U.S. NAVAL BASE, PEARL HARBOR, LINK TRAINER BUILDING
(U.S. Naval Base, Pearl Harbor, Naval Station Ford Island)
(Facility No. 97)
Near intersection of Enterprise Street and Intrepid Boulevard
Pearl Harbor
Honolulu County
Hawaii

HABS No. HI-368

HABS
HI-368

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN BUILDINGS SURVEY
Pacific Great Basin System Support Office
National Park Service
Oakland, California

HISTORIC AMERICAN BUILDINGS SURVEY

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Location:

Near intersection of Enterprise Street and Intrepid Boulevard
Ford Island
Pearl Harbor Naval Base
City and County of Honolulu, Hawaii

U.S.G.S. Pearl Harbor Quadrangle, Hawaii
7.5 Minute Series (Topographic) (Scale – 1:24,000)
Universal Transverse Mercator Coordinates ~~3~~ 4.607430.2362860

Significance:

This building was associated with a major function of the Naval Air Station on Ford Island during World War II. It was used in training pilots who then went on to serve in the Pacific theater. The ability of the United States to quickly train pilots in large numbers was an advantage in this war where aviation played such a large role.

Description:

This one-story wooden building has a hip roof with gablet vents. Except for the unusual trenches in the floor that were used for wiring the training machines, the building appearance is not distinctive. Its foundations measure 114'-2" x 40'-2" and the building height is about 15'. The floor of most of the building is a 6"-thick concrete slab, with this thickness wrapping below the 4" and 10" trenches. The 10" trenches run parallel to the walls of the room, but the 4" trenches are angled. As described in the history section, it was necessary to have the machines oriented to the north.

The building has 1x8 horizontal drop siding and asphalt shingle roofing. The windows are mostly pairs of 1/1 awning type, which are probably original. However, the windows do not match the drawing of the building's elevation (see attached) mostly because they lack the horizontal siding between the windows. These boards may never have been installed, due to time or material restrictions of war-time construction. The window pairs are located on either side of the structural 8x8 columns. The original glazed double doors on the northeast side have been replaced with modern flush doors and the transom has been altered and covered, but the original surrounding windows remain. The encircling screened vents under the eaves and the two gablet vents provide ventilation of the attic

The interior has been greatly altered. It was originally divided into one large and three small rooms. The three small rooms occupied one bay at the southeast end. The remaining seven structural bays were one large room that held eleven Link trainer machines. The southeast bay was divided into a small storage room, flanked by a locker/toilet room and an instrument shop room. The interior of what was the main room still has a wainscot of horizontal 1x6 tongue-and-groove boards to the level of the window sills. The walls, above the wood wainscot cap, are canec (panels made of sugar cane fiber), as are the ceilings. The walls in what had been the storage room still have tongue-and-groove boards from floor to the ceiling. The height to the bottom of the trusses is 9'-10". However, the braces for the roof trusses extend below the ceiling and run to either side of the 8x8s that are the structural columns. They are attached at 6'-0" above the floor.

A major difference between the floor plan and the existing building is the orientation of the trenches. As explained below in the history section, a re-orientation of the training machines was necessary after construction had begun.

The building originally had a low addition on the southwest side, labeled a turbine shed on the drawings. This has been removed, and only a 2'-6"-high concrete base wall indicates its previous position. A door has been added on the southwest side. Several windows have been replaced with jalousies or large fixed panes, or else boarded up. The main large room has been divided into several rooms with new partitions and other interior layout changes have been made. Some of the canec ceiling panels have been removed either due to water damage or due to rebuilding of partitions. The roof has new asphalt shingles and the gablet vents have been closed up with plywood.

Historical Context:

This building was one of those erected during the build-up of the Navy's aviation base on Ford Island during World War II. This part of the Naval complex was called Naval Air Station Pearl Harbor during most of its active period. The history of Navy aviation in Hawaii, from 1919 through World War II, is summarized in another report, HABS No. HI-361, and is not repeated here.

Link trainers were "used during WW II for teaching pilots proper procedures of instrument flight, such as using a radio range for determining an airplane's position in bad weather and a subsequent let-down to a field for landing. An operator sat at the desk and transmitted radio signals which the 'pilot' in the Link heard through his ear phones" (U.S. Air Force Museum 1999). The trainers were shaped like squat little airplanes and sat on a base that could move this equipment to simulate turns, climbs, and descents.

The training machines were named after their inventor, Edwin Link, who got the idea of reducing the expense of flying lessons by using a ground trainer. He perfected the design for the machine in his father's organ and piano factory in Binghamton, N.Y. He received his first patent in 1931 for this "pilot maker" device, using organ bellows, vacuum pump, and motor. Early sales were mostly to amusement parks. In 1934 the Army Air Force ordered some, after it was put in charge of the nightly mail flights. This was in response to the loss of five pilots in the first few days. The importance of training for instrument flying, in the dark, fog, or clouds, became more evident. In the 1930s the Japanese Imperial Navy also was a customer for these machines, along with several airline companies (Museum Bevrijdende Vleugels 2001).

After the U.S. entered WWII, the military contracted with Link's company for his entire production. It provided 6,271 trainers to the Army and 1,045 to the Navy. Almost all pilots received instrument flight training in these machines. They were not only safer, they were much less costly to operate (Aerospace Education Center 2001). "Before the trainer was available blind flying was taught hands on in the air, with the pilot and an instructor, and a hood over the cockpit of the plane" (Atlantic Canada Aviation Museum 2001).

The drawings for this building were approved December 8, 1941, and construction was completed in March 1942 (Contractors Pacific Naval Air Bases n.d.: A-563). This specialized building was part of the $16 million in construction undertaken on Ford Island by Contractors Pacific Naval Air Bases between 1939 and 1943. The urgent need to train pilots was probably recognized before the December 7, 1941 attack, but that attack surely speeded up the approval and construction priority of this project. The haste to get this building finished apparently led to an oversight regarding the training machines that required a costly revision:

> When this structure was nearing completion, it was discovered that the training machines had not been planned to the north, or even approximately north – an absolute operational "must." The floor trenches, and the control systems that they enclosed, had to be re-oriented at right angles to their original direction. The correction approximately doubled the original estimate of the building's cost (Contractors Pacific Naval Air Bases n.d.: A-600 & 601).

The re-orientation of the trenches approximately 90 degrees is visible in the floor. Since removal of the Link trainer machines, the building

has been used as a Hobby Shop, and for storage. It is now filled with shelving that covers most of the trench pattern.

Sources:

The original drawings for this building, dated December 8, 1941, are on microfilm at Pacific Division, Naval Facilities Engineering Command Plan Files, under Y&D drawing numbers 183415 through 183422. No renovation drawings were located.

Aerospace Education Center
2001 Web page, researched 12/21/01, titled "Link Trainer" at www.aerospaced.org/permart/linkt.html.

Atlantic Canada Aviation Museum
2001 Web page of this museum in Bedford, Nova Scotia, Canada, researched 12/21/01, titled "Link Trainer" at www.acam.ednet.ns.ca/trainer.htm.

Contractors Pacific Naval Air Bases
n.d. Technical Report and Project History, Contracts NOy-3550 and NOy-4173, Chapter XIII - Ford Island. Microfilm of report at Pacific Division Naval Facilities Engineering Command Library.

Museum Bevrijdende Vleugels
2001 Web page of this museum in The Netherlands titled "Link Trainer" at www.wingsofliberation.nl/linktrainer-uk.html.

Naval Station Pearl Harbor
1962 Property Record form 2-00661 for Facility 97, prepared May 1962, in the Regional Property Record Files.

U.S. Air Force Museum
1999 Web page of this museum at Wright-Patterson Air Force Base, researched 3/24/99, titled "Link Trainer" at www.wpafb.af.mil/museum.

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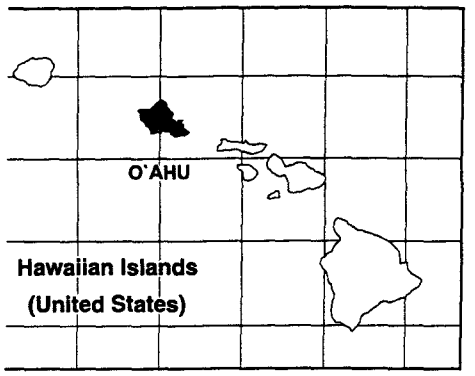
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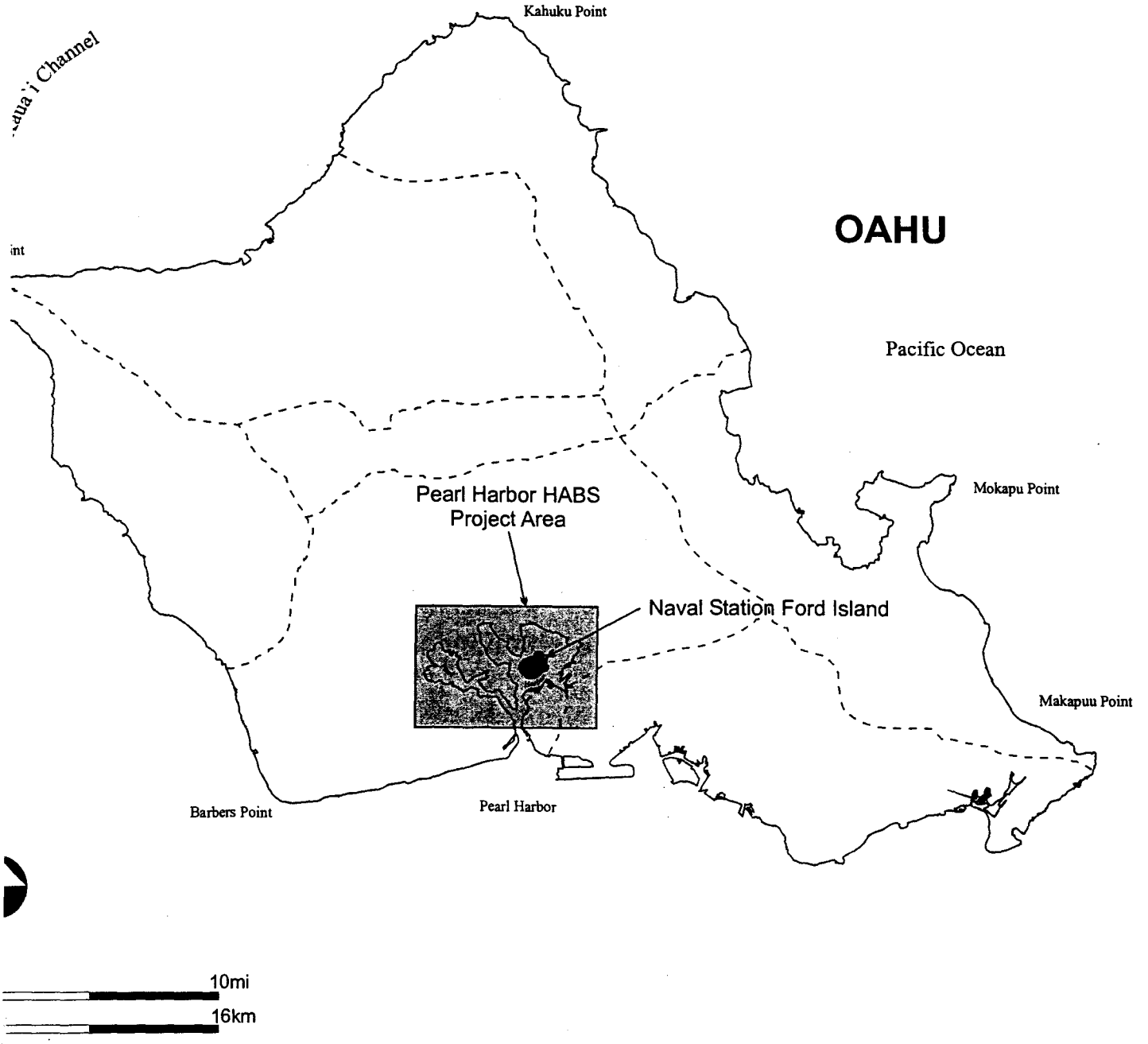
Hawaiian Islands
(United States)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Pearl Harbor HABS
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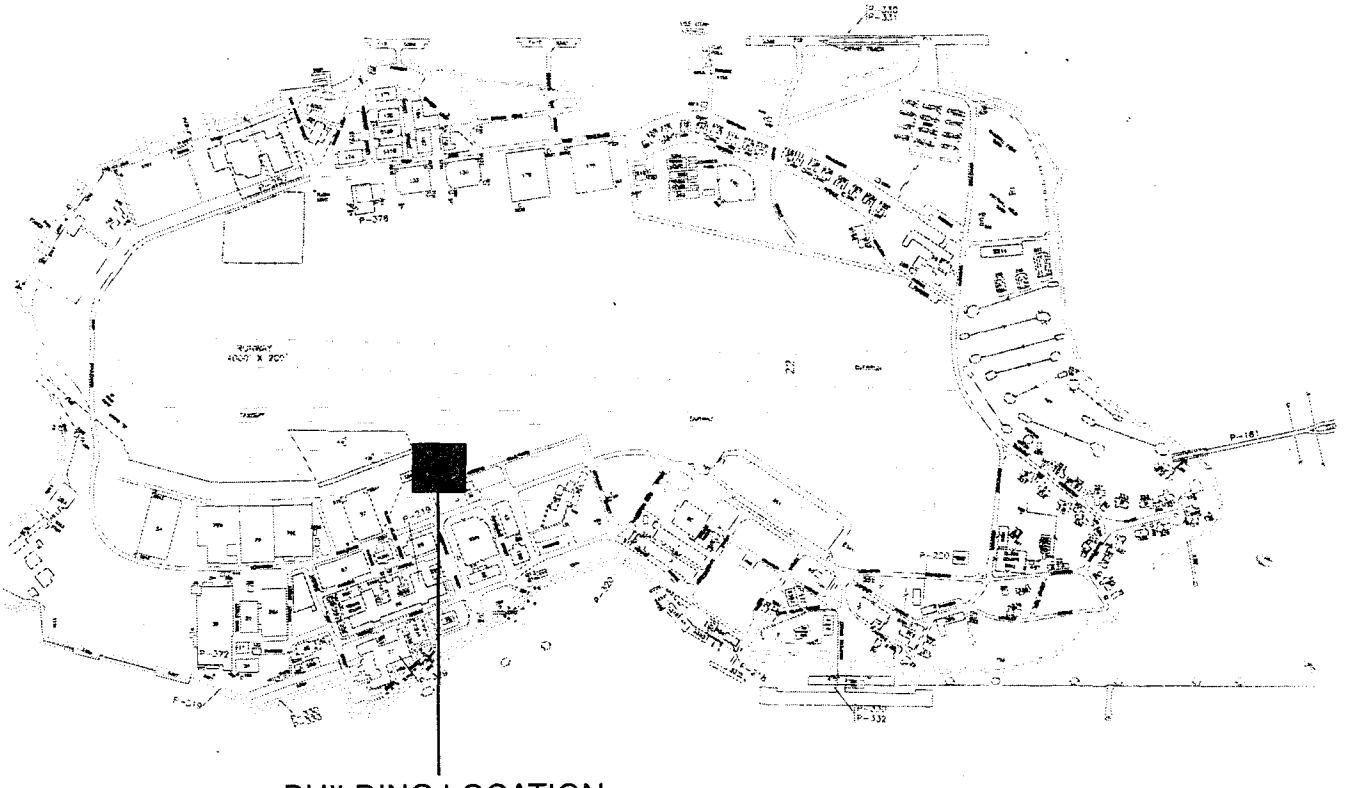
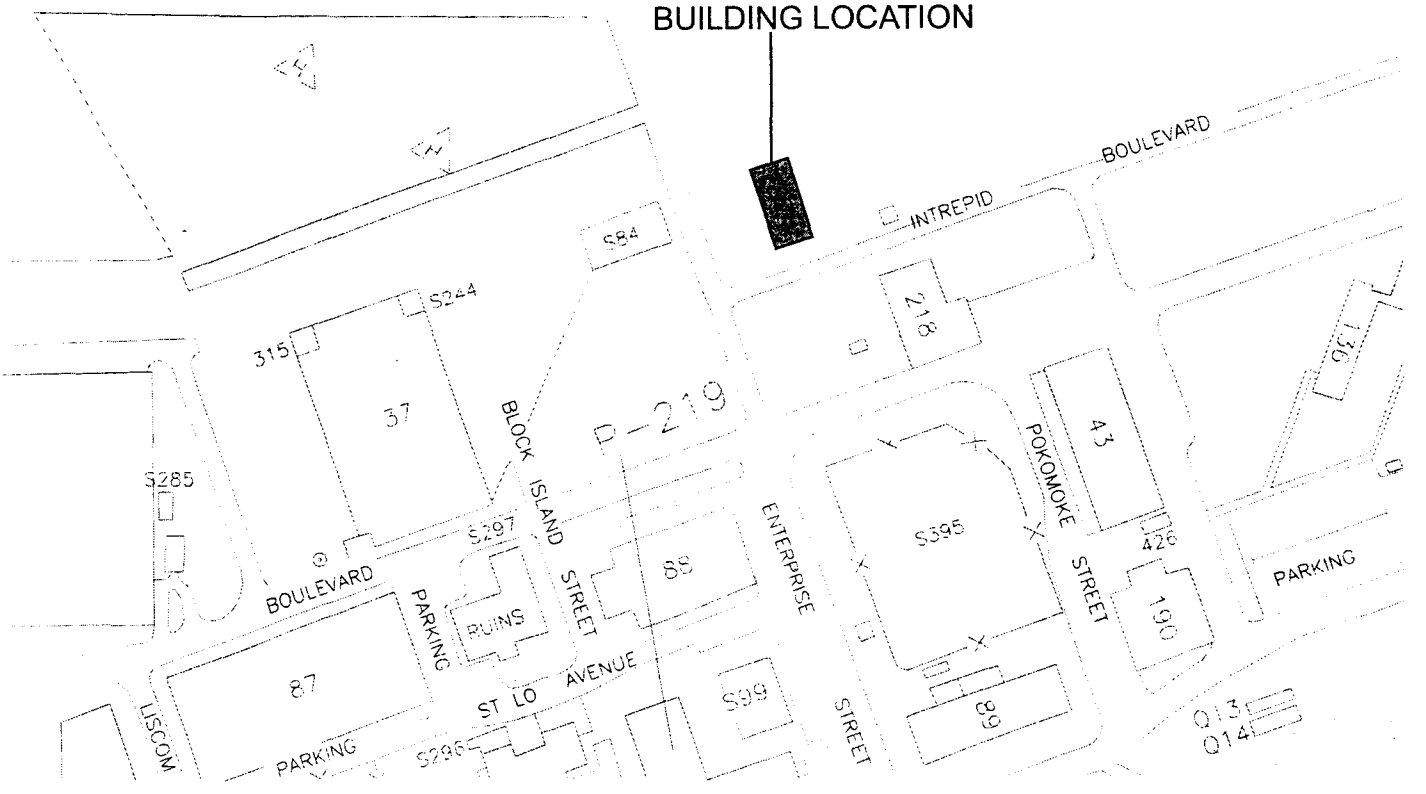
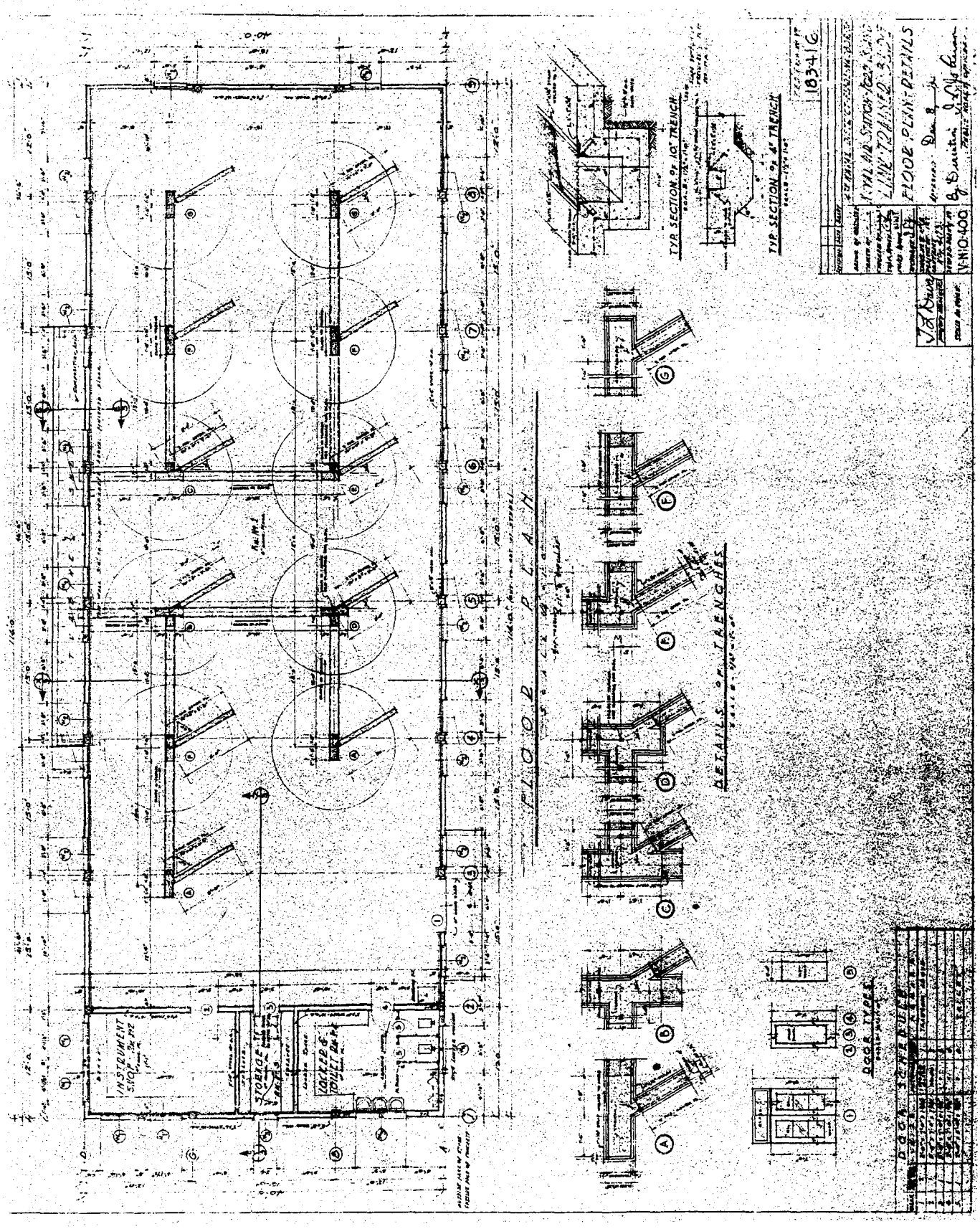
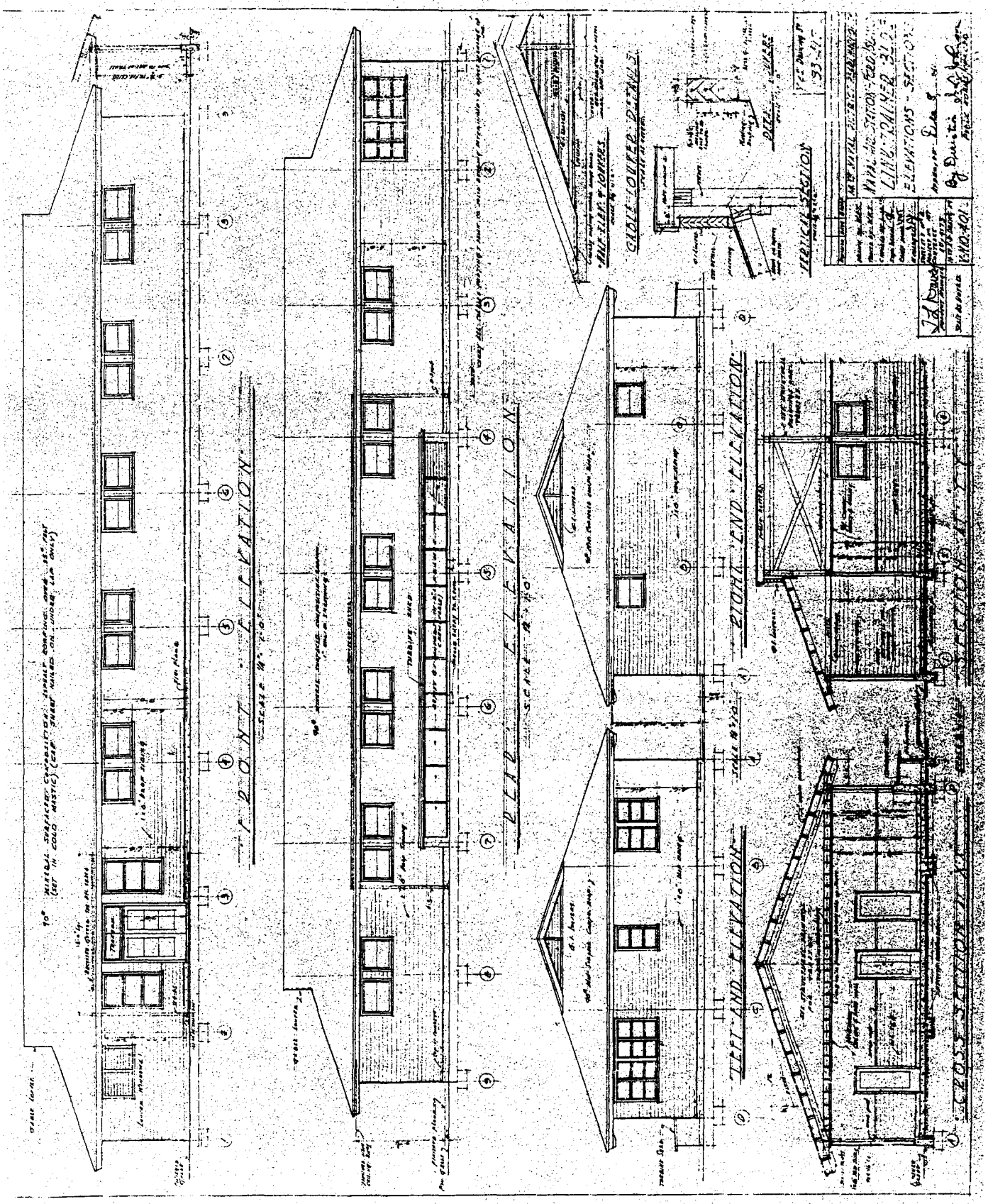
10mi
16km





VICINITY MAP
Not to Scale

1941 Floor Plan and Details (Y&D Drawing No. 183416)
[Note that trench pattern is not as shown, because re-oriented 90 degrees after initial construction]



1941 Elevations and Sections (Y&D Drawing No. 183417)