2.0 DESCRIPTION OF THE PROPOSED ACTION -AND ALTERNATIVE

This chapter presents a detailed description of the Proposed Action to implement the F-22 Force Development Evaluation (FDE) program and Weapons School (WS) at Nellis AFB. It also describes the No-Action Alternative, in which the FDE program and WS would not be implemented at Nellis AFB. Under the Proposed Action, the Air Force would base 17 F-22 aircraft at Nellis AFB in fiscal years 2002, 2003, and 2008. This proposal would also involve construction or external modification of eight base facilities and internal modification to two facilities, addition of 367 personnel, and implementation of flight activities for the FDE program and WS within the Nellis Range Complex (NRC). The details of the Proposed Action form the basis for analysis of potential environmental impacts. This section also describes the reasons why Nellis AFB and its associated airspace and ranges represent the single location that reasonably provides for the specific and unique requirements of the F-22 FDE program and WS.

2.1 BASING REQUIREMENTS FOR F-22 FDE PROGRAM AND WS

2.1.1 Overall Considerations

Three overall considerations must be taken into account when selecting a base to fulfill the FDE program and WS.

1. *Integrated Battlespace Environment for Testing and Training.* An integrated battlespace environment for testing and training consists of airspace, range, and other assets that support the full spectrum of operations that could be encountered in combat. Such an environment supports realistic activities, including major exercises involving many types of aircraft in addition to aircraft adopting the roles and tactics of adversaries. An integrated battlespace environment also offers a variety and arrangement of ground-based threats that require aircrews to operate and react as they would in combat. It provides for air-to-air and air-to-ground testing and training, employing the equipment and facilities to monitor and review aircraft and aircrew performance. Since the F-22 FDE program and WS must test and train under as realistic conditions as feasible, a location offering a nearby integrated battlespace environment is required.

2. *Interaction of F-22 FDE Program and WS.* Interaction between the staffs of the FDE program and WS enhances the professional expertise of each program. FDE staff tests and evaluates the operational capabilities of an aircraft and uses this information to develop tactics. These capabilities and tactics are then incorporated into the WS program. The WS staff also evaluates the utility and value of the tactics through its intensive training course, providing feedback to the FDE staff on changes and refinements in tactics. This feedback process forms a continuous improvement cycle, or synergy, between the two programs as long as the aircraft remains in the Air Force inventory. Locating both programs at the same base would enhance the synergy, allowing consistent interaction between the F-22 FDE program and WS.

3. *Maximum Use of Existing Infrastructure to Accommodate the F-22 FDE Program and WS.* A base that requires minimal changes to accommodate these F-22 programs would offer a more efficient and effective alternative than a site that needed extensive changes. Such efficiency and effectiveness can be measured in terms of costs. For example, minimized changes may also equate to less potential for environmental impacts. Fewer infrastructure changes mean less construction and ground disturbance that could affect the environment. Similarly, less infrastructure and personnel changes would translate into lower overall costs.

2.1.2 Flying and Mission Considerations

To fulfill their unique flying and mission requirements, the F-22 FDE program and WS need to be at a location that provides specific assets (see Section 2.1.3). These requirements apply specifically to implementing the F-22 FDE program and WS; they would not necessarily apply to other aspects of the F-22 development and deployment process, including future basing of operational units. Since the F-22 is a new aircraft and has no operational history, the operational requirements were defined as follows.

FUNCTIONAL AND OPERATIONAL CHARACTERISTICS OF THE F-22: The functional and operational characteristics designed into the F-22 include stealth, supercruise, agility and maneuverability. It contains comprehensive yet simple combat information systems and both air-to-air and air-to-ground combat roles, as well as maintainability, sustainability, reliability, and responsiveness. Table 2.1-1 outlines the characteristics and associated operational requirements for test and evaluation.

ANTICIPATED COMBAT ROLES FOR THE F-22: Air superiority represents the F-22's primary mission. The goal of air superiority is to dominate the skies over the battlefield, over U.S. and allied forces, and over as much of the enemy's territory as possible. To achieve and maintain air superiority, U.S. aircrews must identify, target, and neutralize enemy aircraft in the air and on the ground. They must also avoid detection and targeting by enemy airborne and ground-based radar, missiles, and anti-aircraft artillery systems. Success against enemy air and ground defenses requires employment of maneuvers, high and low speeds, changes in altitudes, and defensive countermeasures. The F-22 has a secondary air-to-ground mission employing air-to-ground ordnance, including the Joint Direct Attack Munition (JDAM).

During past conflicts, such as the Gulf War, air superiority fighters often flew as high as 50,000 feet above mean sea level (MSL). To evade enemy air and ground threats, the fighters changed altitudes rapidly, sometimes diving to below 500 feet above ground level (AGL). They also flew faster than the speed of sound when necessary to avoid enemy defenses or to optimize the use of sophisticated weapon systems. To respond to newer threats, it is expected that the F-22 would fly as high as 60,000 feet MSL and as low as 300 feet AGL.

PROJECTED TRAINING ACTIVITIES: The F-22 offers the capabilities to fulfill all of the mission elements described above. The F-22 FDE program and WS must occur at a location that permits the specific test and training activities that would eventually lead to successful performance of the

Table 2.1-1. F-22 Operational Characteristics and Requirements

Operational Characteristics	*Operational Requirements*
Stealth	• Ability to test and use stealth in tactics • Instrumentation and threat radar against which to employ stealth
Supersonic Cruise	• Sufficient airspace in which to fly supersonic during employment of tactics • Adversary aircraft simulating enemy capabilities and tactics
Agility and Maneuverability	• Adequate airspace in which to employ the full spectrum of tactics . Adversary aircraft and ground-based threats against which tactics can be employed
Comprehensive Combat Information Systems	• Opportunity to employ systems in large-force exercises involving numerous different aircraft types, including simulated adversaries . Ground-based simulated threats and instrumentation to test combat information systems and use in tactics
Maintainability, Sustainability, Reliability, and Responsiveness	• Adequate facilities to employ large-force, multi-day exercises simulating operations tempo for combat • Opportunity to employ full spectrum of tactics and capabilities to evaluate aircraft systems
Weapons Capability	. Ability to fire air-to-air missiles and 20mm gun • Opportunity to employ air-to-ground ordnance

mission elements in combat. To help define these activities for the F-22, it is necessary to use the programs for an existing, comparable aircraft type.

The F- 15C is the aircraft type most comparable to the F-22. Although the F-22 offers superior capabilities to those of the F-15C, both aircraft have similar missions and combat roles, and the Air Force has slated the F-22 to replace the F-l 5C in the next century. The F-22 would also be used for some air-to-ground missions. The F- 15C FDE program and WS operations represent the best available perspective on the nature and type of activities that the F-22 would conduct.

Table 2.1-2 outlines the representative test and training mission activities derived from F-l 5C programs and applied to the F-22. It also includes tactical training against surface attack. This table presents data on the types of airspace generally used for each activity, as well as the estimated flight parameters (speed, altitude, and duration).

2.1.3 Criteria for Basing F-22 FDE Program and WS

The overall considerations and the flying and mission considerations under the FDE program and WS determine the requirements used for basing the aircraft. Listed below are nine criteria describing the basing requirements for both the FDE program and WS:

Table 2.1-2. Projected Test and Training Activities Required for F-22

Activity	*Tasks*	*Airspace Type*	*Altitude (feet)*	*Speed*	*Duration*	*Time in Airspace*
Aircraft Handling Characteristics	G-force awareness, maneuverability, break turns, high angle of attack maneuvering, acceleration maneuvering, gun tracking, offensive and defensive positioning, simulated fueling, stall recovery	MOA[1] and ATCAA[2]	5,000 AGL to 60,000 MSL	100 KCAS[3] to Mach 1.4	1.0 hour	0.5 to 1.0 hour
Basic Fighter Maneuvers	Recognize all offensive/defensive weapons situations, defeat enemy weapons employment, G-force awareness, offensive/defensive maneuvering, visual missile defense, beyond visual range missile defense, maneuvering for weapons use, defensive countermeasure (flares/chaff) use	MOA and ATCAA	10,000 AGL to 30,000 MSL	100 KCAS to Mach 1.0	1.0 hour	0.5 to 1.0 hour
Air Combat Maneuvers	Multi-aircraft formations and tactics, systems check, G-force awareness, 2 vs. 4 and 4 vs. 6 aircraft intercepts, combat air patrol, defense of airspace sector from composite force attack, intercept and destroy bomber aircraft, avoid adversary fighters	MOA, Restricted Areas[4], and ATCAA	10,000 AGL to 60,000 MSL	100 KCAS to Mach 1.1	1.0 to 1.2 hours	0.5 to 1.0 hour
Low-Altitude Training	1 or 2 aircraft offensive and defensive operations at low altitude, G-force awareness at low altitude; handling, turns, tactical formations, navigation, threat awareness, defensive response, defensive countermeasure (flares/chaff) use, low-to-high and high-to-low altitude intercepts, missile defense, combat air patrol against low/medium altitude adversaries	MOA, Restricted Areas, and ATCAA	300 AGL to 20,000 MSL	100 KCAS to Mach 1.0	1.3 hours	0.83 to 1.0 hour
Tactical Intercepts	2 vs. 4 and 4 vs. 6 aircraft tactical intercepts, G-force awareness, electronic countermeasures, lead and formation flying	MOA, Restricted Areas, and ATCAA	300 AGL to 60,000 MSL	100 KCAS to Mach 1.4	1.2 hours	0.75 to 1.0 hour
Night Operations	4 vs. 4 aircraft intercepts and defense, defensive countermeasure (flares/chaff) use, maneuvering for weapons use	MOA, Restricted Areas, and ATCAA	10,000 AGL to 60,000 MSL	100 KCAS to Mach 1.4	1.2 hours	0.5 to 1.0 hour
Dissimilar Air Combat Tactics	Multi-aircraft and multi-adversary (involving dozens of aircraft) defense and combat air patrol, defense of airspace sector from composite force attack, intercept and destroy bomber aircraft, avoid adversary fighters, strike-force rendezvous and protection	MOA, Restricted Areas, and ATCAA	300 AGL to 60,000 MSL	100 KCAS to Mach 1.4	1.0 hour	0.75 to 1.0 hour
Mission Employment	Multi-aircraft and multi-adversary (involving dozens of aircraft) composite strike force exercise (day and night), systems check, air refueling, strike force defense and escort, air intercepts, electronic countermeasures, combat air patrol, defense against composite force, bomber intercepts, defensive countermeasure (flare/chaff) use	MOA, Restricted Areas, and ATCAA	300 AGL to 60,000 MSL	100 KCAS to Mach 1.4	1.5 hours	1.5 hours
Attack Tactics	2 vs. 2, 2 vs. 4 or 4 vs. 4 aircraft, low-to-high altitude tactical weapons delivery and escape maneuvers (day and night)	MOA, Restricted Areas (over weapons delivery ranges), and ATCAA	Surface to 60,000 MSL	350 to 600 KCAS	1.5 hours	0.75 to 1.0 hour

1. Military Operations Area (see section 2.2.2 for definition)
2. Air Traffic Control Assigned Airspace (see section 2.2.2 for definition)
3. Knots Calibrated Airspeed
4. Restricted Area (see section 2.2.2 for definition)

1. *Air Combat Command (ACC) and Major Range and Test Facility Base. Under* Air Force policy and instructions, implementation of the FDE program and WS is the responsibility of the major command operating the new aircraft. FDE activities occur at a base with a Major Range and Test Facility Base components as described in DoD Directive 3200.11. ACC is the major command receiving the F-22s and is the Air Force's primary fighter command, so ACC is responsible for the F-22 FDE program and WS, as well as eventual deployment of the aircraft to operational units. To ensure it meets its responsibilities, ACC would maintain command and control over these programs throughout their existence. Basing the F-22 FDE program and WS at an ACC base with associated Major Range and Test Facility Base components would also fulfill these responsibilities because of the special funding authorities and assets associated with such bases.

2. *Runway Length.* The landing and takeoff for the F-22 under the FDE program and WS require an 8,000-foot runway that includes an arresting cable.

3. *Ramp Space.* The fully established FDE program and WS would require a total of 17 F-22 aircraft for testing and tactics development and graduate-level combat training of instructor pilots. Therefore, a base must offer sufficient ramp space to park 17 F-22s for the FDE program and WS.

4. *Security Restrictions.* Because the F-22 represents the newest and most sophisticated fighter aircraft in the world, knowledge of its systems and capabilities would provide a potential advantage to adversaries. For this reason, the ability to observe specific F-22 FDE flying activities must be restricted. Both the base for the F-22 beddown and the ground underlying the airspace associated with the base must prohibit unauthorized observation of these aircraft operations.

5. *Airspace.* The F-22 FDE program and WS need a large airspace area that overlies land and accommodates supersonic flight activities. To provide sufficient area for air-to-air combat maneuvering by F-22 aircraft, the base must have nearby Military Operations Area (MOA), restricted airspace, or a combination of both measuring 100 by 50 nautical miles (NM) and must overlie land to accommodate range instrumentation and realistic threat simulation. This area should offer sufficient airspace for an F-22 to identify an adversary aircraft, lock-on with a weapons system, and close with the opposing aircraft. Due to the increasing capabilities of non-U.S. advanced fighters and air-to-air missiles, airspace offering 100 NM separation between opposing aircraft should be considered a minimum. The airspace must also permit substantial vertical maneuvering, offering altitudes from surface or near surface to 60,000 feet MSL. Since the upper altitudes of MOAs generally stop at 18,000 feet MSL, the airspace also needs to include Air Traffic Control Assigned Airspace (ATCAA) above the MOA(s) to accommodate the flight training requirements.

6. *Ordnance Use and Ranges.* Under an FDE program and WS, the functionality of all systems, including ordnance delivery systems, requires evaluation and use under tactical conditions. To fully evaluate and use these systems, the FDE program and WS must

conduct test and training activities at a range that permits delivery of training (inert or nonexplosive) and live (explosive) ordnance. Performance of the aircraft and the weapons must also be monitored from the point of release to the point of impact. For the F-22 FDE program and WS, a range must be available that provides full instrumentation for use of weapons with the aircraft.

7. *Range Instrumentation System.* A significant proportion of FDE program and WS activities for the F-22 would involve employing and evaluating the full range of maneuvers that would be used in combat. These activities, in part, test the capabilities of the aircraft and pilot in realistic combat training situations. To provide the realism needed for these activities, the F-22 must engage in combat training with other aircraft and against adversary aircraft. Given the speed of modem aircraft and the pace of combat engagements expected in the F-22 programs, a range instrumentation system must provide for live monitoring and recording of flight activities. Instructors and pilots can then review the training engagement and use the feedback to improve performance and tactics. Air combat engagements for testing and training regularly involve dozens of aircraft, so the base and airspace supporting the F-22 FDE program and WS must offer an instrumentation system capable of monitoring and recording multiple aircraft simultaneously.

8. *Realistic Threats.* An important element of the F-22's value to the Air Force stems from its expected capability to avoid and defeat the variety of ground-based surface-to-air missile and anti-aircraft-artillery systems maintained by potential enemies of the U.S. To ensure and refine that capability and the tactics used in its employment, the F-22 FDE program and WS need to operate against simulated ground-based threats that provide the variability and realism expected in actual combat. Therefore, the F-22 should operate in airspace that overlies an array of realistic, flexible electronic emitters that simulate the types of enemy radar anticipated in a variety of combat scenarios.

9. *Training Exercises.* The FDE program and WS contribute to pilot readiness to successfully perform combat missions. To augment the synergy needed for FDE program and WS, the F-22 must engage in realistic combat training with other aircraft and against adversary aircraft. To achieve this type of training, a base must offer an organizational structure and mission, as well as access to airspace and other interrelated training assets, that promote interaction of the F-22 with a variety of other aircraft through major exercises.

2.1.4 Identification of Basing Location for F-22 FDE Program and WS

To meet the specific and unique requirements of the F-22 FDE program and WS, a location must satisfy the overall considerations as well as fulfill each basing criteria. Only one location, Nellis AFB and the associated NRC, best meets these requirements.

APPLYING OVERALL CONSIDERATIONS TO NELLISAFB: Nellis AFB and its associated ranges and airspace (i.e., NRC) meet the overall considerations important to basing the F-22 FDE program and WS, as outlined in section 2.1.1.

1. *Integrated Battlespace Environment for Testing and Training.* The NRC offers one of the best sets of facilities, ranges, infrastructure, and airspace to provide an integrated battlespace environment.

2. *Interaction of the F-22 FDE Program and WS.* Nellis AFB offers the unique opportunity for interaction between the F-22 FDE program and WS. The Air Force needs to test and evaluate the operational characteristics of the F-22 aircraft through the FDE program. The WS staff need to incorporate the results of tactics developed through test and evaluation into the WS curriculum so that state-of-the-art tactics and techniques can be taught to the pilots from operational F-22 squadrons located throughout the world. F-22 tactics developed by the WS would be used in a wide range of simulated combat conditions by the FDE program. As threats change through time, tactics would require consistent re-evaluation and refinement by the FDE and WS staff. Co-locating the FDE program and WS on the same facility would create a continuous tactics improvement cycle. Nellis AFB has been and remains the Air Force's only location for both the fighter aircraft FDE program and WS. This personnel interaction between the FDE program and the WS at Nellis AFB has existed for many years and currently exists for other aircraft (e.g., F-16s, F-l 5s). This interaction, or synergy, has proven invaluable to developing the full combat potential of the aircraft and the aircrews.

3. *Maximum Use of Existing Infrastructure.* Basing the F-22 FDE program and WS at Nellis AFB would require minimal changes to its infrastructure. To accommodate the specific requirements of these programs, no changes would need to occur in Nellis AFB's organization, its associated ranges or airspace, security measures, range instrumentation and threat simulators, or major force exercises. Only minor construction and facility upgrades on-base would be needed. The F-22 FDE program and WS could be directly integrated into the long-established testing and training activities that form part of the daily routine for the base.

APPLYING BASING CRITERIA TO NELLIS AFB: The basing criteria, as well as the flying and mission considerations listed in section 2.1.2, are addressed below.

ACC Major Range and Test Facility Base. As an ACC base with Major Range and Test Facility Base components, NRC, and the 422nd Test and Evaluation Squadron, Nellis AFB meets this criterion. There already exists a Test and Evaluation Squadron and Weapons School at Nellis AFB to receive the F-22s and incorporate them into their missions without duplication of personnel and resources.

2. *Runway Length.* Nellis AFB includes two runways, each measuring longer than 10,000 feet and exceeding the 8,000-foot criterion for the F-22 FDE program and WS.

3. *Ramp Space.* Nellis AFB can accommodate over 150 aircraft on its ramps at the same time. No additional ramp space would be needed for the F-22 beddown.

4. *Security Restrictions.* Nellis AFB offers standard, high-level Air Force security, particularly along the flightline and ramp areas. No unauthorized individuals may enter

the base, and security forces guard all entry points and the base boundary. Nellis Air Force Range (NAFR), as part of the NRC, offers more than 3 million acres of land restricted from public entry and patrolled by security forces.

5. Airspace. Airspace comprising the NRC lies within 20 NM of Nellis AFB. It includes MOAs and restricted areas that cover approximately 150 by 80 NM and contiguous airspace that exceeds the 100 by 50 NM criterion. All of this airspace overlies land, with roughly one-half extending from the surface to unlimited altitudes and the other half extending from 100 feet AGL to 60,000 feet MSL (including ATCAA). Range instrumentation and realistic threats underlie this airspace. Approximately 70 percent of the NRC airspace supports supersonic flight, with portions authorized for flights as low as 100 feet AGL (in a restricted area only) and 60,000 feet MSL or higher. With these attributes, the NRC airspace associated with Nellis AFB meets the specific criteria for basing the F-22 FDE program and WS.

6. *Ordnance Use and Ranges.* NAFR, managed and operated by Nellis AFB, meets this basing criterion. It includes more than 1,300 targets within 174 target complexes. A total of 73 target complexes permit ordnance delivery with live (explosive) weapons ranging from 20 mm cannon rounds to 2,000-pound bombs. Targets within NAFR also permit use of training ordnance. Almost every type of conventional (i.e., non-nuclear) air-to-ground ordnance is authorized for use on NAFR. Live fire of air-to-air munitions is not conducted at Nellis AFB. The subranges and target complexes within NAFR provide monitoring and scoring instrumentation for ordnance delivery.

7. *Range Instrumentation System.* NAFR provides extensive live monitoring, recording, and tracking instrumentation to support testing and training. The Range Control Center at Nellis AFB can track and monitor a single aircraft's entire mission or a multi-aircraft exercise (up to 100 aircraft simultaneously). The range instrumentation system available at Nellis AFB provides coverage for the NRC airspace. For these reasons, it meets this basing criterion.

8. *Realistic Threats.* NAFR offers realism and simulated threats required to meet the basing criteria for the F-22 FDE program and WS. NAFR includes multiple electronic threat simulators and communications jamming equipment that defend 174 target complexes containing more than 1,300 simulated targets. These established electronic threats are used to train and test aircrews and weapon systems in a realistic battlespace environment. These threats simulate the full range of anticipated enemy air defenses, including radar units for target acquisition, surface-to-air missiles, and anti-aircraft artillery. This substantial array of equipment provides realistic threats for both testing and training operations.

9. *Training Exercises.* Nellis AFB, along with the NRC, represents the Air Force's premier location to conduct complex, multi-aircraft combat training exercises. Nellis AFB conducts Red Flag and Green Flag large-force exercises every year, as well as numerous other exercises. Red and Green Flag are special large-force training exercises that realistically simulate aircrew deployment, actual battlefield combat, and the intense

tempo of air warfare. The FDE program and WS would also participate in these exercises. In terms of the F-22 programs, participating in these Nellis AFB programs would fulfill the basing requirement defined above.

2.1.5 Alternatives Considered But Not Carried Forward

In compliance with NEPA and Air Force Instruction (AFI) 32-7061, which implements the NEPA process, the Air Force must consider reasonable alternatives to the Proposed Action. Only those alternatives determined as reasonably able to fulfill the need for a proposed action warrant detailed analysis. The following presents the analysis of possible alternatives for basing the F-22 FDE program and WS.

The purpose of the action discussed in this EIS is to implement both the F-22 FDE program and WS. To achieve that purpose, the Air Force must implement the FDE program and WS at a base that meets the specific and unique requirements of each program- Although many bases are capable of accommodating F-22 operational units, the FDE program and WS have requirements different from those needed for the operational units.

OTHER BASES: Of the 61 bases within the Air Force with an active flying mission, only two represent ACC bases with Major Range and Test Facility Base components: Nellis AFB, Nevada, and Holloman AFB, New Mexico. Other bases, such as Edwards AFB in California, have Major Range and Test Facility Base components, but are not under ACC command and control.

Holloman AFB primarily supports operational and training units of F-l 17, F-4, T-38, and Tornado (German Air Force) aircraft- This base is organized and structured for these operational and training units, not for FDE program and WS. It operates the White Sands Missile Range, Major Range and Test Facility Base components, although it also conducts testing on the nearby White Sands Missile Range. Testing at the White Sands Missile Range emphasizes ground-based engineering, as well as radar, missile, and aircraft testing. While it represents a DoD center of excellence for these capabilities and supports diverse operational units, Holloman AFB does not meet the specific and unique requirements for the F-22 FDE program and WS. At a minimum, it does not meet the considerations and criteria enumerated in section 2.1.1 and 2.1.3 because it lacks the following elements: integrated battlespace environment (consideration 1), existing infrastructure for an FDE program (consideration 3), range instrumentation for tracking and providing feedback to numerous aircraft simultaneously (criterion 7), threat simulation for a realistic battlespace environment (criterion S), and support for large-force training exercises involving a broad spectrum of aircraft and situations (criterion 9).

Edwards AFB and its Air Force Flight Testing Center serve as the primary location for flight testing new aircraft in their initial or developmental stages. The base offers infrastructure to support many types of test aircraft. Airspace and ranges associated with or near the base provide the assets and instrumentation needed for the specific type of aircraft testing performed at Edwards AFB. Although an important test center for the Air Force, Edwards AFB does not meet the specific and unique requirements for either the F-22 FDE program or the WS. It does not meet the overall consideration presented for these F-22 programs (refer to section 2.1. 1), since it

does not offer an integrated battlespace environment. Placement of the F-22 programs at Edwards AFB would require major changes to base and training range infrastructure. Of the nine basing criteria listed in section 2.1.3, Edwards AFB and associated assets fail to meet five. It is not an ACC base (criterion I), it lacks the range instrumentation (criterion 7) and realistic threat environment (criterion 8) essential to the FDE program and WS, and it offers neither the ranges (criterion 6) nor support for large-force training exercises (criterion 9).

COSTS: It is not possible to exactly quantify the costs to duplicate the existing infrastructure, airspace, and personnel for FDE program and WS at an installation other than Nellis AFB and the NRC. Multiple actions would be needed at Holloman AFB and nearby Army training ranges to duplicate FDE program and WS capabilities existing at Nellis AFB. Similar changes would be needed to alter Edwards AFB to duplicate the capabilities at Nellis AFB. A conservative list of these actions includes enhancing electronic threats and targets; improving range instrumentation with tracking, scoring, and related teaching facilities; adding security and airspace modifications; and providing new or relocated personnel to perform comprehensive FDE program and WS functions. Additional construction would be needed at either Holloman AFB or Edwards AFB. The net result would cost an additional $45 to $80 million to duplicate most FDE program and WS capabilities currently available at Nellis AFB and the NRC.

SPLITTING THE PROGRAMS: Splitting the programs, with FDE at one location and WS at another, would not represent a reasonable alternative. It would eliminate the synergy achieved when both reside at a single base and subsequently increase the costs and resources involved. The changes outlined above would be required at both locations if either program were placed at a location other than Nellis AFB. Holloman AFB would require additional ramp space and new maintenance, support, and operations facilities, costing approximately $80 million in order to support the beddown of the FDE program. Edwards AFB would also require new facilities to support the beddown at a cost of approximately $45 million. This increase in cost and lengthening of the timeline to implement the beddown could delay the entire program, potentially diminishing national defense capabilities.

SUMMARY: Basing the F-22 FDE program or WS at a base other than Nellis AFB would not represent a reasonable alternative. Other bases would need to make extensive changes to their infrastructure, organization, existing programs, and airspace and ranges in order to meet the requirements of the F-22 FDE program and WS. To provide the integrated battlespace environment and level of training exercises important to FDE program and WS, the Air Force would need to make wholesale changes to the ranges and the exercises held there. Such changes would conflict with the overall basing consideration regarding minimizing change by employing existing assets and would:

- require additional time to establish the FDE program and WS, delaying the entire F-22 program and potentially diminishing national defense capabilities;
- increase the costs of implementing the F-22 program substantially; and
- could result in more extensive actions with greater effects on the environment than those potentially occurring from the Proposed Action.

No location or combination of locations other than Nellis AFB would meet the specific requirements for basing the F-22 FDE program and WS. No reasonable action alternative to Nellis AFB exists, since none would fulfill the purpose and need for the proposal.

2.1.6 Alternatives Carried Forward for Analysis

The Air Force and ACC's existing fighter FDE program and WS are currently located at Nellis AFB, so it represents the location of the Proposed Action. Nellis AFB, its ranges, and its airspace already exist and meet both F-22 program needs. Therefore, two alternatives were carried forward for detailed analysis in this EIS: No-Action and the proposed beddown of the F-22 at Nellis AFB. The No-Action Alternative is detailed in section 2.2, and a description of the Proposed Action follows in section 2.3.

2.2 NO-ACTION ALTERNATIVE

Under NEPA, "No-Action" means that the Proposed Action (i.e., F-22 beddown at Nellis AFB) would not take place, and the resulting environmental effects from taking no action would be compared to the effects of permitting the Proposed Action to go forward. Under the No-Action Alternative for this EIS, no F-22 beddown would occur at Nellis AFB, no on-base construction or personnel increases would be implemented, and the FDE program and WS for the F-22 would not use the NRC.

The following sections describe the current activities at Nellis AFB and the NRC. Nellis AFB, its location, infrastructure, operations, and personnel are discussed first; a description of the NRC follows. These descriptions of the current status of Nellis AFB and NRC provide a context for presenting the changes associated with the Proposed Action (section 2.3).

2.2.1 Nellis AFB

Nellis AFB is located in the southeast comer of the state of Nevada, adjacent to the cities of Las Vegas and North Las Vegas in Clark County (refer to Figure 1. 1- 1). Nellis AFB is the point of departure and return for most of the training and testing activities conducted at the NRC. Nellis AFB provides logistics support for the NRC and for the aircraft and personnel using it. The base is the command, communications, and operations center for units using the NRC.

The base lies five miles northeast of the City of Las Vegas. The unincorporated town of Sunrise Manor and undeveloped portions of Clark County encompass the majority of the base. Covering 11,450 acres, the base contains three major functional areas (Figure 2.2-l). Area I, the main base, is located east of Highway 604. Northeast of the main base lies Area II, and west of Highway 604 is Area III. The areas north, east, and southeast of Nellis AFB are primarily open range and mountains, with urban uses along Highway 604. Directly southwest of the base, commercial and residential land use dominates, although there are some industrial activities.

The mission of Nellis AFB is to provide realistic combat training involving every type of aircraft in the Air Force inventory. It also supports test and evaluation programs and weapons schools for all Air Force fighter aircraft: F-l 5C/Ds, F-15Es, and F-16s. The organizational structure of

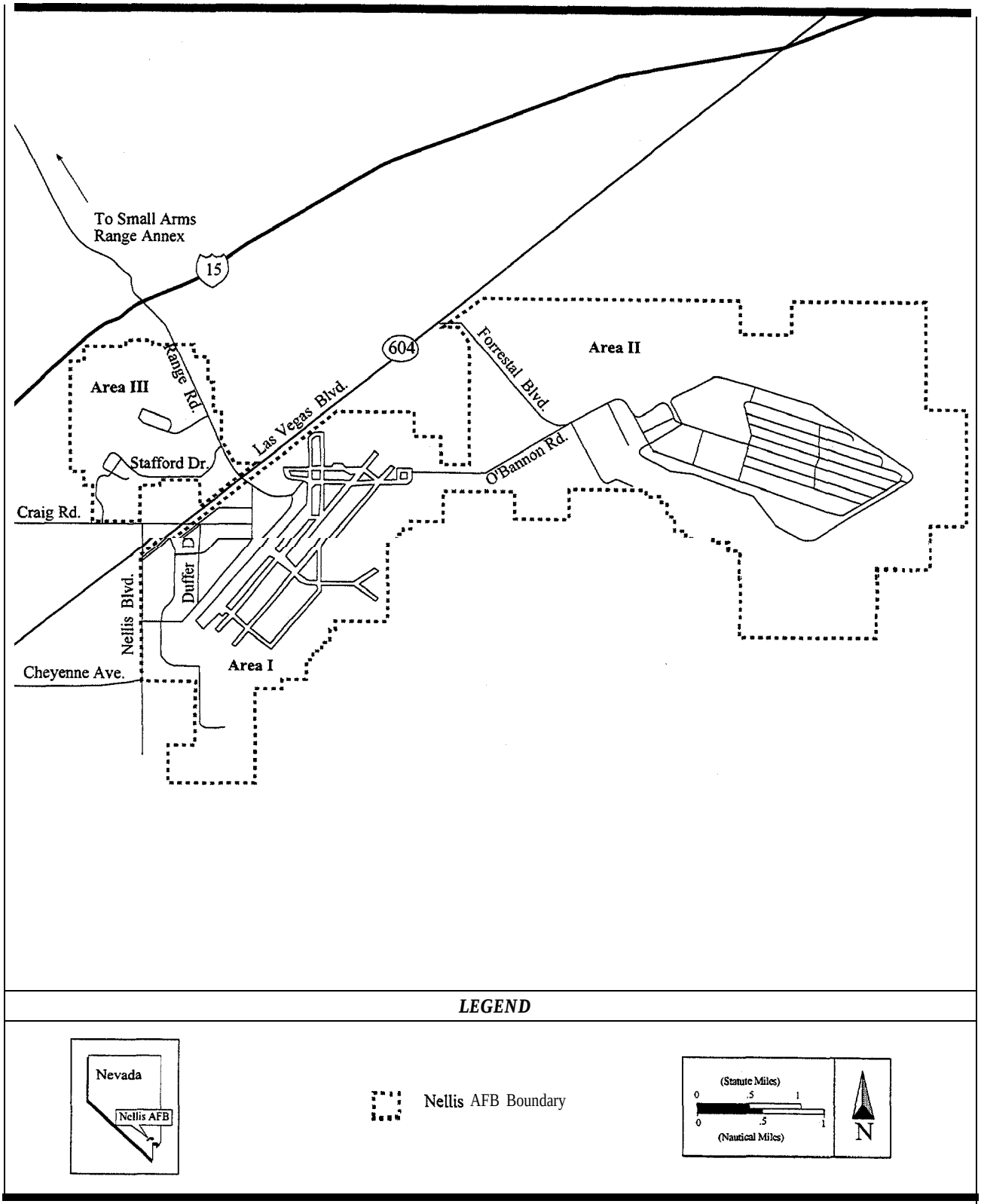

Figure 2.2-l. Nellis AFB

Nellis AFB includes two major wings and several other units. Table 2.2- 1 summarizes the major units relevant to the FDE program and WS and their functions.

Table 2.2-l. Nellis AFB Units Relevant to the No-Action Alternative and Proposed Action

Unit	*Relevant Functions*
Air Warfare Center	. Manages advanced pilot training and integrates test and evaluation requirements . Operates, maintains, and develops NAFR . Manages NRC airspace
99th Air Base Wing	. Host wing for Nellis AFB . Oversees all day-to-day operations and functions
57th wing	. Ensures realistic training in combined air, ground, and electronic threat environment . Oversees Air Force Weapons School
4 14th Combat Training Squadron	. Conducts large-force exercises involving combat training for multiple "friendly" and "adversary" forces
422nd Test and Evaluation Squadron	• Performs operational test and evaluation of aircraft and equipment . Develops tactics . Operates A-10, F-15C/D, F-15E, and F-16C aircraft
Air Force Weapons School	. Provides an advanced combat training course in weapons and tactics • Trains graduate-level fighter aircrews for all fighter aircraft

In addition to the 422nd Test and Evaluation Squadron, which conducts operational test and evaluation for all Air Force fighter aircraft, and the Air Force Weapons School, which provides graduate level training in weapons and tactics for fighter aircraft, Nellis AFB hosts and conducts large-force exercises in the NRC for U.S. and allied air forces.

The 4 14th Combat Training Squadron conducts large-force exercises that maximize the combat readiness and survivability of participants by providing a realistic training environment. Red Flag and Green Flag are special multi-week large-force exercises that realistically simulate aircrew deployment and combat situations. Red Flags are complex, full-scale simulated wars, complete with aggressor aircraft using potential adversary tactics. These exercises teach units how to deploy and operate in an integrated manner. In a typical Red Flag exercise, Blue Forces (friendly) engage Red Forces (aggressor) in combat situations. Blue Forces are made up of units from ACC, Air Mobility Command, U.S. Air Forces Europe, Pacific Air Forces, Air National Guard, U.S. Air Force Reserve, Army, Navy, Marine Corps, and allied air forces. They are led by a Blue Forces commander, who orchestrates the deployment plan. Red Forces are composed of Red Flag's Adversary Tactics Division and provide realistic threats through the emulation of

enemy tactics. In a typical year, the Air Force plans five Red Flag exercises at Nellis AFB and the NRC.

Green Flag, the Air Force's premier electronic warfare flying exercise, is held once a year and usually involves about 400 people drawn from allied and U.S. Air Force units from around the world. The event is subdivided into three consecutive two-week programs, with new units involved in each. Green Flag focuses on military intelligence, which is gathered, analyzed, and distributed during the exercise. Each two-week segment is normally commanded by a general officer functioning as a joint force, air component commander and involves air operations and battle planning staffs. Intelligence-gathering aircraft play a key role in these events.

NELLIS AFB ASSIGNED AIRCRAFT AND AIRFIELD OPERATIONS: Under the No-Action Alternative, the number and nature of aircraft assigned to Nellis AFB and the quantity and type of airfield operations would remain unchanged from the baseline conditions described below. Table 2.2-2 lists the aircraft force structure currently stationed at Nellis AFB. Since Nellis AFB supports major force exercises such as Red Flag and Green Flag, more than a dozen types of transient aircraft (visitors not based at Nellis AFB) temporarily operate from the base during exercises. These aircraft range from U.S. B-1B bombers to fighters such as the Mirage 2000 and Tornado, which are operated by U.S. allies. Table 2.2-3 summarizes the principal operational tasks of the major types of aircraft that are stationed at Nellis AFB, use the base as transients, or operate on the NRC. Other aircraft at Nellis AFB are minor transient users and are not listed.

Table 2.2-2. Aircraft Assigned to Nellis AFB

Aircraft Type	HH-60'	A-10	F-15C	F-15E	F-16C	Total
Number of Aircraft	15	18	26	17	52	128

1. Helicopter

The Nellis AFB airfield airspace environment is included in Class B airspace that the Federal Aviation Administration (FAA) designates around the nation's busiest airports. Designed for air traffic operating under instrument flight rules, Class B airspace for Nellis AFB extends around Nellis AFB and Las Vegas' McCarran Airport (Figure 2.2-2). Class B airspace requires that all aircraft operating within the area be in contact with the air traffic control facility. Stealth aircraft use a transponder to transmit locations to air traffic controllers. Figure 2.2-2 also shows aircraft departure and arrival routes in the immediate vicinity of Nellis AFB for the parallel runways serving the base. These runways extend northeast-southwest.

Throughout this document, three terms are used to describe aircraft activities: ***sortie, airfield operation,*** and ***sortie-operation.*** Each has a distinct meaning and commonly applies to a specific set of activities in particular airspace units. A ***sortie*** consists of a single military aircraft from takeoff through landing. For this DEIS, the term sortie is commonly used to summarize an amount of flight activity from Nellis AFB. In contrast, ***an airfield operation*** represents the single movement or individual portion of a flight in the base airfield airspace environment, such as one takeoff, one landing, or one transit of the airport traffic area. A single sortie generates at least

Table 2.2-3. Major Types of Aircraft Operating at Nellis AFB and in the Nellis Range Complex

Aircraft Type	*Status*	*Description*
A-10 and OA-10 Thunderbolt II	B/T	Low-altitude, heavily protected aircraft designed to defeat armored vehicles and act as forward air controller
AV-8B Harrier	T	Close support attack aircraft used by the Marine Corps; has short takeoff and vertical landing capabilities
B-1B Lancer	T	Long-range, high- low-altitude bomber Derforminn deep interdiction strikes
B-2 Spirit	T	Long-range, high- low-altitude bomber performing deep interdiction strikes with stealth technology
B-52H Stratofortress	T	Long-range, high- low-altitude bomber performing deep interdiction strikes.
C-130 Hercules	T	Four engine turboprop transport
C-17A Globemaster	T	Long-range, heavy lift cargo transport
E-3 Sentry	T	Airborne Warning and Control System (AWACS) capable of high- or low-level surveillance of air vehicles over all types of terrain
E-SC Joint STARS	T	Multi-engine aircraft modified with a side-looking radar for ground surveillance, targeting, and battle management missions
EA-6B Prowler	T	Navy all-weather, electronic warfare aircraft capable of detecting, locating, jamming, and destroying enemy air defense radar; now employed by the Air Force to replace the EF- 111
F/A-l 8C/D Hornet	T	Navy, Marine, and Canadian Air Force twin-engine, multi-mission tactical air-to-air and air-to-ground fighter aircraft
rF-4 Phantom	T	Multi-role fighter for air-to-air combat and close support interdiction missions
F- 14 Tomcat	T	Navy long-range, swing-wing tighter specializing in air-to-air combat and interdiction strikes
F-15C Eagle	BIT	Performs air-to-air combat and air intercept operations. No surface attack missions
F- 15E Strike Eagle	B/T	Air-to-ground fighter performing air strike missions
F- 16C/D Fighting Falcon	B/T	Multi-role fighter performing close air support, air-to-air combat, interdiction strikes, and suppression of enemy air defenses
F- 117A Night Hawk	T	Light bomber with stealth technology
HH-60G Pave Hawk	B	Combat search and rescue helicopter designed for long-range, rapid-response missions
KC-135R KC-10A	T	High-altitude air refueling aircraft to support varied aircraft missions
Mirage 2000	T	High performance delta-winged fighter-bomber used by foreign air forces
Unmanned Aerial Vehicles	B*	Unmanned aerospace vehicles providing long endurance, unmanned aerial reconnaissance, surveillance, and target acquisition
RC-135 Rivet Joint	T	Surveillance aircraft equipped with sophisticated intelligence-gathering devices for monitoring enemy electronic activity
C-141 Starlifter	T	Transport aircraft for supplies, equipment, and troops
Tornado	T	Supersonic swing-wing interceptor, attack, and reconnaissance aircraft used by air forces of the United Kingdom, Italy, Germany, and Saudi Arabia

Notes: B = Based, T = Transient for exercises, B*= Based at Indian Springs Air Force Auxiliary Field and operated only in NAFR

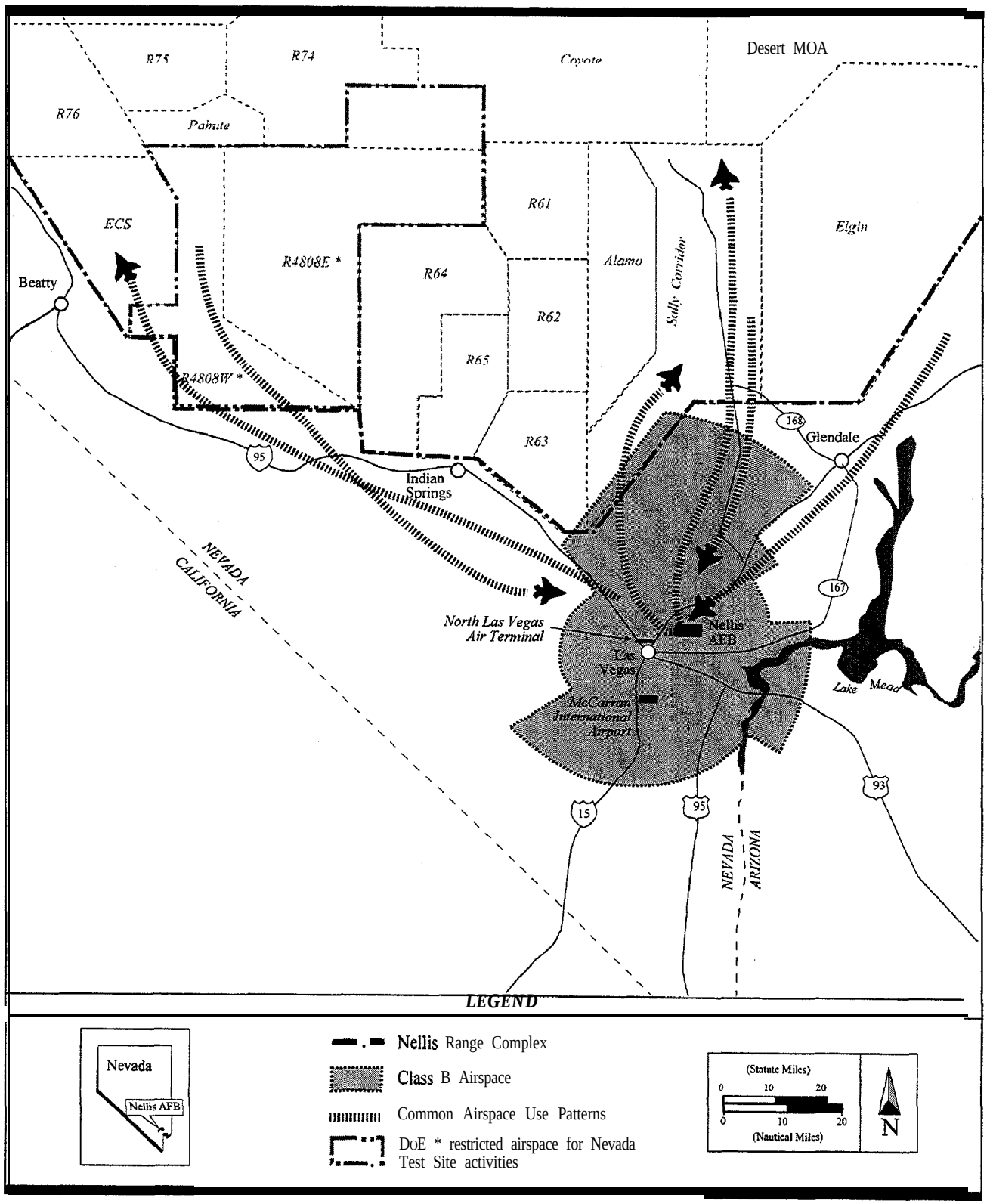

Figure 2.2-2. Nellis Air Force Base Terminal Airspace and Departure/Arrival Routes

two airfield operations (takeoff and landing), **and** a sortie can result in more than one *sortie-operation.* A sortie-operation is defined as the use of one airspace unit (e.g., MOA, Restricted Area) by one aircraft. Sortie-operation applies to flight activities outside the airfield airspaceenvironment. Each time a single aircraft conducting a sortie flies in a different airspace unit, one sortie-operation is counted for that unit.

Annual airfield operations at Nellis AFB since 1987 (Air Force 1997f) have varied between 6 1,000 and 181,000. This variation has resulted from budget constraints, aircraft realignments, and changes in the number, composition, and duration of the exercises conducted at Nellis AFB. Table 2.2-4 presents the annual airfield operations and annual sorties at Nellis AFB for 1997 by aircraft type and according to day or night operations. In 1997, airfield operations totaled about 68,000, and this total is representative of airfield use in recent years.

Table 2.2-4. 1997 Annual Airfield Operations and Sorties at Nellis AFB

Aircraft Type	*Annual Airfield Operations*		*Annual Sorties*
AIRCRAFT BASED AT NELLIS AFB	Day (7:00 AM – 10:00 PM)	Night (10:00 PM – 7:00 AM)	
A-10	4,558	81	2,319
F-15	10,938	**1,344**	**6,141**
F-16	20,420	2,876	**11,648**
HH-60	3,892	65	1,978
TRANSIENT AIRCRAFT	**22,958**	624	**11,791**
TOTAL	62,766	4,990	33,877

In 1997, sorties for aircraft based at Nellis AFB, including those for A- 1 Os, F- 16s, F- 15s, and HH-60 helicopters, totaled roughly 22,000, with approximately 12,000 additional sorties conducted by transient aircraft.

FACILITIES AND INFRASTRUCTURE: Nellis AFB includes a well-developed infrastructure supporting a broad spectrum of functions and organizations. Covering 11,450 acres, the base consists of three functional areas (see Figure 2.2-l). Area I, the main base, occupies about 3,450 acres and contains runways, flightline, industrial facilities, housing, and administrative and support facilities. This main area contains over 2,000 buildings, including more than 1,200 family housing units, dormitories, and billeting facilities. Area II (approximately 6,800 acres) includes primarily weapons storage and a small housing area and recreational facilities, whereas Area III (about 1,200 acres) supports housing, recreational facilities, and some light industrial areas interspersed with open space. Under the No-Action Alternative, no change to the existing infrastructure would occur.

PERSONNEL: No additions of personnel would occur under the No-Action Alternative. Estimated personnel levels at Nellis AFB would remain unchanged from the present, as shown in Table *2.2-5.*

Table 2.2-5. Nellis AFB Personnel

	Military	C[redacted]	*Total*
Nellis Personnel	6,400	2,600	9,000

Source: Estimated from Air Force 1996d

2.2.2 Nellis Range Complex

The NRC (Figure 2.2-3) refers to the NAFR and its associated airspace, as well as military training airspace adjacent to NAFR. The airspace overlying these two areas covers approximately 12,000 square NM. Two airfields, Indian Springs Air Force Auxiliary Field and Tonopah Test Range Airfield, lie within NAFR and support the activities performed within the complex. Under the No-Action Alternative, no change would occur to the size, structure, or management of the NAFR or the airspace associated with the NRC.

NELLIS AIR FORGE RANGE: NAFR was established by Executive Order in 1940 as the Las Vegas Bombing and Gunnery Range. From 1942 until 1959, the range operated under numerous Executive Orders and Public Land Orders. In 1959, operating authority was established in compliance with the Engle Act (Public Law 87-3 10). During the 1960s, 1970s, and 1980s, Air Force requirements to test advanced weapons and tactics necessitated increased security for the range. Redesignated the Nellis Air Force Range, the range extended its exclusive military use with enactment of Public Law 99-606, the Military Land Withdrawal Act of 1986. Unless renewed, this withdrawal or exclusive-use authorization terminates in 200 1. A Final Legislative EIS (Air Force 1999) has been prepared to address the renewal of the withdrawal; it was released in March 1999.

NAFR presents a unique national asset that provides opportunities for testing weapons systems and providing the highest level of training available for military personnel. It is the only location in the U.S. where both individual and large-force training is provided in highly sophisticated exercises that equate to full-scale battlefield scenarios. This training tests tactics, equipment, and personnel. NAFR also supports specialized test and evaluation activities for aircraft, weapons, and reconnaissance systems. NAFR testing and training facilities include realistic threats, operational space, topographic complexity, security, and public safety buffers.

NAFR consists of two main functional areas, the North Range and South Range, both of which accommodate the delivery of live and inert ordnance as well as electronic combat operations (Figure 2.2-4). In total, NAFR covers about 3.1 million acres. Figure 2.2-5 depicts target and electronic threat sites on the North Range and South Range.

The North Range comprises approximately 1.9 million acres of withdrawn land. This includes land withdrawn for exclusive military use by Public Law 99-606 and its amendment (Public Land Order 100-338) of June 17, 1988, which added approximately 89,000 acres to the North Range. An additional withdrawal of 3,972 acres of the Safety and Security Buffer (Public Land

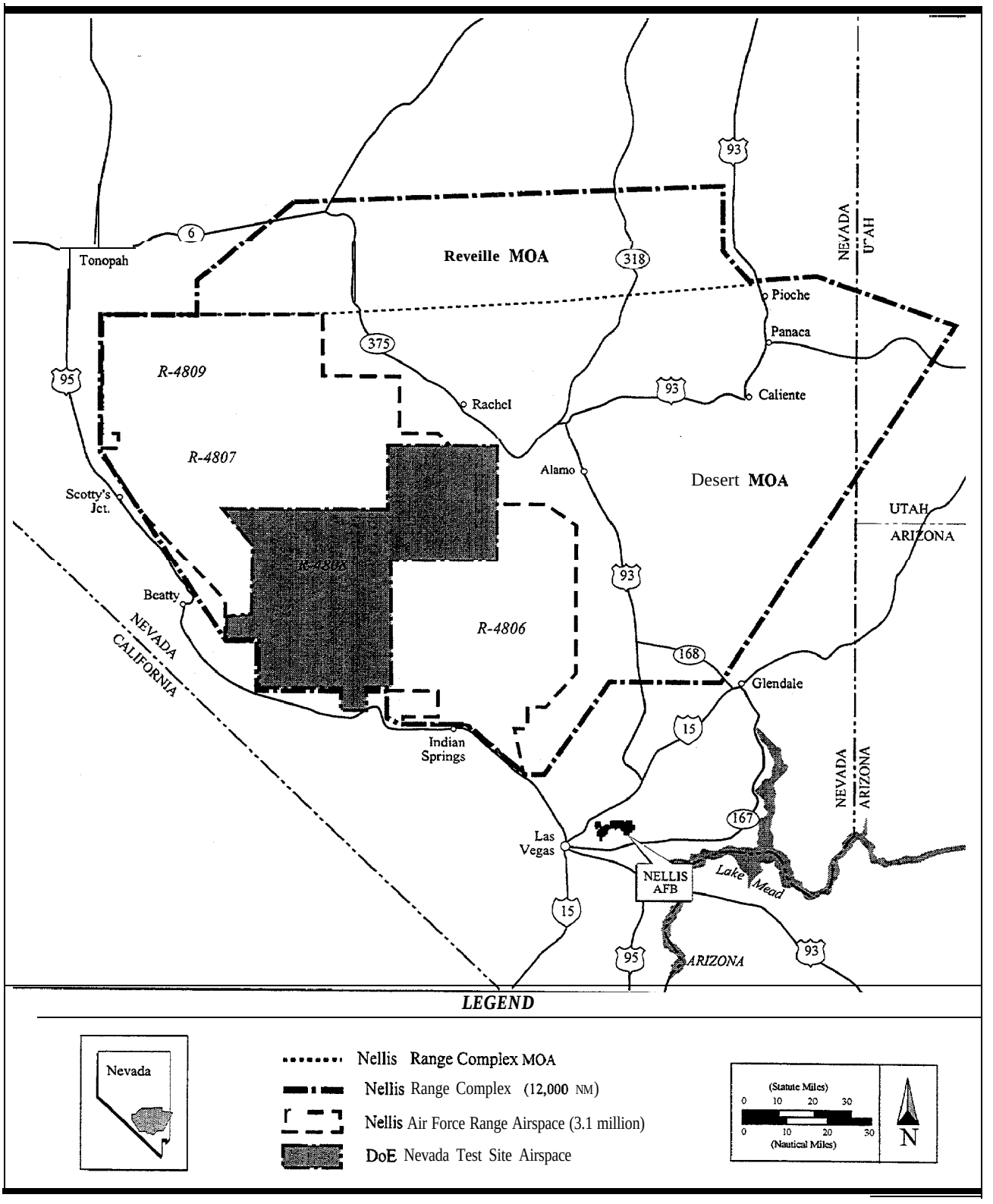

Figure 2.2-3. Nellis Range Complex Airspace

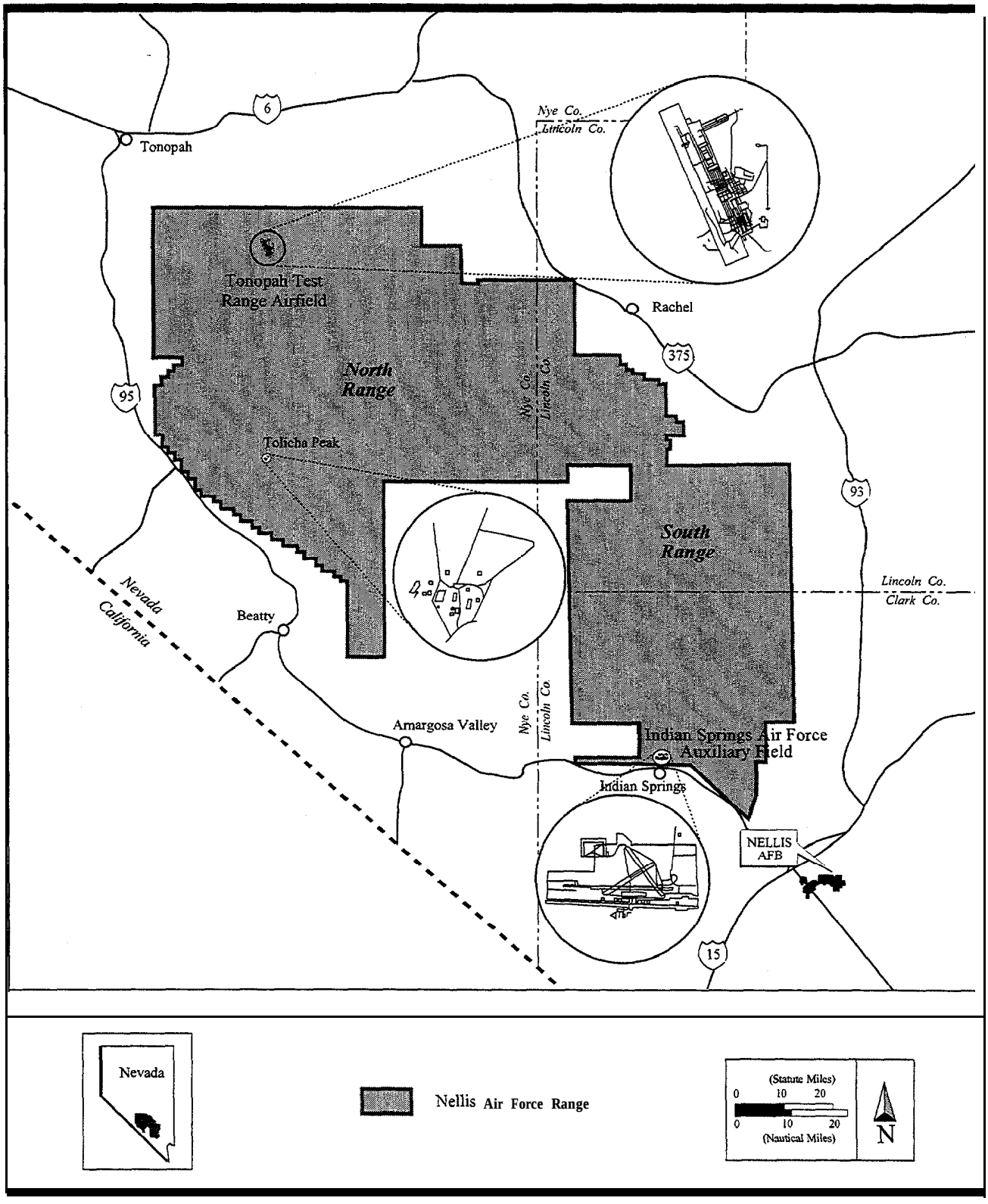

Figure 2.2-4. **Nellis** Air Force Range, North and South Ranges

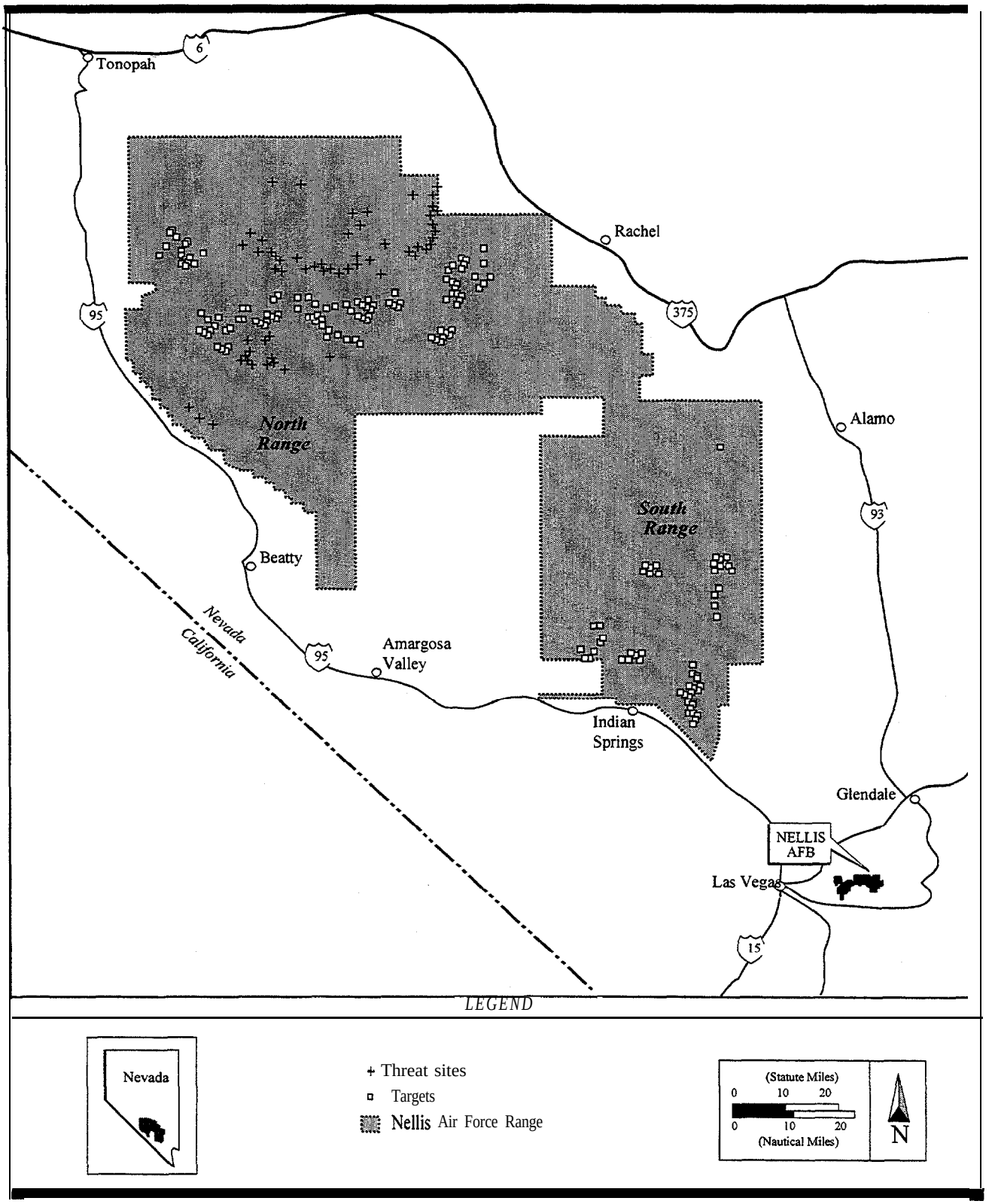

Figure 2.2-5. Nellis Air Force Ranges, Targets, and Electronic Threat Sites

Order 713 1) along the eastern edge of the range was completed in 1993. The North Range also includes Pahute Mesa which is used by the Department of Energy (DOE) through mutual agreement.

The North Range contains four unmanned weapons delivery subranges. It also includes multiple and dispersed facilities supporting three Electronic Combat Ranges: Tonopab Electronic Combat Range, Tolicha Peak Electronic Combat Range, and Electronic Combat South Range. These ranges provide a range of high-to-low electronic threat environments.

The South Range comprises approximately 1.2 million acres of withdrawn land located in the southeastern portion of NAFR. Most of the South Range lands were withdrawn for exclusive military use by Public Law 99-606. The South Range contains five weapons delivery areas consisting of two manned subranges and three unmanned subranges. The area also contains three air-to-air subranges.

The South Range overlaps a portion of the Desert National Wildlife Range, which was established in 1936 for the protection and preservation of desert bighorn sheep. The Memorandum of Understanding between the Air Force and USFWS regarding this overlap has been updated and amended, with the latest version in 1997, to ensure proper management by the respective agencies.

Overall NAFR currently includes 174 tactical target complexes that offer more than 1,300 simulated targets. A total of 73 target complexes permit live ordnance delivery with weapons ranging from 20 mm cannon rounds to 2,000-pound bombs. To improve target complex realism, targets are enhanced with actual or simulated military assets, including a tank battlefront, truck convoys, airfields, industrial complexes, surface-to-air missile sites, and a railroad complete with marshaling yards and a railroad tunnel. Many of these target complexes are defended by electronic threat simulators. These provide a realistic arena for operational testing of weapons systems, tactics, and combat readiness. Threat simulators are electronically and, in many cases, visually similar to equipment likely to be encountered in actual combat. Radar units simulate early warning, ground control intercept, target acquisition, and surface-to-air and anti-aircraft artillery defenses and guidance.

NAFR ground equipment includes radar and communications jamming equipment designed to test and improve the quality of aircrew combat training. Many of the threat simulators are equipped with instruments to collect data that can be used to evaluate and score surface-to-air engagements.

Extensive monitoring and tracking equipment are deployed throughout the range to support testing and training. Data collected on the range and in the supporting airspace are processed by computers located in the Range Control Center at Nellis AFB. The Range Control Center can track a multi-force engagement (up to 100 aircraft simultaneously) or a single aircraft's entire mission. Several different kinds of two- and three-dimensional graphic displays from varying perspectives are produced for evaluation of performance and rapid feedback for tests and training.

NAFR supports extensive testing and training activities:

1. Air-to-air testing and training involves ground-based instrumentation to measure air combat maneuvering, air-to-air gunnery range for aircraft gun bore sight testing, aircraft and missile targets testing, and dynamic and static infrared targets testing.

2. Air-to-ground test capability includes ground-based command, control, communications, and intelligence evaluation; open-air weapons evaluation; aerial targets evaluation; ground, fixed, and mobile targets evaluation; radio frequency and sensor targets (nondestructive) evaluation; sea targets evaluation; cruise missile flight tests; multi-mode missiles and munitions testing; weapons system dispensing (submunitions) testing and evaluation; aircraft and missile targets usage; and dynamic and static infrared targets usage and testing.

3. Electronic combat testing and training uses ground-based instrumentation such as threat simulators, radar tracking units, and electronic scoring systems; these capabilities predominantly support tactics development and integration testing,

NAFR supports realistic training by permitting the use of ground ordnance, both live and inert. Aircrews must be skilled in the use of the full range of conventional Air Force weapons, from unguided ordnance to laser-guided bombs to air-to-ground missiles. NAFR provides for safe training, testing, and evaluation of weapons systems in support of potential technological improvements in hardware, software, tactics, and training. Testing capabilities for weapons systems and live ordnance are prime purposes of the exclusive military use of large land areas. Ordnance testing, particularly of rocket-propelled live ordnance, requires control of all land within range of the ordnance for safety and security.

In recent years, the amount of ordnance used annually on NAFR has varied, with a high of 4,500 tons and a low of 3,000 tons. Inert ordnance represents slightly more than 50 percent of the ordnance expended on the NAFR. Nuclear, chemical, or biological weapons are not used on the range. Use of ordnance is not directly linked to the number of sortie-operations flown in the NRC. Therefore, the amount of ordnance tends to vary year-to-year and would continue to do so under the No-Action Alternative.

The Air Force can currently support use of an extensive inventory of conventional live and inert training ordnance on NAFR. These include a wide range of air-to-ground weapons: so-called "iron" (unguided) bombs; guided bombs and air-to-ground missiles; cluster bombs; rockets; cannon; and soon, a new generation of guided bombs and air-to-ground missiles, some of which contain packages of guided submunitions.

Training ordnance includes no high explosives and commonly consists of a small steel projectile or steel-encased concrete projectile. Constructed to function like actual munitions, inert ordnance ranges in weight from about 10 pounds to 2,000 pounds. Some inert ordnance contains a small spotting charge that generates a puff of smoke to aid in scoring weapons delivery. Live ordnance, as the designation indicates, includes high explosive charges. Live ordnance used in training and testing at NAFR is identical to that used in actual combat. Live ordnance ranges from cluster bomb units to general purpose bombs weighing 2,000 pounds and containing almost 1,200 pounds of TNT-equivalent high explosive. Air-to-ground missiles, such as the AGM-65 Maverick (300-pound explosive warhead) and 2.75-inch rockets are also used on authorized

targets at the NAFR. While air-to-air missile training occurs at the range, safety rules require the missiles remain fixed to the aircraft. No **actual** launching of air-to-air missiles is permitted over NAFR.

Air Force control of NAFR enables flight and ground operations to train and test equipment for the defense of national security interests while minimizing risks to the public. Public protection is ensured at NAFR by excluding the public and non-required military personnel from locations simulating an active, high-stress battlefield environment. The Air Force uses Operational Risk Management for making decisions that promote safe operations. These management procedures produce standards to protect the public, military personnel, and equipment from ordnance impacts.

All firing or release of weapons must be conducted in a manner that ensures impact within the hazard area. For air-to-ground missiles and free-fall guided weapons, the land area and airspace must be large enough to contain the entire flight envelope of the weapon from launch/release to impact. Weapons safety buffers are developed for all aircraft, weapons, and delivery systems employed in training and testing. Safety buffers for all weapons encompass the target area and several miles on either side of the target. As the largest exclusive-use, land-based range in the continental U.S., NAFR can accommodate existing and projected future safety buffers.

Training on NAFR includes realistic threats, so electronic threat emitters are deployed throughout the range. The majority of these threat systems are mobile. Exclusive-use land that extends to the limit of the equipment hazard is required. Some of these systems pose hazards to personnel, who are directed to maintain a safe distance from operating systems. Ground-launched simulated threats, such as simulated Smokey surface-to-air missiles, also present a falling-object hazard and require exclusive-use land to ensure public safety.

Isolation of hazardous materials and dangerous operations from the public and untrained military personnel provides the greatest safety margin. Each weapon system is evaluated for hazards associated with operations, maintenance, and military capability. Operational rules, regulations, and practices minimize the chance of personnel injuries.

NELLIS RANGE COMPLEX AIRSPACE AND AIRSPACE USE: The NRC includes special-useairspace that overlies NAFR withdrawn lands and the adjacent supporting MOA airspace as shown in Figure 2.2-6 and listed in Table 2.2-6. Training activities within the NRC predominantly involve subsonic flight. The restricted areas comprise special use airspace within which the FAA has determined that potentially hazardous activities occur, including air-to-ground ordnance delivery. Nonparticipating military and civil aircraft are precluded from flying within the airspace when the restricted areas are in use. For purposes of scheduling airspace use and tracking sortie-operations, Nellis AFB has subdivided all NRC and DoE special use airspace into areas that are more closely aligned with airspace uses associated with the different target areas, electronic combat ranges, and other support facilities.

Under the No-Action Alternative, the structure, function, and use of the NRC would not change. Variation in the amount of use is likely to occur, but it would remain within the range of variability noted over the past decade or more.

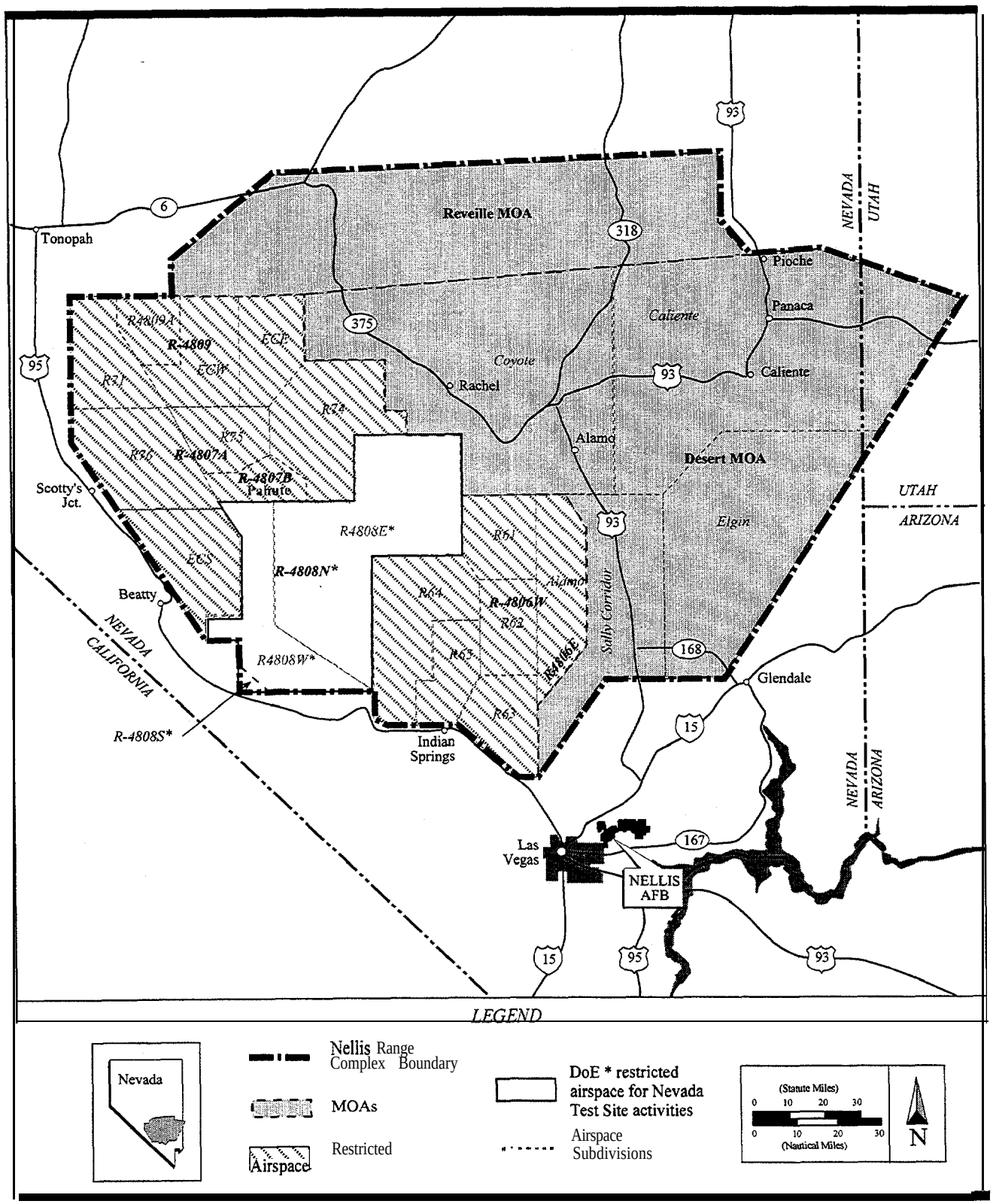

Figure 2.2-6. Nellis Range Complex Airspace Units

Table 2.2-6. Airspace Associated with the Nellis Range Complex

Airspace Unit	*Floor (lower) Altitude*	*Ceiling (upper) Altitude*	*Supersonic Flight Authorized*
Reveille MOA	100 feet AGL	<18,000 feet MSL	Above 5,000 feet AGL
Desert MOA	100 feet AGL	<18,000 feet MSL	Portions above 5,000 feet AGL
Restricted Area R-4806E/W	100 feet AGL	Unlimited	Portions above 5,000 feet AGL
Restricted Area R4807A/B	Surface	Unlimited	Portions above 100 feet AGL Portions above 5,000 feet AGL
Restricted Area R-4809	Surface	Unlimited	Not authorized
Restricted Area R-4808N/S[1]	Surface	Unlimited	Not authorized

1. DoE airspace over the Nevada Test Site (NTS); it is not part of the NRC, but its western portion is used by NRC aircraft to transit to and from the North Range.

The airspace comprising the NRC consists of the Desert and Reveille MOAs, with their overlying ATCAA and restricted areas: R-4806E/W, R-4807A/B, and R-4809, which include multiple subdivisions. Discussions concerning NRC airspace use and sortie-operations throughout this EIS are described in relation to the internal subdivisions (i.e., R-4808E/W). Table 2.2-7 describes each airspace subdivision and its uses as they relate to the NRC operations.

MOAs overlying the NRC include the Reveille and Desert MOAs. Nellis AFB has further subdivided the Desert MOA to enhance scheduling and training opportunities. MOAs consist of special-use airspace that provides substantial vertical and horizontal maneuvering room for military aircraft training and separates that training from other air traffic. MOAs also identify areas where concentrated military aircraft operations may occur. When a MOA is active, the FAA normally routes other air traffic around it, although nonparticipating military and civil aircraft may enter an active MOA by employing see-and-avoid procedures.

ATCAA overlies both MOAs, extending from 18,000 feet MSL to the altitude assigned by the FAA. ATCAA is assigned on an as-needed basis by the FAA to provide additional maneuvering airspace for training. Since federal rulings limit the ceiling of MOAs to altitudes up to, but not including, 18,000 feet MSL, ATCAA is provided on an as-needed basis by the FAA to extend airspace from 18,000 feet MSL to the higher altitudes needed to accommodate the flight training requirements. ATCAAs are only activated for use while scheduled aircraft operations are being conducted within the higher altitudes above the MOAs.

A restricted area is airspace within which flight by non-participating aircraft, while not wholly prohibited, is subject to restriction during scheduled periods when hazardous activities are being performed. With the exception of R-4806E (which begins at 100 feet AGL), all of these restricted areas extend from the surface up for an unlimited distance into the atmosphere. Restricted area R-4806W, R-4807A, and R-4809 overlie portions of the NAFR. Lands under

Table 2.2-7. Nellis Range Complex Airspace and Subdivisions

VRC Special-Use Airspace	*Nellis AFB Designated Subdivision*	*Primary Use*	*Additional Data*
Reveille MOA	None	Air-to-air training	Requires advance scheduling with FAA Salt Lake
Desert MOA	Alamo	Air-to-air training	Reverts to R-4806E for air-to-ground training only
	Elgin	Air-to-air training	Instrumented for air combat
	Caliente	Air-to-air training	
	Coyote	Air-to-air training	
	Sally	NRC entry/exit corridor	
R-4806E	Alamo	Air-to-ground training Air-to-air training	Reverts to Desert MOA Alamo for air-to-air only
R-4806W	R61-65[1]	Air-to-ground training Air-to-air training	Conventional ordnance and gunnery testing/training
R-4807A	R7 1, R74-76	Air-to-ground and electronic combat threat training Air-to-air training	Targets and combat threat emitters
R-4807B	Pahute Mesa	Overflight	No target or threat facilities
R-4809	R-4809A	Tonopah Test Range Airfield Air-to-air training	NRC emergency airfield and Sandia National Laboratory test activities
	ECW	Electronic combat threat training Air-to-air training	Threat emitters
R-4808N[2]	R-4808E/W	Overflight only	Western portion of R-4808N (R-4808W) used as NRC entry/exit corridor
R-4808S[2]	R-4808W	Overflight only	Part of R-4808W NRC entry/exit corridor; FAA overflights

1. R = Range.
2. Not part of NRC airspace; DoE airspace over the NTS.

R-4806E do not contain any targets. Most of R-4806 E/W are within the DNWR and aircraft normally remain above 2,000 feet AGL. R-4807B is used for overflights of a land area used by the DoE as an annex to the NTS.

Adjacent to the NRC airspace is R-4808N/S, which is controlled by the DoE for Nevada Test Site (NTS) activities. Through agreement with the DoE, NRC aircraft are able to use the western portion of this restricted airspace as a transit corridor between 14,000 and 27,000 feet MSL for entering and exiting the North Range. Nellis AFB has subdivided this restricted airspace into R-4808E/W to internally schedule and track aircraft operations through this airspace. Further internal subdivision of this restricted airspace is being coordinated with DoE to accommodate internal changes in the use and scheduling of these areas. These changes do not affect the purpose for which R-4808N/S was established, nor do they affect surrounding airspace uses.

About 70 percent of NRC airspace is authorized for supersonic flight activities (Figure 2.2-7. Within authorized airspace, supersonic flight activities primarily occur during air-to-air combat and, to a lesser degree, during evasive maneuvers in response to ground threats or adversary aircraft. Not all aircraft using the NRC conduct supersonic flight. For supersonic aircraft, supersonic flight occurs between 3 and 10 percent of the time during air-to-air combat on a typical training flight. The F-l 5C, the aircraft most similar to the F-22, conducts supersonic flight about 7.5 percent of the time during air-to-air combat.

Military use of the NRC varies from year-to-year, depending on many factors. These factors include congressional funding levels, weapons testing requirements, aircrew training requirements, scheduling conflicts, and the actions of enemies that may pose a threat to the security interests of the U.S. or our allies. Due to these year-to-year variations in use, and the expectation that they will continue, the Air Force conducted a comprehensive review of NRC aircraft sortie-operations (Appendix C). Air Force support of these national priorities has created the establishment of local-use priorities. Large scale test efforts and large-force exercises lead the list of eight to ten priority activities. During both exercise and non-exercise days, NAFR is heavily scheduled by established priority users.

Since the NRC airspace includes several subdivided MOAs, and restricted areas, sorties at the NRC commonly result in multiple sortie-operations, particularly during major exercises. For example, an average F-l 5C sortie from Nellis AFB uses six different airspace units, and a sortie-operation is counted for each. Figure 2.2-S shows common patterns of aircraft operations within the NRC. Each of these patterns flies through multiple airspace units, resulting in multiple sortie-operations.

Review of NRC sortie-operations establishes a low-to-high range for annual sortie-operations in order to account for year-to-year variations in use. For a low-use year, a total of 200,000 sortie-operations occur in the NRC airspace. A total of 300,000 sortie-operations represents a high-use year. Table 2.2-S presents sortie-operations by airspace unit for a low-use and high-use year. Air Force anticipates that sortie-operations in NRC airspace under the No-Action Alternative would continue to range between 200,000 and 300,000 per year in the foreseeable future.

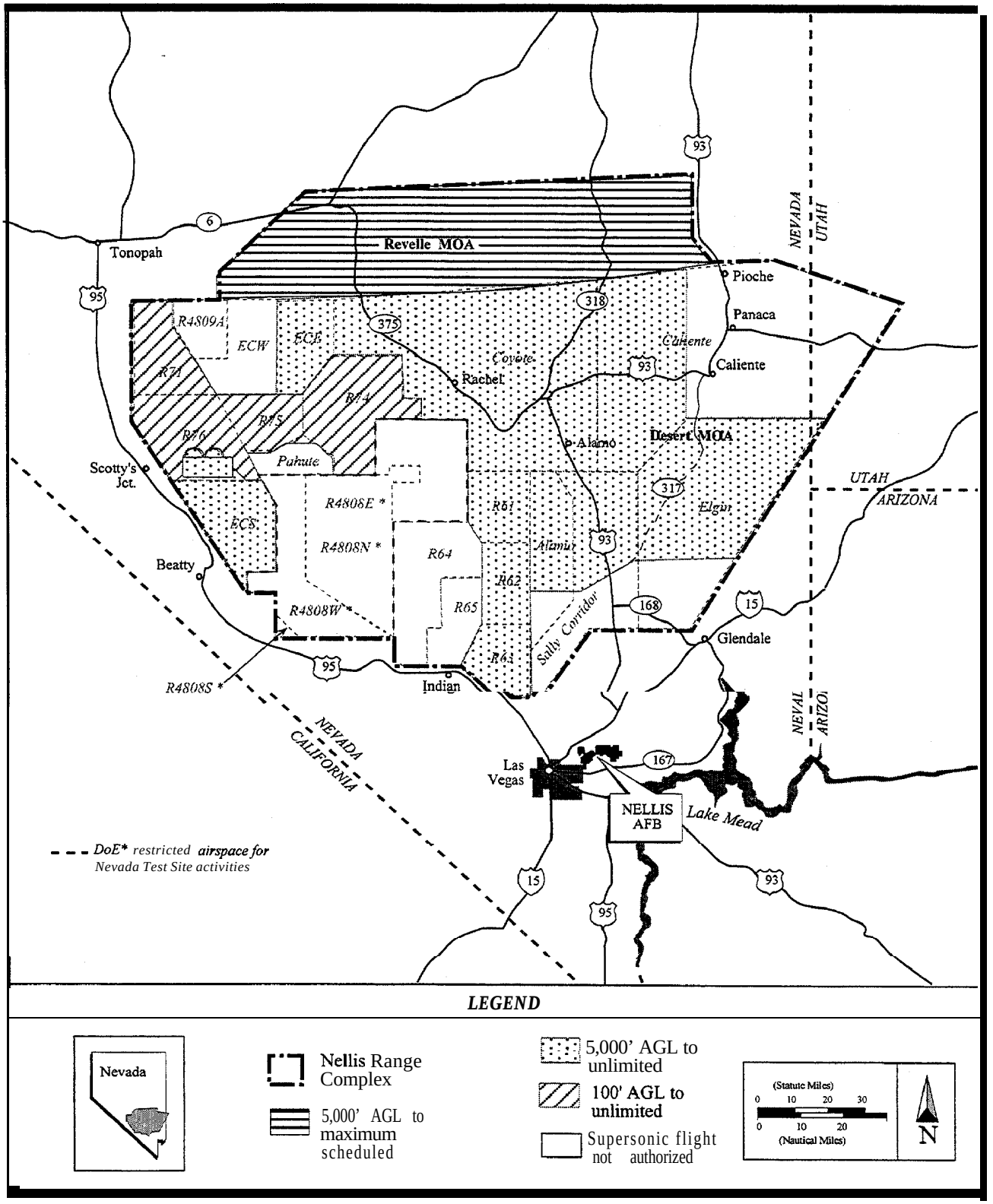

Figure 2.2-7. Supersonic Authorized Areas within the Nellis Range Complex

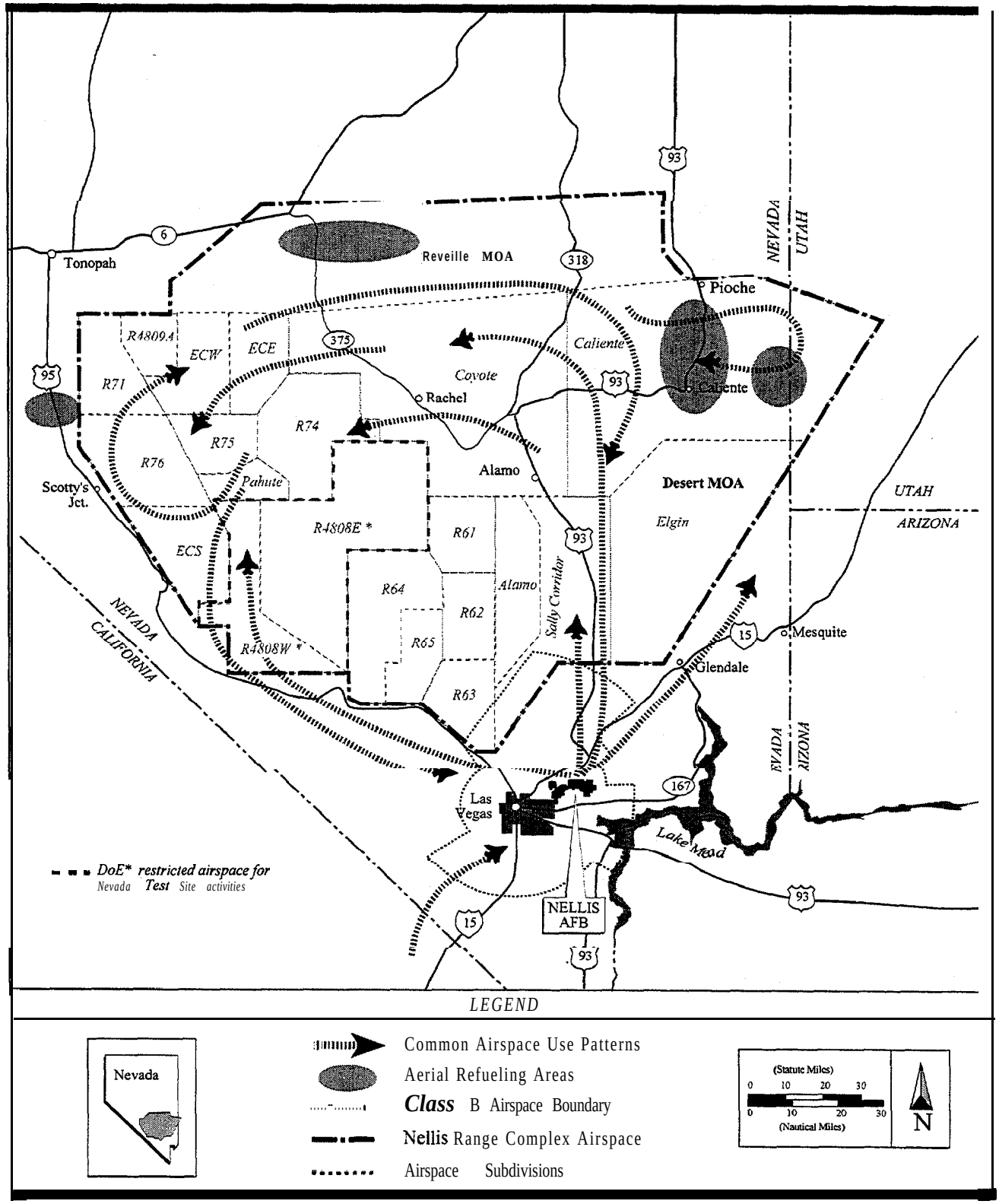

Figure 2.2-S. Aircraft Operations Associated with the Nellis Range Complex

Table 2.2-8. Baseline Sortie-Operations by Airspace Unit

		LOW USE - 200,000 ANNUAL SORTIE-OPERATIONS	HIGH USE - 300,000 ANNUAL SORTIE-OPERATIONS
Airspace Unit	*Airspace Subdivision*	*Total Baseline Sortie-Operations*	*Total Baseline Sortie-Operations*
Desert MOA			
	Caliente	23,424	35,136
	Coyote	13,947	20,921
	Elgin	12,520	18,779
SUBTOTAL		***49,891***	***74,836***
Reveille MOA		13,746	20,619
SUBTOTAL		$3,746	***20,619***
R-4806			
	R61	3,173	4,759
	R62	4,578	6,867
	R63	4,800	7,200
	R64	5,823	8,735
	R65	5,907	8,860
	Alamo	3,722	5,583
SUBTOTAL		***28,003***	***42,004***
R-4807			
	Electronic Combat South (ECS)	6,331	9,497
	Pahute Mesa	5,184	7,777
	R71	9,607	14,410
	R74	20,479	30,718
	R75	17,956	26,934
	R76	16,457	24,685
SUBTOTAL		76,014,	***114,021***
R-4808'			
	R-4SOSW	9,844	14,765
	R-4808E	4,256	6,385
SUBTOTAL		'14,100	***21,150'***
R-4809			
	R-4809	2,518	3,777
	Electronic Combat East (ECE)	7,764	11,646
	Electronic Combat West (ECW)	7,964	11,947
SUBTOTAL		***18,246***	27,370.
TOTAL		200,000	300,000

1. DoE airspace overlying NTS; sortie-operations are transit only

As with ordnance described previously, chaff and flare use in the NRC varies yearly, depending upon the nature of testing and training performed. Chaff use has and would continue to range from approximately 370,000 to 405,000 bundles per year. Flare use would vary from about 60,000 to 95,000 units per year.

Chaff and flares are the principal defensive mechanisms dispensed from military aircraft to avoid detection or attack by adversary air defense systems. A bundle of chaff consists of approximately 0.5 to 3.1 million one-inch long fibers smaller than the size of a hair that reflect radar signals and, when dispensed in sufficient quantities from aircraft, form a "cloud" that breaks the radar signal and temporarily hides the aircraft from radar detection. Flares provide high-temperature heat sources ejected from aircraft that mislead heat-sensitive or heat-seeking targeting systems. Chaff and flares are used to keep aircraft from being targeted by weapons such as surface-to-air missiles, anti-aircraft artillery, and other aircraft. Section 3.4 provides additional details on the composition and attributes of chaff and flares.

Effective use of chaff and flares in combat requires training and frequent use by aircrews to master the timing of deployment and the capabilities of the devices and by ground crews to ensure safe and efficient handling. Flare and chaff deployment throughout the NRC airspace is governed by a series of regulations based on safety and environmental considerations and limitations (see Appendix A). These regulations establish procedures governing the use of flares and chaff over ranges, other government- owned and controlled lands, and nongovernment-owned or controlled areas. ACC has set standard minimum-release altitudes (ACC Supplement to AFI 11-214) for flares over government-owned and controlled ranges and lands (Table 2.2-9). These standards, which vary from 400 to 900 feet AGL according to aircraft type, are designed to allow the flares to burn out completely at least 100 feet AGL. Over nongovernment-controlled lands, flare release is restricted to 2,000 feet AGL and above.

Table 2.2-9. Minimum Flare Release Altitudes

Aircraft Type	*ACC Standard Minimum Altitude (AGL) over Government Land*	*NAFR Minimum Altitude (AGL)*	*NRC MOAs Minimum Altitude (AGL)*
A-10/OA-10	400 feet*	700 feet	5,000 feet
F-4	600 feet	700 feet	5,000 feet
F-15, F-16, F-l 11, B-l	700 feet	700 feet	5,000 feet
B-52	900 feet	900 feet	5,000 feet

* Depends on flare type
Source: AFI 11-214 ACC1

Flare use in the NRC is regulated according to location of release, altitude of release, and fire risk conditions on the ground. No flares may be dispensed anywhere in the NRC over manned sites and ground parties or within 3 NM of forested areas. During the dry season when the fire code is "extreme," flare use is prohibited. Flares may be used over the numbered and electronic combat

ranges of NAFR and in the MOAs, but altitude minimums are stricter than ACC standards. Minimum-release altitude for NAFR's numbered and electronic combat ranges is 700 feet AGL for all aircraft except B-52s (900 feet AGL). In the MOAs, minimum flare-release altitude is 5,000 feet AGL.

In accordance with Nellis AFB Supplement 1 to AFI 13-212, chaff may be employed in all numbered ranges and MOAs between 300 feet AGL and 10,000 feet AGL, except in Range 63, Range 65, Range 74A, Wilderness Areas, Wilderness Study Areas, National Parks, and populated areas. Chaff use is authorized to 25,000 feet AGL in R-4807, Electronic Combat West, the Coyote subdivision of the Desert MOA, and Reveille MOA/ATCCA, and up to 20,000 feet AGL in the Caliente and Elgin subdivisions of the Desert MOA and R-4806. Additional restrictions may be imposed dependent on weather conditions.

2.3 PROPOSED ACTION

In three phases between fiscal years 2002 and 2008, the Air Force proposes to base 17 F-22 fighter aircraft at Nellis AFB. The aircraft would be assigned to the FDE program and WS at Nellis AFB. Flight activities would occur at Nellis AFB and the NRC. Some sorties (less than 4 percent) would occur at ranges and in airspace away from the NRC. For instance, firing of air-to-air missiles under the FDE program and WS traditionally has been done at places like the range associated with Eglin AFB.

2.3.1 Nellis AFB

PROPOSED BEDDOWN OF THE F-22: The Air Force proposes to establish an F-22 Division of the 422nd Test and Evaluation Squadron and an F-22 Division of the Air Force Weapons School at Nellis AFB. The beddown of 17 F-22s would occur in three phases: six aircraft are scheduled to be assigned to the 422nd TES in FY 2002, two additional F-22s assigned to the 422nd TES in FY 2003, and nine aircraft assigned to the WS in FY 2008. These aircraft would remain at Nellis. AFB into the foreseeable future beyond 2008, since the requirements for the FDE program and WS would remain as long as the Air Force retains the F-22.

Although the F-22 represents the eventual replacement for the F- 15C, the specific timing of that transition currently cannot be defined. The Proposed Action and the analysis in this DEIS are based on the assumption that the existing complement of F- 15Cs would remain at Nellis AFB even after completion of the F-22 beddown.

The overall inventory of aircraft based at Nellis AFB (refer to Table 2.2-2) would remain unchanged with the exception the added 17 F-22s. The Proposed Action would increase the based aircraft inventory from 128 to 145. Nellis AFB has accommodated more than 150 aircraft in the past.

PROPOSED NELLIS AFB AIRFIELD OPERATIONS: By 2008, the 17 F-22s would conduct approximately 8,900 (8,944 actual) airfield operations annually. Table 2.3-l presents details regarding the total airfield operations that would occur at the completion of the beddown.

Table 2.3-l. Projected F-22 Airfield Operations at Nellis AFB by 2008

Details of Airfield Operations	Baseline Nellis AFB Airfield Operations[1]	Proposed F-22 Airfield Operations	Total With F-22
Day (7:00 A.M. - 10:00 P.M.)	63,000	8,400	71,400
Night (10:00 P.M. - 7:00 A.M.)	5,000	544	5,544
Per Year (from 2008 on)	68,000	8,944	76,944

1. Based on 1997 Data (refer to Table 2.2-4), Nellis AFB.

Approximately 94 percent of the airfield operations would occur during the day (7:00 A.M. - 10:00 P.M.) as defined for the purposes of environmental analysis. Additional F-22 airfield operations would result in a 13 percent increase in overall day operations at the base and a 11 percent increase in overall night (10:00 P.M. - 7:00 A.M.) operations. The total airfield operations after completion of the F-22 beddown (approximately 76,944 airfield operations) would exceed representative use (68,000 airfield operations) during recent years. However, it would represent roughly 40 percent of the peak total (18 1,000 airfield operations) for recent past airfield activities at the base.

Existing standard departure and arrival routes would be used by the F-22. Approximately 56 percent of the flying missions would involve a northeastward departure (without afterburner), with the aircraft following existing tracks to the north for entry into the NRC. Approximately 44 percent of the flights would involve a southwestward departure (without afterburner) and follow existing tracks to the north into the NRC.

PROPOSED FACILITIES INFRASTRUCTURE CONSTRUCTION AND MODIFICATION: The proposed F-22 beddown would require construction of new facilities, alteration of existing facilities, and demolition of existing facilities. Table 2.3-2 summarizes the construction, alteration, and demolition to support the proposed beddown at Nellis AFB. It also presents the anticipated sequence of infrastructure changes over the period from 2000 through 2006.

Construction would encompass about three acres with an additional acre used for construction activities. Affecting only existing structures and previously disturbed land, these facilities would be primarily completed before the aircraft beddown began to ensure availability of needed support functions for the F-22. The majority of construction, alteration, and demolition actions would occur along the flightline in Area I (Figures 2.3-l and 2.3-2). The Air Force also anticipates the need to internally alter several miscellaneous facilities along the flightline in Area I.

In Area II, the ammunitions maintenance and storage facilities would be constructed for the JDAMs used by the F-22. These facilities would lie in the northeast portion of Area II, in association with other munitions storage areas. The location would be consistent with safety requirements that specify sufficient separation between munitions facilities and other land uses.

Table 2.3-2 Proposed Construction, Alteration, and Demolition Actions for the F-22 Beddown

Nellis AFB Area	*Actions*	*Building/ Location*	*Size (Square Feet)*	*Fiscal Year*
I	Demolish existing building; construct Maintenance Hangar/Aircraft Maintenance Unit	287	34,970	2000
I	Construct addition to 422nd Squadron Operations Building	878	6,460	2000
I	Construct F-22 parts warehouse	Attach to 290	6,460	2000
I	Modify building to construct Phase One Composites Shop	252	Internal Alterations Only	2000
I	Demolish existing building; construct Phase Two Composites Shop	254	16,140	2000
I	Construct additions to Weapons School Building	282	27,000	2000
I	Construct additions and alterations to existing building for Maintenance Training Facility	586	4,200	2005
I	Alterations to miscellaneous facilities	Unknown	Internal Alterations Only	2000 - 2006
II	Construct Munitions Maintenance and Storage Facility	Northeast Area II	6,458	2002
To Be Determined	Construct 84-person dormitory	To Be Determined	29,820	2005
Total Square Feet/Total Acres			131,508/3.0	

To support the WS program, the Air Force proposes to construct an 84-person dormitory. The location of this dormitory remains to be sited, although it would be consistent with existing land use plans for Nellis AFB. Siting would avoid significant habitat, cultural resources, and areas posing a safety concern.

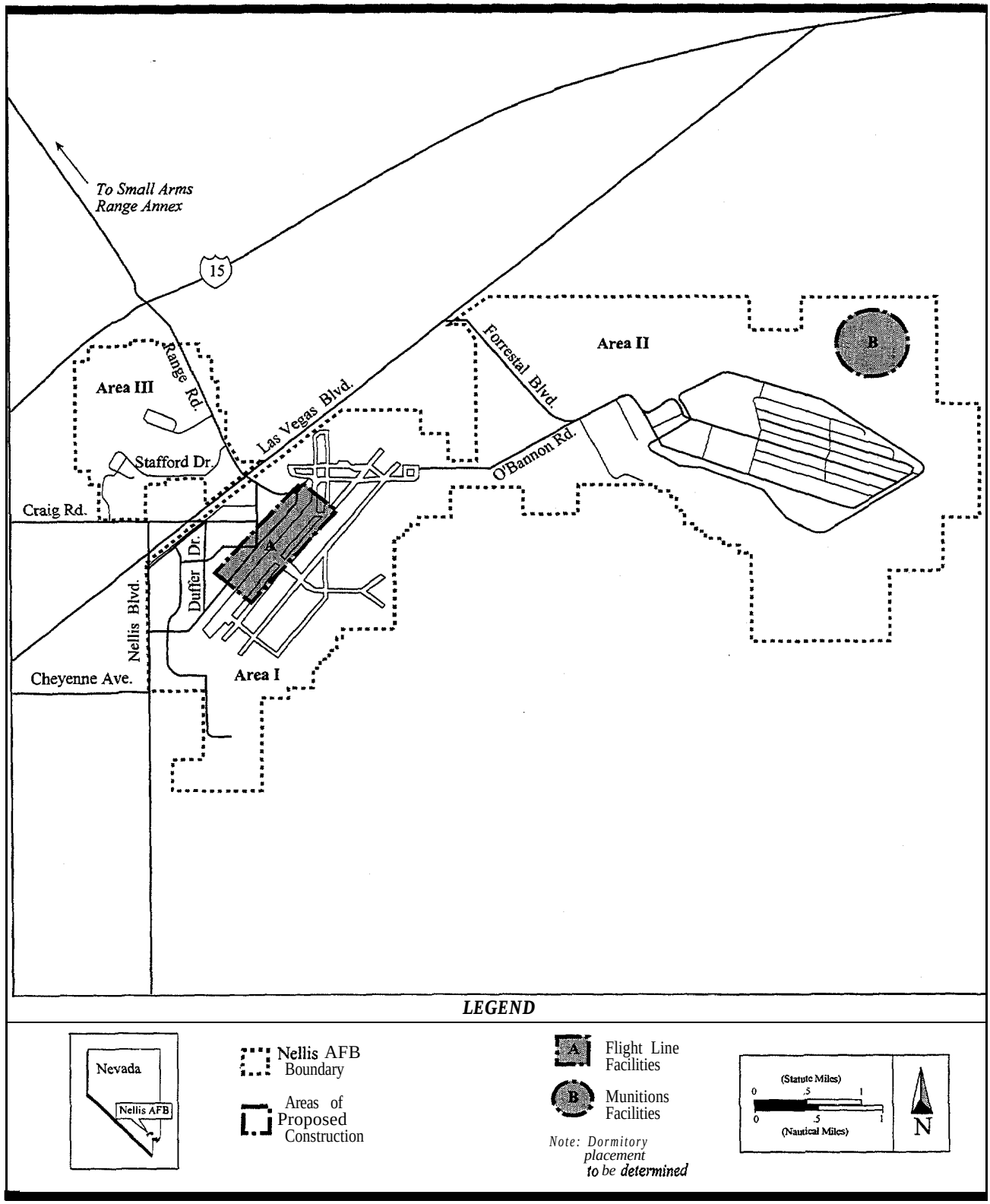

Figure 2.3-1. Nellis AFB and Proposed Construction Areas

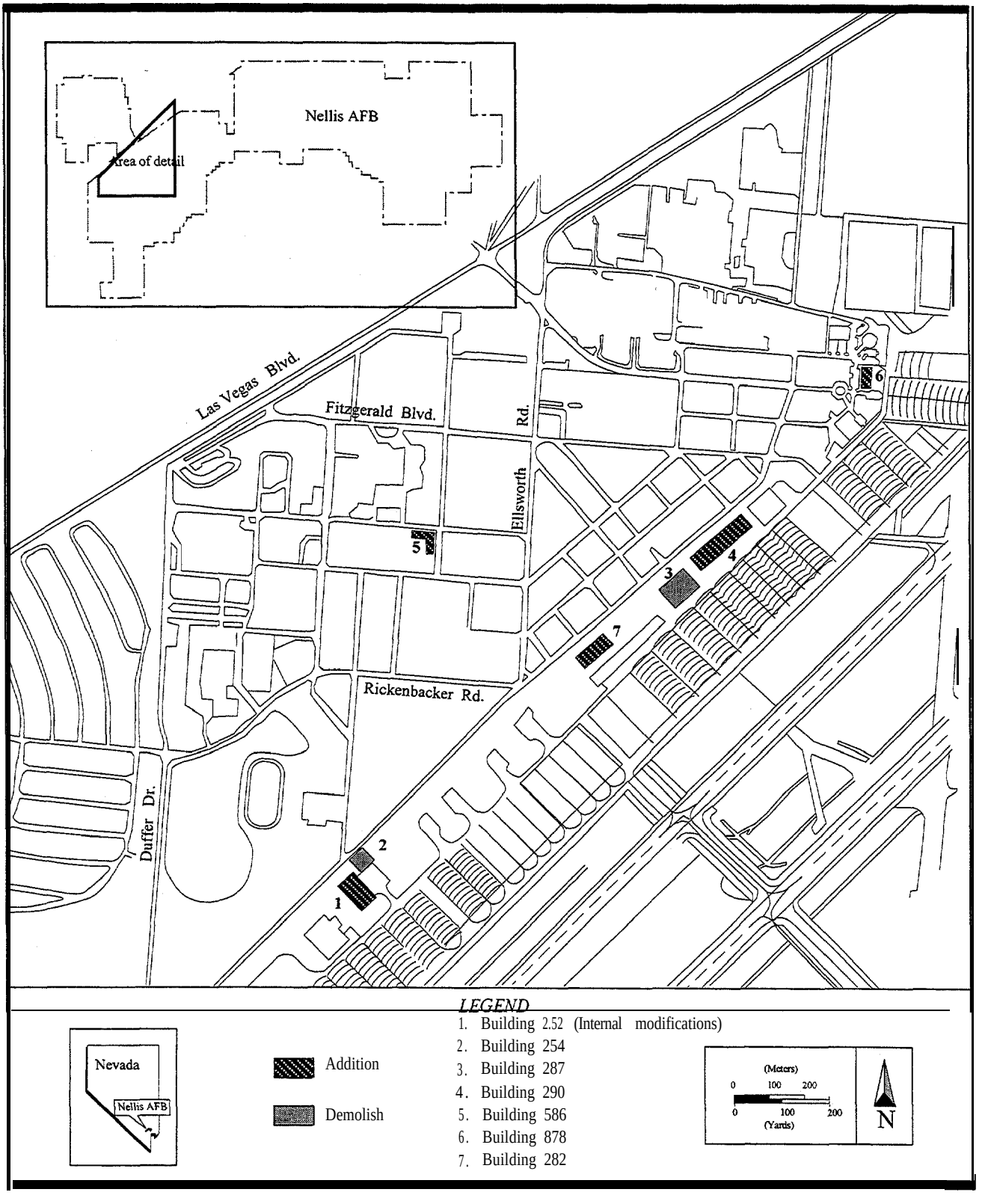

Figure 2.3-2. Nellis AFB Detail of Proposed Construction

PROPOSED PERSONNEL CHANGES: An additional 367 personnel would be added to Nellis AFB in two phases (Table 2.3-3). In 2002, a total of 172 personnel would be added at the base to support the FDE program starting that same year. In 2007, before the start of the WS program, another 195 personnel would be added. These personnel levels would continue throughout the life of the program. The addition of F-22 program personnel would constitute a 4 percent increase in overall base personnel levels.

Table 2.3-3. Projected Nellis AFB Personnel

	Military	*Civilian*	*Total*
Current	6,400	2,600	***9,000***
F-22 FDE & WS			
2002	169	3	172
2007	191	4	195
TOTAL	6,760	2,607	***9,367***

2.3.2 Nellis Range Complex

PROPOSED USE OF NELLIS AIR FORCE RANGE: The Proposed Action of the F-22 beddown would not alter the structure, management, or safety procedures at NAFR. Existing instrumentation, currently planned upgrades, and threat emitters would suffice for the F-22 FDE program and WS.

By 2008, the F-22 aircraft in the FDE program and WS would conduct ordnance delivery of any air-to-ground munitions capable of being employed by the F-22. The primary air-to-ground munition carried by the F-22 is expected to be the JDAM. JDAMs consist of l,OOO-pound bombs guided to the target by an attached Global Positioning System (GPS) receiver. Once the weapon has been programmed with the target position in GPS coordinates, it can be delivered in any weather. These weapons do not require any laser guidance. For the F-22, most releases of the JDAMs would occur between 20,000 feet and 50,000 feet MSL.

The Mark-82 ordnance used in JDAMs can be inert or live. Roughly 50 percent of the JDAMs used by the F-22s would consist of inert ordnance; the other 50 percent would be live ordnance. All munitions releases would occur on approved targets and ranges within NAFR. Based on the total tonnage of ordnance used on NAFR from 1991 through 1995 (between 3,000 to 4,500 tons per year), use of ordnance by the F-22s would represent a 3 to 5 percent contribution to the total depending on year-to-year variations.

The F-22 would use ordnance within the parameters and restrictions applicable to NAFR. No new safety procedures or restrictions would be needed to accommodate F-22 testing and WS activities at NAFR.

PROPOSED *F-22 USE OF THE NELLIS RANGE COMPLEX AIRSPACE*: As an eventual replacement for the F- 15C aircraft, the F-22 would adopt similar missions and training programs. Therefore, the

Air Force expects that the F-22 FDE program and WS would use the NRC in a manner almost identical to-those of the F- 15C programs. No changes would occur to the airspace structure or management for the NRC as a result of the Proposed Action. F-22 sortie-operations in the NRC would take place in existing approved airspace.

The nature and duration of F-22 flight activities would be the same under both the FDE program and WS. Although each program focuses on different goals and requires different instrumentation, they provide feedback to each other in order to produce the best available tactics and capabilities (refer to Table 2.1-2, which details the nine primary test and training activities projected for F-22s under the FDE program and WS).

Missions flown by aircraft assigned to either the FDE program or the WS would operate within the general flight parameters discussed previously. FDE F-22 missions would concentrate on testing and evaluating flight maneuvers and tactics to fully develop the combat capability of the aircraft. The WS F-22 flight activities would follow a syllabus of approximately 35 missions over 5.5 months designed to simulate different combat scenarios and teach advanced tactics developed and/or evaluated by the FDE program. **Some** of the F-22 missions would include aerial refueling with KC- 10 or KC- 13 5R tankers, using existing tanker aircraft already operating in the NRC. Existing high-altitude aerial refueling tracks would be used to support F-22 activities.

Using the full, authorized capabilities of the NRC, the F-22 would operate from surface up to 60,000 feet MSL. The F-22 would most often operate at 30,000 feet MSL or higher. Figure 2.3-3, which compares the F-22 flight at altitude with that of the F- 15C, demonstrates that the F-22 would operate at higher altitudes during a greater percentage of each flight hour. F-22s would use altitudes below 10,000 feet AGL about 11 percent of the total time in each sortie, with less than 5 percent below 1,000 feet AGL.

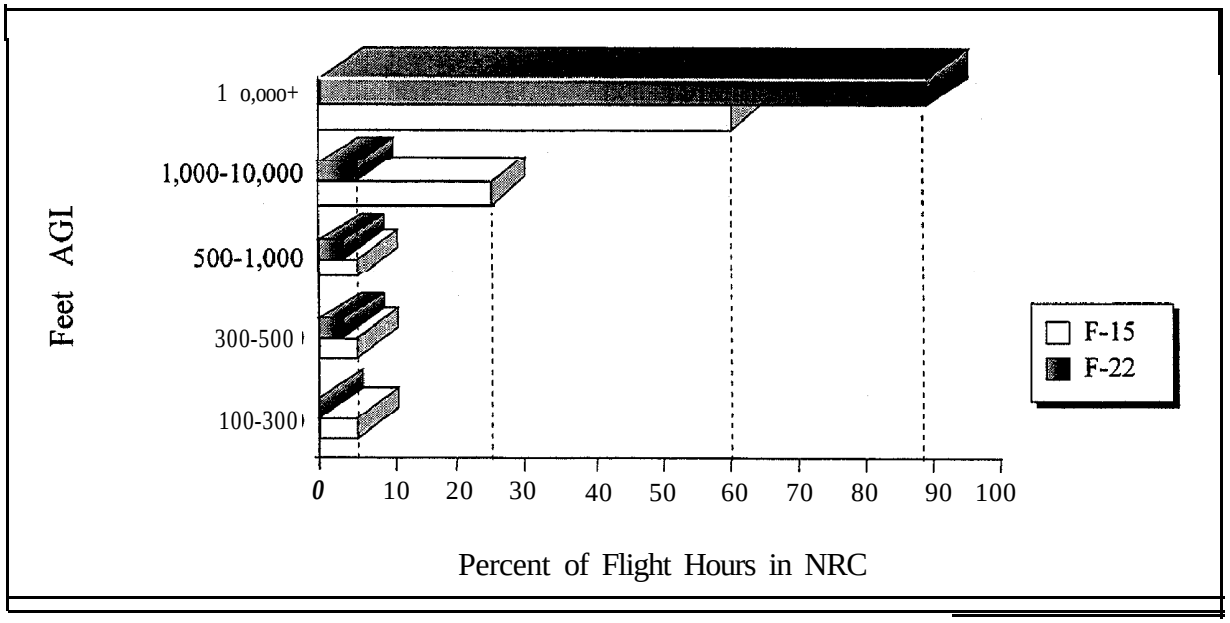

Figure 2.3-3. Percent of F-15 and F-22 Altitude Use Per Flight Hour

To test and train with the full capabilities of the aircraft, the F-22 would employ supersonic flight. All supersonic flight would occur at altitudes and within airspace authorized for such activities. Flight activities leading to supersonic events would commonly involve use of the Elgin and Coyote Subdivisions of the Desert MOA and restricted airspace over R74. Due to the mission of the F-22, the Air Force anticipates that approximately 10 percent of the time spent in air combat maneuvers would involve supersonic flight. In comparison, F-15C aircraft conduct supersonic flight for about 7.5 percent of the time spent in air combat maneuvers. Inclusion of F-22 sortie-operations would raise overall supersonic activity in the NRC by less than 1 percent, most of which is anticipated to occur above 30,000 MSL.

By the 2008 completion of the proposed beddown, the F-22 would fly 4,500 (4,472 actual) annual sorties from Nellis AFB. Of these sorties, 4,300 would be in the NRC for testing and training. The remaining 172 sorties (less than 4 percent) would involve operations at remote ranges and airspace such as those associated with Edwards AFB, Eglin AFB, Hill AFB, and others. These activities would form a minor part of the overall program. Any of these activities not already covered by existing environmental analyses would be assessed in separate environment documentation.

The 4,300 ***sorties*** in the NRC would represent approximately 25,800 ***sortie-operations*** in the numerous airspace units encompassed by the NRC (Table 2.3-4). The number and distribution of F-22 sortie-operations derive directly from the use patterns of the FDE program and WS for the F- 15C aircraft. F-22 sortie-operations would represent a 13 percent contribution to the total NRC sortie-operations under the low-use (200,000 annual sortie-operations) scenario and a 9 percent contribution under the high-use (300,000 annual sortie-operations) scenario. Total sortie-operations, even with those by the F-22s, would remain between the variation defined by low-use and high-use scenarios.

Although the F-22's stealth features reduce its detectability, it needs to employ chaff and flares as defensive countermeasures. For the FDE program and WS, the F-22s would dispense chaff as part of testing and training. Chaff use would follow all requirements and restrictions currently applicable at the NRC. Under the Proposed Action, F-22s would use 36,000 bundles of chaff per year (in 2008 and after). This amount contributes 9 to 10 percent of the total chaff use for the NRC relative to established variations in annual use levels (i.e., 370,000 to 405,000 bundles of chaff). Annual chaff use would remain within the range for total use (370,000 to 405,000 bundles). Due to the lack of major or numerous surface waters under the NRC, significant quantities of chaff are not expected to accumulate in surface waters or be transported into major surface waters. The extensive area over which the chaff would be dispensed also diminishes this potential. Approximately 60,000 to 95,000 flares are currently dispensed over the NRC annually. Flare use operates under minimum altitude restrictions to ensure safety (refer to section 2.2.2, Table 2.2-9). These minimum altitudes provide sufficient tune for complete combustion and consumption of the flares before potential contact with the ground. The altitude restrictions provide a considerable buffer against inadvertent low releases that might result in burning material contacting the ground.

Flare and chaff use for the F-22s would adhere to all Nellis and ACC directives. F-22s are anticipated to use the same types of flares as other fighter aircraft (e.g., F- 15) use. As with these

Table 2.3-4. Projected F-22 Sortie-Operations by Airspace Unit

		LOW-USE - 200,000 ANNUAL SORTIE-OPERATIONS			HIGH-USE - 300,000 ANNUAL SORTIE OPERATIONS		
Airspace Unit	*Airspace Subdivision*	*Projected F-22 Sortie-Operations*	*Total Projected Sortie-Operations*	*F-22 Percent of Total*	*Projected F-22 Sortie-Operations*	*Total Projected Sortie-Operations*	*F-22 Percent of Total*
Desert MOA							
	Caliente	3,559	23,424	15%	3,559	35,136	10%
	Coyote	2,091	13,947	15%	2,091	20,921	10%
	Elgin	1,942	12,520	16%	1,942	18,779	10%
SUBTOTAL		***7,592***	***49,891***	***15%***	***7,592***	***74,836***	***10%***
Reveille MOA		2,094	13,746	15%	2,094	20,619	10%
SUBTOTAL		***2,094***	***13,746***	***15%***	***2,094***	***20,619***	***10%***
R-4806							
	R61	293	3,173	9%	293	4,759	6%
	R62	374	4,578	8%	374	6,867	5%
	R63	404	4,800	8%	404	7,200	6%
	R64	334	5,823	6%	334	8,735	4%
	R65	342	5,907	6%	342	8,860	4%
	Alamo	373	3,722	10%	373	5,583	7%
SUBTOTAL		***2,120***	***28,003***	***8%***	***2,120***	***42,004***	***5%***
R4807							
	EC South	653	6,331	10%	653	9,497	7%
	Pahute Mesa	741	5,184	14%	741	7,777	10%
	R71	1,104	9,607	11%	1,104	14,410	8%
	R74	2,984	20,479	15%	2,984	30,718	10%
	R75	2,508	17,956	14%	2,508	26,934	9%
	R76	2,040	16,457	12%	2,040	24,685	8%
SUBTOTAL		***10,030***	***76,014***	***13%***	***10,030***	***114,021***	***9%***
R-4808[1]							
	R-4808W	1,425	9,844	14%	1,425	14,765	10%
	R-4808E	227	4,256	5%	227	6,385	4%
SUBTOTAL		***1,652***	***14,100***	***12%***	***1,652***	***21,150***	***8%***
R-4809							
	R-4809	85	2,518	3%	85	3,777	2%
	EC East	1,203	7,764	15%	1,203	11,646	10%
	EC West	1,024	7,964	13%	1,024	11,947	9%
SUBTOTAL		2,312	***18,246***	13%	2,312	27,370	8%
Total		25,800	200,000	13%	**25,800**	300,000	9%

1. DoE Airspace overlying NTS; Sortie-Operations are transit only.

other fighter aircraft, F-22 minimum flare release altitudes over NAFR's numbered and electronic combat ranges would be 700 feet AGL. This minimum ensures complete burn-out of flares at least 100 feet above the ground. In the NRC's MOAs, the minimum flare-release altitude would remain unchanged at 5,000 feet AGL for all aircraft including F-22s. Based on the emphasis on flight at higher altitudes for the F-22 (refer to Figure 2.3-3), roughly 89 percent of F-22 flare release throughout the NRC would occur above 10,000 feet AGL. The F-22 would release a maximum total of 8,000 flares per year over the NRC and contribute 8 to 13 percent to total flare use by all aircraft, depending upon annual variations in activities (i.e., annual total flare use varies from 60,000 to 95,000 in the NRC).

SUMMARY OF PROPOSED ACTION: Table 2.3-5 provides a chronological summary of the elements of the proposed F-22 Beddown. It offers, at a glimpse, the estimated flow and schedule of proposed F-22 activities.

Table 2.3-5. Summary of Proposed Action

Fiscal Year	*F-22s Beddown/ Total Based at Nellis AFB*	*Projected Annual F-22 Airfield Operations at Nellis AFB*	*Number of F-22-Related Construction Activities Per Year*[1]	*F-22 Personnel Additions/ Total F-22 Personnel*	*Projected Annual F-22 Sortie-Operations in NRC*[2]	*Projected Annual F-22 Chaff/Flare Use on NRC*
2000	0	0	5	0	0	0
2001	0	0	0	0	0	0
2002	6/6	3,156	1	172/172	9,468	12,700/2,800
2003	2/8	4,280	0	0/172	12,840	16,900/3,670
2004	0/8	4,280	0	0/172	12,840	16,900/3,670
2005	0/8	4,280	2	0/172	12,840	16,900/3,670
2006	Of8	4,280	0	0/172	12,840	16,900/3,670
2007	0/8	4,280	0	1951367	12,840	16,900/3,670
2008	9/17	8,944	0	0/367	25,800	36,000/8,000
2009-onward	0/17	8,944	0	0/367	25,800	36,000/8,000

Note: 1. Excludes internal alteration projects spanning 2000-2006; so 8 total projects shown.
2. Estimated

2.4 RELATIONSHIP OF THE RENEWAL OF THE NELLIS AIR FORCE RANGE LAND WITHDRAWAL LEGISLATIVE EIS AND THIS F-22 BEDDOWN EIS

Public scoping identified questions regarding the relationship of the proposed F-22 actions in this EIS and the ongoing land withdrawal renewal process that is addressed in a recently released Legislative EIS (LEIS). The F-22 beddown is a specific test and training action determined by the Air Force. The NAFR land withdrawal renewal is a land-use policy decision to be made by Congress.

The Air Force will decide on the best course to achieve specific weapons system operations to perform testing and training. F-22 FDE program and WS beddown is a stand-alone decision, independent of any congressional decisions on the NAFR land withdrawal renewal. A decision to beddown, test, and train with the F-22 is not automatically triggered by any land withdrawal renewal decision, nor would a decision regarding the F-22 substantively change the use of NAFR.

2.4.1 Renewal of the Nellis Air Force Range Land Withdrawal

NAFR has been used for test and training of numerous weapons systems or weapons system modifications for nearly 60 years. Section 2.2 describes NAFR and explains that a congressionally directed (Public Law 99-606) land withdrawal renewal process is underway to identify the environmental consequences of continuing exclusive military use at NAFR. The final LEIS for the land withdrawal renewal was released to the public in March 1999.

The purpose for renewing the land withdrawal for NAFR is to continue to provide a safe and secure location that permits testing of high performance equipment and tactics and training for military personnel to meet nationally directed missions. These missions include ensuring and protecting national security, training for the full spectrum of potential military operations, and ensuring continued public safety.

The proposal to continue DoD use of NAFR includes use of ground-based facilities on the range that continue to support existing, projected, and unanticipated future test and training activities. The ground-based facilities consist of airfields, housing, maintenance, transportation, tracking, test equipment, threat emitters, targets, and safety and security buffers. A future decision to renew NAFR would include continued use of this ground-based equipment.

2.4.2 Training and Testing of New Weapons Systems

NAFR ground-based equipment is used to test and train for improvements to all types of weapons systems, other military equipment, tactics, and personnel. F-22 aircraft, proposed to be based at Nellis AFB and use NRC for the FDE program and WS, would be part of this continuing test and training activity. This use is consistent with past and projected future uses of NRC and the NAFR. Any specifics regarding new facilities needed at Nellis AFB or changes in flight characteristics resulting from the F-22 are addressed in this Draft EIS.

This F-22 program-specific EIS has provided input into the cumulative analysis of the NAFR land withdrawal renewal LEIS. Similarly, data developed for the land withdrawal renewal have been integrated into the baseline, No-Action Alternative, and cumulative effects for the F-22 EIS.

2.5 SCOPING OF ISSUES FOR ANALYSIS

The implementing regulations (40 CFR, Parts 1500-l 508) for NEPA require the following:

- "An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR, Par 1501.7); and

- An EIS to discuss "impacts in proportion to their significance," and to include only enough discussion of other than significant issues "to show why more study is not warranted" (40 CFR, Part 1502.2[b]).

This F-22 EIS adheres to these requirements by using public scoping and federal, state, and local agency input to assist in focusing the discussion on potentially significant issues. Identifying those issues and topics warranting detailed discussion in this EIS involved three primary steps: (1) solicit issues from the public through the scoping process and from agencies and Indian tribes through the Intergovernmental and Interagency Coordination of Environmental Planning (IICEP) process; (2) review all identified issues and determine if they would actually be affected by the Proposed Action; and (3) determine those resources (e.g., air quality, land use) and subsets of resources (e.g., minerals as a part of earth resources) that represent significant issues. Those issues determined to not warrant detailed further study are described, along with the justification for their exclusion, in the following sections.

2.5.1 Issues Derived from Public Scoping and IICEP

Scoping yielded 20 comments, and IICEP letters sent to 21 federal, state, and local agencies and Indian tribes yielded 4 responses. Agencies and the public raised concerns about the effects of noise, especially sonic booms on humans, wildlife, recreation, and general quality of life. Structural damage on homes and historic structures due to sonic booms was also of concern. Airspace issues focused on potential conflicts between military aircraft and local aviation activities. Agency comments centered on potential effects of noise on wildlife and the potential for hazardous wastes on base to affect water quality.

2.5.2 Assessmeht of Identified Issues

Identified issues correlate to one or more resource categories used in environmental analysis. For example, an issue raised concerning the effects of sonic booms would apply to several resource categories including noise, land use, biological resources (wildlife), cultural resources, and recreation. Scoping, IICEP, and Air Force internal evaluation yielded potential issues correlating to 15 resource categories (Table 2.5-l). Each resource category (and its subsets) was analyzed to determine if and how the Proposed Action would affect it. This analysis was accomplished through the following actions:

- Identifying the types and location of all elements of the Proposed Action;
- Determining the relationship or interaction of these elements with the resources and their subsets; and
- Assessing if and how these resources and subsets would be affected.

This analysis revealed that several subsets of resource categories, and resource categories within a particular ROI, would not be appreciably affected by the Proposed Action.

Table 2.5-1. Scoping of Issues for Environmental Impact Analysis Process

Resource	Public/Agency/ Air Force Scoping	Affected Area		Excluded from Further Detailed Discussion	Location in EIS
		Nellis AFB	NRC		
Airspace	x	X	X		Section 4.1
Noise: Subsonic Supersonic	X X	X NA	X X		Section 4.2
Land Use	X	X	X		Section 4.2
Air Quality	X	X	X		Section 4.3
Safety	X	X	X	Radio frequency	Section 4.4
Hazardous Material/Waste	X	X	NA	Solid waste, hazardous waste on NAFR; storage tanks, PCBs, pesticides, radon on Nellis AFB	Section 4.5
Earth	X	X	NA	Earth Resources on NAFR	Section 4.6
Water	X	X	NA	Surface water and sedimentation on NAFR	Section 4.6
Biological	X	X	X		Section 4.7
Cultural	X	X	X		Section 4.8
Transportation	X	X	NA	Transportation on NRC	Section 4.9
Recreation	X	X	X		Section 4.10
Visual	X	NA	X	Visual resources on Nellis AFB	Section 4.10
Socioeconomics	X	X	NA	Socioeconomics in NRC	Section 4.11
Environmental Justice	X	X	X		Section 4.12

Notes: NA = Analysis not discussed in detail in EIS

2.5.3 Definition of Resource Analysis in This EIS

Further detailed analysis of some resource categories has been limited in this F-22 EIS because they were not potentially affected by any aspect of the Proposed Action and because they were not identified during the public scoping process. The topics that did not warrant further detailed discussion in the body of this EIS include radio frequency emissions from emitters used in training; soils and water on the NAFR, certain aspects of hazardous materials and wastes; visual resources on Nellis AFB; and solid waste, transportation, and socioeconomics on the NRC. The topics are discussed below, and explanation is provided as to why further analyses are not warranted.

2.5.4 Resources Eliminated from Further Detailed Analysis

SAFETY

RADIO FREQUENCIES EMISSIONS ON NAFR: Use of electronic emitters to provide training in electronic warfare and add realism to other types of training activity on NAFR would continue. Electronic emitters give off radio frequency emissions. Safe separation distances from these emissions have been established for each emitter type and vary from 53 to 783 feet. All emitters are located on NAFR, and each is surrounded by a safety zone that ensures safe separation. Since NAFR is closed to public entry, public safety is not and would not be a concern. Under the Proposed Action, operation of these emitters would continue with required safety zones established and maintained. Because the F-22 beddown would not alter the use or locations of these emitters, no potential impacts exist and no further analysis is needed.

HAZARDOUS MATERIAL AND WASTE

SOLID WASTE: Beddown of the F-22 and its additional personnel would increase the amount of solid waste on Nellis AFB by about 5,000 pounds per year or 5 percent. Existing non-hazardous solid waste collection and disposal procedures for the base and NRC would be adequate for the amount of waste generated. The limited domestic solid waste generated by the F-22 beddown would be transported to and disposed of through a commercial solid waste collection agency, as are solid wastes today. Solid waste, therefore, requires no further detailed analysis.

STORAGE TANKS: Although beddown of F-22 aircraft would increase aircraft fuel transfers, this increase would not impact the overall base fuels management procedures or storage capabilities. Implementation of the Proposed Action would not require new fuels storage and distribution facilities but may increase the frequency of fuel transfer operations. Nellis AFB now and in the past has supported more than 200 aircraft and has demonstrated the procedures and capabilities to ensure safe handling of petroleum, oils, and lubricants. No changes to refueling procedures would occur. No environmental impact is expected, so no further analysis is needed.

POLYCHLORINATED BIPHENYLS (PCBS): The accommodations necessary for F-22 aircraft would have no effect on the quantity of PCB-containing or PCB-related material found on base. Lighting in new facilities associated with the Proposed Action would be provided with fluorescent lamps containing non-PCB lamp ballasts. Therefore, further analysis of PCBs is not warranted.

INSTALLATION RESTORATION ***PROGRAM:*** The Air Force has established the Installation Restoration Program to plan and implement remedial actions to mitigate the effects of these materials on the environment. The sites addressed by the Installation Restoration Program include ordnance trenches, disposal pits, landfills, surface spills, storage terminals, fire training sites, waste ponds, and storm drains. None of the proposed construction associated with the F-22 beddown would occur on, or affect Installation Restoration Program sites. Thus, no impacts to or from Installation Restoration Program sites would occur, and no additional analysis is needed.

HAZARDOUS WASTE ON NAFR: Operations at NAFR affecting hazardous wastes would continue unchanged under the Proposed Action, with maintenance and support requirements for the range being met through current processes and procedures. Range personnel would continue to perform all of the support requirements identified under current operations. F-22 projected use of NAFR would be restricted to existing, disturbed target areas and involve the same types of ordnance already used there. No new waste streams or types would be added, so further analysis is not required.

EARTH AND WATER

EARTH RESOURCES: Ordnance delivery represents the aspect of the Proposed Action that could affect earth resources. However, ordnance delivery impacts would occur only on DoD-controlled target areas at the NAFR. This type of activity can reduce groundcover, thereby increasing the potential for soil erosion. Both the craters resulting directly from ordnance impacts and ordnance-caused fires can temporarily eliminate groundcover. However, several factors indicate that the use of the range under the Proposed Action would not measurably increase erosion or accelerate soil loss. The projected type and amount of ordnance used on the range would be negligible (3 to 5 percent of total ordnance use) in comparison to the amount (3,000 to 4,500 tons) of ordnance that is presently delivered per year. The small amount of ordnance delivered by F-22s would impact the same, already disturbed target areas that are currently used. There would be no increase in maintenance activities affecting groundcover and soils (i.e., disking of targets and ordnance disposal). Groundcover is absent or very sparse over most of the existing target areas and vicinities, so little opportunity exists for weapons impacts to reduce groundcover. Areas that do receive the most intensive weapons impacts (i.e., targets) occupy relatively flat topography, which is unsuitable for generating extensive erosion or soil loss. Low precipitation and low runoff rates further reduce the potential for soil loss and erosion.

Implementing the Proposed Action would not alter the current situation with mining and mineral resources since the NAFR is currently withdrawn from mineral entry.

Paleontological surveys have not been completed at NAFR (personal communications, S. Rolf 1997; B. Reynolds 1997), but important fossil localities have been documented. All of these localities lie away from existing target areas that could be affected by the F-22. As was noted for soils, the target areas potentially affected by F-22 ordnance use have been disturbed for years and do not include the types of sediments associated with fossils. Paleontological resources are also unlikely to occur in the sediments and disturbed areas on Nellis AFB. For these reasons, no further analysis of paleontological resources is warranted.

WATER RESOURCES ON THE NRC: Factors considered with regard to water resources on NRC include ordnance delivery and chaff use. Ordnance delivery would occur only on existing, previously disturbed target areas within NAFR. No aspect of ordnance delivery with the potential to affect water resources (surface and groundwater) would change with the beddown of the F-22. Although unrecovered ordnance debris could retain residues from charges, several factors demonstrate that no potential for surface water or groundwater contamination would exist. Low precipitation and runoff rates, coupled with flat topography, limit surface transport of materials.

Regular cleanup activities eliminate most ordnance residues, and the small amount of residual chemicals quickly dissipates. Intermittent ordnance delivery on NAFR would not be expected to contaminate surface waters or groundwaters. Since no changes to the elements with a potential to affect water resources on NAFR would occur, no further analysis is needed.

Use of chaff throughout the NRC would continue under the Proposed Action, with the F-22 dispensing about 36,000 bundles per year after 2008. Because chaff is relatively insoluble in water, chaff landing on water would either be submerged or driven across the surface by the wind. No change in dissolved oxygen content or temperature from chaff in the water would be expected. A study in which a water body was spiked with chaff resulted in extremely low increases in the concentration of aluminum or other metals. No appreciable increases were noted after 13 days (Air National Guard Readiness Center 1990). Given these factors, water quality would not be adversely impacted. In addition, because the material is nontoxic, chaff landing in surface waters poses an insignificant health risk, if any. Surface water in the NRC is rare and confined to small springs and similar features. Moreover, total chaff use would not increase for the NRC after the F-22 beddown. All of these factors, taken in combination, demonstrate that chaff use associated with F-22 sortie operations would not result in impacts to water in the NRC. No further analysis is warranted.

TRANSPORTATION

There are no anticipated changes to transportation resources within the NRC due to implementation of the Proposed Action. No roads would be constructed or modified and no effects to transportation networks are expected. Transportation resources within the NRC were eliminated from further analysis.

VISUAL RESOURCES

All proposed facilities would be sited on previously disturbed land on the industrially developed portion of Nellis AFB. They would be built of similar materials and landscaped as other structures on base. These types of military buildings are a common sight on Nellis AFB and are not expected to impact the visual environment of the base or require further analysis. Visual resources on NRC are analyzed in section 4.10.

SOCIOECONOMIC RESOURCES

Clark, Lincoln, and Nye counties underlie the NRC. Potential socioeconomic effects from the Proposed Action occur in the vicinity of Nellis AFB, including additional income and school use from an increase in personnel and an increase in economic value from construction projects. These effects are addressed in section 4.11. No construction or population increase is expected outside the Las Vegas metropolitan area. Socioeconomic effects within the lands underlying the NRC were eliminated from further analysis.

2.6 SUMMARY OF IMPACTS

Table 2.6-l presents a summary of the impacts associated with the proposed beddown of 17 F-22 aircraft for the FDE program and WS at Nellis AFB. The table compares the effects of the Proposed Action to those of the No-Action Alternative.

Table 2.6-1. Comparison of Alternatives by Resource and Potential Impact (Page 1 of 7)

No-Action Alternative	*Proposed Action: F-22 Beddown*
AIRSPACE (Section 4.1)	
Nellis AFB	
• Existing departure and arrival routes established for safety and noise abatement	• Use and structure of departure and arrival routes unchanged
• Recent average of over 68,000 annual aircraft operations	• 8,944 additional F-22 operations in airfield area; 13% increase
• Night (10:00 P.M. - 7:00 A.M.) operations of about 5,000	• An increase of 544 F-22 annual night operations
NRC	
• NRC airspace consists of two MOAs and five restricted areas	• Airspace structure and management unaffected
• Desert MOA and Restricted Area R-4807 receive *25%* and 38% of total use	• No change to airspace use patterns
• no impediments to civil and commercial aviation	• No aspect of F-22 activities affect civil or commercial aviation use
• 200,000 to 300,000 annual sortie-operations in NRC	• Total (200,000 - 300,000) sortie-operations unchanged
	• About 25,800 annual F-22 sortie-operations contribute 13 to 9% to total
	• F-22s would fly 89% of average sortie above 10,000 feet AGL
• Supersonic activity estimated to be 3% to 10% of time spent in air combat maneuvers	• Overall supersonic activity in NRC approved airspace would increase less than 1%
NOISE AND LAND USE (Section 4.2)	
Nellis AFB	
• Approximately 15,000 to 21,000 acres exposed to noise greater than 65 DNL over the last 20 years	• Noise levels on base consistent with existing levels
	• Approximately 23,000 acres exposed to noise greater than 65 DNL with F-22 beddown

Table 2.6-l. Comparison of Alternatives by Resource and Potential Impact (Page 2 of 7)

No-Action Alternative	*Proposed Action: F-22 Beddown*
NOISE AND LAND USE (Section 4.2) continued	
Nellis AFB continued	
• Surrounding area includes industrial, commercial, open, recreational and residential land uses	• Areas with noise greater than 65 DNL primarily affects open lands (85%)
• Current noise contours exceeding 65 DNL affect about 22,800 people	• Noise contours exceeding 65 DNL could affect about 37,750 people.
• Current noise in residential areas already zoned for noise levels above 65 DNL	• Increase in noise occurs in areas zoned for noise level above 65 DNL and no increase above 2 dB.
• Seven noise-sensitive receptors subject to noise above 65 DNL	• Thirteen additional noise-sensitive receptors subject to noise above 65 DNL
NRC	
• Total of 20 sonic booms per month in Elgin MOA; 4 in Coyote MOA; and 2 in Reveille MOA and EC East and RF-74 training ranges	• Increase to 24 sonic booms per month in Elgin; 10 in Coyote. Still 2 in Reveille, EC East, and RF-74
• Subsonic noise levels vary from 63 DNL to <45 DNL	• No perceptible change in subsonic noise in NRC
• Supersonic noise varies from 56 CDNL to <45 CDNL	• Increase of 1 to 3 CDNL in Elgin, Coyote airspace from supersonic operations
• Combined DNL and CDNL from 54 to 62 in NRC airspace	• Combined DNL and CDNL would increase by no more than 1 DNL
• Sound exposure levels (SEL) at 500 feet AGL vary from 95 to 112 dB for range of aircraft using NRC	• F-22 SEL at 500 feet AGL is 114 dB, but F-22 operates 89% of time above 10,000 feet AGL so noise likely reduced
• NRC lands primarily managed by DoD, BLM and USFS	• No change in land status or land-use management
• Special Use Areas include Wilderness Study Areas, National Wildlife Refuges, state parks, and Wild Horse Management Area	• No change in supersonic restricted areas (i.e., Desen National Wildlife Range); no change in noise levels over Special Use Areas

Table 2.6-1, Comparison of Alternatives by Resource and Potential Impact (Page 3 of 7)

No-Action Alternative	*Proposed Action: F-22 Be&own*
AIR QUALITY (Section 4.3)	
Nellis AFB	
• Current tons/year emissions: Carbon monoxide (CO): 2,644 Volatile organic compounds (VOC): 533 Oxides of Nitrogen (NO,): 659 Sulfur dioxide (SO,): 372 Particulate matter (PM_{10}): 54	• Projected (maximum) increase tons/year emissions: co: 89 (3.4% increase) VOC: 12 (2.3% increase) NO,: 124 (19.1% increase) so,: 7 (1.9% increase) PM_{10}: 6 (11.1% increase)
• Clark County (which contains Nellis AFB) in serious nonattainment for CO and PM_{10} due to traffic and development in Las Vegas metropolitan area	• F-22 beddown would not contribute to nonattainment for CO or PM_{10} or exceed regional significance. • *CO de minimis* 100 tons/year; projected CO would be 89 tons/year • PM_{10} *de minimis* 70 tons/year; projected PM_{10} would be 6 tons/year
• Emissions from Nellis AFB account for 2% of overall CO budget and 0.06% of overall PM_{10} budget for Las Vegas Metropolitan Area	• F-22 beddown increases Nellis AFB contribution to 0.1% for CO and 0.068% for PM_{10} in 2008
NRC	
• Current emissions unchanged	• F-22 contributions to emissions would be within annual variation • No exceedences of federal, state or regional air quality standards.
SAFETY (Section 4.4)	
Nellis AFB	
• Existing ground safety procedures sufficient	• No diminishment of ground safety or increase in risks
• One Class A mishap recorded in 10 years for WS, same for FDE.	• No change in safety risk in Nellis AFB vicinity
• Historical average of 13.5 bird-aircraft strikes per year in base vicinity	• No substantive change in bird-aircraft strikes expected

Table 2.6-1. Comparison of Alternatives by Resource and Potential Impact (Page 4 of 7)

No-Action Alternative	*Proposed Action: F-22 Beddown*
SAFETY (Section 4.4) continued	
NRC	
• Munitions safety and handling procedures meet standards and ensure public safety	• Annual use of ordnance including JDAMs would not affect targets, procedures, or safety
• Weapons safety footprints established on ranges provide safety margins for live and inert ordnance delivery	• JDAMs would fall well within existing range areas
• Probability of Class A aircraft mishap in NRC MOAs is 0.00003	• F-22 may have higher Class A mishap rate at onset of development, but it would decrease due to pilot experience, FDE program and WS
• Historical average of 1 bird-aircraft strike per year in NRC	• No increase in bird-aircraft strikes anticipated
• 370,000 to 405,000 bundles of chaff and 60,000 to 95,000 flares used annually	• 36,000 bundles of chaff used by F-22s contribute 9% to total chaff use; 8,000 flares used by F-22s contribute 8% total flare use • No health risk to people or animals from chaff; minimal risk of fire from flares
HAZARDOUS MATERIALS AND WASTE (Section 4.5)	
Nellis AFB	
• Approved hazardous waste management and pollution prevention programs used on base	• Additional F-22 maintenance and operations consistent with and accommodated by existing programs
• Hazardous waste accumulation sites on base adequate for quantity	• No change to waste generator status
EARTH AND WATER RESOURCES (Section 4.6)	
Nellis AFB	
• Existing soil conditions unchanged	• Construction affects approximately 4 acres of mostly previously disturbed soils • Best management practices would minimize soil loss and erosion

Table 2.4-1. Comparison of Alternatives by Resource and Potential Impact (Page 5 of 7)

No-Action Alternative	*Proposed Action: F-22 Beddown*
EARTH AND WATER RESOURCES (Section 4.6) continued	
Nellis AFB continued	
• Existing water availability and use rates adequate for base	• Aircraft beddown and personnel additions increase water use by about 400 to 500 AFY, existing availability sufficient to support change • Surface and groundwater not affected by construction • Best management practices for construction would make potential for sedimentation negligible
BIOLOGICAL RESOURCES (Section 4.7)	
Nellis AFB	
• Base supports 1 sensitive plant species, which is under protective management • Base contains or has potential to contain 18 protected and/or sensitive wildlife species; one listed as threatened (desert tortoise) • Current areas affected by noise levels of 65 DNL or greater not adversely affecting protected and/or sensitive wildlife species.	• Construction avoids plant habitat, uses previously disturbed locations or those lacking native habitat • Construction avoids known species habitat; no adverse effects anticipated • Expansion of area under 65 DNL contour around the base unlikely to affect protected and/or sensitive wildlife species because noise levels would remain within levels occurring over last 20 years
NRC	
• No sensitive plant species in target areas used for actual ordnance delivery • Approximately 90,000 acres of disturbed areas centered around targets • 9 federally designated threatened or endangered species • Potentially noise-sensitive wildlife occur within NRC	• No change to or effects on sensitive plant species • No change to number of disturbed acres around targets • No direct impacts expected from subsonic noise, overflights, or ordnance delivery to T & E species • Sonic booms increase by 4 to 6 per month in NRC airspace authorized for supersonic flight, but are unlikely to adversely disturb wildlife

Table 2.6-l. Comparison of Alternatives by Resource and Potential Impact (Page 6 of 7)

No-Action Alternative	*Proposed Action: F-22 Beddown*
CULTURAL RESOURCES (Section 4.8)	
Nellis AFB	
• 22 significant archaeological sites in Area II, 5 significant architectural resources on base • 14 potentially significant sites surround base • No traditional resources on base or in area surrounding base	• Construction avoids archaeological sites and significant architectural resources • Increase in noise would not affect significant cultural resources • No effect on traditional resources
NRC	
• 5,000 archaeological sites estimated within NRC • Over 50 historic mining sites, 15 mining districts, rock art, traditional use areas, and sacred sites in NRC • Traditional cultural properties include rock art sites, landscapes, hunting and gathering areas.	• Noise and sonic booms unlikely to affect archaeological sites or architectural resources • Slight increase in sonic booms could be considered to affect setting of sacred and traditional use areas, but not significantly
TRANSPORTATION (Section 4.9)	
Nellis AFB	
• Two roads surrounding Nellis AFB below minimum design standard, 11.5 miles reaching maximum capacity	• Additional base traffic increases slightly, but within existing capacity
RECREATION AND VISUAL RESOURCES (Section 4.10)	
Nellis AFB	
• On-base recreation offered through a variety of indoor and outdoor facilities • Noise above 65 DNL affects two local parks around Nellis AFB	• No change in recreational opportunities on base • Noise above 65 DNL affects four local parks around Nellis AFB
NRC	
• NRC overlies state parks, national forests, wildlife refuges, hunting areas, wilderness study areas • No effect on visual resources	• Increase from 20 sonic booms per month to 24 per month in Elgin MOA and from 4 to 10 in Coyote MOA; could annoy some users, but not significantly • No effect on visual resources

Table 2.6-l. Comparison of Alternatives by Resource and Potential Impact (Page 7 of 7)

No-Action Alternative	*Proposed Action: F-22 Beddown*
SOCIOECONOMICS (Section 4.11)	
Nellis AFB (Clark County)	
• Base supports about 9,000 employees	• Additional 367 personnel associated with the beddown (4% increase)
• Average annual base payroll $555 million	• F-22 beddown adds $9.1 million/year to payroll
• Military population associated with base equals approximately 27,000	• About 1,109 additional base personnel and dependents (4% increase)
• Clark County fastest growing metropolitan county in U.S. (1.2 million in 1996)	• F-22 beddown results in 0.09% increase in population of Clark County
• On-base housing of 1,212 multifamily units, 1,136 dormitory beds, and 482 billeting facilities	• On-base housing combined with expanding off-base housing and construction of a new dormitory would accommodate proposed personnel increases
• More than 180 public schools	• Negligible effect on educational facilities
ENVIRONMENTAL JUSTICE (Section 4.12)	
• Baseline noise levels above 65 DNL disproportionately affect about 5,913 people (26%) belonging to minority groups, but do not disproportionately affect low-income populations	• Noise levels above 65 DNL would disproportionately affect about 10,050 people (27%) belonging to minority groups and 7,045 low-income people (19%), but occurs within areas zoned for noise above 65 DNL
• Within the county, the minority population is 25% and the low-income population is 11%	
NRC	
• No noise above 65 DNL, therefore no adverse effect to populations	• No noise above 65 DNL, therefore no adverse effect to populations