Historic Resource Study

Updated Final
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Former Almaden Air Force Station

Mt. Umunhum and Mt. Thayer,
Santa Clara County, CA

Prepared for
Mid-Peninsula Regional Open Space District
Los Altos, CA

Prepared by
PAGE & TURNBULL, INC.
1000 Sansome Street, Ste. 200, San Francisco CA 94111
415.362.5154 / www.page-turnbull.com

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I. INTRODUCTION

This Historic Resource Study has been completed at the request of the Midpeninsula Regional Open Space District. It examines the history and significance of buildings located at the former Almaden Air Force Station (AFS) at the summits of Mt. Umunhum and Mt. Thayer, California. The station is located approximately six miles southeast of Los Gatos and ten miles south of downtown San Jose. This study evaluates forty-seven resources (thirty-one buildings and sixteen structures) and the site as a whole for their eligibility for listing in the National Register of Historic Places (National Register) and the California Register of Historical Resources (California Register) **(Figure 1)**. The inclusion in this report of buildings on Mt. Thayer is an update to the original Historic Resource Study, dated 6 July 2010. See Table 1. for a list of the evaluated properties.

On February 10 – 11, 2010, Page & Turnbull surveyed and digitally photographed forty-five buildings on Mt. Umunhum, accompanied by staff members from the Midpeninsula Regional Open Space District (MROSD) and Northgate Environmental Management, Inc. On February 22, 2011, Page & Turnbull surveyed the former Almaden Air Force Station Ground to Air Transmitter Receiver (GATR) complex on Mt. Thayer, which has two remaining buildings.

Page & Turnbull staff then conducted research on the buildings in support of a historic context statement, which addresses the evolution of the former Almaden Air Force Station and identifies significant themes, events, and persons associated with the facility. This research was conducted in consultation with the MROSD and local Almaden Air Force Station chroniclers, who provided historical documentation, photographs, and other pertinent references. Due to the often technical nature of the concepts, direct citations and excerpts from research resources are included in the historic context statement.

The context statement frames the history and significance of the individual buildings within the context of the larger facility, as well as other similar Air Force radar facility sites in California. It provided the necessary background for the evaluation of the resources and their eligibility for listing in the California Register of Historical Resources. This Historic Resource Study found none (0) of the resources eligible for listing in the California and National Registers, based upon an assessment of historic significance and integrity.

The determination of eligibility for the entire site as a potential Historic District is found in **V. Evaluation of the Former Almaden Air Force Station as a Potential Historic District**. The determination of individual eligibility for the forty-seven resources surveyed has been summarized in

VI. Property Inventory. Detailed individual evaluations are not included, and State of California Department of Parks and Recreation (DPR) 523A (Primary Record) and 523B (Building, Structure, and Object Record) forms were not completed.

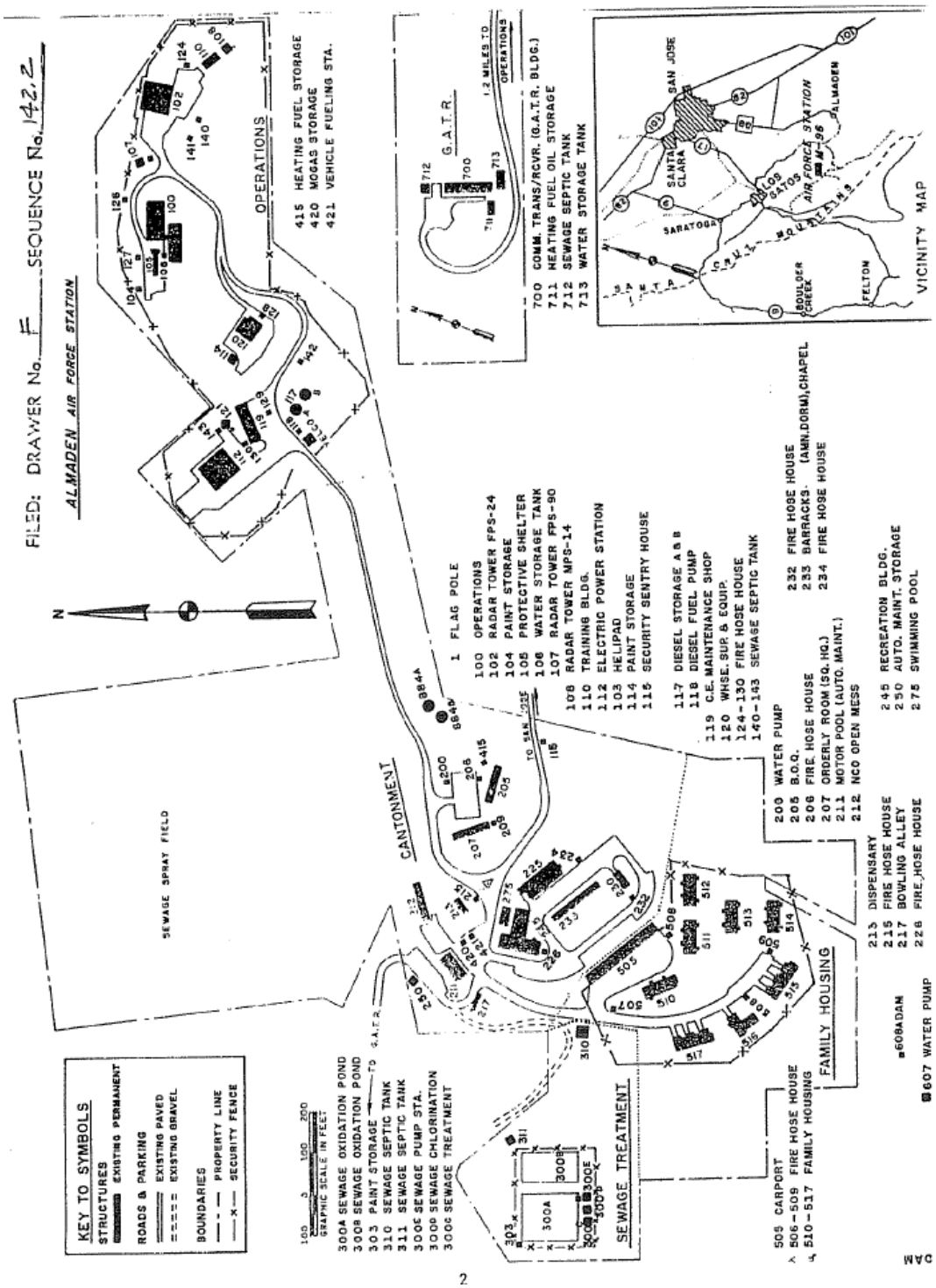

Figure 1. Site Map, Former Almaden Air Force Station.

(Source: Gould Architects, *Mt. Umunhum Facilities Inventory and Evaluation*, 1994).

Table 1. Determination of Eligibility for Forty-seven Surveyed at the Former Almaden Air Force Station on Mt. Umunhum. [1]

Resource Identifier	Applicable NR/CR Criteria for Historic Significance	Integrity?	California Register-Eligible?
100: Operations (1957, addition in 1959)	A/1	No	No
102: Radar Tower FPS-24 (1959-1961)	A/1, C/3	No	No
105: Fallout Shelter (1961)	N/A	Yes	No
108: Radar Tower MPS-14 (1962)	A/1, C/3	No	No
110: Training (1957)	A/1	No	No
112: Electrical Power Station (1960)	N/A	Yes	No
114: Sheet, Pipe & Paint Storage (1965)	N/A	No	No
115: Security Sentry House (1964)	N/A	Yes	No
118: Diesel Fuel Pump (1957)	N/A	Yes	No
119: CE [Civil Engineering] Maintenance Shop (1957)	N/A	Yes	No
120: Warehouse Supply & Equipment (1957)	N/A	No	No
200: Water Pump Station (1957)	N/A	Yes	No
205: Bachelor Officers' Quarters (1957)	N/A	Yes	No
206: Fire Hose House (ca. 1957)	N/A	No	No
207: Squadron Headquarters Orderly Room (1957)	N/A	Yes	No
211: Auto Maintenance Shop, aka Motor Pool (1960)	N/A	Yes	No
212: NCO Open Mess (1957, addition 1975)	N/A	Yes	No
213: Dispensary (1957)	N/A	Yes	No
215: Fire Hose House (ca. 1957)	N/A	No	No
217: Bowling Alley (1961)	N/A	Yes	No
225: Airman's Dining Hall (1957)	N/A	Yes	No
226: Fire Hose House (ca. 1957)	N/A	Yes	No
230: Commissary (1957; addition in 1967)	N/A	Yes	No

[1] All dates checked and/or provided via Email Correspondence with Basim Jaber, 9 March 2010. Some drawings for buildings on file at MROSD are dated 1955 or 1956, but these drawings pre-date the establishment of the facility and actual construction of the buildings.

232: Fire Hose House (ca. 1957)	N/A	No	No
233: Barracks, aka Airman's Dormitory and Chapel (1957)	N/A	Yes	No
234: Fire Hose House (ca. 1957)	N/A	Yes	No
245: Recreation (1957)	N/A	Yes	No
250: Auto Maintenance Storage (1958)	N/A	Yes	No
275: Swimming Pool (1957)	N/A	Yes	No
276: Bath House (1966)	N/A	Yes	No
303: Paint Storage (1958)	N/A	Yes	No
505: Carport (1958)	N/A	Yes	No
506: Fire Hose House (ca. 1957)	N/A	Yes	No
507: Fire Hose House (ca. 1957)	N/A	No	No
508: Fire Hose House (ca. 1957)	N/A	No	No
509: Fire Hose House (ca. 1957)	N/A	Yes	No
510: Fourplex Apartment (1958)	N/A	Yes	No
511: Fourplex Apartment (1958)	N/A	Yes	No
512: Fourplex Apartment (1958)	N/A	Yes	No
513: Fourplex Apartment (1958)	N/A	Yes	No
514: Fourplex Apartment (1958)	N/A	Yes	No
515: Triplex Apartment (1958)	N/A	No	No
516: Commander's House (1958)	N/A	Yes	No
517: Triplex Apartment (1958)	N/A	No	No
700: Communications Transmitter/Receiver (GATR Building) (1962)	N/A	No	No
715/ 722: Security Sentry House (1966)	N/A	No	No
TELCO (1957)	N/A	No	No

II. METHODOLOGY

The following section outlines the methodology used to frame the historic context of the former Almaden Air Force Station and evaluate the resources for listing in the California Register of Historical Resources and the National Register of Historic Places. Also included in this section is an introduction to the historic significance criteria and integrity considerations of the California Register and the National Register.

APPROACH TO SURVEY, DATA COLLECTION, AND PRODUCTION OF HISTORIC CONTEXT

In July 2010, Page & Turnbull completed a Historic Resource Study of forty-five resources at the former Almaden Air Force Station.[2] This study consisted of site visits on February 10 – 11, 2010. Page & Turnbull updated this Historic Resource Study in February and March 2011 by surveying the Almaden Air Force Station GATR complex at Mt. Thayer, bringing the total number of surveyed properties to forty-seven. Fieldwork focused primarily on basic documentation with field notes and digital photography. No formal interior survey was conducted as part of this project, although the interiors of several buildings were accessible and briefly inspected.

Page & Turnbull conducted a review of historical documents, maps, facilities records, and historic photos. Research sources are cited in the bibliography. Historic research also included consultation with Kirk Lenington, Senior Resource Planner at the MROSD, as well as interviews with local Santa Clara valley residents who have amassed a wealth of information regarding the former Almaden Air Force Station. These local sources included:

- Basim Jaber, who has been very active with Almaden Air Station veterans and has provided information regarding the Almaden Air Force Station site history and individual building histories. This information was derived from historic documents, photographs and oral histories, as well as correspondence with former Air Force staff.

- David Schwaderer, who provided information about the Almaden Air Force Station site history.

[2] Page & Turnbull staff member Christina Dikas is the primary author of this study. She meets the Secretary of the Interior's Professional Qualifications Standards in Architectural History.

The evaluations in this report are confined to buildings and radar structures. Ancillary structures and objects deemed to have no potential for historic significance were not surveyed or evaluated. These facilities include the following:

- 1: Flag Pole (1957)
- 103: Helicopter Pad (1962)
- 140, 141, 142, 143: Sewage Septic Tanks (1957)
- 310, 311: Sewage Septic Tanks (1957)
- 415: Storage for Heating Fuel (1957)
- 420: Storage for Gasoline (1958)
- 421: Vehicle Fueling Station/Pump (1958)
- 600 Series: water pump stations, storage tanks, and three earthen dam facilities that harvested water from nearby Lake Elsman and watershed (1957)
- 884B: Water Tank, Steel (1958)

Similarly, this survey determined that several buildings and facilities are no longer extant, and are therefore not evaluated in this report. They include:

- 104: Paint Storage
- 106: Water Storage Tank
- 107: Radio Tower FPS-90, foundation extant
- 117: Diesel Storage A&B
- 124: Fire Hose House
- 126: Fire Hose House
- 127: Fire Hose House
- 128: Fire Hose House
- 129: Fire Hose House
- 130: Fire Hose House
- 209: Fire Hose House
- 711: Heating Fuel Oil Storage
- 712: Sewage Septic Tank
- 713: Water Storage Tank
- 884A: Water Tank, Wood (1957)

GUIDELINES FOR EVALUATION

National Register of Historic Places

The National Register is the nation's most comprehensive inventory of historic resources. The National Register is administered by the National Park Service and includes buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, or local level. Typically, resources over fifty years of age are eligible for listing in the National Register if they meet any one of the four criteria of significance and if the resources retain historic integrity. However, resources under fifty years of age can be determined eligible for listing in the National Register if it can be demonstrated that they are of "exceptional importance," or if they are contributors to a potential historic district. The National Register Criteria for Evaluation are described in full in Code of Federal Regulation, Title 36, Part 60 and in *National Register Bulletin Number 15: How to Apply the National Register Criteria for Evaluation*. There are four criteria under which a structure, site, building, district, or object can be considered eligible for listing in the National Register. These criteria are:

> *Criterion A (Event)*: Properties associated with events that have made a significant contribution to the broad patterns of our history;
>
> *Criterion B (Person)*: Properties associated with the lives of persons significant in our past;
>
> *Criterion C (Design/Construction)*: Properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant distinguishable entity whose components lack individual distinction; and
>
> *Criterion D (Information Potential)*: Properties that have yielded, or may be likely to yield, information important in prehistory or history.

California Register of Historical Resources

The California Register of Historical Resources (California Register) is an inventory of significant architectural, archaeological, and historical resources in the State of California. Resources can be listed in the California Register through a number of methods. State Historical Landmarks and National Register-listed properties are automatically listed in the California Register. Properties can also be nominated to the California Register by local governments, private organizations, or citizens. The evaluative criteria used by the California Register for determining eligibility are closely based on those developed by the National Park Service for the National Register of Historic Places.

In order for a property to be eligible for listing in the California Register, it must be found significant under one or more of the following criteria:

- *Criterion 1 (Events)*: Resources that are associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

- *Criterion 2 (Persons)*: Resources that are associated with the lives of persons important to local, California, or national history.

- *Criterion 3 (Architecture)*: Resources that embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of a master, or possess high artistic values.

- *Criterion 4 (Information Potential)*: Resources or sites that have yielded or have the potential to yield information important to the prehistory or history of the local area, California, or the nation.

- Resources eligible for the National Register are automatically listed in the California Register of Historical Resources.

The "Fifty Year Rule" and Criteria Consideration G

According to National Register evaluation criteria, resources that are less than fifty years old must meet "Criteria Consideration G: Properties that Have Achieved Significance within the Last Fifty Years" in order to be eligible for listing in the National Register. Criteria Consideration G states that "[a] property achieving significance within the last fifty years is eligible if it is of exceptional importance."[3] In order for a property to be evaluated under Criteria Consideration G, there must be sufficient historical perspective to determine that the property is exceptionally important, as well as a comparison among other related properties within a geographic area to determine if the property qualifies as exceptionally important. In addition, the property must first meet one of the four National Register significance criteria. Properties which have achieved significance within the past fifty years can also be eligible for the National Register if they are an integral part of a qualified district.

As stated in the *National Register Bulletin: Guidelines for Evaluating Properties that Have Achieved Significance Within the Past Fifty Years:*

[3] National Park Service, *National Register Criteria for Evaluation,* p. 41.

> The rationale or justification for exceptional importance should be an explicit part of the statement of significance. It should not be treated as self-explanatory… The second section should contain the justification as to why the property can be determined to be of exceptional importance. It must discuss the context used for evaluating the property. It must demonstrate that the context and the resources associated with it can be judged to be "historic." It must document the existence of sufficient research or evidence to permit a dispassionate evaluation of the resource. Finally, it must use the background just presented to summarize the way in which the resource is **important**.[4]

Examples of properties that have been listed according to Criteria Consideration G are the Cape Canaveral launch pad, from which the first humans traveled to the moon, the Chrysler Building in New York, for its significance as the epitome of "Style Moderne" architecture, and the home of nationally prominent playwright Eugene O'Neill.[5]

Though the National Register of Historic Places requires that resources less than fifty years of age show "exceptional importance," this is not the case with the California Register. According to the California Office of Historic Preservation:

> In order to understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than fifty years old may be considered for listing in the California Register if it can be demonstrated that sufficient time has passed to understand its historical importance.[6]

To date, none of the resources at the former Almaden Air Force Station have been assessed for their historical significance. Consequently, none of these resources have been listed in or found eligible for the California Register or the National Register.

Special Considerations in the Evaluation of Highly Technical and Scientific Facilities

The highly technical nature of the radar facilities at the former Almaden AFS presents unique issues for determining the resources' historical significance and level of integrity. Since the character of highly technical and scientific facilities includes the constant evolution of technology and use, an evaluation of historic significance and integrity must be based upon a firm understanding of a resource's functional history, historic context, character, and reason for the changes over time.

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[4] Marcella Sherfy and W. Ray Luce, *National Register Bulletin Number 22: Guidelines for Evaluating and Nominating Properties that Have Achieved Significance Within the Past Fifty Years* (Washington D.C.: National Park Service, 1998), p. 11.
[5] Ibid.
[6] California Office of Historic Preservation, *Technical Assistant Series No. 7, How to Nominate a Resource to the California Register of Historic Resources* (Sacramento, CA: California Office of State Publishing, 4 September 2001) .11

One of the earliest public documents to address this issue was the Advisory Council on Historic Preservation's "Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities," published in 1991. This document addressed the issue of stewardship of historic resources within scientific and technical facilities. These facilities are faced with the challenge of balancing ongoing technical advancements—which often involve major alterations to historically significant buildings, equipment, and spaces—with consideration of the effects of these activities on historic properties. In terms of evaluating scientific or technical properties, questions arise regarding the resources' direct connection to a significant historic context and the ability of the resources to convey this connection through their physical features. These two issues, determining the historic context and assessing historic integrity, are the main challenges in evaluating the eligibility of the radar facilities under review at the former Almaden Air Force Station.

Scientific and highly technical resources are often significant because of their indirect contributions to other events or resources and larger systems and discoveries. However, this analysis can prove overly broad because it can be argued that nearly every technical resource in a network is related to one particular operational mission. In accordance with the methodology used by Page & Turnbull in evaluating resources at other mid-twentieth century scientific and technical facilities, only those properties that had a direct association with an important event can be considered significant under California Register criteria.

INTEGRITY

In addition to qualifying for listing under at least one of the California Register criteria for historic significance, a resource must also retain historic integrity. Integrity is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance," or more simply defined as "the ability of a property to convey its significance."[7] The process of determining integrity is similar for both the California Register and the National Register. The same seven variables or aspects that define integrity—location, design, setting, materials, workmanship, feeling and association—are used to evaluate a resource's eligibility for listing in the California Register and the National Register. According to the National Park Service's *National Register Bulletin Number 15: How to Apply the National Register Criteria for Evaluation,* the aspects of integrity are defined as follows:

[7] California Office of Historic Preservation, *Technical Assistance Series No. 7: How to Nominate a Resource to the California Register of Historic Resources* (Sacramento, CA: California Office of State Publishing, 4 September 2001), p. 11; National Park Service, *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (Washington D.C.: National Park Service, 1997), p. 44.

- *Location* is the place where the historic property was constructed.
- *Design* is the combination of elements that create the form, plan, space, structure and style of the property.
- *Setting* addresses the physical environment of the historic property inclusive of the landscape and spatial relationships of the building(s).
- *Materials* refer to the physical elements that were combined or deposited during a particular period of time and in a particular pattern of configuration to form the historic property.
- *Workmanship* is the physical evidence of the crafts of a particular culture or people during any given period in history.
- *Feeling* is the property's expression of the aesthetic or historic sense of a particular period of time.
- *Association* is the direct link between an important historic event or person and an historic property.

Integrity is a "yes" or "no" determination. An historic property either retains integrity or it does not. To retain historic integrity, a property will often possess several, if not all of the aforementioned aspects. Specific aspects of integrity may also be more important, depending on the criteria for which it is significant.

Most of the buildings at Mt. Umunhum show deterioration due to weathering and neglect. However, it is important to note that historic integrity is *not* synonymous with condition. A building or structure can possess all or many of the seven aspects of integrity, even if the condition of the materials has degraded. Condition becomes a more important factor when weathering or vandalism has led to the outright loss of historic materials.

Assessing Historic Integrity

Scientific facilities or highly technical resources are often significant for the events that took place within them, rather than for their physical characteristics, which may have been significantly altered over time. This issue presents a challenge when evaluating the historic integrity of a scientific property, since a resource must be found significant within an historic context and retain the physical characteristics that best express this historical significance in order to be eligible for listing in the California Register. According to the National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (which also applies to California Register criteria):

> To retain historic integrity a property will always possess several, and usually most, of the aspects. The retention of specific aspects of integrity is paramount for a property to convey its significance.
>
> All properties change over time. It is not necessary for a property to retain all its historic physical features or characteristics. The property must retain, however, the essential physical features that enable it to convey its historic integrity. The essential physical features are those features that define both *why* a property is significant (Applicable Criteria and Areas of Significance) and *when* it was significant (Periods of Significance).[8]

For the forty-seven resources reviewed at the former Almaden AFS, the aspects of integrity deemed to be of the highest value in the evaluation process were workmanship and association. These two aspects allowed for latitude in the evaluation of the other aspects of integrity, which may have been significantly altered. As defined previously, workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory, and association is the direct link between an important historic event or person and a historic property.

Although workmanship is often associated with traditional crafts and construction techniques, it can be adapted to suit the evaluation of scientific and technical resources. Examples of workmanship for these types of facilities include the presence of specialized equipment and other technological resources, such as computer stations, specialized infrastructure, large-scale cranes, vacuum spheres, and cable trays. These resources are often vital in the facility's operational mission, and serve as the physical evidence of work conducted in a particular time and place. In many cases, equipment and technological resources function as the primary historic elements within technical facilities, and the building housing them is often treated as a shell adapted to these resources. While the character of the equipment may change or evolve over time, the function of this equipment or technology remains constant despite the changes in appearance or design. Therefore, in evaluating the workmanship of radar facilities, significant equipment that played a role in the history of Cold War military programs must be noted in the context statement and integrity evaluation. Although the structure or building may physically change and evolve over time, if the significant equipment and technological resources used in that military function still exist, even if altered, then a resource may retain integrity of workmanship.

[8] Ibid., 44; 46.

In a scientific or highly technical facility, integrity of workmanship is defined as the constant evolution of equipment and technology constructed for a specific goal. This technology often results in significant events or associations that are embodied within a place. The National Park Service defines this connection as the integrity of association – the direct link between an important historic event or person and an historic property. The National Park Service recognizes integrity of association as being subjective, and often, ephemeral in nature. The integrity of association of a scientific or highly technical facility is vital to convey its significance because some identifiable link to the significant event or person is essential. Integrity of association is not solely defined by its aesthetic attributes, which are identified as the integrity of feeling. Technical facilities often lack this integrity of feeling, due to the evolution of the physical characteristics, which would have originally defined a building, structure or object. The integrity of association is more closely tied to the place. Therefore, integrity of association is required in order to convey a scientific or highly technical facility's connection to a past discovery or achievement.

DEFINITION OF PROPERTY TYPES

At the former Almaden Air Force Station, properties can be divided into three general uses: Special Military Purpose (radar operation), Support (functional support to the radars and operation of the station as a whole), and Ancillary (sheds, outbuildings, etc.). Further description of the buildings can be found in **IV. Architectural Description of the Site**.

Special Military Purpose Facilities

Buildings designed as purpose-built military facilities are located in the Operations area on Mt. Umunhum and the GATR site on Mt. Thayer. They generally include the largest building type (in size) found at Almaden AFS. These buildings and structures housed or supported the technical equipment directly related to performing radar military operations. The resources were constructed with either thick reinforced concrete walls, concrete masonry unit (CMU) construction, or steel structures. None of the buildings are rendered in a particular style; they are utilitarian in appearance with no ornamentation and few windows.

Significance of Special Military Purpose Facilities

These facilities may be considered significant, as they contained the instruments used for radar operation and communication with other Air Force personnel. They represent the primary purpose of the facility. Some Special Military Purpose facilities have unique designs created specifically for their particular functions.

Support and Residential Facilities

Support facilities are located in the Operations, Cantonment, and GATR areas. They include administrative offices, cafeteria, commissary, gymnasium, and maintenance shops. Housing in the Cantonment includes barracks and family apartments. Many of these are pre-fabricated steel buildings, while others are of CMU or wood frame construction. Most of these buildings are utilitarian in appearance, though the apartments are designed in a simple modern style.

Significance of Support and Residential Facilities

Support and Residential Facilities are likely not individually significant because, as their names indicate, they provide supportive services to the Special Military Purpose Facilities. As individual resources, they do not best represent the purpose of Almaden AFS or any important events that may have occurred there. While several are representative examples of the Modern style, they are not particularly unique or outstanding in their designs.

Ancillary Facilities

Ancillary buildings include sheds and outbuildings, and primarily consist of simple wood-frame fire house shelters. The buildings lack an architectural style and are utilitarian in nature.

Significance of Ancillary Facilities

These facilities are not considered significant. They support the basic functions of the facility as a whole, but like support facilities, they do not individually represent the primary purpose of Almaden AFS or any important events that may have occurred there.

III. ARCHITECTURAL DESCRIPTION OF THE SITE

The former Almaden Air Force Station is located at the peak of Mt. Umunhum in the Santa Cruz Mountains, approximately six miles southeast of Los Gatos, California **(Figures 2 and 3)**. The station is constructed at an elevation of approximately 3,400 feet, and is accessed by following an 11.5 mile winding route past Guadalupe reservoir. Mt. Umunhum and Mt. Thayer are located towards the southern end of the Sierra Azul Open Space Preserve, which is owned and managed by the Midpeninsula Regional Open Space District.

The primary facility on Mt. Umunhum is roughly divided into three sections: the operations area, the cantonment area, and the family housing area. The operations area is located at the east end of the site, and is divided into an upper and a lower section. The upper operations area, located on the highest peak of the site, housed the radar operations facilities, including the operations building (Building100), storage sheds, a concrete radar tower for the AN/FPS-24 (Building 102), a steel tower structure for the AN/MPS-14 (Building 108), and a training building (Building 110). The lower section of the operations area, located southwest of the peak, includes a supply warehouse (Building 120), the power station (Building 112), the civil engineering maintenance shop (Building 119), a TELCO building paint storage (Building 114) and a diesel fuel pump building (Building 118).

The cantonment area is located at a lower elevation to the southwest, near the main entrance to the site. It includes the site administration facilities and facilities that supported the service-people and their families. The squadron headquarters/orderly room building (Building 207) and the bachelor officers quarters (Building 205) are located on a slight hill to the east in the cantonment area. A water pump is situated across the parking lot from these two buildings below a large metal water tank (once the site of two water tanks). Community services are located at the center of the cantonment area, including a dispensary (Building 213), NCO open mess (Building 212), automobile maintenance facility (Building 211), recreation building (Building 245), swimming pool and bathhouse (Buildings 275 and 276), bowling alley (Building 217), barracks/chapel/hobby shop (Building 233), commissary (Building 230) and airmen's dining hall (Building 225).

Down the hill to the west is the family housing residential section, which includes a long carport (Building 505), five fourplex apartments (Buildings 510, 511, 512, 513, 514), two triplex apartments (Buildings 515 and 517), one single-family residence (Building 516), and several fire hose houses for fire protection. A sewage treatment area with oxidation ponds is located northwest of the cantonment.

The GATR complex is located one mile west on Mt. Thayer. Only two buildings remain: a small security sentry house (recorded as both Building 715 and 722) and the Communications Transmitter/Receiver building, also known as the GATR Building (Building 700). Surrounding Building 700 is an "antenna farm" of wood poles with anchoring cables.

Figure 2. Aerial, Almaden Air Force Station, ca. 1960s. Cantonment in the western foreground and radars to the east (several steel barracks buildings were removed in the 1970s). (Source: http://www.radomes.org/museum/)

Figure 3. Aerial, former Almaden Air Force Station on Mt. Umunhum in relation to GATR facility on Mt Thayer, ca. 2010. (Source: Microsoft Corporation, www.bing.com)

The buildings at the former Almaden AFS feature reinforced concrete, concrete masonry unit (CMU), or wood frame construction. Notably, the station also includes a number of prefabricated steel "Butler buildings," which first came into widespread use by the military during World War II **(Figure 4)**. Built by the Butler Manufacturing Co., Butler buildings feature an integrated structural steel building system with components that have been pre-engineered and fabricated based on the designer's specifications. They are long and narrow, with concrete foundations, corrugated metal siding, divided-light steel awning windows, and metal gable roofs. The steel Butler buildings are located in both the operations and cantonment areas of the station. They include the Training Building (Building 110), one section of the Operations building (Building 100), CE Maintenance Shop (Building 119), the Squadron Headquarters/Orderly Room (Building 207), Bachelor Officers Quarters (Building 205), Dispensary (Building 213), NCP Open Mess (Building 212), the Airmen's Dining Hall (Building 225), Commissary (Building 230), and Barracks/Chapel (Building 233). Five other barracks buildings were once located in the cantonment, but only their concrete footing foundations remain today.

Figure 4. Butler Manufacturing Co. emblem at the gable peak of the Commissary (Building 230). (Source: Page & Turnbull, February 2010).

There is also one steel structure in the operations area—the tower for the AN/MPS-14 height finder radar. This structure has four legs and a small metal enclosure at the top of the platform, which is accessed by metal stairs on the east side. The radar unit is no longer located above the tower.

The concrete masonry unit (CMU) buildings are also located in both the operations and cantonment areas, as well as at the GATR complex on Mt. Thayer. They include two sections of the Operations Building (Building 100), Warehouse Supply and Equipment (Building 120), the Electrical Power Station (Building 112), TELCO, Bowling Alley (Building 217), Recreation Building (Building 145),

Paint Storage (Building 303), and the Communications Transmitter/RCVR building at GATR (Building 700). The AN/FPS-24 tower is a behemoth of reinforced concrete construction.

Figure 5. The TELCO, Security, Diesel Fuel Pump, and spill containment pool at the east end of the operations area.
(Source: Page & Turnbull, February 2010).

Figure 6. The road leading east to the Operations Building and radar towers.
(Source: Page & Turnbull, February 2010).

The wood frame buildings and structures are primarily located in the family housing section and the cantonment area, though there is a wood frame Sheet, Pipe and Paint Storage building (Building 114) in the operations area and a wood-frame security sentry house (Building 715/722) at the GATR complex.

The apartment buildings, single family residence, and fire hose houses are all constructed with wood frames **(Figure 7)**. The apartment buildings are of a typical Modern style common in California during the 1950s and 1960s, with flush wood doors, sliding aluminum-sash windows, and open stairwells ornamented with vertical wood slats. They appear to have been designed by the architecture firm of Porter, Urquhart, McCreary & O'Brien.

Figure 7. Apartments on the hill at the west end of the site.
(Source: Page & Turnbull, February 2010).

IV. HISTORIC CONTEXT

The following section provides a center-specific discussion of the former Almaden Air Force Station's contribution to the U.S. Air Force's defense efforts during the Cold War. Included in this section is a brief history of the Cold War, an outline of the development of the Air Defense Command (ADC) and the North American Aerospace Defense Command (NORAD), and an historic context statement specific to the former Almaden Air Force Station.[9]

THE COLD WAR (1945 – 1991)

With the conclusion of World War II in 1945, disagreements arose between the Allied powers over the future political and economic direction of the conquered nations. These tensions soon developed into the "Cold War," so named because it was not characterized by direct armed conflict, but rather by the buildup of nuclear and missile defense systems, spying, and economic competition. This indirect conflict involved multiple nations, but was primarily a contest between the Soviet Union and the United States. The Cold War was not fully resolved until the Soviet Union collapsed and was officially dissolved in 1991.[10]

During the Cold War, both the Soviet Union and the United States vastly expanded their respective weapons capabilities, first with long-range nuclear bombers, and later with the development of Intercontinental Ballistic Missile (ICBM) systems capable of delivering nuclear warheads to targets located thousands of miles away. These developments compelled both nations to devise new defense systems, including significant investments in radar technology that could detect and help destroy incoming threats.[11]

RADAR DEFENSES

As part of its defense systems, the United States—in cooperation with Canada—built and maintained extensive radar networks. These included the interim LASHUP and PERMANENT networks throughout the U.S. (1951); 35 radar sites on the PINETREE line (1951) across mid-Canada; and the Distant Early Warning System, or DEW line (1954), in northern Canada.[12] The Semi-Automatic Ground Environment (SAGE) system, established in 1958, allowed the military to locate enemy aircraft in U.S. airspace through an automated system that could receive and analyze data from many

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[9] For a comprehensive historic context on Cold War radar defense, see: David F. Winkler, *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (Champaign, Il: United States Air Force Headquarters Air Combat Command, June 1997).
[10] "Cold War," Wikipedia. Accessed on 2 March 2010, http://en.wikipedia.org/wiki/Cold_War
[11] "NORAD Fact Sheet," Online Air Defense Radar Museum. Accessed on 23 February 2010, http://www.radomes.org/museum/data/newsletters/NORAD79-1.jpg
[12] National Park Service, Western Region. Historic American Buildings Survey: Mill Valley Air Force Station, HABS No. CA-2615 (San Francisco, CA: National Park Service, 1995) 4.

stations simultaneously.[13] Along with other radar networks, management of the SAGE system was incorporated within the North American Aerospace Defense Command (NORAD), inaugurated in 1958. At its height in the early 1960s, NORAD employed about 120,000 individuals and commanded an annual budget of $1.4 billion.[14] Its mission was to protect U.S. airspace from invasion, warn of weapons entering that airspace, and intercept any attacks that were launched from the air, sea, or ground.

Radar was originally developed by the U.S. Navy in 1940. The term is an acronym for Radio Detection and Ranging, indicating its use of electromagnetic radio waves to detect the presence of objects at long distances.[15] Radar systems transmit radio waves and use any returns, or bounces, to pinpoint the location of objects. By the 1950s, radar had become sufficiently advanced to allow tracking of airborne missiles.

During the Cold War, Air Force radar stations generally operated three types of radars: a general surveillance radar, a search radar, and a long-range height-finder radar **(Figures 8 and 9)**. The search radars detected potential hostile aircraft and told the range and bearing, while the height-finder radars rocked up and down to find the altitude of objects in the airspace.[16] These two types of radars worked together to triangulate the specific location of objects. The radars each went through several upgraded iterations as technology improved over the years. The following includes direct citations from the Federation of American Scientists about some of the more common radars used at Cold War era Air Force Stations:

> **General Surveillance Radar: AN/FPS-20, AN/FPS-66, AN/FPS-67, AN/FPS-93**
>
> Production of the AN/FPS-20 Surveillance Radar began in 1956. This dual-modulator, fixed station, general surveillance system, developed by RADC [Air Force Rome Air Development Center] became the main surveillance radar for the continental United States. Equipped for dual-channel operations with a klystron transmitter, this system provided long-range surveillance capability. This Bendix-built radar was an AN/FPS-3 search radar with an AN/GPA-27 installed. Designed to operate in the L-band frequencies of 1250 to 1350 MHz, the radar had a range of over 200 miles. By the late 1950s, this radar dominated the U.S. radar defense network, with deployment continuing into the early 1960s. In June 1959 Bendix received a contract to provide private industry's MK-447 [the same system as the military AN/GPA-103] and MK-448 [AN/GPA-102] antijam packages to the radars. With the addition of these packages, the Air Force re-designated the radars

[13] Ibid.
[14] "The Mission of ADC," Aerospace Defense Command Pamphlet 190-1, September 1963. Online Air Defense Radar Museum. Accessed on 23 February 2010
[15] "Radar," Wikipedia. Accessed on 2 March 2010, http://en.wikipedia.org/wiki/radar
[16] David F. Winkler, *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (Champaign, Il: United States Air Force Headquarters Air Combat Command, June 1997) 30.

as AN/FPS-66 [AN/GPA-102] and AN/FPS-67 [AN/GPA-103]. The AN/FPS-93 search radar system is a modified AN/FPS-20 with the addition of the Diplex Gating Unit (DGU) developed by Raytheon for use in the SAGE system.

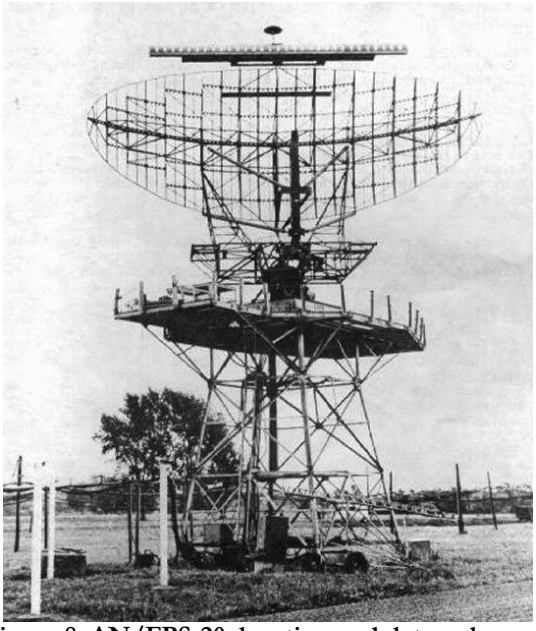

Figure 8. AN/FPS-20, location and date unknown.
(Source: http://www.fas.org/nuke/guide/usa/airdef/an-fps-20.jpg)

Search Radar: AN/FPS-24, AN/FPS-26, AN/FPS-27, AN/FPS-28, AN/FPS-35

The Frequency Diversity Radar program was a major radar developmental program at RADC. Some of the prototypes developed as part of it included the AN/FPS-26, the AN/FPS-27, the AN/FPS-28, and the AN/FPS-35, in addition to the AN/FPS-24 frequency diversity radar. This equipment was designed to succeed existing Semi-Automatic Ground Environment (SAGE) radar systems, which had served as the backbone of air defense of the CONUS, in order to provide enhanced electronic counter countermeasures (ECCM) capability.

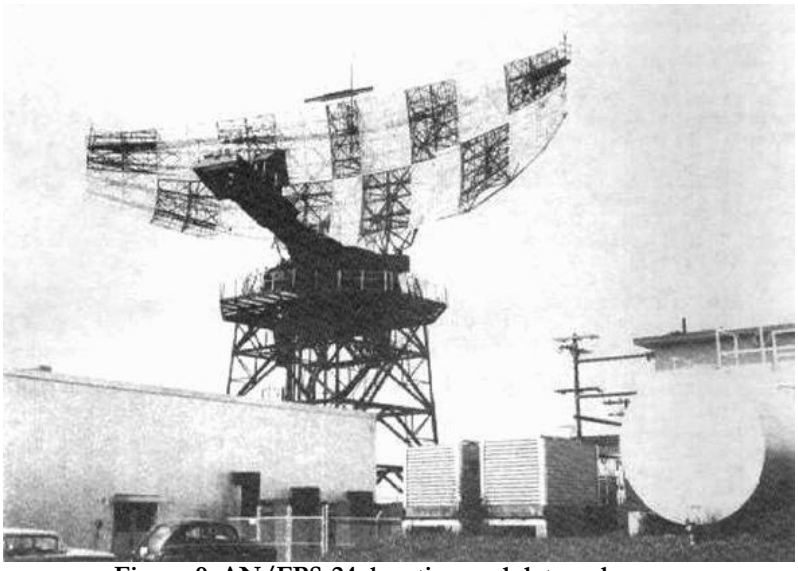

Figure 9. AN/FPS-24, location and date unknown.
(Source: http://www.fas.org/nuke/guide/usa/airdef/an-fps-24.jpg)

AN/FPS 24: General Electric built an FD search radar designed to operate in the Very High Frequency (VHF) at 214 to 236 MHz. There were problems with this radar at the test site at Eufaula, Alabama, in 1960. These problems required many modifications. Additional problems occurred when deployment was attempted in 1961. When the radar finally deployed, bearing problems often occurred due to the eighty-five ton antenna weight. Twelve systems were built between 1958 and 1962. The AN/FPS-24 radar, utilizing a hydrostatic bearing, became operational in the SAGE system on 30 June 1968. The development of the bearings was the work of Goodyear Aerospace, under contract with Air Force Rome Air Development Center RADC.

AN/FPS 26: Avco Corporation built this height-finder radar that operated at a frequency of 5400 to 5900 MHz. On 20 January 1960, after testing, RADC accepted the AN/FPS-26 air defense radar from AVCO, the contractor, stipulating that the contractor must correct certain component deficiencies. This radar deployed in the 1960s.

Long-Range Search Radar: AN/FPS- 7

In the mid-1950s, General Electric developed a radar with a search altitude of 100,000 feet and a range of 270 miles. The AN/FPS-7 radar system was one of the first stacked-beam systems to combine both the search and the height-finding capabilities to perform ground-controlled intercept functions. Designed to operate in the L-band at 1250 to 1350 MHz, the radar deployed in late 1959 and the early 1960s. The AN/FPS-7 was used for both air defense and air traffic control in New York, Kansas City, Houston, Spokane, San Antonio, and elsewhere. In the early 1960s, a modification called AN/ECP-91 was installed to improve its electronic countermeasure (ECM) capability. About thirty units were produced.

Long-Range Height Finder Radar: AN/FPS-6, AN/FPS-90

The AN/FPS-6 radar, developed at RADC, was the first long-range height finder radar employed at all Semi-Automatic Ground Environment (SAGE) locations. This system had a maximum range of 200 nautical miles and a height-finding

> capacity of 75,000 feet within an angle limit of minus 2 to plus 32 degrees. The AN/FPS-90 is a modified AN/FPS-6B.[17]

The highest period of tension for the United States during the Cold War was the 1962 Cuban Missile Crisis, when it was discovered that the Soviet Union was in the process of placing nuclear missiles on the island. Threats of nuclear war slowly diminished after that event, which was resolved without armed conflict. Between 1963 and 1979, the United States and Canada cooperated on reducing the size of NORAD facilities and eliminating obsolete sites, as air defense of the United States shifted more to the Air National Guard and Air Force Reserve. The Aerospace Defense Command (ADC), the U.S.'s operating arm of NORAD, was inactivated in 1979 and replaced with the Tactical Air Command (TAC), which consolidated air defense operations. The 1979 Joint U.S.-Canada Air Defense Study paved the way to modernize NORAD through the development of new radar lines and the use of Airborne Warning and Control System (AWACS) aircraft for improved performance.[18] The development of these new technologies made many of the older radar facilities obsolete, and most were closed over the coming years.

HISTORY OF THE ALMADEN AIR FORCE STATION

With the outbreak of the Cold War, as well as the Korean War in 1950, the U.S. Army and U.S. Air Force began reestablishing air defenses to protect the United States against manned bomber attacks from the Soviet Union. Some air defense radar sites that were used in World War II were reactivated, and many new sites were established. Almaden Air Force Station was a U.S. Air Force early warning radar base that operated from 1958 to 1980. It was constructed as part of NORAD to keep watch over Northern California's airspace during the Cold War. In order to develop the site, the U.S. Air Force acquired, between 1957 and 1962, 48.02 fee acres, 43.72 easement acres, and 26.62 lease acres (total acreage of 118.36) from several private individuals and the San Jose Water Works (SHWW), a public utility company.[19]

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[17] "Strategic Air Defense Systems," Federation of American Scientists, Website http://www.fas.org/nuke/guide/usa/airdef/
[18] "Aerospace Defense Command," Wikipedia. Accessed on 3 March 2010, http://en.wikipedia.org/wiki/Aerospace_Defense_Command
[19] U.S. Army, "Defense Environmental Restoration Program Formerly Used Defense Sites, Findings and Determination of Eligibility, Almaden Air Force Station (Z-96), Santa Clara, California, Site No. J09CA099900" (2 December 1991).

Figure 10. The 682nd Radar Squadron's emblem.
(Source: http://www.radomes.org/museum/)

Radar Facilities and Responsibilities

The station was established on 24 July 1957, when the 682nd Aircraft Control and Warning (AC&W) Squadron was assigned to the site **(Figure 10)**. However, funding shortfalls at the Air Defense Command delayed construction, and the squadron was not officially transferred until 7 October 1957.[20] Almaden AFS subsequently became fully operational on 21 March 1958 as part of the San Francisco Air Defense Sector.[21] It was known as Transmitter Site M-96; AC&W Site M-96; Call Mountain Radio Relay Annex; and Almaden Air Force Station (Z-96).[22]

The radar facilities were clustered at the east end of the complex on the highest point of the mountain. These buildings included the radar towers, operations building, and generator buildings. The first operational radars were an AN/FPS-20 search radar and AN/FPS-6A height finder that had been constructed in 1957. The AN/FPS-6A was located immediately north of the Operations Building (Building 100), and designated as Building 125. The radar was removed in 1963, and the structure is no longer extant **(Figure 11)**.[23]

[20] "Almaden Air Force Station," Wikipedia. Website accessed on 16 March 2010 from: http://en.wikipedia.org/wiki/Almaden_Air_Force_Station
[21] 682nd Radar Squadron, 2.
[22] U.S. Army.
[23] Email correspondence with Basim Jaber, 23 March 2010. Information drawn from accounts by veterans who completed the upgrades and moves.

Figure 11. Operations (Building 100) with AN/FPS-20 radome to the left, AN/MPS-14 radar to at center, and AN/FPS-6A to the far right, ca. 1959-1960.
(Source: http://www.radomes.org/museum/)

A second AN/FPS-6A height-finder radar was installed as Building 107 in 1958, and upgraded to an AN/FPS-90 in the spring of 1963. An AN/MPS-14 radar (Building 108) was constructed in 1962 and came online in 1963. The AN/MPS-14 was constructed at the same as the AN/FPS-6A, but was constructed to be mobile rather than fixed.

The AN/FPS-20 search radar was situated west of the Operations Building where the helipad is currently located. The radar was housed in a domed structure called a radome. This radar was replaced by a massive AN/FPS-24 search radar atop Building 102—itself an imposing five-story concrete tower constructed between 1959 and 1961. This building also included a height finder shop on the second floor **(Figure 12)**. The AN/FPS-24 was deployed by the manufacturer in 1961, but bearing problems often occurred due to the eighty-five ton weight of the antenna. In subsequent years, the radar was rarely updated because of difficulties arising from its enormous size.[24]

[24] Telephone interview with Basim Jaber, local chronicler of the former Almaden AFS, 2 March 2010.

Figure 12. AN/FPS-24 (Building 102) at left, Building 110, and AN/FPS-90 (Building 108), ca. 1960s. (Source: http://www.radomes.org/museum/)

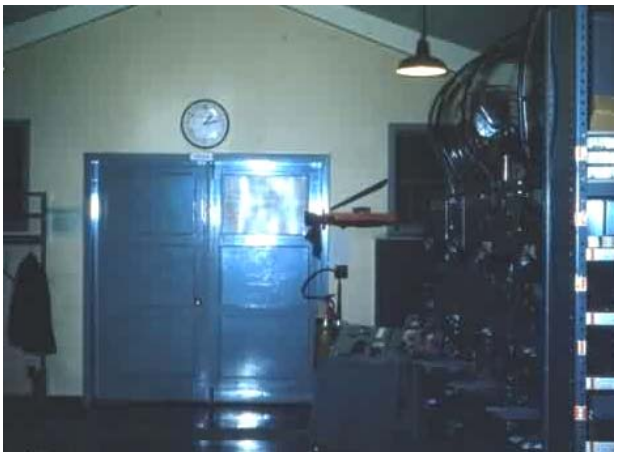
The AN/FPS-24 system at Almaden was the second of twelve production models built between 1958 and 1962. The radar became operational in 1962, and had a 250-mile range—considerably stronger than the 200-mile range of the Air Force radars at Mill Valley and Cambria.

The AN/FPS-20 radome was removed after 1961, and the structural footings were shaved to the ground.[25] The AN/FPS-24 radar "sail" was removed in June 1980, and the radars for the AN/MPS-14 and AN/FPS-90 were removed about the same time.[26]

The Ground to Air Transmitter Receiver (GATR), or communications function, was originally located in Building 110 **(Figures 13 and 14)**. The communications equipment was connected to the Operations Building (Building 100) via cable trough. Following the construction of the AN/FPS-24 tower, the GATR function needed to be moved so that the UHF frequency of the radar would not interfere with the transmitter communication equipment. A new GATR site was constructed in May 1962, about a mile away on Mt. Thayer. Building 110 was then converted to the D.E. supply room. [27] "D.E." was the Air Force office symbol at the time for "Civil Engineering." When Building 110 was

[25] Email correspondence with Basim Jaber, 23 March 2010. Information based upon historic photographs and veterans' accounts.
[26] Email correspondence with Basim Jaber, 23 March 2010. A friend moved onto the mountain in June 1980 and recalls watching the radars being removed immediately after moving.
[27] Telephone interview with Basim Jaber, local chronicler of the former Almaden AFS, 2 March 2010.

used for GATR, the Civil Engineering Supply was located in part of Building 119, the Civil Engineering Quarters (CEQ), also known as Station Support. When GATR moved to Mt. Thayer, the CEQ moved the supply portion into Building 110 until the new power plant (Building 112) was completed and the original power plant (Building 120) was converted to the D.E. warehouse/supply. Around 1965, Building 110 was converted for training new personnel.[28]



Figures 13 and 14. Exterior and interior of GATR (Building 110), prior to construction of a separate GATR site, ca. 1959-1960.
(Source: http://www.radomes.org/museum/)

The Operations Building (Building 100) was used to process information received from the radars **(Figure 15)**. This included a Digital Data Processor, and an AN/FST-2B "computer" which was installed in 1961 for the SAGE automated control system.[29] The AN/FST-2B accepted all data input from the search and height finder radars and processed them into readable data for the radar scopes. The AN/FST-2B required a large room in the Operations Building to house all the equipment, as well as an air-conditioning system specifically designed to cool the equipment. The AN/FST-2B was replaced in 1973 by advanced technology in the form of an AN/FYQ-47, which took up only a couple racks of equipment instead of an entire room.[30] Building 100 also included a room for cryptography, where encrypted messages were sent and received from NORAD and the various Air Defense Sector "Direction Centers." This room included crypto "typewriters" that were used to encode messages, but the process of decoding was manual.[31]

[28] Email correspondence with Basim Jaber, 23 March 2010.
[29] Telephone interview with Basim Jaber regarding the former Almaden AFS, 2 March 2010.
[30] Email communication with Basim Jaber, 23 March 2010.
[31] Ibid.

Figure 15. Operations (Building 100), the AN/FPS-90 (Building 107) and the corner of Building 102, ca. 1969. (Source: http://www.radomes.org/museum/)

After operating as a NORAD Ground Control Intercept site from 1958 to 1963, the 682nd Radar Squadron reverted to a Long Range Radar Squadron in April 1966. At that time, it became part of the 26th Air Division headquartered at the Adair AFS in Oregon, under the command of the 4th Air Force at Hamilton Air Force Base, California. On 1 July 1968, the Squadron was incorporated into the Backup Interceptor Control Center (BUIC) system, which provided backup capability in the event that a regional control center was destroyed. The squadron's mission again reverted to a Long Range Radar in March 1969, and on 15 September 1969, the squadron fell under the operational control of the 26th Air Division NORAD Region, headquartered at Luke Air Force Base, Arizona.[32] By the mid-1970s, a handout provided by the 682nd Radar Squadron stated its mission was to "equip, administer and train all assigned personnel to provide surveillance data, height information, and IFF/SIF responses to the Region Control Center at 26AD/NORAD Region. We also provide ground-to-air communications and data link with aircraft in our area of responsibility."[33]

In May 1962, following construction of the AN/FPS-24 tower, the Air Force acquired land on the neighboring peak of Mt. Thayer and moved the Ground-to-Air Transmitter-Receiver (GATR) so that the radar would not interfere with GATR's radio frequency signals. The primary building erected on Mt. Thayer was the Communications Transmitter/Receiver building, also known as the GATR Building (Building 700). Initially it contained mostly the same equipment as that used when GATR was in Building 110, but with some improvements. Over the years, the communications equipment

[32] 682nd Radar Squadron, *Welcome to 682nd Radar Squadron, Almaden AFS, California* (n.d.; post-1976) 2.
[33] 682nd Radar Squadron, 3.

grew to include transmitters, receivers, antennae, data links, and a Klystron tube. A power line connected the GATR site to the power plant at the Operations site. Telephone lines came from the phone company to the demarcation point in the TELCO Building, and then local wiring was distributed throughout the facility. Radar Operations used the GATR via the TELCO lines to communicate to intercept and patrol aircraft.[34]

Other enhancements to the GATR site on Mt. Thayer included below-surface water storage and septic tanks (Buildings 711, 712, and 713, which appear no longer extant), antenna arrays, and a small security sentry house (Building 715/722) down the road. The sentry house was installed at the gate in the summer of 1966, possibly as a result of heightened anti-war efforts for those opposing the Vietnam War.[35] The tall wood poles for lower-frequency antennae were placed in a mesh arrangement and sent and received signals from intercept aircraft on patrol for intercept missions. Another type of antenna array was the FRT-49 (no longer extant), a high power data-link transceiver "horizontal ladder array" **(Figure 16)**. It protruded out from the east and west sides of the east and west sides of Building 700 and had a peak output of 20,000 watts. The FRT-49 was coupled with the GKA-5 data link for sending data to intercept fighters for cockpit on-screen display information. When Almaden AFS was designated as a Semi-Automatic Ground Environment (SAGE) site between January 1961 and Feb 1974, a SAGE Direction Center could communicate to the site via secure telephone lines to Building 700 and were able to communicate with intercept fighters within the Almaden AFS GATR transmission range remotely.[36]

Figure 16. GATR (Building 700) with tall poles for lower-frequency antennae and shorter FRT-49 horizontal array visible, ca. 1964-1965.
(Source: N. McKiethan via B. Jaber Archives)

[34] Email correspondence with Basim Jaber, 2 March 2011.
[35] Email correspondence with Basim Jaber, 4 March 2011.
[36] Ibid.

Support Facilities and Residential Facilities

The support buildings and residential facilities at the former Almaden AFS are located at the southwest end of the site. At its peak, Almaden AFS housed approximately 120 people including employees and their families, and counted eighty-four buildings and structures. On average, the facility employed approximately 30 stationed military personnel and 50 to 100 civilian personnel.[37] To support the radar installation and residential cantonment, the station included basic support facilities for water and sewage, fire protection, administration, heating and refrigeration, and supply. It also catered to community needs with facilities for medical and dental care, postal services, a commissary and exchange, a chapel, and a barber shop. Recreational facilities included a bowling alley, pool and gymnasium. Nearly all of the non-residential support buildings and the barracks were pre-fabricated Butler buildings, while the apartment buildings for families were of wood-frame construction.

The widespread use of Butler buildings at Almaden AFS appears to be a departure from other Air Force stations that were constructed earlier in the 1950s in California, such as Klamath AFS and Mill Valley AFS (both established in 1951). There, the barracks, administration buildings, mess halls, recreation facilities, and maintenance buildings were primarily of wood-frame construction and based on standardized designs by the Chicago-based architectural firm of Holabird, Root and Burgee.[38]

Administration was located in Building 207, the Orderly Building **(Figure 17)**. It housed the commander's office, the first sergeant, and others who handled business operations. In its earliest years, the Almaden AFS commander lived in the Bachelor Officers' Quarters (Building 205, also known as the Visiting Airman Quarters or the Transient Lodging Facility). As the names suggest, this building was mostly used as temporary housing and included four hotel-style rooms, a bar and lounge.

[37]"Site Survey Summary Sheet for DERP-FUDS site No. J09CA099900: Almaden Air Force Station." Corps FUDS. Website accessed on 4 March 2010 from: http://www.corpsfuds.org/reports/INPR/J09CA0999inpr.pdf
[38] National Park Service, Western Region. Historic American Buildings Survey: Mill Valley Air Force Station, HABS No. CA-2615 (San Francisco, CA: National Park Service, 1995) 7.

Figure 17. View east from the barracks buildings (no longer extant) to the Headquarters/Orderly Room (Building 207) and Bacherlor Officers' Quarters (Building 205) on the hill, ca. 1959-60.
(Source: http://www.radomes.org/museum/)

Single male enlisted personnel were housed in six steel Butler barracks. In 1974, the commander condemned the old barracks buildings because they were leaking, moldy, and no longer habitable. Five of the six barracks buildings were purchased by the U.S. Forest Service and dismantled. Only their concrete footings remain today. Personnel without families moved to leased quarters off-base, and the remaining barracks building (Building 233) became the chapel/photo lab/ceramics building.[39]

The twenty-seven family housing units (Buildings 510 to 517) on site were completed in 1959 **(Figures 18 and 19)**. Dependent children attended nearby schools in San Jose via a bus service. According to the architectural drawings, the apartment buildings were designed by the architecture and engineering firm of Porter, Urquhart, McCreary & O'Brien (PUMO). PUMO also designed the Catalina Heights Neighborhood for Oxnard Air Force Base in 1958 as part of the Capehart military housing program. The Capehart and Wherry programs were designed to ease military housing shortages in the 1950s by allowing private sponsors to build units on or adjacent to military installations. The apartments at the former Almaden AFS resemble other Capehart and Wherry projects, including the 1953 Baker Beach apartments at the Presidio of San Francisco. Though not designed by PUMO, the Baker Beach apartments feature wood-frame construction clad in stucco, aluminum-sash windows, and open stairwells with decorative wood lattice screens. It therefore seems a fair assumption that PUMO's designs for the Almaden AFS apartments were influenced by other mass-produced military housing designs of the period.

[39] Telephone interview with Basim Jaber, chronicler of the former Almaden AFS, 2 March 2010.

The threat of wild fires meant that fire protection was an important aspect of living on the mountain. Fire hose houses were located throughout the site, including sixteen fire hose houses with 1 ½ inch and 2 ½ inch pre-connected fire houses in the Cantonment area. All of the surviving fire hose houses are marked with an interior stencil that reads "Built by 115 CET Wisconsin ANG," which appears to indicate they were fabricated by the 115th Fighter Wing of the Wisconsin Air National Guard. In addition to the hose houses, the site had a 1,500 gallon water distributor.[40]

Figure 18. Cantonment, ca. 1969.
(Source: http://www.radomes.org/museum/)

Figure 19. Playground by apartments, ca. 1969.
(Source: http://www.radomes.org/museum/)

[40] 682nd Radar Squadron, 7.

Medical and dental services were located within Building 213 **(Figure 209)**. Two medical technicians provided routine medical care, and a civilian contract doctor offered services one day a week by appointment. An Air Force dentist visited the station for a period of thirty days every three months to take care of military personnel. Dental care for dependents was provided by local dentists in the San Jose area. A fully equipped ambulance was available on station 24 hours a day for emergencies. Military patients requiring care beyond the capabilities of the station were transported to Moffett Naval Air Station Dispensary, Letterman Hospital in San Francisco, or to Travis Air Force Base Hospital.[41]

Figure 20. Dispensary (Building 213), ca. 1959-1960.
(Source: http://www.radomes.org/museum/)

Community services were supplied by Almaden AFS for personnel and residents. The Post Exchange was located in the recreation hall, Building 245. Although small in size, it carried most basic necessities and some popular items, such as cameras, radios, stereos, calculators, and a small selection of clothing. Almaden AFS had a branch commissary supported by Travis Air Force Base. The store maintained a supply of canned goods, dairy products, frozen foods, produce, and other foodstuffs. The commissary was open during the weekdays, but not on weekends. Recreational facilities consisted of a pool table, a half-court gymnasium (Building 245), weight room, ping pong tables, a foosball table, a nine-foot swimming pool with a diving board, and a two-lane bowling alley with automatic pin-setters (Building 217) **(Figure 20)**. Building 245 also included a library. Hobby shops were located in Building 233, and included a Photo Lab and a Ceramic Shop. The "Top of the Rock" Consolidated Open Mess in Building 212 required club membership to attend squadron functions.

[41] 682nd Radar Squadron, 6.

Figure 21. View east to the Orderly Building (Building 207) from the swimming pool, ca. 1959-1960. (Source: http://www.radomes.org/museum/)

Closure

Almaden AFS came under TAC jurisdiction in 1979, and the facility's closing ceremony took place on 29 March 1980 with a final lowering of the flag.[42] The official "inactivation" date was 30 June 1980.[43] On 30 September 1980, a total of 18.42 acres of leased land was disposed of by terminating two leases (14.60 and 3.82 acres). The net remaining acreage was 48.02 fee acres, 43.72 easement acres, and 8.20 leasehold acres for a total of 99.94 acres of land. In June 1982, control of the property and improvements was transferred to the General Services Administration (GSA). On 21 April 1986, the GSA quitclaimed 91.696 acres of perpetual easements and fee acres to the Midpeninsula Regional Open Space District (MROSD). The remaining 8.20 acres of leaseholds were terminated at that time.[44]

Today the site is part of the Sierra Azul Open Space Preserve. It is not open to the public because of environmental hazards, including asbestos and lead-based paint. In addition, most of the buildings have deteriorated due to damage from the 1989 Loma Prieta earthquake, as well as ongoing vandalism and a significant amount of weather exposure which has damaged both the exteriors and interiors.

[42] Telephone interview with Basim Jaber, 2 March 2010.
[43] Email correspondence with Basim Jaber, 23 March 2010.
[44] U.S. Army.

OTHER NORAD RADAR FACILITIES IN CALIFORNIA

The Almaden Air Force Station was one of two hundred air defense and long-range radar facilities that monitored the skies over the continental U.S. As such, it was one of about 23 Lashup (temporary) and permanent radar stations in California that were constructed to protect the West Coast from Soviet attack. The radar ranges generally reached up to 200 miles, though a couple, like Almaden's AN/FPS-24, reached 250 miles. The ranges overlapped for good coverage, and removable radars were positioned in gaps.

In order to provide a comparative basis for the facilities at the former Almaden AFS, the following is a discussion of the other nine permanent NORAD radar facilities in California (Air Force Stations—excluding impermanent Lashup sites and Air Force Bases). It includes information about when the installations were established, what types of radar equipment were operated, when the stations closed, and any available information about their current state.

Mill Valley Air Force Station

The closest station north of Mt. Umunhum was the Mill Valley Air Force Station, located on a 106.4 acre site on the west peak of Mt. Tamalpais **(Figure 22)**. The site was leased from the Marin Municipal Water District in 1942 and returned to them in 2005. The 666th Aircraft Control and Warning (AC&W) Squadron began operating an AN/CPS-6B radar there in late 1951. Mill Valley AFS was designated the Master Direction Center under the manual control system of operations in 1951, meaning that it had operational tactical control over three other Ground Radar Squadrons, two Navy picket ships, two Air Early Warning and Control Aircraft, sixteen Army Air Defense Artillery Nike-Ajax and Nike-Hercules units in the San Francisco-Travis Air Force Base complex.[45]

Between 1955 and 1964, the Mill Valley AFS operated an AN/FPS-8, AN/GPS-3, AN/FPS-4 height-finder radar, AN/FPS-6 set, AN/FPS-7 search radar, AN/FPS-6B height-finder radar, AN/FPS-26A height-finder radar, and AN/FPS-90. In January 1961, the site began feeding data into the SAGE System. Following the station's integration into the SAGE system, Battery Integration and Radar Display Equipment (BIRDIE) was installed in April "to provide a tightly-knit control of Nike defenses, unattainable prior to its development, assuring optimum target engagement in the most efficient and economical manner." At this time, Mill Valley AFS was designated the headquarters for the San Francisco NORAD Control Center, composed of both Army and Air Force personnel and equipment. The same year, the 666th squadron became host to the 40th Artillery Brigade Air Defense Command Post, and was put in charge of the Nike-Hercules missile systems in the San Francisco-

[45] National Park Service, Western Region. Historic American Buildings Survey: Mill Valley Air Force Station, HABS No. CA-2615 (San Francisco, CA: National Park Service, 1995) 8.

Travis AFB area.[46] In 1966, the AN/FPS-26A was removed from SAGE duties when it was converted to an AN/FSS-7 SLBM detection & warning radar. The U.S. Army Air Defense Command Post also shared this radar site during the 1960s for Nike-missile control because the site was linked with the Nike missile site at nearby Fort Barry.[47]

Figure 22. Former Mill Valley Air Force Station, 2010. FAA facility to the right, remaining foundations of other buildings to the left.
(Source: Google Maps, 2010)

Mill Valley AFS came under Tactical Air Command (TAC) jurisdiction in October 1979. During the 1980s, most of the property was turned over to the National Park Service and the Federal Aviation Administration (FAA). The Air Force retained control of the height-finder radar (modified to an AN/FPS-116) and the SLBM radar, which was deactivated circa 1980. In 1995 the FAA operated an AN/FPS-66A search set, which was replaced in the late 1990s with an ARSR-4.

At its height, the Air Force Station contained sixty-two buildings, and radar systems were housed in radome tower buildings. Most of the radar facilities were deactivated by 1980, but the ARSR-4 continues to function for the FAA.[48] The majority of facilities have since been removed.

The site was documented in the Historic American Buildings Survey (HABS) in 1995, and was determined eligible for listing in the National Register of Historic Places based on its significant role as one of the most important radar stations in the country. According to the HABS documentation:

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[46] National Park Service: 9.
[47] Ibid.
[48] "Mt. Tamalpais West Peak/Mill Valley AFS," Website accessed on 9 March 2010 from: http://wikimapia.org/1482223/Mt-Tamalpais-West-Peak-Mill-Valley-AFS-site; and "Mill Valley AFS," Website accessed on 9 March 2010 from: http://www.militarymuseum.org/MillValleyAFS.html.

> At every phase of its history—as a control station in the 1950s, as a SAGE combat division center from 1961 to 1963, as San Francisco Defense Area NORAD Control Center from 1961 to 1974, and as one of six SLBM radar stations from 1968 to 1980— it was one of the few radar stations to hold a position of leadership.[49]

Because it was determined eligible for listing on the National Register, the Mill Valley Air Force Station was automatically listed on the California Register of Historical Resources. It was assigned a California Historic Resource Status Code of "2D2," which means "Contributor to a district determined eligible for NR by consensus through Section 106 process. Listed in the CR."

Point Arena Air Force Station

Further north along the coast, the Point Arena AFS operated from December 1951 to the mid-1980s. The 72-acre station was manned by the 776th Radar Squadron until the unit was deactivated in 1980, and an element of the 26th Air Defense Squadron continued operations. The site included barracks, a post exchange, recreation center, tennis courts and a pool, wastewater treatment plant, boiler plant, and an operations building, among other structures.[50] It featured two radar towers, including an eighty-foot concrete tower, much like the one at the Almaden AFS. The Point Arena AN/FPS-24 general surveillance radar was the first of twelve productions (Almaden's was the second) **(Figure 23)**. During its operational years, the site contained an AN/TPS-1B radar, AN/FPS-3 and AN/FPS-4, AN/FPS-8, AN-GPS-3, AN-FPS-20 and AN/FPS-6 set, AN-FPS-6B, AN-FPS-24, AN-FPS-26A and AN-FPS-90 height-finders, AN/FPS-93A, AN-FPS-91A and AN/FPS-116. In addition to the site's radars, it also supplied ground-to-air (GATR) communications to aircraft in the operating area. The GATR site was remotely located from the radar site to minimize interference from the radars into the radio gear.[51] Nearly identical to GATR at Almaden AFS, the Point Arena GATR featured tall poles for lower-frequency antennae and a linear FRT-49 antenna array **(Figure 24)**.

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[49] National Park Service: 10.
[50] "April 2004 SitRep," Air Defense Radar Museum. Website accessed on 11 March 2010 from: http://www.radomes.org/museum/
[51] "Point Arena Air Force Station. Wikipedia. Website accessed on 9 March 2010 from; http://en.wikipedia.org/wiki/Point_Arena_Air_Force_Station

Figure 23. Point Arena AFS, AN/FPS-24 tower.
(Source: http://www.uneeda-audio.com/776th/)

Figure 24. Aerial of the GATR site at Point Arena AFS (n.d.)
(Source: http://www.radomes.org/museum/)

Point Arena AFS came into NORAD's SAGE command and control system in 1960. The site came under TAC jurisdiction in 1979. Once manned by 200 Air Force personnel, by 1982 Point Arena AFS was operated by forty-four civilians. The site remained in use as joint FAA and civilian-manned radar station until 1998, but is now closed.[52]

[52] Ibid.

Klamath Air Force Station

Klamath AFS was first established in 1951 as a temporary installation, but became part of the permanent radar network in April 1952 when the 777th AC&W Squadron began operating AN/FPS-3 and AN/FPS-4 radars. Between 1956 and 1966, the facility operated an AN/GPS-3, AN/FPS-20, AN/FPS-6, AN/FPS-6A, AN/FPS-20A, AN/FPS-66, AN/FPS-90, AN/FPS-26 height-finder, and an AN/FPS-27 long-range search radar. The 777th became a SAGE radar squadron in 1960, and the site came under TAC jurisdiction beginning in 1979. In the 1980s, much of the property was turned over to the National Park Service, and the operations area became an FAA/U.S. Air Force joint-use facility. In 1995, the FAA operated an AN/FPS-66A search set in the old AN/FPS-27 tower. The Klamath AFS has since been replaced by the FAA/U.S. Air Force site at Rainbow Ridge, CA.[53]

Red Bluff Air Force Station

Red Bluff AFS began in 1955 with the acquisition of 24.2 acres of grazing land south of Redding in Tehama County **(Figure 25)**. The station became operational by the end of 1956 with the 85th AC&W Squadron as a garrisoning unit. The 858th initially operated the AN/MPS-8 height finder radar and the AN/MPS-11 search radar, which were both mobile systems. At different times between 1959 and 1970, the facility operated fixed AN/FPS-6, AN/FPS-6A, AN/FPS-67 fixed search radar, AN/FPS-90 height finder radar.

The radar information began being fed into the SAGE command and control system in 1960, which removed the Ground Control Intercept function from the station and reduced its manpower requirements. A GATR site and two gap filler annexes were established in 1960. With the transfer of the GATR function, the former on-site building was converted into the station's commissary. In 1964, Red Bluff AFS came under joint control of the FAA and the ADC. The 859th Squadron was inactivated in 1970, and the facility closed. In 1971, the GATR site and operations portion of the main station were transferred to the FAA, who continues to operate a search radar there as part of the Joint Surveillance System (JSS), a joint U.S. Air Force/FAA air sovereignty monitoring system. By the end of 1972, the remainder of the station was transferred to Tehama County, which developed the site into a county park.

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[53] "Klamath Air Force Station," Wikimapia. Website accessed on 15 March 2010 from: http://wikimapia.org/5166808/Klamath-Air-Force-Station

Figure 25. Red Bluff Air Force Station, date unknown.
(Source: http://www.radomes.org/museum/)

Red Bluff AFS was unique to California radar stations in that it was the only station that used metal buildings for administration, logistical support, and housing. All of the other stations used wood frame construction for at least some of their buildings. With closure of the station, most of the buildings were disassembled and transferred to government agencies and non-profit organizations.[54]

Madera Air Force Station

Several radar Air Force Stations were situated south of Almaden. The Madera AFS was located northeast of Fresno, and was established as a temporary emergency site. It was first occupied by the 774th AC&W Squadron in 1951, and construction began that year on several concrete and wood-frame buildings to house the radar and support equipment, as well as its eight officers and 108 enlisted airmen and noncommissioned officers. The site became a permanent Air Force Station in 1952 **(Figure 26)**. Nine family housing units were constructed in 1956, and seventeen more in 1960. The facilities at Madera AFS also included a swimming pool, skeet range, athletic court and field, base exchange, and a three-hole golf course, which contributed to the station's unofficial nickname, "Country Club of the Air Force."[55]

[54] "Red Bluff Air Force Station," The California State Military Museum, Website accessed on 15 March 2010 from: http://www.militarymuseum.org/RedBluffAFS.html.
[55] "Madera Air Force Station," The California State Military Museum, Website accessed on 9 March 2010 from: http://www.militarymuseum.org/Madera%20AFS.html.

Figure 26. Aerial of former Madera Air Force Station, 2010.
(Source: Google Maps, 2010)

Madera AFS was integrated into NORAD's SAGE command and control system in 1960. With this change, the 774th AC&W Squadron became the 774th Radar Squadron (SAGE). Between 1950 and 1963, the site operated an AN/TPS-1B search radar, AN/FPS-3 and height finder, AN/FPS-4 radar sets, an AN/FPS-6A height finder radar set, an AN/FPS-20 system, an AN/FPS-66 and an AN/FPS-90.[56]

On 25 June 1966, the Madera AFS and the 774th Radar Squadron were both deactivated. In December of that year, the U.S. Air Force issued a permit to the Bureau of Indian Affairs (BIA), Department of the Interior to use the site as a school and vocational training center.[57] It is unclear if any buildings remain standing at the site.

Cambria Air Force Station

The Cambria AFS was established in 1951 on the Pacific coast, about thirty miles north of San Luis Obispo. The 34-acre site contained an AN/FPS-26A height finder, as well as AN/FPS-6 and AN-FPS-107 radar towers during its period of operation **(Figure 27)**. The radar units have since been dismantled, but the structures remain **(Figure 28 and 29)**.

[56] Ibid.
[57] Ibid.

Figure 27. Former Cambria Air Force Station, n.d. (ca. 2000)
(Source: http://www.radomes.org/museum/recent/CambriaAFSCA.html)

The AFS was nearly self-sufficient, and included a post exchange, library, mess hall, theater/bowling alley, tennis courts, dark room, medical unit, two radar towers, six barracks, a bomb shelter, a telephone exchange building, officers' quarters, a pump house, automotive maintenance facility, two gate houses, a boiler room, a sewage treatment plant, a water filtration facility, power plant building, club/pool room, commissary, recreation building, administration building, operations buildings, maintenance shop, and various ancillary buildings **(Figure 30)**.[58]

By 1968, 180 Air Force personnel and twenty-five civilian workers were employed at Cambria AFS. About sixty percent of the staff lived off-station, some in an Air Force housing tract in Cambria, some in Cayucos, and others in Morro Bay.[59] The AFS was closed in 1979. As of 2008, the site was owned by a private individual, but it was still in minor use by the government to broadcast safety notices and weather information to ships through USCG Navigational Telex.

[58] "Cambria Air Force Radar Station Conversion Project Proposal," Website accessed on 9 March 2010 from: http://www.macronet.org/airbase/airforce.html
[59] http://sloblogs.thetribunenews.com/slovault/2008/04/13/1968-cambria-air-station/


Figures 28 and 29. Former Cambria AFS—the AN/FPS-26A radome in 1968, and the AN/FPS-107 radar tower in 2004.
(Source: http://sloblogs.thetribunenews.com/slovault/2008/04/13/1968-cambria-air-station/; http://www.radomes.org/museum/recent/CambriaAFSCA.html)

Figure 30. Former Cambria AFS barracks in the cantonment area, July 2003.
(Source : http://www.radomes.org/museum/recent/CambriaAFSCA.html)

Santa Rosa Island and Lompoc Air Force Stations

The Santa Rosa Island AFS operated from 1952 to March 1963 on Santa Rosa, one of the Channel Islands. At various times, the 669th AC&W Squadron operated an AN/CPS-6B, AN-FPS-10, AN/FPS-3, AN-GPS/3, and AN/MPS-14.

The Lompoc AFS was established at Oak Mountain in Santa Barbara County in 1963, when the 669th AC&W Squadron moved from Santa Rosa Island AFS **(Figure 31)**. The 669th operated as part of the SAGE network, and was administered by Vandenberg Air Force Base. A GATR facility was located about a mile south at Sudden Ranch. Between 1963 and 1968, the Lompoc AFS operated an AN/FPS-67, AN/FPS-6, AN-FPS/6A height-finder radar, and AN-FPS-67. The 669th was deactivated in June 1968. The GATR site has been retained.[60]

[60] "Lompoc Air Force Station," Website accessed on 15 March 2010 from: www.radomes.org

Figure 31. Lompoc AFS, ca. 1964.
(Source: http://www.radomes.org/museum/)

Boron Air Force Station

Boron AFS was established in February 1952 in the Mojave Desert, and was initially managed by Edwards Air Force Base **(Figure 32)**. The 750th AC&W Squadron subsequently assumed command of the site and operated two AN/FPS-10 radars, one of which remained until 1959. Between 1958 and 1969, Boron AFS operated an AN/FPS-6 height-finder radar, AN/FPS-61 height-finder, AN-FPS-10, AN/FPS-20, AN/FPS-35 FD, AN/FPS-26A and AN/FPS-90 height-finder radars, and an AN/FPS-67 with a radome. The facility provided data for the regional SAGE center in 1961, and the AN/FPS-6A became an operational ADC/FAA joint-use radar.

The 750th was deactivated in June 1975. Part of the site continued to be used by the FAA, while the other section was used as a federal prison camp, which subsequently closed in April 2000.[61]

[61] "Boron Federal Prison Camp/Boron AFS," Wikimapia. Website accessed on 15 March 2010 from: http://wikimapia.org/3945077/Boron-Federal-Prison-Camp-Boron-AFS-site

Figure 32. Aerial of former Boron Air Force Station, 2010.
(Source: Google Maps, 2010)

San Clemente Air Force Station and San Pedro Hill Air Force Station/Fort MacArthur

The 670th AC&W Squadron began operations at San Clemente AFS in May 1952 with a single AN/FPS-3 radar. A year later, an AN/FPS-4 height-finder radar joined the site. Over the years between 1955 and 1960, the facility also operated an AN/FPS-8, AN/GPS-3, and AN/FPS-4. The site was deactivated in 1960, and the 670th AC&W Squadron relocated to Fort MacArthur/San Pedro Hill AFS, a joint-use Air Force/Army/FAA radar site. San Clemente Island was handed over to the Navy. Operations at San Pedro Hill AFS/Fort MacArthur included AN/FPS-6B and AN/FPS-26A height-finder sets in 1963, and AN/FPS-90 and AN/FPS-27 radars in 1964. The 670th Radar Squadron was deactivated in April 1976 **(Figures 33 and 34)**.

Figures 33 and 34. San Clemente AFS- radar in 1958; the site in recent years.
(Source: http://www.radomes.org/museum/)

Mt. Laguna Air Force Station

Operations at the Mt. Laguna Air Force Station, located east of San Diego, began in April 1952 **(Figures 35 and 36)**. At that time, the 751st AC&W Squadron (later 751st Radar Squadron) operated AN/CPS-4 and AN/FPS-3 radars. Between 1952 and 1966, the Radar Squadron also operated an AN/FPS-8, AN/GPS-3, AN/FPS-6, AN/FPS-7C search radar and AN/FPS-6 and 6B height-finder radars, AN/FPS-90 set; AN/FPS-26A FD height-finder radar; and AN/FSS-7 SLBM D&W radar. The site became integrated into the SAGE system in 1961. Mt. Laguna became a joint-use ADC/FAA facility around 1965. In 1979 the facility came under TAC jurisdiction. In the 1980s, the FAA assumed greater control, replacing the AN/FPS-7E with an ARSR-3 search radar, leaving the Air Force responsible only for the height-finder tower, which was removed circa 1988. In the late 1990s, the ARSR-3 was replaced by the ARSR-4.[62] The other radars have since been removed, and only the towers remain. The FAA currently uses the ARSR-4 radar for en route flight safety and air traffic control. The site is scheduled to be dismantled in 2010 by the U.S. Forest Service with federal stimulus funds.[63]

Figures 35 and 36. Former Mt. Laguna AFS, married enlisted quarters, ca. 1994 and the AN/FPS-26 height-finder radar/AN-FSS-7 SLBM radar tower with the FAA's ARSR-4 radar behind, 2009. (Source: http://www.radomes.org/museum/recent/MountLagunaAFSCA.html)

[62] "Mount Laguna AFS," Website accessed on 9 March 2010 from: http://wikimapia.org/5329703/Mount-Laguna-AFS-site

[63] "751st Radar Sqdn., Mount Laguna AFS, CA," Website accessed on 9 March 2010 from: http://www.radomes.org/museum/recent/MountLagunaAFSCA.html

V. EVALUATION OF THE FORMER ALMADEN AIR FORCE STATION AS A POTENTIAL HISTORIC DISTRICT

The following is an evaluation of the former Almaden AFS for its potential eligibility as a historic district. The evaluation uses the significance criteria of the California Register of Historical Resources and the National Register of Historic Places, as well as integrity considerations that were previously discussed at length in the Methodology section. Individual evaluations are located in **VI. Inventory and Brief Evaluation of Individual Buildings**.

Criterion A/1 (Events)

The former Almaden Air Force Station does not appear eligible for listing in the National Register under Criterion A or the California Register under Criterion 1 (Events) as a potential historic district. Though the facility was constructed as part of NORAD's Cold War defense system for the United States and Canada, nine permanent Early Warning Radar Air Force Stations existed in California during the same period. The radars at the Almaden AFS overlapped in range with the nearby stations, and all of the radars worked in concert to detect foreign objects in airspace along the Pacific Coast. Likewise, all these facilities were connected to the SAGE command and control system in 1960-61, and at least three other stations contained separate GATR facilities. Thus, the former Almaden AFS does not appear singularly significant in function, nor was its equipment unique.

The facilities and operational tasks for each radar station were quite similar, and the hierarchy of command was nearly identical—aside from those stations which served as a command post or headquarters. For example, Mill Valley AFS functioned as a control station in the 1950s, as a SAGE combat division center from 1961 to 1963, as San Francisco Defense Area NORAD Control Center from 1961 to 1974, and as one of six SLBM radar stations from 1968 to 1980. Because of these significant functions, the station was determined eligible for listing as a historic district on the National Register in 1995, which meant that it was automatically listed in the California Register as well. By contrast, the former Almaden AFS does not rise to the same level of significance as Mill Valley AFS, and thus does not appear eligible for listing on the California Register or National Register.

Almaden AFS operated from 1958 to 1980. It was the not the first Cold War-era Air Force radar station to be established in California. In fact, it was the last station established without transferring a radar squadron from a previous location in California (i.e. Santa Rosa AFS to Lompoc AFS and San Clemente AFS to Fort MacArthur). The Mill Valley, Point Arena, Klamath, and Cambria Air Force Stations were established in 1951, and Madera, Santa Rosa, Boron, San Clemente, and Mt. Laguna

Air Force Stations were established in 1952. The establishment of these stations may be considered more significant than Almaden AFS because the 1951-52 system of Early Warning Radar stations was the United States' first major construction project as a result of Cold War hostilities.[64] Other stations also operated for longer periods than Almaden AFS, including Klamath AFS which closed in the 1980s, Mt. Laguna which closed in the 1990s, and Point Arena which did not close until 1998.

In conclusion, the former Almaden AFS does not stand out as particularly significant compared with other Cold War-era Air Force radar stations in California, such as those which served as local or regional command centers. It therefore does not appear eligible for listing as a historic district on the National Register or the California Register.

Criterion B/2 (Persons)

The former Almaden Air Force Station does not appear eligible for listing in the National Register under Criterion B or the California Register under Criterion 2 (Persons). It was a military facility and by definition all of the personnel worked together in support of the operational mission. Research has failed to turn up an intimate association with a particularly prominent person or persons that would justify its inclusion in the National Register or California Register under this criterion.

Criterion C/3 (Architecture & Design)

The former Almaden Air Force Station does not appear eligible for listing in the National Register under Criterion C or the California Register under Criterion 3 (Architecture & Design) as a potential historic district. The buildings at the former Almaden AFS are common amongst radar stations of the Cold War era in terms of construction materials, style, size, massing, and use. Prefabricated steel Butler buildings were most often used for radar support, administration, community services, and airmen barracks. All of the stations except Red Bluff AFS used wood-frame construction for apartments or other buildings, in addition to the use of steel buildings. The wood-frame apartments, though modern in design, resemble other mass-produced military housing of the era, such as those constructed for the Capehart and Wherry programs. The buildings likewise do not appear significant in the portfolio of Porter, Urquhart, McCreary & O'Brien, who worked on larger military housing projects elsewhere.

The radar structures used at the Almaden AFS were not unique, but rather, followed common conventions similar to other radar installations. Height-finder radars were placed on steel structural supports, while search radars were placed on multi-story concrete cubes. The specific types of radars varied from station to station, and also varied over the years as technology improved. However, a

[64] National Park Service: 1.

select number of radars were in use during a given time period. For example, all nine other stations in California used AN/FPS-6 series height-finder radars, and seven used the AN/FPS-90. Three used the AN/FPS-20 search radar, and Santa Rosa AFS used the AN/MPS-14. Point Arena was the only other Early Warning Radar Station in California to operate the large AN/FPS-24. Though the concrete tower at the former Almaden AFS is distinctive, it supported the second of twelve production models of the AN/FPS-24—the first being at Point Arena. Furthermore, the radars themselves have been removed from the towers at the former Almaden AFS. Based upon Page & Turnbull's methodology of highly technical and scientific resources, which emphasizes the need to retain some technical equipment related to the historic function of the building, the towers consequently do not retain integrity of workmanship and association. Thus, the historic integrity has been lost. A rare fully intact AN-FPS-24 (the radar sail remains) is located at Camp Hero on Long Island, New York.

The buildings and structures at the former Almaden AFS do not represent the work of a master or possess high artistic value. They embody the characteristics of a type, period, and method of construction, but within the broader historic context of the period, they do not stand out as a collection of buildings that should be recognized for their design as a National Register or California Register Historic District.

Finally, the facility's site and layout are not unique compared to the other Cold War-era Air Force radar stations. For example, the Mill Valley, Point Arena, Klamath, Cambria, Santa Rosa Island, San Clemente, and Mt. Laguna Air Force Stations were all situated on elevated pieces of land—either mountains or coastal bluffs—as these locations were advantageous for non-obstructed radar placement. It was also not uncommon for stations to combine the radar installation with multiple family housing and community services because the facilities were situated in relatively isolated locations.

Criterion D/4 (Information Potential)

The analysis of the former Almaden Air Force Station for eligibility under California Register, Criterion 4 (Information Potential), which is typically reserved for archaeological resources, is beyond the scope of this report. However, the site will likely not have merit under this criterion from its era as an Air Force Station.

Evaluation Conclusion

Though the entire site as a whole does not appear to possess the level of significance required for listing on the National Register or the California Register, there are layers of importance within the

site. The area most relevant to the historic purpose and function of the Air Force Station was the radar facility at the top of Mt. Umunhum. The cluster consisting of Operations (Building 100), the concrete tower for the AN/FPS-24 (Building 102), the steel structure for the AN/MPS-14 (Building 108), and the steel Butler building (Building 110) together represent the most important function of the site. They also exemplify typical construction methods. Though the buildings and structures lack the historic integrity needed to qualify for eligibility as a small historic district on the California Register, they do offer an excellent opportunity for historic interpretation of the site (see **VIII. Recommendations**).

VI. INVENTORY & BRIEF EVALUATION OF INDIVIDUAL BUILDINGS

This section includes summary information for each of the individual surveyed buildings, including the location, date of construction, function, brief description/historic context, and a brief evaluation utilizing the National Register and California Register criteria and assessment of integrity. The buildings are generally separated into the following uses: Special Military Purpose (radar operation), Support (functional support to the radars and operation of the station as a whole), Residential (housing), and Ancillary (sheds, outbuildings, etc.). The majority of the historic background information was provided by local Santa Clara County resident Basim Jaber.[65]

Regarding historic integrity, to reiterate, most of the buildings at the former Almaden AFS show deterioration due to weathering and neglect. However, it is important to note that historic integrity is *not* synonymous with condition. A building or structure can possess all or many of the seven aspects of integrity, even if the condition of the materials has degraded. Condition becomes a more important factor when weathering or vandalism has led to the outright loss of historic materials, such that the resource can no longer convey a direct connection to its historic function and design.

[65] Email correspondence with Basim Jaber, 9 March 2010.

100: Operations

Date of Construction: 1957; addition 1959

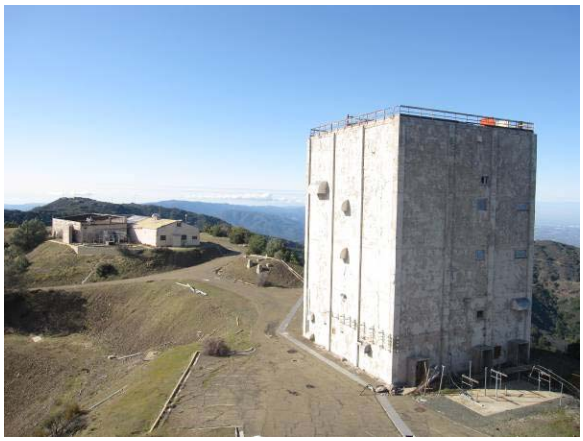
Property Type: Special Military Use- Radar Operations

Historic Context Notes: Originally constructed as two separate buildings of steel and concrete block construction, a third section of concrete block was built in 1959. The roof was joined to make one building with three separate sections inside for scopes, cryptography, and administration. Cryptography was later moved to the main FPS-24 radar tower. Radiation shielding was added in 1963.

Evaluation: The building is not of significant design or construction. Its function was important within the station as the control arm of the radar facility. Thus, the building possesses significance under Criterion A/1, but it is not individually eligible for the National Register or California Register due to lack of integrity.

Retains Integrity: No (Lacks integrity of setting since the radar towers that once immediately surrounded it are no longer extant. Lacks integrity of workmanship, feeling and association since the equipment inside has been removed and it no longer functions in any capacity related to its original use.)

102: Radar Tower FPS-24



Date of Construction: 1959-1961

Property Type: Special Military Use- Concrete Radar Support Tower

Historic Context Notes: The 19,845 square foot, five-story, cast-in-place concrete building was constructed from 1959 to 1961, and the radar it supported on its roof was fully operational in 1962. The AN/FPS-24 search radar was the second of twelve production models (the first was located at Point Arena, whose tower has recently been restored). The radar had a range of 250 miles, whereas most radars had a range up to 200 miles. The radar was removed from the tower in June 1980.

Evaluation: Significant to former Almaden AFS under Criterion A/1 (Events) as the most prominent and directly-related example of radar operation at the site, and Criterion C/3 (Architecture/Design) as the only concrete radar tower at the site which was built for one of the most high-powered antennas in California. However, it is not individually eligible for the National Register or California Register due to lack of integrity.

Retains Integrity: No (Lacks integrity of materials, workmanship, and association, largely because the radar unit on the roof and the other technical machinery to operate the radar has been removed. The removal of the radar and equipment prevents the building from directly conveying a connection to its historic function and design.)

105: Fallout Shelter

Date of Construction: 1961

Property Type: Support- Fallout Shelter

Historic Context Notes: The 1,590 square foot fallout shelter consists of two Quonset huts placed longitudinally adjacent to one another, rock-lined, and lead painted. An escape hatch and a concrete staircase next to Building 100 access it from above. Never needed, and used as storage.

Evaluation: Not individually eligible for the National Register or California Register because design and construction is typical and the fallout shelter was never used as such.

Retains Integrity: Yes

108: Radar Tower MPS-14

Date of Construction: 1962

Property Type: Special Military Use- Steel Radar Support Tower

Historic Context Notes: This mobile height-finder radar was the last radar constructed at the site. The footings of the tower measure 19 feet by 19 feet, and the building is approx. 40 feet tall to the platform. The radar was removed from the steel tower in the spring/summer of 1980.

Evaluation: Significant within the former Almaden AFS under Criterion A/1 (Events) and Criterion 3/C (Architecture/Design) as the only steel height-finder radar tower remaining on site. Aside from Building 102, it is the other structure to directly relate to the station's radar defense mission. However, it is not individually eligible for the National Register or California Register due to lack of integrity.

Retains Integrity: No (Lacks integrity of materials, workmanship, and association and association, largely because the radar has been removed. The removal of the radar and associated equipment prevents the building from directly conveying a connection to its historic function and design).

110: Training

Date of Construction: 1957

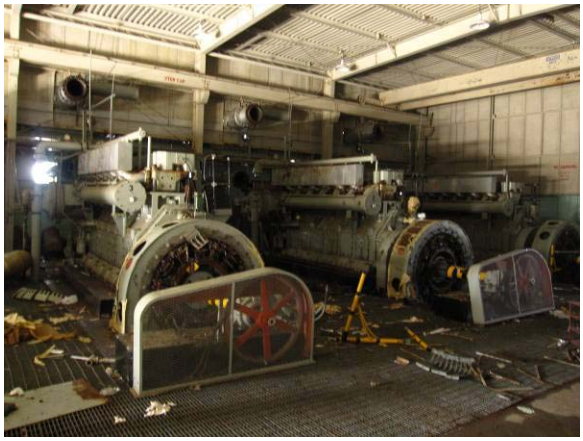
Property Type: Special Military Use - GATR, Storage, Training

Historic Context Notes: The 1,080 square foot building was constructed as the original Ground to Air Transmitter Receiver (GATR) communications building. GATR moved to Mt. Thayer in 1962 and this building became the D.E. (civil engineering) warehouse before it was converted to personnel training in 1965.

Evaluation: Significant within the site under Criterion A/1 (Events) as the first GATR building. Not eligible as an individual resource on the National Register or California Register due to lack of historic integrity.

Retains Integrity: No (Lacks integrity of workmanship, feeling, and association because the GATR equipment and function was removed in 1962. Without the equipment, the shell of the building does not convey the connection to this historic use, and the building resembles all other steel Butler buildings, which were used in a variety of ways.)

112: Electrical Power Station



Date of Construction: 1960

Property Type: Support Facility—power station

Historic Context Notes: The 5,660 square foot building was constructed with a steel frame, concrete masonry unit (CMU) and cement-asbestos board siding, and a steel roof. It was not the original power plant at the site. Consists of four Nordberg model #9018-0634 Diesel engines rated at 933 hp each. This power plant was constructed to support the new AN/FPS-24 radar built in 1959-1962. Three of the generators ran in excess of 73,000 hours, and the fourth developed problems after 1500 hours and was then used for parts for the other machines.

Evaluation: This building supported the function of the radars, and is not individually significant.

Retains Integrity: Yes

114: Sheet, Pipe & Paint Storage

Date of Construction: 1965

Property Type: Ancillary— storage

Historic Context Notes: N/A

Evaluation: Support facility, and not individually significant. Also, not age-eligible because it is less than fifty years old.

Retains Integrity: No (Lacks integrity of design, materials, workmanship, feeling, and association.)

115: Security Sentry House

Date of Construction: 1964

Property Type: Support Facility—security

Historic Context Notes: The 215 square foot corrugated metal building at the entrance to the operations area at the top of the mountain. The building may have originally been located at the main gate on Mt. Umunhum Road in 1964, and moved to the operations area shortly thereafter.

Evaluation: Support facility, and not individually eligible for the National Register or California Register. Also, not age-eligible because it is less than fifty years old.

Retains Integrity: Yes

118: Diesel Fuel Pump

Date of Construction: 1957

Property Type: Support Facility—pump house

Historic Context Notes: 250 square foot, concrete block building. Two 80,000-gallon diesel DF2 tanks were located below, as well as a spill containment earthen dam. This was the site of heavy soil contaminants that were recently abated by the Army Corps of Engineers.

Evaluation: Support facility, and not individually eligible for the National Register or California Register.

Retains Integrity: Yes

119: CE Maintenance Shop

Date of Construction: 1957

Property Type: Support Facility—Maintenance

Historic Context Notes: The 1,920 square foot building was also known as the Civil Engineering Quarters (CEQ). It was constructed with a pre-fabricated steel structure and skin manufactured by the Butler Manufacturing Co.

Evaluation: Support facility, and not individually eligible for the National Register or California Register

Retains Integrity: Yes

120: Warehouse Supply & Equipment

Date of Construction: 1957

Property Type: Support Facility— power plant, warehouse

Historic Context Notes: This 2,190 square foot building was the original power plant used to power the AN/FPS-20 search radar and height finder sets. It contained three or four Cummins Turbo-diesel generators. The generators were removed in 1962 when the AN/FPS-20 was decommissioned and removed. The building was converted to supply room at that time.

Evaluation: Support facility, and not individually eligible for the National Register or California Register

Retains Integrity: No (Lacks integrity of materials, workmanship, and association due to the change from its original purpose and missing materials.)

200: Water Pump Station

Date of Construction: 1957

Property Type: Support Facility—pump station

Historic Context Notes: The 240 square foot, corrugated metal building was used to pump water from the "upper" and "lower" pump houses on the final route to the water tanks. Also used for pressurization of fire hydrants on station.

Evaluation: Support facility and not individually eligible for the National Register or California Register

Retains Integrity: Yes

205: Bachelor Officers' Quarters

Date of Construction: 1957

Property Type: Support Facility- temporary lodging

Historic Context Notes: 1,920 square foot steel Butler building was also known as the Visiting Airman Quarters (VAQ), the Transient Lodging Facility (TLF), and the Bachelor Airman Quarters (BAQ).

Evaluation: Support facility, and not individually eligible for the National Register or California Register.

Retains Integrity: Yes

206: Fire Hose House

Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: No (Lacks integrity of materials and workmanship because some of the walls and the doors are missing)

207: Squadron Headquarters Orderly Room

Date of Construction: 1957

Property Type: Support Building- headquarters

Historic Context Notes: The 1,920 square foot pre-fabricated steel Butler building housed administrative functions. It included the Commander's Office, admin assistant to the Commander, personnel office, mail room, etc.

Evaluation: This building functioned in the daily operation of the station, but was not a part of any significant events, nor is its architecture distinctive. It is not individually eligible for the National Register or California Register.

Retains Integrity: Yes

211: Auto Maintenance Shop, aka Motor Pool

Date of Construction: 1960

Property Type: Support Facility— auto shop

Historic Context Notes: This is a 1,984 square-foot pre-engineered metal building.

Evaluation: Support facility that contributed to the daily function of the station, and not individually significant for the National Register or California Register.

Retains Integrity: Yes

212: NCO Open Mess

Date of Construction: 1957, addition in 1975

Property Type: Support Facility- dining hall

Historic Context Notes: The 1,950 square foot, pre-fabricated steel Butler building had an addition of 1,690 square feet constructed in 1975. It was used as a dining hall for the non-commissioned officers.

Evaluation: Not individually significant for the National Register or California Register

Retains Integrity: Yes

213: Dispensary

Date of Construction: 1957

Property Type: Support Facility— medical

Historic Context Notes: The 1,000 square foot building was used to provide medical and dental care for Air Force personnel.

Evaluation: A support facility for resident personnel, and not individually eligible for the National Register or California Register

Retains Integrity: Yes

215: Fire Hose House

Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: No (Lacks integrity of materials and workmanship because much of the walls and the doors are missing)

217: Bowling Alley

Date of Construction: 1961

Property Type: Support Facility- recreation

Historic Context Notes: This 1,740 square foot concrete masonry building contained two lanes with pinsetters, one ball-return machine, a frame-counter, frame reset console, operator booth, and men's/women's restrooms inside.

Evaluation: A recreational facility for resident personnel, and not individually eligible for the National Register or California Register. Also, not age-eligible because it is less than fifty years old.

Retains Integrity: Yes

225: Airman's Dining Hall

Date of Construction: 1957

Property Type: Support Facility—dining

Historic Context Notes: The 4,640 square foot, pre-engineered steel building functioned as the dining hall for commissioned personnel.

Evaluation: Support facility for the station, and not individually eligible for the National Register or California Register.

Retains Integrity: Yes

226: Fire Hose House

Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: Yes (All three walls and the roof are intact, as well as the fire hydrant and hose).

230: Commissary

Date of Construction: 1957; addition in 1967

Property Type: Support Facility—store

Historic Context Notes: Originally a 1,000 square foot prefabricated steel Butler building; a wood-frame addition of 535 square feet was constructed in 1967. The building functioned as a store for groceries and other items.

Evaluation: Support facility for the personnel who lived on site. Not individually eligible for the National Register or California Register.

Retains Integrity: Yes

232: Fire Hose House

Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: No (Lacks integrity of design, materials, and workmanship because the roof and doors are missing.)

233: Barracks, aka Airman's Dormitory and Chapel

Date of Construction: 1957

Property Type: Residential- barracks

Historic Context Notes: This 2,920 square foot building was once one of six pre-fabricated steel Butler buildings originally used for barracks. The others were removed in the 1970s due to substandard conditions, and personnel without families moved to rented apartments at the bottom of the mountain. This building was converted to a chapel and hobby rooms for photography and ceramics.

Evaluation: Support facility for personnel living on site, and not individually eligible for the National Register or California Register

Retains Integrity: Yes

234: Fire Hose House

Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: Yes (All three walls and the roof are intact).

245: Recreation

Date of Construction: 1957

Property Type: Support Facility—recreation

Historic Context Notes: The 4,660 square foot concrete masonry building contained a BX (base exchange), gymnasium with half-court basketball court, library, billiard room, weight/workout room, barber shop, and projectionist booth for movies.

Evaluation: Support facility for recreation. Not individually eligible for the National Register or California Register.

Retains Integrity: Yes

250: Auto Maintenance Storage

Date of Construction: 1958

Property Type: Ancillary—storage

Historic Context Notes: The 360 square foot building is a pre-engineered metal Butler Manufacturing Co. building.

Evaluation: Ancillary building, and not individually significant for the National Register or California Register

Retains Integrity: Yes

275: Swimming Pool

Date of Construction: 1957

Property Type: Support Facility—recreation

Historic Context Notes: The pool was constructed at the same time as the adjacent gymnasium. It is nine feet deep at one end, and featured a diving board, spiral slide, and filtration system.

Evaluation: Recreational facility for personnel on site, and not individually eligible for the National Register or California Register.

Retains Integrity: Yes

276: Bath House

Date of Construction: 1966

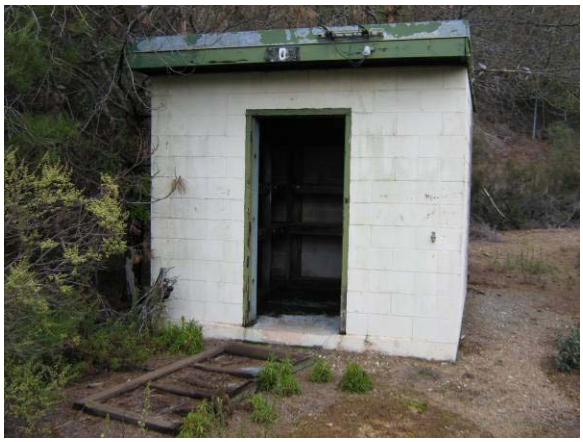
Property Type: Support Facility- recreation

Historic Context Notes: The 400 square foot concrete masonry building contained men's and women's showers, sinks, urinals, and toilets, with a closet/plumbing room in the center.

Evaluation: Recreation facility for personnel on site, and not individually eligible for the National Register or California Register. Also, not age eligible because it is less than fifty years old.

Retains Integrity: Yes

303: Paint Storage



Date of Construction: 1958

Property Type: Ancillary—storage

Historic Context Notes: This concrete masonry unit (CMU) building is located next to the sewage treatment ponds at the west end of the facility.

Evaluation: Ancillary building, and not individually eligible for the National Register or California Register

Retains Integrity: Yes

505: Carport

Date of Construction: 1958

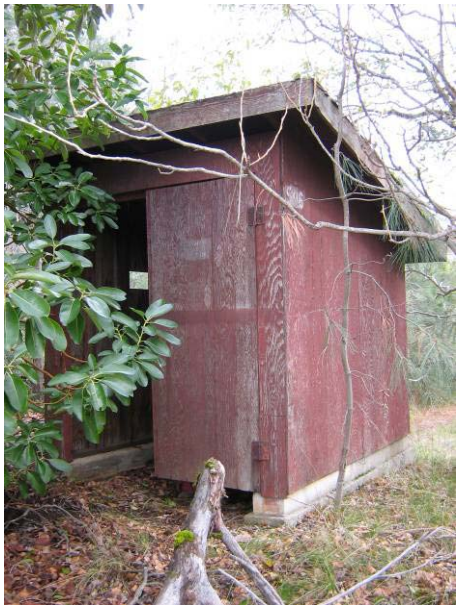
Property Type: Residential—carport

Historic Context Notes: The 4,870 square foot building was constructed adjacent to the family apartments in the cantonment area at the west end of the facility. The two end walls are of stone, and the back wall is concrete.

Evaluation: Support facility for the personnel who lived on site, and not individually eligible for the National Register or California Register

Retains Integrity: Yes

506: Fire Hose House



Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: Yes

507: Fire Hose House

Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: No (Lacks integrity of design, materials, workmanship, and feeling because it has partially collapsed—the roof and doors are missing.)

508: Fire Hose House

Date of Construction: ca. 1957

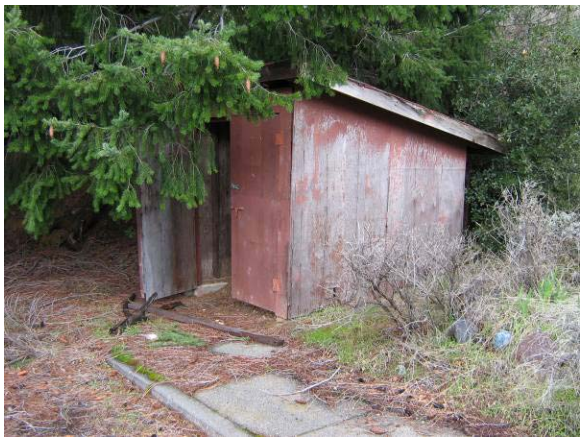
Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: No (Lacks integrity of materials and workmanship because the roof and doors is missing)

509: Fire Hose House



Date of Construction: ca. 1957

Property Type: Ancillary—fire protection

Historic Context Notes: All fire hose houses were built between 1957 - 1958. The hydrants were installed first, then these structures were built to shelter the hoses. All of the hose houses were in place before the station became operational in 1958, and all show the interior stencil "Built by 115 CET Wisconsin ANG."

Evaluation: Not individually eligible for the National Register or California Register

Retains Integrity: Yes

510: Fourplex Apartment

Date of Construction: 1958

Property Type: Residential—multiple family housing

Historic Context Notes: This 4,880 square foot, two-story wood-frame building was constructed as a residence for Air Force families, while personnel without families lived in steel barracks buildings.

Evaluation: One of five identical fourplex apartment buildings that provided on-site housing for personnel and their dependents. Not individually eligible for the National Register or California Register.

Retains Integrity: Yes

511: Fourplex Apartment

Date of Construction: 1958

Property Type: Residential—multiple family housing

Historic Context Notes: This 4,880 square foot, two-story wood-frame building was constructed as a residence for Air Force families, while personnel without families lived in steel barracks buildings.

Evaluation: One of five identical fourplex apartment buildings that provided on-site housing for personnel and their dependents. Not individually eligible for the National Register or California Register.

Retains Integrity: Yes

512: Fourplex Apartment

Date of Construction: 1958

Property Type: Residential—multiple family housing

Historic Context Notes: This 4,880 square foot, two-story wood-frame building was constructed as a residence for Air Force families, while personnel without families lived in steel barracks buildings.

Evaluation: One of five identical fourplex apartment buildings that provided on-site housing for personnel and their dependents. Not individually eligible for the National Register or California Register.

Retains Integrity: Yes

513: Fourplex Apartment

Date of Construction: 1958

Property Type: Residential—multiple family housing

Historic Context Notes: This 4,880 square foot, two-story wood-frame building was constructed as a residence for Air Force families, while personnel without families lived in steel barracks buildings.

Evaluation: One of five identical fourplex apartment buildings that provided on-site housing for personnel and their dependents. Not individually eligible for the National Register or California Register.

Retains Integrity: Yes

514: Fourplex Apartment

Date of Construction: 1958

Property Type: Residential—multiple family housing

Historic Context Notes: This 4,880 square foot, two-story wood-frame building was constructed as a residence for Air Force families, while personnel without families lived in steel barracks buildings.

Evaluation: One of five identical fourplex apartment buildings that provided on-site housing for personnel and their dependents. Not individually eligible for the National Register or California Register.

Retains Integrity: Yes

515: Triplex Apartment

Date of Construction: 1958

Property Type: Residential—multiple family housing

Historic Context Notes: This 3,870 square foot, two-story wood-frame building was constructed as a residence for Air Force families, while personnel without families lived in steel barracks buildings.

Evaluation: One of two identical triplex apartment buildings with integral carports that provided on-site housing for personnel and their dependents. Not individually eligible for the National Register or California Register.

Retains Integrity: No (Lacks integrity of materials and workmanship due to severe damage caused by weathering that has removed a large amount of interior materials).

516: Commander's House

Date of Construction: 1958

Property Type: Residential—single family dwelling

Historic Context Notes: This 1,527 square foot, one-story wood-frame building provided housing for the commander of the station. In later years, after the base closed, it was used by the caretaker for the site.

Evaluation: Housing for personnel, and not individually eligible for the National Register or California Register

Retains Integrity: Yes

517: Triplex Apartment

Date of Construction: 1958

Property Type: Residential—multiple family housing

Historic Context Notes: This 3,870 square foot, two-story wood-frame building was constructed as a residence for Air Force families, while personnel without families lived in steel barracks buildings.

Evaluation: One of two identical triplex apartment buildings with integral carports that provided on-site housing for personnel and their dependents. Not individually eligible for the National Register or California Register.

Retains Integrity: No (Lacks integrity of materials and workmanship due to severe damage caused by weathering that has removed a large amount of interior materials.)

700: Communications Transmitter/Receiver (GATR Building)

Date of Construction: 1962

Property Type: Special Military Use - GATR

Historic Context Notes: The building was constructed as the second Ground to Air Transmitter Receiver (GATR) communications building. GATR moved to Mt. Thayer in 1962 when the AN/FPS-24 radar was constructed on Mt. Umunhum, so that radio signals would be interfere.

Evaluation: The building is not of significant design or construction. Its function was important within the station as the communication building that relayed information from the radars to Air Force pilots, but it was not the first GATR building at Almaden AFS. Furthermore, it is not individually eligible for the National Register or California Register due to lack of integrity.

Retains Integrity: No (Lacks integrity of workmanship, feeling, and association because the GATR equipment was removed. Without the equipment, the shell of the building does not convey the connection to this historic use, and the building resembles other CMU buildings at the facility, which were used in a variety of ways.)

715/722: Security Sentry House

Date of Construction: 1966

Property Type: Support Facility—security

Historic Context Notes: The small wood-frame building is located down the road from the GATR facility on Mt. Thayer. It has been recorded in documents as numbering either Building 715 or 722.

Evaluation: Support facility, and not individually eligible for the National Register or California Register. Also, not age-eligible because it is less than fifty years old.

Retains Integrity: No (Lacks integrity of materials and workmanship due to missing door and windows.)

TELCO

Date of Construction: 1957

Property Type: Support Facility—telephone company building

Historic Context Notes: Concrete Masonry Unit (CMU) construction. Telephone lines came in from the phone company, and the TELCO building acted as a demarcation point, where local lines extended throughout the facility.

Evaluation: Support facility, and not individually eligible for the National Register or California Register

Retains Integrity: No (Lacks integrity of materials and association as all telecom equipment has been removed).

VII. CONCLUSION

The former Almaden Air Force Station contributed to NORAD's Early Warning Radar system along the Pacific Coast from 1958 to 1980. Its radars worked in conjunction with those at nine other Air Force stations in California, and all were connected to the SAGE network—the automated control system for tracking and intercepting enemy bomber aircraft from about 1960 through the 1980s.

The station functioned much like the others in California, and its built resources were very similar. The other sites also contained concrete and steel radar towers, pre-engineered steel Butler buildings, and wood frame residential buildings in similar styles. The types of radars used at the former Almaden AFS were also used at the other stations. Consequently, the former Almaden AFS does not stand out as particularly significant compared to other radar stations in California, nor did it have enhanced responsibilities as a command center. It therefore does not appear eligible as a historic district on the National Register of Historic Places or the California Register of Historical Resources.

Of the forty-seven resources examined at the former Almaden Air Force Station on Mt. Umunhum and Mt. Thayer, none of the properties were found individually eligible for listing on the National Register or the California Register by Page & Turnbull, whether at the local, state, or national level. Most are support facilities or residences that are not significant architecturally and did not have an important function individually within the station. The four extant buildings that were most important to the station include Building 100 (the Operations Building); Building 102 (the concrete tower for the AN/FPS-24 radar); Building 108 (the steel tower for the AN/MPS-14 radar); and Building 110 (the original GATR building). However, these are not eligible due to lack of historic integrity. The concrete radar tower at Point Arena may better represent the AN/FPS-24 radar within the state, as it was the first of its type to be built and the building has already had complete exterior hazmat abatement. A rare fully intact AN-FPS-24 (the radar sail remains) is located at Camp Hero on Long Island, New York. A summary table of the report's conclusions is found in **I. Introduction** (See Table 1).

In conclusion, no buildings or structures at the former Almaden Air Force Station were determined eligible for listing, either as a historic district or individually, on the National Register of Historic Places or the California Register of Historical Resources.

VIII. RECOMMENDATIONS

Although none of the buildings, nor the site, qualify for the National Register of Historic Places or the California Register of Historical Resources, some of the structures are in good condition and are important representations of the historic background of the former base. Page & Turnbull was asked to provide recommendations for buildings that would be appropriate for re-use, should the District's site planning efforts determine that retaining one or more buildings is a viable option. Several individual buildings were found to be important, but they lacked sufficient integrity to be eligible for the National Register or California Register. However, because of their historic function or continuing potential for usefulness, these facilities could provide excellent opportunities for interpretation and/or reuse.

HISTORIC INTERPRETATION (BUILDINGS 102, 108, 110)

As previously discussed, the buildings that best represent the historic function of the former Almaden Air Force Station are all clustered at the top of the mountain. They include the concrete radar tower for the AN/FPS-24 (Building 102); the steel tower for the AN/MPS-14 (Building 108); and the Training Building (Building 110). It may be fair to say that nearly all the other buildings present at the former Almaden AFS were designed solely to support the functions of these facilities **(Figure 35)**. These buildings also exemplify typical construction methods, such as reinforced concrete construction and the prevalent use of pre-engineered steel Butler buildings. Thus, they are excellent candidates for interpretation.

Figure 35. Buildings 102, 108, and 110 in about 1969.
(Source: http://www.radomes.org/museum/)

Building 102 is the most impressive structure at the site. If it were to be retained, it could potentially be used as an interpretive center that discusses the historic use of the former Almaden AFS. Interpretive signage about the site, the building, and the AN/FPS-24 that was once located there could be installed. Any option for re-use of building 102 would require structural upgrades. If the interior space is utilized, additional code upgrades would be required and hazardous openings would need to be closed with appropriate screens or glazing. Conversely, the building could be fully sealed, the interior unused by visitors. In this case, the building would continue to serve as a local icon, and interpretive materials could be placed on the exterior.

Figure 36. Building 108 and 110, ca. 1969. (Source: http://www.radomes.org/museum/)

Figure 37. Buildings 108 and 110, 2010. (Source : Page & Turnbull, February 2010).

Building 108 is a steel structure that is not likely to be reused. However, its distinctive design makes it attractive for interpretation, and signage discussing its historic function could be placed at the base.

Building 110 is a good example of a typical steel Butler building, and it also housed an important communication function in the early days of the AFS **(Figures 36 and 37)**. This building could be used for interpretation or another function.

Access to this cluster of buildings is an important consideration. If vehicular access is anticipated, parking areas are already in place adjacent to Buildings 102 and 110. However, because the site

presents a spectacular natural viewpoint, the Midpeninsula Regional Open Space District may choose to restrict vehicle access to this area in order to eliminate soundscape intrusions from traffic, car stereos, slamming doors, etc. In this case, a parking area could be established lower down the mountain and visitors would walk up to the peak. However, access for the disabled would need to be provided to the top.

POTENTIAL MROSD FACILITIES (BUILDINGS 211, 212, 884B)

In addition to historic interpretation, there are also several buildings at the site that present good opportunities for reuse in support of day-to-day Midpeninsula Regional Open Space District operations, should such facilities be required. These include the Automotive Maintenance Facility (Building 211), which could be reused as a service/storage area for MROSD vehicles. Likewise, the adjacent Building 212 could provide storage facilities and a small office area for the MROSD. This Butler building is particularly attractive because it is screened behind a small slope and thus does not interrupt views in the area.

Fire protection remains an important consideration for the MROSD, and thus the Water Tower (884B) located approximately 200 yards upslope from the Auto Maintenance Shop might be retained. It appears to be in good condition and is generally screened by vegetation.

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