U.S. Naval Base, Pearl Harbor, Gymnasium Building
(U.S. Naval Base, Pearl Harbor, Naval Submarine Base)
(Building No. 667)
North Waterfront and Pierce Street near Berth S-13
Pearl Harbor
Honolulu County
Hawaii

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
National Park Service
Western Region
Department of the Interior
San Francisco, California 94107

HABS
HI
2-PEHA,
150-

HISTORIC AMERICAN BUILDINGS SURVEY

U.S. Naval Base, Pearl Harbor, Gymnasium Building
(U.S. Naval Base, Pearl Harbor, Naval Submarine Base)
(Building No. 667)

HABS No. HI - 293

Location: Naval Submarine Base, along North Waterfront Street near Berth S-13, Pearl Harbor Naval Base, City and County of Honolulu, Hawaii

USGS Pearl Harbor Quadrangle, Hawaii
7.5 minutes series (orthophotoquad)
Universal Transverse Mercator Coordinates
4.609520.2362500

Significance: The U.S. Naval Base, Pearl Harbor was designated as a National Historic Landmark in 1964; due to the crucial role it played in the Nation's defense during the twentieth century and the calamitous events which occurred on December 7, 1941. As a Category 3 structure, it is determined that Building No. 667 functioned as a part of the Pearl Harbor Naval Base, but is only of minor importance to the historic character of the National Landmark.

Description: Building No. 667 is a single story structure housing 22,800 square feet of floor area. The building is approximately 228 feet long, 100 feet wide, and 24 feet high. The building is built on a concrete floor slab, with corrugated metal on wood stud walls, corrugated metal on wood purlin roofing, and wood framing throughout.

History: Building 667 was built in 1943 as a storehouse for supplies and equipment at a cost to the government of $327,000. The storehouse provided needed storage space in support of the war effort. After the war, circa 1948, with the need for more recreational facilities for enlisted personnel, Building 667 was converted into a gymnasium complete with two wooden basketball courts, bleachers, and a boxing ring. In the early 1960's, to alleviate a space problem, folding bleachers were installed. The former Dolphin's Wives

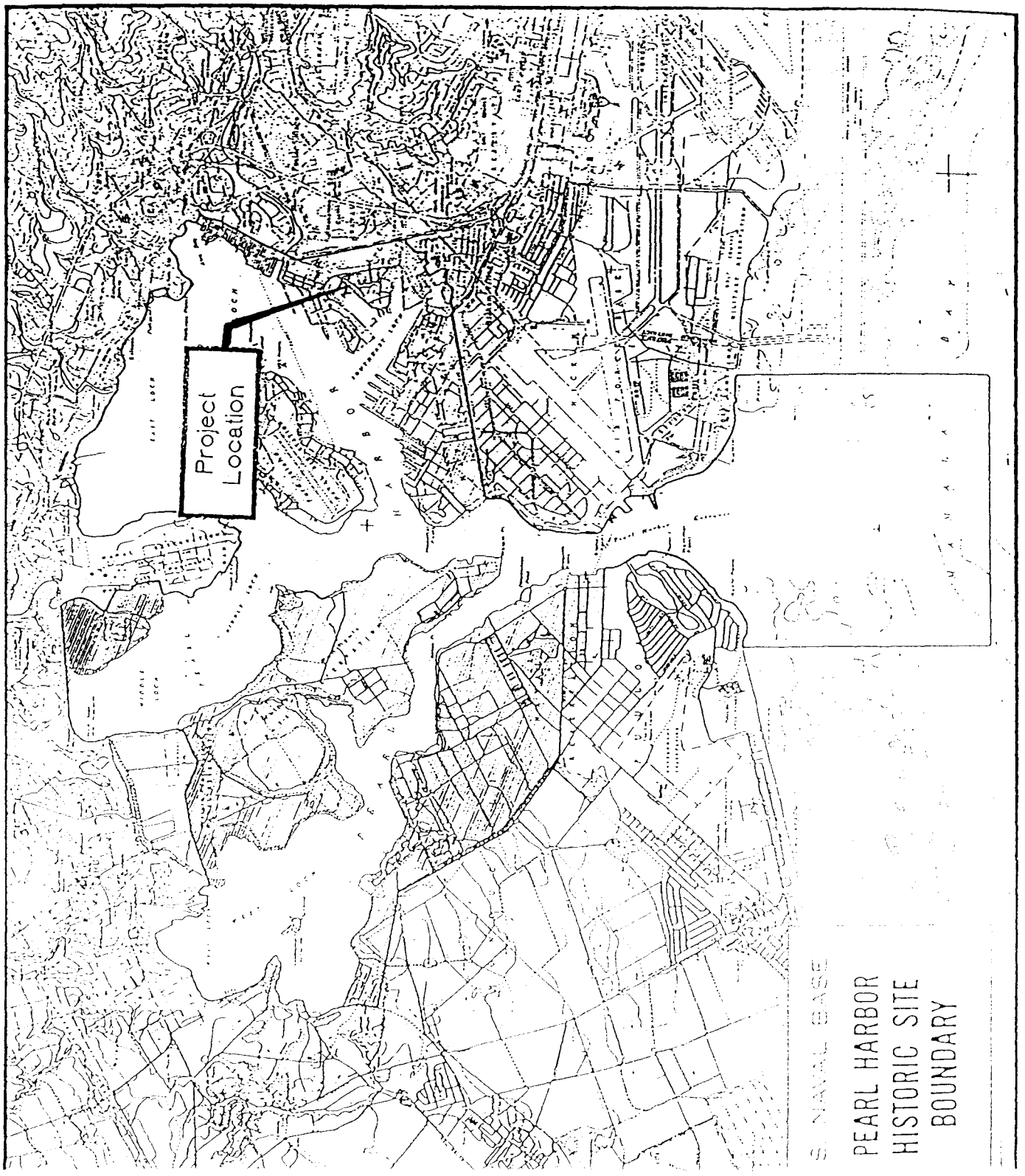
meeting room was converted into a recreation room with new equipment, and the Pearl Diver's club room was converted into a special services meeting room where all club meetings could be held. Additional renovations included the extension of existing locker rooms and the addition of sauna rooms. Through the years, Building 667 has continued to serve as a gymnasium and recreational facility while undergoing various repairs and renovation work. In 1992, the building interior was renovated and modernized through the use of Construction Battalion (Seabee) labor. Today, Building 667 offers additional women's facilities, MWR facilities, and air conditioned exercise machine and weight room areas.

Sources:

Pacific Division Drawing No. I-N06-199 dated 10/22/40
Pacific Division Drawing Nos. Z-N04-509 and Z-N04-510 dated 5/19/48
Pacific Division Drawing No. 142944 dated 1/16/40
Pacific Division Drawing No. 142945 dated 4/23/48
NAVFAC P-164; Detailed Inventory of Naval Shore Facilities
Pacific Division / Public Works Center Drawing Index
U.S. Naval Base, Pearl Harbor, National Historic Lankmark, Historic Preservation Plan
Yarmin, Ray W. de, Curator, History of the Naval Submarine Base, Pearl Harbor, Hawaii. Pacific Submarine Museum: 1984.

Historian:

Craig Yoshika, Mechanical Engineer
Navy Public Works Center, Pearl Harbor
Project Development Branch
Pearl Harbor, Hawaii 96860-5470
March 1996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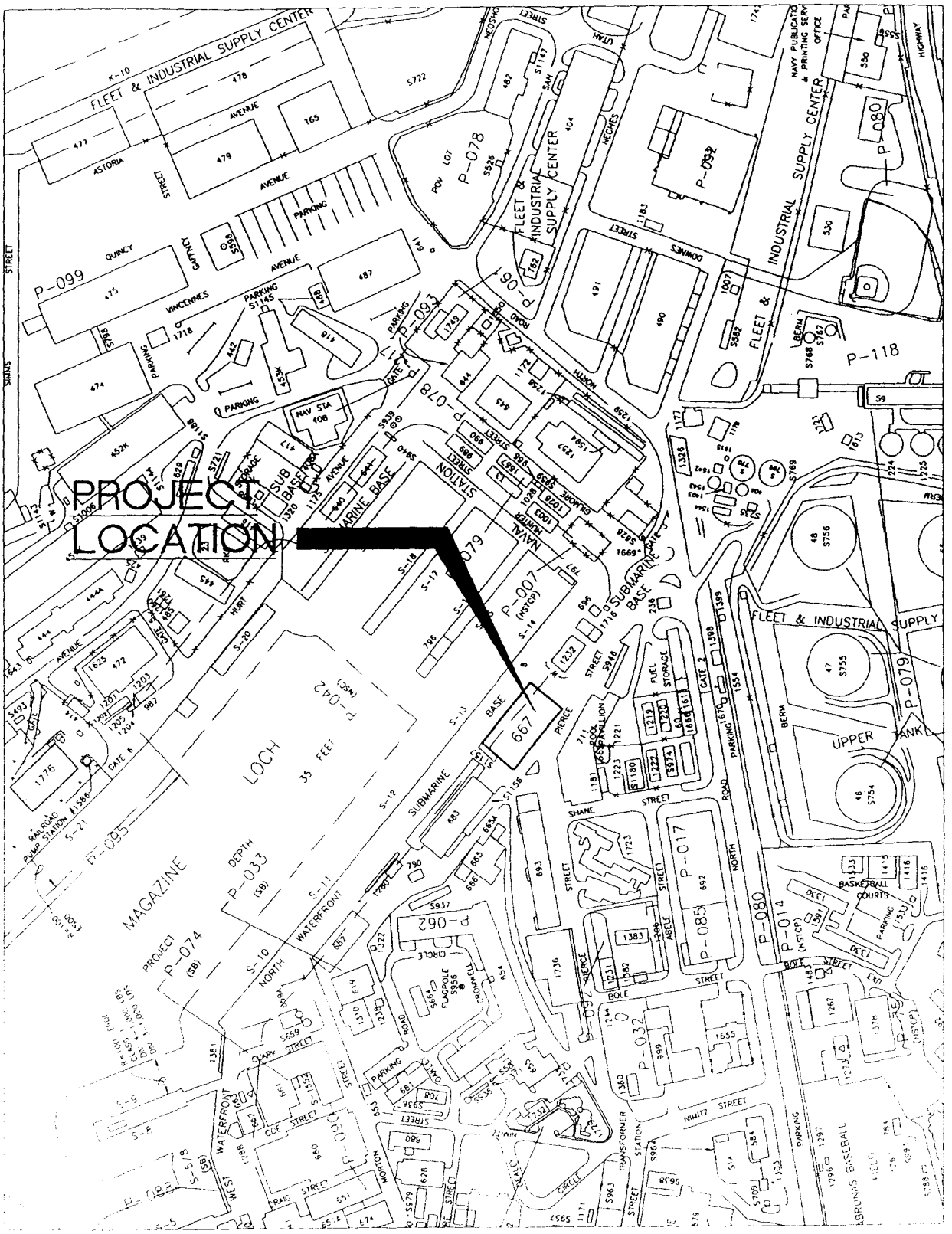
PEARL HARBOR
HISTORIC SITE
BOUNDARY



VICINITY MAP

SCALE: 1" = 400'

Addendum to
U.S. NAVAL BASE, PEARL HARBOR, GYMNASIUM BUILDING
(U.S. Naval Base, Pearl Harbor, Naval Submarine Base)
(Building No. 667)
North Waterfront and Pierce Street near Berth S-13
Pearl Harbor
Honolulu County
Hawaii

HABS No. HI-293

BLACK & WHITE PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN BUILDINGS SURVEY
U.S. Department of the Interior
National Park Service
Oakland, California

HABS
HI,
2-PEHA,
150-

HISTORIC AMERICAN BUILDINGS SURVEY

U.S. NAVAL BASE, PEARL HARBOR, GYMNASIUM BUILDING
(U.S. Naval Base, Pearl Harbor, Naval Submarine Base)
(Building No. 667)

This report is an addendum to a four page report previously transmitted to the Library of Congress in 1998.

Location: North Waterfront and Pierce Street near Berth S-13

Pearl Harbor
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: 4.609780.2362110

Significance: Facility 667 is significant as an example of wooden building construction at the Naval Submarine Base during the time leading up to and during World War II. The building was completed by February 1941 as a storehouse during the time when the U.S. Pacific fleet was stationed permanently at Pearl Harbor in anticipation of a conflict with Japan. By 1948 Facility 667 was converted to a gymnasium, and it became significant for its association with the Navy's history of providing recreational facilities, contributing to the morale and welfare of the sailors.

Description: This large, single story gymnasium building has an irregular footprint with overall measurements of about 228' x 100'-8" and is oriented with its long axis in a northeast/ southwest direction. The main section of the building is rectangular in plan, with dimensions of 208' x 100'-8". There is an electrical equipment building, S 1157, attached to the southwest end of Facility 667. At the northeast end of the gymnasium is a small, full height, projecting wing. Facility 667 has a gable roof with a ridge height of about 28' that is covered in ribbed metal and has four round ventilators at the ridge and overhanging eaves. There are bands of screen vents at the eaves along each long side of the building. The building has a wood frame that is covered with corrugated metal siding and it has a concrete slab floor.

The overhanging eaves of the long sides of the building extend about 4' and have exposed rafters made up of paired 2" x 8" with cut tails that are separated at their ends by blocks of wood. These rafters support a purlin located about midway between their ends and the side wall of the building. A ventilating band is formed by extending metal screening from this purlin to the junction of the building side wall and roof and down the side wall about 1'. This provides a wider ventilating band than a screen vent at the side wall alone. Along the northwest side of the building the side wall vent band has been enlarged at the locker room areas by

extending it downward an additional 2' in some places. Round profile metal gutters run along the edge of the eaves on the long sides. Round downspouts extend from the gutters at an angle in toward the building, reaching the side wall about 6' above grade where they continue downward along the wall.

Facility 667 typically has jalousie windows, hinged flush doors, and flush doors with vision panel. At the southwest end of the building the window openings are filled with fixed louver panels. One opening with original surface-sliding wood doors is found along the northwest side. These doors are paired, 6' wide and 12' high, three-panel doors with fixed horizontal louvers in the bottom two panels. The upper panel of each door is filled with diagonally-oriented tongue and groove boards. The doors have a painted finish. A similar pair of doors is found along the southeast side. In these however, one of the doors has had its louver panels altered to accept a hinged door. This hinged door opening is now sealed with a wood panel.

Two sets of original six-over-six-light double-hung sash windows are found near the west corner on the southeast side of the building. These are a triple-ganged and a pair of windows. The triple ganged windows are about 10'-6" in total width. On the interior of the building, a dropped ceiling (which was installed at an unknown date after the building was built) screens the upper half of the upper sash of these windows. The ceiling was installed leaving clearance between it and the windows.

The interior of Facility 667 is primarily an open gymnasium space with two basketball courts. Additional rooms are located along each long side. The entire southeast long side is walled off from the basketball courts into an approximate 25' wide space running the length of the building. The upper portion (approximate 6') of this wall is a ventilating band that is screened with metal chain-link. The 25' wide space walled off from the main gymnasium is further divided into offices and storage at the west end (a section about 75' long) and a weight lifting room occupying the remainder of the space. These areas are typically finished with painted gypsum board walls and dropped acoustic panel ceilings with recessed fluorescent lights, the weight lifting room has jalousie windows. Three doors provide access to the weight lifting room from the gymnasium floor, and a single door from the weight room leads to the storage/ office area. The primary access to the office area is via an exterior door on the southwest end of the building.

Along the northwest long side of the building two additional spaces are walled off from the gymnasium floor. A ventilating band screened with chain-link is also found at the tops of these walls. The first space, at the west end, is a cardio-vascular conditioning training room which is about 50' long and about 25' wide and contains stationary bicycles. This room is finished with gypsum board walls, jalousie windows, and a dropped acoustic panel ceiling with recessed fluorescent lights.

The other space along the northwest long side extends about 110' from the east end of the building. It is divided into men's and women's locker rooms, a laundry, and office space for the front reception desk. The men's locker room area has no ceiling and is open to the roof of the building. The laundry has a ceiling of expanded metal mesh.

The upper portion of the interior wall that separates this 110' long section from the main gymnasium extends along the line of posts which support the roof trusses. This line of posts (and the upper portion of the wall) is about 25' from the northwest long side of the building. The lower portion of the wall, up to a height of about 7', is set back from the edge of the basketball court about 4' from the line of the upper wall. This lower portion of the interior wall is located about 21' from the northwest long side of the building. This provides an approximate 4' wide covered walkway and bench space. The square wood posts of the building frame are exposed at the basketball court edge of this walkway and are wrapped with cushioned mats.

At the northeast end of the building is an added full height wing that is the width of the open gymnasium space, about 58', and projects about 20' from the northeast end. This added wing is open to the basketball court on the ground floor level. It has stairs that lead up to a mezzanine level overlooking the gymnasium floor. This wing has metal fixed louver vents to the outside in the end gable.

The main gymnasium space of Facility 667 is taken up by two basketball courts with wood strip flooring. 1948 drawings indicate that ohia wood strip flooring was to have been installed. However, the wood strip flooring extant at the time of this report does not appear to be that species of wood, it is lighter than is typical for ohia and with less figure to its grain.

The main gymnasium space has no ceiling, the wooden roof trusses are exposed and the space is open to the building roof. The metal roof of the building, as visible on the interior, is of a different design than the material visible from the exterior. The exterior metal is ribbed, and the interior, underside, of the roof shows corrugated metal similar to that of the exterior sheathing. It is likely that when the building was re-roofed (at an unknown date) the newer ribbed metal was added over the existing corrugated metal. The roof of Facility 667 also has twenty six skylights arranged with thirteen on each slope of the roof. Each individual skylight is a translucent panel about 2' wide and 10' long, oriented lengthways down the slope of the roof.

The wooden trusses supporting the roof have their top and bottom chords constructed of four laminated 2" x 8" boards. The inclined web members between the top and bottom chords are constructed of laminated 2" x4" boards. 2" x 8" boards diagonally brace the trusses to their 10" square supporting posts. The roof sheathing is carried on wood purlins which span the trusses.

Historical Context: Building No. 667 was originally built as "Temporary Storehouse KF."[1] It was completed by Feb 1941.[2] Although the original plans for the building specify in the title block that it was a "Temporary Storehouse" building, in 1945 it was classified as "permanent" in the Navy's comprehensive listing of its buildings.[3] By 1963 this classification had been changed to "semi-permanent."[4]

The original drawing for Building 667 shows that another similar building was designed at the same time.[5] This building is designated "Bldg Y.C." Bldg Y.C. was the same width as Building 667, 100'-0", but it was 256'-0" long. Building Y.C. was listed on original drawings as another temporary storehouse.[6] It is not known if this building was ever constructed.

Building 667 and the Pre-War Navy Supply System at Pearl Harbor

Building 667 was planned and constructed during the build-up before WW II, shortly after the U.S. Pacific Fleet was ordered to move from its west coast base to an advanced position at Pearl Harbor in May 1940. President Roosevelt ordered the fleet based at Pearl Harbor in order to deter Japanese advances in the East Indies. Pacific Fleet Commander James O. Richardson objected to this move, maintaining that the fleet at Pearl Harbor was unprepared for any advance into the western Pacific. Although the president prevailed and Richardson was relieved of command of the fleet, the build up at Pearl Harbor during the ensuing year and a half seems to indicate that Roosevelt shared Richardson's concerns.

Building 667 contained material that supported the approximately thirty three submarines that were assigned to the Pacific Fleet in 1941. Up until that year the supply activities of the Submarine Base were just a part of the Naval supply system at Pearl Harbor. In mid-1941 the demands placed on the Navy supply system at Pearl Harbor had been greatly increased with the transformation of the Naval Base into a role supporting the entire Pacific fleet.[7] In July 1941 there were numerous supply activities at Pearl Harbor, the Navy yard, fuel depot, Submarine Base supply department, and the supply department of the Naval Air Station, which provided the majority of aviation supplies. Additionally, other supply activities existed such as disbursing office, accounting office, and various disbursing, accounting, and commissary and supply offices at the

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[1] Naval Facilities Engineering Command (NAVFAC) Pacific Division, Plan files drawing numbered I-N26-212, September 5, 1940.
[2] National Archives and Records Administration (NARA), photograph # 14106, February 11, 1941, in RG 71 CA 175E.
[3] U.S. Navy Bureau of Yards and Docks (BuDocks), *Public Works of the Navy Data Book, Buildings, NAVDOCKS P-164, July 1945 Edition,* (Washington D.C.: Dept. of the Navy, 1945), 1069.
[4] U.S. Navy (BuDocks), *Detailed Inventory of Naval Shore Facilities, Real Property Data NAVDOCKS P-164, Vol. IV Districts 12 through 14*, (Washington D.C.: Dept. of the Navy, 1963), 3701
[5] (NAVFAC) Pacific Division, Plan files drawing numbered 142944, July 19, 1940.
[6] Ibid.
[7] Fourteenth Naval District (14th ND), *World War II Administrative History of the Supply Activities of the Fourteenth Naval District, Vol. I Supply in the 14th Naval District*, (n.p.: 1945), 1.

receiving station, Bishop's Point, Naval Hospital, Kaneohe Air Station, and other installations. This far-flung supply system apparently proved cumbersome under the Pearl Harbor expansion pressure, and the Naval Supply Depot was created in October 1941 with the mission of maintaining "supplies and stores for the support of the Fleet."[8]

Building 667 Original Construction

Building 667 was constructed with a 6" concrete slab floor, wood framing sided with 24 gauge galvanized corrugated metal roofing, overhead track sliding doors, and six-over-six-light double-hung sash windows. Bands of wire mesh vents were located at each eave on the long sides of the building. The gable roof was clad with 22 gauge galvanized corrugated metal roofing and had four 36" diameter ventilators.[9] The interior of the 208' x 100'-8" building was open space, with the exception of a small enclosure at the north corner, about 16' x 12', which had an office and toilet. Roof trusses of the 16' spaced transverse bents were supported by two lines of wood posts, each line 25' from the long side walls.

Building 667 Alteration History

Between 1944 and 1948 Building 667 was altered for use as a gymnasium. An office (about 32' x 25') was added at the south corner of the interior and the original office and toilet at the north corner was converted to a head with a trough lavatory and a trough urinal. Also added before 1948 were two basketball courts (45' x 84' and 45' x 75'), a boxing ring at the east corner, and wall-mounted punching bags at the west corner.

In 1948 Building 667 received some additional alterations. The head was reconfigured with a shower and a small addition, about 10' x 12', with a urinal. Plans from that year also included seven wood bleachers, each 8'-9" high and 16'-4" wide with eight benches, and a portable boxing ring made of 2" x 8" joists with a deck of 1" x 6" tongue and groove boards covered with 1¼" matting and canvas. Corner posts were 4" x 4" with ¾" rope for the ring. Also in 1948 a new wood floor was specified to be laid down over the concrete slab everywhere but the office and the head, which each retained the original concrete. The new floor was to have consisted of 1" ohia wood strips laid over pressure creosoted or wolmanized 2" x 4" joists on 16" centers on top of pressure creosoted or wolmanized 2" x 4" sleepers bolted to the concrete floor on 4'-0" centers.[10] Ohia (species Metrosideros, family Myrtaceae) is a large endemic Hawaiian tree, which often grows to 80' in a wide range of habitats on the major Hawaiian Islands. It produces dense dark wood which has been used for flooring in Hawaii and on the mainland since at

[8] (14th ND), *Supply Activities, Vol. I*, 8-9.
[9] (NAVFAC) Pacific Division, Plan files drawing numbered 142944, July 19, 1940.
[10] (NAVFAC) Pacific Division, Plan files drawing numbered Z-N4-509, May 19, 1948.

least 1912.[11] If this ohia wood strip floor was installed, it has since been replaced.

In 1951 the head at the north corner of the building was expanded into a shower room with adjoining large and small locker rooms. This new locker room area measured about 48' x 20' with its long dimension extending south along the northwest long side. This locker room area was further expanded southward in 1964 with the addition of two sauna rooms, a reconfigured large locker room, utility room, and issue room. This brought the length of the locker room area to 72'-6". The saunas were constructed with 1" x 6" redwood tongue and groove ceiling, walls, and floor. There was an aluminum foil vapor barrier and 4" insulation of unspecified type. The saunas each had benches with tops of 2" x 3" redwood slats with ¾" spacing.[12] In 1981 the redwood was removed from one of the sauna rooms and it was converted to an additional shower. Also that year the janitor's closet was removed from the locker room area and the space used for a new locker room entry.[13]

Permanent and Temporary Construction in the Navy During WW II

During World War II, the Navy classified its buildings as permanent, temporary, or leased.[14] The leasing of real property was an important method used by the Navy to acquire needed property when condemnation for a permanent facility was not called for.[15]

Presently, the Navy no longer uses the leased category for its real property,[16] and the classification for semi-permanent has been added, sometime before 1963.[17] The earliest definitions for these classifications which could be located date from 1963. The 1963 definitions for permanent and temporary are likely the same as those definitions applied during WW II:

> Permanent: Permanent construction is defined as that which produced a facility suitable and appropriate to serve a specified purpose for a maximum period of time (at least 25 years) and with a minimum of maintenance.
>
> Semi-permanent: Semi-permanent construction is defined as that which produced a facility suitable and appropriate to serve a specified purpose for a limited period of time

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[11] "Hawaiian Ohia Making Name With Coast Builders," *Pacific Commercial Advertiser*, August 25, 1912, 5.
[12] (NAVFAC) Pacific Division, Plan files drawing numbered 1038599, July 15, 1964.
[13] (NAVFAC) Pacific Division, Plan files drawing numbered 7035052, July 27, 1981.
[14] U.S. Navy (BuDocks), *P-164, July 1945 Edition*, 1068-1070.
[15] U.S. Navy (BuDocks), *Building the Navy's Bases in World War II, History of the Bureau of Yards and Docks and the Civil Engineer Corps 1940-1946*, (Washington D.C.: U.S. Government Printing Office,1947), Vol. I, 111-112.
[16] Mason Architects, Inc. and Helber Hastert & Fee Planners, *Historic Context Report and Historic Preservation Repair Plan, Building Types Assessment: World War II Wooden Facilities*, (Pearl Harbor, HI: Commander, Navy Region Hawaii, 2005), 1.2-10.
[17] U.S. Navy (BuDocks), *Real Property Data NAVDOCKS P-164*, 1.

> (less than 25 years and more than 5 years) and with a moderate to high degree of maintenance.
>
> Temporary: Temporary construction is defined as that which produced a facility suitable and appropriate to fill a need for a short period of time (five years or less) without regard to degree of maintenance, and the designs and details of which provided minimum facilities with maximum initial economies.[18]

Permanent construction during WW II was reserved for buildings that were intended to stay in use after the war and were typically built of masonry, metal frame, or (in some cases) of wood. Buildings built as temporary construction were not intended to be utilized after the war and were usually wooden-frame, often built using standardized plans, or were modular metal buildings (Quonset huts).[19] After the Japanese attack of December 7, 1941 "the trend was curtailment of permanent construction" around Pearl Harbor.[20]

Of the 57 wood buildings built at the Submarine Base during WW II, 22 were classified as permanent construction in the July 1945 edition of the Navy's P-164 Data Book of Buildings, which covers construction through mid-1944.[21] These permanent buildings included 1943 barracks buildings, 1942 and 1943 shop buildings, 1942 and 1943 personnel support buildings, 1943 garage and plant buildings, 1942 training building, and 1941, 1942 and 1943 storage buildings. Fifteen wood buildings in the P-164 Data Book are classified as temporary, including nine 1943 shop buildings in the shop facilities compound at the north corner of Magazine Loch, and five 1944 barracks buildings. Also constructed in 1944 (apparently after the P-164 list was compiled) were another eight temporary wood buildings; a boiler house and an office building at the shop facilities compound, and special weapons buildings, storehouses, a generator house, and a carpenter shop elsewhere on the sub base.

Wooden Buildings in the Navy During WW II

Well before the United States entered WW II, in 1940, it was understood by the Navy that construction materials routinely used in building naval facilities would eventually become scarce, and a directive was issued to economize.[22] In January 1942 the War Production Board (WPB) was created to control the manufacture and allocation of war materials. In a memo from May of that year, the Bureau of Yards and Docks recognized that the "point has now been reached in the war program where the

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[18] Ibid.

[19] R. Christopher Goodwin and Associates, Inc., *Historic Context for Department of Defense Facilities World War II Permanent Construction*, (Baltimore: U.S. Army Corps of Engineers, 1997) available from www.aec.army.mil/usaec/cultural/ww2_pc.doc accessed on June 8, 2004, [29].

[20] Contractors Pacific Naval Air Bases (CPNAB), *Technical Report and Project History Contracts NOy-3550 and NOy-4173.* (n.p., n.d.), A582.

[21] U.S. Navy (BuDocks), *P-164, July 1945 Edition*, 1068-1070.

[22] U.S Navy (BuDocks), *Building the Navy's Bases*, Vol. I, 96.

consumption of materials for construction purposes is making these materials unavailable for combat equipment" and that an effort must be made to "reduce the use of all metals."[23] Later that month, the WPB, along with the Secretaries of War and the Navy, approved the Bureau of Yards and Docks' directive of May 20, 1942 "Directive for War-Time Construction" that prompted a Navy conservation policy for war-time building which featured the use of temporary buildings.[24] The salient points of the directive were:

> 1: Unnecessary construction was to be eliminated.
>
> 2: Construction of a temporary nature consistent with sound engineering principles was to be employed.
>
> 3: Maintenance was to be kept to the minimum consistent with necessary operational requirements.
>
> 4: Use of critical materials was to be eliminated or decreased to the minimum amount practicable, by re-design, substitution of less-critical materials, or use of increased allowable working stresses.
>
> 5: Investigation and use of available surplus materials and equipment was to be made prior to placing orders through the usual procurement sources.
>
> 6: Scrap material was to be collected, classified, and segregated as to kind, and processed back into proper using channels.
>
> 7: Conservative use was to be made of all utilities.[25]

Later in 1942, the Secretary of the Navy clamped down even tighter with guidelines designed to make the most of materials that were important to the war effort. These included reducing the shore infrastructure projects, scrutinizing new projects to ensure they have "a direct and important effect on the conduct of the war" and ensuring that "all non-essential items have been removed from the project."[26] For certain buildings it was mandated that construction be of the "cheapest temporary character, with structural stability sufficient only to meet the needs of the service which the structure is intended to fulfill during the period of its contemplated war use," and that its "materials are those which will cause the least interference with the production of combat material."[27] In the case of lumber, the competition between various military purchasing departments created a shortage situation where specifications on lumber required

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[23] U.S. Navy (BuDocks), *Memorandum #40-'42: Conservation of materials – conference of War Production Board,* May 15, 1942, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 1.
[24] U.S Navy (BuDocks), *Building the Navy's Bases*, Vol. I, 96-97.
[25] Ibid.
[26] Ibid., 15-16.
[27] Ibid.

were upgraded in order to obtain any deliveries of lumber.[28] This reduced the supply of quality lumber (and plywood) available for combat needs such as medical supplies, aviation components, and boatbuilding. High grade lumber was also needed for floating drydock construction[29] to support the combat theater.

During World War II a number of materials were either prohibited for use in Bureau of Yards and Docks projects, or their permitted usage was strictly defined in order to conserve them for the most vital war time needs. On April 1, 1942, the Army and Navy Munitions Board, (which was created in 1922 for coordinating both branches' procurement of munitions and supplies) composed a list of controlled materials and the applications where their use was allowed. This list, titled "List of Prohibited Items for Construction Work" was amended several times throughout WW II, and was the guide to materials usage in all war time construction. The list contained entries for metals, fuels, fibers, oils, rubber, chemicals, as well as building materials such as wood, plywood, and structural steel framing.[30] Five months after the first "List of Prohibited Items" was released, wood boards were arriving at Pearl Harbor in bulk on transport ships and being offloaded at Kuahua Supply Depot.[31]

As a critical war time material, the use of wood was controlled by the "List of Prohibited Items for Construction Work," which provided a number of construction situations where wood was banned, as well as giving guidelines for its various permitted applications. Here, the November 1942 mandate that construction be of the "cheapest temporary character"[32] seems to come up against the regulations of the "List of Prohibited Items", which states "the use of laid up masonry walls both interior and exterior should be encouraged and should be made load bearing wherever possible."[33] Concrete and masonry were not on the list of prohibited items, but they hardly seem to fit the admonition of the Secretary of the Navy's call for cheap temporary construction with structural strength only for the time of its contemplated war use. Although wood was "the most well-understood building material at the time, as well as the least expensive for framing and cladding,"[34] the Army and Navy Munitions Board recognized that it could also be a critical material and recommended that concrete be considered and used where metal forms were available and where "appreciable savings in wood will be

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[28] Ibid., 94.
[29] Ibid.
[30] U.S. Navy (BuDocks), *Circular letter 309-43, Information Regarding Failure of Substitute Materials – Request for,* December 30, 1943, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 4.
[31] Rear Admiral William Furlong, Photograph 4051-42, September 24, 1942, Hawaii State Archives, Furlong Collection, folder PPFUR-1-27.
[32] U.S Navy (BuDocks), *Building the Navy's Bases*, Vol. I, 16.
[33] Army and Navy Munitions Board, *List of Prohibited Items for Construction Work*, April 24, 1944, NARA II RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 1, 28.
[34] Mason Architects, *World War II Wooden Facilities,* 1.2-2.

accomplished."[35] The resolution of this seeming contradiction was the Army and Navy Munitions Board's instructions that "the guiding principal should always be to utilize those materials which are most plentiful and which in the ultimate analysis, will cause the least interference with the production of combat material."[36] This resulted in the use of wood for the majority of temporary war time construction and, as also seen in war time construction at the Submarine Base, for many buildings classified permanent as well.

The allowed uses for wood changed during the course of WW II. Comparing the two lists of prohibited items which were located for this report (December 1943, and April 1944), the most significant change was in the use of lumber for siding, becoming more restrictive as the war continued. In 1943 specific grades and species of wood were prohibited from being used for siding, in 1944 all lumber was prohibited from being used for siding.[37] At the same time that the restrictions on lumber were tightening, the limitations on structural steel framing were loosening. This was most likely due to the doubling of U.S. steel production which occurred during the war as plants idled by the depression came back on line and new plants were built. Previously, in 1943 "the use of structural steel framing [was] prohibited except when its use is essential, and then only by special permission."[38] However, by the following year, 1944, structural steel framing was one of the permitted uses of steel and iron.[39] That year, structural steel framing was being recommended by the Army and Navy Munitions Board to substitute for scarce building wood. "Structural steel should be used where ultimate savings in critical lumber, especially under 2", will be made in conjunction therewith."[40] Although structural steel became allowed, the supply of steel plate was still short of demands.

Problems developed with war time wood construction, becoming evident not long after the start of the war. "During the construction of Naval shore establishments over the last two years, the substitution of green or partially cured timber for steel and concrete has given rise to problems of maintenance and repair, of which the Bureau [of Yards and Docks] has been aware for some time." This indicates that the demand for timber was such that time was not available for its proper curing. Rather than mandate the use of properly cured wood, the Navy's solution was a building inspection program to identify "excessive shrinking, warping and other movement"[41] in the wood buildings. Even with these headaches,

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[35] Army and Navy Munitions Board, *List of Prohibited Items*, April 24, 1944, 29.
[36] Ibid.
[37] U.S. Navy (BuDocks), *Circular letter 309-43,* December 30, 1943, and Army and Navy Munitions Board, *List of Prohibited Items*, April 24, 1944.
[38] U.S. Navy (BuDocks), *Circular letter 309-43,* December 30, 1943, 34.
[39] Army and Navy Munitions Board, *List of Prohibited Items*, April 24, 1944, 18.
[40] Ibid., 28.
[41] U.S. Navy (BuDocks), *Circular letter 293-43, Inspection, Maintenance and Repair of Timber Structures*, July 29, 1943, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 1.

the favorable costs of the use of timber outweighed its disadvantages, even as the supply of steel began to loosen up later in the war, in early 1944. "While bolt tightening and necessary repairs have increased the cost of timber structures, the over-all cost even with these charges included is still well below the cost of structural steel framing" and the use of timber construction was continued "where justified by sound engineering principles in order to secure cheap construction."[42] At that time, the growing availability of structural steel allowed it to be considered for buildings with roof spans greater than 120', or with high floor loads, and also for boiler rooms where high temperatures could cause checking in timber.[43]

It was also recognized that the potential for a disastrous fire increased with more wood construction, especially if the buildings were packed together. The standard spacing was 75' for one-story frame buildings and 100' for two-story. Buildings were allowed to be grouped closer if a 100' spacing was maintained between groups and if the structures were "small and the loss of several will not seriously affect the activity."[44] For buildings less than 8,000 square feet, spacing could be reduced to 50' for one-story and 75' for two-story as long as they were sheathed in the equivalent of ¼" asbestos-cement board. Local conditions also factored into the spacing of wood frame buildings, a steep grade or strong prevailing winds would necessitate a "greater horizontal separation."[45] In addition to the building spacing requirements, intended to minimize the impact of fires, in early 1944 the fire escape requirements for temporary (wood) barracks were amended to improve the egress. This provided at least two sets of exterior stairs for exit from the building, replacing previously utilized ladders for barracks "housing large groups of personnel."[46] This change was to be incorporated into future barracks and also to be retro-fitted to existing buildings.

Although the supply of steel began to loosen up in early 1944, a shortage of draftsman necessitated another cutback in procedures for temporary construction. "Drawings and specifications showing the project as actually built...need be furnished for temporary structures only where unusual foundation or other conditions indicated the desirability of such a record in order that data may be available for possible future alterations."[47] This indicates that the collection of drawings for temporary

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[42] U.S. Navy (BuDocks), *Circular letter 14-44, Policy regarding restrictions on use of construction materials*, February 10, 1944, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 4, 2.
[43] Ibid.
[44] U.S. Navy (BuDocks), *Circular letter 211-43, Fire protection – spacing of structures*, December 2, 1943, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 4.
[45] Ibid.
[46] U.S. Navy (BuDocks), *Circular letter 33-44, Fire protective measures in buildings*, February 18, 1944, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 1, 2.
[47] U.S. Navy (BuDocks), *Circular letter 42-44, Policy with regards to drawings*, February 15, 1944, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 1.

buildings, at least those constructed during the final years of the war, was not comprehensive from the very beginning.

In August, 1942 the individual entities of the Army, Navy, Maritime Commission, Panama Canal, and the War Shipping Administration agreed to combine their orders for lumber and plywood in order to guarantee delivery to the most urgent military programs and not waste premium grades on projects which could specify lower quality. From a document located at the National Archives, it is possible to make some generalities about the demand for various types of wood. By March 1944 the Navy had authorized the direct purchase of "quantities up to 350,000 FBM [foot-board measure] of lumber of any specie [sic] other than Douglas Fir" by Bureau of Yards and Docks contractors without submitting a request through the Bureau.[48] This seems to indicate that Douglas fir was a much desired species of wood for wartime use, that other types of wood were available, and that the Navy encouraged the use of these other types as appropriate to various projects.

World War II Wooden Buildings at the Sub Base.

Much of the wood construction at the Submarine Base during World War II was to provide housing and collateral services, such as messing, for the large influx of sailors. The number of enlisted personnel at the Submarine Base increased steadily during the period before WW II and during its first year, from 359 in June 1940 to 700 in August 1941 to 1081 in 1942. The numbers peaked in July 1944 when there were 6633 enlisted men on the Submarine Base.[49] This large rise corresponds with the construction of wood barracks buildings and wood additions to barracks buildings during 1943 and 1944 that could house over 3000 men. At the end of WW II the Submarine Base still had over 6000 enlisted men.[50]

1940-1942

Through the build-up to WW II and during its first year (1940-1942), seven wood buildings were built at various locations around the sub base. In 1940 a storehouse (Building 673) was constructed near pier No. 1, and in 1941, Building 667, Storehouse KF was built. In 1942 construction of wood buildings began to increase, five were built; two storage buildings (Building 674 and 678), a torpedo man school (Building 682), a boathouse repair shop (Building 677). Also, a ship's service and post office (Building 693) was constructed. Formerly these services were housed in the basement of the enlisted barracks, 654. The construction

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[48] U.S. Navy (BuDocks), *Circular letter 49-44, Procurement of Douglas Fir by direct Purchase*, March 20, 1944, NARA II, RG 71, Bureau of Y&D circular letters, 1940-45, box1, folder 1.
[49] Ray W. de Yarmin, *History of the Naval Submarine Base Pearl Harbor Hawaii*, (Pearl Harbor: Pacific Submarine Museum, 1984), 27, 39.
[50] Ibid., 41.

of Building 693 "alleviated a space problem within the enlisted barracks."[51]

1943

Wood building construction at the Submarine Base during the war peaked in 1943, when twenty seven wood buildings, a wood fourth floor addition to enlisted barracks, and a concrete transformer substation with a wood second floor were built. The origin of most of these buildings was a letter written by the Commandant of the Submarine Base to the 14th Naval District Public Works officer on 31 December 1942 which proposed projects to accomplish an expansion of the Submarine Base. "The increased scope of the work included additional personnel facilities: a fourth story addition to building No. 654, six 200-man barracks [Buildings 686-691], a dormitory for officers [Building 700], messhall equipment [collateral services for 200-man barracks, Buildings 694-699]: and also additional facilities for submarine overhaul [shop facilities compound, Buildings 639-648]...and dredging for a quay wall for the dry-dock basin [quay S20 for the floating dry dock, adjacent to Building 639]."[52]

Eight of the buildings constructed in 1943 (Buildings 639-648) belonged to a group of shop buildings and support buildings, now called the shop facilities compound, that were used for overhaul and repair of submarines. These buildings, located at the north corner of Magazine Loch, were all classified as temporary buildings in 1945.[53] See the description of the shop facilities compound below. Also built near the shop facilities compound's east edge was a splinterproof concrete transformer substation with a wood second floor (Building 626).

A cluster of twelve permanent wood buildings was constructed in 1943 in the main portion of the Submarine Base between North Road and Pierce Street. One building was a large storehouse (Building 692), and the eleven others formed a complex to house and feed men at the Submarine Base who were connected with overhauling submarines at the shop facilities compound.[54] This complex included six, 200-man barracks, Buildings 686-691,[55] mess and galley (Building 694), boiler house (Building 698), transformer station (Building 699), cold storage (Building 695), and garbage (Building 697). Before this cluster of buildings was built, oil storage tanks 39, 40, and 41 were removed, North Road built, and the Oahu Railway & Land Company (OR&L) tracks re-routed.[56]

The remainder of the wood buildings constructed during 1943 were located in the main portion of the Submarine Base and had various functions. Two were for officer's housing, (Building 700, temporary, and

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[51] Ibid., 40.
[52] (CPNAB), *Technical Report and Project History*, A-620.
[53] U.S. Navy (BuDocks), *P-164, July 1945 Edition*, 1068-1070.
[54] (CPNAB), *Technical Report and Project History*, A-611.
[55] U.S Navy (BuDocks), *Building the Navy's Bases*, Vol. II, 131.
[56] de Yarmin, *History of the Naval Submarine Base*, 39.

Building 622A, permanent) and two were storehouses (Building 712 and 713). Building 700 was a two-story dormitory to house 44 overflow officers in 2-man rooms with central toilet and storage, and utilized the dressing rooms and showers of the adjacent swimming pool.[57] Additional 1943 buildings were; a scullery (Building 654A), welding shop (Building 675, permanent), boat repair shop (Building 684, permanent). Also during 1943, a wood fourth floor addition was constructed on the existing barracks, Building 654 to house an additional 1000 men. This addition was for housing men associated with submarine overhaul at the shop facilities compound[58] and was removed in the spring of 1945.[59]

The 200-man barracks (Buildings 686-691) were probably a hip-roof variation of the Navy's standard barracks design of 1942. This standard design, called the B-2, had a flat roof, bands of windows, and a rectangular plan, 42'x150', and could house 250 men.[60]

1944

In 1944 there were sixteen wood buildings and two wood upper floor additions built on the sub base. Three of these were temporary buildings at the shop facilities compound, a galvanizing and tin shop (Building 648), a boiler house (Building T8), and an office (Building T9).

Another five buildings were temporary barracks and warrant officer's quarters (Buildings 701, 702, 703, 704, 705) that were clustered east of North Road. Six barracks were originally planned for this area, and it was thought that the construction of these barracks would entail the removal of oil storage tank #42 as "the selection of any other site would necessitate construction of additional messing facilities" (Wetsel 15 June 1944). Ultimately, the five barracks buildings constructed were located on the site of oil storage tank #43, which was removed sometime between June 1943 and January 1944. The problem with messing facilities for the new barracks was solved by a wooden pedestrian overpass which linked the north building of the group, the warrant officer's quarters (Building 705), with the 1943 mess and galley building (694) on the other (west) side of North Road and the OR&L tracks.

Two of the wood buildings constructed that year were special weapons buildings (Buildings T3 and T5) located at the head of Magazine Loch in the center of a cluster of five Quonset huts designated for special weapons. Also constructed that year in the cluster of buildings for special weapons was a wooden latrine (Building 996). The remaining wood construction from 1944 was distributed in the main portion of the sub base; a boq storehouse (Building T12), and a metal storehouse (Building

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[57] Ibid., 40.
[58] (CPNAB), *Technical Report and Project History*, A-611.
[59] de Yarmin, *History of the Naval Submarine Base*, 39, 41.
[60] John S. Garner, *World War II Temporary Military Buildings. A Brief History of the Architecture and Planning on Cantonments and Training Stations in the United States*, (Springfield, VA: National Technical Information Service, 1993), 48.

T11), a carpenter shop (Building T10), a generator house (Building T13, and the chapel (Building 708). The chapel was built primary from donated materials and labor obtained by Chaplain Thomas H. Reilly "without the direct use of any government funding and without any official papers of authorization ever being drawn up."[61] Also in 1944, a two-story wood addition was constructed atop the telephone exchange (Building 619) and a wood addition for training was built on the roof of the administration building (661), near the northwest corner. Also on the roof of Building 661 were several Quonset huts. These were erected at the southeast corner of the building, and were oriented northeast-southwest.[62]

1945

The final year of WW II, 1945, saw three wooden buildings built on the Submarine Base. A beer garden and dance floor (Building 711, the Beeman Rec. Center) was constructed at the north area of the main base. At the cluster of special weapons buildings at the head of Magazine Loch a latrine and shower (Building 993), and a test shop (Building 1028) were built. The original classification of these buildings is not known, their classification in 1963 was semi-permanent.[63]

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[61] de Yarmin, *History of the Naval Submarine Base*, 40.

[62] Rear Admiral William Furlong, Photograph #64, May 26, 1944, Hawaii State Archives, Furlong Collection, folder PPFUR-2-4.

[63] U.S. Navy (BuDocks), *Real Property Data NAVDOCKS P-164,* 3700 - 3702.

57 Wood Buildings Built at the Submarine Base During WW II

BLDG	Classification in 1945 (p=perm, t=temp)	YEAR		ORIGINAL BLDG DESCRIPTION
673		1940		storehouse
667	p	1941		storehouse
678		1942		submarine part storehouse
674	p	1942		battery storage & overhaul
677	p	1942		boathouse repair shop section
682	p	1942		torpedo man school
693	p	1942		ships service & post office
626	p	1943		wood 2nd fl on concrete substa.
639	t	1943	Shop Facilities Compound	latrine
640	t	1943	Shop Facilities Compound	storehouse
641	t	1943	Shop Facilities Compound	salt water pumping & air compressor
642	t	1943	Shop Facilities Compound	distilled water plant
644	t	1943	Shop Facilities Compound	foundry
645	t	1943	Shop Facilities Compound	shipfitters shop
646	t	1943	Shop Facilities Compound	machine shop
647	t	1943	Shop Facilities Compound	pattern shop
648	t	1944	Shop Facilities Compound	galvanizing & tin shop
700	t	1943		boq
712		1943		storehouse
713		1943		storehouse
654		1943		4th floor addn to enlisted barracks
654a		1943		scullery
675	p	1943		outside machine welding
684	p	1943		repair shop
686	p	1943		barracks
687	p	1943		barracks
688	p	1943		barracks
689	p	1943		barracks
690	p	1943		barracks
691	p	1943		barracks
692	p	1943		storehouse
694	p	1943		mess, galley , & recreat
695	p	1943		cold storage
697	p	1943		garbage
698	p	1943		boiler house
699	p	1943		transformer stat
662a	p	1943		boq addition
701	t	1944		barracks
702	t	1944		barracks
703	t	1944		barracks
704	t	1944		barracks
705	t	1944		warrant officers quarters
T10	t	1944		carpenter shop
T11	t	1944		metal storage
T12		1944		boq storehouse
T13	t	1944		generator house
T5	t	1944		spec weps bldg
T8	t	1944		boiler house
T9	t	1944		office
708		1944		chapel
996		1944		latrine lavatory
T3		1944		spec weps bldg
619	p	1944		upper floor addn to telephone exch
661		1944		3rd fl addn to admin bldg for training
711		1945		beer garden & dance floor
993		1945		latrine & shower
1028		1945		test shop

The Shop Facilities Compound at the Submarine Base

A group of shop buildings and their support buildings were constructed during the war at the north corner of Magazine Loch. These wood buildings were built in 1943 and 1944[64] in order to support repair work at the Submarine Base and at the base's floating dry dock. This grouping of buildings is now referred to as the sub base shop facilities compound. An additional building in the compound, Building 643 – an electrical substation, extant, was constructed in 1944 of concrete. All of the buildings at the shop facilities compound, including the concrete substation, were originally designated as temporary buildings.[65]

The shop facilities compound was not a part of the Submarine Base's planned build-up before the war. It was found to be necessary after World War II began and the Navy realized that it needed to increase its capabilities for overhauling submarines in the Pacific theater. This was due to "the Navy's decision to assign to that theater a very large proportion of its growing submarine force."[66]

Before 1941 the area that would become occupied by the shop facilities compound was submerged beneath Magazine Loch. At that time Kuahua was an island that was accessed by a narrow causeway running approximately along the route of present day North Road between Pierce Street and San Juan Avenue. By October of that year the area northeast of the causeway was being filled, probably with dredging spoils from the north shoreline of Kuahua.[67] Over the next two years the areas on both sides of the causeway were filled. On the southwest side of the causeway this fill squared off the shoreline at the head of Magazine Loch, allowing the construction of piers 5 (S15 & S16) and 6 (S17 & S18), and also the shop facilities compound at the north corner of the loch. The buildings of the shop facilities complex were built on piles driven in to the filled area.[68] Eight of the buildings at the shop facilities compound would be built by the end of 1943. Building 648, the Galvanizing and Tin Shop, would be erected the following year, along with temporary buildings T8, a boiler house, and T9, an office. Both these buildings were located at the rear of the machine shop (Building 646).

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[64] NAVFAC Archives, Photograph #16888, November 11, 1943, in box # TI-8-27, Pearl Harbor Sub Base Shops, and NAVFAC Archives, Photograph #16889, November 11, 1943, in box TI-8-27, Pearl Harbor Sub Base Storage Facilities, and Rear Admiral William Furlong, photograph #1998.035, March 11, 1944, Hawaii State Archives, Furlong Collection, folder PPFUR-2-2.

[65] U.S. Navy (BuDocks), *P-164, July 1945 Edition*, 1069.

[66] (CPNAB), *Technical Report and Project History*, A-619.

[67] (NARA), photograph # 115419, October 13, 1941, in RG 71 CB box 101 folder aerial views.

[68] (CPNAB), *Technical Report and Project History*, A-612.

Wood Buildings at Submarine Base Shop Facilities Compound

Building	Original Use	Notes
639	Latrine	Built in 1943
640	Dry Dock Storehouse	Extant See HABS HI-291
641	Salt water pump. & air comp.	Extant
642	Distilled water plant	Built in 1943
644	Foundry	Extant See HABS HI-154
645	Shipfitters shop	Built in 1943 See HABS HI-155
646	Machine shop	Built in 1943
647	Pattern Shop	Built in 1943
648	Galvanizing & tin shop	Built in 1944
T8	Boiler house	Built in 1944
T9	Office	Built in 1944

Before any of the shop facilities compound buildings went up the construction crews at work on filling the area southwest of the Kuahua causeway ran into problems with settling. The area was described as a "swamp" and it was noted that "an unusual amount of fill was required to bring the area to grade."[69] When fill was deposited "the soft underlying material [was] extruded into the adjacent water," settling about 1'-6" and displacing the tops of about 50 piles by up to 3'-0".[70] The effected piles were pulled and re-driven and the quay walls at the head of Magazine Loch were completed without backfill next to them. The problems prompted the re-location of planned shop facilities buildings (646, 645, and possibly 644) back further than originally intended from the quay wall at the head of Magazine Loch. A duct was installed near this quay wall to carry power from an electrical substation to piers 5 and 6 and to nearby buildings. Subsidence had "made the duct unusable" and it was

[69] Ibid., A-621.
[70] Ibid.

removed.[71] More piles were driven to support a new duct and fuel lines. The duct and lines were carried on a timber deck built on 12"x12" caps placed over the piles.

The buildings of the shop facilities compound were constructed by Naval Construction Battalion 62.[72] The construction of these buildings was authorized originally under contract NOy-4173 to Contractors Pacific Naval Air Bases (CPNAB), a consortium of firms which were first awarded contracts on August 5, 1939 to construct bases in the Pacific.[73] The original contract was cancelled in late 1943 and Buildings 641-648 (including concrete substation 643) were finished by Naval Construction Battalion (Seabee) labor.[74]

The buildings of the shop facilities compound were designed by the 14th Naval District Public Works Office. The designs were guided by "standard Navy Department specifications, as modified by directives requiring conservation of critical materials."[75] On most of the original drawings that were located for the wood buildings of the shop facilities compound, a statement, signed and dated by the project manager (illegible signature, possibly M. W. Moody), reads; "Approved & certified to comply with all material & design requirements of district order 29-43 dated January 1, 1943 for war-time construction."[76] Several of the original drawings for buildings at the shop facilities compound have notes stating that the workmanship was "to be of the highest quality."[77]

In spite of the fact that the wood buildings of the shop facilities compound each had a different design, they had similar construction features such as; wood posts and 2" x 6" or 2" x 8" stud framing covered by 1" x 8" horizontal drop siding, 2" x 8" or 2" x 10" wood rafters or wood roof trusses with 2" x 8" or 2" x 10" purlins, and 1" x 8" shiplap roof sheathing covered with 5-ply built-up roofing. Most buildings had overhead-track sliding doors that were built of a mortise and tenon 3" x 8" frame with four panels of diagonal 1" x 6" tongue and groove Douglas fir.[78]

Although it is not possible to determine the precise spacing of all the buildings of the original shop facilities compound, from surviving site plans and by scaling WW II maps of the Submarine Base it seems that the compound was constructed under a very lax interpretation of the guidelines for the spacing of structures for fire protection.[79] As stated in the guidelines, the minimum spacing allowed under the most optimum

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[71] Ibid.
[72] de Yarmin, *History of the Naval Submarine Base*, 41, and NAVFAC Archives, Photograph #16888.
[73] U.S Navy (BuDocks), *Building the Navy's Bases*, Vol. I, 115.
[74] (CPNAB), *Technical Report and Project History*, A-613, A-622.
[75] Ibid., A-619.
[76] (NAVFAC) Pacific Division, Plan files drawing numbered Z-N6-228, June 17, 1943.
[77] (NAVFAC) Pacific Division, Plan files drawings numbered Z-N6-228 and Z-N5-129, July 17, 1943, and Z-N5-270, August 7, 1943.
[78] (NAVFAC) Pacific Division, Plan files drawing numbered Z-N6-231, June 17, 1943
[79] U.S. Navy (BuDocks), *Circular letter 211-43, Fire protection – spacing of structures.*

conditions was 50' between buildings. The larger buildings (644, 645, 646, 647, 648) appear to have about 30' to 35' spacing between them. Also in the case of the buildings at the shop facilities compound, the stipulations imposed on allowing buildings spaced at the minimum 50' do not seem to have been observed. These called for the buildings to be sheathed in the equivalent of ¼" asbestos cement board (the buildings were covered with wood siding). The Hawaiian trade winds also should have been a factor working to increase the spacing of the buildings. "Prevailing winds of considerable velocity" were cited as a consideration for "greater horizontal separation."[80] Also required for 50' spacing was that the "loss of several [structures] will not seriously affect the activity."[81] This idea is at odds with the relatively high level of importance placed upon the function of the shop facilities compound in quickly overhauling submarines to keep them out of action for as short a time as possible. The repairs and overhauls to submarines accomplished there "became the keystone to successful submarine operations in the Pacific.[82]

Submarine Repair at the Shop Facilities Compound During WW II

Between May 1944 and July 1945 the Submarine Base Engineering & Repair department (E&R) overhauled, refitted, or repaired 400 submarines. This was usually accomplished by keeping each submarine at the base for a two-week session during which inspections and necessary repairs were done. E&R technicians would often begin work on the submarines as they were still waiting for berthing space at the Submarine Base. Officers on board the submarine would provide E&R with work orders, and a repair plan was made while crews from the different shops began disassembly work. Repair work at the Submarine Base peaked in September 1944 when twelve submarines were refitted by the E&R department and twenty five submarines had voyage repairs,[83] which is emergency work necessary to enable a submarine to continue its mission and that can be accomplished without a change to the schedule of deployment.

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A. Architectural Drawings:

Historic drawings are available as electronic scans only, were viewed on the NAVFAC Pacific Plan File data base at Building 258, Makalapa, Pearl Harbor. Scans can be viewed and printed on 11" x 17" paper only. Drawings for this facility are indexed under both Facility 667, and under the associated buildings described or listed in this report.

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[80] Ibid.
[81] Ibid.
[82] de Yarmin, *History of the Naval Submarine Base*, 40.
[83] Ibid.

B. Early Views:

Historic aerial and ground photos are at the National Archives and Records Administration, College Park, MD, the Naval Facilities Engineering Command Archives at Port Hueneme CA, and in the Admiral Furlong Collection of the Hawaii State Archives, Honolulu HI. Photographs in this collection were created by a U.S. federal agency (U.S. Navy) and are considered in the public domain.

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Circular letter 33-44, Fire Protective Measures in Buildings. 18 February 1944 From NARA II RG 71 Bureau of Y&D circular letters 1940-45, box 1 folder 1.

_____.
Circular letter 49-44, Procurement of Douglas Fir by Direct Purchase. 20 March 1944. From NARA II RG 71 Bureau of Y&D circular letters 1940-45, box 1 folder 1.

_____.
Public Works of the Navy Data Book, Buildings: NAVDOCKS P-164. July 1945 Edition. Washington D.C.: Department of the Navy. 1945

_____.
Building the Navy's Bases in World War II, History of the Bureau of Yards and Docks and the Civil Engineer Corps 1940-1946. Vols. I and II. Washington D.C: U.S. Government Printing Office. 1947.

_____.
Detailed Inventory of Naval Shore Facilities, Real Property Data NAVDOCKS P-164, Vol IV Districts 12 through 14. Washington D.C: Department of the Navy. 1963.

Wetsel, G. D.
Memorandum to the District Logistical Board. 15 June 1944. From National Archives and Records Administration San Bruno, CA, 181 General correspondence [formerly classified] 1936-1944, folder A1-1(8) Developments beginning Sept 1943-ending Dec 1944.

Project Information: This addendum was prepared in advance of the demolition of Building 667, and to fulfill anticipated mitigation measures under a future MOA, between Commander, Navy Region Hawaii (CNRH) and the Hawaii State Historic Preservation Officer. CNRH and other Navy activities in Hawaii are required under Section 110 of the National Historic Preservation Act of 1966, as amended, to initiate measures to make appropriate records of historic properties that would be substantially altered or demolished as a result of Navy action. Mitigation for demolition or extensive alteration under Section 106 sometimes requires amending and adding photographs to existing HABS reports according to National Park Service guidance. Large-format photographs for this report were taken in July 2008 by David Franzen of Franzen Photography, Inc and the written portions were researched and prepared by Dee Ruzicka of Mason Architects, Inc. Honolulu, HI.

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Date of Report: February 2009

U.S. NAVAL BASE, PEARL HARBOR, GYMNASIUM BUILDING
(U.S. Naval Base, Pearl Harbor, Naval Submarine Base)
(Building No. 667)
HABS No. HI-293 (Page 30)

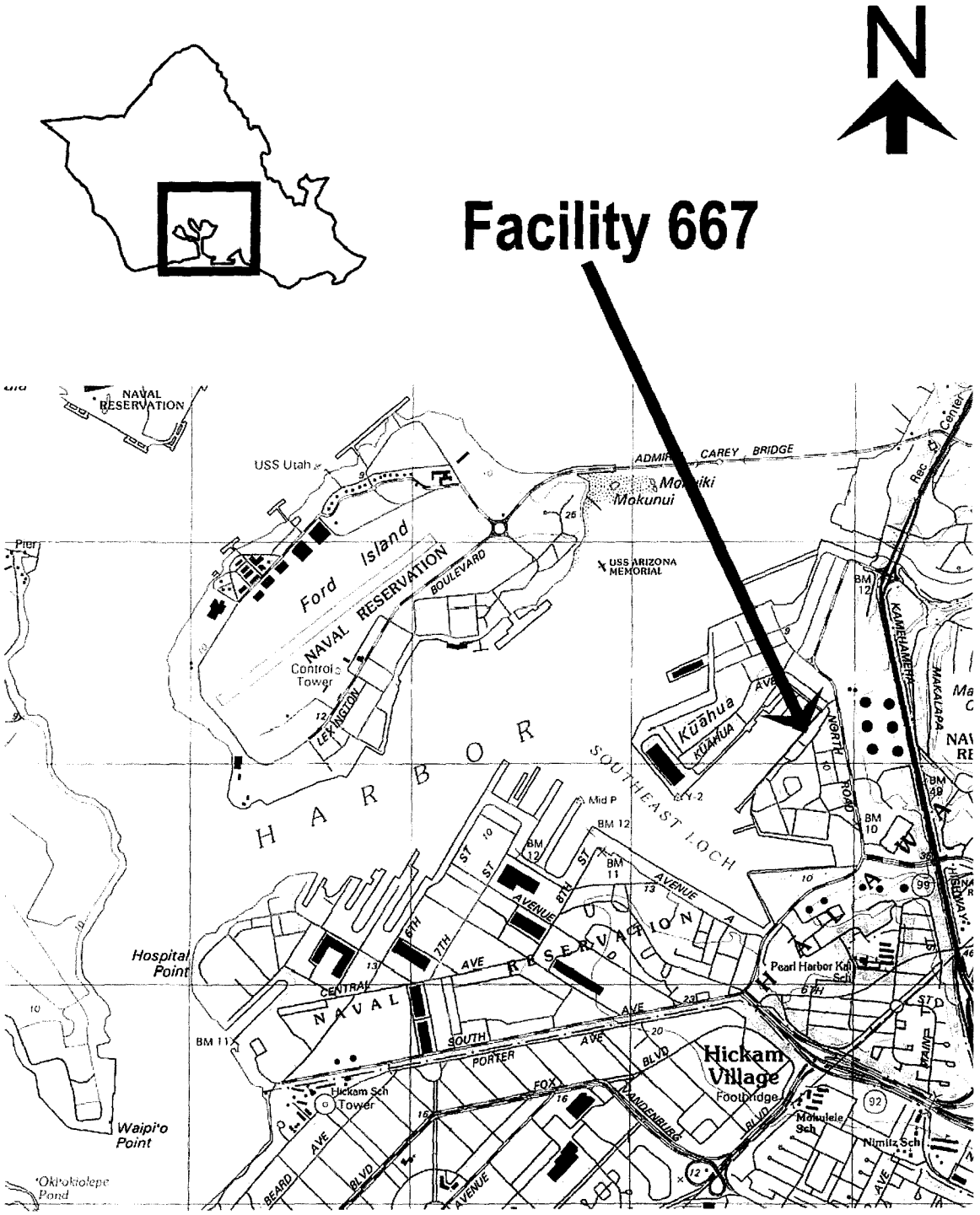
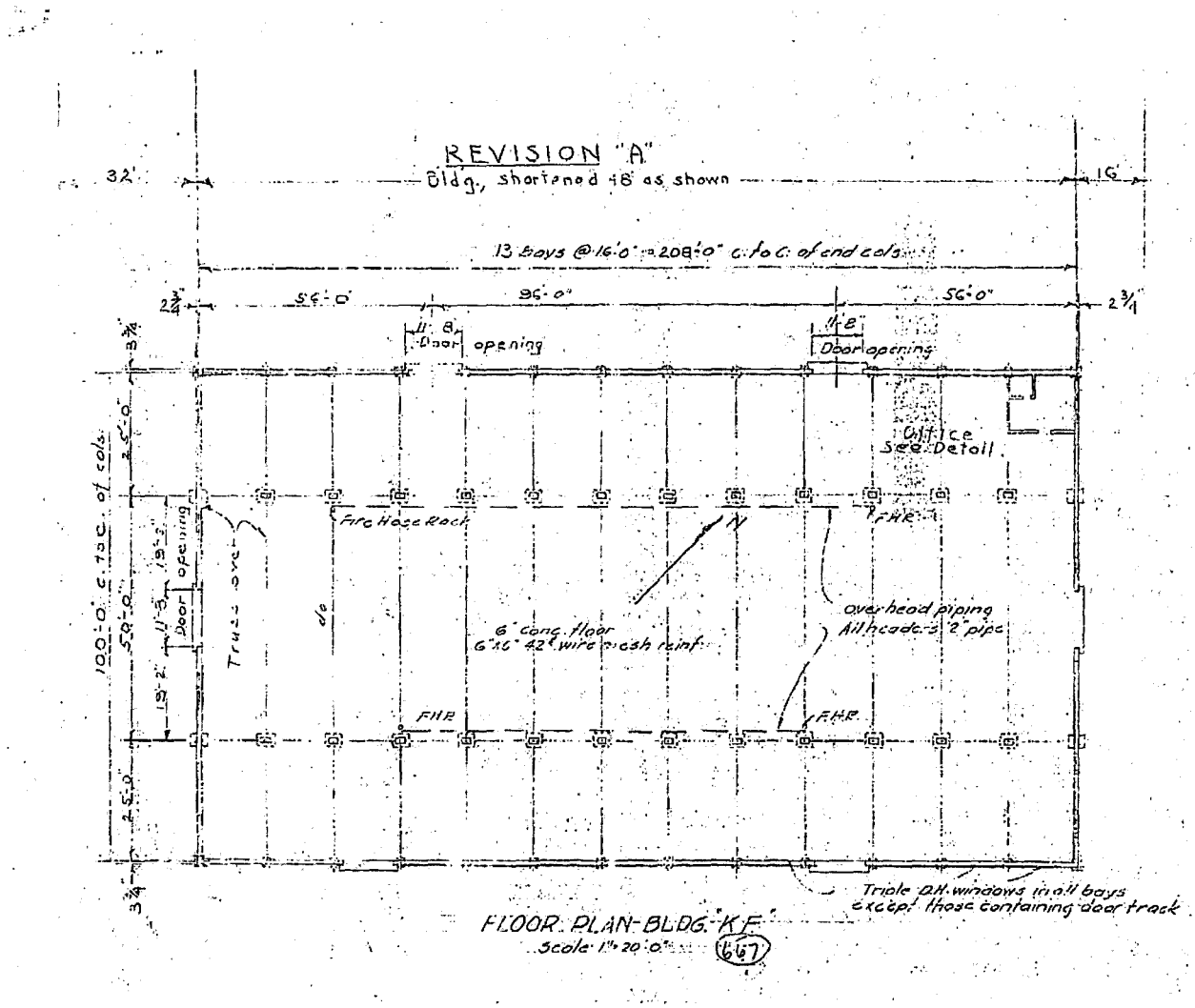
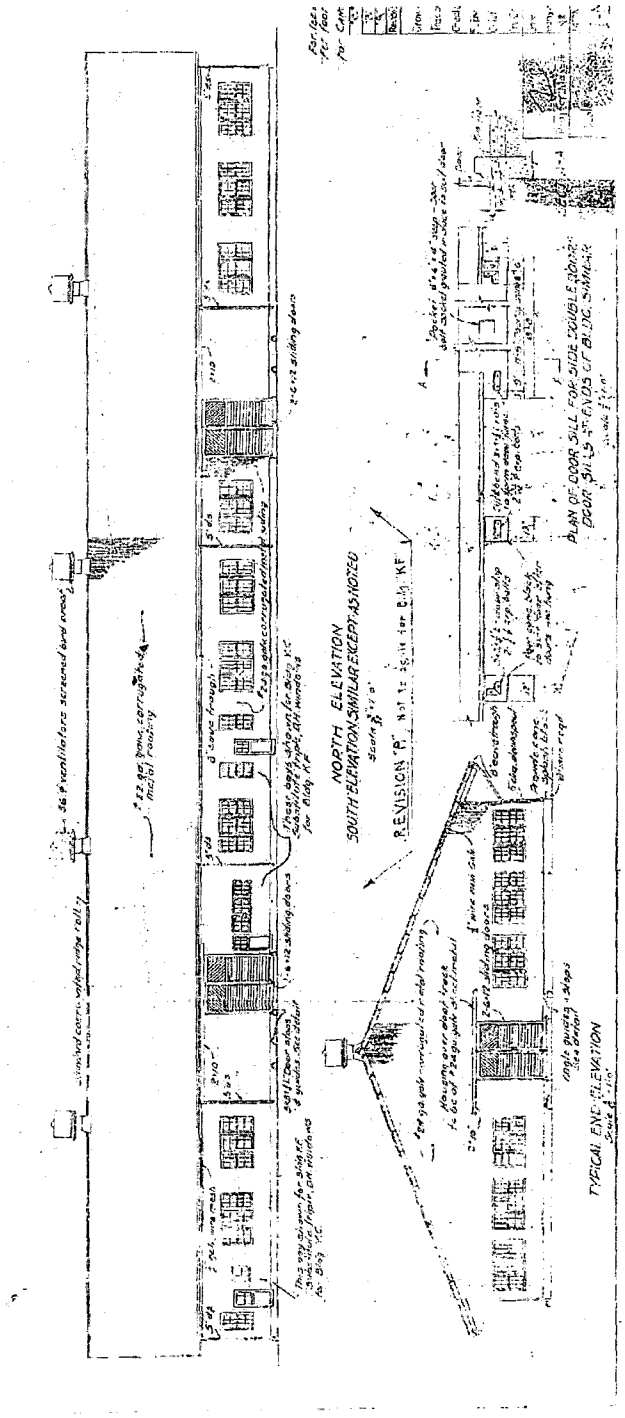


Photo dated 11 February 1941 showing Building 667, storehouse KF at the Submarine Base. View looking west. From NARA RG 71 CA 175 E #14106.

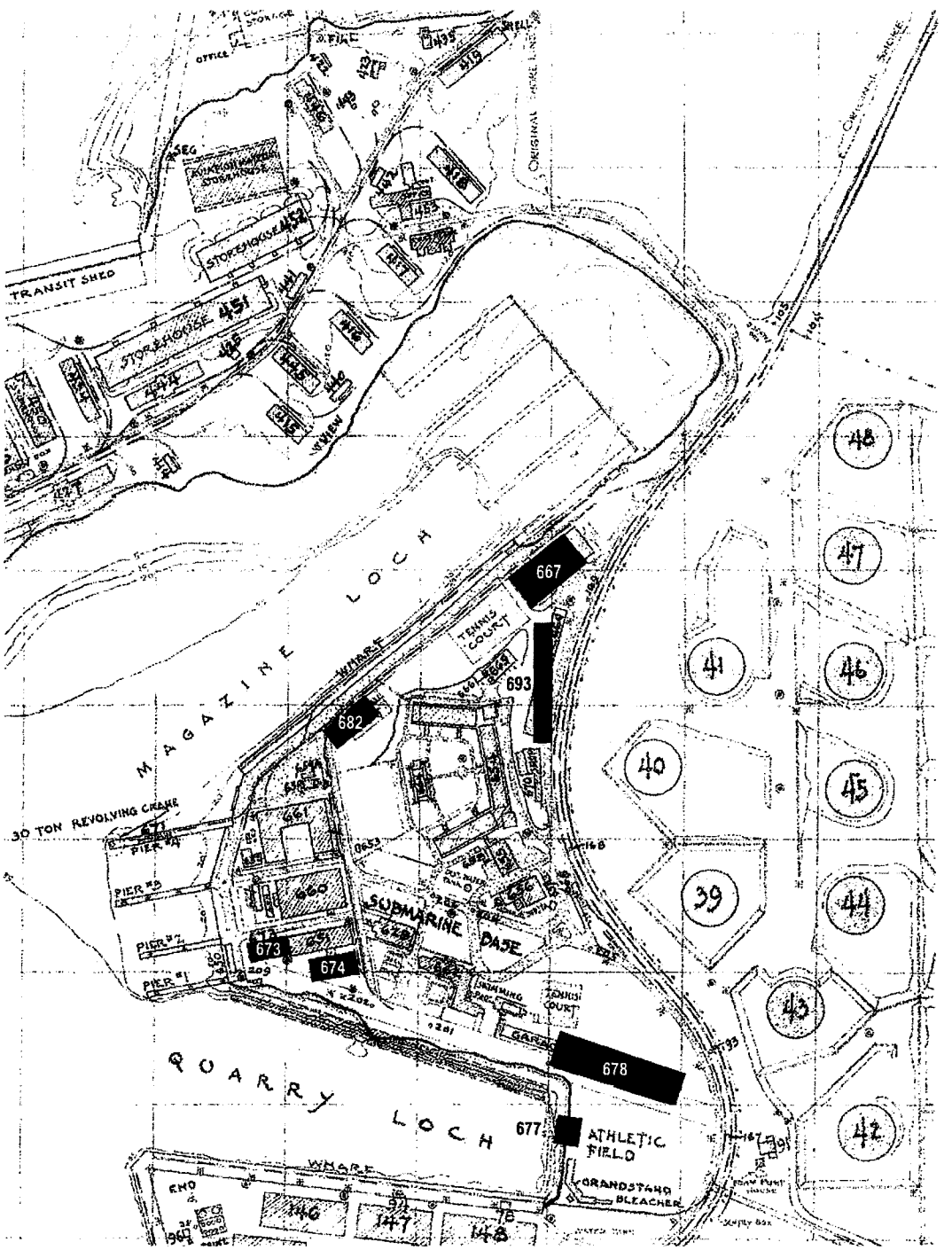
Portion of drawing dated July 19, 1940 showing the floor plan of Building 667. NAVFAC drwg 142944, July 19. 1940.



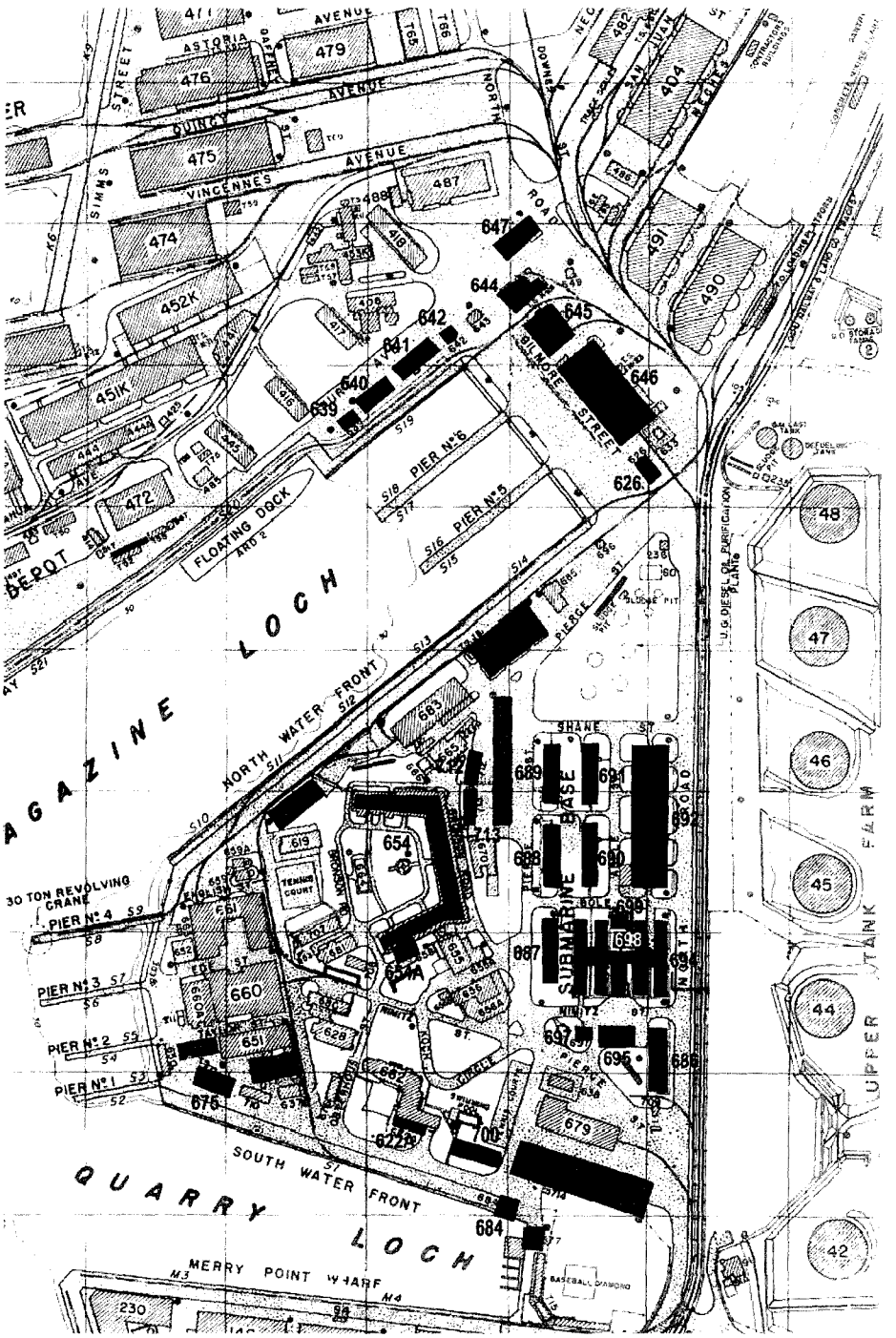
Portion of drawing dated July 19, 1940 showing elevations of Building 667. NAVFAC drwg 142944, July 19. 1940.



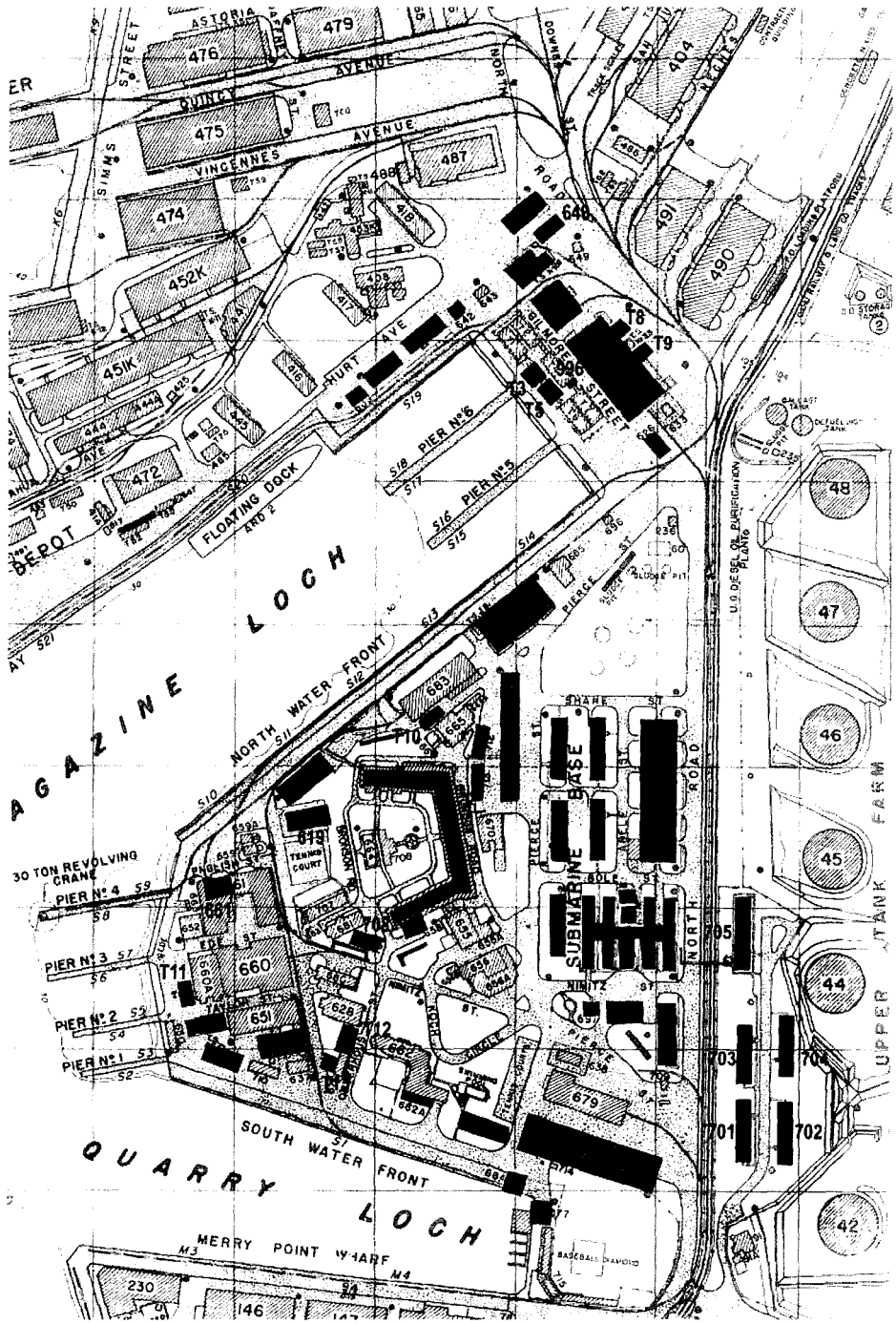
Map showing wooden buildings built at the Submarine Base, 1940-1942. Note the area south of the causeway to Kuahua which is shown with proposed fill for the shop facilities compound and finger piers for submarine slips. Highlighting added. From NARA RG 71, file #1400-3-106, 30 June 1941.



Map showing wooden buildings built at the Submarine Base, 1943. Note the shop facilities compound (Bldgs 639-646) at the north corner of Magazine Loch. Highlighting added (black shading is 1943 wood buildings, earlier wood buildings highlighted in gray). From NARA RG 71, 1400-3-145, 30 June 1946.



Map showing wooden buildings built at the Submarine Base, 1944. Highlighting added (black shading is 1944 wood buildings, earlier wood buildings highlighted in gray). From NARA RG 71, 1400-3-145, 30 June 1946.



Map showing wooden buildings built at the Submarine Base, 1945. Highlighting added (black shading is 1945 wood buildings, earlier wood buildings highlighted in gray). From NARA RG 71, 1400-3-145, 30 June 1946.

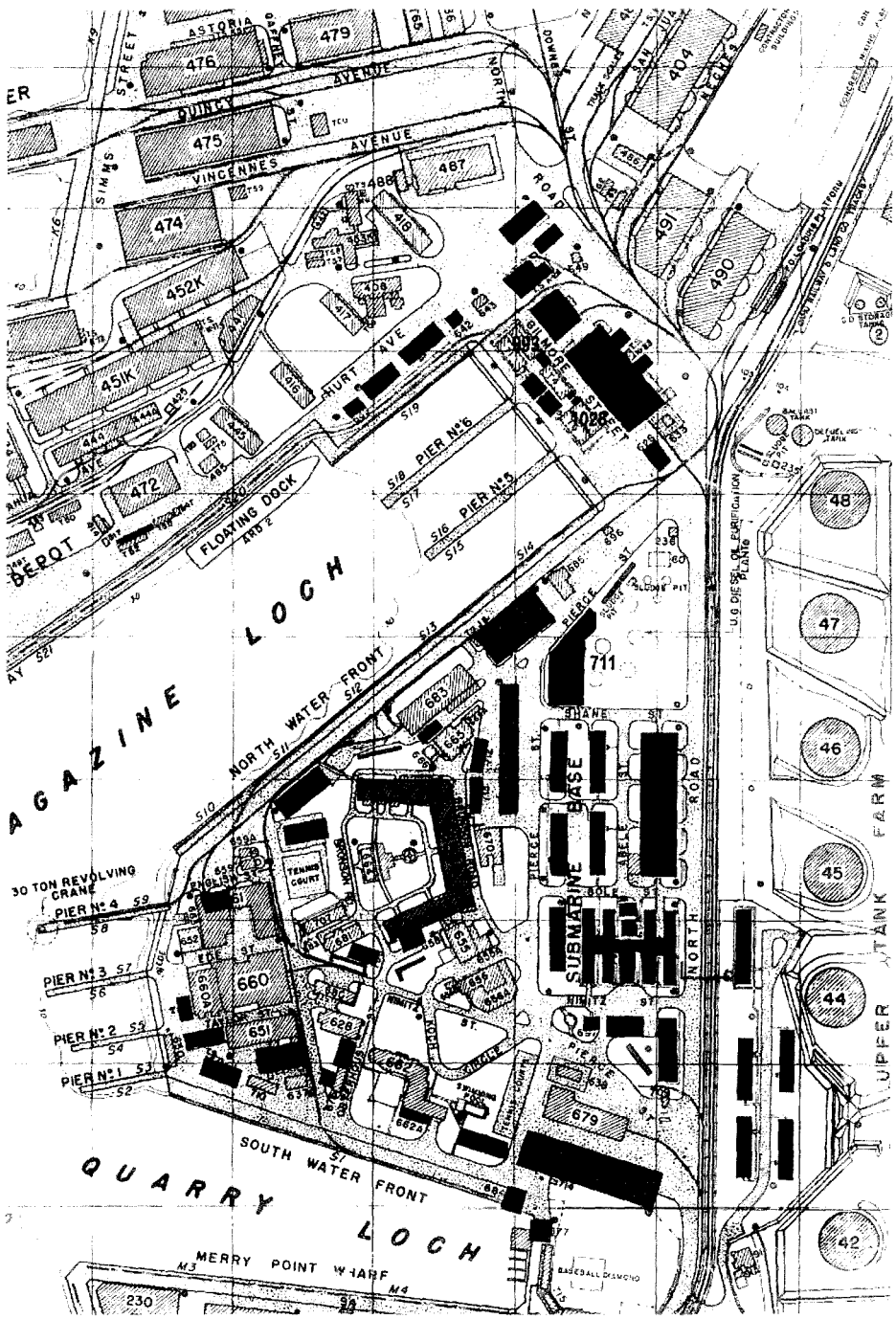


Photo dated 14 February 1941 showing Submarine Base, view looking north. The area that will become the shop facilities compound is still under water at the north end of Magazine Loch. Note Building 667 at the northeast edge of Magazine Loch. From NARA RG 71 CA 171 B 7.

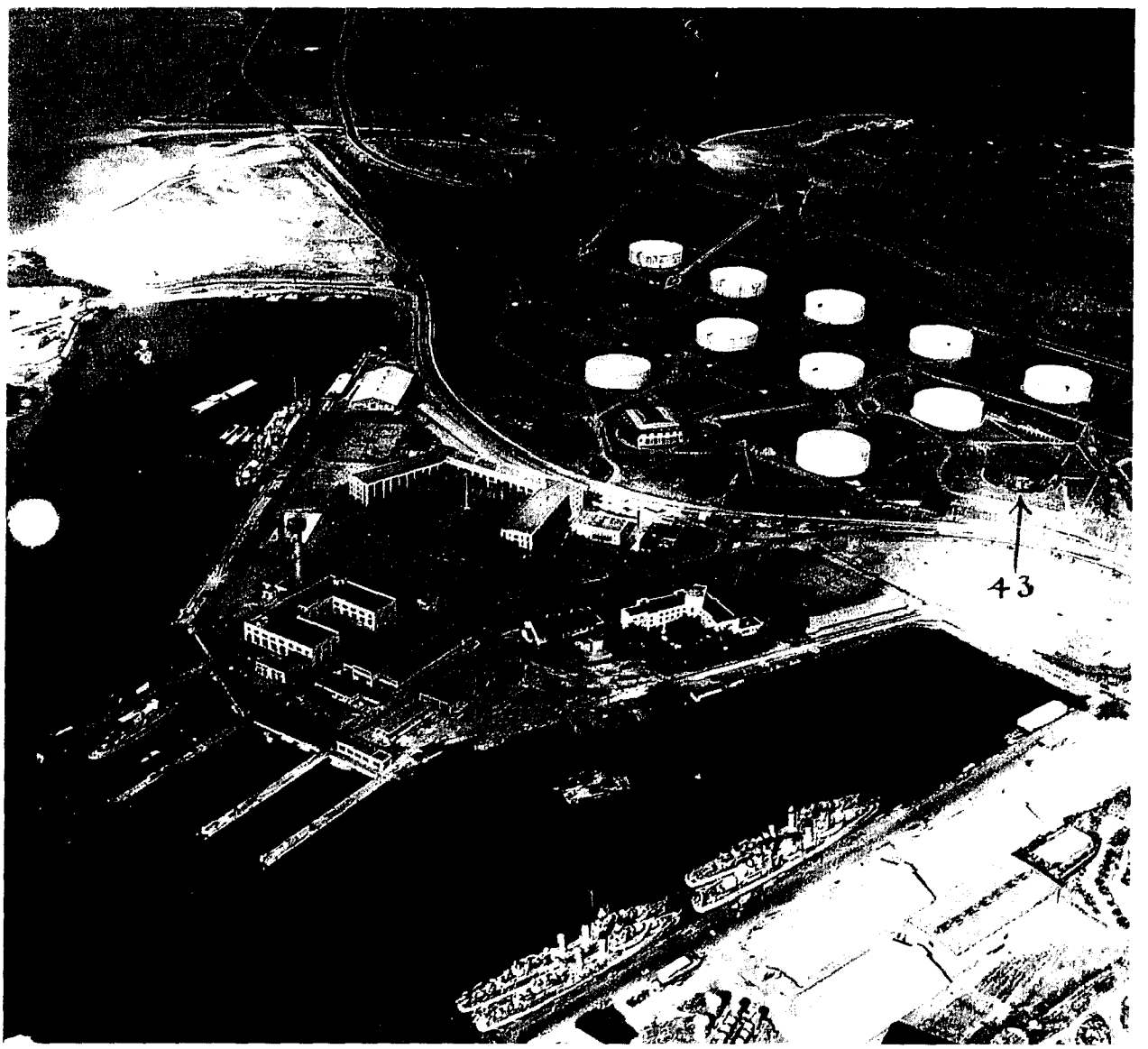


Photo dated 13 October 1941 showing the Submarine Base, view looking south. Note the area north of (below) the causeway to Kuahua is being filled. Magazine Loch south of (above) causeway will be filled for the construction of the shop facilities compound and to form piers 5 and 6. From NARA RG 71 CB box 101 folder aerial views, #115419.

Photo dated 11 November 1943 showing Building 639 (left) latrine, and Building 640 (right) dry dock storehouse, at the Submarine Base shop facilities compound. View looking north. From NAVFAC Archives TI 8-27, "Pearl Harbor sub base storage facilities" #16889.

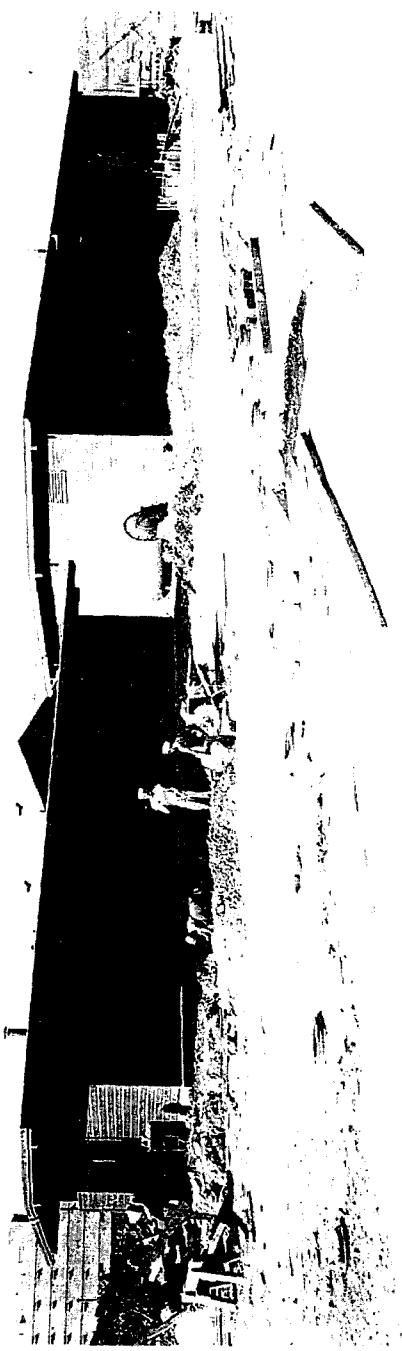


Photo dated 11 November 1943 showing Buildings 644, 645, and 646 at the shop facilities compound. Note the foundation of Building 648 in the foreground. View looking south. From NAVFAC Archives TI 8-27, "Pearl Harbor sub base shops" #16888.

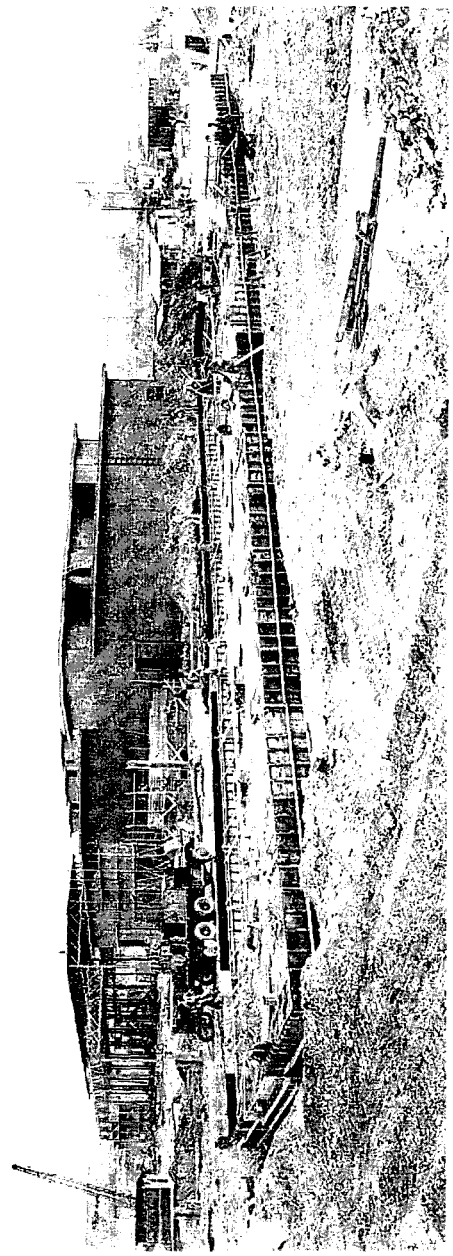


Photo dated 11 March 1944 showing the shop facilities compound of temporary wooden buildings at the Submarine Base at lower left, view facing west. From Furlong 11 March 1944.

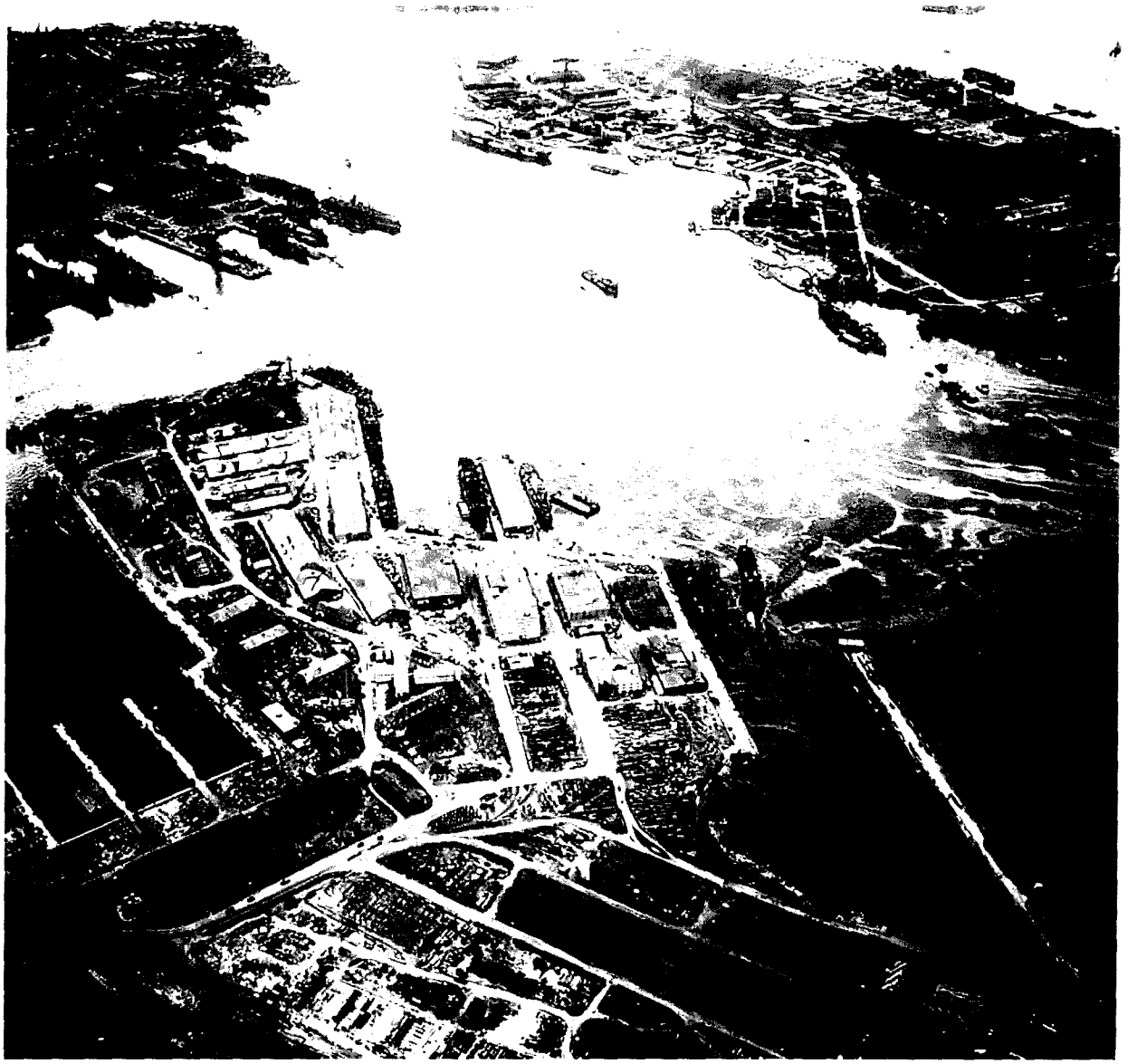


Photo dated 23 June 1944 showing Building 645, the shipfitters shop at the Submarine Base shop facilities compound. Note Building 644, the foundry, in background at left. View looking north. From NAVFAC Archives TI 8-27, "Pearl Harbor sub base shops." #16997.

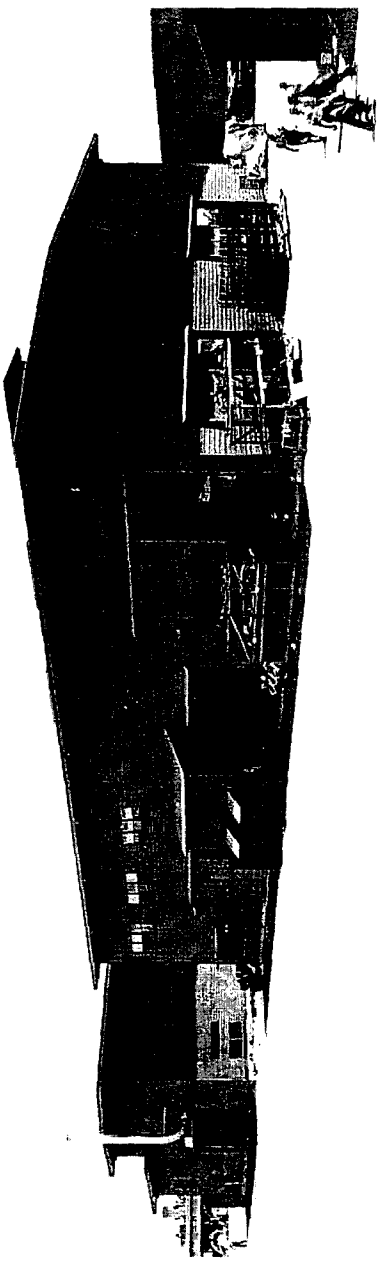


Photo dated 23 June 1944 showing Building 646, the Machine Shop at the Submarine Base shop facilities compound. View looking east. From NAVFAC Archives TI 8-27, "Pearl Harbor sub base shops." #16997.

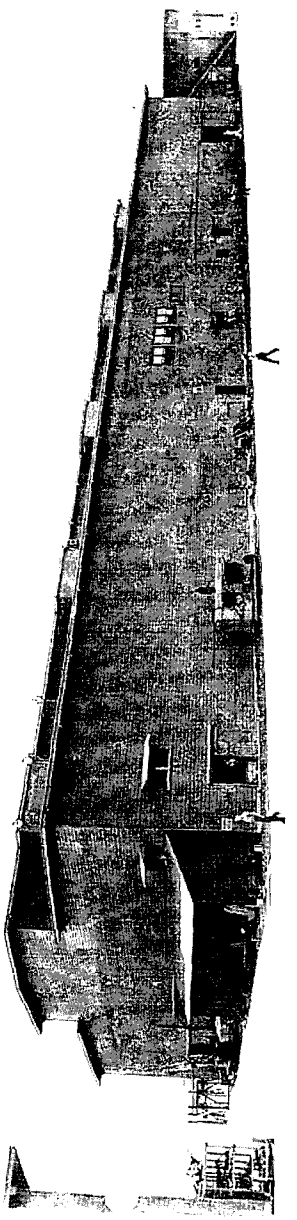


Photo dated 23 June 1944 showing the construction of Buildings 701 (left) and 702(right) at the east edge of the Submarine Base, view looking northwest. From NAVFAC Archives TI 8-27 "Pearl Harbor Submarine Base quarters" # 17001.

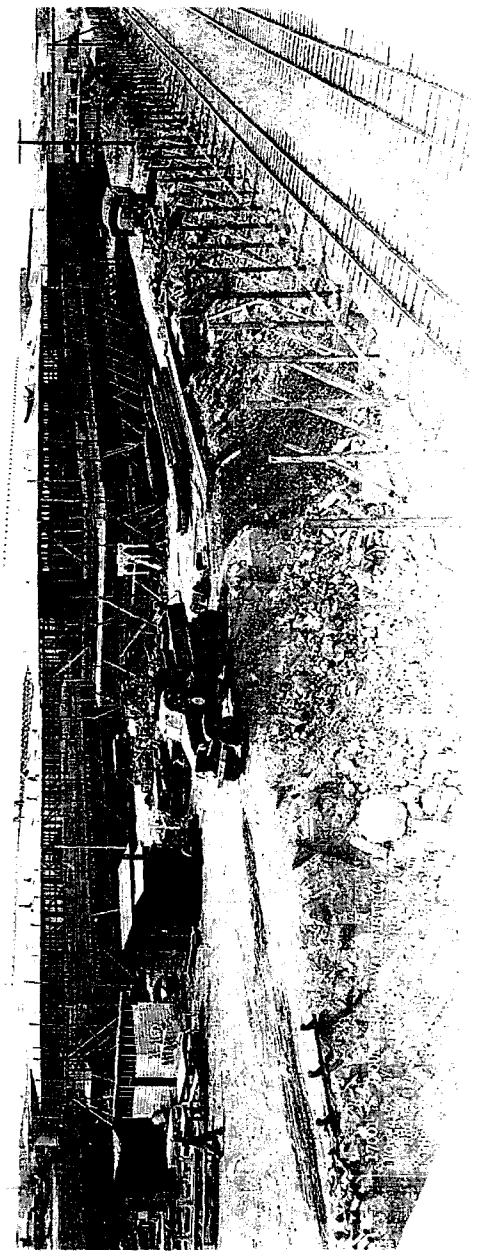


Photo dated 1945 showing the shop facilities compound (arrows added), view looking northeast. From NAVFAC Archives Kidder-Smith Collection, N-195-9.