CI-1
Community and Infrastructure
Analytical Approach

APPENDIX CI-1 COMMUNITY AND INFRASTRUCTURE

I. Resource Definition

A. Public Services

Public Services include on and off-base potable water systems, wastewater treatment systems, electric and natural gas utilities, and public schools. Both the base and the affected community as a whole rely on these public services daily.

B. Transportation

Transportation and circulation refer to the movement of vehicles on roadway networks. Roadway operating conditions, or the adequacy of the existing and future roadway system to accommodate these vehicular movements, are usually described in terms of average daily traffic (ADT) volumes and level-of-service (LOS) ratings. LOS ratings range from LOS A for free-flowing traffic conditions (average vehicle delay of 5 seconds or less) to LOS F for congested conditions (average vehicle delay of 60 seconds or more). LOS is a measure of the flow speed characteristics of a road as shown in Table CI-1-1. It takes into account volume, speed, facility type, and land development of the surrounding area. LOS are classified from "A" to "F," with "A" representing free flow and "F" representing gridlock.

Table CI-1-1. Level of Service Definitions

Road Classification	***Level of Service***
A	Free flow, completely unimpeded operations
B	Reasonably unimpeded flow (70 percent of free-flow speeds)
C	Stable conditions flow (50 percent of free-flow speeds)
D	Borderline impeded flow (40 percent of free-flow speeds)
E	Partially impeded flow (33 percent of free-flow speeds)
F	Impeded flow (25-33 percent of free-flow speeds)

Source: Air Force 1997

C. Hazardous Materials and Waste

Hazardous material is defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Solid Waste Disposal Act (SWDA), and the Emergency Planning and Community Right-to-Know Act (EPCRA) as a substance that, because of its quantity, concentration, or physical or chemical characteristics, may present substantial danger to public health, welfare, or the environment. The term hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), means any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that poses a substantive present or potential hazard to human health or the environment. Hazardous wastes must exhibit a characteristic of toxicity, reactivity, ignitibility, or corrosivity, or be listed as a hazardous waste as indicated in 40 Code of Federal Regulations (CFR) 261 and 263, respectively.

Aircraft flight operations and maintenance and installation maintenance require the use of many types of hazardous materials. Each alternative installation stores and uses hazardous materials including acids, corrosives, caustics, glycols, compressed gases, aerosols, batteries, hydraulic fluids, solvents, paints, cleaning reagents, pesticides, herbicides, lubricants, fire retardants, photographic chemicals, alcohols, sealants, and low-level radioactive material.

Asbestos-containing materials (ACMs) are materials that contain greater than 1 percent asbestos. Friable, finely divided, and powdered wastes containing greater than 1 percent asbestos are defined as wastes and are subject to regulation. A friable waste is one that can be reduced to a powder or dust under hand pressure when dry. Nonfriable asbestos-containing wastes, such as floor tiles, are considered to be nonhazardous, regardless of their asbestos content, and are not subject to regulation. Demolition of facilities at any of the alternative locations has the potential to produce ACMs.

II. Regulatory Setting

Hazardous materials and wastes are federally regulated by the United States Environmental Protection Agency (USEPA), in accordance with the Federal Water Pollution Control Act, the Clean Water Act, the Toxic Substance Control Act, SWDA, RCRA, CERCLA, and the Clean Air Act. Pesticide application, storage, and use is regulated by the Federal Insecticide, Fungicide, and Rodenticide Act. The federal government is also required to comply with applicable state laws and regulations under Executive Order 12088, DoD Directive 4150.7, and Air Force Instruction 32-1053. Our analyses are further based on the best available information.

Hazardous materials used and hazardous wastes generated for the F-22 would differ from the F-15C mainly in the type of paint, cleaners, or bonding agents (adhesives) used. The F-15C is primarily constructed of aluminum and uses standard primers and paints to control corrosion. However, the F-22 utilizes a large percentage of composite materials as part of its construction.

Composites are used for a number of reasons. They possess excellent strength-to-weight ratios, do not fatigue like metals, are lightweight, and can be molded into a variety of shapes. In the case of the F-22, composite materials may also play a key factor in making the aircraft “less visible” to enemy radar. These composite materials may require special paints, bonding agents, or cleaning materials in order to maintain their structural integrity or “low-observable” properties.

The types of paint and the solvents used for cleaning are still lunder study. The Department of Defense Pollution Prevention Strategy established an aggressive program to reduce or eliminate toxic chemicals and extremely hazardous substances associated with new weapons systems. Air Force policies require the use of the most "environmentally friendly" paints and solvents that can be applied successfully in a wide variety of atmospheric conditions. The testing of new types of paints and their solvents is continuing with the development of each new prototype F-22 aircraft.

Only limited data are available on composite and surface-coating materials currently used by the F-22, since only four prototypes of the aircraft have been developed. The composite and surface-coating materials used on these aircraft are still undergoing testing. These materials may not be the same as those employed in the production version of the aircraft, based on the results of these tests.

The Air Force has special procedures in-place to ensure protection of both workers and the environment. These procedures are currently used for maintenance and operations associated with other aircraft made of composite materials (e.g., F-117 and B-2). No unique hazards (over those associated with other composite aircraft) are anticipated with the composites or surface coatings that will eventually be used by the production F-22. However, once data on the type of composite or surface coating materials used by the production aircraft are known, the Air Force will evaluate the information to determine if in fact there are no adverse effects on the environment. If these materials or their use are relevant to environmental concerns and bearing on the proposed action or alternatives or their impacts, then the Air Force would prepare additional environmental documentation.

A quantitative assessment of the potential increase in the quantity of hazardous waste generated by the F-22 could not be performed, since the hazardous wastes stream generated by the prototype aircraft has not been completely quantified and may not be representative of the production aircraft. In most cases, the types and quantities of waste generated would be similar to those for the F-15C aircraft, since both are comparably sized, twin-engine fighters. The F-22 uses the same fuel, lubricants, greases, and hydraulic fluids as does the F-15C. As a result, quantities of hazardous waste generated for the F-15C were analyzed to obtain estimates for the F-22.

No adverse effects of these wastes on the environment are anticipated because the Air Force follows special requirements for handling, processing, and disposal of hazardous wastes. Once these wastes are better known, the Air Force will evaluate the information to determine if there are any adverse effects on the environment. If these wastes or their generation are relevant to environmental concerns and bearing on the proposed action or alternatives or their impacts, then the Air Force would prepare additional environmental documentation.

As with hazardous materials, the management of hazardous wastes is performed according to prescribed procedures already in-place. There are pollution prevention (P2) programs designed to prevent or reduce pollution, reduce safety and health risks, and recycle wastes when possible. Wastes that cannot be recycled are disposed of in a manner approved of by the USEPA, at licensed facilities.

Each of the alternative locations has developed programs to comply with all federal and state hazardous materials reporting requirements. These efforts have included submission to the states and local emergency planning committees of annual Tier II forms, which are an updated inventory of chemicals or extremely hazardous substances in excess of specific threshold limits. Under the law, the installations would also be required to prepare and submit a Toxic Release Inventory report for a variety of listed chemicals if the reportable quantities established by the USEPA for a calendar year are exceeded.

All of the alternative locations maintain active P2 programs in order to protect and enhance the environment and reduce occupational safety and health risks to base personnel. The P2

Program plans support the concept of reducing use of hazardous and toxic substances and the generation of wastes through source reduction and environmentally sound recycling. According to the plans, generation of hazardous substances, pollutants, or contaminants will be reduced or eliminated at the source. Pollution that cannot be eliminated at the source will be recycled in an environmentally safe manner. Pollution that cannot be recycled will be treated in an environmentally safe manner. Disposal or other releases to the environment will be employed only as a last resort and will be conducted in an environmentally safe manner.

III. Methodology

A. Public Services

The assessment of impacts quantitatively focuses on how and to what degree the proposed action or alternatives affect services and utilities both on and off base. Methods used to collect this information included an intensive records search, as well as discussions with applicable community public works departments, school district personnel, and base personnel. Determination of an impact was made based on the capacity of a utility or service (e.g. wastewater treatment plant capacity of 5 mgd) and whether or not the proposed action would cause that utility or service to operate outside of its capacity.

B. Transportation

The transportation analysis assesses prospective impacts in terms of LOS for each installation by applying a conservative set of LOS criteria to the changes in travel demand associated with the proposed action at each installation. Therefore, the metric used in this analysis for the characterization of congestion is the LOS.

It is noteworthy that the lower the LOS, the smaller the increase in traffic volume required to drop the LOS by one level. For example, it takes a 67 percent increase in volume to decline from LOS A to B, but only 20 percent to go from LOS B to C. In fact, a 25 percent increase in volume will drop LOS C by *two* levels to LOS E. An LOS decline below level E is not meaningful, because flow becomes unstable as the capacity of the lane or intersection has been exceeded. The most conservative applicable criterion for volume increase is therefore the increment from LOS D to E, because the last margin of capacity is consumed. In addition, the 11.1 percent increase in volume that degrades LOS D to E is smaller than all higher LOS increments; any increase in volume that does not fully degrade LOS D to E will not degrade A to B, B to C, or C to D.

For the purposes of this analysis, an 11.1 percent increase in lane or intersection volume will be treated as a *primary criterion* indicating the threshold of concern for highway capacity . A threshold of concern for highway capacity impacts is an indication that a more detained analysis is required, including the following:

- location of new employment attractions

- assignment of associated traffic to specific gate(s) and intersections

- current LOS of those gate(s) and intersections

A *secondary criterion* will be applied that is based on traffic volume increases degrading LOS C to E, or two full levels. This decline is associated with a 25 percent increase in volume and will require more detailed analysis, including the following:

- Location of new employment attractions
- Assignment of associated traffic to specific gate(s) and intersections
- Current LOS of those gate(s) and intersections
- Specific turning movements at those gate(s) and intersections
- Effect of prospective capital improvements on capacity.

The first application of these primary and secondary criteria will be to intersections and approaches where 100 percent of the baseline traffic volume is associated with trips to and from the installation (e.g., a gate). Other intersections will tend to carry more non-base traffic as they become more removed from the gate access points. Consequently, the defined 11.1 and 25 percent increases become more conservative for non-gate intersections because an 11.1 or 25 percent increase in base-generated traffic becomes a smaller portion of the total intersection volume. For these intersections, the primary and secondary criteria will be used to estimate the highest proportion of total intersection volume that can be base traffic without exceeding the criteria.

The implicit assumptions in this approach are that one morning and one afternoon vehicle trip is generated for each new employee, and that the assignment of new traffic to the road network will be proportional to the existing traffic distribution. School district existing conditions and the potential to impact these existing conditions were obtained through conversations with school districts, on-base personnel, and state records.

The range of change in traffic volume associated with the beddown is from –227 to +1,850 peak-hour trips. This translates into a –3 percent to + 32 percent change in vehicle attractions to the respective installations. This range of change in peak-hour traffic volume indicates that the *Base and Environs* is the most appropriate region of influence (ROI) for the Transportation assessment. It is recognized that the Regional ROI is important for the assessment of air quality, and that a large portion of the regional air quality impact is driven by changes in vehicle miles of travel, and information and guidance regarding regional volumes has been provided to the air quality analysis. Disturbed Area and Airspace ROIs are not applicable to the transportation assessment.

C. Hazardous Materials and Waste

Baseline data on hazardous material usage and management, hazardous waste generation and management, and hazardous waste disposal processes were collected for each alternative location. Base Hazardous Waste Management Plans and other pertinent data sources were reviewed with particular emphasis on current aircraft maintenance processes and waste streams. Data on hazardous material usage and hazardous waste generation in the Environmental Assessment of the beddown of additional F-15s at Langley AFB and the Environmental Impact Statement (EIS) on the beddown of the F-22 training wing at Tyndall AFB were validated and used as a starting point for the analysis. Data for the use of hazardous materials, hazardous waste generation, and hazardous waste disposal at the other alternative locations were obtained from the Air Force point-of-contacts at the installations.

Implementing the proposed action would result in the use of hazardous materials and the generation of hazardous wastes during the operations and maintenance of the F-22. EISs for the beddown of the F-22 Training Wing at Tyndall AFB and the beddown of the F-22 Aircraft Force Development Evaluation and Weapons School at Nellis AFB in Nevada have been prepared. At the time these EISs were prepared, information on the composition of the chemicals in the composite material that makes up much of the aircraft structure was not available. Similarly, information on the paints/coatings was not available. Currently, the Air Force is characterizing residues from maintenance processes. Information on new waste streams will be included in the analysis as it becomes available in order to provide a more complete identification, quantification, and evaluation of potential impacts of the beddown.

Demolition and modification of existing facilities will result in the generation of solid waste, some of which may be hazardous. These wastes may be contaminated with asbestos, lead-based paints, or polychlorinated biphenyls (PCBs). Construction debris will result from the construction of new facilities. Typically, this type of waste is not hazardous, but procedures to check this waste for hazardous components will be required. The assessment will focus on solid and hazardous waste management plans, hazardous waste identification process, and solid and hazardous waste disposal plans.

The proposed location of construction sites will be evaluated to identify any possible conflicts that would exist with Environmental Restoration Program sites. The assessment of potential environmental impacts at affected sites will focus on how, and to what degree, the proposed action or alternatives affect the sites, and how any proposed mitigating actions will reduce the potential environmental impacts.

The assessment of impacts focused on how, and to what degree, the proposed action or alternatives affect hazardous material usage and management, hazardous waste generation and management, and hazardous waste storage and disposal. Hazardous material management programs were reviewed to determine the significance of anticipated increases in any hazardous material usage and transport with respect to current levels of activity. Pollution prevention plans were reviewed to identify initiatives that may reduce the environmental impact of the beddown by product substitution, process change, or recycling.