

U.S. NAVAL BASE, PEARL HARBOR, BOMBPROOF PERSONNEL
SHELTER
(U.S. Naval Base, Pearl Harbor, Naval Station Ford Island)
(U.S. Naval Base, Pearl Harbor, Administration Building)
(Facility No. S99)
Enterprise Street and St. Lo Avenue
Pearl Harbor
Honolulu County
Hawaii

HABS HI-395

HI-395

HABS

HI-395

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN BUILDINGS SURVEY
PACIFIC GREAT BASIN SUPPORT OFFICE

National Park Service
U.S. Department of the Interior
1111 Jackson Street
Oakland, CA 94607

HISTORIC AMERICAN BUILDINGS SURVEY

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Location: Enterprise Street and St. Lo Avenue
Ford Island
Pearl Harbor Naval Base
City and County of Honolulu, Hawaii

U.S.G.S. Pearl Harbor Quadrangle, Hawaii, 1999
7.5 Minute Series (Topographic) (Scale – 1:24,000)
Universal Transverse Mercator Coordinates 4.607810.2362340

Significance: Facility No. S99 was built as a bombproof personnel shelter in direct response to the attack of Pearl Harbor on December 7, 1941. It is a distinctive type of reinforced concrete construction, built for the specific purpose of protection. It is associated with a particular period in American history, when the threat of attack was high. While the exterior retains much integrity, the interior has undergone extensive renovations in order for the structure to be used as administrative offices. It is a contributing element of the Pearl Harbor National Historic Landmark.

Description: Facility No. S99 is located in the southeastern portion of Ford Island, in the same block as the Bachelors' Enlisted Quarters (Facility No. 55). It is surrounded by pavement. The Ford Island theater (Facility No. 89) and ball field (Facility No. S395) are located across Enterprise Street, and a building that was originally a laundry (Facility No. 88) is located across St. Lo Avenue from this shelter.

Facility No. S99 is a two-story bombproof building, built of very thick reinforced concrete. The overhanging eaves of the flat roof are 6'-0" and the walls, seen because the windows on the second floor are recessed, are 4'-0". The building is basically rectangular in plan, with one-story entry sections at each end, projecting approximately 10' from the walls of the building, and about 5' beyond the overhanging eaves. The entry on the southeast end is the same width as the main part of the building and so is part of the rectangular footprint. The entry projection on the northwest end is not as wide. The maximum footprint dimensions are 94'-8" x 47'-6" and the building is approximately 29' tall. The drawings for the building show the thickness of the second floor is 4'-0" and the first floor is generally 3'-0" thick, but thickens to 5'-0" at the perimeter. The building has a concrete apron extending 20'-0" from the exterior walls, all around the building.

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The first floor of the structure has no window openings. Drawings show that intake ducts and pipes were designed to provide air to the first-floor space. Three small rectangular duct openings, measuring 1'-6" x 2'-8", for fresh air intake are located between the central windows on the southwest side, just under the roof overhang. In addition, each end wall has two 6"-diameter intake pipes. The large ducts go into the first-floor machine room, which held the original air conditioning and other equipment. Three pipes go into corners of the main shelter space, and one goes into the decontamination chamber in the western corner of the building. The toilet room on the first floor has a 12"-diameter exhaust duct which vents on the southwest side, just under the roof overhang.

The existing windows on the second floor are set in large openings, generally evenly spaced on each side of the building. Typically the windows are 5'-0" x 8'-0" and set back at the plane of the inner wall surface. The window openings are mostly floor-to-ceiling in height. Most are regularly spaced so that there is 5'-0" of wall surface between adjacent openings, but with slightly more width at the corner walls. The southwest and northeast sides of the structure each have six of the large window openings. The southeast and northwest ends each have four such openings. At the northwest end three of these openings start at 1'-2" above floor, and since one is used as a doorway, there are two steps down to floor level. The fourth window on the northwest end is the full 8'-0" floor-to-ceiling height and 7'-0" wide, so the space between that window and the adjacent one is only about 3'. It appears from the 1941 plans that there were originally no windows or doors in these openings. A variety of infill windows, panels, and doors have been installed over the years. Most of the window openings now have a plywood panel in the lower part, with glass above, but some just have plywood with an air conditioning unit. Two openings on the second floor have doors; each has a standard 3'-0" wide flush metal door with a plywood side panel to fill the remainder of the masonry opening.

Each first-floor entry section also originally just had an opening to a corridor leading to an entry door. Now, both have gates of expanded metal mesh in X-braced frames installed at the exterior end of the corridors. The southeast end gate is in the eastern corner of the one-story section. The corridor opening, and therefore the gate, is 6'-6" wide. About halfway along this corridor is a steel bulkhead with an original blast-resistant, gas-tight metal door, measuring 3'-0" x 7'-0", at the center. (See the following history section for a discussion of this type of door.) The northwest end gate is near the center of that end, but close to the north corner of that section. This gate is only 5'-0" wide. An exterior metal stair at this northwest end leads to a second-floor landing or balcony on the roof of the one-story entry section. This balcony measures 9'-0" x 26'-0". From this level a steel ladder leads to the main roof. There is also a second-floor balcony on the roof of one-story entry

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section at other end. This larger balcony measures 10'-8" x 47'-6". It can be reached only from the second-floor interior. Both balconies are edged with metal pipe railings.

The roof is essentially flat with a very slight pitch. The roof has a 5'-0" overhang all around, which provides some protection to the second-floor openings. Four concrete structures, comprising an anti-aircraft battery, are on the roof of Facility No. S99 -- a concrete cube-like magazine for ammunition storage, a concrete shelter with one open side for generator equipment, and two gun positions. The larger gun position has a more complicated plan with several concrete sections, compared to the smaller gun position which has a simple U-shaped plan. There is metal cable encircling the roof edge, attached to eyebolts in the concrete battery structures or threaded through vertical pipe supports. This minimal guard rail may have been added later.

The exterior appearance has changed very little since its construction. Windows and doors have been installed in the originally open second-floor openings, but at the interior plane of the 4'-thick wall, so they are not obtrusive. Gates of expanded metal mesh on the first-floor entries have also been installed at the exterior plane, but are similar to the gate originally specified for the transformer room. A few conduits and exterior lighting fixtures have also been added to the building.

The original drawings show the first floor rooms with ceilings 10'-0" above the floor, while the second-floor space has an 8'-0" ceiling height. Interior access could not be arranged, so the current layout of the interior is assumed to be as shown in the latest drawings. The original room arrangement and the changes to the interior are discussed in the following history section.

Historical Context: Refer to HABS No. HI-391 for an overview history of bombproof buildings at the Pearl Harbor Naval Base. See also HABS Nos. HI-328 and HI-329 for reports on two other similar bombproof personnel shelters on the west side of Ford Island, Facility Nos. 180 and 181, respectively. Another bombproof building located in the same block as Facility No. S99; Facility No. 208, which was a communications center, is discussed in HABS No. HI-422. HABS No. HI-390 is a report on Pearl Harbor's splinterproof buildings, which were designed to provide protection from flying debris and shrapnel (splinters), but not from bombs. Most of the splinterproof construction was for personnel shelters, but there were other types of protected buildings, including splinterproof electrical substations and transformer stations to help ensure the continuity of power during an attack.

Facility No. S99 was built in 1942 as a reinforced concrete bombproof personnel shelter. It was one of many buildings that were designed

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specifically to provide protection for personnel from potential bomb and gas attacks during World War II. The bombproof construction designs had been drawn previous to the attack on Pearl Harbor in December of 1941, but the structures were not built until 1942-1943. This facility was built before June 1942 (Naval Air Station, Pearl Harbor 1942). Contractors Pacific Naval Air Bases (CPNAB) built these structures from designs by the U.S. Navy, Bureau of Yards & Docks. As soon as the debris was cleared and materials were received after the December 7, 1941 attack, CPNAB launched "an extensive program of protective and defense construction, "including personnel shelters (Contractors Pacific Naval Air Bases n.d.: A-592). The Bureau of Yards & Docks had developed standard bombproof shelter designs for 200, 300, and 400 personnel. The title blocks show that these numbers fell to 100, 150, and 200 for seated capacities.

Facility No. S99 was designed to protect up to 300 people. Notes on the drawings show the design was intended to protect personnel in the bottom floor of the building from a direct hit by a 2000-pound bomb. It provided protection for those living, working, or playing in the nearby buildings and recreational facilities. A 1942 map show that several splinterproof shelters were also constructed nearby, with three just across Enterprise Street, two on the edge of the ball field and one closer to the ferry landing (Naval Air Station, Pearl Harbor 1942).

In addition to the thick concrete walls and roof for passive protection, an anti-aircraft battery was built on the roof for more active defense. Two historic photos show a pair of sand-bagged gun positions on the roof in 1942 and early 1943; these were probably installed immediately after the December 7, 1941 attack (National Archives II 1942 & 1943). In 1943 the temporary gun positions were replaced by the four existing concrete structures of the battery. The battery is composed of a pair of gun positions, a magazine for ammunition, and a generator shelter. These elements, or variations of them, are seen in abandoned batteries at existing and former military air fields in Hawaii. See HABS No. HI-279-V for a report on a similar battery at Naval Air Station Barbers Point.

Moving to the history of the building's interior, the original room layout is described first, and then the changes made to the building after World War II. Each one-story entry section has a corridor with right-angle turns that originally led to a blast-resistant and gas-tight metal door with steel bulkheads on either side filling the width of the corridor. They are made of ¼"-thick steel plate with bracing welded to the interior face. Each such door was secured with a specialized clamp called a Jamison Wedgetight Door Fastener. The other hardware details of the doors included strap hinges, simple metal door clamps, and U-shaped handles. Pressure-relief valves were unusual hardware items also found on either the door or the bulkhead. These 4"-diameter valves were installed close to floor

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level and relieved the higher air pressure on the inside of the shelter, which was one of the techniques used to combat gas attacks. The entrance on the northwest end of the structure was the one intended for use in case of a gas attack. The entry corridor led to the airlock which had gas-tight steel doors, like the one described above, on three sides of the room. The first door led into it from the entry corridor. A second door allowed entry from the airlock to the main shelter room, if there was no gas attack. The third door led to the decontamination chamber. This room held a collective protector device that included an air blast mechanism, activated by standing on a treadle. The blast of purified air was intended to remove "loose vapor from clothing, reducing the amount of gas carried into protected spaces" (Smith 1999: 82). This chamber had a shower room and dressing room next to it, so apparently water was also used for treating gas attack victims. The door between the shower and the dressing room was also the gas-tight type. Other rooms along the southwest wall were a toilet room, a machine room, a first aid room, a pantry, and a storage room. The doors to these rooms were all made of wood, with the machine room having double doors, and most other rooms having louvered panels in the lower third of their doors. The southeast entrance projection, which is larger than the one on the other end, contains a transformer room as well as the corridor to the main shelter room. The door to the transformer room was steel-framed with expanded metal mesh. The door to the main shelter room was the steel gas-tight type. The shelter room, occupying the majority of the first-floor of the building, was an open area to accommodate personnel during an attack. The floor plan (drawing no. 164934) shows dotted-in benches which are labeled "Future Seats." The second floor was a large open area, with no doors or windows originally, just the openings as detailed in the description section. In the center of the second-floor space were two steel tanks, each 5,000-gallon capacity, resting on concrete saddles. The function is not noted but perhaps these were the emergency water supply for the shelter. The remainder of the room was labeled "Storage Space."

Immediately after the end of WWII, the building was converted to administrative use. It first accommodated the "ComAirPac personnel accounting unit" (Naval Air Station 1945: 6). However, in 1966 its use was still listed as "bomb shelter" (U.S. Navy 1966: 4933) The building was also used for storage. However, the building's use, on various Navy maps or facilities lists, is continually listed as bomb shelter from 1943 until at least 1978. The only alteration drawings found of the building are dated 1982, but show that alterations to the building had been made prior to that year (nos. 7039796 and 7039797). The earlier alterations are consistent with an office use. Windows, panels with air-conditioning units, or doors had been installed in all the second-floor openings. A plywood partition had been installed around the tanks on the second floor, apparently just to screen them from view. The expanded metal mesh gates had been installed on the first-floor entries prior to 1982 also. The

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interior of the first floor had been altered prior to that year by building two small rooms in the southeast half of the original large shelter room. These partitions were built of wood studs covered by canec and wood siding. Panels of canec material, made from left-over sugar-cane processing fibers, suggest that those walls could have been installed in 1945, since use of that material was then common.

The changes made to the second floor of the building in 1982 to 1983 included removal of the steel tanks, concrete saddles and plywood partitions around them. Other minor repair work on this floor included two new flush metal doors, the replacement of the floor tiles in one corner of the space with new vinyl tiles, and installation of new pipe railing around the southeast balcony. The first-floor alterations in 1982-1983 included replacement of the pre-1982 wood-stud partition walls with new partitions made of metal studs and gypsum board. These rebuilt rooms also got new flush, solid-core wood doors. Five electrical outlets were installed in one rebuilt room and the other had ten new outlets. A suspended ceiling of acoustical tile, at an 8'-0" height, was also installed on the first floor. The equipment in the machine room was removed, and the collective protector equipment in the decontamination room had apparently been removed at some earlier date. A new floor of vinyl tile was put in the machine room.

The only clue to the users of the building on the 1982 drawings were the initials COSP in the title block. This is the abbreviation for Commander, Oceanographic Systems Pacific, which was the command then in charge of the Navy's Integrated Undersea Surveillance System in the Cold War period. This command had an important mission: "To support anti-submarine warfare command and tactical forces by detecting, classifying, and providing timely reporting of information on submarines and other contacts of interest" (Commander, Underseas Surveillance 2005). From 1980 until 1994 that command had a Naval Ocean Processing Facility (NOPF) on Ford Island, with staff in the addition to Facility No. 77 and other buildings. This building apparently had some related use, perhaps chosen for its proximity to Facility No. 77 or for its secure design.

Facility Nos. S180 and S181 (see HABS Nos. HI-328 and HI-329) were also bombproof personnel shelters on Ford Island. They are located on the northwest side of the island. Their designs are similar to Facility No. S99. Facility No. S181 is essentially the same design and Facility No. S180 is slightly smaller. On the exterior the latter differs from Facility Nos. S181 and S99 only in having five second-floor windows on each long side instead of six. The interior layout only lacks the storage room that the other two shelters have. Facility No. S180 was designed to shelter a maximum of 200 personnel. A 1942 drawing (no. V-N28-105) shows that a "400-Man Shelter" was planned between Facilities 39 and 26A, but this was never built.

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Bombproof shelters were built at other Navy installations in the Pacific. The title blocks for the shelter drawings show that they were also used at Naval Air Station, Kaneohe, since "Kaneohe" is crossed out and "Ford Island" written in. Facility No. 217 at NAS Kaneohe is a shelter with capacity for up to 400 personnel.

Sources:

Copies of drawings on microfiche cards for this building are found at the Plan Files of the Naval Facilities Engineering Command, Pacific. The query made for drawings of this 300-personnel capacity building yields a list that also includes those for the standard 200- and 400-personnel capacity shelters, between numbers 164925 and 164944. The drawings specific to this building include a location map (no. V-N4-329), and two 1982 repair drawings (nos. 7039796 and 7039797). There is also a location map (no. V-N28-105) for the four bombproof shelters planned for Ford Island (one of which was never built). The drawings for 300-personnel shelters are nos. 164934—164938. The detail drawings that apply to all the bombproof shelters are 164925—164930. The drawings for 200-personnel capacity shelters (Facility No. 180 on Ford Island) are nos. 164923, 164924, 164931, 164932, and 164933. The shelter drawings for those with 400-personnel capacity are nos. 164939—164944.

Commander, Underseas Surveillance

2005 Web page discussing Integrated Undersea Surveillance System, at <http://www.cus.navy.mil/mission.htm>, accessed December 15, 2005.

Contractors Pacific Naval Air Bases

n.d. *Technical Report and Project History, Contracts NOy-3550 and NOy-4173*, on microfiche at library of Naval Facilities Engineering Command, Pacific.

National Archives II

1942 Historic photo dated September 12, 1942 in RG 71 CB, Box 102, PH no. 317474, Still Photo Section, College Park, Maryland.

1943 Historic photo dated March 3, 1943 in RG 71 CB, Box 100, PH no. 218370, Still Photo Section, College Park, Maryland.

Naval Air Station, Pearl Harbor

1942 Ford Island, Conditions as of June 1st, 1942. Map no. 509. Provided by Jeffrey Dodge, Naval Facilities Engineering Command, Pacific.

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1945 Narrative of the U.S. Naval Air Station, Pearl Harbor, T.H.
1 September 1945 to 1 October 1946. Typescript report from
Shore Establishment files of Aviation History Branch in Naval
Historical Center, provided by Jeffrey Dodge, Naval Facilities
Engineering Command, Pacific.

Smith, Bolling W.

1999 "Note, Gas!" *The Coast Defense Study Group Journal*, Vol. 13,
Issue 3, p. 80-82.

U.S. Navy

1966 *Detailed Inventory of Naval Shore Facilities – Real Property.*
In library of Naval Facilities Engineering Command, Pacific.

Project Information: Commander Navy Region (COMNAVREG) Hawaii has embarked on a program of documentation of historic properties within its area of responsibility, with the goal of recording historic information about each property and establishing its context of significance. This information will assist COMNAVREG Hawaii in the appropriate management of these properties, be it routine repair and maintenance for continuing use, rehabilitation for continuing use / adaptive reuse, or demolition. At this time, specific action that may affect this facility has not been determined. This report was prepared under a Historic Preservation Services contract (N62742-97-D-3502) awarded to AMEC Earth and Environmental, the prime contractor, by the U.S. Navy, Naval Facilities Engineering Command. The contract was funded through the Cultural Resources Program of COMNAVREG Hawaii. The photographic documentation was undertaken by David Franzen, of Franzen Photography. Location maps were made by Nestor Beltran of NAB Graphics. Between 1999 and 2001, the field work was done and the draft of this report was written by Dot Dye, AMEC Earth & Environmental, Inc. The report was rewritten in 2005 by Mason Architects, Inc.

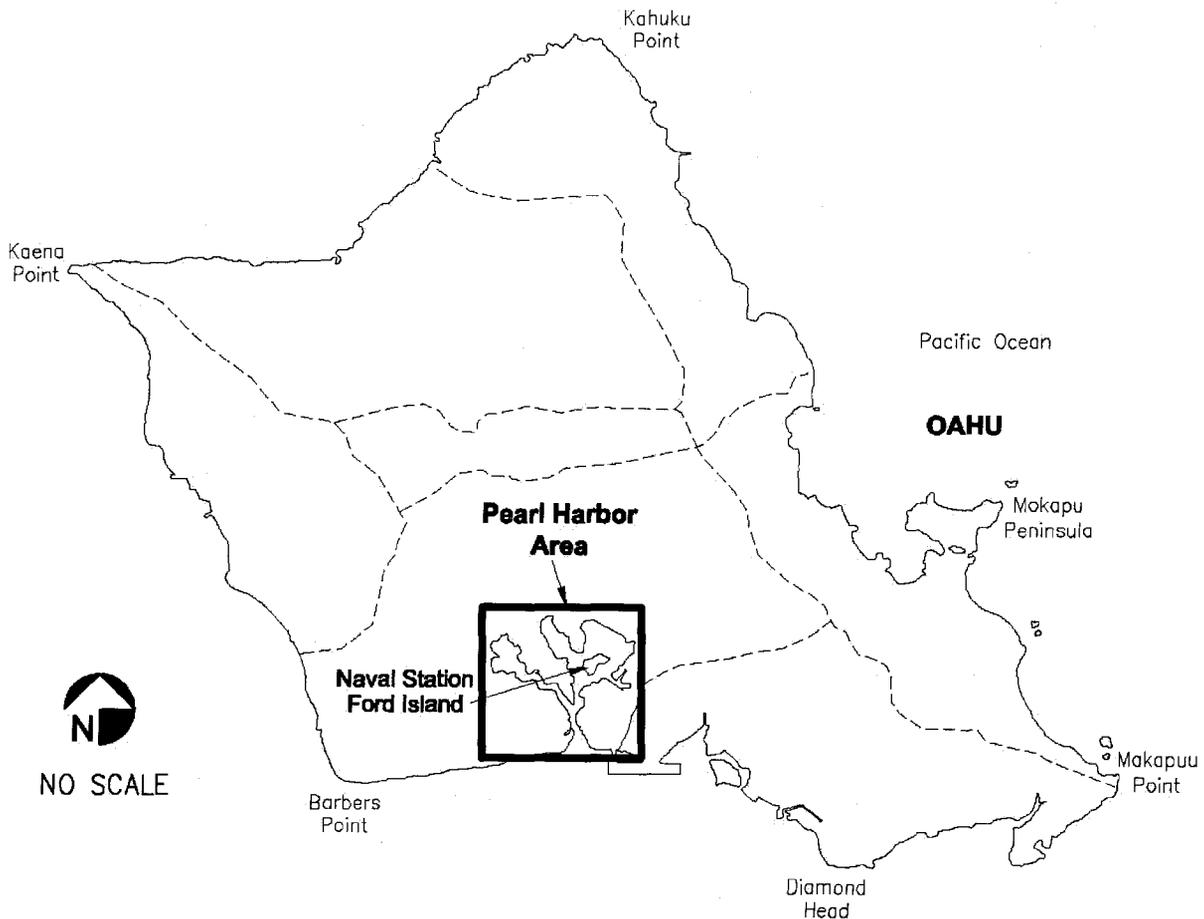
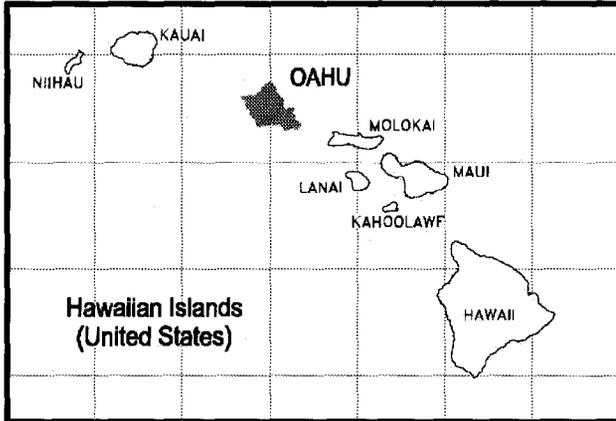
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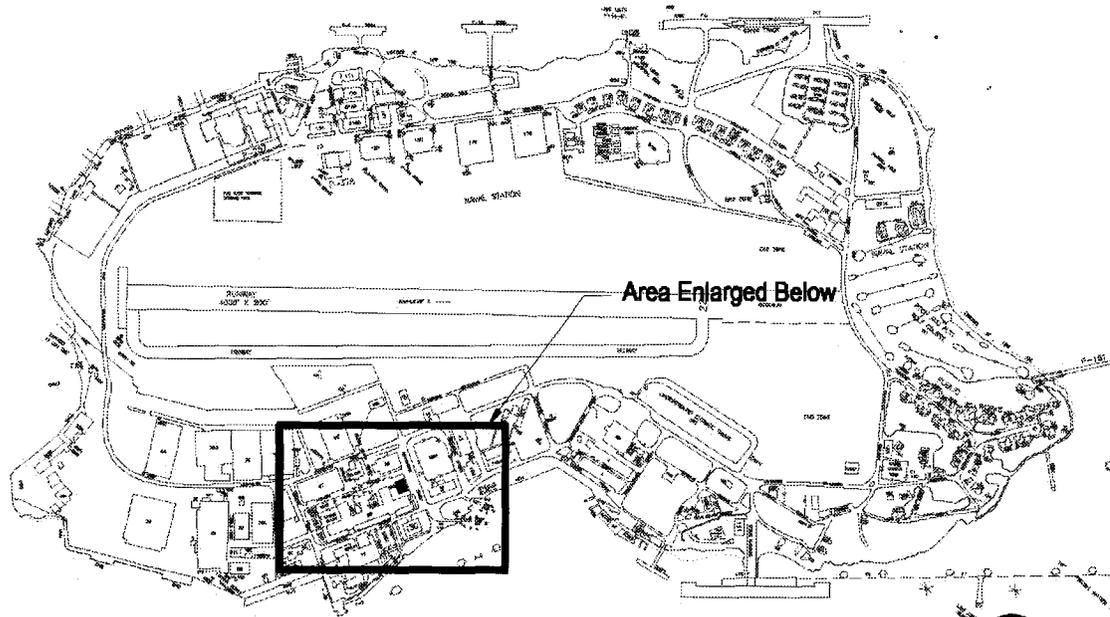
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Date of Final Report: December 2005

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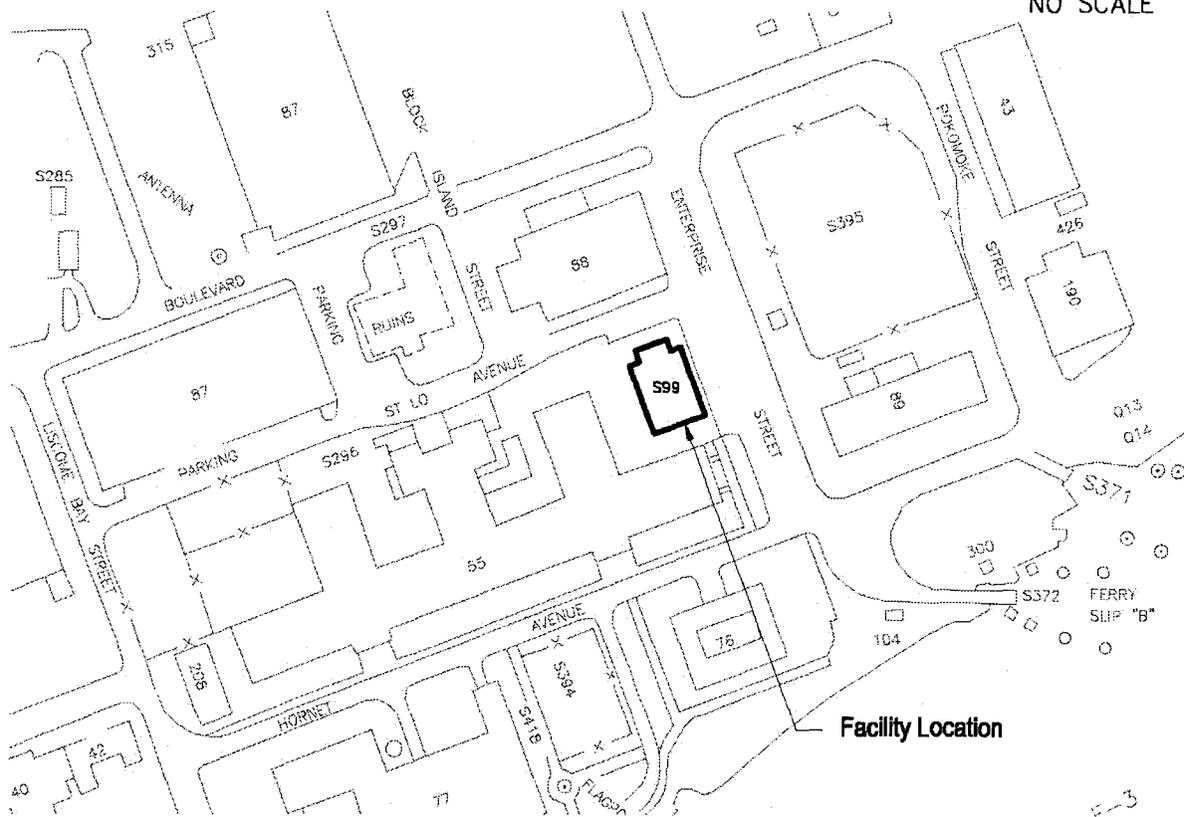
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Vicinity Map



NO SCALE

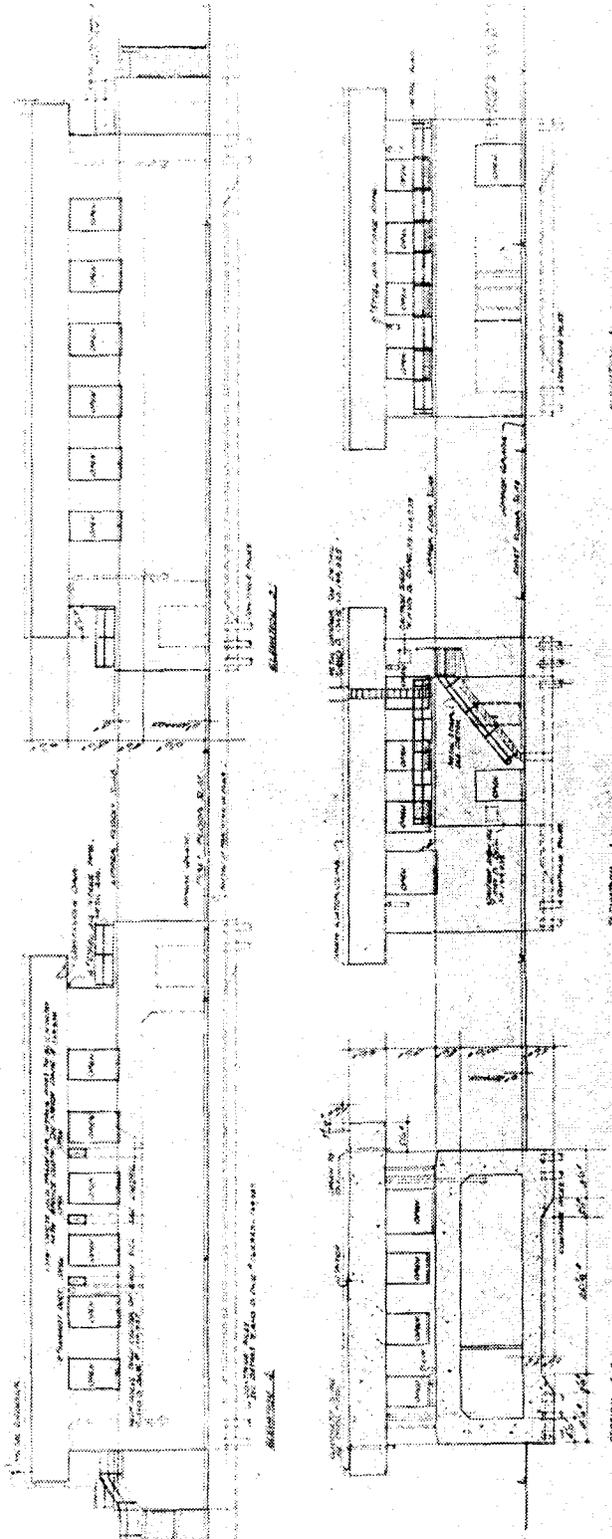


Site Map

Facility Location

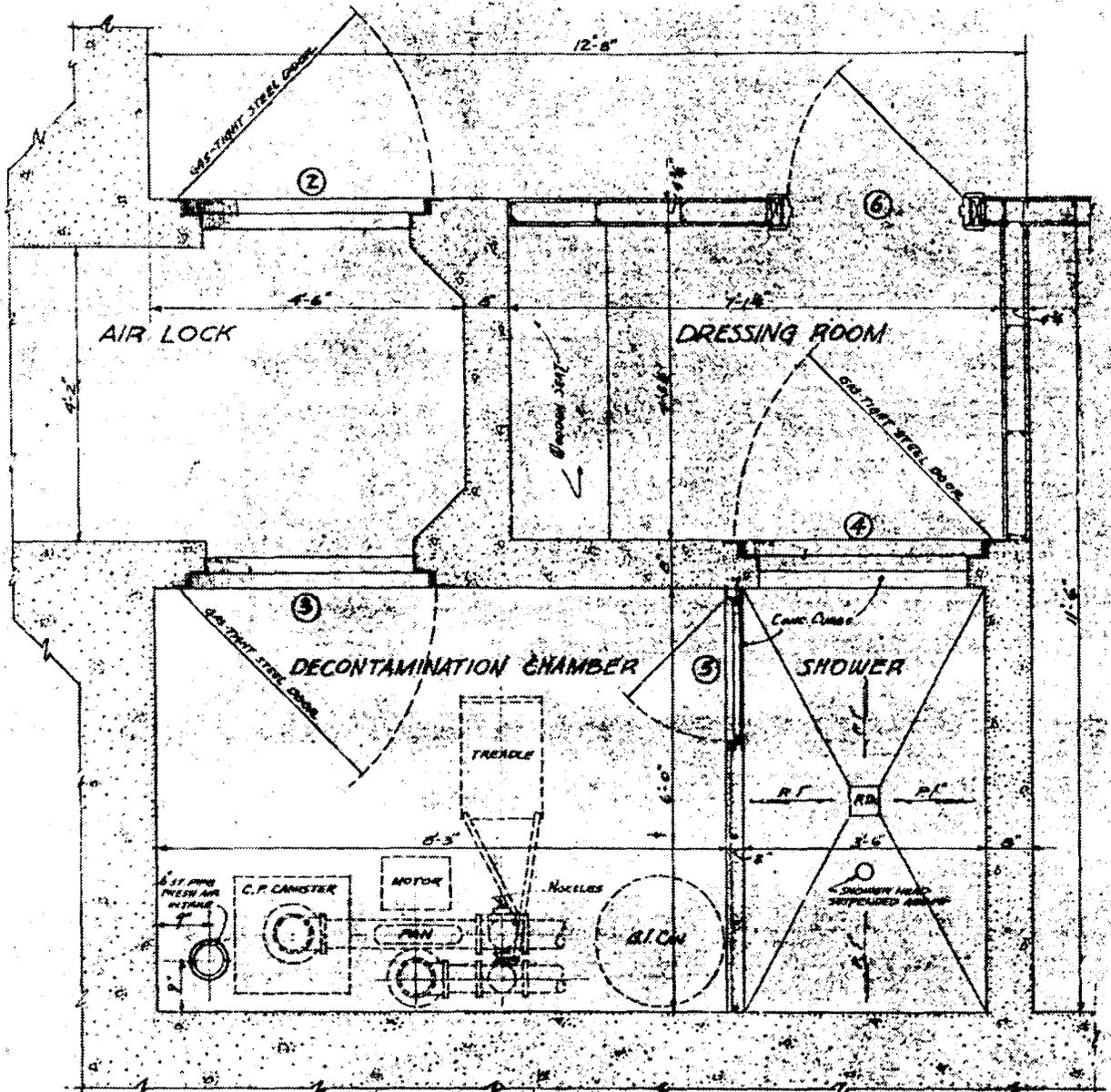
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Portion of Drawing No. 164934, dated July 30, 1941 (elevations and section)



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Portion of Drawing No. 164935, dated July 30, 1941 (detail plan of airlock entry area)



DETAIL PLAN OF DECONTAMINATION CHAMBER, SHOWER, & DRESSING ROOM

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Portion of Drawing No. 7039796, dated June 1982 (alteration floor plans)

