PREPARATION OF ENVIRONMENTAL ASSESSMENT AND PROBABLE FINDING OF NO SIGNIFICANT IMPACT FOR SHEPPARD AIR FORCE BASE, TEXAS, REALIGNMENT

November 1989

Prepared by

Tulsa District
Corps of Engineers
P.O. Box 61
Tulsa, Oklahoma 74121-0061

Engineering * Economics * Social Analysis * Environmental Planning

Air Force
Environmental Planning Division
(HQ USAF/CEVP)

Room 5B269
1260 Air Force Pentagon
Washington, DC 20330-1260

16 JUL 93

MEMORANDUM FOR DTIC (Acquisition)
(ATTN: Matt Mauby)

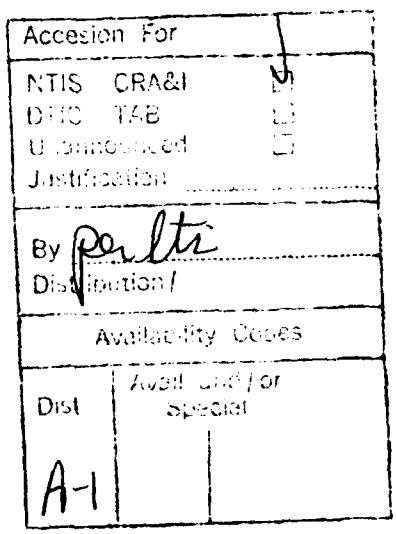
SUBJ: Distribution of USAF Planning Documents Forwarded on 1 JUL 93

All the documents forwarded to your organization on the subject date should be considered Approved for Public Release, Distribution is unlimited (Distribution statement A).

Jack Bush, GM-14

Mr. Jack Bush
Special Projects and Plans
703-697-2928
DSN 227-2928

EXECUTIVE SUMMARY



SUMMARY SHEET FOR FINAL ENVIRONMENTAL ASSESSMENT

Environmental Assessment (EA)
for Sheppard Air Force Base (AFB) Realignment

( ) Draft (X) Final

U.S. Army Corps of Engineers
Tulsa District

etc.

1. **Type of Action:** (X) Administrative Action
( ) Legislative Action

2. **Description of Action:**

This Environmental Assessment was prepared by the U.S. Army Corps of Engineers, Tulsa District in response to a request by the U.S. Air Force. The action to be assessed involves a troop realignment at Sheppard AFB, Wichita Falls, Texas. Approximately 2,300 military personnel will be transferred to that base over an approximate three year period. Approximately $88,000,000 worth of construction will be required to accommodate the realignment requirements. Impacts will be generated by the construction activity and subsequently by the increased population and training activities. An estimated peak population increase of approximately 4,800 persons is expected in the third year of implementation. This will then decline slightly to approximately 4,600 persons whose presence is attributable to the implementation of this action.

3. **Summary of Major Environmental Impacts:**

Approximately 15 acres of soil will be covered by buildings, parking lots, and other appurtenant facilities. Construction of these facilities would also remove these lands from potential use as feeding grounds for raptors, insectivorous birds, and small mammals such as ground squirrels and jack rabbits. Since these lands have been previously disturbed and/or developed, the habitat value is minor and, thus, the long-term impact to the area's wildlife population would be insignificant. Mitigation measures will have to be implemented to assure that no adverse

effects occur on the Texas horned lizard, a state protected species.

The additional personnel and training activities would result in increased emissions of pollutants to the ambient air, primarily from vehicular traffic. Increased demands on drinking water supplies and on waste (sewage and solid waste) treatment/disposal facilities will also result from the increase in personnel and training activities.

4. **Summary of Major Socioeconomic Impacts:**

The major beneficial impacts would be increases in employment and income in the region. Implementation of this action may induce economic development, including higher land values, physical upgrading of schools and recreational facilities as well as residential and commercial development. Of major importance is that the effects of the increased staffing at Sheppard AFB will continue far into the future after the boost to the local economy resulting from the construction activity has passed.

Adverse socioeconomic effects would relate to increased demands on schools, law enforcement, recreational facilities, etc. Comparison of the service demands associated with this action with the existing levels of service and projected future levels of population and economy indicate that the increases fall within acceptable levels of projected future growth. Therefore, it is felt that the local community can adequately accommodate these needs.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

I. PURPOSE AND NEED

I. PURPOSE AND NEED

Introduction

The Defense Secretary's Commission on Base Realignment and Closure ("Commission or CBRC") was chartered on 3 May 1988 by the Secretary of Defense to recommend military installations within the United states, its commonwealths, territories, and possessions for realignment and closure. Subsequently, the Base Closure and Realignment Act (Public Law 100-526, 24 October 1988) endorsed the Secretary's Commission and required the Secretary of Defense to implement its recommendations unless either he rejected them in their entirety or the Congress passed (and the President signed) a Joint Resolution disapproving the Commission's recommendations.

The primary criterion used by the Commission for identifying candidate bases was the military value of the installation. However, cost savings were also considered, as were the current and projected plans and requirements for each military service. Lastly, the Commission focused its review on military properties and their uses, not military units or organizational/admini-strative issues.

On 29 December 1988, the Commission recommended the realignment and closure of 145 military installations. Of this number, 86 are to be closed fully, five are to be closed in part, and 54 will experience a change (either an increase or a decrease) as units and activities are relocated.

On 5 January 1989, the Secretary of Defense approved those recommendations and announced that the Department of Defense would implement them. The Congress did not pass a Joint Resolution disapproving the recommendations within the time allotted by the Act.

Therefore, the Act now requires the Secretary of Defense, as a matter of law, to implement those closures and realignments. Implementation must be initiated by 30 December 1991, and must be completed no later than 30 September 1995. Thus, this Environmental Assessment addresses only implementation; the decision to realign Sheppard Air Force Base (AFB) is by law a final one.

The Base Closure and Realignment Act requires the implementing actions to conform to the provisions of the National Environmental Policy Act of 1969 (NEPA), as implemented by the President's Council on Environmental Quality (CEQ) regulations. In addition, this EA also follows Air Force Regulation (AFR) 19-2, which implements both NEPA and the CEQ regulations within the Air Force system. However, the Act also modified NEPA to the extent that the environmental analysis need not consider:

1. The need for closing or realigning a military installation selected for closure or realignment by the Commission;

2. The need for transferring functions to another military installation which has been selected as the receiving installation; or

3. Alternative military installations to those selected.

Description of Planned Action

Location

As a result of the Commission's recommendations, Sheppard AFB, Texas was one base selected for realignment activity. A portion of training mission operations (aircraft engine, propulsion, maintenance and aircrew life-support training courses) will be relocated from Chanute Air Force Base, Illinois to Sheppard AFB, Texas. Figure 1 shows the general location of Sheppard AFB and the City of Wichita Falls, Texas. Implementation of the planned mission change will involve two action components at Sheppard AFB: (a) an increase in personnel--trainees, and those involved in providing and supporting the training mission; and, (b) construction of facilities to support the expanded training mission, including housing for unaccompanied trainees. The schedules of these two actions are

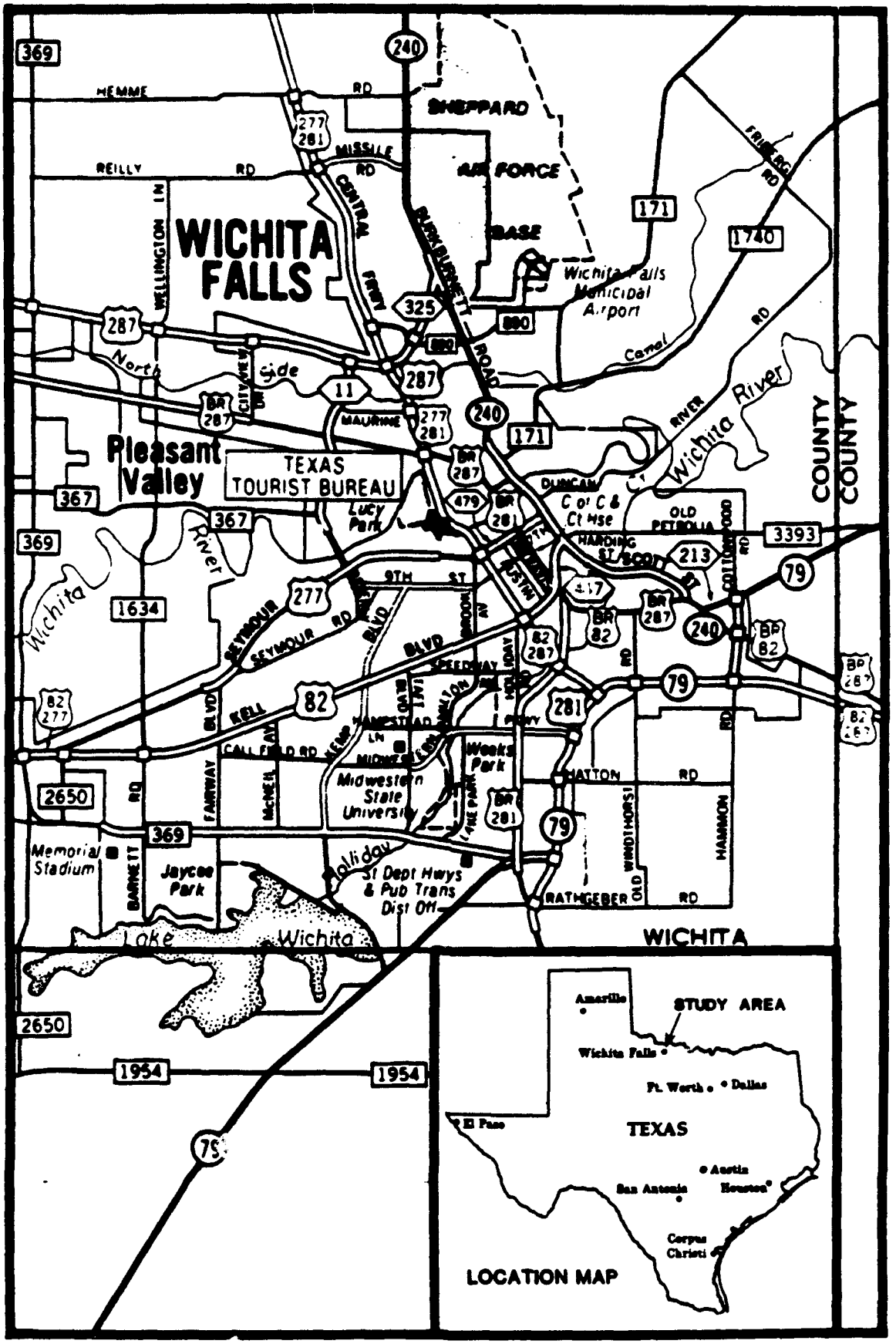


Figure 1. Project Area and Vicinity Map

discussed in the following sections. Figure 2 illustrates the planned construction and training relocation schedule.

Construction and Personnel Requirements

Construction

In order to meet the new training mission requirements, the following facilities will be constructed:

Construction Initiated in Fiscal Year 1991
(millions of dollars)

Alter Technical Training Facility	$ 1.05
Unaccompanied Enlisted Housing	29.00
Dining Facility	4.60
Addition, Aircraft Systems Facility	5.70
Weapons Support System Support Facility	3.20
Addition Wing Headquarters Facility	0.85
Troop Subsistence Warehouse	0.51
Support Facilities Modification	0.35
Fiscal Year 1991 Total	$45.26

Construction Initiated in Fiscal Year 1992
(millions of dollars)

Unaccompanied Enlisted Housing (Phase II)	8.90
Unaccompanied Officers Housing	3.90
Metal Technical Testing	21.00
AGE Training Facility	9.10
Fiscal Year 1992 Total	$42.90
GRAND TOTAL	$88.16

All construction is expected to be completed by October, 1993 (USAF, Sheppard AFB, 1989).

Personnel Increases

Base personnel will increase with the following new assignments:

Personnel Providing and Supporting Training Mission

520 Enlisted Persons
56 Officers
275 Civilians (estimated 50 percent to be hired from local labor market)

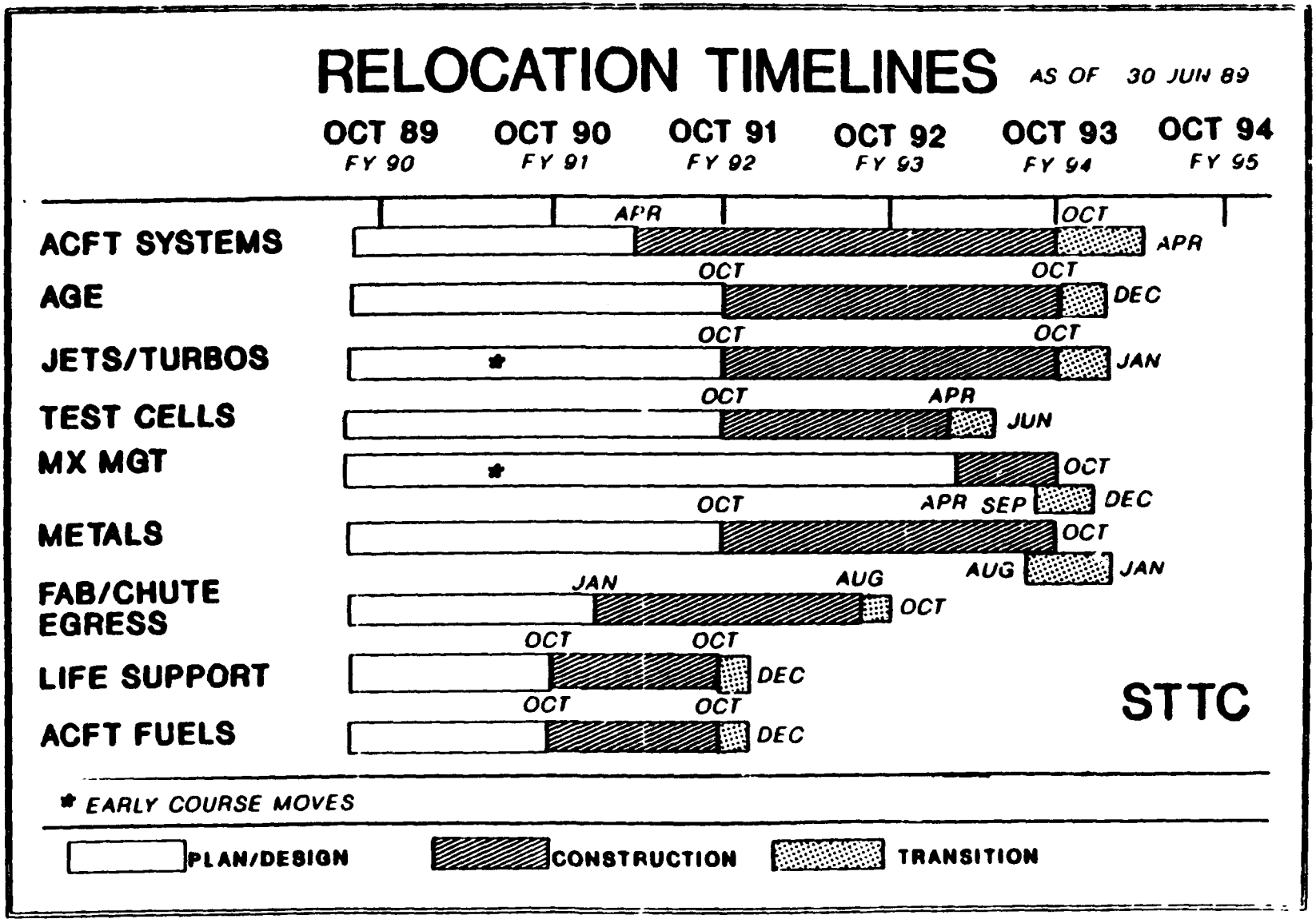


Figure 2. Relocation Timelines

Trainees

1,663 Officers, Enlisted and Civilian Persons

Relocation of personnel will begin in mid-1990 and will continue through 1994 (USAF, 1989). Projected course enrollments and durations were unavailable at present. The estimates shown in Table 1 apportion incoming trainees and permanent staff equally among the various courses. Figures reflect an estimate of 138 permanent civilian staff personnel.

Table 1

ESTIMATES OF INCOMING PERSONNEL,
BY TYPE AND FISCAL YEAR

Start Date	Number of Courses	Trainees	Perm. Staff	Total Persons	Cum. Persons
11/91	4	128	55	183	183
11/92	2	64	27	91	274
12/92	5	160	69	229	503
6/93	5	160	69	229	732
7/93	14	448	192	640	1,372
8/93	11	352	151	503	1,875
9/93	10	320	137	457	2,332
10/93	1	32	13	45	2,377

Source: U.S. Air Force, Time Phased Task Schedule, PAD No X-89, June 89, HQ ATC OPR, Schedule of Directed Actions.

II. ALTERNATIVES

II. ALTERNATIVES

Only two alternatives were considered in the current assessment--the "No Action" alternative and the implementation of the Commission's recommendations for realignment at Sheppard AFB. The need to consider other alternatives was specifically exempted by Public Law 100-526. The "No Action" alternative would constitute a continuation of current operations without relocation of the training functions from Chanute Air Force Base. However, by not passing a Joint Resolution setting aside the Commission's recommendations and the Secretary's directive to implement them, Congress gave the force of law to the planned alternative--the realignment at Sheppard AFB. Therefore, the "No Action" alternative is no longer applicable. This Environmental Assessment considers only the implementation of the realignment at Sheppard AFB.

III. AFFECTED ENVIRONMENT

III. AFFECTED ENVIRONMENT

Physiography/Geology/Soils

Sheppard AFB is located within the Osage Section of Central Lowland Province. The terrain at Sheppard AFB is rolling to slightly hilly, with no significant geological features (e.g., mountain ranges) on or near the base. A subsurface mountain range, which traverses Wichita County along an east-west axis, is situated about 2,500 feet below ground surface in the vicinity of Sheppard AFB. Sandstone and clayey shales deposits occur at varying depths from zero to 40 feet and are locally considered to comprise the area's bedrock.

The area's soils are mostly residual and derived from the weathering of these parent sandstone and shale deposits. The soils are generally characterized as reddish-brown, sandy loam underlain with red clay to clay loam. Ten soil associations comprise the soil types found at Sheppard AFB. Most of the proposed construction/reservation associated with the realignment would occur on soils within the Kamay and Deandale series. Although no soil associations at Sheppard AFB are classified as non-buildable areas in regard to load-carrying capacities, plasticity, and shrink/swell potential, the Kamay series exhibits moderate to high shrink/swell ratios and, thus, additional precautions against structural damage to buildings are required for construction on these soils. Because of high winds low annual precipitation, high clay content and restricted permeability, the soils at and near Sheppard AFB are limited in their use as croplands (USAF, 1975; USDA, SCS, 1977).

Water Resources

Surface Water Supply and Quality

Natural drainage at the base flows to the south and east into Plum Creek and Bear Creek, respectively, which, in turn, discharge into the Wichita River. The Wichita River flows into the Red River approximately 20 miles northeast of Sheppard AFB. Seven man-made lakes ranging in size from 23,000 to 444,000 acre-feet are situated within a 50 mile radius of the base. Lake Kemp is the largest and

is located on the Wichita River approximately 40 miles southwest of Sheppard AFB. Lake Iowa, the smallest of the impoundments, is located within 10 miles of the base.

The water quality of the various lakes is considered good, although total dissolved solid concentrations are sometimes elevated. Lakes Arrowhead and Kickapoo contain water of high quality and are designated for use as public water supply sources. Table 2 presents a summary of water quality data for samples collected at Lake Wichita from 1985 through 1987. As can be seen, no significant water quality problems are indicated.

At low flows the Wichita River becomes extremely saline, due to high concentration of dissolved solids, sulfates, and chlorides. Plum and Beaver creeks become intermittent at times during prolonged drought periods; consequently, they provide little aquatic habitat of any significant value.

Some oil-field brine (produced waters) discharges have occurred within the Wichita River basin, thus exacerbating the naturally occurring salinities. Table 3 presents results of water quality analyses conducted from 1985 through 1987 on samples collected from the Wichita River. As these data indicate, fecal coliforms are at levels which exceed contact recreation requirements.

Ground Water Supply and Quality

The Texas Water Commission (1988) described the major groundwater sources underlying the Sheppard AFB and surrounding area as follows:

> The High Plains (Ogallala) Aquifer occurs over a large area of the High Plains in the western part of the Red River Basin.
>
> The aquifer consists of interbedded sand, clay, silt, gravel, and caliche. Total thickness ranges up to approximately 900 feet, and saturated thickness reaches a maximum of about 400 feet. Yields of large capacity wells average 500 gallons per minute (gpm), but wells produce up to 1,100 gpm.

Table 2

WATER QUALITY DATA, WICHITA LAKE, 1983-1987

Parameter	Criterion	Number of Samples	Minimum	Maximum	Mean	Number of Value Outside Criteria	Number of Value Outside Criteria
Dissolved Oxygen (mg/l)	5.0	3	5.3	10.7	8.8	0	0
Temperature (F)	90.0	3	50.7	83.5	61.7	0	0
pH	6.5-9.0	3	8.2	8.3	8.2	0	0
Chloride (mg/L)	1000	2	240	1136	688	1	1136
Sulfate (mg/L)	400	2	60	474	267	1	474
TDS (mg/L)*	1800	3	541	2415	1165	1	2415
Fecal Coliforms	200	2	4	55	14	0	0

*TDS estimated by multiplying specific conductance by 0.5.

Source: Texas Water Commission, 1988.

Table 3

WATER QUALITY DATA, WICHITA RIVER BELOW DIVERSION LAKE, 1983-1987

Parameter	Criterion	Number of Samples	Minimum	Maximum	Mean	Number of Value Outside Criteria	Number of Value Outside Criteria
Dissolved Oxygen (mg/l)	5.0	79	3.8	15.9	8.4	6	4.4
Temperature (F)	90.0	79	36.0	91.8	77.8	6	90.6
pH	6.5-9.0	79	6.3	8.9	7.8	1	6.3
Chloride (mg/L)	1800	41	48	1835	1122	1	1835
Sulfate (mg/L)	800	41	15	880	487	4	833
TDS (mg/L)*	5000	92	278	4450	2563	0	0
Fecal Coliforms	200	27	2	26000	180	11	2762

*TDS estimated by multiplying specific conductance by 0.5.

Source: Texas Water Commission, 1988.

Generally, water in the aquifer contains less than 1,000 milligrams per liter (mg/L) dissolved solids, but may contain fluoride concentrations in excess of EPA Interim Primary Drinking Water Standards.

The Alluvium Aquifer produces water in local areas in the central part of the Red River Basin. The aquifer is composed of remnants of the Seymour Formation and recent alluvial deposits along the major streams.

The Alluvium Aquifer consists of interbedded sand, gravel, silt, and clay. Total thickness is usually 100 feet or less, but locally it ranges up to about 360 feet. Saturated thickness is commonly less than 50 feet, with a maximum of about 150 feet. Yields of high capacity wells average 300 gpm, but wells produce up to 1,300 gpm.

Water in the aquifer is fresh over most of the area, but locally is slightly saline.

The Trinity Group Aquifer extends over the eastern and east central parts of the basin. The aquifer is composed primarily of the Antlers Formation, with minor contributions by the Paluxy Formation, and consists of basal conglomerate and gravel overlain by fine- to coarse-grained sand interbedded with clay. Total thickness ranges from approximately 400 to more than 1,000 feet. Yields of large capacity wells average 325 gpm; wells produce up to 700 gpm.

Water in the aquifer generally contains less than 1,000 mg/L dissolved solids, but salinity increases downdip and toward the east.

Air Quality

Communications with the Texas Air Quality Board (Butz, 1989) indicated that the Sheppard AFB is in a region that is in attainment for all parameters that are monitored (i.e., particulates [PA], nitrogen oxides [NOx], sulfur oxides [SOx], and carbon monoxide [CO]). Ozone levels are not measured on a routine basis and, thus, are not reported.

The largest air pollutant source at the base is aircraft flying and ground operations. These activities produce about 11 tons of particulates, 2,925 tons of CO, 4,087 tons of SOx, 110 tons of NOx and 474 tons of hydrorcarbons (HC) annually (USAF, 1986). Table 4

presents an inventory of the pollutant emission sources at Sheppard AFB.

Waste Treatment and Disposal

Sewage

Industrial and domestic wastewater generated at Sheppard AFB is conveyed to a wastewater treatment plant located on base. The plant provides secondary treatment with dechlorination required prior to final discharged into an unnamed tributary of Plum Creek. The unnamed tributary flows through the base golf course prior to joining Plum Creek near the southwest end of the base.

The average flow of treated wastewater is approximately 1.0 million gallons per day (MGD); minimum flow is about 0.5 MGD. The design capacity of the system is 1.3 MGD.

Funds have been approved to tie a portion of the base into the City of Wichita Falls' sewage system during Fiscal Year 1990. Approximately, 30 percent of the wastewater flow would be diverted to the city system. Plans have also been approved to have the entire base on the city sewage system by the end of Fiscal Year 1992. The City of Wichita Falls is presently undertaking a $41 million expansion which would incorporate the wastewater flows from Sheppard AFB (Fowler, 1989).

Solid Wastes

Three solid waste landfills have been constructed and subsequently closed at Sheppard AFB. The last landfill was used for disposal of normal refuse, some wastewater sludge, and construction rubble until 1972. Since then, private contractors have been used to collect and dispose of wastes at approved off-site landfills. No data are available concerning the amount of wastes collected and disposed by contractors.

Hazardous Wastes

Hazardous wastes are managed and disposed off-site by the U.S. Air Force DRMO. When practicable, hazardous wastes are sent to recycling/recovery units. Sheppard AFB is presently preparing a hazardous waste minimization plan, in accordance with

Table 4

AIR EMISSIONS INVENTORY (TONS/YEAR)
SHEPPARD AFB, TEXAS

Pollutant	PA	SOx	CO	HC	NOx
T-37 Flying Operations	2.380	7.340	686.390	84.380	17.190
T-38 Flying Operations	0.150	19.080	1761.340	250.000	35.680
T-37 Ground Operations	0.079	0.976	42.130	2.560	3.280
T-38 Ground Operations	1.470	3.490	162.030	14.480	7.400
Other Military Flight Operations	3.530	8.660	172.050	113.140	37.480
Civilian Flight Operations	0.150	0.110	92.570	3.040	0.360
Commuter Motor Vehicles	0.760	0.035	29.540	4.980	4.470
Fuels Evaporation Losses:					
BX Service Stations				11.370	
Aero Club				0.203	
Liquid Fuels Management				83.370	
Fire Fighting Training	0.512	0.002	2.240	1.280	0.017
Aerospace Grouhd Equipment:					
Northrop	0.053	0.015	2.544	0.136	0.751
CMS/AGE	0.662	0.150	27.830	1.560	9.350
Heating and Power Production	1.910	0.220	3.930	1.560	23.080
Incinerator	0.219	0.037	0.292	0.219	0.029
Surface Coating				78.230	
TOTALS	2.56	41.70	3286.52	707.27	189.70

Source: U.S. Air Force, 1986.

Department of Defense minimization program objectives. This plan will necessarily incorporate any increases in hazardous wastes expected to be generated by additional activities associated with the realignments.

Current sources of hazardous waste generation include the corrosion control shop, printing plants, pesticide applications, and some maintenance shops.

Installation Restoration Program (IRP)

In 1980 the United States Air Force (USAF) began implementing the Department of Defense (DOD) Installation Restoration Program. The IRP is designed to identify and evaluate problems associated with hazardous waste and to control hazards to health and welfare resulting from past operation.

Sheppard AFB is not on the National Priority List. A description of the Sheppard AFB IRP is provided in Appendix A.

Biological Resources

Vegetation

Sheppard AFB has been highly developed and thus natural vegetative communities are extremely limited, or non-existent. The areas proposed for construction of structures associated with the realignment have all been disturbed/developed. Where vegetation does exist at these sites, it consists primarily of landscaping grasses such as bermuda and St. Augustine grasses (Cynodon dactylon and Stenotaphrum secundatum, respectively). Eastern red cedar (Uniperus virginiana), fruitless mulberry (Morus alba kingans), cedar elm (Ulmus crassifolia), pecan (Carya illinoensis) are placed sporadically in these areas for landscaping purposes only and provide little habitat for wildlife.

Wildlife

Because of the limited availability of habitat, wildlife resources on the base are also restricted. No large mammals occur on the base. Ground squirrels (Spermophilus tridecemlineatus) and other rodents occur in the less developed areas, such as near the runway and in drainage ditches, where burrowing is easier.

Jackrabbits (Lepus californicus), striped skunk (Mephitis mephitis), and oppossum (Didelphis virginiana) have established populations on the base at densities rates of 1/20 acres, 1/75 acres, and 1/100 acres, respectively.

Predatory birds consist primarily of northern harriers, red-tailed hawks and burrowing owls. Northern bobwhite and mourning doves are the only two game birds that occur on the base. Resident populations densities of these two are estimated at 1/30 acres and 1/15 acres, respectively. Numerous species of passerine non-game bird species occur at various times on the base. However, resident populations of mockingbirds, cardinals, and American robins are known to occur on the base.

Fish

Three one-acre lakes, which were constructed as part of the base golf course, were stocked with sunfish (Lepomis spp.), channel catfish (Ictalurus punctatus), and large mouth bass (Micropterus salmoides). No recent data are available concerning the current status of these populations. However, because of the limited amount of habitat, these resources should not be considered significant.

Threatened and Endangered Species

Table 5 presents a list of Federal and state protected species that are known or presumed to occur at Sheppard AFB. As can be seen from this table, the Texas horned lizard is the only protected species that is known to occur on the base. The bald eagle has been sighted over the base on one occasion (Hunter, 1989) but is unlikely to utilize the base property for feeding or resting since it prefers large bodies of water that are lined with tall trees. Similarly, the wood stork, white-faced ibis, and osprey all require wetland areas and/or large waterbodies for feeding and thus, are very unlikely to utilize the base but may fly over the property during fall or spring migration.

Table 5

FEDERAL AND STATE PROTECTED SPECIES KNOWN OR PRESUMED TO OCCUR AT SHEPPARD AFB

Common Name	Scientific Name	Status[1]		Probable[2] Occurrence
		Federal	State	
Texas kangaroo rat	Dipodomys elator		P	3
American swallow-tailed kite	Elanoides forficatus		P	4
Artic peregrine falcon	Falco peregrinus tundrius	E	E	2
Bald eagle	Haliaeetus leucocephalus	E	E	3
Interior least tern	*Sterna antillarum athalassos*		E	3
Osprey	Pandion haliaetus		P	2
White-faced ibis	Plegadis chihi		P	2
Whooping crane	Grus americana	E	E	3
Wood stork	Mycteria americana		P	2
Central plains milk snake	Lampropeltis triangulum gentilis		P	3
Texas horned lizard	Phrynosoma cornutum		P	1
Blue sucker	Cycleptus elongatus		P	3
Paddlefish	Polyodon spathula		E	4
River darter	*Percina shumardi*		P	4
Shovelnose sturgeon	Scaphirhynchus platorynchus		E	4
Western sand darter	Ammocrypta clara		P	4

[1] E = Engangered; P = Protected

[2] 1 = Known to occur on property.
2 = Seasonal on transient occurrence.
3 = Occurrence possible.
4 = Property is within species range.

Source: U.S. Air Force, 1987.

Socioeconomic Resources

Study Area Definition

Sheppard AFB is located in Wichita County, Texas. To the south and east are, respectively, the Texas counties of Archer and Clay. Cotton County, Oklahoma is across the Red River to the north. Counties other than Wichita County may derive some benefit from the construction phase of the realignment in the form of jobs. Construction workers often commute long distances to work. However, it is expected that the principal area of impact, particularly for incoming workers and personnel, will be Wichita County, and more specifically, the City of Wichita Falls. **Population**

Wichita County and Wichita Falls, Texas

The population in Wichita County, Texas, is most directly affected by the activities at Sheppard AFB. The county surrounds the base, and Wichita Falls, the largest city, is located immediately to the south. The estimated 1989 populations of the county and the city are 125,000 and 98,900 persons respectively (City of Wichita Falls, 1989). The county's population has experienced slight growth since the 1980 census, when the population was 121,000 persons. The city's population, which was 94,000 persons in 1980, has accounted for most of the county's growth (U.S. Bureau of Census, 1980).

The Bureau of Economic Analysis (BEA), Office of Business and Economic Research (OBERS) (1985) estimated the population of of Wichita County will total 136,400 persons in 1995. Assuming no change in share in the city and county populations, the City of Wichita Falls population is projected to total 105,000 persons in 1995.

Sheppard Air Force Base

In June 1989, the number of permanent party military personnel stationed at Sheppard AFB totaled 3,325 persons--769 officers and 2,556 enlisted personnel (Sheppard, 1989). There were 3,926 trainees reported at that time. Sheppard (1989) also reported a total of 4,673 dependents which included 2,677 children 18 years

old or less. School age children (ages 6-18) totaled 1,459 or 54.5 percent of all children of Sheppard AFB personnel.

Available Housing Units

Wichita County and Wichita Falls, Texas

In 1988, the City of Wichita Falls reported a total of 40,713 housing units, including 31,948 single family units and 8,785 multi-family residences (City of Wichita Falls, 1989). Single family housing had a vacancy rate of seven percent (2,236 units) while multi-family housing had a vacancy rate of 14.6 percent (1,283 units). This is a total of slightly more than 3,500 housing units vacant and presumed available. Based upon Wichita Falls Board of Realtors data, the average selling price of houses in Wichita Falls was $58,718 in 1988. The Board reports that 35.1 percent of houses listed in 1988 were sold.

Sheppard Air Force Base

Base housing is comprised of 239 single family units and 503 units in multi-family housing. Six dormitory-type facilities provide quarters for unaccompanied personnel. Approximately 95 percent of the single and multifamily units were occupied in June 1989, with an occupancy rate of 85 percent in the group quarters. Approximately 56 percent of the Sheppard AFB military personnel live off base in approximately 1,900 units.

Labor Force and Employment

The Texas Employment Commission reports that the average annual total for non-agricultural wage and salary employment for 1988 was 50,700. This includes only civilian labor force of Wichita County (Wichita MSA), which had an annual average unemployment rate of 6.3 percent for that year. The single most important employment category in the county is wholesale and retail trade, which comprises approximately 24 percent of employment in the county. Services, the next most important employment category, employed 23 percent of the labor force.

Production workers and laborers make up the largest occupational category of the civilian labor force. The most recent occupational

data, (1980 census) indicated that 33 percent of the work force was in the production and labor category, followed by the managerial and professional category which comprises 20 percent of the total work force. The majority of the remaining categories include sales, clerical, and service workers, with only a small number of persons being employed as technicians or agricultural workers.

Income

The U.S. Bureau of the Census estimated that the total personal income of the population in Wichita County was $1.6 billion in 1984 (U.S. Bureau of Census, 1988). The per capita income for that year was $12,985 as compared to $12,575 for the state of Texas, and $12,772 for the United States population, respectively.

Transportation Systems

Highways

The City of Wichita Falls is served by a network of Federal and State highways and local roads. Major routes are U.S. Routes 82, 277, 281 and 287. Wichita Falls is the southern terminus of I-44 which crosses Oklahoma as the H. E. Bailey Turnpike.

Rail Transportation

The City of Wichita Falls is also serviced by one mainline and one branch line providing rail freight transport. Bus Transportation Service

Intercity bus service is available to the citizens of Wichita Falls. Local bus service is provided by a mass transit system in Wichita Falls.

Air Passenger and Freight Service

Wichita Falls is serviced by major domestic air carriers which provide regularly scheduled passenger and freight service through the Wichita Falls Municipal Airport located adjacent to Sheppard Air Force Base. There are several smaller general aviation airport facilities as well.

Public Services and Social Institutions

Religion

The religious needs of the citizens of Wichita Falls and Wichita County are met by a total of 133 of churches representing all the major denominations and many of those with fewer adherents (Texas Facts).

Education

According to the most recent Census of Governments (1982), public governmental expenditures in Wichita County for education were estimated at $47.2 million, translating into $375.00 per capita. The per capita expenditures for education for the State of Texas was $441.00. In the 1986-1987 school year, schools in Wichita County had an enrollment of 21,276 students. There is one elementary school located on Sheppard AFB. Midwestern State University provides opportunity for higher education to the inhabitants of Wichita County and surrounding areas.

Health Care

Six hospitals currently operate in Wichita County, providing a total of 1,311 beds (American Hospital Association, 1988). The City of Wichita Falls serves as a medical center for surrounding counties in Texas and Oklahoma. In 1985, 226 medical doctors were practicing in Wichita County. Sheppard AFB provides health care on site for military personnel through a 130-unit hospital and an outpatient clinic operated in conjunction with the hospital.

Police and Fire Protection

Police and fire protection are public safety services provided by municipal and county police and fire departments, volunteer fire departments, state highway patrols and state and Federal control agencies. Sheppard AFB has security and fire departments which provide service on the base. Present levels of protection are apparently adequate to meet the perceived needs of the various local populaces.

Recreation

The area around Sheppard AFB has many thousands of acres of lands that are available for outdoor recreation such as hunting, fishing, hiking and camping. Within a 50-mile radius are seven

reservoirs available for flat-water recreation. The Red River and the Wichita River are available for riverine based recreation. Sixty-one municipal parks and recreation areas with a total of 2,844 acres provide recreation opportunities in Wichita Falls (Texas Facts).

IV. ENVIRONMENTAL CONSEQUENCES

IV. ENVIRONMENTAL CONSEQUENCES

Physiography/Geology/Soils

Construction of the various buildings, associated parking lots, and other appurtenant structures will require disturbance to the base's soils, particularly in those areas that are presently undeveloped. Less than 15 acres would be disturbed. As mentioned previously, in those areas where the soils exhibit a high shrink/swell potential, measures will be implemented to reduce structural damage potentials. Erosion control measures will also have to be implemented during the construction phase until the denuded soils become developed or revegetated. Training activities will not have any affect upon the area's soils.

Neither construction nor training activities would be expected to produce significant adverse effects to the area's physiography or geology.

Water Supply and Quality

Increased turbidity and suspended solids concentrations may occur in area streams during the construction phase. Such effects would also tend to reduce dissolved oxygen levels and increase water temperatures in these streams. The magnitude of these effects would depend upon the time of year, current conditions of the stream/water body, proximity of the construction site to the water body, and the efficacy of the base's erosion control measures during the construction. No significant long-term adverse effects would be expected, however.

The additional personnel and training activities would increase the demand on the City of Wichita Falls water supply system, from which the base procures all of its water. Relocation of the personnel will be complete by 1993, at which time the water demand at the base will increase by about 0.3 MGD.

Training activities should not have a significant adverse effect upon the quality of the surface or groundwater supplies. As mentioned previously, the base is planning to tie into the City of

Wichita Falls' sewage treatment sytem which would be expected to increase the quality of the wastewater effluent.

Air Quality

Pollutants emitted to the ambient air during the construction phases include soil particules made airborne incidental to excavation and off-road travel of construction vehicles, hydrocarbon (gasoline vapor) emissions from fuel tanks, and combustion produced from fuels burned in internal combustion engines. Because the construction will be conducted at various times over a three-year period and the emissions will be dispersed over a wide, sparesely populated area, no significant adverse long-term impacts are expected to occur to the area's air quality.

Renovation of some buildings may result in the liberation of asbestos fibers into the air. Although the general public would not be at risk, precautions will have to be implemented to assure the health and safety of construction workers. Any asbestos materials removed will have to be removed and disposed of in strict accordance with regulations and requirements of the Texas Air Control Board.

Relocation of the support personnel and trainees will result in an increase in the emissions associated with motor vehicles. There will also be emissions from supply and service contractor's vehicles and vehicles assigned to the training missions and used for various errands.

The specific pollutants of concern that are emitted from engine exhaust include carbon monoxide, hydrocarbons and nitrogen oxides. Relatively insignificant amounts of particulate matter and sulfur oxides are emitted from engines using military and civilian motor fuel. Increase in motor vehicle traffic would result in an additional 109 tons of carbon monoxide, 18 tons of hydrocarbons, and 16 tons of nitrogen oxides each year.

No increase in training flights would occur and thus, no additional emissions from aircraft operations are expected.

Sewage/Solid/Hazardous Waste

Sewage

The increase in personnel would increase the demand on the base's wastewater treatment by about 35 percent. However, as mentioned previously, the base presently plans to be completely tied to the City of Wichita Falls' system by Fiscal Year 1992, which is currently undertaking a significant expansion program. The expansion plans incorporate the addition of Sheppard AFB and the increased personnel; thus, no signifiant long-term adverse impacts to the area's wastewater treatment system wuld be expected.

Solid Waste

The additional personnel will result in an approximate 35 percent increase in the amount of solid waste produced by Sheppard AFB. This increase will have a consequent decrease in the life span of the area's sanitary landfill. The magnitude of the effect, however, cannot be determined at present.

Hazardous Waste

The majority (78 percent) of the hazardous wastes produced at Sheppard AFB are associated with corrosion control measures. Since the additional personnel and training activities would not require an increase in corrosion control, no significant increase in the production and disposal of hazardous wastes would be expected.

Biological Resources

No native vegetative communities would be disturbed by the construction or training activities. Because of the lack of natural habitat, wildlife populations are also extremely limited at the base and thus no significant long-term impacts to the area's wildlife population would be expected. Some burrowing animals (e.g., ground squirrels, etc.) may be lost during construction, however. Construction of the additional buildings, especially those near the runway, would remove potential hunting grounds for raptorial and insectivorous birds.

The only protected species that may be affected would be the Texas horned lizard. A survey should be conducted at each construction site to identify and relocate, if necessary, all specimens found. Since suitable habitat does occur elsewhere on

base and in the surrounding vicinity, no significant, long-term adverse impact to the population would be expected, particularly if relocation measures are thoroughly implemented.

Socioeconomic Resources

The socioeconomic impacts of large scale projects are generally associated with the number of workers who come into an area in response to recently available jobs and where those workers choose to live. Construction projects are characterized by a "boom and bust" cycle as workers move in to fill the jobs made available, work until the job is over, then move on to the next construction job. The extent of the impact is affected by a number of factors. Principal among these are size of the project, scheduling of the project and availability of local labor. Long-term changes such as the increase in troops stationed at Sheppard AFB have sustained effects that continue as long as the base's mission and population remain unchanged.

A combined approach using two well-recognized sources was used to estimate the amount of direct and indirect employment and consequent in-migration resulting from the construction and realignment at Sheppard AFB. The U.S. Army Corps of Engineers Construction Engineering Research Laboratory Economic Impact Forecast System (CERL-EIFS) was used to evaluate the socioeconomic effects of the realignment move and the attendant necessary construction of new facilities at Sheppard AFB. The EIFS impact model was selected because it has the capability to estimate the impacts of both construction and troop realignment.

Overall impact estimates generated by the EIFS model were then augmented for the construction phase by using information from another Corps of Engineers document, the Report of Survey of Corps of Engineers Construction Workforce (Dunning, Mark, 1981). Information items used from this source were the percent of construction jobs expected to be filled by local workers (70 percent); the percent of incoming construction workers expected to be accompanied by dependents (59 percent); average number of

dependents (2.11); and, average number of school age children (0.86).

The EIFS model estimated impacts for the realignment phase were adjusted by applying ratios for percent of married personnel and average number of school age children that were taken from existing Sheppard personnel to incoming military personnel. The assumption was made that the incoming permanent party and trainees would have essentially the same overall characteristics as those already stationed at Sheppard AFB.

For both the construction phase and the realignment phase the "spin-off" jobs or indirect employment were considered to be filled at a slightly higher rate by local workers (75 percent) than were construction jobs. However, the percent of incoming workers who are accompanied by dependents and the average number of those dependents per incoming worker were assumed to be the same as for incoming construction workers.

The construction associated with the troop realignment will have a considerable effect on the economy of Wichita Falls as much of the material, labor and services required to complete the construction will be purchased from the local area. Increased sales, income and employment are expected. The value of construction activity is expected to total $88,160,000 with the actual work being done over a period of about three years. Based on national averages of expenditures, it is estimated that 34.2 percent of expenditures will be for labor and 57.8 percent for materials.

Table 6 displays the results of EIFS construction impact forecasts. The results displayed illustrate the effects estimated for construction initiated in Fiscal Year 1991 and Fiscal Year 1992 and total project effects. The actual employment effects are rather evenly distributed over a three year period (see Figure 2, shown previously for timelines and

Table 6

CONSTRUCTION IMPACT FORECAST
FOR
SHEPPARD AIR FORCE BASE REALIGNMENT[1]

Construction Initiated by:	FY 91	FY 92	Total
Increases in:			
Sales Volume ($ millions)	41.9	39.7	81.6
Income ($ millions)	13.2	12.6	25.8
Net Local Government Revenue ($ millions)	.3	.2	.5
Employment (man-years)	754	715	1469
Direct	206	195	401
Indirect	548	520	1068

[1] Based on $88,160,000 in construction. Impacts expressed in terms of effects to Wichita County.

and phasing). Wichita County is expected to sustain most of the impacts associated with construction at Sheppard AFB. These effects include direct effects that result from actual expenditures for construction as well as the indirect effects that result from the initial expenditures.

The total effects of the construction will increase sales volume in the county by $81,600,000. The construction activity will generate an estimated 1,469 man-years of employment and $25,800,000 in personal income. Of this amount, 401 man-years is direct, construction employment. Indirect employment resulting from construction activity is expected to total 1,068 man-years. Employment is expected to be spread rather equally over the three year realignment period. As a result of increased taxes, receipts and other forms of revenue, local government revenues will increase by an estimated $500,000.

These effects represent a general stimulus to the local economy. However, the effects are within the 95 percent confidence interval of the predicted 1995 values of all the above parameters, based on

historical trends (1969-1986). From this statistical perspective, these effects of the realignment action do not represent a significant impact on the local economy. Detailed population effects and the attendant demands for housing, schooling and other amenities will be presented in later sections.

The troop realignment action will result in a military personnel increase of 2,239. An additional 138 civilian instructors and support personnel will also be transferred to Sheppard AFB. It is expected that another 138 civilian direct employment slots will be filled from local sources. The average military salary is estimated at $24,000 and the average civilian annual salary is estimated at $29,000.

Table 7 displays the anticipated result of the troop realignment impacts using the EIFS model and the total effects of full implementation of the realignment activity. The EIFS model estimates that the realignment will increase sales volume in the local area by $78,700,000, including purchases of supplies to support the expansion activity as well as the personal expenditures by incoming personnel. The estimated increase of $69,100,000 represents the income of employees in local retail, wholesale, and service establishments that are initially affected by the realignment, plus the income of new personnel. A total $1,700,000 increase in all forms of local governmental revenue is also expected. The employment figure includes increases in local retail, wholesale, service establishments and employment associated with the realignment plus the reassigned military and civilian personnel. The employment includes both direct and indirect changes to local employment. The EIFS model, adjusted using ratios based on existing conditions at Sheppard AFB and information obtained from the Construction Workforce cited earlier, estimates a realignment related population increase of 4,814 persons by 1993. This includes trainees, permanent military and civilian personnel and their dependents as well as

Table 7

POPULATION IMPACTS BY YEAR FOR
SHEPPARD AIR FORCE BASE REALIGNMENT

Increases in:

Sales Volume ($ millions)	$78.7
Income ($ millions)	$69.1
Net Government Revenues ($ millions)	$ 1.7
Employment (man-years)	3,323
Incoming military (trainees and permanent)	2,239
Direct Incoming Civilian	138
Direct Local Hire Civilian	138
Indirect Civilian	808

in-migrating workers filling newly created "spin-off" jobs and their dependents. Post-construction (1994 and beyond) estimates are for a permanent increase of 4,616 persons in Wichita County over the base year population.

These effects represent a general stimulus to the local economy. The effects are within the 95 percent confidence interval of the predicted 1995 values of all the socioeconomic parameters, as based on historic trends (1969-1986). From this statistical perspective, these effects do not represent significant impacts.

Population

As mentioned above, most socioeconomic impacts result from an influx of new workers and their dependents. Table 8 shows the estimated population growth attributed to each category of incoming personnel or in-migrating workers. Effects are shown by year. It should be noted that direct construction employment and indirect employment is distributed evenly across the years 1991, 1992 and 1993 and then ceases when construction has been completed. A small residual number of workers who come into the area may elect to remain after construction is completed. They are counted in post-construction years.

Population growth due to implementation of troop realignment

builds from year to year and then stabilizes in 1994. This plateau is then maintained pending future troop additions or deletions.

As shown in Table 8, the peak population impact occurs in 1993 when the construction workforce is still on hand and the bulk of the trainees, etc. is also present. This is a maximum impact scenario since the arrival of military personnel may stretch into 1994. The estimated total population impact of 4,814 persons represents approximately four percent of the population of Wichita County.

Housing

For purposes of estimating the impact on the housing market in Wichita Falls several assumptions were made. First, unaccompanied in-migrating workers would tend to double up and share living quarters. The demand for dwelling units for this group was judged to be half the number estimated to migrate into the area. Second, accompanied workers would require one housing unit each. For this group the demand equaled the number estimated to in-migrate. Third, all unaccompanied military personnel could be housed in the newly constructed dormitory housing on base. Fourth, any military personnel with dependents would live off-base. The vacancy rate for family housing on-base reflected only the normal vacancy due to tenants moving in and out, cleaning or repairing units in between occupancies, etc. This source of demand for off-base housing was determined by using an estimate of the number of incoming personnel who would be accompanied by a spouse. Fifth, all incoming civilian instructors or support personnel would live off-base. Again, unaccompanied personnel were judged to share quarters while those accompanied by dependents were considered to require one housing unit each.

As seen in Table 8, the peak demand for off-base housing units will occur in 1993 by which time an estimated 1,118 units will be required. This number is approximately 32 percent of the

Table 8
POPULATION IMPACTS BY YEAR FOR SHEPPARD AIR FORCE BASE REALIGNMENT

POPULATION SOURCE	Year 1991	1992	1993	1994
Construction:				
Direct (401 Man-Days total, 134 annually)				
Total In-migrating (0.30 x 134 = 40)				
Unaccompanied (0.41 x 40 = 16)	16[a,b]	16[a,b]	16[a,b]	5[a,b]
Accompanied (.59 x 40 = 24)	24[a,b]	24[a,b]	24[a,b]	8[a,b]
Total dependents (2.11 x 24 = 51)	51[a]	51a	51[a]	16[a]
Total children (1.24 x 24 = 30)	30	30	30	10
Total school age (.86 x 24 = 21)	21[c]	21[c]	21[c]	7[c]
Construction:				
Indirect (1,068 man-days total, 356 man-days annually)				
Total Inmigrating (.25 x 356 = 89)				
Unaccompanied (.41 x 89 = 36)	36[a,b]	36[a,b]	36[a,b]	12[a,b]
Accompanied (.57 x 89 = 53)	53[a,b]	53[a,b]	53[a,b]	17[a,b]
Total Dependents (2.11 x 53 = 112)	112[a]	112[a]	112[a]	36[a]
Total Children (1.24 x 53 = 66)	66	66	66	21
Total School Age (.86 x 53 = 46)	46[c]	46[c]	46[c]	14[c]
Realignment:				
Annual percentage incoming	7.7%	13.5%	78.8%	--
Cumulative percentage incoming	7.7%	21.2%	100.0%	100.0%
Incoming military (2,239 total)				
Annual Incoming	172	303	1,764	--
Cumulative Incoming	172[a]	475[a]	2,239[a]	2,339[a]
Incoming military dependents[1]				
Annual Incoming dependents	111	195	1,137	--
Cumulative Incoming dependents	111[a]	306[a]	1,443[a]	1,443[a]
Incoming spouses--annual	55	97	565	--
Incoming spouses--cumulative	55[b]	152[b]	717[b]	717[b]
Incoming military school age				
Incoming school age--annual	35	61	355	--
Incoming school age--cumulative	35[c]	96[c]	451[c]	451[c]

Table 8 (Cont'd)

POPULATION IMPACTS BY YEAR FOR SHEPPARD AIR FORCE BASE REALIGNMENT

POPULATION SOURCE	Year 1991	1992	1993	1994
Incoming Civilian Direct (138 total)				
Unaccompanied (.41 x 138 = 57)				
Unaccompanied annual	4	8	45	--
Unaccompanied cumulative	4[a,b]	12[a,b]	57[a,b]	57[a,b]
Accompanied (.59 x 138 = 81)				
Accompanied annual	6	11	64	--
Accompanied cumulative	6[a,b]	17[a,b]	81[a,b]	81[a,b]
Civilian dependent (2.11 x 81 = 171)				
Civilian dependent--annual	13	23	135	--
Civilian dependent--cumulative	13[a]	36[a]	171[a]	171[a]
Civilian school (.86 x 81 = 70)				
Civilian school--annual	5	10	55	--
Civilian school--cumulative	5[c]	15[c]	70[c]	70[c]
Realignment Civilian Indirect (Total = 946)				
Inmigrant Civilian Indirect (.25 x 946 = 237)				
Unaccompanied (.41 x 237 = 96)				
Unaccompanied--annual	7	13	76	--
Unaccompanied--cumulative	7[a,b]	20[a,b]	96[a,b]	96[a,b]
Accompanied (.59 x 237 = 140)				
Accompanied--annual	11	19	110	--
Accompanied--cumulative	11a,[b]	30[a,b]	140[a,b]	140[a,b]
Individual Civilian Dependent (2.11 x 140 = 295)				
Individual Civilian dependent--annual	23	40	232	--
Individual Civilian dependent--cumulative	23[a]	63[a]	295[a]	295[a]
Individual Civilian School (.86 x 140 = 120)				
Individual Civilian School--annual	9	16	95	--
Individual Civilian School--cumulative	9[c]	25[c]	120[c]	120[c]
a: Population Increase Number	639	1,251	4,814	4,445
b: Off-Base Housing Demand (units) (unaccompanied: 2 persons per unit)	181	318	1,118	1,041
c: School Age Children	116	203	708	662

[1]Dependent ratios of permanent party/trainees presently stationed at Sheppard AFB were applied to incoming military personnel.

3,519 vacant housing units cited in the description of available housing. The influx is certain to tighten the housing market in Wichita County, especially in proximity to the base itself. However, there appears to be a substantial surfeit of housing available in the county as a whole to accommodate the projected demand arising from this action.

Schools

The peak year for school enrollment related to the present action is also 1993. In that year an estimated 708 school age children will need to be accommodated in the schools of Wichita County. This number represents an increase of approximately 3.3 percent over the existing school population. While this amount of additional student load must be planned for by local school administrators, the local officials do not feel that the increase will cause a problem in budgeting or crowding of facilities (Cowden, 1989). The 3.3 percent increase would result in an increase in the teacher/student ratio from 1:17 to 1:18.

Transportation

Effects on the transportation system are unlikely to cause any serious difficulties. The most obvious effect will be an increase in automobiles going onto the base as new teachers, students and support personnel are added to those already travelling onto the base each day. During the construction phase, truck traffic may increase substantially in the areas close to the base as material is brought to the building sites. This should be relatively minor and temporary.

The local mass transit system will gain in ridership to an indefinite degree. Commercial airline passenger boardings and arrivals will increase. Rail transport will be relatively unaffected.

Health Care

According to accepted standards (Canter, et al. 1984) an increase of close to 5,000 persons should require an additional six physicians, three dentists, 22 nurses and 15 other health related

personnel to accommodate the additional populace. Approximately 20 additional hospital beds would also be required. If a rate of four hospital beds per 1,000 population is accepted as a reasonable standard, then Wichita County, with 1,300 or more beds has considerable capacity in hospital bedspace. Therefore the implementation of this action should prove no hardship to the area's hospital and other medical resources.

Police and Fire Protection

An increase in population of 5,000 persons would require an increase of approximately 10 policemen and eight fire fighters (Carter, et al., 1985). This level of increase in personnel should not place an undue burden on local resources.

Recreation

Recreation facilities are unlikely to be adversely impacted by the demands made by the increased population resulting from the implementation of this troop action. Current facilities are rather extensive and should be able to accommodate increased demand from the increased population.

REFERENCES

American Hospital Association as reported in U.S. Bureau of Census, County and City Data Book, 1988), U.S. Government Printing Office, Washington, D.C., 1988.

Bureau of Economic Analysis, 1985, OBERS Projections, Vol. 2, U.S. Government Printing Office, Washington, D.C., 1985.

Butz, J., 1989. Personal communication between Mr. Butz, Texas Air Quality Board, and Mr. Jim Hoover, Gulf Engineers & Consultants, Inc., October 1989.

Canter, L. W., S. Atkinson and F. Larry Leistritz. Impact of Growth--A Guide For Socioeconomic Impact Assessment and Planning, Lewis Publishers, Chelsea, Michigan, 1984.

Census of Governments, 1982, as reported in U.S. Bureau of Census, County and City Data Book, 1988; U.S. Government Printing Office, Washington, D.C., 1988.

City of Wichita Falls Growth Trends, City of Wichita Falls Planning Department, Wichita Falls, Texas, 1989.

Clements, John. Texas Facts, Clements Research II, Inc., Dallas, Texas.

Correspondence with City of Wichita Falls Planning Department, July 1989.

Cowden, T., 1989. Personal communication between Mr. Cowden, Bureau of Commerce and Industry, Wichita Falls and Ms. A. Jordan, Gulf Engineers & Consultants, Inc., November 1989.

Dunning, Mark. Report of Survey of Corps of Engineers Construction Workforce USCOE Institute for Water Resources, Fort Belvoir, Virginia, 1981.

Fowler, W., 1989. Personal communication between Mr. Fowler, Manager, Environmental Section, Sheppard AFB and Mr. C. Ingram, Gulf Engineers & Consultants, Inc., November 1989.

Headquarters, USAF/PPR Policy Guidance, 13 February 1989; subject: Environmental Impact Analysis Process (EIAP).

Hunter, T. Personal communication between Mr. Hunter, Agronomist, Environmental Section, Sheppard AFB and Mr. C. Ingram, Gulf Engineers & Consultants, Inc., November 1989.

Sheppard Air Force Base, data provided by base staff in June 1989.

Sheppard Air Force Base Personnel, personal communications, 1989.

Texas Water Commission, 1988. The State of Texas Water Quality Inventory, 9th Edition, Austin, Texas, 1988.

U.S. Air Force, 1975. Sheppard Air Force Base Environmental Narrative Document, Sheppard AFB, Wichita Falls, Texas.

U.S. Air Force, 1986. Air Emission Inventory, Sheppard AFB, Texas.

U.S. Air Force, Time Phased Task Schedule, PAD No X-89, June 1989, HQATC OFR, Schedule of Directed Actions.

U.S. Army Construction Engineering Research Laboratory, 1978, Economic Impact Forecast System, Champagne, Illinois.

U.S. Bureau of the Census, 1980, Census of Population and Housing as reported in the United States Army Construction Engineering Research Laboratory, Economic Impact Forecasting System (EIFS) database.

U.S. Bureau of Census, County and City Data Book, 1988, U.S. Government Printing Office, Washington, D.C., 1988.

U.S. Department of Agricultural, Soil Conservation Service, 1977. Soil Survey of Wichita County, Texas.

CONTRIBUTORS

Persons Contributing to Preparation of Environmental Assessment

Kenneth Ashworth, Ph. D., Archeologist, United State Army Corps of Engineers, Tulsa District, Tulsa Oklahoma.

Jim Hoover, Social Scientist, Gulf Engineers & Consultants, Baton Rouge, Louisiana.

Chris Ingram, Environmental Scientist, Gulf Engineers & Consultants, Baton Rouge, Louisiana.

Edwin J. Rossman, Social Scientist, United States Army Corps of Engineers, Tulsa District, Tulsa, Oklahoma.

Jerry Sturdy, Environmental Specialist, United States Army Corps of Engineers, Tulsa District, Tulsa, Oklahoma.

Agency Contacts and Consultations

City of Wichita Fall, Texas
Sheppard Air Force Base, Texas, Environmental Section
Texas Water Commission
Texas Air Quality Board
Randolph Air Force Base, Texas, Environmental Planning

APPENDIX A

SHEPPARD AIR FORCE BASE
INSTALLATION RESTORATION PROGRAM (IRP)

In 1980 the United States Air Force (USAF) began implementing the Department of Defense (DOD) Installation Restoration Program (IRP). The IRP is designed to identify and fully evaluate suspected problems associated with past hazardous waste contamination, and to control hazards to health and welfare resulting from past operations.

Sheppard AFB is not on the National Priorities List. Regulatory oversight is provided by the Texas Water Commission. The Installation Restoration Program will not be affected by the base realignment.

Landfill Site 1

History

Landfill Site 1 was used from 1941 to 1957. A portion of the landfill was closed about 1952 and base housing was subsequently constructed on this area. The area used as landfill is approximately 100 acres. The wastes disposed of in the Landfill were normal base refuse including incinerator ash, sludge from the wastewater treatment plant drying beds, and some hardfill and construction rubble. The landfill was operated using the trench and fill method, with an average depth of the trenches of approximately 14 ft.

Previous Studies

During the Remedial Investigation/Feasibility Study (RI/FS), four borings were installed and converted into monitoring wells. Surface soil and water samples were taken from the landfill, monitoring wells, and the creek which goes through the landfill. Upon completion of the sampling analysis, a public health risk evaluation was performed. Based on the results of the public health evaluation, it was recommended that this site be removed from further consideration. No future investigation is planned Landfill Site 1.

Low Level Radioactive Waste Disposal Site 1

History

The disposal well adjacent to the wastewater treatment plant is concrete-lined, about 6 inches in diameter and 14 feet deep, and is surrounded by a locked, fenced area. The well reportedly installed in the early 1950s for the disposal of X-ray waste from the Sheppard AFB hospital. The volume, identity, and source of material are unknown.

Previous Studies

During the Remedial Investigation, a pit was dug in the area fenced in an effort to locate the well as described in the history of this site. No concrete-lined well was located. It was determined that their was no well in this location. Based on these findings, it was recommended that this site be removed from further consideration. No further investigations are planned at the Low Level Radioactive Waste Disposal Site 1.

Low-Level Radioactive Waste Disposal Site 2

History

The radioactive waste burial vault in Landfill #1 is in a marked area approximately 100 feet square. It is alleged that the site was activated and marked in the late 1950s and early 1960s and that a radioactive tool or wrench used in munitions maintenance may have been deposited in the vault on one occasion. No written base records are available to indicate whether the site has been used.

Previous Studies

During the Remedial Investigation, a geophysical survey was preformed to locate the vault as described in the history of this site. Because of the concrete fill which was disposed in this area, the vault could not be located accurately. However, one boring was installed downgradient of the suspected location of the vault. Samples were taken this boring and the results evaluated. Based on the results of this public health evaluation, it was recommended that this site be removed from further consideration. No further investigations are planned at the Low Level Radioactive Waste Disposal Site 2.

Waste Pits 2

History

An earthen industrial waste pit just north of the wastewater treatment facility was used during the 1950s as a storage pond for waste oils and fuels from the old engine test cells. The oils in the pit were burned on at lease one or two occasions during the 1950s. This pit is presently used as an overflow basin for the effluent from the oil water separator.

Previous Studies

During the Remedial Investigation, a record search of existing aerial photographs and documents to ascertain the original limits of the waste pits. After completing this survey, two monitoring wells were installed to a depth of approximately 50 feet. Soil samples were collected from the core samples taken during drilling operation. Samples of the water and soil was analyzed and the result evaluated. Based on the results of the public health risk evaluation, it was recommended that this site be removed from further consideration. No future investigations are planned at Waste Pit 2.

Pesticide Spray Area

History

Pesticide applications have been performed by the Entomology Shop, Golf Course Maintenance, and Roads and Grounds. Building 4493 adjacent to the waste treatment plant was used for storing and mixing the chemicals. rinse water generated from cleaning the application equipment and empty containers was dispensed over a gravel lot adjacent to the building.

Previous Studies

During the Remedial Investigation, soil samples were taken from the gravel around the apron of building 4493. These samples were analyzed and the results evaluated. Based on the results of the public health evaluation, it was recommended that this site be removed from further consideration. No further investigations are planned at the Pesticide Spray Area.

Fire Protection Training Area 3

History

Fire Protection Training Area 3, located adjacent of the northern corner of the old municipal runway, was activated in 1957 and is used at the present time. This site consists of a storage area containing three 2,000-gallon elevated tanks, a concrete block building, a mock-up of a T-38 used for fire training, a C-140A aircraft for rescue training, and a waste drainage and collection system. Present burn frequency is approximately quarterly, with approximately 300 gallons of fuel consumed per burn.

Previous Studies

During the IRP evaluation, three monitoring wells ranging in depth from 30 to 35 feet deep were installed. Three additional monitoring wells were installed to a depth of approximately 30 feet after the results of the SOV survey was completed in order to determine the desired location. Samples were collected and analysis performed on these samples. The results of the samples were evaluated from a public health risk basis. Based on the results of the evaluation, it was recommended that this site be removed from further consideration. No further investigation is planned at Fire Training Area 3.

Industrial Waste Pit 1

History

In 1966, three waste pits were excavated to contain waste engine cleaning fluids and solvents from the maintenance buildings. The pits were approximately 80 feet square, 10 feet deep and unlined. The pits were actively used from 1966 to the Mid-1970s.

Previous Studies

During the IRP Phase II Stage 1 investigation, a geophysical survey and soil borings was performed at this site. In this study, no groundwater was encountered to a depth of 45 feet and the boundaries of the original pits were determined. Based on the absence of a public health risk, a no further action decision document was submitted on this site. This document is under consideration by the Texas Water Commission.

Fire Protection Training Area 1

History

Fire Training Area 1 was located within Landfill 1 and used as a fire protection training area from 1941 until 1957. The site consisted of a depressed burning area and three old aircraft. The frequency and duration of burns during the 1940s is unknown. During the 1950s, four or five burns occurred each weekend day. Each burn constituted about 400 to 500 gallons of material.

Previous Studies

During the IRP Phase II evaluation, four monitoring wells ranging in depth from 18 to 30 feet and four coreholes ranging in depth from 3 to 4 feet were installed. A soil organic vapor (SOV) survey and geophysical survey were also performed. After the completion of these surveys, three monitoring wells were installed in locations designated by the surveys. These wells were installed to a total depth of approximately 30 feet. Samples analysis were performed on the water from the wells and the results evaluated from a public health risk basis. Based on this evaluation, it was recommended that this site be removed from further consideration. No further investigations are planned at Fire Training Area 1.

Fire Training Area 2

History

Fire Training Area 2, located north of the municipal airport terminal and Taxiway C, was used as a small-scale fire protection training are from about 1968 until 1976. Typical usage consisted of one burn of contaminated oil, fuels, and solvents every 3 to 6 months. An oil-water separator, connected to a storm drain, exist at the site.

Previous Studies

During the Remedial Investigation, one soil boring was installed. Also soil samples were taken from around the abandoned pit. The analysis from the samples taken were evaluated from a public health risk basis. Based on the results of this evaluation, it was recommended that this site be removed from further consideration. No further investigation are planned at Fire Training Area 2.

Landfill Site 2

History

Landfill Site 2 is a rectangular-shaped site approximately 7 acres in area. It is located south of the present municipal airport complex and was operated for about 3 years during the early 1960s. Landfill operations entailed trench-and-fill procedures; trenches were approximately 10 to 14 feet deep. Only normal base refuse was disposed of in Landfill site 2. Burning of the refuse was performed during the period of use.

Previous Studies

During the Remedial Investigation at Landfill 2, three borings were installed and converted into monitoring wells. Surface soil samples were also taken. Upon completion of the sampling analysis from the wells and the soil, a public health risk evaluation was performed. Based on the results of this evaluation, it was recommended that this site be removed from further consideration. No future investigation are planned at the Landfill Site 2.

Landfill Site 3

History

Landfill Site 3 is about 60 acres at the northwest corner of the Base which was operated from about 1957 until 1972. This site was disposal for normal base refuse, some wastetreatment sludge, hardfill and construction rubble. The operation was performed as trench-and-fill with east-west trenches approximately 14 feet deep. Burning of the refuse occurred until 1968, after which no further burning was performed.

Previous Studies

During the IRP Phase II Stage 1 investigation two monitoring wells were installed and two borings were drilled to depths of 40 and 51 feet. Additional borings and monitoring wells were installed during the Remedial Investigation effort. Also soil, sediment, and water samples were taken from this site. The results of the analysis of these samples were subjected to a public health risk evaluation. Based on this evaluation, it was recommended that this site be removed from further consideration. No future investigations are planned at Landfill Site 3.