DOCKET
08-AFC-2
DATE APR 28 2008
RECD. APR 28 2008

Docket 08-AFC-02

Attn: Bill Pfanner, Project Manager
CALIFORNIA ENERGY COMMISSION
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Dear Mr. Pfanner:

We, of Ecosystem Solar Electric Corp. (ESE), in analyzing 08-AFC-02 and taking position as a commenter, would like to present to you and to the Commission's staff just a few comments, as well as our research in adding the Commission's staff, represented by the attached hereto for reference, marked as Appendix_M_R-2508_Complex.doc, which is incorporated herein as a part thereof our comments.

There is no issue as to the mandatory consultation required with the Sustainability Manager, AFFTC/XPT and with the Lead Encroachment Prevention Manager, AFFTC/XPT from Edwards Air Force Base, DoD, which includes the Navy, particularly with Mr. Henry Rigol from EAFB (Cell 661-810-6662) and Mr. Anthony Parisi from the Navy, in regards to JLUS R-2508.
We of ESE fully support our troops, as well as all DoD' missions, which provides security for our country. (ESE' commenter and his staff did perform in the past as a DoD A&E Contractor).

Since virtually all of the proposed Solar-Thermal Electric Facilities are in the Mojave Desert, based upon the DoD Maps for R-2508, which indicates that almost the entire Mojave Desert is under the Military Air Space, e.g., R-2508, the sought consultation shall focus on specifics, such as structures height.

At-issue are structures in height as low as 80 feet AGL, sought by the termed "dark sky" of R-2508, which is somewhat in a "gray" area, particularly thereafter review of the attached hereto Appendix and other issues raised herein by the commenter as to the Points and not limited thereto based upon the Authority.

My name is Nick Panchev, CEO Ecosystem Solar Electric Corp. (ESE). Although, ESE is to file an AFC with the CEC as soon as practical, ongoing surprises with recently filed AFC's, particularly these for the development of Solar-Thermal Electric Power Generating Facilities, specifically in the Mojave Desert, are somewhat postponing ESE' filing.

As our Governor have stated "But, I mean, if we cannot put solar power plants in the Mojave desert, I don't know where the hell we can put it", I suggest that certain "Standard Rules" be implemented by the CEC, being the Lead Agency in the licensing process, which includes solar thermal electric facility.

In review of the attached hereto Appendix, there shall be certain methodology implemented, rather than project-specific, since virtually the entire Mojave Desert is under the R-2508, predominantly in establishing standard and maximum height of structures therein the power block.
Other than the solar field collectors-receivers, all other structures shall be deemed of being within a power block.

ESE have decided to curtail surprises and in preparation of its AFC Volume I &II, will implement the Panchev's design of power block below ground for two facility, SMF-1, near the town of Boron, Kern County and for SMF-2, near the town of Hinkley, Barstow area, San Bernardino County.
Such power block siting was disclosed to Mr. Rigol in past consultation, not limited to (laughingly) that since the radar cannot find the power plant, being below ground and the only structures can be in the radar screen, being the mirror, such will be painted with same paint the Stealth Fighter is painted with, just use the left-over paint for F-117.

As a part thereof these few comments, the need for standardized Rules is sought to be implemented.
In careful analyses of the Appendix, it is not difficult in the Rule makings to have methodology implemented, as to height of structures, siting of power generating facility on privately owned land, other

issues, all in consideration thereof:

(i) the absolute remote possibility that military, either subsonic or supersonic fighter jet can be at altitude (short of crashing) of less than 200 feet AGL over privately owned land, regardless that per R-2508 the FL is at 200 and somewhat sought to be as low as FL80. (Such low altitude could be, per Rules (See Appendix) at the Military Bases, however may not be justifiable outside the boundaries of the Bases, even when taken to consideration the so-termed "Buffer-Zone" or "Zone of Influence", of up to 1,000 feet). (At either subsonic, or supersonic speed, a fighter jet may not raise its ceiling during these 1,000 feet from, say FL80 to FL600, which FL600 is sought to be the minimum ceiling a military jet shall be at a point of exiting the Base's boundary.

(ii) the absolute minimum, whether in training, combat or otherwise in any event, said military jet is permitted to penetrate below the "restricted air space" (R) designation, before causing substantial damage to not only people on the ground, but structures, not limited thereto, (definitely present in the Mojave Desert) Tortoises, Ground Squirrels, Borrowing Owls and a myriad of other species. (There shall also be consultation with at least two agencies, the CDFG and USFWS, ensuring survival to such). (Since these species are in the Mojave Desert and the entire Mojave Desert is under the R-2508, there is no other place for translocation of such, in event either subsonic or supersonic military jets are flying at less then FL200, (at worst, the sought FL80), most likely crushing the fragile shell of the Juvenile Tortoises, causing cardiac arrest to the Ground Squirrels and tearing apart the fragile feather of the Borrowing Owls); and

(iii) the absolute remote possibility, that military personnel training will take place thereupon privately owned land, not limited to during wartimes, including military aircraft overflight at extremely low altitude, (say less than FL600), thus the privately owned land upon which a power plant is to be sited, can be determined by the CEC as not incompatible land uses that result in **significant** impacts to the military mission of Department of Defense installations or to the Joint Service Restricted R-2508 Complex that can not be mitigated and therefore shall not be considered inconsistent with this plan, being of not less than FL600 as well as not subject to any mitigation over said air space, in FAA terms ceiling of not less than 600 ft AGL.

(There is no reason of why the established FAA 7460-1 can not serve the purpose of joint consultation. [Under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, Part 77].

Points and Authority

California Government Code

The California Government Code, referred to as the State Planning and Zoning Law, includes the provisions of Senate Bill (SB) 1462, adopted in 2005, that requires the military to be notified of any land use proposal located within 1,000 feet of a military installation, within special use airspace, or beneath a low level flight path. To aid in the implementation of SB 1462, the California Office of Planning and Research has drafted the R-2508 Joint Land Use Study (JLUS) to address land use issues for the R-2508 military range complex (R-2508 Complex).

Per a September 11, 2007, report from the County Planning Department to the Board of Supervisors (Kern County Planning Department, 2007), specific implementation measures that are expected to be included in the JLUS are maps showing areas of military review requirements for solar facilities and zoning ordinance amendments to establish dark sky requirements.

County Planning staff anticipates that a Military Readiness Element will also be prepared for inclusion in the County General Plan.

Governor Schwarzenegger's Keynote Address at Yale Climate Change Conference
http://gov.ca.gov/speech/9360/

Energy Resources

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 ensure energy support to the national security mission of the Air Force in a manner which emphasizes efficiency of use, effectiveness of costs, and independence from foreign sources for mission essential operations... (AFFTC 1995)".

Energy Resources Use
Edwards AFB uses electricity, solar power (e.g., photovoltaic panels to run traffic lights and heat water), natural gas/propane and other petroleum-based products (gasoline, jet fuel, and diesel) as sources of energy to operate facilities, vehicles, equipment, and aircraft.
Southern California Edison provides electricity to Edwards AFB.
The base uses this energy source to operate a variety of systems including lighting, heating and cooling, computers, and pumps for gas and water.
Pacific Gas and Electric supplies natural gas to Edwards AFB.
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 for hot water and forced air heating systems; to provide light (i.e., skylights); and to operate the emergency phone system on major portions of Rosamond, Lancaster, and Mercury Boulevards". Certain megawatt-hours, to be produced by the ESE' SMF-1 facility, could foster additional "green power", of at least 15 MWe to EAFB, thus can accommodate future expansion of the Base easterly boundary, energized by the SCE.

County of Kern
"Kern County supports all forms of renewable energy if appropriately sited with mitigated that provided protection for existing property owners and Kern County interest". "Kern County is to be the center of solar development in California", as stated by Lorelei H. Oviatt, AICP, Special Projects Division Chief".

Notes to statements: Mr. Nick Panchev applauds these encouraging statements made by Lorelei H. Oviatt and is more than anxious to submit to the Kern County Planning Division the CUP Application for the ESE' SMF-1, Nominal nameplate 150 MWe project, clearly delineating the entire power block of being 36 feet below ground, in a trapezoid pit in size 660 feet by 264 feet, [excavation is a balanced cut and fill spread over the entire solar field, which includes earth berms at the perimeter, fostering screening of the mirrors], which siting not only alleviate visual and noise, but myriad of cumulative impacts. (Such environmentally friendly sitting, definitely in compliance with R-2508, could set precedence for future projects in the Southern California Mojave Desert)).

Commenter in support thereof licensing of Beacon Project, a FPL Facility, by the CEC
Nick Panchev, CEO, Ecosystem Solar Electric Corp. (ESE), hereby supports licensing of the Beacon Solar Project, as (i) a registered Architect, State of California No. C25314, Lead Prototype-Design-Inventor of all ESE' Solar-Thermal Electric with Ionic Fluid HTF Storage Electric Power Generating, Utility Scale Facilities, and as (ii) a Licensed Builder, California GBC License No. 322890, Participating Lead-Co-Developer in all ESE' Solar-Thermal Electric with Ionic Fluid HTF Storage Electric Power Generating, Utility Scale Facilities. (Additional Diversified Experience: Civil, Structural, Mechanical, Plumbing and Electrical Engineering, not limited thereto Surveying, Mapping, Simulations and Geotechnical. An Environmentalist, striving to bring Renewable Energy in the State of California).
Contact Information: Direct Cell No. (909) 263-2868 www.esecorp.org email@esecorp.org

Transmission via electronic mail is consistent with the requirements of California Code of Regulations, Title 20 Sections 1209, 1209.5 /1210.

Mailing List

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R-2508 Complex • Military Training Routes • Military Operations Areas • Rules

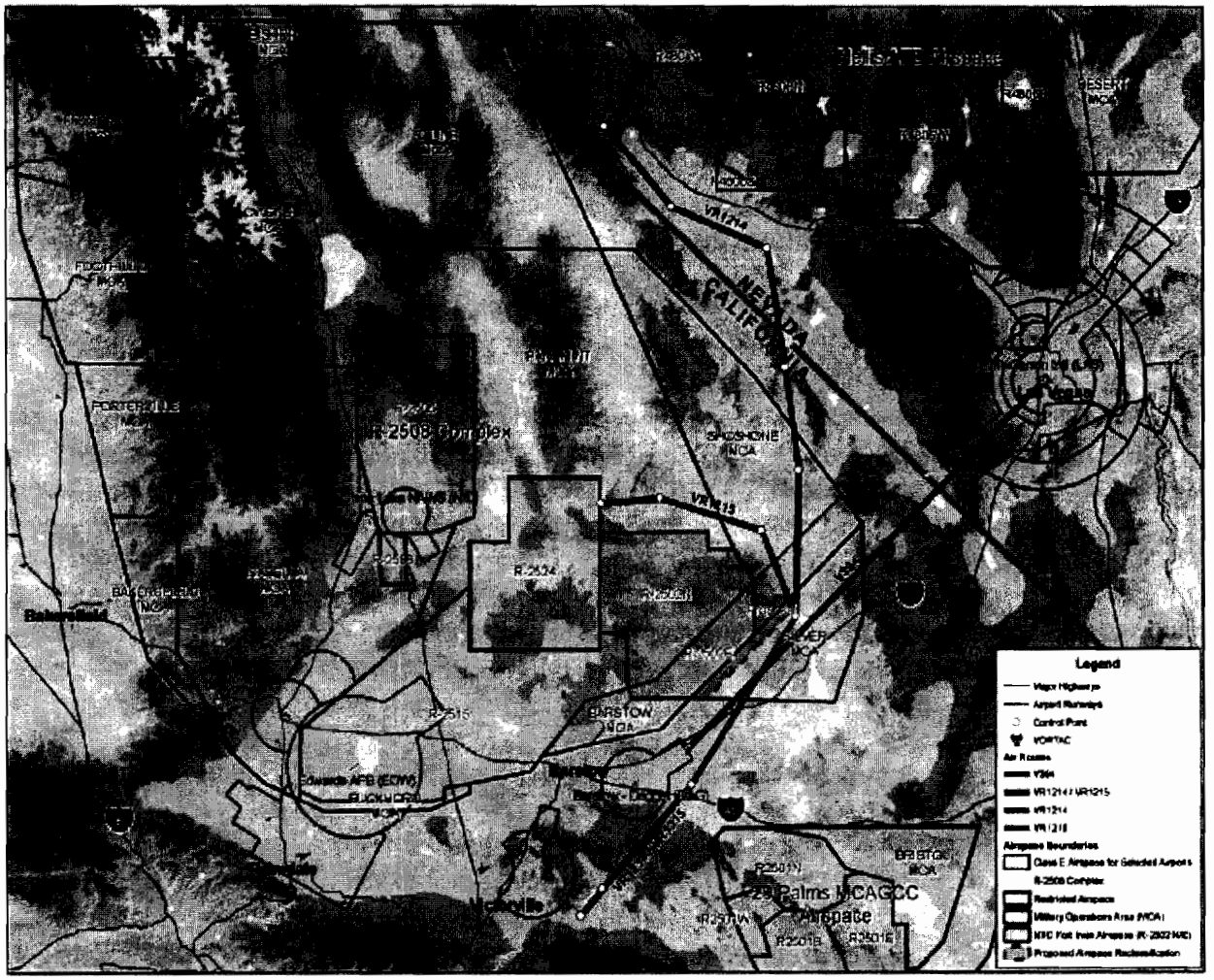


Figure 3.2-1: R-2508 Complex

R-2508 Complex, CA

Boundaries. Beginning at lat. 37°12'00"N., long.
117°20'03"W.; to lat. 35°34'00"N., long.
116°23'03"W.; to lat. 35°28'35"N., long.
116°18'48"W.; to lat. 35°18'45"N., long.
116°18'48"W.; to lat. 35°07'00"N., long.
116°34'03"W.; to lat. 35°07'00"N., long.
116°47'48"W.; to lat. 35°08'50"N., long.
116°48'43"W.; to lat. 35°06'30"N., long.
116°58'43"W.; to lat. 34°53'30"N., long.
117°11'53"W.; to lat. 34°50'20"N., long.
117°32'03"W.; to lat. 34°48'30"N., long.
117°32'03"W.; to lat. 34°48'00"N., long.

117°35'03"W.; to lat. 34°48'00"N., long.
118°01'03"W.; to lat. 34°49'40"N., long.
118°05'48"W.; to lat. 34°51'30"N., long.
118°05'48"W.; to lat. 34°56'00"N., long.
118°21'03"W.; to lat. 35°15'00"N., long.
118°35'03"W.; to lat. 37°12'00"N., long.
118°35'03"W.; to the point of beginning.
Designated altitudes. 20,000 feet MSL to unlimited.
Time of designation. Continuous.
Controlling agency. FAA, Hi-Desert TRACON,
Edwards, CA.
Using agency. U.S. Navy, Naval Air Warfare Center
Weapons Division, China Lake, CA.
AMENDMENTS 7/22/93 58 FR 27652 (Amended)

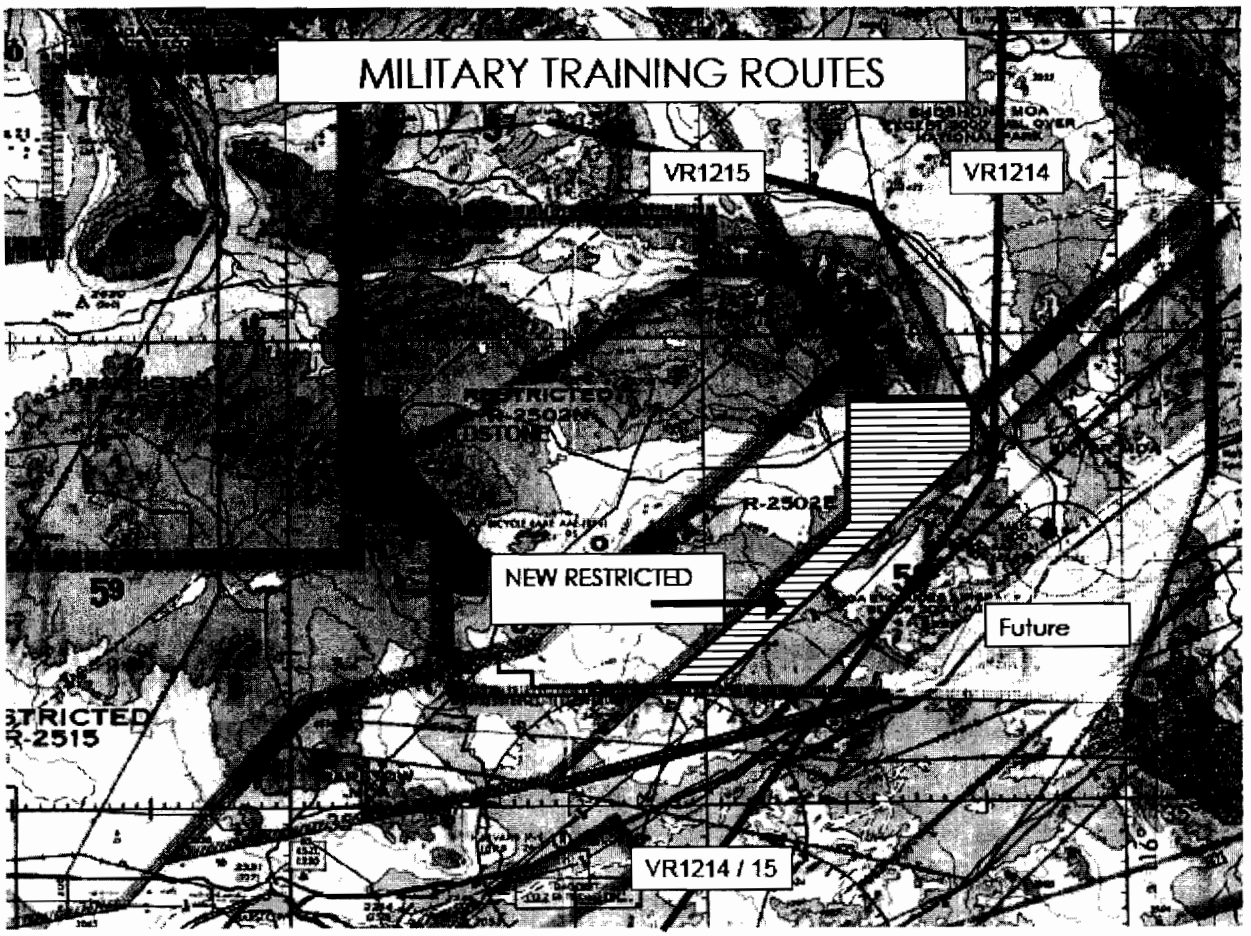


Figure 3.2-2: Military Training Routes

Figure 3.2-3: Military Operations Areas

Special Use Airspace

There are 20,000 square miles of airspace that have been designated as restricted for use by DoD, NASA, and other government agencies.

This airspace is over an area 140 miles north to south (Bishop to Edwards AFB) and 110 miles east to west (Nevada state line to Bakersfield).

Known by its FAA designation as the R-2508 Complex, this airspace is scheduled, monitored, regulated, and controlled to provide safe aircraft test areas.

Aircraft operation characteristics and altitudes are regulated in this airspace to minimize ground-based conflicts, which are primarily due to noise.

The R-2508 complex encompasses large portions of Inyo, Kern, San Bernardino, and Tulare counties in east central California.

It also includes a portion of Fresno and Los Angeles counties in California and extends into Nevada's Esmeralda County (NASA/Dryden Flight Research Center 1999).

The southwestern most part of the R- 2508 Complex lies beneath the Alternative A corridor.

Activities within restricted areas must be confined because of their nature, or due to limitations imposed upon aircraft operations that are not a part of those activities, or both (FAA 2000a).

Restricted areas denote the existence of unusual and often invisible hazards to aircraft (FAA 2000a).

In addition to the southwestern-most part of the R-2508 Complex, other special use airspace within Alternative A includes the restricted areas R-2516, R-2517, and R-2534 A and B over Vandenberg AFB, and R-2513 and R-2504 complex south of Big Sur along the California coast.

Military Operation Areas (MOAs) are airspace of defined vertical and lateral limits that have been established in order to separate certain military activities from IFR traffic (FAA 2000a). The R-2513/R-2504 complex is surrounded by the Hunter Low A, B, C, D, and E MOAs and the Roberts MOA.

Warning areas are airspace that is of defined dimensions, extending from 3 nautical miles outward from the coast of the United States (FAA 2000a).

Warning areas contain activity that may be hazardous to nonparticipating aircraft, and the purpose of warning areas is to warn nonparticipating pilots of the potential danger (FAA 2000a).

Further offshore are Warning Areas W-285A, the southern tip of W-285B, W-532, and W-537.

There are no prohibited or alert special use airspace areas within Alternative A (National Ocean Service 2000).

The R-2508 Complex

The R-2508 Complex is composed of internal restricted areas, Military Operations Areas (MOAs), Air Traffic Control Assigned Airspace (ATCAAs) areas, and other special airspace.

The R-2508 Complex includes all the airspace and associated land presently used and managed by the three principal military activities in the Upper Mojave Desert region:

Air Force Flight Test Center (AFFTC), Edwards Air Force Base (EAFB)
National Training Center, Fort Irwin
Naval Air Weapons Station China Lake (NAWS China Lake)

Use of these areas include bombing ranges, supersonic corridors, low altitude high speed maneuvers, radar intercept areas, and refueling areas.

Military Training Routes

Alternative A contains several IFR and VFR low altitude military training routes and one slow speed, lowaltitude training route (SR-390) (Colored routes/low-level supersonic/terrain following routes are military training routes used primarily by Edwards AFB and are controlled by AFFTC through the High Desert Terminal Radar Approach Control (TRACON).

All routes within the ROI are within the boundaries of the R-2508 Complex, and are governed by the flight restrictions and requirements to "see and avoid" other aircraft when operating under VFR.

All routes are designated as "military assumes responsibility for separation of aircraft" (MARSA) operations, which are established by coordinated scheduling.

Hours of operation are normally daylight hours. Other hours are by Notice to Airmen (NOTAM), except for IR 211 and VRs 1206 and 1265, which have continuous hours of operation (National Imagery and Mapping Agency 2001).

Restricted Areas

Restricted area R-2508 extends from FL200 upward to unlimited and is shared-use airspace.

Individual restricted areas within the R-2508 Complex include R-2502N, R-2502E, R-2505, R-2506, R-2515, and R-2524.

These internal restricted areas have vertical dimensions of surface to unlimited, except for R-2506, which extends from surface to 6,000 feet MSL.

The internal restricted areas are "managed" by individual military agencies, which may release those areas-in their entirety or in part-by establishing an overflight altitude for FAA/Department of Defense joint use.

The released airspace becomes part of the basic R-2508 Complex.

R-2508 Range Complex

The R-2508 complex is the most effectively integrated and probably the most important multiple service Special Use Airspace [SUA] in the National Airspace System [NAS].

Managed by a group representing the complex's three primary user organizations (NAWC-WD China Lake, the Air Force Flight Test Center (AFFTC)/Edwards AFB, and National Training Center (NTC)/Ft. Irwin), it provides the largest single area of overland SUA within the United States.

The complex consists of the overlying Restricted Area R-2508, five underlying restricted areas, and ten MOAs.

There are three tiers of management hierarchy within the R-2508 Complex.

Management of the Complex is the responsibility of the R-2508 Joint Policy and Planning Board (JPPB). JPPB members are the Commanders of the NAWC-WD, China Lake; AFFTC, Edwards AFB; and NTC, Fort Irwin.

The mission of the JPPB is to enhance and preserve the R-2508 Complex bases, ranges, and special use airspace; and to increase DOD capability for research, development, testing, and evaluation of aircraft and weapons systems.

Additionally, the JPPB preserves an area for operational training and readiness of DOD-sponsored activities.

The next tier, the R-2508 Complex Control Board (CCB) is comprised of representatives from each command.

The CCB conducts the R-2508 Complex management function.

The R-2508 Complex Control Board conducts day-to-day management of the R-2508 Complex management function.

Within the policy, scope, and limitations imposed by the CCB, the Central Coordinating Facility (CCF) has autonomous authority pertaining to R-2508 Complex shared use airspace utilization when the Complex is scheduled/ activated for military use.

The R-2508 Central Coordinating Facility, under direction of the Complex Control Board, is the designated scheduling authority for R-2508 Complex shared-use airspace.

Each of the three using organizations manages and schedules restricted airspace and ranges internal to the Complex.

As a result, units planning missions that require more than one area/type of airspace may be required to schedule with both the specific airspace scheduler (at Ft. Irwin, China Lake or Edwards AFB) and the CCF.

The cost of operating and maintaining the Complex is shared between the Navy, Air Force and the FAA.
This cost is predicated on a formula agreed to a number of years ago.

The initial cost was determined by the percentage of air traffic supported within the complex.

The formula is 42% Air Force, 42% Navy and 16% for the FAA.5 Modernization of the complex is funded in a number of ways.

Some modernization efforts are funded by the complex while modernization to remain interoperable with the FAA as they transition to digital technology is funded, at least in part, by the participating services.

Airspace associated with Edwards AFB consists of the R-2508 Complex and the High Altitude Supersonic Corridor [HASC].

The R-2508 Complex is composed of restricted airspace, Military Operations Areas (MOAs), the Black Mountain Supersonic Corridor, and Air Traffic Control Assigned Airspaces (ATCAAs).

The R-2508 Complex encompasses large portions of Inyo, Kern, San Bernardino, and Tulare counties in east-central California.

It also includes a portion of Fresno and Los Angeles counties in California and extends into Nevada's Esmeralda County.

Major communities beneath the R-2508 Complex include Lone Pine (population approximately 1,810), Tehachapi (5,800), Ridgecrest (27,700), Rosamond (7,430), Mojave (3,760), California City (5,960), Boron (2,100), North Edwards (1,259), Lake Isabella (3,323), and Kernville (1,656).

Edwards AFB is within the land area overlain by the R-2508 Complex.

In addition to Edwards AFB, military land use areas beneath the R-2508 Complex include the NAWCPNS and the Army's Fort Irwin National Training Center.

Portions of the Sequoia and Inyo national forests and Death Valley, Sequoia, and Kings Canyon national parks are situated beneath the R-2508 Complex.

State-owned areas include Red Rock Canyon State Park and the Tomo Kahini Project.

Areas of private land are primarily concentrated in the Owens Valley (Big Pine, Independence, and Lone Pine areas) and in the area that extends northwest from the western and northwestern boundary of Edwards AFB to the Porterville area.

This includes Rosamond, Mojave, and Tehachapi, and land south and west of the national forests situated beneath the southwestern part of the R-2508 Complex.

Native American land use areas include the Tule River Indian Reservation and three small Indian reservations at Big Pine, Lone Pine, and Fort Independence.

The majority of the remaining land areas beneath the R-2508 Complex are controlled by the BLM.

The HASC extends from Ventura County, California, in the west, to Clark County, Nevada, in the east.

It passes through portions of Kern, Los Angeles, and San Bernardino counties in California, and overlaps the R-2508 Complex in the vicinity of Edwards AFB.

Land uses within the portion of the HASC west of the R-2508 Complex include portions of the Los Padres and Angeles national forests and an area of primarily private land in the Tehachapi Mountains and Antelope Valley areas.

The eastern portion of the HASC crosses the Mojave National Preserve in California and terminates over the Lake Mead National Recreation Area in Nevada; both are administered by the National Park Service.

The remaining land areas within the eastern portion of the HASC are primarily BLM-owned lands in California and Nevada.

The AFFTC at Edwards AFB is primarily tasked with testing manned and unmanned prototype and experimental aerospace vehicles in support of the Air Force mission.

The R-2508 Complex airspace utilized by the AFFTC and other DOD users was established for the purpose of accomplishing subsonic and supersonic flight test mission operations necessary to evaluate the total integrated systems and subsystems of prototype and experimental aerospace vehicles.

California Desert Protection Act

Passage of the California Desert Protection Act in the late 1980s led to a careful examination of the vulnerability of the R-2508 complex and its constituent installations to restriction or even closure from environmental lawsuits.

DoD has seldom been a defendant in these suits; rather, activist groups sue other agencies such as BLM and NPS and demand relief to include curtailment of DoD activities.

A current effort appears to target DoD over flights in the California Desert area, with the intent of reducing or eliminating overflight of endangered Peninsular Bighorn Sheep.

Local range managers are aware of the issue and are examining the potential operational impacts.

There is little likelihood that DoD would be granted, or even request, significant relief from such lawsuits and regulations.

Nevertheless, they do constitute a potential threat to operational efficiency and eventually to airspace and range access, not only in California but virtually anywhere DoD operates.

Edwards AFB, California

Edwards AFB is situated in Kern, Los Angeles, and San Bernardino counties, approximately 100 miles north of the city of Los Angeles.

The base consists of approximately 301,000 acres of largely undeveloped or semi-improved land that is used predominantly for aircraft test ranges and maintained and unmaintained landing sites (i.e., dry lake beds).

According to the 1994 Base Comprehensive Plan, 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.

It includes North Base, South Base, Main Base, and Family Housing areas.

In the nomenclature of Edwards Air Force Base, North Base is also referred to as Operable Unit 10.

Land uses associated with this area include airfield clearance, airfield pavement, aircraft operations and maintenance, engineering test, industrial, administrative, community commercial, community service, medical, accompanied and unaccompanied housing, outdoor recreation, and buffer zones.

In addition, Air Force Research Lab, situated in the eastern portion of the base, includes a small developed area primarily used for administration, engineering, and testing related to rocket and propellant research, and community commercial uses.

Edwards Air Force Base, on California's Mojave Desert about 100 miles northeast of Los Angeles, has two unique natural resources that help make it the premier flight test facility in all the world; Rogers and Rosamond dry lakebeds.

The main Edwards concrete runway is located next to Rogers Dry Lake and combining this runway's 15,000 foot length with a 9,000 foot lakebed overrun gives pilots with an inflight emergency one of the longest and safest runways anywhere in the world.

Rogers Dry Lake is the largest of the two and has been used since 1977 as the landing site for many space shuttle test and operational flights.

But both lakebeds have been used for emergency and test landings of aircraft for more than 40 years.

And these natural flat surfaces have literally saved hundreds of aircrew lives and aircraft valued at millions of dollars because they offer a broad expanse of hardened clay on which to land aircraft in emergency situations.

Rogers Dry Lake has been declared a National Historic Landmark by the National Park Service, U.S. Department of Interior, because of its role in the development of the nation's space program and in the development of aerospace systems.

Rogers has a surface of about 44 square miles and is the lakebed next to which the main Edwards complex has been developed.

There are seven "drawn on" runways crisscrossing the surface of Rogers, with the longest 17/35 extending 7 1/2 miles.

Rosamond Dry Lake, several miles southwest of Rogers, offers 21 square miles of smooth flat surface which is also used for routine flight test and research operations and for emergency landings.

The lakebeds are among the lowest points in Antelope Valley and collect seasonal rain and snow runoff from surrounding hills and also from the San Gabriel Mountains to the south and the Tehachapi Mountains to the west.

At one time the lakebeds contained water the year around, but changing geological and weather patterns are void of vegetation and contain water only after infrequent rains or snow falls.

The flatness of the lakebeds was revealed following a measurement of the Rosamond lakebed surface which has a curvature of less than 18 inches over a distance of 30,000 feet.

One of the problems associated with the supersonic X-1 research project was the matter of connecting the diminutive rocket plane to the launching bay of its "mother ship."

Even with its bomb bay doors removed, the converted B-29 sat too close to the ground to clear its passenger.

However, a simple solution proved to work very well.

Early in 1946, Muroc Air Force Base engineers constructed a small, cruciform pit near the edge of the flight line which just fit the X-1.

It was then an easy matter to roll the small rocket plane into the pit, tow the B-29 over it, and then hoist it up into the bay.

Once secured by a bomb shackle, the X-1's water-alcohol and LOX tanks were topped off.

BRAC 2005

Secretary of Defense Recommendations: Realign Edwards AFB by relocating base-level LANTIRN intermediate maintenance to Hill AFB, establishing a Centralized Intermediate Repair Facility (CIRF) for Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) pods at Hill.

Assuming no economic recovery, this recommendation could result in a maximum potential reduction of 4 jobs (2 direct jobs and 2 indirect jobs) over the 2006-2011 period in the Bakersfield, CA, Metropolitan Statistical economic area (less than 0.1 percent).

DoD also recommended to realign Eglin AFB, FL, by relocating Air & Space Sensors, Electronic Warfare & Electronics and Information Systems Test & Evaluation to Edwards AFB.

Secretary of Defense Justification: The Air Force distributed Reserve aircraft to Homestead Air Reserve Base (31) to create an optimum sized squadron that supports the homeland defense Air Sovereignty Alert mission.

The remaining Reserve aircraft are distributed to the only other remaining Reserve F-16 squadron at Naval Air Station Joint Reserve Base Fort Worth (58).

This laydown keeps the active/Air National Guard/ Air Force Reserve force structure mix constant.

Creating CIRFs for LANTIRN pods and F110 engines establishes Hill as a maintenance workload center for these commodities.

This recommendation compliments other CIRF recommendations as part of an Air Force effort to standardize stateside and deployed intermediate-level maintenance concepts, and will increase maintenance productivity and support to the warfighter.

The second recommendation would reduce the number of technical facilities engaged in Air & Space Sensors, Electronic Warfare, and Electronics and Information Systems RDAT&E from 6 to 2. Through this consolidation, the Department would increase efficiency of RDAT&E operations resulting, in a multi-functional center of excellence in the rapidly changing technology area of C4ISR.

Environmentally, this recommendation would have the potential to impact air quality at Edwards.

Additional operations at Edwards might impact archeological sites, which might constrain operations.

Additional operations on Edwards might impact threatened and endangered species and/or critical habitats.

Community Concerns: There were no formal expressions from the community.

Commission Findings: The Commission found that the realignment was consistent with the Air Force goals of creating larger more efficient fighter aircraft squadrons and improving intermediate level maintenance processes.

The Commission found that Hill Air Force Base had capacity and conditions for current and future flying missions.

The Commission also found that the Secretary of Defense's overall intent and concept of realigning F-16 aircraft out of Hill Air Force Base was supportable.

The Commission supported the recommendation to establish Hill as a Centralized Intermediate Repair Facility for Low Attitude Navigation and Targeting Infrared for Night pods and for F-110 Engines.

The Commission established an F-16 wing at Homestead Air Reserve Base, Florida and the Naval Air Station Joint Reserve Base Fort Worth, Texas.

This recommendation is consistent with the Commission's Air National Guard and Air Force Reserve Laydown Plan.

Commission Recommendations: The Commission found that the Secretary of Defense deviated substantially from final selection criteria 1, 3, 4 and 5, as well as from the Force Structure Plan.

Therefore, the Commission recommends the following:

Realign Edwards Air Force Base, CA; Mountain Home Air Force Base, ID; and Luke Air Force Base, AZ, by relocating baselevel LANTIRN intermediate maintenance to Hill, establishing a Centralized Intermediate Repair Facility (CIRF) for Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) pods at Hill AFB.

Rules

The safe, orderly, and compatible use of the nation's airspace is made possible through a system of flight rules and regulations, airspace designations, and ATC procedures.

This system safely accommodates the individual and common needs of general, commercial, and military aviation, without imposing unreasonable restrictions on any one group.

Visual Flight Rules

Visual Flight Rules govern the procedures for conducting flight whereby aircraft control is maintained through visual reference with the ground using references such as highways, power lines, railroads, or other visual cues.

Flights under VFR are restricted to altitudes below 18,000 ft Above Mean Sea Level (AMSL) and do not require flight clearances from ATC in uncontrolled airspace, although traffic advisories may be requested.

Pilots flying VFR must exercise "see-and avoid" clearance caution, which means they must be vigilantly aware of their surroundings and must alter their course or altitude, as necessary, to remain clear of other traffic, terrain, populated areas, clouds, etc.

Instrument Flight Rules

Instrument Flight Rules govern the procedures for conducting instrumented flight whereby aircraft control is maintained with reference to aircraft instruments.

Air traffic, including, commercial air carriers, corporate jets, general aviation, and military aircraft, may operate under IFR. To fly under IFR, aircraft must be appropriately equipped.

Pilots must be trained and certified in advanced navigational methods and adhere to ATC clearances containing specific flight routes and altitude directions.

Navigational aid systems, ATC clearances, and ATC radar keep IFR aircraft separated from each other from takeoff to landing.

Airspace Structure

The NAS recognizes two airspace classifications: controlled and uncontrolled airspace.

These classifications allow for safe use of the airspace by multiple users (e.g., general aviation, commercial, and military aircraft). These classifications are described below.

Controlled Airspace

Controlled airspace encompasses airspace (Class A, Class B, Class C, Class D, and Class E) within which the FAA provides ATC services: Class A Airspace Class A airspace originates at 18,000 ft (Flight Level (FL)180) AMSL and extends upward to an altitude of 60,000 ft (FL600) AMSL. Aircraft operating in this airspace must meet the requirements for instrument flight, have an ATC clearance, and operate solely under IFR. Class B, C, and D Airspace.

These three airspace classes surround airports with ATC towers and define the airspace under tower or ATC control. An ATC clearance is required to enter and operate within Class B airspace.

Pilots flying VFR are provided sequencing and separation from other aircraft while operating within Class B airspace.

Aircraft in Class C and D airspace must be in radio communication with the ATC facility that controls the airspace.

Class E Airspace

Generally, if controlled airspace is not Class A, B, C, or D, it is classified as Class E airspace.

Class E airspace has no defined vertical limit, but rather, it extends upward from either the surface, or a designated altitude, to the overlying or adjacent controlled airspace.

Civilian low altitude airways (described later) are Class E airspace areas and, unless otherwise specified, extend upward from 1,200 ft Above Ground Level (AGL) to, but not including, 18,000 ft (FL180) AMSL.

Uncontrolled Airspace

All uncontrolled airspace (airspace that has not been designated as Class A, B, C, D, or E) is designated as Class G airspace.

The area around Fort Irwin contains uncontrolled and special use airspace (see below).

This includes the Panamint and Shoshone MOAs (to the north and northeast of Fort Irwin), the Silver MOA (to the east of Fort Irwin), and the Barstow MOA (to the south and southwest of Fort Irwin).

Special Use Airspace

Special use airspace is airspace of defined dimensions, wherein activities must be confined because of their nature, or limitations are imposed upon aircraft operations that are not a part of those activities.

Except for Controlled Firing Areas (CFA), special use airspace areas are depicted on aeronautical charts.

Prohibited and Restricted Areas are regulatory special use airspace and are established in Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 11, Subpart A, through the rulemaking process.

Warning Areas, MOAs, Alert Areas, and CFAs are non-regulatory special use airspace.

The three types of SUA affecting the NTC are explained below.

Restricted Areas

Restricted Area boundaries are depicted on aeronautical charts and identified by the letter "R," followed by a number for the specific area (i.e., R-2508).

Restricted Areas are established when it is determined necessary to confine or segregate activities considered hazardous to nonparticipating aircraft.

Aircraft flight, while not wholly prohibited, is subject to restriction.

The Restricted Area altitude floor may be established to the surface only when the using agency owns, leases, or by agreement controls the underlying surface.

The airspace over Fort Irwin, with the exception of the eastern land expansion area, is classified as Restricted.

Military Operations Area Military Operations Area boundaries are depicted on aeronautical charts and are identified by geographical names for the specific area (i.e., Shoshone MOA).

A MOA is airspace designated outside of Class A airspace, to separate or segregate certain non hazardous military activities from IFR traffic and to advise VFR traffic where these activities are conducted.

Military Operations Areas may extend below 1,200 ft AGL if a mission requirement exists and there is minimal adverse aeronautical effect.

Provisions must be made to enable aerial access to private and public use land beneath the area, and for terminal VFR and IFR flight operations.

Provisions must also be made to accommodate instrument arrivals/departures at affected airports with minimum delay.

The MOA shall exclude the airspace 1,500 ft AGL and below within a 3-nautical mile radius of airports available for public use.

This exclusion may be increased, if necessary, based on unique circumstances.

Military Operations Areas, in effect, are always joint use.

This means that VFR aircraft are not denied access to MOAs, and IFR aircraft may be routed through the airspace when approved separation can be provided from MOA activity.

Procedures for use of the airspace by nonparticipating IFR traffic shall be set forth in letters of agreement between the controlling and the using agencies.

There are numerous MOAs surrounding Fort Irwin.

Controlled Firing Areas A CFA is airspace designated to contain activities that, if not conducted in a controlled environment, would be hazardous to nonparticipating aircraft.

They provide a means to accommodate, without impact to aviation, certain hazardous activities that can be immediately suspended if a nonparticipating aircraft approaches the area.

There is no requirement for nonparticipating aircraft to avoid the airspace; nor are any communications or ATC separation requirements imposed.

Controlled Firing Areas are not depicted on aeronautical charts, because the user terminates the activities, when required, to prevent endangering nonparticipating aircraft.

Special Activities
Special activities at Fort Irwin involving one or more of the following: 'lights out' operations; UAS; ground control intercept activities; a concentration or continuous flow of aircraft; electronic countermeasures (electronic jamming/chaff corridors; not self-protection); supersonic flight; Airborne Radar Unit communications link; and ground/air live fire and bombing operations.

Low Altitude and Terrain Following Flight Operations

The Military Training Routes (MTR) program is a joint FAA–DoD venture.

Military Training Routes provide airspace (i.e., 200 to 1,500 ft AGL) for high-speed (i.e., above 250 knots), low altitude navigation proficiency training for aircrew or aircraft flight-testing.

The activities may occur during the day or night.

Nonparticipating aircraft are not prohibited from flying within an MTR; however, extreme vigilance must be exercised when flying through or near these routes.

UAS Operations Unmanned Aerial System operations in the R-2508 Complex outside Fort Irwin restricted airspace must comply with specifically outlined proposal submission timelines, safety reviews, scheduling coordination, and post mission evaluation in accordance with the R-2508 Complex User's Handbook.

Those UAS operating outside restricted areas require a Certificate of Authorization from the FAA.

'Lights Out' Operations In modern combat operation, operating aircraft in a 'lights out' mode helps enhance the element of surprise and reduces the chances of detection.

Aircrews are required to advise the controlling agency when commencing and terminating 'lights out' operations.

Aircrews are required to leave aircraft position lights on while transiting to and from the scheduled restricted area (or 'lights out' approved area) and to turn lights off only when authorized within the restricted or approved 'lights out' areas.

The R-2508 Complex was established in 1955 as one of the largest military SUA areas in the United States.

Covering approximately 19,600 square miles, the R- 2508 Complex is located in the western Mojave Desert of Southern California and areas of the Sierra Nevada mountains.

The Complex is a major training range and test facility featuring unique characteristics necessary for the Army, Air Force, Navy, National Aeronautics and Space Agency (NASA), and other Federal and commercial testing entities.

The R-2508 Complex allows for safe, large-scale research, development, and operational test activities for aircraft and advanced weapons systems in extreme flight regimes including supersonic flight.

In addition, student training, air combat maneuvering, and proficiency flights are scheduled in the R-2508 Complex each day.

All these potentially hazardous activities remain isolated from civil aviation and the general public.

The Complex includes all the airspace and associated land (excluding the Proposed Action) operated and managed by the Army National Training Center, Fort Irwin; the Naval Air Warfare Center Weapons Division, China Lake Naval Air Station; and the Air Force Flight and Test Center, Edwards Air Force Base.

Restricted area R-2508 is the major restricted area from which the Complex derives its name and includes all the underlying Complex SUA extending from FL200 AMSL upward to unlimited when activated.

Individual restricted areas R-2502N/E, R-2505, R-2506, R-2515, and R-2524 are within the R 2508 Complex boundaries and require prior approval for entry.

They are operated by the individual military agencies and may be released for civilian use or joint DoD exercises.

NTC Specific Military Operations

R-2502N Restricted Area R-2502N is restricted from the surface to unlimited on a continuous basis.

The area extends east to R-2502E and west to the border of R- 2524 and R-2515.

The airspace is primarily used for joint service livefire and for combat support training.

Whenever possible, portions of the R-2502N airspace are released for civilian over flight R-2502E.

Restricted area R-2502E is restricted from the surface to unlimited on a continuous basis.

The area extends west to the border of R 2502N.

The airspace is primarily used for joint service live-fire and for combat support training.

The R-2502E Restricted Area airspace is released at 24,000 ft (FL240) AMSL and above on a continual basis to Los Angeles ARTCC through a formal Letter of Agreement.

The ceiling is raised for military maneuvers for as long as needed by coordination with ARTCC.

This release of airspace allows civilian operations in the Daggett Shelf area at 24,000 ft (FL240) AMSL and above (R-2502N/E Air Traffic Control Aviation operations within the R-2502N/E airspace are coordinated and controlled through the NTC Army Airspace Command and Control Center.

Most of the flight activity in R-2502N and R-2502E is helicopters, the majority of which train at Fort Irwin prior to global deployments; the primary fixed-wing users are Air Force Air Warrior aircraft flown in support of NTC combat training operations; UAS operations are conducted by visiting military and other federal agencies.

Numerous military, contractor, and civilian aircraft, as well as UAS operate within R-2502N/E.

Civil aircraft operations include Mercy Air MEDEVAC support, aerial photography, defense contract support, and Utility Corridor D Flight Checks.

Rotary-wing aircraft include: AH-64, UH-1, H-60, CH-46, CH-47, CH-53, OH-6, OH- 58, and Bell Jet Ranger.

Fixed-wing aircraft include: F-16, F-15, F-117, F-18, A-10, B-1B, B-2, B-52, T-38, C-17, C-130, U-21, C-12, Cessna, and Lear Jet. Unmanned aerial systems include the Shadow, Hunter, Scan Eagle, Global Hawk, Predator, Dragon Eye, I-GNAT, Warrior, Raven, and Wasp.

In the fiscal year ending in September 30, 2005, a total of 76,278 air traffic control events were recorded in R-2502N/E.

Military aircraft operating within the boundaries of R-2502N/E must be in contact with and under the control of one of the following agencies: Army Flight Following Service.

The Army Flight Following Service, call sign "Desert Radio" is the primary NTC flight following agency.

Desert Radio is responsible for the airspace management and procedural control of aircraft operating within the R-2502N/E airspace.

This includes: Monitoring the status of flight routes, restricted operating zones, ranges, and other information pertinent to safe operations. Initiating overdue aircraft procedures, search and rescue operations, and emergency response agency operations.

Disseminating airspace management information to include Airspace Control Orders and Notices to Airman (NOTAM). Desert Radio is operational 24 hours a day, 365 days a year.

During training exercises, procedural control and airspace coordination above the 3,000 ft coordinating altitude is released to Sundance Control.

Desert Radio maintains procedural control below the coordinating altitude.

Sundance Advisory Service.

The Air Force, Air Warrior Sundance Advisory Service, call sign "Sundance Control" provides flight advisory service and is responsible for airspace coordination and procedural control of aircraft operating above the 3,000 ft coordinating altitude.

Sundance Control is located in the Army Airspace Command and Control Center and is operational during training exercises and when required by Air Warrior missions.

Live Fire Control. Live Fire Control provides procedural control of all aircraft operations in live-fire airspace.

The boundaries of live-fire airspace are disseminated by special airspace control orders. provides positive control of aircraft operating within the aviation forward operating base.

Operational procedures are specified by letter of agreement with the NTC Office of Aviation Operations.

Operating hours and frequencies are disseminated in an airspace control order.

Silver MOA The Silver MOA is located to the east of R-2502E.

It is scheduled through Nellis AFB.

It extends upward from 200 ft AGL to 7,000 ft AMSL and is used to support the NTC mission and provide Air Force pilots training in close air support.

Pilots use the Silver MOA to hold until called into the NTC battle area.

Times of use are intermittent by NOTAM. Airspace below 3,000 ft AGL within a 3- nautical mile radius of the Baker airport is excluded from the MOA (DOT 2001b).

Non-NTC Specific Military Operations

Military Training Routes The two main MTRs that may be impacted by the Proposed Action are VR1214 and VR1215 provides information on these two MTRs. VR1214 and VR1215 VR1214 and VR1215 are terrain following, low-altitude routes that pass east of the NTC.

They are scheduled through the Resource Operations Center at Edwards AFB, California.

These two routes follow identical paths southeast of the NTC and then diverge further north.

VR1214 continues away from NTC north towards Nevada.

VR1215 continues to the northwest and is used for access into R-2524 approximately twice a year, between sunrise and sunset.

Table 3.2-2: Military Training Routes

Primary User/Scheduling Organization	AFFTC/ Edwards AFB CA	AFFTC/ Edwards AFB CA
Hours of Operation	Continuous	Sunrise to Sunset, daily
Average number of sorties/yr.	103	4
Altitudes	100' to 1,500' AGL	100' to 1,500' AGL
Route Widths (a)	±5 NM	±5 NM
Typical user aircraft	B-1/B-2 F-16/F-18	N/A
Typical missions	Terrain following; low altitude flight to the NTTR	Terrain following; low altitude flight to the NAWC-WD

Airways

An airway is Class E airspace established to form a transportation corridor, the centerline of which is defined by radio navigation aids.

Low altitude airways include the airspace within parallel boundary lines approximately four nautical miles each side of the centerline.

High altitude jet routes have no width limits; however, alignments are planned using protected airspace specified for VHF Omni-directional Range (VOR) airways, to prevent overlapping special use airspace or the airspace protected for other jet routes.

Low altitude airways are designed to handle mainly general aviation; high altitude airways are designed to handle mainly commercial jet aviation.

Low Altitude Airway

Unless otherwise specified, low altitude airways include airspace extending upward from 1,200 ft AGL to, but not including 18,000 ft (FL180) AMSL.

Low altitude airway V394 extends from the Daggett VORTAC to the Las Vegas VORTAC 6 nautical miles to the southeast of, and parallel to, the southeast boundaries of R-2502E and the Shoshone MOA on heading of 31°/211°

Airway V394 accommodates primarily air traffic arriving into the Los Angeles basin.

High Altitude Airways

High altitude airways extend from 18,000 ft (FL180) AMSL up to 45,000 ft (FL450) AMSL.

Contiguous airways J9/J100/J146 (Figure 3.2-5) extend from the Daggett VORTAC to the Las Vegas VORTAC on headings of 31°/211°.

These airways parallel the southeast boundaries of R-2502E and Shoshone MOA 6 nautical miles to the southeast of R-2502E.

High altitude airways J9/J100/J146 primarily accommodate air traffic departing the Los Angeles basin.

High altitude airways J60/J64/J107 primarily accommodate air traffic arriving into the Los Angeles basin.

Daggett Shelf

The Daggett Shelf consists of Barstow East Air Traffic Control Assigned Airspace (ATCAA), R 2502E, and the portion of R-2508 that overlies R-2502E at 24,000 ft (FL240) AMSL and above (Figure 3.2-6). The Daggett Shelf was established by a Letter of Agreement to provide FAA relief for control of IFR traffic through the busy Daggett/Hector corridor. The Daggett Shelf, along with Shoshone South ATCAA airspace, remains under ARTCC control until High Desert Terminal Radar Approach Control (TRACON) requests and receives control of the airspace for military use. By Letter of Procedure, ARTCC must return use of the Daggett Shelf airspace back to the military within 15 minutes upon TRACON request. 3.2.5 Non-Military, General Aviation Operations General aviation jet operations (typically corporate/private jets and/or jet charter service) tend to use similar airspace as commercial jets under IFR at altitudes above 18,000 ft (FL180) AMSL. General aviation piston-driven aircraft typically operate under VFR or IFR at altitudes below 10,000 ft AMSL. General aviation piston-driven aircraft may operate near the NTC restricted airspace between the Los Angeles and Las Vegas areas.

Regulatory Setting

Noise levels generated by Army installations are regulated by AR 200-1 which implements federal laws concerning environmental noise for DA activities (DA 1997a). These laws include the Noise Control Act of 1972, the Quiet Communities Act of 1978, and Federal regulations, such as EPA Procedures for Reporting Proposed Pollution Abatement Projects for Federal Facilities. Army Regulation 200-1 identifies three noise zones for determining land use compatibility with Army noise environs: Zone I (compatible), Zone II (normally incompatible), and Zone III (incompatible). Table 3.5-1 provides details of the three noise zones.

Table 3.5-1: Army Land Use Noise Compatibility Guidelines

Noise Zone	Population Annoyed	Population Highly-Annoyed	Transportation Sources, ADNL*	Impulsive Artillery, CDNL**	Small Fire Arms, Peak SPL***
I - Compatible	< 15%	< 1%	< 65 dBA	< 62 dBC	< 87 dBP
II - Normally Incompatible	15% to 39%	1- 13%	65 to 75 dBA	62 to 70 dBC	87 to 104 dBP
III - Incompatible	> 39%	> 13%	> 75 dBA	> 70 dBC	> 104 dBP

* *A-weighted day-night level (ADNL) closely resembles the frequency response of human hearing (helicopters, vehicles).*

** *C-weighted day-night level (CDNL) measures the low-frequency component of noise (i.e., noise responsible for causing windows and buildings to shake, e.g., some forms of artillery firing and supersonic over flights).*

*** *Un-weighted peak sound pressure level (dBP).*

Source: DA 1997a; DA 2000

Existing Noise Environment

Military aircraft in the Study Area also contribute to the existing noise environment. They operate routinely within the MOA and established airspace corridors. Fixed wing aircraft that support NTC exercise training (Air Warrior) fly from Nellis AFB near Las Vegas, Nevada. Secondary contributors to the noise environment include commercial and private aircraft that fly outside Fort Irwin's existing boundaries, and vehicular traffic along I-15 and State Highway 127.

Aircraft Noise

Aerial operations at the NTC include helicopters and fixed wing aircraft. In a typical simulated combat situation, approximately 34 helicopters and 25 fixedwing aircraft are flown on a daily basis. Some of these operations occur during the night. Figure 3.5-1 shows 12 Standard Army Aircraft Flight Routes (SAAFR) in use within Fort Irwin (DA 2000). The width of the Noise Zone II contours (> 65 dBA) along these routes varies from 0-600 ft wide. Some of the flight corridors shown in Figure 3.5-1 are very near to the Fort Irwin boundary. However, because of the low number of flight operations on those corridors and their remote location, the impact of a Noise Zone II or III beyond Fort Irwin boundaries for these operations will be minimal. The NTC also bases some of its flight operations out of Barstow-Daggett Airport (BDA), which is a municipal airport 40 miles south of Fort Irwin. The noise contours for the aircraft operations that utilize BDA are shown in Figure 3.5-2. The Noise Zone II contour is 500 ft wide consistently from Fort Irwin to BDA and does not impact noise sensitive land uses. No significant noise impacts are expected from aircraft that use BDA outside of Fort Irwin since aircraft are required to maintain higher altitudes outside NTC airspace. Table 3.5-3 lists close proximity noise levels for helicopters commonly used at Fort Irwin. It should be noted that the noise levels the general public would be exposed to are significantly less since they are not in close proximity to military helicopter operations. Table 3.5- 4 provides a baseline of common sounds as compared to helicopter noise levels. 4.0 Environmental Consequences 4.1 Introduction This section describes the potential environmental impacts associated with the proposed reclassification of airspace to restricted status over the eastern land expansion area. Consultation and coordination has been conducted with adjoining civil and military airspace users to assess potential impacts of the Proposed Action. Species lists were obtained from USFWS and CDFG to ensure adequate conservation of species that may possibly be impacted. Mitigation measures will be discussed in each section as appropriate. 4.2 Airspace This section describes the Proposed Action and the No Action Alternative impacts on existing airspace. The proposed

airspace changes outlined in this section meet the requirements of FAA Order 7400.2, Procedures for Handling Airspace Matters, and are for explanation and environmental analysis purposes only. The FAA must approve all airspace changes. This EA will be submitted to the FAA as part of the SUA proposal for airspace changes, in accordance with FAA Order 7400.2, Part 5, Chapter 21 (FAA 2006). Additional information may be found in the SFEIS and the Environmental Assessment for Changing the Silver Military Operations Area for Nellis Air Force Base, Nevada dated March 2005. Impacts to airspace could be considered significant if any of the following occurred: New restricted airspace eliminates current commercial flights. New restricted airspace eliminates private planes from reaching authorized destinations. 4.2.1 Aircraft Helicopter and UAS aircraft are operated at Fort Irwin by the assigned tenant units and the visiting rotational units. Table 4.2-1 lists the helicopter and UAS aircraft predominately operated at Fort Irwin. Rotational units often bring aircraft types that are not assigned to Fort Irwin. Typically the smaller Observation Helicopter (OH) aircraft fly more missions and flight hours than the larger Attack Helicopter (AH), Utility Helicopter (UH), and Cargo Helicopter (CH) aircraft. As a future cost reduction measure, the Light Utility Helicopter (LUH) is a commercial off-the-shelf aircraft that will eventually replace all Fort Irwin tenant aircraft. Military Training Routes VR1214 and VR1215 are terrain-following, low-altitude routes that pass east of the NTC (Figure 3.2-2). They are scheduled through the Resource Operations Center at Edwards AFB, California. These two routes follow identical paths southeast of the NTC and then diverge further north. VR1214 continues away from NTC north towards Nevada. VR1215 continues to the northwest and is used for access into R-2524 approximately twice a year, between sunrise and sunset. The VR1215 centerline would enter a small corner of the proposed restricted area. The route width throughout is 5 nautical miles either side of centerline. An aircraft flying on the extreme limits of the route to the left of centerline would enter an even greater portion of the proposed restricted area. To alleviate this conflict, special instructions have been coordinated with the MTR proponent and will be published in the DoD Flight Planning Publications. As indicated in the Edwards AFB 12 July 2006 memo (Appendix A), the NTC airspace reclassification will have no adverse impact on VR1214 and VR1215 operations. Shoshone MOA Under the Proposed Action Alternative, the part of the Shoshone MOA that overlies the eastern land expansion area would be converted to restricted status with NTC designated as the using agency. The R-2508 Complex Control Board (CCB) is responsible for scheduling military operations within the Shoshone MOA and this reclassification action has been coordinated with the CCB airspace managers. As indicated in the R-2508 CCB 20 July 2006 memo (Appendix A), Maximum Airspace Release Under maximum airspace release, there would be no impact to air traffic along the civilian airways in the Daggett-Las Vegas and Hector Boulder City Corridors, since the proposal is below Class A airspace and the boundary does not extend beyond 4 nautical miles of the centerline of airways V394 and J9/J100/J146 connecting the Daggett VOR and the Las Vegas VORTAC. Commercial air traffic often flies point-to-point over R-2502 N/E and surrounding airspace when R-2502 airspace is not needed for military maneuvers and is released above 16,000 or 24,000 ft (FL240) AMSL. Under maximum airspace release, this practice would continue essentially unchanged (See Table 4.2-2). 4.2.3.4 Potential Impacts to General Aviation Operations Since the Proposed Action vertical limits will be surface to 17,999 ft, commercial traffic within Class A airspace (18,000 ft and above) will be unaffected. General aviation jet operations tend to use similar airspace as commercial jets and therefore would be similarly impacted by the Proposed Action. General aviation, piston-driven aircraft typically operate under VFR at altitudes below 10,000 ft AMSL. They fly between the Los Angeles and Las Vegas areas and use the airspace near the Proposed Action. If the Proposed Action were approved and implemented, that portion of the Shoshone and Silver MOAs converted to restricted airspace would exclude general aviation aircraft. This would cause a slight narrowing of the available general aviation corridor below 18,000 ft (FL180) AMSL and

could increase the potential for airspace interactions between aircraft. General aviation, piston driven aircraft also tend to fly VFR, following highways, railways, power lines, and other visual cues. Aircraft that currently fly along Utility Corridor D—using it as a visual cue—would be impacted by the Proposed Action, because portions of the power lines would be within new restricted airspace. 4.4 Biological Resources The alternatives presented in this EA would have minimal ground impacts. Helicopters would be used during training activities in the airspace overlying the eastern land expansion area. Helicopters may land anywhere in this area, except in designated off-limit areas. Helicopters usually land on relatively flat areas or designated landing areas, and not on steep slopes or rocky terrain. Potential direct impacts from helicopter landings in the eastern land expansion area include crushing of vegetation and soil compaction. Helicopters normally fly 200 ft AGL. Although considered negligible, direct impacts from in-flight maneuvers could include collisions with birds. Indirect impacts to vegetation and wildlife include the effects of dust and noise generated by helicopters. Dust may impact vegetation, while noise may impact behavior of wildlife, including flushing wildlife from the immediate area. Helicopter flights and landings in the training area are not numerous or frequent and are not expected to result in significant impacts. Biological impacts resulting from ground maneuver training were analyzed in the SFEIS. 4.6.2 Mitigation The Commanding General of NTC is a member of the Joint Policy and Procedures Board (JPPB) managing the R-2508 Complex consisting of Army, Navy, and Air Force military airspace. The JPPB manages scheduling procedures, safety concerns, and overflight sensitivities with other federal agencies and the public. Established zones of operation, mandatory safety briefs, and comprehensive airspace command and control measures increase situational awareness and reduce the risk of mishaps. The restricted airspace isolates potentially dangerous military activities, guarantees the exclusion of civilian aircraft from military operations, and provides a greater measure of safety for the general public. Management of the restricted airspace is coordinated with the surrounding military airspace proponents and the FAA on a real time basis.

Acronyms and Abbreviations
AAQS Ambient Air Quality Standards
AC Alternating Current
ADNL A-Weighted Day-Night Average Sound Level
AFB Air Force Base
AGL Above Ground Level
AMSL Above Mean Sea Level
AR Army Regulation
ARTCC Air Route Traffic Control Center
ARU Airborne Radar Unit
ATC Air Traffic Control
ATCAA Air Traffic Control Assigned Airspace
BA Biological Assessment
BDA Barstow-Daggett Airport
BLUEFOR Blue Force
CA California
CAAQS California Ambient Air Quality Standards
CARB California Air Resources Board
CCB Complex Control Board
CCF Central Coordinating Facility
CDCA California Desert Conservation Area
CDNL C-Weighted Day-Night Average Sound Level Pressure
CEQ Council on Environmental Quality

CFA Controlled Firing Area
CFR Code of Federal Regulations
CNEL Community Noise Equivalent Level
CO Carbon Monoxide
DA Department of the Army
dB Decibel
dBA Decibel A-Weighted
dBC Decibel C-Weighted
dBP Peak Decibels
DC Direct Current
DNL Day-Night Average Sound Pressure Level
DoD Department of Defense
DT Desert Tortoise
EA Environmental Assessment
EAFB Edwards Air Force Base
EIS Environmental Impact Statement
EO Executive Order
ESA Endangered Species Act
FAA Federal Aviation Administration
FL Flight Level
FONSI Finding of No Significant Impact
IED Improvised Explosive Device
IFR Instrument Flight Rules
IPA Intermountain Power Agency
KRGT Kern River Gas Transmission Company
LADWP Los Angeles Department of Water and Power
Leq Equivalent-Continuous Sound Pressure Level
Lmax Maximum Noise Level
Lpk Peak Noise Level
MBTA Migratory Bird Treaty Act
MDAQMD Mojave Desert Air Quality Management District
MOA Military Operations Area
MPH Miles Per Hour
MTR Military Training Route
MW Megawatt
NAAQS National Ambient Air Quality Standards
NAS National Airspace System
NASA National Aeronautics and Space Administration
NEPA National Environmental Policy Act
NM Nautical Miles
NO2 Nitrogen Dioxide
NOA Notice of Availability
NOTAM Notice to Airman
NOx Oxides of Nitrogen
NTC National Training Center
OPFOR Opposing Force
PM-10 Particulate Matter (less than 10 microns in diameter)
PPM Parts Per Million
R Restricted
ROE Rules of Engagement

ROW Right-of-Way
RSOI Reception, Staging, Onward Movement and Integration
SAAFR Standard Army Aircraft Flight Routes
SFEIS Supplemental Final Environmental Impact Statement for Proposed Addition of Maneuver Training Land at Fort Irwin, CA
SH State Highway
SO2 Sulfur Dioxide
SOP Standard Operating Procedures
SPL Sound Pressure Level
UAS Unmanned Aerial Systems
US United States
USN United States Navy
VFR Visual Flight Rules
VOR VHF Omnidirectional Range
VR Visual Route
μg/m3 Micrograms Per Cubic Meter
°F Degrees Fahrenheit

Energy Resources

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 ensure energy support to the national security mission of the Air Force in a manner which emphasizes efficiency of use, effectiveness of costs, and independence from foreign sources for mission essential operations... (AFFTC 1995).

Edwards AFB uses electricity, solar power (e.g., photovoltaic panels to run traffic lights and heat water), natural gas/propane and other petroleum-based products (gasoline, jet fuel, and diesel) as sources of energy to operate facilities, vehicles, equipment, and aircraft.

Southern California Edison provides electricity to Edwards AFB.

The base uses this energy source to operate a variety of systems including lighting, heating and cooling, computers, and pumps for gas and water.

Pacific Gas and Electric supplies natural gas to Edwards AFB.

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 for hot water and forced air heating systems; to provide light (i.e., skylights); and to operate the emergency phone system on major portions of Rosamond, Lancaster, and Mercury Boulevards.

Edwards AFB is responsible for approximately 13.4 miles of petroleum pipeline used to transport JP-8 jet fuel to various locations throughout the Base.

The supply pipeline for the base is the CalNev Pipeline.

Edwards AFB receives JP-8 fuel from a spur line from the George AFB terminal.

Water Distribution System

The AFFTC purchases potable water from the Antelope Valley East Kern (AVEK) Water Agency.

This water is distributed through a system located in Boron, California.

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.

Five storage tanks, three at the Main Family Housing area and two at North Base, provide a potable water storage capacity of 4.3 million gallons.

Additional storage tanks dedicated to fire suppression are located throughout the base.

The distribution system, although presently adequate, requires continuous repairs and replacement to sustain its capacity (AFFTC 1997a).

Wastewater/Storm Water 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.

The Main Base Waste Water Treatment Plant provides tertiary treatment of wastewater.

The storm water distribution system at Edwards AFB consists of conveyance structures and drainage ditches (unpaved).

Storm water conveyance structures include channels, gutters, drains, and sewers (not tied into the sanitary sewer system) that collect storm water runoff and direct its flow.

The storm water system at Main Base conveys storm water to a pretreatment facility, which consists of an oil water separator and an evaporation pond (AFFTC 1998b).

Storm water from the undeveloped portions of the base flow into the nearest dry lake (AFFTC 1994).

Communication Systems

Communication systems on Edwards AFB include telephone, microwave, and local area networks.

The distribution system for these systems generally consists of copper-pair cable, fiber-optic cable, and a communication manhole/conduit system.

Transportation Systems

Edwards AFB is accessed by way of Rosamond Boulevard from the west or north, and by Lancaster Boulevard/120th 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 of which is in operation 24 hours a day, 7 days a week.

All gates contain two inbound and two outbound lanes (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).

The primary base streets currently carry all rush-hour traffic without significant congestion problems.

The traffic flow at the West Gate is approximately 5,300 vehicles daily or 40 percent of total base traffic volume.

The South Gate has a traffic flow of approximately 4,600 vehicles daily or 34 percent of the total base traffic volume.

The North Gate services approximately 3,500 vehicles daily or 26 percent of the total.

The West Gate provides the best free flow during morning rush-hour traffic, while the South and North Gates allow sufficient flow without exceeding design capacity.

Traffic consists of government, contractor, and privately owned vehicles 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. 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 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 main line does not provide service to Edwards AFB.

The Atchison, Topeka, and Santa Fe 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 1994).

Off-Base Region

Areas within the reentry corridors for Alternatives A and B sustain widespread infrastructure, including traffic circulation systems such as highways and byways, unpaved roads, non maintained roads, railroad lines, and any other system involved in mass transportation. Hundreds of miles of road and railroad traverse the land beneath the Alternative A and B corridors.

Interstate 5, State Highway 101, and State Route 99 are the largest roads within both of these corridors. Amtrak, Union Pacific Railroad Company, and the Burlington Northern & Santa Fe Railway Company are the largest railroad operators within these corridors.

Many regional, local, and switching and terminal lines are also found here, including a railroad.

Within the Alternative A and B corridors are cities, towns, and rural communities of all sizes, throughout which are extensive communication systems; industrial complexes with factories and power plants; energy distribution systems for electricity, natural gas, liquid fuels, and nuclear, solar, hydro, and wind power; water treatment facilities; and waste management facilities. In addition, there are many pipelines for crude oil transportation, operated by All American, Chevron, Four Corners, Exxon/Mobil, Shell, Texaco, Unocal, ARCO, and Pacific Texas.

In addition, Calnev, Shell, and Kinder Morgan operate product transportation pipelines throughout the ROIs (Department of Energy [DOE] 2001).

LAND USE

Land may be used for a variety of purposes including residential, industrial, commercial, agricultural, recreational, and military. Specialized land uses may include radio transmission areas, bombing/missile ranges, wildlife preserves, explosive ordnance ranges, and airfields.

On-Base Region

Edwards AFB is situated in Kern, Los Angeles, and San Bernardino counties, approximately 60 miles northeast of the city of Los Angeles.

The base consists of approximately 300,800 acres of 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 six percent of the total base area, and is concentrated on the west side of Rogers Dry Lake.

Developed areas include Main Base, North Base, South Base, Family Housing areas, and the AFRL.

The Edwards Air Force Base Comprehensive Plan describes long-range development for Edwards AFB, establishing goals, policies, plans, and anticipated action regarding the physical, social, and economic environment (AFFTC 1994).

Land use designations, including total acreage and the percent of the base area, are described in Table 3 8 (AFFTC 1994).

Land Use Designations at Edwards AFB

Land Use Designation	Total Square Miles	Total Acres	Percentage of Total Base Property (%)
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	0.070
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	0.07	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
Total	**470**	**300,800**	**100**

Within these various land use designations, specific areas have been set aside for a particular purpose. These include, but are not limited to, the off-road vehicle areas I and II, the Combat Arms Range, hunting and fishing areas, the Precision Impact Range Area, and the AFRL.

A portion of Edwards AFB is designated for the NASA DFRC, which is a major installation on base, covering 838 acres.

DFRC's existing land-use plan divides its facility into three basic use zones: (1) the flightline, (2) support services, and (3) explosive hazard zones.

The flightline zone is adjacent to Rogers Dry Lake, is restricted to flight research activities, and includes aircraft hangars, test facilities, pavement, and runways.

Support services are behind the flight line zone and include warehouses, project support complexes, and administrative support.

Western Aeronautical Test Range zones include a remote site and a small triangular section of the facility adjacent to Lily Avenue that includes a radio tower.

The remote site includes the facility's water tower and several radio towers.

The two explosive hazard zones overlap the flight line and support services zone.

These two circular zones extend for a minimum distance of 1,200 feet from the shuttle loading area (NASA/Dryden Flight Research Center 1999).

Land Use Restrictions

Air Force land use policies and guidance are only applicable to lands under their control.

Policies established by the Air Force for airfields are similar to the criteria established by the FAA for development of surrounding civilian airports.

Air Force Joint Manual 32-1013, Airfield and Heliport Planning and Design Criteria, sets the minimum requirements for airfields and applicable land uses for surrounding areas.

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.

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 B runways is in the type of aircraft used on the runway.

Class A runways are primarily intended for small, light aircraft. Class B runways are primarily intended for high performance and large, heavy aircraft.

The Main Base Runway (Runway 22) is a Class B runway and is the primary airstrip on base. The runways on North and South Base are class A. In addition, the base has 18 runways painted on 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.

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, located beyond the clear zone, possess a significant potential for accidents.

Each zone has associated land use restrictions and its size is dependent upon a variety of factors defined in Air Force Joint Manual 32-1013, Airfield and Heliport Planning and Design Criteria.

The following land uses are generally compatible with APZ I: industrial, agricultural, recreational, and vacant land.

In addition to compatibility with APZ I land uses, APZ II also includes low-intensity residential and nonresidential uses for a maximum of 20 percent building coverage per acre.

Explosive hazard or quantity-distance zones are associated with test areas and areas for explosives, munitions, and propellant storage.

These zones vary in size depending upon the quantity and type of explosive being used or stored.

Zoning ensures the safety of all personnel within a given area.

Typical areas where these zones exist include the unconventional fuels area, the explosive ordnance disposal area, the gun-butt and munitions storage area, the arm/de-arm areas, the hot cargo area, and the AFRL.

The ROI for the proposed action includes all explosive hazard and quantity distance zones on base, as well as those in the immediate vicinity of Runway 22.

Airfield Operations

Flightline operations are carried out by the 412th Test Wing (412 TW) and the 95th Air Base Wing (95 ABW).

The 412 TW is the direct mission organization of the AFFTC, which is responsible for testing and evaluating manned and unmanned aerospace vehicles, subsystems, and components.

The 95 ABW is the support unit on Edwards AFB responsible for communications; civil engineering; transportation, including loading and unloading armament and supplies; fuel supply; security police; and fire protection.

The 412th Operations Group (412 OG) plans and conducts all flight test activities for the 412 TW.

The 412 OG also advises the 412 TW on air traffic control matters and airfield and airspace management including flight management.

Ridley Mission Control Center is the central safety coordination point for all operations affecting the Precision Impact Range Area.

Visual and Aesthetic Resources

A Scenic Quality Map for Edwards AFB, created by the Bureau of Land Management (BLM) Visual Resource Management Program, divides the base into sub-units and rates them according to the following factors: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification.

Class A areas contain a combination of the most outstanding characteristics of each rating factor.

There are no Class A areas on base.

Class B areas contain a combination of some outstanding features and features fairly common to the physiographic region.

Areas with lakebeds, the more scenic and relatively undisturbed hills and ridges, the denser Joshua Tree woodlands, and Leuhman Ridge on base fall into Class B.

Class C areas contain features 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 and/or extensively disturbed that they lack positive aesthetic attributes, thereby diminishing the visual quality of surrounding areas.

These areas include North Base, JPL, NASA, Main Base, South Base, housing, and the AFRL (AFFTC 1994).

Edwards AFB contains two areas with special ecological concerns: desert tortoise critical habitat, and Significant Ecological Areas (SEAs).

These areas are discussed further in Section 3.9, Natural Resources.

Off-Base Region

Alternative A (Western Approach)

The Alternative A ROI extends from Edwards AFB to the Pacific coast, east to west, and from Monterey to Point Dume, north to south.

The area encompasses approximately 6,494 square miles.

Visual and aesthetic resources in this region fall under several different designations including national forest; national monument; national, state, and county parkland; BLM land; wilderness areas; wild and scenic rivers; national trails; and privately owned land.

Various off base aircraft restrictions apply to inland and offshore visual and aesthetic resources.

Inland Region

The land below the Alternative A corridor includes many visual and aesthetic resources including all of Santa Barbara and San Luis Obispo Counties, most of Monterey County, approximately half of Kern and Ventura Counties, and small portions of Kings and Tulare Counties.

The corridor's boundary also cuts through the uppermost portion of Los Angeles County, although these areas are either mostly National Forest lands or other lands that are relatively unpopulated.

Visual and aesthetic resources beneath the Alternative A corridor include three national forests, one national monument, five national wildlife refuges, BLM land, two military installations, and six wilderness areas.

Located throughout the area below the Alternative A corridor are 19 state parks, 16 state beaches, 3 state reserves, 9 state historic parks, and several county parks.

These areas are generally in or near highly populated regions.

U.S. Forest Service Land, National Wildlife Refuges, National Parks, California State parks, Areas of Special Biological Significance, Ecological Reserves, and Biospheres do not regulate aircraft overflights.

Population Distribution Under the Alternative A Corridor

County (Population)	City (Within ROI)	City Population
Ventura (753,197)	Oxnard	170,358
	Thousand Oaks	117,005
	Simi Valley	111,351
	San Buenaventura	100,916
	Camarillo	57,077
	Moorpark	31,415
	Santa Paula	28,598
	Port Hueneme	21,845
	Fillmore	13,643
	Ojai	7,862
	Mira Monte	7,177
	El Rio	6,193
	Oak View	4,199
	Meiners Oaks	3,750
	Casa Conejo	3,180
	Oak Park	2,320
	Piru	1,196
Kern (661,645)	Bakersfield	247,057
	Delano	38,824
	Oildale	27,885
	Ridgecrest	24,927
	Wasco	21,263
	Rosamond	14,349
	Lamont	13,296
	Arvin	12,956
	Shafter	12,736
	Tehachapi	10,957
	Rosedale	8,445
	California City	8,385
	Taft	6,400
	Mojave	3,836
	Ford City	3,512
	Weldon	2,387
	Frazier Park	2,348
	Wofford Heights	2,276
	Boron	2,025
	Lost Hills	1,938
	Bodfish	1,823
	Kernville	1,736

Kern (Continued)	Buttonwillow	1,266
	North Edwards	1,227
	Inyokern	984
	Onyx	476
	Keene	339
	Randsburg	77
Monterey (401,762)	Salinas	151,060
	Monterey Park	60,051
	Seaside	31,696
	Marina	25,101
	Pacific Grove	15,522
	Greenfield	12,583
	Soledad	11,263
	King City	11,094
	Gonzales	7,525
	Castroville	6,724
	Carmel Valley Village	4,700
	Carmel-by-the-Sea	4,081
	San Ardo	501
	Spreckels	485
	San Lucas	419
	Bradley	120
Santa Barbara (399,347)	Santa Barbara	92,325
	Santa Maria	77,423
	Goleta	55,204
	Lompoc	41,103
	Isla Vista	18,344
	Carpinteria	14,194
	Vandenberg AFB	6,151
	Guadalupe	5,659
	Solvang	5,332
	Santa Ynez	4,584
	Buellton	3,828
	Los Alamos	1,372
	Santa Ynez Reservation	566
Tulare (368, 021)	Visalia-Tulare-Porterville	368,021

San Luis Obispo (246,681)	San Luis Obispo	44,174
	Atascadero	26,411
	Arroyo Grande	15,851
	Grover Beach	13,067
	Nipomo	12,626
	Morro Bay	10,350
	Cambria	6,232
	Pismo Beach	8,551
	Templeton	4,687
	San Miguel	1,427
	Shandon	986
Kings (129,481)	Hanford	41,686
	Lemoore	19,712
	Avenal	14,674
	Corcoran	14,458
	Armona	3,239
	Kettleman City	1,499
	Stratford	1,264

NATURAL RESOURCES

Biological resources are defined as the terrestrial and aquatic ecosystems with the native plants and animals that occur throughout these ecosystems.

This includes plant populations and communities; wildlife populations and their relationship to habitat; and aquatic, wetland, and riparian ecosystems.

Plant and animal species that are proposed for, candidates for, or are listed as, threatened or endangered by the U.S. Fish and Wildlife Service (USFWS), and species having equivalent status at the California state level, are referred to as special-status species and are given special consideration by law for their preservation.

Critical habitat for a threatened or endangered species is defined under the federal Endangered Species Act (ESA) as specific areas within the geographical area occupied by the species at the time it is listed that contain the physical or biological features that are essential to the conservation of the species and may require special management considerations or protection, and specific areas outside the geographic area occupied by the species at the time it is listed that are also essential to the conservation of the species.

The USFWS identifies primary physical and biological constituent elements of an area designated as critical habitat that are essential to the conservation of the species (50 CFR 424.12).

Primary constituent elements may include, but are not limited to, roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetlands or drylands, water quality or quantity, host species or plant pollinators, geological formations, vegetation types, tides, and specific soil types (50 CFR 424.12).

Federal agencies are required by Section 7 of the ESA to assess the effect of any project on federally listed threatened and endangered species.

Under Section 7, consultation with the USFWS is required for federal projects if such actions could directly or indirectly affect listed species or destroy or adversely modify critical habitat; a conference is required if such action could directly or indirectly affect a proposed listed species or proposed critical habitat.

It also is Air Force policy to follow management goals and objectives specified in Integrated Natural Resources Management Plans, and to consider sensitive species, sensitive communities, and habitats recognized by state and local agencies when evaluating impacts of a project.

On-Base Region Plants

Plant Communities

The five major plant communities at Edwards AFB are creosote bush scrub, Joshua tree woodland, halophytic phase saltbrush scrub, xerophytic saltbush scrub, and mesquite woodland Creosote bush scrub is dominated by creosote bush (Larrea divaricata).

At Edwards AFB, there are approximately 103,000 acres of creosote bush scrub, which comprises approximately 34 percent of the area of the base.

Common species found in this community include winterfat (Ceratoides lanata), cheesebush (Hymenoclea salsola), and Nevada tea (Ephedra nevadensis).

Joshua tree woodland is dominated by Joshua trees (Yucca brevifolia).

At Edwards AFB, there are approximately 52,800 acres of Joshua tree woodland, which comprises approximately 17 percent of the area of the base.

Common species found in this community include the native desert dandelion (Malacothrix glabrata), pincushion (Chaenactis sp.), and fiddleneck (Amsinckia tesselata).

Halophytic phase saltbush scrub is dominated by four species of the genus Atriplex: spinescale (A. spinifera), shadscale (A. confertifolia), four-wing saltbush (A. canescens), and quailbush (A. lentiformes).

At Edwards AFB, there are approximately 55,300 acres of halophytic phase saltbush scrub, which comprises approximately 18 percent of the area of the base.

A common species found in this community includes saltgrass (Distichlis spicata). Arid phase saltbush scrub is dominated by allscale (Atriplex polycarpa).

At Edwards AFB, there are approximately 45,300 acres of arid phase saltbush scrub, which comprises approximately 15 percent of the area of the base.

Common species found in this community include burrobush (Ambrosia dumosa), goldenhead (Acamptopappas sphaerocephalus), and cheesebush (Hymenoclea salsola).

Sensitive Plant Species

Studies of sensitive plants on Edwards AFB indicate that no federal or state-listed plant species have been identified on base.

Nine species that are listed by the California Native Plant Society (CNPS), however, have been identified on base.

Four of these plants are Barstow woolly sunflower (Eriophyllum mohavense), desert cymopterus (Cymopterus deserticola), alkali mariposa lily (Calochortus striatus), and yellow spiny cape (Goodmania luteola).

Wildlife

Five eubranchiopod shrimp species have been identified in Rogers Dry Lake: clam shrimp (Eocyzicus digueti), tadpole shrimp (Lepidurus lemmoni), and three species of fairy shrimp (Branchinecta mackini, B. gigas, and B. lindahli) (AFFTC 1992).

Eubranchiopods lie dormant in the soil of dry lakebeds until flooding creates the aquatic habitat necessary to complete their life cycles.

These shrimp are a food source for a variety of migratory shorebirds that congregate at Rogers Dry Lake when water is present.

To date, the only amphibians identified on base include the western toad (Bufo boreas), Pacific tree frog (Hyla regilla), red-spotted toad (Bufo punctatus), and African clawed frog (Xenopus laevis).

These were identified at Piute Ponds by U.S. Geological Survey biologists during a survey in 1997.

The African clawed frog is a problematic introduced species that feeds on native wildlife, including other amphibians, small reptiles, and fish (AFFTC 1997c).

Common reptiles on base include the desert spiny lizard (Sceloporus magister), side-blotched lizard (Uta stansburiana), western whiptail (Cnemidophorus tigris), zebra-tailed lizard (Callisaurus draconoides), glossy snake (Arizona elegans), coachwhip (Masticophis flagellum), gopher snake (Pituophis melanoleucus), and the Mojave green rattlesnake (Crotalus scutulatus).

Common birds include the turkey vulture (Cathartes aura), common raven (Corvus corax), sage sparrow (Amphispiza belli), barn owl (Tyto alba), house finch (Carpodacus mexicanus), and western meadowlark (Sturnella neglecta).

Joshua tree woodlands support cactus wren (Campylorhynchus brunneicapillus) and ladder-backed woodpecker (Picoides scalaris).

Common bird species found in creosote scrub include the horned lark (Eremophila alpestris), black-throated sparrow (Amphispiza bilineata), and sage sparrow.

The seasonal inundation of lakebeds and claypans attracts wading bird species, including the black necked stilt (Himantopus mexicanus), American avocet (Recurvirostra americana), and greater yellowlegs (Tringa melanoleuca). Birds associated with ponds include the yellow-headed blackbird (Xanthocephalus xanthocephalus), black-crowned night heron (Nycticorax nycitorax), and green heron (Butorides striatus).

Horned larks are commonly found in open habitat with sparse vegetation or areas of low shrubs (i.e., open field, agricultural areas, desert habitat, prairies, and grassland communities).

The main runways on base are surrounded by arid phase saltbush scrub.

Combined with open areas along the flightline, this habitat is suitable for horned larks.

The vegetation adjacent to the runways is periodically graded, creating a buffer area devoid of vegetation, which also provides additional foraging habitat for horned larks.

Methods that have been used at Edwards AFB to control the bird airstrike hazard problem with horned larks include revegetation with native plants and the use of a falconer.

The storm water retention pond along the flightline attracts other types of birds (e.g., waterfowl, shorebirds, etc.) and possibly bats that are associated with aquatic habitats. Barn owls (Tyto alba) are known to inhabit buildings on the flightline.

During the evening, owls feed on small rodents adjacent to the runways and in other areas nearby.

Common mammals on Edwards AFB include the black-tailed jackrabbit (Lepus californicus), desert cottontail (Sylvilagus audobonii), and coyote (Canis latrans). Common rodents include the deer mouse (Peromyscus maniculatus), grasshopper mouse (Onychomys torridus), little pocket mouse (Perognathus longimembris), Merriam's kangaroo rat (Dipodymus merriami), and desert woodrat (Neotoma lepida).

Common bats include the western pipistrelle (Pipistrellus hesperus) and little brown bat (Myotis lucifugus).

Sensitive Wildlife Species

The desert tortoise is listed as threatened by the federal government and by the State of California.

It can occur throughout the Colorado and Mojave deserts in elevations up to 4,100 feet, although ideal habitat typically occurs between 1,000 and 3,000 feet (Edwards AFB 2001a).

The desert tortoise can occur in almost every desert habitat, but is most common in desert washes, desert scrub, creosote bush, and Joshua tree habitats.

This species finds cover in burrows that are usually under bushes and requires loose, dry, sandy soil for nest building.

The desert tortoise is a 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.

Desert tortoises are known to live on Edwards AFB and the ROI includes suitable desert tortoise habitat.

Designated Critical Habitat

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.

The proposed project occurs in the airspace above the desert tortoise critical habitat.

However, desert tortoise critical habitat does not occur in the proposed landing areas for the LEV.

Migratory Birds Seasonal migratory birds use both permanent and temporary bodies of water for foraging on shrimp and other food items at Edwards AFB.

These birds include ducks and geese such as the ruddy duck (Oxyura jamaicensis), northern mallard (Anas platyrhynchos), northern pintail (Anas acuta), Canada goose (Branta canadensis), and snow goose (Chen caerulescens). Ducks and geese are hunted in designated areas on base.

Significant Ecological Areas

The County of Los Angeles General Plan establishes 61 SEAs, which represent a wide variety of biological communities within the county.

The SEAs function 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 are not intended to 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).

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.

The best example of shadscale scrub and alkali sink biotic communities in Los Angeles County are in SEA #50.

It also contains Piute Ponds, which are located in the southwestern corner of the base. Piute Ponds support a variety of wildlife, especially birds.

An important aspect of these ponds is that they provide a stopover area for migratory birds.

Off-Base Region

Alternative A (Western Approach)
Plants

A variety of plant communities occur throughout the land beneath the Alternative A corridor.

These habitats may be dominated by trees, shrubs, or herbs, and may also include aquatic and developed habitats.

Numerous sensitive plant species may occur beneath the off-base region of the Alternative A corridor.

Wildlife

Thirty-nine species of marine mammals inhabit the ROI, including year-round residents, occasional visitors and migratory species.

Many of these species are listed as threatened, endangered, or species of concern and are protected under the ESA. All of these species are protected under the Marine Mammal Protection Act of 1972, and some are listed under this act as "depleted" or "strategic," even though they may not be listed under the ESA.

Numerous other sensitive wildlife species occur beneath the off-base region of the Alternative A corridor.

Designated critical habitat for various species exists in the off-base region beneath the Alternative A corridor.

The Pacific Flyway is a region of the Pacific coast that is utilized by thousands of migratory birds every year. This flyway begins in the western Arctic, extends to include the Pacific Coast regions of Canada, the United States and Mexico and continues south, where it combines with other flyways in Central and South America.

The Channel Islands and mainland coast act as a stopover during both north (April through May) and south (September through December) migrations.

The months of June and July are peak months for transient shorebirds.

The Channel Islands and the mainland coast also provide breeding and nesting sites for varying species and large numbers of seabirds, including threatened and endangered species.

Alternative B (Northwestern Approach)

Plants

A variety of plant communities occur throughout the land beneath the Alternative B corridor.

These habitats may be dominated by trees, shrubs, or herbs, and may also include aquatic and developed habitats.

Various sensitive plant species may occur in the area below the Alternative B corridor.

Wildlife

Thirty-nine species of marine mammals inhabit the ROI, including year-round residents, occasional visitors and migratory. Many of these species are listed as threatened, endangered, or species of concern and are protected under the ESA.

All of these species are protected under the Marine Mammal Protection Act, and some are listed under this act as "depleted" or "strategic," even though they may not be listed under the ESA.

Numerous other sensitive wildlife species occur beneath the off-base region of the Alternative B corridor.

Designated critical habitat for various species exists within the land beneath the Alternative B corridor.

The Alternative B corridor also includes portions of the Pacific Flyway migratory bird corridor.

NOISE

Noise Characteristics

In 1972, Congress enacted the Noise Control Act (NCA), Public Law 92-574.

Among the requirements under NCA was a directive to the U.S. EPA to "...publish information on the levels of environmental noise, the attainment and maintenance of which in defined areas under various conditions as requisite to protect the public health and welfare with an adequate margin of safety."

The U.S. EPA published EPA- 550/9-47-004, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, in 1974 (Levels Document).

The characteristics of sound include parameters such as amplitude, frequency, and duration. The decibel (dB), a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit measurement of sound.

Different sounds may have different frequency content.

When measuring sound to determine its effects of the human population, A-weighted sound levels (dBA) represent adjusted sound levels.

The adjustments, created by the American National Standards Institute (1983), are established according to the frequency content of the sound.

Noise is usually defined as sound that is undesirable because it interferes with communication and hearing, is intense enough to damage hearing ability, or is otherwise annoying.

Noise levels often change with time.

Therefore, to compare levels over different time periods, several descriptors were developed to account for the time variances.

These descriptors are used to assess and correlate the various effects of noise on humans, including land use compatibility, sleep and speech interference, annoyance, hearing loss, and startle effects.

A-weighted decibel scale (dBA).

The A-weighted scale significantly reduces the measured pressure level for low frequency sounds while slightly increasing the measured pressure levels for middle frequency sounds. A-weighted sound levels are typically measured between 1,000 to 4,000 hertz (Hz).

• The long-term equivalent A-weighted sound level (Leq).
• Day-night average noise level (DNL). The DNL, often referred to as Ldn, has been adopted by federal agencies as the standard for measuring noise.

The DNL is an Aweighted, 24-hour average of hourly averages.

Each hourly average represents the sound energy of all the disparate sounds that occurred during that hour.

The hourly average would be a continuous, uniform sound whose total sound energy would be equal to the sum of the individual sound energies of all the real sounds occurring during that hour.

Typically, different hours of the day would have different hourly averages.

For this reason, and for standardization, the DNL is defined as the average of the 24 hourly averages of the day.

C-weighted sound level.

C weighting measures sound levels in dB, with no adjustment to the noise level over most of the audible frequency range except for a slight deemphasis of the signal below 100 Hz and above 3,000 Hz. C-weighting is used as a descriptor of low-frequency noise sources, such as blast noise and sonic booms.

• C-weighted day-night level (CDNL) is the C-weighted sound level averaged over a 24- hour period, with a 10-dB penalty added for noise occurring between 10:00 p.m. and 7:00 a.m. CDNL is similar to DNL, except that C-weighting is used rather than A weighting.
• Sound exposure level (SEL) considers both the A-weighted sound level (AL) and duration of noise.

SEL converts the total A-weighted sound energy in a given noise event with a given duration into a 1-second equivalent and, therefore, allows direct comparison between sounds with varying intensities and durations.
• C-weighted sound exposure level (CSEL) is an SEL measurement based on the Cweighted level rather than the A-weighted level.
• Sound pressure level (SPL) is a logarithmic scale, using dB as units, and a reference pressure that corresponds approximately to the minimum audible sound pressure.
• Community noise equivalent level (CNEL) has been adopted by the State of California as the descriptor for measuring noise levels.

The CNEL is similar to the DNL, except that it includes a 5 dB penalty for evening noise (7:00 p.m. to 10:00 p.m.) in addition to the 10 dB "penalty" for nighttime noise.

In the Levels Document, the U.S. EPA reported that the best metrics to describe the effects of environmental noise in a simple, uniform, and appropriate way were:
• The Leq; and
• The DNL or Ldn (a variant of Leq that incorporates a 10-dB "penalty" for nighttime noise).

However, when high-intensity impulsive noise is evaluated to determine its effects on a human population, C weighted sound levels are used so that the low-frequency effects of the noise are considered.

The low-frequency content of impulsive noise contributes to effects such as window rattle that influence people's perception of and reaction to the noise.

Existing Noise Setting

On-Base Region

Major noise sources at DFRC and Edwards AFB are aircraft operations that include rotary wing air traffic, engine testing, sonic booms, and vehicle traffic on streets.

The major sources of motor vehiclerelated noise at Edwards AFB are Lancaster Boulevard, Rosamond Boulevard, and primary and secondary streets on the base.

The major source of motor vehicle-related noise near DFRC is Rosamond Boulevard.

Noise estimates are usually presented as noise contours.

Noise contours are lines on a map of an airfield and its vicinity where the same noise level is predicted to occur.

The 5-dB interval chosen to represent noise contours reflects the Department of Housing and Urban Development (HUD) noise criteria commonly used for airfield noise.

Parts of the on-base recreation areas lie between the 65- and 70- dB contours.

These areas include the Edwards AFB Rod and Gun Club (Combat Arms Range), base golf course, off-highway vehicle area number 1, and some of the picnic areas and athletic fields.

The Main Base residential area is outside the 60-dB contour.

The Main Base has a range of exposure from 65 to 85 dBs; the South Base 70 to 85 dBs.

On-base land under the 80-dB noise contours is primarily open space and test program support areas.

The South Base and a portion of the Main Base are currently within the 80-dB noise level; therefore, small areas of administrative, commercial, and industrial land are subject to these noise levels.

The area around Air Force Research Laboratory is subject to very high levels of noise during rocket engine tests.

Test firings occur during daytime hours for 1 to 3 minutes on an infrequent basis.

Personnel at the test site remain in buildings designed to protect them from high noise levels. Smaller engines are also tested at this location, and noise levels are less than half those produced by the large Titan engines.

Approximately 1,750 people reside within the 80-dB contours of Titan test firings.

Off-Base Region

The off-base region under the corridors for Alternatives A and B consists primarily of open space, but includes major industrial, residential, commercial, and public/recreation centers as well. Runway 22 noise contours for 60-dB and above lie completely within the boundary of Edwards AFB, therefore, ambient noise levels in the off-base regions adjacent to Edwards AFB for Alternatives A and B are anticipated to be below a CNEL of 60-dB under normal conditions.

However, there are areas within the off-base region where noise levels exceed 60-dB due to freeways, major highways, airports, and other noise-generating operations.

Project-Related Noise: Sonic Booms

As an aircraft or missile moves through the air, the air in front is displaced to make room for the vehicle and then returns once the vehicle passes.

This causes what is called a sonic boom.

In subsonic flight, a pressure wave (which travels at the speed of sound) precedes the vehicle and initiates the displacement of air around the vehicle.

When a vehicle's speed reaches the speed of sound, it is said to be traveling at Mach 1.

The pressure wave cannot travel faster than the speed of sound or precede the aircraft, and the parting process is abrupt.

As a result, a shock wave is formed initially at the front of the aircraft when the air is displaced around it and lastly at the rear when a trailing shock wave occurs as the air recompresses to fill the void after passage of the vehicle.

A sonic boom differs from most other sounds because it is impulsive (similar to a double gunshot), there is no warning of its impending occurrence, and the magnitude of the peak levels is usually higher.

Sonic booms are typically measured in dBC or by changes in air pressure, called peak overpressure (pounds per square foot). Factors that affect the nature and extent of sonic boom overpressures include aircraft design and operation, and atmospheric effects.

Pressure waves are generated any time an object exceeds the speed of sound, and thus are generated for all supersonic flights.

However, these pressure waves do not always propagate to the ground where they are perceived as a sonic boom.

For a vehicle flying straight, the maximum sonic boom amplitudes will occur along the flight path and decrease gradually to either side.

Because of the effects of the atmosphere, there is a distance to the side of the flight path beyond which the sonic booms are not expected to reach the ground.

This distance is normally referred to as the lateral cut-off distance.

Measurements of Sonic Boom Impact on Structures

Many studies have been conducted on the effects of sonic booms on conventional (i.e., modern, inhabited) structures.

Sonic boom overpressure, in units of psf, is the typical metric used to evaluate sonic boom impacts on structures.

The most common incidence of damage is to glass, plaster, and bric-a-brac.

These types of damage to structures could potentially result from sonic booms.

The actual occurrence of damage depends upon a number of variables; most important are the orientation of the object to the flight track, and the condition of the object.

Possible Damage to Structures from Sonic Booms

Sonic Boom Peak Overpressure Nominal (psf)	Item Affected	Type of Damage
0.5 - 2	Cracks in plaster	Fine; extension of existing; more in ceilings; over door frames; between some plaster boards
	Cracks in glass	Rarely shattered; either partial or extension of existing.
	Damage to roof	Slippage of existing loose tiles/slates; sometimes new cracking of old slates at nail hole.
	Damage to outside walls	Existing cracks in stucco extended.
0.5 - 2	Bric-a-brac	Those carefully balanced or on edges can fall; fine glass, e.g., large goblets.
	Other	Dust falls in chimneys
2 - 4	Glass, plaster, roofs, ceilings	Failures show which would have been difficult to forecast in terms of their existing localized condition. Nominally in good condition.
4 - 10	Glass	Regular failures within a population of well-installed glass; industrial as well as domestic; green houses; ships; oil rigs.
	Plaster	Partial ceiling collapse of good plaster; complete collapse of very new, incompletely cured or very old plaster.
	Roofs	High probability rate of failure in nominally good slate, slurry-wash; some chance of failures in tiles on modern roofs; light roofs (bungalow) or large area can move bodily.
	Walls (outside)	Old, free standing walls in fairly good condition can collapse.
	Walls (inside)	"Party" walls known to move at 10 psf.
Greater than 10	Glass	Some good glass will fail regularly in response to sonic booms from the same direction. Glass with existing faults could shatter and fly. Large window frames move.
	Plaster	Most plaster affected.
	Ceilings	Plaster boards displaced by nail popping.
	Roofs	Most slate/slurry roofs affected, some badly; large roofs having good tile can be affected; some roofs bodily displaced causing gable-end and wall-plate cracks; Domestic chimneys - dislodgment if not in good condition.
	Walls	Internal party walls can move even if carrying fittings such as hand basins or taps; secondary damage due to water leakage.
	Bric-a-brac	Some nominally secure items can fall, e.g., large pictures; especially if fixed to party walls.

Note: psf- pounds per square foot
Source: U.S. Air Force, HSD-TR-89-01.

FAA-sponsored study was conducted using a statistical analysis to determine the probability of glass breakage for various overpressures.

If all flight paths are considered equally likely (that is, the aircraft could approach the structure from any direction) then the probability of breakage for good glass at various nominal peak overpressures (FAA 1973).

Probability of Glass Breakage

Under Flight Path from Any Direction Overpressures (psf) Probability of Breakage 1 0.000001a 2 0.000023
Note: a - 1 pane in 1,000,000 panes. If the aircraft were to approach from head-on or perpendicular to the plane of the window, which would be the worst condition, the probability would increase.

Probability of Glass Breakage from Head-on or Perpendicular Flight Path Overpressures (psf) Probability of Breakage 1 0.000023a 2 0.000075 3 0.000300 4 0.001200 5 0.002300 6 0.004000
Note: a – 23 panes in 1,000,000 panes.

Measurements of Sonic Boom Impact on Human Annoyance

In 1977, at the request of the U.S. EPA, the National Academy of Science's Committee on Hearing, Bioacoustics and Biomechanics (CHABA) proposed guidelines for the uniform description and assessment of the various noise environments associated with various projects.

In 1982, the U.S. EPA published Guidelines for Noise Impact Analysis, based on the CHABA Guidelines.

According to CHABA Guidelines, the Leq and DNL were selected as the appropriate descriptors for noise because they reliably correlate with health and welfare effects.

From data on community social surveys, DNL has been found to correlate with community annoyance, as measured in terms of percentage of exposed persons who are "highly annoyed" (%HA)

Relationship Between C-Weighted and A-Weighted Sound Levels and Percent of the Population Annoyed

CDNL (C-weighted)	% Highly Annoyed	DNL (A-weighted)
48	2	50
52	4	55
57	8	60
61	14	65
65	23	70
69	35	75

Note: CDNL can be interpreted in terms of "equivalent annoyance" DNL.
Source: CHABA 1981

Exposure to sonic booms is typically measured as a CDNL, on a C-weighted scale, rather than as a DNL on an A-weighted scale.

Correlation between DNL and CDNL has been established based on community reaction to impulsive sounds (CHABA 1981).

The DoD has followed the recommendations of CHABA in describing high-intensity impulsive sounds, such as sonic booms and explosions, in terms of C-weighted sound exposure level.

A DNL of 65 dBA or lower is considered to be acceptable; a DNL above 65 dBA but not exceeding 75 dBA is normally unacceptable unless some form of noise attenuation is provided; a DNL higher than 75 dBA is unacceptable.

Daily exposure to sonic booms of CDNL of 61 dB or less is comparable to the DNL 65 dBA significance level for non impulsive noise.

Sonic boom noise levels measured as a CSEL also provide a metric for potential impacts to humans over a short-term duration, rather than averaged over a 24-hour period.

For example, CSEL values can be used to evaluate potential physiological startle responses and other short-term annoyance factors.

Relationship Between Sonic Boom Overpressure in Pounds per Square Feet (psf) and Other Metrics (dB)

Peak Overpressure (psf)	CSEL (dB)	Peak SPL (dB)	SEL (dB)
0.2	85.4	113.6	75.9
0.5	94.0	121.6	84.5
1.0	100.4	127.6	90.9
2.0	106.9	133.6	97.4
3.0	110.7	137.1	101.2
4.0	113.4	139.6	103.9
5.0	115.5	141.6	106.0
6.0	117.2	143.1	107.7
8.0	119.9	145.6	110.4
10.0	121.9	147.6	112.4
12.0	123.6	149.2	114.1
14.0	125.1	150.5	115.6
18.0	127.4	152.7	117.9
22.0	129.3	154.4	119.8
26.0	130.9	155.9	121.4
30.0	132.2	157.1	122.7

Measurements of Sonic Boom Impact on Land Use Compatibility

In 1980, the Federal Interagency Committee on Urban Noise (FICUN) published guidelines for considering noise in land use planning (FICUN 1980).

Federal agencies have adopted these guidelines as the standard when making recommendations to local communities on land use compatibility issues.

The Table shows the types of land uses that would be appropriate based on a range of DNL values.

Again, a DNL of 65 dBA or lower is considered to be acceptable a DNL above 65 dBA but not exceeding 75 dBA is normally unacceptable unless some form of noise attenuation is provided; a DNL higher than 75 dBA is unacceptable.

Daily exposure to sonic booms of CDNL of 61 dB or less is comparable to the DNL 65 dBA significance level for non-impulsive noise and is normally considered compatible with most land uses.

PUBLIC/EMERGENCY SERVICES

Public/emergency services refers to the capability of ensuring protection of people and property.

On-Base Region

Public/emergency services at Edwards AFB ensure the protection of base personnel and property.

The public/emergency service umbrella at Edwards AFB consists of the Fire Department, Security Forces, and the Medical Group.

Fire Protection/Prevention

Fire protection on base comprises personnel and equipment that are organized and trained to respond to a series of emergencies.

The emergency response time of the Fire Protection Division is contingent upon the distance to the emergency site and the availability of personnel, support equipment, and supplies.

All areas of the base are currently covered.

The proposed action would utilize Runway 22 or the Rogers Dry Lakebed for landing.

This area is located near and serviced by Fire Station No. 1. This station is a 26,200-square-foot facility providing fire protection and emergency medical service as needed for the entire base.

Vehicles assigned to this fire station include two engines; five Aircraft Rescue Fire Fighting vehicles; one rescue vehicle; a 5,000- and a 2,000-gallon water tender; and two airfield surveillance vehicles.

A maximum of 35 firefighters are housed in this facility.

Security

Security forces provide general law enforcement on Edwards AFB.

Law enforcement duties include traffic stops, domestic disputes, and police investigations. Security forces (police) on base comprise personnel and equipment organized and trained to respond to a series of emergencies, as well as to provide a daily security presence.

Security programs provide the means to counter threats during peacetime, mobilization, or wartime.

Medical Services

Medical services on-base comprise personnel and equipment that are organized and trained to respond to a series of emergencies.

Air Force Instruction 41-106, Medical Readiness Planning and Training, establishes procedures for medical readiness, planning, and training during peacetime and wartime operations.

Off-Base Region

Public/emergency services within the Alternative A and B corridors include all state and local fire protection services, security forces, and medical services utilized by the general public during accidents, disasters, or events commonly requiring such public/emergency services.

Land Use Compatibility

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65–70	70–75	75–80	80–85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
Public Use						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoria, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware, and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Notes:

Numbers in parentheses refer to notes.

- The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law.

The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

Y (YES) - Land Use and related structures compatible without restrictions.

N (No) - Land Use and related structures are not compatible and should be prohibited.

NLR - Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 - Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.
1 - Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
2 - Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
3 - Measures to achieve NLR 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noisesensitive areas, or where the normal noise level is low.
4 - Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noisesensitive areas, or where the normal noise level is low.
5 - Land-use compatible provided special sound reinforcement systems are installed.
6 - Residential buildings require an NLR of 25.
7 - Residential buildings require an NLR of 30.
8 - Residential buildings not permitted.
Source: 14 CFR Part 150

SAFETY

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 ROI.

For public safety, a much larger area must be considered.

This area varies depending upon the nature of the operation, but may extend for miles beyond the source of the hazard. Potential health and safety issues on Edwards AFB include radiological, biological, chemical, and physical hazards, as well as weapons, flight, ground, range, and test [systems] safety.

The DFRC's institutional safety program is intended to minimize accidental injury, illness, and loss of property.

DFRC's Safety Office is responsible for monitoring the safety programs through a system of inspections, surveys, audits, and follow-up investigations.

Elements of the safety program include accident and injury prevention and reporting, fire prevention and protection, emergency preparedness, and hazardous material and waste management.

A DFRC Emergency Response Plan is in place to address emergencies such as earthquakes, aircraft accidents, fires and explosions, bomb threats, civil disturbances, nuclear emergencies, and toxic vapor releases or chemical spills.

A NASA-wide safety reporting system encourages employees to report their concerns about workplace safety.

The DFRC's occupational health program is intended to recognize, evaluate, and control workplace factors or stresses that may cause sickness, impaired health, or significant discomfort to employees.

To protect DFRC personnel from noise hazards, hearing protection is used if personnel are exposed to noise levels exceeding 85 dBA.

The program identifies and quantifies worker exposure to hazardous chemicals, noise, and radiation.

Through DFRC's Hazardous Communication Program, employees are educated regarding proper chemical management principles and procedures.

Range Safety

The national range system, established by Public Law (PL) 81-60, was originally sited based on two primary concerns: location and public safety.

Thus, range safety, in the context of national range activities, is rooted in PL 81-60 and Department of Defense Directive 3200.11, Use Management, and Operation of Department of Defense Major Range and Test Facilities; both provide the framework under which the national ranges operate and provide services to range users.

To provide for the public safety, the ranges, using a Range Safety Program, ensure that the launch and flight of launch vehicles present no greater risk to the general public than that imposed by overflight of conventional aircraft.

It is the policy of the Edwards AFB Range to ensure that the risk to the public, military personnel, government civilian workforce, contractors, and to national resources is minimized to the greatest degree possible.

This policy is implemented by using risk management in the areas of public safety, launch area safety, and landing area safety.

Range users are required by Edwards AFB to demonstrate, through risk modeling, that the lowest possible risk is achieved, consistent with mission requirements and AFFTC launch risk guidance.

The AFFTC Chief of Safety has responsibility for approving the proposed flight plan, flight termination system(s), and flight safety criteria.

The AFFTC Commander has final authority and responsibility for the safety of the proposed action.

The Range Commander may deviate from these mission criteria based on geography, weather, and national need; however, the basic standard is no more risk than that voluntarily accepted by the general public in normal day-to-day activities (NASA 1997).

Health and safety issues related to aircraft operations (both routine and emergency management) involving ground personnel working near operating aircraft during taxiing and inspection activities, aircrews using runways (lakebed and non-lakebed surfaces), and personnel present during emergency operations, aircraft malfunction, or other mishap are specifically addressed in Air Force Flight Test Center Instruction (AFFTCI) 11-1, Air Operations, and AFFTCI 11-2, Ground Operations.

These instructions address in-flight operations, flight preparation, and ground procedures directly related to the safety of personnel on the ground, as well as emergency procedures for the protection of all personnel at Edwards AFB.

A fundamental requirement of the Edwards AFB Flight Safety Program is that each unit conducting or supporting flight operations has a flight safety program as well as a Midair Collision Avoidance Program.

A QRA was prepared to provide defensible evidence to support the orbital reentry corridors identified under Alternatives A and B.

This analysis addressed the risks to persons and property resulting from use of these reentry corridors.

To determine the risk to the ground populations, a model of population sheltering was developed based on census data from the western United States and Canada.

To calculate aircraft risk, FAA data were used to create a model of aircraft density.

The risk calculation allowed for uncertainties in fragment description, season (as it affects both the atmosphere and sheltering), trajectory information, and vehicle failure mode.

The computed risk was compared with two standards: the Range Commanders Council (RCC), which requires an expectation of fatality, EF, less than 30 x 10-6 (30 fatalities per million missions) and the Range Safety Requirements of the Eastern and Western Ranges, which require an expectation of casualty, Ec, of 30 x 10-6 (30 casualties per million missions).

Following these standards, three corridors or trajectories were recommended for missions with failure probabilities less than one percent.

These corridors are a western corridor with azimuth from 250 to 290 degrees, which was selected as Alternative A; a northwestern corridor with azimuth from 325 to 337 degrees, which was selected as Alternate B; and a polar orbit corridor with azimuth from 350 to 020 degrees, which was not selected as an alternative because a polar orbit reentry corridor would not normally be considered as a primary reentry corridor for flight test of an experimental unmanned LEV.

The probability of aircraft impact for each corridor is less than the RCC standard of 1 x 10-7 (1 impact in 10 million missions) and the Eastern and Western Range common practice of 1 x 10-8 (1 impact in 100 million missions).

Exposure Hazards

Non-ionizing Electromagnetic Radiation Non-ionizing electromagnetic radiation (EMR) comes from two major sources on base: radio frequency emitters (i.e., radar, radar-jamming transmitters, and radio communication equipment), which are regulated in accordance with the Air Force Occupational Safety and Health (AFOSH) Standard 48-9, Radio Frequency Radiation Safety Program; and laser emitters (lasers), which are regulated by AFOSH Standard 48-10, Laser Radiation Protection Program.

Sources of EMR at Edwards AFB exist throughout flightline areas, and include fixed location radar, airfield management equipment, and aircraft equipment/instrumentation.

Electromagnetic radiation can cause thermal and photochemical injuries to humans, particularly to the eyes and skin.

Standards and practices are in place to shield and isolate workers from operational hazards surrounding existing EMR sources.

The Bioenvironmental Engineering Office periodically visits and evaluates the operations of all known AFFTC industrial radiation users as a part of the Industrial Hygiene Surveillance Program.

This office also annually verifies the list of on-base radio frequency radiation 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 1997d).

Lasers

There are many laser-based systems used in Edwards AFB operations, most of which are used on aircraft during flight operations as target-range finders and target designators.

Laser weapons are used for test and training activities at approved locations on Edwards AFB under scheduled and controlled conditions (i.e., Integrated Facility for Avionics Testing, Benefield Anechoic Facility).

Lasers produce narrow beams of light that may or may not be in the range of light visible to humans.

Edwards AFB tests about four types of American National Standards Institute Class 3 lasers, which are mainly used for range operations (Cogan 1995).

Explosives and Propellants

Explosives and propellants are used and stored in a number of locations throughout Edwards AFB.

An inhabited building separation distance (or clear zone) has been established around each of the existing explosives and/or propellant use/storage locations.

The size of the clear zone varies based on the quantity and type of explosive used, or propellant stored.

Clear zones ensure the safety of all personnel in the area from the potential overpressure hazard associated with use and storage of these materials.

SOCIOECONOMICS

Socioeconomic resources are the economic, demographic, and social assets of a community. Key elements include fiscal growth, population, labor force and employment, housing stock and demand, and school enrollment.

Edwards AFB

Edwards AFB makes a substantial contribution to the economic status of the surrounding communities within Antelope Valley of California.

The Antelope Valley has a labor force of approximately 161,031 persons with an unemployment rate of 13.6 percent.

The labor force is employed in a variety of industries including services, manufacturing, construction/mining, retail, government, and agriculture.

The military labor force comprised two percent and the government labor force comprised six percent of those employed in the Antelope Valley in 1997 (Alfred Gobar Associates 1997).

As of March 31, 1999, Edwards AFB employed approximately 10,920 military, civilians, and contractor personnel.

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 an approximate total of 1,741housing 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 units. The number of units ranges from 1,640 to 1,777.

Edwards AFB also maintains a 188-space mobile home park for privately owned mobile homes.

Personnel with families and unaccompanied members are allowed to reside in the park (MARCOA Publishing, Inc. 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 has recently been opened.

Transient quarters are available through the Billeting Office. Edwards AFB has three elementary schools and one junior/senior high school, both under the jurisdiction of the Muroc Unified School District. 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.

Several additional school districts exist within the Antelope Valley.

For the 1998 to 1999 school year, total enrollment in these school districts was 128,029 (California Department of Education)

Numerous private schools also exist within this region.

In fiscal year 1998, Edwards AFB expended $3,186,230 for training and education of active duty personnel and civilians.

Impact Aid provided by the Department of Education to school districts that are associated with Edwards AFB was $4,631,541 for fiscal year 1998.

This aid is provided to schools that have children who reside on base or whose parents work on base, or both. These parents may be active duty military or civilians (Levell 1999).

WATER RESOURCES

Water resources include surface water and groundwater quantity and quality.

On-Base Region

Water Quantity and Source

Sources of water on Edwards AFB include groundwater, AVEK Water Agency water, and storm water.

Jurisdictional waters of the United States do not occur within Edwards Air Force Base (USACOE 1996).

The AFFTC purchases potable water from the AVEK Water Agency through a water distribution system located in Boron.

Groundwater has been an important source of water for the Antelope Valley since development began there in the late 1800s, and for the base since 1947.

In recent years of rapid urban growth and drought, between 50 and 90 percent of all water demands in the Valley were satisfied by groundwater.

Groundwater pumping and irrigation of crops began to decrease when water levels declined. Groundwater depth has declined approximately 90 feet since 1947 (AFFTC 1999).

Edwards AFB uses 12 groundwater wells, 10 of which are reserved for drinking water purposes. The 10 potable water wells have a maximum combined production capability of 15.6 million gallons per day.

Water Quality

The U.S. EPA's Office of Water establishes the groundwater and drinking water quality standards found in the National Primary Drinking Water Regulations (or primary standards) that are legally enforceable and apply to public water systems.

Edwards AFB must also conform to the standards for clean water set by the Cal EPA.

These standards are administered locally by the Lahontan Regional Water Quality Control Board.

Primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in public water systems.

The Bioenvironmental Engineering Office monitors base groundwater quality, and compliance with drinking water standards.

Flood Potential

Edwards AFB is situated at the bottom of the Antelope Valley Watershed Basin, roughly a 2,400 square mile watershed with no outlet.

As such, stormwater runoff for the entire watershed is directed toward three large playa lakebeds: Rogers, Rosamond, and Buckhorn Dry Lakes.

Playas are expansive, ancient dry lakes that fill with water during seasonal rainfall periods. Water may be retained in these playas for several months due to mostly impermeable soils that contain high levels of solute, alkalinity, salinity, sodium, and total dissolved solids.

Any water reaching these lakebeds is trapped, pending evaporation (USGS 1998). In general, drainage tends to flow toward the nearest dry lakebed.

Rosamond and Buckhorn Dry Lakes, in turn, drain toward Rogers Dry Lake (AFFTC 1993).

Water level elevations (above msl) for Rosamond Dry Lake during flood conditions are described in Table 3-19 (USACOE 1995).

Water Levels for Rosamond Dry Lake Flooding Events Flood Level Lake Elevation (feet) 50-year 2,280.9 100 year 2,282.2 200-year 2,283.4.

Despite the apparent potential for the formation of a sizable lake, the playa lakebeds remain dry most of the time due to arid climate conditions.

The average annual rainfall at the base is approximately 5 inches and the maximum recorded 1-year rainfall is 15.5 inches, which occurred in 1983.

The average annual evaporation, as measured by a nearby Mojave pan evaporation gauge from 1939 to 1959, is 11.4 inches.

The Mojave Creek Floodplain is a well defined drainage that runs southeast along the north and east of the residential area of Main Base along Lancaster Boulevard and crosses Rosamond Boulevard where it runs southward just west of South Base and empties into Rogers Dry Lake.

Mojave Creek is dry for most of the year, but periodic flooding does occur during above-normal rainfall periods (AFFTC 1993).

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, which 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 storm water runoff.

The AFFTC 1993 flood study estimated a flood-of-record inundation elevation to be used for planning purposes and performed a risk of flooding analysis of existing base facilities near Rogers Dry Lake.

This level represents the maximum water surface elevation that would occur during a flood of reasonably high return interval (e.g., 50 years, 100 years).

The level of flooding that occurred in 1943 was estimated to be the flood-of-record level. Most development on Edwards AFB is above this estimated flood-of-level of 2,277.4 feet.

However, a relatively high flooding in 1993 remained more than 3 feet below the estimated flood-of-record level (AFFTC 1993).

Off-Base Region

Alternative A (Western Approach)

The land beneath the Alternative A corridor contains 19 watersheds. Table 3-20 provides comparisons of land acreage and waterway mileage within each watershed (California Rivers Assessment 1997). Major lakes within Alternative A include Buena Vista Lake in Kern County; Pyramid Lake in Los Angeles County; Lake Casitas in Ventura County; Gibraltar Reservoir and Lake Cachuma in Santa Barbara County; Twitchell Reservoir, Lopez Lake, Santa Margarita Lake, and Lake Nacimiento in San Luis Obispo County; and Lake San Antonio in Monterey County.

Alternative B (Northwestern Approach)

Alternative B contains 98 watersheds throughout California, Nevada, and Oregon (California Rivers Assessment 1997). The area below the Alternative B corridor contains hundreds of lakes and reservoirs, including the two deepest lakes in the United States: Crater Lake (1,932 feet) in Oregon and Lake Tahoe (1,645 feet) on the California/Nevada border. Other major lakes within 200 miles of Edwards AFB include Isabella Lake in Kern County; Lake Success and Lake Kaweah in Tulare County; Hume Lake, Wishon Reservoir, Courtright Reservoir, Florence Lake, Lake Thomas A. Edison, Huntington Lake, Shaver Lake, Mammoth Pool Reservoir, and Pine Flat Reservoir in Fresno County.

Watersheds Under the Alternative A Corridor

Watershed	Acres	Miles of Naturally Occurring Waterways
Alisal-Elkhorn Sloughs	155,539.57	346.09
Antelope-Fremont	2,168,077.64	4,352.77
Calleguas	242,578.07	483.15
Carmel	199,570.32	464
Carrizo	283,322.39	522.66
Central Coast	673,977.61	1,398.65
Cuyama	732,147.42	2,007.67
Estrella	606,872.66	1,410.81
Middle Kern-Upper Tehachapi	851,259.50	2,169.58
Pajaro	838,326.29	1,970.06
Salinas	2,099,440.67	4872.39
San Antonio	138,628.04	278.98
Santa Barbara Coastal	240,719.88	632.83
Santa Clara	1,032,302.26	2,623.92
Santa Maria	453,776.91	1,082.58
Santa Ynez	574,885.56	1,556.18
Tulare-Buena Vista Lakes	5,453,232.60	4,905.87
Upper Los Gatos	490,036.37	1,272.01
Ventura	173,629.76	461.12

Source: California Environmental Resources Evaluation System 2001.

Rivers and Creeks Under the Alternative A Corridor

River or Creek	County	Special Designation
Big Sur	Monterey	Wild & Scenic River
Caliente	Kern	
Carmel	Monterey	
Cottonwood	Kern	
Cuyama	Santa Barbara, San Luis Obispo	
Estrella	San Luis Obispo	
Jalama	Sant Barbara	
Kern	Kern, Tulare	Wild & Scenic River
Kings	Kings, Tulare	Wild & Scenic River
Nacimiento	Monterey	
Poso	Kern, Tulare	
Salinas	Monterey, San Luis Obispo	
San Antonio	Santa Barbara	
San Juan	San Luis Obispo	
Santa Clara	Ventura, Los Angeles	
Santa Maria	Santa Barbara	
Santa Ynez	Santa Barbara	
Sespe	Santa Barbara	Wild & Scenic River
Sisquoc	Santa Barbara	Wild & Scenic River
Tule	Kings, Tulare	
Ventura	Santa Barbara, Ventura	
White	Tulare	

Source: National Park Service 2001.

Watersheds Under the Alternative B Corridor

Watershed	Acres	Miles of Naturally Occurring Waterways
Applegate	58,273.59	91.22
Butte	380,756.39	212.94
Chetco	11,727.37	21.89
Cottonwood Headwaters	440,102.40	808.54
Crowley Lake	1,190,498.15	2,020.24
East Branch North Fork Feather	656,964.77	1,318.22
East Walker	324,506.55	498.61
Honcut Headwaters	117,095.75	315.69
Honey-Eagle Lakes	1,418,877.85	1,713.90
Illinois	37,845.84	70.71
Indian Wells-Searles Valleys	1,290,877.58	2,136.03
Lake Tahoe	238,809.80	250.04
Lost	1,088,863.45	676.05
Lower American	180,706.70	379.46
Lower Butte	367,635.38	661.64
Lower Cottonwood	162,371.88	352.87
Lower Feather	378,465.77	530.78
Lower Klamath	979815.75	1780.41
Lower Pit	1,708,590.25	1,598.99
Madaline Plains	513,540.52	424.29
McCloud	435,130.75	618.26
Middle Fork Feather	871,778.68	1,752.05
Mill	111,592.83	243.01
Mill-Big Chico	570,625.56	1,020.40
North Fork American	647,154.90	1317.6
North Fork Feather	80,578.51	1,338.69
Owens Lake	878,294.71	1,059.99
Sacramento Headwaters	412,283.88	560.84
Sacramento-Lower Cow-Lower Clear	245,461.73	552.93
Sacramento-Lower Thomes	675,361.37	1,820.32
Sacramento-Upper Clear	201,774.45	333.8
Salmon	480,864.01	864.5
Scott	520,968.34	878.83
Shasta	508,734.42	603
Smith	452,091.69	842.37
South Fork American	543,219.70	1,143.41
South Fork Kern	627,757.55	1,088.98
Trinity	1,304,178.97	2,234.93
Truckee	274,372.43	497.93

Watersheds Under the Alternative B Corridor (Continued)

Watershed	Acres	Miles of Naturally Occurring Waterways
Upper Bear	259,032.46	564.76
Upper Butte	130,602.23	296.44
Upper Calaveras	250,977.00	780.80
Upper Carson	289,996.56	586.36
Upper Chowchilla-Upper Fresno	620883.23	1196.31
Upper Coon-Upper Auburn	69,919.42	154.96
Upper Cosumnes	421,656.38	1,017.54
Upper Cow-Battle	531,329.25	861.17
Upper Deer-Upper White	227,761.95	391.62
Upper Dry	92,993.61	223.1
Upper Kaweah	574,754.60	976.08
Upper Kern	700,014.53	1,138.41
Upper King	988,565.56	16,272.92
Upper Klamath	544,215.51	880.36
Upper Merced	703,115.64	1,305.26
Upper Mokelumne	519,643.89	1,308.44
Upper Pit	1,702,444.87	3,097.22
Upper Poso	168,796.48	308.17
Upper San Joaquin	1,090,990.98	1714.35
Upper Stanislaus	640,372.01	1,659.51
Upper Tule	285,958.95	509.82
Upper Tuolumne	1,033,493.28	1,944.37
Upper Yuba	842,717.25	1,725.24
West Walker	261,434.27	424.98

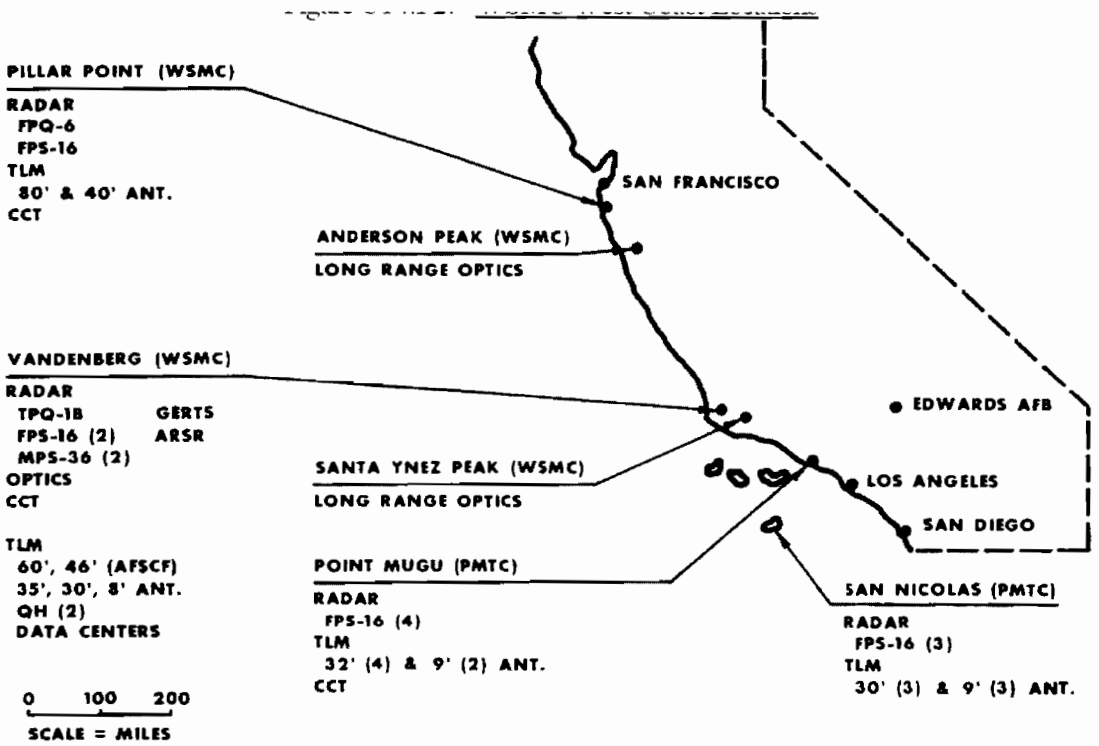
Table 3-22, Page 2 of 2
Source: California Environmental Resources Evaluation System 2001

Rivers and Creeks Under the Alternative B Corridor

CALIFORNIA		
River or Creek	**County**	**Special Designation**
American River	El Dorado, Placer	Wild & Scenic
Antelope Creek	Siskiyou	
Antelope Creek	Tehama	
Applegate River	Siskiyou	
Auburn Ravine	Placer	
Battle Creek	Shasta	
Bear Creek	Nevada	
Bear River	Placer	
Butte Creek	Siskiyou	
Butte Creek	Butte	
Caliente Creek	Kern	
Carson River	Alpine, Tuolumne	
Chowchilla River	Modera	
Clavey River	Tuolumne	
Clear Creek	El Dorado	
Clear Creek	Shasta	
Cosumnes River	Amador, El Dorado	
Cottonwood Creek	Kern	
Cottonwood Creek	Shasta, Tehama	
Cow Creek	Shasta	
Coyote Creek	Calaveras	
Deer Creek	Tehama	
Dry Creek	Fresno, Mono, Tuolumne	
Dry Creek	Nevada	
Elder Creek	Tehama	
Feather River	Butte, Plumas, Sutter, Tehama, Yuba	Wild & Scenic
Fresno River	Modera	
Grindstone Creek	Glenn	
Illinois Creek	Del Norte	
Kern River	Kern, Tulare	Wild & Scenic
Keweah River	Tulare	
Kings River	Fresno	Wild & Scenic
Klamath River	Del Norte, Humboldt, Siskiyou	Wild & Scenic
Lost River	Modoc, Siskiyou	
McCloud River	Shasta	
Merced River	Mariposa, Modera	
Mill Creek	Fresno	
Mill Creek	Tehama	
Mill Creek	Tuolumne	

Rivers and Creeks Under the Alternative B Corridor (Continued)

CALIFORNIA (continued)		
Mokelumne River	Almador, Alpine, Calaveras	
Owens River	Tuolumne	
Pit River	Lassen, Modoc, Shasta	
Poso River	Kern	
Rubicon River	El Dorado, Placer	
Sacramento River	Butte, Glenn, Placer, Shasta, Siskiyou, Tehama	
Salmon River	Siskiyou	Wild & Scenic
San Antonio Creek	Calaveras	
San Joaquin River	Fresno, Modera	
Scott River	Siskiyou	
Shasta River	Shasta, Siskiyou	
Shonecut Creek	Butte, Yuba	
Smith River	Del Norte	Wild & Scenic
Stanislaus River	Tuolumne	
Stony Creek	Glenn	
Susan River	Lassen	
Thomes Creek	Tehama	
Trinity River	Shasta, Trinity	Wild & Scenic
Truckee River	Nevada, Placer, Sierra	
Tule River	Tulare	
Tuolumne River	Tuolumne	Wild & Scenic
Upper Truckee River	Alpine, El Dorado, Tuolumne	
W Walker River	Tuolumne	
White River	Tulare	
Wolf Creek	Nevada	
Yuba River	Nevada, Sierra, Yuba	



AIR FORCE FLIGHT TEST CENTER

MISSION

Plans, accomplishes, and reports on Air Force development, test, and evaluation (DT&E) of manned and unmanned aircraft systems; participates in and reports on test of operational flight simulator trainers; supports and participates in Air Force initial operational test and evaluation (IOT&E) and follow-on tests of manned aircraft systems; tests manned experimental and research aerospace vehicles; tests parachute systems and aerodynamic deceleration devices; operates the USAF Test Pilot School; conducts or supports artificial icing tests for the Air Force and other Governmeint Agencies; develops, controls, and operates test facilities used to support flight testing; and supports operational functions, such as the Air Force Rocket Propulsion Laboratory, the NASA Hugh L. Dryden Flight Research Center, and the Army Aviation Engineering Flight Activity.

LOCATION

The Air Force Flight Test Center (AFFTC) is located at Edwards AFB, about 100 miles northeast of Los Angeles, on the western edge of the Mojave Desert.

CAPABILITIES

Flight Test Range Capabilities

Take-Off and Landing Facility.

Uninterrupted photographic time-space positioning data on a 300 foot wide by 15,000 foot long main runway, with transition to Rogers Dry Lake.

Low, Medium, and High Altitude Supersonic

Corridors Four aircraft spin areas (two instrumented), from 10,000 feet mean sea level to unlimited altitude.

Precision Impact Range Area (PIRA).

Includes dual air-to-ground gunnery range used for precision bombing, rocket firing, stores separation, evaluation of photo and infrared reconsystems, and other tests requiring precision ground instrumentation.

The alpha corridor provides supersonic airborne entry into the PIRA.

Photo and Infrared Resolution Range.

Targets include 18 bar type, one tridensity, five circle, one oblique, 14 check-cross patterns, and an infrared tactical range with a variety of surveyed targets.

Radar Fidelity and Geometric Range (RADFAG).

Various reflector arrays and wide assortment of corner reflectors for forward and side-looking radar.

Technical Support Capabilities

Mission Control Complex.

Main AFFTC scientific data processing and display complex that monitors flight test missions in real time.

Data Acquisition and Reduction Facilities.

Instrumentation engineering, range facilities, airborne and ground photography, television and various specialized range instrumentation, and large-scale digital computers are available.

Integration Facility for Avionics Systems Testing.

Reliable means of testing, identifying problem areas, and improving integrated avionics systems concurrently with flight test programs.

Flight Test Simulation Facility.

Simulation capability using digital computers, cockpits, and six degree-of-freedom motion base.

Additional facilities available to support flight testing include Runway Meteorological System, Weight and Balance Facility, Flutter and Ground Vibration Systems, and a Subsonic Airspeed Calibration Facility.

Surface

The AFFTC has 65 square miles of usable landing area on base with runway lengths up to 7.5 miles.

Numerous dry lakebeds suitable for emergency landing exist throughout the southwest test range area to the Utah Test and Training Range.

Nineteen aircraft hangar complexes, three with two hangar bays, include office space for engineering and administrative personnel, shop, and laboratory spaces.

Thirteen hangars are located on the main base, four at the north base (ideal for classified programs), and two at the south base.

Airspace

R-2508 California Restricted Area complex (12,000 to unlimited) with military operating area and forward air traffic control assigned airspace area extends approximately 130 nautical miles north, 30 nautical miles east, and 40 nautical miles west of Edwards AFB.