

Hawthorne Army Ammunition Plant  
Hawthorne  
Mineral County  
Nevada

HAER No. NV-5

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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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National Park Service  
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HISTORIC AMERICAN ENGINEERING RECORD

Hawthorne Army Ammunition Plant

NV-5

**Location:** In Mineral County, Nevada, 135 miles southeast of Reno and 311 miles northwest of Las Vegas. Bordered by Walker Lake on the north and the Excelsior, Gillis, and Wassuck mountain ranges on the other three sides.

**Date of Construction:** Established in 1929.

**Owner:** Department of the Army

**Significance:** Constructed and operated by the U.S. Navy in 1929-1931, and greatly expanded during World War II, the plant served as a high explosive ammunition depot supporting the Pacific fleet. Ancillary functions included demilitarization, rework, and load-assemble-andpack of various ordnance items. In 1977 the entire facility was transferred to the U.S. Army.

**Historical Report**

**Prepared by:**

Stuart MacDonald, 1984

**Prepared for**

**Transmittal by:**

Robie S. Lange, HABS/HAER, 1985.

## EXECUTIVE SUMMARY

The Hawthorne Army Ammunition Plant (HWAAP) is a government-owned, contractor-operated installation occupying 146,994 acres in Mineral County near Hawthorne, Nevada, 135 miles southeast of Reno and 311 miles northwest of Las Vegas. Its high desert terrain is bordered by Walker Lake on the north and mountain ranges on the other three sides. Constructed and operated by the U.S. Navy in 1929-1931 and greatly expanded during World War II, the plant served as a high explosive ammunition depot supporting the Pacific fleet. Ancillary functions included demilitarization, rework, and load-assemble-and pack of various ordnance items. These storage and manufacturing operations have continued to the present as part of the Army's Armament, Munitions and Chemical Command (AMCCOM). In 1977 the entire facility was transferred to the U.S. Army, and in 1980 it was converted to government-owned, contractor-operated status.

The HWAAP currently comprises 2,911 structures, two-thirds of which are explosive storage magazines. Nearly 90% of the plant's buildings date from the original 1929-1931 construction period and World War II. The plant also contains several remotely situated mining cabins and ranching structures that pre-date military use of the site; however, all are architecturally undistinguished and dilapidated.

There are no Category I or Category II historic properties at HWAAP. Because they form a highly intact architectural assemblage and are locally important works of architectural design, the buildings in the plant's 1929-1931 Personnel and Industrial Area are Category III historic properties and together form a district that should be nominated to the National Register of Historic Places.

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PREFACE

This report presents the results of an historic properties survey of the Hawthorne Army Ammunition Plant (HWAAP). Prepared for the United States Army Materiel Development and Readiness Command (DARCOM), the report is intended to assist the Army in bringing this installation into compliance with the National Historic Preservation Act of 1966 and its amendments, and related federal laws and regulations. To this end, the report focuses on the identification, evaluation, documentation, nomination, and preservation of historic properties at the HWAAP. Chapter 1 sets forth the survey's scope and methodology; Chapter 2 presents an architectural, historical, and technological overview of the installation and its properties; and Chapter 3 identifies significant properties by Army category and sets forth preservation recommendations. Illustrations and an annotated bibliography supplement the text.

This report is part of a program initiated through a memorandum of agreement between the National Park Service, Department of the Interior, and the U.S. Department of the Army. The program covers 74 DARCOM installations and has two components: 1) a survey of historic properties (districts, buildings, structures, and objects), and 2) the development of archaeological overviews. Stanley H. Fried, Chief, Real Estate Branch of Headquarters DARCOM, directed the program for the Army, and Dr. Robert J. Kapsch, Chief of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) directed the program for the National Park Service. Sally Kress Tompkins was program manager, and Robie S. Lange was

project manager for the historic properties survey. Technical assistance was provided by Donald C. Jackson.

Building Technology Incorporated acted as primary contractor to HABS/HAER for the historic properties survey. William A. Brenner was BTI's principal-in-charge and Dr. Larry D. Lankton was the chief technical consultant. Major subcontractors were the MacDonald and Mack Partnership and Jeffrey A. Hess. The author of this report was Stuart MacDonald. The author would like to thank the many employees at the HWAAP who graciously assisted him in his research and field surveys. He especially acknowledges the help of the following individuals: on the government staff, Floyd Justus, Chief of Operations; Max Hughes, Facilities Management Specialist; and Fred Bandoni, Facilities Management Specialist; and on the Day & Zimmermann/Basil Corporation staff, James Ryan, Environmentalist/Land Manager; and Phyllis Nichols, Real Property Clerk.

The complete HABS/HAER documentation for this installation will be included in the HABS/HAER collections at the Library of Congress, Prints and Photographs Division, under the designation HAER No. NV-5.

Chapter 1

INTRODUCTION

SCOPE

This report is based on an historic properties survey conducted in 1983 of all Army-owned properties located within the official boundaries of the Hawthorne Army Ammunition Plant (HWAAP). The survey included the following tasks:

- . Completion of documentary research on the history of the installation and its properties.
- . Completion of a field inventory of all properties at the installation.
- . Preparation of a combined architectural, historical, and technological overview for the installation.
- . Evaluation of historic properties and development of recommendations for preservation of these properties.

Also completed as a part of the historic properties survey of the installation, but not included in this report, are HABS/HAER Inventory cards for 54 individual properties. These cards, which constitute HABS/HAER Documentation Level IV, will be provided to the Department of the Army. Archival copies of the cards, with their accompanying photographic

negatives, will be transmitted to the HABS/HAER collections at the Library of Congress.

The methodology used to complete these tasks is described in the following section of this report.

### METHODOLOGY

#### 1. Documentary Research

A concerted effort was made to locate published and unpublished sources dealing specifically with the history and technology of the Hawthorne Army Ammunition Plant (HWAAP). This site specific research was conducted primarily at the AMCCOM Historical Office at Rock Island Arsenal, Rock Island, Illinois; the Mineral County Courthouse, Hawthorne, Nevada; the Nevada Historical Society Archives, Reno, Nevada; the Special Collections of the University of Nevada Reno Library; and the HWAAP government and contractor files.

On the basis of this literature search, a number of valuable sources were identified, including 1929 and World-War-II-era construction drawings prepared by the U.S. Navy Bureau of Yards and Docks. The Nevada State Historic Preservation Office had no pertinent information.

Army records used for the field inventory included current Real Property Inventory (RPI) printouts that listed all officially recorded



buildings and structures by facility classification and date of construction; the installation's property record cards; base maps and photographs supplied by installation personnel; and installation master planning, archaeological, environmental assessment, and related reports and documents. A complete listing of this documentary material may be found in the bibliography.

2. Field Inventory

Architectural and technological field surveys were conducted in January 1984 by Stuart MacDonald. Primary assistance during the field survey was provided by Max Hughes, Facilities Management Specialist, and James Ryan, Environmentalist/Land Manager. Additional assistance and guidance was provided by Fred Bandoni, Facilities Management Specialist.

Field inventory procedures were based on the HABS/HAER Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures.<sup>1</sup> All areas and properties were visually surveyed.

Building locations and approximate dates of construction were noted from the installation's property records and field-verified. Interior surveys were made of the mine-filling production facilities to permit adequate evaluation of architectural features, building technology, and production equipment.

Field inventory forms were prepared for, and black and white 35 mm photographs taken of all buildings and structures through 1945 except

basic utilitarian structures of no architectural, historical, or technological interest. When groups of similar ("prototypical") buildings were found, one field form was normally prepared to represent all buildings of that type. Field inventory forms were also completed for representative post-1945 buildings and structures.<sup>2</sup> Information collected on the field forms was later evaluated, condensed, and transferred to HABS/HAER Inventory cards.

### 3. Historical Overview

A combined architectural, historical, and technological overview was prepared from information developed from the documentary research and the field inventory. It was written in two parts: 1) an introductory description of the installation, and 2) a history of the installation by periods of development, beginning with pre-military land uses. Maps and photographs were selected to supplement the text as appropriate.

The objectives of the overview were to 1) establish the periods of major construction at the installation, 2) identify important events and individuals associated with specific historic properties, 3) describe patterns and locations of historic property types, and 4) analyze specific building and industrial technologies employed at the installation.

4. Property Evaluation and Preservation Measures

Based on information developed in the historical overviews, properties were first evaluated for historical significance in accordance with the eligibility criteria for nomination to the National Register of Historic Places. These criteria require that eligible properties possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that they meet one or more of the following:<sup>3</sup>

- A. Are associated with events that have made a significant contribution to the broad patterns of our history.
- B. Are associated with the lives of persons significant in the nation's past.
- C. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.
- D. Have yielded, or may be likely to yield, information important in pre-history or history.

Properties thus evaluated were further assessed for placement in one of five Army historic property categories as described in Army Regulation 420-40:<sup>4</sup>

- Category I Properties of major importance
- Category II Properties of importance
- Category III Properties of minor importance
- Category IV Properties of little or no importance
- Category V Properties detrimental to the significance  
of adjacent historic properties.

Based on an extensive review of the architectural, historical, and technological resources identified on DARCOM installations nationwide, four criteria were developed to help determine the appropriate categorization level for each Army property. These criteria were used to assess the importance not only of properties of traditional historical interest, but also of the vast number of standardized or prototypical buildings, structures and production processes that were built and put into service during World War II, as well as of properties associated with many post-war technological achievements. The four criteria were often used in combination and are as follows:

- 1) Degree of importance as a work of architectural, engineering, or industrial design. This criterion took into account the qualitative factors by which design is normally judged: artistic merit, workmanship, appropriate use of materials, and functionality.
- 2) Degree of rarity as a remaining example of a once widely used architectural, engineering, or industrial design or process. This criterion was applied primarily to the many standardized

or prototypical DARCOM buildings, structures, or industrial processes. The more widespread or influential the design or process, the greater the importance of the remaining examples of the design or process was considered to be. This criterion was also used for non-military structures such as farmhouses and other once prevalent building types.

- 3) Degree of integrity or completeness. This criterion compared the current condition, appearance, and function of a building, structure, architectural assemblage, or industrial process to its original or most historically important condition, appearance, and function. Those properties that were highly intact were generally considered of greater importance than those that were not.
  
- 4) Degree of association with an important person, program, or event. This criterion was used to examine the relationship of a property to a famous personage, wartime project, or similar factor that lent the property special importance.

The majority of DARCOM properties were built just prior to or during World War II, and special attention was given to their evaluation. Those that still remain do not often possess individual importance, but collectively they represent the remnants of a vast construction undertaking whose architectural, historical, and technological importance needed to be assessed before their numbers diminished further. This assessment centered on an extensive review of the

military construction of the 1940-1945 period, and its contribution to the history of World War II and the post-war Army landscape.

Because technology has advanced so rapidly since the war, post-World War II properties were also given attention. These properties were evaluated in terms of the nation's more recent accomplishments in weaponry, rocketry, electronics, and related technological and scientific endeavors. Thus the traditional definition of "historic" as a property 50 or more years old was not germane in the assessment of either World War II or post-war DARCOM buildings and structures; rather, the historic importance of all properties was evaluated as completely as possible regardless of age.

Property designations by category are expected to be useful for approximately ten years, after which all categorizations should be reviewed and updated.

Following this categorization procedure, Category I, II, and III historic properties were analyzed in terms of:

- Current structural condition and state of repair. This information was taken from the field inventory forms and photographs, and was often supplemented by rechecking with facilities engineering personnel.
- The nature of possible future adverse impacts to the property. This information was gathered from the

installation's master planning documents and rechecked with facilities engineering personnel.

Based on the above considerations, the general preservation recommendations presented in Chapter 3 for Category I, II, and III historic properties were developed. Special preservation recommendations were created for individual properties as circumstances required.

5. Report Review

Prior to being completed in final form, this report was subjected to an in-house review by Building Technology Incorporated. It was then sent in draft to the subject installation for comment and clearance and, with its associated historical materials, to HABS/HAER staff for technical review. When the installation cleared the report, additional draft copies were sent to DARCOM, the appropriate State Historic Preservation Officer, and, when requested, to the archaeological contractor performing parallel work at the installation. The report was revised based on all comments collected, then published in final form.

NOTES

1. Historic American Buildings Survey/Historic American Engineering Record, National Park Service, Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures (unpublished draft, 1982).

2. Representative post-World War II buildings and structures were defined as properties that were: (a) "representative" by virtue of construction type, architectural type, function, or a combination of these, (b) of obvious Category I, II, or III historic importance, or (c) prominent on the installation by virtue of size, location, or other distinctive feature.
3. National Park Service, How to Complete National Register Forms (Washington, D.C.: U.S. Government Printing Office, January 1977).
4. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984).



## Chapter 2

### HISTORICAL OVERVIEW

#### BACKGROUND

The Hawthorne Army Ammunition Plant (HWAAP) is a government-owned, contractor-operated installation occupying 146,994 acres in Mineral County near Hawthorne, Nevada, 135 miles southeast of Reno and 311 miles northwest of Las Vegas (Figure 1). Its isolated high desert terrain (4,300' elevation) is bordered by Walker Lake on the north and the Excelsior, Gillis, and Wassuck mountain ranges on the other three sides. Constructed and operated by the U.S. Navy in 1929-1931 as a consequence of the 1926 depot explosion in Lake Denmark, New Jersey, and greatly expanded during World War II, the plant served as a high explosive ammunition depot supporting the Pacific fleet. Ancillary functions included demilitarization, rework, and load-assemble-and-pack of various ordnance items, including mines, depth charges, and bombs. These storage and manufacturing operations have continued to the present. In 1977 the entire facility was transferred to the U.S. Army, and in 1980 it was converted to government-owned, contractor-operated status.

The HWAAP currently comprises 2,911 structures,<sup>1</sup> two-thirds of which are explosive storage magazines. Nearly 90% of the plant's buildings date from the original 1929-1931 construction period and World War II.

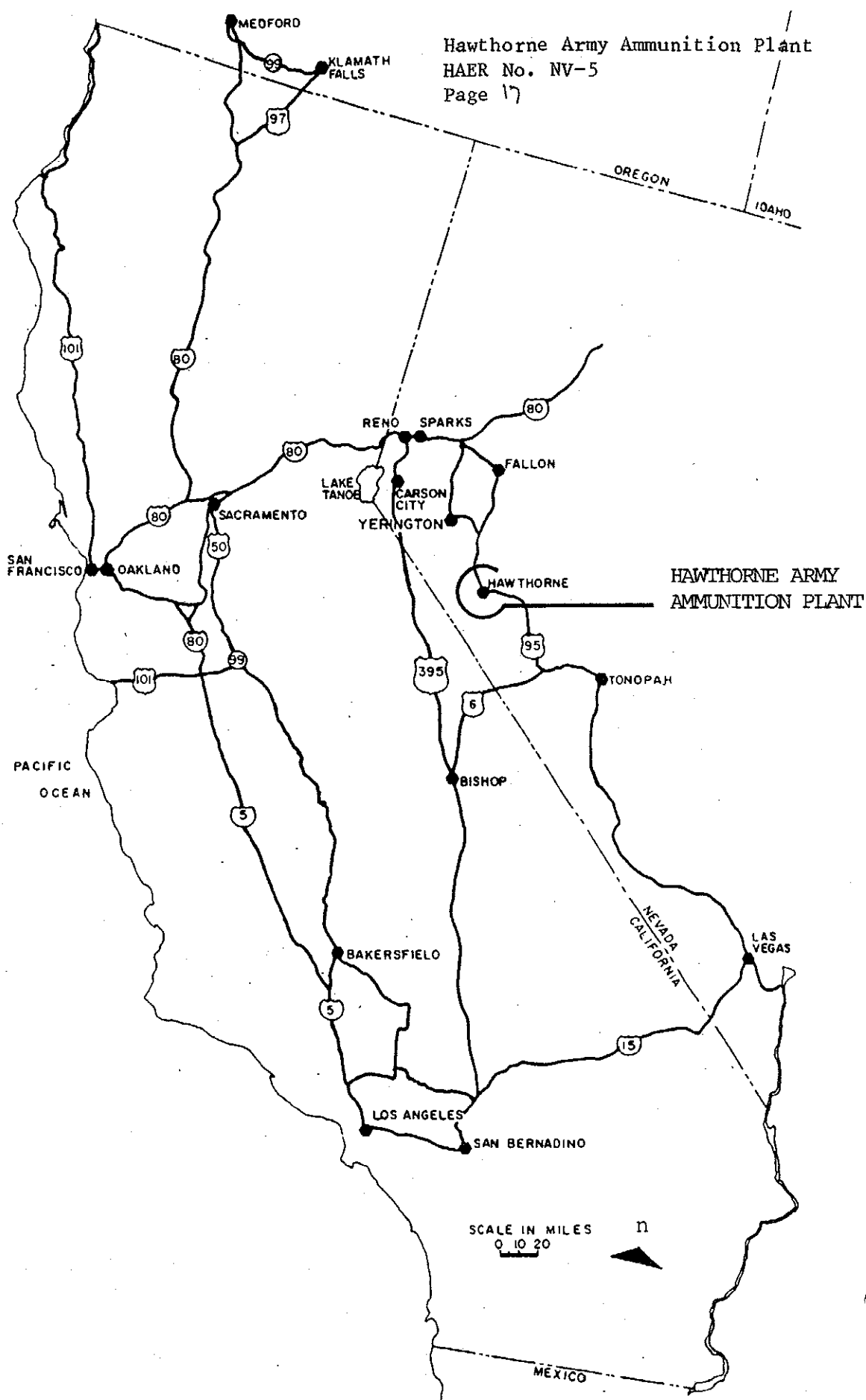


Figure 1: Hawthorne Army Ammunition Plant. Location map.  
(Source: Government files, HWAAP.)

EARLY MILITARY DEVELOPMENT

The Naval Ammunition Depot (NAD)<sup>2</sup> at Hawthorne, Nevada, directly resulted from a disastrous explosion in 1926 at the Navy's depot in Lake Denmark, New Jersey: "In the midst of an electrical storm . . . a fire broke out in one of the magazines. A series of explosions racked every building on the station and the detonations were followed by a week-long fire that swept away the wreckage."<sup>3</sup> A court of inquiry, appointed on July 14, 1926, investigated the catastrophe and recommended:

The establishment of a new ammunition depot to serve the Pacific coast and that the said proposed ammunition depot be located "within a radius of 1,000 miles from the Pacific coast, and to be so located as to have convenient railroad facilities to the Los Angeles-San Diego area, to the San Francisco Bay area, and to the Columbia River-Puget Sound area, the land provided to be either Government-owned land or cheap barren land, covering an area of at least 100 square miles, and allowing an unoccupied safety zone of 2 miles."<sup>4</sup>

Located approximately 200 miles directly east of San Francisco, the HWAAP site satisfied all criteria. Requiring only modest track and highway construction, the site offered easy access to the Southern Pacific Railroad's station at Thome, Nevada. It occupied an area nearly twice the recommended minimum, was virtually undeveloped, largely government-owned, and geographically isolated from population encroachment. Walker Lake, a 23-mile-long saltwater lake, and the Excelsior and Gillis mountain ranges formed natural barriers on the northern, eastern, and southern boundaries. A section of the Wassuck Range, including Mt. Grant (11,303' elevation), occupied the western half of the site (Figure 2). In addition, the region offered the advantage of an arid climate that would minimize deterioration

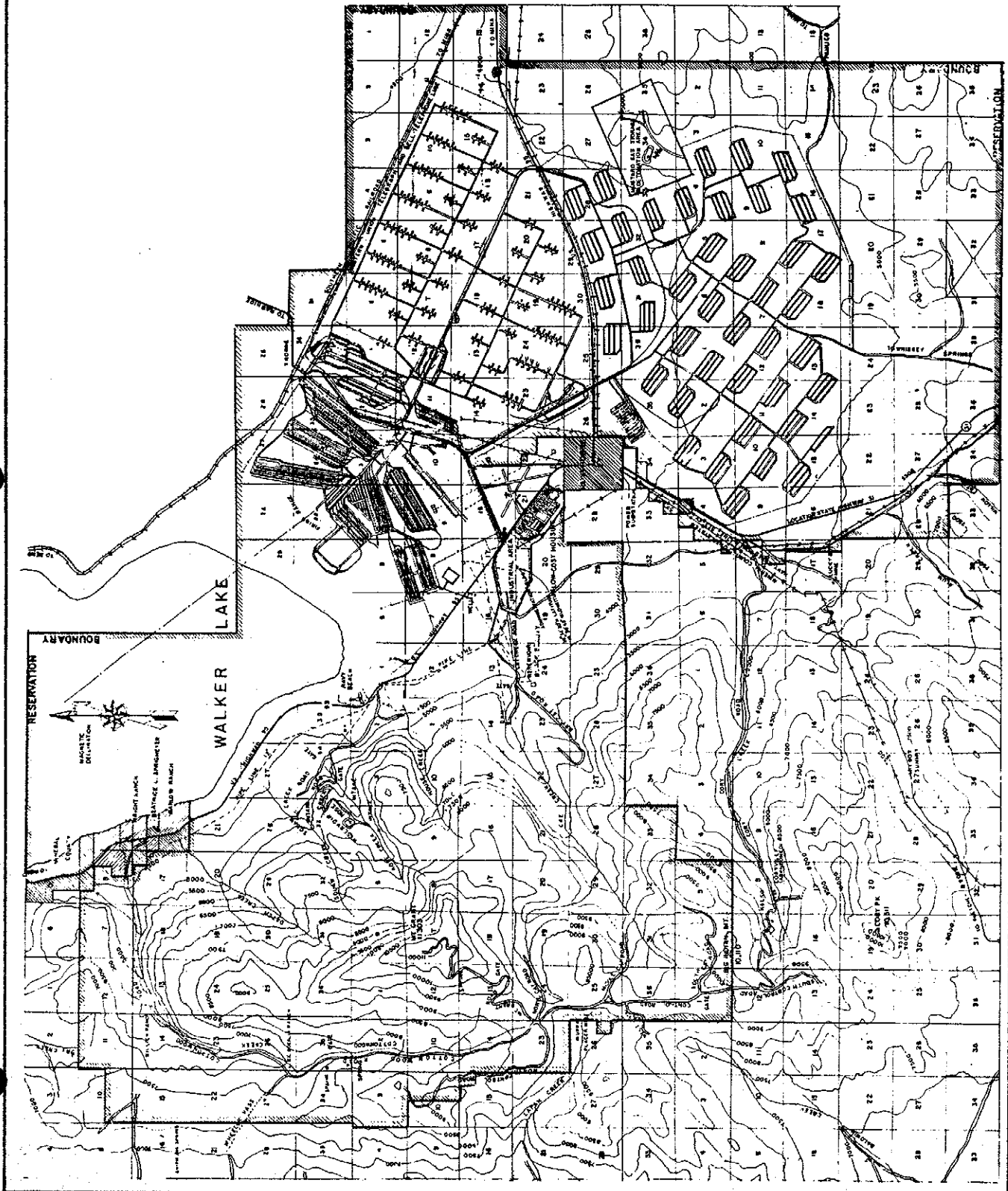
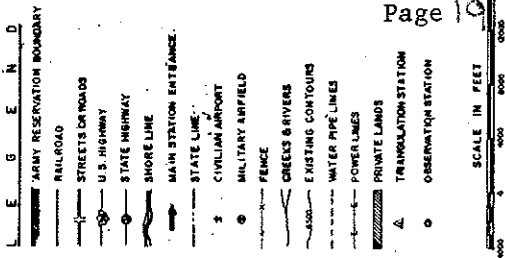


Figure 2: HWAAP. Site Plan, 1984. (Source: Day & Zimmermann/Basil Corporation files, HWAAP.)

of ordnance, and a favorable topography of gentle slopes permitting economic layout of structures.<sup>5</sup>

After exhaustive investigation of 20 possible sites in Nevada and California, the Navy judged the Hawthorne site to be the most suitable.<sup>6</sup> On October 27, 1927 by Executive Order No. 4531, President Calvin Coolidge "withdrew from the public domain in Nevada an area of 197 square miles [near Hawthorne] and set it aside for the exclusive use and benefit of the United States Navy for the development of and use as an ammunition depot. . . ."<sup>7</sup>

#### Former Land Use

General settlement in the HWAAP vicinity began with the establishment of the railroad town of Hawthorne, Nevada, in 1881. Tracks of the Carson and Colorado Railroad reached the townsite on April 7 of that year. The Carson and Colorado "owned the town-to-be 'lot, block and acre,'"<sup>8</sup> put up individual lots for public sale on April 14, 1881, and then "erect[ed] a depot, freight depot, repair shops, and other service facilities in what was then the 'southern terminus' of the rail line. . . ."<sup>9</sup> For half a century prior to the adjacent military development, Hawthorne served as a regional trade center, supporting limited ranching and intermittent mining activities, especially at the nearby Lucky Boy Mine.<sup>10</sup> The only structures on the plant site surviving from this earlier period are remotely situated along Cottonwood Creek in the Wassuck Range. In addition to four mining cabins of unknown date (Figure 3), they include a cabin, detached kitchen,

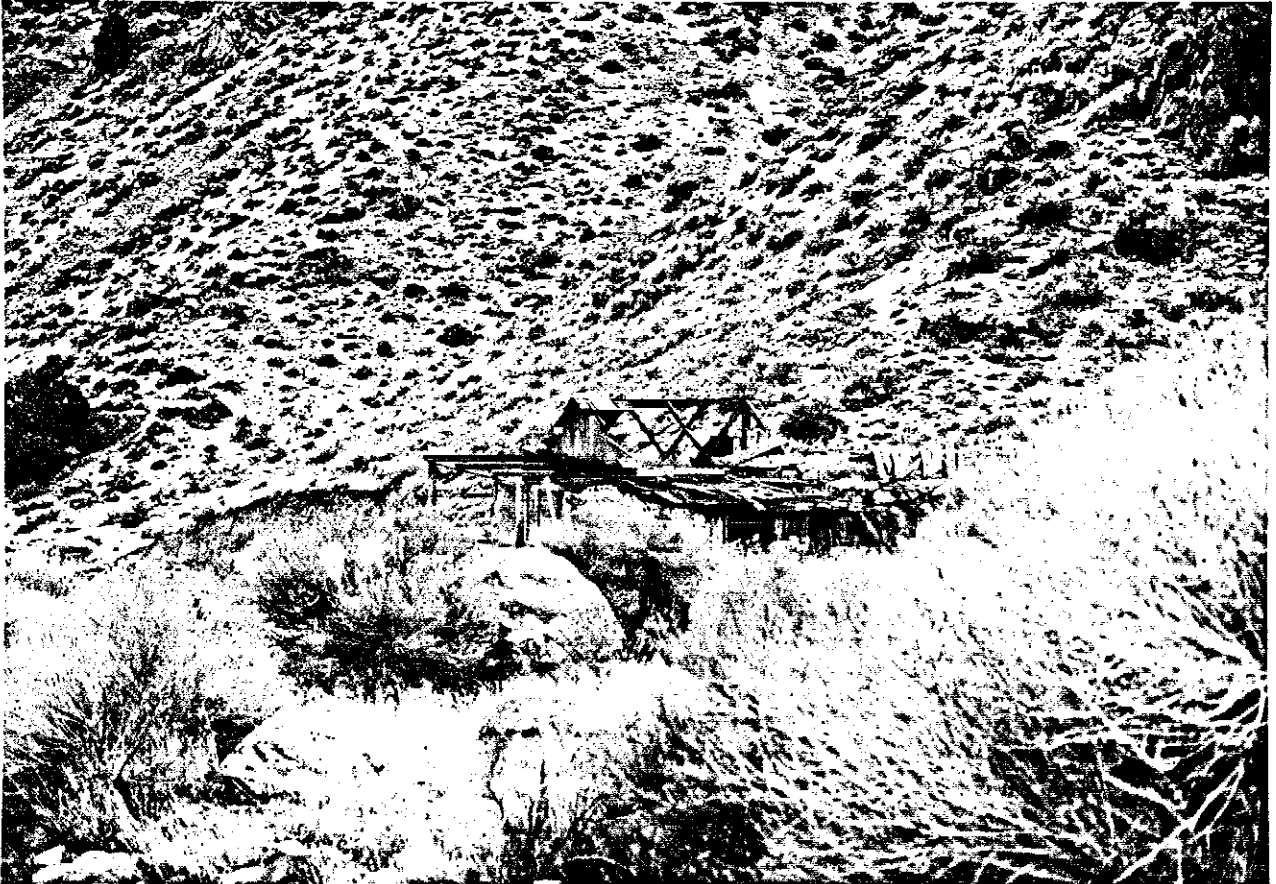


Figure 3: HWAAP, unidentified mining cabin, construction date unknown, looking east. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

goat shed, several storage structures, and corrals that comprise the ca.1900 Milich Ranch (Figure 4).<sup>11</sup> All are of wood frame construction, architecturally undistinguished, and dilapidated.

#### Construction and Operation

Under the general supervision of the U.S. Navy Bureau of Yards and Docks, construction work at the Hawthorne site commenced with official groundbreaking on July 24, 1928, and continued to completion in 1931.<sup>12</sup> Mittry Brothers Construction Company held the general construction contract.<sup>13</sup> Preliminary to construction, the Navy established temporary headquarters in the Mineral County Courthouse at Hawthorne and built 7.7 miles of single-track railroad, connecting the future Personnel and Industrial Area and Magazine Area with the Southern Pacific Railroad's station east of Walker Lake at Thorne.<sup>14</sup> The Personnel and Industrial Area contained the headquarters, administration, engineering and maintenance facilities, and housing and community services for the installation (Figures 5-15). Substantially constructed of brick and poured concrete, the buildings were carefully arranged and landscaped to establish windbreaks and "counteract the depressing effect of the vast areas practically devoid of vegetation."<sup>15</sup> In terms of architectural design, the Colonial and Spanish Colonial Revival styles were prevalent accompanied by buildings of a modest, strictly utilitarian nature. Collectively, they formed a well-designed, architecturally cohesive assemblage.



Figure 4: HWAAP, Milich Ranch, built ca.1900, looking north.  
(Source: Field inventory photograph, 1984, Stuart  
MacDonald, MacDonald and Mack Partnership.)



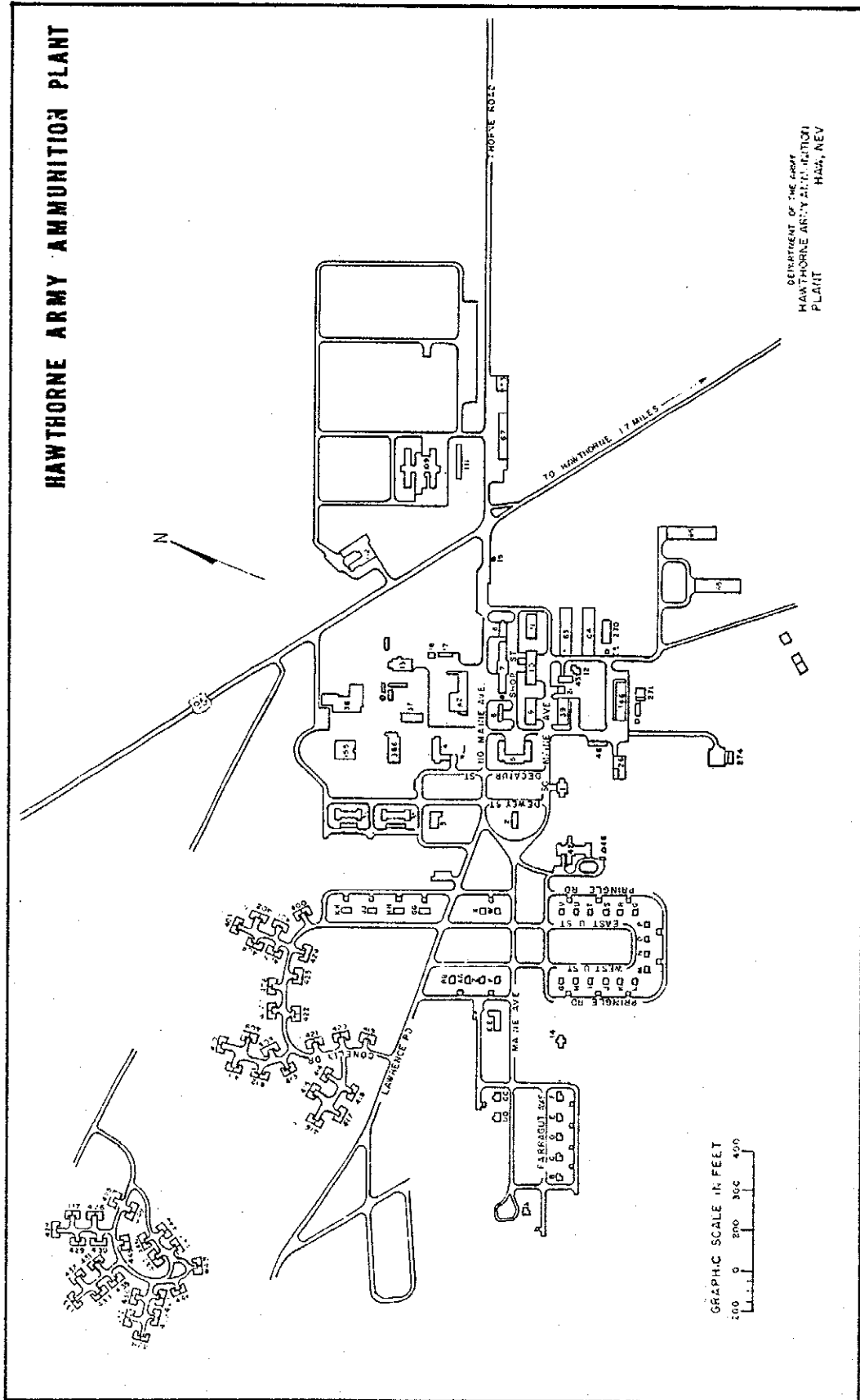


Figure 5: HWAAP, Personnel and Industrial Area site plan, 1984.  
(Source: Day & Zimmermann/Basil Corporation files,  
HWAAP.)

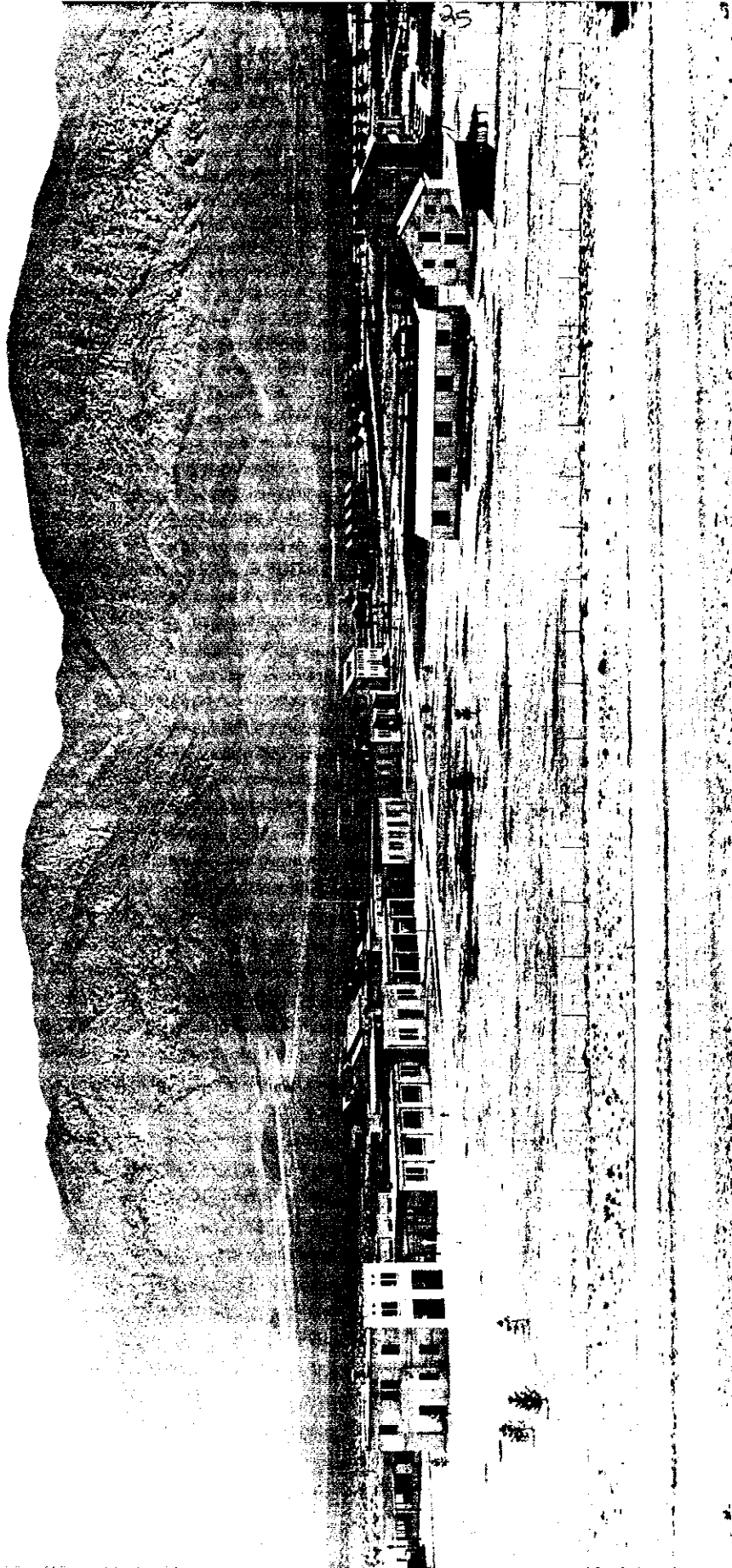


Figure 6: HWAAP, construction photograph of Personnel and Industrial Area, 1930, looking south.  
(Source: Day & Zimmermann/Basil Corporation files, HWAAP.)



Figure 7: HWAAP, Post Headquarters Building (Building A1), built 1930, northwest elevation. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 8: HWAAP, Day & Zimmermann/Basil Corporation Administrative Offices (Building A2), built in 1930 as general administration building, northeast elevation. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 9: HWAAP, Office Building (Building A9), built in 1930 as a warehouse, northwest and southwest elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 10: HWAAP, Boiler Maintenance Building (Building A18), built in 1930 as a horse stable, southeast and southwest elevations. Originally, the U.S. Marines patrolled the depot on horseback. (Source: Field inventory photograph, 1984, Stuart Macdonald, MacDonald and Mack Partnership.)



Figure 11: HWAAP, Commander's Residence (Quarters A, Building A174), built in 1929 as Inspector's Quarters, northwest elevation. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 12: HWAAP, Field Grade Officer Housing (Quarters C, Building A176), built in 1929 as executive and staff officer quarters, northwest and southwest elevations. (Source: Field inventory survey, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



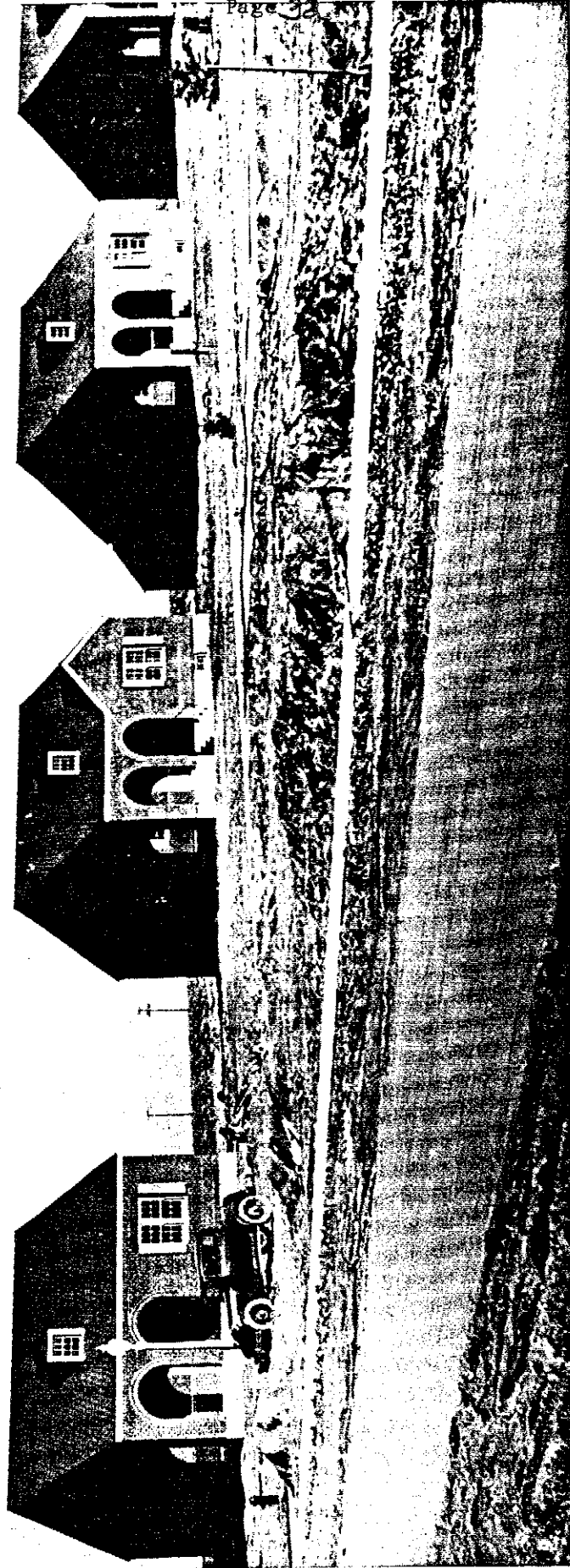


Figure 13: HWAAP, construction photograph of Company Grade and Warrant Officer Housing (from right to left, Quarters S, T, U, V, Building A280, A281, A282, A283), built in 1930 as petty officer quarters, looking northeast. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 14: HWAAP, Barracks (Building A4), built in 1930 as U.S. Marine mess hall and barracks, northwest and southwest elevation. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 15: HWAAP, Plant Theater (Building A14), built in 1930 as a schoolhouse, northwest and southwest elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

Situated approximately three miles northeast of the industrial facilities, the Magazine Area contained 84 high explosive and 2 fuze and detonator storage magazines. Concern for safety governed magazine layout and individual magazine design. As noted by Lieutenant Commander C. H. Cotter, officer in charge of construction:

A factor of major technical importance was the design of the magazine layout as to proper spacing and the construction of the magazines. The most stringent state regulations for the storage of high explosives in this country are the laws of New Jersey. These laws, together with the American Table of Distances, are the result of studying every major explosion since 1863 on which reliable data could be obtained. Following the Lake Denmark explosion four years ago, a naval board . . . made a thorough study of the damage and recommended . . . formulas for high-explosive magazine spacing, [equating distances in feet to the quantity of explosive in pounds].

In designing the magazine layout for the Hawthorne storage, the recommendations of the . . . board were followed closely. Each group of seven magazines forms an approximate hexagon with one building at each angle of the perimeter and one in the center. A distance of 600 ft. c. to c. separates these seven magazines in the group. This spacing is considered more than ample to prevent induced or sympathetic explosions within the several units of the group. The maximum probable loss would be explosive stored in one magazine building, amounting to 143,000 lb., which is 1.19 per cent of the total storage.

As a further precaution, each group is spaced 3,000 ft c. to c. from the adjacent groups. This is a sufficient distance to prevent damage extending into adjoining groups in the remote event of simultaneous destruction of all seven magazines in any one group. Thus, the maximum loss possible is believed to be the amount of explosive stored in one group, namely, 1,000,000 lb. or 8.33 per cent of the entire storage.

Because of the area available at the Hawthorne depot it was entirely feasible to secure greater distances from inhabited and developed sections than is possible in congested districts. The industrial and personnel section of the depot is situated 14,500 ft. from the nearest magazine. The nearest inhabited building is 8,000 ft. distant, and the public highway and commercial railroad are 4,000 and 6,000 ft., respectively, from the nearest magazine. With these

distances and barricades there is a large factor of safety, and danger to property outside the depot is believed to be entirely eliminated.

The design of the individual magazines is similar to that of the units constructed at the navy mine depot at Yorktown, Va., in 1928. Because of the arid condition at the Hawthorne site and the sandy soil, it was possible to place the floor level of each magazine 4 ft. below ground level and provide access by means of a depressed roadway. This lowering of the floor level practically equalized cut and fill, thus reducing construction costs. The following general safety requirements governed magazine design and construction: (1) Structure must be fireproof; (2) construction materials must not be capable of forming dangerous missiles; (3) strength must be sufficient to resist external blast pressures and to stop missiles, including rifle bullets; (4) spacing distances must be safe; (5) structure must be protected from lightning, and must have all reinforcing and metal parts grounded; (6) protection from fire must be assured by cleared ground and distance from fire hazard; (7) no electrical connections are permissible; and (8) floor surfaces must be non-sparking.

. . . All reinforcing steel and other metal parts are electrically connected to a copper girdle circling the entire structure and embedded in the footing. The typical magazine of 143,000-lb. capacity is 40 ft. 4 in. long, 25 ft. wide, with a maximum height of 20 ft. at the center of the arch roof. A complete covering of earth is provided on top and sides except in front where the depressed roadway gives access to the door. An earth barricade is provided on the opposite side of this depressed entrance (Figure 16).<sup>16</sup>

The contractor completed magazine construction in 1930, and the first ammunition shipment arrived in October of that year.<sup>17</sup>

Typically, Navy storage depots also doubled as munitions manufacturing facilities, and Hawthorne was no exception.<sup>18</sup> According to designs prepared by the Bureau of Yards and Docks, C. B. Dinsmore & Company of Ogden, Utah, commenced building a mine-loading plant adjacent to the Magazine Area in January 1931 (Figure 23).<sup>19</sup> Although completed in that

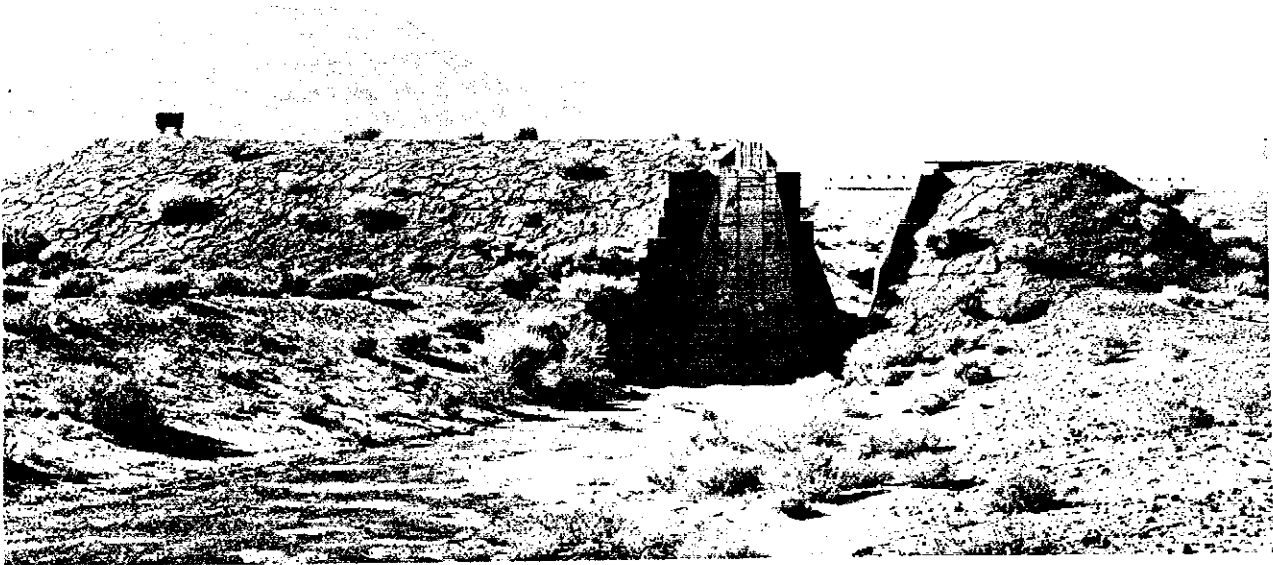


Figure 16: HWAAP, High Explosive Storage Magazine (Building 51-BT-2), built 1930, south and east elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

same year, the plant was not activated until 1935, and then for only a brief period, to rework mines, depth charges, and bombs.<sup>20</sup>

Early building activities at the depot ended in 1931-1932 with construction of Cat Creek Dam (Facility No. 298/Figure 17). The U.S. Department of the Interior Bureau of Reclamation provided the design for the 120'-high, concrete-arch structure, and R. G. Rowland Construction Company of Salt Lake City, Utah, served as general contractor.<sup>21</sup> Situated in the Wassuck Mountains approximately 2-1/2 miles directly west of the Personnel and Industrial Area, the dam impounded a 50-million-gallon reservoir, supplementing the depot's previously inadequate water supply.<sup>22</sup>

Approximately 160 structures were built during the original 1929-1931 construction period at NAD Hawthorne, and virtually all have survived to the present.

#### WORLD WAR II

At the outbreak of war in Europe in the fall of 1939, the U.S. Navy had only limited capacity for storing munitions. This situation changed rapidly in 1940, when the Navy embarked on construction of 12 major new stations and enlargement of nine existing facilities.<sup>23</sup> At NAD Hawthorne, the Navy's only pre-World War II inland depot, the number of storage magazines increased more than twentyfold from 1935 to 1945. A total of 1,751 magazines were erected, nearly two-thirds of which were conventional, 25' x 80', single-arch, high explosive storage igloos (Building 83-AT-3/Figure 18) that occupied the entire area south of U.S. Highway 95. Other

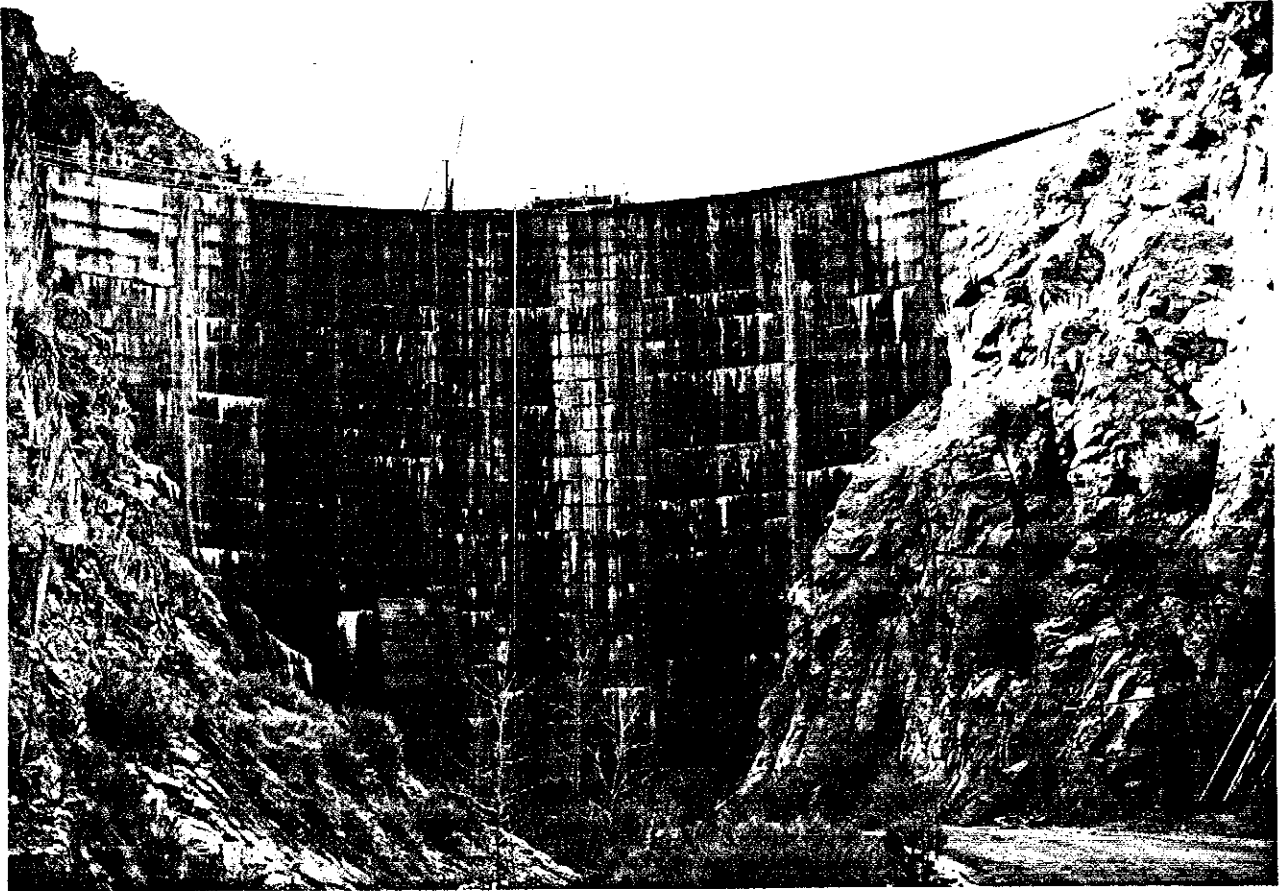


Figure 17: HWAAP, Cat Creek Dam (Facility No. 298), built 1931-1932, east elevation. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



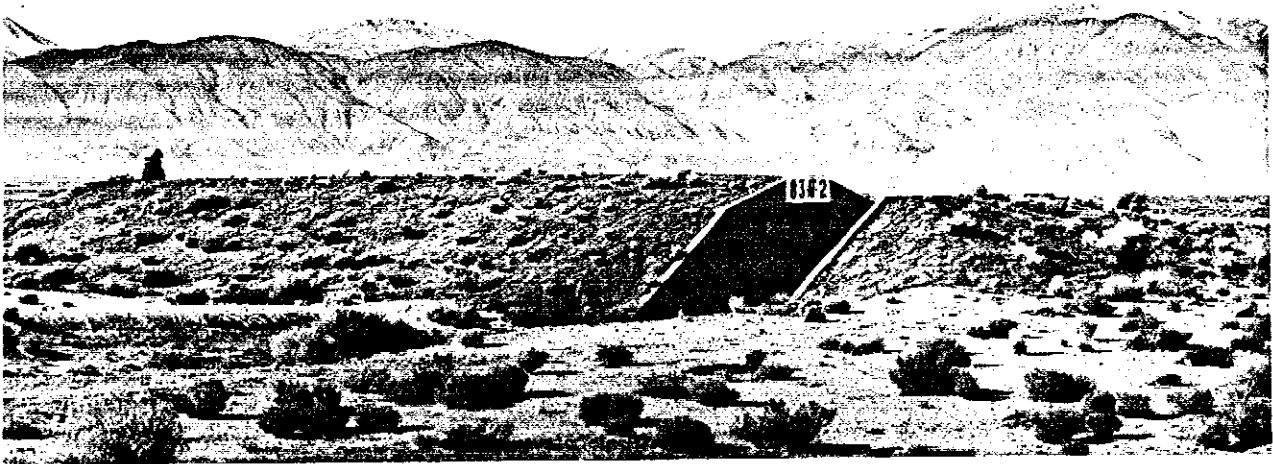


Figure 18: HWAAP, High Explosive Storage Magazine (Building 83-AT-2), built 1940, south and west elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

magazine types included: 25' x 80' (per vault), triple-barrel-vault, high explosive magazines (Building 113-2/Figure 19); 50' x 100', rectangular-box, high explosive magazines (Building 112-33/Figure 20); 25' x 20', single-arch, fuze and detonator igloos (Building 100FC-1/Figure 21); and 100' x 50', smokeless powder magazines (Building 110-L-38/Figure 22).<sup>24</sup> All were laid out for safety according to standard quantity and distance formulas, and with the exception of four brick, smokeless powder magazines (Buildings 110-L-53, 54, 55, 56), all were constructed of reinforced concrete. Nearly 200 reinforced concrete warehouses, built during the same period, provided inert storage.

Throughout World War II, the Navy enlarged and diversified the depot's manufacturing role. The 1931 mine-filling plant became fully operational for the first time, and in 1942 expanded to four complete loading lines. Each featured an extended, linear arrangement of widely spaced buildings interconnected by enclosed ramps that housed conveying systems. In terms of functional importance, major structures included TNT storehouses, TNT screen buildings, metal parts preparation warehouses, cooling sheds, and melt-and-pour buildings (Building 101-15/Figure 23). In the standard melt-and-pour process, TNT flowed by gravity from transporter to hot-water-jacketed melt kettles at the second floor level, to the pouring machine, and into mines, depth charges, bombs, and torpedos.<sup>25</sup> In 1943-1944 manufacturing operations expanded west of the filling plant with construction of a combined facility for loading boosters and reworking major- and medium-caliber ammunition, and a rocket assembly area (Building 108-1/ Figure 24; Building 108-14/Figure 25). Generally constructed of

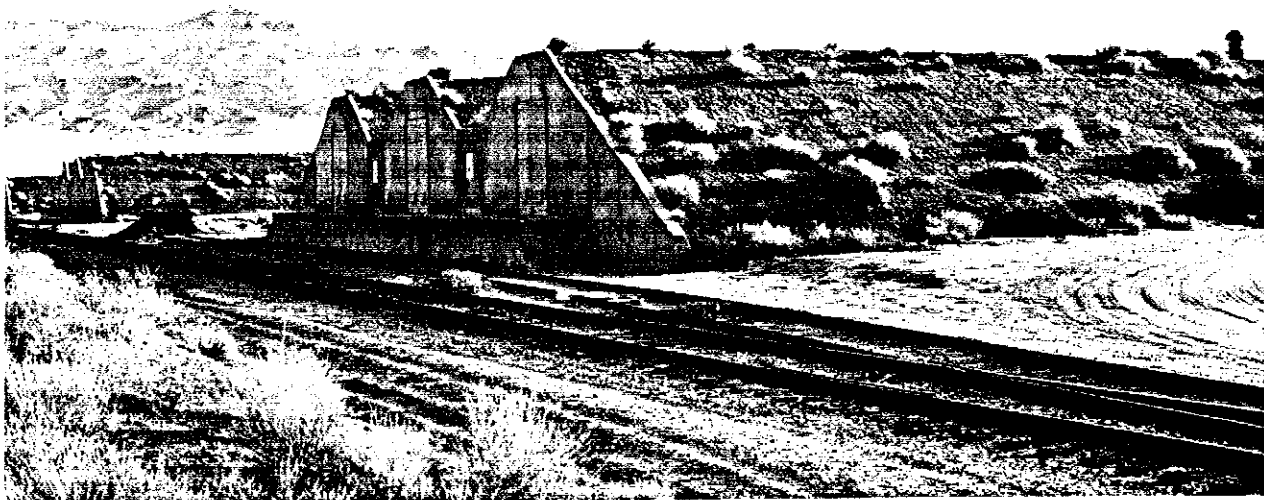


Figure 19: HWAAP, High Explosive Storage Magazine (Building 113-2), built 1943, south and west elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

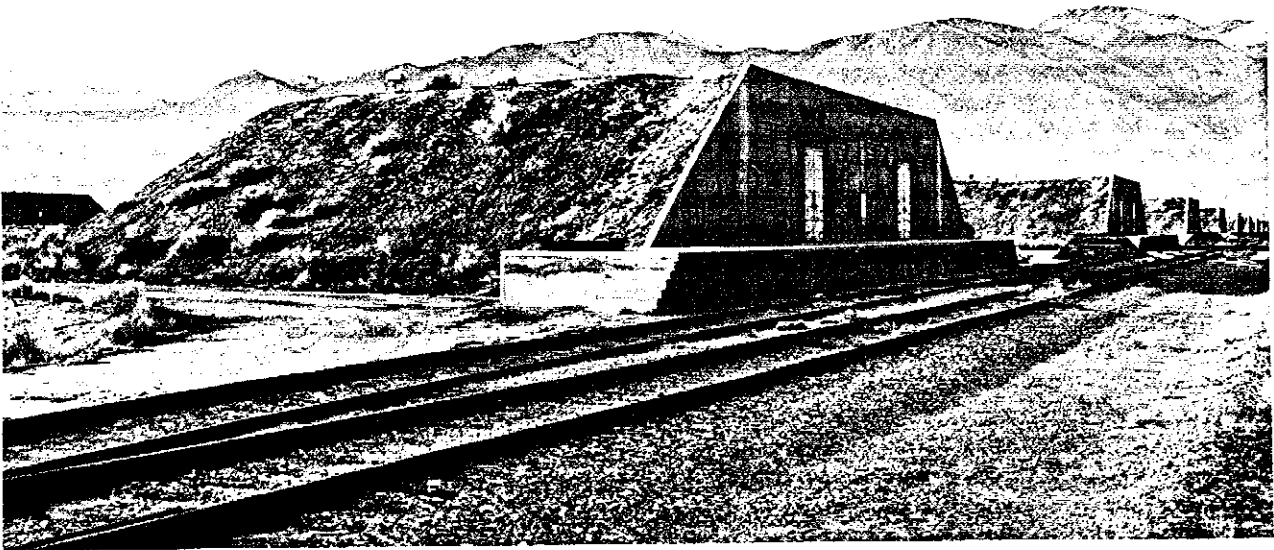


Figure 20: HWAAP, High Explosive Storage Magazine (Building 112-33), built 1945, northwest and southwest elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

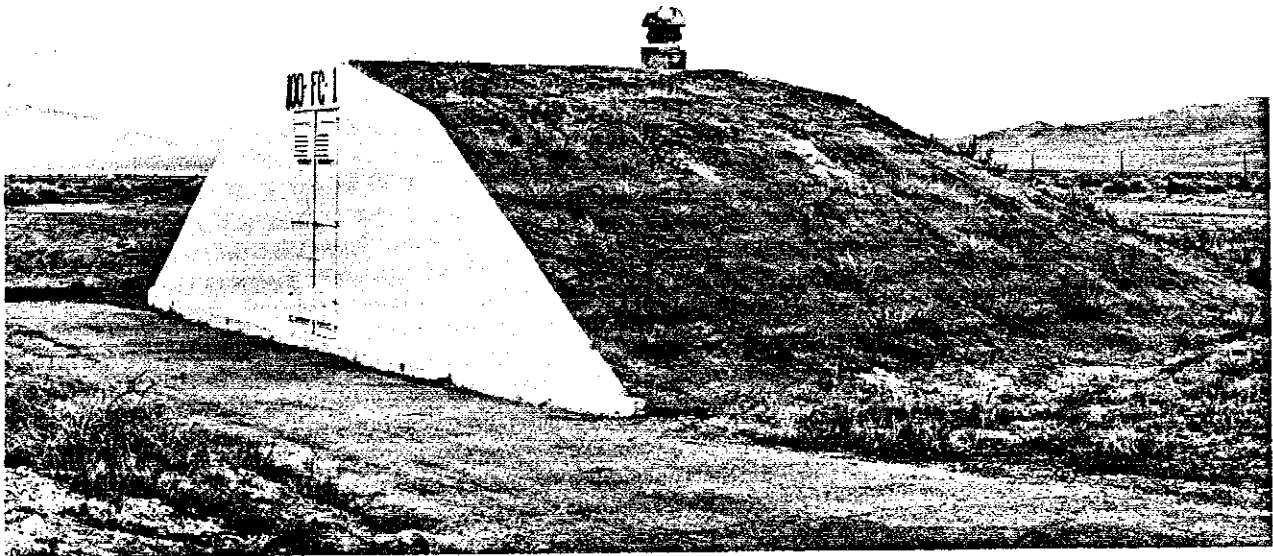


Figure 21: HWAAP, Fuze and Detonator Magazine (Building 100FC-1), built 1945, west and south elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

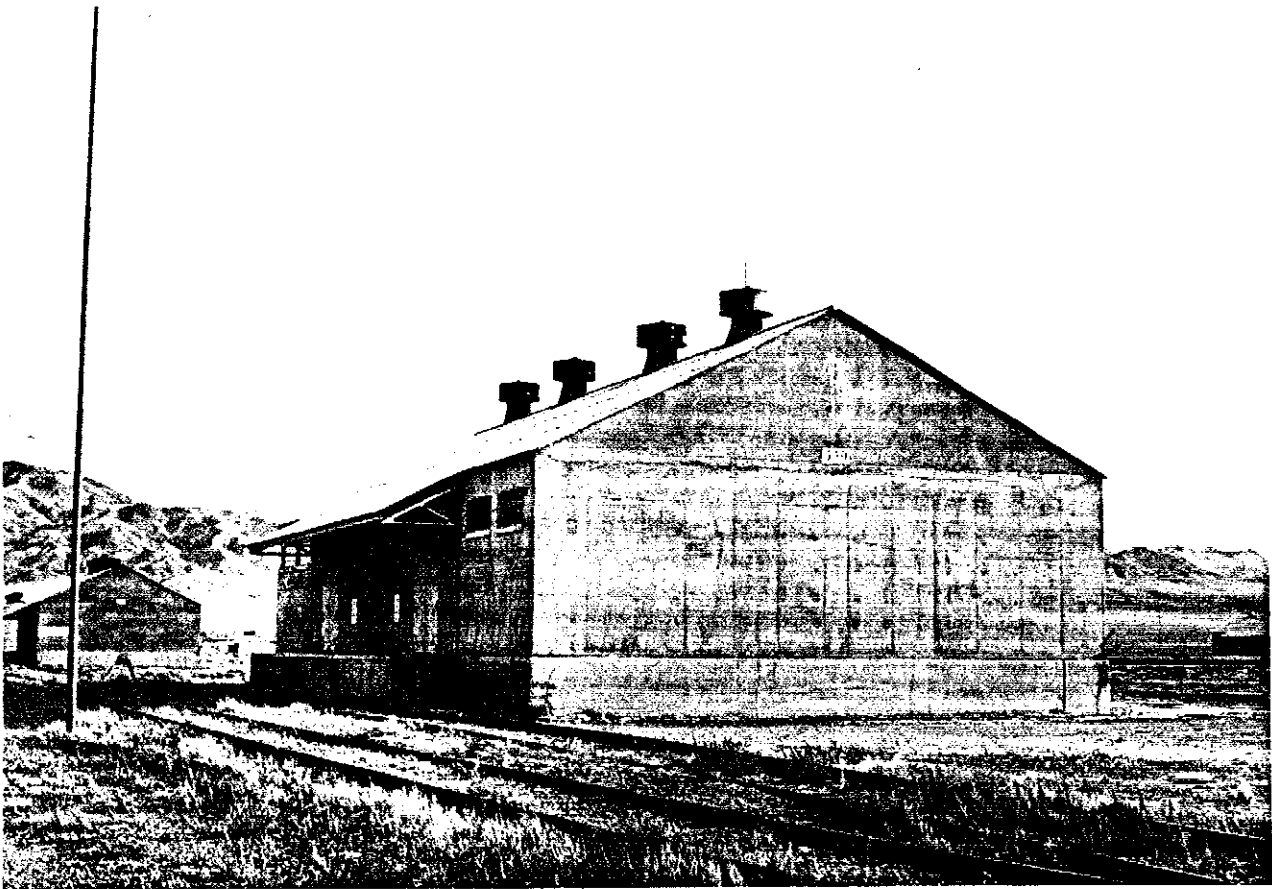


Figure 22: HWAAP, Smokeless Powder Magazine (Building 110-L-38), built 1940, south and west elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

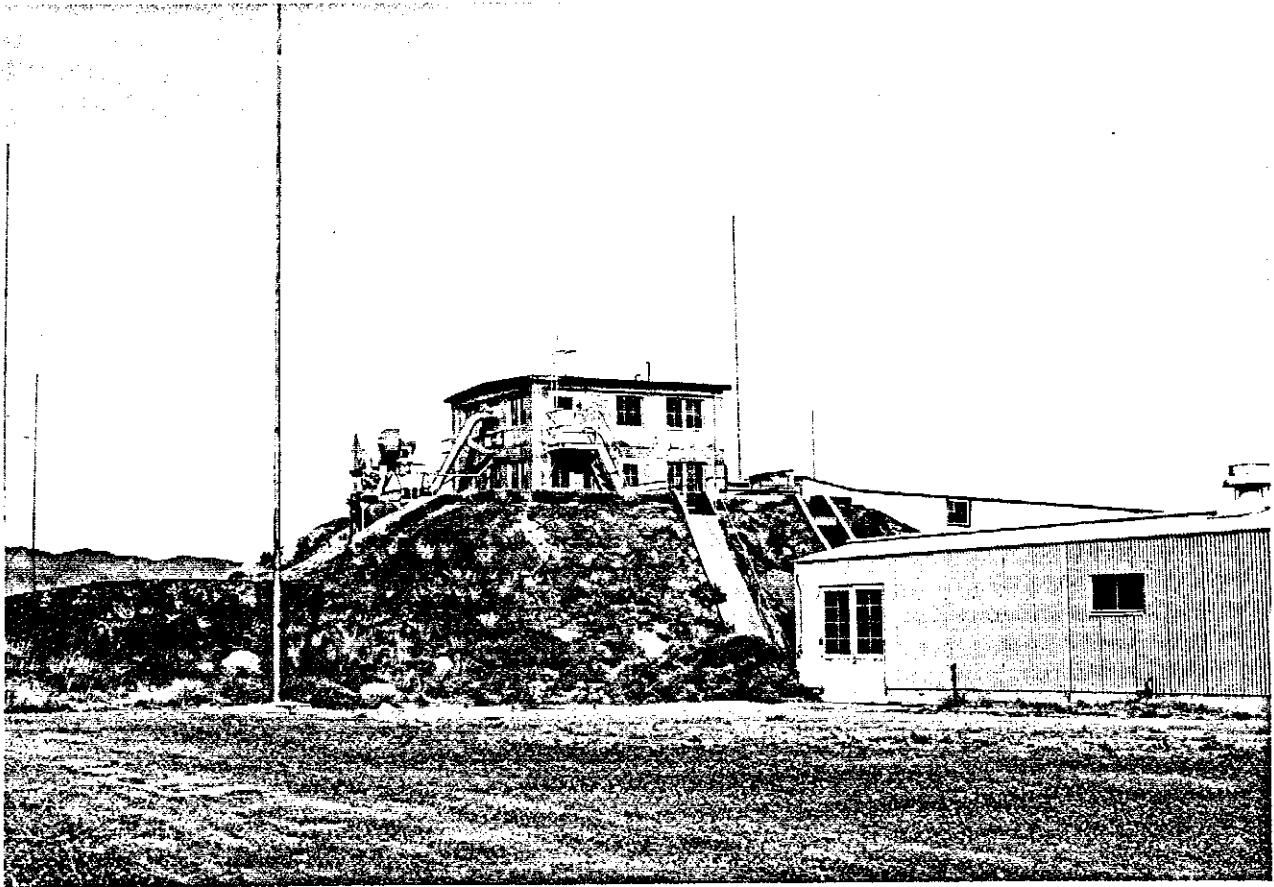


Figure 23: HWAAP, Melt-and-Pour Building (Building 101-15), built 1942, southeast and southwest elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 24: HWAAP, Receiving Building (Building 108-1), built 1943, north and east elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



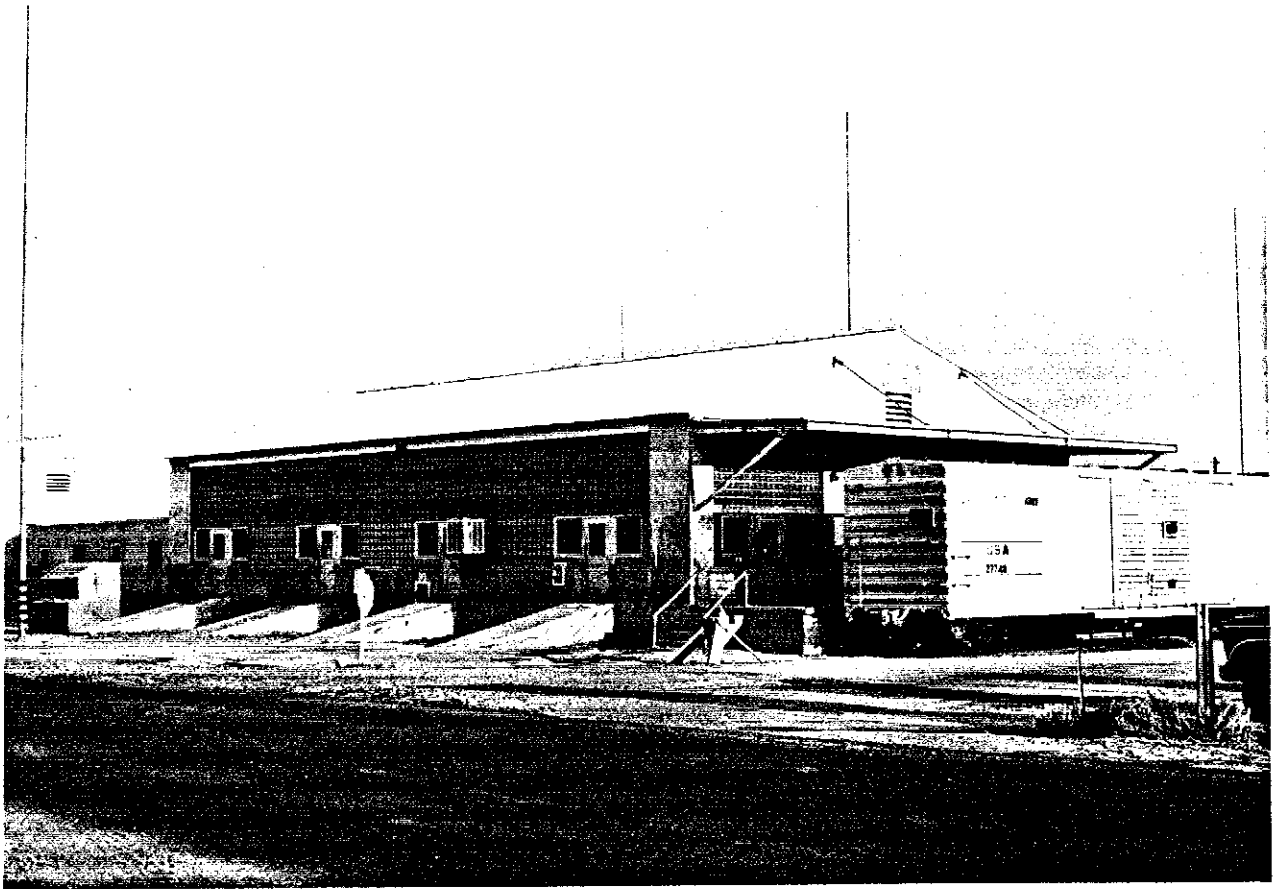


Figure 25: HWAAP, Ammunition Renovation Building (Building 108-14), built 1944, south and west elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

poured concrete, all production buildings were designed in a utilitarian style.

Wartime construction activities in the Personnel and Industrial Area concentrated on enlarging workshop, maintenance, and warehousing capabilities (Building All/Figure 26), and expanding housing to accommodate the depot's burgeoning work force. Apartment buildings, bachelor quarters, U.S. Marine barracks (Building A37/Figure 27), and family housing units were built. In 1943 the Navy provided 240 units of low-cost, family housing in the new community of Babbitt. Situated along U.S. Highway 95 between the Industrial Area and the town of Hawthorne, Babbitt supplied a full range of community services, including a school, library, bank, recreational facilities, and shopping area. All buildings were wood frame design (Buildings 101, 103/Figure 28).

Immediately following V-J Day, construction activities at the installation virtually ceased. Approximately 2,400 structures had been built during the years 1939-1945, making NAD Hawthorne the world's largest ammunition depot.<sup>26</sup>

#### POST-WORLD WAR II

Limited construction activities resumed at NAD Hawthorne during the Korean War. At that time, the Navy built 73 inert and explosive storage structures and expanded the Babbitt housing community to 487 units. An additional 100 duplex housing units were provided within and immediately west of the Personnel and Industrial Area in 1969 (Building 400A, 400B/

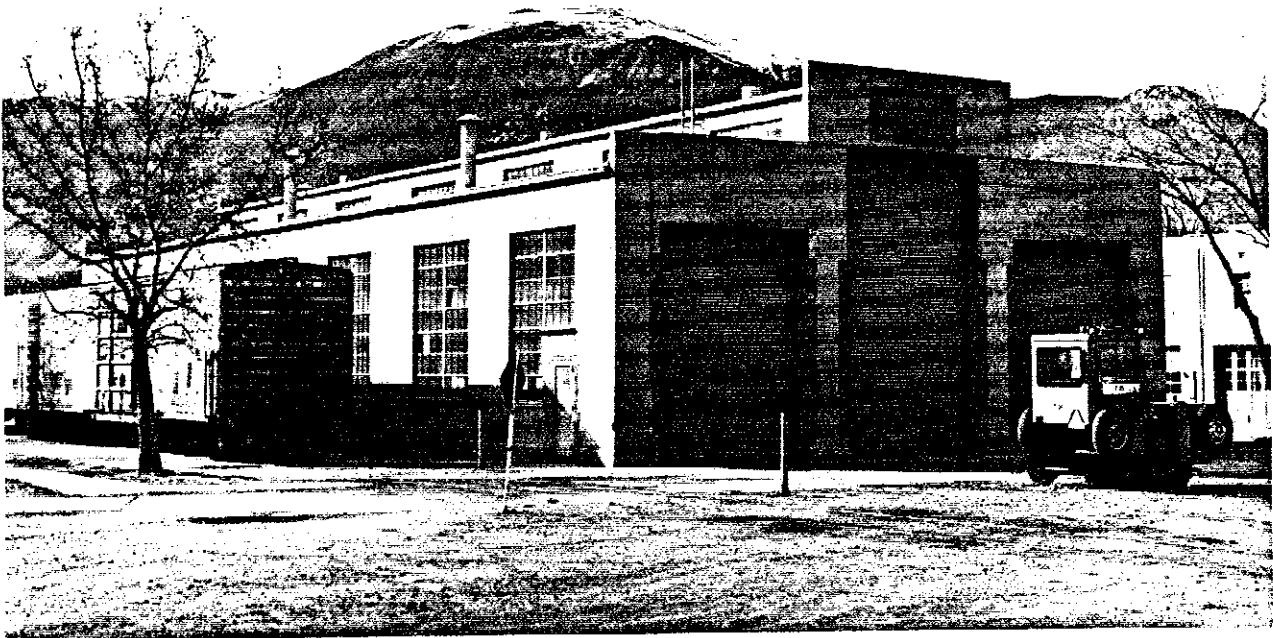


Figure 26: HWAAP, Railroad Equipment Maintenance Shed (Building All), built 1943, northeast and southeast elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



Figure 27: HWAAP, General Administration Building (Building A37), built in 1941 as U.S. Marine barracks, northwest and southwest elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

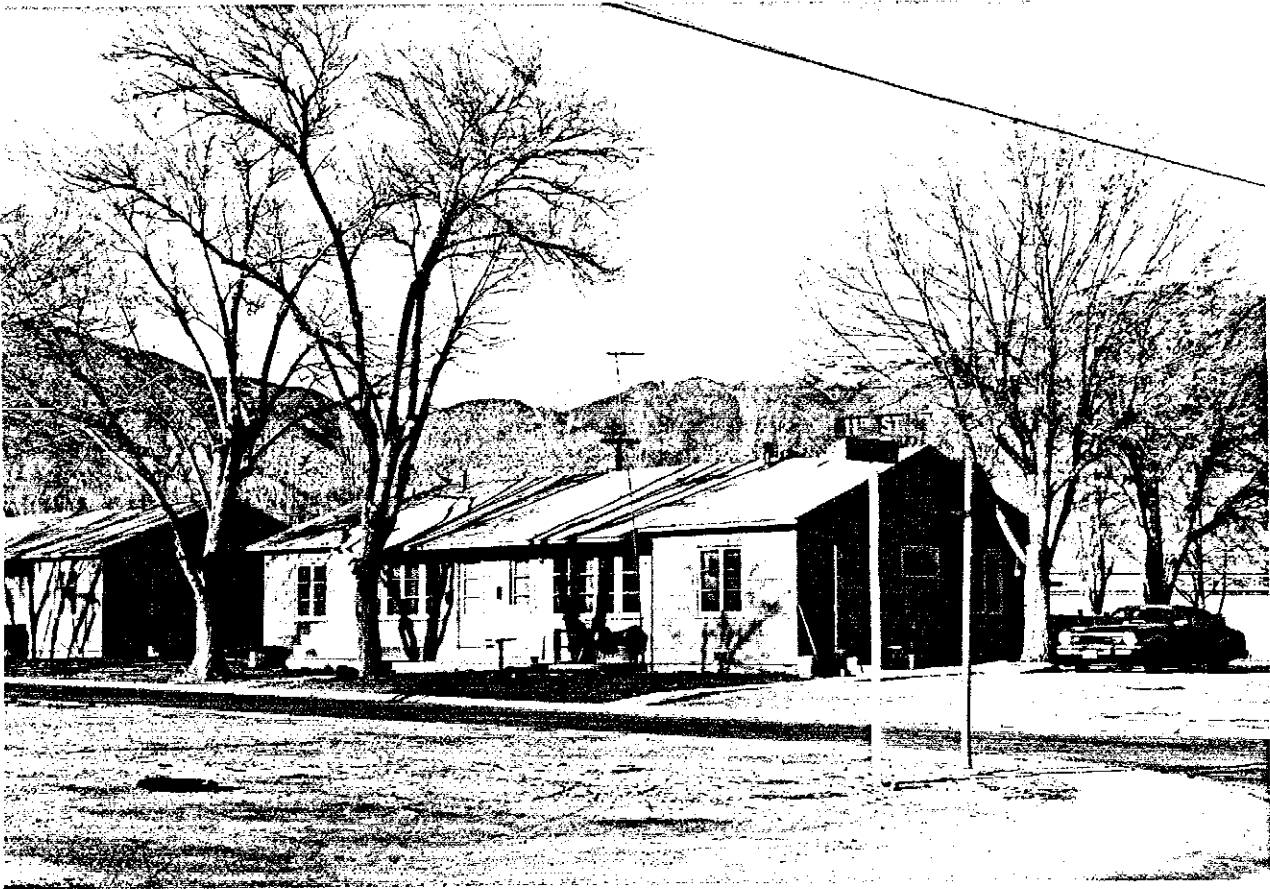


Figure 28: HWAAP, Family Housing at Babbitt (Building 101, 103),  
built 1943, northwest and southwest elevations.  
(Source: Field inventory photograph, 1984, Stuart  
MacDonald, MacDonald and Mack Partnership.)

Figure 29). Manufacturing activities expanded to include loading, assembling, and packing warheads for Zuni rockets and Sidewinder, Falcon, and Terrier missiles, and beginning in 1977, production of hydraulically-powered, wire-rope pulling equipment.<sup>17</sup> At present, three of the mine-filling plant's four load lines are laid-away, and demilitarization operations are in the process of being centralized in the Western Demilitarization Facility, "a network of remotely controlled operations capable of fixed round disassembly, defusing, smokeless powder separation and the removal of components from bombs, mines and depth charges (Building 117-1/Figure 30)."<sup>28</sup>

In 1977 the entire facility was transferred to the U.S. Army and redesignated the Hawthorne Army Ammunition Plant. In 1980 HWAAP was converted to government-owned, contractor-operated status with Day & Zimmermann/Basil Corporation serving as the operator.<sup>29</sup>

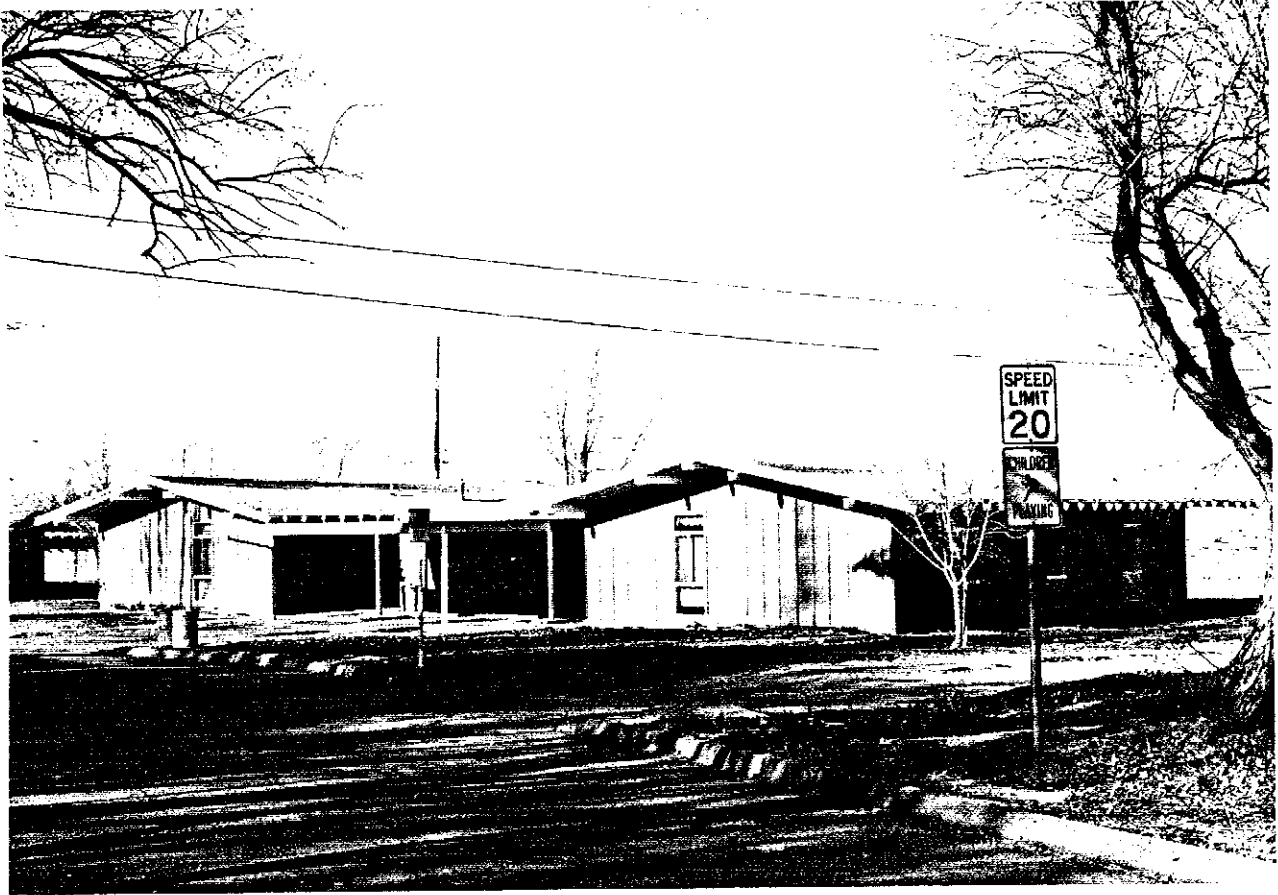


Figure 29: HWAAP, Family Housing (Building 400A, 400B), built 1969, southeast and southwest elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)

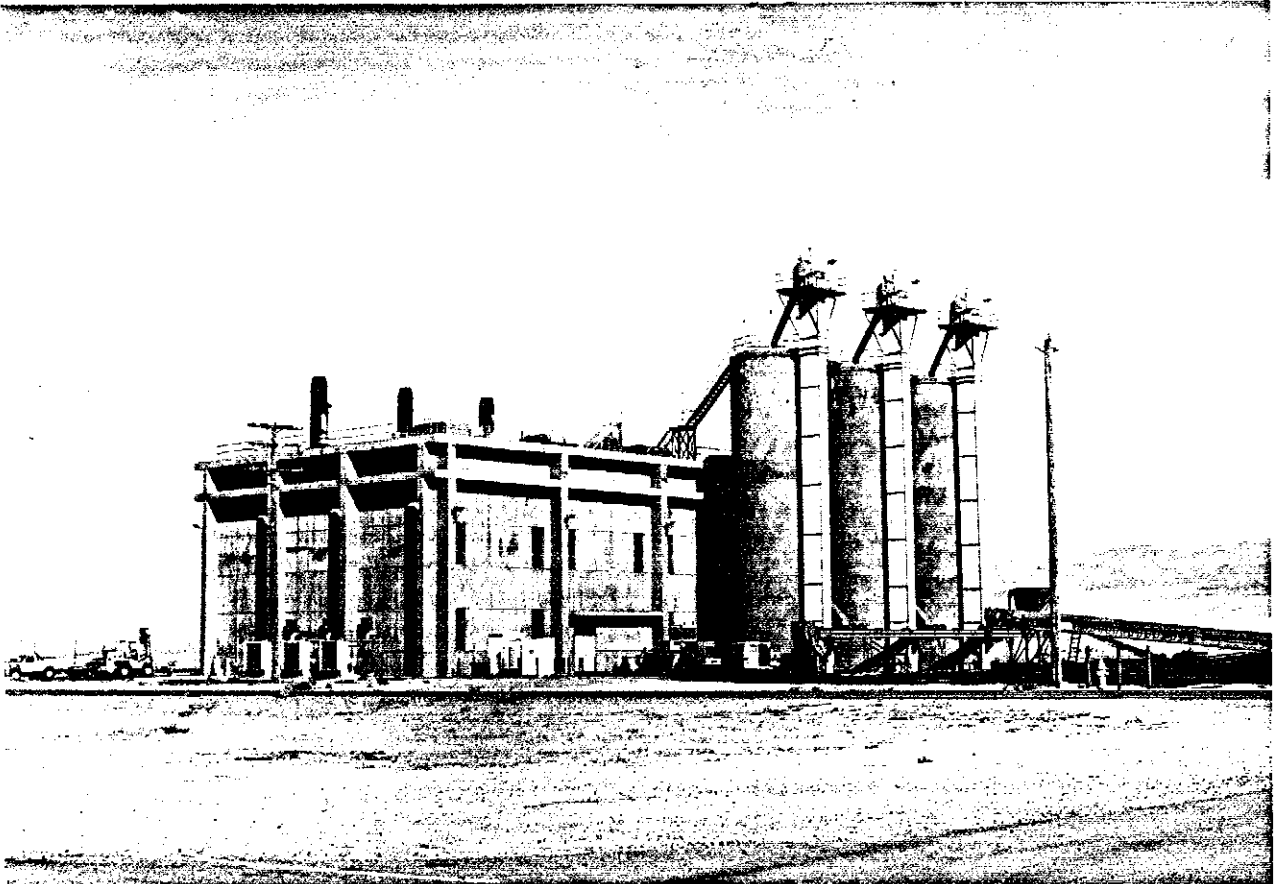


Figure 30: HWAAP, Western Demilitarization Facility Steam Power Plant (Building 117-2), built late 1970s-early 1980s, southeast and southwest elevations. (Source: Field inventory photograph, 1984, Stuart MacDonald, MacDonald and Mack Partnership.)



NOTES

1. DARCOM Installation Inventory of Military Real Property, computer printout, December 31, 1981, in government files, HWAAP. Buildings recently constructed at HWAAP, such as those of the Western Demilitarization Facility, are not included in this total.
2. Until 1977 the HWAAP was a U.S. Navy facility officially designated the Naval Ammunition Depot, Hawthorne. In general the plant's earlier named is used throughout this report for the sake of brevity and clarity.
3. Buford Rowland and William S. Boyd, U.S. Navy Bureau of Ordnance in World War II (Washington, D.C.: Bureau of Ordnance, Department of the Navy, [ca.1950]), p. 211.
4. "Develop an Ammunition Depot at Hawthorne, Nevada," 69th Congress, Second Session, House of Representatives Report No. 1846, January 24, 1927, pp. 1-2.
5. LTC. C. H. Cotter, "Naval Ammunition Depot Near Hawthorne, Nev., Built to Serve the Pacific Coast." Engineering News-Record, 105 (November 20, 1930), p. 803.
6. "Admirals Complete Their Survey Here," Nevada State Journal, October 15, 1926, p. 1; and "Hawthorne Site is Favored by Navy Men," Yerington Times, March 14, 1928, p. 1.
7. "Develop an Ammunition Depot at Hawthorne, Nevada," p. 2.
8. "Hawthorne's Centennial, 1881-1981," Mineral County Independent and Hawthorne News, April 8, 1981, p. 4.
9. "Hawthorne's Centennial, 1881-1981," p. 4. The public sale of lots in 1881 was a major event for the region. "800 people, including Governor Kinkead, responded to the advertisements of the C&C and rode the free excursion to Hawthorne to buy town lots. . . . Once the auctioneer got the program started, some 35 lots were sold in a three-hour period at prices ranging from \$100 to \$195. Considering that this was in the middle of the desert without a permanent habitation around, the effort was considered successful. . . . At three o'clock the auction was over, and fifteen minutes later the trainload of hot and weary passengers was homeward bound 'with the exception of a few who had eaten too much (beer)'" : see David F. Myrick, Railroads of Nevada and Eastern California (Berkeley: Howell-North Books, 1962), pp. 171-172. The Carson and Colorado Railroad was acquired by the Southern Pacific Railroad in 1900. Five years later, the Southern Pacific standard-gauged the former C&C trackage, and realigned its former route to the

- east side of Walker Lake, bypassing Hawthorne ("DARCOM Installation and Activity Brochure," n.p., unpublished, n.d.).
10. Silver, gold, lead, and copper were mined at the Lucky Boy, beginning in the 1880s ("DARCOM Installation and Activity Brochure," n.p.). Neither the Lucky Boy Mine nor the town of Hawthorne are on HWAAP property.
  11. During the field survey, 2 of the 4 surviving mining cabins were inaccessible due to snow. According to Max Hughes, Facilities Management Specialist at HWAAP, these cabins are similar to the 2 observed at lower elevations.
  12. Formal commissioning of the depot took place on September 15, 1930, before completion of construction the following year ("DARCOM Installation and Activity Brochure, n.p.).
  13. "Filling Plant Construction is Advancing," Hawthorne News, August 19, 1931, p. 1; and "Munitions Depot Almost Ready for Uncle Sam," Hawthorne News, September 3, 1930, p. 1.
  14. "Hawthorne's Centennial, 1881-1981," p. 53.
  15. Cotter, p. 804.
  16. Cotter, pp. 804-805.
  17. "First Shipment of Ammunition to Reach Hawthorne Next Week," Hawthorne News, October 15, 1930, p. 1.
  18. Rowland and Boyd, p. 211.
  19. "Navy Dam Bids Open in March," Hawthorne News, January 14, 1931, p. 1.
  20. "Hawthorne's Centennial, 1881-1981," p. 54.
  21. "S. L. Firm Gets Dam Contract," Hawthorne News, April 1, 1931, p. 1. The 120'-high Cat Creek Dam, a common "arched-gravity" design, was a modest structure by Bureau of Reclamation standards. Of 124 dams designed and built by the Bureau from 1906 to 1932, nearly half were 200' or more in height (P. I. Taylor, "Dams -- High, Large, and Unusual," The Reclamation Era, 23 (February 1932), pp. 28-31).
  22. The major disadvantage of the Hawthorne site and its arid climate was the lack of potable water. Walker Lake was a body of saltwater, and local well water was not suited to industrial production due to mineral content. Prior to construction of the dam, the depot's water supply system consisted of a five-mile-long, 4-inch line from an intake at Cat Creek to a distribution reservoir ("Black Beauty Reservoir") near the Personnel and Industrial Area (Cotter, pp. 803-804).
  23. Rowland and Boyd, p. 210.

24. Additional storage capacity was provided near the northeast boundary of the installation in open storage plots which were surrounded on three sides by earth barricades. These plots were designated "Y"-sites.
25. L. A. Quayle, "Volumetric Pouring Machine," Mechanical Engineering, 67 (September 1945), pp. 599-606.
26. "Naval Ammunition Depot, Hawthorne," p. 5, unpublished, February 19, 1976, in government files, HWAAP.
27. "DARCOM Installation and Activity Brochure," n.p.
28. "Naval Ammunition Depot, Hawthorne," p. 11.
29. "DARCOM Installation and Activity Brochure," n.p.

## Chapter 3

## PRESERVATION RECOMMENDATIONS

BACKGROUND

Army Regulation 420-40 requires that an historic preservation plan be developed as an integral part of each installation's planning and long-range maintenance and development scheduling.<sup>1</sup> The purpose of such a program is to:

- . Preserve historic properties to reflect the Army's role in history and its continuing concern for the protection of the nation's heritage.
- . Implement historic preservation projects as an integral part of the installation's maintenance and construction programs.
- . Find adaptive uses for historic properties in order to maintain them as actively used facilities on the installation.
- . Eliminate damage or destruction due to improper maintenance, repair, or use that may alter or destroy the significant elements of any property.
- . Enhance the most historically significant areas of the installation through appropriate landscaping and conservation.

To meet these overall preservation objectives, the general preservation recommendations set forth below have been developed:

Category I Historic Properties

All Category I historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for

nomination regardless of age. The following general preservation recommendations apply to these properties:

- a) Each Category I historic property should be treated as if it were on the National Register, whether listed or not. Properties not currently listed should be nominated. Category I historic properties should not be altered or demolished. All work on such properties shall be performed in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800).
  
- b) An individual preservation plan should be developed and put into effect for each Category I historic property. This plan should delineate the appropriate restoration or preservation program to be carried out for the property. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above-referenced ACHP regulation. Until the historic preservation plan is put into effect, Category I historic properties should be maintained in accordance with the recommended approaches of the Secretary of Interior's Standards for Rehabilitation and

Revised Guidelines for Rehabilitating Historic Buildings<sup>2</sup> and in consultation with the State Historic Preservation Officer.

- c) Each Category I historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.<sup>3</sup> When no adequate architectural drawings exist for a Category I historic property, it should be documented in accordance with Documentation Level I of these standards. In cases where standard measured drawings are unable to record significant features of a property or technological process, interpretive drawings also should be prepared.

#### Category II Historic Properties

All Category II historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for nomination regardless of age. The following general preservation recommendations apply to these properties:

- a) Each Category II historic property should be treated as if it were on the National Register, whether listed or not. Properties not currently listed should be nominated. Category II historic properties should not be altered or demolished. All work on such properties shall be performed

in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800).

- b) An individual preservation plan should be developed and put into effect for each Category II historic property. This plan should delineate the appropriate preservation or rehabilitation program to be carried out for the property or for those parts of the property which contribute to its historical, architectural, or technological importance. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above-referenced ACHP regulations. Until the historic preservation plan is put into effect, Category II historic properties should be maintained in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings<sup>4</sup> and in consultation with the State Historic Preservation Officer.
- c) Each Category II historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level

II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.<sup>5</sup>

### Category III Historic Properties

The following preservation recommendations apply to Category III historic properties:

- a) Category III historic properties listed on or eligible for nomination to the National Register as part of a district or thematic group should be treated in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800). Such properties should not be demolished and their facades, or those parts of the property that contribute to the historical landscape, should be protected from major modifications. Preservation plans should be developed for groupings of Category III historic properties within a district or thematic group. The scope of these plans should be limited to those parts of each property that contribute to the district or group's importance. Until such plans are put into effect, these properties should be maintained in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Revised



Guidelines for Rehabilitating Historic Buildings<sup>6</sup> and in consultation with the State Historic Preservation Officer.

- b) Category III historic properties not listed on or eligible for nomination to the National Register as part of a district or thematic group should receive routine maintenance. Such properties should not be demolished, and their facades, or those parts of the property that contribute to the historical landscape, should be protected from modification. If the properties are unoccupied, they should, as a minimum, be maintained in stable condition and prevented from deteriorating.

HABS/HAER Documentation Level IV has been completed for all Category III historic properties, and no additional documentation is required as long as they are not endangered. Category III historic properties that are endangered for operational or other reasons should be documented in accordance with HABS/HAER Documentation Level III, and submitted for inclusion in the HABS/HAER collections in the Library of Congress.<sup>7</sup> Similar structures need only be documented once.

#### CATEGORY I HISTORIC PROPERTIES

There are no Category I historic properties at the Hawthorne Army Ammunition Plant.

CATEGORY II HISTORIC PROPERTIES

There are no Category II historic properties at the Hawthorne Army Ammunition Plant.

CATEGORY III HISTORIC PROPERTIES

Personnel and Industrial Area Historic District

Background and significance. During the course of the historic inventory of HWAAP, the Personnel and Industrial Area was identified as a distinct historic district and documented for nomination to the National Register. Constructed during 1929-1931, the district contains the headquarters, administration, engineering and maintenance, and housing and community services for the installation. Situated on a high desert plateau at the foot of the Wassuck Mountain Range, it forms an architecturally cohesive group of 36 principal buildings, supplemented by small-scale service structures such as storage sheds and residential garages (see Figure 6, Figure 7, and Chapter 2). Designed in Colonial Revival, Spanish Colonial Revival, and utilitarian styles, the buildings were substantially constructed of brick and poured concrete, and have survived virtually intact. Principal buildings included in the district are as follows:

- Quarters "A" (Building A174/Figure 11)
- Quarters "B" through "F" (Buildings A175-A179/Figure 12)

- Quarters "G" through "V" (Buildings A180-A190 and A280-A283/Figure 13)
- Post Headquarters (Building A1/Figure 7)
- Civilian Personnel Building (Building A2/Figure 8)
- Recreation Building (Building A3)
- Barracks and Mess Hall (Building A4/Figure 14)
- Government Staff Building (Building A5)
- Contractor Personnel Building (Building A6)
- FE Maintenance Building (Building A7)
- Fire Station (Building A8)
- Contractor Office Building (Building A9/Figure 9)
- FE Maintenance Shop (Building A10)
- Heating Plant (Building A13)
- Plant Theater (Building A14/Figure 15)
- Gate House (Building A15)
- Boiler Maintenance Building (Building A18/Figure 10)

These buildings in the Personnel and Industrial Area are all considered Category III historic properties because as a group they form a highly intact architectural assemblage that is locally important as a work of architectural design. Since they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and represent a significant and distinguishable entity whose components may lack individual distinction, together these buildings meet the eligibility criteria for nomination to the National Register of Historic Places as an historic district.

- . Condition and potential adverse impacts. The buildings in the district are in good condition and receive routine maintenance and repair. There are no current plans to alter or demolish any of these structures.
  
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category III historic properties eligible for nomination to the National Register.

NOTES

1. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984).
2. National Park Service, Secretary of Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings, 1983 (Washington, D.C.: Preservation Assistance Division, National Park Service, 1983).
3. National Park Service, "Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines," Federal Register, Part IV, 28 September 1983, pp. 44730-44734.
4. National Park Service, Secretary of the Interior's Standards.
5. National Park Service, "Archeology and Historic Preservation."
6. National Park Service, Secretary of the Interior's Standards.
7. National Park Service, "Archeology and Historic Preservation."

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- "Hawthorne Site is Favored by Navy Men." Yerington Times, March 14, 1928.
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- "Naval Ammunition Depot Hawthorne, Nevada: Location Private Lands." Unpublished map, 1938. Recorder's Office, Mineral County Courthouse, Hawthorne, Nevada.
- "Naval Ammunition Depot Hawthorne, Nevada: Location of Private Lands and Claims within Naval Reservation." Unpublished map, June 11, 1931. Recorder's Office, Mineral County Courthouse, Hawthorne, Nevada.
- "Naval Ammunitions Depot Reservation Hawthorne, Nevada, and Mt. Grant Massif Area." Drawing No. 935, Prepared by NAD Hawthorne, March 4, 1935. Recorder's Office, Mineral County Courthouse, Hawthorne, Nevada.
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United States Geological Survey. "[Map of] Nev.-Calif. Hawthorne  
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"U.S. Naval Ammunitions Depot Hawthorne, Nevada: General Development  
Map." Prepared by Department of the Navy, Naval Facilities  
Engineering Command, n.d., Government files, HWAAP. The map  
shows HWAAP property disposed of by the government.