Re-use Study for

Tierra Amarilla AFS P-8 Radar Site Historic District

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for the
New Mexico Historic Preservation Division

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Cherry/See Architects 9/23/03

Iris Planted by a Sidewalk, Tierra Amarilla Radar Site

Introduction

Purpose of the Re-Use Study

In 1957, the United States Department of Defense acquired 107.26 acres of land in Rio Arriba County to construct a manned radar station to protect the national laboratories in New Mexico. As technology and defense policies changed the need for the site was diminished and by 1961 the property and the improvements were sold to the State of New Mexico.

The New Mexico Forestry and Resource Conservation Division occupied the site briefly, but it was ultimately abandoned, and turned over to Northern New Mexico Community College (NNMCC) by the New Mexico State Legislature for educational purposes. NNMCC has its main campus in Española and another campus in El Rito and cannot financially support a third campus at the Radar Site.

The site is on the State Register of Historic Places (Site # 1790) and was placed on the National Register of Historic Places on February 26, 2001. It is one of the first New Mexico sites from the Cold War to be nominated. The State Legislature has authorized the Historic Preservation Division to sponsor this study to propose uses for this site.

Intentions of Interested Parties

Northern New Mexico Community College, the owner of the site, does not have the resources to develop the site and operate it. The College would like to see the property remain in public service in some capacity. The Rio Arriba County Manager and the Chama Valley Independent School District Superintendent

would like to see the site cleaned up and put to good use for the citizens of the area.

Methodology

The scope of work for this study did not include additional research regarding the history or condition of the Tierra Amarilla Radar Site. Existing sources were reviewed and analyzed to develop the background necessary to propose uses for the site. No financial information is provided regarding rehabilitation or operating costs.

Web site and literature reviews provided information on how other Cold War sites, especially radar sites, are being used. Previous condition assessments, historic survey forms, and the National Register of Historic Places Nomination Form were reviewed, and that very helpful information was incorporated.

Numerous interviews with interested parties, in person and on the phone provided helpful information. The State Historic Preservation Division staff was very helpful as well. The site was visited and photographed extensively.

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1. Context and History of the Site

Radar Technology

Radar technology in the United States began in 1935 when the US Army began experimenting with high frequency radio waves and aiming them at aircraft. Army and private research in the early years of the World War II increased development of this tool that became known by the acronym, RADAR, for radio detection and ranging.

In 1940, as threats from Germany and Japan increased, the United States Army established the Air Defense Command (ADC). During the early years of World War II, a network of 95 radar stations operated along the eastern and western seaboards. Later in the war, it became apparent that the war was to be fought on foreign soil and US development of radar diminished. The British, however, suffering from German air attacks, continued intensive development of the technology.

After World War II, the Soviet threat began to loom on the defense horizon. It wasn't until 1949 that funding was made available to construct a permanent network of air defense radar sites. These sites were intended to protect the US from air strikes by the Soviets, especially strikes coming over the North Pole.

At first, it was thought that the Soviets would strike major cities and key military sites. Radar stations were installed to cover these sites. Later, it was assumed that Intercontinental Ballistic Missiles (ICBMs) would be launched at key sites. These required an early warning system that would allow time to launch defensive air craft to strike down the missiles en route, and possibly launch a counter attack.

The North American Air Defence Communication System established the Distant Early Warning Lines (DEW Lines) of radar stations on the perimeter of the US and in several rows in Canada (Figure 1.1)

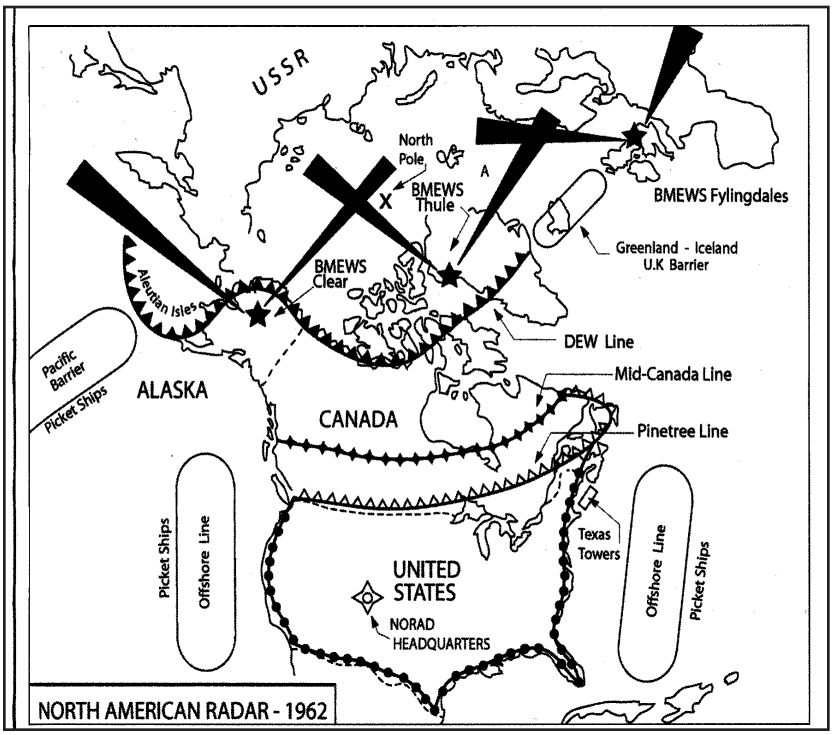


Figure 1.1 North American Radar, 1962. (McCamley, 2002: 41)

Radar Sites in New Mexico

In late 1948 and early 1949 ADC, reorganized under the Continental Air Command (CONAC), constructed 75 radar sites. The first of these defensive radar sites made use of existing WWII systems relocated to new sites. Known as Project Lashup, 44 of the sites were operational by mid-1950. Of those, the site near Tierra Amarilla, was activated in 1950. This site lay within the

area designated as the Albuquerque Air Defense and Interception Zone (ADIZ), was first identified as L-44, and later as LP-8/98.

While the large urban centers were afforded special radar protection, remote sites with unique defense purposes were also well protected. The national laboratories at Los Alamos and Albuquerque, New Mexico, were among these special sites. The plan for protecting the labs in New Mexico resulted in the development of two temporary and three permanent Air Control and Warning (AC&W) radar sites in New Mexico during the 1950s. The two temporary sites were at Walker AFB in Roswell and Kirtland AFB in Albuquerque and operated between December 1950 and November 1951. The three permanent sites were located in more remote areas near Moriarty (AFS-P7), Continental Divide (AFS-P51), and the Tierra Amarilla site (AFS-P8). These sites were backed up by fighter/interceptor squadrons located at Kirtland AFB and at Davis-Monthan AFB in Tucson, Arizona. Of the five original radar sites in New Mexico, only the Tierra Amarilla Radar Site remains in any way recognizable from that era.

The Tierra Amarilla Site

One of the earliest sites, AFS P-8, the focus of this study, was located west of Tierra Amarilla on the road to what is now the El Vado Lake State Park. The site is often referred to as “El Vado Radar Site. This site was the only one north of Los Alamos National Lab. The Air Force acquired the first 80 acres of the site for AFS P-8 in 1949 from local ranchers. Site acquisitions grew to 107 acres. The mesa top at 7280 feet offered a clear radar “view” for many miles.

Opening in 1950, initially in temporary facilities, the radar site was staffed by the 767th ACW Squadron. The first radar equipment was developed by Bell Telephone Laboratories and General Electric in 1945. It was transportable and was employed at other early

Lashup sites. The equipment was capable of searching up to 60 miles at 40,000 feet, and was operated by a crew of ten. The radar antenna was mounted on a platform of steel trusses, referred to as an "Arctic type" tower. It was a large oval dish that rotated 360 degrees. This apparatus has been removed.

Between 1950 and 1952, the permanent buildings were constructed based upon plans apparently developed by W.C. Kruger, a New Mexico Architect who later designed the State Capitol Building, and the U.S. Corps of Engineers. The design was comprised of a rectangular compound of buildings oriented to take advantage of the long dimension of the flat area of the mesa top. The compound configuration was similar to that of the radar stations at Moriarty and Continental Divide.

The AFS P-8 radar site was supposed to be staffed by 166 men, 16 officers and a commander with the rank of major, but it rarely if ever reached this population. Pressing Cold War defense matters in Korea and Europe had priority over the staffing of this remote radar station. Despite these shortages, records show that during one month (March, 1952) the staff plotted almost 7,000 aircraft at distances ranging up to 140 miles.

The remoteness of the site from larger cities called for provision of activities at the site. A basketball league played on an outdoor court. Bingo nights and movies contributed to squadron morale. In 1953, an indoor gymnasium was constructed to provide year round physical recreation. In the mid-1950s, the Air Force leased land for trailers for families.

As early as 1952, defense plans began to focus on the need for a Distant Early Warning (DEW) system across the northern portion of North America. Additional weapons technology focused on retaliatory attack systems including intercontinental ballistic missiles. By 1958, new air defense systems were being put in place. This approach was known as the Semi-Automatic Ground Environment (SAGE) System. This system delivered signals to

central operations facilities and reduced the need for radar stations staffed by large numbers of personnel. Given this new approach, the Tierra Amarillo site was deemed unnecessary and was closed on December 8, 1958, the first of the permanent New Mexico sites to close.

In 1960, the government Services Administration (GSA) conveyed the site to the State of New Mexico, finalizing the transfer on July 21, 1961. The state's Forestry and Resource Conservation Division used the station for a brief period of time. The state turned the site over to Northern New Mexico Community College (NNMCC), and the site remains unused to the present.

In May of 1997, the U.S. Army Corps of Engineers (USCE), Albuquerque District, submitted a report proposing three projects to investigate or remediate problems at the site: 1) underground storage tanks, 2) falling hazards associated with facility water tanks, and 3) facility landfill. In the late 1990s, the USCE removed two underground fuel storage tanks in the vicinity of the former radar tower, leaving the surface disturbed.

In the 1999 session, the New Mexico State Legislature directed the Office of Cultural Affairs to prepare the nomination for the National Register of Historic Places. Further, the Legislature requested a management plan for preserving and interpreting this Cold War site and developing it as an educational facility.

Opportunities and Limitations of Cold War Architecture

Cold War Architecture in the United States, and in most of the allied and ad versa rial countries that participated, is the epitome of functional optimization. The other purposes of architecture, such as elevation of the human spirit, are minimized. This architecture was built in a hurry, for singular purposes, and with absolutely no frills. Everything erected had a direct mission, or supported those who performed that mission. Even the presence of something like a gymnasium was intended to keep the mission staff fit and alert.

It has been said of Cold War Buildings that, “They’re function, not beautiful, which explains why they, and their Cold War cousins, aren’t exactly the darlings of the architecture critics.” (Bose, 2002,2)

The Soviet Radar Stations are perhaps even more stark than the US facilities. The “Hen House” and “Dog House” installations present even more difficulty in imagining an effective reuse (Figures 1.2 and 1.3). Even the Soviet public architecture of the time was dismal and purely functional.

Figure 1.2 Olenogorsk Hen House Radar Station (Intelligence Resource Program Web Site)

Figure 1.3 Kubinka Dog House Radar Station (Space Policy Project (FAS) Web Site)

There are a few exceptions to the rigid functional design approach of Cold War architecture. The British "ROTOR" Guardhouses of the early 1950s looked like little cottages out in the country (Figure 1.4). Beneath these charming cottages were large, bunkered basements where the staff worked and equipment hummed. Some of these basements were 40 feet underground and extended far beyond the limits of the footprint of the cottage. Below the roof tiles was a two-foot-thick, flat concrete slab roof. However, these charming bungalows were also purely functional in that they were the camouflage of the real purpose of the building.

Figure 1.4 British "ROTOR" Guardhouse (McCamley, 2002: 78).

The austere, functional, design of the American structures, mitigates against their adaptation to local peace-time activities. "American Cold War architecture suffers a curious fate. No one can deny its importance, its service to national defense. And yet, for the most part, we do not venerate abandoned Cold War landmarks in the way we do Civil War battlefields,

lavishing them with markers and plaques" (Bose, 2002,2). Those isolated from population centers suffer an additional difficulty in trying to attract new uses over a considerable distance.

The Tierra Amarilla Radar Site is isolated from population centers, and its architecture is definitely plain and simple. Its site plan is very effective, and was once even very attractively landscaped. This site has a great many advantages over other Cold War sites, and it is the positive attributes that we will seek to enhance in this study.

2. Existing Conditions

This chapter will describe the existing conditions of the site and buildings that affect the future uses. First we will describe the demographics and climate of the area. Next we will describe the site and building conditions.

Area Demographics

Rio Arriba County is located in north central New Mexico with its northern border abutting the State of Colorado. The county has grown by 2% annually over the past 10 years to 41,200 persons. The Chama Valley area population has increased by a similar percentage. Chama has 1,604 people as of the 2000 census and Tierra Amarilla has 750. Much of the county's population lives in a rural setting. The majority of the population is over the age of 20 with Chama area being 71% over the age of 20. The local school district's enrollment is around 600 students.

Much of the Chama Valley area economy is driven by tourism. Major attractions include the Cumbres-Toltec Railroad that connects Chama, NM with Antonito, Colorado,; El Vado and Heron Lakes and State Parks, and Corkin's Fishing Loge.

Climate

Climate information is included in this report for the benefit of prospective users of the Tierra Amarillo Radar Historic District Site. The data included below are compiled from New Mexico In Maps (Williams, 1986). It is probable that climate information was recorded when the Tierra Amarilla

Radar Site was occupied. However, location of that information is beyond the scope of this project. The dam site at El Vado Lake has recorded information, however, that site is much lower than the Radar Site and in a valley; so, the information below refers to information from Tierra Amarillo, unless otherwise noted.

Precipitation

According to the map in New Mexico In Maps (Williams, 1986, 43), the Tierra Amarillo Radar Site gets an average of between 16 and 20 inches of precipitation per year. As with most of the state, the months of highest precipitation are July and August.

Snow

Tierra Amarilla is the closest reporting site with an average annual snowfall of 65 inches. Chama, north of Tierra Amarilla by twelve miles reports an average annual snowfall of 102 inches. The Radar Site is higher than Tierra Amarilla, and further south than Chama.

Wind

New Mexico In Maps does not record wind data near the site. It does provide wind data for Santa Fe which has similar terrain. The data shows that in Santa Fe the wind is calm only 2% of the time. Dominant winds come from the northeast, north, and northwest, with the north wind blowing 43% of the time. The strongest winds are in the winter and spring.

Temperature

Chama is the closest recording station in our resource, and is slightly cooler than our site. On the average, Chama has 24 days per year with a temperature of 0 degrees F. Chama reports a maximum number of days below 0 degrees F at 48 since 1931. There is no record of Chama's having exceeded 100 degrees F. 85 degrees is the average warmest temperature, and 10 degrees is the average coldest temperature. The average lowest temperature is –17 degrees.

Cooling and Heating Degree Days

Again, Chama is the closest recording station in our resource, and is slightly cooler than our site. The cooling degree days are 100 or

under, indicating that no artificial cooling is necessary. Chama is just under 9000 heating degree days. Based on the map, it appears that 8000 would be the amount of heating degree days at the approximate location of our site.

Given the very high number of sunny days in all of New Mexico, this site would be an excellent opportunity for use of solar heating or electric generation, provided the application of the apparatus meets the Secretary of the Interior Standards. These standards could perhaps be met by the development of new, respectfully designed, structure(s) that concealed the apparatus visually and distributed the heat or electricity through the same means that these services were delivered.

Site Conditions

The Tierra Amarilla Radar Site is located approximately 8 miles southwest of Tierra Amarilla, the county seat of Rio Arriba County, New Mexico. The radar site is located on top of a mesa that rises from the road entry at 7200 feet of altitude up to 7301 feet at the upper surface. The mesa top was flattened more than the natural level when the installation was built, leaving a talus slope that has not completely revegetated even today (Figure 2.1). Views from the site are spectacular offering a 60-mile or more view to the east, south, and west (Figures 2.2, and 2.3). From the eastern edge of the site, the Chama Valley and the rock cliffs of Los Brazos can be viewed. The view to the north is blocked by the ridge that rises to 7400 feet.

Of the 107 acres originally acquired by the Air Force, only 42 acres make up the Historic District. This mesa top contains the primary structures built to support the radar mission

Figure 2.1. Talus slope of Radar Site viewed from southwest

Figure 2.2. View to southeast from the Radar Site

Figure 2.3. View to the west from the Radar Site

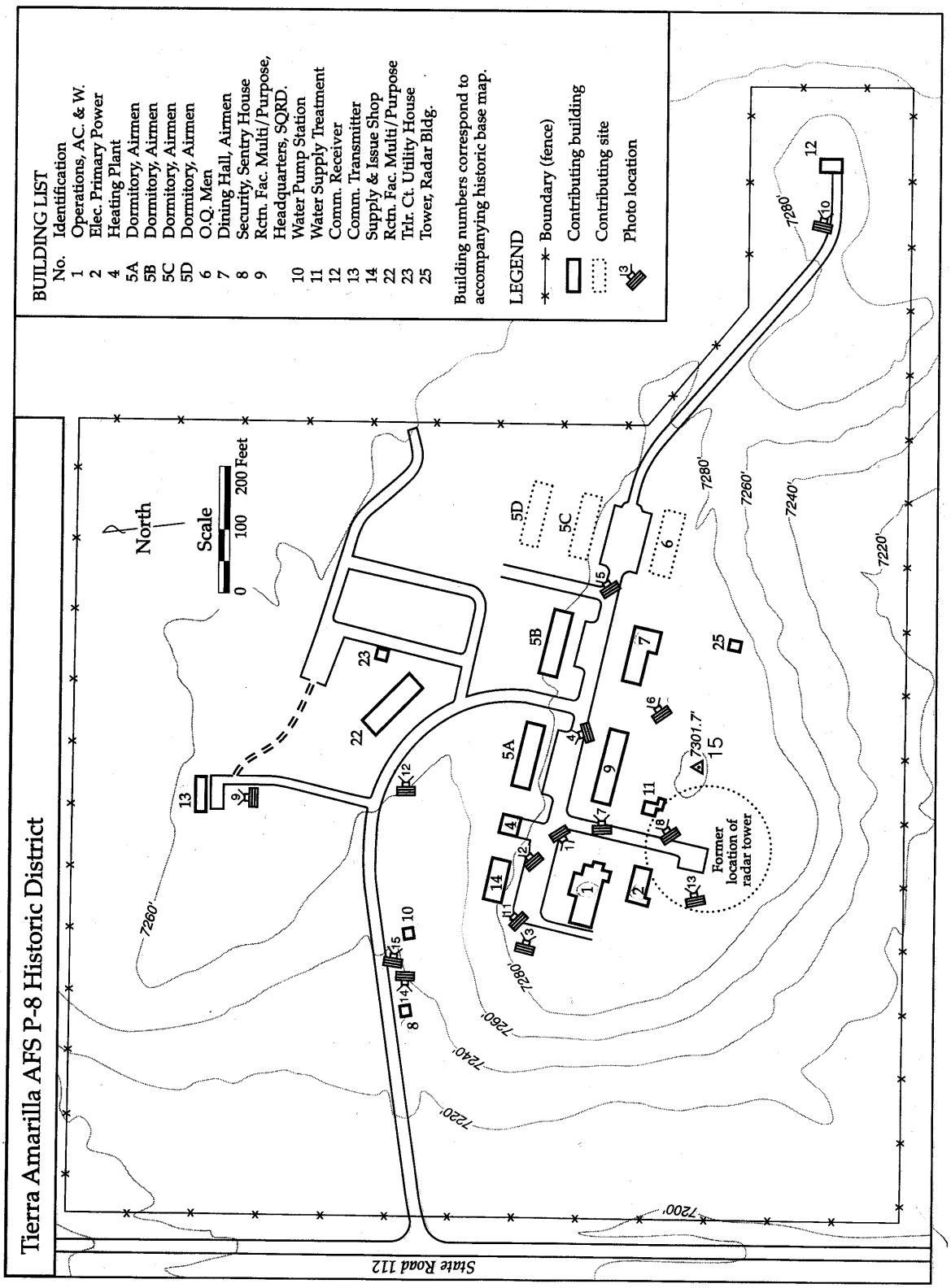


Figure 2.4. Site Plan of Historic District

Figure 2.5. Gate from Highway 114 to site

Figure 2.6. Trees line the curve in the entry road

Figure 2.7. Picnic Grounds and remains of stone walls

(Figure 2.4). The other land was used to accommodate trailers housing dependents of airmen and water wells. The core area was defined by an interior wire security fence. Beyond that fence to the east and down the slope were oxidation ponds.

The entry to the site is to the east off of Highway 112 (Figure 2.5). Judging by its design, the gate was added by the Forestry and Resource Conservation Division that occupied the site after the Air Force left. The asphalt road curves up and around to the south to the top of the mesa and the major area of the compound. Trees line the upper part of the entry road (Figure 2.6 taken in April before the trees leafed out) and the curve in the road bounds a picnic area that had concrete picnic tables and stone walls (Figure 2.7).

To the north of the entry road are located Building #13, the Communication Transmitter, a basketball court, Building #22, the Recreation Facility, Building #23, the Trailer Court Utility House, and the drives and parking ares for the Trailer Court.

The entry road intersects the axis of the major compound at right angles. The compound is formally laid out almost symmetrically on either side of the main street. Street trees lined the north side of the main street (Figure 2.8). The elevation of the floor level of the buildings to the south or the road is higher than that of the buildings to the north. The difference in elevation was managed by steps up to the Dining Hall (Building 7), Headquarters (Building 9), and the Officers Quarters (Building 6, now a foundation only). To the south of the compound, at the highest part of the mesa was the radar tower, marked today by the foundations (Figure 2.9). To the east of the tower's former location is the rubble and dirt piles left by the U.S. Corps of Engineers removal of fuel tanks.

The compactness of the core facilities is contrasted by the locations of three buildings. Building 12 is the Communications Receiver and is located far out to the east of

the core. Building 13 is the Communications Transmitter and is located to the north of the core, across the entry road. These two buildings were as far apart from each other and the radar tower as they could practically be in order to prevent their signals from interfering with each other. The technology of the time was unable to shield signals from other signals.

Building 22, the Recreation Facility Multi-Purpose Room, is also removed from the core. It was a later addition, and it was located near the residents of the trailer court.

Site Infrastructure

Electricity was generated on the site in Building #2 and boilers in Building #4 produced the hot water for heating the buildings with fin tube radiators. A 10,000 gallon diesel fuel underground storage tank was in place near Building #2 until its removal in 1997. Another 500 gallon diesel tank was located south of Building #7, the Dining Hall. This tank was removed in 1997 as well. Some piping is shown on the USGS Quad Map c. 1958 (see Appendix A).

The water supply was apparently provided by wells at the base of the mesa and through a pipe line from a near-by ranch, perhaps at different times. Two 60,000-gallon water tanks served the complex. These tanks were removed by the U. S. Corps of Engineers. Sewer treatment was apparently provided with on-site septic systems associated with the oxidation ponds located 1200 feet to the east of the Building 22, the Recreation Building.

The electric supply lines were above grade on poles. Only one major set of poles remains standing. The lower portions of most poles have been sawed off and removed. The crossbars of the transmission lines remain on the site in various places with insulators and some cable. In one case location near Building 23, transformers are still connected to the crossbars and there is fluid leaking from the transformer (Figure 2.10. This power pole was in place in an August 1995 Videotape.).

Figure 2.8 Trees lining “Main Street”

Figure 2.9 Foundation of Radar Tower

Figure 2.10 Remains of a pole mounted electric transformer

Other potentially hazardous waste remains on the site. A pipe which appears to be a heating pipe lies on the ground west of the Dining Room, Building #7, surrounded by a white fibrous material that should be tested for asbestos and removed properly (Figure 2.11). This pipe could have been left when the fuel storage tank near the Dining Hall was removed.

In addition to these examples of materials that might be hazardous, there is a great deal of debris of various types strewn about the site and dumped such as that near Building 12 (Figure 2.12). Some of the metal objects are sharp and present their own hazards.

Building Conditions

In January, 2000, the Alliance for Transportation Research Institute at the University of New Mexico prepared a report on the condition of the buildings at the Tierra Amarilla Radar Site. The report, signed by Robert McKeen, Professional Engineer, catagorized the buildings by type of construction as follows:

Type I Construction
Reinforced concrete frame with masonry-block infill; slab-on-ground floors.

Type II Construction
Masonry walls on slab-on ground floors.

Type III Construction
Wood frame with pitched or flat roof, concrete footings or slab-on ground foundations.

The report indicates that the Type I and II buildings are generally in good condition. Window glass is broken out, but the building shell is relatively sound. Type III buildings

Figure 2.11 Pipe with suspected asbestos insulation

Figure 2.12 Debris dumped near Building 12

Figure 2.13 Building #1, Operations, East Facade

are seriously deteriorated at the roof which is causing water damage elsewhere. The wood roof structures are not failing as of yet. Ceiling and wall finishes are deteriorating and littering the floors. All of the window glass is broken out.

The buildings are presented in order of their numbers on the map of the Historic District. This order is not necessarily the order of their importance.

Building #1, Operations

This building has approximately 3,415 square feet. It is Construction Type I with a concrete roof and a small basement. A garage is located at the rear west side and there is a higher ceiling over that area. There is a tower on the northeast corner. The roof is formed with a slight overhang on the raised portion of this one story building and on the tower as well (Figure 2.13 and 2.14).

The main entry faces east toward the rest of the complex. The door is clad with metal sheathing and is covered with a small cantelevered concrete hood and a small wood framed porch. The front door leads to a central hall with concrete-walled rooms on either side (Figure 2.15).

The only windows in the building are on the rear, or west portion of the buiding, possibly an addition to the original building. These windows are single metal-frame hopper windows. The walls of the tower have louvered openings.

Building #2, Electric Primary Power

This building, with an area of 1,572 square feet, is of Type II construction with a concrete roof deck penetrated with four metal exhaust pipes. The roof structure is cast-in-place concrete beams. It is located immediately south of the Operations Building (#1). The east elevation has a large

Figure 2.14 Northwest corner of Building #1, Operations

Figure 2.15 Corridor of Building #1, Operations

Figure 2.16 West Facade, Building #2, Electric Primary Power

Figure 2.17 South Facade, Building #2, Electric Primary Power

Figure 2.18 Interior, Building #2, Electric Primary Power

Figure 2.19 East Facade, Building #4, Heating Plant

garage door opening flanked by a louvered opening to the south and a personnel door on the north. A louvered opening and a door are located on the west elevation (Figure 2.16). The south elevation is without fenestration (Figure 2.17) Two single fixed steel casement windows with four lights each are the only fenestration. Markings on the floor and the metal exhaust pipes indicate that there were four fairly large generators in the building (Figure 2.18).

Building #3, (Number Not Used. On the USGS Quad Map in Appendix A, this number refers to a small building south of the Building #7, Dining Hall, that is called "Club Service".)

Building #4, Heating Plant

This 1,275 square foot building is of Type II construction with concrete roof deck and structure. Apparently, the south portion of the building was added after the north portion was built. It has seven large windows , three on the east side and four on the west (Figures 2.19 and 2.20). The west windows are mounted above louvered openings. The building houses two Kewanee Portable Fireboy Boilers with brick bases (Figure 2.21) and one smaller unit (Figure 2.22). The boilers have an insulation material that should be tested for asbestos. In places the material is flaking off, presenting further hazard if it is asbestos.

Figure 2.20 West Facade, Building #4, Heating Plant

Figure 2.21 Boilers, Building #4, Heating Plant

Figure 2.22 Portable Boiler, Building #4, Heating Plant

Building #5-A, Airmen's Dormitory
This building of 5,710 square feet is a two-story building of Type III construction. The roof structure is wood trusses and deck with a low-sloped hip (Figure 2.23). The roof has eaves on all four sides. The roof is badly deteriorated, and water leaks are causing damage to interior materials. Windows on the first floor have a canopy over them to block the sun. The exterior siding is cement shingles, probably containing asbestos. A small balcony is on either end of the upper corridor with a door with three, square windows. The windows are regularly spaced with eleven units on each side, both floors. The windows are steel frame hopper type. Almost every pane is broken.

Building #5B, Airmen's Dormitory
This building is identical to Building #5-A (Figure 2.24). This design is a standard Bachelor Officers Quarters (BOQ) type dormitory. The plan of both buildings is a central hall with barracks type rooms on either side and an internal stair. The interior walls are wood stud with gypsum board that is deteriorating (Figure 2.25). The ceiling tiles and other finishes are being damaged by water.

Foundations for Buildings #5C, #5D, Airmen's Dormitories, and #6, Officers Quarters
The building proportions are the same as buildings 5A and 5B. The perimeter stem wall supported the load bearing exterior wall. The corridor walls were supported on piers with beams supporting the floor deck. The bolts that secured the floor plates are still in place on most of the stem walls and piers (Figures 2.26 and 2.27). These bolts are somewhat of a hazard. The bottom of what was the crawl space is about 3 feet below the top of the stem wall. This level change could be a hazard as well.

Building #7, Dining Hall
The Dining Hall has 2,090 square feet and is Type III construction. The building structure is in good condition

Figure 2.23 Southeast Corner of Building #5-A, Airmen's Dormitory

Figure 2.24 Southwest Corner of Building #5-B, Airmen's Dormitory

Figure 2.25 Interior Corridor, Building #5-B, Airmen's Dormitory

Figure 2.26 Foundations of Buildng #5C, Airmen's Dormitory

Figure 2.27 Foundation of Building #6, Officers Quarters

Figure 2.28 Southwest corner of Building #7, Dining Hall

with the exception of the southeast corner. It looks as if this corner was demolished intentionally, perhaps to remove some equipment. The roof is wood trusses with wood deck. It is badly deteriorated and the roof leaks are ruining interior materials. The exterior material is cement-asbestos shingles as found on the dormitories. Steps led up from the main road to the north entry. The south elevation had enclosed wood porches with large, fixed glass windows now all destroyed (Figures 2.28 and 2.29).

The interior plan had the dining area on the west, kitchen on the east, and food service in the middle. A vent hood and some other sheet metal fixtures are still in place. Portions of the floor are dark red quarry tile (Figures 2.30 and 2.31)

Building #8, Security Guardhouse

This building is a small (96 square feet), one story, frame structure located on the main entry road, about 300 feet from the entry gate off NM State Road 112 (Figure 2.32). It has a concrete foundation, cement-asbestos shingle siding, and a flat, asphalt roof with a wide overhang. Large wood framed windows with multiple panes on the north, east, and west elevations allow a clear view of the road. The concrete slab extends to the north under the overhang, allowing a porch for the guard to stand outside to approach vehicles.

Building #9, Recreational Facility, Multi-Purpose, Squadron Headquarters Building

This facility of 2,789 square feet is of Type III construction. It has a low sloped, hipped roof with a wide overhang (Figure 2.33). The roof structure is wood trusses. The building is sheathed in cement-asbestos shingles. Two entries face north and contain three-panel wood doors with three small square panes with a transom above. Windows are grouped, large-light, metal framed, fixed panes. The east portion of the building consists of three large rooms, used apparently as offices. The west portion consists of a large single room (Figure 2.34) with a large overhead rolling garage door (Figure 2.35).

Figure 2.29 East end of south facade of Buildling #7

Figure 2.30 Interior of Building #7 Kitchen. Imprint of service counter in foreground

Figure 2.31 Dining area of Building #7, looking west

Figure 2.32 West facade of Building #8, Guard House

Figure 2.33 South facade of Building #9, Recreation Facility/Squadron Headquarters

Figure 2.34 High bay of Building #9, looking west

Figure 2.35 North facade, west end of Building #9, overhead door

Figure 2.36 Building #10, Water Pump Station

Figure 2.37 Building #11, Water Supply Treatment

Figure 2.38 Building #11, Water Storage Tank

Figure 2.39 Building #12, Commuication Receiver

Figure 2.40 Buiding #13, Communication Transmitter

Building #10, Water Pump Station
The Water Pump Station is a 99 square foot building of Type 22 construction (Figure 2.36). It has a concrete foundation and a flat roof. It housed the motors that pumped water from the wells. There are no windows, and the door panel is missing from the frame.

Building #11, Water Supply Treatment Building
This building is a Type II construction containing 532 square feet. It has a concrete foundation and a flat roof (Figure 2.37). The building is composed of two rectangular boxes. The door panels are missing. Windows are steel-framed, large light, hopper windows. A large steel tank is located in the west room, supported on a concrete base (Figure 2.38).

Building #12, Communications Receiver
Located approximately 600 feet east of the main campus, this facility of 684 square feet is of Type II construction. It has a concrete foundation and a flat roof with a small overhang (Figure 2.39). The dimensions of the building are 18'-8 by 36'. A concrete block chimney rises above the roof. Eleven holes lined horizontally under the west overhang apparently allowed communication cables to connect to the main facilities. Wood panel doors and small metal louvered rectangles are the only openings.

Building #13, Communications Transmitter
This building, also remote from the main campus by about 600 feet to the north, is similar to Building #12 (Figure 2.40). This building is larger than Building #12 with 1,083 square feet. Its dimensions are 18'-8" by 36'. It also has about twice as many holes lined under the overhang as Building #12.

Building #14, Supply and Issue Shop
The Supply and Issue Shop is a Type III construction with an area of 1,621 square feet on the ground floor. It has a small basement on the north side. The roof consists of wood trusses and a broadly pitched hipped roof covered with composition rolled roofing. The siding is cement-asbestos shingles as with the other buildings of Type III construction (Figure 2.41). The

Figure 2.41 Building #14, Supply and Issue Shop Southeast Corner

Figure 2.42 Building #14, Supply and Issue Shop Work Bay

Figure 2.43 Builidng #14, Supply and Issue Shop Tool Storage

plan is rectangular with the entry on the south side. There is an overhead door to the work bay on the west end (Figure 2.42). Windows are grouped steel framed hoppers located on the north and south elevations. A portion of the east wall is painted with a tool storage guide (Figure 2.43). It is not known if this storage guide was from the Air Force occupation or the State Forestry and Resource Conservation Division period.

Buildings #15: Location of Former Auto Maintenance Shop
This building has been removed. The foundations are not apparent and may have been removed with the removal of the underground storage tanks. The location shown on the map in Figure 2.4 is the approximate location where the underground storage tanks were removed.

Buildings #16-22, (Numbers Not Used. The USGS Map, Appendix A indicates theses numbers as Storage Sheds and Canine Kennels. Number M-18 on that map refers to the basketball court and a "Recreational Court.))

Building #22, Recreation Facility
Probably the last building built at the site, this facility is located immediately north of the entry road as it curves toward the south and up toward the top of the mesa. The building is of Type III construction and contains approximately 4,000 square feet (McKeen, 2000. Dimensions indicate 3.060 square feet. McKeen notes the discrepancy). The building has two parts, the gymnasium on the east and the canteen/game room on the west (Figure 2.44). The gym has a higher ceiling and a pitched roof. The canteen/game room has a lower ceiling and a hipped roof. Both roofs are wood trusses with wood deck.

The gymnasium has a wood floor that is not yet ruined by water, but will be ruined in a short time (Figure 2.45). The roof leaks throughout the building have destroyed the ceiling tile and much of the gypsum wall board.

Openings consist of two entries on the south elevation and a single entry on the north. These openings have wood framed entry sheds. Entries leading to the east section have paired

Figure 2.44 Building 22, Recreation Facility, Southwest Corner

Figure 2.45 Building 22, Recreation Facility, Multi-Purpose Room

Figure 2.46 Builiding #23, Trailer Court Utility House, Southeast Corner

doors with four panes, and the entry to the west section is a wood panel door with four panes. Windows in the east portion are paired steel-framed hoppers placed along the top of the walls on the north and south sides.

Building #23, Trailer Court Utility House
This Type III construction structure has 144 square feet within a rectangular plan (Figure 2.46). The roof, like the other Type III structures is wood frame with wood deck. It is located adjacent to the driveway pattern that housed the Trailer Court.

The roof is pitched and is badly deteriorated. There is a door facing east that is a five-paneled door in a wood frame. The windows are steel framed casements.

Building #24, (Number Not Used. This number does not appear on the USGS map either.)

Building #25, Paint Storage Building
The Paint Storage Building has an area of 80 square feet and is of Type II construction (Figure 2.47). It is located remotely probably because paint storage is considered a potential fire hazard.

Figure 2.47 Builidng #25, Paint Storage Building, West Facade

In summary, all the major buildings are in good condition structurally. The buildings with wood roofs are in desperate need of reroofing. Interior finishes in the buildings with wood roofs are deteriorated to the extent that they will have to be replaced. All buildings maintain a high degree of historical integrity.

The total square footage of the buildings is shown in the following chart:

Bldg No.	Building Name	Square Feet	Demolished
1	Operations	3,415	
2	Electric Primary Power Plant	1,572	
3	Club Service	-	x
4	Heating Plant	1,275	
5A	Airmen's Dormitory	5,710	
5B	Airmen's Dormitory	5,710	
6	Club Service	-	x
7	Dining Hall	2,090	
8	Security Guard Housee	96	
9	Recreation Facilitiy/Squadron		
	Headquarters	2,789	
10	Water Pump Station	99	
11	Water Supply Treatment	532	
12	Communication Receiver	684	
13	Communication Transmitter	1,083	
14	Supply and Issue Shop	1,621	
22	Recreation Facility	3,060	
25	Paint Storage	80	
	Total Area of Buildings	**29,816**	

The only significant change to the historic integrity of the site is the removal of the radar tower. The site layout is intact although the road asphalt is deteriorating and pedestrian circulation, both walks and stairs, are deteriorating as is the basketball court.

Almost all buildings and certain areas of the site appear to contain hazardous materials. The presence of these materials is the most serious challenge to reutilization of this historic resource.

3. Similar Sites and Their Reuse

What Has Happened to Similar Cold War Sites?

The purpose of this study is to recommend reuses for the Tierra Amarilla Radar Site. Some ideas for reuse of the site may be gleaned by a review of other Cold War sites and their reuses. There are many types of Cold War sites and each type offers different opportunities. Our review will focus on radar sites, but we will look briefly at missile silo sites. The missile silo sites have two things in common with the Tierra Amarilla site: (1) they are usually remote from urban areas, and (2) they often have housing and other similar support buildings.

The Air Defense Veterans Association has an active web site (Radomes Inc, http://www.radomes.org) that provides a listing of over 700 radar sites of various types. Almost all of the sites are United States site. Some of the listed sites are duplications, for example "Tierra Amarilla" is also listed as "El Vado." However, the listing is very useful in that is provides the current uses of the sites, if the use is known to the organization.

The vast majority of the radar sites on the Radomes web site are still being used for some type of radar function such as the Federal Aviation Administration (FAA) sites. Fifty-one of the sites are FAA sites. Another 50 sites are Joint Surveillance System (JSS) sites where more than one agency shares a site, such as the Air Force, or Army and the FAA. Twenty-nine of the sites are noted as totally removed. Fifty-three of the sites are mostly removed.

Of the sites cataloged by Radomes that are being used for purposes other than radar, five sites are being used as prisons,

presumably minimum security facilities. Two sites are ski areas. Training sites for National Guard and commercial television antennas are also listed, as is one national cemetery.

N. J. McCamley in his book, Cold War Secret Nuclear Bunkers, (McCamley, 2002) referred to in Chapter 1, provides a listing of British "ROTOR" installations and their status. Many of them are being used for radar communications purposes, as in the US. Also, many are abandoned and falling into disrepair, as in the US. However, some are being used for new purposes and are worthy of cataloging as part of this research.

Research into other sources has produced additional uses, some in the planning stages. The listing below is organized by radar sites first and missile silos last. The sites are arranged in alphabetical order according to state, then listings from the United Kingdom sites in alphabetical order by city. Many of these sites either are museums or are being planned as museums. Some are associated with National Park Service sites.

Uses For Radar Sites

United States Radar Sites

Dauphin Island, Alabama
A USAF radar site on Dauphin Island, Alabama, is being integrated into a Sealab consortium project to construct wetlands and a nature center. It was determined ineligible for the National Register because of loss of historic integrity (DOD, 1994, 29).

Boron AFS, California
This site is being used as a federal prison (Radomes, Inc.).

Savannah AFS (Hunter AFB), Georgia
This site is being used as a National Guard training site (Radomes, Inc.).

Rockville AFS, Indiana
This site is being used as a prison (Radomes, Inc.).

Charleston AFS, Maine
This site is being used as a prison (Radomes, Inc.).

Fort Heath, Winthrop, Massachusetts
The site is now a city park (Radomes, Inc.).

Fordland AFS, Missouri
This site is being used as a prison (Radomes, Inc.).

Painesdale, Mississippi
This site is now used as a commercial TV transmitter site (Radomes, Inc.).

Snelling AFS, Montana
The site is now Fort Snelling National Cemetery (Radomes, Inc.).

Camp Evans, Monmouth County, New Jersey
This area, related to where Marconi invented the "wireless telegraph" has been placed on the National Register of Historic Places. In addition to being a radar site, many WWII radar components were invented and manufactured here. INFOAGE, Inc, a nonprofit corporation is taking over the responsibility for the site. "Our goal is to save Camp Evans and creatively reuse the historic buildings and grounds as a science history center focused on communications, computer, radio technology and radio entertainment history." (Quote of Fred Carl, Director. Harnes, 2002, 2).

Fort Hancock, New Jersey
A former Nike missile site that includes a separate radar installation can be visited by the public (Bender, 2003).

Montauk Island, New York
The Montauk Radar Preservation Group is seeking to protect this radar site from further demolition. Now operated by the

New York State Office of Parks, Recreation and Historic Preservation. The 85 foot tall tower and a number of buildings still remain. The tower will eventually be opened to the public as an observation tower. (Bender, 2000,1 and Bender, 2003).

New Windsor, New York
"The block house" sits tucked into a far corner of Stewart International Airport in New Windsor. It opened in 1958 with the official name of "Semi-Automatic Ground Environment (SAGE) Direction Center on the military base that occupied the present airport grounds. "It housed part of the military's first major computer based command and control system, a precursor of today's Internet." Individuals from nearby New Paltz, NY, hope to reuse it as a Cold War museum. (Benjamin, 2001, 1)

New York, New York
The former Control Area of Nike missile battery NY-79/80, a Cold War anti-aircraft missile site, is now serving as studios for local artists (Bender, 2003)

Watertown AFS, New York
This site is being used as a prison (Radomes, Inc.).

Clayburg AFS, Pennsylvania
This site is being used as a ski area (Radomes, Inc.).

Oakdale Army Installation, Pennsylvania
Oakdale contained a Cold War ear Air Force long-range radar site as well as an Army operated regional missile control facility. The radar site is presently being used by the FAA. This site and three other regional sites are likely to become components in a Cold War historic district. The Oakdale site is envisioned as becoming a historic site and museum (Bender, 2003).

United Kingdom Radar Sites (McCamley, 2002, 97)

Anstruther (Fife)
The facility has been open to the public as a tourist attraction since 1994.

Bawburgh (Norfolk)
Now owned by Highpoint Communications, who uses the surface compound as a transmitter site. The underground areas are not used.

Hackgreen (Cheshire)
The site is now a cold war museum.

Hope Cove
Site is in private ownership and is being used as a fodder store.

Langtoft (Peterborough)
Commercial use.

Sandwich (Kent)
Now a commercial high-security computer center.

Seaton Snook (Northumberland)
For many years was a yard for a construction company.

Snaefell (Isle of Man)
The site houses a motorcycle museum.

Sopley (Hampshire)
This site is in private hands as a high security storage operated by BDM Logistics.

St. Twynell's (Milford Haven)
In poor condition, the site is being used for agricultural purposes.

Truleigh Hill
The surface buildings are used as a privately run radio communications technical site.

Wartling (East Sussex)
The guardhouse is now a private residence.

Uses For Missile Sites

There were originally 54 Titan II missile sites in the US. Titans remained in use until 1987 to launch weather and communications satellites (Titan, 3).

Sahuarita, Arizona
The Titan Missile Museum is on the site of the Davis-Monthan Air Force Base near Tucson, Arizona. This museum has operated since 1986, and has deactivated missiles in place in silos (Titan, 2) .

Marin County, California
The National Park Service operates Ft. Barry where visitors can view three disarmed Hercules missiles in a cavernous underground battery. (Benjamin, 2001, 2)

Whiteman Air Force Base, Missouri
The state is attempting to gain control of a Minuteman II ICBM silo. The state would like to develop the site for interpretation in conjunction with the former Soviet Union for the public to view sister silo museums (DOD, 1994, 30).

Wichita, Kansas
McConnell Air Force Base (site of 18 Titan missile sites) is now the home of a Titan Missile Museum (Titan, 3).

Roswell, New Mexico
Two former Atlas F missile silos, comprising 1.2 million cubic feet of usable space "built to withstand most natural disasters and perils of mankind" will be used by Strategic Data Services, Inc for data and archival storage. The space will be rented to commercial and institutional concerns who have a need for secure storage.

New York (Upper State)
Atlas F ICBM silo has become a 4,000 square foot home carrying a $2.4 million price tag
(Bose, 2002, 3).

Badlands National Park, South Dakota
The National Park Service is considering adding this Minuteman II ICBM site to the nearby Badlands National Park and providing interpretation (DOD, 1994, 30).

Lorton, Virginia
The Cold War Museum is in negotiations with Fairfax County Park Authority to locate at the former Nike Missile Base in Lorton, Virginia. The Cold War Museum has become an affiliate of the Smithsonian Institution (Powers, 2002, 1).

Relevance to the Tierra Amarilla Radar Site

The uses above that require an urban population base such as the commercial ventures and, perhaps, the museums have little application to this beautiful, but remote site in Rio Arriba County. Use as a radar station appears out of the question given that while other radar sites have been selected for continued operation, this one has not. It is difficult to imagine that political or technical circumstances might change to the extent that the Air Force or the FAA would consider reusing the site.

A national cemetery site is not likely because they are usually located near urban areas, such as the one in Santa Fe, or former military bases. There is a national cemetery at Ft. Bayard in southern New Mexico, however, its location there is a matter of history, more than a contemporary choice of sites. A new military cemetery is being considered for New Mexico, but the sites are all near urban areas.

The idea of using the site as a prison is a possibility, however, today's prison architecture is very complicated and heavy duty compared to the architecture of the Tierra Amarillo Radar Site. The County Manager of Rio Arriba County, Lorenzo Valdez, reports that the County did consider the site for a detention center, but has since purchased other property, especially due to the hazardous conditions at the site (Valdez, L, 2003).

Assuming a way of financing the clean-up can be found, the site could be used for a minimum security facility, such as a drug rehabilitation facility or a boys or girls ranch type of facility.

The following chapter will consider this and other possibilities for the site.

4. Recommendations and Reuse Potential

First Actions

No reuse of the Tierra Amarilla Radar Site Historic District is possible until the hazardous waste is removed, and the site is made safe for construction workers to make repairs. The process should include:

Step 1: Hazardous Material Assessment

An assessment by certified professionals must be conducted to determine the presence of hazardous materials. The possible hazards include but are not limited to:

- the fluid leaking from the downed transformers which could contain PCBs, a carcinogenic material
- friable (flacking) asbestos insulation on boilers and pipes (some pipes are loose on the ground; others are still in their original places)
- broken cement-asbestos siding panels
- vinyl-asbestos flooring and mastic
- lead based paint
- ceiling tiles and mastic that may contain asbestos
- glazing putty that may contain asbestos
- roof flashing mastic
- other asbestos containing materials used in the 1950s

The professional hazardous material assessors are the ones who should make the determination about what items should be tested. This work may have to be accomplished in two stages: (1) to visit the site and decide what tests should be made, and (2) the actual taking of the samples and testing. The scope of work of the assessment should require an estimate of the abatement design and abatement, itself.

Step 2: Design of the Abatement Process
Again, a certified professional must design the abatement process, based upon the results of the testing process. The scope of work of the abatement design should include the preparation of an estimate of the cost of the abatement work. The specifications should include proper protections for the Owner in the form of appropriate liability insurance.

Step 3: The Abatement of the Hazardous Material
Again, certified professionals should conduct the work according to the standards of the industry.

In the abatement process, one unique problem exists. In rehabilitating historic structures, it is important to preserve features and materials that are character defining. Many of the buildings are covered with cement-asbestos shingle siding and this siding contributes to the architectural character of the buildings. The hazardous material professional should make a determination regarding the safety of leaving this material or replacing it. If it must be replaced, the removal should not be scheduled until replacement siding is available immediately to be put in place. Removal of all the original shingles without protecting the buildings with a replacement shingle, would expose the buildings to further, and more rapid deterioration.

If it is possible to preserve unbroken shingles in place safely, it would help maintain the historic integrity of the buildings. Nonhazardous material that matches the originals shingles are available. It may be possible to install replacement shingles of a non-hazardous material in place of the broken cement asbestos shingles.

In the above steps, all the site should be surveyed and abated, not just the area immediately around the buildings, because contaminants may have been spread. The future use of the site depends on providing the Owner, or the Owner's tenant, with the assurance that it is safe for people to visit or live at the site.

How Can the Abatement Work Be Financed?

The hazardous materials on the site were all there prior to the transfer of ownership to Northern New Mexico Community College. Presumably, these materials were all part of the original construction work. Apparently, the task of the Army Corps of Engineers in 1997, was limited to removal of underground storage tanks only. None of the other hazards were dealt with at that time. This effort could have been limited by the funding source.

It does not seem fruitful to try to establish responsibility for the hazardous materials at the site. To do so would possibly take years in court and thousands of dollars in legal fees. The time and money is much better spent on the rehabilitation of the property. It is clear that agents of the taxpayers created the hazards, and it appears that the taxpayers will have to pay for the abatement.

A visit to the U.S. Environmental Protection Agency's web site (http://www.epa.gov/brownfields/glossary.htm#brow) offers the following definition for a brownfield site: "The term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." On the surface, this definition seems to fit the Tierra Amarilla Radar Site perfectly, however, there are exceptions to the definition that involve legal references which require the interpretation of a lawyer trained in environmental law.

Assuming that this site could be designated a Brownfield, other possibilities exist. The Brownfields Federal Partnership Action Agenda, according to the EPA Brownfields Cleanup and Redevelopment web site (http://www.epa.gov/frownfields/partnr.htm), is intended to undertake partnerships "to help

communities deal with brownfields and associated problems." The website mentions "Pilots/Grants." It might be necessary for Northern New Mexico Community College, the County of Rio Arriba, and the New Mexico Environment Department to approach the EPA with a proposal for a Federal Partnership to abate the hazardous material at the Tierra Amarilla Radar Site. It may be that some matching funds would need to be requested of the New Mexico State Legislature, even though the pollution was put in place with Federal dollars.

It appears that economic development is one of the goals of the Brownfields Federal Partnership Action Agenda, and the case can certainly be made that if the site were put back into use, there would be construction and operation jobs related to its renewed service. Any use that brought people to the site to use the dormitories would have an associated benefit to the surrounding area in additional customers for food service, vehicle fuel and repair, and recreational services.

The environmental cleanup has to happen, no matter what the future use might be. The buildings cannot be demolished, even if they were not listed on the State Register of Historic Places, without first removing the hazardous waste. Allowing the site to deteriorate further is not acceptable because the hazardous material would in time turn to dust, move into the soil, air, and water system. So, the cost of the environmental clean-up has to be spent, the sooner, the better environmentally; the sooner the better economically.

Additional Site Clean-Up and Stabilization

Once the hazardous materials are removed from the site, the next step is to have the debris and garbage removed and prevent further damage to the buildings. The buildings that are the most vulnerable are those with wood truss roofs, specifically Buildings #5-A, 5-B, 7, 8, 9, 14, 22, and 23. These buildings need to have the roofs repaired and be made water tight.

The window and door openings should be covered with plywood secured to the frames to keep out the water and deter intruders. The concrete block buildings are less vulnerable to the elements, but they should be stabilized as well by covering the windows and doors with plywood.

This stabilization should happen to all of the contributing buildings, even if no plans for their reuse are foreseen. In the future, the buildings that are not used for the major purpose assigned to the site can be used for interpretation and education regarding the history of the Cold War.

Positive Attributes and Disincentives

Positive Attributes

The site has a number of positive attributes. The surrounding natural setting and views are spectacular. The climate is sunny and allows for outdoor use over ninety percent of the year. The night sky is absent of light pollution, and star gazing can be a wondrous experience, if one is dressed warmly in winter.

The location is near an important New Mexico State Park at El Vado Lake. It is near popular fishing streams, rivers, and lakes and within an easy drive to National Forests. Tierra Amarilla and Chama offer schools, health care facilities, and commercial retail facilities for supplies.

The building stock is diverse and would permit a variety of activities. The building structural systems are sound. The campus layout lends itself to the use of a social community and the relatively compact area allows for fairly efficient maintenance.

The site is an Historic District. Federal and State tax credits would be available to a tenant who leased the site for thrity-nine and five-years, respectively, and rehabilitated the buildings, or stabilized some and rehabilitated others.

Disincentives

The site has a variety of hazardous materials still in place from its original use. As far as we know, these materials are all familiar to abatement professionals, and their removal is a matter of money, not development of new technology.

The site infrastructure (power, water, and sewer) are probably not usable and would have to be repaired or replaced.

The building stock needs to be stabilized to prevent further deterioration until a use can be found. The cost of rehabilitation of the buildings and grounds requires financing beyond the abilities of the Owner. The availability of Federal and State Tax Credits for Rehabilitation are not an advantage to a not-for-profit owner such as Northern New Mexico Community College.

Educational Potential of the Site and Its History

Architecture and the way it is positioned on a site is always social evidence. That is why archaeologists can excavate a site and draw conclusions about what life was like for those who lived and worked there. The Tierra Amarilla Radar Site tells a part of the story of a nation that was prepared for an attack by the Soviets; a nation that sought a warning prior to that attack. This was a time when families, especially in urban areas, built air raid shelters in their back yards. Children, such as this researcher, practiced air raid warnings in school, huddled under a school desk away from windows that might break, not realizing that broken glass was far less deadly than radiation.

There are also important lessons that this site teaches about technology: its advantages and its limitations. The communications technology illustrated by this installation has evolved to allow a person to make a telephone (from the Greek for “far” and “sound”) call from a street corner to almost anywhere in the world without a wire. At the same time, the

site illustrates that ideas such as material technology may have unforeseen consequences. The asbestos that insulated pipes and thereby conserved fuel or made floor tile resistant to wear turned out to do more harm than good. The PCBs that efficiently cooled a transformer, had an unintended consequence that we must clean up very carefully. If the site is designated as a "Brownfield" the reasons for that designation and the clean-up process are also important lessons to teach.

Radomes Inc., the Air Defense Veterans Association (see Bibliography for web site address) is an organization of veterans who staffed the radar sites during the Cold War. It is likely that veterans who served at the Tierra Amarilla site could provide oral histories that would be valuable additions to the visitors educational experience at the site. What was it like for a private in the Air Force from the inner city in New Jersey to be stationed on a mesa top in Northern New Mexico? Who took the time to plant the irises that still grow next to the abandoned sidewalk (Figure 4.1)? Did it make things feel more like home?

Figure 4.1 Irises edging an abandoned sidewalk

All of these lessons and more can be taught at this site through the types of media that one finds at any National Park Service historic site or at our state monuments. Outdoor exhibit stations can be developed to explain the site features and the functions of the various buildings. A portion of one of the buildings could be used to show videos of Cold War events and movies of the era; oral histories of people who served here; New Mexico's role during the Cold War, and other lessons of history.

A number of facilities on site could be used for instruction areas as will be discussed in the next section. Outdoor lectures and field trips to near-by public facilities such as El Vado State Park could teach about the ecosystems of Northern New Mexico, the San Juan Mountains, the Chama Valley water system, and other significant natural features.

The night sky at the Tierra Amarilla Radar Site is perhaps the most valuable educational tool of all. Today it is more and more difficult to find places where one can study the night sky without the detriment of reflections from urban centers or the glare of isolated outdoor lights. This site provides a view of the entire sky-dome with the exception of the lower levels to the north. It is almost "mountain-top" visibility of the night sky. This view is definitely an educational opportunity that should be exploited at this site.

Rehabilitation and the Secretary of the Interior s Standards for Treatment of Historic Properties

Rehabilitation of this site will have to meet the Secretary of Interior's Standards for the Treatment of Historic Properties. These standards are intended to maintain the historic appearance of historic structures and landscapes (Figure

4.2). As with all rehabilitation projects, the details of the rehabilitation design will have to be developed in concert with the State Historic Preservation Division. There are some wonderful examples in the state of buildings that were in worse shape than these that have been restored to effective use in New Mexico communities using these standards.

Figure 4.2, Rehabilitated Dormitory

Potential Uses

The most desirable use would be one that meets the legislative desires of an educational purpose and the owner's desire for the site to remain in public service. In each of these cases, the land would be leased by NNMCC to a vendor who operates the facility. Some possibilities for that use include the following:

A Conference Center
The campus of the Tierra Amarilla Radar Site could become a conference venue for groups seeking lower cost conference

opportunities. Youth groups could be offered an option of camp sites or dormitory type accommodations. Some buildings could be converted to classroom space and outdoor facilities such as the foundations of Buildings 5C, 5D, and 6 could become amphitheaters (Figure 4.3).

Figure 4.3 Outdoor Lecture Area at Rehabilitated Dormitory Foundation

The closest conference center is at Ghost Ranch, north of Abiquiu. The mission statement of the organization, according to their web site says, “Ghost Ranch, an education and retreat center of the Presbyterian Church (U.S.A.), grounds its life and program in reverence, hospitality for all people, and respect for creation.”

In order not to compete with this established and popular organization, the Tierra Amarilla Radar Site Conference Center could aim its availability at other groups. Some of the urban youth enrichment programs such as Outward Bound (http:

//www.outwardbound.com) have wilderness schools that might use a site such as this one. It could be a perfect place for a base for operations, using the other recreational resources in the area for activity sites. Or summer programs for youth in the near-by areas of the Chama Valley and San Luis Valley could be held here. Perhaps organizations such as Youth Development, Inc (YDI) stationed in Albuquerque would be interested in using such a conference center (Figure 4.3).

According to a web site conference venue locator, the other conference centers in the northern part of the state are associated with the institutions of higher education. One exception is the Columbine Inn and Conference Center at the Taos Ski Valley.

An Optical Telescope Observatory Complex

The night sky at this site lends itself to the use of optical telescopes because of the low light pollution in the area. The campus could be used to house observatory staff as well as visiting groups of students and the public. David Bining of the Loadstar Astronomy Center at the New Mexico Museum of Natural of Natural History has been kind enough to let astronomers state-wide know that this site may be available someday for such a use. He says that there are a number of research projects that astronomers in the state are pursuing that are currently occupying resources available to astronomers.

Perhaps the astronomy uses could be developed later as a supplement to the conference center idea. The two uses could compliment each other and add to the overall activity of the site.

A "Think Tank" with Public Access and Presentations

Somewhat along the lines of a conference center, but probably less likely, would be a retreat for researchers from the sciences or the humanities to come as a retreat to work individually and as groups designed to develop a cross-pollination of ideas. The rehabilitated accommodations would be more humble

than similar places but would also be more affordable. The wonderful views and the outdoor spaces within the immediate area lend themselves to contemplation, peace, and quiet.

The obligations to public education could be met with seminars, presentations, lectures, and other events where the researchers make their work available to the public.

There are other potential uses that are less public, but could serve New Mexico. In these cases, the land would be used by the agency under an agreement with NNMCC.

Residential Program for State Needs
This use would benefit the public if such facilities are needed. An educational role could be served here, but for the residents, rather than the public. Several of the buildings could be converted to educational purposes including vocational training. The program would need to be one where security requirements are minimal. The historic designation limits the number of things that can be done to the buildings, and it might be difficult to meet security requirements.

Youth Hostel
The proximity to ski areas, both downhill and cross county, fishing areas and hiking trails, make this site inviting to young travelers from around the world. This type of use would be educational only in respect to the Cold War interpretations at the site. Young people have a tolerance for modest accommodations that would minimize the necessary changes to the site and its buildings. This type of use would be operated by a vendor under agreement with NNMCC. Perhaps, at the very least, an international organization of youth hostels could provide some sort of exchange program with NNMCC students.

Supplemental Use
A supplemental use that might help defray expenses and one that might be in keeping with the original use of the site would be

the housing a one or more cell phone towers. The shape of cell phone towers is not similar to radar towers, but the purpose is very similar. Cell phone towers pick up and send signals and their image is that of communications hardware.

Opportunities and Limitations of the Site and Individual Buildings

The site as a whole will require infrastructure repairs or replacement. All site lighting should be designed to protect the darkness of the night sky.

The odds are that electric power will be obtained more economically from the local rural co-operative electric company than it would by bringing in new generators. Another possibility for electric power would be to establish a photo voltaic array on the site in an area that does not impact the historic nature of the campus. Perhaps some sort of renewable energy grant could be found to test photo voltaic arrays and provide electricity for the campus.

The former radar tower foundations can be converted to a stargazing platform regardless of who uses the site. As mentioned earlier, the foundations can be converted to outdoor lecture areas.

Certain areas of the site, such as the former trailer court area could be used, and perhaps expanded for recreational vehicle parking if the use required such area. Areas to the east of the former trailer court could be designated for campsites, as could some of the area near Buildings #12 and 13.

The Americans with Disabilities Act (ADA) must be accommodated on the site. Ample exterior space exists to allow the addition of ramps to connect levels of the sites and

to approach buildings with ramps supplementing the original stairs.

The basketball court near Building #13 should be resurfaced. Depending on the overall site use it could be used for basketball, volley ball, shuffleboard, or a multi-use court.

The picnic grounds near Building #14 should be restored. More tables should be added (Figure 4.4).

Figure 4.4 Rehabilitated Picnic Area

Building #1, Operations

This building has more of an appearance of authority than any other building on the campus. It also has few windows. If the use requires a visitor's center or has a large historical interpretation component, this building would lend itself to exhibit areas, audio-visual displays, and other uses where controlled light is desirable.

It could be used for offices, but the offices would not have natural light, unless the addition of skylights would be permitted by the Secretary of the Interior's Standards.

Building #2, Electric Primary Power
Assuming this building is not used for electric generation, it could readily accommodate a lecture or classroom setting, or work cubicles in the open area. The windows provide good natural light. Information on the previous use of the building could be displayed on the walls.

Building #4, Heating Plant
Once the insulation is removed from the boilers, they should be examined to determine if they are reusable. If so, they should be reused to provide heating to the buildings.

Buildings #5A and 5B, Airmen's Dormitories
These building can be reused as residential units. The central corridors can be maintained, allowing access to residential accommodations on either side of the hall. The plumbing and exits will have to be brought up to code. If they are to be used as co-ed dorms, there will need to be two sets of rest rooms and showers. The relatively high crawl space will make replumbing easier than slab on grade floors would allow.

The use most closely related to the historical use would be bunks sharing a room. If that is not acceptable to the use, the existing rooms could be divided, leaving the exterior windows in place. If private baths are required by the selected use, the windows in the baths could be covered with shades to provide the privacy desired.

In accommodating the exit requirements, two exists will be required. At least one internal stair exists, but without a smoke proof enclosure. If permitted, ADA accommodation would be

met on the ground floor only, to avoid the cost of an elevator.

In the event that not all of the space is required for living accommodations, the buildings could be used as offices or small classrooms. All of these uses could leave the corridor and exterior windows in place.

Foundations of Buildings 5C, 5D, and D
Convert these former crawl spaces into outdoor lecture areas. Seats can be installed on top of the former piers to the hallway. Additional rows of seats can be added. A ramp and steps can be added to permit handicapped access. A railing would be added a few inches to the outside of the foundation.

Building #7, Dining Hall
This building is best used for its original purpose. In addition to the roof repairs noted earlier, this building will require replacement of the southeast corner.

Building #8, the Security Guard House
This building can be used for interpretive exhibits and orientation information, similar to the entry gate to a state monument or a national park.

Building #9, Recreation Facility, Multipurpose Headquarters
This building can be used for offices, meeting rooms, or classrooms. The high bay space on the west end would make a very nice special meeting room.

Building #10, Water Pump Station
If the well or other water supply is viable, this building could be used for its original purpose. If not, it can be used to store maintenance equipment.

Building #11, Water Supply Treatment
This building should be examined by a mechanical engineer to see if some of the equipment, such as the large tank, can be relined and reused. If any of the original piping is reusable,

it likely connects to this building, so this building should continue its original use.

Building #12, Communications Receiver
The remoteness of this building and the magnificent view from it calls for some sort of special use. The ground around it could be landscaped to provide a area to sit and watch the sun rise or contemplate the view. The building itself could become a place for a small meeting or a storage area for outdoor furniture used on the viewing deck.

A unique use for this building would be to turn it into a *camera obscura*, a building that is essentially the interior of a camera. These buildings were popular in the first decades of the 20th century as tourist attractions. The view of Los Brazos would travel through a pin hole (or a lens if necessary) and be projected upside down on the inside of the west wall. Interpretive signs could explain the building's original use and the development of wireless communication, as well as explaining how the *camera obscura* works.

Building #13, Communications Transmitter
This building could be used for functions similar to Building #12. It could house small meetings, especially if light needs to be controlled, since there are no windows. The view from here is not spectacular, but if it were used as a *camera obscura* viewing toward the south, one could see the remainder of the campus in the projection.

Building #14, Supply & Issue Shop
This building could be used for its original purpose as the maintenance building for the campus. It could also be used for a meeting room, classroom, or offices in an open office or cubicle setting.

Building #22, Recreation Facility, Multi-Purpose
This building should be used as a multi-purpose room for indoor sports, lectures, and movies. The canteen on the west

side could be reused for the same purpose. Otherwise, it could be an office for two or three people.

Building #23, Trailer Court Utility House
This building is in very bad condition, but if it can be reused, it could be used for its original purpose and provide supplies or an office for the RV parking and camping area. Otherwise, it could be used to store maintenance equipment.

What Will Stabilization Cost?

Actual estimates of rehabilitation of this site are beyond the scope of this reuse study. Conceptually, it is possible to define certain parameters.

The buildings contain almost 30,000 square feet. Estimating stabilization (roof repair, plywood on windows and doors, closing other openings and holes) at $50 per square foot in today's dollars would result in a construction cost of $1,500,000 plus administrative costs, fees, taxes, and contingencies which might produce a total project cost of $2,000,000. Of this amount, the roofing costs and some of the repair of holes would not need to be redone in the rehabilitation work.

If priorities must be set, it is most important to stabilize the Type III construction buildings, that is the ones with wood roofs. Of the almost 30,000 square feet, approximately 21,000 square feet of buildings are Type III construction. Again using a very rough figure of $50 per square foot in today's dollars, the stabilization construction cost would be $1,050,000 plus administrative costs, fees, taxes, and contingencies which might produce a total project cost of $1,365,000.

To put these stabilization costs in perspective, it is important to compare the replacement value of the asset these buildings represent. Assuming demolition and replacement of new structures costs $130 per square foot, the replacement cost of 30,000 square feet of new structures would be $3,900,000 for construction alone plus the overhead noted above for a total project cost of $5,070,000. Infrastructure costs are not included in this number.

The Need for Rehabilitation Cost Estimate Research

Estimating rehabilitation costs are beyond the scope of this study, but rehabilitation costs are difficult to project in any useful way without knowing the use to which the building will be put or the condition of the infrastructure. A detailed condition assessment of the buildings, grounds, and infrastructure should be conducted to estimate the costs necessary for the rehabilitation for various purposes. This study could arrive at a rehabilitation cost per building, with separate line items for infrastructure and site improvements of various types.

Where Will the Money Come From?

As noted earlier, the owner, NNMCC, does not have the resources to operate three campuses for its own educational purposes. NNMCC is able to lease the space to other users who can make the necessary capital improvements. It could also be the pass-through agency which could administer federal or state funds to make both the environmental clean-up, stabilization, and the capital improvements, provided the funds included covering the administrative costs and provided NNMCC had the staff time to conduct the administration. The County Manager of Rio Arriba County, Lorenzo Valdéz and the Superintendent of the Chama Valley Schools, Manuel Valdéz,

have both stated an interest in having the site put to useful purposes that would benefit the public, if the money can be found.

If a public use is selected, the monies for the rehabilitation will have to come from the State of New Mexico or the Federal Government. If a private tenant is interested, the property could be leased from NNMCC. A tax-exempt entity cannot pass the federal 20% rehabilitation tax credit to its lessee(s) because Treasury regulations require that a property be property to which depreciation is allowable to the lessor. However, taxpaying tenants could take advantage of the New Mexico Income Tax Credit program as a financial assistance to the rehabilitation costs, which would allow a 50% credit of approved eligible expenditures to a maximum of $25,000 per building, when a tenant has a lease term of five-years at the completion of the project.

Also, the National Trust for Historic Preservation has been demonstrating a way for not-for-profits to be able to participate in the federal tax program, with the establishment of partnerships that are creative structures where a number of participants might be accommodated, e.g., not-for-profits or government agency ownership of assets. The structures would have other participants that are tax-paying participants (e.g., development joint venture partners, investment banking partners, etc.). These structures can be costly to establish, and the myriad of rules that surround them would need to be assessed for project feasibility and tax implications. If a private tenant is committed, and if the financial longevity of the operation is probable, it may be possible to rehabilitate the facilities with revenue bonds.

All of these decisions will be made by the proper authorities. It is the purpose of this study to present the possibilities for consideration.

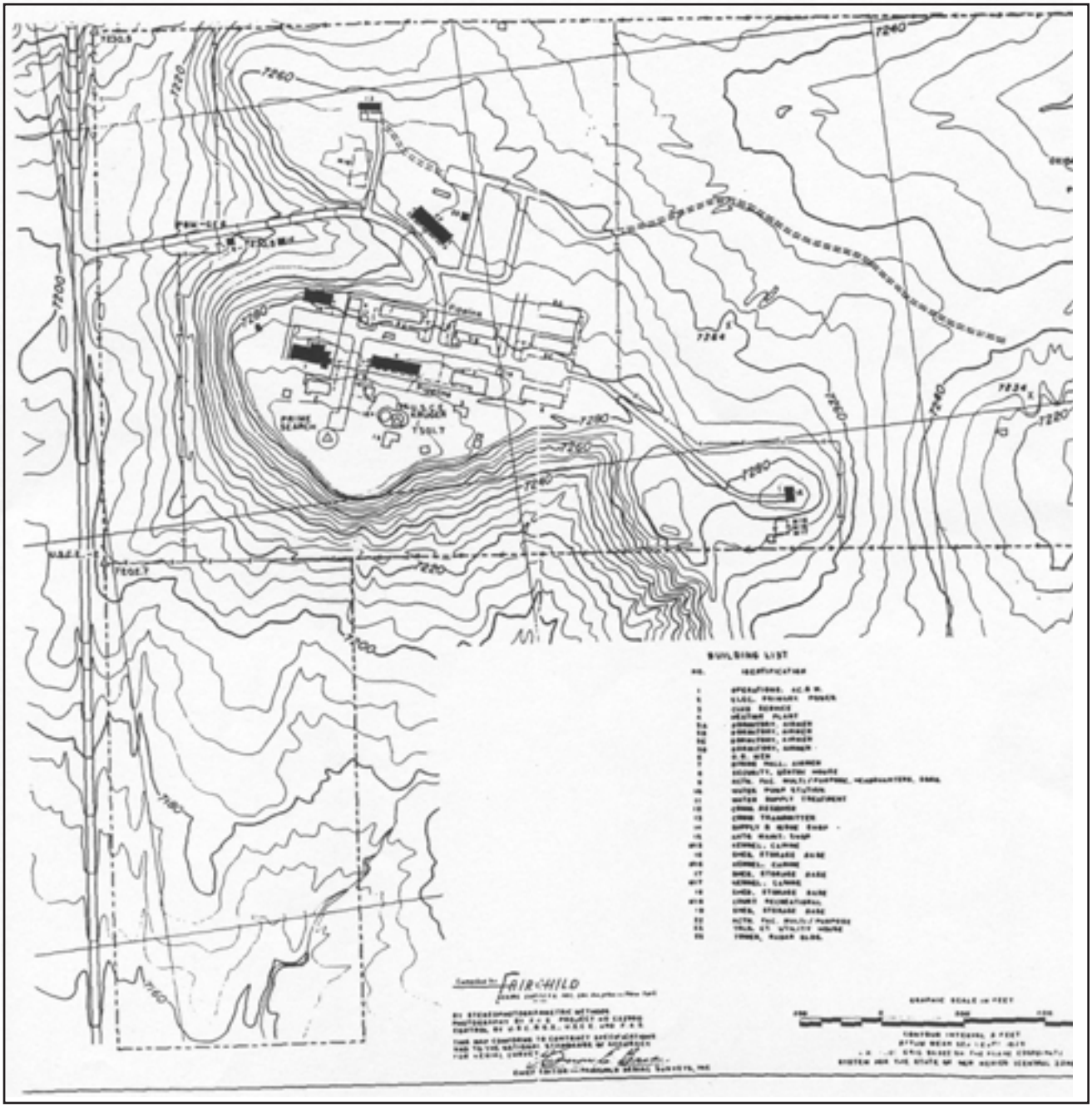
Summary

Figure 4.5 Rehabilitated Main Street at the Tierra Amarilla Radar Site

In summary, we have here at the Tierra Amarilla Radar Site an important resource for the people of New Mexico and their recent history. The history of our state is inextricably intertwined with the forces that operated during the Cold War. New Mexico's role in that silent conflict was probably greater than that of any other state, per capita. The most rapid growth our state has ever seen happened during that period, and it forever changed the nature of our population and our commerce.

Appendix A

USGS Map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