthen parapet slopes, has two levels. The upper level features a platform with gun emplacements at the southeast and southwest corners to accommodate 4.7-inch rapid fire rifles. The lower level features concrete-walled rooms for ammunition and other storage. The concrete for the structure was mixed on site at a temporary cement plant. The south wall extends above the level of the emplacement platforms (Photograph 3).

Several changes were made to the battery during the twentieth century. Circa 1917, the guns emplaced at Battery Van Swearingen were declared surplus to the needs of the Pensacola Harbor Defense Project and dismounted in winter 1917–1918. They were then shipped to the Watervliet Arsenal. In mid-March 1919, the War Department reversed course and decided to retain the battery as part of the Pensacola Harbor Defense Project, and the guns and their carriages were returned to Florida, where they were placed in storage. By May 1921, the War Department had again reconsidered its position and ordered the guns and carriages disposed of. In 1922–1923, the battery was repurposed to include a coincidence range finder for the 3-inch rapid fire guns associated with batteries Payne and Trueman. The concrete coincidence range finder is located in

[13] National Park Service, List of Classified Structures, 2014.
[14] Bears, *Historic Structure Report and Resource Study*, 87–88; National Park Service, List of Classified Structures.

emplacement 1.[15]

Despite the changes that were made to the structure by the U.S. Army Corps of Engineers during the period of significance, Battery Swearingen retains sufficient integrity to convey its historic associations and contributes to the historic district.

Coincidence range finder (one contributing structure). Located atop the upper level platform of Battery Van Swearingen in gun emplacement 1 is a coincidence range finder built in 1922–1923 to support the artillery positioned at Batteries Payne and Trueman. The reinforced concrete structure measures 10 feet square in plan. It is composed of foundation walls and an interior platform set 6 feet above the ground surface. The walls of the structure are 18-inches thick. The structure features a viewing slit centered 4 feet above the instrument pedestal. When not in use, the instruments were stored in the former magazine of Battery Van Swearingen.[16] Access to the southeast elevation and doorway is via a concrete stairway.

The coincidence range finder at Battery Swearingen has been little altered since 1947. As such, it retains sufficient integrity to convey its historic associations and contributes to the historic district.

Latrine (one contributing building). Located to the north of the loop road, across from Battery Swearingen, is a latrine. The one-story wood frame structure was built circa 1939–1945 to support Army operations within the base at Fort Pickens. The structure, which faces west, measures 18 by 20 feet in plan. It has a front-gable roof, clad with green asphalt shingles, and open cornices. The building is clad with weatherboards, painted white, and has a concrete foundation. The front elevation has two bays, each with a single wood panel door. One louvered window is in the gable above the doors. The east elevation has two small screened windows and a centered louvered window in the gable (Photograph 4).[17]

The latrine has been little altered since 1947. As such, it retains sufficient integrity to convey its historic associations and contributes to the historic district.

Battery Payne

Battery Matthew M. Payne (one contributing structure). Battery Payne is located to the west of Battery Van Swearingen within the Fort Pickens base area and inside the seawall that edges the western end of Santa Rosa Island. Constructed in 1904 based on plans prepared by the U.S. Army Corps of Engineers, Battery Payne measures approximately 121 by 70 feet in plan. The battery is an earth covered reinforced concrete structure with stairs on the southeast that lead to a tunnel and underground storage area. The earthen features are inclined and rounded to deflect projectiles. The storage area is composed of three concrete-walled rooms marked by iron doors. The interior space is topped by a concrete hipped roof. Battery Payne was designed to serve an

[15] National Park Service, List of Classified Structures, 2014.
[16] Bearss, *Historic Structure Report and Resource Study*, 91.
[17] National Park Service, List of Classified Structures, 2014.

emplacement of two 3-inch rapid-fire guns on pedestal mounts. The battery was sited to aim at the entrance into Pensacola Harbor and protect against fast torpedo boats and destroyers. Together with Battery Trueman to the north, these guns afforded a 360 degree field of fire. The two gun emplacements are located on a concrete platform reached via flights of concrete stairs at either end (Photograph 5).[18] The battery is protected to the rear by a parados, or low earthen mound. Associated with the battery is an underground water tank marked by two square concrete manholes protruding about 4 feet above ground level. A reinforced concrete igloo-type magazine was constructed north of Fort Pickens to house the munition associated with the battery.

Several changes were made to the battery during the first half of the twentieth century. In response to concerns regarding the battery's proximity to the ocean and 6 foot elevation above sea level, it was shielded by groins made of riprap from the debris of the Fort Pickens bastion that was destroyed in the ammunition blast on June 20, 1899. This protective system was replaced by the sea wall completed in 1910.

In 1923, a coincidence range finder was built to service Battery Payne on the abandoned gun emplacement 1 of Battery Van Swearingen, as noted above. In 1943, a combined splinter-proof battery commander's station/coincidence range finder was built on the west flank of Battery Sevier to support Battery Payne, as the earlier structure was determined to be obsolete.[19] (See previous descriptions of these features, above.)

Battery Payne has otherwise been little altered since 1947. As such, it retains sufficient integrity to convey its historic associations and contributes to the historic district.

Concrete manhole structures and water tank (one contributing structure). Associated with the battery are two modest concrete structures that measure approximately 4 feet in height and 3 feet square, and feature a concrete lid. These structures are concrete manholes associated with an underground water tank built to support Battery Payne and its use in the Pensacola Harbor Defense Project. These structures survive with integrity and contribute to the significance of the historic district.

Igloo magazine (one contributing structure). An igloo magazine to support munitions storage associated with the operation of Battery Payne's two guns was constructed in 1943 to the north of Fort Pickens. The magazine is a cylindrically shaped reinforced concrete structure, upright in form, with a concrete foundation, poured tar roof, and corrugated metal walls. The magazine measures approximately 20 by 11 feet in plan, and is 7-1/2 feet tall. The entrance is located in the northwest elevation. It is marked by an approximately 30-foot-long by 9-1/2-foot-high trapezoidal concrete wall with a central door. The southeast end has a concrete chimney.[20]

The igloo magazine associated with Battery Payne has been little altered since 1947. As such, it retains sufficient integrity to convey its historic associations and contributes to the historic

[18] Ibid.
[19] Bearss, *Historic Structure Report and Resource Study*, 176–177.
[20] National Park Service, List of Classified Structures, 2014.

district.

Battery Trueman

Battery Alexander Trueman (one contributing structure). Battery Trueman is located near the far western end of Santa Rosa Island, north of Battery Payne and inside the seawall that surrounds Fort Pickens. It was constructed in 1905 based on plans prepared by the U.S. Army Corps of Engineers to emplace two 3-inch rapid fire rifles designed to work with the guns at Battery Payne in defending the entrance into the harbor against fast torpedo boats and destroyers. The batteries were placed far enough away to reduce the effect of their blasts on one another. Similar construction methods and concerns regarding the proximity to the ocean are associated with the construction of batteries Trueman and Payne. The guns were emplaced at Battery Trueman to allow for a sweep of the harbor's interior waters while also covering the minefield and channel. However, the design left one dead angle. This angle was covered by the guns of Battery Payne.

The battery is constructed of earth and concrete. It measures approximately 120 by 82 feet in plan. The two-level, earth covered battery has stairs on the southeast that lead into a tunnel, three-room storage and magazine area with iron doors, and a flat concrete roof. The roof is flanked by stairs that lead to the two gun emplacements (Photograph 6). White wooden signs formerly helped distinguish the two batteries. An underground water tank identical to that at Battery Payne, and similarly marked by two square concrete manholes protruding about 4 feet above ground level, is located 20 feet northeast of the battery.

In 1922, a coincidence range finder was built 100 feet northeast of the battery to support its guns. In 1943, in order to provide better coverage of the beach and open water along the southern shores of Santa Rosa Island, Battery Trueman was relocated to the site of former Battery Cullum. The battery's two 3-inch rapid fire guns were relocated to the position's concrete platforms between former emplacements 1 and 2.

Despite the changes that have occurred to Battery Trueman over the years, it retains sufficient integrity to convey its historic associations and contributes to the historic district.

Coincidence range finder (one contributing structure). In 1922, a coincidence range finder was constructed 100 feet northeast of Battery Trueman to support accurate aiming and firing of the guns using the most up-to-date technology available. The reinforced concrete structure measured 10 by 10 feet (interior dimension). It was supported by concrete foundation walls and featured a platform or interior floor approximately 6 feet above the ground. To provide the structure with a low silhouette, sand and earth were embanked against three of its elevations to within 6 inches of the observation opening. Access to the southeast elevation and doorway was provided by a concrete stairway (Photograph 7).[21] The station was equipped with an azimuth measuring

[21] Bearss, *Historic Structure Report and Resource Study*, 176.

instrument, three telephones and headsets, as well as three telephone terminal blocks, and a terminal box.[22]

Although it no longer includes the original range finding equipment, the coincidence range finder has otherwise been little altered since 1947. As such, it retains sufficient integrity to convey its historic associations and contributes to the historic district.

Concrete manhole structures and water tank (one contributing structure). A sand path and flight of concrete stairs lead from the base perimeter loop road to Battery Trueman. Sited alongside the path are two modest concrete structures. One is approximately 4 feet in height and 6 feet long by 2 feet wide. It has a concrete lid. A second concrete section extends from half of the structure to its east. This portion is lower in height and open to the air. The second is approximately 4 feet in height and 3 feet square, and is covered with a metal plate. These structures are concrete manholes associated with an underground water tank built to support Battery Trueman and its use in the Pensacola Harbor Defense Project. These structures survive with integrity and contribute to the significance of the historic district.

Comfort station near Battery Trueman (one non-contributing building). Located along the perimeter road inside the seawall in close proximity to Battery Trueman is a concrete comfort station constructed by the National Park Service in 2009. The pre-fabricated, one-story structure measures approximately 16 feet square. It has a low-pitched gable concrete roof with a shallow overhang on all sides, and sits on a concrete slab. An enclosure that is open at the top extends behind the building. It has separate areas for two outdoor shower systems. The building is entered from the west, facing the road. L-shaped concrete walls extend from the sides across the front of the building toward the middle to shield the entrances to men's and women's bathroom areas. Two small horizontally oriented rectangular window openings are set in the upper portion of the north and south walls. There is a door centered in the principal facade, and two additional window openings between the central door and the bathroom areas. A ramp leads to the concrete slab from parking spaces in front of the building. This building postdates the period of significance associated with the Pensacola Harbor Defense Project Historic District and does not contribute to its significance.

Housing Area

The housing area is composed of a cluster of buildings located approximately 300 yards northwest of Fort Pickens. These structures are wood frame buildings with white painted clapboard siding, dark green asphalt shingle roofs, and white trim. All were built between 1898 and 1919. The buildings are accessed via the asphalt road system that extends through the center of the base. Parking is afforded along the road margins.

Lieutenant's quarters (Building 2) (one contributing building). The officer's quarters is one of three quarters buildings located in a row along the access road. It is identical to the adjacent

[22] Ibid., 177.

lieutenant quarters. The quarters building was constructed in 1900, based on designs prepared by the U.S. Army Quartermaster Department, to house officers stationed at Fort Pickens.

The 1-1/2-story quarters building measures approximately 48 by 59 feet in plan. It features an asphalt-shingled, cross-gable roof, green in color, weatherboard siding painted white, and a stuccoed brick-pier foundation. There are two interior brick chimneys. The quarters building also features a wrap-around porch with a low hipped roof, exposed brackets, and chamfered wood post supports.[23] The quarters building was restored by the National Park Service in 1980, and has been adapted for use as National Park Service personnel housing. Although the interior of the officer's quarters has been adapted for National Park Service personnel housing, it retains a good degree of integrity on the exterior. As such, it contributes to the significance of the historic district.

Lieutenant's quarters (Building 3) (one contributing building). The lieutenant officer's quarters is located to the west of the officer's quarters described above. It is the middle in a row of three quarters buildings developed by the army for base housing (Photograph 8). The officer's quarters building is identical in design to the officer's quarters described above, and was also built in 1900 based on plans prepared by the U.S. Army Quartermaster Department. The building has similarly been adapted for use by the National Park Service. Although the interior of the lieutenant's quarters has been adapted for National Park Service offices, it retains a good degree of integrity on the exterior. As such, it contributes to the significance of the historic district.

Captain's quarters (Building 4) (one contributing building). The third and westernmost residence in the row of buildings northwest of Fort Pickens was designed as quarters for a captain. The building was constructed in 1912 based on plans prepared by the U.S. Army Quartermaster Corps. The two-story building measures approximately 38 by 68 feet in plan, and features a one-story ell addition on the southwest (rear) elevation. It features a hipped roof with exposed brackets that is covered with green asphalt shingles, a brick pier and concrete foundation, weatherboard siding, three brick chimneys, and a porch that wraps three sides of the building. The porch has a flat roof, round post supports with simple capitals, and a wood ramp added by the National Park Service to provide universal accessibility (refer to Photograph 8).[24] The National Park Service rehabilitated the building for use as personnel quarters in 1991. Although the interior of the captain's quarters has been adapted for National Park Service personnel housing, it retains a good degree of integrity on the exterior. As such, it contributes to the significance of the historic district.

Tennis court (one contributing site). Located between the two lieutenant's quarters is a concrete slab that formerly served as a tennis court for the recreational use of those stationed at the base. Although the net is no longer present, the tennis court possesses sufficient integrity to convey its historic associations. As such, it contributes to the significance of the historic district.

[23] National Park Service, List of Classified Structures, 2014.
[24] Ibid.

Administrative Area

The administration area edges the central road extending through the post from north to south on axis with the former Quartermaster Wharf. This group of buildings includes housing, the post administration building, and a fire station. Similar to the residences area, these buildings are wood frame, clad with white clapboards, and feature green asphalt shingle roofs.

Non-commissioned officers' quarters (also VIP Cottage, Fort Pickens Cottage) (Building 1) (one contributing building). This duplex was built in 1909 to house two non-commissioned officers and the fire station crew, and later housed noncommissioned officers. It is located along the central road that extends north to south through the base, in close proximity to the post administration building.

The building measures approximately 41 by 66-1/2 feet in plan. It features a hipped roof, covered with green asphalt shingles, a stucco exterior, and a concrete foundation. There are three interior brick chimneys. The building also features two porches on the southeast elevation and two more on the northwest elevation. All have hipped roofs, chamfered wood post supports, pier foundations, and wood railings.[25] The two-story building includes two bedrooms, one bath, and a living room and kitchen within each unit of the duplex. The dwelling has been adapted for use as National Park Service personnel housing. Although the interior of the residence has been adapted for National Park Service personnel housing, it retains a good degree of integrity on the exterior. As such, it contributes to the significance of the historic district.

Post administration building (Building 5) (one contributing building). The post administration building is located along the north-south road that cuts through the center of the post to the south of the duplex non-commissioned officer residence. This structure was built in 1900 based on plans prepared by the U.S. Army Quartermaster's Department as a mess hall and kitchens. The one-story wood-frame building measures 37 by 181 feet in plan at the top of the T-shaped plan, and 22 by 65 feet along the stem of the T. It has a cross-gable roof with exposed brackets and green asphalt shingles. The gable on the east elevation has a Palladian vent window. The walls are weatherboard, and the foundation is stuccoed brick piers. The building features a wrap-around porch topped by a hipped roof. Windows are 6-over-6 double-hung wood sash. Doors are wood with six-panel (Photograph 9).[26] It was restored by the National Park Service in 1987, and rehabilitated in 2009–2010. It currently serves as the exhibit space and museum for visitors to Santa Rosa Island, and also features National Park Service offices, storerooms, and a library. Although the interior of the building has been adapted for National Park Service office use and as a museum, it retains a good degree of integrity on the exterior. As such, it contributes to the significance of the historic district.

Fire station (Building 6) (one contributing building). The fire station was constructed in 1940 based on designs prepared by the U.S. Army Quartermaster Corps. The one-story T-shaped

[25] Ibid.
[26] Ibid.

building measures approximately 20 by 44 feet in plan at the top of the T and 17 feet by 48 along the stem of the T. It features an asphalt-shingled, cross-gable roof, green in color, with exposed rafters, a brick chimney, weatherboard siding that is painted white, and a continuous stuccoed brick foundation. Windows are 6-over-6 wood sash. The east and west ends have garage bay doors with wood vents above.[27] It contains a garage for the park's fire truck and several storage rooms. The National Park Service restored the building in 1986. Although the interior of the building has been adapted for National Park Service use, the exterior retains a good degree of integrity. As such, the building contributes to the significance of the historic district.

Duplex for non-commissioned officers (Building 7) (one contributing building). This duplex, designed to house two non-commissioned officers, is located east of the post administration building within a row of post residential and administrative buildings. It was constructed in 1900 based on designs prepared by the U.S. Army Quartermaster Department. The two-story duplex measures approximately 53 by 43-1/2 feet in plan. It features an asphalt-shingled, cross-gable roof, green in color, weatherboard siding that is painted white, and a brick pier foundation. There are two interior brick chimneys. The residence also features a wrap-around porch with a low hipped roof, exposed brackets under the eaves, and chamfered wood post supports.[28] The National Park Service restored the building in 1991. It contributes to the significance of the historic district.

Duplex for non-commissioned officers (Building 8) (one contributing building). This duplex, designed to house two non-commissioned officers, is also located in the complex of residential and administrative buildings northwest of Fort Pickens. It was constructed adjacent to the duplex structure described above in 1910, based on designs prepared by the U.S. Army Quartermaster Department. The two-story duplex measures approximately 43-1/2 by 37-1/2 feet in plan. It features an asphalt-shingled, gable roof, green in color, weatherboard siding that is painted white, and a stuccoed brick foundation. The building features porches on the north and south elevations with shed roofs; the central section of the south porch is enclosed. The center of the north facade features two entrances.[29] The National Park Service restored the building in 1980. Although the interior of the building has been adapted for National Park Service use, the exterior retains a good degree of integrity. As such, the building contributes to the significance of the historic district.

Concrete walk (one contributing structure). A concrete walk leads between the maintenance and mine support area to the row of housing and administrative buildings east of the central road. Walks lead from this main walk to the front entrances of each of the buildings. The main walk appears on a 1943 map of the base. The walk retains sufficient integrity to convey its historic associations and contributes to the significance of the historic district.

Grills (one non-contributing object). Grills are located outside some of the residences for use by

[27] Ibid.
[28] Ibid.
[29] Ibid.

National Park Service personnel. These appear to have been installed by the National Park Service. As such, they postdate the period of significance and do not contribute to the historic district.

Maintenance and Mine Support Area

The maintenance and mine support area is located north of Fort Pickens in close proximity to the sea wall. It is accessed via the base road. It includes five structures built between 1898 and 1919 to support maintenance as well as the harbor mine project.

Pump house (Building 10) (one contributing structure). The pump house was constructed circa 1940–1945 based on plans prepared by the U.S. Army Quartermaster Corps. Located to the west side of the road that leads towards the seawall, the pump house is a one-story wood-frame structure that measures 18 by 32 feet in plan. The pump house features clapboard walls, a side-gable roof with an open cornice and exposed rafters clad with green asphalt shingles, and a concrete foundation. The east (front) elevation has two bays with a wood panel, six-light door, and one window. The west elevation also has a wood panel door and one window. The north and south elevations have one window each. The windows are 6-over-6 wood sash.[30] Although the interior of the building has been adapted for National Park Service use, the exterior retains a good degree of integrity. As such, the building contributes to the significance of the historic district.

Pumping plant (Building 11) (one contributing structure). The pumping plant is located within the line of buildings west of the road leading toward the seawall adjacent to the pump house. The pumping plant was built in 1920 based on plans prepared by the U.S. Army Quartermaster Corps. The one-story building measures 20 by 40 feet in plan. It is of brick construction, with a molded concrete foundation. The side-gable roof is clad in asphalt shingles. The east (front) elevation has four bays with a single door, two 4-over-4 double-hung wood sash windows, and a double door. The building also has concrete lintels, and two interior brick chimneys.[31] Although the interior of the building has been adapted for National Park Service use, the exterior retains a good degree of integrity. As such, the building contributes to the significance of the historic district.

Transformer house (Building 12) (one contributing building). The transformer house was built in 1918 based on plans prepared by the U.S. Army Corps of Engineers.[32] It is located to the east of the road that leads toward the seawall across from the pump house and pumping plant. The one-story rectangular building measures 18 by 26 feet in plan. It is constructed of concrete, and has a concrete foundation, a flat roof, molded cornices, and a projecting water table. The west (front) elevation has three bays with a glass door on the south end and two windows enclosed and painted black. The south and east elevations each have two enclosed windows. The north

[30] Ibid.
[31] Ibid.
[32] Personal communication, David Ogden, December 2015.

elevation has an enclosed door and an enclosed window.[33] Although the interior of the building has been adapted for National Park Service use, the exterior retains a good degree of integrity. As such, the building contributes to the significance of the historic district.

Cable storage tank ruins (one contributing site). To the northeast of the transformer house, and south of the mine storeroom is the concrete foundation (or possibly the top of the walls) of a cable storage tank constructed in 1898.[34] The cable storage tank was 4 feet deep.[35] The ruins contribute to the significance of the historic district.

Pump house (Building 13) (one non-contributing structure). This structure is located west of the mine storeroom and mine loading building and north of the pump house and pumping plant described above. It was constructed by the National Park Service in 1973, and is a small, white, wood-frame building with a gabled roof covered with green asphalt shingles. The pump house measures approximately 18 by 32 feet in plan. A single door faces east with a vent above. The number 13 is mounted above the door. There are three windows in the north and south elevations. An old pump remains present within the room, which has otherwise been converted into a paint supply storeroom by the National Park Service. Access to the building is limited by chain link fencing. Two large propane tanks stand adjacent to the structure. The structure postdates the period of significance and thus does not contribute to the significance of the historic district.

Pump house (Building 14) (one non-contributing structure). Also located within the maintenance complex adjacent to the pump house is a second small, white, wood-frame building thought to have housed pump equipment. It was constructed by the National Park Service in 1974. The building measures approximately 18 by 32 feet in plan. This building has a gable roof clad with green asphalt shingles, a door centered in the east elevation, and two windows set within the north and south elevations. Access to the building is limited by chain link fencing. Two large propane tanks are located to the north of the structure. This structure postdates the period of significance and thus does not contribute to the significance of the historic district.

Mine loading building (Building 15) (one contributing building). The original mine loading building was constructed in 1898, but was destroyed by the Fort Pickens munition explosion on June 20, 1899. The present-day mine loading building was completed in 1907. The building stands west of the mine storeroom to the north of the pump houses and transformer house. It is a rectangular brick structure that measures 23 feet, 7 inches by 47 feet, 2 inches in plan, and is 20 feet, 2 inches tall (Photograph 10). The building features a concrete foundation, three-wythe brick walls with decorative corbeling, and a wood truss-framed, asphalt-shingle clad gable roof with open and exposed eaves. Black-painted wood double doors set in the south facade lead into an open interior. The north and south elevations each contain three bays with associated window

[33] National Park Service, List of Classified Structures, 2014.
[34] The 1942 Record of Completed Work for salvage of the cable storage tank, completed in August 1941, shows a foundation depth of 4 feet.
[35] Record of Completed Work, Mine Loading Room, 1943; National Archives, College Park Maryland, CP-031407-029.

and door openings. A pit indicates the location of a water tank that was used for testing water-tightness after the mines had been loaded with explosives.[36] The building was later used as a railroad shop and an automotive shop. The east and west walls are divided into five equal-sized bays that include window and door openings. A 20-foot-long section of steel rail track extends from the main entrance on the southwest elevation. The track is composed of two parallel 3-inch wide steel rails, approximately 4 feet apart, set in a concrete apron. The mine loading building is currently used by the National Park Service as a carpentry and maintenance shop. Although the interior of the building has been adapted for National Park Service use, it retains character-defining features. The exterior retains a good degree of integrity. As such, the building contributes to the significance of the historic district. As of 2016, the building is scheduled for rehabilitation/adaptive reuse as part of the ferry project planned to connect the Fort Pickens area to nearby Pensacola and Pensacola Beach.

Mine storeroom (Building 16) (one contributing building). The original mine storeroom was built in 1898–1899. It was destroyed by the explosion of ammunition that occurred within the northwest bastion of Fort Pickens on June 20, 1899. The present-day mine storeroom was built on the foundation of the original building in June 1900. The mine storeroom is a one-story load-bearing red brick masonry structure, rectangular in plan, which measures approximately 60 feet long by 36 feet wide, and is 21 feet tall at the gable peak. The building has a concrete foundation that projects 6 inches from the three-wythe brick masonry walls, and a steel and wood-framed gable roof. The bricks are laid in American bond. Green-painted iron double doors in the southwest facade lead into a partially divided interior space comprised of a main storage room and a supply room. The north facade has no door or window openings. The east and west walls are organized into four bays, each of which contains a single window opening. Remains of an overhead travelling crane are visible inside. A rolling crane is present inside the building. The mine storeroom is currently used by the National Park Service for storage. Although the interior of the building has been adapted for National Park Service use, it retains character-defining and significant features such as the overhead travelling crane. The exterior retains a good degree of integrity. As such, the building contributes to the significance of the historic district. As of 2016, the building is scheduled for rehabilitation/adaptive reuse as part of the ferry project planned to connect the Fort Pickens area to nearby Pensacola and Pensacola Beach.

Engineer storeroom (Building 17) (one contributing building). Built by 1909 based on plans prepared by the U.S. Army Corps of Engineers, the one-story engineer storeroom measures 20 by 62 feet in plan. It has a hipped roof clad with asphalt shingles, a concrete foundation, and a stuccoed concrete exterior. The west (front) elevation has a central double door on the north and a window on the south. The south facade has one window. The east elevation has two windows, one of which has been enclosed. The north elevation has no doors or windows.[37] Although the interior of the building has been adapted for National Park Service use, it retains a good degree of integrity on the exterior. As such, it contributes to the significance of the historic district.

[36] Mark A. Berhow, ed., *American Seacoast Defenses: A Reference Guide*, second edition. (McLean, Virginia: CDSG Press, 2004), 355.
[37] National Park Service, List of Classified Structures, 2014.

Gazebo (one non-contributing structure). Approximately 10 feet east of the mine loading building is a covered open-air picnic shelter with a square plan and pyramidal roof. The gazebo was constructed circa 2013 by the National Park Service. The gazebo postdates the period of significance and does not contribute to the significance of the historic district.

Telecommunications tower (one non-contributing structure). Located between the mine loading building and the storage building to its north, is a steel telecommunications tower, approximately 50 feet tall, which was erected by the National Park Service. The tower postdates the period of significance and does not contribute to the significance of the historic district.

Support Area

Support area ruins (one contributing site). Located within the center of the Fort Pickens base are the concrete foundations and ruins of several base support structures, including an ordnance shop and boiler house, as well as two warehouses, completed in 1942. The support area may also include other foundations relating to a shed for Battery GPF's four mobile 155 mm guns, and another ordnance storehouse. Collectively, these ruins constitute one contributing site.[38]

Additional Base Features

Fort Pickens seawall (one contributing structure). The Fort Pickens seawall was first proposed for construction in the 1890s. Construction began in 1908, spurred by the devastating 1906 hurricane, and continued until circa 1910. The land adjacent to the seawall interior was filled by the U.S. Army Corps of Engineers between November 1911 and May 1912 to construct an apron and road corridor.[39] The reinforced concrete structure was designed to protect the Pensacola Harbor Defense Project structures located at the western end of the island from storm surges and flooding.

The seawall is generally U-shaped. It forms a continuous line around the western end of the island, connecting to the edge of the dry moat and the southwest bastion of Fort Pickens (Photograph 11). The wall is 4 to 5 feet thick and ranges from 4 to 12 feet 9 inches in height measured from the inside versus the outside. It features iron floodgates at regular intervals. These are no longer operational, however, due to efforts conducted by the U.S. Army Corps of Engineers to fill and level the base interior that blocked the openings and rendered the draining of water from the interior following storm events difficult. Wooden posts extend beyond the top of the wall, marking the locations of the flood gates in some places.

A concrete sidewalk edges the interior of the seawall along the northern edge. Concrete stairs provide access to the top of the wall near the mine support buildings. There is also a concrete ramp that extends to the east of the mine support structures to provide access to the top of the wall. Metal handrails edge the ramp, which also connects to a wooden ramp and stair leading to a wharf on the bayside of the island in this location.

[38] 1934 map; 1945 D-1 map; personal correspondence with David Ogden, April 2016.
[39] Bearss, *Historic Structure Report and Resource Study*, 242.

The seawall possesses sufficient integrity to contribute to the significance of the historic district.

Cable junction box (one contributing structure). Adjacent to the northeastern interior corner of the seawall is a modest reinforced concrete structure built as a cable junction box constructed by 1934.[40] The specific cables that joined at this location and their function are not currently known. It measure approximately 4 by 6 feet in plan and is 10 feet in height with a concrete slab roof that overhangs the concrete walls on all sides. Concrete stairs lead to a door opening inset with a metal door.

This structure is associated with the Pensacola Harbor Defense Project, and retains sufficient integrity to convey its historic associations. As such, it contributes to the significance of the historic district.

Mosquito control canals (one contributing site). To drain standing water and reduce the mosquito problems on the island, a 25-foot-wide canal was excavated along the north and south sides of the main road at Fort Pickens east of the fort circa 1930–1945.[41] Although some of the canals nearest the old fort are filling in, they remain visible and are associated with the Pensacola Harbor Defense Project. As such, they contribute to the significance of the historic district.

Quartermaster Wharf pilings (one contributing site). Built in 1917 based on designs prepared by the U.S. Army Quartermaster's Department, the Quartermaster Wharf played an important role in base operations. It was built to replace the Engineer's wharf to the east, which had been destroyed in a hurricane earlier that year. Today, the Quartermaster Wharf is in ruinous condition. All that remains are the concrete wharf pilings of an L-shaped pier that originally extended 188 feet north into Pensacola Bay from the area in front of the seawall and was 83 feet wide at its widest point. The pilings are located within the bay on axis with the central road corridor that passes from north to south across the base. The original wood decking is missing. The wharf was destroyed during a hurricane in 1995.[42]

The ruins of the Quartermaster Wharf contributes to the significance of the Pensacola Harbor Defense Project Historic District as the site of a feature that played an integral role in the operation of the base.

Road system (one contributing structure). Much of the base is accessible via a paved asphalt road system. The road follows portions of the interior of the seawall, connecting the batteries of the Pensacola Harbor Defense Project with the residential and administrative areas and the maintenance and shop area. The U.S. Army constructed the road system by the 1930s to facilitate the passage of men and equipment due to the difficulties posed by moving through the deep sand on the island. The road was later extended through the southeastern portion of Fort Pickens and

[40] Pensacola Harbor, Fort Pickens, Santa Rosa Island, General Map, updated December 5, 1934.
[41] National Park Service, List of Classified Structures, 2014. The canals were likely excavated by the U.S. Army Corps of Engineers or the Civilian Conservation Corps; documentation confirming their history has not been discovered as part of this study.
[42] National Park Service, List of Classified Structures, 2014.

connected to a road extending eastward along the center of the island. A spur road continues southward to provide access to Battery 234 and the nearby tower, and Battery Cooper and the nearby Panama Mounts. Portions of the road follow chert or graveled routes that connected Battery Cullum and Van Swearingen by the late 1890s. The road has been altered since 1947 through the inclusion of parking facilities added to support visitors and park administration. Despite the changes that have occurred since 1947, the road possesses sufficient integrity to convey its historic associations and contributes to the significance of the historic district.

Narrow-gauge railroad bed (one contributing site). The U.S. Army Corps of Engineers first built a narrow-gauge rail line on Santa Rosa Island in 1896 in order to facilitate construction of the new concrete structures that would support protection of Pensacola Bay using Endicott batteries. Initially, the rail line extended from the Engineer's Wharf to Fort Pickens. It was extended in 1897–1898 to provide access to the site where Battery Cullum was to be constructed, followed by the site of Battery Van Swearingen. The rail line was later extended eastward to form a 3-mile loop used to support construction of the additional batteries built beyond the Fort Pickens base. The rail line was repaired after 1932 to address problems resulting from hurricane damage, but remained in use until the end of World War II.

During the State Park era, most of the tracks were removed, and the rail line bed converted to trail use. In the vicinity of the mine loading building, there is surviving evidence of the rail line composed of a 20-foot long section of steel track that extends from the main entrance into the building on the south elevation. The track consists of two parallel 3-inch-wide steel rails, approximately 4 feet apart, set in a concrete apron at the entrance to the building. Elsewhere, only a few examples of track remain. The rail line bed currently occurs as a 6- to 8-foot-wide linear clearing surfaced with crushed shells, gravel, and earth (Photograph 12).[43] A portion of the route was adapted as a bicycle trail in 1976.

The rail line, although in ruinous condition, possesses sufficient integrity to convey its historic associations. As such, it contributes to the significance of the historic district.

Railroad roundhouse foundation (one contributing site). Located along the northern portion of the base road system near the seawall on the north side of the island is the foundation of a structure that formerly served the narrow-gauge rail line. The roundhouse structure was built circa 1935–1945 based on a design prepared by the U.S. Army Quartermaster Corps.[44] The foundation is composed of two low walls oriented east-west, approximately 3-/2 feet high and 2 inches thick. The east and west ends are open where the train passed through; the structure served as the turning point for engines. The floor is concrete. There are three rows of narrow-gauge rails and ties intact in the floor. Although in ruinous condition, the foundation possesses sufficient integrity to convey its historic associations. As such, it contributes to the significance of the historic district.

[43] Ibid.
[44] Ibid.

Fishing piers (two non-contributing structures). Fishing piers extend into the bay from the shoreline north of the residence area and the mine support building area. These wooden pier structures were constructed by the National Park Service. As such, they postdate the period of significance and do not contribute to the significance of the historic district.

Jetties (one contributing structure). Located to the west of the fishing pier is a pair of stone jetties that extend into the bay. Little is currently known about the origin of these jetties, although they appear on a 1945 map of the Fort Pickens base area. As such, they appear to survive from the period of significance. Further research is needed to assess the contribution of these features to the significance of the historic district.

Features East of Fort Pickens Base

Battery 234

Battery 234 (one contributing structure). Battery 234 was built in 1943 based on plans prepared by the U.S. Army Corps of Engineers. It is located southeast of Fort Pickens along a spur arising from the main road that extends along the center of Santa Rosa Island, and faces the ocean along the island's southern shore.

Battery 234 was built in response to a defensive need identified in 1940 by a special War Department board that developed a plan for a comprehensive system of seacoast fortifications along the east and west coasts of the United States designed to emplace standardized guns.[45] Two of the new batteries were ordered constructed as part of the Pensacola Harbor Defense Project: Battery 233, at Foster's Bank, and Battery 234, on Santa Rosa Island. Both batteries consisted of a pair of 6-inch guns that had a range of 15 miles. These guns were designed to be set in a curved cast-steel protective shield, 4 to 6 inches thick, which resembled a turret, and protected against machine gun and light artillery fire. The battery's magazine, power station, communication, storage, and service rooms were located in an earth-covered concrete vault positioned between the two guns. A coincidence range finder/battery commander's station tower was constructed nearby as part of each battery complex.[46] A latrine was built near the battery. Also associated with the battery, but located to the north along the railroad line, was a collection of four structures that collected radar information—two power houses, a transmitter building, and a 100-foot-tall signal tower—referred to as Signal Corps Radar (SCR)-296. Battery 234 is a concrete and earthen structure that measures approximately 237 by 115 feet. It is composed of two open-air gun pits located to either side of a central complex of vegetation camouflaged storage and control rooms (Photograph 13). These rooms housed the battery's magazine, power station, communication, storage, and service areas. The guns were to have a range of 15 miles. Although

[45] Emanuel Raymond Lewis, *Seacoast Fortifications of the United States: An Introductory History* (Annapolis, Maryland: Naval Institute Press, 1979), 115–118.
[46] Bearss, *Historic Structure Report and Resource Study*, 293–295.

the shields and barbette carriages were received as intended, the 6-inch guns were never shipped and the battery was never armed.[47]

Today, Battery 234 houses two shield cannon (B-5A and B-5B), that were provided to the park by the Smithsonian Institution in 1976. The guns are mounted in gun pits A and B. Each weapon weighs approximately 80 tons.

Despite the addition of non-original guns, Battery 234 retains sufficient integrity to convey its historic association and contributes to the significance of the historic district.

Battery commander's station/coincidence range finder tower (one contributing structure). The battery commander's station/coincidence range finder tower is located north of Battery 234 along the spur road that is connected to the main road to its south. It was one of three similar towers erected on the island circa 1943, but is the only one that survives today.

The tower stands approximately 50 feet in height and is constructed of a concrete foundation, steel framing, and a two-level concrete and steel observation booth. At the center of the structure is a steel-framed stair that extends from grade to an access hatch on the underside of the lower level of the observation booth (Photograph 14).[48] Deteriorated elements of the tower were replaced in 1980. The Battery 234 tower retains a good degree of integrity. Diminishing integrity are the loss of the roof over the upper level of the observation booth and the windows, and deterioration of some concrete and steel elements. The Battery 234 tower retains sufficient integrity to continue to convey its historic association and contributes to the significance of the historic district.

Battery 234 SCR-296 radar complex foundations (one contributing site). Located to the north of Battery 234 and the narrow-gauge rail line corridor is the site of four structural ruins established to support Battery 234 through collection of radar data. The four foundations that comprise the site constitute the remains of two power houses, a transmitter building, and the base of a 100-foot signal tower. This site, representative of a SCR-296 radar location, operated the standard World War II fire control radar utilized by the Coast Artillery for engaging surface targets. Beginning in 1943, SCR-296 radar sites were authorized for all batteries of 6-inch caliber or higher.[49] By January of 1944, the SCR-296 for Battery 234 had been installed to include three prefabricated metal buildings and the steel tower, all on concrete foundations.[50] An identical radar complex was installed west of Battery Langdon to serve that battery.

[47] National Park Service, List of Classified Structures, 2014.
[48] Wiss Janney Elstner Associates, Inc., *Battery 234 CRF/BC Tower Historic Structure Report*, May 2015, 23.
[49] *American Seacoast Defenses: A Reference Guide*, 400.
[50] Coast Artillery, "Report of Completed Works – Seacoast Fortifications (Fire Control or Submarine Mine Structures) Harbor Defenses of Pensacola, Florida; Fort Pickens, Structure: SCR 296 Radar Tower, Battery 234," 1944.

Battery Cooper

Battery George A. Cooper (one contributing structure). Battery Cooper is located east of Battery 234 along the spur road that is connected to the main road to its south. Battery Cooper was constructed circa 1903–1905 based on plans prepared by the U.S. Army Corps of Engineers. It was designed to emplace two 6-inch rifles on disappearing carriages. Battery Cooper measures 172 by 85 feet in plan. It is composed of two levels, with the gun emplacements on the upper level, and a series of interior spaces on the lower level. The side that faces toward the ocean is camouflaged by an earthen bunker.[51] The gun emplacements are located east and west of the lower area. Doors at each pit lead to various concrete and yellow tiled rooms inside. Stairs lead to the top of the parapet and the gun emplacements from the lower level (Photograph 15).

The battery has been altered over the years. During World War I, in 1917, the guns were removed for use on railway mounts in France, while the disappearing carriages were kept on hand until June 1920 when they were declared obsolete and salvaged.

In 1934, the Army decided to modify Battery Cooper to accommodate four 155 mm Panama Mount Grande Puissance Filloux (GPF) guns with a 360 degree field of fire that could cover the water south of the island and protect against amphibious landings. To accommodate the guns, work to rehabilitate Battery Cooper began in 1937, with plans to renew the steel doors, shutters, and stairs, rewire the battery, and remodel the battery commander's station. Plans also included construction of a latrine.[52] It appears that a plotting room was established in the old magazine. One store room was modified for a generator, and the adjacent office modified for a radiator that blew into the old magazine for heat. An arch was cut through the wall between the old guardroom and office for unknown reasons.[53] Four 155 mm GPF rifles were emplaced beginning in spring 1937 as Battery GPF.

Battery Cooper currently houses an Alvin Jeffries disappearing rifle (B-4A). The 6-inch model 1904 weapon was transferred to the park by the Smithsonian Institution in 1976 and mounted in gun pit B. The gun and carriage weigh approximately 40 tons (Photograph 16).

Despite these changes, Battery Cooper retains sufficient integrity to convey its historic association and contributes to the significance of the historic district.

Battery GPF (one contributing structure). Battery Cooper was adapted to support for Battery GPF in 1937. Battery GPF was designed to house 155 mm Panama Mounts, so named because they were first developed in the Panama Canal Zone.[54] The emplacement was developed in the Canal Zone, where it received its name. The battery is composed of four circular concrete gun emplacements with iron rail embedded in a concrete platform that employed mobile 155-mm

[51] National Park Service, List of Classified Structures, 2014.
[52] Bearss, *Historic Structure Report and Resource Study*, 161–162.
[53] Personal communication, David Ogden, December 2015; 1945 D-1 map.
[54] Personal communication, David Ogden, Gulf Islands National Seashore, April 2016.

guns. Battery GPF's circular mounts allowed for a firing radius of 360 degrees.[55] Two of the platforms are located to the south, one to the east, and one to the west of Battery Cooper. The 155-mm guns were World War I French mobile artillery pieces modified and put into production in the United States as the model in 1918. After World War I, these guns were modified to fit Panama Mounts, segments of curved rail embedded in concrete that the guns slid across in order to fire on different positions. The design of the Panama Mounts allowed the gun's weight to rest on the central pad, while the trailing arms that stabilized the gun when it was fired rested on the circular rail. The trailing arms moved around the circular arm to change direction of fire. The configuration of the outer rail of the mounts determined the firing radius or "traverse" of the guns.

The four 155 mm guns constituted a unit of the Pensacola Harbor Defense Project that was assigned to Fire Group I, and remained a part of the project through much of World War II. The battery was disarmed and discontinued in April 1945. Although the battery no longer contains the 155 mm guns, and some materials are deteriorated, it retains sufficient integrity to convey its historic association and contributes to the significance of the historic district.

Latrine and septic system ruins (one contributing site). In 1937, a frame latrine with a concrete foundation and floor was built north of Battery Cooper. The latrine featured six commodes, two basins, a urinal, and a septic tank. It was connected to a 2-inch water main that extended from Battery Worth. The concrete foundation of the latrine structure, as well as the septic tank, survive today. Although the latrine is in ruinous condition, this site possesses sufficient integrity to convey its historic associations. As such, it contributes to the significance of the historic district.

Chasefield gravestones and fenced enclosure (one non-contributing site). Located along the spur road that leads from the main road to Battery 234 and Battery Cooper is a fenced area that contains relocated gravestones. The gravestones were originally located in the Chasefield Plantation Cemetery on land that is now part of the Pensacola Naval Air Station. They were moved to the current location in 1957 when the land was slated for development. Chasefield Plantation was the home of William H. Chase, who supervised the construction of Fort Pickens during the early nineteenth century. This collection of gravestones does not relate to the significant historic contexts of the property and does not contribute to the significance of the historic district.

Battery Worth

Battery Worth is the focus of a cluster of built resources that include both Pensacola Harbor Defense Project elements as well as state park features, including searchlight tower bases and other structural ruins, and a comfort station, picnic shelter, and parking area.

[55] National Park Service, List of Classified Structures, 2014.

Battery William J. Worth (one contributing structure). Battery Worth is located northeast of Battery Cooper. The narrow-gauge rail line passes to the rear of the battery. Constructed in 1898–1899 as part of the Endicott system, Battery Worth was designed to emplace eight 12-inch mortars in two gun pits. Four of the mortars remained active until 1942, at which time a tower was added to accommodate adaptive reuse as a Harbor Entrance Control Post (HECP) and the Harbor Defense Command Post (HDCP) that supported coordinated efforts of the Army and Navy.

Battery Worth is a reinforced concrete structure that measures approximately 315 by 260 feet in plan. It is edged to the south by an earthen embankment.[56] The concrete and metal structure is a two-level, rectangular battery with two gun emplacements with fire control stations at the entry on the east and west. Stairs on the east and west lead to the top of the embankments. Two gun emplacements are separated by a central series of rooms that reach a height of 40 to 50 feet; the gun emplacement pits are now filled (Photograph 17). These central rooms were originally used for storage of ammunition and equipment. Four of the large rooms were converted into living quarters with acoustical tile ceilings, tile floors, and bathrooms during the 1940s to accommodate use by the men stationed at the HECP-HDCP during World War II. There are also four pyramidal bases for a radar tower on the west flank, in front (south) of the west crow's nest. The foundation of the power plant is located at the foot of the stairs to the crow's nest.

During the 1930s, the four 12-inch mortars associated with the battery, in combination with the 12-inch rifles of Battery Langdon, were considered part of Tactical Fire Group No. 2. By the time the United States entered World War II, however, the mortars were considered obsolete and were salvaged in 1942. The battery was adapted for use in 1942–1943 as an HECP-HDCP with the addition of a two-story building over the central traverse and conversion of the old magazines, guardrooms, and plotting room below into barracks, radio rooms, and the fire control switchboard room, respectively. These efforts were conducted to accommodate new weapons technology relating to the threats posed during World War II. Thereafter Battery Worth served as the nerve center for joint Army-Navy defense of the Pensacola area.[57] New features were added, including an observation tower. Although some materials of the structure are deteriorated, Battery Worth retains sufficient integrity to convey its historic association and contributes to the significance of the historic district.

Searchlight tower bases 4 and 5, foundations and counterweight bases (also bascule searchlight tower foundations and counterweight, replaced towers 7 and 8, searchlights 5 and 6) (one contributing site). To support anti-aircraft activities associated with Battery Worth, two searchlights 4 and 5, originally 7 and 8, were installed nearby between 1917 and 1922. Sixty-inch lights were mounted on 60-foot steel bascule towers. The legs of the steel structure rested on concrete foundations positioned 600 and 760 feet east of Battery Worth. Energy was provided by two 25-KW generators housed in a 23 foot, 8 inch by 15 foot reinforced concrete structure

[56] Ibid.
[57] Bearss, *Historic Structure Report and Resource Study*, 86.

that served as a power plant. The power plant was housed in the structure that now serves as a comfort station for campground loop D (see below). The searchlights could be lowered when not in use with steel-enclosed concrete counterweights. The surviving concrete foundations are hexagonal in plan, while the smaller concrete bases and counterweights are square. The center of the foundations are large openings for the counterweights.[58] The searchlights themselves were salvaged in 1946. Although these features are in ruins, the searchlight tower bases, foundations, and counterweight bases retain sufficient integrity to convey its historic association and contributes to the significance of the historic district.

Unidentified concrete structure (one contributing structure). Located to the north of Battery Worth and southwest of the comfort station and picnic shelter is a concrete structure that has been overturned likely due to overwash. Further investigation is needed to determine the history and use of this structure. Assessment of the structure is not currently possible.[59]

Restroom and picnic shelter (one non-contributing building). Located to the north of Battery Worth is a State Park-era combined restroom building and picnic shelter. The picnic shelter is open air, while the restroom is enclosed within a central core. Paired doors lead into the men's and women's bathrooms. The structure's low-pitched roof is covered with asphalt shingles. The picnic shelter roof is supported by steel piers and has a broad overhang. The overhang shades a concrete slab, atop of which are placed picnic tables. A concrete walk leads to the structure from a parking area to the south. The National Park Service has added solar panels to power aspects of the building onto the roof. There is a fenced utility register to the south of the building. The building postdates the period of significance and does not contribute to the significance of the historic district.

Parking area (one non-contributing structure). A large, two-bay, asphalt-paved parking area sits between Battery Worth and the restroom and picnic shelter building. The parking area was added during the State Park era. The parking area postdates the period of significance identified for the historic district and does not contribute to its significance.

William Bartram Trail marker (one non-contributing object). A cast-bronze marker is located along the trail that extends east to west through the park between Fort Pickens and Battery Langdon and follows the narrow-gauge rail line bed. The marker notes that the trail is part of the William Bartram Trail that traces the route followed by William Bartram in 1775 to explore the South. The marker was erected by the Ivy Garden Club of District One, the Florida Federation of Garden Clubs, and the National Park Service. The marker postdates the period of significance and does not contribute to the significance of the historic district.

[58] National Park Service, List of Classified Structures, 2014.
[59] Although little is known about this structure, including its function, the park believes it to be historic and associated with the Pensacola Harbor Defense Project. Personal communication, David Ogden, Gulf Islands National Seashore, December 2015.

Campgrounds, Picnic Area, Beach Facilities

Campground road system (one non-contributing structure). During the State Park era, campgrounds were established within the area to the east of Battery Worth and to the west of Battery Langdon. The campgrounds encompass several features of the Pensacola Harbor Defense Project, including gun emplacements, searchlight tower bases, a power station, which has been converted into a comfort station, and the narrow-gauge railway bed, which now serves as a trail. The road system includes campground loop A, a closed system that arises from the main road west of Battery Langdon, the group camp area access road northeast of campground loop A, and the access road that leads to campground loops B, C, D, and E. The road postdates the period of significance and does not contribute to the significance of the historic district.

Campground store (undetermined, building). This structure was constructed circa 1970, based on information provided by the park. It was renovated in 2010. The building is thus believed to postdate the period of significance. As such it does not contribute to the significance of the historic district.

Campground loop A comfort station (one non-contributing building). This building was constructed by the National Park Service circa 2010 to replace an existing comfort station. It postdates the period of significance and as such, does not contribute to the significance of the historic district.

Campground loop C comfort station (one non-contributing building). This comfort station edges campground loop C to the east and loop E to the south. It is a concrete block structure with a low-pitched gable roof. The principal facade, which faces west, has two door openings, one to either side of the center. Wooden privacy fencing extends in front of each of the comfort station door openings. Vents are located in the gable ends beneath the roof line. Although an earlier comfort station on this site included the magazine for the nearby Battery Fixed anti-aircraft emplacement of 1918–1921, the present-day comfort station was built by the National Park Service in 2015 after demolition of the earlier structure. As such, the comfort station postdates the period of significance and does not contribute to the significance of the historic district.

Campground loop D comfort station (power station) (one contributing building). The comfort station associated with the state park-era campground loop D was constructed circa 1917–1923 as a power station for searchlights 7 and 8 located nearby. The structure was adapted for use as a restroom during the State Park period. The one-story structure measures 23 by 15 feet in plan. It is constructed of concrete block, and has a shed roof clad with asphalt shingles. The principal facade is edged by an entry terrace addition that provides access to the two entrances to accommodate comfort station use. The terrace is edged by partial L-shaped walls. A single door is located in the west facade (Photograph 18).[60] Despite the alterations to the structure that were

[60] National Park Service, List of Classified Structures, 2014.

made to accommodate state park needs, the building retains sufficient integrity to convey its historic associations and contributes to the historic district.

Campground loop E comfort station (one non-contributing building). This structure is composed of concrete block. It was built by the National Park Service circa 2010. As such, it postdates the period of significance and does not contribute to the significance of the historic district.

Searchlight tower bases (one contributing site). Within campground loop B are the remains of two collapsible searchlight towers. The foundation bases are low reinforced concrete structures with steel bolts (Photograph 19). Although the towers are no longer present, the foundation remains are important features of the Pensacola Harbor Defense Project. As such, they constitute a contributing site.

Gun emplacements (one contributing site). Located within campground loop E are two circular concrete structures with hollow centers, and a notched form on one side of the interior wall. The structures are approximately 18 inches tall, and 8 feet in diameter (Photograph 20). They are the emplacements of Battery Fixed, begun in 1918 and transferred to the CAC in 1921.[61] Although in ruins, these features are important examples of the evolution of artillery types associated with the Pensacola Harbor Defense Project. As such, they constitute a contributing site.

Blackbird Marsh Nature Trail (one non-contributing structure). Located to the north of campground loop A is the Blackbird Marsh Nature Trail. This trail is surfaced with hard packed earth, sand, and gravel. Bridges convey the trail across low lying wet areas. The trail was constructed by the National Park Service. It postdates the period of significance and does not contribute to the significance of the historic district.

Beach shelter (one non-contributing structure). Located to the south of the main road that extends through the center of Santa Rosa Island, south of Battery Langdon, is a beach parking and day use area. An open-air shelter set on a raised platform and adjacent restroom facility edge the parking area and face the ocean. The shelter is accessed via wooden steps and a ramp. An orientation sign and a wash-off water spray facility are also associated with the shelter. This structure was built by the National Park Service and postdates the period of significance. It thus does not contribute to the significance of the historic district.

Parking area (one non-contributing structure). A large asphalt-paved parking area is located between the main road and the beach shelter. The parking area was built by the National Park Service and postdates the period of significance. It thus does not contribute to the significance of the historic district.

[61] Edwin C. Bearss, *Historic Structure Report, Fort Pickens: Historical Data Section, 1821–1895* (Denver, Colorado: National Park Service, February 1983), 289.

Battery Langdon

Battery Langdon is the main feature of a collection of features that relate to both the Harbor Defense Project and State and National Park-era developments. These features include a warehouse foundation, the site of a wharf on the bay north of the battery at the end of a concrete road, the narrow-gauge rail line corridor, searchlight tower bases, an observation tower foundation, a picnic shelter, comfort station, and maintenance facilities. There is also a complex of SCR-296 radar foundations—two power houses, a transmitter building, and a 100- foot-tall signal tower—located to the northwest of the battery that supported its use during World War II.

Battery Loomis L. Langdon (one contributing structure). Battery Langdon is located on a low sand ridge to the east of Battery Worth, 600 feet from the north shore of Santa Rosa Island, and 1,700 feet from the Gulf beach. The narrow-gauge rail line passes to the north of the battery. Battery Langdon was constructed in 1917–1923 based on plans prepared by the U.S. Army Corps of Engineers. When completed in 1923, Battery Langdon housed two 12-inch 1895 MI rifles that could shoot projectiles 17 miles out to sea. During 1942–1943, massive concrete casemates with walls 10 feet thick, and overhead masonry 17 feet thick, were added to the battery to protect the guns and crew against plunging fire. Battery Langdon was the most important and powerful element of the Pensacola Harbor Defense Project. It was designed to protect Navy shore installations, harbor facilities and shipping in Pensacola Bay from naval gunfire in minor attacks; deny enemy ships access to the bay; and support the defense against amphibious attack within range of its armament. This type of fixed coastal defense mounting long-range guns was made obsolete by the atomic bomb.[62]

The battery measures approximately 170 by 575 feet in plan. It has numerous interior spaces that include generator rooms, a radiator room, a plotting room, a switchboard room, storage areas, magazines, and bathrooms. It is covered with earth and heavy vegetation. Steel doors and facing cover the front of the bunker beneath the gun emplacements (Photograph 21). In 1923, searchlights 6 and 7 (originally 9 and 10) were built to support use of Battery Langdon. These were located 2,900 and 3,149 feet to the east of the structure.

In 1926, the wharf and searchlights were destroyed by a hurricane. In 1930, the narrow-gauge railroad between Batteries Worth and Langdon, and searchlights 6 and 7, were rebuilt. At the time, the U.S. Army Corps of Engineers also erected three steel-frame towers, supported on concrete piers, near the beach 800 yards northwest of Battery Langdon. Positioned on these towers were 10 by 10 foot fire control stations. Atop each station was an observation platform with a pipe handrail. These stations were part of the Butler Group and served as secondary stations for Batteries Sevier, Cullum, and Langdon. In 1933, after Batteries Sevier and Cullum were withdrawn from the HDP, the westernmost station was assigned to Battery GPF and the middle one to Fire Group II. During the 1930s, another trio of steel-frame towers supported on concrete piers, known as the Davis Group, was erected approximately 300 yards west of Battery

[62] Bearss, *Historic Structure Report and Resource Study*, 269–288.

Langdon. The middle tower served as Battery Worth's secondary station, while the tower to the west was assigned to the harbor defenses and the eastern structure for auxiliary purposes.[63]

After Pearl Harbor, major structural changes were made to Battery Langdon to address the need for cover against aerial bombardment. The massive casemates of reinforced concrete were added to the circa 1923 emplacements in 1942–1943. The casemate construction reduced the guns' fields of fire from 360 to 145 degrees. Each emplacement was connected with the magazines in the traverse by reinforced concrete corridors, with more than 8 feet of masonry, 20 feet of sand fill, and a 2-foot outer course of concrete overhead. A new power room was built in the rear of the traverse. It was protected by 5-foot-thick concrete walls, and 5 feet of concrete and more than 6 feet of sand fill overhead. The interior walls were concrete and divided the space into a power room, storeroom, water cooler room, muffler gallery, corridor, and two exhaust tunnels. Battery Langdon possesses a high degree of integrity and contributes to the significance of the historic district.

Searchlight tower bases (one contributing site). Built in 1917–1922 based on plans prepared by the U.S. Army Corps of Engineers, searchlights 6 and 7 (originally 9 and 10) were positioned on 60-foot steel bascule towers with legs that rested on concrete foundations. These were positioned 2,900 and 3,149 feet east of Battery Langdon. Surviving elements include hexagonally-shaped concrete foundation walls with four piers for the searchlight towers. The center of the foundation has a rectangular opening.[64] Energy was provided by two 25-KW generators housed in a 23 foot, 8 inch by 15 foot reinforced concrete power station. The searchlights were salvaged in 1946.[65] Although these features are in ruins, the searchlight tower bases retain sufficient integrity to convey their historic association and contribute to the significance of the historic district.

Battery Langdon Battery Commander's Station foundation (one contributing site). The foundation of the Battery Commander's Station for Battery Langdon is located north of the battery. The tower was constructed circa 1941–1945 based on designs prepared by the U.S. Army Corps of Engineers. Surviving structural evidence includes four large concrete piers that were the base of the tower. The piers are in the shape of a truncated pyramid.[66] Although this feature is in ruins, the observation tower foundation retains sufficient integrity to convey its historic association and contributes to the significance of the historic district.

Wharf and rail line ruins (one contributing site). A wharf was built on the bay side of the island north of Battery Langdon in 1917 to support construction and arming of the new defensive fortification. The wharf allowed for the transport of materials and workmen to the Battery

[63] Ibid., 222.
[64] National Park Service, List of Classified Structures, 2014.
[65] Bearss, *Historic Structure Report and Resource Study*, 201.
[66] National Park Service, List of Classified Structures, 2014.

Langdon construction site, which was otherwise a four-mile trip by rail line from the Fort Pickens Engineer's Wharf. Construction of the wharf was authorized on March 7, 1917. A dredge was employed to create a channel from the deep water area to a point closer to the shore to reduce the length needed to build the wharf from 800 to 124 feet. The wharf was connected to the battery via a narrow-gauge rail line. A concrete road extends between the battery and the wharf site today. Work on the project was delayed by United States entry into World War I, which diminished the labor available, and the battery was not completed until 1923. The wharf was destroyed in a 1926 hurricane and was not rebuilt.[67] The wharf and rail line ruins contribute to the significance of the historic district.

Warehouse ruins (one contributing site). To the north of Battery Langdon is the concrete foundation of a warehouse building that was used to support casemating of the fortification in 1942. The ruins contribute to the significance of the historic district.

Battery Langdon picnic shelter (one non-contributing structure). An open-air picnic shelter was constructed during the State Park era near Battery Langdon on the site of the concrete foundation associated with a former construction warehouse used during casemating of Battery Langdon in 1942 (see above). It is composed of twelve 6x6 posts that support a gable roof clad with asphalt shingles. An arch connects the terminal paired posts at either end. Picnic tables and metal grills are available for visitor use. The shelter postdates the period of significance and does not contribute to the significance of the historic district.

Battery Langdon SCR-296 radar complex foundations (one contributing site). Located to the northwest of Battery Langdon is the site of four structural ruins established to support Battery 234 through collection of radar data. The four foundations that comprise the site constitute the remains of two power houses, a transmitter building, and the base of a 100-foot signal tower. This site, representative of a SCR-296 radar location, operated the standard World War II fire control radar utilized by the Coast Artillery for engaging surface targets. Beginning in 1943, SCR-296 radar sites were authorized for all batteries of 6-inch caliber or higher.[68] By January of 1944, the SCR-296 for Battery Langdon had been installed to include three prefabricated metal buildings and the steel tower, all on concrete foundations.[69] An identical set was installed north of Battery 234 to serve that battery.

Comfort station near Battery Langdon (one non-contributing building). The comfort station is located across the parking area from the Battery Langdon picnic shelter. The comfort station is identical in design to the restroom located near Battery Trueman. It was built by the National Park Service following damage caused to an earlier restroom in this location during Hurricane Ivan in 2004. It postdates the period of significance and does not contribute to the significance of the historic district.

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[67] Bearss, *Historic Structure Report and Resource Study*, 284.
[68] *American Seacoast Defenses: A Reference Guide*, 400.
[69] Coast Artillery. "Report of Completed Works – Seacoast Fortifications (Fire Control or Submarine Mine Structures) Harbor Defenses of Pensacola, Florida; Fort Pickens, Structure: SCR 296 Radar Tower, Battery Langdon." 1944.

Maintenance building (one non-contributing buildings). Located northwest of Battery Langdon and north of the trail that follows the former narrow-gauge railway alignment is a small maintenance area. There is one modest prefabricated building located within the complex. This building was constructed by the National Park Service in 2001 to accommodate park needs. The building postdates the period of significance and does not contribute to the significance of the historic district.

Battery Fixed

Battery Fixed anti-aircraft emplacement ruins 1 and 2 (one contributing site). Anti-aircraft gun emplacements are located in the middle of the island between Battery Langdon and the ranger station. These emplacements, referred to as Battery Fixed, were constructed circa 1939–1940.[70] These gun emplacements are in ruinous condition. Surviving features of the site include two circular concrete platforms; these features are not currently visible aboveground.[71] Together they constitute one site that contributes to the significance of the historic district.

Battery Fixed ammunition shelter (one contributing structure). Associated with the anti-aircraft emplacement ruins is a concrete ammunition shelter. Constructed circa 1941–1945, the shelter measures approximately 11 feet square. It is composed of a single concrete room with a flat concrete roof, and is one story in height. The entrance is located in the east elevation. It is surrounded by an iron frame; there is no door (Photograph 22).[72] The ammunition shelter possesses sufficient integrity to convey its historic associations and contributes to the significance of the historic district.

Battery Fixed igloo magazine (one contributing structure). Also associated with Battery Fixed is a magazine constructed circa 1942–1943. The magazine is composed of a concrete foundation, corrugated metal walls, and poured tar roofing. The horizontal, cylindrically-shaped building measures approximately 20 by 11 feet in plan, and is 7-1/2 feet in height. The entrance is located in the northwest face and occurs through a trapezoidal concrete wall, 30 feet long and 9-1/2 feet high, with a central door (Photograph 23).[73] The structure was partially rotated and covered by sand from Hurricane Ivan's storm surge in September 2004. The magazine possesses sufficient integrity to contribute to the significance of the historic district.

Battery Fixed dugout shelter (one contributing structure). The Battery Fixed dugout is a three-room concrete and iron storage facility with interior rooms and a flat concrete roof that measures approximately 27 by 10 feet in plan (Photograph 24).[74] It is located west of the ranger station. Constructed circa 1940–1945, the structure was based on designs prepared by the U.S. Army Corps of Engineers. It was designed to house a firing director and power plant for the artillery

[70] Coast Artillery, "Report of Completed Works – Seacoast Fortifications (Fire Control or Submarine Mine Structures) Harbor Defenses of Pensacola, Florida; Fort Pickens, Structure: Battery Fixed (A-A2)," 1944.
[71] National Park Service, List of Classified Structures, 2014.
[72] Ibid.
[73] Ibid.
[74] Ibid.

associated with Battery Fixed. The dugout shelter possesses sufficient integrity to contribute to the significance of the historic district.

Battery Fixed latrine and septic tank ruins (one contributing site). Located to the northeast of the Battery Fixed dugout shelter are the remains of the latrine and septic tank associated with Battery Fixed, constructed at the same time as the other features of the battery, circa 1940–1945. The latrine and septic tank site helps to convey the historic associations of the original feature and contribute to the significance of the historic district.

Ranger Station Area

Ranger station (Life Saving Station/Coast Guard Station) (one non-contributing building). This building, constructed circa 1908 after an earlier coast guard/life saving station was destroyed in the 1906 hurricane, does not relate to the themes and areas of significance associated with the historic district (Photograph 25). It has also been altered and has lost integrity. As such, it does not contribute to the significance of the historic district.

Ranger station garage (one non-contributing building). The ranger station garage was built to support the nearby coast guard/life saving station in 1939. It was altered to accommodate National Park Service use in 1986, and rehabilitated in 2004. The building is a 1-1/2-story, front gable wood-frame building, clad with weatherboards, and a gable roof clad with asphalt shingles and a concrete foundation. There is a shed roof addition on the north side. The west (front) elevation has three garage doors flanked by two six-panel wood doors. The door in the north elevation has a canopy. The south elevation has three windows on the ground floor and one in the half story. There is a vent in the gable end (Photograph 25).[75] Like the ranger station, the garage does not relate to the operations of the Pensacola Harbor Defense Project. As such, it does not contribute to the significance of the historic district.

Wharf ruins (one non-contributing site). A concrete road leads north from the vicinity of the ranger station, past the garage, to the bay where it originally connected to a Coast Guard wharf. The wharf is in ruins. Like the ranger station, the wharf ruins do not relate to the operations of the Pensacola Harbor Defense Project. As such, they do not contribute to the significance of the historic district.

Searchlight tower bases (one contributing site). Southeast of the ranger station are two searchlight sets; one of the sets, composed of three concrete searchlight tower bases, is currently visible. The other set is buried beneath wind-blown sand. The bases are low, reinforced concrete forms located north of the main road. Although their integrity is diminished due to the loss of the upper components, these features are important evidence of Pensacola Harbor Defense Project operations and convey sufficient integrity to contribute to the significance of the historic district as a contributing site.

[75] Ibid.

HARBOR DEFENSE PROJECT

DATA SHEET

RESOURCE NAME	LCS	Park Resource No.	ASMIS No.	DATE	PHOTO #
	PENSACOLA HARBOR DEFENSE PROJECT HISTORIC DISTRICT				
	CONTRIBUTING SITES – 19				
Tennis court, housing area				Circa 1900–1912	
Support area ruins (ordnance shop, boiler house, two warehouses, shed, ordnance storehouse)				Circa 1934; 1942	
Mosquito control canals	005394	P-38		Circa 1930–1945	
Quartermaster Wharf ruins (pilings)	007478	P-22		1917	
Narrow-gauge railroad bed	005392	P-32		1896–1898	12
Railroad roundhouse foundations	007476	P-19		Circa 1935–1945	
Cable storage tank foundations				1898	
Latrine and septic system ruins, Battery Cooper				1937	
Battery 234 SCR-296 radar complex foundations				1943–1934	
Searchlight tower bases 4 and 5, foundations and counterweight bases, Battery Worth and bascule searchlight tower foundations and counterweight, replaced towers 7 and 8, searchlights 5 and 6, campground loop B	005390			1917–1922	19
Gun emplacements, campground loop E (original location of Battery Fixed)				1917–1921	20

Searchlight tower bases, Battery Langdon	005391	P-30, P-31		1917–1922	
Battery commander's station foundation, Battery Langdon	005403	P-48		1941–1945	
Wharf and rail line ruins, Battery Langdon				1917	
Warehouse ruins, Battery Langdon				1942–1943	
Battery Langdon SCR-296 radar complex foundations				1943–1944	
Battery Fixed anti-aircraft emplacement ruins 1 and 2	005400, 005401	P-45, P-46		Circa 1939–1940	
Searchlight tower bases, ranger station area				1917–1922	
Battery Fixed latrine and septic tank ruins				1940–1945	
	NON-CONTRIBUTING SITES – 2				
Chasefield gravestones and fenced enclosure					
Wharf ruins, ranger station area				Undetermined	
	CONTRIBUTING BUILDINGS – 15				
Mine casemate building (present-day restroom building)	07473	Building 9, P-09		1905–1907	
Latrine near Battery Van Swearingen	007474	P-18		1939–1945	4
Lieutenant's quarters	007462	Building 2, P-02		1900	
Lieutenant 's quarters	007461	Building 3, P-03		1900	8
Captain's quarters	007460	Building 4, P-04		1912	8

Non-commissioned officers' quarters (also VIP Cottage, Fort Pickens Cottage)	007465	Building 1, P-01		By 1909	
Post administration building	007466	Building 5, P-05		1900	9
Fire station	007467	Building 6, P-06		1940	
Duplex for non-commissioned officers	007463	Building 7, P-07		1900	
Duplex for non-commissioned officers	007464	Building 8, P-08		1910	
Transformer house (also pipe shop)	007475	Building 12, P-12		1918	
Mine loading building	007469	Building 15, P-15		1907	10
Mine storeroom	007470	Building 16, P-16		1900	
Engineer storeroom	007468	Building 17, P-17		Circa 1900–1910	
Campground loop D comfort station (also searchlight power station)	091708	P-49		Circa 1917–1923; modified 1950s	18
	NON-CONTRIBUTING BUILDINGS – 10				
Comfort station near Battery Trueman				2009	
Comfort station near Battery Langdon				Post 2004	
Restroom and picnic shelter near Battery Worth				Post 1947	
Campground loop A comfort station				Circa 2010s	
Campground loop C comfort station				2015	
Campground loop E comfort station				Circa 2010s	
Ranger station (coast guard station/life saving station)				Circa 1906	25
Ranger station garage	091710	P-33		1939	25

Campground store				Circa 1970	
Maintenance building				2001	
	CONTRIBUTING STRUCTURES – 35				
Fort Pickens	007459	P-0		1829–1834	
Battery Pensacola	005411	B-01		1898–1899	1
Battery commander's station, Battery Pensacola	07473	P-09		1907–1908	
Battery Cullum	005419	B-08		1896–1897	2
Battery Sevier	005419	B-09		1914–1916	2
Battery commander's station, Battery Sevier				1914–1916	
Power station, Batteries Cullum and Sevier				1922–1923	
Battery commander's station/coincidence range finder, Battery Trueman				1943	
Battery AMTB 90 mm gun platforms	005389	P-29		1943	
Magazine, Battery AMTB				1943	
Battery Van Swearingen	005420	B-10		1898–1899	3
Coincidence range finder, Battery Van Swearingen				1922–1923	
Battery Payne	005416	B-06		1904	5
Igloo magazine for Battery Payne	005386	P-26		1943	
Battery Trueman	005417	B-07		1905	6
Coincidence range finder, Battery Trueman				1922	7
Concrete walk between Fort Pickens and administration area				By 1943	

Pump house	007472	Building 10, P-10		Circa 1940–1945	
Pumping plant	007471	Building 11, P-11		1920	
Fort Pickens seawall		P-23		Circa 1908–1910	11
Cable junction box adjacent to seawall				Circa 1917–1922	
Road system				Circa 1930s	
Jetties				By 1945	
Battery 234	005415	B-05		1943	13
Battery commander's station/coincidence range finder/Tower, Battery 234		P-39		1943	14
Battery Cooper	005414	B-04		1903–1905	15, 16
Battery GPF/Panama mounts	005399	P-44		1937	
Battery Worth	005413	B-03		1898–1899	17
Unidentified concrete structure				Circa 1910s	
Battery Langdon	005412	B-02		1917–1923; 1942–1943	21
Battery Fixed ammunition shelter	005402	P-47		Circa 1941–1945	22
Battery Fixed igloo magazine	005387	P-27		Circa 1942–1943	23
Battery Fixed dugout shelter	005388	P-28		Circa 1940–1945	24
Concrete manhole structures and water tank, Battery Payne				Circa 1917–1922	
Concrete manhole structures and water tank, Battery Trueman				Circa 1917–1922	

	NON-CONTRIBUTING STRUCTURES – 15				
Concrete walks, Fort Pickens				Undetermined	
Wooden fencing, Fort Pickens				Undetermined	
Chain link fencing, Batteries Cullum and Sevier				Undetermined	
Pump house		Building 13, P-13		1973	
Pump house		Building 14, P-14		1974	
Gazebo				2013	
Telecommunications tower				Undetermined	
Fishing piers (2)				Undetermined	
Parking area, Battery Worth				Undetermined	
Campground road system				Undetermined	
Blackbird Marsh Nature Trail				Undetermined	
Beach shelter				Undetermined	
Parking area, beach shelter				Undetermined	
Picnic shelter, Battery Langdon				Undetermined	
	CONTRIBUTING OBJECTS – NONE				
	NON-CONTRIBUTING OBJECTS – 5				
Grills associated with administration and housing areas				Undetermined	
Wayside exhibits				Undetermined	

Flagpole				2014	
Artillery exhibits				Undetermined	
William Bartram Trail marker				Undetermined	

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.)

- [X] 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.
- [X] 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.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
Architecture
Engineering
Military History

Period of Significance

1893–1947

Significant Dates
1898
1904–1906
1917–1918
1923
1942–1943

Significant Person
(Complete only if Criterion B is marked above.)

Cultural Affiliation

Architect/Builder

Statement of Significance Summary Paragraph

The Pensacola Harbor Defense Project Historic District is nationally significant for its association with a large and complex system of surviving coastal defense structures that illustrates decades of evolving military engineering designed and constructed to protect American shores from enemy attack and invasion. The property possesses one of the most extensive collections and greatest concentrations of coastal defense structures in the United States. These structures collectively constitute a system that grew and was modified over time in response to changing approaches to warfare, and emerging weapons and detection technology, between the Civil War and the end of World War II. These features were also part of a larger system of structures designed to protect Pensacola Harbor and the U.S. Naval Base to its north. The strategic importance of the harbor has been recognized since early European settlement of Florida's Gulf Coast, including Spanish occupation and military defense development during the sixteenth century. The resources that survive to convey these historic associations date from circa 1893, when the first elements of the national Endicott Battery System were established, and 1947, when the U.S. Army abandoned the Harbor Defense Project and deaccessioned the military features on Santa Rosa Island considered obsolete following the advent of the atomic bomb. The coastal defense structures also reflect several periods of military engagement and conflict that reinforced the need for American defense, including the Spanish-American War, World War I, and World War II.

The historic district is significant under Criteria A and C in the areas of Architecture, Engineering, and Military History. The historic features that survive on Santa Rosa Island and help convey the evolving nature of warfare and coastal defense between the late nineteenth and mid twentieth centuries include 15 contributing buildings, 32 contributing structures, 19 contributing sites, and no contributing objects. Although many of the features have been adapted for new uses over time, and some have deteriorated or been lost, the Pensacola Harbor Defense Project Historic District possesses sufficient integrity to convey its historic associations for the 1893–1947 period of significance. There are also 2 non-contributing sites, 9 non-contributing buildings, 14 non-contributing structures, and 5 non-contributing objects located within the historic district.

National Register Status of the Property

The Pensacola Harbor Defense Project on Santa Rosa Island is not currently listed in the National Register of Historic Places. In 1977, the National Park Service prepared a draft nomination for the Harbor Defense Project, but the draft was never completed. However, Civil War-era Fort Pickens, located in the heart of the Pensacola Harbor Defense Project Historic District, has been listed for its role in the Civil War. Related Endicott-era coastal defense features located on Perdido Key are also listed in the National Register of Historic Places.[76]

[76] Anne Castellina-Dudley, National Register nomination: *Perdido Key Historic District* (Gulf Breeze, Florida: National Park Service, 1979, listed 1979).

Narrative Statement of Significance

Criterion A Significance

Military History

The Pensacola Harbor Defense Project is significant in the area of Military History as an intact example of a late nineteenth and early twentieth century military installation designed to support defense of the key harbor and naval base at Pensacola, Florida, as part of the Endicott Battery System. The coastal defense system envisioned by the Endicott Board in 1885 comprehensively considered coastal defense needs following a lull in military spending in the United States after the Civil War. The system was designed to ensure that coastal areas of the United States were not vulnerable to attack, particularly from European powers that had significantly advanced their military weaponry capabilities during the 1870s and 1880s.

The Pensacola Harbor Defense Project on Santa Rosa Island is one of the sites developed under the direction of the Endicott Board, a federal body authorized by U.S. Congress and appointed by President Grover S. Cleveland in 1885 to evaluate the coastal defenses of the United States. The board was formed in response to the concerns raised by high-ranking military officers as well as civilians about the efficacy of America's coastal defenses. The board was named for its head, Secretary of War William Crowninshield Endicott (1826–1900). After thorough study and review of the nation's defenses, the board determined that these resources were badly outdated:

> The coast fortifications, which in 1860 were not surpassed by those of any country for efficiency, either for offence or defense, and entirely competent to resist vessels of war of that period, have, since the introduction of rifle guns of heavy power, and of armor plating in the navies of the world, become unable to cope with modern or iron or steel-clad ships of war; far less to prevent their passage into ports destined for attack.[77]

The report continued:

> It is impossible to understand the supineness which has kept this nation quiet—allowing its floating and shore defenses to become obsolete and effete—without making an effort to keep progress with the age, while other nations, besides constructing powerful navies have not considered themselves secure without large expenditures for fortifications, including armored forts.[78]

The members of the board considered many of America's coastal cities and populations to be at risk of attack, and potential targets for destruction and plunder. They also anticipated that future

[77] Report of the Board on Fortifications or other Defenses Appointed by the President of the United States under the Provisions of the Act of Congress approved March 3, 1885. William C. Endicott, Secretary of War, President. Appendix, 499.
[78] Report of the Board on Fortifications, 500.

naval attacks would be directed at commercial ports as much as military installations. In response to this threat, they suggested that fortified harbors were needed to protect native populations, merchant vessels operating along the coast, ships engaged in foreign trade, as well as naval stations, yards, military depots, and the communication and transportation systems that supported both military and civilian activities. The board also identified the need to enhance the efficacy of military armaments and counter European advancements by building new plants that could produce modern guns including gun steel.

The report of the Endicott Board recommended an extensive program of coastal defense improvements that should be treated as a top priority of U.S. Army. The program included construction of permanent fortifications in association with twenty-seven ports, armed with 677 modern high-powered guns and 824 modern mortars, torpedo boats, submarine mines, and floating batteries. The program also entailed strengthening existing fortifications. Despite the strength of the board's entreaty, Congress was not quick to respond with approval or funding of the project. Although the board's plans were never fully implemented, twenty-six Endicott installations were constructed or modified between 1890 and 1910 based on the board's recommendations. Of those twenty-six installations, six were constructed specifically as a result of the war with Spain in 1898. The Endicott Board established a comprehensive method for responding to the threat posed to America's extensive coastline, which continued to form the basis for coastal defense systems until the end of World War II.

The great masses of concrete that formed Endicott batteries have allowed a most of them to survive the ravages of time. As they have been declared surplus to national defense needs, many have been turned over to other national agencies (including the National Park Service), state agencies, and local governments. The most notable examples previously listed on the National Register of Historic Places are found on the east and west coasts of the United States within Gateway National Recreation Area (Fort Hancock and the Sandy Hook Proving Ground Historic District, and Fort Tilden Historic District); Fort Monroe National Monument; and Golden Gate National Recreation Area (Forts Baker, Barry, and Cronkhite; Fort Point National Historic Site; and the Presidio of San Francisco). Other fine examples of former coast defense posts in the care of state agencies may be found at Fort Mott State Park (Fort Mott and Finns Point National Cemetery District) in New Jersey; Fort Stevens State Park in Oregon; and Fort Casey State Park and Fort Worden State Park, both in Washington.

The most notable example in a county park is Fort DeSoto in Pinellas County, Florida. Although only consisting of two mortar batteries, the Fort DeSoto Batteries have four original twelve-inch mortars. Other than the Pensacola Harbor Defense Project, Fort DeSoto is the best example on the Gulf Coast.[79]

[79] Berhow, 623–625; "National Register of Historic Places Program: Research, Map," available at: https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466. Accessed March 2017.

The Pensacola Harbor Defense Project is significant as one of the only coastal fortification systems in the United States that survive intact from the Spanish-American War era, and reflect the vision of the Endicott Board as partially implemented during the 1890s.

Criterion C Significance

Architecture

The Pensacola Harbor Defense Project is also significant for the surviving collection of early twentieth century U.S. Army post architecture that supported the housing, storage, maintenance, and administration needs of those stationed on Santa Rosa Island to manage the coastal defenses. The architecture of the Pensacola Harbor Defense Project is representative of the standardized plans prepared by the Quartermaster Corps. Extant buildings at Santa Rosa Island are good examples of the types of buildings constructed around the United States during a specific period. They are white frame buildings with dark green roofs and wood trim, and include six residential structures, an administration building, and a firehouse. These buildings are significant as an overall collection that represents the range of building types used to manage a post community. The post buildings are located west of Fort Pickens, along the interior road system that bisects the open space between the seawall and Fort Pickens. The buildings are sighted to form streetscapes along the orthogonal road system. To the north of Fort Pickens there are also structures of wood, brick, and concrete clustered along the road the originally led to the former Engineer's Wharf site. These buildings are associated with maintenance, mining, and engineering functions of the Pensacola Harbor Defense Project.

Army architecture evolved in several phases between 1865 and 1940. Following the Civil War, the U.S. Army instituted extensive cuts in military spending. In response, the base on Santa Rosa Island associated with Fort Pickens was almost completely abandoned. In 1874, the U.S. Congress once again began to appropriate funds for military base operations, in particular noting the poor living conditions at many Army posts. As part of an overall effort to increase the standards of its post housing, the Army began to develop standardized quartermaster plans. Standardized building plans were considered to be more cost-effective and addressed the need for more salubrious housing.[80] Beginning in 1874, the Quartermaster Corps also began to contract with civilian architects and builders to complete the designs for and construct post buildings, although the Quartermaster Corps continued to oversee the work and approve the plans. Standardization plans typically fall within three distinct phases based on Army initiatives; 1866 to 1890, 1890 to 1917, and 1917 to 1940.[81] Post buildings tended to be simplified versions of Queen Anne, Colonial Revival, Italianate, Romanesque Revival, and other popular styles of the day.[82] All of the housing and administration buildings on Santa Rosa Island fall within the second phase—1890–1917—and generally reflect a simplified Queen Anne character.

[80] Bethanie C. Grashof, *A Study of United States Army Family Housing Standardized Plans* (Atlanta, Georgia: Georgia Institute of Technology, Center for Architectural Conservation, College of Architecture, May 1986), 9–10.
[81] Grashof, 1–59.
[82] Katherine Grandine, National Register nomination: "Staff Row and Old Post Area Boundary Increase, Fort McPherson" (Frederick, Maryland: R. Christopher Goodwin & Associates, Inc., May 1993), 8-2.

One of the housing types with which the Army experimented during this period was the duplex, which allowed for the construction of larger units for officers that still afforded more privacy than apartment units.[83] T-shaped duplexes were one of the most commonly constructed building plans.[84] Examples of this building type are also found on Santa Rosa Island.

Engineering

The Pensacola Harbor Defense Project is significant in the area of Engineering as an example of a comprehensive collection of seacoast defensive structures that exhibit advances in armament design and technology between circa 1893 and 1947. The collection also includes Fort Pickens, a Third System fortification built in 1829–1834 based on pre-Civil War military engineering capabilities that was adapted for use in the Harbor Defense Project. Third System fortifications were designed to protect coastal areas from naval attacks. However, they were not expected to hold out more than two weeks under land-based assaults. Many Third System forts were massive brick and stone structures designed to be part of a permanent, integrated, and organized coastal defense system. They were considered by American military engineers to be state of the art and capable of repelling most enemy attacks.[85] However, during the Civil War (1861–1865) Third System fortifications were rendered obsolete by more powerful cannon, as evidenced at the siege of Fort Pulaski, and by steam-driven screw propellers that allowed ships to pass the forts without being sunk, as evidenced at the mouth of the Mississippi in 1862 and at Mobile Bay in 1864. Only underwater mines, called "torpedoes", were found to be effective against these ships.

Following the Civil War, work continued on Fort Pickens until 1869. The forts protecting Pensacola Harbor continued to be at least minimally maintained for many years, and there was a flurry of gun-mounting at several forts during the *Virginius* incident, that involved a diplomatic dispute between the United States, Great Britain, and Spain, in 1874. Repairs and modifications continued to be made at Fort Pickens into the 1890s when the fort was adapted for new purposes in support of the Endicott plan.

The Pensacola Harbor Defense Project was conceived as part of the broader Endicott Battery System capable of surviving attack by rifled artillery as well as other emerging threats.[86] The Endicott System involved large-scale modernization of harbor and coastal defenses in the United States through the engineering of strategically-placed, relatively small concrete batteries of breech-loading guns located along the coastline. Many were sited at earlier Third System sites, such as Fort Pickens, due to the continued strategic importance of these locations.[87] The system involved construction of well-dispersed, open top, reinforced concrete gun emplacements, protected by sloped earthworks. Unlike Third System defenses, which were typically traditional masonry forts concealing massed batteries of cannon, these smaller batteries of up to four large-

[83] "Architectural Context: Standardized Plans," Fort Belvoir, http://www.belvoirhousinghistory.com/context.html (August 2011).
[84] Grashof, 61.
[85] Lewis, 42.
[86] Weaver, 15.
[87] Ibid., 16–17.

caliber rifled guns were emplaced in reinforced concrete structures hidden behind earth-covered concrete parapets. These defenses also involved plans for the placement of mines near the mouth of the harbor, and within the harbor, to protect against torpedo boats. The Endicott Battery System became the primary system for coastal defenses between 1886 and 1917.

The Pensacola Harbor Defense Project includes four examples of Endicott batteries—Batteries Cullum, Van Swearingen, Pensacola, and Worth. Updates to the system were designed at the request of Secretary of War William Howard Taft during the presidential administration of Theodore Roosevelt. Additions to the harbor defenses at Pensacola Bay based on the Taft plan, which addressed the emerging threat of torpedo boats, included Battery Trueman, Battery Payne, and Battery Cooper. Plotting rooms and other features that facilitated precision firing and electrical systems were also added to enhance the efficacy of the defenses. As attack by aircraft emerged as a threat during World War I, the Army retrofitted existing batteries with anti-aircraft guns and installed searchlights for night lighting. Battery Langdon and Battery GPF (Grand Puissance Filloux) were constructed in the 1920s and 1930s to further augment the system in response to advances in military engineering involving aircraft, and to provide longer range guns to defend against naval armament advances. Finally, during World War II, the system was again updated with the construction of Battery 234, several lookout towers, and casemating of Battery Langdon in response to the threat of attacks by air.

The Pensacola Harbor Defense Project illustrates the importance of strategic terrain in military planning and engineering. Located at the western tip of Santa Rosa Island, the harbor defenses are oriented to fire on seafaring vessels as they approach Pensacola Harbor, one of the most important deep water ports within the Gulf of Mexico. The coastal defense structures occupy high ground and other key terrain on the western end of the island, and are positioned to fire on several approaches. Over time, the defenses were expanded to target additional avenues of approach, including across the peninsula, from the sea, from submarines, and from aircraft. The Coast Artillery Corps, a unit of the U.S. Army, operated the Pensacola Harbor Defense Project batteries. Santa Rosa Island was also used for corps training, for weapons testing, and for deployment.

Historic Contexts

U.S. Military Coastal Defense, 1812–1947

The Pensacola Harbor Defense Project on Santa Rosa Island is representative of the Fourth System of coastal defense structures designed and employed by the U.S. government to protect the nation from enemy attack by sea. The property includes evidence of a Third System coastal defense structure—Fort Pickens—as well as the late nineteenth century Endicott System, and evolutionary adaptations to the system that occurred between 1904 and 1943. Surviving evidence of older coastal defense systems occupies ground used by the Spanish when in control of Florida prior to its acquisition by the United States in 1821.

The earliest coastal defenses erected on American shores were established by the French, Spanish, and British to protect territorial interests and shipping concerns. Coastal defenses were an early priority for the United States government following the end of the Revolutionary War. The U.S. Congress authorized construction and updating of its coastal defense systems three times prior to the establishment of the Harbor Defense Project. These efforts are referred to as the First System (1794 to 1807), the Second System (1807 to 1812), and the Third System (1816 to 1867).

After the United States Constitution was ratified in 1789, the government began to focus on strengthening the nation's military defenses by defining the role of a national army and navy, and developing defense systems to protect against invasion. To protect the vast coastline, the government identified the need to establish a navy, followed by protected seaports and harbors both for military and commercial purposes. In 1789, the government established the War Department, while the Naval Act of 1794 created a standing U.S. Navy. At the time, the only coastal defensive structures were several batteries built as temporary structures to meet individual needs as they arose. This uncoordinated collection of batteries constituted the First System of coastal defense.[88]

Circa 1797, the United States government began to address the need for coastal defense by building artillery positions where garrisoned troops could protect key locations. The Second System of coastal defense was comprised of these new works, constructed between 1797 and 1812. Notable examples of Second System forts include Fort McHenry in Baltimore, Fort Washington on the Potomac, and Castle Williams, located on Governor's Island in New York Harbor.[89]

After the British warship the *Leopard* fired on the *USS Chesapeake* as it sailed off the Virginia coast in 1807, the government grew more resolved to improve the nation's coastal defenses. Congress subsequently appropriated money to build new fortifications designed to guard key harbors.[90] The fortifications that resulted from efforts to establish Second System defenses were more elaborate than First System fortifications that were neither uniform nor durable, and designed to emplace smoothbore cannon.[91] Some included casemates and arched gunrooms. Both First and Second System fortifications were built primarily of earth with some masonry backing, but were not highly durable. They were generally designed to emplace smooth-bore cannon, although they were not uniform in design.[92]

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[88] Weaver, XV.
[89] Weaver, XV; Thor Borresen, "Simon Bernard and America's Coastal Forts," in *The Regional Review* Vol. II (No. 2, February 1939):1.
[90] *American Seacoast Defenses,* 6.
[91] Ibid.
[92] Coast Defense Study Group, Inc., "United States Seacoast Defense Construction 1781–1948: A Brief History: The First, Second, and Third Systems, 1794–1860." Available online at http://cdsg.org/old/cdsghis2.htm (accessed July 30, 2015).

Despite the efforts conducted as part of the Second System strategy, the British were not prevented from landing on American shores, capturing seaports, pillaging the coast, and burning Washington, D.C., during the War of 1812. Elsewhere, American success in turning back the British forces at Fort McHenry, as described in Francis Scott Key's "The Star Spangled Banner," suggested the importance of effective coastal defense structures. The embarrassment of the British invasion prompted Congress to allocate funding for the creation of a new seacoast defensive program that would offer a more effective and coordinated system of protection. The evaluation of the coastal defense system that followed the signing of the Treaty of Paris in 1815 suggested several aspects of the Second System defenses that were ineffective or lacking, including outmoded battlement fighting tops and narrow embrasures, and the confinement of the guns to a limited field of fire. By the early nineteenth century, improvements in weaponry included larger calibers, longer ranges, and pivoting carriages that fired *en barbette*, affording the guns a wider range of operation and broader field of fire. Based on these armament improvements, coastal defense batteries would need to be redesigned and rebuilt.[93]

Unlike the previous two coastal defense systems, the Third System was developed during peacetime without the direct threat of war. In 1816, President James Madison created a Board of Engineers for Fortifications to establish criteria for the nation's coastal defense, while Congress appropriated $800,000 for the new construction program. While First and Second System forts were designed by individual and local engineers, the War Department decided to select a single engineer to design the Third System. In 1816, the War Department engaged Simon Bernard, a French engineer educated at the Ecole Polytechnique who had served under Napoleon in the Grand Armée, to design the new fortifications system. Bernard had already designed several fortification systems in Europe and had previously served as an aide-de-camp to Napoleon during the Napoleonic Wars. Bernard settled in the United States after Napoleon's second abdication.[94] The charge given to Bernard was to design the Third System works as permanent structures that would accommodate advanced armaments within a comprehensive collection of fortifications placed strategically along the United States coast from Maine southward based on criteria provided by a board of engineers. Under Bernard's direction, the Third System became the "most comprehensive, most uniform, and the most advanced the nation had yet to construct."[95]

The Board of Engineers for Fortifications guided Bernard's work by developing goals for the Third System and analyzing what was required to complete the system. The board studied the entire coastline, considering each harbor for its importance to naval and commercial traffic, and suggesting how each fortification might be manned in time of war, while also carrying a peace-time garrison for maintenance. As part of their process, the board visited potential sites and prepared initial plans for the new works.[96] The board also considered how to provide

[93] *En barbette* is a French phrase that describes the practice of firing a fixed gun over a parapet without overhead protection.
[94] Weaver, 3.
[95] "Seacoast Fortification-Third System," Global Security.Org:Military, (May 2007), http://www.globalsecurity.org/military/facility/coastal-forts-third-system.htm (accessed March 13, 2012).
[96] *American Seacoast Defenses*, 6–7.

communications between the various defensive posts, which in some cases might involve the building of roads and canals. The canals that were built to serve as communication lines were later linked together and to existing waterways, forming the nation's inland waterway.

The board prepared its first report in 1821. This report would form the basis for American coastal defense systems for the next fifty years. The report suggested that coastal defense fortifications be established at fifty locations. The objectives identified in the report for the new system suggested that the design:

1. Close important harbors to an enemy.
2. Deprive the enemy of strong positions.
3. Protect key American cities from attack.
4. Prevent interior navigable waterways from an enemy naval blockade.
5. Protect key naval bases.[97]

The board's report also concluded that all coastal defense fortifications were ultimately vulnerable given the potential for a protracted siege. Therefore, it suggested that forts be designed to withstand sieges of up to fourteen days, allowing ample time for reinforcements to arrive. The report also prioritized the construction of proposed forts into three phases. Hampton Roads, Virginia; Boston, Massachusetts; and Narragansett Bay, Rhode Island were identified as the highest priority due to their role in naval operations.[98]

The earliest Third System forts tended to be the largest of those built under this system, and more similar in appearance to earlier fortifications. They were often polygonal and irregular in shape, with large bastions. Fort Pickens is an example of an early Third System fort. Third System fortifications designed after 1820 were generally smaller. This reflected the emergence of rail lines that rendered the transport of relief troops and supplies easier and faster, diminishing the length of time that a fort might need to withstand a siege. The later forts were also more regular in shape and symmetrical in the placement of tiers for casemates, often forming regular hexagons that could be truncated on the side-facing land. Examples include Fort Pulaski in Savannah, Georgia, and Fort Sumter in Charleston, South Carolina.[99]

Third System fortifications also incorporated design elements of earlier defensive structures, such as casemates. Casemates are vaulted brick structures formed by connecting networks of brick arches designed to withstand the impact of artillery shells. Early experiments with these structures date as far back as 1540.[100] Casemates offer an advantage in that the firepower emanates from inside the fort rather than from the earthen terreplein on top of the structure, providing cover for both the gun and gun crew. Additionally, casemates can be tiered, increasing

[97] Weaver, 7.
[98] J.E Kaufmann and H.W. Kaufmann, *Fortress American: The Forts That Defended America, 1600 to the Present* (Boston, Massachusetts: Da Capo Press, 2004), 206.
[99] Lewis, 52.
[100] Ibid., 31.

the amount of firepower possible.[101] Casemates were also sometimes used as quarters and mess halls, or served other administrative functions.[102] Some Second System forts like Castle Williams on Governors Island in New York Harbor contained casemates. Bernard elected to incorporate these features into the design of the new forts, along with bastions and outer works.

As part of the Third System defenses design, fort architecture was standardized for the first time. Large polygonal masonry structures were built on shores and islands to protect harbors and trade routes. Engineering combined structural elements like brick, stone, earth, and concrete to allow for casement emplacements that concentrated armament in an unprecedented way. The arched casement design characteristic of the Third System lined the seaward fronts. Guns were positioned in each arched opening. Guns were also emplaced on top of the terreplein *en barbette* to add another layer of firepower.

Fortification construction was overseen by the U.S. Army Corps of Engineers. The new defensive works were mostly large masonry structures built to house guns that pointed outward from vertical perimeter walls. These larger works were mainly located around larger harbors, and were replacements for earlier works. Smaller works were built to guard less important harbors.[103]

In 1821, the United States gained control of Florida from Spain following ratification of the 1819 Adams-Onis Treaty, greatly increasing the amount of shoreline to be protected. Pensacola Bay was soon identified as an important deep water harbor large enough to be developed as the principal U.S. naval depot on the Gulf Coast.[104] The U.S. Army Corps of Engineers immediately began planning a system of defenses for the region. Several would approximate the locations of earlier Spanish and British harbor fortifications.

The first plan for a fort on Santa Rosa Island was prepared by Col. Joseph G. Totten, a graduate of West Point Military Academy; the site for the fort was selected by Bernard. It was part of a larger system of four works designed to protect the entrances into Pensacola Harbor and the naval base. Two of the works would occupy the islands at the mouth of the bay, while the other two were located on either side of the peninsula where the navy yard was to be built. The fortification on Santa Rosa Island was the most important defensively and would be the largest of the four.[105] The resulting masonry structure was named Fort Pickens. Work began in 1829, and the fort was declared ready for troops in 1834.

In 1850, several decades after its 1821 report on Third System construction, the board expanded its recommendations to include numerous additional fortifications, with a final tally of 200

[101] Weaver, 22.
[102] Ibid., 23.
[103] *American Seacoast Defenses*, 7.
[104] Thomas Muir, Jr., and David P. Ogden, *The Fort Pickens Story* (Pensacola, Florida: Pensacola Historical Society, 1989), 1.
[105] Muir and Ogden, 3.

Atlantic and Gulf coast and 20 Pacific coast sites. By the Civil War, however, only about two-thirds of the proposed sites had been developed.[106]

Although Fort Pickens witnessed combat during the Civil War, it remained in Union hands and was never seriously threatened. Other defense structures, however, did not fare as well. New rifled artillery, such as the 6.4-inch 100-pdr Parrott rifle, was found to be able to penetrate the masonry walls of the forts built as part of the Third System, diminishing their viability as defensive structures. Fort Pulaski in Savannah, Georgia, is an example of a Third System defensive work that was breached by the new artillery during the Civil War. Once the masonry walls were penetrated, the Confederate forces garrisoned within were forced to surrender to their Union attackers. Thus the new rifled artillery rendered the defenses of the Third System obsolete almost overnight, particularly given how difficult the masonry forts were to repair. As the Civil War progressed, military engineers learned that parapets built of sand and earth, relatively easy to build and repair, were more resistant to the new artillery as earth could absorb the impact of the projectiles. Another advancement in weaponry during the Civil War that would impact military engineering was the use of underwater mines.[107]

Following the Civil War, the War Department ordered many of the Third System fortifications repaired. Construction of several new Third System forts was also initiated as detached batteries with earthen parapets and brick-lined magazines.[108] These were designed to accommodate the new large-caliber smoothbore cannon developed during the war. In 1867, however, the U.S. government ceased funding for masonry fortifications, effectively ending implementation of the Third System.

During the 1870s, the government authorized several projects to establish large caliber mortars and submarine mines as part of existing coastal defense bases. Many of these were never completed, however. By the early 1880s, nearly all of the nation's coastal defense posts were in a state of disrepair.[109]

Weaponry design continued to advance during the late 1870s and 1880s, including the development of breech-loading, longer-ranged cannon. These advances threatened all existing coastal defense systems. By the early 1880s, the U.S. Army began to lobby for another round of improvements to the coastal defense system. Heeding the advice of the Army, President Chester A. Arthur noted in his 1882 Second Annual Message to Congress:

> I call your attention to the recommendation of the Secretary and the board that authority be given to construct two more cruisers of smaller dimensions and one fleet dispatch

[106] *American Seacoast Defenses*, 7.
[107] Ibid., 8.
[108] Ibid.
[109] *American Seacoast Defenses*, 8.

> vessel, and that appropriations be made for high-power rifled cannon for the torpedo service and for other harbor defenses.[110]

This recommendation would be coupled with the U.S. Navy's strategy to build new ships designed to function as offensive weapons as well as defensive features. The associated naval bases, located in coastal harbors, would require additional safeguarding.[111]

In 1885, President Grover Cleveland furthered the cause by appointing a joint army, navy, and civilian board headed by Secretary of War William Endicott to further study the issue of coastal defense. The resulting Board of Fortifications was tasked with evaluating proposals for new defenses. Their report, published in 1886, recommended implementation of a new program that would feature batteries to house breech-loading cannon, mortars, floating batteries, and submarine mines for twenty-nine coastal locations at a projected cost of $127 million.[112] In 1888, Congress created the Board of Ordnance and Fortification to test weapons and implement the new program; construction would be directed by the U.S. Army Corps of Engineers. Congress began to appropriate funding in 1890.

The Endicott Board's recommendations resulted in the construction of reinforced concrete fortifications and emplacement of large caliber breech-loading artillery and mortar batteries. The Endicott batteries were not like the earlier coastal defense features. Rather, they were part of a new Fourth System of coastal defense structures that included well-dispersed emplacements that each housed a few large guns. The structures were composed of concrete walls open at the top and protected by sloped earthworks. Many featured disappearing guns—6-, 8-, 10-, and 12-inch rifled guns on disappearing mounts—that sat protected behind protective walls until they were raised to fire. The 6-inch rifled guns would be supported by 8-, 10-, and 15-inch Rodman guns. Mine fields and other underwater explosive devices were later added to the program. Smaller gun emplacements were used to protect the mine fields.

By the Spanish-American War, several Endicott batteries had been constructed in the United States, including Battery Cullum on Santa Rosa Island. With the outbreak of war in 1898, it was necessary to arm the defenses that had been constructed. In some cases, older muzzle-loading ordnance were emplaced, while additional hurriedly built temporary defenses were constructed in key locations. Mine fields were planted and maintained during the time of that conflict.[113] On Santa Rosa Island, the Army also elected to construct an additional emplacement that would later be named Battery Van Swearingen.

With the Endicott System, U.S. Army commanders realized that the new heavy fixed artillery required different training programs and tactics than mobile field artillery. To address the needs of the new defenses, in February 1901 the Artillery Corps was divided into two divisions: field

[110] The American Presidency Project, "Chester A. Arthur, XXI President of the United States: 1881–1885." Available online at http://www.presidency.ucsb.edu/ws/index.php?pid=29523%7C (accessed July 30, 2015).
[111] *American Seacoast Defenses*, 9.
[112] Ibid., 9.
[113] Ibid., 10.

artillery and coast artillery. The coast artillery became responsible for the installation and operation of mine fields. To meet this new responsibility, the corps began to acquire the types of vessels needed to plant and maintain mine fields, as well as the cables that connected the mines to the mine casemate on shore. Mine planting vessels, referred to as mine planters, were operated by civilian crews until the creation of the U.S. Army Mine Planter Service (AMPS). The Warrant Officer Corps trained officers and engineers for the mine planter ships.

In 1905, President Theodore Roosevelt appointed a new coastal defense board, under the direction of Secretary of War William Howard Taft. This group updated several existing standards and reviewed the progress regarding implementation of the Endicott program. The new board suggested the addition of new technical features, such as adding searchlights, electrification for lighting, communications, projectile handling, and updating optical aiming techniques.[114] The fortifications designed under the Taft Program differed slightly in battery configuration from those associated with the Endicott System and resulted in fewer guns at each location.[115] By the beginning of World War I, the United States had a coastal defense system equal to that of any other nation on earth.

In 1907, Congress further divided field and coast artillery forces by creating a separate Coast Artillery Corps (CAC). Fort Monroe in Virginia became the Coast Artillery School. The facility continued to operate until 1946.

Despite the extensive improvements in U.S. coastal defenses implemented under the Taft Program, by 1915 many Endicott System batteries had become obsolete due to the increased range and accuracy of naval weaponry and the advent of aircraft. The high firing angles of naval guns generally nullified the advantages of the disappearing carriages used in the batteries, and several foreign battleships could outrange any harbor defense weaponry in the United States.

During World War I, many guns were removed from the existing seacoast defenses and remounted for use overseas. Many coast artillery units manned these and other field pieces in Europe. At home, the coast artillery posts served as enlistment and training centers for those going overseas.[116]

The growing importance of aircraft as an offensive military weapon resulted in the formation and training of specialized Coast Artillery Corps anti-aircraft artillery units following World War I. The period between the two world wars also saw an increase in cooperation between the Coast Artillery and the Navy and Air Corps. Several anti-aircraft guns were installed at harbor defense reservations during World War I and in the late 1910s and 1920s.[117] The threat posed by aircraft to existing coastal defenses led to changes in these reservations. The Army at first considered bombers as more of a defensive weapon against naval attack than a strategic offensive weapon. However, planes like the Boeing B-17, which evolved as defensive weapons,

[114] Ibid.
[115] Ibid.
[116] Ibid.
[117] Ibid.

turned out to have excellent offensive capacity as well. Weaponry in use in the coastal defense batteries during the period between the wars included the 3-inch M1903, 155 mm M1918, a French-designed weapon built for the U.S. Army; the 8-inch Mk. VI, 8-inch M1888 (railway and fixed mountings); 12-inch coast defense mortar; 12-inch M1895; 12-inch/45 caliber Mark 5 naval gun; and 16-inch M1919.

Following the end of World War I in 1918, the United States entered a period of austerity. Many of the coast defense forts were placed on caretaker status with a small detail and used as summer training camps for reserve, National Guard, reserve officer training corps, and civilian military training corps units. New long-range 12-inch and 16-inch army ordnance were developed for existing seacoast armaments following the Washington Naval Treaty of 1922. These were supplemented by 16-inch naval guns, available due to naval reductions. Although several new harbor defense works were designed, few new batteries were actually built during the 1910s and 1920s.[118]

Mobile guns remaining from World War I were treated as supplemental firepower to support the older emplaced guns. Twelve-inch mortars and 8-inch guns, as well as 14-inch guns mounted on railroad carriages, were also stationed at United States seacoast defense sites.

During World War I, the United States had purchased from France a number of 155 mm GPF tractor-drawn guns, later made in the United States as the model M1918. In the late 1920s, these were added to the nation's coastal defenses. To increase the accuracy of these guns, they were emplaced on circular concrete Panama Mounts, named for the area in which they were first used.

Despite this, in 1923 the general Army staff reconfirmed a commitment to artillery and mines as the most practical and cost-effective methods for seacoast defense, as an alternative to a larger navy or air corps. In 1931, the Army established a Harbor Defense Board to supervise the execution of coastal defense projects drafted for each harbor between 1930 and 1932.

Existing batteries were camouflaged, but remained vulnerable to air attack. In response to this threat, the last generation of coastal artillery consisted of armaments mounted under thick concrete shields covered with vegetation to make them invisible from above. In anticipation of a conflict with Japan, most of the limited funds available between 1933 and 1938 were spent on improving defenses along the Pacific coast. In 1939, the threat of war in Europe prompted larger appropriations and the resumption of work along the Atlantic coast.

At the same time, the end of naval armament limitations during the 1930s allowed for larger and longer-range weapons on ships, which led to the need for better long-range shore batteries. The manufacture of large guns firing 16-inch-diameter, 2,000-pound shells with ranges up to 25 miles, which rivaled the latest naval weapons, was authorized, although few were actually installed. Construction of the first 16-inch emplacement began in 1936 at Battery Davis in Fort

[118] Ibid.

Funston, south of the Golden Gate Bridge in San Francisco, California. The first test firing took place in 1940, from Battery Townsley in Fort Cronkhite, north of the Golden Gate Bridge.

Rearming the American coastline with long-range 16-inch weapons from existing Army and Navy stores finally began in the late 1930s. These guns were emplaced in positions with substantial overhead protection. Two 16-inch prototype batteries were constructed at San Francisco from 1937 to 1940. Similar structures were authorized by Congress in September 1940 for other reservations. The program included new defenses for nineteen harbors along both coasts of the United States. These fortifications were built using two standardized designs, a two-gun 16-inch battery, which in some cases involved remodeled 12-inch batteries, and a two-gun 6-inch or 8-inch battery. Both were accompanied by supporting command and observation stations.

When America entered the war in December 1941, a large number of mobile weapons were rushed to arm these emplacements at both coasts. These were supplemented by temporary seacoast defenses built using old naval weapons and relocated Army seacoast weapons.[119]

The air attack on Pearl Harbor demonstrated the obsolescence of existing coastal artillery. Although coastal defense emplacements in the Philippines and Singapore were locally effective, the Japanese chose to attack where there were no defenses and then surrounded the fortifications. Heavily fortified positions such as Japanese Rabaul and Fort Drum in the Philippines demonstrated tactical success amid a strategic failure.

With the entry of the United States into the war, additional mines, searchlights, radar, and anti-aircraft guns were installed in late 1940 and 1941. Submarine nets and underwater mines protected many harbor entrances. Radar and patrol planes could detect enemy vessels at long distances, and aircraft became the first line of defense against attack. The seacoast defense construction program went into high gear in 1942, with sites along the Pacific coast given priority. Batteries of new 90 mm guns were added to the program as anti-motor torpedo boat (AMTB) units. Permanent defenses were planned for thirty-three harbor areas.

By World War II, submarines, U-boats, and airplanes had become greater threats and required new technology in coastal defense systems. For submarines, this concern caused an increase in the use of mines and nets, and a demand for superior artillery. However, as the war progressed incursions across the Atlantic grew fewer, and progress diminished along with concerns.

The United States planned an extensive Harbor Defense Armament Program during World War II that involved the use of stockpiled 16-inch naval rifles intended for canceled battleships and battle cruisers and 8-inch naval rifles removed from others such as the *USS New Jersey*, *USS Kansas*, *USS Minnesota*, and *USS New Hampshire*. New batteries were designed to emplace new 16-inch guns with a range of 25 miles as well as new 12-inch mortars with a range of 17 miles, 8-inch guns with a range of 20 miles, and 6-inch guns with a range of 15 miles. Fortifications were planned for several locales, including the Harbor Defenses at Pensacola. However,

[119] *American Seacoast Defenses*, 12.

approximately one-third of the proposed batteries were never completed as a result of changing priorities. Tactics and strategies evolved throughout the war to focus more on sea-based air power in the Pacific and land-based battles in Europe, rendering the defense of American harbors against ships superfluous. After the Battle of Midway in June 1942, the possibility of Japanese attack on the American mainland diminished. As a result, the construction program was curtailed in 1944 and halted altogether in 1948.[120] Even before the war ended, several coastal defense guns were scrapped to become new weapons, and soldiers of the heavy artillery were transferred to anti-aircraft and infantry duties.

During the Cold War, atomic and nuclear weaponry again changed the nature of national defense. Seacoast artillery as conceived could no longer protect against the new technologies afforded by advanced airplane, missile, and amphibious landing technology. By 1947, most of the guns emplaced within seacoast defense structures were declared surplus and removed. Any remaining weapons were removed in 1950 when the Coast Artillery was deactivated and the Coast Artillery Corps abolished as a separate branch of the Army. At that point, all harbor defense commands were dismantled. Many former coast defense reservations were converted to other uses by the military or declared surplus and sold off. Interestingly, many of the reservations have become public parks.[121]

The Battle of the Atlantic, 1939–1945

Following the entry of France and Great Britain into World War II on September 3, 1939, Germany initiated plans to use its naval force to control shipping in the Atlantic. Unable to match the power of Great Britain's Royal Navy, the Kriegsmarine instead targeted the ships of Allied forces, particularly those providing supplies to Great Britain. Although the United States did not enter the war until late 1941, it was instrumental in supplying the Allied war effort. The Germans employed a combination of surface vessels and U-boats in these endeavors. They grouped the U-boats into so called wolf packs to attack Allied convoys carrying supplies to Great Britain.

Prior to United States entry into World War II, the Germans and Great Britain engaged in two significant naval battles—the Battle of the River Plate in December 1939, off the coast of South America, and the Battle of the Denmark Strait in May 1941, in the North Atlantic—that involved German surface raiders. In the latter battle, The *Bismarck*, commissioned in August 1940, engaged and destroyed the British Royal Navy's HMS *Hood* and forced the HMS *Prince of Wales* to retreat in the Battle of the Denmark Strait. A few days later, following sustained pursuit by the British navy, the *Bismarck* was bombarded, scuttled by her crew, and sank with heavy loss of life.

Control of the Atlantic by the Germans became more plausible following the fall of France in 1940, after which the Germans were able to occupy naval bases on the Bay of Biscay and use

[120] Ibid., 12.
[121] Ibid., 13.

them to send out additional U-boats. The U-boat packs were often accompanied by German aircraft used to locate and help attack Allied ships. The U-boats were highly successful in inflicting heavy losses among Allied ships.

British ships at the time employed a primitive type of sonar that was used to help locate the U-boats. In September 1940, the United States provided Great Britain with fifty obsolete destroyers through the Destroyers for Bases Agreement, which assisted the British navy as escort vessels. The United States and Canada provided escorts for ships passing through the Atlantic, while remaining neutral. As the war progressed, the British also became better equipped to locate U-boats and trained in anti-submarine maneuvers.

Following United States entry into World War II, German Admiral Karl Doenitz ordered U-boats dispatched to the East Coast and Caribbean waters in January 1942 as part of Operation Drumbeat. Unescorted American merchant ships fell prey to the German U-boats, and the U.S. Atlantic coastline was threatened due to the failure to implement a black-out. The United States implemented a convoy system for merchant ships in May 1942; losses continued, however, as the convoys continued to encounter packs of German U-boats. In spring 1943, the U-boats appeared to be destroying a formidable number of Allied ships, suggesting that the Germans were gaining the upper hand.

In May, however, the Allies began to turn the tide based on several factors, including development of the Hedgehog anti-submarine mortar, advances in deciphering German radio transmissions, enhanced radar, and the Leigh Light, which allowed Allied aircraft to locate surfaced U-boats at night.[122]

During the summer of 1943, Admiral Doenitz responded by developing new tactics and equipment, such as U-flak boats that contained enhanced anti-aircraft defenses, as well as a variety of countermeasures and new torpedoes. Once these new features were in place, the Germans returned to their offensive in September 1943. The new technology was initially successful. However, as Allied air power grew in strength, they began to attack the U-boats in the Bay of Biscay as they left and returned to port. As his fleet was increasingly under attack, Doenitz began to order new U-boat designs, including the revolutionary Type XXI. Designed to operate entirely submerged, the Type XXI was faster than any of its predecessors. However, only four were completed by the end of the war.

By the 1930s, the design of American coastal defense batteries had begun to respond to one of the new military threats to emerge from World War I—attack by air from long-range and carrier-borne aircraft. This threat suggested that all components of coastal defense systems needed to be provided with substantial overhead cover, while anti-aircraft weaponry also needed to be accommodated. At the same time, battleships began to carry more powerful artillery that could fire longer distances with devastating effect either as projectiles or aerial bombs. Battery

[122] "World War II: Battle of the Atlantic," available at http://militaryhistory.about.com/od/worldwarii/p/World-War-Ii-Battle-Of-The-Atlantic.htm (accessed October 23, 2015).

structures associated with coastal defenses now needed to house larger guns to reach the battleships, while withstanding the impact of incoming projectiles. Batteries subsequently required roofs of densely reinforced concrete and thick layers of soil on top to deflect the energy of the projectiles. Most defensive systems installed after 1940 and throughout the war were either 16-inch naval guns or 6-inch pieces, which were emplaced alongside some high-angle 12-inch batteries and 8-inch naval guns that survived from an earlier era. Heavy armor shields were used to protect the guns during this period. The 6-inch guns were set behind curved shields of cast steel. Because of the longer range batteries installed during the 1940s, fire control networks were generally expanded, including construction of new base-end stations often located in towers. They were also improved through the introduction of fire-direction radar instruments.[123]

Narrative History

Early European-American History of the Pensacola Region, 1513–1821

The first recorded European visitors to the region were the Spanish. Several Spanish expeditions through the gulf were chronicled during the early sixteenth century, beginning with that of explorer Juan Ponce de León in 1513. The first expedition to explore Pensacola Bay in more detail was recorded by Panfilo de Narvaez in 1528. Later, an expedition led by Tristan de Luna y Arellano was the first to attempt the establishment of a permanent settlement in Pensacola in 1559. The effort was short-lived, however, and efforts to establish colonies along the gulf shores were abandoned in favor of the eastern coast of Florida after the Presidio San Agustin (present-day St. Augustine) was established in 1565. The presidio later served as the administrative center for a system of missions to its north and south that served 26,000 Christianized Indians.[124] The gulf coast did not become a focus of Spanish colonization again until the late seventeenth century, spurred on in part by French interest in the region.[125]

One of the factors contributing to Spanish interest in controlling Pensacola was its relationship to trade and shipping lanes. The Spanish regularly traveled through the gulf for trade. By the mid-sixteenth century, Spanish ships carrying silver mined in Peru and New Spain (today central and southern Mexico) sailed through the Gulf of Mexico on their way to Spain. The Pensacola Bay area was a strategically important location along the route. As such, it became the target of Spanish occupation. The Spanish built several fortifications in the area of the bay to protect their naval interests in Florida, beginning with the fort and village of Presidio Santa Maria de Galve on the bluffs overlooking the pass into the bay in 1698.

Despite their rivalry with the French, the Spanish settlement maintained trade relations with the French in Mobile, Alabama. However, as part of the conflict associated with the War of

[123] Lewis, 115–119.
[124] John W. Griffin, "Foreword," in Bonnie G. McEwan, *The Spanish Mission of "La Florida"* (Gainesville, Florida: University Press of Florida, 1993), xv.
[125] William S. Coker, "Pensacola, 1686–1821," in Judith A. Bense, ed., *Archaeology of Colonial Pensacola* (Gainesville, Florida: University Press of Florida, 1996); and Paul E. Hoffman, *Florida's Frontiers* (Bloomington and Indianapolis: Indiana University Press, 2002).

Quadruple Alliance (1718–1721), the French captured the Presidio of Santa Maria from the Spanish in 1719. Spain regained control of the area in 1722 based on a treaty that followed the conflict. However, when they moved to occupy the site, they found that the presidio had been burned to the ground. Rather than rebuild in the same location, which had been subject to attacks by Native Americans, the Spanish instead built a new presidio on Santa Rosa Island at the mouth of the bay. Lt. Col. Alejandro Wauchope, the recently appointed governor of the area, was ordered to oversee construction of the new presidio. Wauchope chose a site for the fort located approximately one-half mile east of the western tip of the island and 240 feet south of the Pensacola Bay shoreline, where a few trees and dunes offered protection.[126] Once completed, the presidio housed soldiers, officers, and convict laborers from Mexico; women and families joined the settlement later. Hurricanes and other severe weather, however, led to frustration and regular rebuilding of the presidio structures. A severe hurricane in 1752, which followed several other damaging storms, destroyed much of the settlement. In response to these events, the Presidio Santa Maria was officially abandoned in 1755.

Spain continued to control Florida until 1763, at which time it was forced to cede the territory to Great Britain as part of the Treaty of Paris resulting from the Seven Years War (1754–1763). The British subsequently reorganized the territory into the provinces of East Florida—consisting of most of the present-day state of Florida—and West Florida, an area bounded by the Mississippi River and Lake Pontchartrain on the west, the 31st parallel on the north, and the Apalachicola River on the east. For the next twenty years, the British worked to colonize the region.

In 1781, the Spanish, led by Bernardo de Galvez, conducted a siege of British forces in what is known as the Battle of Pensacola. Spain legally regained control of Florida in the 1783 Treaty of Paris following the American Revolutionary War.

During the War of 1812, the region was again the target of military activity. General Andrew Jackson invaded Spanish West Florida in pursuit of British and Creek forces following the Battle of Horseshoe Bend, which occurred in March 1814. At the time, the Spanish were allied with the British against Napoleon, but were not at war with the United States. The British and Creeks boarded waiting British ships while the Spanish fought a brief battle with Jackson's troops in the town of Pensacola. The British then blew up the Spanish fort, San Carlos de Barrancas, to insure the Americans could not use its guns on them as they sailed out of the harbor. Jackson then returned with his men to Mobile, which he had previously taken from the Spanish. Jackson also invaded Spanish Pensacola in 1818 during the First Seminole War.

[126] Alejandro Wauchope, Letter to Juan de Acuña, Marqués de Casafuertes, February 27, 1723. AGI Mexico 380. Translation by R. Wayne Childer on file, Archaeology Institute, University of West Florida, Pensacola.

Overview History of U.S. Military Defenses, Pensacola Bay and Santa Rosa Island

United States Ownership of Florida and the Establishment of Coastal Defense Systems, 1821–1861

Pensacola Bay has long been recognized as strategically important for shipping and military defense purposes. The bay is a large sheltered water body that drains the Escambia, Blackwater, East Bay, and Yellow rivers. It features a deep water harbor sufficient for naval vessel use. The bay is composed of two large northward trending lobes, cut by a peninsula of land between them. The long, narrow sand bar of Santa Rosa Island edges the majority of the bay along its eastern side. The only entry into the bay occurs along its southwestern edge. The opening is marked by the western tip of Santa Rosa Island and an upland landform associated with mainland Florida, set directly across from one another. These landforms have been developed since the eighteenth century as fortifications to control the passage of ships into and out of Pensacola Bay.

Spain continued to control Florida until the Adams-Onís Treaty, signed in 1819, eventually resulted in its transfer to the United States in 1821. The treaty served to clearly define the boundary between the United States and New Spain. Florida had become a burden to Spain, due to insufficient means to adequately settle or garrison the territory. Rather, Spain elected to focus on colonizing Spanish Texas. The United States renounced claim to Texas as part of the negotiation.

By 1821, trade activities between Atlantic and Gulf Coast ports had increased substantially, along with the number of ships passing through the Gulf of Mexico. To support trade and commerce in the region, the United States government took immediate action to protect American shipping interests in the Gulf. Following reconnaissance of the region, U.S. Navy Commodore Matthew C. Perry identified the need to establish naval bases in Florida as part of this effort.

The War of 1812 had revealed the weakness of American shoreline defenses, especially when the British were able to land in Washington and burn the nation's capital. The nation's coastal defenses at the time, known as the Second System, consisted of a haphazard assortment of batteries and outposts. The U.S. Army, recognizing the danger posed to national security during the War of 1812, designed a new defensive network, known as the Third System. The new fortifications associated with the system would house advanced armaments within a comprehensive collection of fortifications placed strategically along the United States coast line.

In 1816, Congress appropriated more than $800,000 for construction of Third System defenses. President James Madison appointed a Board of Engineers for Seacoast Fortifications, which visited potential sites and prepared plans for the new works. Its first report, published in 1821, suggested a chain of forts to stretch from Maine to Texas.[127]

[127] Coast Defense Study Group, Inc.

Shortly after Florida was transferred to the United States, the federal Board of Engineers updated the plan to include the newly acquired stretch of coastline. Pensacola Bay was selected as the principal naval depot along the Gulf Coast due to its deep water harbor. To protect the depot, the United States determined to build several fortifications based on the Third System design. The western end of Santa Rosa Island was chosen as the site for the first of these fortifications—Fort Pickens, named in honor of Revolutionary War hero Maj. Gen. Andrew Pickens. Additional forts would be built at other strategic locations around the harbor and navy yard, including Fort Barrancas, constructed between 1839 and 1844, and Fort McRee, built between 1834 and 1839. Fort Barrancas was constructed on the site of the 1797 Spanish Fort San Carols de Barrancas, which overlooked the entrance to Pensacola Bay north of Fort Pickens, in an area known as Warrington. Fort McRee was located west of Fort Pickens and Santa Rosa Island, on the eastern edge of Perdido Key. Like Fort Pickens, both Fort Barrancas and Fort McRee were constructed of masonry.

Construction of Fort Pickens began in late May 1829 and was completed by early October 1834. Access to the site and delivery of construction materials occurred via boats that docked at the so-called Engineers' Wharf, a structure completed on the north side of the island by 1828. The new fortification was constructed of brick and masonry in a pentagonal shape, with walls 40 feet high and 12 feet thick. Fort features included protected passageways, a ditch, and flanking outerworks. Built to accommodate the emplacement of more than 200 artillery pieces, the fort was designed to fire on all potential enemy avenues of approach. The lower walls were punctuated with openings in bomb-proof casemates for artillery, while positions were established *en barbette* on top of the walls. Corner bastions projected forward from the fort walls to allow for cross fire. Beginning in 1845, the Army also built an Advanced Redoubt to protect landward approaches to the navy yard at Pensacola. This feature was not completed until 1870.

The first garrison, Company H of the 2nd U.S. Artillery, arrived on October 21, 1834. Fort Pickens was never heavily garrisoned except during periods of military conflict, such as the Mexican-American War (1846–1848), and the Civil War (1861–1865).

The Civil War, 1861–1865

At the onset of the Civil War conflict, the fort was unoccupied. Following the passage of the secession ordinance in Florida on January 10, 1861, the U.S. Army determined that Fort Pickens was the most defensible post in the area and moved quickly to garrison the fort. Lt. Adam J. Slemmer, in charge of United States forces at Fort Barrancas, destroyed over 20,000 pounds of gunpowder at Fort McRee, spiked the guns at Barrancas, and evacuated with fifty-one soldiers and thirty sailors to Fort Pickens.

Despite repeated threats from Confederate attack, Fort Pickens remained in Federal control throughout the war. During the Civil War, changes in ordnance—particularly new rifled artillery—resulted in the vulnerability of masonry fortifications to destruction. This was made clear in the April 10, 1862, attack on Fort Pulaski near Savannah, Georgia, where the rifled cannon repeatedly breached the masonry walls and did extensive damage, leading to Confederate

surrender. Fort Pickens, however, was not attacked by the Confederates in this way, and remained operational throughout the war.

Post-Civil War Military Use of Santa Rosa Island, 1861–1893

After the Civil War, Fort Pickens remained in use as a prison for military and political prisoners. In late October 1886, Batteries B and H of the 2nd U.S. Artillery under the command of Capt. James E. Wilson were ordered to Pensacola to guard the famous Apache warrior Geronimo; the chief, Naiche; and several other Chiricahua Apache Indians. The first group of Apache to be held at the fort consisted of fifteen men, with two more arriving a few days later. Six months later, their families arrived from Fort Marion and the number rose to forty-eight prisoners. The Apache were held at the fort for eighteen months after being captured in 1886. The prisoners attended to the routine maintenance of the grounds and frequently entertained visitors until their departure on May 12, 1888.[128]

A freeze on construction funds for the nation's seacoast defenses imposed by Congress beginning in fiscal year 1877 resulted in the fortifications located at the mouth of Pensacola Bay falling into a state of disrepair. During the 1880s, the only funds allocated for coastal fortifications in the United States were for maintenance, which resulted in a general decline in the defensive capacity of the structures. At the same time, important advances were being made in the design and manufacture of heavy ordnance.[129] One important development involved the substitution of steel for iron in the casting of guns. As the technique of forging large masses of steel improved, it enabled the manufacture of the compound tube that involved an increase in the size and strength of the gun by the successive shrinking on of reinforcing hoops. The founding of cannon tubes in accordance with this new concept began prior to 1860. It was not until the Civil War, however, that banded and rifled guns of heavy caliber came into general use. As noted by Dr. Raymond E. Lewis in his history of U.S. seacoast fortifications: "Not until the late 1880s did the combined availability of good quality steel in large amounts, industrial facilities for producing heavy forgings, and machinery techniques able to meet the required standards of precision make it possible to produce substantial numbers of these lighter, stronger, and hence, more powerful weapons."[130]

Another important advance was the perfection of breech-loading guns. Although in principle this technique had been common knowledge for centuries, it had been employed only intermittently until 1855, when Lord William Armstrong of Great Britain designed a rifled breech-loading gun that "included so many improvements as to be revolutionary."[131] During the Civil War, breech-loading artillery was employed but only on a limited basis. After 1865, breech-loading field pieces replaced muzzle-loaders in European armies, as well as those of the United States. Not so

[128] Bearss, *Historic Structure Report, Fort Pickens: Historical Data Section, 1821–1895*, 766, 770, 772–789; Muir and Ogden, 11–13.
[129] Bearss, *Historic Structure Report and Resource Study*, 3.
[130] Lewis, 75.
[131] Albert Manucy, *Artillery through the Ages: A Short Illustrated History of Cannon, Emphasizing Types Used in America* (Washington, D.C.: National Park Service, 1948), 14.

rapid was the replacement of the muzzle-loading heavy ordnance mounted in coastal fortifications. A technological problem impeded development of a successful breech-loading great gun. To function properly, a breech-loading mechanism had to withstand the great heat given off by the detonation of the propellant, be capable of containing the gasses released by detonation, and be machined to be opened and closed rapidly. It was not until the mid-1880s that ordnance technology was sufficiently advanced to produce the well-machined block mechanisms required by the big rifled guns needed for coastal defense.[132] Three other developments helped spark the emergence of modern coastal artillery defense:

1. improved methods of rifling tubes, which made possible the introduction of more efficient projectiles;
2. the development of disappearing carriages that utilized the firing recoil energy to return the gun to its position in battery behind a parapet, where it could be reloaded and serviced without unduly exposing its crew; and
3. the introduction of improved propellants—nitrocellulose—and nitroglycerin-based powders, to replace black powder.[133]

The influence of this technological innovation resulted in the greatest advance in the effectiveness of artillery since the fourteenth century, which continued until this type of weapon was rendered obsolete by the invention of atomic weaponry in the 1940s and 1950s. As noted by Dr. Lewis, "Compared to the best of the smoothbore muzzle-loading cannon of the post-Civil War period, the new weapons which began to emerge from the developmental stage around 1890 could fire projectiles that, caliber for caliber, were four times as heavy [with] effective ranges two or three times as great; and they could do so with remarkably increased armor-penetration ability and accuracy."[134]

During the latter part of the nineteenth century, the European naval powers embarked on ambitious and expensive weaponry design and construction programs that included the development of the battleship. At sea, the British and Italians had launched ships mounting rifled cannon weighing more than 100 tons. The existence of such weapons on naval vessels suggested that the United States develop "a certain corresponding resistance of works of defense, a corresponding thickness of cover."[135] News of the development of the battleship—considered to be the ultimate weapon afloat—caused ranking U.S. Army and Navy officers, as well as citizens who dwelled on the Atlantic and Pacific coasts, to become alarmed over the failure of Congress to authorize appropriations for coastal defense beginning in the mid-1870s. Congress was increasingly pressured to take action and improve the nation's security by enhancing coastal defenses, with key harbors and naval bases now potentially "helpless against the attack of any

[132] Lewis, 75.
[133] Lewis, 76; Manucy, 28.
[134] Lewis, 76.
[135] Executive Documents of the House of Representatives for the 1st Session of the 52nd Congress, 1891–1892, Serial 2922, Vol. 3 (Washington, D.C.: U.S. Government Printing Office, 1892), 5–7.

third rate power possessing modern iron-clad vessels armed with heavy rifled cannon."[136] Nevertheless, as noted above, the only funds allocated for coastal fortifications in the United States during the 1880s were for minimal maintenance.

In 1882, President Chester A. Arthur noted the need for improving the efficacy of heavy fixed artillery for seacoast defense in his Second Annual Message to Congress: "I call your attention to the recommendation of the Secretary and the board that . . . appropriations be made for high-power rifled cannon for the torpedo service and for other harbor defenses."[137] No bills resulted from his appeal.

In 1885, President Grover Cleveland convened a board, headed by Secretary of War, William C. Endicott, to evaluate the nation's coastal defenses and propose a program to modernize them. The board was composed of officers of the Army and Navy, as well as civilians. Not since 1816, when the four-man board headed by Bvt. Brig. Gen. Simon Bernard proposed construction of the Third System, had such an exhaustive study of fortifications, armaments, and coordinated emplacements been contemplated.

As noted in the *Report of the Board on Fortifications or other Defenses Appointed by the President of the United States under the Provisions of the Act of Congress Approved March 3, 1885*, the justification for the design of the system and the locations selected for establishment of the new Endicott Batteries was described as follows:

> Where Defenses are Most Urgent
>
> The first in the order of the duties imposed upon the Board is to examine and report at what ports fortifications or other defenses are most urgently required.
>
> Preliminary to a decision upon this important matter, it is proper to discuss briefly the objects to be secured by a defense of the coasts, and the nature of the attack to which these are most exposed.
>
> To the last named the answer would be—a naval attack. An attack by land, if attempted in force, must be resisted by the armies of the country, and the mode of doing this is not necessary here to consider.
>
> The objects against which a naval attack would be directed are—
>
> First, the important commercial ports, containing, in addition to the shipping large magazines of the products of commerce, and which are, on account of public and private wealth, tempting marks to an enemy. Such cities are also railroad centers,

[136] Executive Documents of the House of Representatives for the 1st Session of the 51st Congress, 1889–1890. Serial 2716, (Washington, D.C.: U.S. Government Printing Office, 1889), 4–6.
[137] The American Presidency Project, "Chester A. Arthur, Second Annual Message, December 4, 1882," Available at http://www.presidency.ucsb.edu/ws/index.php?pid=29523%7C (accessed January 12, 2015).

and their capture by an enemy would derange, not only the internal commerce by land, but also interfere with the transportation of troops and *matériel* of war; and this might occur at critical junctures during military operations. And if, in addition, these places should be the sites of navy-yards, naval stations, and of depots of military and naval stores, the loss and injury to the country would be greatly increased.

In the second place, vessels in the foreign trade must be protected—this at sea could be performed only by the navy—but when these arrive upon the coast, they should find fortified harbors or refuge provided for their security.

The third object of attack and capture would be the vessels employed in the coasting trade. A glance at the map of the coast will clearly indicate the dangers to which this commerce is exposed. An enemy having superior naval power might intercept all communication coastwise between New York and the ports of New England, by cruising in Vineyard and Long Island Sounds. His cruisers watching Sandy Hook, the mouths of Delaware and Chesapeake Bay, the coasts of Georgia, and the Carolinas, the Florida straits, and the Gulf coasts, would subject this trade to such risk of capture that during war it would be virtually suspended. Nor could this result be prevented by our Navy, even if provided with more numerous and more suitable vessels than past experience would seem to insure, because of the immense stretch of the coast and of the crowd of fast cruisers and of privateers which could be let loose to capture and destroy. When the country shall have been provided with a few fast cruisers, their employment should be in depredating upon the enemy's property and commerce, instead of engaging in a futile attempt to protect the coasting trade over a line extending for 4,000 miles. Experience has also taught us that a few Confederate privateers sufficed to annihilate or suspend our commerce upon the seas, and we should be ready to apply the lesson so taught to an enemy's commerce.

By the suspension of the coasting trade the lines of inferior navigation would become of importance. The meaning must be restricted here to the proportions of those lines where a hostile vessel could not easily penetrate, and hence would only include the route from New York to Baltimore by canal and otherwise; that from Norfolk to Beaufort, N.C., and that from Savannah to the Saint John's River, though this last-named line might be penetrated at several points.

The subject of the defense of the coasts has usually been treated upon the supposition of the existence of a navy not equal to the fleets of the enemy, but sufficiently numerous to impose upon him the necessity of concentration and the avoidance of large detachments from his force, but this view of the case the Board is not called upon to discuss, for it does not exist, and it will, besides, be found in the sequel that some of the ports named for defense will be strategic rendezvous

> for fighting ships of war, when these shall have been built in adequate numbers for operating in force against the enemy.[138]

The board called for fortifications at twenty-seven locations along the coast, plus three on the Great Lakes; Pensacola was among the locations targeted for improvements. Permanent batteries designed for the emplacement of artillery and mortars would be supplemented by floating batteries, submarine mine fields, and torpedo boats.[139] The cost of the undertaking, which included the manufacture of 577 big rifled guns, 724 giant mortars, and their carriages, was estimated at $126,377,800.[140]

On March 29, 1887, the Board of Engineers for Fortifications was directed by Secretary of War Endicott to prepare plans for the defense of the Nation's more important harbors in accordance with recommendations of the Endicott Board's 1886 report. Operating within these guidelines, the Endicott Board "undertook a thorough revision of plans for defense of our chief ports by submarine mines and a study of the precise location of the new armaments rendered necessary by modern modes of attack."[141]

Between 1887 and 1896, detailed plans for defense of twenty-three key harbors, including Pensacola, were prepared by the Board of Engineers, and approved by the Secretary of War.[142] Besides these major undertakings, partial projects were programmed and approved for defense of the lake ports.

On September 22, 1888, President Cleveland signed into law an act implementing several of the Endicott Board's recommendations. The legislation established a Board of Ordnance and Fortifications to oversee the development of armaments for the projected Endicott System, and

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[138] *Report of the Board on Fortifications or other Defenses Appointed by the President of the United States under the Provisions of the Act of Congress Approved March 3, 1885, Appendix 3*, 501–502.

[139] New York, San Francisco, Boston, the lake ports, Hampton Roads, New Orleans, Philadelphia, Washington, Baltimore, Portland, Me., Rhode Island ports in Narragansett Bay, Key West, Charleston, S.C., Mobile, New London, Savannah, Galveston, Portland, Ore., Pensacola, Fla., Wilmington, N.C., San Diego, Cal., Portsmouth, N.H., Defenses of Cumberland Sound at Fort Clinch, Defenses of ports in the Kennebec River, Maine, at Fort Popham, New Bedford, Mass., Defenses of Ports on the Penobscot River, Maine, at Fort Knox, New Haven, Conn. As noted in the *Report of the Board*, 502.

[140] Executive Documents, 1889, Serial 2716, 4–6, from Bearss, *Historic Structure Report and Resource Study*, 5.

[141] Craighill to Lamont, Sept. 29, 1886, found in Report of the Secretary of War being part of the Messages and Documents Communicated to the Two Houses of Congress at the Beginning of the Second Session of the 54th Congress, 3 vols. Serial 3479, vol. 2. (Washington, D.C.: U.S. Government Printing Office, 1896), 7. Brig. Gen. W.P. Craighill was Chief Engineer and Daniel S. Lamont was Secretary of War in 1896.

[142] The harbors included Pensacola, Florida; Portland, Maine; Portsmouth, New Hampshire; Boston, Massachusetts; Narragansett Bay, Rhode Island; eastern entrance, Long Island Sound, New York; New York Harbor, New York; Philadelphia, Pennsylvania; Baltimore, Maryland; Washington, D.C.; Hampton Roads, Virginia; Wilmington, North Carolina; Charleston, South Carolina; Savannah, Georgia; Key West, Florida; Mobile, Alabama; New Orleans, Louisiana; Galveston, Texas; San Diego and San Francisco, California; mouth of the Columbia River, Oregon and Washington; and Puget Sound, Washington. Report of the Secretary of War, Serial 3479, 7.

appropriated funds for beginning the manufacture of modern seacoast guns and mortars as well as the inauguration of the submarine mine defense scheme.[143]

Using the appropriated funds, the U.S. Army Corps of Engineers commenced construction of mining casemates at Forts Wadsworth and Schuyler, New York, and Fort Warren, Massachusetts. A second appropriation from Congress in March 1889, funded construction of five additional casemates at Willetts Point (later named Fort Totten), Fort Lafayette, New York; a fort at Sandy Hook, Connecticut; and Alcatraz and Point San Jose, California.[144]

In 1890, Congress resumed making annual appropriations for seacoast fortifications. The Fortifications Act of August 17, 1890, appropriated $1,221,000 for works at Boston, New York, and San Francisco. An additional $750,000 was appropriated for defenses at San Francisco, New York, Hampton Roads, and Washington, D.C.[145]

Because most of the nation's existing coastal brick and masonry fortifications were in a state of deterioration, the U.S. Army Corps of Engineers ceased funding repair and preservation of the forts between 1891 and 1894. Fort Pickens was among the fortifications where the Army halted all repair and maintenance, having determined that the fortification no longer possessed value in the defense against contemporary naval warships and rifled artillery.[146] Once a determination was made to enhance the defensive battery system on Santa Rosa Island, the base transitioned in status to a U.S. Army Coastal Artillery Post, and remained under this administrative jurisdiction until the end of World War II.

Endicott System Implementation, 1893–1905

In January 1893, the Board of Engineers specifically indicated the need to begin implementing Endicott Board recommendations at Pensacola. The program included the setting out of explosive mines in the harbor as a defense against submarines and armored warships.

It was June 1893 before the Board of Engineers, composed of Cols. Henry Abbot and Cyrus B. Comstock, and Lt. Cols. Henry M. Robert and G.L. Gillespie, completed its study and plans for the defense of Pensacola. The Board recognized the fact that Pensacola's importance as a commercial port was continually increasing. The harbor was one of the best anchorages on the Gulf Coast, although deep-draft ships were not able to cross the bar. About 500 foreign vessels had cleared the harbor during the previous year, most of them carrying lumber. As a port of refuge for the merchant marine and supply depot for cruisers, it possessed "sufficient value to warrant the erection of modern works able to defy serious operations of the enemy."[147]

[143] Executive Documents, 1889, 507.
[144] Ibid., 7.
[145] Executive Documents, 1892, 5–7.
[146] Muir and Ogden, 15.
[147] Board of Engineers report, as quoted in Bearss, *Historic Structure Report and Resource Study*, 8.

During a visit to Santa Rosa Island, the board found that Fort Pickens was in fair condition, although the piers at the parade wall exhibited vertical cracks, and the scarp had begun to incline outward. They found the area of the parade to be sufficient for placing a lift battery, and that there were several other positions available to emplace rapid-fire guns to protect the submarine minefield in the bay.[148] They identified a "well marked sand ridge extending eastward . . . composed of hard and fine white sand," that would provide a good site for disappearing guns, while another site further east, which contained a heavy growth of timber, that would provide suitable cover for a mortar battery.[149]

The work at Fort Pickens on Santa Rosa Island was considered in conjunction with other positions along the harbor and at its mouth. At the time, Fort McRee, on Fosters Bank, was in ruins, with most of the structure undermined or broken by ocean waves. The narrow land bank was still protected by two concrete groins and the rubble of the 1830s fort.[150] On the mainland, Fort Barrancas, the Redoubt, and the remains of a Spanish fort were also present. Fort Barrancas stood on the highest ground. The Spanish fort was armed with five siege guns, while Fort Barrancas was large enough to accommodate eight large caliber guns—10-inch smoothbores or rifled 8-inch Rodmans. Three of its emplacements had been given new platforms, with 4-inch pintles, in 1890, and had been mounted by 8-inch rifled Rodmans. The Board recommended that five more platforms be added to accommodate similar artillery features. The rifled Rodmans could cover the minefield and the inner entrance to the harbor.[151]

The board's plan for the defense of Pensacola Bay and the Navy Yard called for:

- Two 12-inch guns in a lift battery on the Fort Pickens parade
- Four 10-inch guns on disappearing carriages on the sand ridge east of Fort Pickens
- Sixteen 12-inch mortars in a battery still farther eastward, provided with local flank defenses
- Two 10-inch guns on disappearing carriages near the site of Fort McRee.[152]

The project was reviewed by the Chief Engineer and approved by Secretary of War Daniel S. Lamont, subject to "such changes in details by the Chief Engineer as may be found expedient during construction."[153]

The role of the Navy in relation to coastal defenses also changed in the first decade of the twentieth century. Until Alfred T. Mahan developed his doctrine of command-of-the-seas in the

[148] Bearss, *Historic Structure Report and Resource Study*, 8.
[149] Board of Engineers report, as quoted in Bearss, *Historic Structure Report and Resource Study*, 10.
[150] Bearss, *Historic Structure Report and Resource Study*, 10.
[151] Ibid.
[152] Ibid.
[153] Lamont to Casey, Jan. 9, 1894, NA, RG 77, Correspondence, 1893–1894, Doc. 881/12.

1890s, the Navy had played a dual role in national defense.[154] Ships were assigned to protect American commerce and to show the flag in distant ports, while warships were designed for coastal defense.[155]

During the 1890s, a naval construction program, the resounding naval victories of the Spanish-American War, and the nation's emergence as a world power had far-reaching repercussions. President Theodore Roosevelt, who fully supported Mahan, was instrumental in helping to transform the Navy's mission. This involved elimination of the passive coast-defense tenet of American naval policy. In 1908, President Roosevelt emphasized this point in an address before the Naval War College, stating, "Let the port be protected by the Army's fortifications, leaving the fleet foot loose to search out and destroy the enemy's fleet; that is the function of the fleet, which is the only function that can justify the fleet's existence."[156] As a result, during the first four decades of the twentieth century, the Army's mission was to defend key harbors and ports and protect naval bases, while the Navy's role in coastal defense changed from one where the Navy was determined not to be tied down by defense of coasts and harbors to a more offensive approach to providing security for these bases, and began to share some responsibilities with the Army.[157] At Pensacola, this included the naval base the Navy had maintained for more than 75 years.[158]

Endicott System Coastal Defense Batteries. The artillery positions established on Santa Rosa Island during the late nineteenth and early twentieth centuries were referred to as batteries. A battery is defined as one or more pieces of artillery under the command of a single individual and directed to concentrate their fire on a single target. Military personnel trained to participate in the operation of battery features are referred to as artillery corps. While Third System defenses tended to include large, multi-storied works, late nineteenth century seacoast defense guns were emplaced in small detached batteries. Artillery corps were often formed into groups assigned to manage a single battery. As the technology evolved, the term battery was expanded to include a set of guns under a single commander, together with the elements required to emplace, protect, and service the guns. Batteries were typically given a discrete name to help tell them apart. At first, the names were descriptive, for example using a cardinal direction to tell one from another. As the number of detached gun batteries grew in response to the Endicott plan, the naming protocol was changed in 1902 to allow for the use of the names deceased individuals, typically those who had served the nation with distinction. At first, the batteries only carried the surnames of the honoree. Later, particularly after World War I, many batteries carried the full name of the individual. When batteries were divided into two or more tactical systems, each was given its own official name.[159]

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[154] Alfred T. Mahan, *The Influence of Sea Power upon History: Securing International Markets in the 1890s* (Boston, Massachusetts: Little Brown, 1892).
[155] Bearss, *Historic Structure Report and Resource Study*, 9.
[156] Quoted by Major William G. Haan in a lecture at the Coast Artillery School, Fort Monroe, July 1908, as noted by Lewis, 99.
[157] Lewis, 98–99.
[158] Bearss, *Historic Structure Report and Resource Study*, 11.
[159] *American Seacoast Defenses*, 154.

The batteries of the Endicott System were designed to perform three basic functions: 1) anchor (emplace) the guns to a stable platform for accurate firing; 2) protect the gun and its crew from enemy fire, and 3) provide protected space for the storage of ammunition. The batteries were typically composed of a maze of concrete rooms and walls, each with a specialized name and function.[160]

Guns or artillery pieces were individually emplaced, or set in place as part of a carefully designed position that would be able to achieve a particular field of fire. Each emplacement was composed of the structure that surrounded, served, and protected a single gun. Components included the gun platform where the gun was anchored to the ground, the loading platform, where the gun crew loaded the gun, and the parapet or protective wall located on the firing side. The front, top, and back of the parapet wall were referred to as the exterior, superior, and interior slopes. Many batteries contained a concrete apron to cover a portion of the superior slope in order to protect against the effects of the firing blast. The protective walls to either side of the emplacement were known as traverses. If the battery was in danger of being fired on from behind, the rear was sometimes protected by a constructed ridge called a parados. In batteries built to accommodate disappearing guns, a counterweight well was located directly below the artillery piece. Mortar batteries were set up in pits rather than emplacements, and were often combined in groups of two or four.[161]

The interior of the battery was composed of several specialized rooms and passageways such as corridors, or uncovered passageways at the rear of the traverse between adjacent emplacements, partially enclosed galleries, and connecting spaces between the interior rooms. Batteries contained magazines—rooms or galleries for the storage of powder charges—and shell or shot galleries or rooms that were used to store projectiles. In two-story batteries, ammunition was brought to specialized hoist rooms by cart, hand, or overhead trolley systems. They were also sometimes sent up to the emplacement level via a hoist system through a hoist well. The ammunition was rolled onto ammunition service tables in a recessed area to one side of the loading platform, transferred to a shot cart, and wheeled out to the guns. Smaller caliber ammunition (5-inch or less) could be carried by hand. In single-story emplacements, the ammunition was brought out to the loading platform via truck galleries. Batteries also contained specialized storage rooms for equipment and supplies, an officer's room, and at least one latrine.[162]

One of the innovations important to the operation of coastal defense structures of the Endicott era was the introduction of electrical service, through which some batteries were equipped with their own power generating equipment. This required a separate power room, but also sometimes suggested the need for a motor-generator room, a radiator room, a transformer room, and a muffler gallery.

[160] Ibid.
[161] Ibid.
[162] Ibid., 155–156.

Fire control structures were also an important part of the battery, although the components of the process evolved between 1885 and World War II to a great degree. Early batteries typically featured at least one observation station to serve lookout purposes. Many batteries had a plotting room either inside or nearby, and a radio switchboard room. Battery commander's stations were located so that the commander could see both the target and the emplacements. In early Endicott System batteries the commander's station was integral to the structure of the battery; later it became a separate structure.[163]

The guns emplaced in Endicott batteries were modern rifled breech-loading artillery pieces. They were designed by the Ordnance Department of the United States Army. They were divided into several categories depending on their tube length and firing process, and termed either mortars, howitzers, or guns. At first, modern era weapons were described by caliber size. Later, they were identified in accordance with the year they were approved (the model or M year), followed by any subsequent modifications. American-built cannon typically included this information on the face of the muzzle, along with the serial number of individual piece and the place of manufacture. During the 1930s, the year appellation was dropped, and cannon were subsequently designated by caliber and model number.[164] When American-made guns were not available, the United States sometimes purchased guns from Great Britain. During the Spanish American War, the Army acquired several British Armstrong guns and carriages, for example. During World War I, the United States purchased several French 155 mm tractor-drawn artillery guns, some of which were used in harbor defense batteries during the 1930s and 1940s.[165]

The guns were set on carriages, which were either fixed—permanently emplaced in a prepared position—or mobile. Like the guns, the carriages were identified by gun caliber, carriage type, model, and/or approval year.

Mines. During the Endicott period, as noted, mines, or torpedoes as they were sometimes called, were an important part of the overall defensive system. Mines were generally designed to prevent submarines and other enemy boats from reaching targets within a controlled area, such as a harbor, by damaging or destroying them, or preventing entry into a harbor when visibility was low such as at night, or during foggy or smoky conditions. They were also used to prevent navigation by hostile naval vessels in formation, and to give warning of hostile submarine activities or of the presence of hostile surface vessels.[166]

Submarine mines were categorized as controlled or uncontrolled, and buoyant or ground. Uncontrolled mines were detonated by contact with a passing vessel. Controlled mines were connected by cables to a control device on shore where they could be set off manually. Buoyant mines floated and were maintained at an optimal depth using an anchor. Ground mines rested on the bottom of the ocean or water body. Both the Army and Navy used and maintained mine

[163] Ibid., 156.
[164] Ibid., 150.
[165] Ibid., 152.
[166] Ibid., 107.

fields; all Army mines were controlled.[167] By World War II, mines could be set to detonate as a result of a change in water pressure, minute changes in the magnetic field, or vibrations emanating from a turning propeller.

Controlled submarine mines were composed of a watertight steel case that contained explosives and a firing device with an electrical connection to shore. The mine was held in place with a mooring rope attached to an anchor. Between the late 1880s and early 1943, the Army used controlled mines to defend American harbors. Controlled mines were used to close portions of harbor entrances leading to the channels required by deep draw naval vessels and friendly commercial ships. The mines could only operate under specific parameters, however. Controlled mine fields could not be placed more than 10,000 yards from the shore, and or in waters that exceeded 250 feet in depth with currents of more than 3 knots.[168]

Mines were placed in accordance with systems as designed by military engineers, and planted using special planter and distribution boats. The War Department established a policy requiring controlled mines and their essential accessory equipment items be stored contiguous to the projects where they would be used, in a state of readiness for immediate use, and in quantities sufficient to plant the mine field authorized by the project, and to provide maintenance of these projects after planting.[169]

Mine shore facilities included buildings and equipment necessary to store, assemble, test, transfer, and repair the mines, cables, anchors, and distribution boxes.[170] Disassembled mine equipment—empty mine casings, anchors, compound plugs, circuit closers, shackles, mooring sockets, distribution boxes, and the various tools and equipment—was stored in one to two-story mine storehouses. The mine storehouse buildings had racks and shelves, movable overhead hoists with blocks and tackle for moving the equipment, ropes, chains, tools, and appliances.[171]

In addition to mine storehouses, the system required the construction of large freshwater cable tanks to store the mine cables. Each concrete tank was designed to hold 10,000 feet of cable on a reel. This number doubled after World War I. The cable tanks were usually enclosed in a building to control evaporation and were equipped with overhead cranes with hoists and tackle. The cables were tested and repaired in these facilities.[172]

Mine systems also included loading rooms where the mine components were assembled and tested after all of the necessary materials and equipment were brought from the storehouses, cable tanks, and magazines. A loading room facility was typically composed of two rooms, one for loading and assembling mines, and the other for loading and assembling the compound plugs or detonating devices. Loading rooms often also included a small cable test tank and overhead

[167] Ibid.
[168] Ibid.
[169] Ibid., 115.
[170] Ibid., 127.
[171] Ibid., 131.
[172] Ibid., 134.

hoists. Mines were loaded with explosives, fitted with their compound plugs, connected to their cables, and tested to ensure that they were watertight and that the electrical circuit was working before being transferred to the wharf. Mines for each complete group were assembled and laid out in transportable "figure 8s."[173]

The explosives used in the mines included dynamite and gun cotton before 1912, followed by trinitrotoluene (TNT). These materials were stored in magazine facilities, but only a fraction of what was needed for the complete project was kept at the post. The rest was shipped from a nearby United States arsenal as needed. Magazines to hold mine detonators were sometimes built near the loading room. Fuses were kept in a separate room away from the explosives.[174]

Mine projects included a mine wharf or pier with a large square work surface. The planter would load the mines, cables, and distribution boxes from the wharf, which was connected by a tramway to the loading room. Mine wharves frequently had boathouses for storing the smaller planter boats and their equipment. Posts ideally included separate mine wharves and quartermaster and engineer wharves to ensure that conflicts did not occur that could interfere with mine planting operations.[175]

Mine depot facilities were connected by a rail or tramway system. If the post did not already possess a rail line, a 3-foot gauge tram system was installed to connect the mine wharf with the loading room, torpedo storehouses, and the cable tanks. The cars could be manually pushed from facility to facility, unless hills were present that required the use of a hoisting engine.[176]

Mine casemates held the firing controls for a mine field. These were the most heavily protected part of the mine project. They were initially located inside a reinforced casemate of an older fortification and composed of a vault that held the control or operating boards that contained the master switches for the mines. After 1900, they were housed in concrete bunkers and adjacent wooden structures designed to hold the more elaborate equipment devised for the system, a room for the operating boards, a power room that held DC and in some cases AC power generators, a storage battery room that held the batteries for generating DC current for testing the circuits, and one or more ready rooms for the men stationed there. After 1930, the casemate structures were moved underground and built to include a rear entrance.[177]

Electrical connections between the shore and the mine casemates were laid in underground tunnels. The tunnels ended at a small concrete structure called the cable terminal hut, box, or vault. The shore cables from the mine groups were routed to the mine casemates through these vaults.[178]

[173] Ibid., 136.
[174] Ibid.
[175] Ibid., 138.
[176] Ibid., 139.
[177] Ibid., 140.
[178] Ibid.

Implementation of the Endicott System on Santa Rosa Island, 1893–1900

In 1893, the U.S. Army began to make plans for improving the defenses on Santa Rosa Island. The first project completed was construction, in 1894–1895, of a mining casemate in the northeast bastion of Fort Pickens to house electric batteries used in the harbor mining system. By June 22, 1894, the floor of the casemate had been excavated to sea level and 4 feet of concrete had been added to the roof and walls of the casemate to further protect it against incoming artillery. Eventually, the room proved too damp for the electrical equipment it was meant to protect. The equipment was removed in 1903 and relocated in a brick structure constructed within the fort's moat. Later, the dungeon-like character of the abandoned battery casemate led to its becoming popularly known as "Geronimo's Cell." For many years a sign over the door into the room reinforced this local myth.[179]

On August 15, 1894, Secretary of War Lamont allotted $100,000 from Congressional appropriations for improvements to national coastal defenses for "gun and mortar batteries," signed into law by President Cleveland on August 1, for construction of an emplacement for two 10-inch guns mounted on disappearing carriages on Santa Rosa Island. It was another year before District Engineer Maj. Frederick A. Mahan prepared working drawings for the battery and submitted them to the Board of Engineers. Changes to the plans were made based on a reconnaissance visit. Based on the importance of the position, it was proposed that a four-gun battery be constructed west of Fort Pickens that could command the harbor entrance. A larger battery, it was thought, would also be more easily defended against amphibious attack. By mid-January 1896, Mahan had prepared a revised design. Money was finally appropriated for the battery in 1896. Ground was later broken for the works in early November.[180]

In the meantime, on August 23, 1894, $8,000 was allocated for the project from appropriations for "Torpedoes for Harbor Defense."[181] To support the project, plans were made to rebuild the Engineers' Wharf, which had fallen into a state of disrepair. The wharf's location was to relate to the selection of the site for the ridge battery, known today as Cullum-Sevier. As designed by Major Mahan and his staff, the wharf was to consist of a series of piles, with heavy decking laid atop double stringers. The stringers would brace the piles in one direction, while the floor would work in the other. To protect against the destructive power of teredoes, a type of worm that eats through wood, the piles were to be encased for their entire length in terra cotta pipes driven 4 feet into the sand at the bottom of the bay, and rising to 1 foot above high tide. The piles were to be laid using a pile driver. Work on the wharf did not begin until 1896. It was completed later in July of that year.[182]

The wharf was to be connected to a narrow-gauge railway with tracks laid to meet the eastern edge of the platform. The railway was designed to facilitate the movement of ordnance and materials to sites where defensive improvements were being constructed. The railway was

[179] Muir and Ogden, 15.
[180] Bearss, *Historic Structure Report and Resource Study*, 14–15.
[181] Bearss, *Historic Structure Report, Fort Pickens: Historical Data Section, 1821–1895*, 799–804.
[182] Bearss, *Historic Structure Report and Resource Study*, 22–23.

composed of 7,500 feet of narrow-gauge track. Two spurs led south from the Engineers' Wharf—one to the site of the proposed new battery emplacement that would house four 10-inch guns, and the other toward the south beach, where clean white sand was available for use in the concrete. The line was laid using a transit; the curves were established either by deflection and chords or by tapeline and ordinates. The line was designed to limit or balance cut and fill. Wherever possible, fill was placed using dump cars, and the track was leveled as fill was hauled in from areas where cutting as required. The wharf and railway were effectively completed in July 1896, and readied to receive supplies.[183]

The concrete plant was fashioned from equipment brought in from elsewhere. A Ledgerwood engine and a sand pump boiler and engine, a sawmill engine and boiler, and three derricks were transported to the island from Mason's Island, Connecticut. Two concrete mixers and their engines, a locomotive and associated dump and measuring cars, along with necessary rammers and shovels were brought from Wetumpka, Alabama, where they were used to build Coosa River Lock No. 31. Several barges were engaged to bring supplies from Pensacola to Santa Rosa Island. For the larger aggregate needed in the concrete mix, Mahan planned to salvage the stone present on the island that included old traverse stones and pintle stones. Material was also salvaged from two buildings near the wharf that had been razed due to poor condition.[184] Army workers leveled an area convenient to the construction site and erected storage bins for sand, pebbles, and cement. Timbers to build an inclined approach to the bins were stored, and readied for positioning as soon as the rolling stock for the railway was received.[185]

To mix the concrete, material was placed into a 4-foot cubic unit using light handcarts. The handcarts were carried up a ramp and dumped into a large wooden and iron-bound bucket resting in the charging hold. The charge was then hoisted vertically and run up to a 25 percent incline above the hopper. The charging hold was held in position by a counterweight until the charge was hoisted. As soon as the sheave block on the bucket came in contact with the buffer in the charging hold, the counterweight was raised and the hold and bucket ascended the incline. As Mahan had forecast, water became one of the most expensive elements of the process. To avoid drawing brackish water from surface wells, a wooden tank was built and connected to one of the Fort Pickens cisterns. This supply was soon exhausted, and a second tank was built atop the wharf. The tank was filled by pumping water from tugboats.[186]

Batteries Cullum, Pensacola, Van Swearingen, and Worth. The plan suggested the construction of several defensive works in and around Fort Pickens to accommodate modern rifled ordnance. Between 1897 and 1899, four reinforced concrete fortifications—Battery Pensacola, Battery Cullum, Battery Van Swearingen, and Battery Worth—were built in the Fort Pickens area, while a mine field was prepared for the harbor entrance.

[183] Ibid., 26–30, 44–46, 67.
[184] Ibid., 24–25.
[185] Ibid., 26.
[186] Ibid., 28.

Battery George W. Cullum. The first Endicott battery to be constructed on Santa Rosa Island was designed to emplace four 10-inch guns to face the Gulf along the southern shores southwest of Fort Pickens. The battery would protect against enemy vessels approaching the entrance to Pensacola Bay on the eastern side, while other positions on the mainland would protect the western side. The battery was named for George W. Cullum, an American soldier, engineer, and writer who served as the sixteenth Superintendent of the United States Military Academy, and supervised several projects involving strengthening American coastal defenses.

Design of the battery preceded construction of the Engineers' Wharf and the railway that would be used to convey materials to the island and the site. Work on excavation of the foundation for the battery began in summer 1896 under the supervision of Lt. James P. Jervey. In September, Capt. Joseph E. Kuhn of the Chief Engineer's Office spent a day on site with Major Mahan. They inspected the completed excavation work for the foundations of three magazines, and the initial positioning of sand fill associated with the foundations of the parapets. Material that would be needed later, such as lumber for concrete forms and gravel, were on hand and stored. The crews, however, were still awaiting delivery of cement and broken stone. The materials were not delivered until October. In early November, work finally began on the concrete platforms.[187]

From early on, Mahan recognized that the design of the battery structures on Santa Rosa Island would need to address excessive moisture levels in the air, high rainfall levels, and the porosity of the sand substrate. One of Mahan's design modifications intended to address these problems was the elimination of air spaces around the magazines and in the walls of the shellrooms to reduce the potential for moisture to remain in any part of the concrete work, or penetrate the magazine from the outside. By March 1897, all of the masonry components, except for a few steps and the magazine paving, had been completed. The concrete plant was then dismantled and stored. Additional concrete needs were mixed by hand. This work was followed by placing sand fill to form parapets around the position in April.

In early May 1897, Mahan determined that the parapets required revetment to prevent the sand from being blown away by the constant wind. He decided that the turf associated with the nearby Fort Pickens glacis could be used for the revetment. It took nearly two months to complete the work on the parapets and the grading of the slopes. By June 30, the slopes had been partially covered with muck and turf. Twenty-one doors were then fabricated and hung within the battery, a permanent water system was installed, the steps were completed, and contracts were let for ammunition service, a lighting plant, and a sewer system. Finally during the autumn of 1897, the electric light plant, ammunition conveyors, shot cranes, and hoists were installed.[188]

War Department policy required that large guns and mortars be mounted in the batteries by the artillery corps. As guns were ready to be emplaced, the Army Corps project engineer would meet with the artillery commander and decide who would oversee the mounting of the guns.[189] At

[187] Ibid., 29–30.
[188] Ibid., 39.
[189] Ibid., 40.

Battery Cullum, it was decided that the Fort Barrancas garrison would mount the carriages and 10-inch guns. The first disappearing gun carriage was received by rail in Pensacola in late May 1897. A contractor was engaged to move the carriage by barge from the railroad wharf to Fort Pickens. As the garrison readied the carriage for installation, they discovered that a new base ring was needed. This and other problems delayed the work. Finally, in late January 1898, gun emplacements 1, 2, and 3 were completed with model 1894 guns emplaced. All that remained to be done was installation of a handrail around the loading platforms and marking of the meridian lines. Emplacement 4 could not be completed at the time because several ammunition hoist parts were missing. Emplacement 4 was finally readied for service, with a model 1896 gun mounted, on April 9, 1898, eleven days before the United States declared war on Spain.[190] The Army tested each gun by firing a round before the gun was declared in serviceable condition. The model 1894 guns, however, were problematic. Without their counterweights, they would not rise clear into battery and had to be punched in by the tripping bars, and the recoil of two of the guns remained between 8 and 12 inches short of the design due to the binding of the top carriage on the chassis rails.[191]

In October 1898, Santa Rosa Island experienced several heavy downpours that caused water to back up into the magazines to a depth of several inches. To prevent further problems, the Army placed grates and drains across each doorway. However, these measures were not sufficient to hold back the water, and it became necessary to drain the gravel road behind the battery into the main sewer. As a secondary measure, the district engineer recommended construction of a cesspool to drain the counterweight well of Emplacement 4. At the same time, the battery was subject to moisture penetration from the roof. To combat the overhead leakage, the district engineer suggested paving the superior slope above the magazines with asphalt. These projects were implemented during the winter of 1898–1899.[192]

By 1900, problems with moisture leakage continued. The district engineer then recommended coating the exterior surface of the concrete in front of the magazines with asphalt. However, due to the expense associated with this treatment, only the most problematic areas were treated, such as Emplacement 4. Even after these efforts, the interior of the magazines remained damp.[193]

Other problems also required modifications to the design of the battery. Because of cramped conditions in the electric light plant and water problems in the dynamo room, the district engineer proposed building two new rooms, removal of the sand parapets, and methods to improve ventilation. The new rooms, which were designed to house a generator and a storage battery, were completed in 1901. Later, drainage holes were drilled in several places in the magazines and platforms to encourage infiltration of surface water, and plans were made to expand the platform to enhance the efficacy of the communication gallery.[194]

[190] Ibid., 42.
[191] Ibid., 43.
[192] Ibid., 45.
[193] Ibid., 46.
[194] Ibid.

After the platform extension was completed in 1902, the chief engineer further addressed the drainage problems by designing detached lead ceilings and brick walls, raised floors, and double doors. Drains were installed to remove water as it accumulated in the magazines. Floors that had subsided due to moisture were raised, and gutters installed, while fractured aprons were repaired. These strategies were also only partly successful.[195]

In 1903, the district engineer determined that the loading platforms were too narrow for proper service of the guns and would need to be widened. To take advantage of the expansion project, he suggested that the Army also build rooms for shells and relocators at the same time. He also made plans to replace obsolete trolleys, cranes, and hoists at Emplacements 1, 2, and 3, and the balanced platform lifts and crane at Emplacement 4. Where needed, new stairs were designed to be constructed of reinforced concrete, using thicker iron bars to improve tensile strength. The district engineer also recommended the use of copper for interior waterproofing.[196]

Battery William J. Worth. In 1897, the Army determined to expand plans for coastal defenses on Santa Rosa Island by building a second battery. On April 6, Chief Engineer Wilson requested that Major Mahan submit detailed drawings and estimates of construction of a structure to accommodate eight emplacements for 12-inch mortars. Mahan selected a site at the western end of the island overlooking the entrance to the harbor, where there were large ridges of sand that could be used to reduce the need to convey fill material to the construction project. Mahan recommended that granolithic mortar or portland cement be substituted for cut stone in the mortar pits to save money. His design included ventilators at each end of the magazines, at the end of the center gallery, in the engine room, in the guardrooms, and in the relocator rooms, as well as an overhead cableway instead of a traveling derrick, which was considered impractical for the long narrow walls of the mortar battery. Mahan also suggested the construction of a cement house, a small storehouse, and a shed to shelter the engines and boilers, as well as relocation of the carpenter shop from Battery Cullum to the new mortar battery site.[197]

During spring 1897, the Army surveyed the route of a spur railway line to connect the narrow-gauge railroad at Engineers' Wharf to the site selected for the mortar battery. The spur was completed in early 1898. After the line was completed, laborers cleared the site; stockpiled sand, gravel, and cement in frame bins above the track; and set up the concrete plant. Charges were dropped into iron concrete cars, which were then hauled up an incline by wire rope. The work was slowed in October 1897, however, by a yellow fever scare, during which Mahan was forced to shut down the operation.[198]

By February 1898, work began again. At the time, Mahan requested additional funds to install lighting apparatus for night firing from the mortar pits and the emplacements for the 10-inch battery. The lighting would be tied to the electrical plant that was already planned to support the interior lighting. Mahan also suggested that fireplaces be built within the guardrooms to diminish

[195] Ibid., 48.
[196] Ibid., 51.
[197] Ibid., 59, 66.
[198] Ibid., 67, 69.

the damp cold of the winter months, with chimneys added for ventilation. Finally, Mahan suggested changing the waterproofing process by replacing asphalt with a slurry of portland cement, set to create a slight slope on the roof designed to shed water. Chief Engineer Wilson instead recommended painting the exterior of the masonry with "parraffine paint" or hot asphalt applied with a brush or a broom. In the end, Mahan added a layer of portland cement, placed and mixed very dry and carefully tamped, on top of the structure. He then applied a layer of mastic. The surface was sloped to drain the moisture into the air spaces around the magazines, where it could percolate into the sand.[199]

In mid-May, Mahan suggested further design modifications to the mortar battery. In order to increase the thickness of the cover over the magazines and prevent a direct hit from hurling large masses of concrete into the pits, which would have resulted in heavy casualties, he recommended extending the superior slope of the emplacement.[200]

The masonry work was nearly complete by May 31, 1898. The platforms were set atop wet sand, however, which was unstable. To compensate, a retaining wall was built around the pits to prevent the sand from spreading laterally. The concrete for the retaining wall was molded into place in 4-foot-long by 2-foot-high sections. The revetment was arched in the rear and supported by slight piers to diminish the potential for cracking due to settlement and movement of the sand.[201]

By the end of 1898, the artillery corps had set base rings for the eight carriages and positioned the racers. Three of the carriages were subsequently mounted by the end of 1898. The other five were completed in 1899, with the exception of mounting the mortars. At the same time, a parapet was added, composed of 34,000 cubic yards of sand. The exterior and superior slopes were covered with the clay soil of the Fort Pickens glacis. Unfortunately, the soil soaked up water from several heavy rains and eroded badly. The Army later removed the clay soil and replaced it with sod from the wet area to the northeast of Fort Pickens. Fortunately, the new waterproofing system appeared to work. During 1899, the Army also built two observation stations associated with the battery, placed the electric plant into operation, and readied to power two searchlights and the battery's interior lighting. As a back-up, the generators at Santa Rosa Island were connected to one another so that the plant at any of the batteries could serve the others in the event of an emergency.[202]

The eight mortars for the battery were shipped from the Army's Sandy Hook Proving Ground, and landed at Engineers' Wharf on April 24, 1899. After being moved by rail to the battery, they were mounted by June 30.[203]

[199] Ibid., 69, 72.
[200] Ibid., 73–74.
[201] Ibid., 74.
[202] Ibid., 75–77.
[203] Ibid., 78.

Heavy rains over the course of the spring had indicated that the drainage system of the mortar battery, which employed open sumps, was insufficient to handle the incoming water. Mahan decided it would be necessary to construct a supplementary drainage system. As a solution, he oversaw construction of an open brick cesspool, 10 feet in diameter and 6 feet deep, behind the battery. Completed in May 1899, the system was connected with the mortar pits by sewer pipe drains.[204]

On March 24, 1900, the War Department issued General Order No. 43, designating the mortar pits Battery Worth to honor Bvt. Gen. William J. Worth.[205]

Repairs were made to the battery later that year. The eroded slopes of the parapet were repaired, and covered with sod and Bermuda grass. Doors were rehung; speaking tubes repaired, altered, and labeled, steel hoods placed over exposed doors to prevent entry of rain; drainage holes were drilled in several places in the magazines and platforms to carry off surface water; and broken concrete was patched. Nonetheless, moisture and water leakage remained a problem in some of the magazines. Two years later, the Army decided to raise the floors of the four guardrooms 2 inches to provide better drainage, while the mortar pits were repaved. At the same time, a flight of concrete steps was built to prevent damage to the slopes by the detachment at drill, while the foundation of the water supply pump was rebuilt.[206]

Mahan continued to address moisture problems at the battery. In May 1903, the guardrooms and passageways were so wet they required lining with copper and wood. Because of dampness, the electric plant could not be maintained on site, and was slated for removal. Power was subsequently supplied from a central powerhouse. The pits were repaved, and a covered trench built to carry pipes and cables. Another problem was addressed when Mahan requested construction of new bathroom facilities to replace existing unsanitary latrines, which were located too close to the battery. The old latrines were removed and replaced with frame structures placed further away.[207]

Battery Joseph Van Swearingen. The threat of war with Spain and the passage of the National Defense Act of March 9, 1898, led to additional concerns regarding the readiness of the nation's coastal defenses. Despite the efforts already conducted at Santa Rosa Island, by March 1898, there remained no rapid-fire batteries at Pensacola. Of concern was the potential for enemy torpedo boats and destroyers to seek to penetrate the controlled minefield in order to enter Pensacola Bay. On March 19, Chief Engineer Wilson notified Mahan that money had been appropriated for construction of yet another new battery on Santa Rosa Island, which would house two 4.7-inch Nordenfeldt rapid-fire guns. The proposed location was to the west of the 10-inch battery already under construction. The Army quickly assembled workers for the project. Because construction of the relatively small battery required only a small amount of masonry,

[204] Ibid., 81.
[205] Ibid., 79–80.
[206] Ibid., 81–82.
[207] Ibid., 82.

the concrete was mixed by hand and placed using wheelbarrows. By June 30, the battery was nearly complete.[208]

Worried about the war with Spain, the Army decided not to wait for delivery of the originally proposed Nordenfeldt guns and instead ordered fourteen 4.7-inch rapid-fire guns, twelve of 40 calibers and two of 50 calibers, from the Armstrong Works in Great Britain. The guns reached Santa Rosa Island in early May, but could not be mounted until the base rings arrived. By June 29, all of the necessary parts were in place, and the pedestal carriages and guns were mounted. Later in the year, small details were attended to such as the placement of a small amount of sand fill on the right flank of the parapet and turf on the slopes, and the hanging of doors. The Army also extended the gravel road that serviced the 10-inch battery to the rear of the new emplacements.[209]

Within a year, the Corps of Engineers found problems with the battery that were corrected by filling eroded sections of the parapet and resodding the slopes where they had been washed by heavy rains. The Armstrong guns were found to be less stable than hoped. During the winter of 1901–1902, the Armstrong rapid-fire guns and their carriages were dismounted and the bases taken out. To increase the stability of the mounts, the bolts were positioned and set in an annular iron ring of the same size as the top base before the guns were remounted and the ironwork painted.[210]

On May 25, 1903, the War Department issued General Order 78 naming the battery for Capt. Joseph Van Swearingen of Maryland, who was killed in 1837 in action against the Seminoles at the Battle of Okee-cho-bee.[211]

Additional changes were made to the battery in 1904 and 1905 to correct problems. In 1904, the Corps of Engineers lined the magazines to prevent seepage, and patched the superior slopes where the concrete had been fractured by muzzle blasts. In 1905, the platforms in the rear of the gun circles were paved to correct a problem whereby the ammunition service was impeded by the artillerists being compelled to cross a space covered with sand and gravel between the head of the steps from the magazines and the rapid-fire guns. The exterior slopes of the battery were also again repaired.[212]

Battery Pensacola. Battery Pensacola, a reinforced concrete structure, was constructed in the center of the parade ground of Fort Pickens in 1898 in response to the threat of war with Spain.[213] By late winter 1898, after the destruction of the USS *Maine* had led to tensions between Spain and the United States, the Army as noted above evaluated the status of the coastal defense system. While the four-gun, 10-inch battery west of Fort Pickens was substantially complete and

[208] Ibid., 87.
[209] Ibid., 87–88.
[210] Ibid., 89.
[211] Ibid.
[212] Ibid., 90.
[213] Muir and Ogden, 15.

partially armed, two other emplacements, each designed to house four mortars, remained under construction. To accelerate the construction and arming of the Endicott battery system, Congress responded to the emergency by appropriating $3 million, and President McKinley signed the bill into law on March 9. One week later, Chief Engineer Wilson telegraphed Mahan that the Army would be building an emplacement for two 12-inch guns mounted on disappearing carriages within Fort Pickens. He noted that the gun platforms were to be built first so the armament could be mounted without delay upon its arrival, and a rush was placed on preparing plans for the new battery.[214]

Lieutenant Jervey helped Mahan prepare plans for the battery, placing the guns so their projectiles would strike the water just beyond the 18-foot curve on the south side of Santa Rosa Island. The right gun was positioned to command the entrance to the harbor beyond the lighthouse, while the left gun had a line of fire designed to clear the new mortar battery 1,300 yards east of Fort Pickens.[215] To ensure that the guns were capable of commanding the area fronting Fort Pickens, it was necessary to raise the interior crest of the proposed battery above the breast height wall of earlier masonry work.[216] As the Army readied the site for construction, Mahan investigated the use of the cement plant, but unfortunately found that it was still in use on the mortar battery and that a new plant had to be assembled. The new plant featured a one cubic yard capacity cubical mixer. The dry materials—sand, pebbles, and cement—were measured in small handcarts, dumped into a tub, raised over the mixture by a derrick, and mixed and dumped into a tub resting on a flat car. The tub was then run out under the derricks at the construction site, and placed in position. Two hoisting lines were used on each derrick so that the bucket of concrete could be dumped anywhere in the area covered by the derrick. By June 30, 1898, both gun platforms had been completed, although problems remained with one of the guns, which when in loading position was in danger of overhanging the platform.[217] By 1899, two large artillery pieces had been mounted on Battery Pensacola.[218] In 1903, a power plant for the battery was located in adjoining casements of Fort Pickens.[219]

Mine Support Structures. One of the key components of the coastal defense systems envisioned by the Endicott Board was the placement of exploding mines in important harbors. Although small in stature in comparison with the concrete batteries, the mines were considered a primary harbor defense weapon. Submarine mines, or torpedoes as they were called originally, were an American invention. First used during the Revolutionary War, they were significantly improved by the Civil War and were used effectively by the Confederates in particular.[220]

After the Civil War, the use of mines as a part of harbor defenses was recommended by the U.S. Board of Engineers. To support this activity, modern submarine mining was made part of the

[214] Bearss, *Historic Structure Report and Resource Study*, 93.
[215] Ibid., 94.
[216] Ibid.
[217] Ibid., 100.
[218] Muir and Ogden, 18.
[219] Ibid., 18.
[220] *American Seacoast Defenses, 326–367.*

curriculum of the Military Engineer School at Willets Point, New York, established in 1869. Col. Henry L. Abbot, who served as the commandant of the school, developed an improved submarine mining system for use by the Army. When the Endicott Board published its report in 1886, it featured the use of submarine mines in harbor defense based on Abbot's system. The practice remained in use, with some upgrades, until the end of World War II.[221]

Although mine defense facilities began to be established in association with major United States harbors during the 1880s, no mines were actually planted, except for tests conducted by Abbot, until the threat of invasion associated with the Spanish-American War arose in 1898. At that time, mines were planted in twenty-eight harbors in the United States, including Pensacola, until the threat passed.[222]

At Santa Rosa Island, mines were designed as part of the program. The first mine support facilities were built inside Fort Pickens. A reinforced mine battery room was placed in casemates 86 and 87 between 1893 and 1895. In 1898, two other casemates of the fort had cement floors added for cables and searchlight equipment. Dampness in the fort caused a new mining casemate to be built outside the fort in 1907. This structure was later adaptively reused by the state of Florida to support park needs as bathrooms and office space. A two-story Mine Battery Commander's Station was added to the parapet of Fort Pickens above the new casemate in 1909.

Additionally, several structures, including a torpedo (or mine) storehouse, concrete cable tank, and loading room were constructed in 1898 adjacent to the railroad between the fort and the wharf. These features were severely damaged on June 20, 1899, when ordnance being stored in one of the Fort Pickens bastions and tackle used for moving guns in the northeast bastion of Fort Pickens caught fire from an unknown cause. A bucket brigade from the nearby cistern failed to prevent the spread of the fire.[223] When the fire reached the bastion, the 8,000 pounds of explosives stored in the northwest bastion exploded,[224] sending up a shower of debris and reportedly hurling bricks as far away as Warrington, 1-1/2 miles away on the other side of the bay. The brick work of the bastion was ruined. Extensive damage occurred to the mine defense facilities, which were soon rebuilt.[225] Repairs were made to the railroad track and locomotive in June 1900.

Establishment of the Coast Artillery Corps, 1901

In February 1901, the Army reorganized the Artillery Corps by dividing it into field artillery and coast artillery. The Coast Artillery was made responsible for the installation and operation of the controlled mine fields, as well as their monitoring, electronic firing, and the manning of the fixed guns of the Endicott batteries. It recognized seacoast artillery as "a distinct branch of service," whose "officers and men must, in order to obtain the greatest proficiency, be specialists to a

[221] Ibid.
[222] Ibid.
[223] Muir and Ogden, 17.
[224] Ibid., 17.
[225] Bearss, *Historic Structure Report and Resource Study*, 182–196.

greater degree" in technical matters such as handling of heavy ammunition, fire control, and nighttime harbor illumination. The Coast Artillery would be responsible for the "care and use of the fixed and movable elements of land and coast fortifications, including the submarine mine and torpedo defenses."[226] Field Artillery would accompany the Army in the field, and would include horse artillery, field and light artillery, mountain guns, and machine guns.[227] Although this reorganization did not affect weaponry or the character of the fortifications, it vitally affected harbor defense activity in the United States for the next half century.

Officers were assigned to the Coast or Field Artillery according to their aptitude. The seven existing artillery regiments were reorganized into 126 companies of Coast Artillery, 30 batteries of Field Artillery, and 10 bands. Each Coast Artillery company possessed sufficient personnel to man either a major-caliber gun or mortar battery, two or more rapid-fire batteries, or a mine battery.[228]

At the same time, the submarine mine program, still based out of Fort Totten at Willets Point, was transferred from the Corps of Engineers to the Artillery Corps. The Artillery Corps established a Submarine Mine School, which was moved in 1908 to the Coast Artillery School at Fort Monroe, Virginia, and its primary mine depot at Fort Totten.

Batteries Cooper, Payne, and Trueman. With additional technological advances, including the development of fast destroyers and torpedo boats, the coastal defenses at Santa Rosa Island were again improved with the addition of three batteries of rapid-firing cannon between 1903 and 1905. The need for improvements was first raised by Captain W.V. Judson after he replaced Captain C.A.F. Flagler as District Engineer. Judson called for improvements as part of a larger need to address construction problems on Santa Rosa Island and Fosters Bank, and noted the need for seawalls and revetments, as well as installation of proposed searchlights and position finders. In particular, Judson believed the defenses were lacking in rapid-fire guns. The growing importance of Pensacola naval shipyard, in part resulting from the dredging of a channel from 22 feet to 30 feet, rendered defense of Pensacola Bay, the best fleet anchorage between Hampton Roads, Virginia, and the Río Grande, essential. Plans prepared to meet this need were approved in 1902.[229] The new structures at Santa Rosa Island included Batteries Payne, Trueman, and Cooper.

Battery George A. Cooper was constructed circa 1903–1905 based on plans prepared by the U.S. Army Corps of Engineers. It was designed to mount two 6-inch rifles, model 1903, on disappearing carriages, one in each gun pit, which faced the ocean southeast of Fort Pickens. The south side of the structure consisted of an earthen bunker.[230] Doors at each pit led to various concrete and yellow tiled rooms inside. The battery was named on December 27, 1904, in honor

[226] As quoted in Bearss, *Historic Structure Report and Resource Study*, 10.
[227] Bearss, *Historic Structure Report and Resource* Study, 9.
[228] Ibid.
[229] Ibid., 153–155.
[230] National Park Service, List of Classified Structures, 2014.

of 2nd Lt. George A. Cooper, who was killed in action at Mavitac, Philippine Islands, on September 17, 1900.[231]

A new battery to emplace four 15 pounder rapid-fire guns was first proposed in June 1902. The battery was to be similar to existing structures in Boston Harbor that featured 360-degree firing, while being protected on the flanks and in front. The rear would be subject to fire unless protected with parados. Low traverses were to separate the guns. When eventually completed in 1904, **Battery Matthew M. Payne** was located west of Battery Van Swearingen, and housed two 3-inch rapid-fire guns on pedestal mounts. The Chief Engineer decided a 4-gun rapid fire battery would be problematic, and during the planning process the Army switched from 15-pdrs to 3-inch rapid-fire guns. Battery Payne was sited to aim at the entrance into Pensacola Harbor in order to protect against fast torpedo boats and destroyers in concert with a second new battery, later named Battery Trueman. Payne mounted two 3-inch guns, the other two being mounted in Battery Trueman. The rear of the battery was protected by parados low enough to permit fire to the rear and high enough to provide good cover for the magazines. The top of the retaining wall was also designed to be low enough to prevent exploding shells coming from the channel, while the sides of the traverse were inclined to deflect projectiles, and the top of the traverse was rounded for the same reason.[232]

The U.S. Army Corps of Engineers raised concerns regarding the proximity of the battery to the ocean, and its low elevation, only 6 feet above mean high tide, with the potential for tides and overwash to damage the position. To prevent the battery from being washed away, it was shielded by groins made of riprap from the debris of the Fort Pickens bastion destroyed in the ammunition blast on June 20, 1899.[233]

On December 27, 1904, the battery was named for Col. Matthew M. Payne of Virginia, who served nearly continuously in the Army from March 12, 1812, until resigning his commission in 1861.[234]

Battery Alexander Trueman, located near the far western end of Santa Rosa Island was constructed in 1905 based on plans prepared by the U.S. Army Corps of Engineers to emplace two 3-inch rapid-fire rifles that would work together with the guns at Battery Matthew Payne. Together, these two batteries were designed to emplace rapid-fire guns in order to enhance the defense of the bay entrance against fast torpedo boats and destroyers. The battery proposed for site No. 3 at Battery Trueman was situated so both its guns could sweep the bay's interior waters while covering the minefield and channel, except for one dead angle. This angle slightly overlapped the corresponding angle of Battery Payne. The two batteries were placed far enough away from one another to reduce the effect of their blast on each other. Battery Trueman was

[231] Bearss, *Historic Structure Report and Resource Study*, 160.
[232] Ibid., 167.
[233] Ibid., 169.
[234] Bearss, *Historic Structure Report and Resource Study*, 175, from Francis B. Heitman, *Historical Register of the United States Army, from its Organization September 29, 1789, to September 29, 1889* (Washington, D.C.: Government Printing Office, 1890), 512.

named on December 27, 1904, for Maj. Alexander Trueman, who died of wounds received in action near Fort Recovery on June 2, 1792.[235]

Seawall. The new batteries were threatened on September 26, 1906, when a severe hurricane struck Pensacola, inflicting heavy damage on the Santa Rosa Island installation. In response, U.S. Army Corps of Engineers District Engineer Cavanaugh recommended erecting a concrete seawall around the installation to protect the facility from future hurricanes. Between 1908 and 1910, a masonry and concrete structure measuring 11 feet in height, 13 feet wide at the base, and 5 feet wide at the top was completed. A concrete-lined ramp was constructed over the seawall to allow rail access to the wharf.[236]

Improvements Resulting from the Taft Plan, 1905

Additional changes were made to the coastal defenses on Santa Rosa Island following the recommendations of a board convened in 1905 by President Theodore Roosevelt and headed by Secretary of War William Howard Taft. The Taft Board reviewed the Endicott Board's plan to address technical improvements associated with evolving technology as well as the need to expand the system to include new territories acquired by the United States since 1885. Although the Taft plan did not result in the installation of many entirely new features as part of the system, it did spur the government to move ahead with some of the Endicott Board's recommendations that had never been implemented, particularly regarding the addition of searchlights, electrification of all aspects of harbor defense, and updating the aiming systems. Electrification was added to improve communications and powered ammunition handling. Improvements in aiming technology for large caliber guns and mortars involved the construction of battery commander stations, plotting rooms, and base end stations.[237]

Aiming Systems. During the early to mid-nineteenth century, when gun ranges were only a few miles at most, artillery aiming techniques were simple. The gunner pointed his cannon in the direction of a target, estimated its speed and course, fired a round or two, and corrected his aim before taking another shot. As improvements in gun design and propellants increased artillery ranges to ten miles and more, the potential for miscalculations also increased, suggesting a need for more precise methods directing artillery fire.[238]

Part of the Endicott System entailed improvements to range finding and aiming. The guns of the Endicott batteries were aimed, or pointed as it was called by the Army, using systems collectively referred to as fire control and position finding. Fire control involved functions of command associated with the concentration and distribution of fire, including the assignment and identification of targets. Once a battery received its target designation, it was responsible for determining the range and pointing direction in order to fire on a target. Position finding systems determined the range and direction of a target from a battery directing point, a known location at

[235] Heitman, 651.
[236] Bearss, *Historic Structure Report and Resource Study*, 226–242; Muir and Ogden, 18.
[237] Lewis, 89–93.
[238] *American Seacoast Defenses*, 91.

or near the battery considered the gun center on the plotting board. At first, all position finding operations originated at the gun itself.

In 1900, the U.S. Army initiated experiments with an aiming method based upon the surveyors' technique of triangulation. The new system relied on the introduction of telephone communications and new instruments used in trigonometric position finding equipment to collect data more rapidly and accurately. In this system, two observers at known distances from each other simultaneously aimed surveying transits at a target. Each observer, situated at a corner of the base line of an imaginary triangle, would view the target from a different angle, or azimuth. The two observers telephoned their azimuth bearings to a central plotting room at the battery. Since the distance between the two observers was known, along with their distances from a pre-determined directing point at the battery itself, geometric calculating afforded the range from gun to target. One of the problems that had to be worked out was how to synchronize the exact instant of reading the azimuths. Engineers established permanent base lines and base end stations for all coast artillery gun batteries.[239] The new equipment helped to furnish accurate ranges and azimuths at which the guns of the battery were to be laid to ensure hitting the target upon firing.[240]

One of the pieces of equipment used in aiming and firing techniques was the coincidence rangefinder, a stereoscopic or parallax scope that uses mechanical and optical principles to allow an operator to determine the distance to a visible object. The device consists of a long tube, with two lenses facing forward at each end, and an operator eyepiece in the center. Two prism wedges which, when aligned result in no deviation of the light, are inserted into the light path of one of the two lenses. By rotating the prisms in opposite directions using a differential gear, a degree of horizontal displacement of the image can be achieved.

The systems used for determining firing data depended in part on the caliber of the guns. In a 3-inch rapid-fire battery, pointing using a self-contained range finder and gun sight were effective as the ranges and times of flight were short and the dead time was negligible. For most rapid-fire batteries of 6-inch caliber and less, a plotting room was typically not provided.[241] Batteries with larger caliber guns used a more complicated system of tracking using a plotting board. The plotting board was the most important piece of equipment used in seacoast artillery range and position finding. It afforded a mechanical solution to the trigonometric problem of locating a distant point associated with the target. Coast artillery plotting boards used the same angle-side-angle relationship used by surveyors to determine inaccessible distances.[242]

To support tracking needs, the Army built base end stations along the coastline near many major American harbors. These small structures helped gunners calculate ranges to enemy ships.[243] The first base end stations began to appear about 1905. They were often clustered to share electrical

[239] Ibid.
[240] Ibid., 62.
[241] Ibid., 63.
[242] Ibid., 74.
[243] Ibid., 91.

and telephone service. Most base end stations contained only a single room, accessed through a hatch or side entry door. They often featured a vision slit that faced the sea fitted with steel shutters to protect the crew and observation telescopes within. For low-lying areas, such as in the Gulf, base end stations were elevated to achieve the required observation range. Before adoption of radar for fire control it was crucial to have a clear line of sight to the target. As a result, multiple stations were assigned to each battery. High elevation stations provided unparalleled views during clear weather, while fog stations set closer to the water provided observations beneath any overcast. Also, artillery theory dictated that the ideal baseline for range finding was about one third the distance to the target. For these reasons, a World War II-era 16-inch gun battery had as many as nine base end stations spread out along several miles of coastline. This large number of stations afforded several options for finding an optimal base line regardless of the weather or target locations.[244]

In addition to base end stations, the coastal defense complexes included observation stations that contained additional rooms for offices, communication gear, and plotting equipment.[245]

The coastal defense batteries associated with the Harbor Defense Project similarly expanded over time to include the appropriate complement of battery commander stations, base end stations, plotting rooms, and coincidence range finders.

Additions and Changes to the Harbor Defense Project during the 1910s

During the 1910s, the Army began updating the batteries of the nationwide coastal defense project to include new technology involving range finding and firing equipment. In addition, by 1914, the design or armaments had advanced such that older magazines were inadequately protected against the powerful rifles found on dreadnaught class battleships. To address the problem and increase protection, it was sometimes possible to excavate sand around the structure and add concrete to the exterior and superior slopes; this was not always possible, however, as it could also reduce the range of the guns emplaced within the batteries. Also problematic was the fact that the battery positions were often deficient in overhead protection. In particular, some of the older positions needed protection from plunging fire. When first built, the Endicott batteries did not included overhead protection because a battleship's turrets did not permit high angle fire at the time.

The Endicott batteries were also difficult to adapt for the emplacement of the emerging heavier and more powerful guns and their associated carriages. A new coastal defense board convened in 1914 indicated that the 12-inch guns and mortars of the late nineteenth century were not equal in range and power to major caliber guns on board many battleships. Existing guns would need to be replaced with artillery that permitted an elevation of 15 degrees and fired a lighter 700-pound projectile that allowed for an increase in range from 15,500 to 20,000 yards.[246] Where modernization required extensive changes, the policy would be to construct new works and

[244] Ibid., 93–95.
[245] Ibid., 103.
[246] Bearss, *Historic Structure Report and Resource Study*, 271.

provide new armaments adequate to the demands of the situation. Wherever new works were needed at the entrances to principal harbors, such as at Fort Pickens, the board recommended new 16-inch guns that could be mounted so as to have the greatest possible protection and command a 360-degree range of fire. Mortars were to be at least 12-inches in size with a range of 21,000 yards.[247] In summary, the board noted that the guiding principal of coastal defense policy would be "to mount armament of greater range and power than any which can be brought against it."[248]

In July 1915, Chief of Coast Artillery E.M. Weaver recommended the addition of two additional 12-inch rifles, mounted for long range fire directed against long-range naval bombardment, to update the defense system designed to protect the city of Pensacola and the naval shipyard.[249]

On December 22, 1915, the Secretary of War called for fabrication of seventeen barbette carriages for high angle fire on which to mount the 12-inch rifles. After President Woodrow Wilson signed related legislation for Fortifications and Other Works of Defense on July 6, 1916, two 12-inch barbette carriages and two 3-inch anti-aircraft guns and mounts were targeted for delivery to Fort Pickens.[250] To accommodate the guns, the Army and U.S. Army Corps of Engineers determined that retrofitting older emplacements would potentially be more trouble than mounting the new, heavier armament in emplacements constructed specifically for them.[251] Plans were later made to construct a new battery that would be called Battery Langdon (see below).

Other specific changes made to the Harbor Defense Project batteries prior to World War I include the following:

Battery Cullum. On January 22, 1914, Chief of Coast Artillery Erasmus M. Weaver called for division of Battery Cullum into two batteries, each to have its own fire control equipment. Due to funding limitations, the two batteries would share one battery commander's station and plotting room. These were to be erected behind loading platforms 3 and 4, while the plotting room was to be placed underneath the battery commanders' station. The work was completed in 1915, and the battery was divided in 1916. The new battery was named in honor of John Sevier, a pioneer, soldier, and the first governor of Tennessee.[252]

Battery Pensacola. In 1915, it was determined that the south and southwest walls of Fort Pickens were obstructing the field of fire associated with Battery Pensacola. Following this determination, Army engineers removed the sand from the parapet on the two walls, and began

[247] Ibid., 272.
[248] Board to Secretary of War, undated, National Archives, RG 77, Correspondence 1894–1923, Doc. 95991/3.
[249] Bearss, *Historic Structure Report and Resource Study*, 273, from Weaver to Board of Review, July 8, 1915, National Archives, RG 77, Correspondence 1894–1923, Doc. 95991/11.
[250] Bearss, *Historic Structure Report and Resource Study*, 274, from Crozier to Chief Engineer, July 22, 1916, National Archives, RG 77, Correspondence 1894–1923, Doc. 38148.
[251] Bearss, *Historic Structure Report and Resource Study*, 273.
[252] Ibid., 56.

blasting the masonry to lower the walls by 3 or 4 feet. The casemates and quarters along the south wall of the fort collapsed during this blasting.[253]

Battery Worth. In 1915, the electrical system at Battery Worth was rewired. In 1915–1916, a battery commander's station and plotting room were built at the battery. The battery commander's station and a walk were built atop the traverse and the former boiler and engine room. The boiler and engine room became the plotting room after the upper part of the old chimney was closed with concrete.[254]

Hurricanes continued to pose a threat to the coastal defenses on Santa Rosa Island. On August 11, 1916, a hurricane swept away the superstructure of the Engineers' Wharf, leaving only the pilings.

Anti-aircraft weapons of the coast artillery corps. The introduction of the use of aircraft during the early twentieth century required the Army to consider anti-aircraft systems for inclusion within the existing coastal defense projects. The first effort made by the Army to address anti-aircraft defense, which occurred in 1913, involved modifying the trail and recoil systems of field guns to allow them to be fired against airplanes. By 1916, the Army was in the process of designing specific anti-aircraft guns. Eventually, these were incorporated into the Harbor Defense Project at Pensacola for use by the Coast Artillery Corps.

World War I, 1917–1918

In early 1917, United States severed diplomatic relations with Germany after the German ambassador announced that his country would resume unrestricted submarine warfare, suggesting that American entry into the war was imminent.[255] Before Congress voted to declare war on Germany in April 1917, the Army readied for the engagement, taking stock of its coastal defenses. The introduction of aerial bombing, from both airplanes and zeppelins, in Europe during the early years of the war suggested that the coastal defense systems would need to be updated to include anti-aircraft weaponry overhead protection. To meet this need, new defenses were built at Battery Langdon and Battery Fixed, while anti-aircraft weaponry, searchlights, and towers were introduced in association with other existing batteries, such as Battery Worth and Batteries Cullum and Sevier, between 1917 and 1919.

Despite United States involvement in World War I, the Army deaccessioned half of the artillery associated with Battery Worth in May 1918 in response to a War Department directive to reduce weaponry mounted in the nation's older mortar emplacements. Mortars 23 and 3 and carriages 109 and 99 were dismounted and removed from Pit A, emplacements 1 and 3. Pit B lost mortars 4 and 18 and carriages 111 and 110 from emplacements 2 and 4. In June 1918, the obsolete

[253] Muir and Ogden, 18.
[254] Bearss, *Historic Structure Report and Resource Study*, 83–84.
[255] Ibid., 275.

mortars were shipped to the Watervliet Arsenal in New York, while the carriages were salvaged and cannibalized.[256]

The Period between the World Wars, 1918–1939

Fort Barrancas Army Post. Beginning after World War I, Fort Pickens referred to all of the emplacements on the western end of Santa Rosa Island, and was considered a sub-post of the Fort Barrancas Army Post, headquarters for the 13th Coast Artillery Regiment and one of the largest artillery training centers in the south.[257] Although many of the members of the regiment were quartered on the mainland, a small staff of regulars, some with families, were housed in the wood-frame quarters on the island built in the early 1900s. Life on the island during the 1920s and 1930s included maintenance and drilling. During the summer months, the sub-post was used for CMTC program training. Men from the Florida National Guard, various college ROTC programs, and the Citizens' Military Training Corps were housed in temporary barracks and tent cities.[258]

Soldiers arrived on Santa Rosa Island via the *Stallworth* and the *Jenkins*, ferries operated by the Army. The ships docked at the wharf in front of the north wall of Fort Pickens, and troops used the narrow-gauge train for transport to the various batteries. The men trained on a variety of weapons, including the 90 mm and 155 mm guns, the 3-inch anti-aircraft guns, the 12-inch cannon at Battery Langdon, and a network of powerful searchlights.[259]

Battery Loomis L. Langdon and Battery Fixed. To address the needs of overhead protection and the emplacement of longer range artillery, the U.S. Army Corps of Engineers build two new gun emplacement structures at Fort Pickens—Battery Langdon (1917–1923) and Battery Fixed (1917–1918). The new batteries were supported by searchlights and towers installed at several locations between 1917 and 1919. Although searchlights had been recommended by the Taft Board to illuminate mine fields and light up targets for nighttime firing, they were now needed to spot approaching aircraft. Battery Langdon would house the 12-inch, long-range guns recommended by the board. To accurately target and fire the long-range guns, a new modern system of range finding would also need to be installed, and existing electrical systems upgraded.[260]

The site chosen for Battery Langdon was located 2 miles east of Fort Pickens, 600 feet from the north shore of Santa Rosa Island, and 1,700 feet from the south shore, on a low sand ridge approximately 6 feet higher than the terrain of the beachfront.

Designs for the battery were developed from standard drawings that were adapted to local conditions. To increase the size of the engine and radiator rooms as a measure designed to

[256] Ibid., 85.
[257] Muir and Ogden, 18–19.
[258] Ibid., 19.
[259] Ibid.
[260] Bearss, *Historic Structure Report and Resource Study*, 270.

accommodate the increased power needed for the battery and associated searchlights, the plans suggested extending the typical parade wall with flanks to either side. The right flank would accommodate two 25-kilowatt generators, while the left flank would house a switchboard room. The floor space of the battery commander's stations was proposed to be enlarged to facilitate installation of the instruments. The magazines were to be damp-proofed using a brick lining. Six trolleys were to be installed in each corridor to convey the artillery and other equipment.[261] Of the proposed design, the Chief Engineer approved the extension of the parade wall, the rectangular room plan, and passage drainage. He did not approve proposals for increasing the amount of floor space associated with the observation room, the elimination of steps leading from the battery commander stations onto the slopes, or extending the cover of rooms in the rear. As for the trolley system, the Chief Engineer approved construction of one rail into each truck corridor leading from the outside into the shellroom.[262]

To facilitate construction, it was proposed that a wharf be built on the bay side, thereby avoiding a four-mile round trip on the existing narrow-gauge rail line to convey materials from the Fort Pickens Engineers' Wharf. The cost of the new wharf was estimated to be less than the cost of materials transport from Fort Pickens.[263]

Construction of the wharf was authorized on March 7, 1917. A dredge was employed to create a channel and reduce the length of wharf to be built from 800 to 124 feet. Authorization was also granted to build a narrow-gauge railroad to the battery site from the wharf. Work on the project was delayed, however, by a lack of labor resulting from the draft associated with World War I.

After the war, the work continued on both the wharf and the battery, but slowly. By March 27, 1922, the battery was nearly complete, and the Army took the opportunity to officially name the structure for Brig. Gen. Loomis L. Langdon, who had been stationed at Fort Pickens three times during his career—in 1861 when he commanded a battery of 10-inch mortars at Fort Pickens, in 1874 as an artillery captain, and in 1885 as a Lieutenant Colonel in charge of the 2nd U.S. Artillery. Construction of Battery Langdon was finally completed in May 1923, and armed in early summer of that year, and proof-fired on August 8. The guns emplaced were two 12-inch Model 1895 MIs mounted on barbette carriages.

When completed in 1923, Battery Langdon featured a massive casemate to protect the magazines, storerooms, and plotting room located between the two 12-inch guns mounted *en barbette* and capable of 360-degree fire to a range of 17 miles. Battery Langdon was in fact the most important and powerful element of the Harbor Defense Project. During the 1930s, it continued to receive much attention from the Army and was used regularly for artillery drills.[264]

The wharf was destroyed in a 1926 hurricane that also buried the locomotive under tons of sand and debris.[265] The locomotive was finally excavated and sold as scrap in 1943.[266]

[261] Ibid., 275–276.
[262] Ibid., 276–277.
[263] Ibid., 276.
[264] Ibid., 284.
[265] Ibid., 285.

In 1930, the narrow-gauge railroad between Battery Worth and Battery Langdon, as well as searchlights 6 and 7 were rebuilt by troops assigned to Fort Barrancas. At the same time, the wharf was rebuilt and the channel re-dredged.[267] During the 1930s, additional changes were made to the system, including the relocation of Battery Fixed to the east of Battery Langdon and the construction of Battery GPF to replace Battery Cooper. In 1931, a new battery commander's station, constructed with wood-framed walls covered with tarpaper, was built within the traverse at Battery Langdon. The structure was later abandoned, and razed in 1941.[268]

Batteries Cullum and Sevier. In 1922–1923, a new power station was constructed to service both batteries. A 23 feet, 8 inches by 15 feet (interior dimensions) reinforced concrete structure was built adjacent to the exterior slope of Battery Cullum near the division point between the two batteries.[269]

In 1930, the aprons and earthen parapet of the two batteries were repaired. Soon, the War Department, recognizing that many coastal defense structures had become obsolete, began a deaccession process that included Batteries Cullum and Sevier. In June 1933, the four 10-inch guns had their breech mechanisms removed and were given a heavy coat of Cosmoline, a rust-preventive coating. The guns, however, were not removed and salvaged until November 1942.[270]

Battery Worth. In the early 1920s, the Corps of Engineers built a new power station. The 23 by 15 foot reinforced concrete structure incorporated part of the old steam power house and was positioned to the rear of the battery. A frame partition divided the station into two rooms. Housed in the station were a radiator, generator, and double-pole, double-throw switchboard.[271]

During the 1930s, the four 12-inch mortars remaining at Battery Worth and the 12-inch rifles of Battery Langdon constituted Tactical Fire Group No. 2. The war reserve allowance for the battery was 259 rounds. In 1936, the battery's lighting and power systems required rewiring. The mortars were obsolete, however.

Battery Van Swearingen. By 1917, the Armstrong guns emplaced at Battery Van Swearingen were considered obsolete. The ammunition used in the guns was also a different caliber than that fired by the standard Coast Artillery rapid-fire guns. Because it had to be purchased from Great Britain or manufactured under license in the United States, it was also considered undesirable. The Armstrong guns were thus declared surplus to the needs of the Pensacola Harbor Defense Project, and were dismounted in winter 1917–1918 and shipped to Watervliet Arsenal. In mid-March 1919, the War Department determined to retain the battery as part of the project, and the guns and their carriages were returned and placed in storage. In May 1921, the War Department reversed itself and ordered the guns and carriages disposed of. They were donated to

[266] Ibid., 284.
[267] Ibid.
[268] Ibid., 285.
[269] Ibid., 57.
[270] Ibid.
[271] Ibid., 85.

Danielsville, Georgia and Orlando, Florida. In 1922, the battery was repurposed. Emplacement 1 was converted into a coincidence range finder station for Battery Payne. This involved construction of a 10-by-10 foot (interior measurement) square structure on the former gun platform. The 18-inch-thick reinforced concrete walls of the station had a viewing slit centered 4 feet above the instrument pedestal. When not in use, the instruments were stored in the former magazine. On February 9, 1923, the station, having been completed and equipped, was transferred by the Engineers to the Coast Artillery.[272]

Battery Pensacola and Fort Pickens. By1934, Battery Pensacola was determined obsolete, and the Army removed its guns. Fort Pickens continued to be used for storage. A road was cut through the old counterscarp wall, running south of the fort. Soldiers are known to have been encouraged to bring salvaged bricks and cannonballs on the ferry to the mainland with them for use as decoration at Fort Barrancas.[273]

A devastating hurricane hit the island in 1926 that damaged the mine battery commander's station and cable storage tank. Although these structures were salvaged, the mine system was eliminated from the Army's harbor defenses of Pensacola Bay. The Navy assumed responsibility for the program thereafter.[274]

Battery Cooper. Following removal of the guns in 1917 to support the war effort in France as railway artillery, Battery Cooper remained unarmed until the 1930s, when four Panama Mounts were placed around the structure to mount 155 mm guns. The magazine for Battery Cooper was converted into a plotting room, while a latrine was built nearby. The new defensive position was named Battery GPF, which stood for Grand Puissance Filloux.

World War II, 1941–1945

After Pearl Harbor, the Army again determined the need to make changes in the nation's coastal defense systems. Responding to the effectiveness of dive-bombers in the Spanish Civil War, the German "Blitzkrieg" of 1939–1941, and the Japanese attack on Pearl Harbor, existing emplacements were casemated, while new gun emplacements were to be protected by armored shields or turrets.

Activity at Fort Barrancas peaked, and then faded during World War II. Tensions ran high in the first year of the war, as German submarines operated all along the American coast, and thousands of new recruits were trained for service overseas.[275] After 1943, however, the threat diminished, and the sub-post was never again as active.

In 1942–1943, Battery Langdon was altered through the addition of massive reinforced concrete casemates, composed of walls 10 feet thick and overhead protection 17 feet thick, designed to

[272] Ibid., 90.
[273] Muir and Ogden, 19–20.
[274] Bearss, *Historic Structure Report and Resource Study*, 179–193.
[275] Muir and Ogden, 20.

protect the guns and crews. These new structures, while affording overhead protection, diminished the field of fire associated with the guns from 360 to 145 degrees. A new power room was also built behind the battery.[276] The structure remained the primary element of the Pensacola Harbor Defense Project, with a mission to 1) protect Navy shore installations, harbor facilities, and shipping in Pensacola Bay from naval gunfire in minor attacks; 2) deny enemy ships access to Pensacola Bay; and 3) support the defense against amphibious attacks within range of the armament.[277]

Battery AMTB and Battery 234. In 1943, two 90 mm guns were located on platforms just outside the seawall south of Fort Pickens in Battery AMTB (Anti-Motor Torpedo Boat) in response to the threat posed by potential German attack. In 1943–1944, improved range-finding towers were established in new locations, and radar towers were constructed. One of these, the Battery 234 tower, was completed east of the seawall, along with improved range-finding towers and range finders. A latrine was also added nearby.

Battery Trueman. In 1943, the Coast Artillery, "to provide better coverage of the beach and water areas within its range," relocated Battery Trueman to Battery Cullum. The two 3-inch rapid-fire guns were emplaced on concrete platforms between emplacements 1 and 2. A battery commander's and coincidence range finder station was erected at the easternmost point of the battery. At the same time, the signal and meteorological stations were relocated to Battery Sevier.[278] The Harbor Entrance Signal Post was built on the emplacements of Battery Sevier.

Battery Worth and the Harbor Entrance Control Post/Harbor Defense Command Post. On May 21, 1942, Secretary of War Henry L. Stinson signed an order listing Battery Worth as no longer required for the defense of Pensacola Bay. By mid-November, the mortars and their carriages had been salvaged. The battery, however, continued to play an important role in the Pensacola Harbor Defenses until Fort Pickens was deactivated in 1947. Before the mortars were salvaged, the Fire Control Switchboard Room was established there. The battery was adapted for use in 1942–1943 as an HECP-HDCP with the addition of a two-story building over the central traverse and conversion of the old magazines, guardrooms, and plotting room below into barracks, radio rooms, and the Fire Control Switchboard Room, respectively. Battery Worth thus became the nerve center for joint Army-Navy defense of Pensacola.[279]

The call for cooperation between the Army and Navy to defend American harbors began with Chief of Naval Operations H. R. Stark, who suggested in November 1940 that the two branches of the military "provide for prompt and decisive action, from the time of their execution, against air, submarine and surface action by enemy or neutral craft, particularly by stratagem,

[276] Bearss, *Historic Structure Report and Resource Study*, 287.
[277] Ibid., 288, from Supplement to the Harbor Defense Project, Harbor Defenses of Pensacola, National Archives, RG 407.
[278] Bearss, *Historic Structure Report and Resource Study*, 58.
[279] Ibid., 86, and personal communication, David Ogden, April 2016.

threatening our harbors or by the shipping using them."[280] To effect the necessary joint coordinated defense response, Stark called for the establishment of Harbor Entrance Control Posts to serve as nerve centers of the system. The posts would be manned by two duty officers—one Army and one Navy—and assisting personnel. The officers were empowered to "initiate, in the name of the commander of the forces concerned and as required in any situation, immediate, decisive and coordinated action, on the part of the respective Army and Navy forces under control of the station."[281] The posts would be supported with a clear tower, a signal tower, communications systems linking them to the key forces assigned to the post, listening posts to monitor activity in the harbor, army minefield control, and net and boom protection against submarines and fast motor boats including gates and gate vessels. The related harbor defense systems were to be equipped with Army batteries, searchlights, and locators, Navy automatic weapons, anti-aircraft units from both the Army and Navy, and naval patrol vessels, mine sweepers, and coastal lookouts.[282] The Harbor Entrance Control Posts were officially authorized on May 29, 1941, in a memorandum signed by Stark, following the incident with the German battleship *Bismarck* that drew worldwide attention to the Battle of the Atlantic. Implementation of this order was indicated to the commanding generals of the various defense commands by Secretary of War Henry L. Stinson on October 2, 1941.[283]

The most desirable location for siting a Harbor Entrance Control Post would command a comprehensive view of the approaches to and the interior of a harbor. The post was also ideally set within a building that already served as a receiving station for underwater listening posts and a visual signal station.[284] As such, commanders were directed to make use of existing facilities and structures on existing military reservations as much as possible to adapt them for the dual role of Harbor Defense Command and Harbor Entrance Control Posts.[285]

Anti-aircraft weapons. During World War II, the United States used a variety of .30 caliber machine guns for close-in anti-aircraft protection: American Colt and Lewis guns, British Vickers guns, and French Chauchats. Eventually, partial standardization was established that called for the use of water-cooled, belt-fed M1917 Browning .30 caliber machine guns on improved mounts. These guns had problems, however, both with their mounts and their ammunition. The wartime tracers were inaccurate and fouled the guns.[286]

Deactivation of the Coast Artillery Corps, 1947

Fort Pickens remained an active military installation until 1947. After World War II, however, airplanes, improved sea-borne assault tactics, and the development of guided missiles and the

[280] As quoted in Edwin C. Bearss, *Special History Study; Fort Sumter Fort Moultrie HECP-HDCP* (Denver, Colorado: National Park Service, Denver Service Center, 1974), 4.
[281] As quoted in Bearss, *Special History Study*, 4–5.
[282] Bearss, *Special History Study*, 5–6.
[283] Ibid., 8.
[284] Ibid., 7.
[285] Ibid., 8.
[286] *American Coastal Defenses*, 287.

atomic bomb, rendered the defenses at Fort Pickens obsolete. Fort Pickens was decommissioned in 1947 after 118 years of service. Between 1947 and 1949, the Army salvaged metal and other useable materials from the Fort Pickens post.[287]

In March of 1949 the War Assets Administration published a "Notice of Availability: Government Real Property for Disposal: Fort Pickens." This document noted that 87 acres had been reserved as a "Historic Monument" (the future state park), with the remaining 1,484.6 acres of land, with improvements, offered for sale as a whole. Included in the itemized list of assets were "five steel towers with steel buildings on top" and "one steel tower with concrete building on top." At the same time, the State of Florida filed an application with the War Assets Administration for all 1,571.6 acres for a park, to encompass Batteries Langdon, Worth, Cooper, and 234.[288]

By 1950, the Coast Artillery was disbanded due to the fact that improved military tactics and the development of new weaponry had rendered the service obsolete.[289]

Public Access and Park Development, 1929–1972

Santa Rosa Island as Escambia County Park, 1929–1939. While the western end of Santa Rosa Island remained a military enclave, other parts of the island became the focus of preservationists and developers. Developers hoped to use the historic structure of Fort Pickens, as well as the pristine beaches of the island, to establish a tourism mecca with hotels and an amusement park, while politicians and others sought to ensure protection and open public access.

In 1929, the War Department elected to sell the majority of the island, with the exception of the Fort Pickens Military Reservation, to Escambia County, Florida, for $10,000. The land was to be used for public purposes, and the county was prohibited from further conveyance of the land except to Florida or the federal government. Escambia County later released 3 miles of the island for development at Pensacola Beach. In 1931, the first Pensacola Bay Bridge was opened, along with the bridge across Santa Rosa Sound to the island.

In the late 1930s, the National Park Service expressed interest in preserving the surviving evidence of the historic Pensacola Harbor forts. In response, Escambia County conveyed undeveloped portions of Santa Rosa Island to the Department of the Interior in 1939 based on the assumption that the National Park Service would develop the land as a park and preserve the Pensacola Harbor fortifications. In 1939, President Franklin Delano Roosevelt signed a Presidential Proclamation establishing Santa Rosa Island National Monument.[290] Due to a lack of

[287] Muir and Ogden, 21.
[288] "Defense Environmental Restoration Program for Formerly Used Defense Sites, Preliminary Assessment, Fort Pickens Military Reservation, Pensacola, Escambia County, Florida, Property Number – I04FL0063," September 2007.
[289] Muir and Ogden, 21.
[290] Proc. No. 2337, May 17, 1939, 53 Stat 2542.

funding and the mobilization needs associated with World War II, the Department of Interior was not able to take action at the site for several years.

In 1941, the Department of the Interior permitted the War Department temporary use of the eastern half of Santa Rosa Island as part of Eglin Field. The U.S. Army Air Corps used the field for early rocket and missile applications and to test a replica of the German V-1. The first launch over the Gulf occurred in October 1944. In 1945 this area was assigned permanently to the War Department.

Fort Pickens State Park, 1949–1971. In 1946, Congress disestablished Santa Rosa National Monument based on a proposal by Congressman Robert Sikes that suggested the area be returned to Escambia County for public use.[291] The last military garrison left Santa Rosa Island in 1947, and the U.S. Army salvaged all usable metal from the area before handing the property over to the State of Florida. An Act of July 2, 1948 (62 Stat. 1220) authorized the establishment of Pensacola National Monument, to include approximately 13 acres encompassing Fort San Carlos de Barrancas, Fort Redoubt, and Fort Pickens. In 1949, Fort Pickens became part of the Florida State Park system. Soon thereafter, the State of Florida built the first road on the island to access the fort; the Army had relied entirely on boats to bring supplies and personnel to the island. Circa 1954, the road was upgraded to a two-lane paved route.

Public Law 91-660, enacted January 8, 1971, established Gulf Islands National Seashore, which includes the property encompassed by this nomination. The park was established "so as to recognize, preserve, and interpret" the national historical significance of surviving coastal defense posts in accordance with the Act of August 21, 1935.[292] In 1972, the western half of Santa Rosa Island, including Fort Pickens, became part of a newly formed unit of the National Park System known as Gulf Islands National Seashore.[293]

Establishment of Gulf Islands National Seashore, and Development of Park Amenities, Visitor Services, and Administration, 1972–2015

After taking possession of the property in 1972, the National Park Service brought in historians to do research on the post and its structures. In 1976, the agency spent nearly $500,000 to stabilize Fort Pickens and make it safe for visitors. In 1976, three 6-inch guns were mounted at Batteries Cooper and 234. The artillery was provided to the park by the Smithsonian Institution. Battery Pensacola was stabilized in 1985, and further stabilization work was completed in 2013. The National Park Service has otherwise managed, repaired, and maintained the historic coastal defense features situated on Santa Rosa Island as part of Gulf Islands National Seashore. The National Park Service now regulates visitor use to ensure the safety of the visitor and the

[291] National Park Service, Bureau of Outdoor Recreation, "A Report for the Proposed Gulf Islands National Seashore" (January 1968), 1.
[292] Bearss, *Historic Structure Report and Resource Study*, 1.
[293] Gulf Islands National Seashore was established "to preserve for public use and enjoyment certain areas possessing outstanding natural, historic, and recreational values." 16 U.S. Code sec. 459h (a) (Pub. L. 91-660); Bearss (1982), 248–250; Muir and Ogden, 21.

preservation of the property, as a part of its mission to protect America's historic and natural treasures for the enjoyment of the public and future generations. In addition, the National Park Service has developed extensive interpretive information to inform the public about the heritage of Army use of the island to protect Pensacola Harbor and the Navy base. Interpretive media include wayside exhibits located along walks and parking areas, and an extensive exhibit located inside the former administration building.

Many of the historic structures located within the Fort Pickens environs have been adaptively reused by the National Park Service for park personnel housing, offices, maintenance facilities, interpretation, and storage. The National Park Service has also continued to manage portions of the property for recreation consistent with programs and facilities established during the State Park era. Camping, picnicking, walking, and enjoying the white sandy beaches of the island are permitted and are administered by park staff. Many State Park-era resources, including picnic shelters, comfort stations, picnic areas, and trails, remain in use today.

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____ 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 Buildings Survey
____ recorded by Historic American Engineering Record # _____
____ recorded by Historic American Landscape Survey # _____

Pensacola Harbor Defense Project
Historic District
Name of Property

Escambia County, FL
County and State

Primary location of additional data:

____ State Historic Preservation Office
____ Other State agency
__X__ Federal agency
____ Local government
____ University
____ Other
Name of repository: _____

Historic Resources Survey Number (if assigned): _____

10. Geographical Data

Acreage of Property 891 acres

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates (decimal degrees)
Datum if other than WGS84:
(enter coordinates to 6 decimal places)

1. Latitude: Longitude:
2. Latitude: Longitude:
3. Latitude: Longitude:
4. Latitude: Longitude:

Or

UTM References
Datum (indicated on USGS map):

[ ] NAD 1927 or [x] NAD 1983

1. Zone: 16	Easting:	471001	Northing:	3355580
2. Zone: 16	Easting:	471110	Northing:	3355582
3. Zone: 16	Easting:	471589	Northing:	3355536
4. Zone: 16	Easting:	472272	Northing:	3355593
5. Zone: 16	Easting:	473642	Northing:	3355003
6. Zone: 16	Easting:	474183	Northing:	3354858
7. Zone: 16	Easting:	475639	Northing:	3354281
8. Zone: 16	Easting:	475639	Northing:	3353933

9. Zone: 16	Easting:	474503	Northing:	3353875
10. Zone: 16	Easting:	474165	Northing:	3353883
11. Zone: 16	Easting:	473913	Northing:	3353913
12. Zone: 16	Easting:	472866	Northing:	3354170
13. Zone: 16	Easting:	472340	Northing:	3354390
14. Zone: 16	Easting:	471362	Northing:	3354963
15. Zone: 16	Easting:	470987	Northing:	3355279
16. Zone: 16	Easting:	470960	Northing:	3355512

Points for UTM reference



Verbal Boundary Description (Describe the boundaries of the property.)

The boundary of the historic district follows the mean water line as it extends along the northern edge of Santa Rosa Island, to a point 585 feet east of the ranger station, and then follows a line directly north to south to the ocean-side mean water line, and then follows the mean water line around the perimeter of the island on a westerly direction to meet the northwestern starting point of the boundary.

Boundary Justification (Explain why the boundaries were selected.)

The historic district encompasses all features associated with the Pensacola Harbor Defense Project located on Santa Rosa Island and constructed or modified between circa 1893 and 1947.

11. Form Prepared By

name/title: Deborah Slaton, Liz Sargent, Tim Penich, and Andi Mele
organization: Wiss, Janney, Elstner Associates, Inc.
street & number: 330 Pfingsten Road
city or town: Northbrook state: IL zip code: 60062
e-mail: DSlaton@wje.com
telephone: 847-272-7400
date: August 26, 2016

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.

  See attached.

- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.

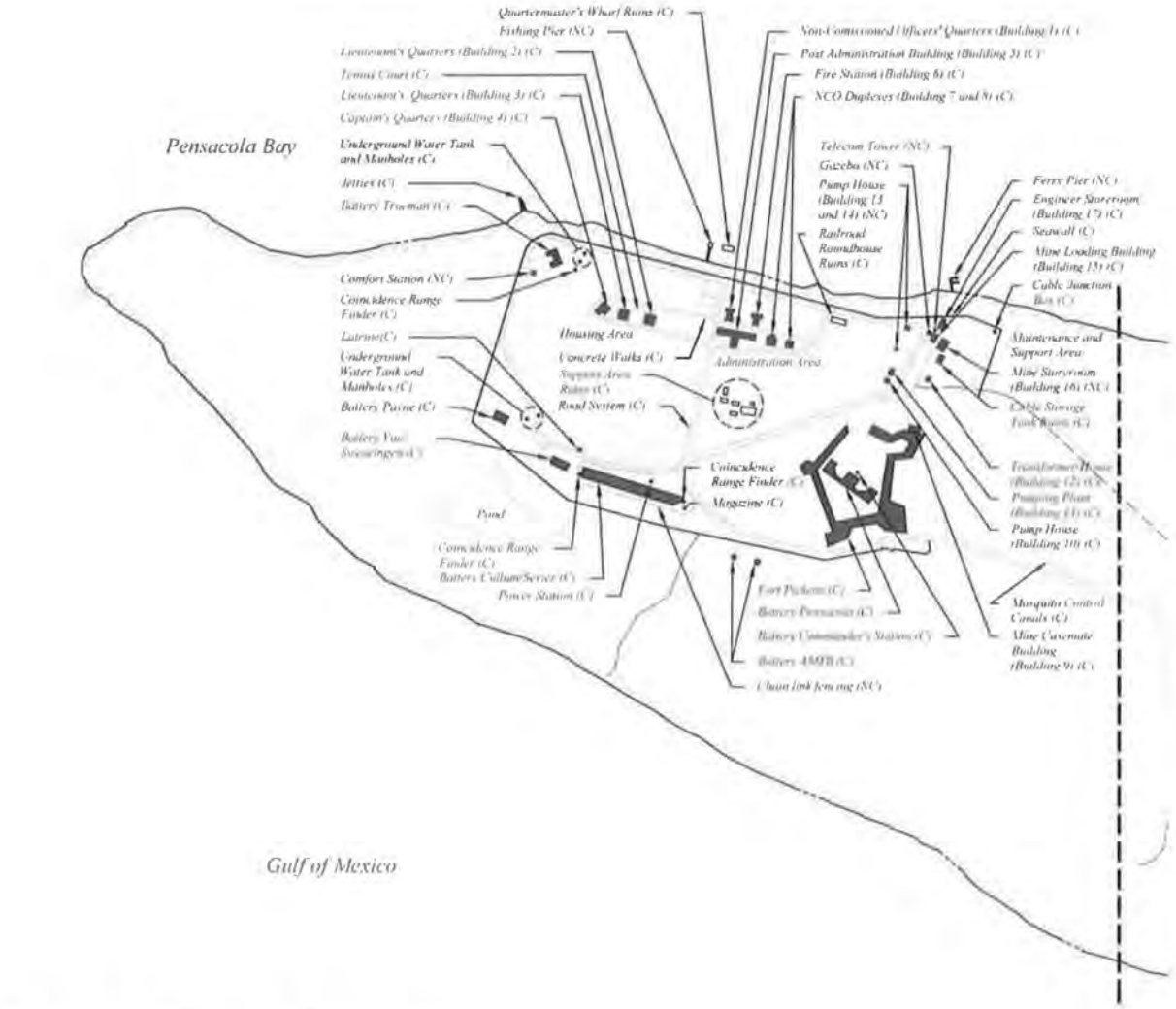
  See below.

- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

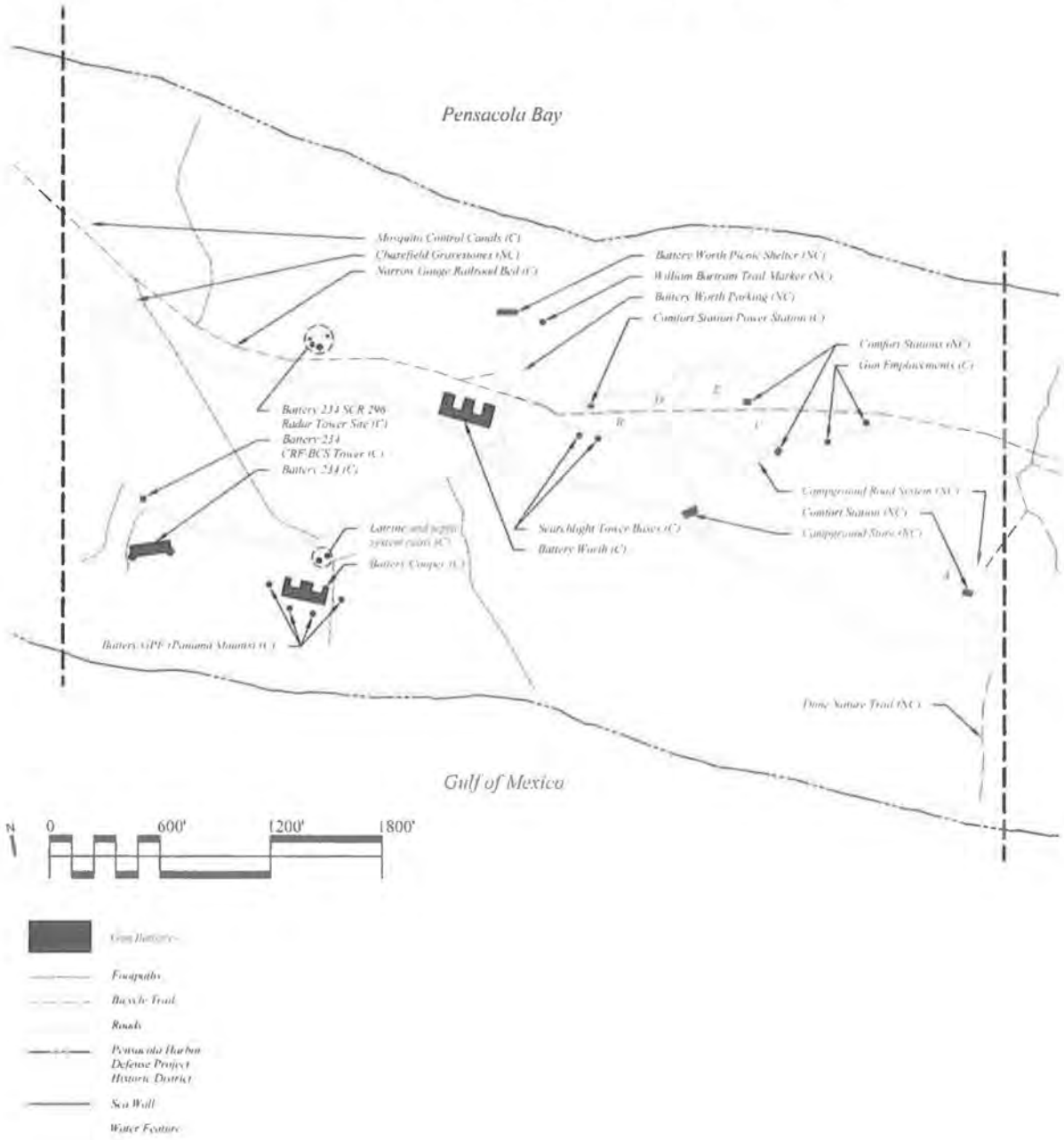
Harbor Defense Project Boundary Map



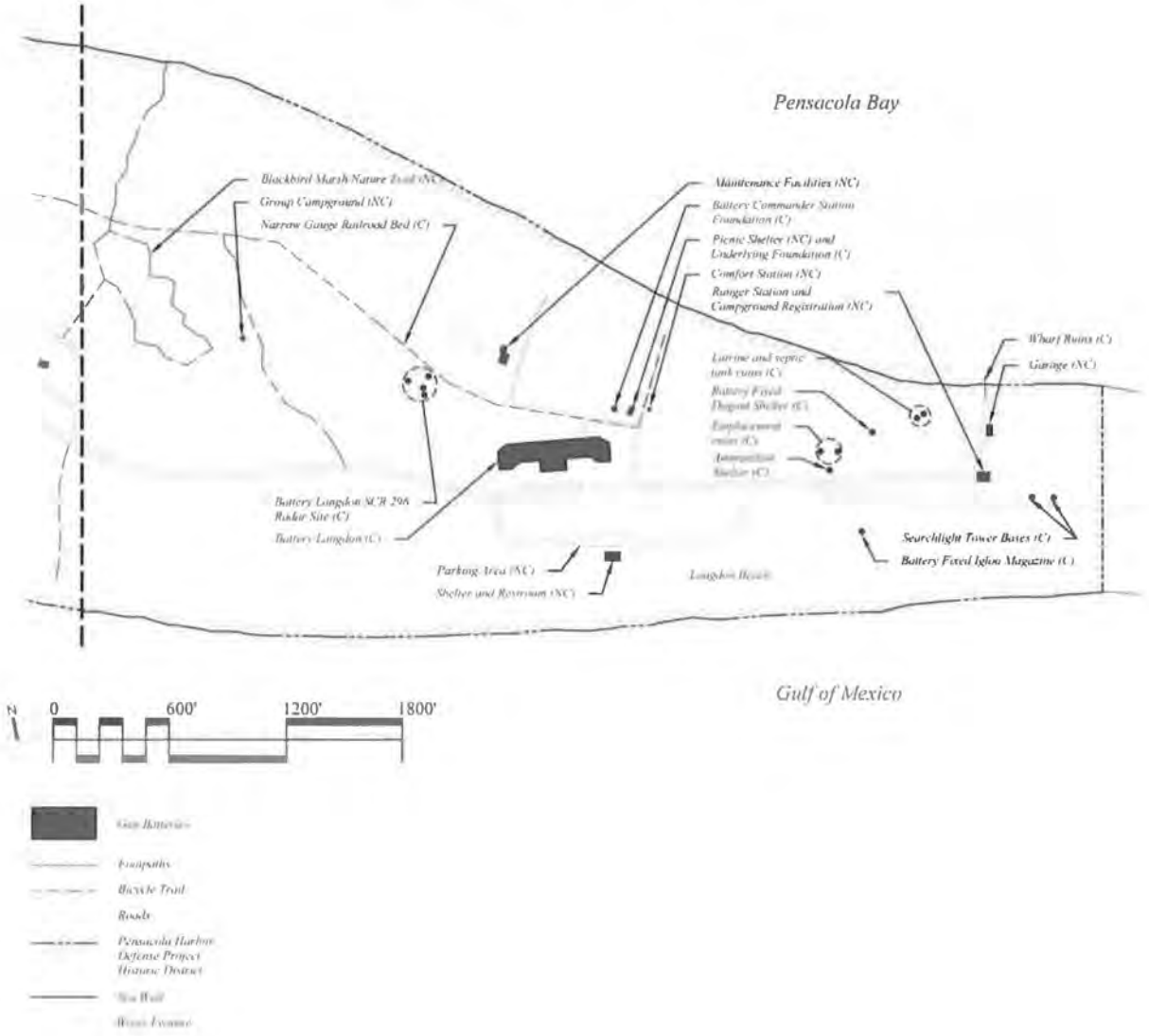
Pensacola Harbor Defense Project Sketch Map (west)



Pensacola Harbor Defense Project Sketch Map (center)



Pensacola Harbor Defense Project Sketch Map (east)



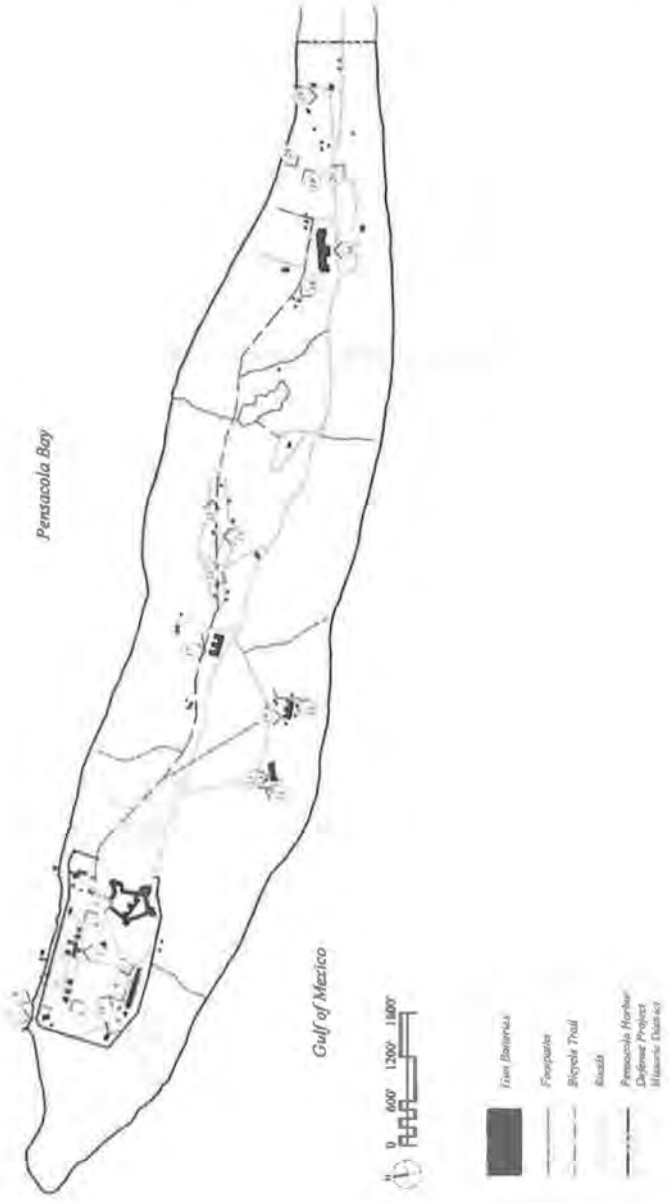
Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 100 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Office of Planning and Performance Management. U.S. Dept. of the Interior, 1849 C. Street, NW, Washington, DC.

Pensacola Harbor Defense Project Photo Points Map



United States Department of the Interior
National Park Service / National Register of Historic Places Registration Form
NPS Form 10-900 OMB No. 1024-0018

Documentation Photographs



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southeast of Battery Pensacola, an Endicott Battery structure sited within Fort Pickens.

1 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southwest of Battery Cullum, with Battery Sevier beyond.

2 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southwest of Battery Van Swearingen.

3 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View northeast of the latrine associated with Battery Van Swearengin, now used as a restroom for park visitors.

4 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View west of Battery Payne.

5 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View south of Battery Trueman.

6 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View south of the coincidence range finder associated with Battery Trueman, built in 1922.

7 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southwest of the Lieutenant's (left) and Captain's (right) quarters.

8 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View north of the post administration building.

9 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View northeast of the mine loading building.

10 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View north of the seawall that surrounds the Fort Pickens area, and one of the outflow structures.

11 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View west of the narrow-gauge rail line trace.

12 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southeast of one of the shield guns donated by the Smithsonian Institution in 1976 at Battery 234.

13 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View north of the World War II-era coincidence range finder/battery commander's station tower associated with Battery 234.

14 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View south of Battery Cooper.

15 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View northeast of the 6-inch disappearing gun at Battery Cooper.

16 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View south of Battery Worth.

17 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View northeast of the former power station building now used as a park restroom.

18 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View south of one of the searchlight tower bases located within the park campground loop B.

19 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southeast of one of the gun emplacements located within the park campground loop E, at the original location of Battery Fixed.

20 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View north of Battery Langdon.

21 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southwest of the ammunition shelter associated with Battery Fixed. 22 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View southwest of the igloo magazine associated with Battery Fixed.

23 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View northeast of the Battery Fixed dugout shelter that housed a firing director and power plant associated with the battery's artillery.

24 of 25.



Name of Property: Pensacola Harbor Defense Project Historic District

City or Vicinity: Pensacola

County: Escambia State: Florida

Photographer: Liz Sargent

Date Photographed: August 27, 2014

Description of Photograph(s) and number: View south toward the ranger station and garage from the road leading to the historic pier site.

25 of 25.

United States Department of the Interior
National Park Service / National Register of Historic Places Registration Form
NPS Form 10-900 OMB No. 1024-0018

Historical Images

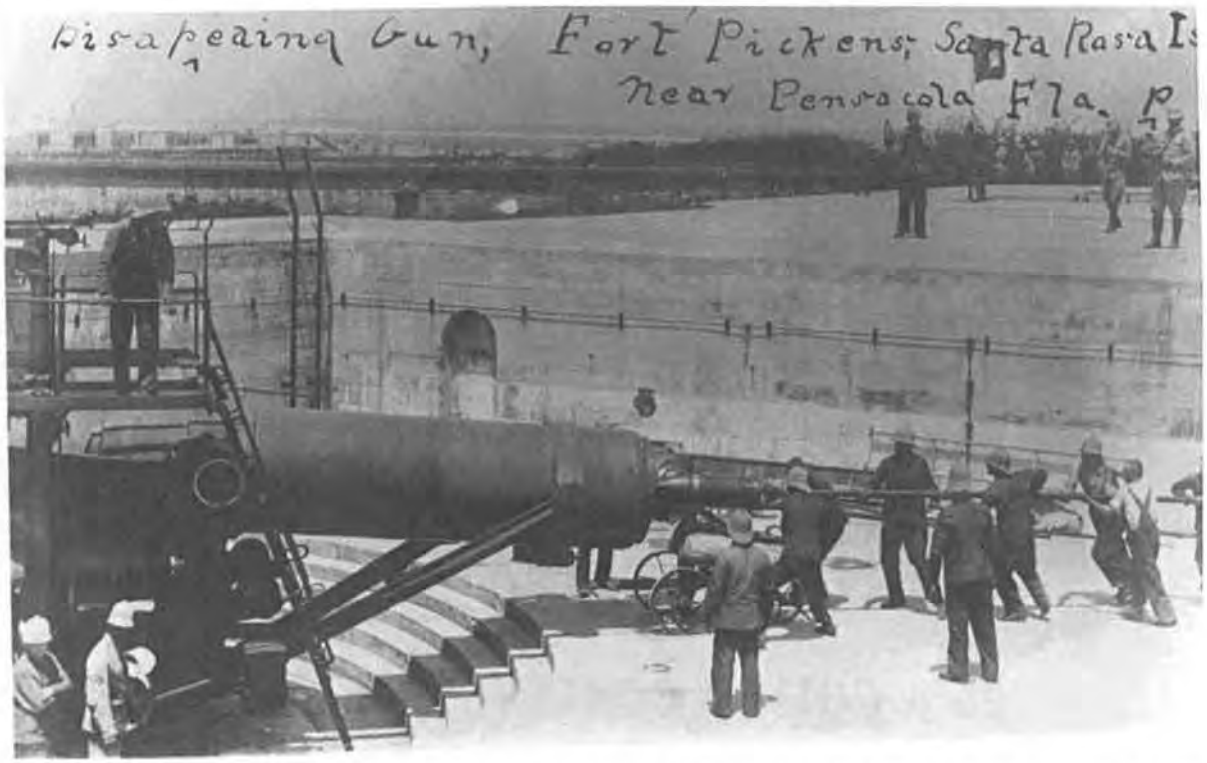


Figure 1. Disappearing 12-inch gun at Battery Pensacola, circa 1900. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no.13.

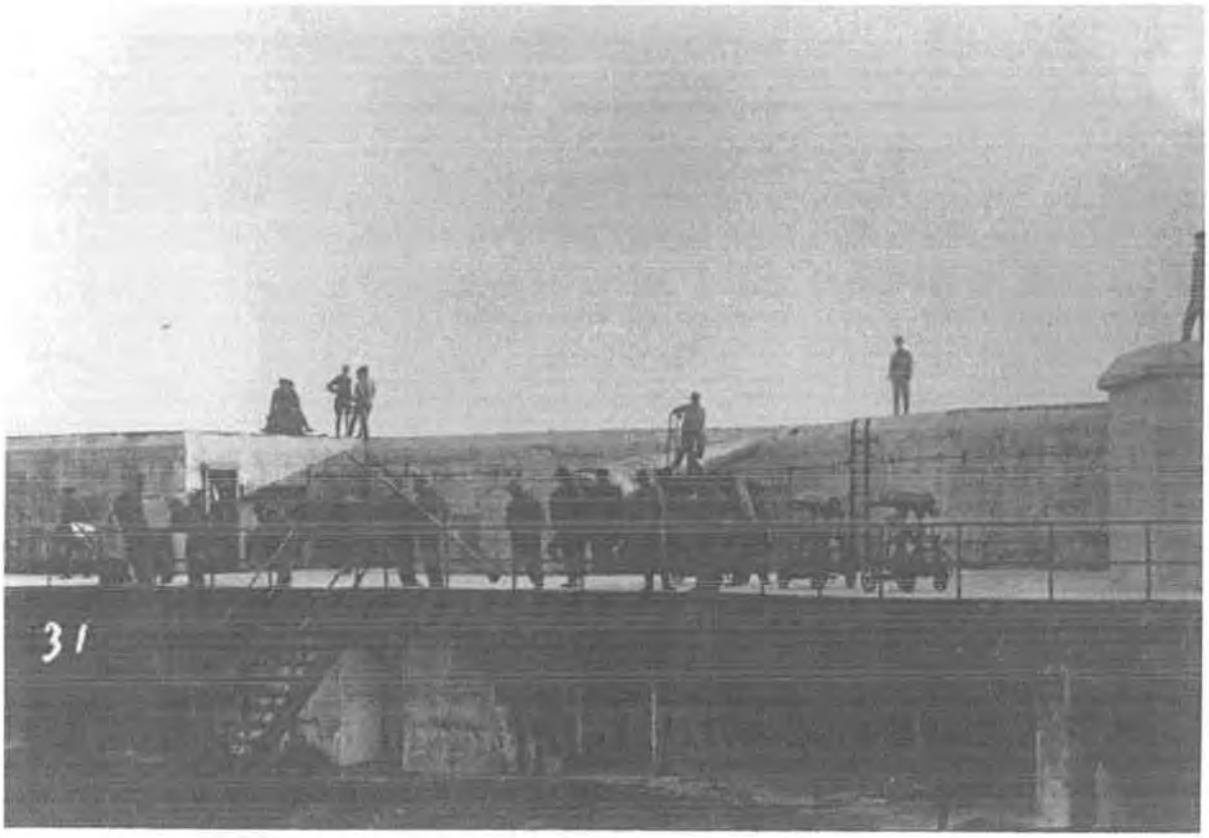


Figure 2. Fort Pickens, Battery Cullum, circa 1910. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 451.



Figure 3. Fort Pickens looking toward the quarters and the mess hall (later the administration building), circa 1911. Two of the duplex quarters for officers are visible in the right background; the mess hall is in the center background; and a two-story barracks for enlisted men, with nearby latrine, is in the left background. The ordnance storeroom is visible in the right middle ground and the rail line is visible in the foreground. The enlisted barracks, latrine, and ordnance storeroom were later salvaged; the other buildings remain. Photograph courtesy of National Park Service, Gulf Islands National Seashore, from the Stillion Collection, catalogue no. 54906.



Figure 4. Battery Trueman, 3-inch gun, circa 1917. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 17349.

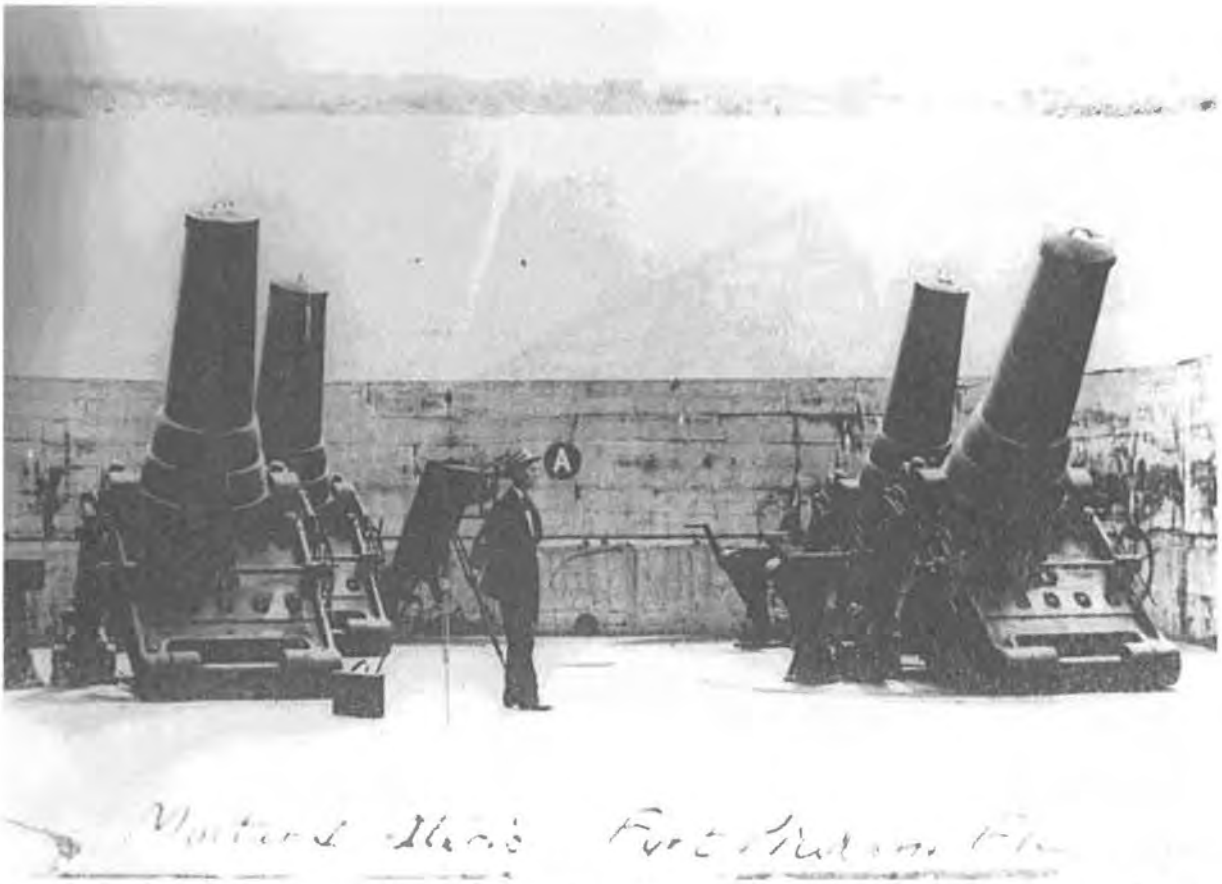


Figure 5. Battery Worth mortars, circa 1918. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 534.

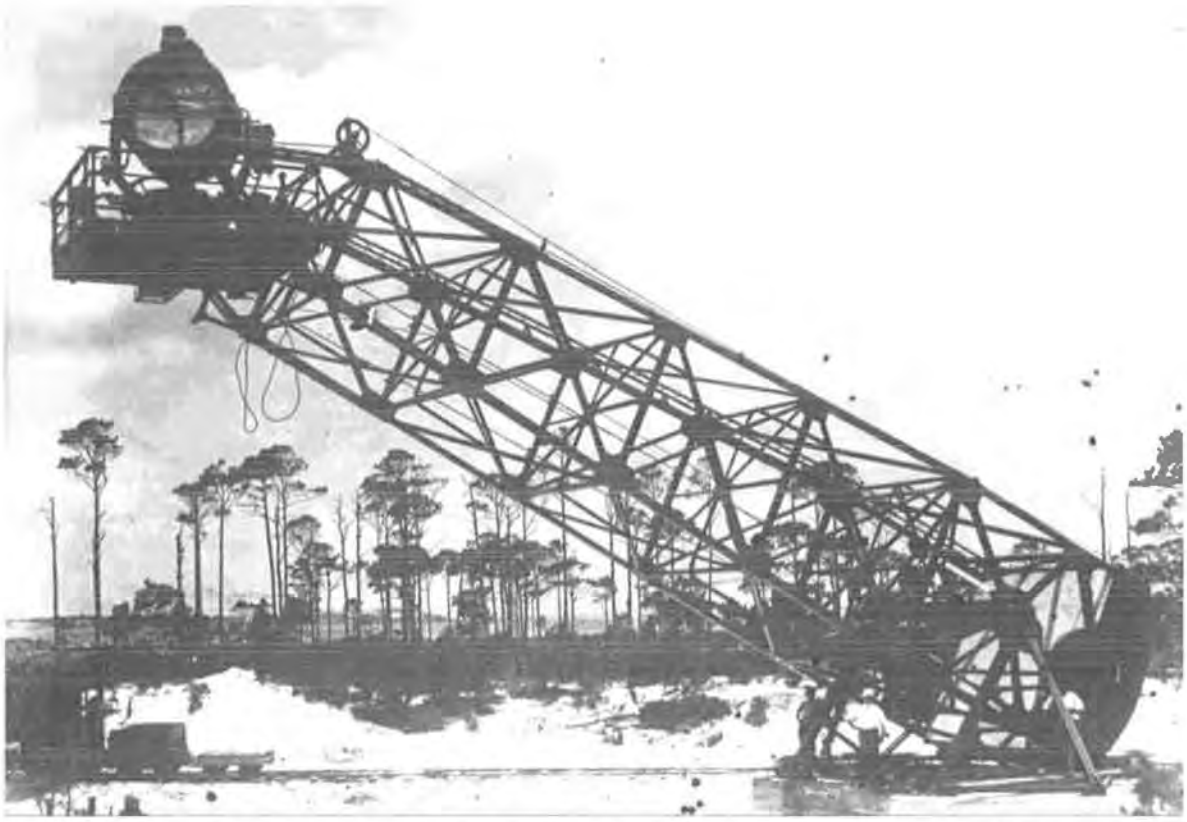


Figure 6. Searchlight at Fort Pickens, circa 1921. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 511.



Figure 7. Battery Trueman, Battery Commander's Station, circa 1922. Photographer unknown; National Archives Record Group 77, File 600.92; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 634.



Figure 8. Anti-aircraft guns, circa 1935. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 538.



Figure 9. Anti-aircraft crew at Battery Fixed, 1938. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 5966.



Figure 10. Fort Pickens rail line, 1941. The buildings visible in this photo include (from left to right): Building 1 (Non-commissioned Officers' Duplex, originally Firemen's Quarters), 1910; Buildings 2 and 3 (Lieutenant's Quarters), 1900; Building 4 (Captain's Quarters), 1912; and the Non-commissioned Officers' Quarters (as shown 1945 D-1 map). Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 866.



Figure 11. Battery Van Swearingen, 155mm gun in recoil having just fired, 1941. The crew member third from left holding a slack lanyard is George Holly. Battery Sevier is visible at left and the seawall in seen in the background. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 877.



Figure 12. Battery Langdon circa 1939–1941, prior to encasement of the batteries in 1942–1943. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 17154.

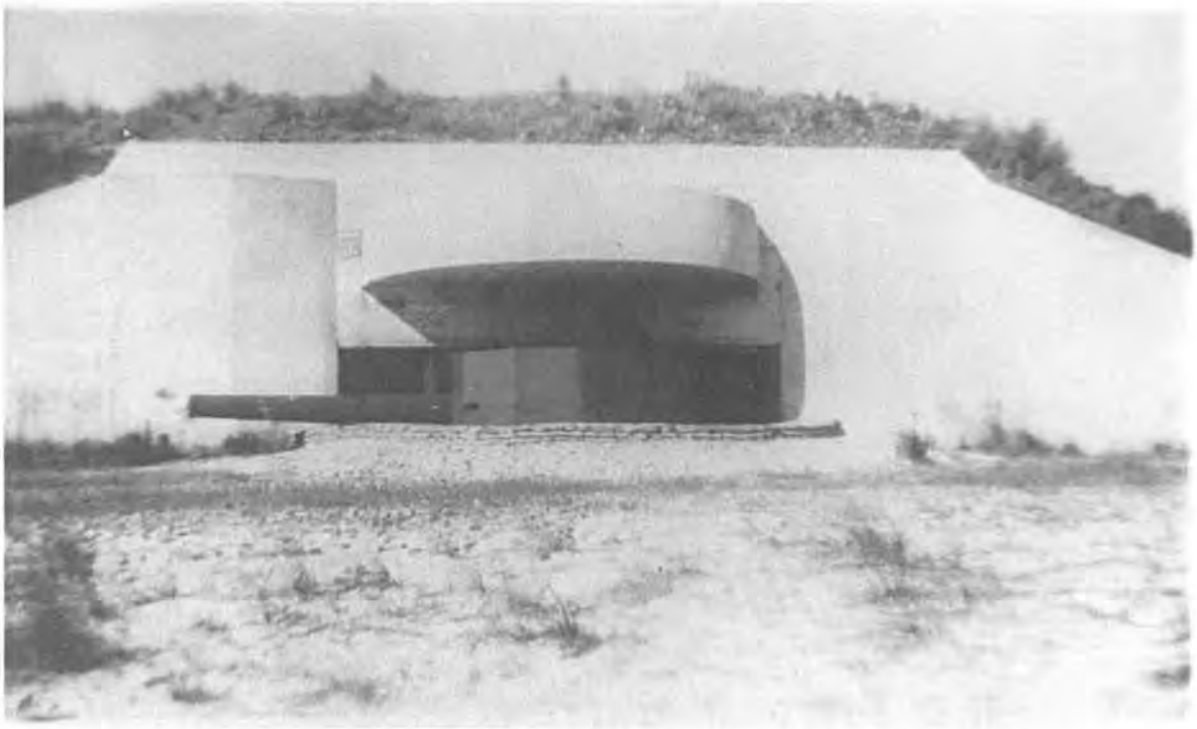


Figure 13. Battery Langdon after encasement of the guns in 1942–1943. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 16051.



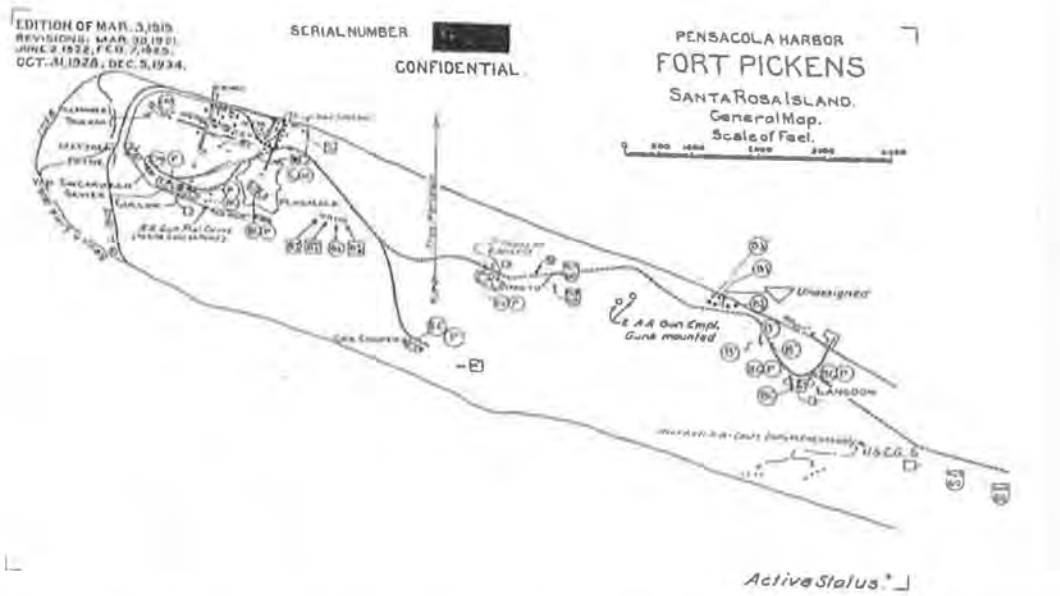
Figure 14. Battery Worth plotting crew, circa 1942. Standing third from left is George Starr, who donated the photograph to the park. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 16077.



Figure 15. The AMTB Battery, 90 mm gun, circa 1945. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 16045.



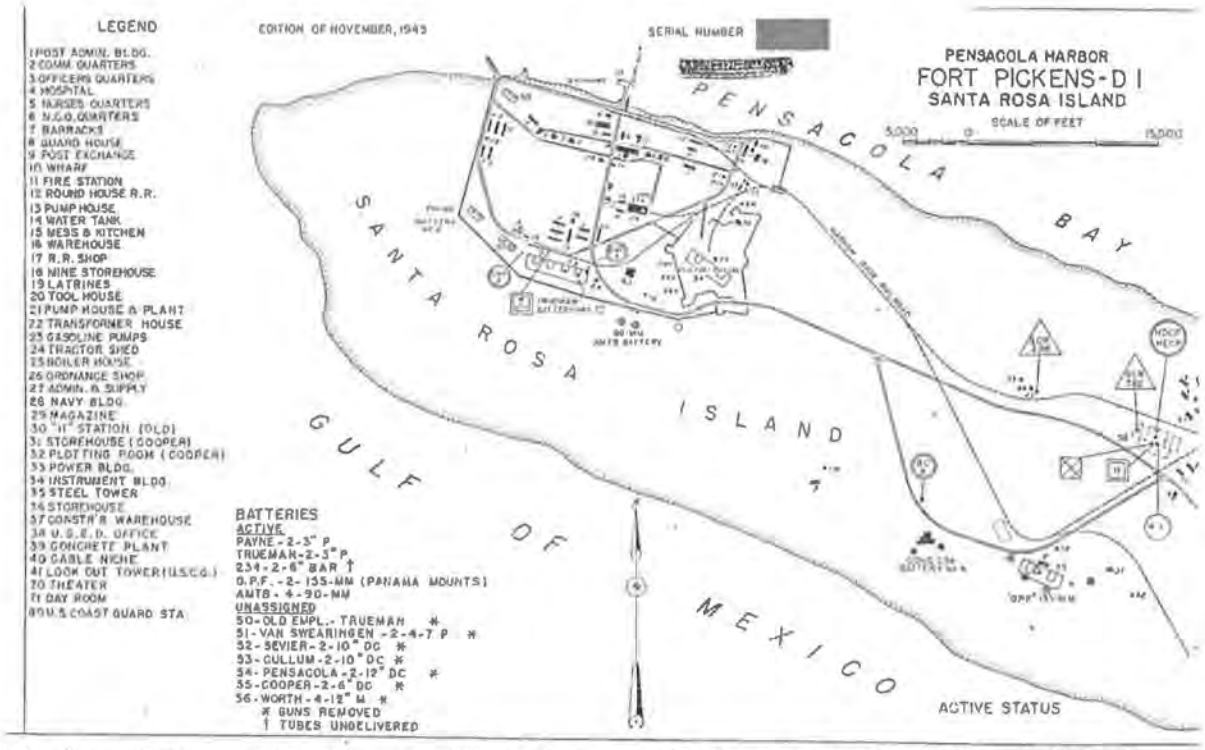
Figure 16. The Battery 234 Coincidence Range Finder/Battery Commander's Station Tower as completed, photograph dated August 26, 1946. Photographer unknown; photograph courtesy of National Park Service, Gulf Islands National Seashore, catalogue no. 946.



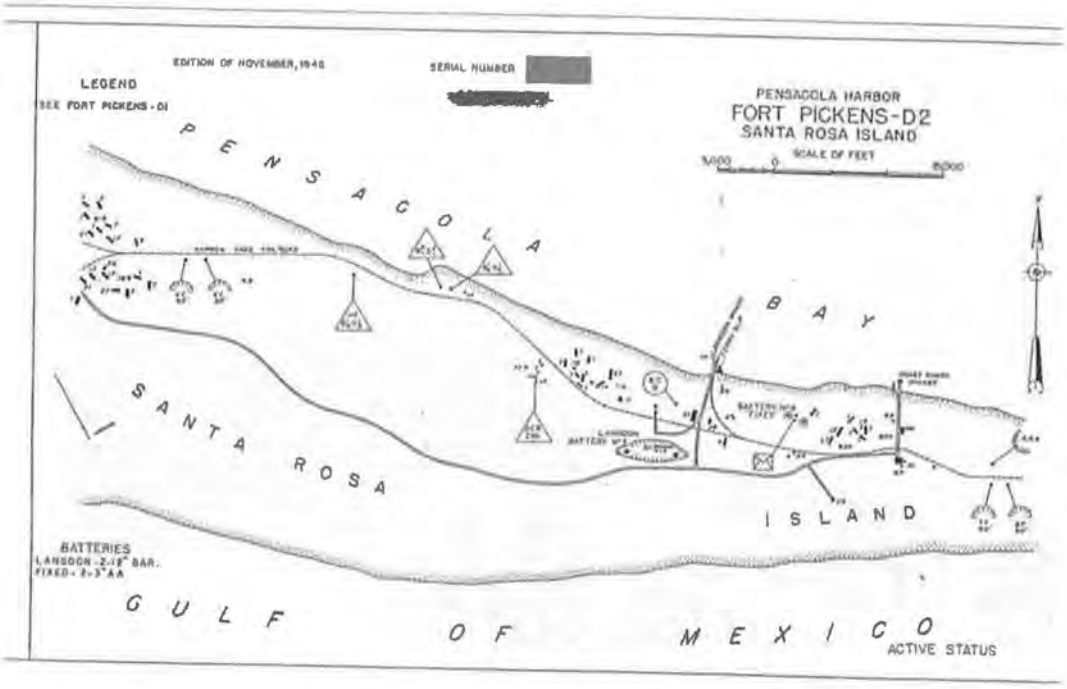
Map 1. Fort Pickens, edition of March 3, 1919, latest revision December 5, 1934. Map courtesy of National Park Service, Gulf Islands National Seashore.

Pensacola Harbor Defense Project Historic District
Name of Property

Escambia, FL
County and State



Map 2. Fort Pickens, map D-1, November 1945. Map courtesy of National Park Service, Gulf Islands National Seashore.



Map 3. Fort Pickens, map D-2, November 1945. Map courtesy of National Park Service, Gulf Islands National Seashore.


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U.S. GEOLOGICAL SURVEY
US Topo
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FLORIDA-ESCAMBIA CO.
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