

U.S. NAVAL BASE, PEARL HARBOR, PIPE & COPPER SHOP  
EXTENSION  
(Shop Storage Building)  
(U.S. Naval Base, Pearl Harbor, Naval Shipyard, Facility No. 4A)  
Russell Avenue between Lake Erie & Port Royal Streets  
Pearl Harbor  
Honolulu County  
Hawaii

HABS HI-360

HI-360

HABS

HI-360

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

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(U.S. Naval Base, Pearl Harbor, Naval Shipyard)**  
**(U.S. Naval Base, Pearl Harbor, Shop Storage Building)**  
**(Facility No. 4A)**

HABS

HI-360

HABS No. HI-360

(page 2)

**Location:** Russell Avenue between Lake Erie and Port Royal Streets  
Naval Shipyard  
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 4.608190.2361360

**Significance:** Facility No. 4A was associated with the build-up of additional shop facilities in the Shipyard area in preparation for World War II. This structure was considered an extension of Facility No. 4; although they had quite different designs, their functions were related. These two shops formed an important grouping of industrial buildings in the Shipyard, along with Facility Nos. 5, 5A, 8, and 13, which were in the same block. All shipyard shop buildings were associated with the World War II ship repair efforts that contributed to the victory in the Pacific. Facility No. 4A was designed by the firm of Albert Kahn, a prominent industrial architect. The building, like others designed by this firm for the Department of Defense, embodies the distinctive characteristics of a type and period of construction. The building's most distinctive architectural features were its bands of windows and the profile of its monitor roofs. It was a contributing element to the Pearl Harbor National Historic Landmark.

**Description:** Facility No. 4A was located between Facilities Nos. 4 and 13, two earlier industrial buildings in the Shipyard area. Facility Nos. 5, 5A, 8 are in the same block, near the northwest corner of Dry Dock No. 1. Because of the slight slope of the ground, and the need to keep the floor of Facility 4A at the same elevation as Facility 4, the eastern entry on the south side was below grade, while the western entries on both sides were at grade. Although most of this industrial area is covered by buildings or pavement, two trees grew along the south side of Facility No. 4A.

Although this building was demolished in the spring of 2001, it is described below as it appeared prior to demolition. Facility No. 4A is an International-style building with an almost rectangular footprint, except for a stepped-in bay in three corners. The maximum dimensions are 240' x 140' in plan and approximately 30' in height. The building's massing consists of a main space (about 24' tall) which is two bays (each 50'-0") wide by 12 bays (each 20'-0") long, with a lean-to wing (about 14' tall) on both sides, each containing ten bays (20'-0" square). The roofs on the main space and lean-to wings are only slightly sloping, but the monitors

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(Facility No. 4A)**  
**HABS No. HI-360 (Page 2)**

that run almost the length of the building have more steeply sloped roofs, which meet in a valley to create a wide M-shape in section. The entire roof has composite roofing material.

The building's foundations are a combination of concrete spread footings and concrete piles. The ground under approximately two-thirds of the building was originally marsh. The edge of this formerly marshy ground runs diagonally through the building. Piles support the western end and much of the southern side of the building which is on fill land. Spread footings are sufficient on the eastern end and some of the northern side of the building, due to the firmer ground. Concrete beams connect the rows of piles and footings under the outer rows of taller columns. There is also a perimeter foundation wall, in addition to the footings and piles, supporting the building's steel structural frame. This foundation wall is 8" thick along the lower lean-to sections, and generally 1'-7" thick under the higher-roofed portion of the building. The base of the exterior walls are concrete (to a height of 4'-6" above the foundations) with corrugated transite siding and bands of multi-light windows above. Due to the slope up from west to east, the tops of the base walls at the eastern end of the building are about at grade level. A driveway on the south side allows access down to the floor level. The stair on the north side that originally led to floor level was removed in the 1950s.

The monitors are 220' long, running above 11 of the building's 12 bays. They begin one bay from the eastern end and extend to abut the end wall of Facility No. 4. The two vertical faces of the monitors are positioned about 32' from the long axis centerline of the building, facing opposite directions. These faces are about 7' high and each has a continuous band of twelve-light steel sash windows, with pivoting sections. Each monitor has a total of 44 windows, four in each bay; the center two windows in each bay have eight-light pivoting sections and the four-light pivoting sections are on the outside of each group of four. The bottom lights in all the monitor windows are fixed. The flat roof sections of Facility No. 4A extend out from the faces of the vertical monitors about 18' to the wall planes of the higher portion of the building. The bands of windows in the upper part of these walls and in the lean-to sections are both created by rows of 16-light steel sash windows, with pivoting sections of four or eight lights. Generally the lights of the top and bottom rows are fixed. Alterations have been made to the original windows, including awning sections instead of pivoting sections in some. Numerous panes of glass have been replaced by sheet metal or other opaque material. Window air conditioning units have replaced lights, especially in the lean-to wings of the building.

The south side of Facility 4A has two large overhead metal roll-up doors, one each at the easternmost and westernmost bays. These replaced the original paired multi-light sliding doors. At the eastern door on this side, grade level is about 4' above the floor level of the building. Here, a driveway with concrete retaining walls leads down from Russell Avenue. At the west overhead door entrance the building floor is approximately at

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(Facility No. 4A)**  
**HABS No. HI-360 (Page 3)**

grade level. The doors on the north side and east end have been altered from the original design. The connection to Facility No. 13 obscures the doors on the east end, and additions on the north side hide those entries.

The interior of Facility 4A, in the taller section, was originally a single large open space with a line of steel columns down the center of the building, but is now divided into smaller areas by chain link fencing or partitions of expanded metal mesh. There is a clear span of 20'-0" to the underside of the roof beams. The ceiling beams and other steel structural members are exposed, as is the tongue-and-groove roof underlayment. There are also diagonal tie rods in bays near each end. Monorails attached to the bottom of the beams for trolley cranes and pillar cranes are other interior features of this shop building. Light fixtures with large conical reflectors are suspended from the ceiling. The lean-to sections, along the north and south sides, are divided into smaller rooms. The section along the north side has wash rooms and a locker room, while the south side has material storage, office, and shop spaces.

According to the 1940s drawings, the building generally has a 6" thick concrete floor slab with additional thickness and reinforcing for the concrete under heavy equipment. Except under the equipment the flooring is end-grain wood blocks, 2" thick and set with staggered joints. Areas of wood blocks have been removed and replaced with poured concrete over the years, as new equipment was installed and new bases built.

**Historical Context:** For an overview of the Naval Shipyard's history see HABS No. HI-483. See also the reports on the adjacent buildings: Facility No. 4 (HABS No. HI-359), Facility No. 5 and 5A (HABS No. HI-484), Facility No. 8 (HABS No. HI-446), and Facility No. 13 (HABS No. HI-462).

Facility No. 4A was built in 1941 as part of the pre-World War II build-up of industrial shops at Pearl Harbor's Navy Shipyard. In the planning for the expansion required to meet war plan objectives, a new Pipe and Copper Shop had been proposed at this location adjacent to Facility No. 4 at least as early as November 1939, as seen on Fourteenth Naval District map (no. I-N5-218). An April 1940 memo on developments at Pearl Harbor explained some of the complex juggling involved in planning the locations and sizes of new buildings or extensions of existing ones. The memo explained that it had not been decided whether or not the sheet metal trades would move into Facility No. 155 (HABS No. HI-496), when the heavy metal trades (shipfitters and boiler shops) moved into that new structure; the sheet metal trade was considered compatible with the pipe and copper shop functions (Almy et al. 1940: 4). Therefore, Facility No. 4A was considered originally to be an extension of Facility No. 4. They are architecturally quite different, but the two buildings functioned as one shop.

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(Facility No. 4A)**  
**HABS No. HI-360 (Page 4)**

Facility No. 4A was designed by Albert Kahn, Inc. of Detroit Michigan, the architectural firm noted for their work with industrial buildings, especially for Ford Motor Company. This firm designed many standard plans for military use. Kahn's office was also known for efficiency, having "turned out 1650 drawings in seven months . . . for new Naval bases in the Pacific and Atlantic" (Bucci,1993: 110) Many of the standard Kahn features are seen in the design of Facility No. 4A, including bands of windows, roof monitors, and large uninterrupted floor spaces with few columns. Albert Kahn's firm also designed four extant buildings at the Shipyard -- Facility No. 55 (HABS No. HI-496), No. 67A (HABS HI-492), No. 167 (HABS No. HI-497), and No. 3A (HABS No. HI-445), as well as Hangars 175 and 176 (HABS No. HI-400) on Ford Island and numerous buildings at other Navy installations. With the rushed pace of the effort to prepare for World War II, the original design drawings for the Shipyard shops were completed quickly by Kahn's office for the Bureau of Yards & Docks. Most are dated June 22, 1940, and were designed under contract NOy 4173. This same contract included a consortium of construction firms called Contractors Pacific Naval Air Bases (CPNAB) who built Kahn's designs and other facilities.

The drawings by Albert Kahn, Inc. for this building (nos. 135809 through 135818) assumed a perfectly flat building site and did not reflect the actual conditions, which included a slight slope. The east elevation, especially, had to be altered to accommodate the change in grade. Other drawings (nos. 640 - 642, 644, and I-N5-335) in the early 1940s were made by CPNAB or the Navy, either to adapt the design to the site, or to show equipment layout. Other changes have been made to the building at that time, or later, which were not documented, such as alterations to doors and door locations.

One 1940 drawing (no. 640) showed the planned layout and schedule of 67 "machine tools, old, new & future." The title block calls the building the "Pipe and Copper Shop," but "Sheet Metal Shop" is labeled on the floor plan. There are 26 tables or benches listed on the schedule, plus 41 machines, including punches, shears, presses, drills, grinders and other metal-forming tools. A drawing (no. I-N5-335) dated 1941 shows most of these machines needed additional reinforcement of the concrete slab floor beneath them, increasing the thickness to 10" of concrete with an extra grid of ½" steel reinforcing bars at 6" spacing. Under all the machines the 2"-thick wood flooring blocks were omitted to increase the thickness of the concrete slab to at least 8", and to bring the floor level flush with the surrounding wood blocks.

The difference in floor levels between Facility No. 13 and Facility No. 4A is about 5'. Thus, during construction, it was necessary to remove the two sets of industrial tracks which had formerly crossed the sloping land to connect Facility No. 13 and Facility No. 4. Instead, to move materials between the buildings, the overhead crane monorail in Facility No. 4A was extended out one east-end door, which had been raised from the position on the original elevation drawing by Kahn's firm. Other

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(Facility No. 4A)**  
**HABS No. HI-360 (Page 5)**

adjustments to the elevations had to be made during construction to accommodate the slope of the site. For instance, the door at the center of the south-side lean-to was constructed higher than shown on the original elevation drawing, and five steps were built to allow access down to floor level.

The building was essentially completed before the December 7, 1941 attack and it sustained no recorded damage during that attack. This shop, like all the Shipyard buildings, played a vital role in the recovery from that disaster, as well as providing needed ship repairs that contributed to the victory in the Pacific.

Several minor changes were made to the building in the 1950s, as documented by drawings. There were additions and alterations to the monorail system in 1952 (drawing no. I-N5-1788). One sheet (no. I-N5-1861) shows the door at the center of the south side lean-to, the awning over it, and the stair were removed in 1952. A drawing (no. I-N5-1938) dated 1953 shows the stair in the northeast corner of the building was removed. Another 1953 drawing (no. I-N5-1934) shows new equipment installed in Facility No. 4A, as well as a large "Harrison Cleaning Area" measuring 26'-0" x 59'-0" consisting of quarry tile set in acid-proof grout that drained to a disposal pit. Also in 1953 the original multi-light double sliding doors in bays 1 and 12 on the south side were replaced with overhead roll-up doors (drawing no. I-N5-1938). In 1952, four pillar cranes (approximately one-ton capacity) were installed in the main work area of Facility 4A. These had concrete footings installed to support the 16' high pillars and 16' long booms for the cranes (drawing no. 648).

Some other changes to the building occurred in the late 1960s. Until then there had been a narrow unroofed passage, about 10' wide, between the east end of Facility No. 4A and the eaves line of the overhanging roof on the west side of Facility No. 13. An extension from the roof of Facility 13 to the roof of Facility No. 4A was built to cover that passage, and corrugated metal siding was added to the south to enclose this area as part of Facility No. 13 (drawing no. 1230241). At this time there was a rearrangement of equipment in the Pipe and Copper Shop, as part of a project involving a few other buildings. These changes were documented in a set of 45 drawings, only 21 of which apply to Facility No. 4A (between nos. 1230236 and 1230279).

The actual function of Facility No. 4A for at least two decades was as a Sheet Metal Shop, although it was labeled as a Pipe and Copper Shop (or Pipe Shop) on most of the drawings for the building, from the original 1940 drawings through the 1970s. The 1942 through 1951 maps and building lists of Pearl Harbor all label Facility No. 4A as a Sheet Metal Shop and Facility No. 4 as the Pipe and Copper Shop (Fourteenth Naval District). In a 1963 and 1966 building inventory, Facility No. 4A is listed, however, as a Pipe and Copper Shop along with Facility No. 4 (Department of the Navy, Bureau of Yards and Docks 1963: 3664 and 1966: 4915). Facility No. 4A was again listed as a Sheet Metal Shop in

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(Facility No. 4A)**  
**HABS No. HI-360 (Page 6)**

the 1978 Pearl Harbor Historic Preservation Plan (Pacific Division, Naval Facilities Engineering Command 1978: A-3). A map first made in 1965, but with most recent update in 1995, lists both Facility Nos. 4 and 4A as Paint Shop (Pearl Harbor Naval Shipyard 1965). However the 1995 building inventory indicates it was converted by this date to a shop storage facility (Department of the Navy, Bureau of Yards and Docks 1995: 70). It was demolished in the spring of 2001.

**Sources:**

The drawings for this building are on microfiche cards at the Plan Files of the Naval Facilities Engineering Command, Pacific. The original 1940 drawings by Albert Kahn, Inc. are numbers 135809 through 135818. A few other WWII drawings have lower numbers – 640 to 642, and 644. Other 1940s and 1950s drawings have the prefix I-N05- followed by non-consecutive numbers, including 218, 335, 510, 1788, 1861, 1920, 1924, 1934, and 1938. There are also miscellaneous drawings, such as some for equipment foundations or utilities. A set of drawings for a major rearrangement of this building and other shops in 1971 are numbers 1230236 through 1230279.

Almy, E.D. [Capt.], J.J. Manning [Cmdr.], and Philip Lemler [Lt. Cmdr.]  
1940 Memo to the Secretary of the Navy, via the Commandant, Fourteenth Naval District, dated 29 April 1940. In files of National Archives and Records Administration, San Bruno, RG 181, 14<sup>th</sup> ND District Staff Hdqtrs, General Correspondence [Formerly Classified] 1936-1944, Box 1, Folder 1-1(1) Developments.

Bucci, Federico

1993 *Albert Kahn: Architect of Ford*. Princeton Architectural Press: New York.

Department of the Navy, Bureau of Yards and Docks

1963 *Detailed Inventory of Naval Shore Facilities: Real Property Data (NAVDOCKS P-164), Vol. IV*. In Archives of Naval Facilities Engineering Command: Port Hueneme, California.

1966 *Detailed Inventory of Naval Shore Facilities: Real Property Data (NAVDOCKS P-164)*. From Library of Naval Facilities Engineering Command, Pacific at Pearl Harbor.

1995 *Detailed Inventory of Naval Shore Facilities: Real Property Data (NAVDOCKS P-164)*. From Library of Naval Facilities Engineering Command, Pacific at Pearl Harbor.

Fourteenth Naval District

var. Maps with varying titles and dates, typically "Pearl Harbor, Oahu, T.H., Showing Conditions on 30 June 19\_\_." From various sources, but mostly from hard copy and microfilm map

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(Facility No. 4A)**  
**HABS No. HI-360 (Page 7)**

collections in RG 71 at National Archives II, College Park, Maryland.

Pacific Division, Naval Facilities Engineering Command  
1978 *U.S. Naval Base, Pearl Harbor, National Historic Landmark, Historic Preservation Plan.* Prepared for the Commander, U.S. Naval Base, Pearl Harbor.

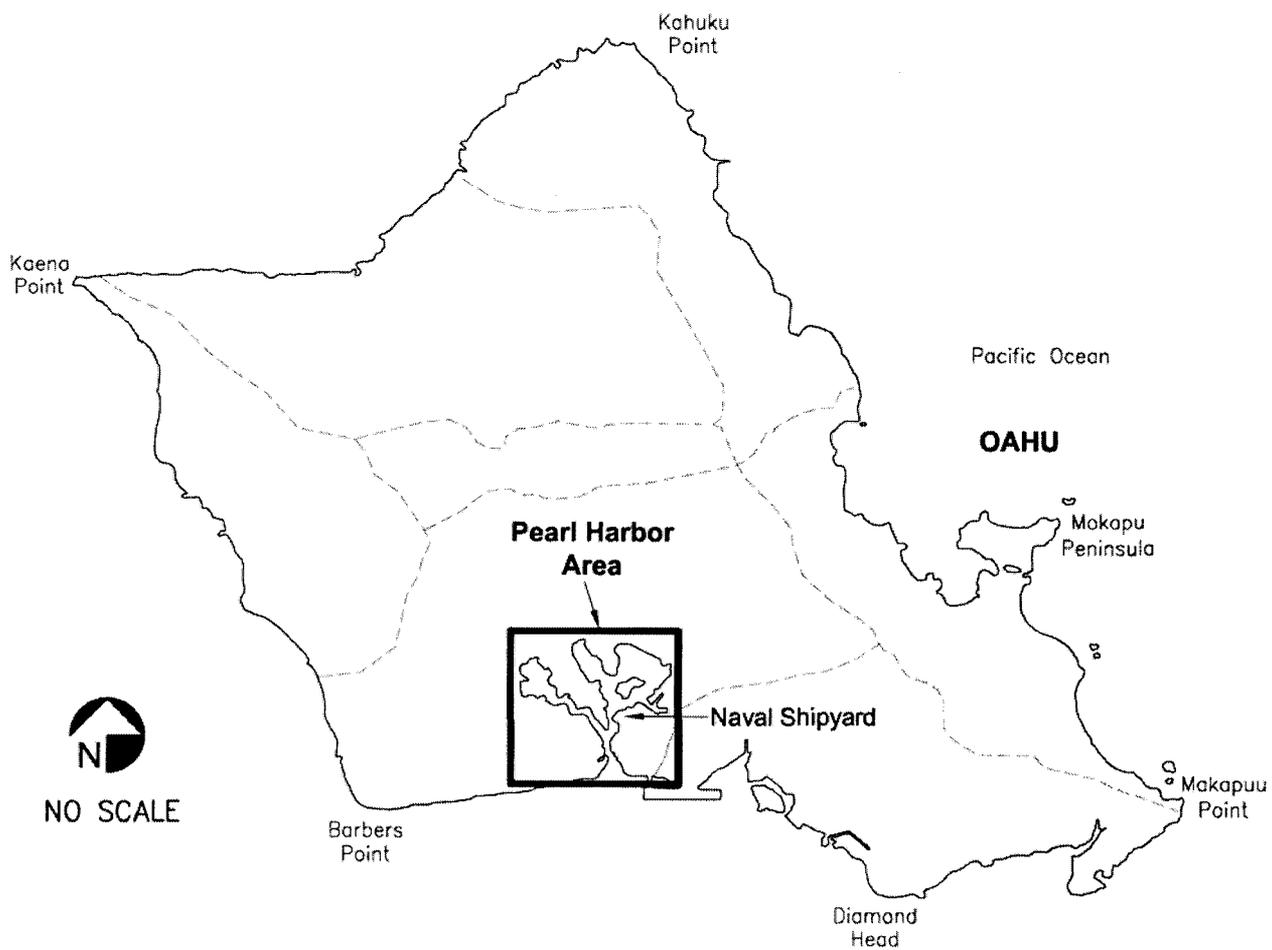
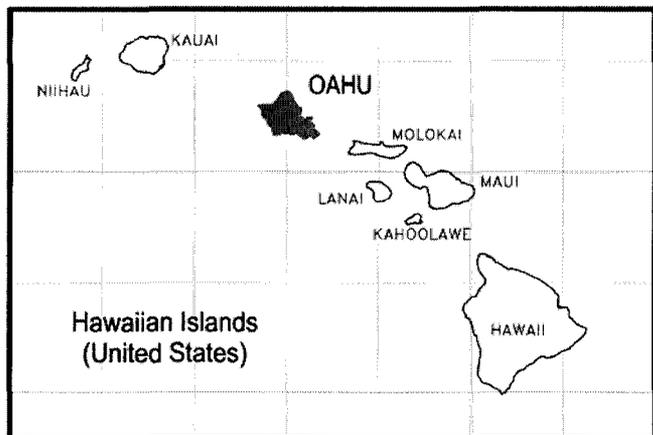
Pearl Harbor Naval Shipyard  
1995 Map of Pearl Harbor Naval Shipyard. Plant Operations, Maintenance and Engineering Department. Provided by Dwayne Tsuruda, Cultural Resources Manager, Pearl Harbor Naval Shipyard.

**Project Information:** In 2001, Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility (PHNSY&IMF) demolished this building. Consultation on the demolition was carried out in accordance with the 1979 Memorandum of Agreement (MOA), which was in effect at the time of consultation in 1996. [The 1979 MOA was terminated in 1999.] 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 addition to the contract covering this report was funded through the Cultural Resources Program of the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility. The photographic documentation was undertaken by David Franzen, of Franzen Photography. Location maps were made by Nestor Beltran of NAB Graphics. Between 1999 and 2000, the field work was done and the draft of this report was written by Dot Dye, of AMEC Earth & Environmental, Inc. The report was rewritten in 2005 by Mason Architects, Inc.

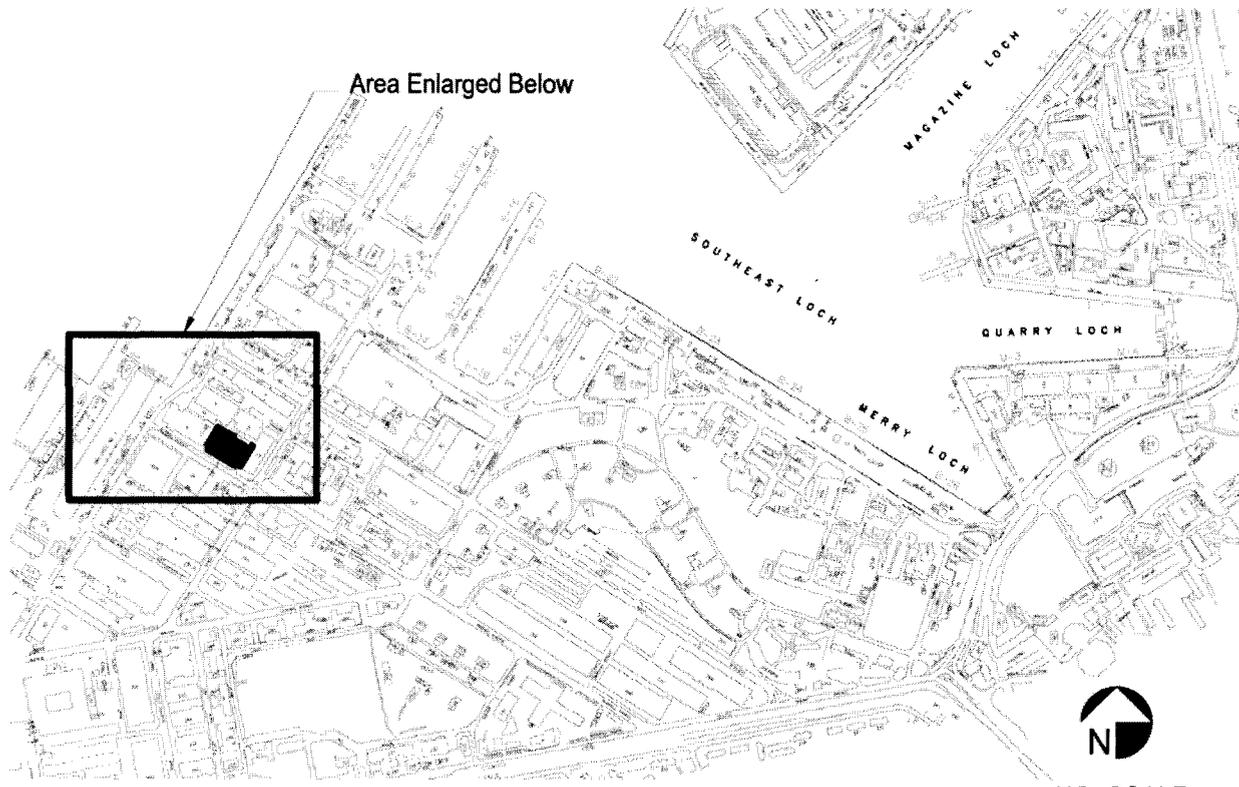
<b>Prepared by:</b>	Mason Architects, Inc. 119 Merchant St., Suite 501 Honolulu, HI 96813	AMEC Earth & Environmental, Inc. 3375 Koapaka Street, Suite F251 Honolulu, HI 96819
---------------------	---	---

Date of Final Report: September 2005

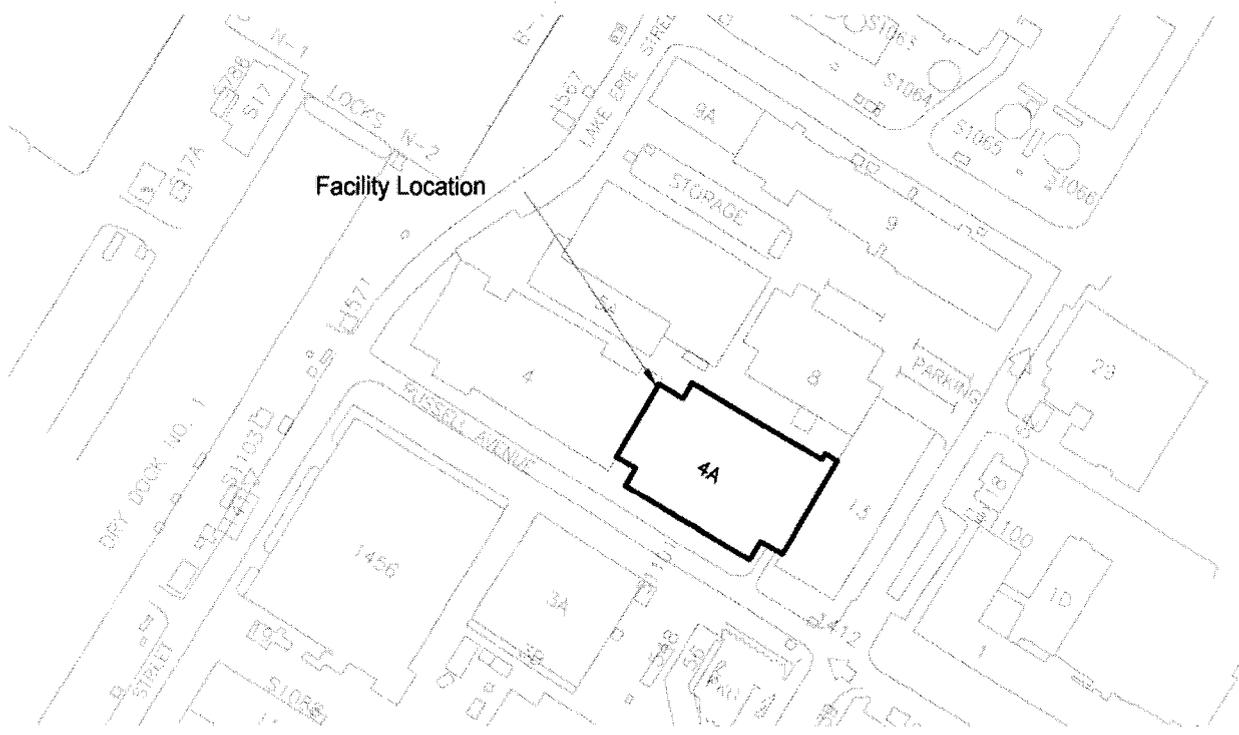
**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
**(Facility No. 4A)**  
**HABS No. HI-360 (Page 8)**



**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION  
(Facility No. 4A)  
HABS No. HI-360 (Page 9)**



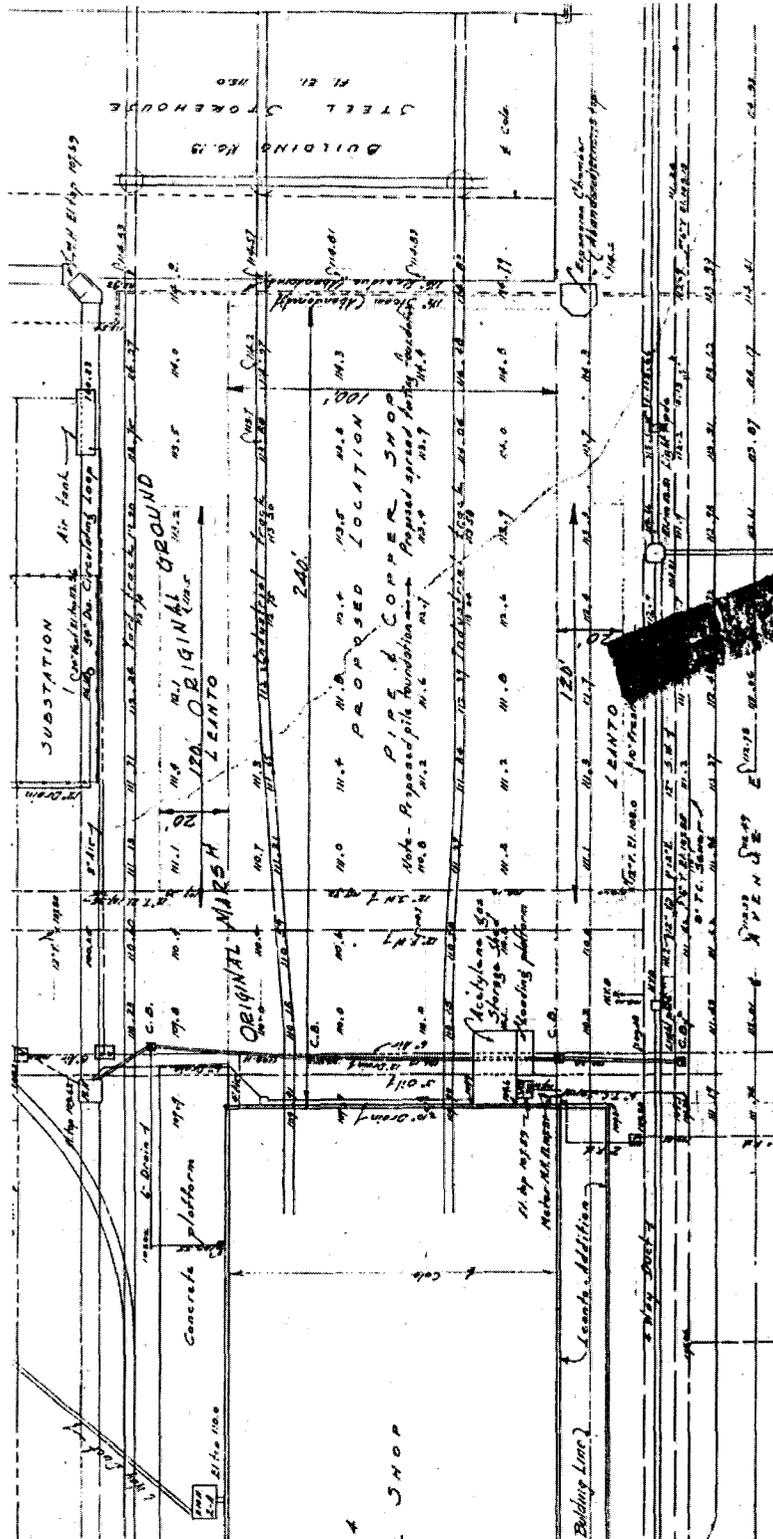
**Vicinity Map**



**Site Map**

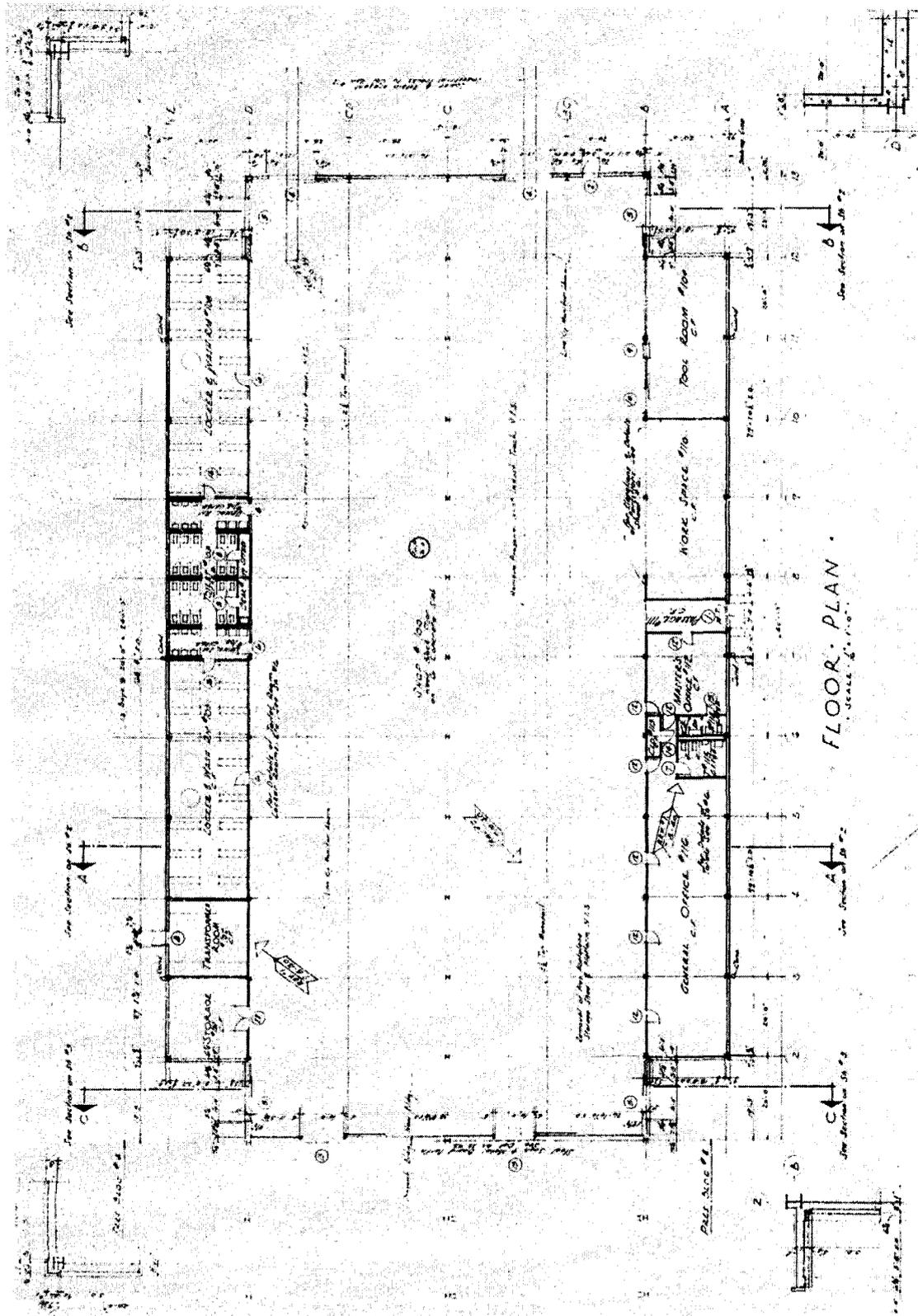
**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION**  
 (Facility No. 4A)  
 HABS No. HI-360 (Page 10)

Portion of Drawing No. I-N5-218, dated November 17, 1939. Topography of Facility 4A site. (Note diagonal line between original marsh and firmer ground.)



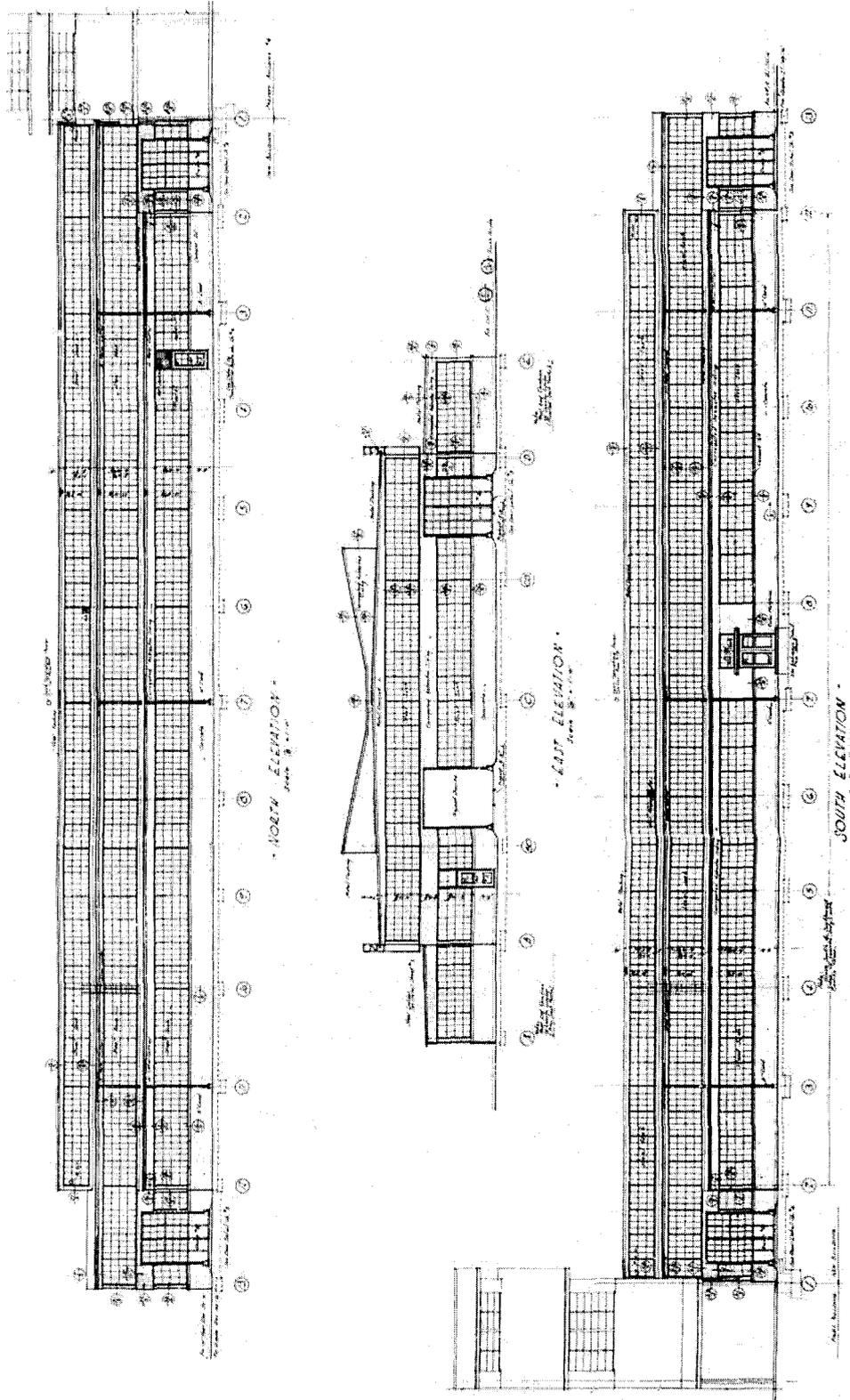
U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION  
(Facility No. 4A)  
HABS No. HI-360 (Page 11)

Portion of Drawing No. 135809 by Albert Kahn Inc., dated July 13, 1940. Floor plan.



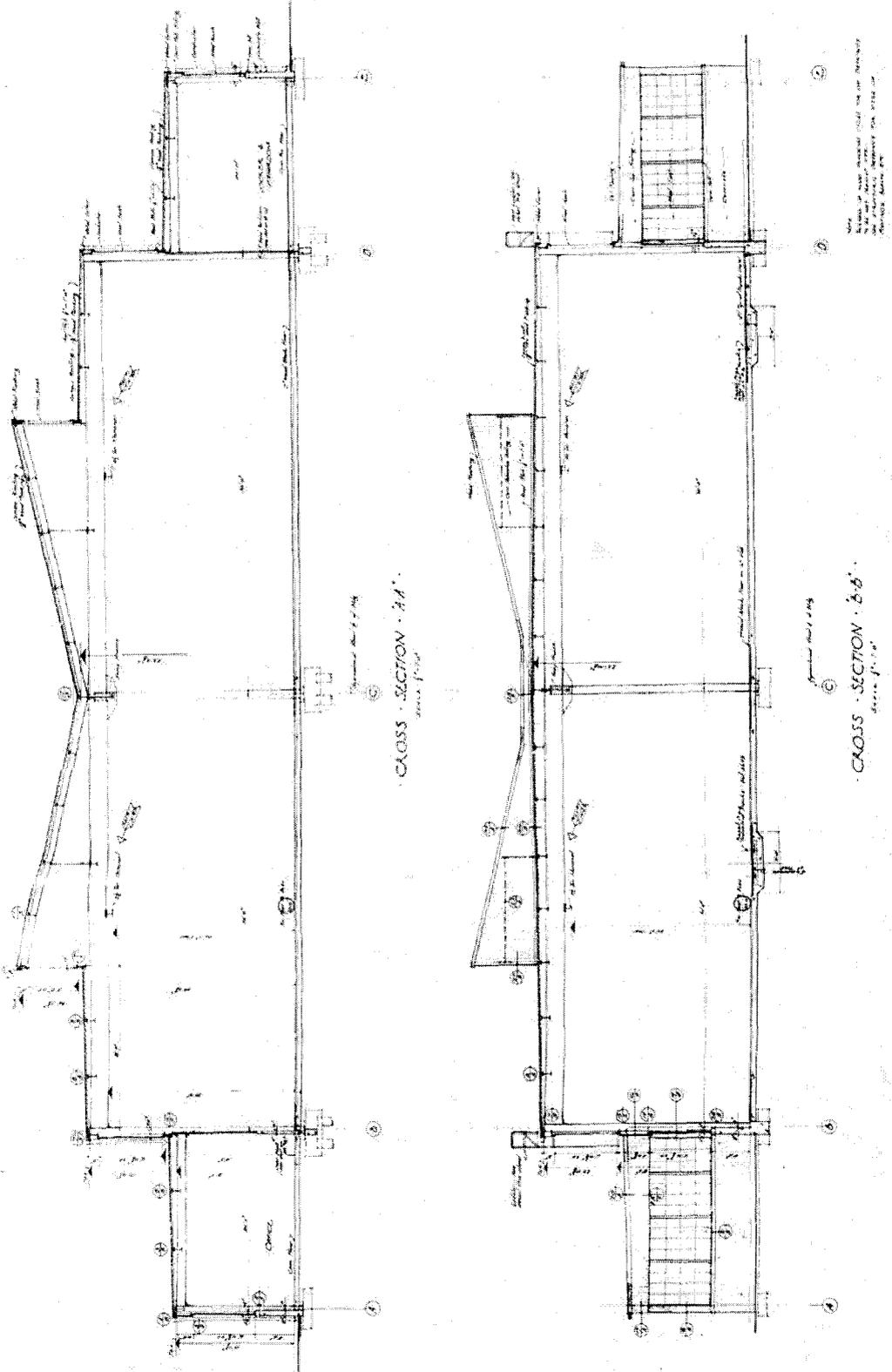
U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION  
(Facility No. 4A)  
HABS No. HI-360 (Page 12)

Portion of Drawing No. 135812 by Albert Kahn Inc., dated July 13, 1940. Elevations.  
(Note that drawing does not reflect sloping site.)



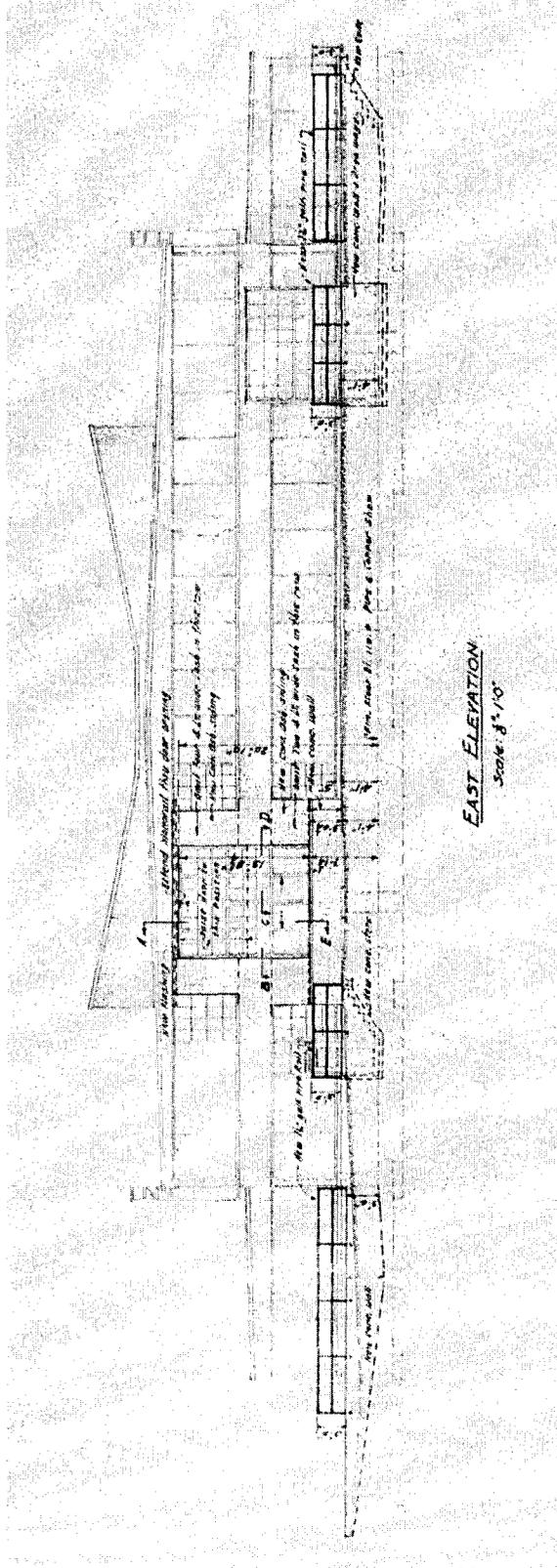
U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION  
(Facility No. 4A)  
HABS No. HI-360 (Page 13)

Portion of Drawing No. 135810 by Albert Kahn Inc., dated July 13, 1940. Cross sections.

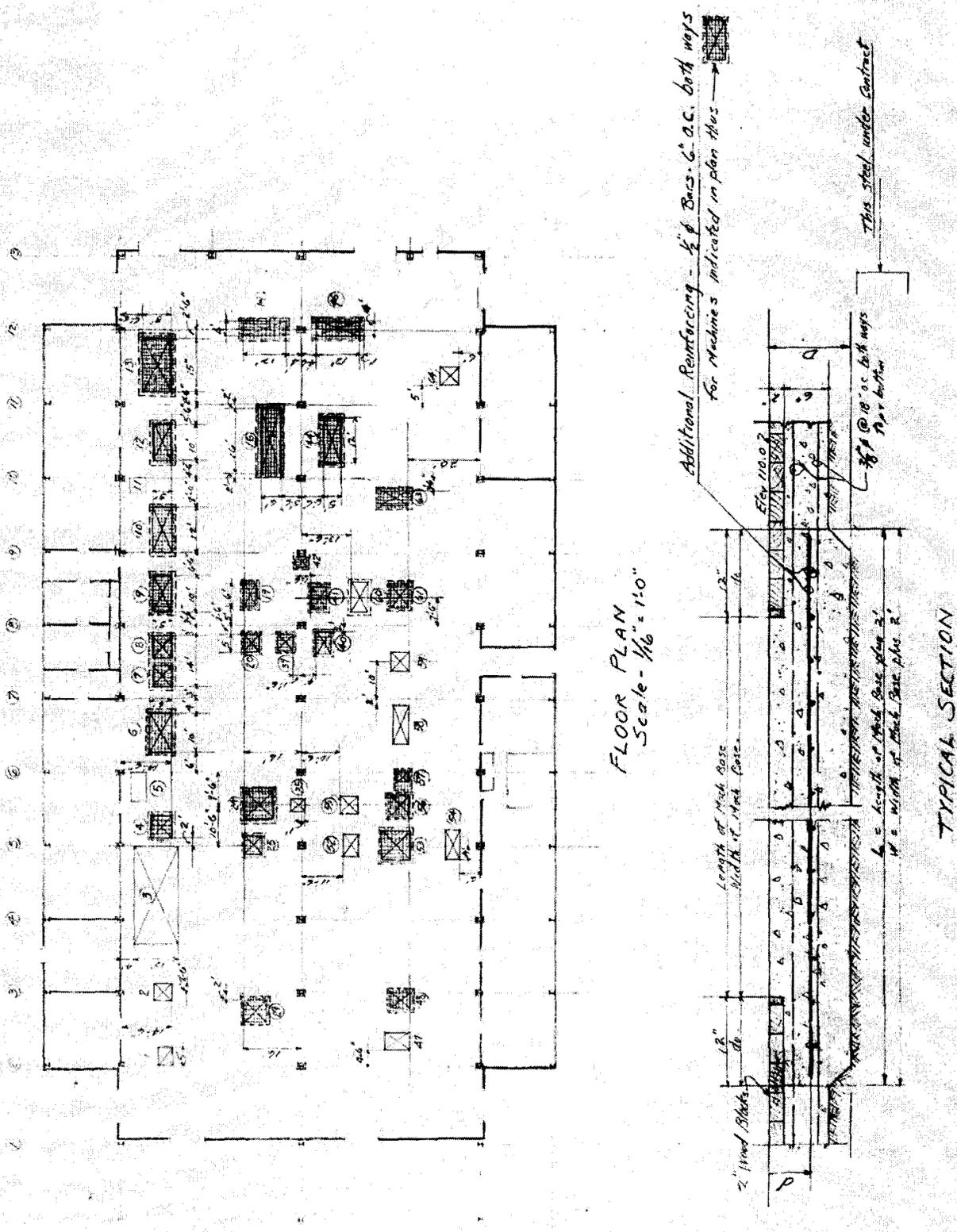


U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION  
(Facility No. 4A)  
HABS No. HI-360 (Page 14)

Portion of Drawing No. 641 by CPNAB, dated May 8, 1941. Changes to east elevation.



Portion of Drawing No. I-N5-335 dated March 24, 1941. Floor slab reinforcing for machines.



FLOOR PLAN  
 Scale - 1/16" = 1'-0"

TYPICAL SECTION

**U.S. NAVAL BASE, PEARL HARBOR, PIPE AND COPPER SHOP EXTENSION  
(Facility No. 4A)  
HABS No. HI-360 (Page 16)**

Portion of Drawing No. 1230238 dated February 8, 1971. Rearrangement of floor plan.

