

Fort Funston, Panama Mounts for 155mm Guns  
Golden Gate National Recreation Area  
Skyline Boulevard and Great Highway  
San Francisco  
San Francisco County  
California

HAER No. CA-193-A

38-SANFRA,  
219A-

**PHOTOGRAPHS**

**WRITTEN HISTORICAL AND DESCRIPTIVE DATA**

**Historic American Engineering Record  
National Park Service  
Department of the Interior  
San Francisco, California**

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38-SANFRA,  
219A-

HISTORIC AMERICAN ENGINEERING RECORD  
FORT FUNSTON, PANAMA MOUNTS FOR 155mm GUNS

HAER No. CA-193-A

Location: Fort Funston, Golden Gate National Recreation Area, City and County of San Francisco, California  
Fort Funston is located between Skyline Boulevard and the Pacific Ocean, west of Lake Merced. The Battery Bluff Panama mounts were located at Fort Funston, 1,200 feet north of Battery Davis' gun No. 1, close to the edge of the cliff overlooking the beach

Date of Construction: 1937

Engineer: United States Army Corps of Engineers

Builder: United States Army Corps of Engineers

Present Owner: United States National Park Service  
Golden Gate National Recreation Area  
Building 201  
Fort Mason  
San Francisco, CA 94123

Present Use: Not Currently Used  
Due to erosion, Battery Bluff Panama mounts have slipped to the beach below where they are still visible

Significance: The Panama mounts of Battery Bluff are significant as they are a contributing feature to the Fort Funston Historic District which is considered eligible for listing in the National Register of Historic Places. The Panama mounts were the only guns of its type to be emplaced in the San Francisco Harbor Defenses.

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Date: February 26, 1998

## HISTORY OF FORT FUNSTON

### **Fort Funston Historic District**

Fort Funston, which is located in the Golden Gate National Recreation Area (GGNRA), was determined eligible for the National Register of Historic Places in 1980 and is now considered the Fort Funston Historic District. The historic district is restricted to the central uplands area of Fort Funston located between Skyline Boulevard on the east and the ocean cliffs on the west, and the anti-aircraft battery structures in the north to the Nike missile launch area in the south. The site incorporates natural, social and military history. The Battery Bluff Panama mounts which are the subject of this report are considered a part of the Fort Funston Historic District.<sup>1</sup>

The district is considered historically significant for its contribution to the harbor defenses of San Francisco Bay during World War II for several reasons. The Fort was the primary defense against enemy ship attacks via the South Channel and it contributed significantly to the advancement of design and engineering of coastal fortifications through its development of Battery Davis, the prototype for all casemated works built for the protection of guns from aircraft bombing attacks. Battery Davis also marked the introduction of the 16-inch gun batteries on the Pacific Coast and was also the location of a Nike Ajax anti-aircraft missile battery.<sup>2</sup>

The area, which is west of San Francisco's popular Lake Merced, is marked by steep, rocky cliffs, immense sand dunes and a narrow beach and is located at the very southern end of the contiguous San Francisco shoreline of the Golden Gate National Recreation Area. Much of the ground cover in and around Fort Funston's Batteries was planted by the United States Army for erosion control and is considered historic.<sup>3</sup> The acres of sand dunes and scrub are considered the "last great dune of San Francisco," and are filled with exotic vegetation. The area is a natural preserve of fragile dune growth with exotic iceplant, monterey cypress, and blue gum eucalyptus.<sup>4</sup>

### **History of Fort**

It is believed that the Costanoan native American Indian tribe roamed the area from the Golden Gate Bridge to Big Sur, and the tribelet which occupied the San Francisco area was known as the Ramay. The San Francisco Ramay, which spoke Ramaytush, consisted of approximately 1,400 individuals when the Spanish landed in the area. The group was affected by local civilization and was first believed to have decreased to less than 30, although ethnological research completed in 1971, found this number to be about 200.<sup>5</sup>

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1        *National Register of Historic Places Inventory - Nomination Form, January 22, 1979.*

2        *Ibid.*

3        *Ibid.*

4        Martini, John A., *Military Historian- GGNRA, Recommendations for Historic Preservation for Northern Fort Funston - GGNRA, 1975.*

5        Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today," *Journal of America's Military Past*, Vol. XX, pp. 48-61

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In 1769, the Portola expedition discovered San Francisco Bay and sent a party under Sergeant Ortega north, to establish the outlet of the huge inland bay they had spotted. They marched right through Fort Funston en route to stumbling upon the Golden Gate. In August 1775, a survey party from the Spanish naval vessel San Carlos under the command of Lieutenant Juan Manual de Ayala landed in San Francisco Bay. A second party led by Don Bruno de Heceta marched north from Monterey in Ayala's support. In September, Heceta and his men camped on the shores of a fresh water lake which he later named La Laguna de la Merced. Lake Merced is still in existence today and is Station 12 on the Fort Funston Sunset Trail. In 1776, Mission de Asis was founded on Laguna de Nuestra Senora de los Dolores, as well as, the Presidio. In 1822, California passed to the Republic of Mexico and land grants for private ranches increased. In 1835, Governor Jose Figueroa granted the Rancho Laguna de la Merced to Jose Antonio Galindo. He eventually sold his title to another landowner, and by the year 1900, the Spring Valley Water Company owned the parcel of land.<sup>6</sup>

In 1859, it is believed that the Fort Funston area was the site of an historic duel between David Broderick and David Terry, known as the Broderick-Terry duel. Broderick was an anti-slavery free labor democrat who was elected U.S. Senator in 1857 and Terry was a pro-slavery democratic attorney who was appointed to the State Supreme Court in 1854. Terry hit Broderick in the right breast and he died three days later. It was considered the most famous duel of its kind in the west and the last of historic consequence.<sup>7</sup>

In the mid 1870's, the United States' seacoast fortification system had fallen into great disrepair, while major technical strides in artillery were being made. President Grover Cleveland appointed a board which reviewed and made recommendations on the entire coast defense system in a report issued on January 23, 1886. This report provided for a modernized system of American coast defense. The period from 1886 to 1905 is referred to as the "Endicott Period." The United States Army began investigating the San Francisco Bay for new coast defenses and San Francisco Bay received critical attention at this time. In 1890, army engineers proposed to build two mortar batteries on the land between Laguna de la Merced and the Pacific. This parcel of land was owned by the Spring Valley Water Company who agreed to a "friendly" condemnation of forty-five acres at the north end of later Fort Funston.<sup>8</sup> The deal was completed in December 1900 at a cost of \$900 per acre with the total cost at approximately \$40,500. This established the Lake Merced Military Reservation.<sup>9</sup> On January 25, 1907, the Coast Artillery was formally established as a separate branch which included 700 officers and 19,147 enlisted men.<sup>10</sup>

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6 *Ibid.*

7 *Ibid.*

8 Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today, *Journal of America's Military Past*. Vol. XX, pp. 48-61.

9 Chappell, Gordon, Historian, *Fort Funston, Battery Davis, And The Panama Mounts* (no date).

10 Johnston, Francis J., Spring 1993, *Fort Funston, Yesterday and Today, Journal of America's Military Past*, Vol. XX, pp. 48-61

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***Fort Funston Renamed for Major General Frederick Funston***

On June 26, 1917, the Lake Merced Military Reservation was renamed Fort Funston in memory of Major General Frederick Funston, who had died on February 19, 1917 and was considered a national hero.<sup>11</sup>

General Funston was born in New Carlisle, Ohio, on November 19, 1865.<sup>12</sup> His mother was a descendant of Daniel Boone and his father was a well-liked United States Congressman. General Funston attended the University of Kansas in 1886, but lacking sufficient funds, he left college to work. He first worked as a police reporter for the *Kansas City Journal* and later for the *Fort Smith Tribune*. Eventually he worked as a ticket taker for several major railroads, until he asked his father for employment help, and he obtained a job with the Department of Agriculture. From 1890 to 1894, he worked at the Department. Although General Funston was dissatisfied with the job and his salary, it might be said that "he made his most lasting and important contributions to civilization" in this position. He served as assistant to Frederick Vernon Coville who was a biologist with the Division of Botany. General Funston worked on a biological survey of parts of California, Nevada, Arizona, and Utah. Coville and Funston were also commissioned to complete a botanical survey of Death Valley, leaving on January 3, 1891, traveling through Cajon Pass and across the Mojave Desert to Death Valley. They returned to Washington, D.C. in September 1891. The study included cataloguing and classifying 2,167 plants as a baseline study for Death Valley and the surrounding area, which is still used as a reference document today. In 1893, General Funston made a 600-mile round trip following the Yukon River from its headwaters through canyons and river rapids to determine the status of a whaling fleet, and in 1896 he joined the military.<sup>13</sup>

Two years after resigning from the Department of Agriculture, General Funston entered the military. During his military career, General Funston served as a mercenary with the Cuban nationalists against the colonial Spanish from, 1896 to 1898. In March 1898, the U.S.S. *Main* was destroyed in Havana harbor and he served as colonel of the 20<sup>th</sup> Kansas Volunteers. His regiment missed the war with Spain, but was sent to Manila, Philippine Islands, in October 1898. The Philippine liberation movement thought that the United States troops had come to free them from Spanish rule, but this was not the case. This began the Philippine Insurrection. Up until March, 1901, a major war was fought, with the loss of 5,000 American lives and over 200,000 Philippine lives.<sup>14</sup>

Through his military dash, bravery and correspondence with Theodore Roosevelt, he received the Medal of Honor and reached the rank of brigadier general of volunteers. In March of 1901, he "pulled off a brilliant covert operation," along with 80 other individuals. This led to the capture of the Filipino Leader, Emilio Aguinaldo. For his part in this, General Funston was commissioned brigadier general in

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11 *Ibid.*

12 San Francisco History Room Card File.

13 Johnston, Francis J., Spring 1993, Fort Funston, Yesterday and Today, *Journal of America's Military Past*, Vol. XX, pp. 48-61.

14 *Ibid.*

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the regular army. General Funston returned to the United States on medical leave due to recurrences of malaria and was put in command of the Department of California under General Adolphus W. Greely who was commander of the Division of the Pacific. It was at this time that the 1906 earthquake hit and with General Greely out of town and unavailable and with the concurrence of the mayor, General Funston declared martial law. The autocratic actions and discipline of the troops shooting looters, controlling food prices and distribution, and fire fighting, involved the general in controversy but overall his actions were commended and Funston Boulevard was named in his honor.<sup>15</sup>

Throughout the rest of his military life, General Funston served in Galveston, Texas, and Vera Cruz, Mexico and was involved in an expedition to capture Pancho Villa.<sup>16</sup> While General Funston was being considered to command an Expeditionary Force that would go to France if there were war with Germany, he died of a heart attack while having dinner with friends at the Palace Hotel in San Antonio, Texas.<sup>17</sup> When he died, his was the first body laid out for viewing in San Francisco City Hall.<sup>18</sup> General Funston is buried in Presidio National Cemetery.<sup>19</sup>

#### **Construction of Batteries at Fort Funston**

While other San Francisco forts experienced a high level of battery activity, no construction happened at Fort Funston. There are several possible explanations for this lack of activity on a prime coastal site. In general, a higher priority was given to building emplacements that were closer to the Golden Gate in the early years of the Endicott Era.<sup>20</sup> In addition, it has been suggested that naval range finding and fire control were based on the assumption that enemy ships would engage at roughly 2,000 yards, and a fleet attacking San Francisco would have had to lay approximately two miles at most west of the northern part of the peninsula to disrupt military works. Guns installed at Lake Merced at that time would have had little effect on ships positioned in this way. Lake Merced Military Reservation slumbered until World War I broke out. Based on the technological and political developments of World War I, it was realized that San Francisco could use protection from the south.<sup>21</sup>

The lessons learned in Europe eventually had a major effect on future planning for the country's seacoast defenses. In Britain, the Queen Elizabeth class of battleships had 15-inch rifles which outranged San Francisco's defenses. Such guns were able to fire at great range and stand outside the

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15 Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today," *Journal of America's Military Past*, Vol. XX, pp.48-61.

16 *Ibid.*

17 *Ibid.*

18 San Francisco History Room Card File.

19 Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today," by Francis J. Johnson, *Journal of America's Military Past*, Vol. XX, pp. 48-61.

20 Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1997.

21 Johnston, Francis, J., Spring 1993, "Fort Funston, Yesterday and Today," *Journal of America's Military Past*, Vol. XX, pp. 48-61.

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coastal defenses and bombard them. Many batteries received attention in terms of extra earth and concrete protection because of the potential threat perceived from the Japanese and Germans.<sup>22</sup> The first fortifications at Fort Funston were built by the Army Corps of Engineers who built a "temporary" battery for four twelve-inch mortars (located at the north east end of the reservation) installed on concrete platforms in a straight line, with the guns coming from Batteries Stotsenburg-McKinnon. This was in contrast to the traditional four in a pit formation. Battery Howe is significant as it was the very last mortar battery built in the United States and because of its unusual straight line configuration.<sup>23</sup> This complex was named Battery Howe for Brigadier General Walter Howe who died in 1915.<sup>24</sup>

Work also began on another "temporary" battery, "Battery Bruff," to mount two five-inch rapid fire guns to come from Battery Sherwood. This battery was named for Colonel Lawrence L. Bruff, an Ordnance officer who had died in 1911. The plotting rooms for both were of wood and the magazines were wood framed dugouts covered with earth. This battery only lasted six months when it was determined to be obsolete and it was dismantled. This battery had the shortest duration of any in the San Francisco district. Battery Howe retained its mortars until 1945, outlasting the armament of many "permanent" mortar batteries.<sup>25</sup> No visible traces of either battery remain today, having been covered by the extension of the Great Highway to meet Skyline Boulevard.<sup>26</sup>

#### **U.S. Enters World War I**

The year 1917 marked a major milestone for the United States, with entry into World War I. The naming of Fort Funston also was a turning point for the reservation. In July of 1917, an additional 150 acres south of the first parcel was purchased by the army and added to the post. Troops began occupying and manning the batteries where they erected tents and began constructing wooden barracks when the fort became a war time post. The *San Francisco Chronicle* wrote on the occasion of raising the first flag over the Fort Funston parade ground, that "the place looked more like a frontier post than anything else." The garrison buildings were almost all built of frame construction and mostly considered temporary. "While some of them were neat enough when new and freshly painted, none had any architectural distinction or decoration."<sup>27</sup> Fort Funston was a temporary post and was always considered a sub-post of Fort Winfield Scott, the Coast Artillery Headquarters for the San Francisco District Coast Defense, which comprised the western portion of the Presidio.<sup>28</sup>

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22 *National Historic Landmark Draft*, GGNRA, 1995.

23 *National Historic Landmark Draft*, GGNRA, 1995.

24 Chappell, Gordon, *Fort Funston, Battery Davis and Panama Mounts* (no date).

25 *Ibid.*

26 *National Register of Historic Places Inventory -- Nomination Form*, January 22, 1979.

27 Chappell, Gordon, *Fort Funston, Battery Davis and Panama Mounts* (no date).

28 Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today," *Journal of America's Military Past*, Vol. XX, pp. 48-61.

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***Battery Richmond P. Davis - 16-Inch Gun Battery Prototype for Nation***

In 1915, the first discussion was made for the need of 16-inch rifles to keep pace with battleship weaponry. In San Francisco, which was considered "the most important continental base in any future Pacific war scenario," the need for protection from rapidly-modernizing Japanese shipboard weaponry was exacerbated by the lack of large caliber guns bearing south along Ocean Beach. A modern battleship could lie off Pedro Point and shell much of the city from a range of 21,000 yards without receiving any return fire.<sup>29</sup> As early as 1925, San Francisco was considered the highest priority site in the continental U.S. for needing 16-inch rifles (only fortifications at the Panama Canal and Hawaii received higher priority from the Corps of Engineers). Concern for the use of aircraft and aircraft carriers caused the Army to design 16-inch gun batteries with substantial overhead cover. The new design enclosed the gun in a reinforced concrete shell.<sup>30</sup>

Fort Funston would eventually play a significant role in American military history. The post became the home for a two gun battery that was one of the three 16-inch batteries built in the San Francisco Harbor Defenses and the first casemated heavy caliber battery in the United States, which became a prototype for the country. Named for Colonel Richmond P. Davis, an officer who had served in the Coast Artillery with distinction, the plan for Battery Davis was included in the *Annex to the Secretary of War's Harbor Defense Project of 1937*.<sup>31</sup> It was one of only two which were actually armed and practice-fired and were designed to withstand bombing attacks from aircraft. It was also a prototype for all subsequent casemated batteries. The weapons mounted at Battery Davis were intended for use on the battle cruiser U.S.S. *Saratoga*.<sup>32</sup> Plans were drawn up in 1924 calling for two guns on barbette mounts, but due to delays over various designs, construction did not commence until October 1936.<sup>33</sup> The new guns were covered with concrete and earthen casemates, the first casemated works to be built in San Francisco since the Civil War. The guns were test fired in 1938 and turned over to the coast artillerymen in 1940.<sup>34</sup>

Construction of Battery Davis cost \$182,938 and involved excavating 113,598 cubic yards of sand and placing 24,934 cubic yards of concrete and 1,868,549 yards of reinforcing steel. The two guns were located 600 feet apart, and the batteries included two gun blocks, the power room and magazines located between the two gun emplacements. In separate structures there were the plotting-switchboard rooms, the radio room, the latrine, and the battery commander's station. Below the top of the earth was a layer

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29 *National Historic Landmark Draft*, GGNRA, 1995.

30 *Ibid.*

31 Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1997.

32 Chappell, Gordon, *Fort Funston, Battery Davis and Panama Mounts* (no date).

33 Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today," *Journal of America's Military Past*, Vol. XX, pp. 48-61.

34 *National Register of Historic Places Inventory -- Nomination Form*, January 22, 1979.

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of concrete called a "burster course," to detonate bombs and shells before they reached the casemate.<sup>35</sup> The guns had a maximum range of 44,000 yards or more than 26 miles, with an effective range of 44,000 yards, and a minimum range of 6,000 yards. They had a field of fire of 145 degrees and the gun barrel weighed 146 tons. A gun crew of 35 men manned each gun during World War II, and in the 1940's, a radar range-finding system was installed.<sup>36</sup> Great pains were taken to hide the emplacements from aerial observation, even to the extent of building false roads that led away from the site.<sup>37</sup> Battery Davis contributed to the coastal defense of San Francisco Bay until it was considered obsolete in 1948 due to air power and nuclear weapons. The guns were then removed from Battery Davis and cut up for salvage.<sup>38</sup>

As of 1979, Battery Davis was in good condition but its interior concrete walls were totally covered in graffiti and its magazines and corridors filled with dirt and rubbish. The sand covering the burster course has eroded severely due to individuals climbing on it. The stripped remnants of the casemates, corridors, magazines, generator plant and entrance halls remained open until approximately 1993 when the National Park Service sealed the battery's interior as a safety and preservation effort.<sup>39</sup>

The Office of Chief of Coast Artillery was closed on March 9, 1942, and the air defense artillery and field artillery were combined into the Artillery Branch in 1950. The descendant of the coast artillery became the Air Defense Artillery Branch for anti-aircraft in 1948. In 1950, Fort Funston was declared surplus except for 71 acres which were retained as a missile site, while San Francisco was deeded 167 acres. In about 1950, the Veteran's Administration Hospital developed plans to build a large complex at Fort Funston, and totally regressed the south end of the post, which destroyed all remnants of the second set of Panama mounts. Barracks buildings and fire control stations were all cleared for this complex which was never built.<sup>40</sup>

Fort Funston would eventually be designated site SF-59L and equipped with Nike Ajax guided anti-aircraft missiles. According to Bud Halsey, Site Manager for the former Nike Missile Site at Fort Barry, the first Nike unit at Funston was deployed in 1956, and the first buildings were installed in late 1955 or early 1956. The site was short lived and closed in March of 1963. Mr. Halsey said that the Nike Ajax missiles were put into service in 1951 and deployed in about 30 to 40 cities across the U.S. and were the first anti-aircraft missiles. The Nike Ajax missiles were very dangerous to use and propelled by liquid

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*Ibid.*

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Chappell, Gordon, *Fort Funston, Battery Davis and Panama Mounts* (no date).

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*National Historic Landmark Draft*, GGNRA, 1995.

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Chappell, Gordon, *Fort Funston, Battery Davis and Panama Mounts* (no date).

39

*National Register of Historic Places Inventory -- Nomination Form*, January 22, 1979 ; Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1997.

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Haller, Stephen, Historian, National Park Service and Martini, John A., Military Historian, GGNRA. Interview by author. San Francisco CA, January 12, 1998.

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fuel.<sup>41</sup> The missiles could be brought into action in fifteen minutes which meant throwing explosive warheads twenty-five miles in a short period of time.<sup>42</sup> The site was approximately 1,400 feet south of Gun No. 2 of Battery Davis. It is considered historically significant because it represents the transition from the traditional cannon to the intercontinental missile in national defense.<sup>43</sup>

Once Nike Site SF-59 was abandoned, the site was used over the years by various groups. In October, 1967, eight buildings at the site were leased by Explosiform, Inc. for conducting experiments with explosives and storage of explosives. In 1968, San Jose State College used the former Nike site for meteorological experiments. In 1969 or 1970, the San Francisco Unified School District's Reserve Officer's Training Corps used the site for training which included map and compass problems, squad problems and training in leadership and command. In 1972 the site was used by Daly City's Jefferson High School's Wilderness School.<sup>44</sup> Fort Funston was abandoned entirely in 1974, when it became part of the Golden Gate National Recreation Area.<sup>45</sup>

In addition to the Nike Ajax missiles, there was one anti-aircraft battery, located at Fort Funston, which was the scene of training exercises in anti-aircraft defense. A major project for modernizing San Francisco's coastal defenses was prepared in 1937 and provided for five anti-aircraft batteries of three 3-inch guns each. The anti-aircraft battery remained active through World War II and was known as Anti-aircraft Battery No. 3. By the end of World War II, Fort Funston had 8 fire control stations, of which only 3 remained in 1979. All of these were the "pillbox" type of construction.<sup>46</sup>

## HISTORY AND DEVELOPMENT OF 155mm GPF GUNS AND PANAMA MOUNTS

### *Development of 155mm GPF Guns*

The 155mm gun was designed by Major Filloux, a French Army officer who designed many guns and the 155mm was his largest.<sup>47</sup> In 1917, the American Expeditionary Force (AEF) in France adopted the French 155mm, Model 1917 GPF (Grande Puissance, Filloux or "high powered filloux" guns) as their standard heavy artillery gun until the United States obtained production rights to the gun and made

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41 Halsey, Bud, Fort Barry Nike Missile Site Manager, Member of Coast Defense Study Group and retired from U.S. Army. Interview by author, Fort Barry, CA, January 13, 1998.

42 Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today," *Journal of America's Military Past*, Vol. XX, pp. 48-61.

43 *National Register of Historic Places Inventory — Nomination Form*, January 22, 1979.

44 Park Archives and Record Center (PARC), National Park Service, GGNRA. Transmittal Letters in Nike SF-59 Files.

45 Johnston, Francis J., Spring 1993, "Fort Funston, Yesterday and Today," *Journal of America's Military Past*, Vol. XX, pp. 48-61.

46 *National Register of Historic Places Inventory — Nomination Form*, January 22, 1979.

47 Grobmeier, Alvin, Retired Navy Commander stationed in Seattle in WWII. Telephone interview by author, San Francisco, CA, November 7 and November 19, 1997 and information provided by Mr. Grobmeier.

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slight modifications which became the 155mm Gun, Model 1918M1.<sup>48</sup> This gun was the most widely used of the mobile artillery pieces adopted for seacoast defense after World War I<sup>49</sup> and was considered one of the best guns of its type in the world at this time.<sup>50</sup> *The Coast Artillery Journal*, Vol. 71, No. 4, October, 1929, pp. 341 says that at the close of World War I, there were approximately 3,000 155 GPF's on Army rolls.

In 1917, the AEF pulled the 155mm guns by horses. In the U.S., initially several commercial tractors were procured from overseas to facilitate the 155mm gun movement until a dedicated tractor was built in the United States. This tractor was then named the 10-Ton Artillery Tractor, Model 1917. This model had armor covering the engine and was used in the United States into 1942. In 1939, a program was begun to modernize the tractor, and the 10-Ton became the Heavy Tractor, M1.<sup>51</sup> The guns were pulled by tractors and were backed in and over the Panama mount for emplacement.<sup>52</sup>

#### **Characteristics of 155mm GPF Guns**

Characteristics of the 155mm M1918 Gun included a 19.5 foot barrel, a rate of fire of 4 rounds per minute and its firing mechanism was a percussion-primer. Its weight including the tube and breech, was 8,715 pounds. The carriage was single axle with two solid wheels and a split trail with limber. Its maximum elevation was 35 degrees and maximum depression was 0 degrees. The tire size was 45.67 inches in diameter and was made of cast steel and dual solid rubber. The carriage had hand brakes and a recoil mechanism that was hydropneumatic, with a normal recoil of 66 inches and a maximum recoil at 35 degrees of 43.2 inches. The carriage weight was 24,200 lbs. The ammunition used for the 155-mm guns was separate loading, HE, AP, Chemical., Shrapnel and the type of charge was base-and-increment. The ammunition projectile weight was 95-lbs, HE and the weight powder charge was 20-lbs, base with 6-lb increments. The ammunition was loaded by hand.<sup>53</sup>

The 155mm gun was primarily designed for firing at land targets and did not lend itself well to firing on rapidly moving seaborne targets. According to the *Coast Artillery Journal* of October, 1929, "Its recoil system is superb, and the armament probable error less than any gun of about the same caliber which we had previously adopted. All officers who have had experience in firing it are enthusiastic over its performance." At one point, the firing mechanism was modified to permit a more rapid fire. It was still limited in its field of fire which was sixty degrees. It was customary for a battery to cover a field of fire of about 120 degrees. "It would have been easier to have thrown out the 155mm gun and set up a wail for

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48 Thomas, Tom, Fort MacArthur Museum, *155-mm Gun, G.P.F. and Panama Mounts* (no date).

49 Lewis, Emanuel Raymond. *Seacoast Fortifications of the United States: An Introductory History*, Smithsonian Institution Press, City of Washington, 1970.

50 Thomas, Tom, Fort MacArthur Museum, Los Angeles, *155-mm Gun, G.P.F. and Panama Mounts* (no date).

51 *Ibid.*

52 Allen, Bill, Fort MacArthur Museum, Los Angeles. Telephone interview by author, San Francisco, August 26, 1997.

53 Thomas, Tom, *155-mm Gun, G.P.F. and Panama Mounts* (no date).

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a gun that 'had everything.'<sup>54</sup>

In World War II, a new 155 was developed which had a fifty percent greater range and was popularly known as the "Long Tom." It could be placed on a circular steel platform that could be transported easily.<sup>55</sup>

### *Construction of Panama Mounts*

During the 1920's, a simple platform mount was developed which consisted of a curved rail embedded in concrete where the gun's twin trails could easily move.<sup>56</sup> The mount was initially developed and tested in the Panama Canal Zone, hence its name Panama mount. According to Bud Halsey, the first Panama mounts emplaced were four 360-degree mounts at Flamenco Island in Panama.<sup>57</sup> Between the two world wars, the GPF gun was highly improved to increase its mobility through use of modern wheels and pneumatic tires. Previously, cast-steel wheels were employed. Regular National Guard and Reserve coast artillerymen trained on the GPF's during the 1920's and 1930's.<sup>58</sup> The Panama mounts in overseas locations were constructed by troop labor using unit personnel or engineer troops. In the U.S., the Panama mounts were constructed by private contractors which were under contract to the Army Corps of Engineer Districts. Construction took from one month to 22 months, with an average of 5.32 months per Battery.<sup>59</sup>

The 60-degree traverse of the M1918 Carriage was insufficient for harbor defense so it was mounted on a concrete emplacement known as a "Panama mount." The mount consists of a central round base which is raised above a semi-circular rim. The gun carriage rests on the base which provides a recoil pit for firing at high elevations. The spade plates are removed from the trail ends and are replaced by plates which fit a curved rail embedded in the semi-circular rim of the mount. This allows a traverse of 180-degrees in addition to the 60-degree traverse permitted by the carriage.<sup>60</sup>

At Fort Funston, there were two 180-degree Panama mounts and two 270-degree mounts. Currently, the only plan that exists for Fort Funston Battery Bluff are for the 180-degree Panama mounts which is included at the back of this report. The 270-degree Panama mount plan is missing and not included in

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54 (No author noted). "A Design for 155mm Gun Emplacements," *Coast Artillery Journal*, October 1929, Vol. 7, No. 4, pp. 341-345.

55 Lewis, Emanuel Raymond, *Seacoast Fortifications of the United States: An Introductory History*, Smithsonian Institution Press, City of Washington, 1970.

56 *Ibid.*

57 Halsey, Bud, Fort Barry Nike Missile Site Manager, member of Coast Defense Study Group and retired from U.S. Army. Interview by author, San Francisco, CA, January 13, 1998.

58 *Ibid.*

59 Thomas, Tom, *155-mm Gun, G.P.F. and Panama Mounts* (no date).

60 *Ibid.*

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this report.<sup>61</sup> The traverse circle size was dictated by the field of fire determined for the area and how the gun needed to be rotated. Also, the Panama mounts which were built around the country varied in whether the concrete circles were at grade or above grade. "The site itself and the nature of the soil affected how the concrete mount was built and whether the ground was even with the concrete mount. Ideally, they should have built a platform around the exterior of the traverse circle so that the ammunition wouldn't sit in the sand and the troops wouldn't have to wade through the sand," said William Gaines.<sup>62</sup>

The "Standard" Corps of Engineers design of the 180-degree traverse capability was constructed in two distinct parts. There is a reinforced concrete raised center circle surrounded by an outer reinforced concrete half circle. The gun block and rails are joined together by two reinforced concrete grade beams. The center circle was 10 feet in diameter, and 4.5 feet to 4.66 feet in height buried into the ground with the top at ground level. A radial support to the half outer ring extended on both sides of the forward portion of the center circle. These radials were 1-foot thick and were 1.9-foot, 4.66-foot, or 5.583-foot deep, depending on the soil conditions, and was at the same grade level as the center and outer circles. The inner face of the spoke was center lined through the center of the center circle. The 270-degree Panama mount was built in a similar way but formed a more complete circle (see 270-degree traverse photocopy dated June 23, 1937 at the back of this report).<sup>63</sup>

The half outer circle of the 180-degree Panama mount was constructed to the same specifications as the 360-degree Panama mounts (3.0-foot wide and 1.9-foot or 3.0-foot deep), but was cut in half to form a half circle. The open end of the half circle faced the primary target line or expected threat engagement area. On each end, the half circle extended 3.09-feet beyond the center line of the center circle. This extension consisted of 1.545-foot overrun and a 1.545-foot raised stop block to prevent the trails in the extreme right or left position from running off the imbedded 70# rail. The 70# "Tee" rail was 63.57-feet in total length and was of continuous weld construction. The extension overrun included the 1-foot thick radial or spokes joined into the outer circle and a 0.545-foot gap between the outer face of the radial or spoke and the raised stop block. Because of soil conditions, especially sandy beach fronts, the outer half circle was normally constructed to a depth of 4.66-foot or 5.585-foot. Both the radial or spoke, the center circle, and the half outer circle depth were the same to provide for stability.<sup>64</sup>

The construction of the emplacement was really very simple. The concrete was reinforced throughout with 5/3 inch steel rods. The plates fit over a curved railroad iron which was imbedded in the circle of concrete and which was anchored in the concrete by steel hooks. A steel curb band surrounds the raised concrete inner circle and serves as guide for the wheels of the carriage. The gun is then fired on its wheels. The guide rail and the inside curb band are kept well lubricated to facilitate the movement of the trails. The trails are moved by hand. When the target appears to be approaching the limit of

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61 Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1998.

62 Gaines, William. Telephone interview by author, San Francisco, CA, January 22, 1998.

63 Thomas, Tom. *155-mm Gun, G.P.F. and Panama Mounts* (no date).

64 *Ibid.*

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traverse permitted by the top carriage the gun crew is directed to man the trails. Four men are needed on each trail. The motive power is the ten-ton tractor.<sup>65</sup>

***U.S. Enters World War II***

After the Japanese attacked Pearl Harbor on December 7, 1941, the GPF's were quickly replaced by the U.S. Army all along both United States coasts in unfortified locations to supplement permanent emplacements. This included Alaska and the Aleutians. They were also used as the principal coast defense weapon on several Pacific Islands.<sup>66</sup> By emplacing guns in pre-surveyed locations, they could be tied into the fire-control network and used more accurately.<sup>67</sup>

According to Mark Berhow, a military historian and member of the Coast Defense Study Group (CDSG), many Panama mounts were built in the early 1940's for coastal defense. "There were not a lot of funds available, and it was a relatively inexpensive form of harbor defense and an important stop gap measure between the old harbor defenses of the 1920's and 1930's and the new, larger guns which were built later," said Berhow. He said there was a big push in 1941 when the U.S. became concerned about being attacked after the attack on Pearl Harbor.<sup>68</sup>

Alvin Grobmeier, a retired Navy Commander stationed in Seattle, said there were many 155mm guns which served as field artillery, and which were not mounted on Panama mounts. He also said that the Panama mounts were available at the beginning of World War II and basically were emergency emplacements. "When World War II broke out, the U.S. was not prepared for coast defense, so the Panama mounts were put up in a hurry. The 155mm guns allowed rapid training and the Panama mount concrete ring was designed only for the 155mm gun." Grobmeier said there were a lot of 155mm guns left over from World War I.<sup>69</sup>

This was concurred by Greg Hagge from Ft. Lewis Museum in Washington State and a member of the CDSG. He said that experience in World War I showed that a more solid gun platform was needed for artillery than was available in the 1930's. "The Panama mounts were a cheap solution to harbor defense and several hundred were built around the country. They were also installed in most overseas positions from 1936-1939 in the Phillipines, Panama and Hawaii, on the East Coast in 1942 and on the Gulf Coast in 1942 to 1943."<sup>70</sup>

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65 (No author noted). "A Design for 155mm Gun Emplacements," *Coast Artillery Journal*, October 1929, Vol. 7, No. 4, pp. 341-345.

66 Lewis, Emanuel Raymond, *Seacoast Fortifications of the United States: An Introductory History*, Smithsonian Institution Press, City of Washington, 1970.

67 Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1997.

68 Berhow, Mark, Coast Defense Study Group. Telephone interview by author, San Francisco, CA, November 4, 1997.

69 Grobmeier, Alvin. Telephone interview by author, San Francisco, CA, November 7 and November 19, 1997.

70 Hagge, Greg, Fort Lewis, Assistant Museum Curator. Telephone interview by author, San Francisco, CA, October 5, 1997.

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Tom Thomas, of the Fort MacArthur Museum and member of CDSG said, "there was no money available between the wars for anything, and the Panama mounts were a stop gap to fill in the gaps in coastal defense since the 1890's. No money was spent on large fortifications. The 155's were stored in two gun sheds at Fort MacArthur and could be moved around to the emplacements from Santa Barbara to Oceanside on trucks and set up very quickly." He said tide charts and gun targets could be measured in advance which were very accurate. "There was nothing magic about their construction by the Army Corps of Engineers. They were utilitarian field artillery pieces without using a lot of money," said Thomas.<sup>71</sup>

**Construction of Panama Mounts at Fort Funston**

During World War II, Fort Funston continued to grow until it contained 86 structures.<sup>72</sup> In 1937, a new "temporary" battery of four mobile 155mm guns were constructed on the bluff northwest of Battery Davis and was named "Battery Bluff", the subject of this report. It was undoubtedly named this after its location on a bluff at Fort Funston. These first Panama mounts and guns were located about 1,200 feet north of Battery Davis's Gun No. 1, close to the edge of the cliffs overlooking the beach.<sup>73</sup> One of its primary missions was to defend Battery Davis against fast and small enemy vessels. There were no fire control stations for this battery. In 1941, due to erosion of the cliff and three years of recession due to normal wave action which was accelerated by severe storms during the winter of 1940-1941, the guns (but not the mounts) were moved to the south of Battery Davis, which are the second set of Panama mounts.<sup>74</sup> Plans in the Park Archives and Record Center (PARC) show this second 155mm battery located at the extreme southwestern corner of the post, just west of where the Nike barracks are now located. This area was totally regraded by the Veteran's Administration, as mentioned earlier in this report, and no traces of that battery remain today.<sup>75</sup>

According to the U.S. Army Corps of Engineers Report of Completed Works (RCW) as of January 18, 1943, construction of the second Panama mount battery commenced on December 29, 1941 and was completed on February 18, 1942. The mounts were not connected to the water supply or sewer and did not have a latrine. The date of transfer was July 9, 1943 and cost to date of transfer was \$13,904.71.

In 1975, Erwin Thompson, who was working on an historic structures report for the Golden Gate National Recreation Area, labeled the cliff area west of the asphalt road as a Class VII Historic Area, which should be protected.<sup>76</sup> The Battery Bluff Panama mounts (first set) are included in this area. As

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71 Thomas, Tom, Fort MacArthur Museum, Los Angeles. Telephone interview by author, September 9 and October 28, 1997.

72 Chappell, Gordon, *Fort Funston, Battery Davis and Panama Mounts* (no date).

73 *National Register of Historic Places Inventory -- Nomination Form*, January 22, 1979.

74 *Ibid.*

75 Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1997.

76 Martini, John A., Military Historian - GGNRA. *Recommendations for Historic Preservation for Northern Fort Funston - GGNRA*, 1975.

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of May of 1979, one of the concrete Panama mounts at Battery Bluff had been lost to continuing erosion, and a second mount was in danger of sliding down the cliff and was badly deteriorated. Two of the mounts were still in a good state of preservation, but it was thought that they would eventually suffer the same fate as the first two. Erwin Thompson's "Historic Resource Study, Seacoast Fortifications San Francisco Harbor," May 1979, recommended that at least one of the surviving Panama mounts should be removed from its precarious location and placed near Battery Davis to be interpreted there.<sup>77</sup>

#### Concrete Foundations Near Panama Mounts

Two concrete foundations are currently located south of the Battery Bluff Panama mounts. In speaking with several sources, their exact purpose and function has not been identified, but during these interviews, the interviewees developed several assumptions. Bill Allen of the Fort MacArthur Museum thought these may have been used to hold ammunition for the guns. Alvin Grobmeier is unsure what the concrete foundations are but thought they could have been stanchions for observation instruments. Or since they are on the seaward side, they could have been to hold camouflage netting which was put over the Panama mounts during war time. He did not think that they were for ammunition, as ammunition was generally flush with the ground and would have had an opening. On the other hand, Grobmeier said there has been a great deal of erosion near the Panama mounts, so the concrete foundations could have originally been underground. Mark Berhow said he did not know what they were used for, but agreed with Al Grobmeier that they could have been the base for another object.<sup>78</sup>

#### Fire Control Stations

The Annexes to (Annex B Fire Control Installations) *The Secretary of War's Harbor Defense Project of 1937*, which was prepared on June 2, 1936, outlines plans "to furnish complete fire control installations, equipment and communication" for a list of new or incomplete seacoast batteries. The list included the 4 - 155mm guns at Battery Bluff at Ft. Funston and also the 16" guns of Battery Davis. The existing observation stations in the defenses listed, were described as being barely sufficient to provide the minimum requirements for the present armament. The desirable minimum installation for the 6" and 155mm batteries was a secondary station that was essential to provide observation over that part of the field of fire not visible from the battery location. The Annexes contained an observation that since the high ground which was available at almost any desired locality provided the necessary elevation, there was no need for towers anywhere in the region. The conclusion was that the dug-in type of station was ideal for the terrain, since it would be invisible from the sea and air would provide almost complete protection for personnel and material. The Annexes said "no permanent stations should be constructed for this battery. Concrete monuments should be placed and orientation data determined at the following locations. Elevations are approximate."<sup>79</sup> The locations included a fire control station marker for another battery 150 yards southwest of the guns, at another station marker on Point Lobos at an

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<sup>77</sup> Thompson, Erwin. *Historic Resource Study, Seacoast Fortifications San Francisco Harbor*, Golden Gate National Recreation Area, Denver Service Center, Historic Preservation Team, National Park Service, May 1979.

<sup>78</sup> Berhow, Mark, Coast Defense Study Group. Telephone interview by author, San Francisco, CA, November 21, 1997. Interviews by author with Bill Allen and Alvin Grobmeier.

<sup>79</sup> *Annexes To The Secretary of War's Harbor Defense Project of 1937*, Park Archives and Records.

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elevation of 100 feet, and a station marker near Mussel Rocks at an elevation of 500 feet.<sup>80</sup>

Mark Berhow said there was never a permanent fire control station for Battery Bluff. "For some of the Panama mounts installed, fire control stations from a previous era were used, such as was as the 1930's concrete pillbox used for the 155's at Long Point in Los Angeles," says Berhow. "At Fort Funston, I believe everything was 'field ready' and mobile — nothing permanent was erected for a fire control station." He said that the idea behind the Panama mounts was for everything to be below ground with only the guns showing.<sup>81</sup>

William Gaines of SCARP (SeaCoast Artillery Research Project) Associates concurs with this assessment. "There were almost no permanent structures constructed for the 155 batteries in the United States and there were temporary fire control stations or an 'ad hoc' system," says Gaines. "The temporary stations consisted of a primary and secondary station, one to the north and one to the south of the battery." He said some of the primary stations had a plotting room. In addition, he said occasionally when there was an existing concrete station which was built earlier for another battery, this would be used as the fire control station for the 155's. Mr. Gaines said most of the temporary fire control stations are all gone.<sup>82</sup> Brian Chin also said there probably were not any fire control stations at the Battery Bluff Panama mounts.

The second Battery Bluff constructed in 1941 did have at least one permanent fire control station according to plans at Park Archives and Records and an interview completed by John Martini in 1976 with Mr. Loren Clark who was stationed there in 1944. It was located at Sutro Heights directly across from the Cliff House in an unused fire control station intended for the never completed Battery No. 129 at Ft. Barry.<sup>83</sup> The *Annexes to the Secretary of War's Harbor Defense Project of 1945* lists a "command" or fire control element at Ft. Funston North as an existing manhole at the Cliff House.<sup>84</sup>

On the subject of triangulation, Mark Berhow said the guns could have been triangulated in several ways. One way was through a stereoscopic tube instrument which would triangulate by focusing in and lining up the sights with the split prism. It could have also been done through the azimuth scopes (like surveying mechanism) where a triangle grid was calculated. Berhow said that most likely triangulation for the 155mm guns at Battery Bluff was done like field artillery, without any pre-surveyed markers. Berhow thought a stick may have just been put in the ground as a marker and used later.

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- 74 *Annexes To The Secretary of War's Harbor Defense Project of 1937*, Park Archives and Records; Thompson, Erwin. *Historic Resource Study, Seacoast Fortifications of San Francisco Harbor*, Golden Gate National Recreation Area, Denver Service Center, Historic Preservation Team, National Park Service, May 1979.
- 81 Berhow, Mark, Coast Defense Study Group. Telephone interview by author, San Francisco, CA, November 21, 1997.
- 82 Gaines, William C. Telephone interview by author, San Francisco, CA, October 28, 1977.
- 83 Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1997.
- 84 *Annexes to the Secretary of War's Harbor Defense Project of 1945*. Park Archives and Record Center (PARC).

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**HISTORY OF BATTERY D, 2ND BATTALION, 18TH COAST ARTILLERY (HARBOR DEFENSE) REGIMENT AT FORT FUNSTON**

In interviews with Mark Berhow, Greg Hagge, William Gaines, and Tom Thomas regarding the regiments which were stationed at Fort Funston and at the Battery Bluff Panama mounts, they agreed that it would have been Battery D of the 18<sup>th</sup> Coast Artillery. Since the interview with Gaines and his review of the RCW's for the second Panama mounts dated January 18, 1943, he was unsure if Battery D ever manned the original Battery Bluff mounts and that they probably manned the second set of Panama mounts. He said that by the early 1940's, the Battery Bluff Panama mounts were in danger of sliding down the bluff to the beach. Consequently when Battery D of the 18<sup>th</sup> Coast Artillery came to Fort Funston in the days following the attack on Pearl Harbor, their guns were emplaced in field positions near the south boundary of the reservation. Construction of new Panama mounts in the new position at Fort Funston South was begun soon afterward on December 29, 1942. "Thus the RCW's for Battery Bluff (January 18, 1943) pertain to the South Funston position, not the (slide) area location of the original Panama mounts. Therefore, it is not likely that the original 1930's Panama mounts were ever manned with Battery D's 155mm guns, nor did Battery D man the 'old mounts', said Gaines.<sup>85</sup>

Yet, the Adjutant General's Office Department of the Army's *History of the 18<sup>th</sup> Coast Artillery Regiment* dated January 3, 1940 to October 4, 1943 states that "the 155mm guns were moved to Fort Funston by the battery emplaced in the south part of the Fort on the bluffs from which the battery derives its name, "Battery Bluff." Based on the information from the Adjutant General's Office, a brief history of the 18<sup>th</sup> Coast Artillery Regiment and Battery D at Fort Funston is presented in the following sections.

***History of 18th Coast Artillery***

Historical data dated May 6, 1944 for the 18th Coast Artillery Regiment, which was headquartered in Camp Breckinridge, Kentucky includes the following information. Pursuant to War Department Letter AG 320.2 (12-15-39) dated January 19, 1940, certain units of the 18th Coast Artillery were activated at Fort Stevens, Oregon. A detachment of 21 men from Headquarters Detachment, 3rd Coast Artillery, Panama detachment and men from Batteries E and F, 3rd Coast Artillery Regiment formed the first cadre. This was augmented by about 400 men from Camp Hayes, Ohio who arrived at Fort Stevens on March 10, 1941. These men were given training in four units called Regimental Headquarters Battery; Headquarters and Headquarters Battery, 1st Battalion; Battery A, and Battery B.<sup>86</sup>

According to General Orders No. 6, Headquarters 18th Coast Artillery Regiment, Fort Winfield Scott, December 4, 1943, the mission of the 18th Coast Artillery was "a. Organization and manning of Forts Funston, Miley and certain installations at Fort Scott, with outlying stations, to protect the harbor facilities and shipping from sea, land, and air attack. h. The mission will be accomplished by the ability

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<sup>85</sup> Gaines, William C. Memo dated December 1, 1997.

<sup>86</sup> National Archives and Records Administration, Washington, D.C. , *History of 18<sup>th</sup> California Regiment*, Record Group: 407 Adjutant General's Office, WWII Operations Reports, February 1, 1940 to May 5, 1944.

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to deliver immediate, accurate, rapid and sustained fire on assigned targets."<sup>87</sup>

On November 1, 1939, Battery C, 6th Coast Artillery Regiment Harbor Defense moved from Fort Winfield Scott to Fort Funston to reactivate the post and to man Battery Richmond P. Davis, the new battery of 16-inch guns. Battery Davis was attached to the Funston Groupment as a separate battery, which was commanded by Captain Arthur Kramer. It was made up of three officers and 112 enlisted men. This group was the sole coast artillery unit at Fort Funston until January 18, 1941, when the group was augmented with six officers and 91 enlisted men from Battery B, 6th Coast Artillery who came to Fort Funston and was commanded by Captain Richard R. Moorman. In addition, the Headquarters and Headquarters Battery of the 3rd Battalion, 6th Coast Artillery was posted at the Fort in early 1941.<sup>88</sup>

**History of Battery D, 18th Coast Artillery at Fort Funston**

Battery D, 18th Coast Artillery was activated on January 15, 1941, per GO #45, HQ. 9th Corps Area as part of the Second Battalion, 18th Coast Artillery, HD. The cadre for Battery D was taken from Battery A, 6th Coast Artillery. Officer personnel assigned were: Captain William R. Nodder, 1st Lt. George E. Tilson, 2nd Lt. Elias P. Ellis, and 2nd Lt. Carl E. Schnetz. The remainder of the Battery was Selective Service men from the 6th Corps Area.<sup>89</sup>

The battery was formed on January 25, 1941, and was quartered at Fort Winfield Scott in Buildings No. 5 and 7. Their primary assigned armament at the time was at Battery Crosby, which consisted of two 6-inch D.C. Guns. Additional assignments included 3-in AA Guns. On November 10, 1941, the Battery was relieved from assignment to Battery Crosby and assigned four 155-mm guns, per GO #60, HDSF, 1941.<sup>90</sup>

When war broke out on December 7, 1941, Battery D was placed on War Condition and assigned to guard duty at Forts Winfield Scott, Miley, and Funston, where they were scattered. The 155-mm guns were moved to Fort Funston by the battery and emplaced in the south part of the Fort on the bluffs from which it derives its name, "Battery Bluff." On December 18, 1941, the personnel was relieved from guard duty and assumed Alert "A". "The men lived in quartered wooden boxes, set in holes dug into the hillside near the guns and the boxes eventually came to be known as 'Rabbit Huts'. Incidentally this appellation suited them perfectly." The men lived here during a very rainy season common to this portion of the coast until September 12, 1942. They then moved into newly constructed "Emergency" type barracks at South Fort Funston.<sup>91</sup>

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87 *Ibid.*

88 Gaines, William C., *The 2nd Battalion, 18th Coast Artillery (HD) Regiment and the Funston Groupment, Fort Funston, 1939-1945.*

89 National Archives and Records, Washington, D.C., *History of 18th California Regiment*, Record Group: 407 Adjutant General's Office, WWII Operations Reports, February 1, 1940 to May 5, 1944.

90 *Ibid.*

91 *Ibid.*

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"Those were miserable quarters most of the men had at Fort Funston," commented Frank Mahoney, a junior officer with the 2nd Battalion, 18th Coast Artillery. The men of Battery D lived in damp underground wooden boxes near the 155-mm guns at the southern end of the fort. Some of the sergeants and corporals had served for three or more years and were a hardy group. According to an excerpt from Brian Chin's book, a battery commander called the first sergeant and ordered him to stop his men from gambling. "Five hours later, the first sergeant reported back to the commander, saying:, Sir, there'll be no more gambling. Sorry it took so long. I started with five bucks, but I have all the money now."<sup>92</sup>

General Orders No. 3 on October 9, 1943, lists Regimental and Special Staff at Fort Funston, some of which included Unit Personnel Officer, Capt Benjamin H. McIntosh; Motor Transportation Officer, 2nd Lt George W. Thomas; Surgeon, Major George F. Lee; Dental Surgeon Capt. George J. Higue; Chaplain, Capt Charles R. Culpepper; Postal Officer, Major Ralph E. Brown; Chemical Warfare Officer, Capt John N Lee; Cryptograph Security Officer, Major Ralph E. Brown; Bomb Reconnaissance & Disposal Officer/ Damage Control Officer, 2nd Lt George W. Thomas; Fire Marshall, 1st Lt Gilbert R. Porter; Athletic Officer, 2nd Lt George W. Thomas, among others. The memo was signed by Ralph E. Brown, Major, 18th C.A. Adjutant. Group 4 (Fort Funston) Commanding Officer was Lt Col Ferdinand J. Lapeyri on December 4, 1943.<sup>93</sup>

Below is a partial list of names of Battery "D" 18<sup>th</sup> Coast Artillery. The list was signed by Ferdinand J. Lapeyri, Lieutenant Colonel, 18th C.A. Commanding.<sup>94</sup>

These included:

S/Sgt John Bozicovich Jr. 36225171	Pfc Walter S. Biskup 36007370
Sgt Clifford L. Maxfield 37047758	Pfc Joseph J. Brossan 36039876
Sgt Ray L. Miller 35161212	Pfc Willard H. Doromor 33350805
Tech 4 William J. Bastian 36214101	Pfc Marvin E. Evans 6577101
Cpl LeRoy H. Bauer 39310191	Pfc Gilbert W. Gutknecht 37109398
Cpl Charles R. Byrum 36050175	Pfc Paul C. Maskell 36120123
Cpl Floyd G. Michael 39310218	Pfc Louis Mohar 37086500
Cpl Harold F. Schmidt 36214127	Pfc Adolph Puchalla 362000477
Cpl Roland E. Schmidt 36214968	Pfc Herman F. Ritter 37048773
Cpl Roman L. Weinzierl 36200446	Pfc William J. Rodmey Jr 36117354
Cpl Harley E. Winterrowd 36200457	Pfc Olaf W. Sherrell 37049970
Tech 5 William C. Conant 3710927	Pfc Oscar A. Smith 39381285
Tech 5 Joe F. Toth 36075587	Pfc Benjamin Treichol 39602924

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<sup>92</sup> Chin, Brian B., *Artillery At The Golden Gate - The Harbor Defenses of San Francisco in World War II*, Missoula, Montana: Pictorial Histories Publishing Co. Inc.;1994; Chin, Brian. Telephone interview by author, San Francisco, CA, October 1, 1997.

<sup>93</sup> National Archives and Records, Washington, D.C., *Headquarters 18<sup>th</sup> Coast Artillery General Orders*, Record Group: 407 Adjutant General's Office, WWII Operations Reports, 1941 to 1944.

<sup>94</sup> *Ibid.*

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Pfc Robert C. Barber 36023148  
Pfc Lyle W. Butzer 18046479

Pfc William A. Venturini 38034092  
Pfc Jessie V. Wilson 3408292

The Funston Groupment was a tactical element of the Harbor Defenses of San Francisco established in the months prior to World War II to operate the guns and mortars and other harbor defense elements, located at Fort Funston. The Funston Groupment was made up of two gun groups, Group Four of Battery Walter Howe - 12-inch mortars; Group Five, four 155-mm guns of Battery Bluff; and Battery Richmond P. Davis, 16-inch guns.<sup>95</sup>

Battery D held several target practices at Fort Funston and the fire was being controlled by spotters. "We weren't too good one day," remembered Frank Mahone, the range officer. "The spotters were calling in and they were missing quite a bit." One of the gunnery sergeants popped up on the parapet; "So where is that target?" he barked, looking seaward till he spotted the pyramidal shape towed by a mineplanter. The sergeant cranked the corrections on the 155, and the next round hit the mark. Battery D's veteran gunnery sergeants had a knack for it."<sup>96</sup>

The first firing conducted by Battery D, was the six-inch D.C.'s at Battery Crosby on May 21, 1941. After this date, the Battery had fired several service practices with the 155-mm guns. Battery D also fired a Special Service Practice using emergency methods only in 1943. The list of armaments fired by the unit include .22 caliber rifle, M1903 .30 caliber rifle, M1. 30 caliber rifle, M1.30 caliber carbine, .50 caliber machine gun, rifle grenade, hand grenade, 37-mm AA gun, 155mm GPF and 6-inch seacoast gun. The Battery attained the phenomenal record during qualifications with the .30 caliber M1 rifle of one hundred percent qualification. At that time, of the original organization, only 22 enlisted men remained. 28 officers had come and gone and eight Battery Commanders had led Battery "D". At this date, the Battery had three years and nineteen days of Federal Service.<sup>97</sup>

In his book, Chin also refers to Battery C has having manned the 155mm guns and 3-inch anti-aircraft guns at Fort Funston. The men drilled on the fixed guns, but did not fire them. They conducted service target practice several times where live ammunition was fired at moving waterborne targets. Battery C would fire ex-caliber gun drills using 37 mm guns sited near the 155's before the annual target shoot. When the target practice with the actual 155-mm guns was scheduled to take place, the crab fleet from San Francisco appeared in the battery's field of fire. "The Coast Guard tried to chase the crabbers away, but the fishermen kept coming back. An exasperated safety officer assigned to the target practice turned to Second Lieutenant Webster (remained only commissioned officer in the battery until mid-1940) and said 'Go ahead and shoot'. Webster gave the order to commence firing. 'When we let the first rounds go out,' he later remembers, 'all the crabbers picked up and headed for the Golden Gate'. Later,

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<sup>95</sup> Gaines, William C., *The 2nd Battalion, 18th Coast Artillery (HD) Regiment And The Funston Groupment, Fort Funston, 1939-1945.*

<sup>96</sup> Chin, Brian, B., *Artillery At The Golden Gate - The Harbor Defenses of San Francisco in World War II*, Missoula, Montana: Pictorial Histories Publishing Co. Inc., 1994.

<sup>97</sup> National Archives and Records, Washington, D.C., *History of 18<sup>th</sup> California Regiment*, Record Group: 407 Adjutant General's Office, WWII Operations Reports, February 1, 1940 to May 5, 1944.

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Webster was ordered to pull one of the 155mm out of position and remove the old paint. Battery C repainted the gun with glossy automotive lacquer. The "high-shine" 155 was entered into the Army's display at the 1940 Golden Gate International Exposition held at Treasure Island.<sup>98</sup>

Brian Chin said that various units used the 155mm guns for 3-6 months at a time, although most narrative information available identifies Battery D as the unit who manned the guns most frequently.<sup>99</sup>

The Funston Groupment was initially manned by the 2nd Battalion, 18th Coast Artillery Regiment and was composed of the Battalion Headquarters and Headquarters Battery. They manned the groupment command post and provided command and control of the armament and administration for the coast artillery troops at Fort Funston. Battery D manned Battery Bluff. The Fort Funston garrison was briefly augmented when the 283rd Coast Artillery Battalion was assigned to Fort Funston to receive training on the 155mm guns, where two of its three firing batteries were assigned to train with the 155mm guns of Battery Bluff. After two weeks of training, they were moved to Fort Cronkite in Marin and were reorganized as a 155mm gun battalion. On June 6, the battalion left for Camp Stonemen Staging Area before sailing to the Southwest Pacific Theater.<sup>100</sup>

In early 1944, reductions were ordered in the number of coast artillery troops in the San Francisco harbor defenses. On April 14, 1944, the 18th Coast Artillery's Headquarters and Headquarters Battery were ordered to prepare for a permanent change of station from Fort Funston to Camp Breckinridge, Kentucky. On April 25, the battalion was relieved of duty at Fort Funston and boarded trains to Kentucky, where they were inactivated on May 5. Its personnel were reassigned to the Headquarters and Headquarters Battery, 417th Field Artillery Group.<sup>101</sup>

The three firing batteries of the 2nd Battalion were also sent to Camp Breckinridge, less their personnel and materiel. Personnel of Batteries D, E and F were transferred to Fort Winfield Scott where they were absorbed into other elements of the Harbor Defenses of San Francisco. Due to the near completion of Battery Construction Number 243 at Fort Miley and the 6-inch guns at Point Lobos, made it unnecessary to retain Battery Bluff in active service. It was taken out of service and a detachment of Battery C of the 6th Coast Artillery served as caretakers until the end of the war. The four 155mm guns at Battery Bluff were ordered disposed of in November 1945.<sup>102</sup>

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98 Chin, Brian, G. *Artillery At The Golden Gate - The Harbor Defenses of San Francisco in World War II*, Missoula, Montana: Pictorial Histories Publishing Co. Inc., 1994.

99 Chin, Brian, Telephone interview by author, San Francisco, CA, October 1, 1997.

100 National Archives and Records, Washington D.C., *History of 18<sup>th</sup> California Regiment*, Record Group: 407 Adjutant General's Office, WWII Operations Reports, February 1, 1940 to May 5, 1944.

101 *Ibid.*

102 *Ibid.*

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OTHER PANAMA MOUNTS FOR 155mm GUNS FOR THE HARBOR DEFENSES OF THE  
UNITED STATES WEST COAST

*Harbor Defenses of Puget Sound, Washington*

There were Panama mounts in several locations in and around Puget Sound, Washington. There were and still are four Panama mounts at the Elwha River, west of Port Angeles on the Strait of Juan de Fuca and four in the Westport/North Cove Area.<sup>103</sup>

*Camp McQuaid Panama mounts, Santa Cruz County, California*

There are four existing Panama mounts at Camp McQuaid on the Pahara River in Santa Cruz County. They are currently overgrown with vegetation.<sup>104</sup>

*Harbor Defenses of Los Angeles, California*

On June 18, 1941, Colonel William W. Hicks assumed command of the Harbor Defenses of Los Angeles and the 3rd Coast Artillery, the Post of Fort MacArthur, and District D, after service in the Hawaiian Department. Expecting war with Japan, he outlined a Standing Operating Procedures program within the Harbor Defenses of Los Angeles. These included organization and practice movement into position of all mobile 155mm guns to cover the coastal areas adjacent to Fort MacArthur in the event of an emergency.<sup>105</sup>

When the Japanese attacked Pearl Harbor on December 7, 1941, the Commanding Officer immediately ordered that all fortifications be manned, all mobile batteries be moved into previously selected positions, and that service ammunition be issued to all units. When the U.S. declared war on Japan, the Harbor Defenses of Los Angeles and Fort MacArthur comprised 163 officers and 1869 enlisted men. The HDLA included 14 155mm gun batteries, all of which had Panama mounts. This totaled 28 Panama mounts, as all batteries had two guns instead of the "usual" four.<sup>106</sup>

The Los Angeles Panama mounts included: Battery 4 - Rocky Point (2-155mm GPF Guns, Panama mount, Btry H, 3rd CA Regt.); Battery 5 - Long Point (2-155mm GPF Guns, Panama mount, Btry 1, 3rd CA Regt.); Battery 6 - Point Fermin (2-155mm GPF Guns, Panama mount, Btry E, 3rd CA Regt.);

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103 Hagge, Greg, Fort Lewis, Assistant Museum Curator. Telephone interview by author, San Francisco, CA, October 5, 1997.

104 Halsey, Bud, Fort Barry Nike Missile Site Manager, Member of Coast Defense Study Group and retired from U.S. Army. Interview by author, Fort Barry, January 13, 1998.

105 Monnett, Lt. Col. John R., Cole, Major Lester, and Cleland, Sgt. Jack C., *Harbor Defenses of Los Angeles in World War II (HDLA)*, Fort MacArthur Military Press, San Pedro, CA, 1992.

106 Grobmeier, Alvin. Telephone interview by author and list of gun batteries provided, San Francisco, CA, November 7, 1997. Interview with Alvin Grobmeier and Berhow, Mark, *"The Harbor Defenses of Los Angeles"*, August 1992.

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Battery 7 - Bolsa Chica (2-155mm GPF Guns, Panama mount, Btry B, 3rd CA Regt).<sup>107</sup> In addition, there was Battery 1 - Pacific Palisades (2-155mm MI Guns, Panama mount, 2nd Plat, Btry F, 56th CA Regt.); Battery 4 - Rocky Point (2-155mm GPF Guns, Panama mount, 1st Plat, Btry H, 3rd CA Regt.); Battery 5 - Long Point (2-155mm GPF Guns, Panama mount, 2nd Plat, Btry H, 3rd CA Regt.); Battery 6 - Upper Reservation (2-155mm GPF Guns, Panama mount, Btry B, 3rd CA Regt.); Battery 7 - Bolsa Chica (2-155mm GPF Guns, Panama mount, Btry E, 3rd CA Regt.); Battery 8 - Costa Mesa (2-155mm MI Guns, Panama mount, 1st Plat, Btry D, 56th CA Regt.) and Port Hueneme - 2-155mm GPF Guns, Panama mounts, Btry F, 3d CA (Redesignated Btry C, 522d CA BN Oct. 44)<sup>108</sup>

According to Mark Berhow's "The Harbor Defenses of Los Angeles", August 1992, the WWII Temporary Panama mount batteries also included two at El Segundo/Hyperion, two at Santa Barbara, two at Ventura and 2 at Oxnard. According to Berhow, the Bolsa Chica mounts have been cleaned up, the Fort MacArthur mounts have been uncovered and the Ventura mounts are now covered with sand or broken up.<sup>109</sup>

Tom Thomas, from the Fort MacArthur Museum, said that there were fixed fortifications all along the coast, anticipating the general target areas. The 155mm guns were stored in the gun park at Fort MacArthur, and if there was a threat by the Japanese, they would be put on trucks and taken to where they were needed. The firing ranges and aiming points were previously calculated, and the guns just needed to be brought to the mounts. During the war, there were at least half a dozen Panama mounts located between Los Angeles Airport and Bolsa Chica near Huntington Beach which could be used. He said that in Los Angeles, they were undergunned as compared to San Francisco in terms of permanent fortifications. The 155's were very important in Los Angeles, as there were not many fortifications there. Thomas said a Panama mount has been reconstructed at the Fort MacArthur Museum in Los Angeles for viewing by the public.<sup>110</sup>

#### *Harbor Defenses of San Diego Bay, California*

The San Diego area has 8 Panama mounts in total. There are four mounts at Fort Emory, Imperial Beach called Battery Imperial and four mounts at Fort Rosecrans, Pt. Loma, called Battery Point Loma.<sup>111</sup>

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107 Monnett, Lt. Col. John R., Cole, Major Lester, and Cleland, Sgt. Jack C., *Harbor Defenses of Los Angeles in World War II (HDLA)*, "Chart B: Tactical Positions, HDLA, June 1, 1942," Fort MacArthur Military Press, San Pedro, CA, 1992

108 Monnett, Lt. Col. John R., Cole, Major Lester, and Cleland, Sgt. Jack C., *Harbor Defenses of Los Angeles in World War II (HDLA)*, "Charts C & D: Tactical Positions, HDLA, June 1, 1942," Fort MacArthur Military Press, San Pedro, CA, 1992.

109 Berhow, Mark. *Harbor Defenses of Los Angeles*, August 1992.

110 Thomas, Tom. Interview by author, San Francisco, CA, September 9, 1997.

111 Grobmeler, Alvin. Telephone interviews by author, San Francisco, CA, November 7 and November 19, 1997.

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**Battery Point Loma, Fort Rosecrans**

This battery consisted of four, mobile 155-mm GPF guns which were located at the southwest tip of Point Loma. These were permanent Panama mounts which were constructed during 1941 and completed in January of 1942. They were located to provide cover for ships approaching the harbor entrance from the west. The batteries' guns had a distance of thirty yards between gun centers and was situated 300 yards from the Point Loma Lighthouse. The initial plans for the battery called for only a 180-degree traverse emplacement, but the post commander protested that 360-degree platforms needed to be installed to obtain full tactical advantage. Battery Point Loma continued to serve through the early months of the war. At the end of 1942, 90mm anti-motor torpedo boat (AMTB) batteries were added to the harbor defense with four-guns which were constructed in front of Battery Point Loma. No date for the dismantling of the 155mm guns is available but is believed to be mid-1943 or later.<sup>112</sup>

The battery is abandoned, although some visible remnants and permanent improvements. In May 1996, the emplacement for Gun #4 was visible due to a previous excavation, but it is now overgrown and not visible. Numerous partially collapsed trenches and underground shelters also existed in 1996, adjacent to the gun emplacements and one east of Cabrillo Road. There are also three adjacent 40 foot underground shelters and smaller material shelters which were in good condition in 1996.<sup>113</sup>

**Battery Imperial**

The history of Battery Imperial is similar to Point Loma. The four 155-MM guns were called to be retained at Fort Rosecrans until there was an "incident of emergency." On December 9, 1941, they were moved to their permanent position on the Coronado Heights Military Reservation, north of Imperial Beach, later named Fort Emory. In contrast to the concrete magazine's at Point Loma, Imperials dug-outs were splinter proof, earth-covered dugouts of board and timber.<sup>114</sup> According to the Army Corps of Engineers Report of Completed Works, Battery Imperial's battery commenced on December 27, 1941, was completed on January 30, 1942 and date of transfer was November 20, 1942.

**Harbor Defenses of the Island of Oahu**

As of September 18, 1941, there were approximately 16 Panama mounts with 155-mm gun emplacements on the Island of Oahu. They did not have formal names as some of the other mounts did. They include mounts all around the island at or near: Kahuku Point, Pyramid Rock, Mokapu Point, Koko Head, Black Point, Harlow, Punchbowl (in Honolulu), Hawkins, Barber Point (3 nearby), Kawailoa, and Ashley.<sup>115</sup>

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112 Thompson, Erwin N. *The Guns of San Diego, San Diego Harbor Defenses, 1796-1947, Historic Resource Study, Cabrillo National Monument, National Park Service, 1991.*

113 *National Register of Historic Places Nomination*, May 1996, Keniston Architects; Stetz, Debbie, Historian, Cabrillo National Monument, Telephone interview by author, San Francisco, CA, November 6, 1997.

114 Thompson, Erwin N., *The Guns of San Diego, San Diego Harbor Defenses, 1796-1947, Historic Resource Study, Cabrillo National Monument, National Park Service, 1991.*

115 Fairfull, Tom, Chief, Museum Division, U.S. Army Museum of Hawaii, *OPN Map, Annex No 1 to Accompany F01, Island of Oahu*, September 18, 1942.

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FORT FUNSTON TODAY

Fort Funston, the foggy parcel of land west of Lake Merced and south of the San Francisco Zoo, represents the last great dune area of San Francisco. It is a reminder of the City's geographic and natural history and is incredibly rich as a natural preserve. Over the years, once the Fort was abandoned, Fort Funston has been used by the City and County of San Francisco as a borrow pit for beach sand for fill use elsewhere. This has been destructive to the ecological balance and disturbs the formation and extent of the natural dunes and increases erosion problems.<sup>116</sup>

Fort Funston is also the busiest hang gliding spot in the world and is visited by 750,000 people annually. The Golden Gate National Recreation Area has even built a redwood observer's deck on the former post for visitors to view the hang gliders adjacent to the fire control station. It is considered the "Los Angeles International Airport of hang gliding."<sup>117</sup> It is also the habitat for the threatened bank swallows, which migrate from South America each year and breed in the holes in the coastal cliffs of Fort Funston.<sup>118</sup> The military left the fort in 1963, and the area's dunes were bulldozed and replanted with native and non-native plants.<sup>119</sup> The South African ice plants which were planted, forced out many native insects and animals which affected the food supply for the bank swallows. The National Park Service's Habitat Restoration Project has been reviving the area's ecosystem to help the swallows and other native plants/animals thrive again.<sup>120</sup>

The former Nike launcher site which was installed in 1955-1956 and closed in March 1963, is now under the main Fort Funston Parking Lot and is not accessible.<sup>121</sup> The former Nike administration area is now National Park Service offices and visitor facilities and the barracks are now offices. The cultural landscape in the immediate area is somewhat stabilized while the remainder of the former fort is managed for natural resources and recreation.<sup>122</sup>

EXISTING CONDITION OF FORT FUNSTON BATTERY BLUFF PANAMA MOUNTS

In 1997, the National Park Service attempted to stabilize the structures and to initiate a full Section 106 compliance for adverse effect to the Panama mounts. The Park Service worked with Gary Ung, a

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116 Martini, John, Military Historian - GGNRA, *Recommendations for Historic Preservation for Northern Fort Funston - GGNRA*, 1975.

117 San Jose Mercury News, July 10, 1982.

118 "Humans hurt - and help - threatened birds - Fort Funston," *The Independent*, August 20, 1996.

119 Martini, John, Military Historian- GGNRA, *Recommendations for Historic Preservation for Northern Fort Funston - GGNRA*, 1975.

120 "Humans hurt - and help - threatened birds - Fort Funston," *The Independent*, August 20, 1996.

121 Halsey, Bud, Fort Barry Nike Missile Site Manager, Member of Coast Defense Study Group and retired from U.S. Army, Interview by author, Fort Barry, January 13, 1998.

122 Haller, Stephen, Historian, National Park Service, Memo dated December 15, 1997.

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structural engineer for the National Park Service to determine the cost of stabilization and obtained an initial plan and estimate of \$16,000. The Park Service then contacted several reputable moving contractors who gave bids of approximately \$250,000, which precluded being able to save the structures. The high cost was due to the difficulty of accessing the site and protecting the structures in the process. The Park Service then decided to initiate full compliance with Section 106 of the National Historic Preservation Act, to address the adverse effect to the historic properties by leaving them in the end to be eroded by nature. As a mitigation measure, the National Park Service, through the architecture firm of Backen Arrigoni & Ross, hired the historic preservation firm of Carey & Co. to undertake an Historic American Engineering Record (HAER) documentation of the Panama mounts, which is the purpose of this report.<sup>123</sup>

As of the date of this report, due to erosion, the two 270-degree Panama mounts and one 180-degree mount have slipped over the cliff and fallen to the beach and are visible. Generally, only two are visible, but during the winter, the third one is uncovered by tidal action. As of December 15, 1997, all three were visible. The last remaining 180-degree Panama mount was dangling on the bluff until December of 1997, when while completing this report, this mount crashed intact onto the beach below, where it is still visible.<sup>124</sup>

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1936 Fire Control Diagram, Eventual Status, Harbor Defenses of San Francisco.

1936 Tactical Organization, The Harbor Defenses of San Francisco.

1937 155mm Gun Battery, Fort Funston, Gun Block and Details, 180-degree Traverse. U.S. Army

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1937 Fire Control Diagram - Eventual Status - Harbor Defenses of San Francisco, California, Annexes to the Secretary of War's Harbor Defense Project of 1937.

1937 Eventual Field of Fire and Proposed Fire Control Stations for 155mm Battery - Fort Funston.

1941 OPN Map, Island of Oahu, Location of Panama Mounts.

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1942 Form 7 Plan of Battery Emplacements from Report of Completed Works, Fort Rosecrans 155mm Emplacements, San Diego, California.

1942 Form 7 Plan of Battery Emplacements from Report of Completed Works, Coronado Heights, Battery Imperial, San Diego, California.

1943 Harbor Defenses of Los Angeles (HDLA) Tactical Positions Chart C.

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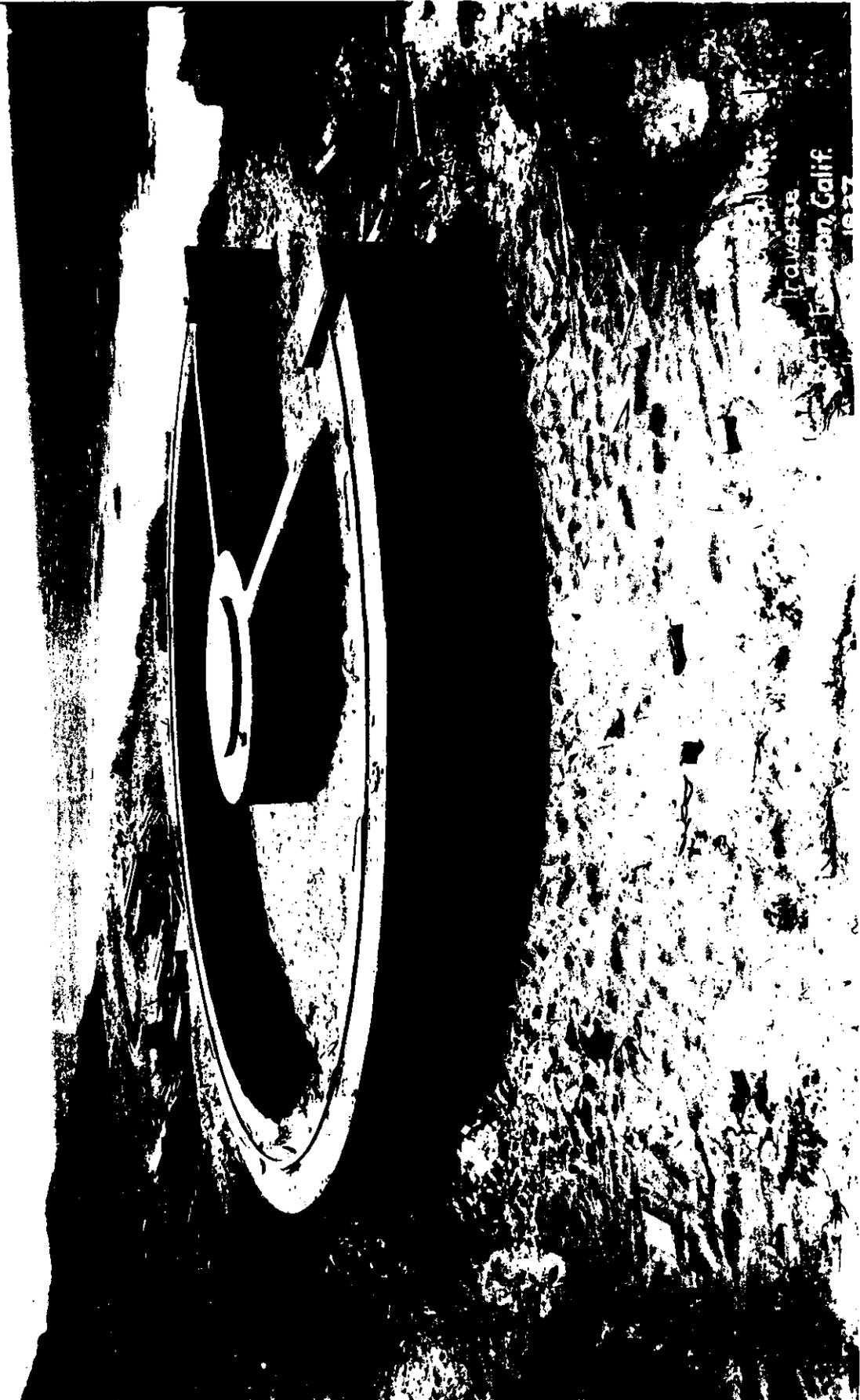
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1994 Vicinity Map of HDSF (courtesy of Brian Chin from "*Artillery At the Golden Gate - The Harbor Defenses of San Francisco in World War II.*")

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FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

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Photocopy of Photograph  
(Original print located at  
Park Archives and Record Center,  
GGNRA, San Francisco)  
Fort Funston 155mm Gun Block  
270-Degree Traverse, June 23, 1937

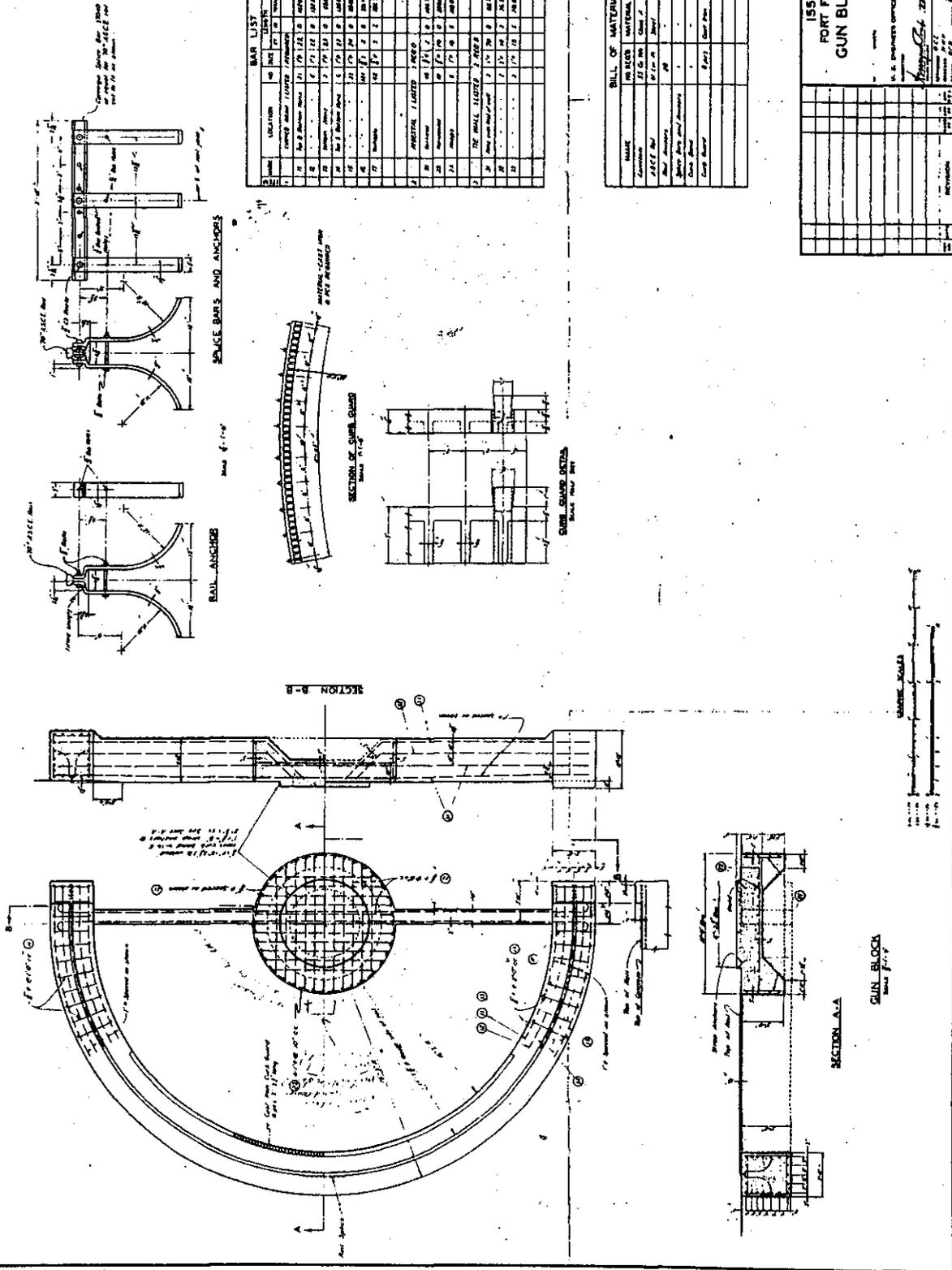


Traverse  
Fort Funston, Calif.

Photocopy  
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 155MM GUN  
 BATTERY FORT  
 FUNSTON, 180-  
 DEGREE  
 TRAVERSE  
 April 21,  
 1937

COMPS OF ENGINEERS, U. S. ARMY

WAR DEPARTMENT



NO.	LOCATION	BAR LIST		DETAILS
		NO.	TYPE	
1	RAIL	1	RAIL	RAIL
2	RAIL ANCHOR	2	RAIL ANCHOR	RAIL ANCHOR
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4	RAIL ANCHOR	4	RAIL ANCHOR	RAIL ANCHOR
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NAME	QUANTITY	REMARKS
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RAIL ANCHOR	26	RAIL ANCHOR
RAIL ANCHOR	27	RAIL ANCHOR
RAIL ANCHOR	28	RAIL ANCHOR
RAIL ANCHOR	29	RAIL ANCHOR
RAIL ANCHOR	30	RAIL ANCHOR
RAIL ANCHOR	31	RAIL ANCHOR
RAIL ANCHOR	32	RAIL ANCHOR
RAIL ANCHOR	33	RAIL ANCHOR
RAIL ANCHOR	34	RAIL ANCHOR
RAIL ANCHOR	35	RAIL ANCHOR
RAIL ANCHOR	36	RAIL ANCHOR
RAIL ANCHOR	37	RAIL ANCHOR
RAIL ANCHOR	38	RAIL ANCHOR
RAIL ANCHOR	39	RAIL ANCHOR
RAIL ANCHOR	40	RAIL ANCHOR
RAIL ANCHOR	41	RAIL ANCHOR
RAIL ANCHOR	42	RAIL ANCHOR
RAIL ANCHOR	43	RAIL ANCHOR
RAIL ANCHOR	44	RAIL ANCHOR
RAIL ANCHOR	45	RAIL ANCHOR
RAIL ANCHOR	46	RAIL ANCHOR
RAIL ANCHOR	47	RAIL ANCHOR
RAIL ANCHOR	48	RAIL ANCHOR
RAIL ANCHOR	49	RAIL ANCHOR
RAIL ANCHOR	50	RAIL ANCHOR

155 MM GUN BATTERY  
 FORT FUNSTON CALIFORNIA  
 GUN BLOCK AND DETAILS  
 180° TRAVERSE

U. S. ENGINEERS OFFICE AND HEADQUARTERS, CALIF. STATE ENGINEERS  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 DATE: 5-1-37

REPORT OF COMPLETED WORKS - SEA COAST FORTIFICATIONS

HARBOR DEFENSES OF SAN FRANCISCO  
FORT FUNSTON, CALIFORNIA  
155 MM GUN BATTERY  
No. of guns-4 Caliber-155 MM. Carriage

Corrected to Jan. 18, 1943.

Form 7

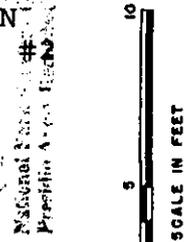


SCALE IN FEET

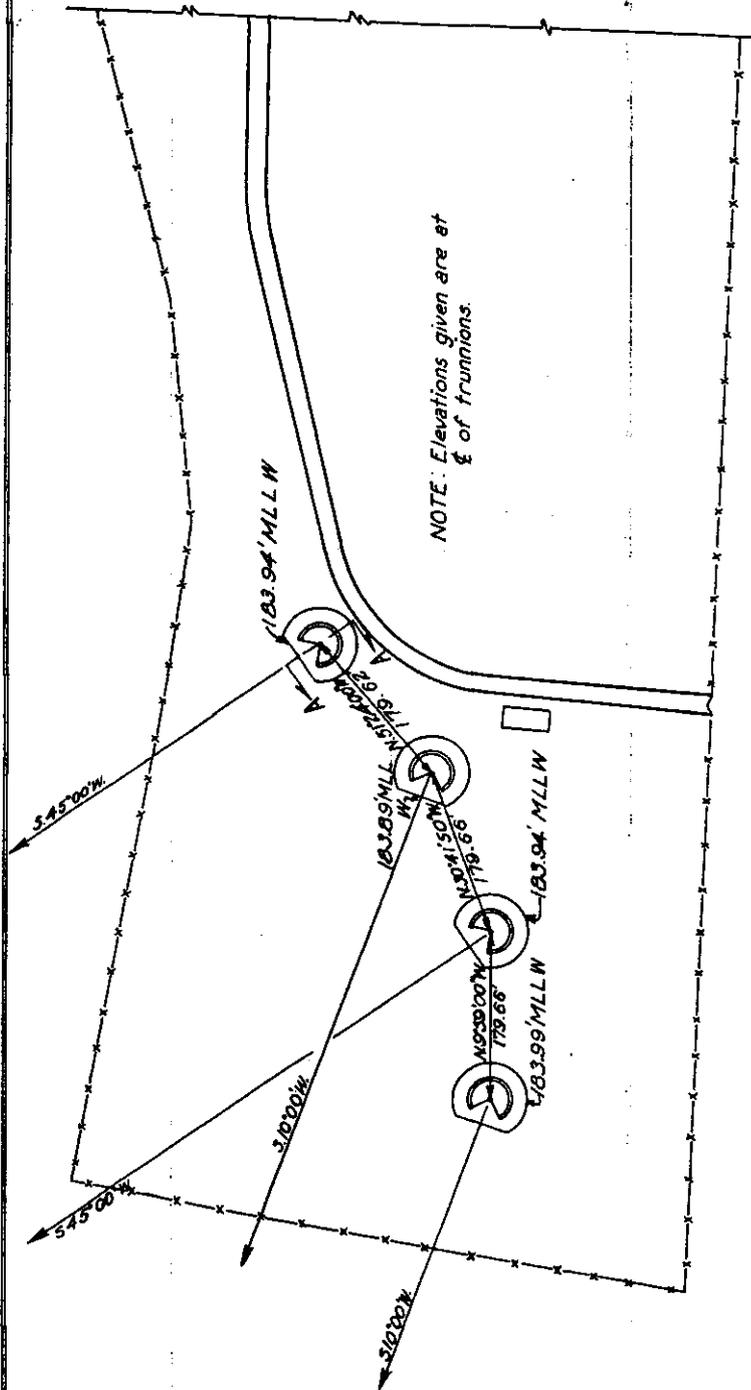
FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Page 32

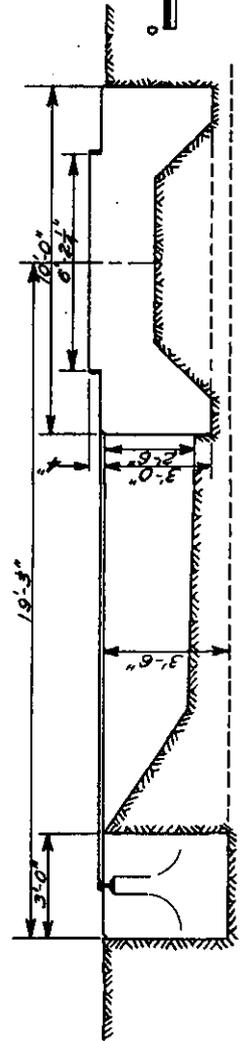
Photocopy of drawing  
(Original located at Park Archive  
and Record Center, SF)  
FORT FUNSTON 155MM GUN  
BATTERY PANAMA MOUNTS #2  
January 18, 1943



SCALE IN FEET



LOCATION PLAN



SECTION A-A

National Park Service  
Presidio Area, Fort Funston

CONFIDENTIAL

REPORT OF COMPLETED WORKS - SEACOAST FORTIFICATIONS  
(Gun and Mortar Batteries)

HARBOR DEFENSES OF San Francisco  
FORT Funston  
BATTERY Bluff  
No. of Guns 4 Caliber 155 MM Carriage Mobile

Form 1 Corrected to Jan. 18, 1943

GENERAL:

Battery commenced 12-29-41  
Battery completed 2-16-42  
Date of transfer July, 19, 1948  
Cost of date of transfer \$13,904.71  
Materials of construction Concrete-Stl  
Types of cement Portland  
WATER & SEWER:  
Connected to water supply No  
Connected to sewer No  
Type of latrine none

12-29-41  
2-16-42  
July, 19, 1948  
\$13,904.71  
Concrete-Stl  
Portland  
No  
No  
none  
Mobile Mounts  
Variable  
MLW

ELECTRIC CUR EFF:

Sources of Max. kv. required for lights  
Max. kw. required for motors  
Present condition of battery  
Rooms wet or dry  
How ventilated  
Type of data transmission  
Remarks-

Not Casemated

Transfer of Panama mounts only.

Trunnion elevation in btry  
Datum plane

ARMAMENT not installed by Corps of Engineers.

Emplacement Number	Cal.	Length	Guns or Mortars		Manufacturer mounted	Type	Carriages		Motor
			model	Serial No.			Serial No.	Manufacturer	
1									
2									
3									
4									
5									
6									
7									
8									

HOISTS

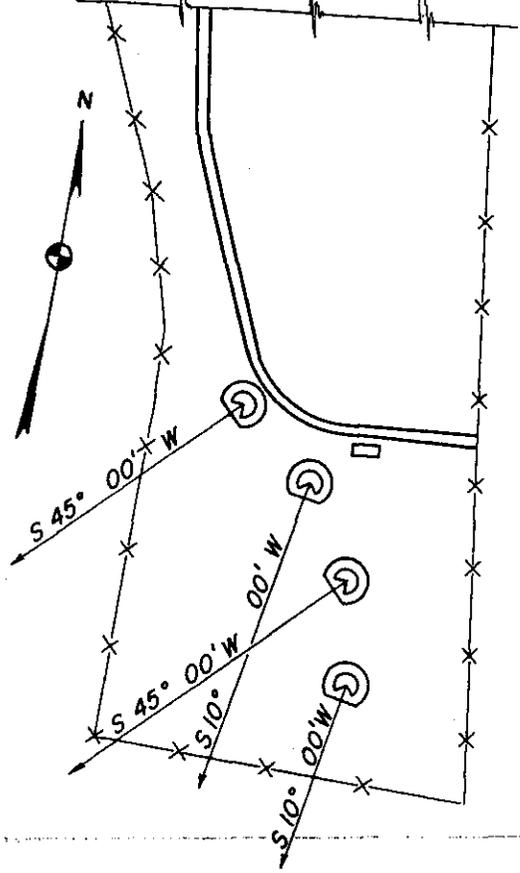
Emplacement Number	Type	Delivery	Serial No.	Maker	Motor H.P.	Volts	RPH	Type of control	Date of transfer	Re modeled
										for long points
1										
2										

CONFIDENTIAL

10/10/48 P. 10/10/48

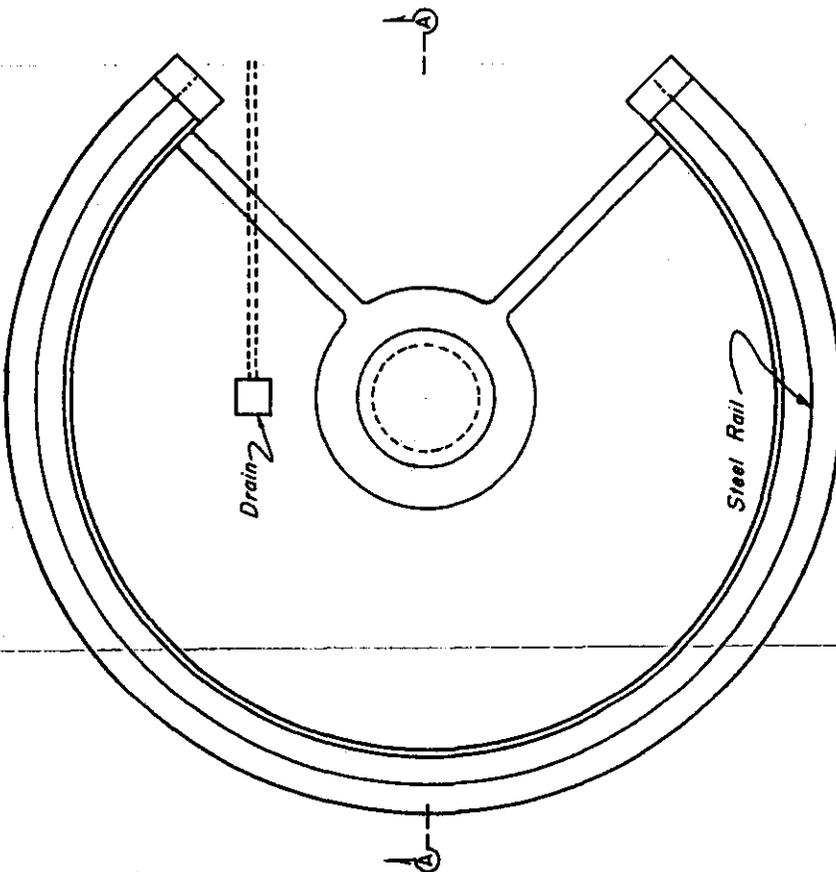
155 MM GUN BATTERY  
FORT FUNSTON  
CALIFORNIA

Photocopy of drawing  
(Original located at Park  
Archive and Record Center, SF)  
FORT FUNSTON 155  
MM GUN BATTERY  
PANAMA MOUNTS #2  
1943

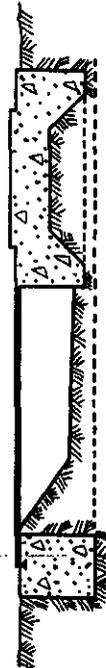


LOCATION PLAN  
0 200 400 600  
SCALE IN FEET

U.S. ENGINEER OFFICE SAN FRANCISCO, CALIFORNIA 43-1-71



PLAN  
0 5 10 15  
SCALE IN FEET



SECTION A-A

FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Page 35  
Photocopy of photograph made from  
original slide

(Original slide located in files of  
Alvin Grobmeier, CDSG)

Photographer, Alvin Grobmeier, August  
26, 1967

FORT FUNSTON BATTERY BLUFF PANAMA MOUNTS

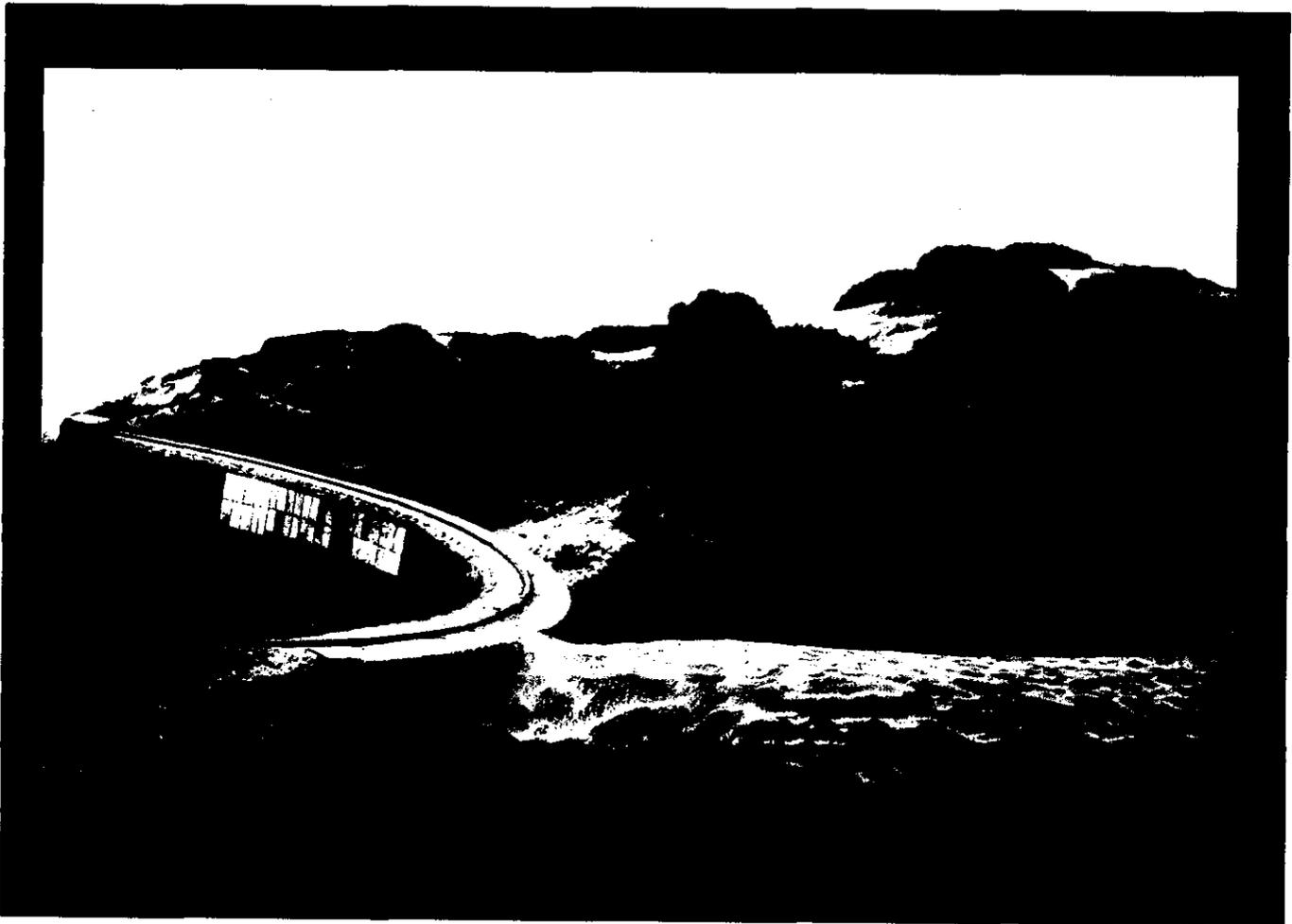


FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A

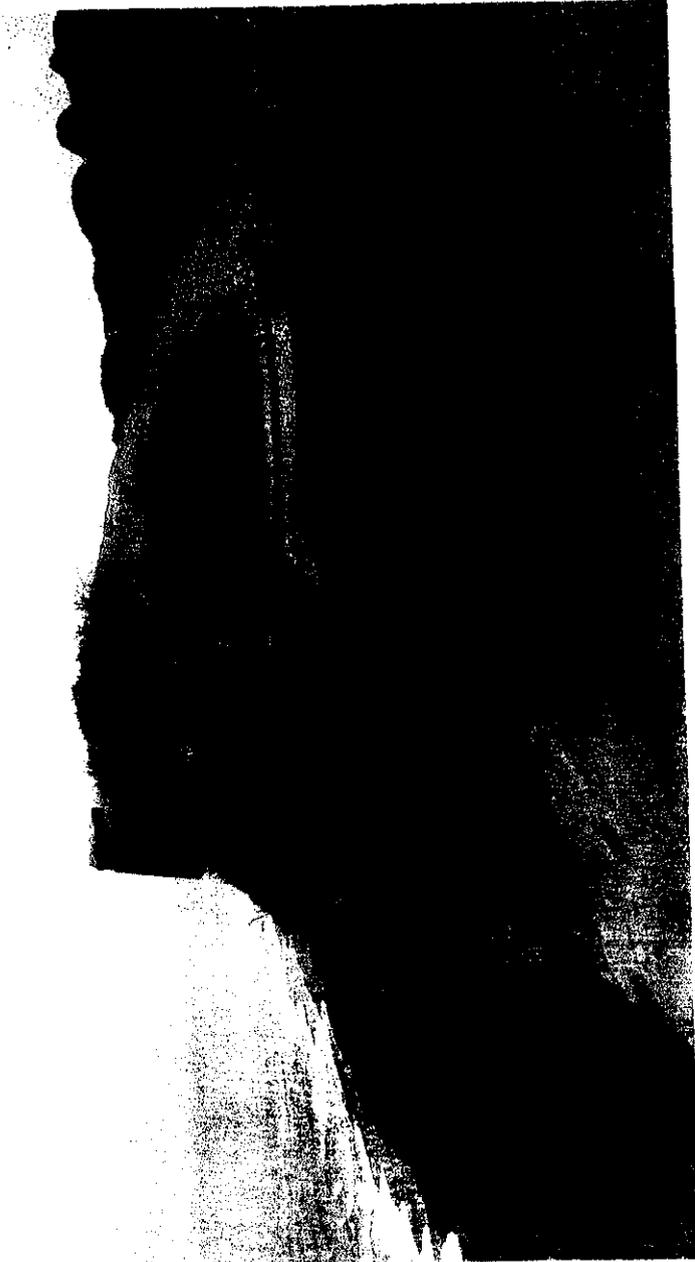
Page 36

Photocopy of photograph made from  
original slide  
(Original slide located in files of  
Alvin Grobmeier, CDSG)  
Photographer, Alvin Grobmeier, August  
26, 1967  
FORT FUNSTON BATTERY BLUFF PANAMA  
MOUNTS



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Page 37  
Photocopy of a photocopied  
photo  
(Original negative located at  
Golden Gate National Recreation  
Area, NPS)  
Linda Bogardus, Photographer,  
1976  
PANAMA MOUNT, BATTERY BLUFF  
FORT FUNSTON - LOOKING NORTH



FORT FUNSTON 155MM GUN  
BATTERY ELLEF  
PANAMA MOUNTS

HAER No. CA-193-A

Page 38

Photocopy of photo. (Original at Park Archive and  
Record Center), Courtesy of Fort Point/Presidio  
Hist. Assoc. July 1938 F. FUNSTON ROTC STUDENTS FIRING

155MM  
GUN



(Original located at Park Archive and  
Record Center, SF)  
Courtesy of Fort Point/Presidio Historical  
Association. July 1938  
FORT FUNSTON, ROTC STUDENTS FIRING SERVICE

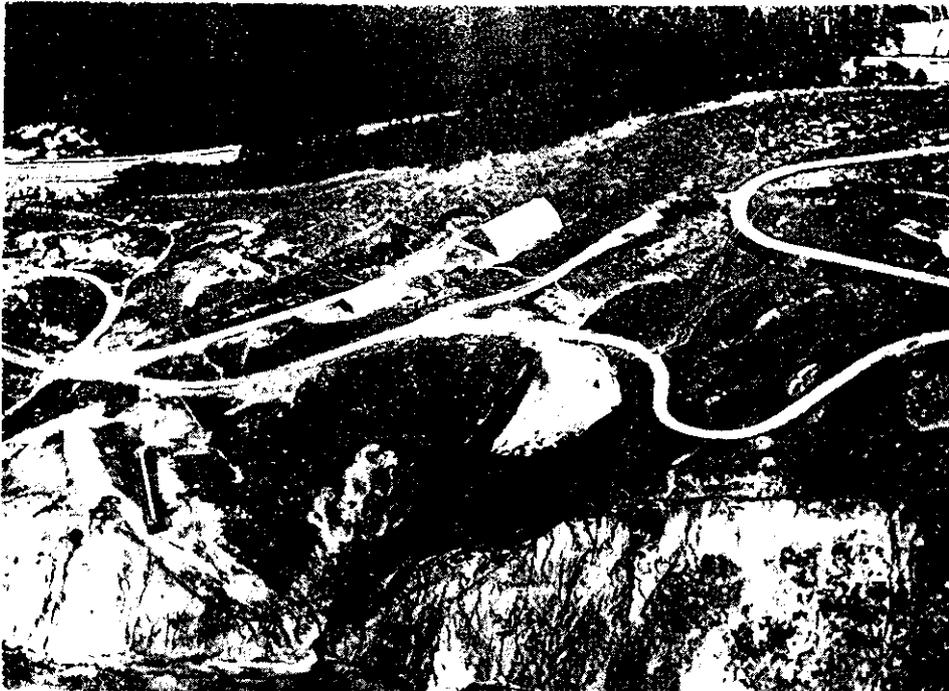
PRAC-  
TICE  
WITH  
155MM  
GUNS



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Page 40  
Photocopy of photograph in  
book  
(Original located in "Artillery  
At The Golden Gate," by Brian  
Chin) 1994  
Kenneth Cooper, Photographer  
Used courtesy of Brian Chin

AIR VIEW OF FORT FUNSTON FROM  
16-INCH BATTERY. EMPTY PANAMA  
MOUNTS OF ABANDONED 155MM GUN  
POSITION ON BLUFF AT LOWER LEFT



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A

Page 41

Photocopy of a photocopied photograph  
(Original negative on file at  
Federal Archives and Records Center,  
San Bruno, CA)

FORT FUNSTON, SAN FRANCISCO, CA  
U.S. Army, Photographer  
Date Unknown





Photocopy of map  
(Original copy located at Park Archive  
and Record Center)  
EVENTUAL FIELD OF FIRE AND PROPOSED  
FIRE CONTROL STATIONS FOR BATTERY  
BLUFF 155MM PANAMA MOUNTS (Annexes to  
Secretary of War's Harbor Defense Project  
of 1937)

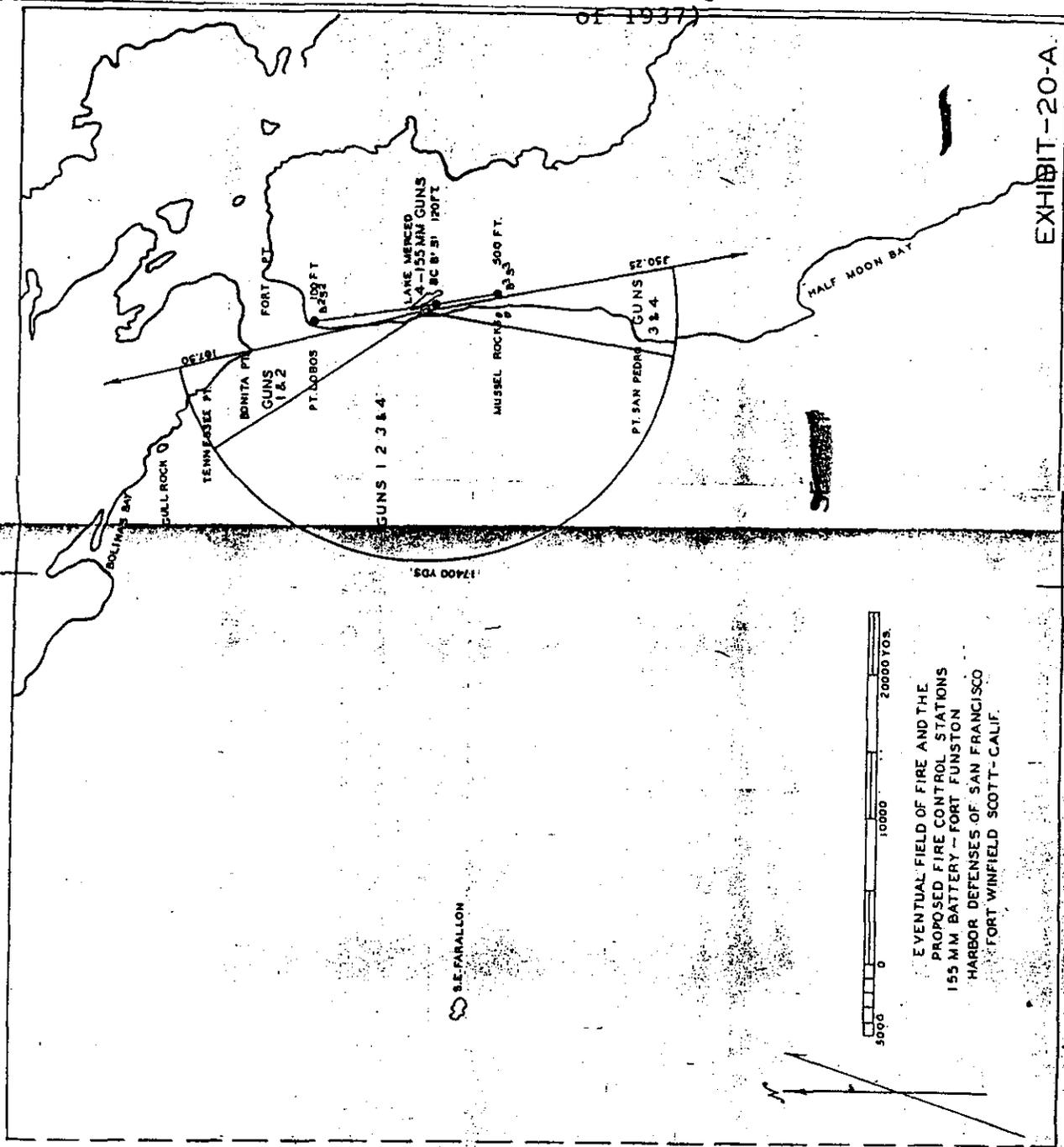


EXHIBIT-20-A

COPY  
PLEASE CREDIT  
NATL PARK SERVICE

EVENTUAL FIELD OF FIRE AND THE  
PROPOSED FIRE CONTROL STATIONS  
155 MM BATTERY - FORT FUNSTON  
HARBOR DEFENSES OF SAN FRANCISCO  
FORT WINFIELD SCOTT - CALIF.

HDSEF DECEMBER  
 1936

Harbor Defense Annexes of 1937

TACTICAL ORGANIZATION  
 THE HARBOR DEFENSES OF SAN FRANCISCO

HARBOR DEFENSE COMMANDER  
 FORT SCOTTY COMMAND

EXECUTIVE

PLANS AND TRAINING

INTELLIGENCE

COMMUNICATIONS

SEARCHLIGHTS

ADMINISTRATIVE STAFF

BARRY GROUPMENT  
 FORT COMMAND

- 1
- 2
- 3
- 4
- 5
- 6

G-1

2-10"R

WALLACE  
 2-12"R

MENDELL  
 2-12"R

ALEXANDER  
 4-12" M

G-2

MINE I

SMITH  
 2-8"R

GUTHRIE  
 2-8"R

O'RORKE  
 4-3"R

MILEY GROUPMENT  
 FORT COMMAND

- 9
- 10
- 11
- 12

G-3

MINE II

CHAMBERLIN  
 2-8"R

CROSBY  
 2-8"R

MCINDOE  
 2-8"R

RATHBONE  
 2-8"R

G-4

SAFFOLD  
 2-12"R

COFFEY  
 3-12"R

SPENCER  
 2-12"R

LIVINGSTON  
 4-12" M

G-5

CHESTER  
 3-12"R

SPRINGER  
 4-12" M

LIVINGSTON  
 4-12" M

FORT BAKER  
 FORT COMMAND

- 7
- 8
- 13
- 14
- 15
- 16
- 17

G-6

2-10"R

NOWE  
 4-12" M

YATES  
 6-3" R

G-7

2-8" RY

BATTERY  
 4-US-GPF

FUNSTON GROUPMENT  
 FORT COMMAND

- 13
- 14
- 15
- 16
- 17

G-11

BATTERY  
 NO. 1 A.A.

3-AA  
 S.L. PLATS

5-AA  
 M.G. PLATS

G-12

BATTERY  
 NO. 2 A.A.

4-AA  
 S.L. PLATS

3-AA  
 M.G. PLATS

BATTERY  
 NO. 3 A.A.

2-AA  
 S.L. PLATS

4-AA  
 M.G. PLATS

BATTERY  
 NO. 4 A.A.

1-AA  
 S.L. PLATS

2-AA  
 M.G. PLATS

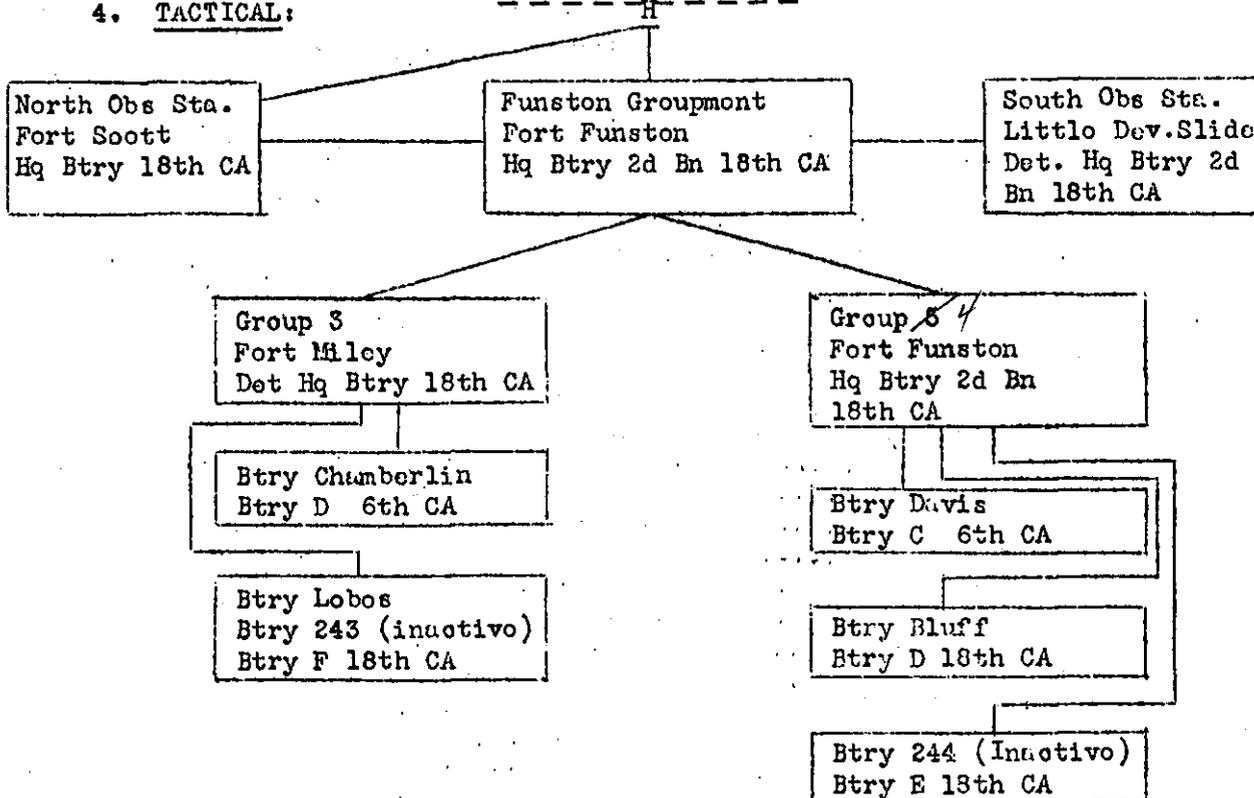
5-AA  
 S.L. PLATS

4-AA  
 M.G. PLATS

EXHIBIT - I - A.

O.N.D.A.E. - DEC. 1936.

G.K.W.

4. TACTICAL:R E S T R I C T E D

5. FORT COMMANDS: a. The Commanding Officer, 130th C.A. Bn (AA) is designated as Land Defense Commander, Fort Soott.

b. The Commanding Officer, Group 4, is designated as Land Defense Commander and Assistant Fort Commander, Fort Funston.

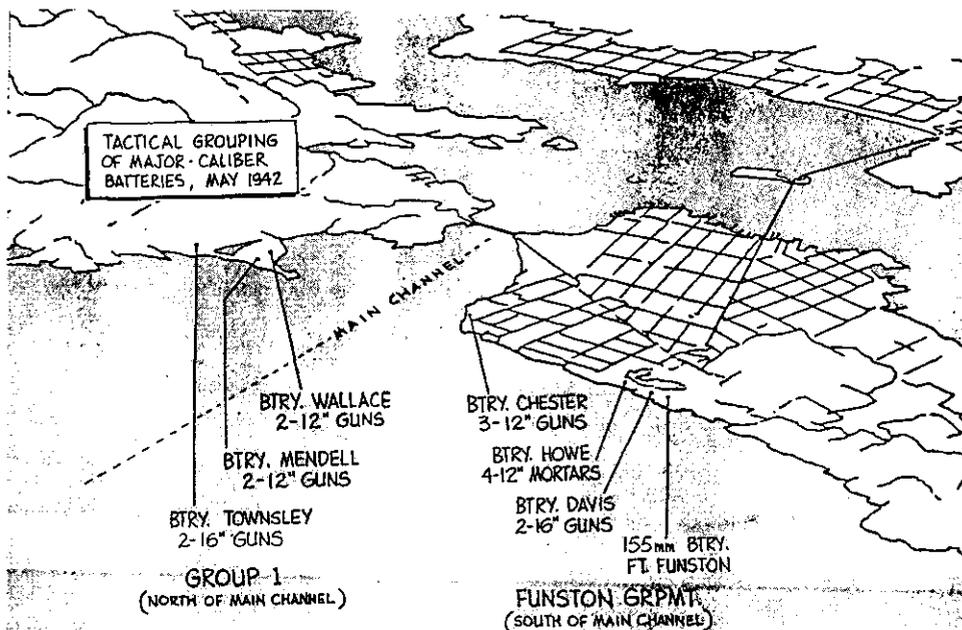
c. The Commanding Officer, Group 3, is designated as Land Defense Commander and Assistant Fort Commander, Fort Miloy.

6. All previous orders and publications in conflict with the above are hereby rescinded.

*K. Rowntree*  
K. ROWNTREE,  
Colonel, 18th C.A.,  
Commanding.

R E S T R I C T E D





Photocopy of map  
in book  
(Original located  
in "Artillery At  
Golden Gate," by Brian  
RICHMOND Chin,  
1994)

Used courtesy of Brian  
Chin  
VICINITY  
MAP OF  
HDSF

MARIN CO.

BOLINAS BAY  
HILL 640  
STINSON BEACH  
ROCKY PT.

MUIR BEACH

TENNESSEE COVE

RODEO BEACH  
PT. BONITA

BAKER BEACH  
PT. LOBOS

SAUSALITO  
HDSF

TIBURON

ANGEL IS.

HORSESHOE COVE  
ALCATRAZ

TREASURE IS.

GOLDEN GATE

FT. MASON  
FT. POINT

HDSF

SAN FRANCISCO

HDSF

DALY CITY

MUSSEL ROCK

MILAGRA KNOB

SAN MATEO CO.

HUNTERS POINT

ALAMEDA

SAN FRANCISCO BAY

PT. SAN PEDRO  
DEVILS SLIDE

GRANADA

REDWOOD CITY

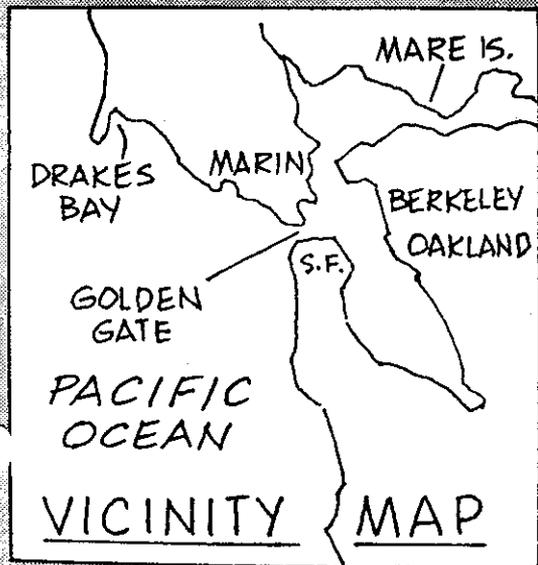
PILLAR POINT

HALF MOON BAY

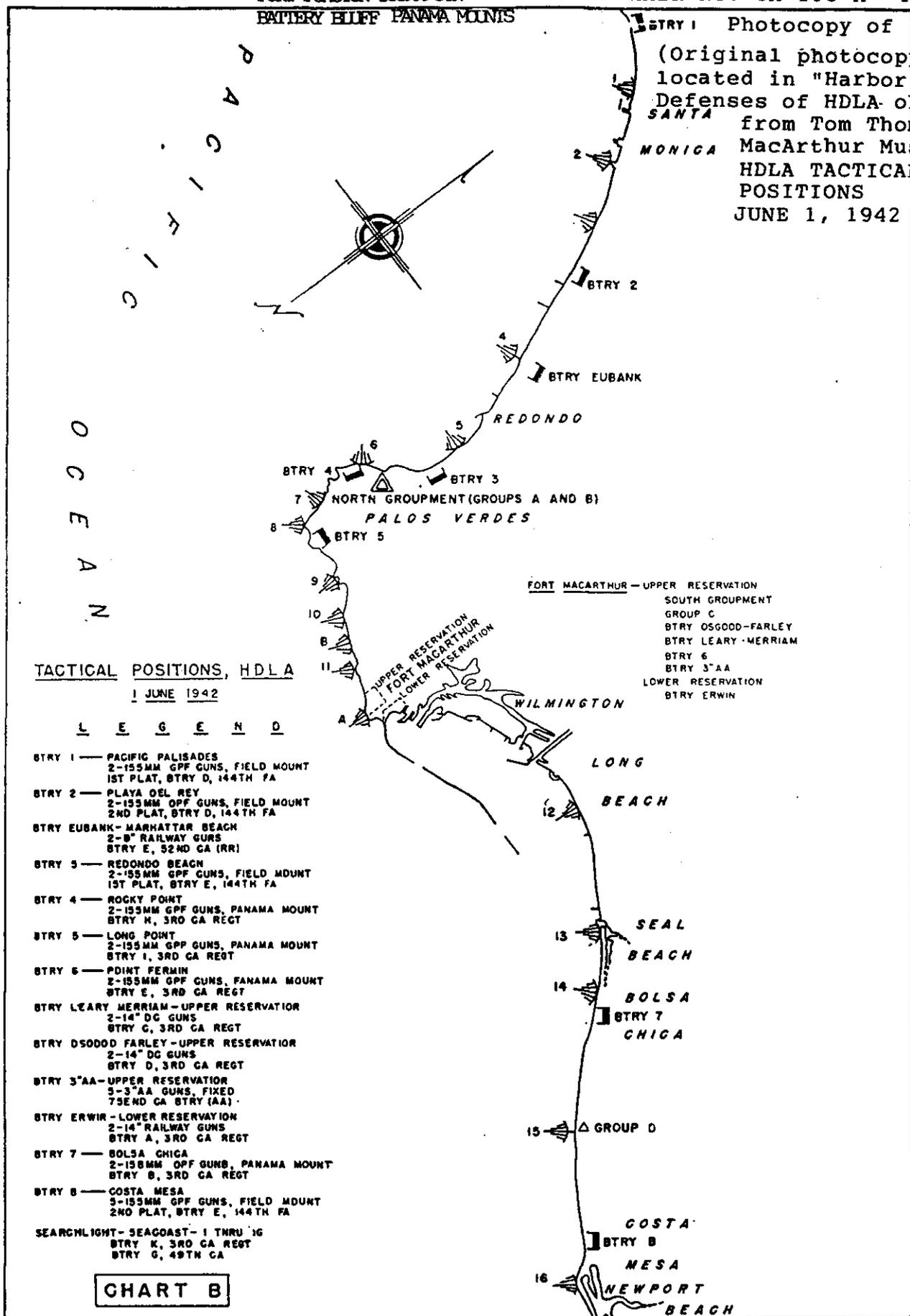
PACIFIC OCEAN



MILES



BTRY 1 Photocopy of map  
(Original photocopy  
located in "Harbor  
Defenses of HDLA obtained  
from Tom Thomas, Ft.  
MacArthur Museum)  
HDLA TACTICAL  
POSITIONS  
JUNE 1, 1942



TACTICAL POSITIONS, HDLA  
1 JUNE 1942

L E G E N D

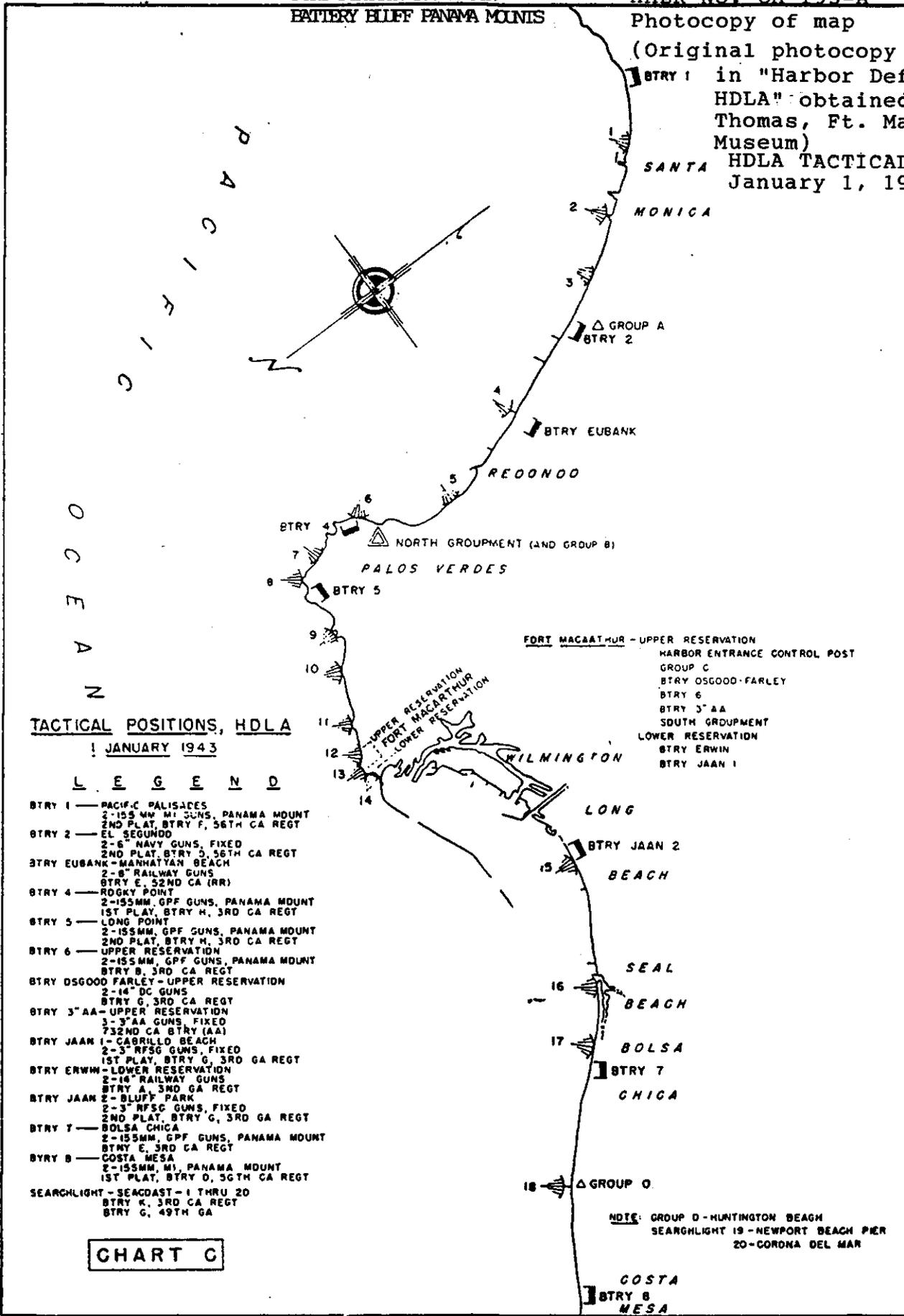
- BTRY 1 — PACIFIC PALISADES  
2-155MM GPF GUNS, FIELD MOUNT  
1ST PLAT, BTRY D, 144TH FA
- BTRY 2 — PLAYA DEL REY  
2-155MM GPF GUNS, FIELD MOUNT  
2ND PLAT, BTRY D, 144TH FA
- BTRY EUBANK — MARHATTAR BEACH  
2-8" RAILWAY GUNS  
BTRY E, 52ND CA (RR)
- BTRY 3 — REDONDO BEACH  
2-155MM GPF GUNS, FIELD MOUNT  
1ST PLAT, BTRY E, 144TH FA
- BTRY 4 — ROCKY POINT  
2-155MM GPF GUNS, PANAMA MOUNT  
BTRY H, 3RD CA REGT
- BTRY 5 — LONG POINT  
2-155MM GPF GUNS, PANAMA MOUNT  
BTRY I, 3RD CA REGT
- BTRY 6 — POINT FERMIN  
2-155MM GPF GUNS, PANAMA MOUNT  
BTRY E, 3RD CA REGT
- BTRY LEARY MERRIAM — UPPER RESERVATION  
2-14" DG GUNS  
BTRY C, 3RD CA REGT
- BTRY OSOOD FARLEY — UPPER RESERVATION  
2-14" DG GUNS  
BTRY D, 3RD CA REGT
- BTRY 3'AA — UPPER RESERVATION  
3-3" AA GUNS, FIXED  
75ND CA BTRY (AA)
- BTRY ERWIN — LOWER RESERVATION  
2-14" RAILWAY GUNS  
BTRY A, 3RD CA REGT
- BTRY 7 — BOLSA CHICA  
2-155MM GPF GUNS, PANAMA MOUNT  
BTRY B, 3RD CA REGT
- BTRY 8 — COSTA MESA  
3-155MM GPF GUNS, FIELD MOUNT  
2ND PLAT, BTRY E, 144TH FA
- SEARCHLIGHT — SEACOAST-1 THRU 16  
BTRY K, 3RD CA REGT  
BTRY G, 49TH CA

CHART B



Photocopy of map

(Original photocopy located in "Harbor Defenses of HDLA" obtained from Tom Thomas, Ft. MacArthur Museum)  
HDLA TACTICAL POSITIONS  
January 1, 1943



**TACTICAL POSITIONS, HDLA**  
**1 JANUARY 1943**

**L E G E N D**

- BTRY 1 — PACIFIC PALISADES  
2-155MM M1 GUNS, PANAMA MOUNT  
2ND PLAT, BTRY F, 56TH CA REGT
- BTRY 2 — EL SEGUNDO  
2-6" NAVY GUNS, FIXED  
2ND PLAT, BTRY D, 56TH CA REGT
- BTRY EUBANK — MANHATTAN BEACH  
2-8" RAILWAY GUNS  
BTRY E, 52ND CA (RR)
- BTRY 4 — ROCKY POINT  
2-155MM, GPF GUNS, PANAMA MOUNT  
1ST PLAT, BTRY H, 3RD CA REGT
- BTRY 5 — LONG POINT  
2-155MM, GPF GUNS, PANAMA MOUNT  
2ND PLAT, BTRY H, 3RD CA REGT
- BTRY 6 — UPPER RESERVATION  
2-155MM, GPF GUNS, PANAMA MOUNT  
BTRY B, 3RD CA REGT
- BTRY OSGOOD FARLEY — UPPER RESERVATION  
2-14" DC GUNS  
BTRY G, 3RD CA REGT
- BTRY 3" AA — UPPER RESERVATION  
3-3" AA GUNS, FIXED  
732ND CA BTRY (AA)
- BTRY JAAN 1 — CABRILLO BEACH  
2-3" RFSG GUNS, FIXED  
1ST PLAT, BTRY G, 3RD GA REGT
- BTRY ERWIN — LOWER RESERVATION  
2-14" RAILWAY GUNS  
BTRY A, 3RD GA REGT
- BTRY JAAN 2 — BLUFF PARK  
2-3" RFSG GUNS, FIXED  
2ND PLAT, BTRY G, 3RD GA REGT
- BTRY 7 — BOLSA CHICA  
2-155MM, GPF GUNS, PANAMA MOUNT  
BTRY E, 3RD CA REGT
- BTRY B — COSTA MESA  
2-155MM, M1, PANAMA MOUNT  
1ST PLAT, BTRY D, 36TH CA REGT
- SEARCHLIGHT — SEACAST — 1 THRU 20  
BTRY K, 3RD CA REGT  
BTRY G, 49TH GA

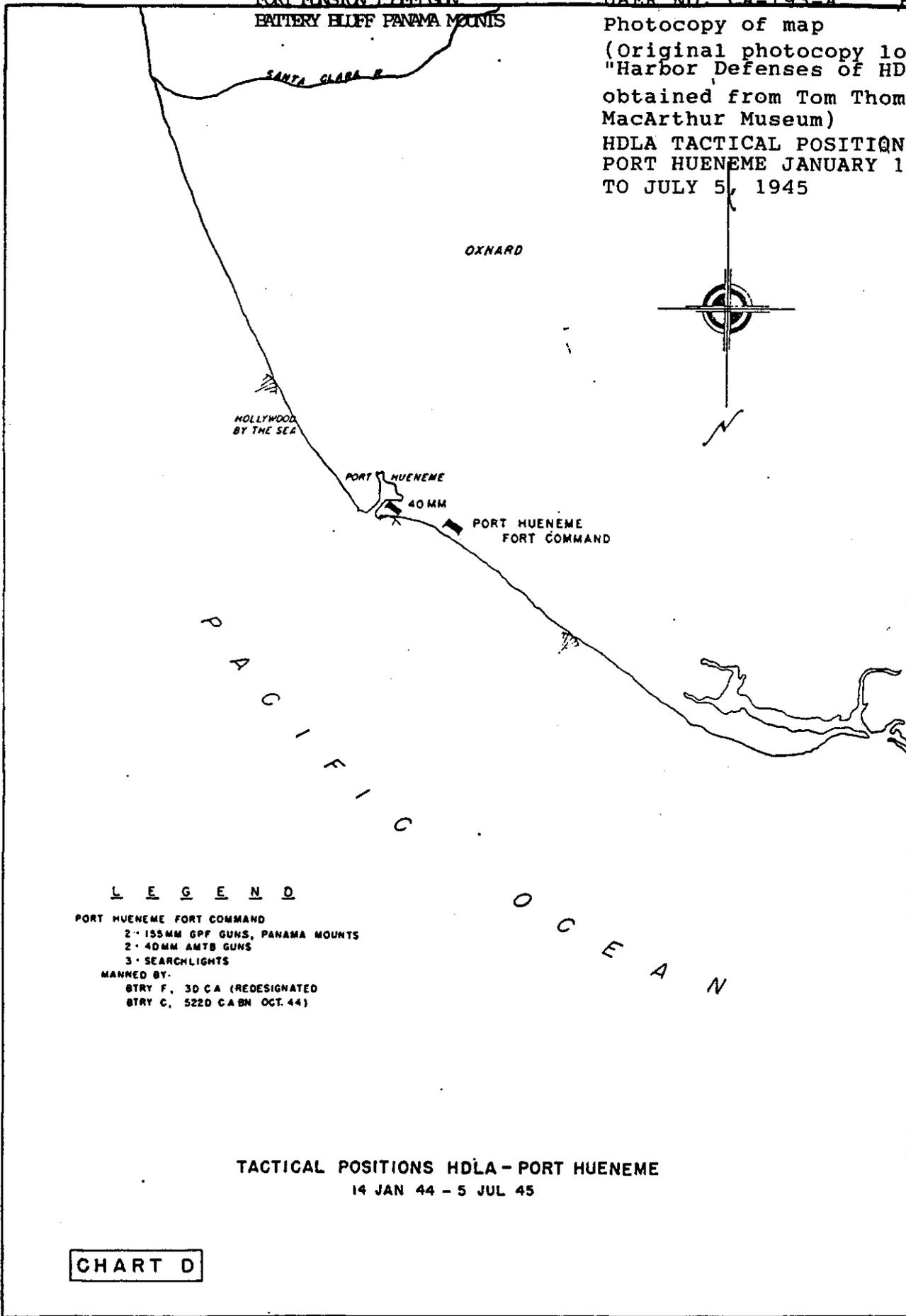
- FORT MACARTHUR — UPPER RESERVATION
- HARBOR ENTRANCE CONTROL POST
- GROUP C
- BTRY OSGOOD-FARLEY
- BTRY 6
- BTRY 3" AA
- SOUTH GROUPMENT
- LOWER RESERVATION
- BTRY ERWIN
- BTRY JAAN 1

NOTE: GROUP D — HUNTINGTON BEACH  
SEARCHLIGHT 19 — NEWPORT BEACH PIER  
20 — CORDONA DEL MAR

**CHART C**



Photocopy of map  
(Original photocopy located in  
"Harbor Defenses of HDLA"  
obtained from Tom Thomas, Ft.  
MacArthur Museum)  
HDLA TACTICAL POSITIONS  
PORT HUENEME JANUARY 14, 1944  
TO JULY 5, 1945



L E G E N D

- PORT HUENEME FORT COMMAND
- 2 - 155MM GPF GUNS, PANAMA MOUNTS
- 2 - 40MM AMTB GUNS
- 3 - SEARCHLIGHTS
- MANNED BY:
- BTRY F, 30 CA (REDESIGNATED
- BTRY C, 522D CABN OCT. 44)

TACTICAL POSITIONS HDLA - PORT HUENEME  
14 JAN 44 - 5 JUL 45

CHART D



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A

Page 52

Photocopy of photograph  
(Original slide located in files  
of Mark Berhow, CDSG)

Photographer, Mark Berhow, 1990  
VENTURA, CALIFORNIA PANAMA MOUNT



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Page 53  
Photocopy of photograph  
(Original slide located in files  
of Mark Berhow, CDSG)  
Photographer, Mark Berhow, Early'  
1990's  
BOLSA CHICA PANAMA MOUNT



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A

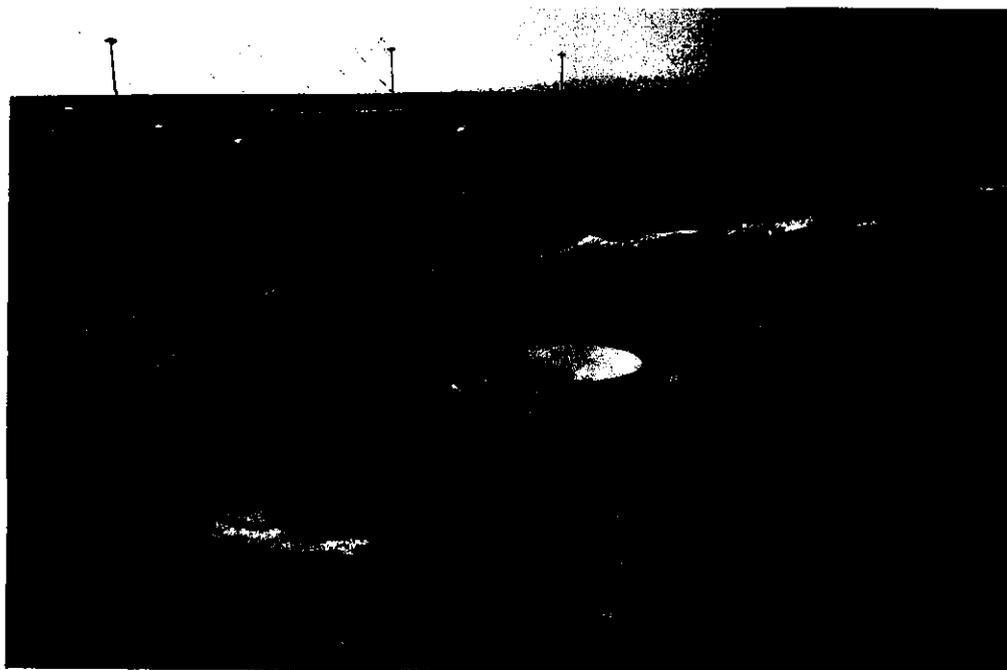
Page 54

Photocopy of photograph  
(Negative located in files of  
Mark Berhow, CDSG)

Photographer, Mark Berhow, 1990

BOLSA CHICA PANAMA MOUNTS

BOLSA CHICA MARINE RESERVE



## M1917 & M1918 Tractor-Drawn Mounts for 155 GUNS

Usual Tubes: M1917, M1918  
Carriages Built: over 2000  
Original Emplacements:  
about 300  
Time Emplaced: 1928-1943

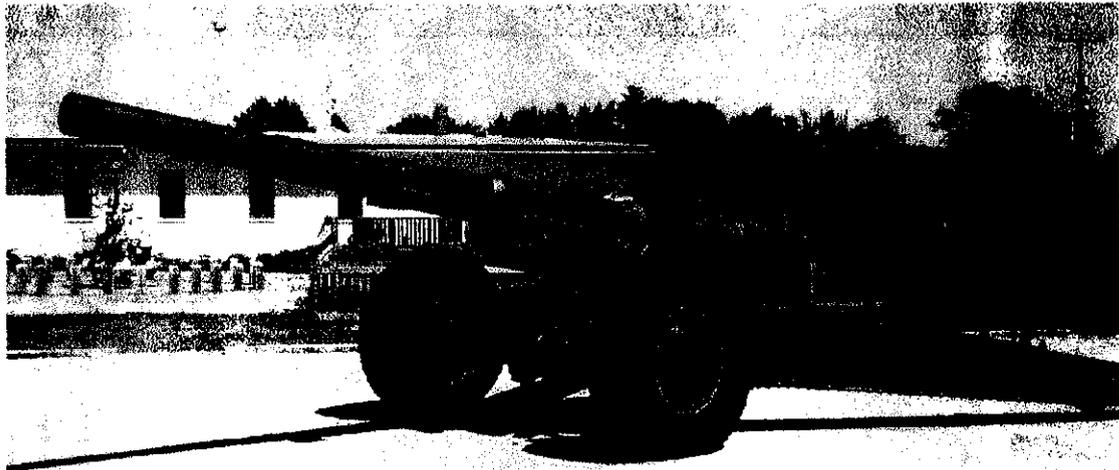
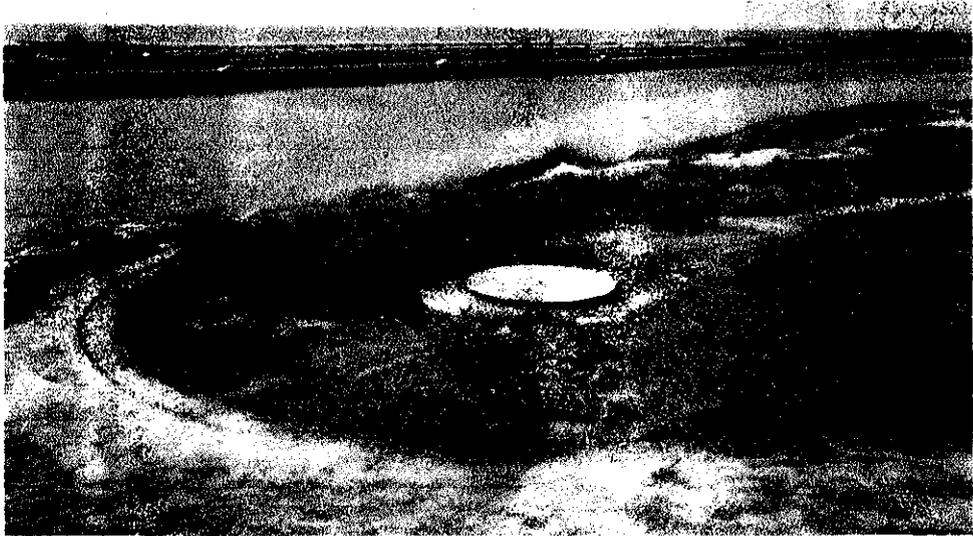
Number of Bolts: none  
Circle Diameter: 17' 8"  
radius center plate to  
racer ring

Notes: Center concrete  
base usually 10' in diameter  
with raised center piece. A  
fairly standardized em-  
placement dating from the  
late 1930s. Approximately  
three hundred concrete  
emplacements were built in  
180, 270, and 360-degree  
varieties. Some were later  
converted, or built new to  
also carry the new 155 mm  
M1 "long-tom". That  
weapon itself also had a  
metal-frame ring for use as  
a fixed emplacement,  
primarily used in overseas  
temporary defenses.

Top: Fort Weaver, HD  
Pearl Harbor, HI, circa  
1935

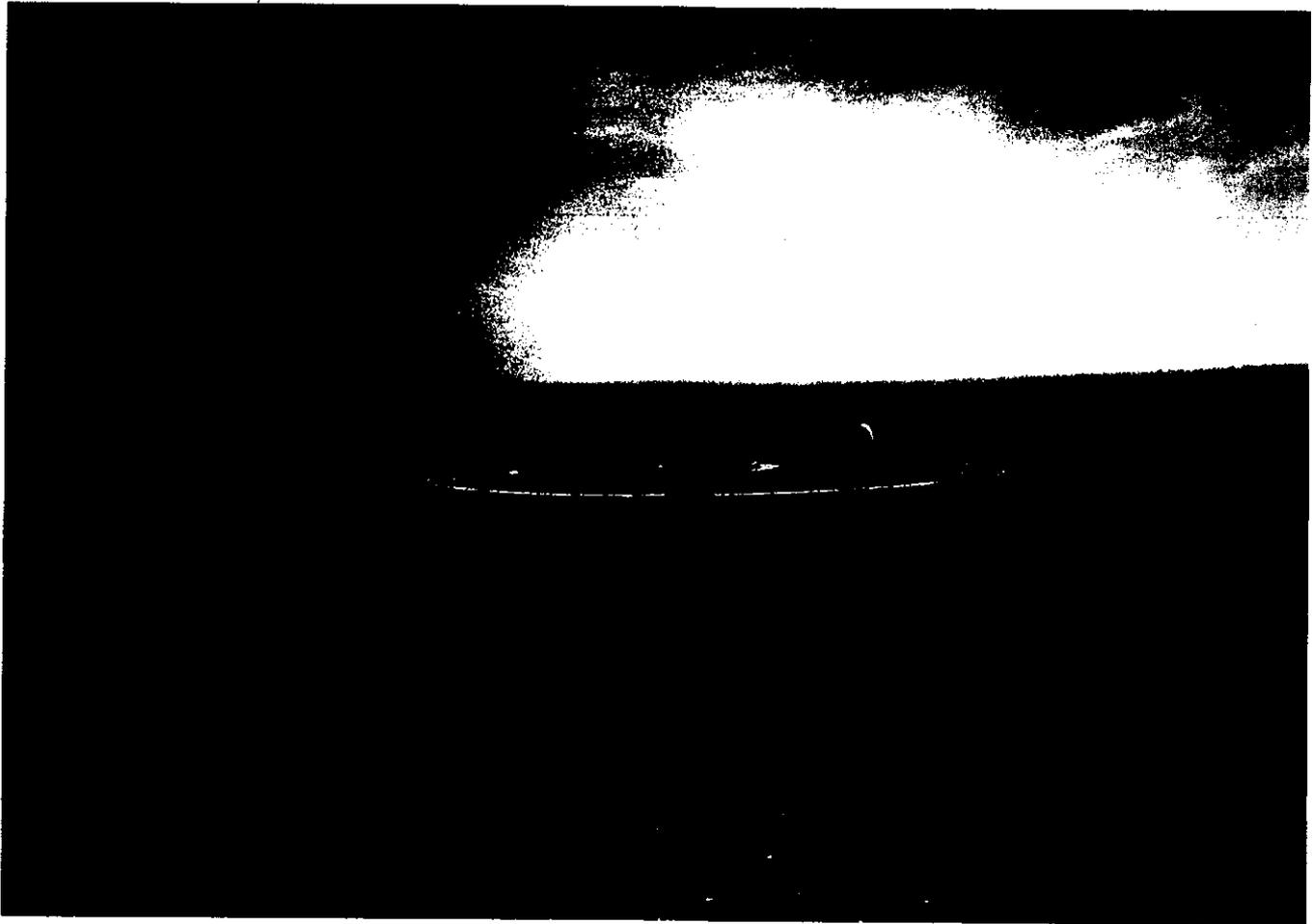
Middle: Bolsa Chica  
Marine Preserve, CA,  
1992 (MAB).

Bottom: Fort Stevens  
State Park, OR,  
1992 (MAB).



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Page 56  
Photocopy of photograph  
(Original slide located in files  
of Mark Berhow, CDSG)  
FORT MACARTHUR PANAMA MOUNTS  
UPPER RESERVATION  
Photographer, Mark Berhow, Early  
1990's



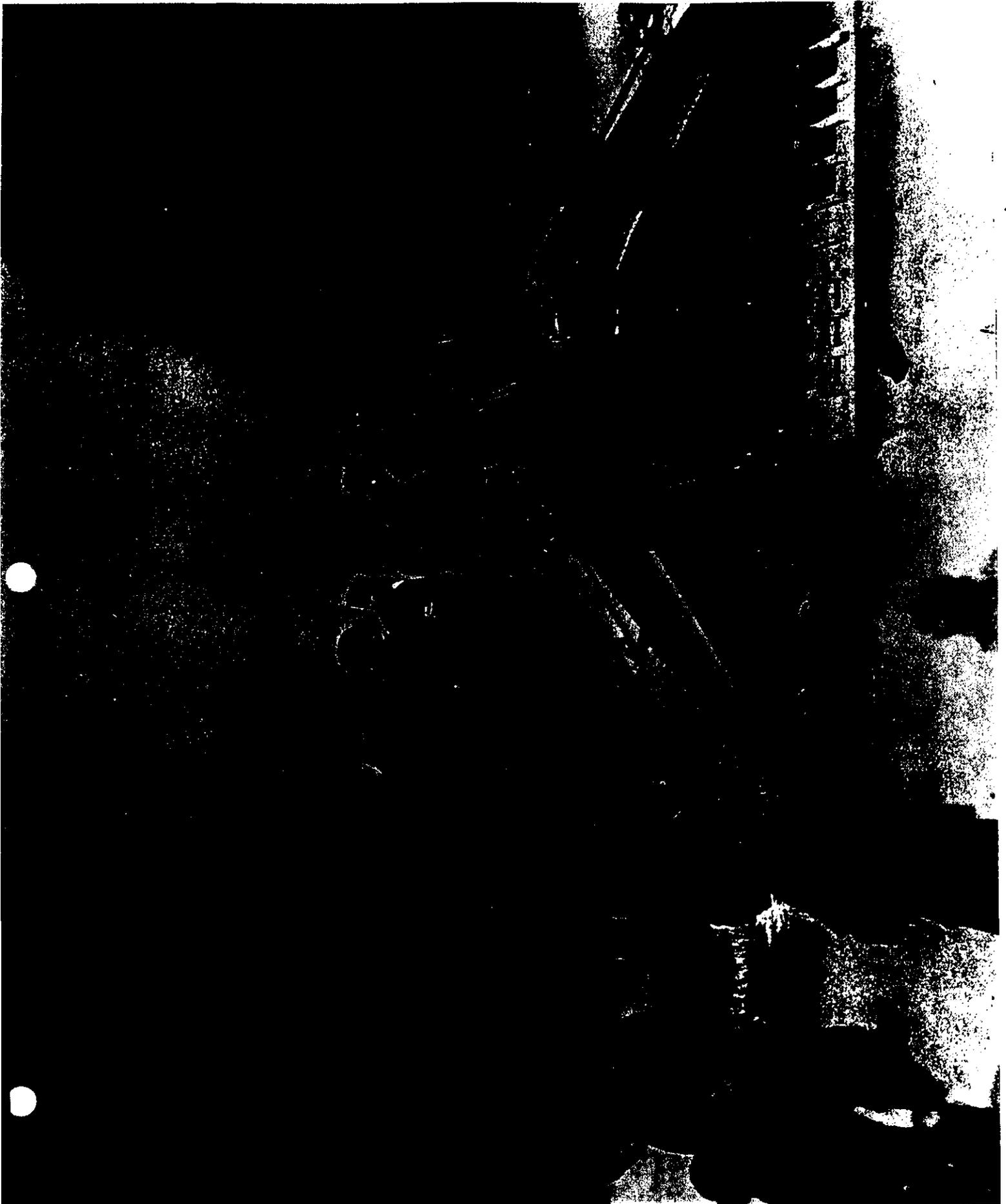
FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Page 57  
Photocopy of a lazer xerox  
(Original photo located in files of  
Tom Thomas, Ft. MacArthur Museum)  
Photographer and date unknown  
PLAYA DEL REY PANAMA MOUNT



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA  
MOUNIS

HAER No. CA-193-A Photocopy of lazer xerox Page 58  
(Original located in files of Tom Thomas, Ft.  
MacArthur Museum) Photographer and date unknown.  
155MM GUN FIRING AT LONG POINT



HAER No. CA-193-A

Photocopy of a lazer xerox  
(Original photo located in files of Tom  
Thomas, Fort MacArthur Museum)

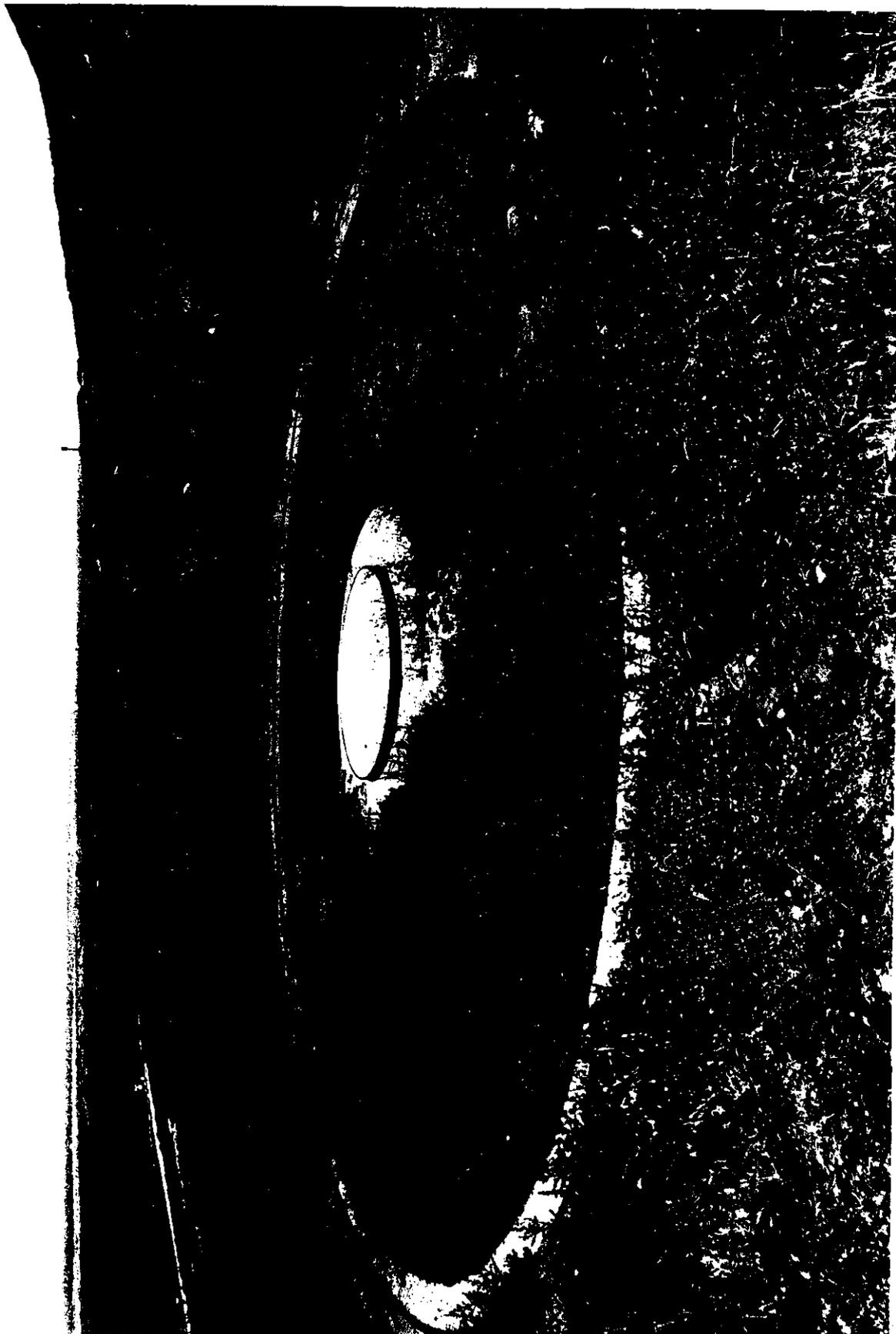
Photographer, date and location unknown  
155MM GUN ON PANAMA MOUNT



Photocopy of photograph (Original  
located in files of Alvin Grobmeier,  
CDSG)

Photographer, Capt. George Snyder,  
July 1991

NO. 4 PANAMA MOUNT BATTERY POINT LOMA,  
SAN DIEGO



FORT FUNSTON 155MM GUN  
BATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A

Page 61

Photocopy of photograph (Original  
located in files of Alvin Grobmeier,  
CDSG)

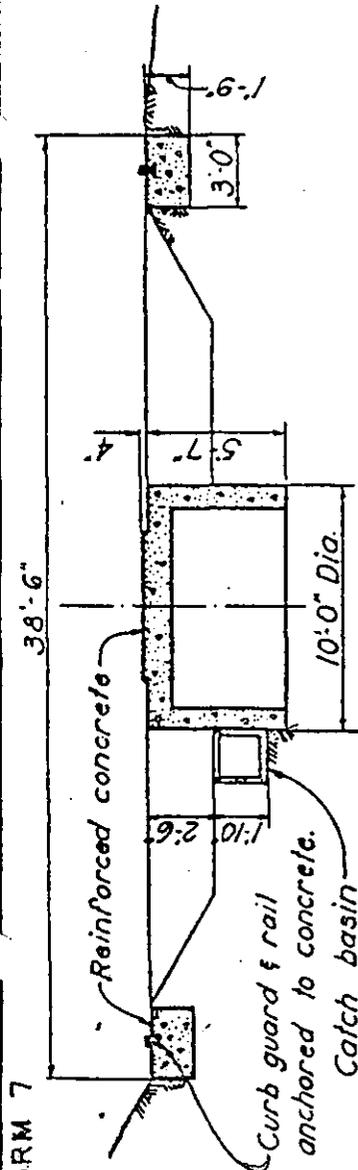
Photographer, Capt. George Snyder,  
July 1991

NO. 4 PANAMA MOUNT BATTERY POINT LOMA  
FORT ROSECRANS, SAN DIEGO

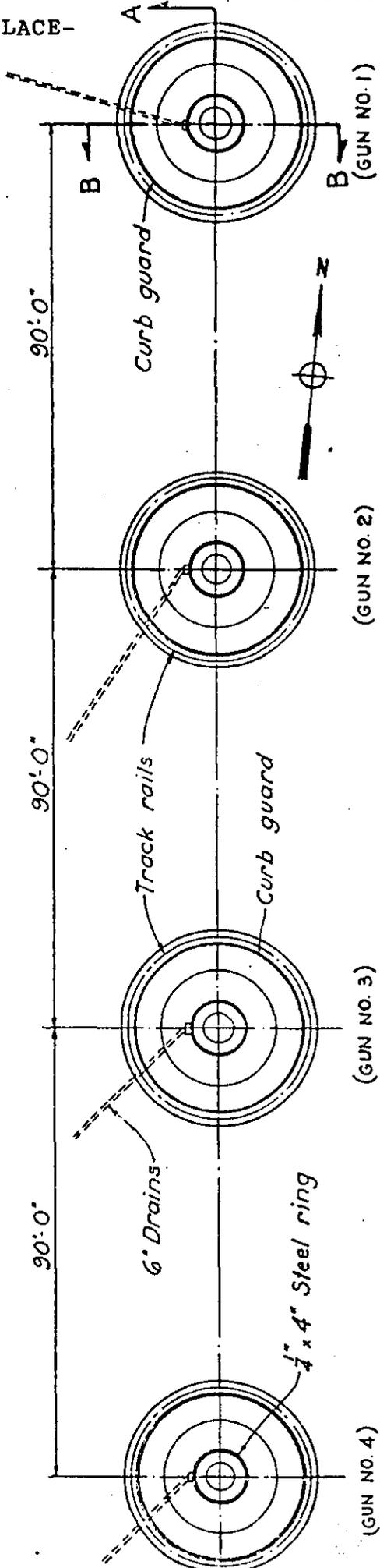


FORT ROSECRANS 155MM EMPLACEMENTS,  
JULY 1942

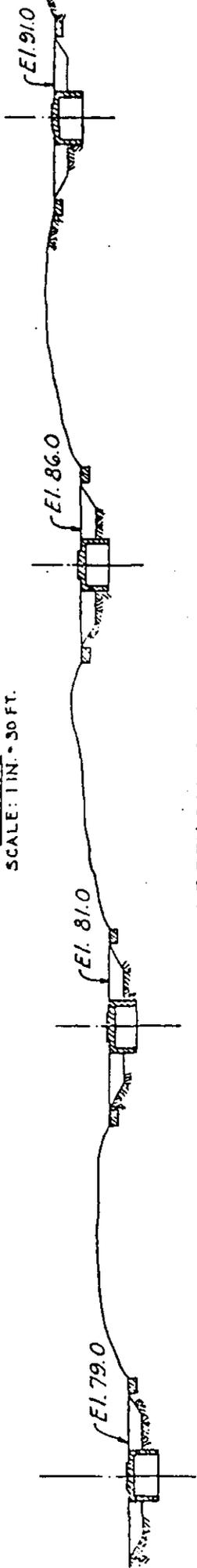
HARBOR DEFENSES OF SAN DIEGO, CALIF.  
FORT ROSECRANS  
155 MM GUN EMPLACEMENTS  
U.S. Engineer Office, Los Angeles, Calif.  
July 1942



TYPICAL SECTION B-B  
SCALE: 1/8 IN. = 1 FT.



PLAN  
SCALE: 1 IN. = 30 FT.

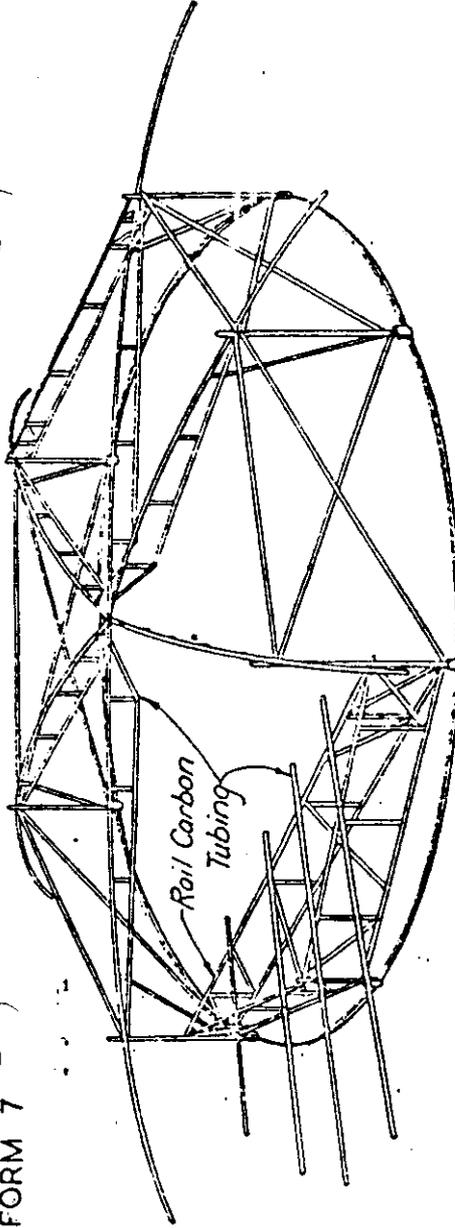


SECTION A-A  
SCALE: 1 IN. = 30 FT.

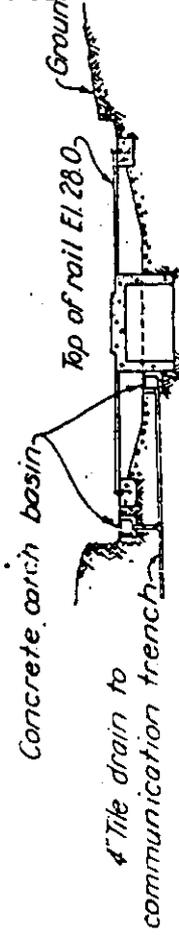
75 9 2P 3P 7P



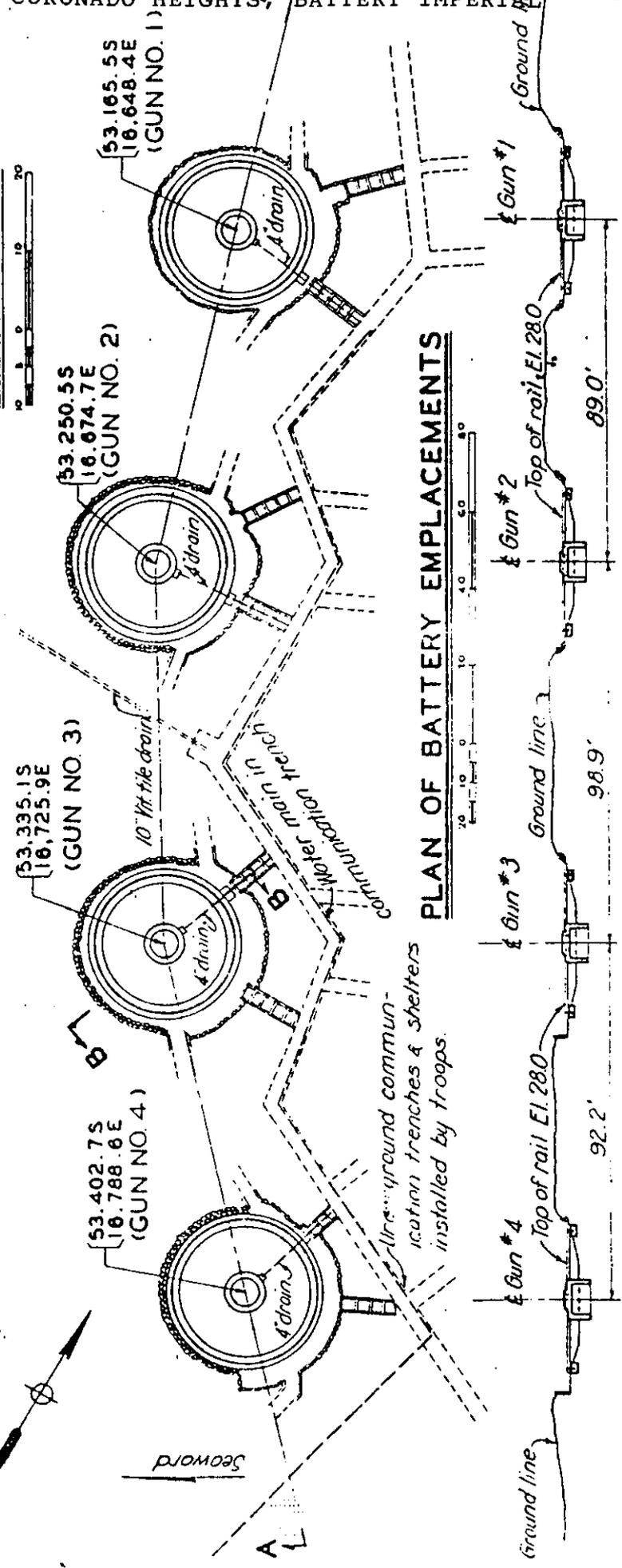
FORM 7



**TUBULAR STEEL "UMBRELLA"**  
**CAMOUFLAGE SUPPORT**  
 4 INSTALLED



**SECTION B-B**



**PLAN OF BATTERY EMPACEMENTS**

**SECTION A-A**

REPORT OF COMPLETED WORKS - SEACOAST FORTIFICATIONS  
(Gun and mortar batteries)

HARBOR DEFENSES OF SAN DIEGO  
FORT ROSECRANS (CORONADO HEIGHTS)  
BATTERY IMPERIAL (155-MM. PLATFORMS)

Form 1 Corrected to January 7, 1943 No. of guns: 4 Caliber: 155 mm. Carriage: Mobil

GENERAL: : ELECTRIC CURRENT: :

Battery commenced : December 27, 1941. : Sources of : None  
 Battery completed : January 30, 1942. : Max. kw. required for lights: None  
 Date of transfer : November 20, 1942. : Max. kw. required for motors: None  
 Cost to date of transfer : \$19,102.32\* : Present condition of battery: Good  
 Materials of construction : Reinforced concrete : Rooms wet or dry : None  
 Type of cement : Modified portland : How ventilated : No ventilators  
 : : Type of data transmission : Telephone

REMARKS: :

Connected to water supply : Yes  
 Connected to sewer : No  
 Type of latrines : None  
 Trunnion elevation in btry.: Mobile  
 Datum plans : Mean lower low water:

\*Cost includes camouflage supports; underground shelters and magazines constructed by troop labor under Engineer supervision.  
 Coordinates: :  
 No. 1 gun - S. 53,165.5 - E. 16,643  
 No. 2 gun - S. 53,250.5 - E. 16,674  
 No. 3 gun - S. 53,335.1 - E. 16,725  
 No. 4 gun - S. 53,402.7 - E. 16,785  
 Origin of coordinates is U.S.C. & G.S. station "Old Town."

ARMAMENT

Emplacement or mortar No.	Cal.	Length	Model	Serial No.	Manufact.	Mounted	Carriages		Remarks	
							Type	Model		Serial
1	155 mm.									
2	155 mm.									
3	155 mm.									
4	155 mm.									
Mobile - mounted by Coast Artillery										
HOISTS (NONE)										
Motor										
Emplacement No.	Type	Delivery	Serial No.	Maker	H.P.	Volts	K.P.M.	Type of control	Date of transfer	Remodeled if long point
1										
2										

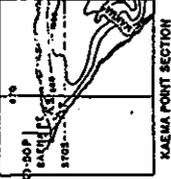
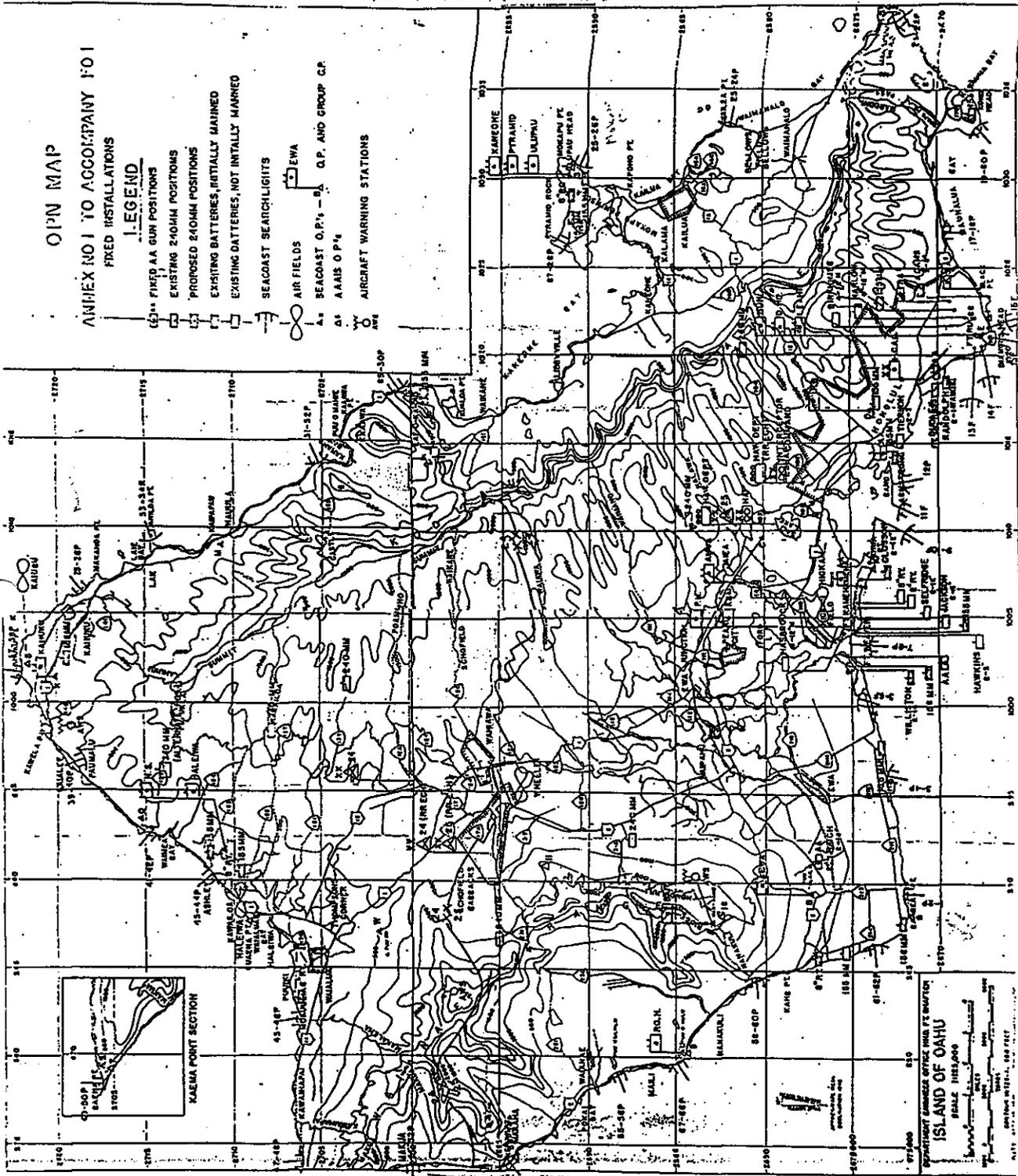
Photocopy of map (Original located in files of Tom Fairfull, U.S. Army Museum of Hawaii)  
 OPN MAP, ISLAND OF OAHU PANAMA MOUNTS, SEPTEMBER 18, 1942

OPN MAP

ANNEX NO 1 TO ACCOMPANY FO I  
 FIXED INSTALLATIONS

LEGEND

- 155mm FIXED AA GUN POSITIONS
- EXISTING 240MM POSITIONS
- PROPOSED 240MM POSITIONS
- EXISTING BATTERIES, INITIALLY MANNED
- EXISTING BATTERIES, NOT INITIALLY MANNED
- SEACOAST SEARCHLIGHTS
- AIR FIELDS
- EWA
- SEACOAST O.P.'s - B
- O.P. AND GROUP C.P.
- AA IS O.P.'s
- AIRCRAFT WARNING STATIONS



DEPARTMENT OF THE ARMY  
 ISLAND OF OAHU  
 SCALE 1:100,000  
 DATE: OCTOBER 1942

SEP 18 1942

FORT FUNSTON 155MM GUN

FATTERY BLUFF PANAMA MOUNTS

HAER No. CA-193-A Photocopy of photo obtained from Tom Page 67



Fairfull,  
U.S.  
Army  
Mus.,  
HI

119  
CA MOBILE

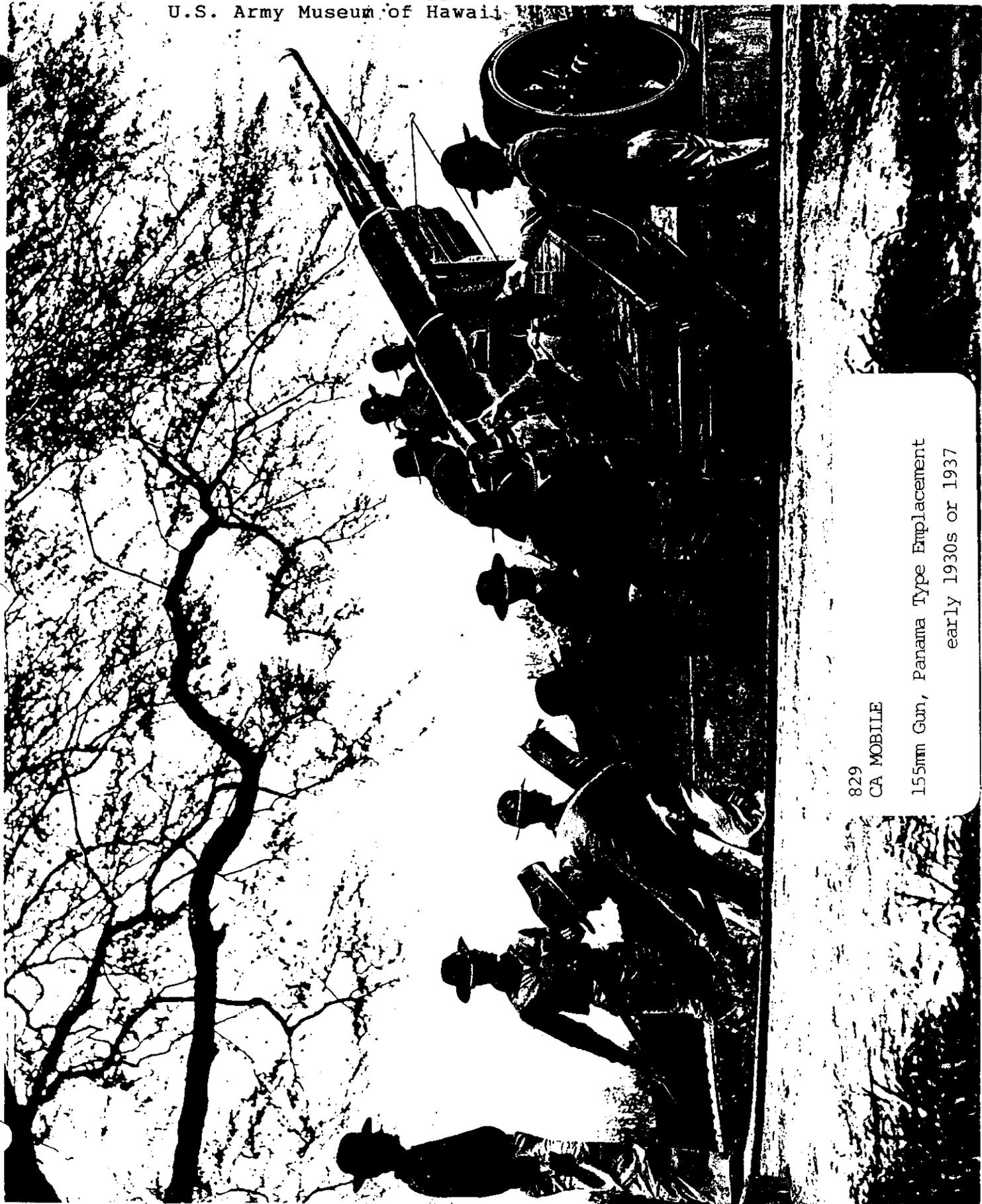
55th CA, Troops with 155mm gun in  
prepared position "Panama" emplacement,  
(Ft. Kam) C.1930s

FORT FUNSTON 155MM GUN

BATTERY BLUFF PANAMA MOUNTS

HAER NO. CA-193-A Photocopy of photo obtained from Tom Fairfull, Page 68

U.S. Army Museum of Hawaii



829

CA MOBILE

155mm Gun, Panama Type Emplacement

early 1930s or 1937



CA MOBILE

117

55th CA, Troops with 155mm gun firing  
from a prepared position (Ft. Kam)  
c. 1930s

Photocopy of photo obtained from Tom Fairfull, U.S.  
Army Mus. of Hawaii



118  
CA MOBILE

55th CA, Troops with 155mm gun  
(Ft. Kam)

late 1930s