

**EDWARDS AIR FORCE BASE  
DIGITAL AIRPORT SURVEILLANCE RADAR  
ENVIRONMENTAL ASSESSMENT  
FINAL**



**Prepared by:**



**for:**



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## EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been completed as part of the *National Environmental Policy Act of 1969* (NEPA) process, in compliance with United States Air Force (USAF) instruction AFI 32-7061. According to this instruction, the EA provides analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) and to aid Federal agencies in complying with NEPA when no EIS is required.

This EA describes the proposed project to install a Digital Airport Surveillance Radar (DASR) at Edwards Air Force Base (AFB), California. This DASR installation will provide a new digital radar signal feed to the High Desert Terminal Radar Approach Control (TRACON) facility operated by the Federal Aviation Administration (FAA) at Edwards AFB. This proposed action is part of the National Airspace System (NAS) Program developed by the FAA in cooperation with the Department of Defense (DoD) to modernize approach control systems in the United States and its territories. The DASR is a DoD-lead contract to install airport surveillance radar equipment for both the DoD and FAA.

The NAS Program will comprehensively upgrade air traffic control systems infrastructure by systematically replacing analog systems with state-of-the-art, digital technology. The purpose of the DASR component of the NAS program is to detect and process aircraft position and weather conditions at airfields. The DASR/ASR-11 will be used to accurately locate aircraft, in terms of range, azimuth, and altitude; provide information regarding aircraft identification code; identify emergency conditions; and report six discrete weather precipitation levels. The ASR-11 at Edwards AFB is needed to replace the older existing ASR-8 facility.

The FAA facility would consist of: a 20-foot tall rotating radar antenna mounted on a 57-foot tower (or 67-foot tower if Site 7 is chosen), a built-on-site concrete masonry unit equipment building with a pitched roof, an emergency engine generator in a concrete shelter, utility cabling, electronic equipment grounding systems, and a 1,000-gallon aboveground fuel storage tank. Facility construction would include separate concrete foundations for the antenna tower, the equipment shelter and the engine generator shelter, a 160-foot by 160-foot site fence and an access road. Construction should be within a 0.92-acre site (200 feet by 200 feet). Additional site improvements would include an unpaved access road, minor regrading, installation of geotextile fabric beneath six inches of crushed stone within the site fence, and up to 800 feet of utility trenching to connect the site to existing duct banks or manholes. The total structure height, including lighting rods on the antenna tower, would be 86 feet (or 96 feet if Site 7 is chosen). Once the new DASR system is operational, the existing ASR-8 will be dismantled and structures will be razed. Edwards AFB would reclaim the ground.

Eight areas were initially identified and evaluated as potential ASR-11 sites. Three of these sites were eliminated after preliminary assessment indicated that they were located too close to fly-by lines or runways. A fourth site was eliminated, because its remote location would require costly utility connections, and a fifth site, located on the existing facility site, was rejected because it would cause an extended period of shutdown of the existing radar system. The three remaining alternative sites on Edwards AFB have been identified as potential locations for the ASR-11,

based on operational, construction, and environmental siting criteria contained in the *Edwards AFB Integrated Site Survey Report*. The three remaining sites (1, 2, and 7) are evaluated in this EA.

Site 1 is located on South Base approximately 800 feet east of the existing ASR-8. Site 2 is also located on South Base approximately 800 feet west-northwest of the existing ASR-8. Site 7 is located on Main Base approximately 500 feet north-northwest of the TRACON facility and would require substantial grading and site work to accommodate the facility footprint.

Issues that must be addressed during construction at any of the sites are elevated noise levels, increased dust, traffic and access disruption, aesthetic effects, site stability, and stormwater management issues. Potential impacts in these areas would be reduced using standard mitigation measures as outlined below. Additional measures are discussed in Chapter 5, Mitigation Measures.

- During the construction period, sheeting or supports of some kind may be used in the areas excavated for the tower footings and utility trenches in order to prevent collapse of these excavated areas.
- To minimize noise impacts during construction, mufflers would be used on construction equipment and vehicles.
- All equipment and vehicles used during construction would be maintained in good operating condition so that emissions are minimized, thus reducing the potential for air quality impacts.
- Dust will be controlled on site by using water to wet down disturbed areas.
- All areas disturbed for the DASR system construction would be seeded with a native seed mixture or covered with a geotextile fabric and crushed stone to stabilize the disturbed soils, in order to minimize the potential for erosion and sedimentation.
- All hazardous materials used during construction of the ASR-11 would be handled and disposed of in accordance with Edwards AFB policies and protocols and all applicable State and Federal regulations.
- Traffic management measures will be developed to facilitate traffic flow and pedestrian access.
- Depending on the site chosen, a portion of the ASR-8 signal may be blanked during construction to avoid Radio Frequency Radiation (RFR) hazard to construction workers.

Potential future impacts associated with operation of the ASR-11 facility would be minimized through the use of mitigation measures including the following:

- All hazardous materials used during operation of the ASR-11 would be handled and disposed of in accordance with Edwards AFB policies and protocols and all applicable State and Federal regulations.
- Due to the potential for RFR hazards during operation, warning signs, indicating the safe distance from the operating radar, would be installed at the facility perimeter.

All three sites are acceptable from an environmental perspective. Table ES-1 provides a summary of the potential environmental impacts associated with each of the alternative sites. The Air Force has selected Site 1 as the preferred ASR-11 location; however, this EA identifies potential impacts associated with placing the ASR-11 at each of the alternative sites.

**Table ES-1. Environmental Impact Summary Matrix for the Alternative ASR-11 Sites at Edwards AFB**

Category	No Action Alternative	Existing ASR-8 Removal with DASR Installation at any Site	Site 1	Site 2	Site 7
<b>Land Use</b>	No Impact	Edwards AFB could reclaim land currently occupied by the ASR-8.	Construction and operation of ASR-11 are anticipated to be compatible with existing land uses, noise levels, and aesthetics.		According to the draft future land use map of the base, construction and operation of an ASR-11 would occur on the border of areas designated as aircraft operations and maintenance and buffer zone.
<b>Air Quality</b>	Short-term impacts from removal of existing ASR-8 and installation of ASR-11 expected to consist of dust generation from construction activities and anticipated to be minimal. Long-term impacts associated with all alternatives consist of evaporative fuel loss from aboveground storage tank and emissions from on-site emergency generator. Neither source is anticipated to represent a substantial impact to air quality.				
<b>Water Resources</b>	No Impact	No drinking water, stormwater, or wastewater resources are located proximate to Sites 1, 2, or 7. Groundwater is not anticipated to be encountered during construction or dismantling activities. No sites are within a floodplain.			
<b>Safety and Occupational Health</b>	No impact expected due to the potential for Radio Frequency Radiation (RFR) hazards during operation; warning signs, indicating the safe distance from the existing radar, are installed at the facility perimeter	No net impact with regard to RFR. Lead-containing paint may be present on existing radar tower.	The FAA has indicated that at a distance of approximately 125 feet from the existing ASR-8, RFR exposure limits are acceptable according to IEEE/ANSI standards. No impacts expected – due to the potential for RFR hazards during operation, warning signs, indicating the safe distance from the operating radar, would be installed at the facility perimeter.		No impacts expected – due to the potential for RFR hazards during operation, warning signs, indicating the safe distance from the operating radar, would be installed at the facility perimeter.
<b>Hazardous Substances and Solid Waste</b>	Hazardous materials used during operation of facility would continue being handled in compliance with all applicable regulations and base policies; therefore no impacts are expected.	Portions of the radar facility may contain lead paint, which has the potential to chip off during the dismantling.	Hazardous materials used during facility operation would be handled in compliance with base policies and regulations.	Site 2 is located within an IRP site that has been remediated and closed. Therefore, no hazardous materials outside of those used during construction and operation are anticipated to be encountered.	Hazardous materials used during facility operation would be handled in compliance with base policies and regulations.
<b>Biological Resources</b>	No Impact	No Impact	Clearing desert scrub vegetation would be required. Limited wildlife displacement would also be possible.		Construction of radar facility at Site 7 is allowed according to the Biological Opinion issued by the United States Fish and Wildlife Service (USFWS).
<b>Cultural Resources</b>	No known cultural resources exist within or near existing or proposed radar locations, therefore no impacts are anticipated.				
<b>Geology and Soils</b>	No Impact	No Impact	A short-term increase in soil erosion is anticipated to result from the construction activities required for the installation of the ASR-11.	A short-term increase in soil erosion is anticipated to result from the construction activities required for the installation of the ASR-11.	The site would require substantial grading and site work to accommodate the facility footprint.
<b>Socioeconomics</b>	No Impact	Dismantling of ASR-8 expected to have short-term minor contributions to the local economy; no long-term impacts are expected.	Installation of ASR-11 expected to have short-term minor contributions to the local economy; no long-term impacts are expected.		
<b>Infrastructure and Transportation</b>	No Impact	No impacts to utilities anticipated. Minor short-term impacts are possible to on-base traffic during dismantling.	Presuming the extension of existing fiber optic network is completed and contains sufficient capacity by the time of installation of the ASR-11, connection of fiber optic line to the RAPCON would require installation of approximately 550 feet of new cable. No impacts to other utilities are expected.	Presuming the extension of existing fiber optic network is completed and contains sufficient capacity by the time of installation of the ASR-11, connection of fiber optic line to the RAPCON would require installation of approximately 400 feet of new cable. No impacts to other utilities are expected.	Presuming the extension of existing fiber optic network is completed and contains sufficient capacity by the time of installation of the ASR-11, connection of fiber optic line to the RAPCON would require installation of approximately 500 feet of new cable. No impacts to other utilities are expected.
<b>Energy Resources</b>	No Impact	There would no longer be a need for energy resources at the facility site.	Installation of the ASR-11 facility is anticipated to have negligible impacts on energy resources.		

## **1.0 INTRODUCTION**

The proposed action addressed in this Environmental Assessment (EA) is the construction of a Digital Airport Surveillance Radar (DASR; specifically, an ASR-11) at Edwards Air Force Base (AFB), in California. This DASR installation will provide a new digital radar signal feed to the High Desert Terminal Radar Approach Control (TRACON) facility operated by the Federal Aviation Administration (FAA) at Edwards AFB. This proposed action is part of the National Airspace System (NAS) Program, the aviation system capital investment plan developed by the FAA in cooperation with the Department of Defense (DoD) to modernize approach control systems in the United States and its territories. The DASR is a DoD-lead contract to install airport surveillance radar equipment for both the DoD and FAA. The implementation of the NAS program at DoD bases was previously evaluated in a Programmatic EA and FONSI (United States Air Force [USAF], 1995a), which fully detailed the need for the program. The Programmatic EA and Finding of No Significant Impact (FONSI) are available on the Internet at <http://www.hanscom.af.mil/ESC-BP/pollprev/products.htm>. Environmental review at FAA airfields is being conducted separately.

The Programmatic EA for the NAS Program committed to completing site-specific *National Environmental Policy Act of 1969* (NEPA) documentation tiered from the Programmatic EA for individual NAS sites. This EA addresses the site-specific impacts of locating an ASR-11 on Edwards AFB, and evaluates the consequences of constructing and operating an ASR-11 on both the natural and man-made environments.

### **1.1 PURPOSE OF THE ACTION**

The NAS program was developed to modernize military air traffic control systems in the United States and its territories. The DoD NAS is a component of the aviation system capital investment plan developed by the FAA. Pursuant to the Program Management Directive (USAF, 1994), the DoD must provide services within its delegated airspace that are comparable to the services that the FAA provides to civil aircraft in civilian airspace. These services include: flight following, separation, expeditious handling, radar approach control, and landing.

The purpose of the DASR component of the USAF NAS Program is to detect and process aircraft position and weather conditions in the vicinity of USAF airfields. The DASR will serve to accurately locate aircraft, in terms of range, azimuth, and altitude; provide information regarding aircraft identification code; identify emergency conditions; and report six discrete weather precipitation levels. The new radar facility will not increase or decrease the current number of flights, change aircraft patterns, or otherwise alter existing base operations.

### **1.2 NEED FOR THE ACTION**

The NAS program is comprehensively upgrading air traffic control systems infrastructure by systematically replacing analog systems with state-of-the-art digital technology. The ASR-11 at Edwards AFB is needed to replace the existing ASR-8 airport surveillance radar, which was installed in 1992. The ASR-11 will improve system reliability, provide additional weather data,

reduce maintenance cost, improve performance, and provide digital data input to proposed new digital automation system air traffic controller displays. The proposed new ASR-11 will take advantage of the significantly increased capabilities of digital technology.

### **1.3 LOCATION AND SCOPE OF THE PROPOSED ACTION**

Edwards AFB is located in the Antelope Valley region of the western Mojave Desert in Southern California. It is about 60 miles northeast of Los Angeles, California. The base occupies an area of approximately 301,000 acres or 470 square miles. Portions of the base lie within Kern, Los Angeles, and San Bernardino counties (Figure 1-1).

Proposed project activities would be located in the Main Base or the South Base portion of Edwards AFB, depending on which site is ultimately chosen as the location for the ASR-11. Three candidate sites, Sites 1, 2 and 7, have been chosen as potential locations for the ASR-11. Specifically, Site 7 is located 500 feet north-northwest of the existing High Desert TRACON, Building 2580 on Main Base. Sites 1 and 2 are located 800 feet east and 800 feet west-northwest of the existing ASR-8 facility, respectively, on South Base (Figure 1-2).

### **1.4 ISSUES AND CONCERNS**

Short-term and long-term issues associated with the dismantling of the existing ASR-8 facility and the installation of an ASR-11 at three alternative locations are analyzed in this document. The issues and concerns related to the construction of an ASR-11 at all of the three candidate sites, and the removal of the ASR-8, are discussed in Chapter 4.

### **1.5 DECISION TO BE MADE**

Unless the No Action Alternative is chosen, one of the three alternative sites (Sites 1, 2 or 7) must be chosen for future construction and operation of an ASR-11 at Edwards AFB.

### **1.6 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS**

#### **1.6.1 Regulatory Requirements**

The *National Environmental Policy Act of 1969* (NEPA; 42 United States Code [USC] Sections 4321-4347) is the basic national charter for protection of the environment (Council of Environmental Quality [CEQ], 1978). The NEPA establishes policy, sets goals, and provides the process for carrying out the policy and achieving the goals. The NEPA procedures were established to ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. To implement NEPA, the USAF has issued internal instruction Air Force Instruction (AFI) 32-7061 (USAF, 2000a) that contains policies, responsibilities, and procedures dictating how NEPA should be implemented for USAF projects.

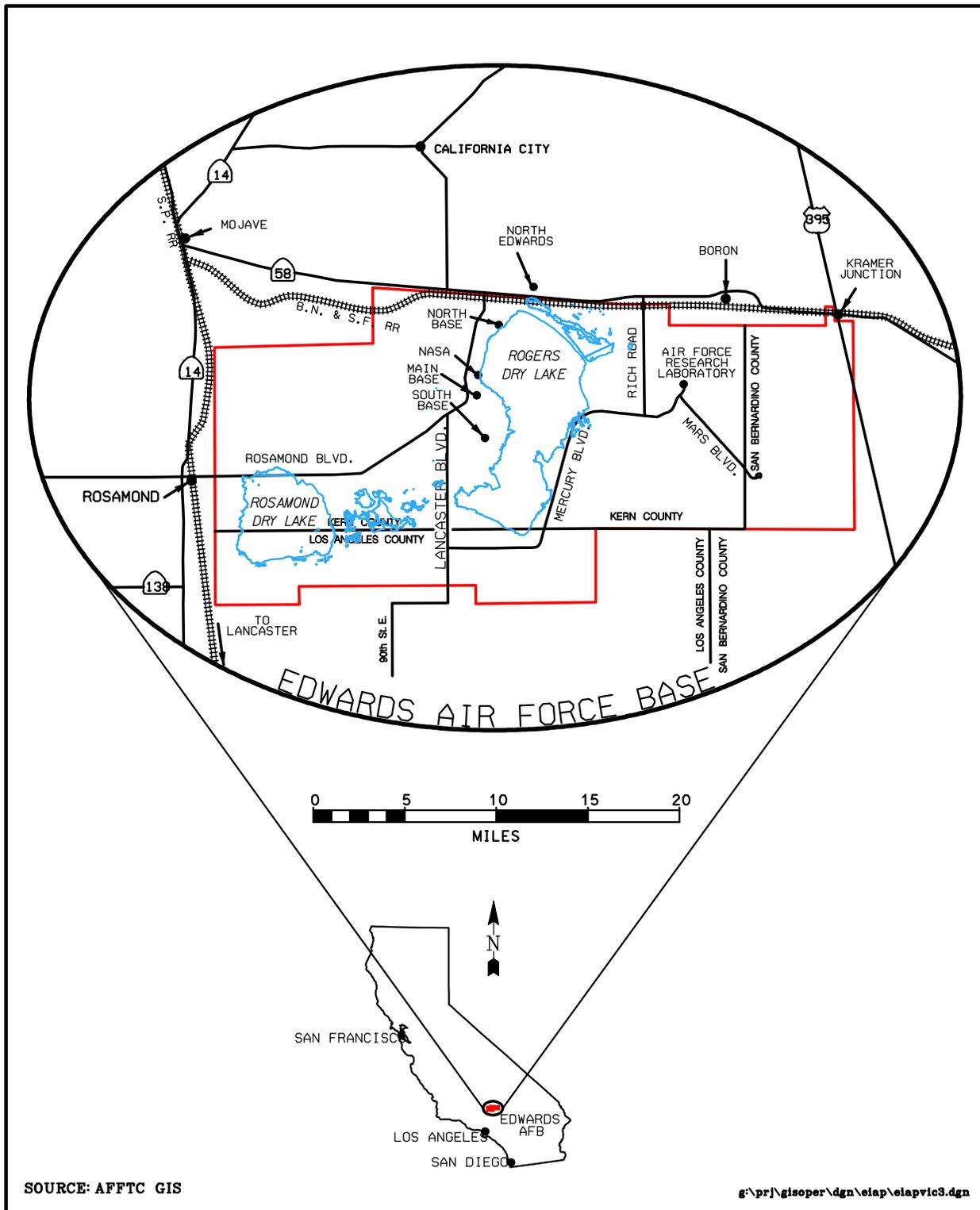
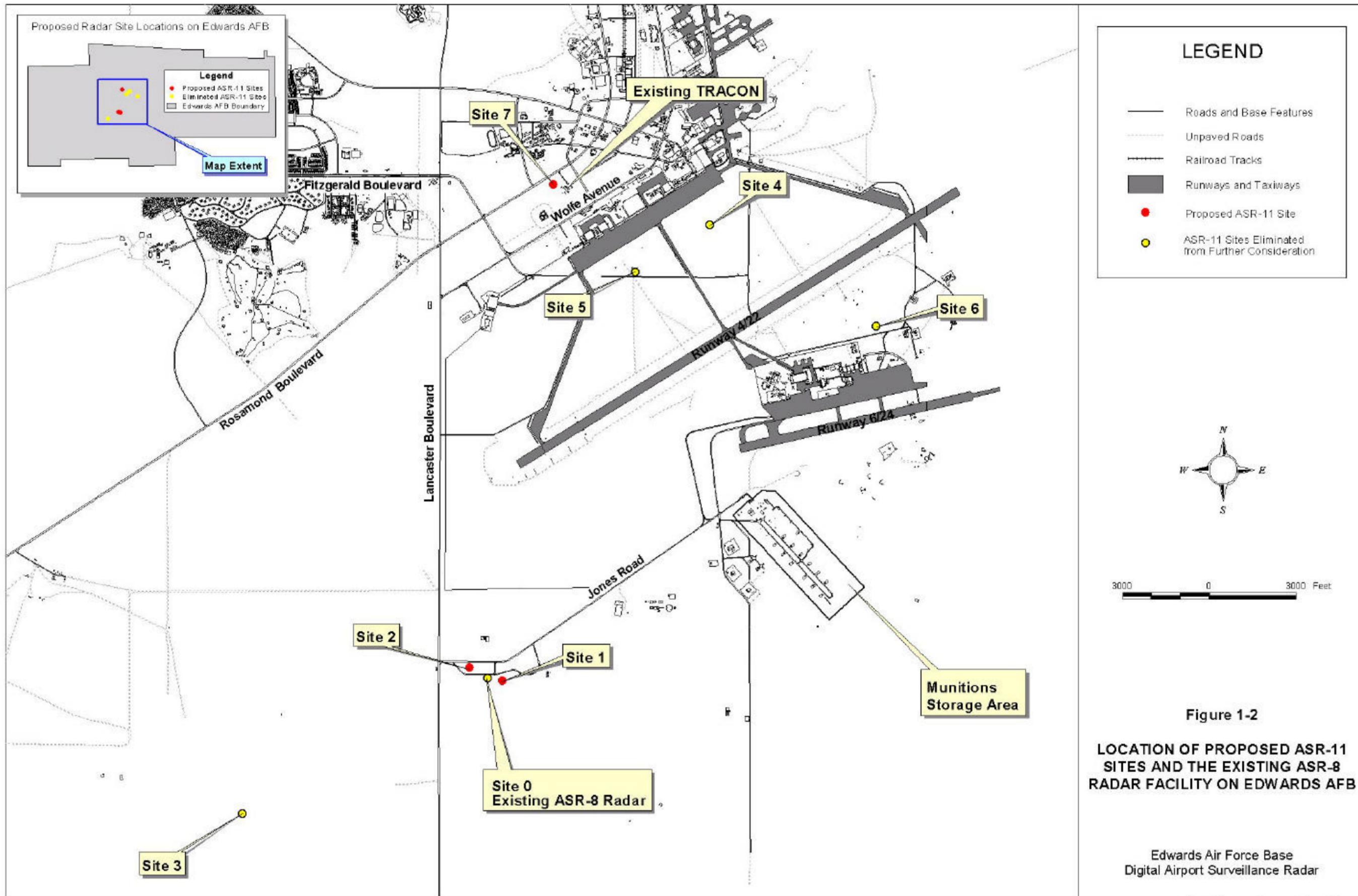


Figure 1-1 General Vicinity Map



Source: Edwards AFB

edwardsafb.apr : basemap/sites : sitesmap

This EA has been prepared in compliance with AFI 32-7061. According to this instruction, the environmental assessment is a written analysis that serves to (1) provide analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a FONSI; and (2) aid Federal agencies in complying with NEPA when no EIS is required. If this EA were to determine that the proposed project would significantly degrade the environment, significantly threaten public health or safety, or generate significant public controversy, then an EIS would be completed. An EIS involves a comprehensive assessment of project impacts and alternatives and a high degree of public input. Alternatively, if this EA results in a FONSI, then the action would not be the subject of an EIS. The EA is not intended to be a scientific document. The level and extent of detail and analysis in the EA is commensurate with the importance of the environmental issues involved and with the information needs of both the decision makers and the general public.

### **1.6.2 Permits and Approvals**

The contractor/proponent performing the work is responsible for obtaining the relevant permits and accomplishing any required notification. Environmental permitting requirements for all work on Base are coordinated through Environmental Management. The following permits would be required. However, as permitting requirements change, other may be required.

- a. All project sitings shall be approved by the Base Planning and Zoning (P&Z) Committee. Contact Civil Engineering (95 CEG/CEC) for coordination on getting your project presented to the P&Z Committee.
- b. Air quality operational permits are required for stationary construction equipment (e.g., generators, air compressors, welders, etc.) exceeding 50 brake horsepower (bhp) that remain on Base for more than 45 days.
- c. An Air Force (AF) Form 103, *Base Civil Engineering Work Clearance Request* (digging permit), is required for any trenching or digging operations that extend 4 or more inches below the ground surface.
- d. An AF Form 332, *Base Civil Engineer Work Request*, shall be accomplished for all building renovation and relocation activities.

### **1.7 DRAFT ENVIRONMENTAL ASSESSMENT PUBLIC NOTIFICATION PROCESS**

This Draft EA is being made available for public comment with a 30-day public comment period. The comment period is being publicized by paid public announcement in one local newspaper, and copies are available for review in local libraries and to those individuals who request copies. The public comment period officially ends April 26, 2002.

## **2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES**

The proposed action is the installation of an ASR-11 at Edwards AFB in California to replace the existing ASR-8 radar facility (Figure 2-1). Alternatives to the proposed action include no action, or installation of the ASR-11 at an alternative site. The no-action alternative consists of **not** constructing the ASR-11 facility and would involve the continued use of the existing ASR-8 system. Three sites, including Sites 1, 2, and 7 (Figure 1-2) were identified on Edwards AFB, in accordance with generic siting criteria outlined in the *NAS Siting Plan* (USAF, 1995) and FAA Order 6310.6 “Primary and Secondary Terminal Radar Siting Handbook,” as well as site-specific criteria identified in the *Edwards Integrated Site Survey Report* (USAF, 2001a). This EA discusses and evaluates potential impacts associated with the placement of the ASR-11 at each of the three alternative sites and also summarizes the potential impacts associated with the no-action alternative.

### **2.1 PROPOSED ACTION: DASR AT EDWARDS AFB**

#### **2.1.1 DASR System**

The DASR system would detect and process aircraft position and weather conditions at the airfield. The DASR system would consist of two subsystems: the Primary Surveillance Radar and the Monopulse Secondary Surveillance Radar. The purpose of the subsystems would be to accurately locate aircraft, in terms of range, azimuth, and altitude.

The Primary Surveillance Radar would transmit electromagnetic waves in the form of radio frequency pulses, which backscatter from the surface of aircraft. The radar would measure the time required for an echo to return and the direction of the signal to determine the aircraft range and azimuth, respectively. By comparing variations in returned signal parameters, such as phase differences between pulses, the radar could separate moving targets from stationary clutter, such as mountains and trees. The primary radar would also report six discrete weather precipitation levels (from mild to hazardous) via a processing channel dedicated to weather detection and reporting.

The Monopulse Secondary Surveillance Radar (also called the beacon radar) would be a cooperative system consisting of ground-based beacon interrogator/receiver systems and existing aircraft based transponders. The secondary radar would obtain additional information, such as identification code, barometric altitude, and emergency conditions, from an aircraft transponder. Various processing techniques would be used to decipher both overlapping responses from multiple aircraft (synchronous garble) and aircraft responses to other beacon systems (asynchronous interference). The beacon radar would also provide rapid identification of aircraft in distress. The DASR system would provide highly accurate target data to the Edwards AFB Local Control Facilities and Military Control Towers. The ASR-11 would have clutter rejection, target accuracy, and probability of detection that are equal to or better than the existing ASR-8.

The DASR facilities at Edwards AFB (High Desert) would consist of: a 20-foot tall rotating radar antenna mounted on a 57-foot tower (or a 67-foot tower if Site 7 is chosen), a radar equipment shelter, an emergency engine generator in a concrete shelter, utility cabling, electronic equipment grounding systems, and a 1,000-gallon aboveground fuel storage tank.



**Figure 2-1**  
**LOCATION OF EDWARDS**  
**AIR FORCE BASE**

**Edwards Air Force Base**  
**Digital Airport Surveillance Radar**

Source: Edwards AFB

edwardsafb.apr : locmapview : locationmap

Facility construction would include separate concrete foundations for the antenna tower, the equipment shelter, and the engine generator shelter. The FAA site would require a concrete masonry unit equipment shelter with a pitched roof and a 160-foot by 160-foot site fence within a 0.92-acre site (200 feet by 200 feet). Additional site improvements would include an unpaved access road, minor regrading, installation of geotextile fabric beneath 6 inches of crushed stone within the site fence, and up to 1,000 feet of utility trenching to connect the site to existing duct banks or manholes. The total structure height, including lightning rods on the antenna tower, would be 86 or 96 feet, depending upon the site chosen. See Figure 2-2 for a photograph of a typical FAA ASR-11 facility.



Figure 2-2 Typical FAA ASR-11 Facility

Depending on the site chosen, approximately 200 to 800 feet of utility trenching between the edge of the site and existing duct banks/manholes would be required to connect the ASR-11 to existing electric lines (USAF, 2001a). The telephone connections and fiber optic connections may be made in a common utility conduit; however, the new telephone cable may connect to an existing cable at a different location within the utility conduit other than the fiber optic connection. Between 400 and 550 feet of fiber optic cable, depending on the site chosen, would be required to connect the ASR-11 to the existing Edwards AFB fiber optic network. An access road, approximately 100 to 300 feet in length, would be required at each of the candidate sites.

Once the new DASR system is operational, the existing ASR-8 would be dismantled and structures would be removed to existing grade. Any subsequent belowground activities (removal of footings, etc.) would be the responsibility of Edwards AFB. Upon completion, the ground would be reclaimed by the base.

### **2.1.2 Alternative ASR-11 Sites**

Three alternative sites on Edwards AFB have been identified as potential locations for the ASR-11, based on the siting criteria contained in the *Primary/Secondary Terminal Radar Siting Handbook* (FAA, 1992), the *National Airspace System Digital Airport Surveillance Radar Siting Plan* (USAF, 1995) and the *Edwards Integrated Site Survey Report* (USAF, 2001a). The three sites evaluated in this EA were identified based on operational, construction, and environmental criteria. The operational criteria included the following (FAA, 1992):

- The site should not be located closer than 0.5 mile from the end of any existing or planned runway.
- The site should not be located closer than 0.5 mile from any point of required detection coverage.
- The site should not be located closer than 2,500 feet from any existing or planned electronic equipment installation or facility.
- The site should not be located less than 0.5 mile from National Weather Bureau radars and radiosonde equipment.
- The site should not be located closer than 1,500 feet to any aboveground object that would interfere or cause degradation in the ASR-11 operation.

Operational characteristics of the new ASR-11 as compared to the existing ASR-8 are shown in Table 2-1.

Construction criteria included siting the ASR-11 in an area with a slope of less than 20 percent and away from occupied existing structures, railroads, highways, runways and taxiways, or power lines. The environmental criteria for siting included avoiding a number of sensitive resources, including: ecological/wildlife refuges, preserves, conservation areas and sanctuaries; wild and scenic rivers; prime and unique farmlands; historical, archaeological, and cultural sites; wetlands; threatened and endangered species habitat; designated hazardous waste sites; and floodplains. The details of the siting process are described in the *Integrated Site Survey Report* prepared by Raytheon Systems Company (USAF, 2001a).

**Table 2-1. Comparison of Characteristics of Existing ASR-8 and Proposed ASR-11**

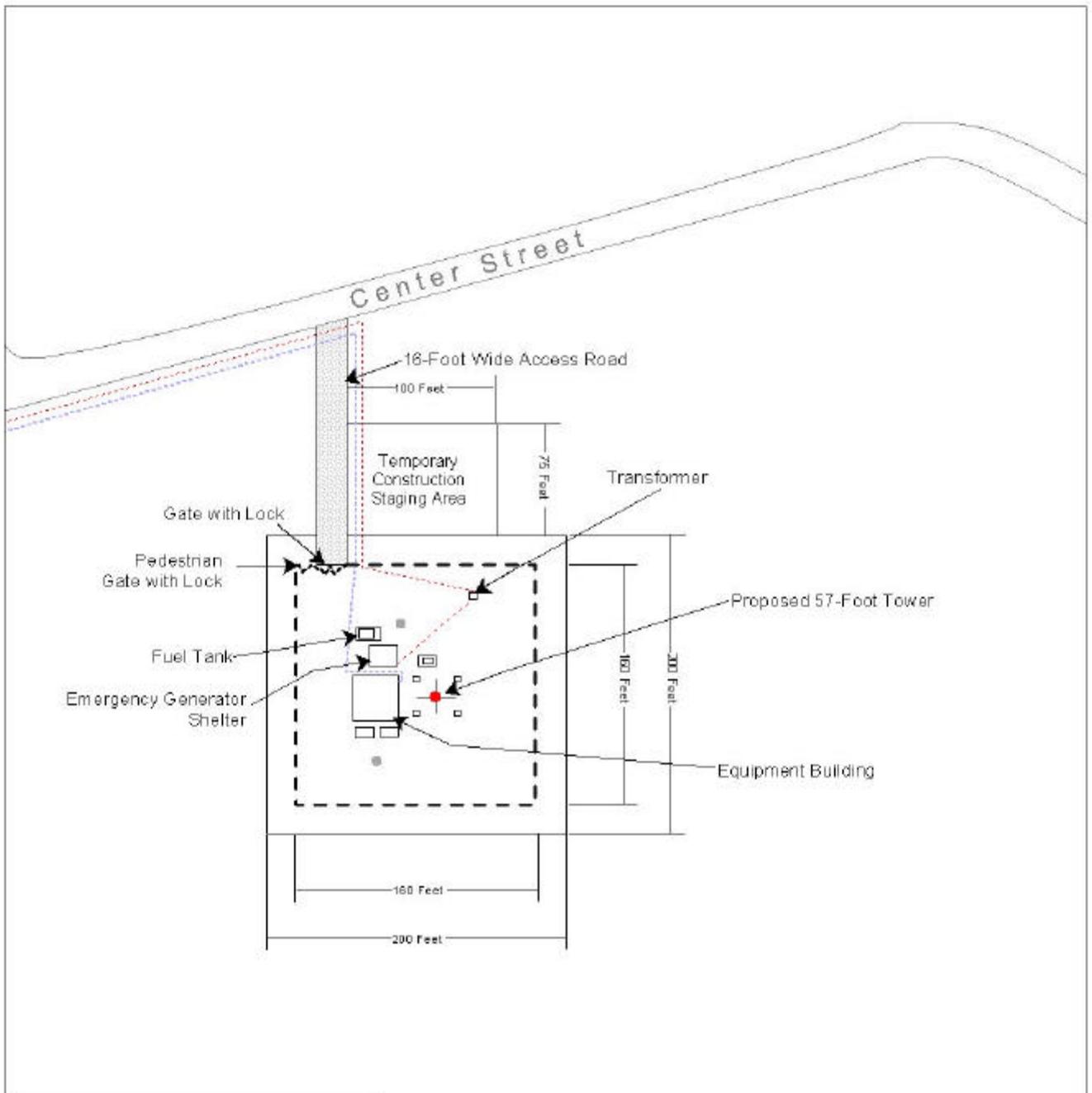
	<b>Existing ASR-8</b>	<b>Proposed ASR-11</b>
<b>Frequency</b>	2712 – 2780 MHz 2 frequencies	2700-2900 MHz; 2 frequencies separated by at least 30 MHz
<b>Power Peak</b>	1 MW 0.935 MW	19.5 kW (1 microsec) 18.0 kW (89 microsec)
<b>Average</b>	597 W 555 W	1600 W (Solid state)
<b>Pulse Repetition Frequency</b>	995 Hz	720-1050 pulses/second

Source: Edwards AFB, 2001

Eight sites were initially identified as potential candidate sites for the ASR-11 on Edwards AFB (Figure 1-2). A down-select meeting was held on 20 March 2001 to narrow down the list of potential sites to three or four.

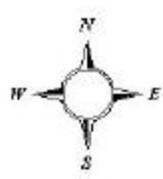
The following sites were initially considered, but subsequently eliminated from further consideration during the down-select meeting held 20 March 2001. Site 0 is located on the ASR-8 site and would require an extended shutdown period of this existing radar facility. This shutdown period was not acceptable; therefore, this site was not considered further. Site 3 is located on top of a berm approximately 2 miles south and west of the existing ASR-8. The utility connections to this site were anticipated to be very costly, and therefore, Site 3 was eliminated. Sites 4 and 5 are located between the north ramp and Runway 4/22 on the airfield of Edwards AFB. These sites are within the tower fly-by line and were eliminated from further analysis. Site 6 is located on the south side of the airfield on Edwards AFB. This location was considered too close to the existing two runways, so Site 6 was eliminated from further analysis.

Sites 1, 2, and 7 were selected for further investigation (Figures 2-3, 2-4, 2-5). Site 1 is located approximately 800 feet east of the existing ASR-8. Site 2 is located approximately 800 feet west of the existing ASR-8. Site 7 is located approximately 500 feet north-northwest of the High Desert TRACON.



**LEGEND**

- - - Proposed Above Ground Power and Telephone Route
- - - Proposed Fiber Communications Link Route
- Proposed ASR-11 Tower
- Proposed Facility Light
- Proposed Access Road
- Proposed ASR-11 Site Fence



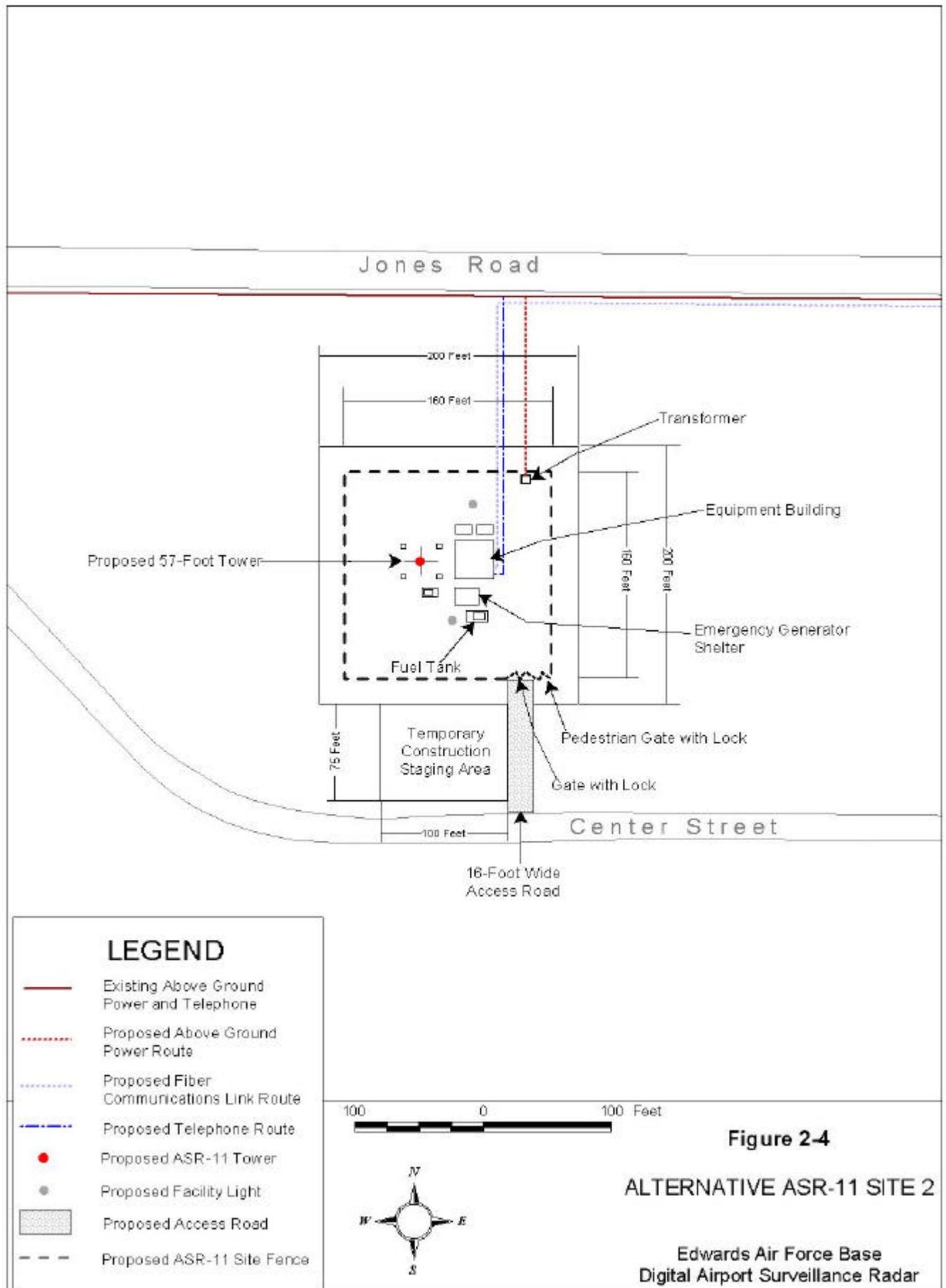
**Figure 2-3**

**ALTERNATIVE ASR-11 SITE 1**

**Edwards Air Force Base  
Digital Airport Surveillance Radar**

edwardsafb.apr | faasite1view | faa\_site1layout

Source: Edwards AFB; Raytheon, 2001



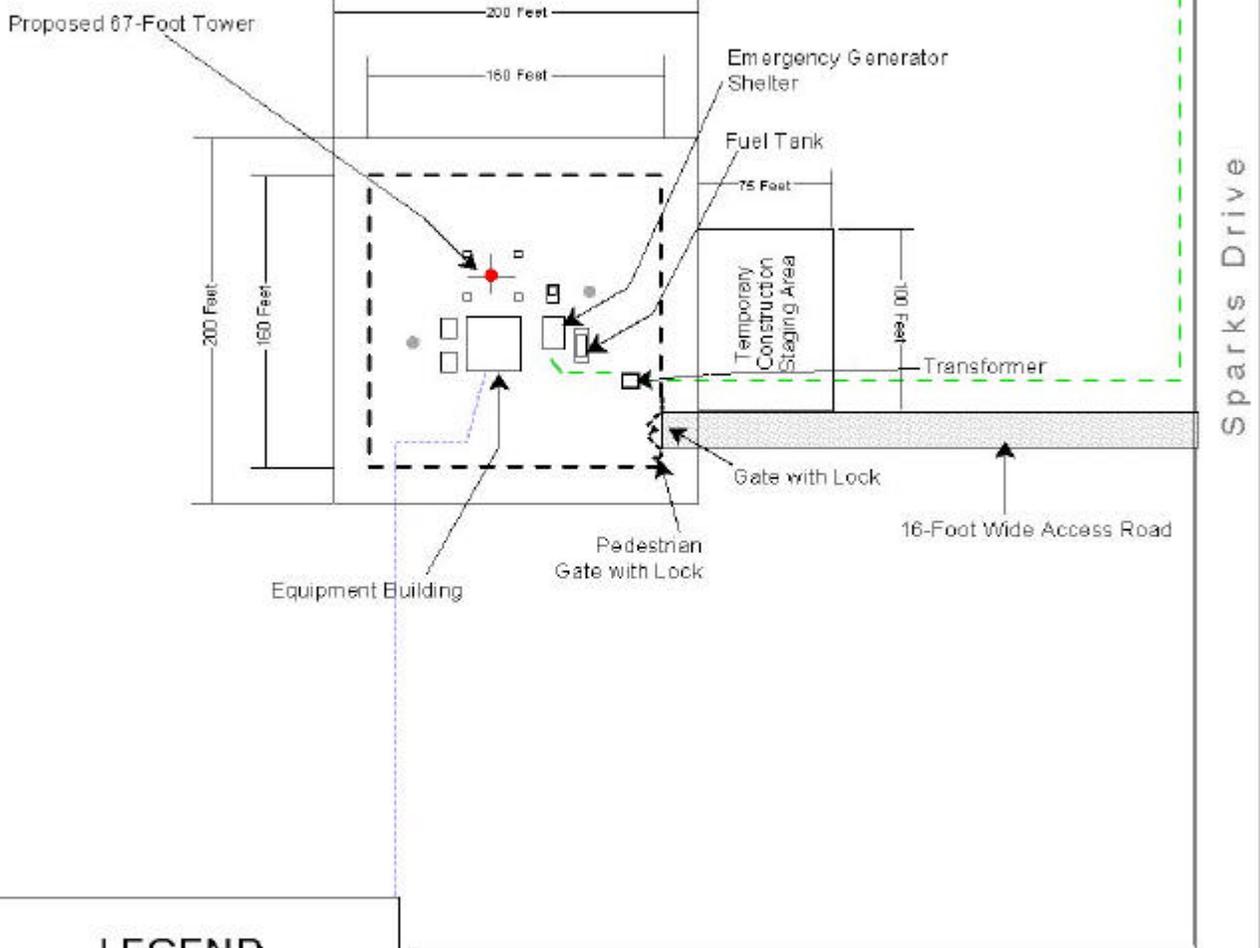
**Figure 2-4**  
**ALTERNATIVE ASR-11 SITE 2**

**Edwards Air Force Base  
Digital Airport Surveillance Radar**

Source: Edwards AFB; Raytheon, 2001

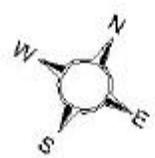
edwardsafb.apr : faasite2view : faa\_site2layout

Rosamond Boulevard



**LEGEND**

- Existing Above Ground Power and Telephone
- Proposed Under Ground Power and Telephone Route
- Proposed Fiber Communications Link Route
- Proposed ASR-11 Tower
- Proposed Facility Light
- Proposed Access Road
- Proposed ASR-11 Site Fence



**Figure 2-5**

**ALTERNATIVE ASR-11 SITE 7**

**Edwards Air Force Base  
Digital Airport Surveillance Radar**

Source: Edwards AFB; Raytheon, 2001

edwardsafb.apr : faasite7view : faa\_site7layout

## **2.2 NO ACTION ALTERNATIVE**

Implementation of the No Action Alternative would result in the continued use of the ASR-8 facility. Continued use and reliance on the ASR-8 would deny Edwards AFB the improved technology offered by the new DASR system. Edwards AFB would not benefit from the improved system reliability, additional weather data, reduced maintenance costs, and improved performance provided by the ASR-11 radar.

Conditions reflecting the No Action Alternative are discussed for each of the 11 main environmental parameters evaluated in Chapter 3.0. For each parameter, the No Action Alternative is characterized in the section addressing Future Baseline Without the Project.

### **3.0 AFFECTED ENVIRONMENT**

This section describes the relevant resources at Edwards AFB that may be impacted by construction of an ASR-11 facility at one of three alternative sites. Also, the condition of each environmental parameter in the future without the project, is also briefly noted. This chapter establishes the baseline against which the decision maker and the public can compare the effects of all action alternatives. The following environmental attributes comprise the existing environment: land use, air quality, water resources, safety and occupational health, hazardous substances and solid waste, biological resources, cultural resources, geology and soils, socioeconomics, infrastructure, and energy resources. These elements are described below.

#### **3.1 LAND USE**

Land on Edwards AFB may be used for a variety of uses including residential, industrial, commercial, agricultural, recreational, and military (Table 3.1-1). Specialized land uses may include radio transmission areas, bombing/missile ranges, ecologically sensitive areas, explosive ordnance ranges, and airfields. The *Edwards Air Force Base Comprehensive Plan* (Air Force Flight Test Center [AFFTC], 1994a) lays out long-range development at Edwards AFB. This Plan establishes the goals, policies, plans, and anticipated action regarding the physical, social, and economic environment. Land uses on Edwards AFB and specifically in the vicinity of the three alternative ASR-11 sites and the existing ASR-8 are discussed in this section.

##### **3.1.1 Regulatory Requirements/Guidance**

Air Force Instruction 32-1026, *Planning and Design of Airfields*, provides guidance to personnel responsible for planning, developing, siting, and the layout of runways, taxiways, aprons, pads, and support facilities for fixed and rotary winged aircraft. It provides references to the documents that contain the criteria and standards for these facilities and establishes a waiver process for deviations from these criteria and standards. The ASR-11 facility will be used as an aircraft support facility, thus installation is subject to AFI 32-1026.

##### **3.1.2 On-Base Land Use**

Edwards AFB consists of approximately 301,000 acres in Kern, Los Angeles, and San Bernardino Counties. The base contains largely undeveloped or semi-improved land that is used to support the flight testing of a wide variety of military, civilian, and experimental aircraft. The developed portion of the base includes approximately 6 percent of the total base area, and is concentrated on the west side of Rogers Dry Lake. The developed areas include Main Base, South Base, North Base, and the Air Force Research Laboratory (AFRL). The *Base Comprehensive Plan* (AFFTC, 1994a) established land use designations for the base. These land use designations, total acreage, and the percent of the base area can be seen in Table 3.1-1. It should be noted that an updated Edwards AFB Comprehensive Plan, (now called the *Edwards Air Force Base General Plan*) was in draft form at the time of this report preparation and existing land use maps were not yet available.

**Table 3.1-1  
Edwards Air Force Base Land Use Designations**

<b>Land Use Designation</b>	<b>Total Square Miles</b>	<b>Total Acres</b>	<b>Percentage of Total Base Property</b>
Aircraft Clearance, Quantity-Distance	4.86	3,110.40	1.00%
Aircraft Pavement, Runways	0.91	582.40	0.20%
Lakebed Painted Runways	3.12	1,996.80	.070%
Lakebed Nonmaintained Landing Site	61.00	39,040.00	13.00%
Aircraft Operations and Maintenance/Engineering Test	27.83	17,811.20	5.90%
Aircraft Test Ranges	336.23	215,187.20	71.50%
Industrial	12.18	7,795.20	2.60%
Administrative	0.19	121.60	0.04%
Community Commercial	0.21	134.40	0.04%
Community Service	0.30	192.00	0.10%
Medical	.07	44.80	0.01%
Housing	1.52	972.80	0.30%
Outdoor Recreation	3.83	2,451.20	0.80%
Buffer Zone	17.75	11,360.00	3.80%
Water	0.00	0.00	0.00%
<b>Total</b>	<b>470.00</b>	<b>300,800.00</b>	<b>100.00%</b>

Source: *Edwards Air Force Base Comprehensive Plan* (AFFTC, 1994a); areas are accurate to within 3 to 5 percent (USAF, 2001b)

**Site 1** is located on South Base, 800 feet east of the existing ASR-8, just south of Jones Road at an elevation of approximately 2,335 feet above mean sea level. Land use in this area is currently identified as administrative and buffer (USAF, 2001b). According to the Base Comprehensive Plan, portions of the base characterized as administrative land use generally include the AFFTC Headquarters, Security Police, Finance, and similar activities. Buffer areas generally provide for the functional dispersal of base facilities, separation from noise producing or other less desirable activities, and future expansion or new activity areas (AFFTC, 1994a). The only structure in the vicinity of the site is Building 12, the existing ASR-8 facility.

**Site 2** is located on South Base approximately 800 feet west-northwest of the existing ASR-8 within an area identified as buffer zone (USAF, 2001b). Site 2 is approximately 2,330 feet above mean sea level. Similar to Site 1, the only structure nearby this site is Building 12.

**Site 7** is located on Main Base 2,360 feet above mean sea level, approximately 500 feet north-northwest of the existing High Desert TRACON. This site is located in an area designated for aircraft operations and maintenance, and also extends slightly into a buffer area (USAF, 2001b).

The existing **ASR-8** facility is located on South Base just south of Jones Road at approximately 2,330 feet above mean sea level. The existing radar is located within an area designated as aircraft operations and maintenance.

**3.1.2.1 Land Use Restrictions.** Air Force land use policies and guidance are only applicable to lands under their control. Policies established for airfields are similar to the criteria established by the FAA for development of surrounding civilian airports. The Edwards AFB Planning and Zoning Committee grants final siting approval for all construction and activity related projects as part of the review and approval process. Land use restrictions are focused on the location of runways, explosive hazard areas and sensitive ecological areas.

**Runways.** Edwards AFB has three paved runways that provide the principal landing surfaces for the base. These runways are divided into two different classes: A and B. The primary difference between Class A and Class B runways is determined by the type of aircraft using the runway. Class A runways are primarily used for small, light aircraft. Class B runways are primarily intended for high-performance and large, heavy aircraft (AFFTC, 2001a). The Main Base runway 4/22 is a Class B runway and the primary airstrip. The North and South Base runways 6/24 are Class A runways. In addition, the base has 18 runways painted on the dry lakebeds and uses the remaining lakebed areas for emergency landings.

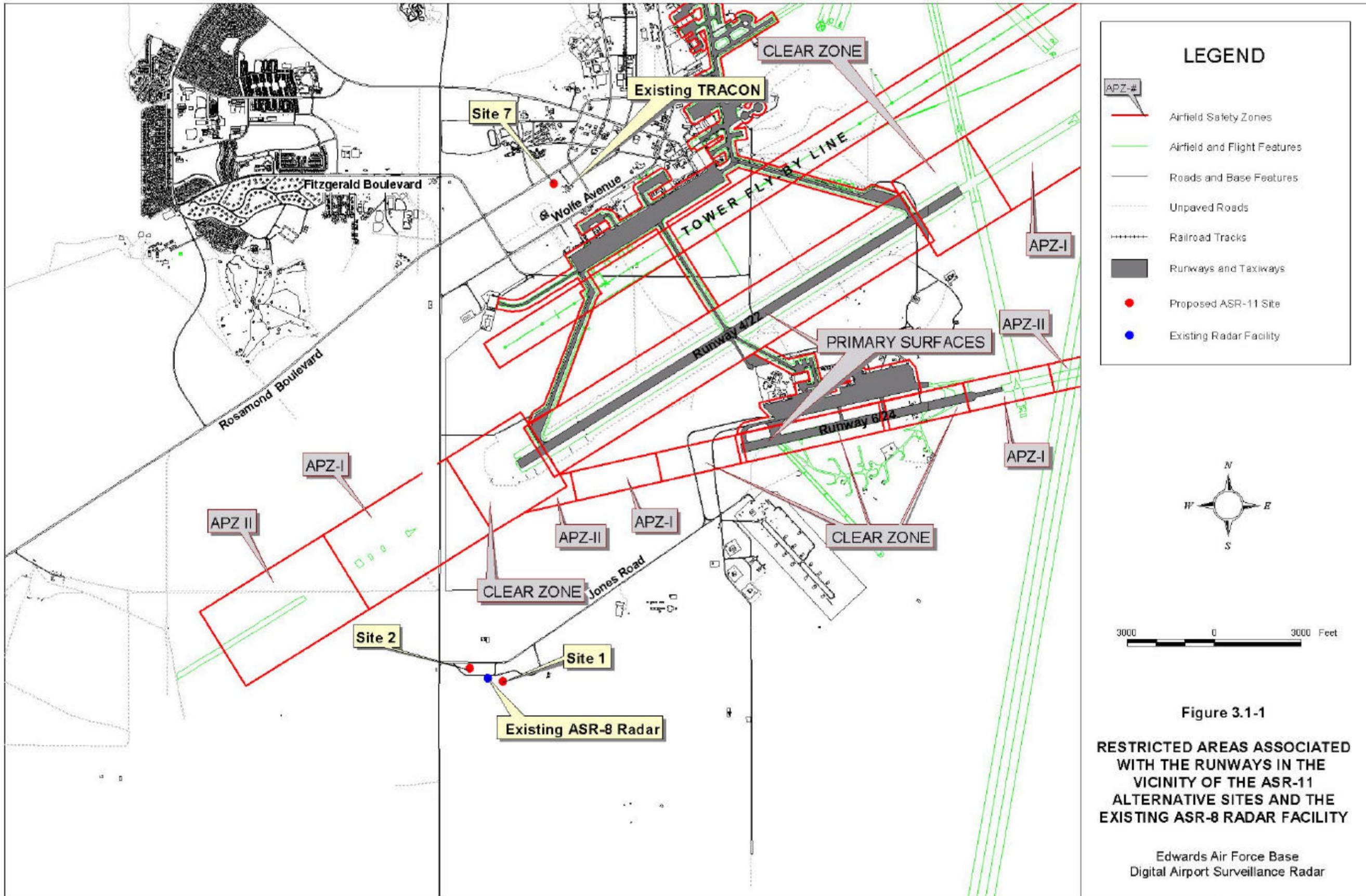
Land use controls around airfields and lakebeds are recommended by the Air Installation Compatible Use Zone (AICUZ). The AICUZ delineates areas at both ends of a runway, called accident potential zones (APZs), where the probability of aircraft accidents is highest based on statistical analysis of past accident data at various bases (Figure 3.1-1).

A clear zone is an area on the ground or water beginning at the end of the runway and symmetrical about its center. This zone is to be free of obstacles for the purpose of protecting the safety of approaching aircraft. The clear zone for a Class A runway is 1,000 feet wide by 3,000 feet long. The clear zone for a Class B runway is 3,000 feet wide by 3,000 feet long.

Accident potential zones I and II are those areas beyond the clear zone that possess a significant potential for accidents. Each of these zones has certain types of land use restrictions associated with them. The following types of land uses are generally compatible with APZ I: industrial, agricultural, recreation, and vacant lands. In addition to the land uses compatible with APZ I, APZ II land uses can also include low intensity residential and nonresidential uses for a maximum of 20 percent building coverage per acre.

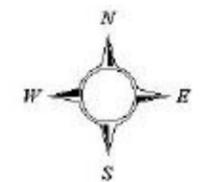
The existing **ASR-8** facility and alternative **Sites 1, 2, and 7** are located outside of all clear zones and APZs.

**Explosive Hazard Areas.** Explosive hazard or quantity-distance zones are associated with test areas and areas that store explosives, munitions, and/or propellant. These areas vary in size depending upon the quantity and types of the explosives being used or stored. These zones ensure the safety of all personnel within a given area. Typical areas where these zones exist include the unconventional fuels area, explosive ordnance disposal area, the gun-butt, the munitions storage area, the arm/de-arm areas, the hot cargo area, and the AFRL.



### LEGEND

- APZ-#
- Airfield Safety Zones
- Airfield and Flight Features
- Roads and Base Features
- Unpaved Roads
- + + + + Railroad Tracks
- Runways and Taxiways
- Proposed ASR-11 Site
- Existing Radar Facility



**Figure 3.1-1**  
**RESTRICTED AREAS ASSOCIATED WITH THE RUNWAYS IN THE VICINITY OF THE ASR-11 ALTERNATIVE SITES AND THE EXISTING ASR-8 RADAR FACILITY**  
 Edwards Air Force Base  
 Digital Airport Surveillance Radar

Source: Edwards AFB

edwardsafb.apr : restrictnrwys : APZlayout

**Sensitive Ecological Concerns.** Edwards AFB contains three areas that have special ecological concerns associated with them: desert tortoise critical habitat, mesquite woodlands, and Piute Ponds. The locations of these resource areas are depicted in Figure 3.1-2.

**Sites 1, 2, and 7** are not located within any runway or explosive hazard restricted zones or within an area of special ecological concern. As explained in Section 3.6, Biological Resources, construction of a radar facility within Site 7 would be in accordance with the Biological Opinion issued by the USFWS.

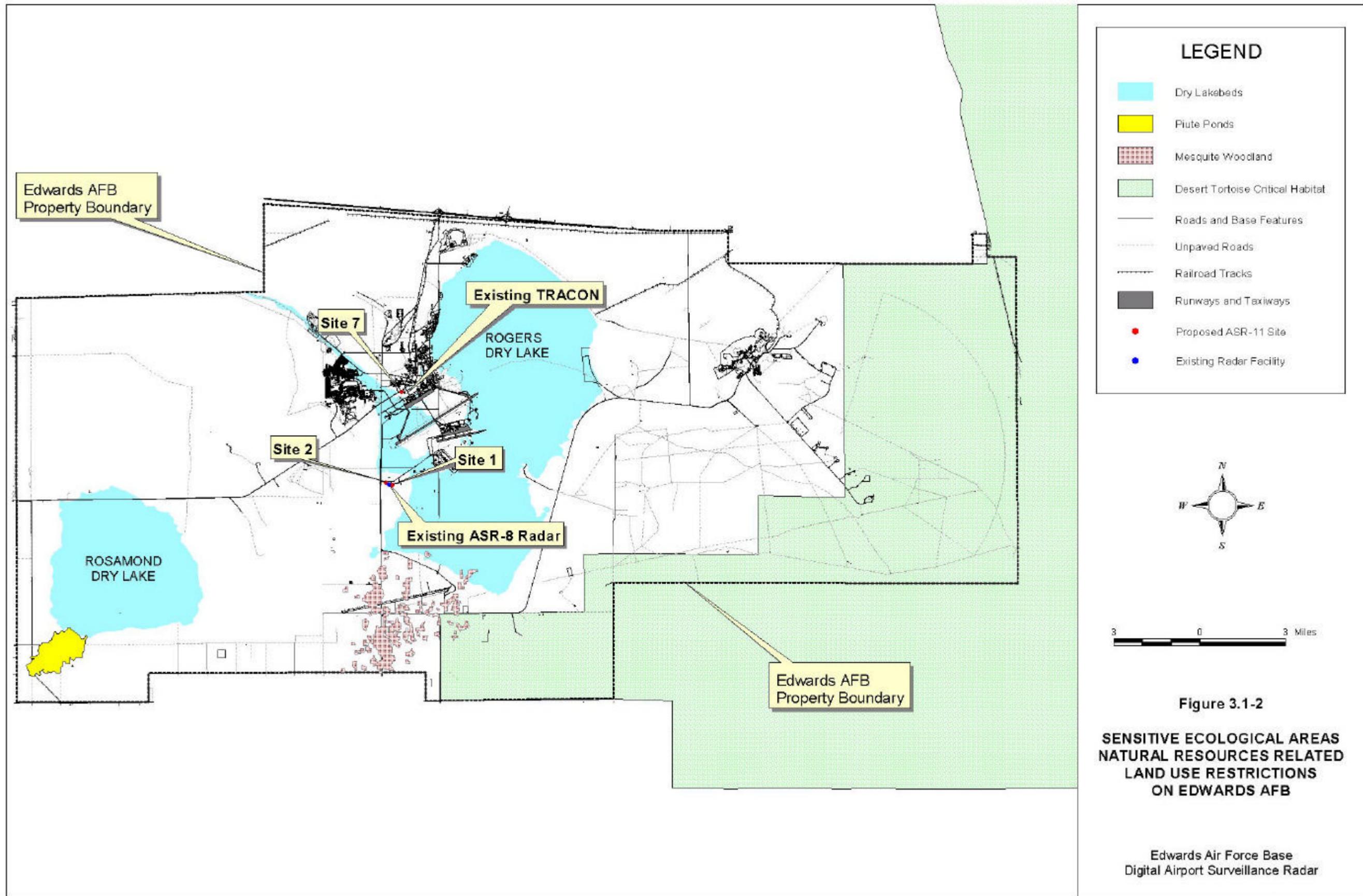
### **3.1.3 Visual and Aesthetic Resources**

Edwards AFB developed a Scenic Quality Map using the Bureau of Land Management's (BLM's) Visual Resource Management Program. The base was divided into subunits and rated according to the following factors: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification (AFFTC, 2001a).

As defined by BLM, Class A areas combine the most outstanding characteristics of each rating factor. There are no Class A areas on Edwards AFB. Class B areas, located in the southwest, center, and eastern portions of the base, combine some outstanding features and some that are fairly common to the physiographic region. On Edwards AFB these include areas such as the lakebeds, the more scenic and relatively undisturbed hills and ridges, the denser Joshua tree woodlands, and Leuhman Ridge. Class C areas, the most abundant class on the base, contain features that are fairly common to the physiographic region and include the remainder of the base, with the exception of the developed areas. Class D areas are so heavily developed/extensively disturbed that they lack positive aesthetic attributes and diminish the visual quality of surrounding areas. These Class D areas include North Base, Jet Propulsion Laboratory (JPL), National Aeronautics and Space Administrative (NASA), Main Base, South Base, housing, and the AFRL (AFFTC, 1994a).

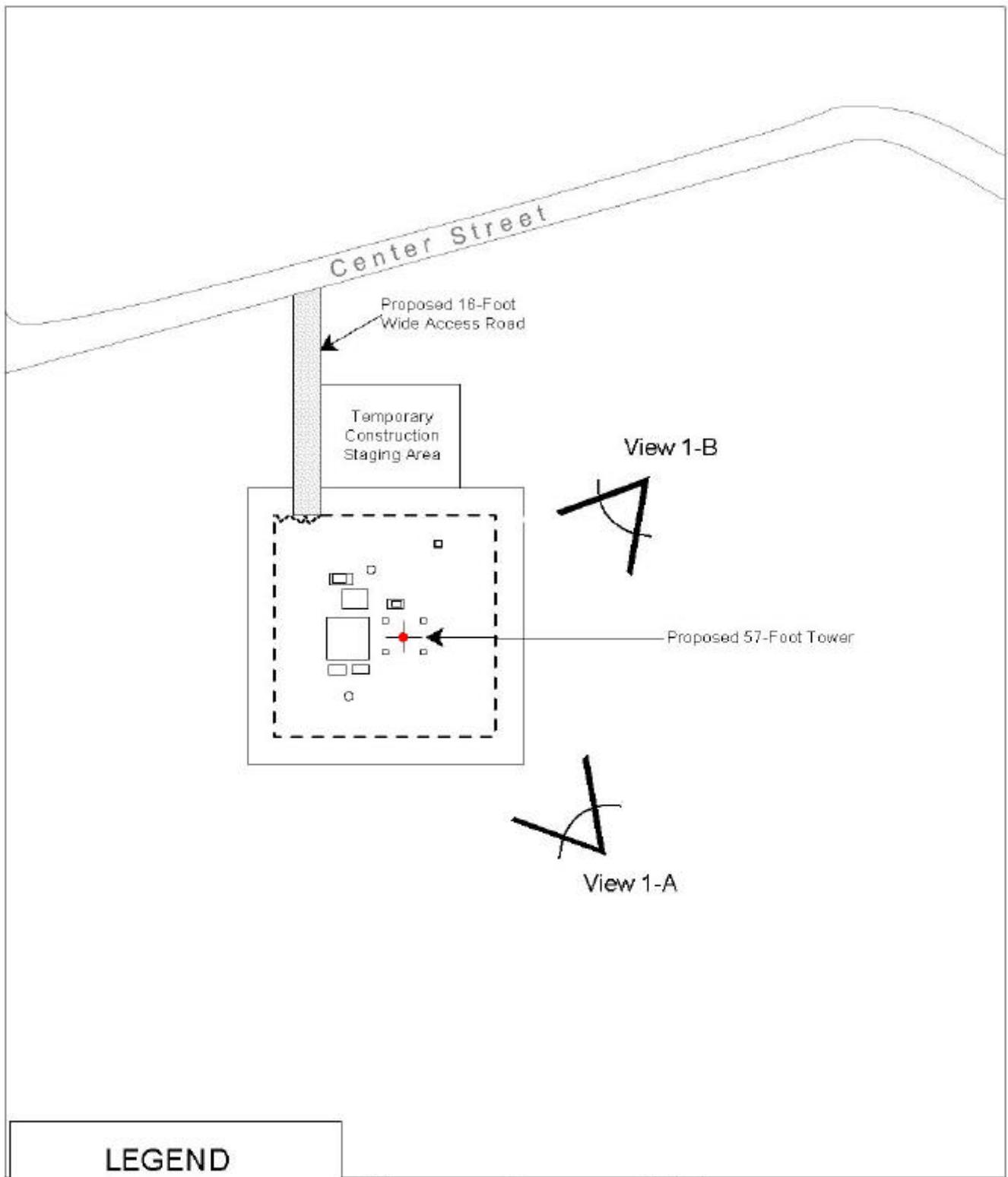
The three alternative ASR-11 sites are located in a Class D area. Photos were taken of each site from different locations around the sites. Figure 3.1-3 shows the locations from which photos of Site 1 were taken. **Site 1** is surrounded by open areas containing desert scrub vegetation typical of the region. View 1-A (Figure 3.1-4) provides a view looking northwest across Site 1, with utility poles visible several hundred feet from the site along Lancaster Boulevard. View 1-B (Figure 3.1-4) provides a view southwest across the site. Although hills are noticeable in the background, a depression exists between the site and the hills. The slope downward begins approximately 100 feet from the site.

**Site 2**, located in South Base, is surrounded by open areas. However, concrete slabs indicating previous development of the area remain scattered on and near the site among typical desert vegetation. The locations from which photos of Site 2 were taken are shown in Figure 3.1-5. Facing east across the site (View 2-A, Figure 3.1-6) utility poles along Jones Road are visible, in addition to the existing ASR-8 facility to the southeast. View 2-B faces west across the site depicting vast undeveloped land. The utility poles seen in this view are located on Lancaster Boulevard.



Source: Edwards AFB

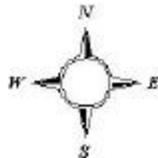
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**LEGEND**

-  Photograph View Angle
-  Proposed ASR-11 Tower
-  Proposed Access Road
-  Proposed ASR-11 Site Fence

100 0 100 Feet



**Figure 3.1-3**

**PHOTOGRAPH ANGLES FOR ALTERNATIVE ASR-11 SITE 1**

**Edwards Air Force Base  
Digital Airport Surveillance Radar**

Source: Edwards AFB, Raytheon, 2001

edwardsafb.apr : faasite1photo : faa\_site1photolayout

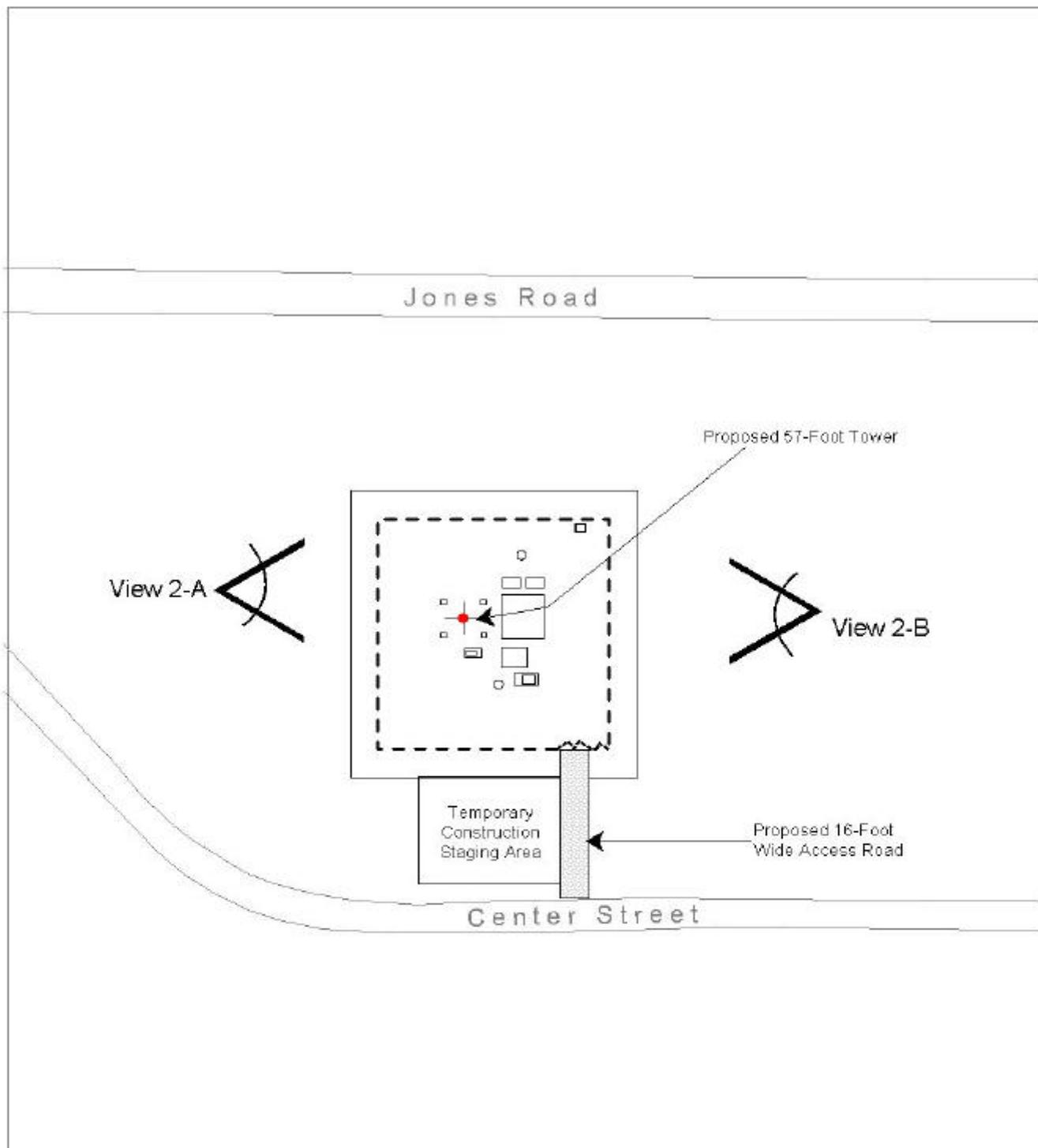


**View 1-A.** Facing Northwest Across Site 1



**View 1-B.** Facing Southwest Across Site 1

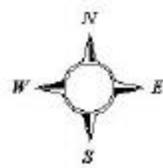
**Figure 3.1-4 Photographs of Site 1 Taken During the March 2001 Site Visit**



**LEGEND**

-  Photograph View Angle
-  Proposed ASR-11 Tower
-  Proposed Access Road
-  Proposed ASR-11 Site Fence

100 0 100 Feet



**Figure 3.1-5**  
**PHOTOGRAPH ANGLES FOR**  
**ALTERNATIVE ASR-11 SITE 2**  
 Edwards Air Force Base  
 Digital Airport Surveillance Radar

Source: Edwards AFB; Raytheon, 2001

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**View 2-A.** Facing East Across Site 2



**View 2-B.** Facing West Across Site 2

**Figure 3.1-6 Photographs of Site 2 Taken During the March 2001 Site Visit**

As compared to the other two alternative sites, **Site 7** is in a more developed area of Main Base. Figure 3.1-7 shows locations from which photos of Site 7 were taken. View 7-A (Figure 3.1-8) faces southeast across the proposed site. The building on the left side of the photograph is the existing TRACON. A hangar and aircraft can be seen in the distance to the south of the proposed site. Facing north across the site, in View 7-B (Figure 3.1-8) the site is shown to be currently undeveloped with Rosamond Boulevard located immediately to the north. The buildings in the distance with red roofs are used as unaccompanied housing.

#### **3.1.4 Noise (Annoyance)**

Sound can vary simultaneously in level (loudness) and frequency content (pitch), while also varying in time of occurrence and duration. The fundamental measure of sound levels is expressed in units of decibel (dB) using a logarithmic scale. Common sounds vary in amplitude over a range of many millions. For instance, an aircraft fly-over may produce pressure amplitude a hundred times greater than a car driving by on a nearby street. On the logarithmic scale, these noise sources would differ by 40 dB. Noise is generally defined as sound that is undesirable because it:

- a. is intense enough to damage hearing,
- b. interferes with speech communication and sleep, or
- c. is annoying.

The Federal Interagency Committee on Urban Noise has developed land use compatibility guidelines for noise and provides recommended day-night average sound level (DNL) ranges for various land use categories. The DNL values of 65 dB, and less, are generally compatible with all types of land uses. Residential, public, and some types of recreational land uses (e.g., nature reserves) are generally not considered compatible with yearly DNL ranges in excess of 65 dB. Commercial, industrial, and other types of recreational land uses (e.g., sports arenas, golf courses, amusement parks, etc.) are generally considered compatible with yearly DNL ranges between 70 and 75 dB, if measures are incorporated into the design and construction of structures associated with these land uses. Some transportation (e.g., railways, airports) and manufacturing land uses (e.g., mining, non-livestock agriculture, fishing, and forestry) can tolerate yearly DNL ranges in excess of 85 dB.

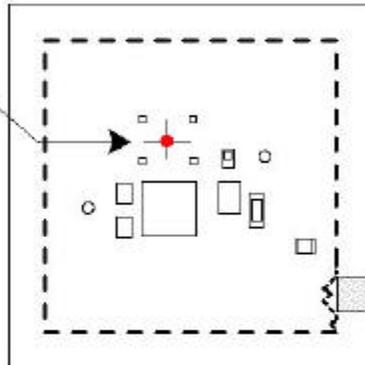
The primary noise sources on Edwards AFB are subsonic and supersonic aircraft operations. Noise due to subsonic flights is produced from engine/propulsion noise and airflow noise generated as the airframe passes through the air. The same noise sources are present with supersonic flights, but the aircraft are often at such an altitude that this noise has been greatly reduced because of the distance and atmospheric absorption. Secondary sources of noise include surface traffic, rail service operations, engine run-ups and other tests, and equipment required for ground facility operations. Ambient noise levels in the developed portions of the base are identified in Table 3.1-2. Existing noise contours at Edwards AFB are based on flightline operations and can be seen in Figure 3.1-9. Noise sensitive receptors at Edwards AFB include military family housing, the dormitories, the Community Health Clinic, schools, child development center, and chapels.

Rosamond Boulevard

View 7-A



Proposed 67-Foot Tower



Temporary Construction Staging Area

Proposed 16-Foot Wide Access Road

Sparks Drive

View 7-B



TRACON Lower Parking Lot

### LEGEND



Photograph View Angle



Proposed ASR-11 Tower

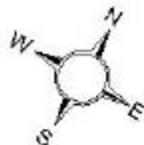


Proposed Access Road



Proposed ASR-11 Site Fence

100 0 100 Feet



**Figure 3.1-7**

**PHOTOGRAPH ANGLES FOR  
ALTERNATIVE ASR-11 SITE 7**

**Edwards Air Force Base  
Digital Airport Surveillance Radar**

Source: Edwards AFB, Raytheon, 2001

edwardsafb apr faasite/photo faa\_site7photolayout

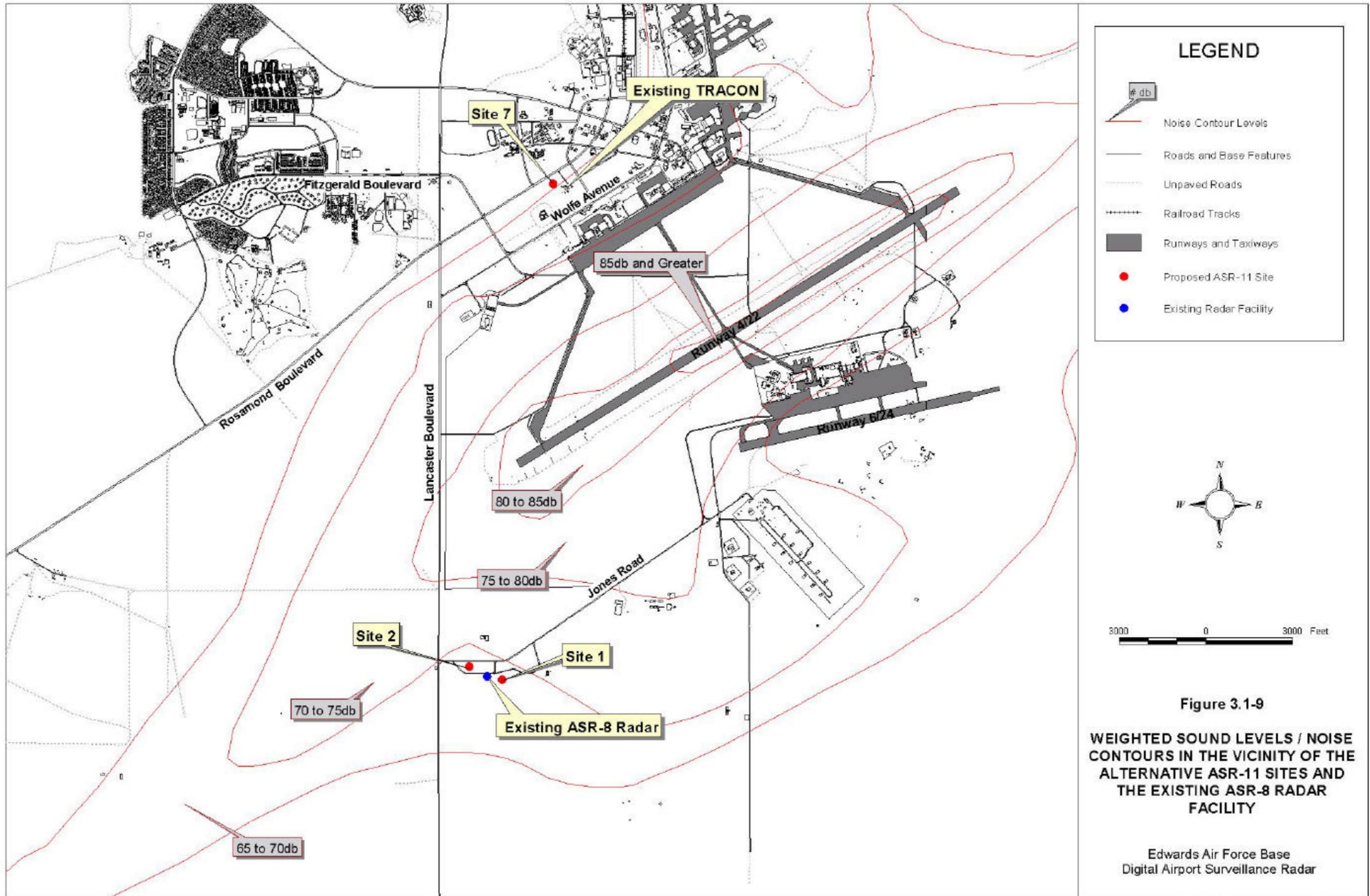


**View 7-A.** Looking at Site 7 Facing Southeast



**View 7-B.** Facing North Across Site 7

**Figure 3.1-8 Photographs of Site 7 Taken During the March 2001 Site Visit**



Source: Edwards AFB

edwardsafb.apr : noiseview : noiselayout

**Table 3.1-2  
Ambient (Background) Noise Levels Recorded at Various Base Locations**

<b>Location</b>	<b>DNL</b>
Edwards AFB Housing Area and Vicinity * Back of Community Health Clinic * Unpaved Parking Area Near Schools * Northeast of the Hospital Dormitory * Intersection of Forbes Avenue and Yeager Boulevard * Chapel * Golf Course	67.7 36.9 61.7 61.5 53.6 54.3
Main Base * Building 1200 (Base Operations/Base Exchange Cafeteria) * Building 1632 (Aircraft Research Engineering Maintenance Facility)	68.8 75.6
North Base * Near JPL Building 4231 (Satellite Communications Ground Terminal) * Near Taxiway/Runway Intersection * At Building 4444 (Research Equipment Storage)	60.6 57.2 65.0
South Base * B-2 Area * Main Runway (Southeast of) * Inactive Runway	67.9 72.4 60.8
Air Force Research Laboratory * Near Building 8255 (Equipment Research Engineering) * Near Building 8483 (Missile in Space Research Support)	54.7 46.1
NASA/Dryden Flight Research Center * Near Building 4850 (NASA Child Development Center)	65.5

Source: *Programmatic Environmental Assessment for the Comprehensive Plan of Edwards Air Force Base, California* (USACOE and AFFTC, 1994)

- Notes:
1. AFB – Air Force Base
  2. JPL – Jet Propulsion Laboratory
  3. NASA – National Aeronautics and Space Administration
  4. DNL – the day/night equivalent noise level. It incorporates a 10-decibel penalty for nighttime noise between 10 p.m. and 7 a.m. to reflect the added likelihood of annoyance during this period.

**Sites 1 and 2** are within an airfield operation noise contour characterized as having a DNL of between 65 and 70 dB. **Site 7** is within the outermost boundary of the 65 dB noise contour. The existing **ASR-8** is located in an area where estimated DNL average between 65 and 75 dB (AFFTC, 1994a).

### **3.1.5 Future Without the Project**

The Base Planning Office reveals no significant changes in future land use (AFFTC, 2001a) surrounding the alternative sites or the existing radar. The figure illustrating this fact is in draft form and unavailable. According to the Base Planner, land use and noise levels in the vicinity of Sites 1, 2, and 7, and the existing ASR-8, are anticipated to be similar to those that currently characterize the area (USAF, 2001b).

## **3.2 AIR QUALITY**

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing weather conditions, determine air quality. The significance of the pollutant concentration is determined by comparing it to the Federal and State ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety.

Edwards AFB is located within three air quality districts; however, all three of the proposed alternative ASR-11 sites are located within one of the districts. Existing air quality characteristics in the vicinity of the three alternative ASR-11 sites and existing ASR-8 are discussed in this section. Information was compiled from regional data and is expected to describe existing site-specific characteristics.

### **3.2.1 Regulatory Requirements/Guidance**

The 1970 Federal *Clean Air Act* (CAA), and the 1990 *Clean Air Act Amendments* (CAAA), regulate air pollution emissions from stationary and mobile sources to protect public health and welfare. Air quality regulations were first promulgated with the CAA and revised with the CAAA. Stationary sources at Edwards AFB typically include fixed sources such as internal combustion engine generators, external combustion boilers, and spray paint booths. Mobile sources typically include motor vehicles, construction equipment, and aircraft. The generator proposed as part of the ASR-11 facility would be subject to these regulations.

### **3.2.2 National Ambient Air Quality Standards**

The CAA and CAAA established the National Ambient Air Quality Standards (NAAQS) for the regulation of criteria pollutants. Criteria pollutants are chemical compounds that are known to have serious public health impacts, as well as cause damage to the environment in general. Designated State and local agencies have the primary authority and responsibility to implement rules and regulations to control sources of criteria pollutants. Within the State of California, the authority to regulate sources of air emissions resides with the California Air Resources Board (CARB) and is delegated to local air pollution control and air quality management districts. The criteria pollutants include ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulate matter equal to or less than 10 microns (PM<sub>10</sub>). In addition, volatile organic compounds (VOCs) and NO<sub>x</sub> pollutants are classified as O<sub>3</sub> precursors, and are subject to further regulations.

Based on measured ambient criteria pollutant data, the United States Environmental Protection Agency (U.S. EPA) designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. An area is often designated as unclassified when there are insufficient ambient criteria pollutant data for the U.S. EPA to form a basis for attainment status. Once an area is classified as nonattainment, the degree of nonattainment is divided into categories of *Marginal*, *Moderate*, *Serious*, *Severe*, or *Extreme*.

The assignment of a nonattainment category is based on measured criteria pollutant concentrations in a given location and varies according to the criteria pollutant of concern.

The measurement of existing ambient criteria pollutant concentrations is accomplished using air quality monitoring stations. The closest CARB air quality monitoring station to Edwards AFB is located in Mojave, California. The location of the Mojave Air Station and other CARB monitoring stations in the Edwards AFB area can be seen in Figure 3.2-1. Table 3.2-1 shows the 1996 and 1997 data received at the monitoring station for criteria pollutants as they related to NAAQS. Table 3.2-1 also shows the number of times the criteria pollutants measured at the Mojave Air Station equaled or exceeded the NAAQS for a given year. For the purpose of this EA, these data are provided as information only. It illustrates the current ambient air quality in the Edwards AFB area.

**Table 3.2-1  
Ambient Air Standards For Criteria Pollutants**

<b>CRITERIA POLLUTANT</b>	<b>NATIONAL AMBIENT AIR QUALITY STANDARD (NAAQS)</b>	<b>NUMBER OF TIMES AND YEAR MOJAVE AIR STATION EQUAL TO OR EXCEEDING NAAQS</b>
Ozone (O <sub>3</sub> )	0.12 ppm (2) – hourly average	2 (1996) 0 (1997)
Particulate Matter <10 µm (1) (PM10)	50 µg/m <sup>3</sup> (3) – annual average 150 µg/m <sup>3</sup> (3) – annual average	0 (1996) 0 (1997)
Nitrogen Oxides (NO <sub>x</sub> )	0.053 ppm – annual average	0 (1996) 0 (1997)

Source: AFFTC, 2001a

Notes: 1. µm – 1 x 10<sup>-6</sup> meters

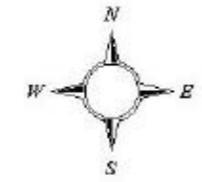
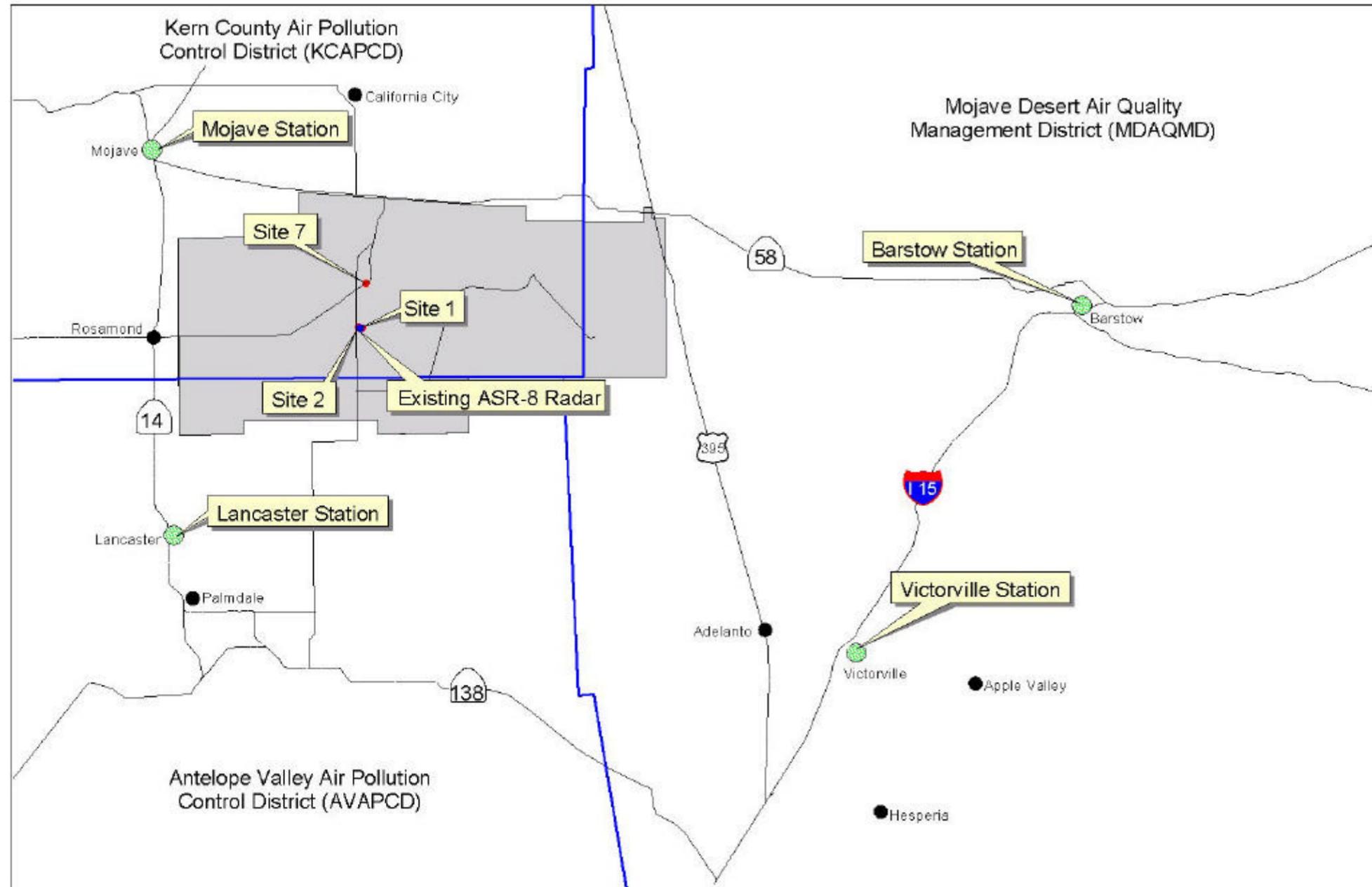
2. ppm – parts per million

3. µg/m<sup>3</sup> – 1 x 10<sup>-6</sup> grams per cubic meter

States are required to develop a State Implementation Plan (SIP) that sets forth how the CAAA provisions will be implemented within the State. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each State. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area. The California O<sub>3</sub> SIP was approved by the U.S. EPA in September 1996 and codified as law in 40 Code of Federal Regulation (CFR) 52, Subpart F.

### **3.2.3 Local District Control**

Within the State of California, the authority to regulate sources of air emissions resides with the CARB and is delegated to local air pollution control and air quality management districts. Local districts enact rules and regulations to achieve SIP requirements. As shown in Figure 3.2-1, Edwards AFB is located within the jurisdiction of three local air districts: Kern County Air Pollution Control District (KCAPCD), Mojave Desert Air Quality Management District



**Figure 3.2-1**  
**AIR QUALITY MONITORING STATIONS**  
**AND AIR DISTRICT BOUNDARIES**  
**IN THE VICINITY OF EDWARDS AFB**

Edwards Air Force Base  
 Digital Airport Surveillance Radar

Source: Edwards AFB

edwardsafb.apr: Air Quality View: AQMDlayout

(MDAQMD), and Antelope Valley Air Pollution Control District (AVAPCD). **Sites 1, 2, and 7,** and the existing **ASR-8** facility are located within KCAPCD. The KCAPCD is designated as being in *Serious* O<sub>3</sub> nonattainment and in attainment or unclassified for all other pollutants.<sup>1</sup>

For KCAPCD, New Source Review (NSR) is implemented under Rule 210.1, *New and Modified Stationary Source Review (NSR)*. Specifically, these rules and regulations:

- a. provide for the pre-construction review of new and modified stationary sources of affected air pollutants to ensure emissions will not interfere with the attainment of ambient air quality standards;
- b. ensure appropriate new and modified sources of affected pollutants are constructed with the Best Available Control Technology (BACT); and
- c. provide for no net increase in emissions from new and modified stationary sources for all nonattainment pollutants and their precursors.

In order to enforce these rules, the air districts have established baseline emission levels for new or modified stationary sources of PM<sub>10</sub>, SO<sub>x</sub>, NO<sub>x</sub>, and VOCs in nonattainment areas. Proposed projects that generate emissions in excess of these threshold levels would require offsets. These threshold emission levels are shown in Table 3.2-2. Local air quality permits from KCAPCD are issued for projects resulting in emissions that may affect local air quality.

**Table 3.2-2  
New Source Review Threshold Emission Levels**

Air District	New Source Review Threshold Emission Levels per Pollutant (tons/year)			
	PM <sub>10</sub>	SO <sub>x</sub>	VOC	NO <sub>x</sub>
KCAPCD	15	27	25	25

Source: AFFTC, 2001a

- Notes:
1. PM<sub>10</sub> – particulate matter less than or equal to 10 microns
  2. SO<sub>x</sub> – sulfur oxides
  3. VOC – volatile organic compounds
  4. NO<sub>x</sub> – oxides of nitrogen
  5. KCAPCD – Kern County Air Pollution Control District

Under the CAAA of 1990, Title V requires that major sources of air pollutants within each air district obtain a Federal operating permit. This permit is an all-encompassing permit, which includes all local air district permits (i.e., criteria pollutants and hazardous air pollutants [HAPs]) and documents compliance with other CAA regulations. Edwards AFB has a Title V permit. Any new source of emissions must be included in the existing Title V permit, with a few exceptions such as diesel fuel storage tanks.

In addition to the requirements for regulation of criteria pollutants, the CAAA also sets forth regulations to control emissions of HAPs. The HAPs are defined as air pollutants that cause serious human health effects including mortality. Title III of the CAAA lists 17 compounds and 171 chemicals (188 total pollutants) that are defined as HAPs and are regulated by the U.S. EPA.

<sup>1</sup> KCAPCD has jurisdiction over the eastern half of Kern County. All of Kern County is designated as *Serious* O<sub>3</sub> nonattainment.

Since pollutants can be added to and deleted from this list, the 188 pollutants should be recognized as the initial list and not the ultimate list of HAPs. Chemicals listed range from trace metals, which are inherent in fuel combustion; to solvents, which are used in a variety of painting, degreasing, and cleaning operations; to chemical intermediates used to produce a variety of everyday products (Bradstreet, 1995).

Title III of the CAAA requires the U.S. EPA to develop a set of rules and regulations designed to implement control technologies and procedures that limit HAP emissions. These rules and regulations are collectively known as National Emissions Standards for Hazardous Air Pollutants (NESHAP). The U.S. EPA is required to develop specific NESHAP for a wide range of industrial source categories. A NESHAP that applies to Edwards AFB is the Aerospace NESHAP (40 CFR Part 63, Subpart GG). This NESHAP controls HAP emissions resulting from aerospace manufacturing and rework facilities. The applicability of a NESHAP to a facility operation is determined by the potential to emit (PTE) of HAPs from all applicable sources, and a PTE threshold value that is set by the area nonattainment status. Edwards AFB is defined as a major source of HAPs and must comply with the Aerospace NESHAP. The HAP PTE threshold values for all local districts are 10 tons per year for a single HAP and 25 tons per year for any two or more HAPs.

The Air Toxic Hot Spots Program was created by the *Air Toxics "Hot Spots" Information and Assessment Act of 1987* (Assembly Bill [AB] 2588, California State Health and Safety Code Sections 44300 through 44384). The Act establishes a program to inventory routine emissions of toxic substances into the air and to assess the public health risk to those who are exposed. As of 1998, there are over 450 toxic substances listed under AB 2588. Toxics can be added to or deleted from this list. At Edwards AFB, toxic substances are generated as a result of various processes including aircraft cleaning and painting, lubricating processes, the operation of internal combustion engines (e.g., Technical Support Equipment [TSE], boilers, turbine engines, etc.), and adhesives/sealant applications.

### **3.2.4 Conformity Requirements**

Federal facilities located in a NAAQS nonattainment area are required to comply with Federal Air Conformity rules and regulations of 40 CFR 51/93. Under Air Conformity, a facility (such as Edwards AFB) that initiates a new action (such as the proposed action) must quantify air emissions from stationary and mobile sources associated with that action. Calculated emissions are first compared to established *de minimis* emission levels (based on the nonattainment status for each applicable criteria pollutant in the area of concern) to determine the relevant compliance requirements. If the calculated emissions are equal to or greater than *de minimis* levels, then the requirements of air conformity apply to the action.

The proposed ASR-11 site locations and the existing ASR-8 radar are located with the Kern County portion of Edwards AFB. Thus, the NAAQS nonattainment and regional planning emission inventories for KCAPCD would be used to determine the applicability of air conformity requirements to the proposed ASR-11 facility installation and operation.

In accordance with the air conformity requirements of 40 CFR 51.853/93.153(b)(1) and KCAPCD Rule 210.7, the *de minimis* level set for the O<sub>3</sub> *Serious* nonattainment area of

KCAPCD for O<sub>3</sub> precursor emission is up to 50 tons per O<sub>3</sub> precursor pollutant (NO<sub>x</sub> and VOC) per year per action.

In addition, even if calculated emissions are less than *de minimis* levels, a subsequent comparison must be made. Specifically, the calculated project emissions must be compared to the regional planning emission inventories for each applicable criteria pollutant in the nonattainment area of concern. If the calculated emissions are equal to or greater than 10 percent of the regional planning emission inventory, then the action is considered to be regionally significant and the requirements of air conformity apply. Otherwise, if the calculated emissions are less than both *de minimis* levels and 10 percent of the regional planning emissions inventories, then the requirements of air conformity do not apply to the action. For KCAPCD, the regional planning emission inventories for O<sub>3</sub> precursor pollutant (NO<sub>x</sub> and VOC) emissions are included in the 1994 California O<sub>3</sub> SIP. In the California O<sub>3</sub> SIP, the regional planning baseline year is 1990. Table 3.2-3 shows the 1990 baseline values and the 10-percent threshold values.

**Table 3.2-3  
1990 Baseline And 10-Percent Threshold Values**

District	1990 Baseline Values (tons/year)			10-Percent Threshold (tons/year)		
	NO <sub>x</sub>	VOC	PM10	NO <sub>x</sub>	VOC	PM10
<b>KCAPCD</b>	14,965	6,205	N/A	1,496.5	620.5	N/A

Source: AFFTC, 2001a

- Notes: 1. NO<sub>x</sub> – oxides of nitrogen  
 2. VOC – volatile organic compound  
 3. PM10 – particulate matter less than or equal to 10 microns  
 4. KCAPCD – Kern County Air Pollution Control District

### 3.2.5 Future Without the Project

No major expansion or change in use of the base is identified in the draft 2001 General Plan; therefore, without the project, air quality in the vicinity of the three proposed ASR-11 sites and the existing ASR-8 is expected to remain stable. Incremental improvement in automotive emissions and continuing pollution prevention efforts at the base aimed at reducing the use of VOCs will tend to improve air quality, while the increasing population of Los Angeles, Kern and San Bernadino counties will contribute to emissions due to increasing traffic and use of small engines. These two tendencies may counteract each other resulting in no appreciable overall change.

### 3.3 WATER RESOURCES

Water Resources describes the sources, quantity, use and quality of water at Edwards AFB. This includes drinking (potable) water, wastewater, and stormwater. The sources of water on Edwards AFB include groundwater, Antelope Valley East Kern (AVEK) Water Agency water, and stormwater.

### 3.3.1 Regulatory Requirements/Guidance

The *Safe Drinking Water Act* (SDWA) (42 USC 300), as amended, was passed to protect public drinking water supplies from harmful contaminants. The Act is administered through regulatory programs that establish standards and treatment requirements for drinking water, the control of underground injection of wastes that might contaminate water supplies, and protection of groundwater.

Air Force Instruction 32-7044, *Storage Tank Compliance*, implements Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*. It identifies compliance requirements for underground and aboveground storage tanks and associated piping that store petroleum and hazardous substances.

The *Clean Water Act* (CWA) (33 USC 1251 et seq.), as amended, is designed to restore and maintain the chemical, physical, and biological integrity of surface waters. The CWA establishes effluent standards on an industry basis and addresses water pollution issues through a permitting system designed to control, and eventually eliminate, water pollution. The *Edwards Air Force Base Storm Water Pollution Prevention Plan* (SWPPP) (AFFTC 1999) is the principle local regulatory mechanism used to control all stormwater discharges. Violations of the CWA can result in large fines and/or imprisonment. An AFFTC Form 5852, *Permit for Industrial Wastewater Discharge Edwards AFB, California*, is the local permitting mechanism used to control discharges of nonhazardous wastewater to the base wastewater treatment plants (WWTPs).

### 3.3.2 Water Quantity and Source

**3.3.2.1 Drinking Water and Groundwater.** The AFFTC purchases potable water from the AVEK Water Agency through a water distribution system located in Boron, California. Edwards AFB also uses 12 groundwater wells, of which 10 are used for drinking water purposes. These ten wells have a maximum combined production capability of 15.6 million gallons per day (mgd). Eight of the groundwater wells are located within the South Track Wells at South Base, three wells are located in the far southwest corner of the base, and one well is located in North Base. The well in North Base is not currently in service (USAF, 2001c). Further discussion of the water distribution system is presented in Section 3.10.2.

**3.3.2.2 Wastewater.** Both domestic and industrial wastewater sources exist on Edwards AFB. The WWTP that serves Main, North, and South Bases is located between Jones Road and County Road and was completed in 1996. The facility treats 100 percent of the wastewater from the sanitary sewer systems on these portions of the base. Treated effluent from the WWTP is used for irrigation and direct groundwater recharge.

**3.3.2.3 Stormwater.** Edwards AFB has been subdivided into six stormwater management units: Main Base Flightline, Main Base miscellaneous, South Base, NASA, AFRL, and North Base (SWPPP, 1998). These units are defined as nonphysical in that the boundaries reflect tenant lease areas and other organizational areas. **Sites 1 and 2** and the existing **ASR-8** are located in South Base, while **Site 7** is in the Main Base Flightline stormwater management unit.

Containment structures to control stormwater pollution within the stormwater units include containment dikes, curbs, drainage ditches, and evaporation ponds. Other control measures include grounds and street cleaning and training in materials handling. The Plan also includes treatment processes by oil/water separators (OWS) and the avoidance of introducing contaminants into the stormwater drainage areas. Additional information with respect to stormwater management units and stormwater drainage areas can be found in the *Edwards Air Force Base Non-Point Discharge and Stormwater Management Plan* (AFFTC, 1994b).

### **3.3.3 Water Quality**

Bioenvironmental Engineering monitors base groundwater quality, compliance of drinking water standards, and assists the Base Civil Engineer (BCE) and Environmental Management with required environmental monitoring, identification, and characterization of industrial wastewater dischargers. It also conducts periodic sampling and analysis to ensure regulatory compliance, and takes out-of-cycle samples for analysis at the request of the BCE and Environmental Management. Any accidental or intentional break in the water lines needs to be identified/coordinated with the BCE and Bioenvironmental Engineering to prevent foreign materials (biological or chemical) from contaminating the base water supply. Groundwater contaminated with petroleum products is not discharged into sanitary or storm sewers. The contaminated waters are pretreated prior to discharge.

Rainfall in the San Gabriel Mountains southwest of Edwards AFB and in the Tehachapi Mountains northwest of the base drains mostly in well-defined channels toward the Valley floor. Sediments carried by various stream channels are deposited along the way and into the Valley. Rogers Dry Lake receives stormwater runoff from the surrounding areas including western portions of the Precision Impact Range Area (PIRA). Stormwater mostly evaporates from the dry lakebed and clay pan areas, but some infiltration is likely (AFFTC, 1999a). The average annual precipitation at Edwards AFB is less than 5 inches. The majority of rainfall comes during the winter and spring months (AFFTC, 1997a).

The *Edwards Air Force Base Non-Point Discharge and Stormwater Management Plan* identifies and assesses sources of stormwater pollution and develops practices and controls to reduce the amount of pollutants in stormwater discharges. The Plan also describes a monitoring program to determine the effectiveness of stormwater practices in removing pollutants (AFFTC, 1994b).

### **3.3.4 Future Without the Project**

No substantial changes in surface water conditions are expected to occur in the future without the project due to limited planned development on base. Implementation of Best Management Practices (BMPs) during normal activities on the base will help to reduce both point and non-point source pollution from stormwater. Withdrawal of groundwater supplies for drinking water sources will continue in the future without the project.

## **3.4 SAFETY AND OCCUPATIONAL HEALTH**

Occupational Health and Safety is defined as the protection of workers and the public from hazards. The total accident spectrum encompasses not only injury to personnel, but also damage

or destruction of property or products. For worker safety, the boundary of the immediate work area defines the region of influence. At Edwards AFB, the potential health and safety issues associated with implementing the proposed action would include radiological and physical hazards.

### **3.4.1 Regulatory Requirements/Guidance**

The Occupational Safety and Health Administration (OSHA) has developed standards to promote a safe working environment. Environmental controls, including exposure limits for noise, ionizing and nonionizing radiation, and toxic and hazardous substances have been established, as well as requirements for handling and storing compressed gases and flammable liquids. The OSHA Act (Public Law [PL] 91-596) also provides standards for emergency response to releases of hazardous chemicals and hazardous wastes. California OSHA (Cal-OSHA) has also developed regulations that do not apply to Edwards AFB DoD workers (i.e., military and civilian). Independent contractors are responsible for meeting Cal-OSHA requirements.

In an effort to provide a safe workplace, the following policies and guidance are applicable to all work on Edwards AFB:

- The OSHA General Duty Clause, Section 5(a)1;
- The AFDPD 91-2, *Safety Programs*;
- Air Force Instruction 91-202, *The US Air Force Mishap Prevention Program*;
- Air Force Occupational Safety and Health (AFOSH) Standard 48-9, *Radio Frequency Radiation (RFR) Safety Program*;

Statutory and regulatory requirements of the Federal OSHA and the AFOSH Standards, which apply to the safety of workers on Edwards AFB, are enforced locally by Bioenvironmental Engineering, Ground Safety, and the Base Fire Department. In addition, operational safety is supervised by various offices for specific activities.

### **3.4.2 Exposure Hazards**

Elements of the existing natural environment at Edwards AFB can present a human health hazard to personnel. Specifically, personnel working outdoors experience heat stress from exposure, hypothermia from exposure, may be bitten by venomous snakes, and contract valley fever from exposure to soils hosting spores. Other exposures of concern are related to electromagnetic radiation (EMR) and magnetic/electric fields.

**3.4.2.1 Electromagnetic Radiation (EMR).** Nonionizing EMR comes from two major sources on base: radiofrequency emitters (i.e., radars, radar-jamming transmitters, and radio communication equipment) which are regulated in accordance with (IAW) AFOSH Standard 48-9, *Radio Frequency Radiation (RFR) Safety Program*; and laser emitters (lasers), which are regulated IAW AFOSH Standard 48-10, *Laser Radiation Protection Program*. Sources of EMR exist throughout the flightline areas, and include fixed location radar, airfield management equipment, and aircraft equipment/instrumentation.

Electrical currents and components generate electrical fields and magnetic fields. These may be stationary or dynamic. Depending on the equipment, EMR that propagates outward may be created. Electromagnetic radiation, electrical fields, and magnetic fields are localized effects. The electromagnetic environment at a particular location and time is the sum of all the localized electric and magnetic fields plus EMR arriving from both natural and manmade sources. Electric fields, magnetic fields, and EMR are of interest here because of the potential for health effects from some frequency ranges and the potential for electromagnetic interference on other electronic equipment.

Electromagnetic radiation travels at a uniform speed ( $3 \times 10^8$  m/sec in a vacuum; the speed of light). It is often useful to consider EMR as a wave, and to describe it in terms of frequency (where 1 Hz means 1 cycle per second and 1 kHz means 1000 cycles per second). Some parts of the electromagnetic spectrum are more commonly described in terms of wavelength, which is inversely related to frequency.

The spectrum of electromagnetic radiation includes visible light, which has frequencies on the order of  $5 \times 10^{14}$  Hz (specifically, wavelengths from 400 nanometers [nm] to 760 nm). Electromagnetic radiation frequencies higher than that of visible light include ultraviolet light, X-rays, and gamma rays. These types of EMR are described as “high energy” and have the potential to “excite” electrons, to thereby ionize molecules, and to thus affect body chemistry. Especially in high absorbed doses, high frequency EMR can adversely affect health (National Safety Council [NSC], 1979).

Electromagnetic radiation with frequencies lower than that of visible light include infrared light and radio waves. Frequencies below  $10^{12}$  Hz ( $10^6$  MHz) are categorized as radio waves. These include frequencies used for AM radio; short-wave, television, and FM broadcast bands; pagers; cellular telephones; mobile radios; radar; and microwave technologies. These frequencies are nonionizing, and have the following known health effects: (1) effects caused by directly heating body tissues and (2) electromagnetic interference with electronic medical devices such as pacemakers.

The heating of tissues caused by exposure to RFR at relatively low incident power densities can normally be accommodated. However, in some tissues, heat produced at higher radiation intensities may exceed temperature-regulating mechanisms, so compensation for heat gain may be inadequate. Thus, exposure at high intensities can cause thermal distress or irreversible thermal damage. Eye tissues are particularly vulnerable (NSC, 1979).

Electromagnetic interference with medical devices has become an issue because medical devices increasingly use sensitive electronics at the same time that RFR and other electromagnetic sources are proliferating (Food and Drug Administration [FDA], 1996). Medical equipment that may be susceptible to interference from RFR includes cardiac pacemakers, defibrillators, ventilators, apnea monitors, and electric wheelchairs (Vermont Department of Public Services [VTDPS], 1996; Institute of Electrical and Electronics Engineers [IEEE], 1998). Medical device manufacturers are expected to design and test their products to ensure conformance with standards for protection against radio frequency interference (IEEE, 1998). Nevertheless, users

of medical devices are generally advised to keep RFR emitters as far away from their devices as is practical (IEEE, 1998).

Existing equipment at the ASR-8 radar emits EMR in the radio frequency range. Locations close to and directly in front of the antenna (whether rotating or stationary) are considered unsafe when the radar is operating, on the basis of the potential for heating of body tissues. Similarly, the tower immediately below the antenna is considered unsafe. The intensity of the radar energy diminishes with distance, so there would be less tissue heating at greater distances.

Within electronic systems for radar, any high-voltage tubes capable of emitting X-rays are typically shielded with lead, and shielding on other equipment is typically adequate to limit transmitted radiation to acceptable levels. While there are unshielded components present at the ASR-8 site such as incandescent light bulbs, there is no indication or expectation that significant levels of EMR other than RFR are emitted into the environment by the ASR-8 system.

Magnetic fields and electric fields other than EMR are also created by electrical equipment. In everyday situations, high-voltage power lines, televisions, computer monitors, fluorescent lights, light dimmer controls, improperly grounded equipment, and appliances used with non-polarized extension cords create measurable electric fields. Transformers, alternating current (A/C) adapters, motors (e.g., analog clocks and kitchen appliances), power lines, vehicles, and old electric blankets create measurable magnetic fields.

The presence of various electrical components in the ASR-8 radar system inevitably means that there are a variety of magnetic and electrical fields in the vicinity of the ASR-8 equipment. There is currently considerable interest on the part of some researchers, the news media, and the public regarding the possibility of other health effects from nonionizing radiation (and/or other electrical or magnetic fields). However, there is no scientific consensus that nonionizing radiation presents any other health risks (USAF, 1995) and no consensus about a mechanism by which nonionizing radiation could have any such effects (i.e., effects other than those associated with heating of tissue and interference with medical devices). A 1996 National Academy of Science report, *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*, concluded that:

“The current body of evidence does not show exposure to these fields presents a human-health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produce cancer, adverse neurobehavioral effects, or reproductive and developmental effects.” (National Academy of Science, 1996).

Bioenvironmental Engineering visits and evaluates the operations of all known AFFTC industrial radiation users on a periodic basis as a part of the Industrial Hygiene Surveillance Program. This office also verifies (annually) the list of on-base RFR emitters. Any proposed use of emitters is evaluated using a preliminary radiation hazard analysis. Using a permissible exposure limit (PEL), a proper hazard analysis is accomplished. This PEL is expressed in terms of safe distance limits from the emitting source. Compliance with these limits is required as a Standard Operating Procedure (SOP) (AFFTC, 1997c).

### **3.4.3 Safety**

The statutory and regulatory requirements of the Federal OSHA and AFOSH standards that apply to the safety of DoD workers on Edwards AFB are enforced locally by Bioenvironmental Engineering, AFFTC Safety, and the Base Fire Department. Operational safety is supervised by the Center Safety Office, which includes Flight, Ground, Test (Systems), Weapons, and Range Safety. The installation of the ASR-11 radar at Edwards AFB would include activities supervised by the Flight Safety and Range Safety Offices.

Munitions are stored and handled at a number of locations on base. The primary use area is the flightline, where use of munitions is allowed in specified areas subject to strict management. The primary munitions storage area on base is located at South Base (Figure 1-2). Additional locations exist within the Main and North Base areas. Each location where live ordnance may be stored or handled has an inhabited building separation distance (or clear zone) associated with it (AFFTC, 1994a). Although most munitions used on base are inert (non-explosive), some live ordnance is used for certain testing and training activities. Munitions Flight is the organization responsible for munitions in the flightline area. Procedures for the safe handling and use of explosives are contained in Air Force Manual (AFMAN) 91-201, *Explosives Safety Standards*.

The closest munitions storage area to the alternative ASR-11 sites is approximately 2 miles from **Site 1**, 1.25 miles from **Site 2**, and less than one mile from **Site 7**.

The *US Air Force Mishap Prevention Program* was designed to implement the Air Force Safety Program. It applies to the various safety disciplines within the Center Safety Office (i.e., Flight Safety, Ground Safety, Test [Systems] Safety, Weapons Safety, and Range Safety). Prior to implementing any new program, a system safety evaluation and analysis is performed consistent with AFI 91-202, *The US Air Force Mishap Prevention Program*, protocols and associated test standards.

### **3.4.4 Future Without the Project**

The existing exposure types on Edwards AFB are not anticipated to substantially change. There is no planned use change at the site locations that would substantially alter the electromagnetic field characteristics in the area. Therefore, the existing occupational safety and health environment is anticipated to remain stable in the future without this project.

## **3.5 HAZARDOUS SUBSTANCES AND SOLID WASTE**

A hazardous material is any material whose physical, chemical, or biological characteristics, quantity, or concentration may cause or contribute to adverse effects in organisms or their offspring; pose a substantial present or future danger to the environment; or result in damage to or loss of equipment, property, or personnel.

Hazardous wastes are those substances that have been “abandoned, recycled, or are inherently waste-like” and which (because of their quantity, concentration, or characteristics) have the potential to cause an increase in mortality or serious irreversible illness, or pose a substantial hazard to human health or the environment if improperly treated, stored, transported, and/or

disposed. For purposes of this analysis, the terms hazardous material and hazardous waste are those substances as defined by the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) and the *Resource Conservation and Recovery Act* (RCRA).

Solid waste refers to nonhazardous garbage, refuse, sludge, and any other discarded solid material resulting from residential, commercial, and industrial activities or operations. Solid waste can be classified as construction/demolition waste (CDW), nonhazardous recyclable waste, or nonhazardous non-recyclable waste.

### **3.5.1 Regulatory Requirements/Guidance**

The types of hazardous materials most commonly used during construction projects include acids, corrosives, caustics, glycols, compressed gasses, paints and paint thinners, solvents, sealants, adhesives, cements, caulking, fire retardant, and hot asphalt (140°F or greater). Building and facility maintenance requires the use of heating fuels, paints, aerosols, and fluorescent light bulbs, all of which are hazardous materials. In spite of the small volumes of hazardous materials and hazardous waste generated by the proposed project, the following regulations, presented in Table 3.5-1, apply.

### **3.5.2 Hazardous Materials**

Edwards AFB uses a wide variety of hazardous materials in support of research activities on the base and its mission requirement to support all types of inventory aircraft. Hazardous materials are used for aircraft repair and maintenance, aircraft launch and recovery, TSE repair and maintenance, building remodeling, and construction. Some of the most commonly used hazardous materials include jet and motor fuel, other types of petroleum products, paints, thinners, adhesives, cleaners, lead-acid batteries, hydraulic fluids, and halogenated and non-halogenated solvents (USAF, 1995).

Edwards AFB uses the Hazardous Materials Pharmacy (HMP) concept to issue hazardous materials for use by the Air Force personnel. The HMP monitors shelf life and tracks usage of hazardous materials on base. Purchases of hazardous materials, as well as requests for use of specific hazardous materials, are processed through the main Hazardous Material Cell (HMC), located in Building 3735. Purchase and use of bulk hazardous materials (i.e., fuels) are not included in the HMP database and are tracked by the responsible organization. When any project (including a Test & Evaluation program or increase in mission support) is considered at Edwards AFB, Program Introduction Documents or the equivalent are reviewed by Bioenvironmental Engineering and Environmental Management to identify any hazardous material/hazardous waste concerns. Prior to bringing any new hazardous material on base, contractors are required to provide a copy of the relevant Material Safety Data Sheet (MSDS) to Bioenvironmental Engineering, who maintains a master hazardous material inventory list for Edwards AFB with all listed MSDSs. All organizations and contractors are required to maintain strict inventories of all their hazardous materials. Furthermore, organizations are also required to reduce the quantity of hazardous materials used or replace them with non-hazardous material, if possible, as a part of the Pollution Prevention Program.

**Table 3.5-1 Hazardous Materials Regulations/Policies Potentially Applicable to ASR-11 Construction and Operation**

Jurisdiction	Title	Citation
Federal	RCRA	42 USC 6901
	Federal Facility Compliance Act	Public Law 102-386
	Hazardous Materials Transportation Act	49 USC 1801
	Federal Compliance with Pollution Control Standards	Executive Order 12088
	Solid and Hazardous Waste Compliance	AFI 32-7042
	Hazardous Material Emergency Planning and Response Program	AFI 32-4002
	Hazardous Materials Management	AFI 32-7086
	Pollution Prevention Act of 1990	42 USC 13101
	Identification and Listing of Hazardous Waste	40 CFR 261
	Oil Pollution Prevention	40 CFR 112
State	CA Hazardous Waste Control Law	22 CCR 66001-67800.51
	State Hazardous Materials Release Response Plans and Inventory Law	AB 2185, Chapter 6.95 of the Health and Safety Code
	CA Hazardous Substances Act	CA Health and Safety Code Section 28740 <i>et. seq.</i>
	Hazardous Substances Highway Spill Containment and Abatement Act	CA Vehicle Code Section 2450 <i>et seq.</i>
Base Plans and Policies	Edwards AFB Hazardous Waste Management Plan <sup>1</sup>	AFFTC 1999a
	Edwards AFB Solid Waste Management Plan <sup>2</sup>	AFFTC 1999b
	AFFTC Oil and Hazardous Substance Spill Prevention Plan <sup>3</sup>	AFFTC 2000
	Pollution Prevention Plan <sup>4</sup>	AFFTC 1995
	Pollution Prevention Opportunity Assessments <sup>5</sup>	N/A

<sup>1</sup> The *Edwards Air Force Base Hazardous Waste Management Plan Number 32-7042* (HWMP) (AFFTC, 1999a) supports Air Force directives and is intended to ensure compliance with applicable Federal, State, and local regulations. The objective of the HWMP is to provide sufficient administrative direction and instructions for originators of RCRA and non-RCRA wastes to properly characterize, package, label, store, treat, handle, and transport hazardous waste at Edwards AFB.

<sup>2</sup> The *Edwards Air Force Base Solid Waste Management Plan* (AFFTC, 1999b) describes Environmental Management's functional management of municipal solid waste disposal and recycling on Edwards AFB. The purpose of the Plan is to comply with Federal, State, and local regulations and Air Force policy and guidance on the management of non-hazardous municipal solid waste.

<sup>3</sup> The *AFFTC Oil and Hazardous Substance Spill Prevention and Response Plan* (AFFTC, 2000) is intended to fulfill the requirements of a Spill Prevention Control and Countermeasures (SPCC) Plan in accordance with 40 CFR 112, *Oil Pollution Prevention*, and an Oil Hazardous Substance Pollution Contingency (OHSPC) Plan, in accordance with 40 CFR 300, *National Oil and Hazardous Substances Pollution Contingency Plan*. This Plan describes general AFFTC procedures and policies for responding to a spill incident and is not intended to be a site-specific plan for all facilities at Edwards AFB. Site-specific contingency plans should be developed and posted for all facilities at Edwards AFB. <sup>4</sup> In response to AFI 32-7080, *Pollution Prevention Program*, the AFFTC has prepared the *Edwards Air Force Base Pollution Prevention Plan* (AFFTC, 1995b). This Plan contains eight program elements, six of which are required under AFI 32-7080.

<sup>5</sup> The AFFTC uses Pollution Prevention Opportunity Assessments (PPOAs) in order to identify existing processes used, hazardous chemicals required for those processes, and recommended actions needed to eliminate and/or reduce pollution. The Pollution Prevention Plan acknowledges Technical Manual requirements for the use of specific hazardous materials that would otherwise be targeted for reduction/elimination.

Alternative **Sites 1, 2, and 7** currently do not host activities requiring hazardous materials because these locations are unused. The existing **ASR-8** requires storage of diesel fuel in a 1,000-gallon concrete aboveground storage tank (AST) to power the emergency generator. An 8-inch high concrete berm is located beneath the tank, functioning as the secondary containment.

### **3.5.3 Hazardous Waste**

The use of hazardous materials results in generation of hazardous waste (e.g., paint waste, used oil, contaminated rags, etc.), which requires proper handling. Fuel oil stored in tanks is regulated by the U.S. EPA (40 CFR 112). Stored fuel oil has the potential to spill or leak from a primary containment vessel. Secondary containments, such as berms, are effective means of limiting releases. When removing or otherwise working in areas located near fuel oil storage tanks, oil may be encountered in the soil. Soil containing waste oil may be subject to State and Federal disposal requirements.

Lead-based paints were commonly used from the 1950s until recently. Lead is a heavy, ductile metal that is commonly found in association with organic compounds, as well as oxides, salts, or as metallic lead. Sources of exposure to lead are through paints, dust, and soil. Wastes containing levels of lead exceeding the Total Threshold Limit Concentration (TTLC) of 1,300 micrograms per kilogram or the soluble Total Lung Capacity (TLC) of 5.0 milligrams per liter are defined as hazardous under 40 CFR 261 and applicable State regulations.

Mercury-based paints were commonly used in the United States prior to the 1950s. Chromium is used in some paints due to its corrosion inhibiting properties. Chromium has been detected in some paint samples from existing on base facilities. Lead-, mercury-, and chromium-based paints may therefore be present on exterior and interior painted surfaces in existing support buildings. Bioenvironmental Engineering and Environmental Management manage these hazardous wastes.

Alternative **Sites 1, 2, and 7** currently do not require hazardous materials because the proposed locations are unused. The existing **ASR-8** generates small amounts of waste oil associated with operation of the emergency generator. The paint on the existing ASR-8 tower, antenna and facility structure may contain lead. This will be confirmed prior to commencement of dismantling. A discussion of IRP sites that have been created as a result of past hazardous waste practices can be found in Section 3.8, Geology and Soils.

### **3.5.4 Solid Waste**

A composting facility is operated at the Main Base Landfill. It uses Ag-bags for large-scale in-bag composting to convert green waste (e.g., grass clippings, leaves, shrubbery trimmings, tree prunings, home garden refuse, and nontreated wood products, etc.) collected within the military family housing area into finished compost product. Screener, grinder, and bagger equipment are used to prepare and process the green waste, which is collected at the curbside.

Edwards AFB operates a non-hazardous (municipal solid) waste landfill within the Main Base area. At current disposal rates, the landfill is expected to reach permitted capacity in the year 2019. Due to the volume of CDW generated on base, most current construction contracts require

the contractor to dispose of such wastes at an approved off-base landfill in order to reduce the impacts to the Main Base Landfill.

The base actively participates in a recycling program. A contractor operates the program for Edwards AFB, with program oversight provided by Environmental Management. Some waste metals generated during construction and demolition projects, as well as the routine operations of various base organizations, are diverted to the Defense Reutilization Marketing Office (DRMO) for resale. In addition, waste tires are diverted from the landfill to DRMO for recycling or proper disposal. The rock crusher (also located at the Main Base Landfill) is capable of recycling concrete and asphalt paving construction debris.

Alternative **Sites 1, 2, and 7** currently do not contribute to the wastestream because they are unused. The existing **ASR-8** site generates incidental volumes of solid waste associated with maintenance projects.

### **3.5.5 Future Without the Project**

Existing hazardous waste and hazardous material use in the vicinity of the alternative sites and the existing ASR-8 are not expected to change in the future without the project. **Sites 1, 2 and 7** are anticipated to remain unused, while the existing **ASR-8** will continue to require diesel fuel and will continue to generate minor amounts of waste oil.

## **3.6 BIOLOGICAL RESOURCES**

Naturally occurring organisms, the physical and biological aspects of their environment, and the relationships between them make up biological resources. In general, biological resources include native and introduced plants that comprise the various habitats, the animals that are found in such habitats, and natural areas that help to support plant and wildlife populations.

Edwards AFB contains and manages biological resources that are typical of a desert environment. These include animal and plant species (including the associated habitats of each), floodplains and watersheds. There are no jurisdictional Waters of the U.S. on Edwards AFB.

### **3.6.1 Regulatory Requirements/Guidance**

The *Endangered Species Act of 1973* (ESA) (16 USC 1531-1544) provides a framework for the protection of endangered and threatened species. Federal agencies may not jeopardize the existence of listed species, which includes ensuring that actions they authorize, fund, or carry out do not adversely affect the species or adversely modify designated critical habitats. Critical habitat is defined as the geographic area containing physical or biological features essential to the conservation of a listed species or an area that may require special management considerations or protection. Under the ESA, all Federal departments and agencies also must utilize their authorities, as appropriate, to promote the recovery of listed species. In addition, the ESA prohibits all persons, including Federal agencies, from harming or killing (“taking”) individuals of a listed species without authorization. While Federal agencies must consult with the USFWS or National Marine Fisheries Service when their activities may affect listed species, projects cannot be stopped unilaterally by the services; however, for any anticipated “take” to be

authorized, applicable measures to minimize the “take” that are developed in the consultation must be followed.

The *Migratory Bird Treaty Act* (MBTA) of 1918 (16 USC 703-712), as amended, provides for Federal protection of all migratory bird species, their active nests, eggs, etc. Permits are required to remove these birds from their roosting and nesting areas. The United States Government is exempt from the MBTA permit requirements based on the court decision in Newton County Wildlife Assn. vs. U.S. Forest Service 113 F. 3d 110 (8<sup>th</sup> Cir 1997), but must minimize takings caused by their activities. Non-Federal contractors are required to obtain a depredation permit from the USFWS prior to removal or disturbance of nesting birds.

Department of Defense Directive (DoDD) 4700.4, *Natural Resources Management Program*, prescribes policies and procedures for an integrated management program of natural resources on DoD property. Enforcement of laws primarily aimed at protecting natural resources and recreation activities that depend on natural resources, is an integral part of a natural resources program and shall be coordinated with, or under the direction of, the natural resources manager for the affected area.

Air Force Instruction 32-7064, *Integrated Natural Resources Management*, implements AFPD 32-70, *Environmental Quality*, and DoDD 4700.4, *Natural Resources Management*. Air Force Instruction 32-7064 explains how to manage natural resources on Air Force property. The *Integrated Natural Resources Management Plan* (INRMP) is a key tool for managing the installation’s natural resources. The most recent version of the INRMP was updated, reviewed and finalized in 2001 (AFFTC/EM, 2001).

The *California Endangered Species Act* (CESA) (Fish and Game Code Section 2050 et seq.) generally parallels the main provisions of the Federal ESA and is administered by the California Department of Fish and Game (CDFG). Under the CESA, the term “endangered species” is defined as a species of plant, fish, or wildlife that is in serious danger of becoming extinct throughout all, or a significant portion of its range” and is limited to species native to California. The CESA establishes a petitioning process for the listing of State-threatened or endangered species, and the CDFG is required to adopt regulations for this process. The CESA prohibits the taking of State-listed species except as otherwise provided in State law. Unlike the Federal ESA, the CESA applies prohibitions to species petitioned for State listing (i.e., State candidates).

The *Natural Community Conservation Planning Act* (NCCPA) (Fish and Game Code Sections 2800-2840) was added to the CESA in 1991. The provisions of the NCCPA provide for voluntary cooperation between the CDFG, landowners, and other interested parties to develop natural community conservation plans that provide for early coordination efforts to protect State-listed species and State candidates. The purpose of the NCCPA is to preserve species and their habitats, while allowing reasonable and appropriate development to occur on affected lands.

A plant or animal species may be assigned a designation other than Federally/State threatened or endangered. Table 3.6-1 includes a list of these designations and a brief explanation of what they mean.

### 3.6.2 Fauna

The desert tortoise (*Gopherus agassizii*) is an herbivorous reptile whose native range includes the Sonoran and Mojave deserts of southern California, southern Nevada, Arizona, extreme southwestern Utah, and Sonora and northern Sinaloa, Mexico. The desert tortoise is Federally listed as threatened under the ESA and State listed as threatened by the California Fish and Game Commission. Desert tortoises are the only Federally-listed species known to occur at Edwards AFB (USAF, 2001d).

In 1994, the USFWS designated portions of the base as “desert tortoise critical habitat” (USFWS, 1994). The boundary designated as “desert tortoise critical habitat” encompasses approximately 60,800 acres in the eastern and southeastern portions of Edwards AFB. Figure 3.1-2 shows the critical habitat for the desert tortoise.

The proposed project areas are not located within desert tortoise critical habitat. The USFWS issued a *Biological Opinion for Routine Operations and Facility Construction within the Cantonment Areas of Main and South Bases*, which includes the area of **Site 7**, for the desert tortoise (Report 1-6-91-F-28; USAF, 2001a). It is not anticipated that a biological opinion will be required for either **Site 1** or **2** (AFFTC, 2001b).

Common mammals, birds, and reptiles found on Edwards AFB, and potentially located at or near the alternative ASR-11 sites are listed in Table 3.6-2. A more complete list of fauna at Edwards AFB is located in the *Biological Resources Environmental Planning and Technical Report Basewide Vegetation and Wildlife Surveys and Habitat Quality Analysis* (Mitchell et al., 1993).

California ground squirrels (*Spermophilous beecheyi*) are considered a nuisance on Edwards AFB. Their populations have been increasing in the developed areas and are responsible for damage to landscaped areas caused by their digging and burrowing activities. Sometimes they find their way into inhabited homes and other buildings/facilities causing widespread damage to the interior of buildings. Edwards AFB attempts to control their population with various methods (AFFTC, 1996).

### 3.6.3 Flora

At Edwards AFB, there are approximately 103,000 acres of creosote bush scrub, 52,800 acres of Joshua tree woodland, 55,300 acres of Halophytic phase saltbush scrub, and 45,300 acres of arid phase saltbush scrub.

The three alternative sites are located in an area of arid phase saltbush scrub, which is dominated by allscale (*Atriplex polycarpa*). Other common species found in this area include burrobush

**Table 3.6-1  
Agency Designations For Animal Species, Plant Species, And Habitats**

DESIGNATION	EXPLANATION	SOURCE OF SPECIES DESIGNATIONS
Federal Endangered	Any species that is in danger of extinction throughout all or a significant portion of its range. This does not include insects that have been determined to be a pest whose protection would present an overwhelming and overriding risk to man.	United States Fish and Wildlife Service  <a href="http://www.endangered.fws.gov">www.endangered.fws.gov</a>
Federal Threatened	Any species that is likely to become an endangered species within the foreseeable future throughout all of a significant portion of its range.	United States Fish and Wildlife Service  <a href="http://www.endangered.fws.gov">www.endangered.fws.gov</a>
State Endangered	Any native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.	CERES Environmental Law, Regulation, and Policy  <a href="http://www.ceres.ca.gov">www.ceres.ca.gov</a>
State Threatened	Any native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.	CERES Environmental Law, Regulation, and Policy  <a href="http://www.ceres.ca.gov">www.ceres.ca.gov</a>
Bureau of Land Management (BLM) Sensitive Species	Bureau of Land Management Sensitive Species are those species whose status is under review by the United States Fish and Wildlife Service/National Marine Fisheries Service, whose numbers are declining so rapidly that Federal listing might become necessary, with typically small and widely dispersed populations, or inhabiting ecological areas or other specialized unique habitat.	Bureau of Land Management  <a href="http://www.ca.blm.gov">www.ca.blm.gov</a>
California Department of Fish and Game Species of Concern	The Department of Fish and Game has designated certain vertebrate species as “Species of Special Concern” because of declining population levels, limited ranges, and/or continuing threats that have made them vulnerable to extinction. These species may also be referred to as California Species of Concern.	California Department of Fish and Game  <a href="http://www.dfg.ca.gov">www.dfg.ca.gov</a>

**Table 3.6-1  
Agency Designations For Animal Species, Plant Species, And Habitats**

<b>DESIGNATION</b>	<b>EXPLANATION</b>	<b>SOURCE OF SPECIES DESIGNATIONS</b>
California Department of Fish and Game Fully Protected and Protected Species	Fully protected and protected species may not be taken or possessed without a permit from the Fish and Game Commission and/or the Department of Fish and Game. Information on fully protected species can be found in the California Fish and Game Code. Generally, this would only apply to actions that take place off of Federal Lands.	California Department of Fish and Game <a href="http://www.dfg.ca.gov">www.dfg.ca.gov</a>
Federal Species of Concern	The term Federal “Species of Concern” describes species whose status may be of concern to the United States Fish and Wildlife Service, but does not have official status.	United States Fish and Wildlife Service <a href="http://www.endangered.fws.gov">www.endangered.fws.gov</a>
Critical Habitat	Critical Habitat is defined as the geographic area containing physical or biological features essential to the conservation of a listed species or an area that may require special management considerations or protection.	National Audubon Society <a href="http://www.audobon.org">www.audobon.org</a>

DFG – CA Division of Fish and Game

**Table 3.6-2 Common Fauna on Edwards AFB**

<b>Classification</b>	<b>Common Name</b>	<b>Scientific Name</b>
Mammals	black-tailed jackrabbit desert cottontail coyote deer mouse grasshopper mouse little pocket mouse Merriam's kangaroo rat desert woodrat little brown bat western pipistrelle	( <i>Lepus californicus</i> ) ( <i>Sylvilagus audobonii</i> ) ( <i>Canis latrans</i> ) ( <i>Peromyscus maniculatus</i> ) ( <i>Onychomys torridus</i> ) ( <i>Perognathus longimembris</i> ) ( <i>Dipodymus merriami</i> ) ( <i>Neotoma lepida</i> ) ( <i>Myotis lucifugus</i> ) ( <i>Pipistrellus hesperus</i> )
Birds	turkey vulture common raven sage sparrow barn owl house finch western meadowlark cactus wren ladder-backed woodpecker horned lark black-throated sparrow	( <i>Cathartes aura</i> ) ( <i>Corvus corax</i> ) ( <i>Amphispiza belli</i> ) ( <i>Tyto alba</i> ) ( <i>Carpodacus mexicanus</i> ) ( <i>Sturnella neglecta</i> ) ( <i>Campylorhynchus brunneicapillus</i> ) ( <i>Picoides scalaris</i> ) ( <i>Eremophila alpestris</i> ) ( <i>Amphispiza bilineata</i> )
Reptiles	desert spiny lizard side-blotched lizard western whiptail zebra-tailed lizard glossy snake coachwhip gopher snake Mojave green rattlesnake	( <i>Sceloporus magister</i> ) ( <i>Uta stansburiana</i> ) ( <i>Cnemidophorus tigris</i> ) ( <i>Callisaurus draconoides</i> ) ( <i>Arizona elegans</i> ) ( <i>Masticophis flagellum</i> ) ( <i>Pituophis melano leucus</i> ) ( <i>Crotalus scutulatus</i> )

Source: AFFTC, 2001a

(*Ambrosia dumosa*), goldenhead (*Acamptopappas sphaerocephalus*), and cheesebush (*Hymenoclea salsola*). The County of Los Angeles has established 61 Significant Ecological Areas (SEAs) that represent a wide variety of biological communities within the County. The SEAs function is to preserve this variety to provide a level of protection to the resources within them. The SEAs are intended to be preserved in an ecologically viable condition for the purposes of education, research, and other non-disruptive outdoor users, but not preclude limited compatible development. Los Angeles County has identified two SEAs on Edwards AFB, Edwards Air Force Base (SEA #47) and Rosamond Lake (SEA #50). Significant Ecological Area #47 contains botanical features that are unique and limited in distribution in Los Angeles County. They include the only good stands of mesquite (*Prosopis glandulosa*) in Los Angeles County. The area contains fine examples of creosote bush scrub, alkali sink, and the transition vegetation between the two. Mesquite woodlands provide habitat for a variety of mammals, birds, and reptiles (Los Angeles County). None of the proposed ASR-11 sites or the existing ASR-8 are located within an SEA.

### **3.6.4 Floodplains**

In 1993, a flood study of the base was conducted to determine floodplain constraints (AFFTC, 1993). Flood-prone areas that were identified include Rogers Dry Lake, Rosamond Dry Lake, and Mojave Creek (Figure 3.6-1). Mojave Creek empties into Rogers Dry Lake. There are other flood-prone areas on base in the residential area where water is trapped and no channels are present to divert heavy stormwater runoff. **Sites 1, 2, and 7** and the existing **ASR-8** are not located within floodprone areas.

### **3.6.5 Future Without the Project**

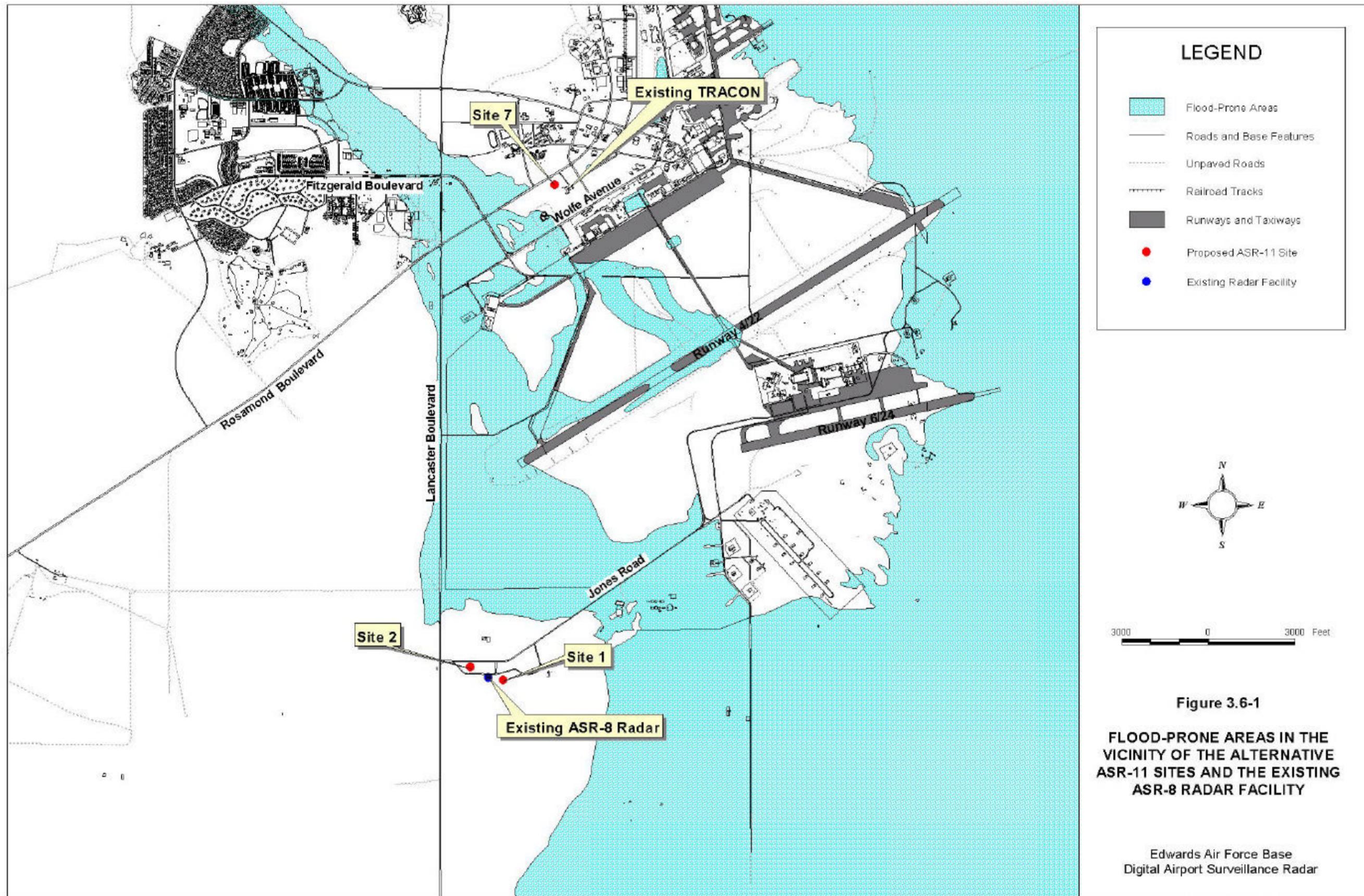
There are no anticipated land use changes that would alter the characteristics of biological resources at **Sites 1, 2, and 7**, or the existing **ASR-8**. Without the project, the status of the fauna, flora, and floodplains is expected to remain similar to existing conditions in these areas.

## **3.7 CULTURAL RESOURCES**

Cultural resources are defined by AFI 32-7065, *Cultural Resources Management*, as any historical, archaeological, or Native American artifacts and properties of interest. Cultural resources at Edwards AFB include archaeological resources (including those from prehistoric and historic periods), historic period resources (including historic period structures and objects), and traditional cultural places. As of May 2001, over 2,822 archaeological sites had been identified on Edwards AFB. Of these, 109 sites have been evaluated for listing on the National Register of Historic Places (National Register); over 50 of these sites have been found eligible or potentially eligible for listing on the National Register either on individual merit or as contributing elements of historic districts. There are 124 eligible buildings and 28 potentially eligible buildings on the base. There is one National Historic Landmark on Edwards AFB, which in the northern portion of Rogers Dry Lake (USAF, 2001e).

### **3.7.1 Regulatory Requirements/Guidance**

The *National Historic Preservation Act* (NHPA) of 1966, as amended (16 USC 470 et seq.), provides for the establishment of the National Register and authorized the establishment of criteria to determine the eligibility of cultural sites for listing on the National Register. Section 106 of the NHPA requires Federal agencies to evaluate the effects of their activities and programs on eligible cultural resources (which include prehistoric and historic archaeological resources, historic resources, and traditional cultural places). Section 110 of the NHPA directs Federal agencies to undertake actions necessary to minimize harm to cultural resources under their ownership or control, or affected by their activities and programs. Compliance with 16 USC 470 et seq., *NHPA*; 36 CFR Part 800, *Protection of Historic Properties*; and AFI 32-7065, *Cultural Resources Management*, at Edwards AFB is coordinated by the Base Historic Preservation Officer (BHPO).



Source: Edwards AFB

edwardsafb apr : floodprone : floodlayout

### 3.7.2 Historic Resources

The only cultural resources located within the vicinity of the alternative ASR-11 sites is a World War II hospital ruin surrounding **Site 1**, **Site 2**, and the existing **ASR-8**. Concrete slabs and wooden debris are still evident in the area. A Phase II cultural resource evaluation was conducted for the site to determine its eligibility for inclusion on the National Register. Based on a report entitled *Cultural Resource Investigations at Area P Housing Complex and Adjacent Sites, Edwards AFB, California*, this site [CA-KER-2339 (EAFB-109)] is not eligible to be listed on the National Register (York, 1997). **Site 7** is located in an area that has been surveyed and no cultural resources were identified in this area (USAF, 2001e).

### 3.7.3 Future Without the Project

It is not anticipated that there would be any substantial change in cultural resource conditions at the alternative sites or the existing ASR-8 location in the future without the project. Each of these areas have been surveyed and found to have no eligible cultural resources.

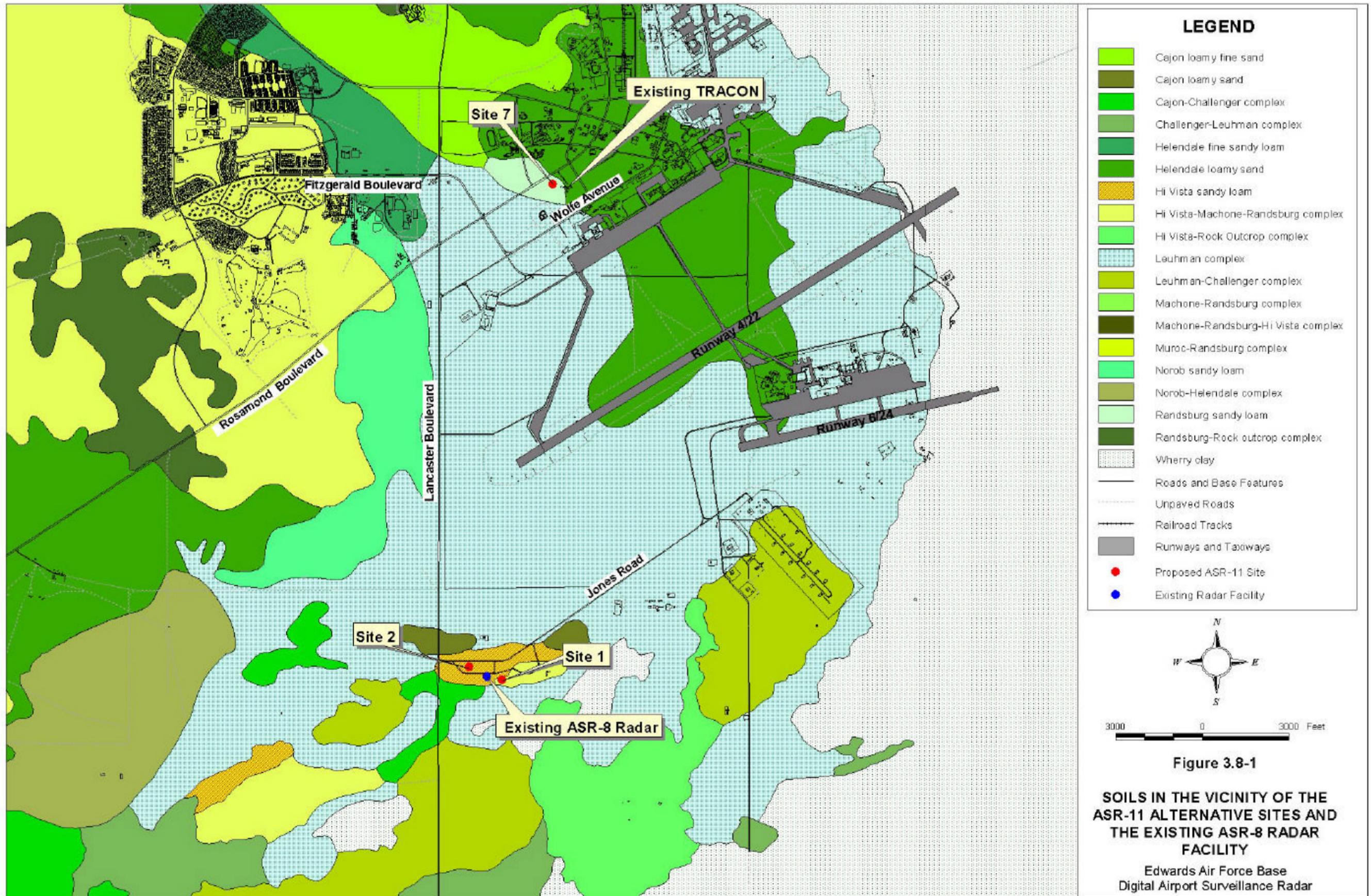
## 3.8 GEOLOGY AND SOILS

Geologic resources consist of naturally formed minerals, rocks, and unconsolidated sediments. Soil refers to the uppermost layers of surficial geologic deposits and is developed by the weathering of those deposits. Concerns associated with the geologic setting at Edwards AFB, which could either affect or be affected by a proposed project, include: topography, IRP site disturbance, seismicity, and land subsidence.

The geologic setting in the vicinity of the Edwards AFB area is characterized by three major rock types or geologic complexes: a basement complex of igneous and metamorphic rocks; an intermediate complex of continental volcanic and sedimentary rocks; and valley fill deposits. The basement complex is of pre-Tertiary age and includes quartz monzonite, granite, gneiss, schist, and other igneous and metamorphic rocks. These rocks crop out in the highlands surrounding the playa areas and occur beneath the unconsolidated deposits of the playa. The intermediate complex, with limited exposure in the Edwards AFB vicinity, is of Tertiary age and includes a variety of sedimentary and volcanic rock types (Dutcher and Worts, 1963).

### 3.8.1 Topography

The United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) has completed a soil survey of Edwards AFB (Figure 3.8-1). The *Grazing and Cropland Management Plan for Edwards Air Force Base, California* (USACOE, 1997b) describes the results of this soil survey. Based on this survey, the soils at Edwards AFB can be characterized as predominantly alkaline, consisting of loams, sandy loams, and loamy sands, all of which are susceptible to wind and water erosion. According to the *Soil Survey of Edwards Air Force Base, California, Interim Report* (USDA Soil Conservation Service [SCS], 1998), the soils at Edwards AFB are given erosion hazard ratings of slight to severe for wind erosion and slight to moderate for water erosion.



Source: Edwards AFB

edwardsafb apr: soil: Soil Layout

The underlying soils in the vicinity of **Site 1**, **Site 2**, and the existing **ASR-8** have been characterized as Hi Vista Sandy Loam. Hi Vista is loamy fine sand, native to deserts. The Hi Vista series are well drained, have medium to very high runoff, and moderately slow permeability. Hi Vista soils are on hills and with slopes ranging from 2 to 50 percent. Hi Vista is a loamy fine sand, native to the Mojave desert.

**Site 7** is located on Randsburg sandy loam series, which consists of shallow to soft rock, well drained soils that formed in residuum from granitic rock. Randsburg soils are on hills and granitic rock pediments with slopes varying from 2 to 50 percent.

### **3.8.2 Installation Restoration Program Site Disturbance**

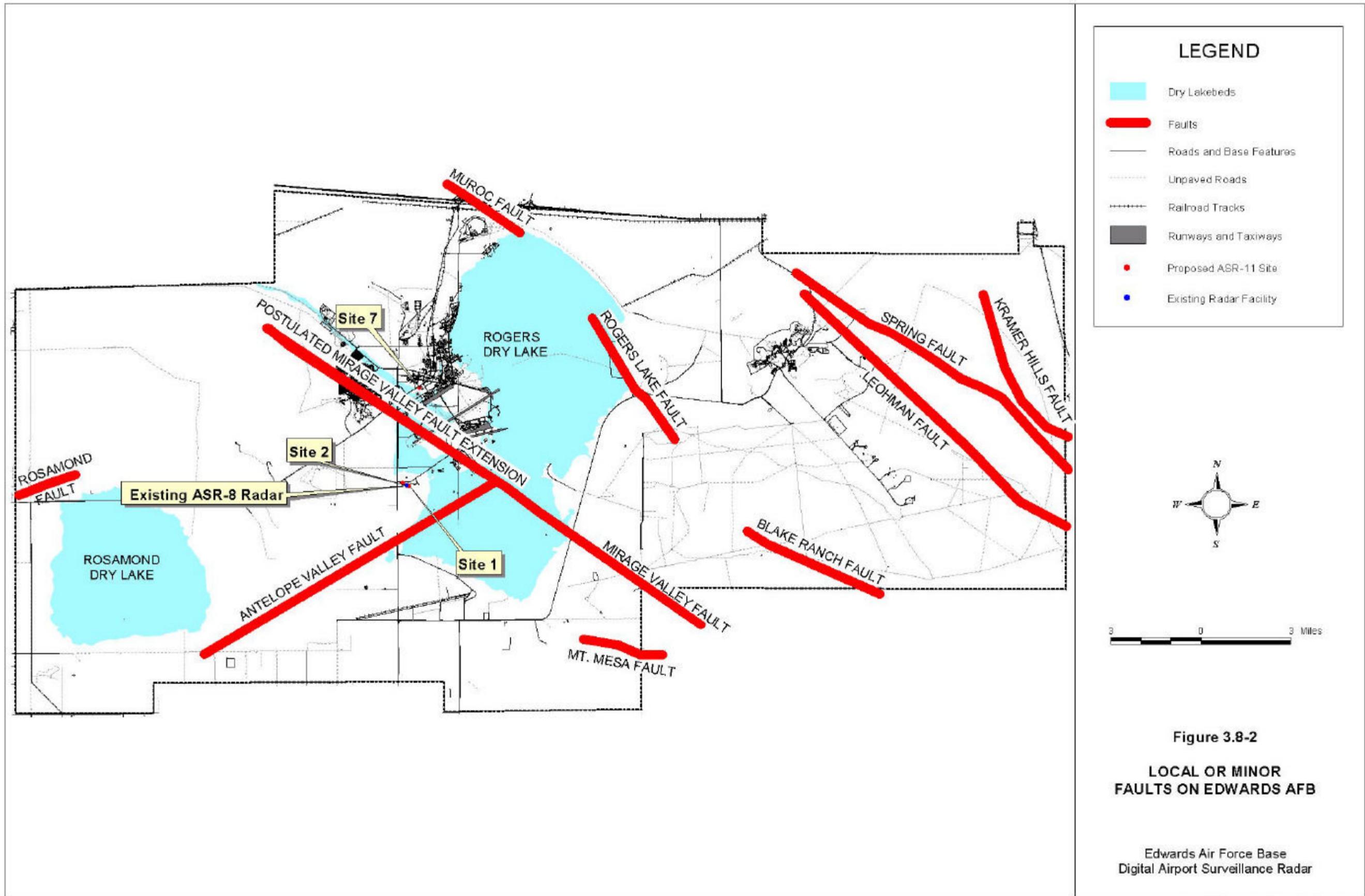
Geologic resources (i.e., soil and groundwater) are susceptible to contamination from the surface. Releases of hazardous chemicals such as petroleum products and solvents have created soil contamination at military installations. Contaminated soil or groundwater may require physical removal or extensive remediation to ensure the protection of public health and safety.

The IRP was established to identify, investigate, assess, and cleanup hazardous waste at former disposal sites on the base in compliance with CERCLA. Under the IRP, a Preliminary Assessment was conducted at Edwards AFB to locate potential areas of concern (AOCs) that may have resulted from past activities on the 301,000-acre base. There are no IRP sites on or in the vicinity of the candidate sites.

### **3.8.3 Seismicity**

The geologic and structural development of the vicinity surrounding Edwards AFB has been measurably affected by tectonic activity. The Mojave Structural Block is wedged between two major intersecting shear zones; the northeast trending Garlock Fault, which controls the trend of the Tehachapi Mountains to the northwest of Edwards AFB, and the northwest trending San Andreas Fault system which bounds the San Gabriel Mountains to the south. Both fault zones have had substantial activity in the Quaternary period. The San Andreas Fault zone is the more dominant of the two, with a known length of about 600 miles and right-lateral displacement of up to 350 miles. The Garlock Fault zone is traceable for more than 150 miles and has left-lateral displacement (Weston, 1986). The Mojave Block reflects characteristic Basin and Range tensional horst and graben structure resulting from the tectonic “wrenching” of the adjacent fault system.

Like much of Southern California, Edwards AFB is subject to earthquake activity and associated seismic hazards. At least eight minor faults are known, or are suspected because of their trends, to be present within the boundaries of Edwards AFB; however, no fault has been active in the last 11,000 years. A local fault seismicity map shows the surface traces of these faults (Figure 3.8-2). According to the 1994 *Uniform Building Code Seismic Zone Map*, the Edwards area is classified as being within Seismic Zone 4: very high earthquake hazard.



Source: Edwards AFB

edwardsafb apr : faultview : faultlayout

Proposed ASR-11 sites (**Sites 1, 2, and 7**) and the existing **ASR-8** are located approximately 1 mile from the postulated Blake Ranch Fault Extension, and approximately 6 miles from the epicenter of a 3.0 to 4.4 magnitude earthquake. All three sites are in Seismic Zone 4 and therefore have a very high probability of experiencing a seismic event.

### **3.8.4 Land Subsidence**

The effects of land subsidence on Edwards AFB were investigated by the USGS using groundwater monitoring and detailed surveys of the topography of Rogers Dry Lake (USGS, 1998). Rogers Dry Lake is classified as a hard, clay-pan playa, the surface types range from small mud curls and cracked, puffy surfaces to a smooth, hard, and compact surface. Flooding of the playa and the subsequent drying of surface sediments cause variations in surface types (polygonal cracking and fissures) as water evaporates (USGS, 1998).

Although polygonal cracking (soil cracking in irregular patterns) is common on lakebeds at undeveloped locations, the frequency at which large cracks, or fissures, appear on Rogers Dry Lake seems to have increased since the 1980s (USGS, 1990). Many of the fissures attain widths of several feet and lengths of hundreds of feet. The appearance of such fissures has been ascribed to overall land subsidence in the Antelope Valley. As groundwater was pumped from aquifers near Rogers Dry Lake, the aquifers have become compacted. This resulted in subsidence-generated tensional stresses that were relieved by fissures being formed in the playa sediments (USGS, 1998). None of the alternative ASR-11 sites are located in subsiding areas. The existing ASR-8 is also not located within a subsiding area.

### **3.8.5 Future Without the Project**

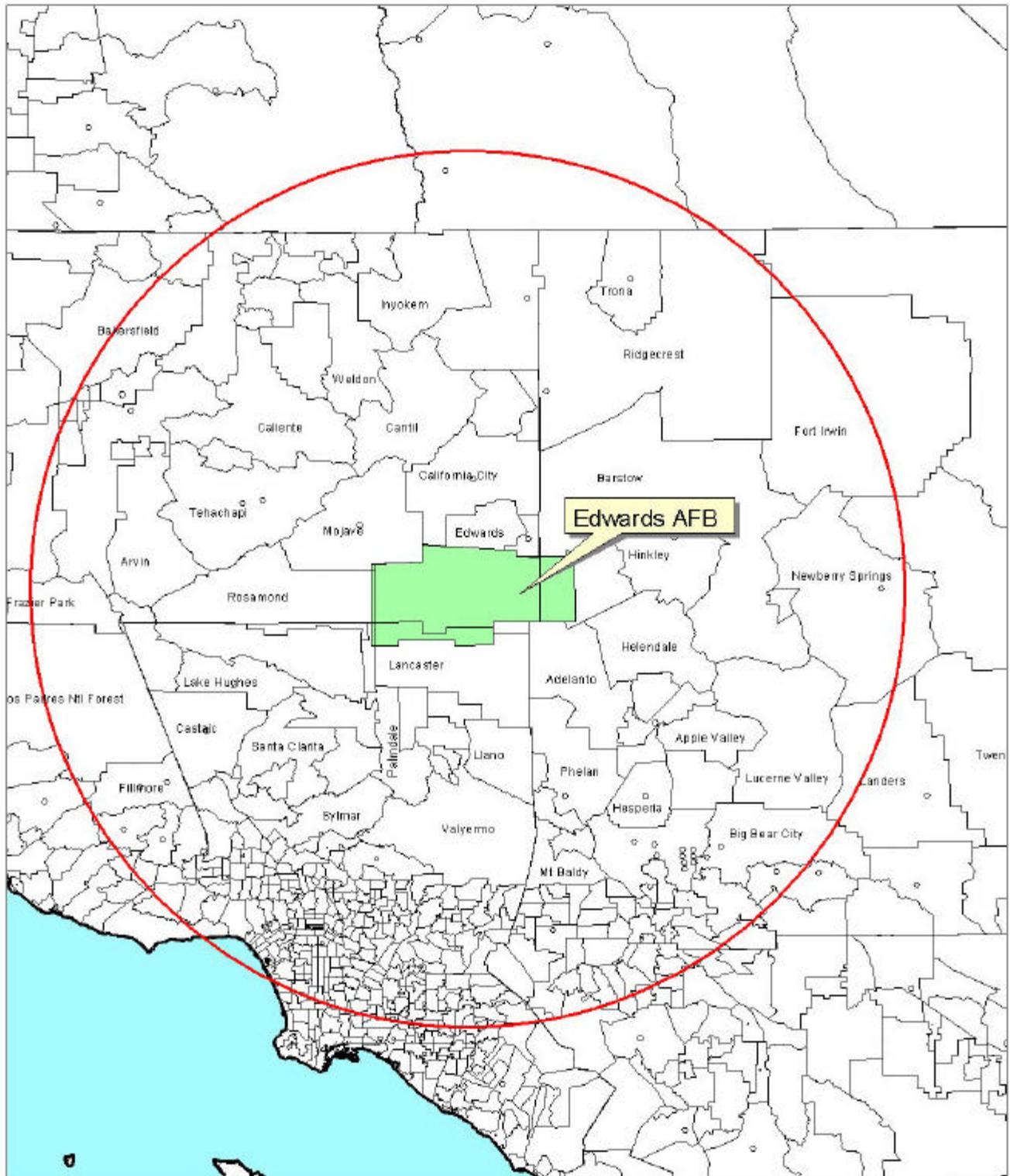
Existing geology and soil conditions are not expected to change in the future without the project, and are expected to continue to represent the area of the alternative ASR-11 sites and existing ASR-8 facility. The current status of the IRP sites in the vicinity of the alternative sites indicates no significant changes are anticipated.

## **3.9 SOCIOECONOMICS**

Key elements of socioeconomics include fiscal growth, population, employment, housing, and schools. For the purpose of this EA, the boundary of the socioeconomic environment is defined by those counties, or portions of counties, in which the proposed action will occur. The Economic Impact Region (EIR) includes all areas within this boundary. The EIR for an impacted community is fundamentally important to the analysis because it defines the area in which changes in fiscal growth, population, labor force and employment, housing stock and demand, and school enrollment will be assessed. The EIR for Edwards AFB is that area located within 75 miles of the Main Base (Figure 3.9-1).

### **3.9.1 Regulatory Requirements/Guidance**

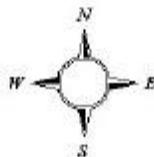
Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires Federal agencies to identify and address



20 0 20 Miles

**LEGEND**

- Extent of Economic Impact Region
- Municipal Boundaries
- Water



Note: Not all municipalities were labeled on this map in order to maintain legibility.

**Figure 3.9-1**

**ECONOMIC IMPACT REGION  
OF EDWARDS AIR FORCE BASE**

**Edwards Air Force Base  
Digital Airport Surveillance Radar**

Source: Edwards AFB; ESRI, 1999

edwardsafb.apr : roiview : rolayout

disproportionately high adverse effects of its activities on minority and low-income populations. This issue is discussed further in Section 4.9.3, Environmental Justice.

### 3.9.2 Population and Employment

The alternative ASR-11 sites and the existing ASR-8 are all located within Kern County. Table 3.9-1 compares racial characteristics of the Kern County population to other counties within the Antelope Valley and the State of California. White (49.5 percent) and Hispanic populations (38.4 percent) dominate the racial makeup of Kern County. The profile of Kern County is generally similar to those of Los Angeles and San Bernardino counties, although Los Angeles County possesses a smaller White population as compared to other ethnic groups.

**Table 3.9-1  
Racial Make-Up Based on Census 2000 Data**

Demographic Unit	Population	Percent White	Percent Black	Percent Hispanic/Latino	Percent Asian	Percent Other	Two or More Races
Kern County	450,266	49.5	5.7	38.4	3.2	1.1	2.1
Los Angeles County	6,851,362	31.1	9.5	44.6	11.8	0.7	2.3
San Bernardino County	1,157,387	44.0	8.8	39.2	4.6	0.9	2.5
State of California	33,871,648	46.7	6.4	32.4	10.8	1.0	2.7

Source: United States Bureau of the Census (USBC), 2000

Table 3.9-2 compares the Kern County unemployment rate to nearby county and State rates. According to June 2001 statistics released by the State of California, Kern County had an unemployment rate of 10.5 percent and a labor force of approximately 293,000 workers. The unemployment rates for Los Angeles and San Bernardino counties, and the State of California are lower, at just over 5 percent. Table 3-9.2 shows that in 1990 median household income was lower in Kern County than in adjacent counties and in the State. Most of Edwards AFB is located in Census Tract 06029005700. Year 2000 census data for counties and census tracts within California are not yet available. According to 1990 census data, the percentage of persons below the poverty level in this census tract (2.1 percent) was lower than several adjacent census tracts, which had between 8 and 14 percent of their population below the poverty level.

**Table 3.9-2  
Labor Force Data**

Demographic Unit	Labor Force <sup>1</sup>	Unemployment Rate <sup>1</sup> (Percent)	Median Household Income <sup>2</sup>
Kern County	292,600	10.5	\$28,364
Los Angeles County	4,801,800	5.3	\$39,035
San Bernardino County	812,600	5.1	\$33,443
State of California	17,391,900	5.1	\$40,559

1. Census 2000 data    2. Census 1990 data

Source: California Department of Employment Development (CDED), 2001

### 3.9.3 Fiscal Growth

Edwards AFB makes a substantial contribution to the economic status of the surrounding communities within the Antelope Valley of California. Antelope Valley, an area of approximately 3,500 square miles, contains parts of Kern, Los Angeles, and San Bernardino counties. For Fiscal Year 2000, the estimated annual dollar value of jobs created from Edwards AFB's annual operating expenditures was \$1,076,936,086 (USAF, 2001j).

### 3.9.4 Community Assets

The estimated 2001 population for Antelope Valley is approximately 300,000 people (Antelope Valley Board of Trade [AVBOT], 2000). Communities near Edwards AFB that attract Edwards AFB employees include Lancaster, Palmdale, Rosamond, Tehachapi, California City, and Mojave.

Antelope Valley has a labor force of approximately 125,610 persons with an unemployment rate of 6.5 percent (AVBOT, 2000). This labor force is employed in a variety of industries including services, manufacturing, construction/mining, retail, government, and agriculture. The military labor force comprised 3.97 percent and the government labor force comprised 6 percent of those employed in the Antelope Valley in 1998 (AVBOT, 2000). As shown in Table 3.9-3, in March 1999 Edwards AFB employed approximately 10,441 military and civilian personnel (AFFTC, 1999c).

**Table 3.9-3  
1999 Edwards Air Force Base employees and their dependents**

CATEGORY	EMPLOYEES	DEPENDENTS	TOTAL
<b>Military</b>	3,450	5,271	8,721
<b>Civilian (DoD)</b>	3,804	7,380	11,184
<b>Contractor</b>	3,187	6,183	9,370
<b>TOTAL</b>	10,441	18,834	29,275

Source: AFFTC, 1999c

Edwards AFB provides permanent party housing for military members in the form of dormitories, military family housing, and mobile home park spaces. Edwards AFB has a total of approximately 1,741 housing units with an occupancy rate goal of 98 percent. The number of housing units fluctuates due to the demolition of older units and construction of new family housing units. The number of units is anticipated to range from a low of 1,640 to a high of 1,777. Edwards AFB also maintains a 188-space mobile home park for privately owned mobile homes. Both personnel with families and unaccompanied members are allowed to reside in the park (MARCOA, 1998).

Unaccompanied enlisted members and designated key and essential personnel are required to live on base. Edwards AFB has two- and three-story dormitories, each housing from 32 to 84 members in single and double rooms. A new complex with single rooms sharing a kitchenette and bath has recently opened. Transient quarters are available through the Billeting Office.

Edwards AFB has three elementary schools and one junior/senior high school, which are under the jurisdiction of the Muroc Unified School District. The elementary schools are broken down by grades as follows: Kindergarten and first grade students attend Bailey Avenue School, second through fourth grade students attend Branch Elementary, and fifth and sixth graders attend Forbes Avenue School. The 1998 to 1999 school year enrollment for these schools was 385, 346, and 457, respectively. The 1998 to 1999 school year enrollment for Desert Junior/Senior High School was 626.

### **3.9.5 Future Without the Project**

The Southern California Association of Governments estimates that Antelope Valley will experience a 6.8 percent annual growth rate over the next 20 years (AVBOT, 2000). Due to the fact that Edwards AFB employs only 3.97 percent of the Antelope Valley labor force, it is not anticipated that any substantial impacts would result from changes at Edwards AFB unless there is a major expansion or reduction in base operation. Presently, there is no indication of any changes planned at Edwards AFB that would substantially affect fiscal growth or community assets.

## **3.10 INFRASTRUCTURE**

Infrastructure refers to the physical components that are used to deliver a service (e.g., electricity, traffic, etc.) to the point of use. Elements of the base infrastructure system include water, wastewater, electricity, natural gas, liquid fuel distribution systems, communication lines (e.g., telephone, computer, etc.), and circulation systems (streets and railroads), which run in a network through the base. This section discusses the existing infrastructure in the vicinity of the ASR-11 alternative sites and the existing ASR-8.

### **3.10.1 Regulatory Requirements/Guidance**

Air Force Instruction 23-201, *Fuels Management*, establishes policies and procedures for fuel operations. It applies to all Air Force activities, including USAF Reserve and Air National Guard units that receive; store; issue; perform quality control; and account for aviation fuels, ground fuels, cryogenic fluids, and missile propellants.

Air Force Instruction 23-204, *Organizational Fuel Tanks*, provides guidelines and procedures for establishing and operating organizational fuel tanks and includes directions for preparing Air Force (AF) Form 500, *Daily and Weekly Fuel Report*. This Instruction applies to every base and tenant organization using and managing organizational fuel tanks.

Air Force Instruction 32-7044, *Storage Tank Compliance*, implements AFD 32-70, *Environmental Quality*. It identifies compliance requirements for USTs, ASTs, and associated piping that store petroleum and hazardous substances.

The Uniform Fire Code (UFC) establishes provision necessary for fire prevention and fire protection.

The National Fire Protection Association's (NFPA) National Electrical Code (NEC), NFPA 70, was first published in 1897 and is adopted and enforced in all 50 States. It provides practical safeguarding of persons and property from hazards arising from the use of electricity by establishing requirements for electrical wiring and equipment in virtually all buildings. It specifically covers the installation of electric conductors and equipment in public and private buildings, industrial substations, and other premises (e.g., parking lots, etc.); installation of fiber-optic cable, wiring, general electrical equipment, the use of electricity in specific occupancies and equipment; special conditions (e.g., emergency and standby power or conditions requiring more than 600 volts, etc.); and communication systems.

The Uniform Building Code (UBC) establishes minimum standards to safeguard life, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures.

### **3.10.2 Water Distribution System**

**3.10.2.1 Potable Water.** The water distribution system for Edwards AFB consists of a series of pipes ranging in size from 4 to 24 inches in diameter, booster pump stations, and storage tanks (Figure 3.10-1). The South Base Well Field and the South Track Well Field are integrated into one system consisting of ten groundwater wells, with a maximum combined production capacity of 14 mgd.

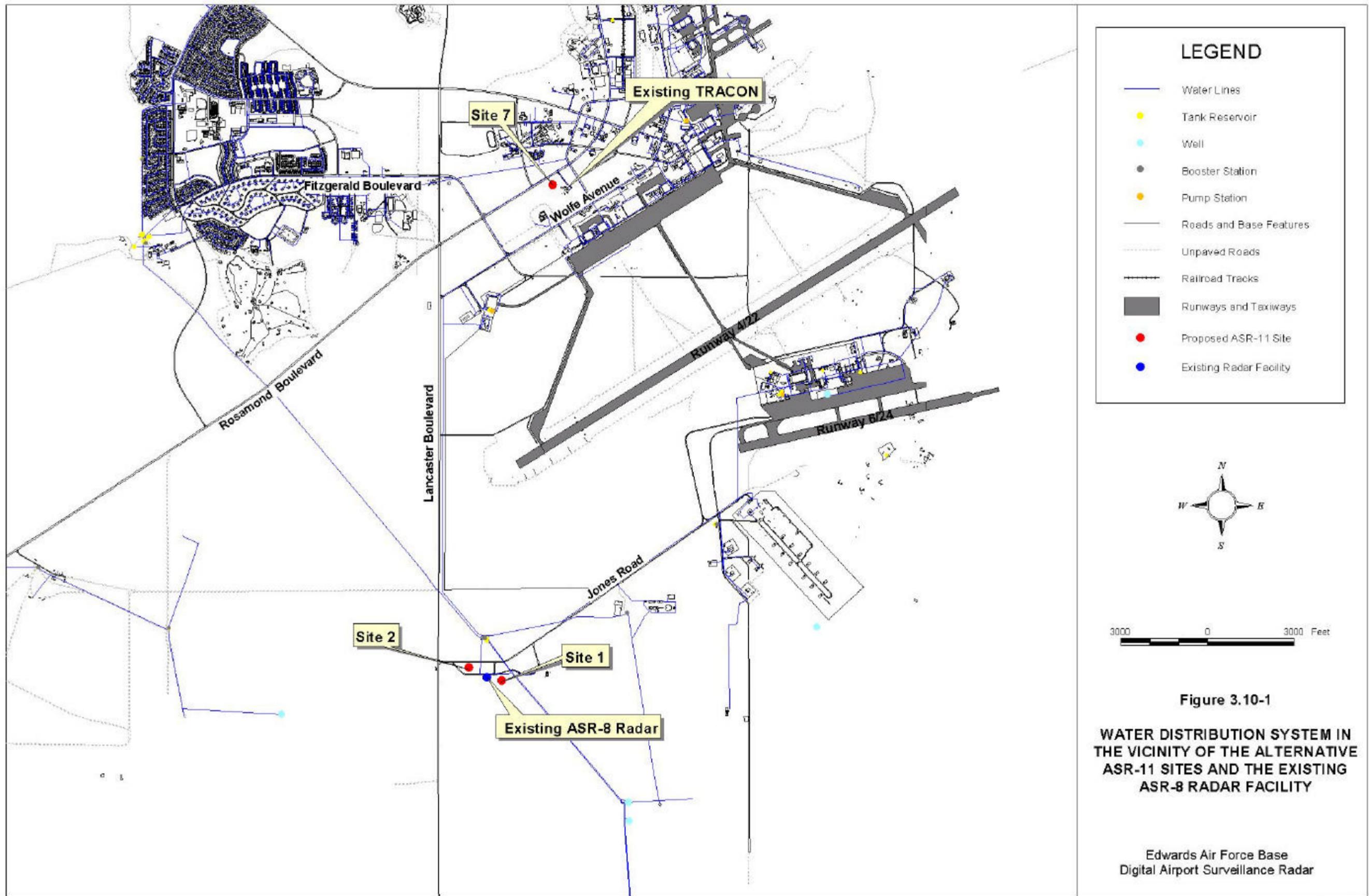
The proposed ASR-11 sites are located in close proximity to the water distribution system. The closest water distribution line to **Site 1** is approximately 160 feet to the north along Center Street. The closest water distribution line to **Site 2** is 800 feet to the east of the site and the closest line to **Site 7** is 300 feet north of the site along Rosamond Boulevard. The existing **ASR-8** facility is currently connected to the water distribution system.

A discussion of water resources, including quality, quantity and source, can be found in Section 3.3, Water Resources.

### **3.10.3 Wastewater System**

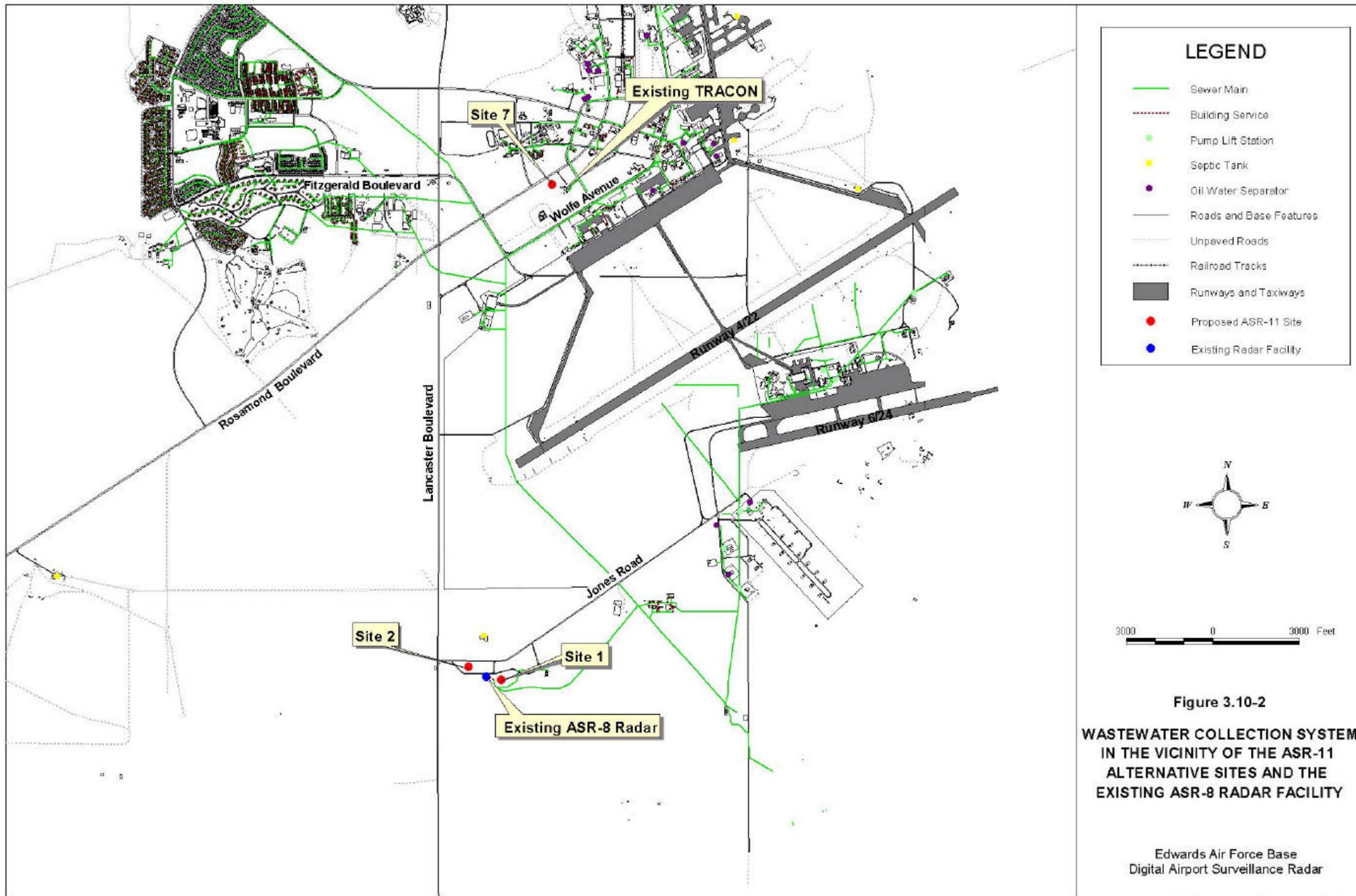
There are two sanitary sewer collection and treatment systems on Edwards AFB. These systems service the Main, North, and South Base areas and the AFRL. The collection network for the existing system is composed of gravity lines, force mains, and pump stations (Figure 3.10-2).

The proposed ASR-11 sites are located near the collection system, but are not connected to the sanitary sewer and do not contain any wastewater management facilities. The closest sanitary sewer lines to the alternative ASR-11 sites are as follows: approximately 285 feet southwest of **Site 1**, 1,000 feet east-southeast of **Site 2**, and 750 feet southeast of **Site 7**. The existing **ASR-8** radar facility shelter is served by an existing wastewater connection.



Source: Edwards AFB

edwardsafb.apr : waterview : waterlayout



Source: Edwards AFB

edwardsafb.apr : sanitaryview : sanitarylayout

The stormwater distribution system at Edwards AFB consists of conveyance structures and drainage ditches (unpaved). Stormwater conveyance structures include channels, gutters, drains, and sewers (not tied into the sanitary sewer system) that collect stormwater runoff and direct its flow. The stormwater system at Main Base conveys stormwater to a pretreatment facility, which consists of an OWS and evaporation ponds (AFFTC, 1998). Stormwater from the undeveloped portions of the Base flow into the nearest dry lake (AFFTC, 1994a). There are no substantial stormwater conveyance structures proximate to the proposed alternative ASR-11 sites or the existing ASR-8.

### **3.10.4 Electrical Distribution System**

Edwards AFB receives electrical services from Southern California Edison's (SCE's) 15-kilovolt (kV) transmission system mounted overhead on wooden poles to a 52-megavoltampere (mVA) substation serving the Main and North Base areas (Figure 3.10-3).

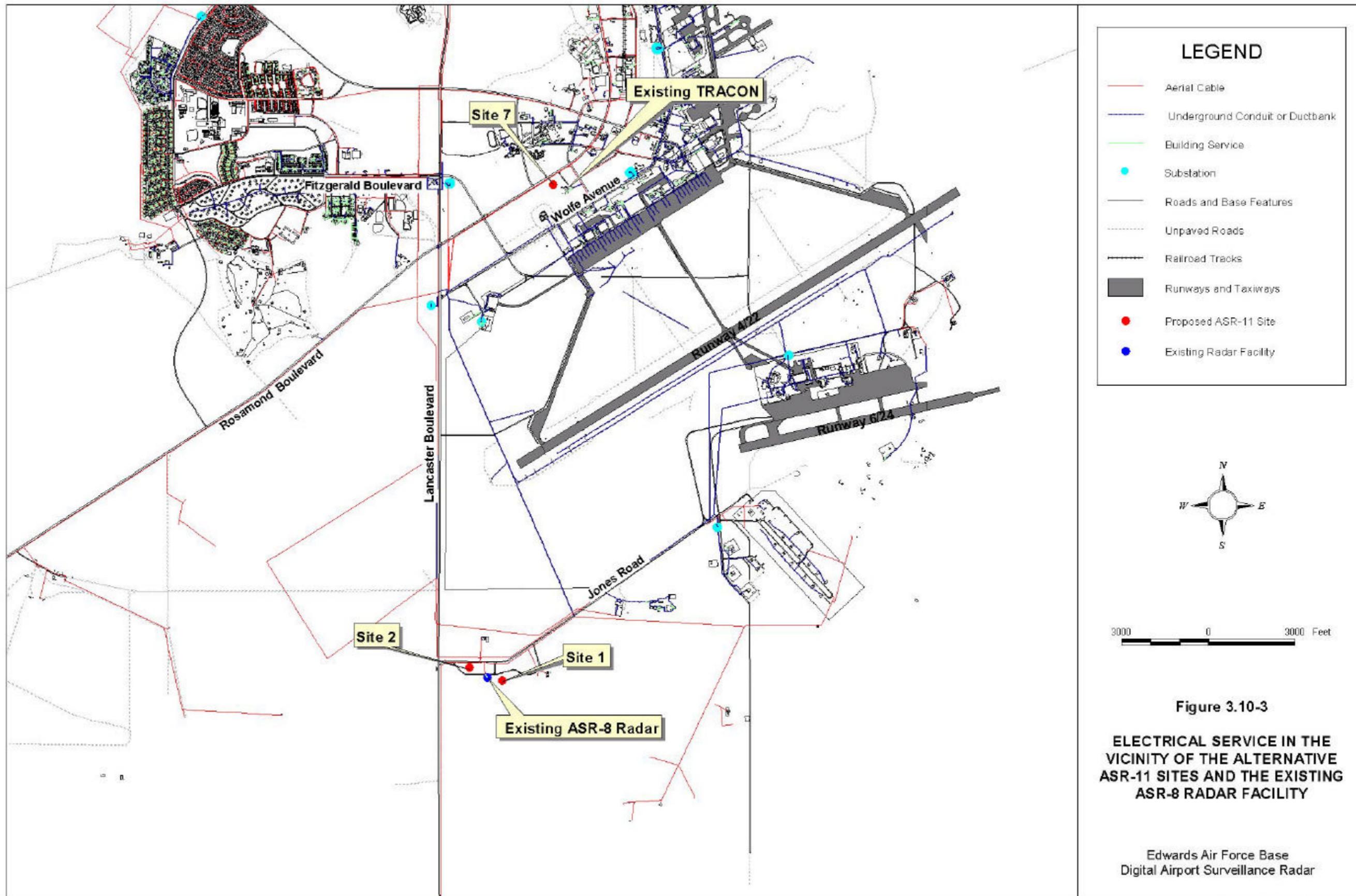
The 115-kV overhead line continues on wooden poles to a 27-mVA substation, which serves the South Base area. Power is metered to Edwards AFB at the 115-kV level with maximum on base demand being no more than 44 megawatts (MW). Secondary voltage of both transmission substations is 34.5 kV.

Transmission lines on Edwards AFB operate at the 34.5-kV level and are segregated into circuits at on base switching stations. The 34.5-kV transmission line is the primary method of power distribution on Edwards AFB, stepping down to either a low-utilization voltage or a medium distribution voltage of 12.47 kV as needed. Twenty-four distribution substations have been designated on Edwards AFB.

General base policy at this time is to change to an underground electrical transmission and distribution system. Underground facilities are preferred to avoid tree interference; impacts from vehicles; birds, and other small animals that cause line-to-line faults; and damage from wind gusts.

The electrical service and distribution facilities at Edwards AFB are monitored by a supervisory control and data acquisition (SCADA) system installed in 1990. The SCADA control motorized circuit switching for automatic remote switching of the circuits and loop feeds, as well as recording consumption and demand readings. Modifications to the existing electrical utility system at Edwards AFB must be compatible with the SCADA.

The proposed ASR-11 sites are not connected to the electrical distribution system. The closest electrical service lines to the alternative ASR-11 sites are as follows: approximately 800 feet west-northwest of **Site 1**, 300 feet north of **Site 2**, and 600 feet northwest of **Site 7**. Site 7 is approximately 500 feet from the underground conduit that services the existing TRACON. The existing **ASR-8** radar is currently serviced by base electric distribution facilities. A diesel-fueled generator is also located at the existing ASR-8 facility. This generator provides power to the ASR-8 when electric power is not available.



Source: Edwards AFB

edwardsafb.apr : elecview : eleclayout

### 3.10.5 Communication Systems

Communication systems on Edwards AFB include telephone, microwave, Local Area Networks (LANs), and Land Mobile Radios (LMRs). The distribution system for these systems generally consists of copper-pair cable, fiber-optic cable, and a communication manhole/conduit system. The routes of the communication system on base are shown on Figure 3.10-4.

The proposed ASR-11 sites are not connected to the communication system. The closest telephone service lines to the alternative ASR-11 sites are as follows: 800 feet northwest of **Site 1**, 300 feet north of **Site 2**, and 600 feet north of **Site 7**. Site 7 is approximately 500 feet from telephone service at the existing TRACON. The distances to fiber optic service for Sites 1 and 2 are based on a planned fiber optic extension along Jones Road past both Sites 1 and 2. It is assumed that the fiber optic extension will be in place by the time the proposed ASR-11 would be installed at either one of these sites. The closest fiber optic service lines to the alternative ASR-11 sites are as follows: 550 feet northeast of **Site 1**, 400 feet northeast of **Site 2**, and 500 feet south of **Site 7**. The existing **ASR-8** is connected to the telephone and fiber optic system.

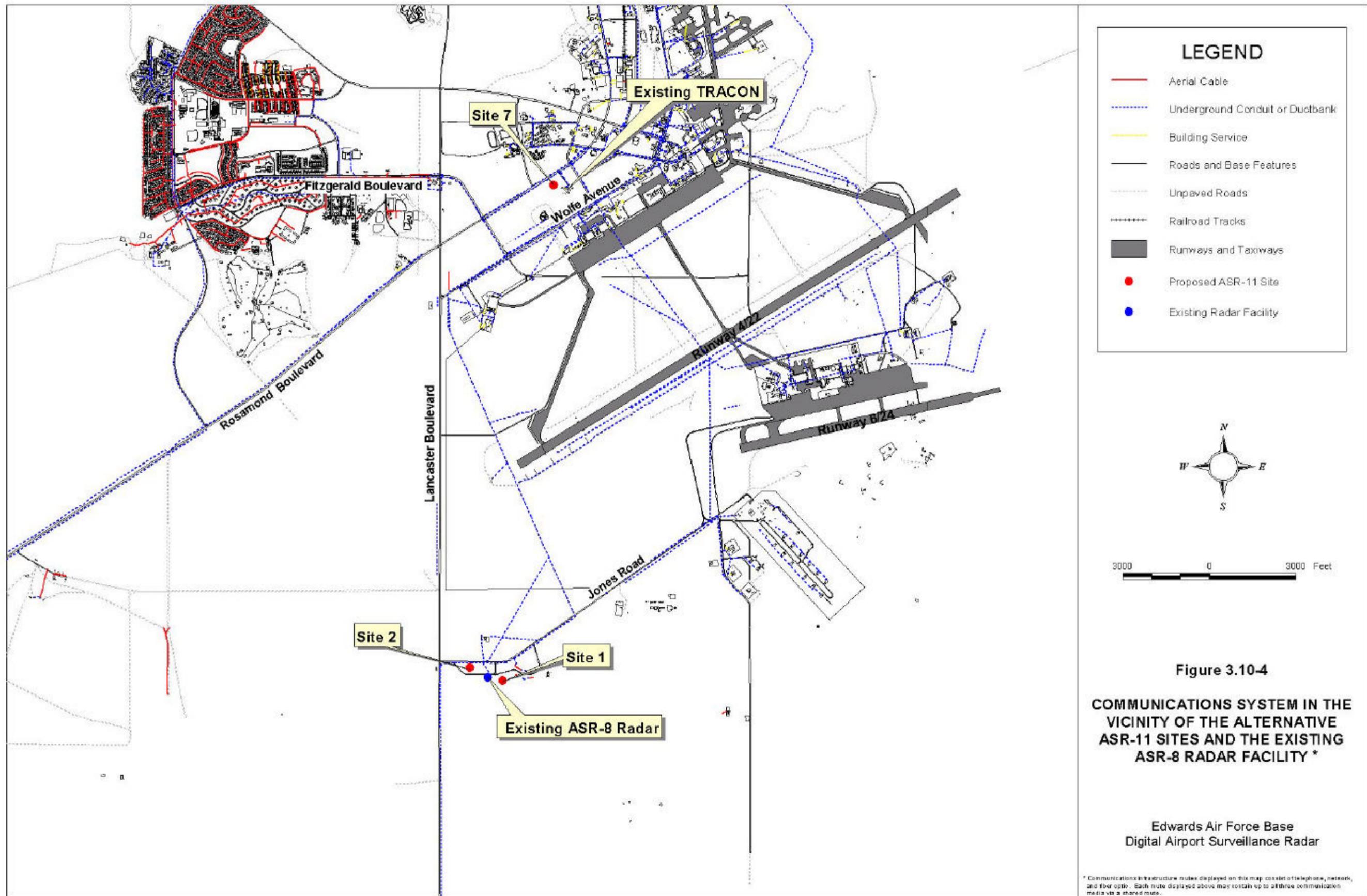
### 3.10.6 Transportation Systems

Edwards AFB is accessed by way of Rosamond Boulevard from the west or north, and Lancaster Boulevard/120<sup>th</sup> Street East from the south. Primary access to Edwards AFB from the adjacent roadways is by way of North Gate, West Gate, and South Gate, each in operation 24 hours a day, 7 days a week. Two inbound and two outbound lanes are provided at each gate (USACOE and AFFTC, 1994).

Internal circulation on base is by way of paved and unpaved primary, secondary, and tertiary roads. Primary roads connect Edwards AFB components such as the flightline, Engineering and Administration, and support areas to entry points. Secondary roads connect Edwards AFB components to one another and support facilities, such as commercial or housing areas. Tertiary roads are unpaved access roads or residential streets within the housing area (AFFTC, 1997b).

Lancaster and Rosamond Boulevards form the spine of the base road system, providing high speed, high-volume access to connecting secondary and arterial roads and activity centers on Main Base. Significant secondary roads are Fitzgerald Boulevard, Forbes Avenue, Yeager Boulevard, and Wolfe Avenue. These roads are typically multilane, with on-street parking prohibited, and a maximum posted speed limit of 45 miles per hour (mph). All other Main Base roads are classified as tertiary and service local areas of Main Base.

**Site 1**, **Site 2** and the existing **ASR-8** are accessed from Center Street, which is a tertiary street located in the South Base area. **Site 7** is accessed from either Rosamond Boulevard or Sparks Drive; Sparks Drive acts as the driveway for TRACON.



Source: Edwards AFB

edwardsafb apr : commview : commlayout

Traffic is comprised of Government, contractor, and personally-owned vehicles (POVs) belonging to those that live and/or work on base. In addition, commercial vehicles deliver material to businesses and facilities in the area. Commercial and Air Force vehicles are used for service and construction work done in the area (e.g., repairs, etc.). Emergency vehicles require access to all buildings and roads.

In addition to the paved roadways, an extensive network of unimproved, dirt roadways exists, essentially equivalent to the paved network. These roads have established posted speed limits and provide access to various installation facilities and sites.

Two railroads are adjacent to the base. The Southern Pacific line runs parallel to the base's west boundary and adjacent to Sierra Highway. The north/south mainline does not provide service to Edwards AFB. The Burlington Northern Santa Fe (BNSF) railroad is located south of California Highway 58 and along the northern boundary of the base. Two rail spurs, one at Edwards Station and the other at Boron Station connect to the Main Base and AFRL respectively (AFFTC, 1994a).

### **3.10.7 Future Without the Project**

No substantial changes in water, wastewater treatment, solid waste, natural gas or transportation systems are anticipated at Edwards AFB in the near future. An extension to the existing fiber optic network is planned in the area of Jones Road; however, the project is not anticipated to have a substantial base-wide effect.

## **3.11 ENERGY RESOURCES**

The use of energy resources at Edwards AFB includes, but is not limited to, natural and propane gas, fuel oil, electricity, and solar.

The general policy of the Air Force regarding energy is as follows: "Energy is essential to the Air Force's capability to maintain peacetime training, readiness, and credible deterrence; to provide quality of life; and to perform and sustain wartime operations. In short, energy is an integral part of the weapon system... The most fundamental Air Force energy policy goal is to assure energy support to the national security mission of the Air Force in a manner that emphasizes efficiency of use, effectiveness of costs, and independence from foreign sources for mission-essential operations..." (AFFTC, 1995a).

### **3.11.1 Regulatory Requirements/Guidance**

The *Energy Policy Act of 1992* (PL 102-486) requires Federal entities to identify and accomplish all energy and water conservation measures with payback periods of less than 10 years. Executive Order 13123, *Greening of the Government through Efficient Energy Management*, identifies the Department of Energy (DOE) as the lead agency responsible for implementing the Act and establishes seven goals regarding energy use that are applicable to Federal agencies. These goals target reduction of: greenhouse gases; petroleum use; energy use by industrial, laboratory, and other facilities; total energy use (as measured at the source); and water consumption (and associated energy use). Expanded use of renewable energy is also targeted.

Air Force Policy Directive 23-3, *Energy Management*, establishes policies for responsibly allocating, controlling, and using energy. These include eliminating waste and conserving energy resources, eliminating energy disruptions to missions and facilities, promoting vehicles energy efficiency, and increasing utility energy efficiency through capital investment and improvement operations.

The objective of the Air Force Materiel Command (AFMC) Energy Management Program is to reduce energy consumption. Eight initiatives are used to measure a base's performance relative to achieving this goal. They include program direction, cost reduction, facility operation, product procurement, capital investment, human resources, public awareness, and environmental interface (AFFTC, 1995a).

The *Edwards Air Force Base Energy Plan* (AFFTC, 1995a) serves as a component of the Base Comprehensive Plan and documents the policies, direction of development, and specific projects associated with the base's desire to meet the national energy goals established by the *Energy Policy Act of 1992* (PL 102-486).

### **3.11.2 Energy Consumption**

Edwards AFB uses electricity supplied by public utility, solar (e.g., photovoltaic panels to run traffic lights and heat water, etc.), natural gas/propane and other petroleum-based products (i.e., gasoline, jet fuel, and diesel) as sources of energy to operate facilities, vehicles, equipment, and aircraft. Consistent with Federal law and Air Force policy, Edwards AFB has developed various programs and methods to reduce energy use. These include an awareness and education program (including standards for heating and cooling) and installation of energy management control systems (EMCSs) for cooling, heating, and lighting. Electric, gas, and water meters are being installed to heighten awareness of consumption. Other energy reduction projects at Edwards AFB include installation of swamp coolers, ceiling and wall insulation, double-pane windows, building foyers, and energy-efficient lighting tubes.

Electricity is provided to Edwards AFB by SCE. The base uses this energy source to operate a variety of systems including lighting, heating and cooling, computers, and pumps (i.e., gas and water). Current and proposed projects to reduce electricity consumption include replacing less efficient (T-12) lighting tubes with more efficient (T-8) tubes, foyer additions to buildings, and the use of passive and active solar energy (AFFTC, 2001a).

Natural gas is supplied to Edwards AFB by Pacific Gas and Electric (PG&E). The base uses natural gas to run boilers, furnaces, and two standby generators. Propane is used in areas where natural gas services are unavailable and is used to operate one standby generator.

Edwards AFB uses solar energy to provide heat for hot water requirements and forced air systems to operate the emergency phone system on major portions of Rosamond, Lancaster, and Mercury Boulevards. Additionally, Edwards AFB has one housing unit that is powered entirely from photovoltaic panels. Edwards AFB uses gasoline and diesel fuel to run generators, vehicles, and equipment.

### **3.11.3 Future Without the Project**

Energy consumption on Edwards AFB is not anticipated to substantially change in the future without this project. No major land use or energy supply changes are anticipated. Edwards AFB is not subject to rolling black-outs experienced by other parts of the State of California (EAFB, 2001 Public Affairs).

## 4.0 ENVIRONMENTAL CONSEQUENCES

The No Action Alternative would leave the existing ASR-8 and air traffic control equipment in place. In addition, no new construction, renovation, or operations would be required. Since the No Action Alternative would involve no alteration to any of the three proposed ASR-11 sites at Edwards AFB, this alternative would result in no impact to environmental resources. However, selecting the No Action Alternative, and thereby having to maintain the existing ASR-8, would require relying on existing radar equipment that is not capable of meeting future user requirements for transmitting digital signal data to new digital automation system air traffic controller displays. The existing radar also does not meet user requirements for increased target detection, weather reporting, and improved reliability.

The proposed action would involve the construction of a new ASR-11 facility and the removal of the existing ASR-8. Construction of the ASR-11 facility would also require the use of a temporary construction staging area approximately 75 feet by 100 feet adjacent to the ASR-11 site. This staging area would be used by construction personnel to store equipment for use during construction of the ASR-11. Potential impacts associated with the action alternative involve those resulting from construction (short-term) and operation (long-term) of the DASR system. The potential impacts are described in this section for each of the alternative ASR-11 sites (Sites 1, 2, and 7) and demolition of the ASR-8. Impacts are presented by environmental parameter. Mitigation measures that may be required to reduce impacts are described in Section 6.0.

### 4.1 LAND USE

The construction of the ASR-11 facility on base must be compatible with the Base Comprehensive Plan and the Edwards AFB Design Standards. In addition, potential impacts to noise sensitive receptors should be identified and avoided.

#### 4.1.1 On-Base Land Use

Alternative ASR-11 Sites 1 and 2 are located within South Base; Site 7 is located in Main Base, near the TRACON. The following sections identify the potential short- and long-term impacts of constructing and installing an ASR-11 at one of the three alternative sites. As noted in Section 3.6.2, Site 7 is located within an area that could support the desert tortoise. A discussion of the biological impacts associated with the project activities can be found in Section 4.6, Biological Resources. Neither Site 1 nor 2 is located within critical habitat, nor are any of the three alternative sites located within mesquite woodlands or Piute Ponds.

**4.1.1.1 Short-Term Impacts.** Short-term impacts associated with the construction of the ASR-11 may include temporary disruption of land uses due to elevated noise levels, increased dust, interference with roadway access, and visual effects; however, these impacts are anticipated to be minimal.

The installation of utilities, such as power, telephone, and fiber optic cable to any of the alternative sites could temporarily affect land uses along the proposed alignment routes. While

specific alignments will not be defined until final design, there is potential that land uses along these alignments would be affected by elevated noise levels and increased dust associated with open trench excavation. Assuming that Edwards AFB independently completes the extension of the existing fiber optic network, only 400 to 550 feet of trenching would be required to connect either Sites 1 or 2 to the fiber optic network, respectively. These distances are similar to the electric and telephone trenches, which would vary in length from 300 to 800 feet. Thus, utility-related construction impacts to adjacent land uses would be minimal. However, if Edwards AFB does not complete the extension of the fiber optic network, then trenching of approximately 18,000 to 20,000 feet would be required between either Sites 1 or 2 and the TRACON. This scenario would increase the potential for utility-related construction impacts, since the alignment would be substantially longer and bisect several existing land uses. Given its proximity to the TRACON, Site 7 would also require only a relatively short fiber optic connection, approximately 500 feet; thus, utility-related construction impacts to adjacent land uses would be minimal.

**4.1.1.2 Long-Term Impacts.** Long-term operation of the ASR-11 at any of the three alternative sites is anticipated to be compatible with existing land uses and consistent with the planning objectives identified in the Base Comprehensive Plan (AFFTC, 1994b). Site 1 is within an area identified as administrative land use; currently the only building/facility in the vicinity of Site 1 is the existing ASR-8. Given the similarity in function of the ASR-11 to the existing radar, and the fact that the existing radar would be removed after installation of the ASR-11, there would be no net impact to existing or future land uses in the vicinity of Site 1. Likewise, Site 2, although located within an area characterized as buffer land use, is proximate to only one building/facility, (i.e., the existing ASR-8). As noted in the Base Comprehensive Plan, buffer zone areas provide for the functional dispersal of facilities, separation from noise producing or less desirable activities, and future expansion or new activities. Thus, installation of an ASR-11 at Site 2 would be consistent with the land use designation established in the Base Comprehensive Plan. Site 7 is located along the limit between aircraft operations and maintenance and buffer zone, close to the existing TRACON. Given its interrelationship with aircraft operations, installation of an ASR-11 at Site 7 would be consistent with the land use designation established in the Base Comprehensive Plan. None of the alternative ASR-11 sites are within a clear zone, APZ I, APZ II, and/or explosive or quantity distance hazard zone. Therefore, no significant long-term impact to land use is anticipated, regardless of which site is selected for the installation of the ASR-11. Obstruction marking and special lighting will be included, as necessary, to further reduce the potential for aircraft colliding with the proposed ASR-11 tower.

Upon the successful completion of the construction of the ASR-11, the existing ASR-8 would be dismantled. Impacts to the surrounding area, identified as buffer zone, are anticipated to be minimal. Removal of the existing radar will be to ground level only; this land could be reclaimed by Edwards AFB for other purposes consistent with its setting.

#### **4.1.2 Visual and Aesthetic Resources**

In general, the aesthetic value of each of the three alternative sites is linked to the military function of the base. Although the areas surrounding the alternative ASR-11 sites are designated for different land uses, they are all located within Class D scenic quality regions of the base, as discussed in Section 3.1.3 Visual and Aesthetic Resources.

**4.1.2.1 Short-Term Impacts.** As an active military installation, construction of military support facilities are typical of the area. Thus, views of temporary construction activities associated with the installation of the ASR-11 and removal of the existing ASR-8 are not anticipated to significantly alter the aesthetic resources at the sites.

**4.1.2.2 Long-Term Impacts.** The long-term presence and operation of an ASR-11 at any of the three alternative sites would be consistent with the existing aesthetic character of the three surrounding areas. Given that the proposed radar at Site 1 or 2 would be approximately 800 feet from the location of the existing ASR-8, no substantial changes in aesthetic impacts are expected. Site 7 would be located in close proximity to the existing TRACON and nearby aircraft activity areas. These facilities are typical of an active military installation, thus the presence of the ASR-11 is not expected to alter aesthetic conditions.

### **4.1.3 Noise (Annoyance)**

Noise impacts are determined by identifying sensitive noise receptors, which may be impacted by increased noise levels during construction of the ASR-11 and also the long-term operation and maintenance of the facility.

**4.1.3.1 Short-Term Impacts.** None of the ASR-11 alternative sites are located near a sensitive noise receptor. Construction of the ASR-11 facility will not generate any sonic booms.

Construction of the ASR-11 and supporting infrastructure, including connections to power and telephone and installation of the fiber optic cable, would result in elevated noise levels as grading and minor excavation occur, and as construction of the tower proceeds. Noise impacts are expected to be minimal at any of the three alternative sites due to the existing elevated noise levels associated with normal base operations. Noise levels may be more perceptible at Site 7 where ambient noise levels are approximately 65 dB, and 10 dB lower relative to Site 1 or 2 (75 dB). However, construction activity would be short-term in nature and mitigation may be taken to reduce noise levels of construction equipment as necessary. Dismantling of the existing ASR-8 would also result in a localized, temporary elevation of noise levels. Construction of the tower and supporting infrastructure is anticipated to take approximately 3 weeks; therefore, elevated noise levels would be temporary. No significant short-term impacts are anticipated.

**4.1.3.2 Long-Term Impacts.** No long-term noise impacts are anticipated to result from operation of the proposed ASR-11 radar. Noise levels generated by the ASR-11 would be maintained at volumes consistent with current OSHA regulations as specified in 29 CFR 1910. Noise would not impact residential areas or other sensitive receptors, as none exist in the vicinity of the sites. Noise from ASR-11 equipment located in operational areas would be designed not to exceed 55 dB at any time. Noise from the ASR-11 system equipment located in general work areas would not exceed 65 dB, including periods when the cabinet doors are open. The antenna pedestal with its drives, mounted on the tower, will be designed not to produce noise levels in excess of 55 dB outdoors on the ground at a distance of 100 feet from the tower. The emergency generator would also produce some noise when running during power failures and generator tests. The contribution to noise in the surrounding areas is expected to be negligible, especially considering the persistent nature of noise produced from the surrounding aircraft operations.

## 4.2 AIR QUALITY

The potential air quality impacts from construction and operation of an ASR-11 relate to the quantities and type of pollutants generated (criteria pollutants, ozone precursors, HAPs, and AB 2588 air toxics). The following section identifies these potential impacts, as well as the required permits associated with implementation of the proposed action.

### 4.2.1 Short-Term Impacts

The short-term impacts of constructing an ASR-11 would be similar at all of the three alternative sites. A short-term degradation in air quality may be experienced during construction activities, as fugitive dust emissions (i.e., PM10) could be generated from site clearing and construction vehicle traffic. Additional dust may be generated during installation of various utilities, and in particular, the trench installation of the fiber optic connection. As noted in Section 4.1.1.1, the overall length of open-trench construction for any of the three alternative sites is expected to be between 400 and 550 feet, assuming that Edwards AFB completes the planned expansion of the fiber optic network. If not, open-trench excavation of approximately 18,000 to 20,000 feet in length may be required for either Site 1 or 2, with the potential to result in a substantially greater generation of fugitive dust.

Total short-term air emissions for the proposed action from all sources (mobile and stationary) are estimated to be 9.02 tons of NO<sub>x</sub> and 1.47 tons of VOC. These emissions are below the *de minimis* levels of 50 tons per O<sub>3</sub> precursor pollutant (NO<sub>x</sub> and VOC) per year per action as identified in 40 CFR 51.853/93.153(b)(1) and KCAPCD Rule 210.7. Total emissions are also well below the 10-percent thresholds for NO<sub>x</sub> and VOC as established by KCAPCD (See Section 3.2.3, Local District Control). The 10-percent threshold for PM10 is not applicable for the KCAPCD. A copy of the emissions calculations can be found in Appendix C.

The relevant and applicable *de minimis* levels for criteria pollutant emissions in all air districts are already less than the corresponding 10-percent threshold values. The proposed action has emissions that are below *de minimis* levels. Thus, the proposed action would not have a regionally significant impact.

### 4.2.2 Long-Term Impacts

Operation of the ASR-11 radar system at any of the three alternative sites would produce identical emissions, which are not anticipated to have adverse impacts on air quality. Sources of emissions during the operation of the ASR-11 would include the operation of the emergency diesel generator and evaporative loss of fuel from the AST at the radar site. Maintenance activities could result in minor amounts of fuels, oils, and greases spilling onto the concrete pad or gravel surfaces near the ASR-11. Some of the fuels could evaporate prior to being cleaned up, which would add very minor amounts of VOC into the atmosphere. The evaporative loss from the AST is anticipated to be minimal, and to have no adverse impact on air quality.

As described in the Programmatic EA for the NAS program (USAF, 1995), the emergency generator approximately once a week for testing and during occasional power outages. The

emissions produced by the emergency generator are estimated to be 0.003 tons of NO<sub>x</sub>, 0.008 tons of VOC and 0.0002 tons PM<sub>10</sub>, which are far below the thresholds established by the *Kern County Air Pollution Control District (KCAPCD) for New Source Review (NSR) and Prevention of Significant Deterioration*.

Since the proposed action would involve the installation of an emergency generator with greater than 50 horsepower, an Authority to Construct (ATC) would be required from the KCAPCD. This authorization would remain in effect until the Permit to Operate (PTO) is granted, denied, or canceled. Issuance of the PTO is required before operating the equipment and contingent upon meeting the standards established by the KCAPCD to ensure no significant impacts would occur. Also, in accordance with AB 2588, emissions from the ASR-11 facility would be required to be included in the biannual Toxic Emissions Inventory Report provided to the KCAPCD. A conformity determination in accordance with 40 CFR 91.153(c)(1) is not required, as the total direct and indirect emissions from the action are anticipated to be below the *de minimis* thresholds specified in 40 CFR 93.153(b)(1), and are not regionally significant.

Compliance with all CAA Title III, HAP requirements, or any more stringent State or local requirements as they apply to stationary sources that emit HAPs, would be required. Therefore, no significant impacts would be expected.

The AST is considered exempt equipment and would not be added to the base's Title V permit; however, the emergency generator would be added to the Title V permit. Although the AST is likely to be larger than that currently located at the ASR-8, it is not anticipated to result in an increase in evaporative loss of fuel. Additionally, the new generator is presumed to be more efficient than the existing generator and would produce less diesel emissions.

### **4.3 WATER RESOURCES**

Impacts to water resources are determined based on the quantity of potable water required and the quantity of wastewater generated. Additionally, potential impacts could result from stormwater runoff at the site of the proposed ASR-11.

#### **4.3.1 Water Quantity and Source**

**4.3.1.1 Short-Term Impacts.** A temporary increase in water demand would occur during the construction of the ASR-11 and removal of the existing radar. Construction contractors may utilize mobile water tanks, which would likely be filled from the existing water supply distribution network at Edwards AFB. It is not anticipated that the water demand (both for workers' personal needs and dust control) during construction of the ASR-11 or removal of the existing radar would adversely impact the water supply of Edwards AFB due to the limited number of construction workers, short construction period, and the adequate water supply.

**4.3.1.2 Long-Term Impacts.** Operation of the ASR-11 radar system would not require water resources; therefore, no impacts to water resources are anticipated.

## **4.3.2 Water Quality**

**4.3.2.1 Short-Term Impacts.** At any of the three alternative ASR-11 sites, the new radar facility would be constructed upon relatively flat, moderately- to well-drained soils; therefore, stormwater runoff is not expected to be a problem. However, during construction, all activities will follow the base's BMP guidelines to prevent sedimentation and erosion during storm events.

There would be an insignificant short-term increase in demand for sewage treatment during construction at any of the three alternative ASR-11 sites. Portable wastewater units would be on site and waste would likely be transported to a nearby treatment facility. No permanent wastewater facilities will be provided at the facility; thus, no impacts to wastewater quality are anticipated.

**4.3.2.2 Long-Term Impacts.** No long-term impacts to the surface water or groundwater are anticipated to result from the operation of the ASR-11 radar system at any of the three alternative sites. Final design of the ASR-11 system will accommodate storm drainage run-off. Due to the small area required for the ASR-11, it is not anticipated that the new ASR-11 system would substantially change the current patterns of stormwater runoff. Similarly, removal of the existing ASR-8 is not anticipated to have an impact on water quality as a result of stormwater runoff.

## **4.4 SAFETY AND OCCUPATIONAL HEALTH**

Impacts related to the potential for personnel exposure to radiological hazards is presented below. No significant impacts are anticipated with regard to chemical, biological, or physical hazards, other than may be routinely encountered during typical construction activities. Compliance with applicable laws, regulations, and Air Force instructions, will minimize health and safety hazards to personnel.

### **4.4.1 Short-Term Impacts**

Construction at any of the ASR-11 alternative sites on Edwards AFB is not expected to generate RFR at levels that would be harmful to human health. Some low levels of RFR could be generated from commonly used devices at construction sites, such as cellular telephones or portable computers. However, any RFR generated, and any other electric or magnetic fields, would be typical of that which exists throughout the human environment and is not anticipated to be harmful to human health. Due to the relative proximity of Sites 1 and 2 to the existing ASR-8, increased radiation exposure may occur in these construction areas. The FAA has indicated that the ASR-8 operates at a transmit power level of no more than 1 Megawatt. The exposure levels within the main beam are acceptable according to Federal standards (IEEE/ANSI) at a distance of approximately 125 feet from the antenna. Thus, blanking/screening the area toward either Site 1 or 2 during construction while the existing ASR-8 is in operation would not likely be necessary due to the distance of the proposed sites to the existing facility.

Dismantling of the existing ASR-8 would occur only after operation of the radar has ceased. If either Site 1 or 2 were used for the new ASR-11 location, the direction of the existing ASR-8 would have to be blanked/screened until the existing radar is completely dismantled.

Consequently, there should be no RFR hazard to workers involved in the ASR-8 dismantling. Similar to the ASR-11 construction, dismantling activities at the ASR-8 site could generate low levels of RFR from commonly used devices; however, these are not anticipated to be harmful to human health.

#### **4.4.2 Long-Term Impacts**

Operation of the ASR-11 radar at any of the three alternative sites would generate identical levels of electric and magnetic fields, including RFR. As discussed in Section 3.4.2.1, the RFR generated by the existing ASR-8 is only hazardous at close distances to the radar when it is operating. Similarly, the RFR generated by the ASR-11 would only be hazardous at close ranges, while the radar is operating (see below). The tower immediately below the radar would be in the spillover region, and would be hazardous to humans while the radar is operating. At any of the three alternative sites, the facility would be sited a sufficient distance from occupied buildings and recreational areas so that the radar operation would not pose a RFR hazard to personnel within the general vicinity of any of the ASR-11 sites. To advise personnel in the area of the RFR hazard at close ranges, signs would be posted at the perimeter of the ASR-11 facility warning against approaching the antenna while it is in operation. There would be no RFR generated from the antenna, and therefore no RFR hazard, when the antenna is not in operation.

The following comparison to various RFR safety standards is adapted from the October 1997 *Radiofrequency Impact Analysis for Airport Surveillance Radar-11* (FAA, 1997), prepared for the FAA.

Terms such as “safety standards” and “exposure standards” generally refer to, and are frequently used interchangeably with, specifications or guidelines on maximum public or occupational exposure levels to electromagnetic fields. Such levels are usually expressed as maximum power densities or field intensities in specific frequency ranges for stated exposure duration. Exposure guidelines have been developed by private organizations such as ANSI/IEEE, and the National Council on Radiological Protection (NCRP, now called the National Council on Radiation Protection and Measurements) as voluntary guidelines for occupational or general public exposure, or both. Governmental agencies such as the Federal Communications Commission (FCC) and various state and municipal bodies have adopted such guidelines or variations thereof as enforceable standards. The draft version of FAA Order 3910.3B, *Radiation Safety Program* (1997) adopts the ANSI/IEEE exposure guidelines.

The ANSI/IEEE (1992) guidelines cover the frequency range from 0.003 MHz to 300,000 MHz, and separately specify the maximum permissible exposure (MPE) in “uncontrolled environments” (accessible by the general population) and “controlled environments” (such as occupational exposure). In the ASR-11 frequency band of 2,700-2,900 MHz, the MPE for uncontrolled environments is 1.80-1.93 milliwatts per square centimeter ( $\text{mW}/\text{cm}^2$ ) averaged over a 30-minute period. The guideline level for controlled environments is 9-10  $\text{mW}/\text{cm}^2$  averaged over a 6-minute period.

In 1988, the International Radiation Protection Association (IRPA) published guidelines for occupational and public exposure to RFR in the frequency range 0.001 to 300,000 MHz. At the ASR-11 frequency, the MPE for occupational exposure is 5  $\text{mW}/\text{cm}^2$  averaged over a 6-minute

period. The MPE for non-occupational exposure is  $1 \text{ mW/cm}^2$  averaged over a 6-minute period. The MPE for pulsed RFR is set at 1,000 times the MPE for time-averaged exposure. Thus, at ASR-11 frequency, the MPE for pulsed RFR is  $1,000\text{-mW/cm}^2$  peak pulse power density. The NCRP also published guidelines for human exposure. For RFR at ASR-11 frequency, the MPE for occupational exposure is  $5 \text{ mW/cm}^2$ , averaged over 6 minutes. The corresponding MPE for exposure of the general population is  $1 \text{ mW/cm}^2$ , averaged over 30 minutes.

In August 1996, the FCC adopted a hybrid standard based in part on the ANSI/IEEE (1992) guidelines and in part on the NCRP guidelines. For occupational exposure to RFR in the ASR-11 frequency band, the FCC MPE is the same as the NCRP guideline level.

The power density of the ASR-11 beam varies considerably between the near-field (within 260 feet of the antenna) and the far-field (greater than 260 feet away) (FAA, 1997). Thus, far-field conditions apply to almost all the human receptors near the proposed radar sites and are presented herein. Any differences in power densities would be conservative, because near-field calculations lead to lower predicted power densities than do far-field calculations. The power density of the ASR-11 signal can be represented by peak pulse power - the maximum power level of a single pulse - or as the power averaged over a time period, usually several or more minutes. At a distance of 23 meters (75 feet) from the ASR-11 antenna, the peak power density of the ASR-11 signal will be  $945 \text{ mW/cm}^2$ , less than the  $1,000 \text{ mW/cm}^2$  MPE for peak power density established by the IRPA, as discussed above. The peak power density will decrease rapidly with distance from the antenna. At all locations more than 23 meters (75 feet) from the ASR-11 antenna, the ASR-11 signal will comply with the MPE for peak power density established by the IRPA.

The average (mean) power radiated by the ASR-11 is 2.1 kilowatts (kW). At any point near the ASR-11 in normal operation (i.e., antenna is rotating), the average power density is lower than the peak density by the factor 0.00034. For the ASR-11 frequency range (uncontrolled environments), the ANSI/IEEE MPE is 1.8 to  $1.93 \text{ mW/cm}^2$ , averaged over 30 minutes. The average power density of the ASR-11 signal decreases with distance from the antenna and will fall below  $1.9 \text{ mW/cm}^2$  at a distance of 10 meters (33 feet) from the radar antenna. Since the ASR-11 will be mounted on a tower greater than 10 meters in height, persons at ground level would not be exposed to RFR levels exceeding the ANSI/IEEE MPE. At distances of more the 13 meters (43 feet) from the ASR-11 antenna, the ASR-11 signal will comply with the MPE levels for the general population,  $1.0 \text{ mW/cm}^2$ , set forth in IRPA, NCRP, and FCC guidelines, discussed above. Since the closest occupied building at the alternative sites is TRACON, located 500 feet from Site 7, no impacts to nearby receptors are anticipated at any of the three alternative sites. At all locations near the radar, the ASR-11 signal will comply by an even wider margin with the guideline levels for occupational exposure set forth by ANSI/IEEE, IRPA, NCRP, and FCC. As a precautionary measure, signs would be posted at the perimeter of the DASR facility advising personnel and the public against approaching the radar facility during operation.

On infrequent occasions, the ASR-11 antenna will remain stationary and transmit a signal for maintenance and testing purposes. This type of operation is expected to occur no more than once every several months. In maintenance mode, the ASR-11 signal will be directed at a fixed location above the horizon for up to several minutes at a time. Because the beam will be

stationary, average power densities will be higher than during normal operation. In this mode, average power density of the main beam within 153 meters (500 feet) of the ASR-11 will exceed the ANSI/IEEE guideline levels. During this mode of operation, the ASR-11 will be under the direct control of an operator at the radar site. At locations greater than 153 meters (500 feet) from the ASR-11 antenna, the average power density of the signal from the ASR-11 operating in maintenance mode will comply with the ANSI/IEEE MPE for uncontrolled environments. At locations greater than 205 meters (672 feet) from the ASR-11 antenna, the average power density of the signal from ASR-11 operating in maintenance mode will comply with the IRPA, NCRP, and FCC MPEs for uncontrolled environments. Again, since the closest occupied building to any of the alternative sites is TRACON, located 500 feet from Site 7, no long-term adverse impacts are anticipated.

#### **4.5 HAZARDOUS SUBSTANCES AND SOLID WASTE**

The construction of the ASR-11 radar system would comply with applicable Edwards AFB policies and guidelines for pollution prevention. In addition, a pollution prevention plan has been developed for the NAS program. This Plan prohibits the use of all Class I ozone depleting chemicals and directs the contractor to minimize the use of Class II ozone depleting chemicals and toxic substances. Consequently, hazardous waste generation is anticipated to be reduced to the maximum extent possible during construction of the radar facility and the dismantling of the existing ASR-8 radar. Similar pollution prevention measures would be implemented during ASR-11 construction regardless of the alternative site at which the facility is constructed. A Safety Plan will be prepared in accordance with base procedures prior to the commencement of construction.

Impacts related to the use of hazardous materials, and generation of hazardous and solid waste are presented below. No significant impacts are anticipated with regard to type and amount of hazardous materials used, type and amount of hazardous waste generated, type and/or amount of material(s) recycled, handling/storage/disposal requirements, or amount of solid waste generated as a percentage of total landfill capacity.

##### **4.5.1 Hazardous Materials**

**4.5.1.1 Short-Term Impacts.** Each of the three alternative sites would be expected to require similar amounts of hazardous materials, such as fuel oil, engine oil, hydraulic fluid, grease, and other heavy equipment operation and maintenance material during construction of the ASR-11. Removal of the existing ASR-8 will also require similar hazardous materials. The types and quantities of hazardous materials used during the proposed activity would not be different from those already used on base. Compliance with all applicable standards addressing hazardous materials management is required, and would ensure proper handling, use, and storage of these substances on base. No significant short-term impacts are, therefore, anticipated with regard to hazardous materials.

**4.5.1.2 Long-Term Impacts.** Operation of the new ASR-11 facility would require motor oil and diesel fuel for the intermittent use of the emergency generator. The diesel fuel would be stored in a 1,000 gallon AST with containment to capture any spills. Compliance with all applicable standards addressing oil and fuel management is required and would ensure proper handling, use,

and storage of these substances on base. No significant long-term impacts are, therefore, expected with regard to hazardous materials.

## **4.5.2 Hazardous Waste**

**4.5.2.1 Short-Term Impacts.** Construction of the radar facility is expected to generate similar amounts and types of hazardous waste, including waste oil from heavy equipment, at each of the potential sites. Removal of the existing ASR-8 may disturb lead-containing paints. The types and quantities of hazardous wastes generated during the proposed activity would not be different from those already generated on base. Compliance with all applicable standards addressing hazardous waste management is required and would ensure proper handling, storage, and disposal of hazardous wastes generated on base. No significant short-term impacts are, therefore, anticipated to result from construction of the ASR-11 or dismantling of the ASR-8 with regard to hazardous waste.

**4.5.2.2 Long-Term Impacts.** Operation of the new ASR-11 facility would generate waste oil from the intermittent use of the emergency generator. Compliance with all applicable standards addressing waste oil management is required and would ensure proper handling, storage, and disposal. No significant long-term impacts are therefore anticipated with regard to hazardous waste.

## **4.5.3 Solid Waste**

**4.5.3.1 Short-Term Impacts.** The proposed action would contribute raw materials, such as waste building materials. Demolition of the existing ASR-8 facility is expected to generate CDW, which would be disposed of in an off-base landfill.

Some waste generated from the proposed action could be recycled, such as concrete and metals. Reuse or recycling of appropriate materials could reduce the amount of solid waste disposed of at landfills, resulting in an incrementally positive impact to solid waste management. It could also provide alternate sources for required building materials, potentially reducing future impacts on nonrenewable natural resources. No significant short-term impacts are, therefore, anticipated with regard to solid waste.

**4.5.3.2 Long-Term Impacts.** Although occasional maintenance or repair activities at the ASR-11 may generate some solid waste, the amounts are expected to be nominal and would not significantly contribute to the Edwards AFB solid waste stream. No significant long-term impacts are, therefore, anticipated with regard to solid waste.

## **4.6 BIOLOGICAL RESOURCES**

The potential short-term and long-term impacts to biological resources, resulting from the construction and operation of the proposed ASR-11 facility at Edwards AFB, must be assessed based on several indicators. These include the area of vegetation, ground, and critical habitat disturbed by construction, the presence of endangered/threatened species, the location of the proposed structure relative to the 100-year floodplain, and whether or not any Waters of the US are affected. Since no jurisdictional Waters of the US are present on Edwards AFB, no short-term or long-term impacts to this resource area are anticipated.

## 4.6.1 Fauna

**4.6.1.1 Short-Term Impacts.** Vegetation provides cover, feed, and shade among other key factors necessary to the success of animal species. Furthermore, vegetation removal is known to result in soil erosion and contribute to flooding through alteration of watercourses. Such changes to natural movements of soil and water can result in impacts to ground-dwelling species.

In general, construction activity for this project will require ground-disturbing activities that have the potential to affect desert tortoises, as well as other ground-dwelling species. These impacts may be direct by physically contacting individuals, or indirect by disturbing habitat or otherwise creating conditions which are adverse to species success.

As discussed in the Section 3.6, only Site 7 is located in an area that could potentially support the desert tortoise, a Federal- and State-listed threatened species. However, the USFWS has issued a biological opinion for the desert tortoise on Edwards AFB. This opinion was related to routine operations and facility construction within an area that includes Site 7. The opinion concluded that the proposed action is not likely to jeopardize the continued existence of the desert tortoise. Based on this judgment, and the limited area of disturbance resulting from the proposed construction, no significant short-term impacts to fauna are anticipated at any of the alternative ASR-11 sites.

**4.6.1.2 Long-Term Impacts.** No significant adverse long-term impacts to fauna are anticipated from the presence and operation of an ASR-11 facility at any of the proposed sites or the dismantled ASR-8 site. The relatively low height of the facility antennas is not anticipated to pose a substantial threat to birds flying through the area. Additionally, a chain link fence, which could act as a barrier to larger mammals would surround the selected site; however, any affected fauna would likely have the mobility to maneuver around the fence.

## 4.6.2 Flora

**4.6.2.1 Short-Term Impacts.** As described in Section 3.6.3, two SEAs have been identified on Edwards AFB. However, none of the proposed ASR-11 sites or the existing ASR-8 is located within an SEA. Therefore, no critical habitat would be disturbed due to construction activity at any of the proposed ASR-11 locations. However, approximately 1 acre of typical desert scrub vegetation will be removed as part of the facility installation. Upon project completion, disturbed areas outside the permanently cleared areas, including the temporary staging area, would be landscaped.

**4.6.2.2 Long-Term Impacts.** The ASR-11 site would replace approximately 1 acre of desert scrub vegetation regardless of the site chosen; however, due to the large amount of similar vegetation on Edwards AFB, this is not considered to be a significant adverse long-term impact. The facility structures will be surrounded with crushed stone/gravel allowing for stormwater permeability and thereby maintaining or enhancing the groundwater recharge. Also, the dismantling of the existing ASR-8 would have no long-term impacts to flora.

### **4.6.3 Floodplains**

Neither the existing ASR-8 nor the proposed ASR-11 sites are located within any known floodplains on Edwards AFB; therefore, no short-term or long-term flooding related impacts are anticipated.

## **4.7 CULTURAL RESOURCES**

Impacts to cultural resources are identified based on the presence of such resources on or within the vicinity of the alternative ASR-11 sites and the eligibility of the cultural resources for listing on the National Register. The ability to avoid known resources throughout the construction period must be identified, as applicable.

### **4.7.1 Short-Term Impacts**

Ground disturbance within the project area has the potential to damage or destroy archaeological sites. Impacts could include, but are not limited to, excavation, off-road vehicle traffic, foot traffic, looting, and erosion. Sites 1, 2, and 7, and the existing ASR-8, have been surveyed for the presence of cultural resources. Site 1, Site 2 and the existing ASR-8 are located within an area previously occupied by a World War II period hospital. This site was evaluated and determined not eligible for the National Register of Historic Places. Site 7 contains no known cultural resources. Therefore, no cultural resource concerns are anticipated due to construction of the ASR-11 and dismantling the ASR-8.

If, during construction, any evidence of cultural resources were uncovered (arrowheads, bones, milling stones, or old cans and bottles) work would stop at the discovery location. The BHPO would be contacted to examine the discovery. Work would not begin again at the discovery location until cleared by the BHPO.

### **4.7.2 Long-Term Impacts**

Due to the absence of any cultural resources eligible for listing, or listed, on the National Register of Historic Places in the vicinity of the alternative ASR-11 sites and the ASR-8 facility, no long-term impacts are anticipated. The Base Historic Preservation Office has reviewed the proposed actions and indicated that no cultural resource concerns should arise (USAF, 2001e).

## **4.8 GEOLOGY AND SOILS**

The potential impacts of ASR-11 construction and operation to geology and soils relate to the extent of ground disturbance, proximity to IRP sites or AOCs, seismic hazard potential, and use of groundwater. The following section identifies these potential impacts, as well as the required permits associated with implementation of the proposed action.

## 4.8.1 Topography

**4.8.1.1 Short-Term Impacts.** Topography is the greatest factor contributing to soil erosion. For the purposes of this discussion, topographic features that increase erosion may be defined as any slope greater than 1:1. The soils of such slopes are influenced by gravity and have a greater tendency to erode than do those on flat land. In such cases, vegetation is often an important factor in keeping such soils stable. Site 1, Site 2, and the existing ASR-8 are not located on slopes greater than 1:1; however, Site 7 would require substantial grading and site work to accommodate the facility footprint (USAF, 2001a).

Water flowing across paved surfaces can attain velocities beyond those normally achieved on native soils. This effect is greatly increased in sloped topographic areas. When water flows onto adjacent soils, this increased velocity has a much greater erosive potential than does slower flowing water. When higher velocity water comes into contact with soils that have been softened by trenching, there is a higher potential to move greater volumes of soil. Such erosive conditions often result in gully and rill formation, which often contributes to destabilization of roads and structures. Trenching also exposes soils to wind erosion. Due to the high winds that are common to the west Mojave, exposed soils can contribute to wind erosion, PM10 emissions, and reductions in visibility due to particles in the air. Minor short-term soil erosion is anticipated to result from the construction activities required for the installation of the ASR-11 and associated activities.

**4.8.1.2 Long-Term Impacts.** Regrading of Site 7 would alter existing topography by making the site less steep. Due to the flat and relatively level topography of the other alternative sites, long-term impacts on soil erosion resulting from the proposed construction would be negligible.

## 4.8.2 Installation Restoration Program Site Disturbance

**4.8.2.1 Short-Term Impacts.** Site 1, Site 2, and the existing ASR-8 are located within OU2, while Site 7 is located within OU5. None of the candidate ASR-11 sites or the existing ASR-8 is located within an IRP site, therefore, no short-term impacts are anticipated to result from construction or dismantling activities.

**4.8.2.2 Long-Term Impacts.** The long-term operation and maintenance of the ASR-11 is not expected to interfere with IRP monitoring or remediation efforts on base. No future release of hazardous materials resulting from the installed ASR-11 facility is anticipated. Removal of the ASR-8 from the area should not impact any IRP sites; therefore, no long-term impacts are anticipated to result from the proposed action.

## 4.8.3 Seismicity

**4.8.3.1 Short-Term Impacts.** Due to the fact that no faults on Edwards AFB are recognized as active, most of the seismic hazard is limited to shaking from activity along the San Andreas and Garlock Faults. Maximum magnitudes of off-base events along these faults are postulated to be greater than a magnitude 8 on the Richter scale; this is sufficient to cause widespread, major damage. An earthquake of magnitude 6 or greater on the Palmdale segment of the San Andreas

Fault could cause damage at Edwards AFB. The extent of the damage would have a direct relationship to the extent of the seismic activities.

Damage could be expected to occur to the tower structure and utility trenches if a seismic event occurred during construction. Strict adherence to building codes with seismic construction requirements would reduce the potential impacts. Base engineers should review plans to ensure structures are sufficient to resist seismic hazards.

**4.8.3.2 Long-Term Impacts.** Damage could be expected to occur to the installed ASR-11 and associated structures if a seismic event of great enough magnitude occurred. The use of building codes with seismic construction requirements would reduce the potential impacts.

#### **4.8.4 Land Subsidence**

**4.8.4.1 Short-Term Impacts.** Land subsidence is associated with the decline of groundwater levels (USGS, 1990). It varies with the relative quantities pumped from various well fields and the differences in geologic substrata. Sites 1, 2, and 7, and the existing ASR-8 are not located in a subsiding area. Therefore, no short-term impacts are expected

**4.8.4.2 Long-Term Impacts.** As noted above, the alternative sites and the existing ASR-8 are not located in a subsiding area. No long-term impacts are therefore expected.

### **4.9 SOCIOECONOMICS**

The potential socioeconomic impacts of construction and operation of an ASR-11 depends on the amount of revenue generated into the economy over a specific time period, amount of increase or decrease of available on base housing, amount of increase or decrease in student enrollment, and potential to impact minority or low-income populations. The following section identifies these potential impacts associated with implementation of the proposed action.

#### **4.9.1 Short-term Impacts**

The proposed project would provide a minor short-term, positive impact to the economy of the Antelope Valley from increased revenue generation. This increase in revenue is expected to occur as a result of money spent off base for construction materials. Additionally, the proposed action is anticipated to result in the temporary employment of approximately ten persons. Construction of the ASR-11 at any of the three alternative sites would require similar work efforts, and therefore, would have similar effects on socioeconomic conditions at the base. No impact on housing or student enrollment is anticipated. Construction of the ASR-11 is not anticipated to alter the racial makeup or the annual median household income of Kern County or the surrounding area.

Upon the successful completion of the construction of the ASR-11, the existing ASR-8 facility would be dismantled. No effects on socioeconomic conditions are anticipated to result from this activity.

## **4.9.2 Long-Term Impacts**

The new radar facility would not be staffed, and maintenance and operation of the ASR-11 would be performed by base personnel. The proposed project is, therefore, not anticipated to impact the long-term employment of the region. The project would also not affect student enrollment or housing conditions on the base.

## **4.9.3 Environmental Justice**

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires Federal agencies to identify and address disproportionately high adverse effects of its activities on minority and low-income populations.

No environmental justice issues are expected to occur as a result of the construction and operation of the DASR system. All alternative sites are located within the perimeter of the base, and therefore, do not have the potential to impact off-base property. In addition, no significant short- or long-term adverse effects are anticipated to occur as a result of the DASR installation. Thus, the proposed project is consistent with the objectives of EO 12898.

## **4.9.4 Fiscal Growth**

**4.9.4.1 Short-Term Impacts.** The proposed project would provide a minor short-term, positive impact to the economy of the Antelope Valley from increased revenue generation. This increase in revenue is expected to occur as a result of money spent off base for construction materials. Additionally, the proposed action is anticipated to result in the temporary employment of approximately 10 persons. Construction of the ASR-11 at any of the three alternative sites would require similar work efforts, and therefore, would have similar effects on socioeconomic conditions at the base.

Upon the successful completion of the construction of the ASR-11, the existing ASR-8 radar would be dismantled. No effects on socioeconomic conditions are anticipated as a result of this activity.

**4.9.4.2 Long-Term Impacts.** The new radar facility would not be staffed, and maintenance and operation of the ASR-11 would be performed by base personnel. The proposed project is, therefore, not anticipated to impact the long-term economy of the region.

## **4.9.5 Community Assets**

**4.9.5.1 Short-Term Impacts.** On-base housing is not required to quarter construction laborers; therefore, no impacts to on-base housing are anticipated. The proposed project would not impact school-aged children, school enrollment, or educational infrastructure. No short-term impacts to community assets are therefore anticipated.

**4.9.5.2 Long-Term Impacts.** Because the ASR-11 facility would not be staffed, on-base housing is not required to quarter laborers; therefore, no impacts to on-base housing are

anticipated. The proposed project would not impact school-aged children, school enrollment, or educational infrastructure. No long-term impacts to community assets are therefore anticipated.

#### 4.10 INFRASTRUCTURE

The following sections describe potential short- and long-term effects to infrastructure as a result of the installation of the DASR system at the three alternative sites. Table 4.10-1 summarizes the lengths of new utility connections to support the ASR-11 at each proposed site.

**Table 4.10-1. Required Lengths of New Utility Connections**

<b>ASR-11 Alternative Site</b>	<b>Length of Access Road</b>	<b>Length of Electric Power Conduit Required</b>	<b>Length of Telephone Cable Required</b>	<b>Length of Fiber Optic Cable Required</b>
Site 1	200 feet	800 feet	800 feet	550 feet*
Site 2	100 feet	300 feet	300 feet	400 feet*
Site 7	300 feet	600 feet	600 feet	500 feet

Source: USAF, 2001a

\* This distance represents new fiber optic routing between the proposed ASR-11 and the planned extension of the existing Edwards AFB fiber optic network. If the planned extension is not in place at the time of ASR-11 construction, or does not have sufficient cable to support the ASR-11 facility, the routes for Sites 1 and 2 would increase to 18,000 feet and 20,000 feet, respectively.

##### 4.10.1 Water-Distribution System

A temporary increase in water demand would occur during construction. A water source would be supplied on site by mobile water tanks. Due to the limited number of construction workers, short construction period, and the adequate water supply of the underlying aquifer, it is not anticipated that the water demand (both for workers' personal need and dust control) during construction of the ASR-11 would adversely impact the water supply at Edwards AFB.

##### 4.10.2 Wastewater System

There would be an insignificant short-term increase in demand for sewage treatment during construction. Portable toilets would be available on site, and waste would be transported to the nearby treatment facility. The proposed project would not impact stormwater conveyance structures. Construction water from dewatered trenches would be held in tanks on site prior to treatment and discharge.

### **4.10.3 Electrical Distribution System**

Adequate electrical power is available in the vicinity of each of the alternative ASR-11 sites. Overhead power lines would be run from existing distribution lines located on Center Street to Site 1 at a distance of 800 feet, and from existing distribution lines on Jones Road to Site 2 at a distance of 300 feet. Site 7 would be supplied with electricity via underground lines extending approximately 600 feet from the existing overhead distribution lines along Rosamond Boulevard. Short-term impacts causing disruption of power to the immediate area around the alternative ASR-11 sites may occur while connections are made. All disruptions would cease upon completion of the installation.

### **4.10.4 Communication Systems**

The final communications route and distance to the new ASR-11 site would be determined when the final site and design are selected. Telephone line connections for Site 1 can be made to the line currently running along Center Street, at a distance of 800 feet. Telephone line connections for Site 2 can be made from Jones Road, a distance of 300 feet. Telephone line connections for Site 7 can be made from existing dial-up lines along Rosamond Boulevard, at a distance of 600 feet. No disruption to telephone service in the immediate area of the alternative ASR-11 sites is expected.

Presuming the planned extension of the existing Edwards AFB fiber optic network is completed by the time of construction of the ASR-11 facility, Sites 1 and 2 would require 550 feet and 400 feet, respectively, of new fiber optic routing. If the planned extension is not in place at the time of construction, or does not have sufficient cable to support the ASR-11 facility, the routes for Sites 1 and 2 would increase to 18,000 feet and 20,000 feet, respectively. A total of approximately 500 feet of new fiber optic cabling would be required at Site 7.

### **4.10.5 Transportation Systems**

Impacts to transportation systems at Edwards AFB during construction would be minimal. Increased activity in the vicinity of the ASR-11 sites, including proposed utility connections, could temporarily disrupt local traffic. Personal vehicles and small trucks belonging to contractors and subcontractors would be on site or at an area designated by Edwards AFB. There would be a period of approximately 10 hours where cement trucks would enter the base for the foundation placement. The foundation concrete must be placed continuously, thus necessitating the 10-hour period. Under existing conditions, heavy vehicles, including cement trucks, frequently use base roads; therefore, construction vehicles would not be expected to have a noticeable impact on base roads. Long-term operation and maintenance of the proposed ASR-11 facility would not alter the traffic patterns on base.

### **4.10.6 Long-term Impacts**

It is not anticipated that long-term utility and transportation conditions at Edwards AFB would be affected as a result of operating the proposed ASR-11 radar system. The addition of electrical power, telephone lines, and fiber optic cable at any of the alternative radar would not have a significant effect on the utilities in the area. The operation of the ASR-11 radar system would

not require water resources, wastewater treatment, collection of significant solid waste, natural gas, or jet fuel resources; therefore, no impacts to those utilities are anticipated. No long-term impacts to traffic are anticipated. Sites 1, 2, and 7 require the construction of an access road (200, 100, and 300 feet, respectively), which would not affect the existing transportation network on base. Discontinuing the operations at the existing ASR-8 radar is not expected to significantly affect area utilities or transportation.

## **4.11 ENERGY RESOURCES**

The short and long-term impacts to energy resources at Edwards AFB, as a result of the proposed DASR facility, are determined based on the use of energy-efficient equipment and building designs, the amount of energy conserved, and anticipated cost savings.

### **4.11.1 Energy Consumption**

**4.11.1.1 Short-Term Impacts.** It is assumed that the contractor will use energy-efficient equipment during construction of the ASR-11 and dismantling the ASR-8. Therefore, no significant short-term impact on energy resources at Edwards AFB is expected to result from construction of the proposed ASR-11 or dismantling of the ASR-8.

**4.11.1.2 Long-Term Impacts.** Based on a comparison of peak and average power demands for the existing ASR-8 and the proposed ASR-11 (Table 2-1), long-term operation of the DASR facility would result in considerably less electricity being consumed. This would result in a long-term beneficial impact to overall energy resources at Edwards AFB.

## **4.12 CUMULATIVE IMPACTS**

Cumulative impacts are defined in this document as those that would result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. Because of the nature of the proposed project, air quality is the only impact considered cumulatively due to the introduction of a new generator and AST. The short-term and long-term emissions anticipated for this project are much lower than the 10-percent thresholds for KCAPCD and, therefore, are not regionally significant. The emergency generator proposed as part of the ASR-11 installation is anticipated to operate less than 300 hours per year. The pollutant emissions associated with this generator are identical at each of the three alternative sites. As discussed in Section 4.2.1, the emissions from this generator are below the *de minimis* levels due to the few operating hours anticipated each year. Considered in light of the dismantling of the existing ASR-8 facility, there would be no permanent net increase in air pollutant emissions anticipated at Edwards AFB due to the installation of the DASR facility. Consequently, significant cumulative impacts to air quality would not occur.

## 5.0 MINIMIZATION AND MITIGATION OF IMPACTS

Most of the impacts that may occur at any of the three alternative ASR-11 sites during construction and operation of the DASR system are minor in nature and few mitigation measures would be required. The following section identifies measures, by environmental parameter, which would be implemented to minimize and or mitigate potentially adverse impacts related to the ASR-11 installation, and ASR-8 dismantling.

### 5.1 LAND USE

The following minimization measures are required or recommended:

- a. The proposed project must obtain final siting approval from the Base Planning and Zoning Committee.
- b. The proposed project must comply with AFI 32-1026, *Planning and Design of Airfields*, and Air Force Joint Manual (AFJMAN) 32-1013, *Airfield and Heliport Planning Criteria*.
- c. The proposed action shall comply with all regulations and instructions regarding airfield operations including, but not limited to, AFFTCI 11-2, *Ground Agency Operations*.
- d. Internal combustion engines in construction equipment must be maintained with an appropriate muffler in order to reduce noise.

### 5.2 AIR QUALITY

The following minimization measures are required or recommended:

- a. The project shall comply with all applicable KCAPCD rules and regulations.
- b. The proposed project shall comply with all *Air Toxic "Hot Spots" Information and Assessment Act* requirements, including revision of existing emissions inventory plans and/or health risk assessments.
- c. The proposed project shall comply with all applicable rules and regulations as identified in AFI 32-7040, *Air Quality Compliance*.
- d. The proposed project shall comply with AFMC standard operating procedures for Air Quality Stationary Source Management.
- e. An ATC and a PTO from the KCAPCD shall be required for the proposed project.
- f. The proposed project shall comply with all BACT specified in KCAPCD Rule 210.1, *New and Modified Stationary Source Review (NSR)*, if the generator is greater than 50 brake horsepower.
- g. Approval from the Base Fire Department, Bioenvironmental Engineering, and the KCAPCD is required prior to open burning of debris or materials.
- h. The proposed action must comply with all Title V requirements. However, if the fuel storage tank only holds diesel fuel, then the tank is exempt from the Title V requirements.

- i. The proposed project shall comply with all CAA Title III, HAP, requirements or any more stringent State or local requirements as they apply to stationary sources that emit HAPs.
- j. All vehicles transporting clean fill material or construction debris would require a cover to reduce PM10 emissions during transport.
- k. All earthwork should be planned and conducted to minimize the duration that soils would be left unprotected. The extent of the area of disturbance necessary to accomplish the project should be minimized. Exposed surfaces should be periodically sprayed with water or soil binder. Use of soil binders should be coordinated with Environmental Management as some soils binders contain hazardous substances.
- l. Ground-disturbance activities should be delayed during high-wind conditions (over 25 knots [29 mph]).
- m. All mechanical equipment should be kept in working order according to applicable Technical Orders and equipment maintenance manuals to reduce emissions to acceptable levels.

### **5.3 WATER RESOURCES**

The following minimization measures are required or recommended:

- a. The proposed project must comply with AFFTCI 32-6, *Edwards Air Force Base Wastewater Instruction*.
- b. The procedures and controls outlined in the *Edwards Air Force Base Non-Point Discharge and Stormwater Management Plan* shall be followed to meet the requirements of the CWA.

### **5.4 SAFETY AND OCCUPATIONAL HEALTH**

The following minimization measures are required or recommended:

- a. The contractor will be registered with Cal-OSHA prior to implementing lead-based paint abatement activities, if necessary, and must fully understand and adhere to the contents of the following:
  - 1) Title 8 CCR, Section 1532.1, *Lead*.
  - 2) Title 8 CCR, Section 3203, *Illness and Injury Prevention Program*.
  - 3) 29 CFR 1910.1025, *Lead*.
  - 4) 29 CFR 1926.62, *Lead*.
  - 5) 40 CFR Part 61, Subpart M, *National Emission Standards for Hazardous Air Pollutants*.
  - 6) Any lead-based paint that has the potential to be disturbed as a result of implementing the proposed project must first be abated by qualified and trained lead-based paint workers as defined in Title 8 CCR Section 1532.1 and 29 CFR 1926.62.
- b. The proponent/contractor shall be responsible for engaging an independent certified consultant to identify the potential presence or absence of mercury- or chromium-based

paints if: (1) no documentation exists confirming that previous surveys have been conducted to detect the presence or absence of mercury- or chromium-based paints where proposed activities are to occur, or; (2) if it has been determined that further sampling would be required where demolition of the existing ASR-8 would occur.

- c. If mercury or chromium is detected, the proponent/contractor shall coordinate the removal, safe handling, and disposal through the Civil Engineer Group Environmental Coordinator and Bioenvironmental Engineering to ensure the proper engineering controls are in place prior to any activities that would disturb the paint.
- d. The contractor should contact the Civil Engineer Group Environmental Coordinator for the Edwards AFB adapted Army Corps of Engineers Guide Specifications for Military Construction, Section 02090, *Work Involving Lead-Based Paint*. The adapted specification would be applicable to all lead-based paint related work at Edwards AFB.
- e. All new electrical equipment procured for the project (e.g., switches, transformers, etc.) shall be specified to contain no detectable polychlorinated biphenyls (PCBs).

## **5.5 HAZARDOUS SUBSTANCES AND SOLID WASTE**

The following minimization measures are required or recommended:

- a. In accordance with 29 CFR 1910.1200 on hazard communication, all hazardous materials would be documented with required MSDSs as part of a complete hazardous materials inventory. A copy of the inventory and all pertinent MSDSs would be submitted to Bioenvironmental Engineering in support of the Base Hazardous Materials Program and Air Force Hazard Communication Program (AFOSH Standard 48-21).
- b. In accordance with the *Edwards AFB Pollution Prevention Plan*, all hazardous materials that are targeted for elimination shall be phased out, unless a Technical Manual requirement can be shown to exist for continued use of those specific materials. Substitute materials shall be identified and used when a Technical Manual requirement does not exist.
- c. Any deviation from the existing SOPs of the *Hazardous Materials Management Plan* (HMMP) would need to be reviewed and approved by the HM Integrated Process Team (IPT), in compliance with all Air Force Directives and local, State, and Federal regulations and laws.
- d. Any hazardous waste generated during installation/operation of the ASR-11 and/or removal of the ASR-8 would be handled in accordance with applicable regulations: 49 CFR 171-177, *Waste Transportation and Packaging*; 40 CFR 260-299, *Storage, Treatment, and Disposal of Waste*; AFI 32-7042, *Solid and Hazardous Waste Compliance*; and the *Edwards Air Force Base Hazardous Waste Management Plan*.
- e. No asbestos-containing building material shall be used on Edwards AFB. Surveys for ACM and lead-, chromium, and mercury-based paints will be required for all exterior and interior portions of buildings that would be disturbed. To arrange for these surveys and to determine whether an Abatement and Disposal Plan will be required, contact the 95<sup>th</sup> Civil Engineer Group, Hazardous Waste Disposal Section.

- f. Hazardous wastes are subject to land disposal restriction requirements. Signed hazardous waste disposal manifests shall be required for ACMs; lead-, mercury-, chromium-, and other heavy metal-based paints; and/or PCB-containing wastes prior to transportation for off-base disposal to an U.S. EPA-approved landfill, if applicable.
- g. Project scope may involve use, alteration, or disposal of chlorofluorocarbon (CFC) containing equipment. Some CFCs are considered ozone-depleting substances. The contractor shall coordinate, in advance of use, the appropriate use, capturing, and recycling of CFC.
- h. The contractor shall not sweep removed lead-based paint from the paved surfaces and the area should be kept wet and under control during the paint removal.
- i. It is the responsibility of the proponent/contractor to transport unusable residual materials or partially filled containers to an off-base, U.S. EPA-approved, disposal site.
- j. This project will generate CDW. The contractor shall be responsible for transporting solid waste to a State-licensed facility.
- k. The contractor should segregate recyclable and reusable materials from solid waste for delivery to the appropriate on- and off-base recovery or disposal facilities. The 95<sup>th</sup> Civil Engineer Squadron, Group Environmental Office, should be contacted regarding recyclable debris.

## **5.6 BIOLOGICAL RESOURCES**

The following minimization measures are required or recommended:

- a. The proponent/contractor shall adhere to the Terms and Conditions of the *Biological Opinion for Routine Operations and Facility Construction within the Cantonment Areas of Main and South Bases, Edwards AFB, CA (1-6-91-F-28)*.
- b. Structures within the project area should be surveyed for the presence of nesting birds prior to the start of work activities. A biological monitor may be required. If nesting birds are discovered during work activities, all work must stop and the contractor must immediately contact Environmental Management and the contracting officer. Federal contractors are potentially subject to criminal liability and must possess a permit to conduct a depredation activity.
- c. A pre-activity survey should be accomplished to determine the presence/absence of sensitive species. If any sensitive species are identified within the project area(s), a biological monitor should be present during work activities.
- d. Prior to commencement of work activities at approved borrow sites, the contractor shall specifically establish approved locations, perimeters, and dimensions of the approved site. To establish these coordinates, the contractor shall consult with Environmental Management to identify specific environmental issues including, but not limited to, threatened species and sensitive species.
- e. Collocate antenna dishes on existing towers and other necessary equipment in existing shelters to accomplish objectives versus constructing new towers and shelters.

- f. The minimum amount of guy wires to ensure the safety and stability of a tower should be employed.
- g. Towers should not be placed near known migratory bird movement routes or stopover sites, and all towers with guy wires should include visual markers to serve as visual deterrents.
- h. Obsolete, nonworking towers should be taken down.

## **5.7 CULTURAL RESOURCES**

The following minimization measures are required or recommended:

- a. Fill material shall be obtained from approved borrow sites only. Contact Environmental Management to determine appropriate borrow areas and applicable operating requirements to ensure compliance with natural and cultural resource regulations.
- b. If any cultural materials not discussed in this report are discovered during project implementation, all work shall cease at the site of discovery, and the BHPO shall be contacted immediately in accordance with 36 CFR 800 and AFI 32-7065.

## **5.8 GEOLOGY AND SOILS**

The following minimization measures are required or recommended:

- a. Restabilize disturbed areas to near original contours upon completion of construction as appropriate.
- b. All earthwork should be planned and conducted to minimize the duration that soils would be left unprotected. The extent of the area of disturbance necessary to accomplish the project should be minimized. Ground-disturbance activities should be delayed during high wind conditions (in excess of 25 knots [29 mph]). Vehicular traffic, grading, and digging should not be permitted in the project area during high wind conditions.
- c. Exposed surfaces should be periodically sprayed with water.
- d. Trenching and removal of vegetation on topographic slopes should be avoided to the maximum extent feasible.
- e. Prior to commencement of work activities at approved borrow sites, the contractor shall specifically establish approved locations, perimeters, and dimensions of the approved site. To establish these coordinates, the contractor shall consult with Environmental Management to identify specific environmental issues including, but not limited to, natural resources, cultural resources, and IRP concerns.
- f. Fill material should be delivered according to all applicable Federal, State, and local regulations regarding transport of fill material. Contact Environmental Management for assistance.
- g. Design standards to be followed include: Air Force Manual 88-3, *Seismic Design of Buildings for Seismic Zone 4*; the USACOE Guide Specification No. 13080, *Seismic*

*Protection for Mechanical and Electrical Equipment*; the UBC Chapters 23, 26, 27, and 29 with the applicable California Supplements; and Kern County building codes.

## **5.9 SOCIOECONOMICS**

Edwards AFB currently maintains a proactive, good neighbor policy in providing prior notification/coordination to potentially impacted businesses through Public Affairs. The construction/installation of the ASR-11 and removal of the ASR-8 are not anticipated to have any adverse socioeconomic impact on Edwards AFB or the surrounding communities. Therefore, since there are no anticipated impacts, there would be no need for mitigation.

## **5.10 INFRASTRUCTURE**

The following minimization measures are required or recommended:

- a. The proponent/contractor shall be responsible for obtaining an AF Form 103, *Base Civil Engineering Work Clearance Request* (digging permit). Contact the Base Civil Engineer Infrastructure Controller for coordination.
- b. Some utilities require a representative to be present on site at all times when motorized construction equipment is being used closer than 20 feet from existing lines. The project sponsor must coordinate with the Civil Engineer Group in order to identify the location of the existing lines.
- c. If current as-built drawings indicating existing utility lines are not available, no mechanical digging can be performed within 4 feet of utilities or communication cables until they are physically exposed by hand digging. Any capping of utilities should take place 5 feet beyond the existing footprint of the buildings.
- d. All work that may require closure, rerouting, or other modification of roadways, streets or highways must be coordinated 15 working days in advance with the Security Forces, Base Fire Department, and Public Affairs Office. A current copy of the *California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work Zones* will be used as guidance for traffic signs.

## **5.11 ENERGY RESOURCES**

Best available energy conservation measures have been incorporated into the design of the ASR-11; therefore, no mitigation measures are required or applicable for energy resources.

## **6.0 COMPARISON OF ENVIRONMENTAL CONSEQUENCES AND SELECTION OF PREFERRED ALTERNATIVE**

All three proposed sites are located in developed areas of the base. Two of the three alternative sites are located 800 feet from the existing ASR-8 facility on South Base. The third site is located 500 feet from the TRACON facility on Main Base. The three sites share some similar existing characteristics. All sites are characterized by similar socioeconomic, air quality, and cultural resource conditions. Sites 1, 2, and 7 support sparse typical desert vegetation. Site 1 is within an area of administrative land use, while Sites 2 and 7 are currently within buffer zone and aircraft operations and maintenance areas, respectively. Sites 1, 2, and 7 share similar ambient noise levels (65-70 dB), although noise levels at Site 7 may be slightly less than the other two sites which are located closer to the 70-75 dB noise contour. Although Site 7 is located within an area of potential desert tortoise habitat, a Federally-listed threatened species, the USFWS has determined that routine construction activities in this area are acceptable. All three sites are located within an area of high probability of a seismic activity. Sites 1 and 7 are not located within an IRP site, however, Site 2 and the existing ASR-8 are located within known IRP sites that have been remediated and subsequently closed. Energy consumption at each of the alternative sites would be consistent. No surface water resources or wetlands are present at any of the sites. The 100-year floodplain limits do not extend within the alternative sites

No short-term impacts are expected at any of the three sites for socioeconomic, hydrologic, cultural resources, hazardous waste, utilities, or energy resources. Although Site 1 is located within an area designated as administrative, base personnel have indicated that construction of an ASR-11 would not be an incompatible land use. Construction activities would not be anticipated to encounter groundwater if excavation does not extend below 30 feet below the ground surface, where perched water may exist. Typical groundwater on base is found approximately 300 feet below the surface. Installation of the DASR facility, regardless of the site chosen, has the potential to result in short-term impacts to land use, air quality, noise, and biological resources, either at the ASR-11 site itself, the nearby staging areas, or along utility connection routes. The utility trenches for each site are anticipated to be similar. If, however, the distances for fiber optic connections are extended at Sites 1 and 2, potentially greater short-term impacts on adjacent land uses, due to increased dust and noise levels, would be expected. Construction in the vicinity of Site 7 would have greater potential to result in noise impacts, compared to Sites 1 and 2, given its proximity to the occupied TRACON facility. Vegetation removal would be similar at all three sites, unless the longer utility trenches are required at either Site 1 or 2.

No long-term impacts are anticipated at any of the three sites with regard to noise, air quality, socioeconomics, hydrology, geology, cultural resources and utilities. Sites 1 and 2 have similar aesthetic characteristics given their location off a less-traveled street, with the existing ASR-8 facility nearby. Site 7 is located in a more developed area of the base, with TRACON located 500 feet away and housing units to the north. Base personnel have indicated that construction of the ASR-11 within the buffer zone or administrative land near the ASR-8 would not be considered an incompatible land use. Aesthetic impacts are also anticipated to be minor at Site 7 because of its location in an aircraft operations and maintenance area. No rare, threatened, or endangered species are anticipated to be impacted by the operation of an ASR-11 at any of the three alternative sites. Although the radar would generate RFR while operating, persons at

ground level would not be exposed to RFR levels exceeding the MPE levels for the general populations, since the ASR-11 will be mounted on a tower at least 57 feet in height. As a precautionary measure, signs would be posted at the perimeter of the DASR facility advising personnel and the public against approaching the radar facility during operation. During the DASR operation, fuel and other hazardous materials may be used at the site, such as engine oil and grease. However, use and disposal of any hazardous material would occur in compliance with Edwards AFB protocols and guidelines as well as applicable State and Federal regulations. Consequently, it is anticipated that operational use of hazardous materials will not adversely affect the natural or human environments.

Construction and operation of the ASR-11 facility would result in minimal short-term and long-term impacts at any of the three sites, regardless of which is selected as the preferred site. Sites 1 and 2 may require lengthy utility conduits if the planned fiber optic extension project is not completed at the time the ASR-11 construction. Site 7 would require more grading than the other two sites to obtain a level site. After considering the potential impacts at each candidate location, the base has selected Site 1 as the preferred site.

## 7.0 REFERENCES

The following references were cited in the Environmental Assessment:

AFFTC, 1993, *Edwards Air Force Base Flood Study*, December. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1994a, *Edwards Air Force Base Comprehensive Plan*, June. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1994b, *Edwards Air Force Base Non-Point Discharge and Stormwater Management Plan*, June. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1995a, *Edwards Air Force Base Energy Plan*, March. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1995b, *Edwards Air Force Base Pollution Prevention Plan*, September. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1996, *Programmatic Environmental Assessment for the Control of Ground Squirrels in Military Family Housing and Other Industrial Areas of Edwards Air Force Base, California*, June. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1997a, *Programmatic Environmental Assessment for the Basewide Removal, Replacement, and Installation of Oil/Water Separators, Edwards Air Force Base, California*, January. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1997b, Chapter 20, *Design Standards*, of the *Edwards Air Force Base Comprehensive Plan*, published under separate cover, March. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1997c, *Programmatic Environmental Assessment for Routine Flightline Activities, Edwards Air Force Base, California*, March. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1997d, *Edwards Air Force Base Utility System Study*, July. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1998, *Stormwater Pollution Prevention Plan (SWPPP), Edwards Air Force Base, California*. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1999a, *Edwards Air Force Base Hazardous Waste Management Plan Number 32-7042*, September. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1999b, *Edwards Air Force Base Solid Waste Management Plan*, August. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 1999c, Appendix H of the Model Environmental Assessment, Socioeconomic Tables.

AFFTC, 2000, *The Air Force Flight Test Center Oil and Hazardous Substance Spill Prevention and Response Plan*, 30 June. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AFFTC, 2001a, *Edwards Air Force Base Model Environmental Assessment*. Document received from Environmental Management, Edwards AFB CA, March.

AFFTC, 2001b, Correspondence received from Environmental Management regarding environmental concerns at alternative sites. Dated May 7, 2001.

AFFTC/EM, 2001. *Integrated Natural Resources Management Plan (INRMP)*. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

AVBOT, 2000, Antelope Valley Board of Trade. *Antelope Valley Demographic and Economic Study*. Compiled by the Antelope Valley Board of Trade, Lancaster, CA.

California Department of Employment Development (CDED), 2001, using the following website: <http://www.calmis.ca.gov/file/1fmonth/0106pcou.txt>.

Council on Environmental Quality (CEQ), 1978, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. 40 CFR Parts 1500-1580. November 28, 1978 (and as updated through July 1, 1998).

Dutcher, L.C., and Worts, G.F. Jr., 1963, *Geology, Hydrology, and Water Supply of Edwards Air Force Base, Kern County, California: Sacramento, California, U.S. Geological Survey Open-File Report*.

Edwards AFB, 2001. Interview with James Oswood, ASR-8 facility operator. March site visit.

Federal Aviation Administration (FAA), 1992, *Primary/Secondary Terminal Radar Siting Handbook*. FAA Order 6310.6, Change 1. June 22, 1992.

Food and Drug Administration (FDA), 1996, Annual Report, Fiscal Year 1996; section on *Electromagnetic Interference (EMI) Testing of Medical Devices*. FDA Center for Devices and Radiological Health, Office of Science and Technology. Available at the following web address: <http://www.fda.gov/cdrh/ost/section4.html>.

Institute of Electrical Electronics Engineering (IEEE), 1998, *Radiofrequency Interference with Medical Devices; IEE Engineering in Medicine and Biology Magazine* 17(3): 111-114.

MARCOA Publishing Incorporated, 1998, *Into the Future Edwards Air Force Base*. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

Mitchell, 1993, *Biological Resources Environmental Planning and Technical Report Basewide Vegetation and Wildlife Surveys and Habitat Quality Analysis*. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

National Safety Council (NSC), 1979, *Fundamentals of Industrial Hygiene*, Second Edition.

USAF, 1994, *Department of the Air Force Program Management Directive for Air Traffic Control and Landing Systems Integrated Weapons System Management*. January 14, 1994.

USAF, 1995a, *Department of Defense National Airspace System Final Programmatic Environmental Assessment*. Prepared by Metcalf & Eddy.

USAF, 2000a, Environmental Impact Analysis Process (EIAP). Federal Register. Vol 64, No.135 38127. AFI 32-7061. July 15, 1999.

USAF, 2001a, *Digital Airport Surveillance Radar (DASR), Integrated Site Survey Report – Preliminary, Edwards Air Force Base, California*. Prepared by Raytheon Systems Company, Transportation Systems, Sudbury, MA.

USAF, 2001b, Personal communication between Edwards AFB (Lee Saylor) and Metcalf & Eddy (C. Hoffman), Re: Land Use Acreage on Base. 7/09/01.

USAF, 2001c, Personal communication between Edwards AFB (Sgt. Ramos) and Metcalf & Eddy (C. Hoffman), Re: Groundwater wells on-Base. 7/05/01.

USAF, 2001d, Personal communication between Edwards AFB (Dan Reinke, AFFTC) and Metcalf & Eddy (C. Hoffman), Re: Endangered plant and animal species on Base. July 5.

USAF, 2001e, Personal communication via electronic mail between Edwards AFB (Richard Norwood, Base Historic Preservation Office) and Metcalf & Eddy (C. Hoffman), Re: Cultural resources on base. June 25.

USAF, 2001f, Personal communication between Edwards AFB (Megan, Public Affairs) and Metcalf & Eddy (C. Hoffman), Re: Rolling blackouts on Edwards AFB. June 20.

USAF, 2001g, Personal communication between Earth Tech (Joan Seigel) and Metcalf & Eddy (T. Rodolakis), Re: IRP sites on Edwards AFB. July 13.

USAF, 2001h, Personal communication between Edwards AFB (Rebecca Hobbs) and Metcalf & Eddy (T. Rodolakis), Re: IRP sites on Edwards AFB. July 13.

USAF, 2001i, Personal communication between Edwards AFB (Irene Nestor) and Metcalf & Eddy (T. Rodolakis), Re: IRP sites on Edwards AFB. July 11.

USAF, 2001j, Personal communication between Edwards AFB (Major Tom Gilroy ) and Metcalf & Eddy (T. Rodolakis), Re: Fiscal data for Edwards AFB. July 2.

United States Army Corps of Engineers (USACOE), 1997b, *The Grazing and Cropland Management Plan for Edwards Air Force Base, California*. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

USACOE and AFFTC, 1994, *Programmatic Environmental Assessment for the Comprehensive Plan of Edwards Air Force Base, California*, July. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

United States Bureau of Census (USBC), 2000, State and County QuickFacts. Data derived from Population Estimates, 2000 Census of Population Employment and Housing. <http://www.factfinder.census.gov/servlet/BasicFactsServlet>.

United States Fish and Wildlife Service (USFWS), 1994, *Biological Opinion for the Precision Impact Range Area, Edwards Air Force Base, California* (1-8-94-F-6), 10 March. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

United States Geological Survey (USGS), 1990, *Land Subsidence and Problems Affecting Land Use at Edwards Air Force Base and Vicinity, California*. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

USGS, 1998, *Topography, Surface Features, and Flooding of Rogers Lake Playa, California*. Document on file at Environmental Management (AFFTC/EM), Edwards AFB CA.

Vermont Department of Public Services (VTDPS), 1996. *Radiofrequency Radiation: Health Effect and Interference; Status of Current Research and Regulation*. December 1996. Available at <http://www.cit.state.vt.us/psd/rfrpt.htm>.

York, A. L., T. Wahoff, and M. Corbett, 1997. *Cultural Resource Investigations at Area P Housing Complex and Adjacent Sites, Edwards Air Force Base, California*. Dames & Moore, San Diego, California under contract to GRW Engineers, Lexington, Kentucky. Submitted to U. S. Army Corps of Engineers, Sacramento District, Contract No. DACA05-91-C-0130, for Air Force Flight Test Center, Base Historic Preservation Office, Edwards Air Force Base, California. On file at the Base Historic Preservation Office, Edwards Air Force Base, California.

Zellar, Bob (Mojave Desert Air Quality Management District), 1999, Personal communication with Elsie Buttane (Computer Sciences Corporation) regarding threshold emission levels, 9 June.

## 8.0 LIST OF ABBREVIATIONS AND ACRONYMS

The following acronyms appear in the text of the Environmental Assessment:

AB	Assembly Bill
ACM	asbestos-containing material
AEA	Atomic Energy Act
AF	Air Force
AFB	Air Force Base
AFFTC	Air Force Flight Test Center
AFFTCI	Air Force Flight Test Center Instruction
AFI	Air Force Instruction
AFJMAN	Air Force Joint Manual
AFMAN	Air Force Manual
AFMC	Air Force Materiel Command
AFOSH	Air Force Occupational Safety and Health
AFPD	Air Force Policy Directive
AFRL	Air Force Research Laboratory
AICUZ	Air Installation Compatible Use Zone
ANSI	American National Standards Institute
AOC	areas of concern
APZ	accident potential zone
AST	aboveground storage tank
ATC	Authority to Construct
AVAPCD	Antelope Valley Air Pollution Control District
AVEK	Antelope Valley East Kern
BACT	Best Available Control Technology
BCE	Base Civil Engineer
BHPO	Base Historic Preservation Officer
BLM	Bureau of Land Management
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
Cal-OSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CCR	California Code of Regulations
CDED	California Department of Employment Development
CDFG	California Department of Fish and Game
CDW	construction/demolition waste
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CSC	California Species of Concern
CSF	Conforming Storage Facility

CWA	Clean Water Act
CWRCB	California Water Resources Control Board
dB	decibel
DNL	day-night average sound level
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DOE	Department of Energy
DRMO	Defense Reutilization Marketing Office
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIR	Economic Impact Region
EIS	Environmental Impact Statement
EMCS	energy management control system
EMR	electromagnetic radiation
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
HAP	hazardous air pollutants
HMC	Hazardous Materials Cell
HMMP	Hazardous Materials Management Plant
HMP	Hazardous Materials Pharmacy
HWMP	Hazardous Waste Management Plan
IEEE	Institute of Electrical and Electronics Engineers
INRMP	Integrated Natural Resources Management Plan
IPT	Integrated Process Team
IRP	Installation Restoration Program
JPL	Jet Propulsion Laboratory
KCAPCD	Kern County Air Pollution Control District
kV	kilovolt
kWh	kilowatt hour
LAN	Local Area Network
L <sub>dn</sub>	day/night equivalent noise level
LMR	Land Mobile Radio
MBTA	Migratory Bird Treaty Act
MDAQMD	Mojave Desert Air Quality Management District
mgd	million-gallons per day
mph	miles per hour
MSDS	Material Safety Data Sheet
MSL	mean sea level
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System

NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO <sub>x</sub>	nitrogen oxides
NRCS	Natural Resource Conservation Service
NSC	National Safety Council
NSR	New Source Review
O <sub>3</sub>	ozone
OHSPC	Oil Hazardous Substance Pollution Contingency
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
OWS	oil/water separator
PM10	particulate matter equal to or less than 10 microns
PCB	polychlorinated biphenyls
PEL	permissible exposure limit
PG&E	Pacific Gas & Electric
PIRA	Precision Impact Range Area
PL	Public Law
ppm	parts per million
PTE	potential to emit
PTO	Permit to Operate
RCRA	Resource Conservation and Recovery Act
RFR	Radio Frequency Radiation
SCADA	supervisory control and data acquisition
SCE	Southern California Edison
SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SEA	Significant Ecological Area
SIP	State Implementation Plan
SOP	standard operating procedure
SO <sub>x</sub>	sulfur oxides
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
TLC	Total Lung Capacity
TRACON	Terminal Radar Approach Control
TS	thermally stabilized
TSCA	Toxic Substances Control Act
TSE	Technical Support Equipment
UBC	Uniform Building Code
UFC	Uniform Fire Code
US	United States
USACOE	United States Army Corps of Engineers
USAF	United States Air Force
USBC	United States Bureau of the Census
USC	United States Code

USDA	United States Department of Agriculture
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
VTDPS	Vermont Department of Public Services
VOC	volatile organic compounds
WWTP	wastewater treatment plant
W/kg	watts per kilogram
µg/l	1 x 10 <sup>-6</sup> grams per liter
µg/m <sup>3</sup>	1 x 10 <sup>-6</sup> grams per cubic meter
µm	1 x 10 <sup>-6</sup> meter

## **9.0 LIST OF PREPARERS**

Metcalf & Eddy prepared this document to fulfill the requirements of the National Environmental Policy Act (NEPA) for the proposed action of constructing a DASR facility at Edwards AFB (High Desert) in California. Other entities that provided information on an as-needed basis included Edwards AFB Environmental Management personnel, including hired contractors, and various technical personnel at URS Corporation. The following persons authored and provided direct oversight for the preparation of this environmental assessment:

### **MANAGEMENT**

Charles Freeman, ESC/GAA. B.S. in Biology; Master of Landscape Architecture; registered Landscape Architect, Commonwealth of Massachusetts. Oasis Systems Inc. As the environmental coordination lead for the DASR program site survey, provided technical review and oversight for preparation of the environmental assessment and acted as liaison among hired contractors.

Shreve-Gibb, Betsy. M.R.P. Urban and Regional Planner. M&E. As Senior Project Manager responsible for all NEPA compliance on National Airspace System (NAS) projects, with extensive experience preparing environmental assessments and permits, provided technical review and oversight for preparation of all sections of the environmental assessment.

### **TASK LEADERS**

Hoffman, Christina. B.S. Plant Science, Chemistry. M&E. As a Senior Environmental Scientist with extensive experience with inland wetlands and preparing technical and scientific sections of environmental permitting documents, focusing on compliance with the NEPA, provided the lead role in data collection and authored portions and reviewed all sections of the environmental assessment.

### **PRIMARY AUTHORS**

Athey, James. B.S. Biology. M&E. As a Senior Environmental Scientist with broad experience in aquatic and terrestrial ecology, GIS and CAD applications, the preparation of technical and scientific documents, and the implementation of environmental protection measures, provided GIS oversight and prepared maps and figures for the environmental assessment and authored portions of the baseline and impact sections.

Petras, James. B.S. Biology. M&E. As a Project Scientist with diverse experience in preparing environmental assessments and impact reports for federal, municipal, and commercial entities, provided review of the environmental assessment.

Rodolakis, Antony M. M.E.Sc. Aquatic and Watershed Science. M&E. As a Project Scientist with specialized experience in ecological risk assessments and technical consulting services for hazardous waste and environmental quality projects, authored portions of the baseline and impacts sections of the environmental assessment.

Scott, Kevin. B.S. Ocean Engineer. M&E. As a Project Scientist with 15 years of experience in preparing environmental impact statements and reports, wastewater treatment plant design, stormwater and combined sewer overflow studies, and surface water quality analysis and modeling, authored portions and provided technical oversight of the baseline and impacts sections of the environmental assessment.

**10.0 LIST OF AGENCIES AND ORGANIZATIONS TO WHOM COPIES OF THE ENVIRONMENTAL ASSESSMENT ARE SENT**

Federal Agencies

AFFTC Technical Library – Building 1400, Edwards AFB, California

Edwards Base Library, 95 SPTG/SVRL, Edwards AFB, California

**APPENDIX A: LISTING OF AGENCIES AND INDIVIDUALS CONTACTED**

## **LISTING OF AGENCIES AND INDIVIDUALS CONTACTED**

Edwards AFB, Keith Dyas  
Edwards AFB, Jocelyn Swain  
Edwards AFB, Sean McCain  
Edwards AFB, Elsie Shepherd  
Edwards AFB, Bill Gries  
Edwards AFB, Rebecca Hobbs  
Edwards AFB, Bill Shelton  
Edwards AFB, Irene Nestor  
Edwards AFB, Dan Rinke  
Edwards AFB, Jim Oswood  
Edwards AFB, Mark Leschinsky  
Edwards AFB, Richard Norwood  
Edwards AFB, Clarence Sander  
Edwards AFB, Lee Saylor  
EarthTech, Joan Seigel

**APPENDIX B: PRELIMINARY SITE SCREENING CRITERIA FOR EDWARDS  
AFB**

## PRELIMINARY SITE SCREENING CRITERIA FOR EDWARDS AFB

### EXCLUSIONARY CRITERIA

These criteria consider the essential environmental, constructional, and operational constraints that could eliminate a site from further consideration as a potential site for the ASR-11 System. These criteria relate to environmental parameters that could lead to unmitigable significant impacts and physical parameters regarding a site's suitability for construction.

Criteria	REJECTED SITES					SELECTED SITES		
	Site 0	Site 3	Site 4	Site 5	Site 6	Site 1	Site 2	Site 7
Impacts occupied existing structures	Yes <sup>1</sup>	No	No	No	No	No	No	No
Within railroad ROW	No	No	No	No	No	No	No	No
Within highway ROW	No	No	No	No	No	No	No	No
Within runways and/or taxiways	No	No	No	No	No	No	No	No
Within power line ROW	No	No	No	No	No	No	No	No
Impacts wilderness areas	No	No	No	No	No	No	No	No
Impacts national natural landmarks	No	No	No	No	No	No	No	No
Site less than 160 by 160 feet	No	No	No	No	No	No	No	No
Lacks coverage of aircraft targets within 1 nmi of the takeoff runway ends	No	No	No	No	No	No	No	No
Lacks coverage of aircraft targets on final approach up to the missed approach point	No	No	No	No	No	No	No	No
Within 1,500 feet of any above ground screening object	No	No	No	No	No	No	No	No
Airport specific exclusions	No	No	Yes <sup>2</sup>	Yes <sup>2</sup>	No	No	No	No

No = Meets Criteria

Yes = Does Not Meet Criteria

- 1 Site 0 is located within the footprint of the existing ASR-8 facility.
- 2 Sites 4 and 5 are located on the airfield of Edwards AFB, between the north ramp and Runway 4/22 and is bounded by Taxiways A and C. The Land Use designations for Sites 4 and 5 are Aircraft Clearance, QD; as a result this location is not suitable for a radar facility. This Land Use designation stems from the tower fly-by line that runs north and parallel to Runway 4/22.

Source: USAF, 2001a

## RESTRICTIVE SCREENING CRITERIA

These criteria could eliminate a site from further consideration due to the extensive mitigation required to offset potentially significant impacts. Many of these criteria originate from Federal law. In these cases, the law has been noted. Additionally, many of the criteria are covered by state and local laws, which were consulted as appropriate.

Criteria	REJECTED SITES					SELECTED SITES		
	Site 0	Site 3	Site 4	Site 5	Site 6	Site 1	Site 2	Site 7
Ecological or wildlife refuges	5	5	5	5	5	5	5	5
Wild and scenic rivers	5	5	5	5	5	5	5	5
Prime and unique farmland	5	5	5	5	5	5	5	5
Parks and recreation areas	5	5	5	5	5	5	5	5
Historical, archeological, and cultural sensitive sites	N/A	N/A	N/A	N/A	N/A	3 <sup>1</sup>	3 <sup>1</sup>	5
Wetlands	5	5	5	5	5	5	5	5
Endangered and threatened species habitat	N/A	N/A	N/A	N/A	N/A	5	5	3 <sup>2</sup>
Non-airfield or non-federal land	5	5	5	5	5	5	5	5
Designated unremediated hazardous waste site	N/A	N/A	N/A	N/A	N/A	3 <sup>3</sup>	3 <sup>3</sup>	3 <sup>3</sup>
Capped landfill	5	5	5	5	5	5	5	5
Scenic highways	5	5	5	5	5	5	5	5
Coastal zones	5	5	5	5	5	5	5	5
Steep terrain	5	5	5	5	5	5	5	5
Floodplain	5	5	5	5	5	5	5	5
Within 2,500 feet of existing electronic facilities or power lines that could interfere with operation	1 <sup>4</sup>	5	5	5	5	1 <sup>4</sup>	1 <sup>4</sup>	3 <sup>4</sup>
Cone of silence impacts coverage of radar/instrument approaches, navigational fixes, airway/route, and special air traffic coverage requirements	5	5	3 <sup>5</sup>	3 <sup>5</sup>	3 <sup>5</sup>	3 <sup>6</sup>	3 <sup>6</sup>	3 <sup>5,6</sup>
Within 2,500 feet of industrial operations that could interrupt or contaminate the site	5	5	5	5	5	5	5	5
Within 0.5 nmi of ends of any operational runways and approach and departure paths	5	5	5	5	5	5	5	5
Violates FAR Part 77 requirements	5	5	5	5	5	5	5	5

5 = No Adverse Impacts/Meets Criteria

3 = Partially Impacted/Marginal

1 = Significantly Impacted/Does Not Meet Criteria

- 1 Base Environmental personnel indicated cultural resources concerns at Sites 1 and 2.
- 2 Site 7 is located within an area studied in 1984 that could possibly support the federal- and state-listed threatened desert tortoise.
- 3 Base EM personnel indicated four closed IRP sites in the area of Sites 1 and 2. Base EM personnel indicated one closed IRP site in the area of Site 7. During field reconnaissance, there was no significant evidence of contamination identified on the surface of these sites.
- 4 Site 0 is located within the footprint of the existing ASR-8 facility. Site 1 is located approximately 780 feet east of the existing ASR-8 facility. Site 2 is located approximately 790 feet west-northwest of the existing ASR-8 facility. Site 7 is located approximately 500 feet north-northwest of the TRACON facility.
- 5 The cone of silence affects the upper altitudes of fix 15 (9L2) for these sites. For Site 4, coverage will not be provided above 19,700 feet MSL for fix 15. For Site 5, coverage will not be provided above 20,900 feet MSL for fix 15. For Site 6, coverage will not be provided above 20,200 feet MSL for fix 15. For Site 7, coverage will not be provided above 18,800 feet MSL for fix 15.
- 6 For Sites 1 and 2, the cone of silence may affect aircraft carrying out missed approach procedures. For Site 7, the cone of silence may affect the approach VOR/DME or TACAN RWY 4, and it may affect aircraft transitioning for EDW Vortac to the left turn for final approach.

Source: USAF, 2001a

## SELECTIVE SCREENING CRITERIA

These criteria provide positive or negative considerations that will form the basis for comparison of candidate sites. Much of the information required is obtained/confirmed during site visits.

Criteria	REJECTED SITES					SELECTED SITES		
	Site 0	Site 3	Site 4	Site 5	Site 6	Site 1	Site 2	Site 7
Visual sensitivity	+	+	+	+	+	+	+	+
Accessibility to roads	+	- <sup>1</sup>	- <sup>1</sup>	- <sup>1</sup>	+	+	+	+
Soils	N/A	N/A	N/A	N/A	N/A	+	+	+
Geology	- <sup>2</sup>							
Proximity to power	+	- <sup>3</sup>	- <sup>3</sup>	- <sup>3</sup>	+	+	+	+
Proximity to telephone lines	+	- <sup>3</sup>	- <sup>3</sup>	- <sup>3</sup>	+	+	+	+
Zoning	+	+	+	+	+	+	+	+
Subsurface rights	+	+	+	+	+	+	+	+
Unique habitat	N/A	N/A	N/A	N/A	N/A	+	+	0 <sup>3</sup>
Utilities	+	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	+	+	+	+
Planned use of site	+	+	+	+	+	+	+	+
Roadways	+	+	+	+	+	+	+	+
Water resources	+	+	+	+	+	+	+	+
Recreational use	+	+	+	+	+	+	+	+
Underground cable routing	0 <sup>5</sup>	- <sup>5</sup>	0 <sup>5</sup>	+				
LOS visibility to air traffic coverage requirements	+ 31 of 55	+ 33 of 55	0 33 of 55	- 33 of 55	+ 34 of 55	+ 31 of 55	0 31 of 55	- 33 of 55
Secondary radar coverage, on the surface, over the entire length of runways	+ <sup>6</sup>	0 <sup>6,7</sup>						

+ = Positive  
 0 = Neutral  
 - = Negative

Source: USAF, 2001a

- 1 Due to the remote nature of Site 3, an access road of approximately 5,000 feet would need to be constructed. Sites 4 and 5 are located on the airfield of Edwards AFB, between the north ramp and Runway 4/22 and are bounded by Taxiways A and C. As a result, these sites would require crossing of either active taxiways or an active runway to access the sites.
- 2 According to the 1994 Uniform Building Code-Seismic Zone Map, all of the candidate sites are located in Seismic Zone 4, which is a very high earthquake hazard area.
- 3 Site 7 is located within an area studied in 1984 that could possibly support the federal- and state-listed threatened desert tortoise.
- 4 Due to the remote nature of Site 3, utility routings will be significant compared to other proposed sites. Sites 4 and 5 are located on the airfield of Edwards AFB, between the north ramp and Runway 4/22 and are bounded by Taxiways A and C. As a result, utility routings would be required to be underground and are of significant length as compared to other proposed sites.
- 5 Due to the remote nature of Site 3, providing the communication link will require a substantial investment. The communication link routes utilized for Sites 0, 1 and 2 assume that the planned extension of the existing base fiber optic network along Jones Road will take place. Additionally, Sites 0, 1, 2, 4, 5 and 6 assume that the planned and existing base fiber optic network will have sufficient fiber to support the proposed ASR-11 facility.
- 6 Only Runway 4/22 was considered in these criteria.
- 7 Several hangars prevent secondary radar coverage of sections of Runway 4/22.

**APPENDIX C: AIR EMISSION CALCULATION SPREADSHEET**

**APPENDIX C**

**MOBILE SOURCES**

<b>Equipment or Vehicle Type</b>	<b>Rate of Emissions</b>	<b>No. of Equip/Veh.</b>	<b>Number of Miles</b>	<b>Number of Days</b>	<b>Number of Hours</b>	<b>NO<sub>x</sub> Emission Factor</b>	<b>VOC Emission Factor</b>	<b>PM10 Emission Factor</b>	<b>Total NO<sub>x</sub> Emissions</b>	<b>Total VOC Emissions</b>
LDGV	lb/mile	5	42,240	120	N/A	0.007	0.021	0.0003	0.1478	0.4435
Track Tractor	lb/hour	1	N/A	75	600	1.26	0.121	0.112	0.3780	0.0363
Wheeled Tractor	lb/hour	1	N/A	25	200	1.269	0.188	0.136	0.1269	0.0188
Bulldozer (tracked)	lb/hour	1	N/A	64	510	24.5	2.9	12.9	6.2475	0.7395
Front-end Loader	lb/hour	1	N/A	25	200	1.89	0.25	0.172	0.1890	0.0250
Motor Grader	lb/hour	1	N/A	75	600	0.713	0.04	0.061	0.2139	0.0120
Wheeled Loader	lb/hour	1	N/A	38	300	1.89	0.25	0.172	0.2835	0.0375
Track Loader	lb/hour	1	N/A	38	300	0.827	0.098	0.058	0.1241	0.0147
HDDT	lb/mile	2	8,400	120	N/A	0.045	0.014	0.006	0.1890	0.0588
Roller	lb/hour	1	N/A	10	80	1.691	0.2	0.139	0.0676	0.0061
Excavator	lb/hour	1	N/A	63	500	1.691	0.152	0.139	0.4228	0.0380
Backhoe Loader	lb/hour	1	N/A	0	100	1.89	0.25	0.172	0.0945	0.0125
Haul/Concrete Truck	lb/hour	1	N/A	25	200	4.166	0.192	0.256	0.4166	0.0192
Misc. Wheeled	lb/hour	1	N/A	18	140	1.691	0.152	0.139	0.1184	0.0106

**TOTAL: 9.0196 1.4725**

**Notes:** The following sources were not on the Edwards AFB emissions table; therefore, by choosing the sources with the highest emission factors, a reasonable and conservative substitute was made as follows: scraper, construction trucks, trencher, concrete paver and crane were substituted with front-end loader, HDDT (2), backhoe loader, concrete truck and miscellaneous wheeled, respectively.

**STATIONARY SOURCES**

<b>Equipment or Vehicle Type</b>	<b>Rate of Emissions</b>	<b>No. of generator</b>	<b>Number of Miles</b>	<b>Number of Days</b>	<b>Number of Hours</b>	<b>NO<sub>x</sub> Emission Factor</b>	<b>VOC Emission Factor</b>	<b>PM10 Emission Factor</b>	<b>Total NO<sub>x</sub> Emissions</b>	<b>Total VOC Emissions</b>
Diesel Emergency Generator	lb/hour	1	N/A	N/A	300	0.017	0.052	0.001	0.0026	0.0078

**TOTAL: 0.0026 0.0078**

**Note:**

LDGV = light-duty gasoline vehicle  
HDDT = heavy-duty diesel truck  
N/A = not applicable

VOC = volatile organic compounds  
PM10 = particulate matter equal to or below 10 microns  
NO<sub>x</sub> = oxides of nitrogen