



US Army Corps  
of Engineers

AD-A194 467

*DIVISION AND BRIGADE  
STATIONING SYSTEM:  
INSTALLATION DATA BOOK*

USAESC-R-88-4

ENGINEER

STUDIES

CENTER

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Prepared by  
Engineer Studies Center  
US Army Corps of Engineers

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REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY N/A		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.	
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE			
4. PERFORMING ORGANIZATION REPORT NUMBER(S) USAESC-R-88-4		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION US Army Engineer Studies Center	6b. OFFICE SYMBOL (If applicable) CEESC	7a. NAME OF MONITORING ORGANIZATION Office, Assistant Chief of Engineers	
6c. ADDRESS (City, State, and ZIP Code) Casey Building, 2594 Telegraph and Leaf Roads Fort Belvoir, VA 22060-5583		7b. ADDRESS (City, State, and ZIP Code) Attn: DAEN-ZCI The Pentagon Washington, DC 20310-2600	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION US Army Corps of Engineers	8b. OFFICE SYMBOL (If applicable) USACE	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code) 20 Massachusetts Avenue, NW Washington, DC 20314-1000		10. SOURCE OF FUNDING NUMBERS DA	
		PROGRAM ELEMENT NO. 0	PROJECT NO. 0
		TASK NO. 0	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification)  (U) Division and Brigade Stationing Study: Installation Data Book			
12. PERSONAL AUTHOR(S) Mann, Pleasant P; Sustar, John F.; Livingston, CPT John R.			
13a. TYPE OF REPORT Final	13b. TIME COVERED FROM 8708 TO 8802	14. DATE OF REPORT (Year, Month, Day) 8804	15. PAGE COUNT 240
16. SUPPLEMENTARY NOTATION Agency Accession No: DA310696			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
		Stationing (U); Division (U); Brigade (U); Installation (U)	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
<p>In December 1985, the Deputy Chief of Engineers tasked the US Army Engineer Studies Center (ESC) to develop an automated planning system which would screen installations to identify the best candidate sites for stationing an additional division or separate brigade.</p> <p>This report summarizes the large amount of quantitative and qualitative data amassed for this study. This installation data book serves as an aid to Army stationing planners by providing detailed information on the geography, economic conditions, environment, training facilities, and real property of the 28 major Army installation complexes in the US.</p>			
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL DALE F. MEANS, COL. CE, CDR/DIR, ESC		22b. TELEPHONE (Include Area Code) (202) 355-2374	22c. OFFICE SYMBOL CEESC

DISTRIBUTION LIST

	<u>No. of Copies</u>
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Total	70

ACKNOWLEDGMENTS

The Engineer Studies Center, US Army Corps of Engineers, prepared this report under the sponsorship of the Installations Planning Division of the Office of the Assistant Chief of Engineers. It was prepared under the overall direction of Dr. Lawrence Lang (Senior Project Manager) and Mr. Joseph D. Brannon (Project Manager). It was written by Mr. Pleasant P. Mann, Mr. John F. Sustar, and CPT John R. Livingston.

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Thanks are extended to COL Steve Rutz, who originated the study; his successor, COL C. O. LaFond, Chief of the Installations Planning Division; Mr. Douglas Macherey, who coordinated the study; and members of the Stationing and Installations Planning Committee who served as the Study Advisory Group.



<b>Accession For</b>	
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DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

## CONTENTS

<u>Section</u>	<u>Page</u>
DD FORM 1473	
DISTRIBUTION LIST	iii
ACKNOWLEDGMENTS	v
CONTENTS	vii
EXECUTIVE SUMMARY	ix
Purpose	1
Scope	1
Background	1
Sources	2
Data Provided	6
Summary	7
<u>Figure</u>	
1	3
2	4
3	8
ANNEX A: ALASKA COMPLEX	A-1
ANNEX B: FORT BENNING	B-1
ANNEX C: FORT BLISS	C-1
ANNEX D: FORT BRAGG	D-1
ANNEX E: FORT CAMPBELL	E-1
ANNEX F: FORT CARSON COMPLEX	F-1
ANNEX G: FORT CHAFFEE	G-1
ANNEX H: FORT DEVENS COMPLEX	H-1
ANNEX I: FORT DIX	I-1
ANNEX J: FORT DRUM	J-1
ANNEX K: HAWAII COMPLEX	K-1
ANNEX L: FORT HOOD	L-1
ANNEX M: FORT HUACHUCA	M-1
ANNEX N: FORT INDIANTOWN GAP	N-1
ANNEX O: FORT IRWIN	O-1
ANNEX P: FORT JACKSON	P-1
ANNEX Q: FORT KNOX	Q-1
ANNEX R: FORT LEE COMPLEX	R-1
ANNEX S: FORT LEWIS COMPLEX	S-1
ANNEX T: FORT McCLELLAN	T-1
ANNEX U: FORT McCOY	U-1
ANNEX V: FORT ORD COMPLEX	V-1
ANNEX W: FORT POLK COMPLEX	W-1
ANNEX X: FORT RILEY	X-1
ANNEX Y: FORT RUCKER	Y-1
ANNEX Z: FORT SILL	Z-1
ANNEX AA: FORT STEWART COMPLEX	AA-1
ANNEX AB: FORT LEONARD WOOD	AB-1

## EXECUTIVE SUMMARY

In December 1985, the Deputy Chief of Engineers tasked the US Army Engineer Studies Center (ESC) to develop an automated planning system which would integrate existing data systems into an automated spreadsheet which could then be easily and routinely updated by Army stationing planners. The completed system would be used to screen installations to identify the best candidate sites for stationing an additional division or separate brigade. Also, ESC was tasked to use the developed system to evaluate 28 Army installation complexes in CONUS, Alaska, and Hawaii.

This report summarizes the large amount of quantitative and qualitative data amassed by ESC for this study. This installation data book serves as an aid to Army stationing planners by providing detailed information on the geography, economic conditions, environment, training facilities, and real property of the 28 major Army installation complexes in the US.

**DIVISION AND BRIGADE STATIONING STUDY:  
INSTALLATION DATA BOOK**

1. Purpose. This report presents the data the Engineer Studies Center (ESC) used to determine the comparative ability of major US Army installations to accept the stationing of an additional division or separate brigade.

2. Scope. This installation data book reorganizes and summarizes the geographic, demographic, economic, and real property information used in ESC's Division and Brigade Stationing Study (DBSS).<sup>1</sup> This data will allow Army stationing planners to qualitatively evaluate the capabilities of individual installations. Data is presented for 28 installation complexes, representing a total of 50 forts, camps, and training sites in CONUS, Alaska, and Hawaii.

3. Background. The DBSS analysis is the result of a long-standing effort to devise a system to optimally station Army troop units in the US.

a. In recent years, the Army has significantly changed its force structure, weapons systems, and base alignments. Several automated data bases and planning systems have also been introduced to make the stationing process more accurate and efficient. Because of these changes, both the Office of the Assistant Chief of Engineers (OACE) and the Stationing and Installations Planning Committee (SIPC) expressed the desire to update the Army's division and brigade stationing options recommended in ESC's 1977 study.<sup>2</sup>

b. In September 1985, the SIPC reviewed ESC's 1977 study and recommended that the new ESC study be structured along the same lines. However, unlike the 1977 study (which relied mostly on questionnaire survey data), the SIPC requested that this new effort emphasize information drawn from the Army's new, automated data bases. In a December 1985 letter, the Deputy Chief of Engineers tasked ESC to develop an automated planning system which would integrate some of these data systems into an automated spreadsheet which could then be easily and routinely updated by stationing planners. The completed system would be used to screen installations to identify the best

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<sup>1</sup>*Division and Brigade Stationing Study: An Analysis of Environmental and Socioeconomic Effects* (ESC, September 1987); *Division and Brigade Stationing Study: An analysis of Training and Operations* (ESC, February 1988); *Division and Brigade Stationing Study: An Analysis of Facilities* (ESC, May 1988); *Division and Brigade Stationing Study: A System Overview*, draft report (ESC, April 1988).

<sup>2</sup>*Review of Division and Brigade Stationing, Volume I* (ESC, February 1977)

candidate sites for an additional division or separate brigade. The Chief of the Installation Planning Division, OACE, was appointed the sponsor for this new ESC effort. The SIPC serves as the DBSS Study Advisory Group (SAG).

c. The list of installations ESC proposed for this update study was based on the stationing recommendations made in the 1977 report. The sponsor, the SAG, and the DA Deputy Chief of Staff for Operations and Training modified that list and presented ESC with their preferred list in February 1986. With sponsor approval, some installations from that list in the same region were grouped into "installation complexes", which are considered a single station in the analysis. Figure 1 lists the installations and installation complexes considered in the DBSS; their locations are mapped in Figure 2.

d. ESC originally planned to use information only from automated data bases and to use only automated analysis procedures in the DBSS effort. In the first phases of the analysis, it became apparent that the Army's available automated systems were not yet developed enough to allow ESC to use them exclusively. They did not contain all of the information necessary for an accurate and thorough analysis. Therefore, with the approval of the sponsor, the study's scope was amended to allow the use of a combination of automated, automation-assisted, and manually collected data.

e. For this study, ESC gathered large amounts of quantitative and qualitative data from diverse sources. Because the quantitative nature of the final automated DBSS model prevented a full representation of the qualitative factors used in the evaluations, this data book presents both the quantitative and qualitative information. In this volume, data are presented by installation in order to give Army stationing planners a clearer idea of the qualitative aspects of each post. There is a separate annex for each of the 28 installation complexes.

4. Sources. The DBSS installation data base was created from several sources. This data book relies heavily on direct extracts or summaries of the information contained in the following sources:

a. *Army Stationing and Installation Plan (ASIP) (U)* (Office of the Assistant Chief of Engineers, August 1986). This confidential document outlines the five-year stationing plan for US Army units worldwide. Unclassified portions of the ASIP were used to determine both the number of military personnel currently on each installation and the projected populations for the

COMPOSITION OF INSTALLATION COMPLEXES

Complexes	Installations Included in Complexes
1. Alaska Complex	1. Forts Greely, Richardson, Wainwright, and Yukon Training Site, AK
2. Fort Benning	2. Fort Benning, GA and AL
3. Fort Bliss	3. Fort Bliss, TX, and Bliss Range, NM
4. Fort Bragg	4. Fort Bragg and Camp MacKall, NC
5. Fort Campbell	5. Fort Campbell, KY and TN
6. Fort Carson Complex	6. Fort Carson and Pinon Canyon Training Area, CO
7. Fort Chaffee	7. Fort Chaffee, AR
8. Fort Devens Complex	8. Fort Devens, Camp Edwards, and Sudbury Training Area, MA
9. Fort Dix	9. Fort Dix, NJ
10. Fort Drum	10. Fort Drum, NY
11. Hawaii Complex	11. Fort Shafter, Schofield Barracks, Wheeler Army Airfield, Dillingham, and Kahuka, Kawaiiloa, Makua, and Pohakuloa Training Areas, HI
12. Fort Hood	12. Fort Hood, TX
13. Fort Huachuca	13. Forts Huachuca and Willcox, AZ
14. Fort Indiantown Gap	14. Fort Indiantown Gap, PA
15. Fort Irwin	15. Fort Irwin, CA
16. Fort Jackson	16. Fort Jackson, SC
17. Fort Knox	17. Fort Knox, KY
18. Fort Lee Complex	18. Forts Lee, A. P. Hill, and Pickett, VA
19. Fort Lewis Complex	19. Fort Lewis and Yakima Firing Center, WA
20. Fort McClellan	20. Fort McClellan, AL
21. Fort McCoy	21. Fort McCoy, WI
22. Fort Ord Complex	22. Forts Ord and Hunter-Liggett, and Camp Roberts, CA
23. Fort Polk Complex	23. Fort Polk, and Peason and Horses' Head Training Areas, LA
24. Fort Riley	24. Fort Riley, KS
25. Fort Rucker	25. Fort Rucker, AL
26. Fort Sill	26. Fort Sill, OK
27. Fort Stewart Complex	27. Fort Stewart and Hunter Army Airfield, GA
28. Fort Leonard Wood	28. Fort Leonard Wood, MO

Figure 1

# INSTALLATION COMPLEXES STUDIED

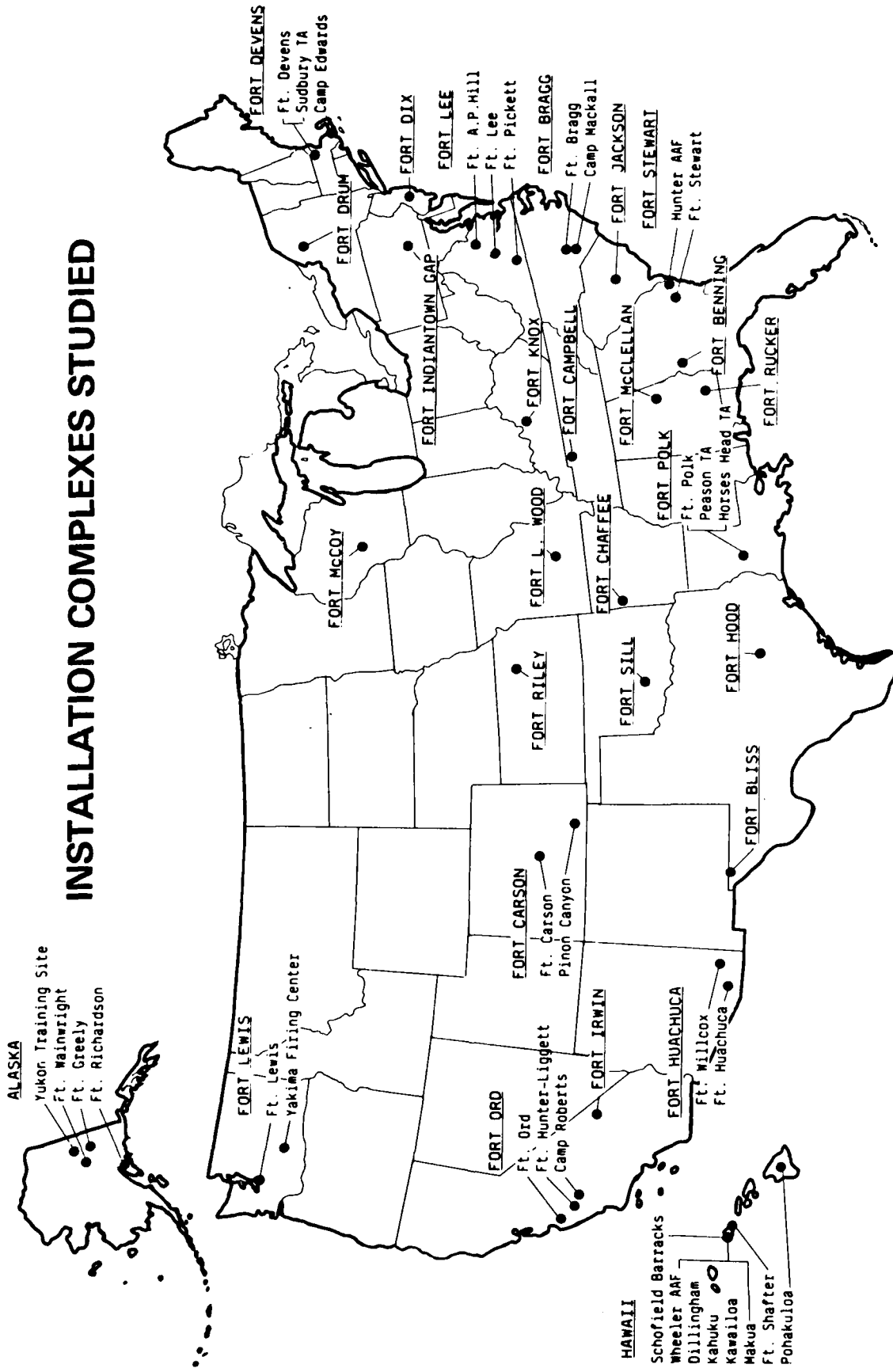


Figure 2

future. The ASIP's information on units by Unit Identification Code (UIC) and Source Resource Code (SRC) also allowed an estimate of the amount of equipment at each installation.

b. **Environmental Early Warning System (EEWS).** An automated system developed by the US Army Construction Engineering Research Laboratory (CERL), EEWS estimates the environmental and encroachment impact of Army stationing moves. The DBSS made particular use of the EEWS's narrative descriptions of the installations' environment.

c. **Economic Impact Forecast System (EIFS).** An economic model managed by CERL, EIFS is based on data from the 1980 census of population and housing, plus the 1982 special census data on personal income, employment, and regional economic impact multipliers. EIFS data served as the basis for the DBSS determination of the impact of stationing actions on local economies and housing markets.

d. **Integrated Facilities System (IFS).** IFS is an automated data base for Army real property. Managed by the US Army Facilities Engineering Support Activity, IFS has two components. The Installation IFS (IIFS) component has detailed information down to the size and type of individual buildings on an installation. The other component, Headquarters IFS (HQIFS), summarizes this data for the use of planners at the major command and Army staff level. The HQIFS was used as a source of information on the available floorspace, by category code, for each installation.

e. **Inventory of Army Military Real Property** (Office of the Chief of Engineers, 30 September 1985). This book was derived from the IFS and lists all real estate, buildings, and other facilities under the control of the US Army. The inventory was the primary source for the acreage of each installation.

f. **FORSCOM Installation Guide** (FORSCOM Pamphlet 210-1, 30 April 1985). A publication offering a brief overview of the history, mission, training conditions, and general support available at US Army Forces Command (FORSCOM) installations. The guide was used to provide additional descriptive information on the physical environment of the FORSCOM installations.

g. **Training Land** (DA Training Circular No. 25-1, 4 August 1978). This publication outlines the Army's methods for determining training land requirements. It also gives a description of available training areas. ESC

used the circular for graphic and quantitative information on Army training areas. Most of the maps used in the annexes were reproduced from this source.

h. *Training Ranges* (Army Field Manual 25-7, 16 September 1985). The basic source of Army planning guidance on the development of training ranges, it was used to give some idea of the adequacy of existing installation range complexes.

i. *Training Site General Information Summary* (National Guard Bureau Pamphlet 25-1, 1 October 1985). This pamphlet lists training sites for use by the Army National Guard during annual training periods. It is used here as a supplemental reference on the maneuver areas, ranges, and transportation links of installations.

j. *Terrain Analyses* (Terrain Analysis Center, US Army Engineer Topographic Laboratories). A series of reports, begun in October 1975, on the terrain of selected FORSCOM installations. ESC used the analyses to determine the environmental and training area conditions of FORSCOM installations.

k. *Master plans*. The installation master development plans (registered at the Office of the Chief of Engineers) were used as a source of information on the terrain and environment of the installations which are assigned to major commands other than FORSCOM.

l. *Atlases*. *The Grolier*, *National Geographic*, *Reader's Digest*, and *University of Hawaii Atlases* were used to supplement Army data on the terrain, soil, climate, water, and vegetation of select DBSS installation complexes.

5. Data provided. This Installation Data Book presents the considerable amount of information used in the DBSS analysis. For each installation complex, a separate annex provides information which is organized into the following categories:

a. *Mission*. Each annex begins by identifying the major command to which the installation is assigned, the installation's population and primary mission, and the major resident Army and Army-tenant units.

b. *Location*. The installation's geographic location and the surrounding region are described. An installation map is provided. The road, air, rail, and sea transportation links to the installation are also listed.

c. **Socioeconomic data.** Data on the population, workforce, and economic conditions of the community surrounding the installation are presented in a table. This information was obtained from the EIFS. Socioeconomic information is provided for both the installation's local area (defined as the counties in which the installation is located) and its commute area (the region within a 50-mile radius of the installation).

d. **Environment.** This section provides a description of the installation's climate, terrain, soils, water resources, and vegetation. This environmental information was derived from the EEWS, the master plans of individual installations, and the Terrain Analysis Center reports.

e. **Training.** This section describes the available maneuver areas and training ranges of an installation. Information on the size and trafficability of installation maneuver areas came from Army publications on training areas and the Terrain Analysis Center reports. The evaluation of available ranges for FORSCOM installations is shown in a chart developed by FORSCOM headquarters. General categories of training units, listed in Figure 3, were used to evaluate ranges. FORSCOM evaluated the range complexes at FORSCOM installations as "adequate" or "not adequate" to satisfy the needs of the units currently on-post. Range evaluations for all other installations were derived from available master planning data. Based on the descriptions of each installation's ranges and on the training requirements for a generic heavy division, ESC evaluated each range category as "excellent," "good," "marginal," "unavailable," or "unknown."

f. **Facilities.** Each annex has a chart which presents the building floorspace on an installation broken down into seven major facility categories. This information came primarily from IFS. The family housing data were provided by OACE.

g. **Key Data.** A summary of information used in the DBSS is provided for each installation complex. If there is no complex, the summary is provided for the installation.

6. **Summary.** This installation data book serves as an aid to Army stationing planners by providing detailed quantitative and qualitative information on the major Army installations located in CONUS, Alaska, and Hawaii. There is a descriptive annex for each installation complex.

### TRAINING RANGE CATEGORIES

Unit Category	Weapons System
Armor	M60-series tanks, M48-series tanks, and M1-series tanks
Infantry(MECH)/Cavalry	M2-series fighting vehicles, M3-series fighting vehicles
Anti-Armor	M72 (LAW), AT4, ITV, TOW, M47 (DRAGON), 90mm recoilless rifle
Aviation	AH64, AH1, AH1G, UH1M, UH1, UH60, CH47
Individual/Crew Weapons	9mm, 38 caliber, 45 caliber, M16, M16A2, M60 mg, M2, M21, M249 (SAW), MK19, M79, M203, M3A1
Indirect Fire Weapons	203mm, 155mm, 105mm, 107mm, 81mm, 60mm, MLRS, 14.5mm
Air Defense Artillery	Redeye, Stinger, Vulcan, Chaparral
Infantry Collective Skills	Squad/Platoon Live Fire Exercise, Squad/Platoon Proficiency Firing, Company/Team Live Fire Exercise, Platoon Air Defense Training, MOUT Training

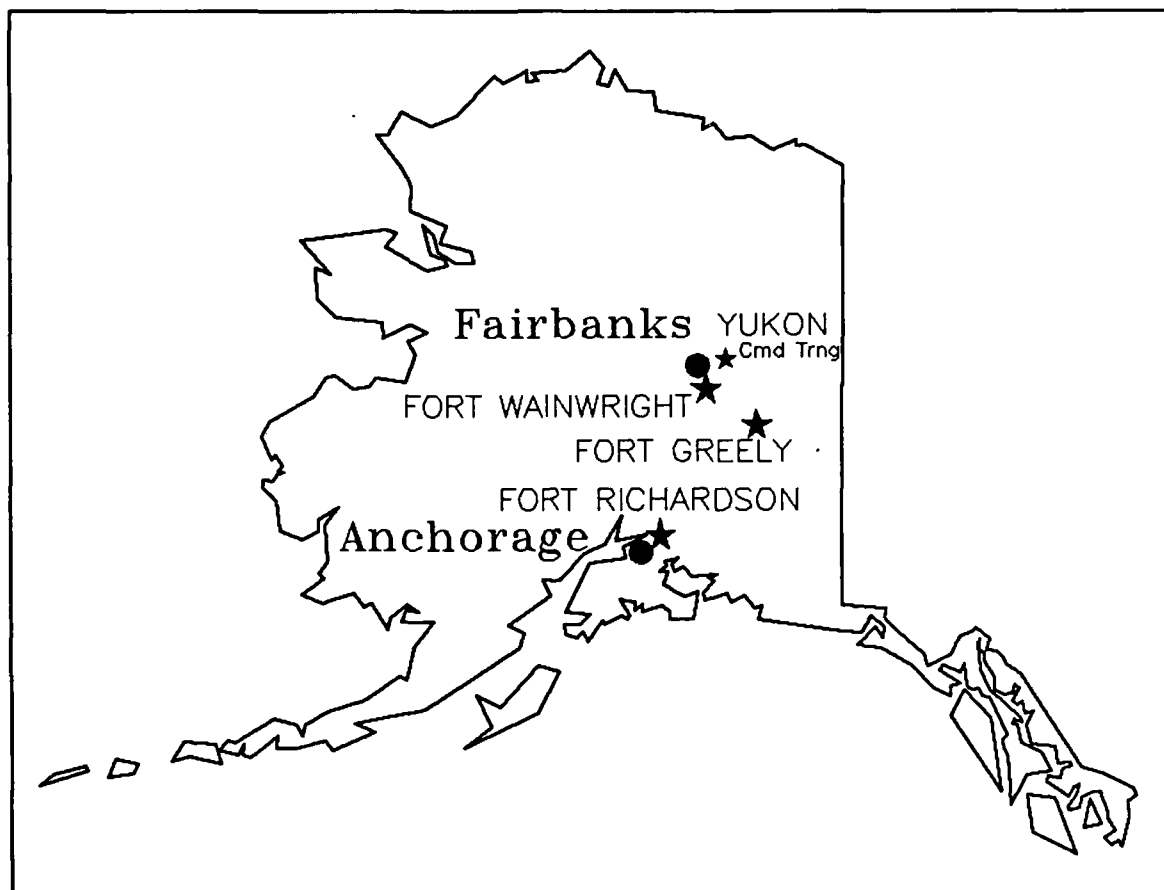
Figure 3

ANNEX A

ALASKA COMPLEX

ANNEX A

ALASKA COMPLEX



In the DBSS analysis, the Alaskan installations of Fort Greely, Fort Richardson, and Fort Wainwright, and the Yukon Command training site were considered to be, collectively, an installation complex. Fort Richardson is adjacent to Anchorage, at the north end of Cook inlet. The other three installations are located in the Alaskan interior, near Fairbanks. These FORSCOM installations are to serve as the division station of the recently activated 6th Infantry Division (Light); a major construction program is underway to accommodate the additional divisional troops.

## ALASKA COMPLEX: RANGES

The ranges of the installations in the Alaska Complex are analyzed below according to information provided by FORSCOM headquarters. Recognize that most of the ranges are located at Fort Greely and Fort Wainwright, which are quite far from Fort Richardson. Fort Richardson has sufficient ranges for one light brigade, except that the range of artillery weapons is limited to about 8,000 meters. Alaskan armor ranges are not well developed and are limited to stationary firing. Aviation ranges are available only at Fort Wainwright.

### ALASKA COMPLEX -- RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

ALASKA COMPLEX: TOTAL FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		858,717	0	0	858,717
<u>Aircraft Maintenance (sf)</u>					
211		324,027	157,630	44,000	525,657
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		413,440	52,594	5,421	471,455
<u>Command, Control, and Administrative (sf)</u>					
141		68,410	39,258	5,928	113,596
171		51,444	5,783	4,779	62,006
610		714,402	13,784	2,149	730,335
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		3,595	0	0	3,595
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,250,707	15,067	11,024	2,276,798
724		463,394	0	0	463,394
<u>Community Support (sf)</u>					
730		232,164	18,030	6,415	256,609
740		912,342	129,501	35,315	1,077,158

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: ALASKA COMPLEX**

Local Area

Surface area (square miles)	9,136
Total population	228,414

Commute Area

Total population	271,930
Total non-military employment	148,923
Total income (\$M)	14,103
Regional multiplier	2.1
Regional cost factor	2.19
Vacant housing units	18,851
Housing location factor	0.4
Variable housing allowance factor	1.574

Installation -- General

Installation area (acres)	1,644,020
Personnel stationed in FY 92 as in ASIP	
Officers	1,011
Enlisted	8,103
Students	57
Total military	9,171
Civilians	2,699

Installation -- Environmental

Land activity -- base-case units	18
Air activity -- base-case units	31
Water availability (excess capacity in persons)	73,805

Installation -- Training and Operations

Average distance to sub-installations (miles)	74
Average distance to airport (miles)	5
Average distance to seaport (miles)	135
Seaport location	Pacific
Mission conflict with generic units	None
Designated maneuver area (acres)	858,804
Terrain suitability factor	
Light units	10.0
Heavy units	0.5
Training variety ratings	
Climate	8
Vegetation	7
Terrain	8
River crossings	10

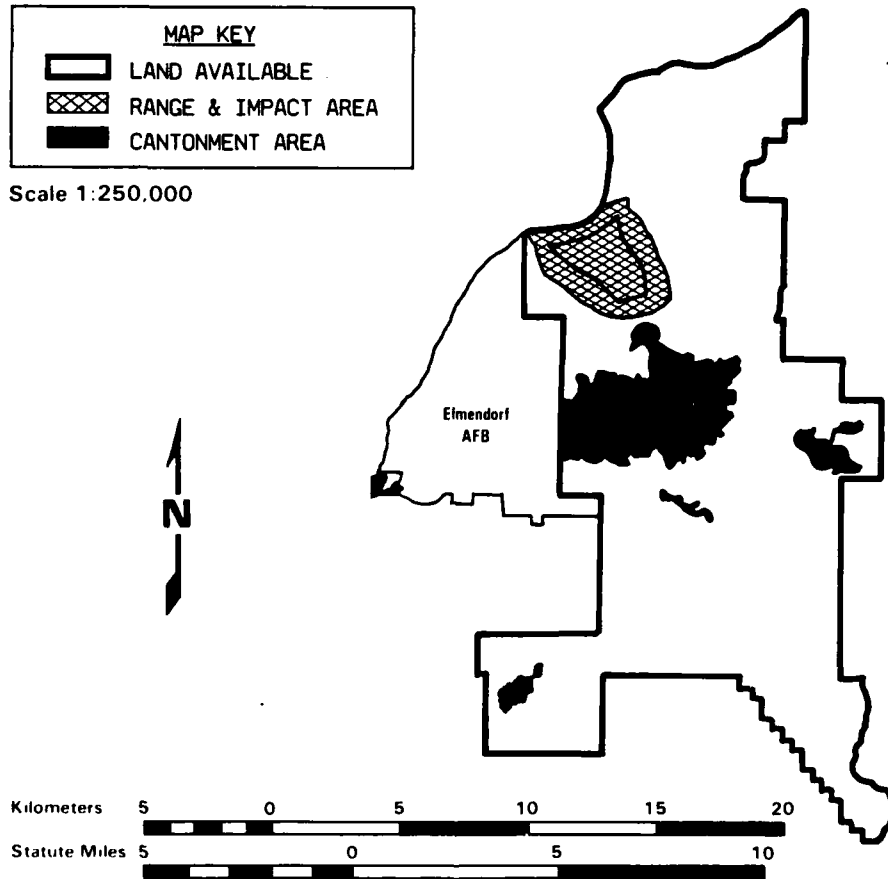
LAST PAGE OF ANNEX A

APPENDIX A-1

FORT RICHARDSON

APPENDIX A-1

FORT RICHARDSON



Fort Richardson is a FORSCOM installation that currently serves as the headquarters for the 172nd Infantry Brigade. The brigade commander also has installation command responsibilities for Forts Greely and Wainwright. The installation currently has a population of 6,369, of which 4,877 are military personnel. The activation of the 6th Infantry Division is expected to increase the post's population to 8,500, of which 6,353 will be military personnel.

Fort Richardson is located in south-central Alaska, immediately northeast of the Anchorage metropolitan area. The post has a total area of

about 61,000 acres, of which 5,000 are devoted to cantonment. The military reservation is bounded on the north by Knik Arm and Eagle Bay; on the east by the Chugach Mountains; on the west by Elmendorf Air Force Base and the city of Anchorage; and on the south by privately-owned rural land. Alaska Highway 1 provides access to the post and is the main arterial route to central Alaska. On post, Fort Richardson has a railhead and two runways (2,842 feet by 100 feet and 3,800 feet by 75 feet). Elmendorf Air Force Base is only 3 miles away, while Anchorage International Airport is 10 miles away. Seaport facilities in Anchorage are 7 miles from post.

**FORT RICHARDSON: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	4
Area (square miles)	1,732	42,435
Population (1980)		
Urban	170,247	170,247
Rural	4,184	63,916
Non-rural	0	16,216
Total	174,431	250,379
Housing Units (1980)		
Owned/Occupied	34,195	50,841
Owned/Vacant	1,444	2,113
Rented/Occupied	26,275	32,420
Rented/Vacant	5,441	7,401
Other/Vacant	2,499	5,456
Housing Value of Owner Occupied Units	94,959	86,078
Mean Contract Rent (\$/month)	356	345
Employment (1982)		
Total	118,980	136,953
Government		
Federal Civilian	9,965	10,240
Federal Military	14,370	15,224
State & Local	12,714	16,135
Construction	8,108	9,478
Manufacturing	2,314	4,099
Wholesale/Retail Trade	23,068	25,510
Finance, Insurance & Real Estate	6,359	6,860
Services	21,694	23,726
Farm		
Proprietors	0	269
Wage & Salary	0	214
Income (1982) (\$M)		
Non-farm	3,037	3,468
Private	2,155	2,482
Government	882	985
Personal	3,588	4,277
Multipliers		
Export Employment	2.1025	2.2027
Export Income	1.9544	2.0250
Export Sales	2.1025	2.2027

## FORT RICHARDSON: ENVIRONMENT

**Climate:** Fort Richardson is in a transitional climatic zone, which means its climate has aspects of both the maritime regime (cool summers, mild winters, and high precipitation) and the continental regime (hot summers, cold winters, and low precipitation). Summers at the reservation are mild; July temperatures range 65°F to 52°F. Average daily temperatures in January range from 3°F to 18°F. Annual precipitation totals an average of about 15 inches; July, August, and September have the most precipitation.

**Terrain:** Although all of Fort Richardson was once covered by glaciers, the characteristics of this glaciated surface vary. The southeastern part of the reservation is a steep bedrock that is loosely covered with topsoil. The cantonment area is located on flat, well-drained layers of sand and gravel. This is good foundation material and is relatively easy to excavate. Slopes are low, stable, and well-drained.

**Soils:** The two types that predominate on Fort Richardson are the spodosols (well-drained upland soils) and the histosols (poorly-drained fibrous soils characteristic of marsh areas). Given the post's transitional climate zone and the soils' glacial origin, the texture varies considerably over the installation. The nature of soils at Fort Richardson is such that only certain types of military activities can be conducted. Erosion is evident where clearing for construction is excessive, or where vegetation has been cleared for drop sites (or removed by off-road vehicles).

**Vegetation:** Due to a relatively mild climate and a varied topography, Fort Richardson has at least six different botanical zones. Most of Fort Richardson is part of an interior forest zone characterized by either white spruce (in areas of adequate drainage) or black spruce, paper birch, and quaking aspen. Cottonwood, aspen, alder and willows are found along stream flood plains. Shrubs include wild rose, lingonberry, bunch berry, northern red currant, and labrador tea. Fort Richardson's other botanical zones include the alpine, sub-alpine, marsh, spruce bogs, and treeless bogs.

## FORT RICHARDSON: TRAINING

**Maneuver Area:** Fort Richardson has a 48,258-acre maneuver area, which is divided into two nearly equal parcels by the cantonment area. The terrain is gently rolling and covered with a combination of thick and sparse woods with open strips of muskeg bog. It is drained by three moderately fast-flowing streams which are deeply entrenched and difficult to ford in summer.

**Cross-Country Movement:** Much of the post is covered with soils and terrain which retard the mobility of men and military vehicles. Some common problems are: the close spacing of trees; fallen trees; rocky hummocks; boulders; bogs; and swamps. Soils are slippery when wet, but are generally excellent in the winter and in the dry periods of the year. The soil and topographic conditions at Fort Richardson have made it ideal as a training site for airborne infantry units.

**Ranges:** Although Fort Richardson has sufficient ranges for one light brigade, artillery weapons are limited to a range of 8,000 meters. Fort Richardson has 4,399 acres devoted to training ranges. The consolidated range information is at page A-2 at the beginning of this annex.

**FORT RICHARDSON: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u> <u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	61,517	0	0	61,517
<u>Aircraft Maintenance (sf)</u>				
211	58,006	6,930	0	64,936
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	203,509	38,066	0	241,575
<u>Command, Control, and Administrative (sf)</u>				
141	47,043	39,258	0	86,301
171	43,711	5,783	114	49,608
610	358,338	5,713	0	364,051
72330	0	0	0	0
<u>Family Housing (units)</u>				
711	1,805	0	0	1,805
<u>Unaccompanied Personnel Housing (sf)</u>				
721	907,710	15,067	0	922,777
724	183,767	0	0	183,767
<u>Community Support (sf)</u>				
730	138,842	7,372	2,115	148,329
740	517,282	34,330	7,126	558,738

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

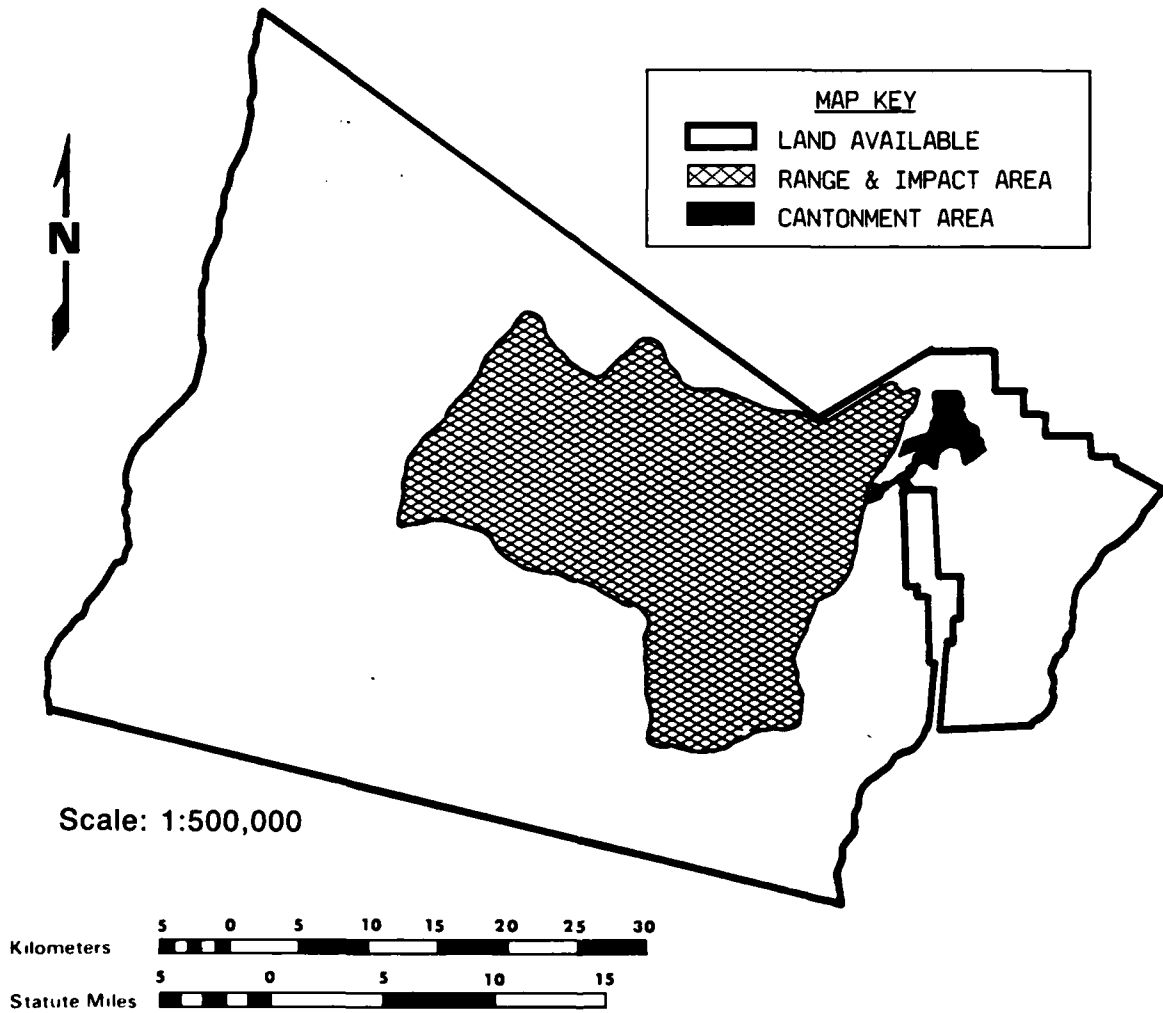
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APPENDIX A-2

FORT GREELY

APPENDIX A-2

FORT GREELY



Fort Greely is a FORSCOM installation, which also serves as the home of the Army's Cold Regions Test Center. It currently has 2,863 military personnel and a total post population of 3,574. Fort Greely is located in the interior of Alaska, 5 miles south of Delta Junction. The reservation covers 639,000 acres, of which 6,285 acres is in the cantonment area. The nearest railhead is at Eielson Air Force Base, 76 miles away. Fort Greely's Allen Army Airfield has three runways of 7,500 by 150 feet, plus there are two

helipads. About 75 miles to the northwest, Eielson Air Force Base has a 14,500-foot runway. The nearest commercial airport is in Fairbanks, 105 miles to the northwest. The seaport in Anchorage is 330 highway miles southwest of Fort Greely.

**FORT GREELY/FORT WAINWRIGHT: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	5
Area (square miles)	7,404	49,839
Population (1980)		
Urban	0	170,247
Rural	22,063	85,979
Non-rural	31,920	15,704
Total	53,983	271,930
Housing Units (1980)		
Owned/Occupied	9,349	60,190
Owned/Vacant	414	2,527
Rented/Occupied	8,875	41,295
Rented/Vacant	2,042	9,443
Other/Vacant	1,425	6,881
Housing Value of Owner Occupied Units	--	81,910
Mean Contract Rent (\$/month)	--	339
Employment (1982)		
Total	33,962	170,915
Government		
Federal Civilian	2,504	12,744
Federal Military	6,768	21,992
State & Local	5,760	21,895
Construction	2,253	11,731
Manufacturing	467	4,566
Wholesale/Retail Trade	4,800	30,310
Finance, Insurance & Real Estate	929	7,789
Services	5,344	29,070
Farm		
Proprietors	89	358
Wage & Salary	77	291
Income (1982) (\$M)		
Non-farm	892	4,360
Private	544	3,026
Government	348	1,333
Personal	1,107	5,384
Multipliers		
Export Employment	--	2.13
Export Income	--	1.96
Export Sales	--	2.13

## FORT GREELY: ENVIRONMENT

**Climate:** Climatic conditions at Fort Greely are characterized by long cold winters, short moderate summers, low precipitation, and low humidity. There are great variations in temperature on both a daily and seasonal basis. The yearly normal temperature is about 27°F, but the temperature can range from a high of 92°F to a low of -64°F. Very strong winds are common, particularly during the winter; the average wind speed is about 11 miles per hour. Calm wind conditions occur approximately 15 percent of the time throughout the year. Excessive snow, ice fog, whiteout, and freezing temperatures are the major climatological hazards at Fort Greely.

**Terrain:** Much of Fort Greely lies in a broad depression which consists of outwash fans sloping gently from the Alaska Range to the Tanana River flood plain. The southern parts of the reservation are characterized by flat-topped, east-west ridges, separated by rolling lowlands that make up the foothills of the Alaska Range. Rugged, glaciated mountains lie farther to the southwest. Rounded ridges cross the northeastern portion of the area. There are numerous small, shallow lakes on the reservation.

**Soils:** Derived from glacial action, the soils have generally been influenced by the presence of streams and intermittent permafrost. Glacial loess and outwash account for the presence of silty loams. The alluvial plains have deep gravel deposits covered by shallow silt or sand. The muskeg areas have wet, highly organic soils and a high water table (sometimes there is permafrost). In upland areas, soils are either moist and loamy (as in the foothills of the Alaska Range) or are well drained and silty. Mountain soils are rocky, steep, and non-vegetated.

**Water Resources:** Most of the streams draining the Fort Greely area have their headwaters in the high rugged mountains of the Alaska Range. Of glacial origin, the streams are generally swift and steep; they carry large amounts of suspended sediment, particularly during the summer months. As they enter lower elevations, they become heavily braided. The Delta River originates in the Alaska Range and flows northward to the Tanana River. The flow is usually

high in the spring and summer and low in the fall and winter. Jarvis Creek originates from the glaciers of Mount Silvertip and flows northward. Flow nearly stops in the winter due to freezing.

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**Vegetation:** Fort Greely is a large wilderness area which supports widely varying types of vegetation. There are forests of white spruce-balsam, poplar-quaking aspen, and tamarack intermixed with muskeg, heath bog communities, and sedge hummocks. Upland areas typically support a forest of white spruce and hardwoods. Along low river terraces are found bottomland forests of white spruce, balsam, and poplar. High brush is found in thickets along the river flood plains and in the foothills of the Alaska Range. Above the treeline, alpine tundra vegetation occurs in the form of dwarfed shrubs, grasses, berry plants, and thick moss.

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## FORT GREELY: TRAINING

**Maneuver Area:** Fort Greely has 491,353 acres of maneuver area on post. The installation's maneuver and exercise area is split by the cantonment area and the airfield. About 51,500 acres of the main post is used primarily as a drop zone for the Arctic Test Center. The larger portion of the maneuver area lies west of the Delta River and is difficult to reach. This area was initially obtained as an impact area to support the Arctic Test Center's mission of testing all weapons and ammunition. The Northern Warfare Training Center makes use of two off-post training areas to the south, Black Rapids (3,312 acres) and the Gulkana Glacier Area (17,950 acres).

**Cross-Country Movement:** The terrain is generally flat with numerous lakes, ponds, and marshy areas. Permafrost is found throughout. Because the braided character of the Delta River prevents bridging, the area is not accessible in summer except by helicopter. In winter, ice bridging can be used. Although the area is passable by armored personnel carriers, the tree cover is dense enough to hamper movement in many places.

**Ranges:** See consolidated data for Alaska ranges at page A-2 in the beginning of this annex.

**FORT GREELY: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		186,471	0	0	186,471
<u>Aircraft Maintenance (sf)</u>					
211		0	0	44,000	44,000
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		84,891	0	5,421	90,312
<u>Command, Control, and Administrative (sf)</u>					
141		19,895	0	4,448	24,343
171		3,082	0	4,376	7,458
610		88,152	0	2,149	90,301
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		361	0	0	361
<u>Unaccompanied Personnel Housing (sf)</u>					
721		150,684	0	11,024	161,708
724		34,179	0	0	34,179
<u>Community Support (sf)</u>					
730		23,314	0	0	23,314
740		144,259	14,196	6,544	164,999

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

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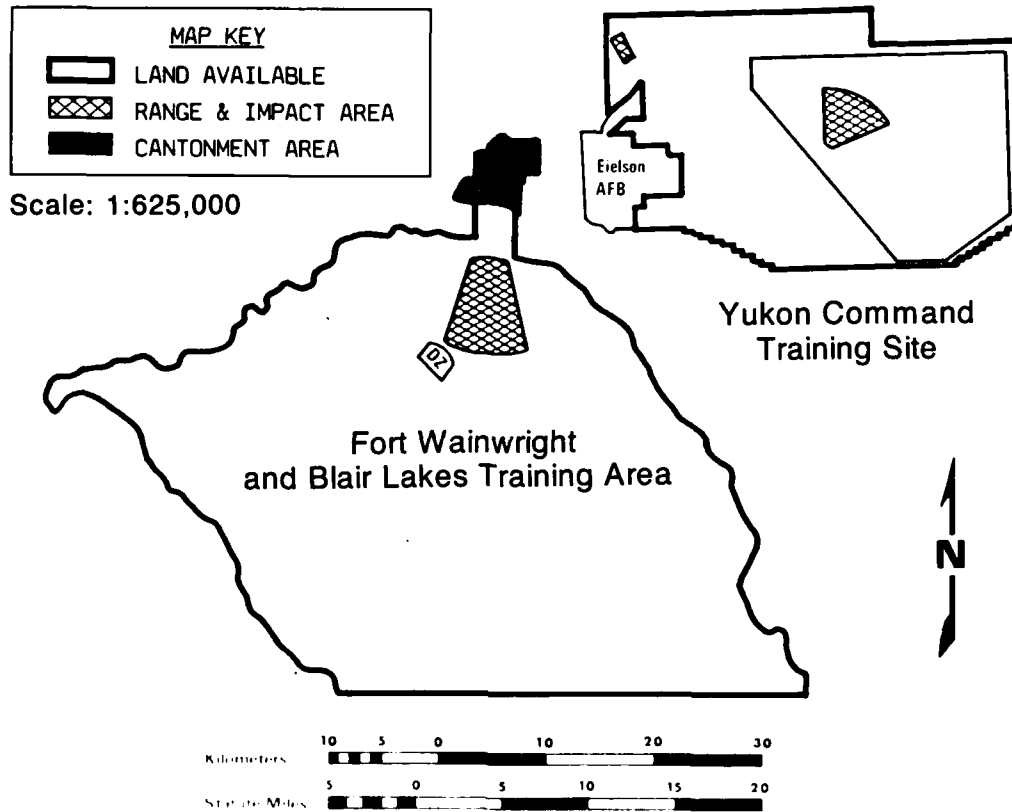
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APPENDIX A-3

FORT WAINWRIGHT

APPENDIX A-3

FORT WAINWRIGHT AND YUKON



Fort Wainwright is currently the home for one battalion of the 172nd Infantry Brigade. The fort also hosts the 222nd Aviation Battalion, the 47th Engineer Battalion (Combat Heavy), and a small number of personnel from the Cold Regions Research and Engineering Laboratory. This FORSCOM installation has a current total population of 3,575, of which 2,863 are military personnel. The activation of the 6th Infantry Division will eventually place an entire brigade at Fort Wainwright.

Fort Wainwright is in central Alaska, immediately south of the city of Fairbanks. Formerly Ladd Air Force Base, Fort Wainwright has about 656,000 acres. A cantonment area of 4,200 acres is at the northern tip of the

reservation. The Yukon Command Training Site lies 22 miles to the northeast of Fort Wainwright. The Yukon Site is under the control of the Bureau of Land Management. By agreement, the Army uses 287,000 acres. The area is served by Alaska Highway 2 from the east, and Alaska Highway 3 from the south. The Yukon site is adjacent to Eielson Air Force Base.

**FORT WAINWRIGHT/FORT GREELY: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	5
Area (square miles)	7,404	49,839
<b>Population (1980)</b>		
Urban	0	170,247
Rural	22,063	85,979
Non-rural	31,920	15,704
Total	53,983	271,930
<b>Housing Units (1980)</b>		
Owned/Occupied	9,349	60,190
Owned/Vacant	414	2,527
Rented/Occupied	8,875	41,295
Rented/Vacant	2,042	9,443
Other/Vacant	1,425	6,881
Housing Value of Owner Occupied Units	--	81,910
Mean Contract Rent (\$/month)	--	339
<b>Employment (1982)</b>		
Total	33,962	170,915
Government		
Federal Civilian	2,504	12,744
Federal Military	6,768	21,992
State & Local	5,760	21,895
Construction	2,253	11,731
Manufacturing	467	4,566
Wholesale/Retail Trade	4,800	30,310
Finance, Insurance & Real Estate	929	7,789
Services	5,344	29,070
Farm		
Proprietors	89	358
Wage & Salary	77	291
<b>Income (1982) (\$M)</b>		
Non-farm	892	4,360
Private	544	3,026
Government	348	1,333
Personal	1,107	5,384
<b>Multipliers</b>		
Export Employment	--	2.13
Export Income	--	1.96
Export Sales	--	2.13

## FORT WAINWRIGHT AND YUKON: ENVIRONMENT

**Climate:** Fort Wainwright has a continental climate and is sheltered by mountain ranges on practically all sides. During June and July, the sun is above the horizon for 18 to 21 hours each day and average highs reach the low 70s. Temperatures of 80°F or higher occur about 10 days each summer. From November to March, when the sunshine period ranges from 4 to 10 hours per day, temperatures commonly fall below 0°F. Extremely cold temperatures of -40°F and colder occur on an average of 14 days each winter. Annual precipitation is about 12 inches and mainly occurs during summer in the form of rain showers. Snowfall averages about 56 inches per year. Winters are characterized by relatively calm, clear weather. Frequent wintertime surface temperature inversions can create serious visibility problems from pollution or ice fog. Average wind velocity is very low and prevailing winds are from the north. During June and July, winds shift to the southwest.

**Terrain:** Fort Wainwright is in the Tanana-Kuskokwim Lowland Province. The terrain is predominantly flat to gently-rolling low plains that contain numerous meander and slough scars, shallow swales, and wide, basin-like depressions. Slopes are mainly less than 1 percent and local relief is less than 16 feet in the northern two-thirds of the installation. The surfaces become more gently rolling in the southern third with fewer scars and depressions. Slopes are usually less than 3 percent and local relief less than 32 feet. Along the southern boundary, there are low hills which have slopes between 10 and 30 percent and local relief between 515 and 706 feet.

The Yukon Command Training Site is located in the Yukon-Tanana Upland Province. The reservation has a combination of high and low hills, and high and low plains. In the east, the high hills are rounded to flat-topped and moderately dissected. Slopes are largely between 30 and 45 percent. Local relief is generally between 1,000 and 1,300 feet, but relief increases to 1,750 feet in the extreme east. In the west, smooth and moderately-dissected low hills have slopes largely between 15 and 30 percent; local relief ranges from 500 to 1,000 feet. The high and low plains are generally found in the

lower reaches of the various streams. Slopes are generally between 3 and 15 percent in the high plains and less than 3 percent in the low plains.

**Soils:** Fort Wainwright is in the Tanana River Valley and the Yukon Command Training Site is situated on the uplands.

The valley is filled with alluvium that is derived from the Alaska Range to the south. In the southern part of the reservation, soils have developed from alluvial fan or glacial outwash material. Terraces along the Tanana River are composed of deep stream-deposited alluvium. The extensive mantle of silt (some redeposited) can be as much as 200 feet in some valleys. The percentage of clay in any of the soils rarely exceeds 15 percent. An important consideration is that the reservation is in the zone of discontinuous permafrost. In the Tanana River Valley it is most likely to occur in fine-grained soils and in areas of peat. The surfaces of most soils are blanketed with a thin layer of strongly acidic, organic material composed of partly decomposed moss, leaves, and twigs, matted together with many fine rootlets. In permafrost areas, destruction of this mat creates major thawing problems.

The upland areas are mainly rolling hills composed of igneous and metamorphic rocks which are usually covered with about a foot of loess. In the uplands, permafrost occurs primarily in the narrow valley bottoms and on north-facing slopes.

**Water Resources:** All surface drainage on Fort Wainwright flows into the Tanana River, a major tributary of the Yukon River. The Tanana River forms most of the eastern and northern boundary of the reservation (except near the cantonment area). The land drains uniformly to the northwest. Although the Yukon Command Training Site drains in many directions, the water eventually flows into the Tanana River. In May, flows peak in the tributaries as rapidly melting snow drains across still frozen, largely impermeable ground (often causing serious flooding). The Tanana River receives much of its discharge from glacial meltwater. Although these spring melts increase the discharges appreciably, the heaviest flow occurs in July and August as summer rainfall and glacial meltwater flow northward out of the Alaska Range. The severe cold winters cause shallow streams and lakes to freeze to the bottom. Only the

Tanana, Chena, and Wood Rivers and Salchaket Slough can be expected to flow year round, as they are fed during the winter from ground water. Hundreds of unnamed lakes dot the reservations. Ground water is abundant in the alluvial fan and glacial outwash material.

**Vegetation:** Fort Wainwright vegetation varies with the elevation of the terrain. About 65 percent of the reservation is covered by scrub and high brush, which is largely found on the low plains. Trees and brush are more prevalent along stream channels. Dominant species are willows, alders, dogwoods, berrybushes, roses, horsetails, and ferns. Mixed forests cover about 25 percent of Fort Wainwright. These forests of white spruce and balsam poplar are found primarily on the terraces and flood plains. About 10 percent of Fort Wainwright is covered by wetlands consisting of muskegs and bogs. The moist tundra areas generally occur on ridges, on rubble slopes, and at higher elevations.

Mixed forests cover most of the Yukon Training Site.

## FORT WAINWRIGHT AND YUKON: TRAINING

**Maneuver Area:** There are training areas at both Fort Wainwright and at the Yukon Command Training Site 22 miles away.

The two training sites on Fort Wainwright consist of a 13,000-acre area near the cantonment area and the nearly 600,000-acre Blair Lakes Range (south of the Tanana River). Blair Lakes is generally swampy, marshy, and flat. Permafrost prevails throughout this area. The Tanana River does not offer desirable bridging locations.

The Yukon Command Training Site covers over 800,000 acres, of which 287,257 are under the direct control of the Army. The area lies 22 miles northeast of Fort Wainwright. Permafrost prevails in the lowlands. The western portion of the area is hilly, sparsely vegetated, and covered with small lakes and marshes. The eastern portion has moderate to very steep slopes. Vegetation can be very dense in valleys and along stream beds.

**Cross-Country Movement:** From April to September, access to Blair Lakes Range is primarily by helicopter. During the winter when streams and the ground freeze, the ice can be reinforced to form ice bridges. Vegetation is sparse and the soil has poor load-bearing capacity.

At the Yukon site, permafrost prevails in the lowlands. Unless the ground is frozen, vehicle mobility is poor.

**Ranges:** See consolidated data for Alaska ranges at page A-2 in the beginning of this annex.

**FORT WAINWRIGHT: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		610,729	0	0	610,729
<u>Aircraft Maintenance (sf)</u>					
211		266,021	150,700	0	416,721
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		125,040	14,528	0	139,568
<u>Command, Control, and Administrative (sf)</u>					
141		1,472	0	1,480	2,952
171		4,131	0	289	4,420
610		267,912	8,071	0	275,983
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		1,429	0	0	1,429
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,192,313	0	0	1,192,313
724		245,448	0	0	245,448
<u>Community Support (sf)</u>					
730		70,008	10,658	4,300	84,966
740		250,801	80,975	21,645	353,421

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**YUKON COMMAND TRAINING SITE: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		0	0	0	0
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		0	0	0	0
<u>Command, Control, and Administrative (sf)</u>					
141		0	0	0	0
171		520	0	0	520
610		0	0	0	0
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		0	0	0	0
<u>Unaccompanied Personnel Housing (sf)</u>					
721		0	0	0	0
724		0	0	0	0
<u>Community Support (sf)</u>					
730		0	0	0	0
740		0	0	0	0

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

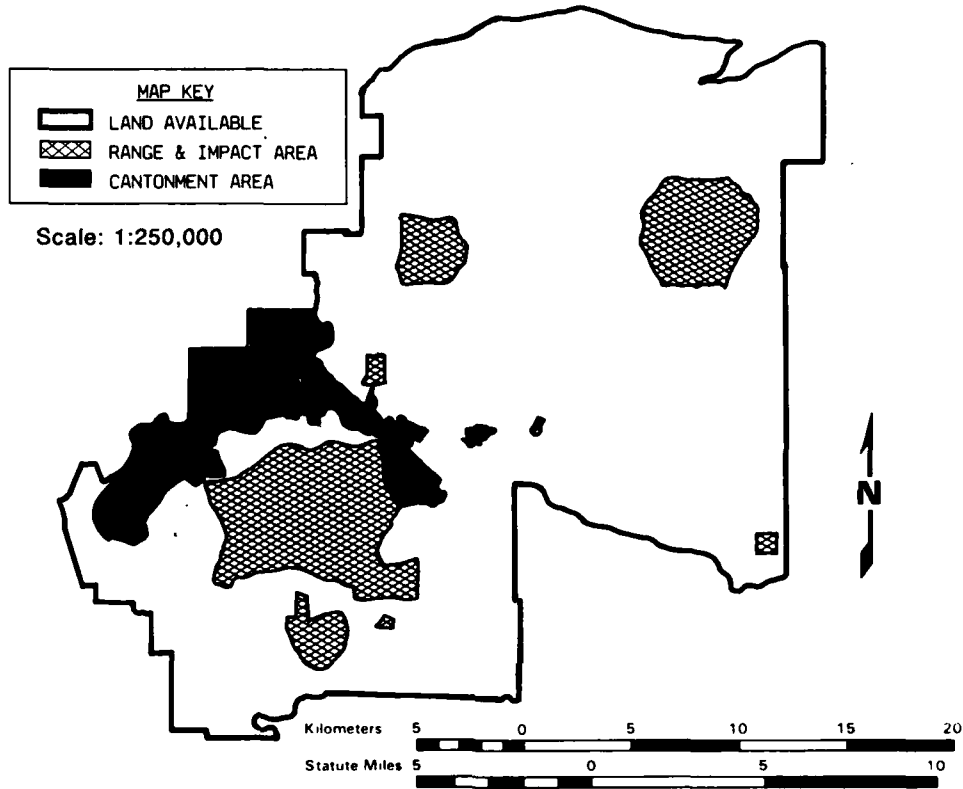
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ANNEX B

FORT BENNING

ANNEX B

FORT BENNING



Fort Benning is a TRADOC post that serves as the Infantry Center and School. It is also the home of the Airborne School, Ranger School, and the School of the Americas. Fort Benning's FORSCOM tenants include: the 197th Infantry Brigade (Separate); the HQ, 75th Infantry Regiment (Ranger); and the HQ, 36th Engineer Group. One brigade of the 10th Mountain Division (Light), which is currently on post, is scheduled to move to Fort Drum by FY 92. Fort Benning has a total population of 40,327, of which 29,428 are military personnel.

Fort Benning is located in the west-central part of Georgia, adjacent to Columbus to the northwest. Part of the reservation lies across the Chattahoochee River, which defines the Georgia-Alabama border. Of the total of

181,835 acres on the installation, 12,156 acres are in Alabama. Interstate 185, US Routes 80 and 27, and Georgia State Road 85 pass through nearby Columbus. On post, Fort Benning has a railhead and an 8,200-foot runway. The Muscogee County Airport, which has 5,650-foot runway, is 20 miles away. The nearest seaports are in Mobile, Alabama, and Savannah, Georgia (both are about 250 miles from the installation). The Fort Benning cantonment area of 16,000 acres is at the west end of the reservation.

**FORT BENNING: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	11
Area (square miles)	468	5,096
<b>Population (1980)</b>		
Urban	182,572	266,414
Rural	9,268	109,608
Non-rural	0	26,576
Total	191,840	402,598
<b>Housing Units (1980)</b>		
Owned/Occupied	34,212	80,568
Owned/Vacant	4,878	1,475
Rented/Occupied	27,912	53,085
Rented/Vacant	2,961	5,676
Other/Vacant	1,202	4,731
Housing Value of Owner Occupied Units	36,807	35,920
Mean Contract Rent (\$/month)	144	132
<b>Employment (1982)</b>		
Total	103,219	176,591
Government		
Federal Civilian	6,417	8,505
Federal Military	23,555	25,797
State & Local	10,591	25,205
Construction	3,561	5,362
Manufacturing	17,054	31,963
Wholesale/Retail Trade	15,321	24,611
Finance, Insurance & Real Estate	5,554	7,246
Services	14,027	28,184
Farm		
Proprietors	84	3,677
Wage & Salary	20	1,711
<b>Income (1982) (\$M)</b>		
Non-farm	1,419	2,256
Private	861	1,450
Government	559	805
Personal	1,735	3,239
<b>Multipliers</b>		
Export Employment	1.9969	2.3662
Export Income	1.8808	2.2151
Export Sales	1.9969	2.3662

## FORT BENNING: ENVIRONMENT

**Climate:** Typical of the southeastern United States, Fort Benning has hot, humid summers and mild winters. The mean temperature in December and January is 37°F. The mean maximum temperature in July and August is 91°F. In the summer, the monthly temperature differences from year to year are rather small because the hot humid maritime effect is seldom interrupted by drier and cooler continental air. Although rainfall averages about 48 inches a year, annual variation is large. The peak rainfall months are March and July, while the driest period is October and November. Traces of snow fall nearly every winter, but seldom remain on the ground for more than a day. The prevailing winds are northerly from August to March, southerly in April, and westerly from May to July.

**Terrain:** Fort Benning has both low plains and high plains. The low plains are broad, flat to gently rolling. They dominate the southwestern, south-central, and extreme northern parts of the reservation. Slopes are generally less than 3 percent in the flood plains and 3 to 15 percent in the other areas. At the margins of the flood plains and along incised valleys, slopes can be 30 to 45 percent. Local relief is as high as 164 feet. The high plains are irregularly-shaped and moderately-rolling to hilly. They are separated by the valleys of major streams. Steep-walled ravines are common. Local relief is generally between 180 and 213 feet; slopes are 8 to 15 percent. In the lower valleys, slopes are commonly between 15 and 30 percent.

**Soils:** The soil is derived primarily from the unconsolidated sand and clay beds of the coastal plain. Much of the alluvium is washed down from the Piedmont Plateau. The reservation is mantled predominantly by deep, poorly-graded sands over clay subsoil. These soils are well drained, some even excessively. The deep sand takes the form of dunes in some areas. Highly plastic clay without any mantle of sand is found on much of the southern part. Flood plain deposits consist primarily of well-drained, sandy silt and a poorly-drained, sandy clay.

**Water Resources:** The Chattahoochee is a major river which flows southerly through the western edge of the reservation. The major portion of the reservation is in the lower basin of Upatoi Creek, which flows northeast to southwest into the Chattahoochee. The high water period extends from January to April. The flow begins to decrease significantly in June and reaches a low by September or October.

**Vegetation:** The vegetation pattern on the reservation changes frequently due to continued tree harvesting and land clearing for various military purposes. Much of the reservation has stands of coniferous, deciduous, or both. The coniferous trees are primarily loblolly and longleaf pine with some shortleaf and slash pine. Deciduous trees are primarily bottomland species such as water, laurel, swamp oak, sweetgum, and blackgum. Other areas include scrub oak, short grasses, marsh grasses, or swamp vegetation.

## FORT BENNING: TRAINING

**Maneuver Area:** Fort Benning has about 119,000 acres of maneuver area. Because of the Infantry School mission, some of this land is not free for field exercises by resident units. In addition, the maneuver area is broken up by ranges, impact areas, cantonment areas, rail lines, and a highway. The largest unbroken maneuver area at Fort Benning is 28,000 acres.

**Cross-Country Movement:** Off-road movement of vehicles is fair to good in the open, cleared flood plains, terraces, and uplands. However, the mobility rating decreases in these areas as the density of the vegetation increases. The densely wooded flood plains and low terraces contain areas of poorly-drained soils which hinder movement by vehicle or by foot. Mobility is further degraded for short periods following heavy rains (due to swollen streams and miry clays).

**Ranges:** There are extensive ranges for light and heavy infantry weapons and for tube artillery of up to 8 inches. There is also 33,000 acres devoted to impact areas. Maximum range is about 15,000 meters. Because only limited tank tables are available, annual firing for armor units must be conducted at Fort Stewart. The table below is based on information from the master planning documents and outlines the capabilities of the ranges at Fort Benning.

### FORT BENNING: RANGE AVAILABILITY

Armor:	Marginal
Infantry(MECH)/Cavalry:	Good
Anti-Armor:	Good
Aviation:	Unknown
Individual/Crew Weapons:	Good
Indirect Fire Weapons:	Good
Air Defense Artillery:	Unknown
Infantry Collective Skills:	Good

FORT BENNING: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	451,553	0	0	451,553
<u>Aircraft Maintenance (sf)</u>				
211	184,432	0	70,169	254,601
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	206,744	73,121	148,639	428,504
<u>Command, Control, and Administrative (sf)</u>				
141	220,157	0	128,796	348,953
171	937,679	30,508	818,124	1,786,311
610	603,036	4,172	269,127	876,335
72330	0	0	116,027	116,027
<u>Family Housing (units)</u>				
711	4,084	0	0	4,084
<u>Unaccompanied Personnel Housing (sf)</u>				
721	3,707,445	0	975,547	4,682,992
724	857,802	0	0	857,802
<u>Community Support (sf)</u>				
730	154,921	0	147,124	302,045
740	874,478	2,852	274,306	1,151,636

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT BENNING

Local Area

Surface area (square miles)	468
Total population	191,840

Commute Area

Total population	402,598
Total non-military employment	150,794
Total income (\$M)	7,750
Regional multiplier	2.4
Regional cost factor	0.70
Vacant housing units	11,882
Housing location factor	0.4
Variable housing allowance factor	0.043

Installation -- General

Installation area (acres)	181,835
Personnel stationed in FY 92 as in ASIP	
Officers	1,793
Enlisted	15,769
Students	12,341
Total military	29,903
Civilians	5,087

Installation -- Environmental

Land activity -- base-case units	60
Air activity -- base-case units	3
Water availability (excess capacity in persons)	77,512

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	1
Average distance to seaport (miles)	250
Seaport location	Atlantic
Mission conflict with generic units	School
Designated maneuver area (acres)	119,675
Terrain suitability factor	
Light units	10.0
Heavy units	7.0
Training variety ratings	
Climate	5
Vegetation	5
Terrain	5
River crossings	10

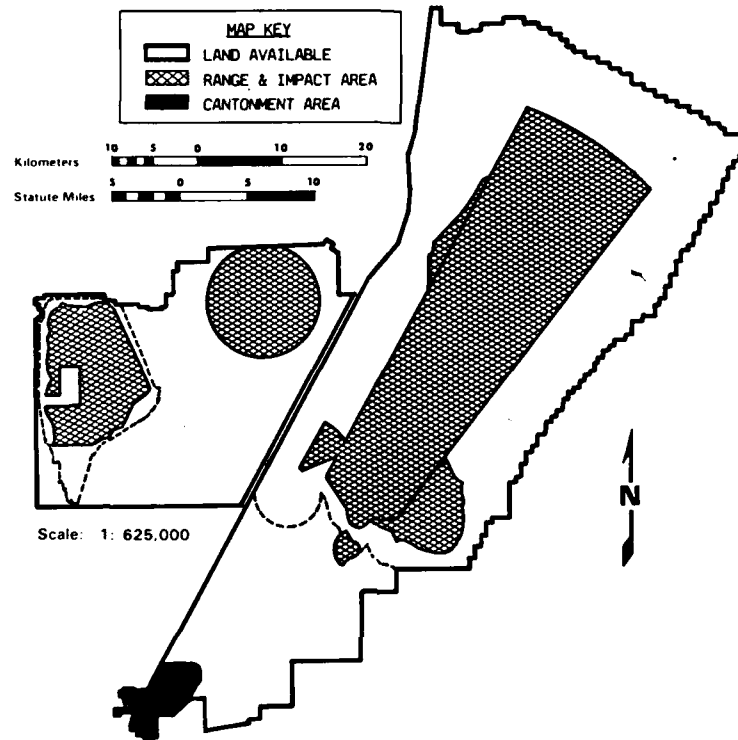
LAST PAGE OF ANNEX B

ANNEX C

FORT BLISS

## ANNEX C

### FORT BLISS



Fort Bliss is a TRADOC post that is the home of the Air Defense Center and School. It is also the location of the Sergeant Majors Academy. Fort Bliss also has some FORSCOM tenants which include the 11th Air Defense Artillery Brigade and the 3rd Armored Cavalry Regiment. Fort Bliss has 19,855 military personnel out of a total population of 28,585.

Fort Bliss begins at the western tip of Texas and extends up into New Mexico. The reservation covers 1,116,528 acres, most of which is owned and operated by the Army. Exceptions include: a 65,920-acre maneuver area at the southern end of the post which is owned by state and private agencies; 226,200 acres to the northeast which is owned by the Army, but managed by the Bureau of Land Management; and 19,800 acres of the Lincoln National Forest at the northern tip of the installation, which is owned and managed by the US Forest



FORT BLISS: SOCIOECONOMIC DATA

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	3	4
Area (square miles)	11,459	16,025
Population (1980)		
Urban	509,231	509,231
Rural	61,161	63,889
Non-rural	50,512	50,512
Total	620,904	623,632
Housing Units (1980)		
Owned/Occupied	112,077	112,559
Owned/Vacant	1,922	1,946
Rented/Occupied	73,739	74,079
Rented/Vacant	5,748	5,759
Other/Vacant	4,640	4,842
Housing Value of Owner Occupied Units	45,133	45,064
Mean Contract Rent (\$/month)	171	171
Employment (1982)		
Total	265,792	266,892
Government		
Federal Civilian	15,613	15,676
Federal Military	28,848	28,859
State & Local	36,416	36,606
Construction	10,805	10,819
Manufacturing	42,037	42,037
Wholesale/Retail Trade	50,712	50,787
Finance, Insurance & Real Estate	9,273	9,286
Services	38,286	38,313
Farm		
Proprietors	1,663	1,836
Wage & Salary	3,007	3,276
Income (1982) (\$M)		
Non-farm	3,819	3,828
Private	2,533	2,538
Government	1,286	1,290
Personal	5,115	5,138
Multipliers		
Export Employment	2.5951	2.6034
Export Income	2.4589	2.4794
Export Sales	2.5951	2.6034

## FORT BLISS: ENVIRONMENT

**Climate:** The climate at Fort Bliss is that of the arid southwestern United States. Sunshine is abundant throughout the year and temperatures vary widely. January has a mean low of 32°F; June has a mean high of 95°F. The relative humidity is typically very low. More than half of the annual 8 inches of rainfall falls in brief, often heavy, summer thunderstorms. Periods of several months without any precipitation are not unusual. Annual snowfall is 5 inches and seldom remains on the ground for more than a few hours.

**Terrain:** Five landforms make up the Fort Bliss reservation area: low plains, high plains, low hills, high hills, and mountains. About 75 percent of the reservation consists of low plains in the Tularosa Valley and on the Otero Mesa. These plains have the nearly flat surfaces of a desert intermountain basin. Most of the Tularosa Valley is covered by small dunes which are typically 10 feet high, 30 feet long, and 20 feet wide. Scattered throughout are large irregularly-shaped depressions which are typically 10 to 20 feet deep with gently sloping sides. The low plains on the Otero Mesa are gently-rolling, smooth, and grass-covered. There are no dunes or boulders. The high plains comprise about 20 percent of the reservation. These moderately-sloping, severely-dissected, rolling plains form the transition between the low plains and the hills and mountains. Slopes range from 5 to 8 percent and local relief is between 200 and 400 feet. Rough, moderately-rolling and rounded low hills and escarpments cover a small part of the reservation. On the low hills, slopes typically range from 8 to 30 percent and local relief is 650 to 820 feet. The high hills have steep, moderately-dissected slopes and ridges; many have boulders and exposed bedrock. Slopes generally range from 15 to 30 percent. Local relief here is largely between 1,000 and 1,600 feet. Very steep mountains are in the extreme northwest and northeast portions of the reservation. Although most slopes range from 30 to 60 percent, many mountains have vertical cliffs with exposed bedrock. Local relief is largely between 2,100 and 2,600 feet.

**Soils:** The non-dune areas are generally silty loam. The soils of the pediment and alluvial aprons contain appreciable amounts of gravel. The Otero

Mesa has moderately deep soil and areas of hardened, cement-like caliche. The mountainous areas are characterized by extremely shallow soils.

**Water Resources:** Fort Bliss lies almost entirely within the Tularosa Valley desert drainage basin and only about 10 percent of the drainage leaves the reservation. Most of the runoff flows into the basin from all directions and evaporates, percolates into the soil, or drains into small depressions to form ephemeral lakes (which retain water for only a few days or weeks). Except for Soledad Canyon Creek, streams at Fort Bliss flow only for a few hours after infrequent cloudbursts.

**Vegetation:** Fort Bliss has three distinctly different regions of vegetation: desert plain, mesa, and mountain. Most of the deciduous scrub on the desert plains is in dune areas which have been stabilized by mesquite and sagebrush. Mesa vegetation is predominantly short grasses. The mountains and hills have shrubs at low elevations and evergreen trees at higher elevations. Predominant species include alligator and one-seed juniper, pinon pine, shrub live oak, and spiny hackberry.

## FORT BLISS: TRAINING

**Maneuver Areas:** Fort Bliss maintains a total of eight maneuver areas which total about 335,000 acres. Although the Army has maneuver rights on one 66,000-acre area, private owners retain grazing rights. (This maneuver area has also been the site of some archeological discoveries.)

**Cross-Country Movement:** Because of the scant rainfall and scarce vegetation, cross-country movement is generally very good on the low plains. Areas with loose, sandy soil reduce the maximum speed of vehicles. Movement is understandably poor on the steeper terrain.

**Ranges:** Fort Bliss has 607,612 acres of training ranges. According to the master plan, the following types of ranges are available.

### FORT BLISS: RANGE AVAILABILITY

Armor:	Excellent
Infantry(MECH)/Cavalry:	Excellent
Anti-Armor:	Excellent
Aviation:	Good
Individual/Crew Weapons:	Excellent
Indirect Fire Weapons:	Excellent
Air Defense Artillery:	Excellent
Infantry Collective Skills:	Good

FORT BLISS: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	1,208,078	0	0	1,208,078
<u>Aircraft Maintenance (sf)</u>				
211	268,249	2,893	0	271,142
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	343,753	30,027	160,636	593,465
<u>Command, Control, and Administrative (sf)</u>				
141	131,293	47,577	12,124	190,994
171	1,099,011	97,169	454,203	1,650,383
610	723,962	197,148	263,719	1,184,829
72330	0	19,368	0	19,368
<u>Family Housing (units)</u>				
711	3,575	0	0	3,575
<u>Unaccompanied Personnel Housing (sf)</u>				
721	2,556,594	690,436	218,160	3,465,190
724	289,377	32,736	42,294	364,407
<u>Community Support (sf)</u>				
730	74,679	48,805	93,090	216,574
740	544,364	239,271	198,872	982,507

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System (IFS), as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

These data include data for Fort Bliss ranges, which is listed as a separate installation in IFS.

**SUMMARY OF KEY DATA: FORT BLISS**

Local Area

Surface area (square miles)	11,459
Total population	620,904

Commute Area

Total population	623,632
Total non-military employment	238,033
Total income (\$M)	12,794
Regional multiplier	2.6
Regional cost factor	0.96
Vacant housing units	12,547
Housing location factor	0.4
Variable housing allowance factor	0.092

Installation -- General

Installation area (acres)	1,116,528
Personnel stationed in FY 92 as in ASIP	
Officers	2,057
Enlisted	11,963
Students	3,615
Total military	17,635
Civilians	5,067

Installation -- Environmental

Land activity -- base-case units	88
Air activity -- base-case units	3
Water availability (excess capacity in persons)	0

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	1
Average distance to seaport (miles)	850
Seaport location	Gulf
Mission conflict with generic units	School
Designated maneuver area (acres)	334,625
Terrain suitability factor	
Light units	1.0
Heavy units	10.0
Training variety ratings	
Climate	2
Vegetation	0
Terrain	8
River crossings	0

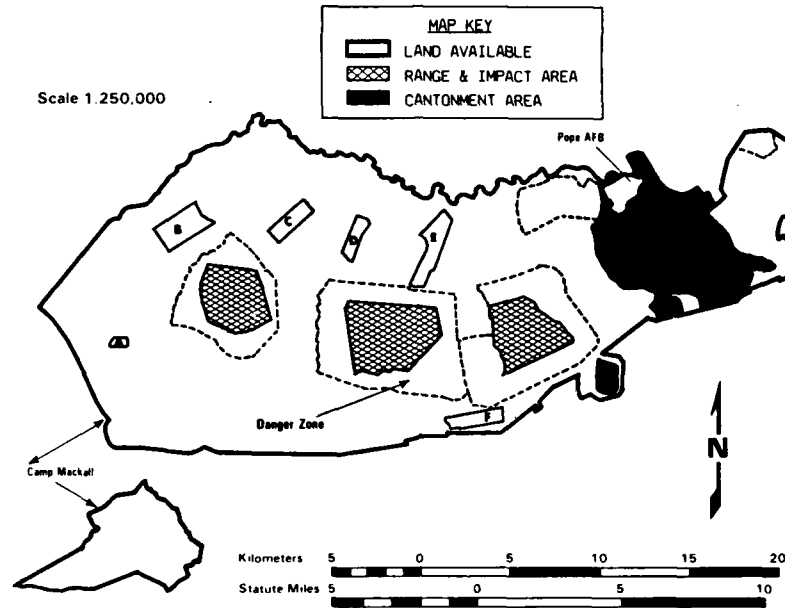
LAST PAGE OF ANNEX C

ANNEX D

FORT BRAGG

ANNEX D

FORT BRAGG



Fort Bragg is a FORSCOM installation which is the home of the 82nd Airborne Division. It also serves as the headquarters for the XVIII Airborne Corps and the 1st Special Operations Command. Other FORSCOM units on post include the XVIII Corps Artillery, 1st Corps Support Command, 35th Signal Group, 16th Military Police Group, 525th Military Intelligence Group, 20th Engineer Brigade, 4th Psychological Operations Group, and the 5th and 7th Special Forces Group (Airborne). Major tenants include: the John F. Kennedy Special Warfare School; HQ, 1st ROTC Region; and the Airborne and Special Operations Test Board. Fort Bragg has a total post population of 48,762, of which 42,120 are military personnel.

Fort Bragg is located in southeastern North Carolina about 50 miles south of Raleigh. Camp Mackall, a sub-installation of Fort Bragg, is about 33 miles southwest of the main reservation. Fort Bragg is irregular in shape and

extends about 28 miles east to west and 12 miles north to south. The 138,637-acre reservation covers parts of Cumberland and Hoke Counties. The cantonment area is in the northeastern portion of the reservation. The reservation is accessible from US Highway 301 and Interstate 95. North Carolina Routes 210 and 87 cross the reservation north to south. On post, Fort Bragg has a railhead and a 3,600- by 100-foot runway. Nearby is Pope Air Force Base, which has a 7,500-foot runway. Fayetteville's commercial airport, Grannis Field, is 15 miles away from the post. There are also three 5,000- by 150-foot runways at Camp Mackall. The nearest major seaports are Wilmington, North Carolina (130 miles away) and Charleston, South Carolina (189 miles away).

FORT BRAGG: SOCIOECONOMIC DATA

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	10
Area (square miles)	1,048	6,500
<b>Population (1980)</b>		
Urban	213,919	215,839
Rural	49,994	369,492
Non-rural	3,630	113,665
Total	267,543	698,996
<b>Housing Units (1980)</b>		
Owned/Occupied	48,284	150,710
Owned/Vacant	1,203	2,387
Rented/Occupied	32,674	75,523
Rented/Vacant	3,304	7,015
Other/Vacant	2,282	10,223
Housing Value of Owner Occupied Units	38,299	36,685
Mean Contract Rent (\$/month)	162	135
<b>Employment (1982)</b>		
Total	126,357	307,816
Government		
Federal Civilian	8,405	9,438
Federal Military	46,268	48,232
State & Local	13,682	35,738
Construction	2,769	7,872
Manufacturing	13,242	66,966
Wholesale/Retail Trade	17,863	42,642
Finance, Insurance & Real Estate	2,606	6,377
Services	10,431	33,265
Farm		
Proprietors	1,385	16,548
Wage & Salary	1,195	12,116
<b>Income (1982) (\$M)</b>		
Non-farm	1,763	3,620
Private	724	2,285
Government	1,039	1,335
Personal	2,106	5,379
<b>Multipliers</b>		
Export Employment	1.7609	2.1022
Export Income	1.6818	2.0783
Export Sales	1.7609	2.1022

## FORT BRAGG: ENVIRONMENT

**Climate:** The climate at Fort Bragg is subtropical. The summers are long, hot, and humid; winters are mild. The mean daily minimum temperature in January (the coldest month) is 32°F. The mean daily maximum in July (the hottest month) is 89°F. The mean monthly precipitation varies from a low of 2.8 inches in November to a high of 6.6 inches in July. Average annual precipitation is 46.6 inches. July averages 11 days of rainfall (mostly as thunderstorms). Fort Bragg gets an average of 3 inches of snow per year.

**Terrain:** Fort Bragg is situated on the Atlantic Coastal Plain. The terrain consists of both low and high plains. In the southwestern, central, and southeastern parts of the reservation, low plains rise gradually from east to west (180 to 350 feet above sea level). They have gently-rolling surfaces and slopes between 3 and 8 percent. Slopes up to 15 percent occur along the upper reaches of the streams. Local relief of interstream areas is generally between 90 and 130 feet above the adjacent valley bottoms. The high plains are irregular, moderately-rolling surfaces which are found in the southwest, northwest central, and northeast portions of the reservation. High plain slopes are between 3 and 8 percent.

**Soils:** Almost all of the reservation is mantled with sandy soils. Most soils are well drained or even excessively well drained. Poorly-drained soils are primarily restricted to flood plains and some terrace silty sand deposits of high organic content. In the west, the generally loose soil and parent material are interrupted by a resistant bed of sandstone.

**Water Resources:** All surface water on Fort Bragg eventually drains into either the Little River or Rockfish Creek. A watershed divide which stretches from east to west across the center of the reservation equally divides the drainage pattern into northern and southern flowing streams. The streams flow into the Cape Fear River. The high-water period is from January to April; the low-water period stretches from July to September.

**Vegetation:** Vegetation consists largely of pine trees mixed with scrub oak undergrowth. Pines are on higher slopes and well-drained areas. On the higher slopes adjacent to stream valleys are found upland hardwoods, e. g., blackjack, turkey, laurel, and red oak. The lowland hardwoods include bald cypress, white cedar, blackgum, water oak, willow oak, yellow poplar, and red maple. Scrub oak is found on some firing ranges. Although short grasses grow in the impact areas, they are continually burned off by range fires.

## FORT BRAGG: TRAINING

**Maneuver Areas:** Excluding impact areas and drop zones, the total maneuver area on Fort Bragg is about 87,000 acres. The bulk of the training area is found in three contiguous strips (the largest has 27,297 acres). Camp Mackall has about 6,000 acres of maneuver area. Also, the Army has limited maneuver rights off-post in the Sand Hills Wildlife Area (92,800 acres). Temporary-use permits have been obtained which have allowed troops to train on a total of 1,586,574 acres in nearby national forests. Although maneuver rights have also been obtained on 1,510,000 acres of private land, future acquisition of similar rights is uncertain.

**Cross-Country Movement:** Terrain and soil conditions at Fort Bragg are suitable for training by all types of units. Off-road movement is fair to good for most of the reservation. Although the training areas are largely wooded, vehicular movement is possible. Off-road movement is poor in densely forested or swampy bottom lands. There are numerous breaks in wooded areas which are suitable for helicopter landing zones.

**Ranges:** There are light and heavy infantry weapon ranges sufficient to support one light or airborne division. Maximum range of artillery is 25,000 meters. One tank range is available for limited firing. Tenant armor units perform their annual qualifications firing at Fort Stewart, Georgia. Based on FORSCOM data, the following types of ranges are available.

### FORT BRAGG: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

FORT BRAGG: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	477,582	0	0	477,582
<u>Aircraft Maintenance (sf)</u>				
211	339,036	0	0	339,036
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	425,729	0	227,215	652,944
<u>Command, Control, and Administrative (sf)</u>				
141	429,432	0	540,239	969,671
171	237,516	0	347,942	585,458
610	980,907	0	847,134	1,828,041
72330	294,931	0	28,661	323,592
<u>Family Housing (units)</u>				
711	4,779	0	0	4,779
<u>Unaccompanied Personnel Housing (sf)</u>				
721	4,068,758	0	1,285,489	5,354,247
724	338,210	0	0	338,210
<u>Community Support (sf)</u>				
730	66,179	0	176,028	242,207
740	995,062	0	417,638	1,412,700

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

These data include data for Camp MacKall, which is listed as a separate installation in IFS.

**SUMMARY OF KEY DATA: FORT BRAGG**

Local Area

Surface area (square miles)	1,048
Total population	267,543

Commute Area

Total population	698,996
Total non-military employment	259,584
Total income (\$M)	12,619
Regional multiplier	2.1
Regional cost factor	0.79
Vacant housing units	19,625
Housing location factor	0.4
Variable housing allowance factor	0.064

Installation -- General

Installation area (acres)	142,067
Personnel stationed in FY 92 as in ASIP	
Officers	5,195
Enlisted	34,994
Students	1,730
Total military	41,919
Civilians	4,302

Installation -- Environmental

Land activity -- base-case units	168
Air activity -- base-case units	94
Water availability (excess capacity in persons)	75,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	1
Average distance to seaport (miles)	130
Seaport location	Atlantic
Mission conflict with generic units	None
Designated maneuver area (acres)	93,396
Terrain suitability factor	
Light units	10.0
Heavy units	7.0
Training variety ratings	
Climate	5
Vegetation	5
Terrain	5
River crossings	4

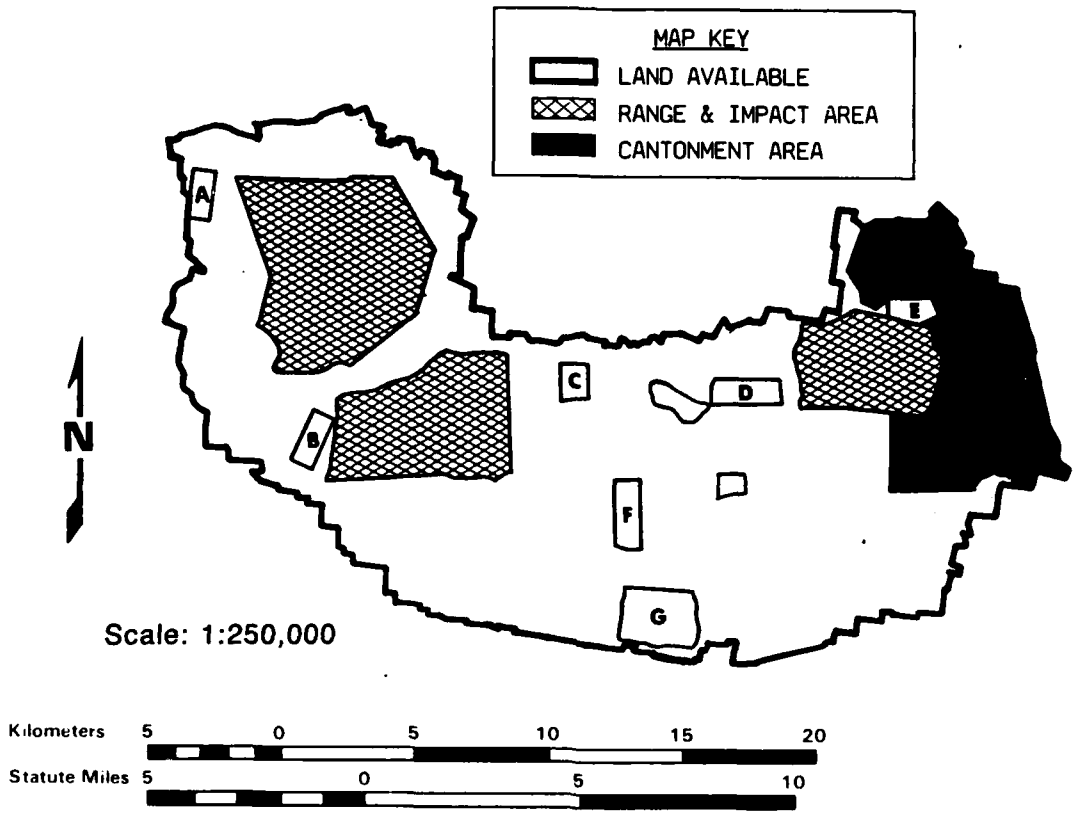
LAST PAGE OF ANNEX D

ANNEX E

FORT CAMPBELL

ANNEX E

FORT CAMPBELL



Fort Campbell is a FORSCOM installation which is home for the 101st Airborne Division (Air Assault) and other smaller FORSCOM units. Fort Campbell has 22,210 military personnel and a total post population of 24,716.

Fort Campbell straddles the state line between southwestern Kentucky and northwestern Tennessee. Of the total area (104,793 acres), about 69,000 acres are located within Montgomery and Stewart Counties of Tennessee, while the remaining 36,000 acres are within the Kentucky counties of Todd, Christian, and Trigg. Clarksville, Tennessee is just southeast of the reservation. Nashville lies about 50 miles to the southeast. The cantonment area of 4,979 acres is at the eastern end of the reservation. Interstate 24 and US Highway 41 pass along the eastern boundary. On post, Fort Campbell has a railhead and

two runways, each 16,800 feet by 200 feet. Five miles away is the commercial airport, Outlaw Field, with a 5,000-foot runway. The nearest major seaport is Mobile, Alabama, 450 miles away.

**FORT CAMPBELL: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	5	10
Area (square miles)	2,514	4,540
<b>Population (1980)</b>		
Urban	77,535	77,535
Rural	75,290	166,419
Non-rural	27,318	55,872
Total	180,143	299,826
<b>Housing Units (1980)</b>		
Owned/Occupied	36,795	68,274
Owned/Vacant	736	1,198
Rented/Occupied	20,646	30,188
Rented/Vacant	2,129	2,866
Other/Vacant	2,353	3,961
Housing Value of Owner Occupied Units	37,095	36,601
Mean Contract Rent (\$/month)	162	151
<b>Employment (1982)</b>		
Total	81,863	121,593
Government		
Federal Civilian	5,490	5,841
Federal Military	23,167	23,654
State & Local	7,446	12,104
Construction	1,301	3,925
Manufacturing	10,612	20,435
Wholesale/Retail Trade	10,011	14,365
Finance, Insurance & Real Estate	1,873	2,651
Services	7,713	10,779
Farm		
Proprietors	5,642	11,984
Wage & Salary	1,600	2,808
<b>Income (1982) (\$M)</b>		
Non-farm	1,016	1,433
Private	482	830
Government	534	603
Personal	1,476	2,449
<b>Multipliers</b>		
Export Employment	1.8350	1.9306
Export Income	1.7419	1.8510
Export Sales	1.8350	1.9306

## FORT CAMPBELL: ENVIRONMENT

**Climate:** Summers are hot and humid, while winters are cool and humid. In July, the average high is 89°F and the relative humidity is about 55 percent. The average January low is 28°F. The average annual precipitation is about 47 inches. In winter, extra-tropical cyclones produce widespread and uniform areas of rainfall -- January, February, and March each average about 5 inches of precipitation. Snowfall averages about 10 inches per year. In summer, localized showers are common. Prevailing winds are southerly, except during February and October when the winds come from the north. Severe storms, tornadoes, damaging hail, and extremely high winds are rare.

**Terrain:** Fort Campbell is within the Highland Rim Section of the Interior Low Plateaus Province. Most of the reservation consists of a broad, gently-rolling upland plain. Slopes are 3 to 10 percent, and reliefs are 20 to 50 feet. The areas adjacent to streams become rolling to steep; slopes vary between 8 and 45 percent. The slope of some valley walls approaches 60 percent. Local reliefs are between 60 and 120 feet. At the western end of the reservation are found strongly-rolling, high plains. Slopes are between 15 and 45 percent, while local relief is from 164 to 220 feet.

**Soils:** In general, the area has a cover of 2 to 3 feet of loess atop weathered limestone. The soils have a brittle, silt-loam surface layer overlying clay. Silts predominate in the flood plains. Upland areas in the central and southern portions are poorly drained. The remaining upland areas are well drained. In the east are many sinkholes.

**Water Resources:** All streams on Fort Campbell drain into the Cumberland River. The tributaries of Ringgold Creek drain about three-fourths of the reservation. Short-lived floods occur after severe thunderstorms. An appreciable amount of water moves vertically through the soil, especially in areas with many sinkholes. The widest stream is Little West Fork Creek which measures 40 feet from bank to bank.

**Vegetation:** The reservation has a mix of coniferous and deciduous trees, scrub, and short grasslands. The predominant coniferous trees are loblolly pines and eastern red cedar. The deciduous trees include the upland hardwoods (oak, hickory, maple, beech, elm, and basswood) and the bottomland hardwoods (pin oak, slippery elm, ash, yellow poplar, sweetgum, and sycamore). The short grasses are broomsedge and Johnson. In the center of the reservation is agricultural land which is planted mostly to corn.

## FORT CAMPBELL: TRAINING

**Maneuver Areas:** Although Fort Campbell has 56,502 acres available for maneuver, the largest individual tract is about 36,000 acres. Fort Campbell currently maintains lease agreements with private and public agencies to use about 258,000 acres of off-post land for maneuver. Most of this land lies to the west of the reservation and is owned by the Tennessee Valley Authority. The use of leased land is constrained seasonally by agriculture, flooding, and land reconstruction. Fly-over rights (up to 500 feet) have been acquired in order to conduct nap-of-the-earth flight training.

**Cross-Country Movement:** Off-road movement of vehicles is controlled primarily by the density of the vegetation. Areas of medium and dense forests are unsuitable for all but infantry. Medium to dense scrub areas also restrict movement. Grasslands and open scrub and forests are good for cross-country movement. Most of the soils are well drained. In the central and southeastern reservation, some areas are underlain by fragipan which blocks absorption of water by the soil. When rainfall is prolonged and heavy, the soils become saturated and highly sensitive to vehicle loadings.

**Ranges:** According to FORSCOM headquarters, the following range facilities are available at Fort Campbell.

### FORT CAMPBELL: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

**FORT CAMPBELL: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		653,116	0	0	653,116
<u>Aircraft Maintenance (sf)</u>					
211		511,906	0	11,735	523,641
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		211,478	6,000	389,688	607,166
<u>Command, Control, and Administrative (sf)</u>					
141		310,767	0	89,468	400,235
171		133,231	0	331,537	464,768
610		51,307	96	462,538	513,941
72330		227,968	0	18,420	246,388
<u>Family Housing (units)</u>					
711		4,154	0	0	4,154
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,924,346	72,327	530,073	3,526,746
724		100,085	0	0	100,085
<u>Community Support (sf)</u>					
730		86,772	0	191,934	278,706
740		719,215	0	416,729	1,135,944

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT CAMPBELL

Local Area

Surface area (square miles)	2,514
Total population	180,143

Commute Area

Total population	299,826
Total non-military employment	97,939
Total income (\$M)	5,315
Regional multiplier	1.9
Regional cost factor	1.00
Vacant housing units	8,025
Housing location factor	0.4
Variable housing allowance factor	0.012

Installation -- General

Installation area (acres)	104,793
Personnel stationed in FY 92 as in ASIP	
Officers	2,963
Enlisted	20,631
Students	163
Total military	23,757
Civilians	2,479

Installation -- Environmental

Land activity -- base-case units	95
Air activity -- base-case units	88
Water availability (excess capacity in persons)	38,608

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	1
Average distance to seaport (miles)	450
Seaport location	Gulf
Mission conflict with generic units	None
Designated maneuver area (acres)	56,502
Terrain suitability factor	
Light units	10.0
Heavy units	5.0
Training variety ratings	
Climate	6
Vegetation	7
Terrain	6
River crossings	3

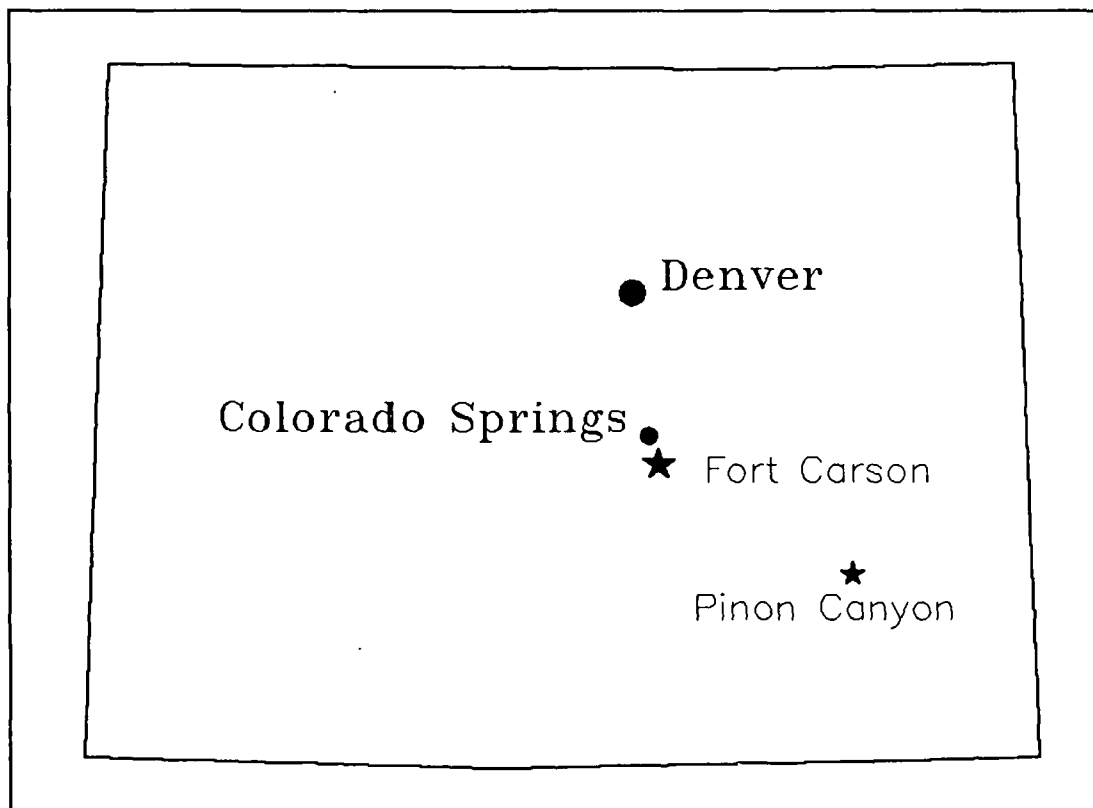
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ANNEX F

FORT CARSON COMPLEX

ANNEX F

FORT CARSON COMPLEX



For the purposes of this study, Fort Carson and the Pinon Canyon training area are considered to be an installation complex. Fort Carson is in central Colorado, about 8 miles south of the city of Colorado Springs. Pinon Canyon training area is located 150 miles to the southeast.

**FORT CARSON COMPLEX: TOTAL FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		117,338	0	16,666	134,004
<u>Aircraft Maintenance (sf)</u>					
211		165,219	0	24,856	190,075
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		960,496	17,202	153,700	1,131,398
<u>Command, Control, and Administrative (sf)</u>					
141		640,472	0	63,964	704,436
171		217,160	98,509	128,454	444,123
610		142,379	388,638	262,634	793,651
72330		72,888	0	0	72,888
<u>Family Housing (units)</u>					
711		1,828	0	0	1,828
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,947,929	61,024	10,620	2,019,573
724		83,388	31,978	3,857	119,223
<u>Community Support (sf)</u>					
730		102,748	0	58,873	161,621
740		526,454	73,172	196,765	796,391

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT CARSON COMPLEX

Local Area

Surface area (square miles)	10,815
Total population	478,969

Commute Area

Total population	882,723
Total non-military employment	357,125
Total income (\$M)	24,127
Regional multiplier	2.6
Regional cost factor	1.02
Vacant housing units	25,065
Housing location factor	0.4
Variable housing allowance factor	0.201

Installation -- General

Installation area (acres)	373,387
Personnel stationed in FY 92 as in ASIP	
Officers	1,741
Enlisted	17,288
Students	147
Total military	19,176
Civilians	2,401

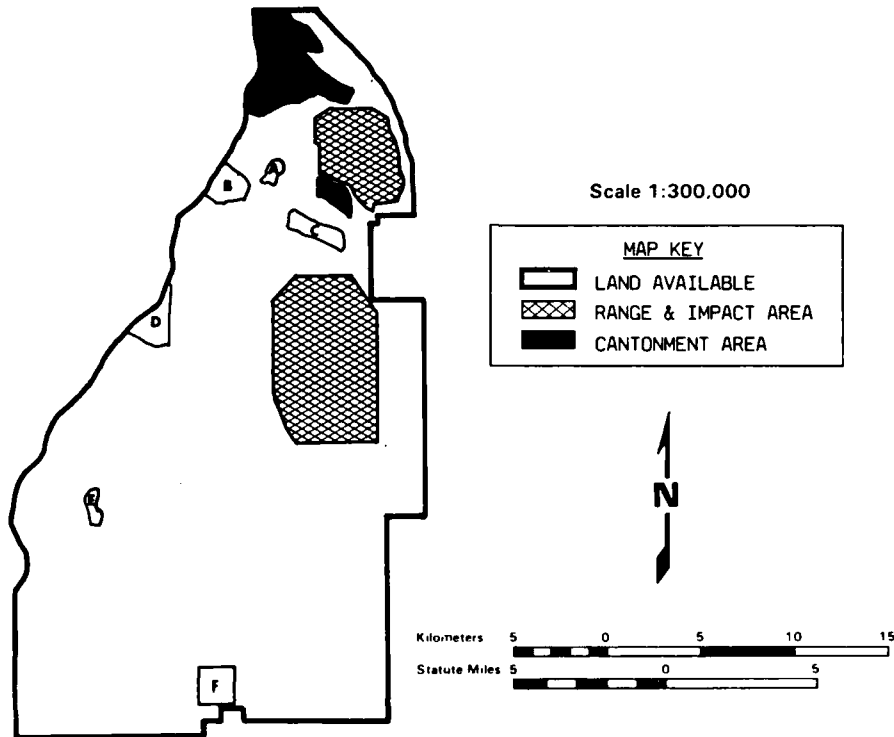
Installation -- Environmental

Land activity -- base-case units	192
Air activity -- base-case units	46
Water availability (excess capacity in persons)	22,600

Installation -- Training and Operations

Average distance to sub-installations (miles)	150
Average distance to airport (miles)	75
Average distance to seaport (miles)	960
Seaport location	Gulf
Mission conflict with generic units	None
Designated maneuver area (acres)	335,637
Terrain suitability factor	
Light units	5.0
Heavy units	10.0
Training variety ratings	
Climate	8
Vegetation	5
Terrain	9
River crossings	0

# FORT CARSON



Fort Carson is a FORSCOM installation which is the home of the 4th Infantry Division (Mechanized) and the 43rd Support Group. The data presented here includes data for the sub-installation of Pinon Canyon Training Area, Colorado. Fort Carson has 20,038 military personnel and a total post population of 23,038.

The 140,000-acre Fort Carson reservation extends about 24 miles by 15 miles at its widest point. It includes parts of three counties: El Paso in the north and central portions, Pueblo in the south, and Fremont on the western edge. The reservation lies between two major highways, Colorado State 115 on the west and Interstate 25 on the east. On post, Fort Carson has a railhead and two runways (4,560 feet by 75 feet and 2,300 feet by 75 feet). Eight miles away is a commercial airport, Peterson Field, which has an 11,000-foot runway. The nearest seaport is Galveston, Texas, which is 960 miles

southeast of Fort Carson. The 233,479-acre Pinon Canyon training area is located 150 miles southeast of Fort Carson.

**FORT CARSON COMPLEX: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	3	9
Area (square miles)	6,044	12,995
<b>Population (1980)</b>		
Urban	386,316	722,621
Rural	46,279	115,694
Non-rural	31,477	44,408
Total	464,072	882,723
<b>Housing Units (1980)</b>		
Owned/Occupied	105,359	211,718
Owned/Vacant	2,735	6,198
Rented/Occupied	57,585	96,449
Rented/Vacant	6,277	9,180
Other/Vacant	4,526	9,687
<b>Housing Value of</b>		
Owner Occupied Units	55,783	70,231
<b>Mean Contract Rent</b>		
(\$/month)	201	232
<b>Employment (1982)</b>		
Total	225,143	394,679
Government		
Federal Civilian	9,874	19,888
Federal Military	33,441	37,554
State & Local	25,231	44,257
Construction	9,357	20,265
Manufacturing	28,283	60,592
Wholesale/Retail Trade	39,129	71,360
Finance, Insurance &		
Real Estate	8,117	14,554
Services	41,592	66,830
Farm		
Proprietors	1,468	2,815
Wage & Salary	753	1,623
<b>Income (1982) (\$M)</b>		
Non-farm	3,445	6,557
Private	2,359	4,879
Government	1,087	1,677
Personal	4,973	11,014
<b>Multipliers</b>		
Export Employment	2.5664	2.6409
Export Income	2.3465	2.3912
Export Sales	2.5664	2.6409

## FORT CARSON COMPLEX: ENVIRONMENT

**Climate:** With its continental location, high elevation (5,871 feet above sea level), and proximity to the Rocky Mountains, Fort Carson has cool summers and relatively cold winters. The mean daily temperature is 71°F in July and 30°F in January. Since storms which move in from the Pacific Ocean lose much of their moisture crossing the mountains, Fort Carson has an average annual precipitation of less than 16 inches, most of which falls during localized summer thunderstorms. Snowfall averages 40 inches a year. Prevailing winds are from the north.

**Terrain:** Fort Carson includes parts of the Great Plains and the Southern Rocky Mountains Provinces. The extreme eastern portion is characterized by low plains, which consist of flat to gently-rolling alluvial surfaces drained by southeasterly flowing tributaries. Slopes are usually less than 3 percent, but can be as much as 15 percent in stream valleys. Local relief is generally between 100 and 164 feet. The high plains of the southeastern, west-central, and western portions of the reservation are gently- to strongly-rolling and intensely dissected. Although generally between 3 and 15 percent, slopes are greater than 30 percent in deeply-dissected stream valleys and in scattered areas of hummocks and landslides. There are scattered rocky escarpments in the southeast and southwest portions of the reservation. Local relief is largely between 246 and 410 feet. In the west-central portion of the reservation are rounded to sharp-crested rocky hills, gently-rolling uplands, and shallow canyons with nearly vertical walls. Although typically 15 and 45 percent, slopes exceed 60 percent along steep-sided canyons and rocky escarpments. Local relief is usually 500 to 720 feet.

**Soils:** The soil is primarily of two types: geologically recent alluvial deposits that have developed on unconsolidated stream-deposited parent material; and, residual soils formed on older sandstone and shale. The alluvial materials (clay, silt, sand, and gravel) are found primarily in the eastern and east-central reservation on broad terraces and uplands. Derived from shales, interbedded sandstones, and clays, these residual soils are rela-

tively shallow and easily eroded. The soils in the west-central and western portions of the reservation are derived from older sandstone and shale.

**Water Resources:** Surface water is scarce in the area. The flow of streams on the reservation is intermittent and stream channels are dry most of the year. Brief periods of sustained flow occur both during the spring snowmelt (April to June) and during periods of intense (or extended) rainfall.

**Vegetation:** Three major vegetative types at Fort Carson are significant to training and operations: grasslands, scrub, and forests. Grasslands predominate in the east, east-central, and southwest. The short grasses (under 3 feet tall) include the blue grama, western wheat grass, little bluestem, and needle-and-thread. About a quarter of the vegetative cover is deciduous scrub or dense-canopy, coniferous scrub. The scrub is extremely fragile and slow to recover once damaged. There are small stands of coniferous trees (ponderosa pine, pinon pine, and one-seed juniper) and deciduous trees (plains cottonwood and Gambel oak).

## FORT CARSON COMPLEX: TRAINING

**Maneuver Areas:** Total maneuver area on post is 102,158 acres. The maneuver area varies from 2 to 14 miles in width and extends from the cantonment area about 20 miles to the south boundary. About 39,480 acres of this area can not be used because access to it is limited or it is set aside for regeneration. Although Pinon Canyon provides an additional 233,479 acres of maneuver area, only about one-fifth of this land may be used in any one year.

**Cross-Country Movement:** The soils are moderately heavy, silty-clay loam with good tractive and load bearing capacity. Vegetation is generally sparse and not an obstacle to movement. Off-road movement at Fort Carson is generally prohibited only in steep terrain. Mobility is hindered during the infrequent wet periods.

**Ranges:** There are sufficient light and heavy infantry ranges for routine division training, for firing 8-inch tube artillery, and firing MLRS (on a limited basis). Maximum range is 13,500 meters. All tank tables and aviation ranges are available. Based on FORSCOM data, the following types of ranges are available.

### FORT CARSON COMPLEX: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

**FORT CARSON: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		117,338	0	16,666	134,004
<u>Aircraft Maintenance (sf)</u>					
211		165,219	0	24,856	190,075
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		694,508	2,063	80,740	777,311
<u>Command, Control, and Administrative (sf)</u>					
141		640,472	0	63,964	704,436
171		217,160	98,509	128,454	444,123
610		120,379	388,638	259,082	768,099
72330		72,888	0	0	72,888
<u>Family Housing (units)</u>					
711		1,828	0	0	1,828
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,947,929	61,024	10,620	2,019,573
724		83,388	31,978	3,857	119,223
<u>Community Support (sf)</u>					
730		99,334	0	58,873	158,207
740		526,454	73,172	196,765	796,391

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

PINON CANYON TRAINING AREA: FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi-</u> <u>permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		0	0	0	0
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		0	0	0	0
<u>Command, Control, and Administrative (sf)</u>					
141		0	0	0	0
171		0	0	0	0
610		22,000	0	3,552	25,552
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		0	0	0	0
<u>Unaccompanied Personnel Housing (sf)</u>					
721		0	0	0	0
724		0	0	0	0
<u>Community Support (sf)</u>					
730		3,414	0	0	3,414
740		0	0	0	0

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

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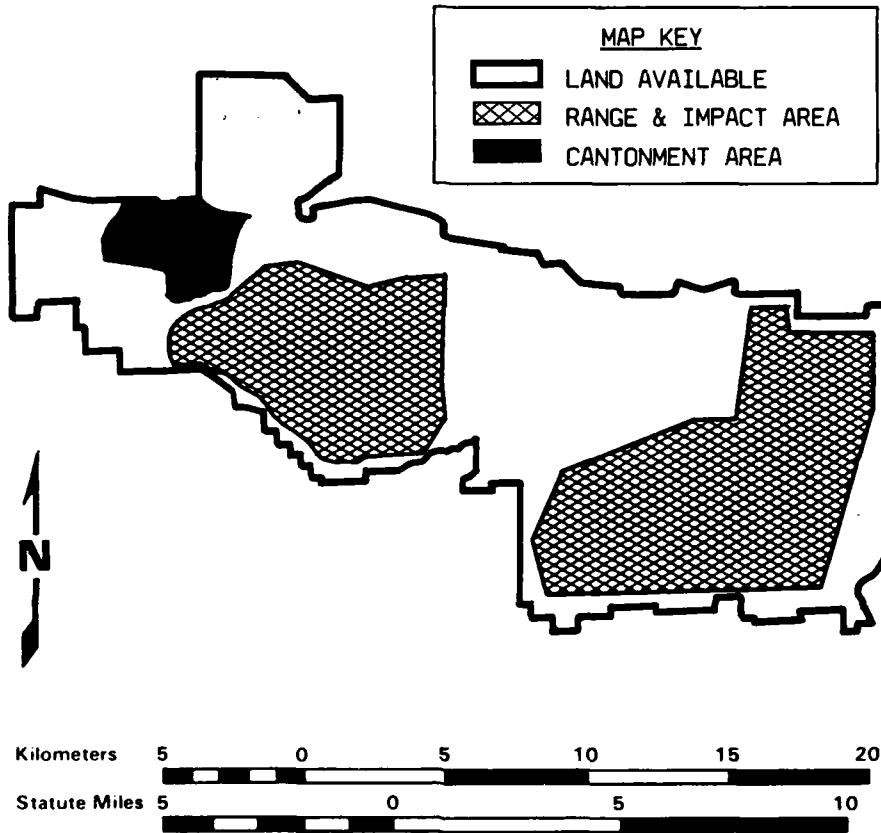
ANNEX G

FORT CHAFFEE

ANNEX G

**FORT CHAFFEE**

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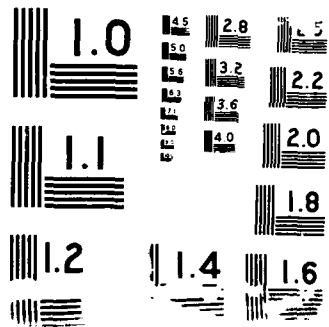


Fort Chaffee is a TRADOC installation which is currently a sub-installation of Fort Sill, Oklahoma. A wide variety of units, primarily National Guard and Army Reserve, train there. Fort Chaffee currently has a total post population of 233, of which 27 are military personnel.

Fort Chaffee is located in northeastern Arkansas near the Oklahoma border. The reservation covers 72,337 acres of Sebastian, Franklin, and Crawford counties. It is about 19 miles east to west and varies from 4 to 9 miles in width. Fort Chaffee is serviced by US Highway 71 and Arkansas Highways 10 and 22. The nearest railhead is in the city of Fort Smith, 10

miles away. Although Fort Chaffee has only a 2,800-foot runway, commercial air service is available at the Fort Smith Municipal Airport. The nearest seaport is in Houston, Texas, a distance of about 500 rail miles from post.





**FORT CHAFFEE: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	10
Area (square miles)	535	7,690
<b>Population (1980)</b>		
Urban	75,535	90,021
Rural	16,320	156,290
Non-rural	3,317	48,345
Total	95,172	294,656
<b>Housing Units (1980)</b>		
Owned/Occupied	23,638	77,240
Owned/Vacant	442	1,349
Rented/Occupied	12,165	28,355
Rented/Vacant	1,490	3,099
Other/Vacant	1,369	5,296
Housing Value of Owner Occupied Units	38,145	31,723
Mean Contract Rent (\$/month)	156	128
<b>Employment (1982)</b>		
Total	53,708	111,409
Government		
Federal Civilian	1,105	2,467
Federal Military	424	1,619
State & Local	3,148	11,204
Construction	2,044	3,438
Manufacturing	16,224	26,732
Wholesale/Retail Trade	10,326	17,665
Finance, Insurance & Real Estate	1,915	3,058
Services	10,600	16,098
Farm		
Proprietors	910	10,702
Wage & Salary	129	1,472
<b>Income (1982) (\$M)</b>		
Non-farm	854	1,419
Private	780	1,213
Government	75	206
Personal	959	2,349
<b>Multipliers</b>		
Export Employment	2.0859	2.5548
Export Income	2.0580	2.4196
Export Sales	2.0859	2.5548

## FORT CHAFFEE: ENVIRONMENT

**Climate:** Fort Chaffee's proximity to the Gulf of Mexico tends to temper the continental winter cold and the high summer temperatures expected in a southern location. Fort Chaffee has an average annual temperature of 61.3°F. The average maximum temperature in the summer is 84.9°F, while the average minimum temperature in winter is 35.4°F. Fort Chaffee is located near the humid sub-tropical belt where precipitation is plentiful. Still, there have been dry periods up to a month's duration in late summer or early autumn. The normal annual precipitation is 42 inches, which includes an average of 5 inches of snowfall.

**Terrain:** Fort Chaffee lies within the Arkansas Valley section of the Ouachita Province. The land has been developed by erosion of a series of greatly deformed strata. In most parts of the area, the strata have been folded into anticlines and synclines that have been broken by normal faults. The location and development of the topographic features have been controlled almost totally by the character and attitude of the strata. Where the strata are horizontal, the most characteristic features are large, broad-topped mountains and flat-topped (or conical) hills. Where the strata are tilted, long, curving ridges have been formed along the outcropping edges of resistant sandstone beds, and curving valleys follow the outcrops of the softer shale.

**Soils:** There are a number of soils present on Fort Chaffee. Soils range from deep, moderately well-drained Leadvale soils, to the poorly-drained Taft soils. The Taft soils, which consist of a silty loam and silty-clay loam over fragipan, are found in level valleys and on stream terraces. Because these soils have a low-bearing strength and restricted permeability, the movement of vehicles is inhibited.

**Water Resources:** The Arkansas River flows through Fort Chaffee for about 3 miles. There are also a number of small tributaries that wind across the installation, intermingle, and eventually feed into the Arkansas River. There are also three lakes on Fort Chaffee. Close to the cantonment area, Wells Lake (22 acres) serves as both a recreational area and an emergency water

supply. Engineer Lake (40 acres) and Darby Lake (15 acres) are located at the northeast section of the reservation. There is also an 80-acre marsh and 12 developed springs. The domestic water supply for Fort Chaffee is currently purchased from the city of Fort Smith.

**Vegetation:** Fort Chaffee lies within the southern forest zone, which is characterized by short leaf, long leaf, slash, loblolly pines, pitch and pond pines. There are also patches of swamp or bottomland species, e. g., elm, sweetgum, bald-cypress, black tupelo, red maple, and eastern cottonwood. Fort Chaffee also has short-grass prairies which are dotted by occasional stands of hardwood trees.

## FORT CHAFFEE: TRAINING

**Maneuver Areas:** Fort Chaffee has 48,572 acres available for maneuver. There is only a relatively limited amount of land on post for large-unit maneuver. The nearby reserves of Ozark National Forest (1,500,000 acres) and Ouachita National Forest (1,000,000 acres) are regarded as alternative maneuver areas.

**Cross-Country Movement:** The river bottomland at the eastern portion of the post provides good areas for maneuver by all types of forces. In the west, steep ridges and exposed rock restrict the maneuver of heavy forces.

**Ranges:** Fort Chaffee does not have an adequate set of ranges for training most large units. Based on information from installation master plans, the range situation at Fort Chaffee is as follows.

## FORT CHAFFEE: RANGE AVAILABILITY

Armor:	Unavailable
Infantry(MECH)/Cavalry:	Good
Anti-Armor:	Unavailable
Aviation:	Marginal
Individual/Crew Weapons:	Good
Indirect Fire Weapons:	Good
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable

FORT CHAFFEE: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	802	0	0	802
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	261	0	746,662	746,923
<u>Command, Control, and Administrative (sf)</u>				
141	0	0	345,713	345,713
171	1,406	0	173,294	174,700
610	0	0	151,490	151,490
72330	0	0	0	0
<u>Family Housing (units)</u>				
711	1	0	0	1
<u>Unaccompanied Personnel Housing (sf)</u>				
721 °	0	0	1,478,170	1,478,170
724	1,914	0	201,823	203,737
<u>Community Support (sf)</u>				
730	0	0	110,018	110,018
740	4,356	0	352,222	356,578

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT CHAFFEE**

Local Area

Surface area (square miles)	535
Total population	95,172

Commute Area

Total population	294,656
Total non-military employment	109,790
Total income (\$M)	5,187
Regional multiplier	2.6
Regional cost factor	0.96
Vacant housing units	9,744
Housing location factor	0.4
Variable housing allowance factor	0.131

Installation -- General

Installation area (acres)	72,337
Personnel stationed in FY 92 as in ASIP	
Officers	78
Enlisted	226
Students	0
Total military	304
Civilians	302

Installation -- Environmental

Land activity -- base-case units	0
Air activity -- base-case units	0
Water availability (excess capacity in persons)	50,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	15
Average distance to seaport (miles)	500
Seaport location	Gulf
Mission conflict with generic units	NTC
Designated maneuver area (acres)	48,572
Terrain suitability factor	
Light units	10.0
Heavy units	6.0
Training variety ratings	
Climate	6
Vegetation	8
Terrain	9
River crossings	10

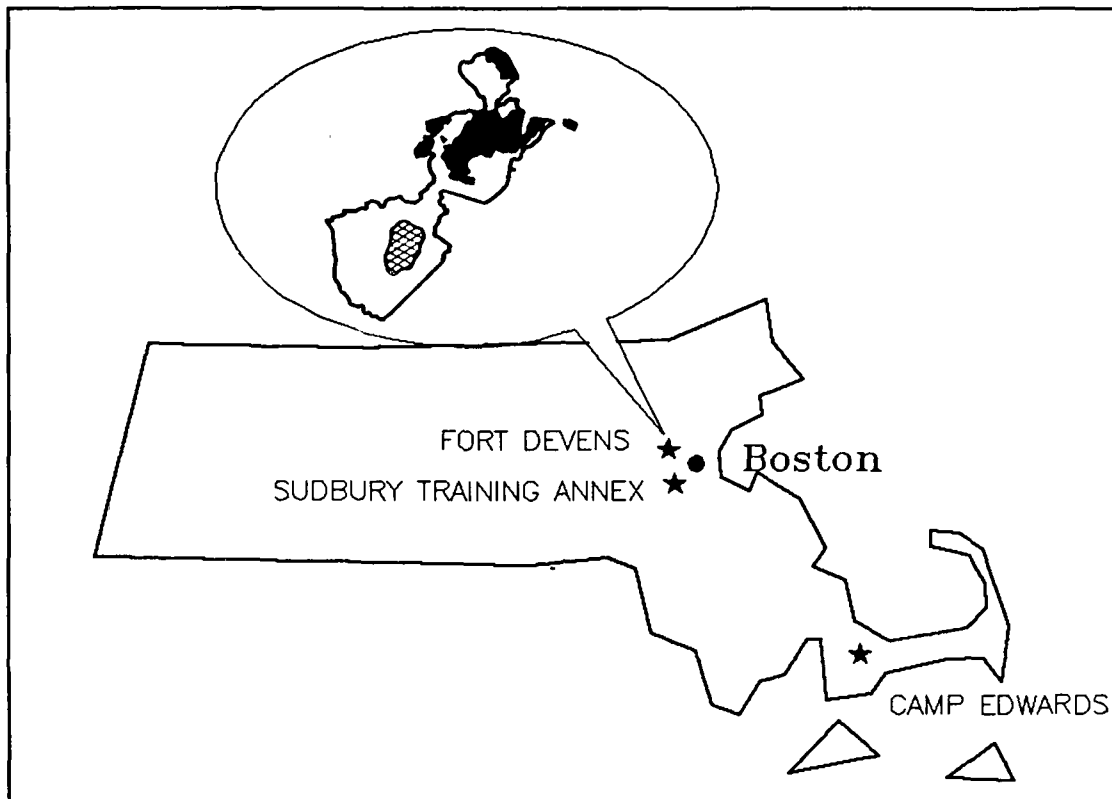
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ANNEX H

FORT DEVENS COMPLEX

## ANNEX H

### FORT DEVENS COMPLEX



For the purposes of this study, the Fort Devens Complex includes: Fort Devens, itself; the nearby Sudbury Training Annex, a sub-installation; and Camp Edwards, a federal installation currently leased to the state of Massachusetts for reserve component training. Fort Devens is a FORSCOM installation that is the home of the 10th Special Forces Group (Airborne) and a variety of FORSCOM units. The entire Fort Devens Complex has a population of 7,581, of which 4,882 are military personnel.

About 45 miles west of Boston, Fort Devens covers 9,340 acres of Worcester County, Massachusetts. Sudbury Training Annex (2,292 acres) is 14 miles to the southeast of Fort Devens. About 60 miles southeast of Boston, Camp Edwards (10,689 acres) is in Barnstable County on Cape Cod. On post,

Fort Devens has a railhead and two runways of 3,745 by 100 feet and 2,900 by 100 feet. Otis Air Force Base is adjacent to Camp Edwards and has two heavy-jet runways (9,500 feet and 8,000 feet in length). The nearest major seaport is in Boston, 45 miles away.

**FORT DEVENS COMPLEX: TOTAL FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		49,821	0	0	49,821
<u>Aircraft Maintenance (sf)</u>					
211		54,768	0	0	54,768
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		106,243	36,187	19,459	161,889
<u>Command, Control, and Administrative (sf)</u>					
141		80,658	2,280	333,844	416,782
171		503,777	59,893	218,573	782,243
610		163,217	82,079	144,365	389,661
72330		19,438	0	4,720	24,158
<u>Family Housing (units)</u>					
711		1,723	0	0	1,723
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,038,114	517,430	362,228	1,917,772
724		78,376	39,571	10,161	128,108
<u>Community Support (sf)</u>					
730		49,812	18,291	12,597	80,700
740		408,816	63,705	322,288	794,809

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT DEVENS COMPLEX**

**Local Area**

Surface area (square miles)	1,913
Total population	794,277

**Commute Area**

Total population	6,266,569
Total non-military employment	4,737,238
Total income (\$M)	186,021
Regional multiplier	3.3
Regional cost factor	1.20
Vacant housing units	121,962
Housing location factor	0.1
Variable housing allowance factor	0.529

**Installation -- General**

Installation area (acres)	22,321
Personnel stationed in FY 92 as in ASIP	
Officers	602
Enlisted	3,737
Students	1,836
Total military	6,175
Civilians	1,893

**Installation -- Environmental**

Land activity -- base-case units	12
Air activity -- base-case units	1
Water availability (excess capacity in persons)	40,600

**Installation -- Training and Operations**

Average distance to sub-installations (miles)	67
Average distance to airport (miles)	1
Average distance to seaport (miles)	45
Seaport location	Atlantic
Mission conflict with generic units	None
Designated maneuver area (acres)	13,842
Terrain suitability factor	
Light units	10.0
Heavy units	7.0
Training variety ratings	
Climate	7
Vegetation	5
Terrain	3
River crossings	4

**FORT DEVENS COMPLEX: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	16
Area (square miles)	1,913	7,345
<b>Population (1980)</b>		
Urban	360,517	4,941,341
Rural	280,250	1,023,746
Non-rural	153,510	301,482
Total	794,277	6,266,569
<b>Housing Units (1980)</b>		
Owned/Occupied	178,644	1,282,218
Owned/Vacant	2,598	13,430
Rented/Occupied	105,235	1,940,871
Rented/Vacant	5,717	53,961
Other/Vacant	14,175	54,571
Housing Value of Owner Occupied Units	49,600	56,690
Mean Contract Rent (\$/month)	181	208
<b>Employment (1982)</b>		
Total	344,717	4,789,583
Government		
Federal Civilian	3,327	62,375
Federal Military	4,493	52,345
State & Local	36,992	317,705
Construction	7,268	94,401
Manufacturing	85,609	730,131
Wholesale/Retail Trade	72,126	631,929
Finance, Insurance & Real Estate	15,259	181,634
Services	72,103	764,783
Farm		
Proprietors	1,002	5,020
Wage & Salary	1,431	8,244
<b>Income (1982) (\$M)</b>		
Non-farm	5,194	54,761
Private	4,526	47,323
Government	668	7,438
Personal	8,735	76,499
<b>Multipliers</b>		
Export Employment	2.70	3.30
Export Income	2.51	3.12
Export Sales	2.70	3.30

## FORT DEVENS COMPLEX: ENVIRONMENT

**Climate:** Fort Devens has short, warm summers and cold, snowy winters. During the summer months, the mean daily temperature is 83°F, while the winter mean is 34°F. The range of temperatures can stretch from 100°F to a low of -20°F over the year. Annual precipitation is about 45 inches, of which almost half falls in September and October. Annual snowfall at Fort Devens averages 60 inches per year. Although Camp Edwards is relatively close, the Gulf Stream current moderates temperatures and snowfall is rare.

**Terrain:** The topography of Fort Devens is typical of central New England -- a variety of slopes, ledge out-croppings, some relatively level areas, and low marshy areas. The cantonment area is generally flat to moderately rolling, although there are areas where the slope exceeds 20 percent. The metamorphic and granite bedrock in the Nashua River Valley confines the major ground water aquifer. This bedrock appears at the surface on Shepleys Hill and at scattered outcrops throughout Fort Devens.

**Soils:** Since well-drained soils cover most of the installation, there is a potential for soil erosion problems. Erosion in some areas is mitigated by surrounding bogs and marsh lands, which act as efficient sediment traps.

**Water Resources:** Flowing through the reservation for over 8 miles, the Nashua River and its tributaries are an integral part of the installation's drainage system. The current storm drainage system at Fort Devens suffers from many deficiencies caused by age and lack of continued maintenance. Fort Devens has a number of impounded bodies of water, including Mirror and Little Mirror Lakes, which serve as habitats for wildlife.

**Vegetation:** Fort Devens has a variable mix of white pine, red oak, white oak, red maple, and pitch pine. The principal shrubs are the same as found elsewhere in the Nashua River basin. There are three climax forest communities found in the installation forest area. Fort Devens also has significant wetland areas.

## FORT DEVENS COMPLEX: TRAINING

**Maneuver Area:** On Fort Devens, there is about 4,450 acres available for maneuver. The training facilities take advantage of both the level areas and steep slopes which prove ideal for light infantry operations and maneuvers. The nearby Sudbury Training Annex provides another 2,300 acres of maneuver land. Camp Edwards has about 7,000 acres of maneuver land.

**Cross-Country Movement:** Although the maneuver area at Fort Devens is generally wooded and flat, there are a few swampy areas as well as gently-rolling hills (with slopes as high as 30 percent). At Camp Edwards, the land is sandy and flat, with relatively little vegetation.

**Ranges:** According to FORSCOM headquarters, the following types of ranges are available at the Fort Devens Complex.

### FORT DEVENS COMPLEX: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Not Adequate
Aviation:	Not Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Not Adequate
Air Defense Artillery:	Not Adequate
Infantry Collective Skills:	Not Adequate

**FORT DEVENS: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u> <u>(Units)</u>	<u>Permanent</u>	<u>Semi-</u> <u>permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	49,821	0	0	49,821
<u>Aircraft Maintenance (sf)</u>				
211	54,768	0	0	54,768
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	76,208	0	15,637	91,845
<u>Command, Control, and Administrative (sf)</u>				
141	80,658	0	333,844	414,502
171	500,611	0	217,757	718,368
610	163,217	0	143,565	306,782
72330	19,438	0	4,720	24,158
<u>Family Housing (units)</u>				
711	1,723	0	0	1,723
<u>Unaccompanied Personnel Housing (sf)</u>				
721	809,016	0	362,228	1,171,244
724	78,376	0	10,161	88,537
<u>Community Support (sf)</u>				
730	45,650	0	12,597	58,247
740	366,442	0	318,861	685,303

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUDBURY TRAINING ANNEX: FACILITIES

M:

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	F Total
<u>Aircraft Parking (sy)</u>				
113	0	0	0	0
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	0	0	0	0
<u>Command, Control, and Administrative (sf)</u>				
141	0	0	0	0
171	0	0	0	0
610	0	0	0	0
72330	0	0	0	0
<u>Family Housing (units)</u>				
711	0	0	0	0
<u>Unaccompanied Personnel Housing (sf)</u>				
721	3,000	0	0	3,000
<u>Community Support (sf)</u>				
730	1,200	0	0	1,200
740	0	0	3,427	3,427

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**CAMP EDWARDS: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		0	0	0	0
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		0	17,952	0	17,952
<u>Command, Control, and Administrative (sf)</u>					
141		0	2,280	0	2,280
171		3,166	59,893	816	63,875
610		0	82,079	800	82,879
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		0	0	0	0
<u>Unaccompanied Personnel Housing (sf)</u>					
721		226,098	517,430	0	743,528
724		0	39,571	0	39,571
<u>Community Support (sf)</u>					
730		2,962	18,291	0	21,253
740		42,374	63,705	0	106,079

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

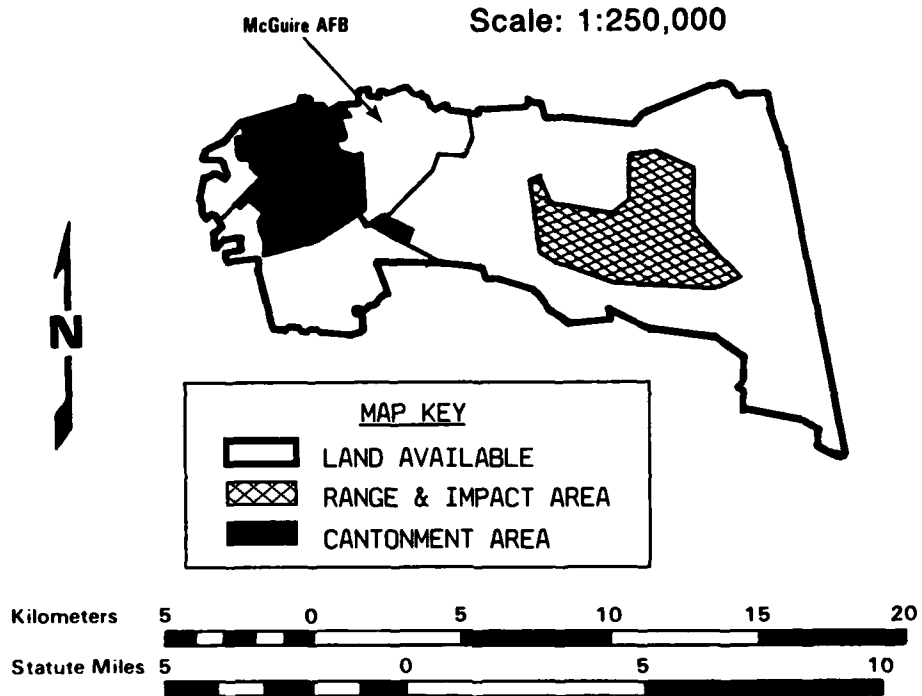
LAST PAGE OF ANNEX H

ANNEX I

FORT DIX

ANNEX I

FORT DIX



Fort Dix is a TRADOC post which is as a US Army reception station and a site for both basic and advanced individual training. It currently has a post population of 17,136, of which 13,416 are military personnel.

Fort Dix is located in the center of New Jersey, approximately 90 miles southwest of New York City, 16 miles southeast of Trenton, and 32 miles north of Philadelphia. The 31,000-acre Fort Dix is bounded to the north by McGuire Air Force Base and Wrightstown, New Jersey; on the east by the Lakehurst Naval Air Station; on the south by Browns Mills, New Jersey; and on the west by farmland. Fort Dix has a railhead on post. For air transit, it has the use of the 11,000- by 150-foot runway at the adjacent McGuire Air Force Base. The nearest commercial airport with scheduled service is Philadelphia International Airport, which is 35 miles away. The nearest seaport is also in Philadelphia, about 25 miles from Fort Dix.

**FORT DIX: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	11
Area (square miles)	808	4,814
<b>Population (1980)</b>		
Urban	253,539	5,033,928
Rural	63,758	557,539
Non-rural	45,245	200,770
Total	362,542	5,792,237
<b>Housing Units (1980)</b>		
Owned/Occupied	84,555	1,369,057
Owned/Vacant	1,311	23,300
Rented/Occupied	30,335	645,956
Rented/Vacant	2,338	49,093
Other/Vacant	2,349	80,637
Housing Value of Owner Occupied Units	54,048	50,766
Mean Contract Rent (\$/month)	244	224
<b>Employment (1982)</b>		
Total	139,554	2,674,897
Government		
Federal Civilian	6,737	92,027
Federal Military	15,712	51,493
State & Local	18,711	321,211
Construction	3,989	84,800
Manufacturing	21,416	480,361
Wholesale/Retail Trade	28,337	537,321
Finance, Insurance & Real Estate	4,703	156,292
Services	22,389	634,105
Farm		
Proprietors	900	6,144
Wage & Salary	1,217	8,636
<b>Income (1982) (\$M)</b>		
Non-farm	2,271	49,159
Private	1,603	40,558
Government	669	8,601
Personal	4,170	70,398
<b>Multipliers</b>		
Export Employment	2.4901	4.2952
Export Income	2.3295	4.1404
Export Sales	2.4901	4.2952

## FORT DIX: ENVIRONMENT

**Climate:** Fort Dix has a moderate climate. The average monthly temperature ranges from a low of 32.6°F in January, to a high of 74.8°F in July. The average annual rainfall is approximately 42 inches; measurable rain falls an average of 115 days a year. The mean annual snowfall is 20.3 inches. The prevailing wind direction is northwest in the winter and southwest in the summer. The average annual wind speed is 6.9 knots.

**Terrain:** In the Coastal Plain Province, Fort Dix has flat to gently-rolling topography with only minor variations in relief. Elevations range from 70 feet above sea level in the eastern part of the installation to 140 feet in the northwest.

**Soils:** The soils of the area are characterized by a very sandy surface layer and a sandy subsoil occasionally interspersed with clay layers. In the east, soils are chiefly of the Downer and Holmdel series of loamy sands. In the west, soils consist of Lakehurst and Atsion series which are mainly sandy soils. Both these soils are very permeable.

**Water Resources:** Fort Dix lies in the watersheds of three tributaries of the Delaware River: Crosswicks Creek, Assiscunk Creek, and Rancocas Creek. Some water for Fort Dix is provided from an impoundment on the Greenwood Branch of Rancocas Creek in New Lisbon. Potable water comes from five deep wells which together have a capacity of 4,624,000 gallons per day. In the range complex area, shallow wells provide water for bivouac areas, shower units, latrines, and range buildings. The ARRADCOM Test Site, USASTRATCOM, and the Brindle Lake Recreation Area each have their own wells.

**Vegetation:** In the western portion of Fort Dix is found an oak-hickory forest which also has tulip poplars, birches, sweetgums, blackgums, black cherries, white ashes, and beeches. Red maples and swamp hardwoods are found in the poorly drained areas. Shrubs include brier and honeysuckle. The eastern portion of the post contains pine-oak forests which include Virginia pines, shortleaf pines, chestnut oaks, scarlet oaks, black oaks, white oaks,

sweetgums, blackgums, and red maples. Shrubs include low bush blueberry, bear oak, dwarf chinkapin oak, mountain laurel, and swamp azalea. In low wet areas in the east are white cedar forests which contain atlantic white cedars, blackgums, sweetbays, and gray birches. Shrubs include sweet pepper bush, swamp azaleas, bush blueberries, dangleberry, and fetterbush. Scattered throughout Fort Dix are also southern arrowwood, spicebush, blackberries, lespedesia, sericea, bicolor, and bunch grasses.

## FORT DIX: TRAINING

**Maneuver Area:** There are only 9,421 acres of maneuver land at Fort Dix. This limited area is heavily used by the Army training center. In addition, this maneuver land is broken up into small training areas, separated by the reservation's cantonment area, McGuire Air Force Base, and the central impact area.

**Ranges:** The current range complex at Fort Dix is designed to accommodate the post's basic training mission. Installation master plans indicate that the following types of ranges are available at Fort Dix.

### FORT DIX: RANGE AVAILABILITY

Armor:	Good
Infantry(MECH)/Cavalry:	Good
Anti-Armor:	Good
Aviation:	Unavailable
Individual/Crew Weapons:	Good
Indirect Fire Weapons:	Good
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable

FORT DIX: FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		9,025	0	0	9,025
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		33,994	75,825	11,056	120,875
<u>Command, Control, and Administrative (sf)</u>					
141		192,580	8,626	2,284	203,490
171		213,648	148,118	108,308	470,074
610		322,037	63,334	20,780	406,151
72330		174,360	0	0	174,360
<u>Family Housing (units)</u>					
711		2,193	0	0	2,193
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,703,441	0	0	2,703,441
724		117,266	0	7,700	124,966
<u>Community Support (sf)</u>					
730		254,567	8,946	9,262	272,775
740		423,619	105,757	42,766	572,142

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT DIX

Local Area

Surface area (square miles)	808
Total population	362,542

Commute Area

Total population	5,792,237
Total non-military employment	2,623,404
Total income (\$M)	168,716
Regional multiplier	4.3
Regional cost factor	1.02
Vacant housing units	153,030
Housing location factor	0.1
Variable housing allowance factor	0.450

Installation -- General

Installation area (acres)	31,065
Personnel stationed in FY 92 as in ASIP	
Officers	516
Enlisted	2,886
Students	10,731
Total military	14,133
Civilians	2,080

Installation -- Environmental

Land activity -- base-case units	14
Air activity -- base-case units	0
Water availability (excess capacity in persons)	33,600

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	1
Average distance to seaport (miles)	25
Seaport location	Atlantic
Mission conflict with generic units	School
Designated maneuver area (acres)	9,421
Terrain suitability factor	
Light units	10.0
Heavy units	8.0
Training variety ratings	
Climate	7
Vegetation	4
Terrain	3
River crossings	0

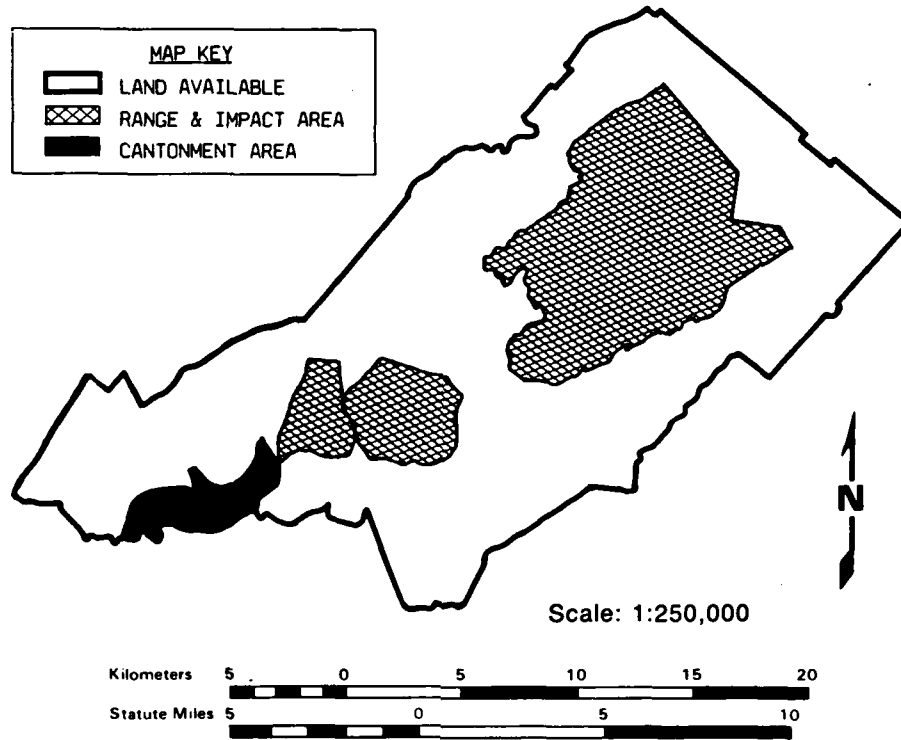
LAST PAGE OF ANNEX I

ANNEX J

FORT DRUM

ANNEX J

FORT DRUM



Fort Drum is a FORSCOM installation that be the home of the recently activated 10th Mountain Division (Light). Although the current post population is only 1,300, an increase to about 10,000 people by FY 92 is scheduled. A major construction effort is now underway to accommodate the new divisional troops. Two infantry brigades, one combat aviation brigade, special troops, artillery, and a support command are to be organized.

Fort Drum is located just east of Lake Ontario in northern New York. The 107,265-acre reservation is oriented northeast-southwest with a length of 25 miles and maximum width of 10 miles. About 90 percent of the reservation is in Jefferson County; the remainder is in Lewis County. The reservation can be reached by Interstate 81, US Highway 11, and New York routes 3 and 26. The 8,550-acre cantonment area is at the western end of the reservation, about 9

miles from Watertown. Fort Drum has a railhead on post. It has two runways of 5,000 by 150 feet each, and a third runway of 4,500 by 150 feet. There are other air facilities in the region which include: Watertown International Airport (six miles away) with two C-130 capable runways; Hancock Airfield in Syracuse (65 miles away) with three C-130 capable runways; Griffiss Air Force Base (90 miles away in Rome, New York) with one C-5 capable runway. The nearest major seaport is on the Saint Lawrence Seaway, 60 miles northeast of Fort Drum at Ogdensburg, New York. The nearest Atlantic Coast seaport is about 350 miles away in Boston, Massachusetts.

**FORT DRUM: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	3
Area (square miles)	1,273	5,285
<b>Population (1980)</b>		
Urban	0	0
Rural	56,647	145,371
Non-rural	31,504	82,069
Total	88,151	227,440
<b>Housing Units (1980)</b>		
Owned/Occupied	21,056	53,245
Owned/Vacant	382	890
Rented/Occupied	9,736	21,399
Rented/Vacant	774	1,676
Other/Vacant	1,274	2,944
Housing Value of Owner Occupied Units	31,263	31,360
Mean Contract Rent (\$/month)	149	151
<b>Employment (1982)</b>		
Total	34,730	81,118
Government		
Federal Civilian	1,626	2,304
Federal Military	823	1,135
State & Local	5,379	15,469
Construction	733	1,581
Manufacturing	5,354	14,375
Wholesale/Retail Trade	5,819	12,113
Finance, Insurance & Real Estate	1,203	2,129
Services	6,368	14,322
Farm		
Proprietors	2,092	5,816
Wage & Salary	631	1,521
<b>Income (1982) (\$M)</b>		
Non-farm	484	1,158
Private	362	871
Government	121	287
Personal	784	1,846
<b>Multipliers</b>		
Export Employment	1.9884	2.0655
Export Income	1.8741	1.9380
Export Sales	1.9884	2.0655

## FORT DRUM: ENVIRONMENT

**Climate:** The climate at Fort Drum is primarily continental in character -- long, cold winters are followed by short, warm, moist summers. Fort Drum is affected by nearly all of the cyclonic storms which move from the interior through the St. Lawrence Valley. Average January temperatures fall below 0°F about one-quarter of the time. During June, July, and August, the mean daily highs are between 76°F and 81°F. The prevailing westerly winds average about 8 knots. The most violent winds are those which may accompany thunderstorms in late spring. Precipitation is well distributed throughout the year, and is relatively reliable. The average annual precipitation is 39.36 inches. Snowfall is fairly heavy with an annual average of 114 inches. Cloudiness and snow squalls are a characteristic of Fort Drum's winter weather.

**Terrain:** Nestled between Lake Ontario and the Adirondack Mountains, Fort Drum straddles the Lake Erie-Ontario Lowlands and the Adirondack Uplands Provinces. The southwestern two-thirds of the reservation include recessional moraines, small sand plains, drumlin fields, swamps, and disrupted drainage patterns which resulted from ancient glaciers. The northeastern third of the reservation has a broad zone of foothills partly covered by lacustrine deposits laid down in old glacial lakes. This portion includes several large lakes, widespread rock outcrops, and numerous steep, straight, hillocks. Predominantly flat to moderately-rolling low plains cover about 98 percent of the reservation. Slopes are generally less than 8 percent and local relief of inter-stream areas is 60 to 130 feet. Two areas of high plains (one on the south-central edge and the other on the northeastern edge) have steeper slopes and greater local relief.

**Soils:** Soils on the reservation range from gravel and sand developed in glacial drifts to highly organic soils in swamps and marshes. The major portion of the reservation consists of very sandy and silty soils. In the center and the western end of the reservation, silts and clays are found atop stratified sands or glacial lake sediments. The northwestern edge of the reservation has predominantly clayey soils developed in sediments from glacier lakes.

**Water Resources:** Almost all of Fort Drum is drained by the Indian River and its tributaries. Because it is strongly channelled by rocky hillocks which extend in a northeast-southwest direction, the Indian River zigzags across the reservation from east to west. Although precipitation is fairly uniform throughout the year, stream discharges vary considerably. The thaw begins in late March and ends by mid-May. Because the still-frozen ground is impermeable, the runoff is concentrated in the streams. Numerous dammed beaver ponds on the reservation contribute to the swampy, marshy conditions. Much of Fort Drum is underlain by a prolific water table and artesian aquifers (of fine and medium deltaic sands).

**Vegetation:** Fort Drum has four major vegetation types: forests, scrub, grasslands, and wetlands. Mixed forests cover about 46 percent of the reservation. The major coniferous trees are white pine, red pine, and eastern hemlock; the major deciduous trees are sugar maple, red and white oak, and black cherry. Forests are intensively managed and timber is routinely harvested. Extremely dense scrub is found in one large stand in the northeastern hilly portion of the reservation. The stand, which is predominantly soft maple, covers about 15 percent of the reservation. Grasslands cover about 27 percent of Fort Drum. The grasses are generally less than 3 feet high and are found throughout the reservation (except in the northeast). Marshes and swamps cover about 6 percent of the installation. About 4 percent of the surface area is unvegetated and about 2 percent is covered by water.

## FORT DRUM: TRAINING

**Maneuver Area:** Total maneuver area on Fort Drum is 58,811 acres. There are few open areas of the reservation suitable for vehicular movement.

**Cross-Country Movement:** Generally, the best areas for vehicular cross-country movement are the few open cleared parts of the reservation (especially those with well-drained soils). In contrast, the rock outcrops and dense scrub make the northeastern portion of Fort Drum almost impassable. Wooded areas are generally poor for all vehicular movement. Other major impediments are excessive slopes, stony soils, shallow soils, and wet, slippery soils (due to a seasonal high water table). During winter, much of the reservation has deeply-frozen soil, which is covered by deep snow.

**Ranges:** Fort Drum has 12,597 acres set aside for ranges. According to FORSCOM headquarters, the following types of ranges are available for training.

## FORT DRUM: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate (programmed)

**FORT DRUM: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		24,347	0	0	24,347
<u>Aircraft Maintenance (sf)</u>					
211		32,540	0	0	32,540
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		77,171	0	82,509	159,680
<u>Command, Control, and Administrative (sf)</u>					
141		0	0	129,576	129,576
171		23,748	30,817	160,044	214,609
610		23,804	8,495	439,114	471,413
72330		24,161	0	59,367	83,528
<u>Family Housing (units)</u>					
711		350	0	0	350
<u>Unaccompanied Personnel Housing (sf)</u>					
721		174,285	11,868	1,059,460	1,245,613
724		800	25,668	235,028	261,496
<u>Community Support (sf)</u>					
730		987	624	51,675	53,286
740		44,369	13,307	313,570	371,246

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT DRUM

Local Area

Surface area (square miles)	1,273
Total population	88,151

Commute Area

Total population	227,440
Total non-military employment	79,983
Total income (\$M)	4,162
Regional multiplier	2.1
Regional cost factor	1.18
Vacant housing units	5,510
Housing location factor	0.4
Variable housing allowance factor	0.085

Installation -- General

Installation area (acres)	107,265
Personnel stationed in FY 92 as in ASIP	
Officers	1,135
Enlisted	9,155
Students	0
Total military	10,290
Civilians	1,498

Installation -- Environmental

Land activity -- base-case units	21
Air activity -- base-case units	36
Water availability (excess capacity in persons)	30,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	60
Average distance to seaport (miles)	360
Seaport location	Atlantic
Mission conflict with generic units	None
Designated maneuver area (acres)	58,811
Terrain suitability factor	
Light units	10.0
Heavy units	5.0
Training variety ratings	
Climate	9
Vegetation	9
Terrain	8
River crossings	10

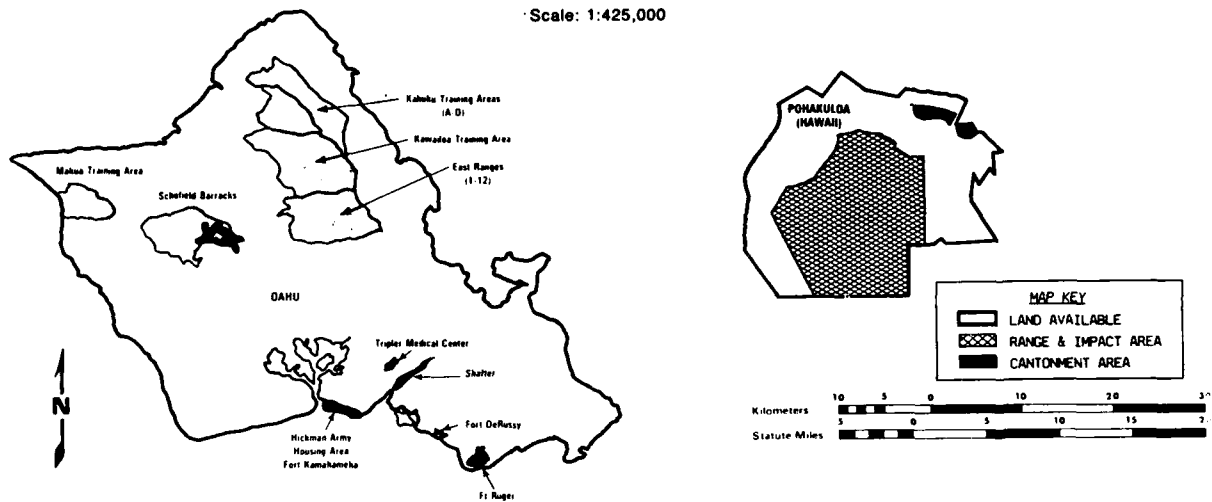
LAST PAGE OF ANNEX J

ANNEX K

HAWAII COMPLEX

ANNEX K

HAWAII COMPLEX



For the purposes of this study, eight major US Army Western Command (WESTCOM) installations in Hawaii are considered as an installation complex. These installations serve as home for the 25th Infantry Division (Light) which is composed of three brigades -- two active and one reserve. Other elements include the Support Command, Hawaii, and the 45th Support Group. A summary of the basic data on the eight installations follows on the next page.

All installations, but the Pohakuloa training area, are on the island of Oahu. Although Fort Shafter is the headquarters installation, Schofield Barracks is the major cantonment area. Immediately south of Schofield Barracks is Wheeler Army Airfield, which has a 6,250-foot runway. About 15 miles south, Hickam Air Force Base and Honolulu Airport share a common runway, which can accommodate all types of aircraft. The Honolulu seaport is 15 miles away from Schofield Barracks.

SUMMARY OF HAWAII INSTALLATION DATA

<u>Installation</u>	<u>Installation Area (acres)</u>	<u>Military Personnel FY 86 (persons)</u>
Fort Shafter	590	842
Schofield Barracks	14,085	11,360
Wheeler Army Airfield	706	717
Dillingham	658	--
Kahuku	9,424	5
Kawailoa	23,348	--
Makua	4,922	--
<u>Pohakuloa</u>	<u>108,846</u>	<u>61</u>
Complex Total	162,579	12,985

The eighth installation, Pohakuloa Training Area, is on the island of Hawaii, about 150 air miles from Schofield Barracks. It lies on the northwest volcanic slope of Mauna Loa. Pohakuloa is also used for training by the other military services. Pohakuloa has a 3,700-foot air strip.

HAWAII COMPLEX: TOTAL FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		282,368	0	7,233	289,601
<u>Aircraft Maintenance (sf)</u>					
211		42,063	0	0	42,063
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		161,845	40,422	234,873	437,140
<u>Command, Control, and Administrative (sf)</u>					
141		833,252	0	38,983	872,235
171		39,609	22,531	128,747	190,887
610		302,523	169,966	333,156	805,645
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		18,937	0	0	18,937
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,683,922	0	107,177	1,791,099
724		63,592	38,172	25,012	126,776
<u>Community Support (sf)</u>					
730		71,521	22,576	39,081	133,178
740		595,190	96,249	305,591	997,030

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. Since family housing is consolidated on the island of Oahu, the family housing units represent assets which are shared by all the armed services. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. IFS lists none of the above facilities for the training areas of Kahuka, Kawaihoa, and Makua. Programmed construction is not shown here. The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: HAWAII COMPLEX**

Local Area

Surface area (square miles)	596
Total population	762,565

Commute Area

Total population	964,547
Total non-military employment	459,314
Total income (\$M)	28,177
Regional multiplier	2.4
Regional cost factor	1.33
Vacant housing units	38,111
Housing location factor	0.2
Variable housing allowance factor	1.181

Installation -- General

Installation area (acres)	162,579
Personnel stationed in FY 92 as in ASIP	
Officers	1,761
Enlisted	14,981
Students	112
Total military	16,854
Civilians	3,877

Installation -- Environmental

Land activity -- base-case units	67
Air activity -- base-case units	26
Water availability (excess capacity in persons)	38,400

Installation -- Training and Operations

Average distance to sub-installations (miles)	24
Average distance to airport (miles)	15
Average distance to seaport (miles)	15
Seaport location	Pacific
Mission conflict with generic units	None
Designated maneuver area (acres)	76,447
Terrain suitability factor	
Light units	5.0
Heavy units	4.0
Training variety ratings	
Climate	5
Vegetation	8
Terrain	9
River crossings	0

HAWAII COMPLEX: SOCIOECONOMIC DATA (OAHU)

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	4
Area (square miles)	596	6,426
Population (1980)		
Urban	688,175	688,175
Rural	27,274	129,955
Non-rural	47,116	146,417
Total	762,565	964,547
Housing Units (1980)		
Owned/Occupied	114,831	151,954
Owned/Vacant	1,321	2,152
Rented/Occupied	115,383	142,027
Rented/Vacant	9,002	16,288
Other/Vacant	10,329	19,671
Housing Value of Owner Occupied Units	139,776	128,072
Mean Contract Rent (\$/month)	307	305
Employment (1982)		
Total	427,226	525,984
Government		
Federal Civilian	31,146	32,245
Federal Military	64,264	66,670
State & Local	46,075	59,640
Construction	14,477	17,851
Manufacturing	16,736	22,638
Wholesale/Retail Trade	87,329	103,736
Finance, Insurance & Real Estate	28,932	33,751
Services	84,281	106,292
Farm		
Proprietors	992	4,389
Wage & Salary	2,458	11,028
Income (1982) (\$M)		
Non-farm	7,062	8,294
Private	4,471	5,423
Government	2,591	2,871
Personal	9,484	11,589
Multipliers		
Export Employment	2.3343	2.4491
Export Income	2.2631	2.3117
Export Sales	2.3343	2.4491

## HAWAII COMPLEX: ENVIRONMENT

**Climate:** Hawaii's climate features mild temperatures the year round, modest humidity, persistent northeast trade winds, remarkable differences in rainfall within short distances, and infrequent severe storms.

On Oahu, summer temperatures range from about 60°F to about 85°F, while winter temperatures stay about 60°F to 70°F. There are large variations in rainfall due to the complex interplay between the terrain and the trade winds. On the southern and southwestern coast, Fort Shafter, Makua, and Dillingham receive about 20 to 30 inches of rain annually. In the island's major saddle, Schofield Barracks receives about 50 inches of rain. On the southwest side of the eastern ridgeline, Kawailoa and Kahuku receive from 70 to about 250 inches of rain annually.

At a higher elevation on the island of Hawaii, the Pohakuloa training area has temperatures which range from the low 30s to the low 50s in summer, and from the mid-20s to the mid-30s in winter. Pohakuloa receives about 15 to 20 inches of precipitation, some of which falls as snow.

**Terrain:** The relief features of Hawaii are the result of volcanic activity and water erosion. Fort Shafter straddles two physiographic divisions: the Pearl Harbor and Honolulu Plains, and the Koolau Cliff and Valley. The Fort Shafter reservation follows the narrow valley carved by Kamaikai and Kalihi streams; elevation falls from about 2,000 feet to sea level in less than 5 miles. Schofield Barracks is located in the Schofield saddle, adjacent to Wheeler AAF. The Schofield Barracks reservation extends from the saddle (elevation about 1,000 feet) up to the east ridgeline of the island (elevation about 2,600 feet). The Kahuku and Kawailoa training areas are both within the Koolau Cliff and Valley Division on the west side of the ridgeline. Makua is located in the Waianae Cliff and Valley Division. Dillingham is on the Waialua Plain. On the island of Hawaii, Pohakuloa is located on the Mauna Loa Upland and the Humuula Saddle, where elevations range from 6,000 to 12,000 feet.

**Soils:** Soil formation is determined by the amount of rainfall, the slope of the terrain, and the age of the island. Oxisols occur on Schofield Barracks and Wheeler. The upper reaches of Schofield Barracks and Fort Shafter as well as Makua, Kahuku, and Kawaihoa have soils characteristic of mountainous areas. Pohakuloa soils are predominantly volcanic ash interspersed with inceptisols and mollisols.

**Water Resources:** Only a few streams in Hawaii carry water throughout the year. Because the volcanic rocks and soils are extremely permeable and drainage basins are usually small, streams are susceptible to flash floods. Fresh water is found in the lens-shaped basal ground water body (which floats atop the denser salt water underneath the islands) and in perched water tables formed by dense volcanic dikes. Schofield Barracks is the only installation with a reservoir -- Ku Tree Reservoir. Another reservoir, Wahiawa Reservoir, is to the immediate north of the installation.

**Vegetation:** Vegetation zones vary according to elevation and rainfall. The lower areas of Fort Shafter, Makua, and Dillingham are in the lantana-koa-haole shrub zone. Wheeler.AAF and much of Schofield Barracks are in a zone of open guava forest and shrubs. Kahuku and Kawaihoa and the upper reaches of Fort Shafter and Schofield Barracks are in a zone of closed guava forest with shrubs and open koa forest with mamani. Pohakuloa is in a zone of open koa forest with mamani and open mamani-naio forest with subalpine shrubs.

## HAWAII COMPLEX: TRAINING AREAS

**Maneuver Areas:** There are five primary maneuver areas in the Hawaiian Complex. Kahuku (9,424 acres) is the only sizable tract of land on the island of Oahu which is suitable for conventional maneuver of units. Schofield Barracks has about 7,200 acres and can accommodate only small-unit training exercises. Kawaihoa Training Area (23,348 acres) provides some of the finest jungle training in the world. Makua Training Area is relatively small, and is used primarily as a tank weapons firing range and impact area. At the Pohakuloa Training Area on Hawaii, there are about 32,000 acres of open land available for maneuver on a continuous basis. The soil is lava-based, which contributes to dust storms during the dry season, and causes rapid wear on both footgear and the treads of tracked vehicles. Extensive lava flows in the center of the area generally restrict movement, even for foot troops.

**Ranges:** On Oahu, impact areas are located at Schofield Barracks and at the Makua Military Reservation. Tube artillery of up to 8 inches in size can be fired from the shore. Subcaliber tank tables are also available. At Pohakuloa Training Area, all weapons systems can be fired. Although reliable detailed information on ranges in Hawaii is not available, the ranges on the complex appear to be adequate for one light division.

**FORT SHAFTER: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		0	0	0	0
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		0	0	31,515	31,515
<u>Command, Control, and Administrative (sf)</u>					
141		0	0	8,592	8,592
171		6,480	0	1,317	7,797
610		110,264	140,067	224,337	474,668
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		--	--	--	--
<u>Unaccompanied Personnel Housing (sf)</u>					
721		167,661	0	0	167,661
724		7,648	38,172	9,428	55,248
<u>Community Support (sf)</u>					
730		964	12,794	13,167	26,925
740		225,542	14,875	109,818	350,235

Since family housing is consolidated on the island of Oahu, the family housing units are shown only for the complex. Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SCHOFIELD BARRACKS: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u> (Units)	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	0	0	0	0
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	161,845	12,070	136,332	310,247
<u>Command, Control, and Administrative (sf)</u>				
141	828,644	0	2,104	830,748
171	10,569	22,531	126,790	159,890
610	179,665	29,899	98,194	307,758
72330	0	0	0	0
<u>Family Housing (units)</u>				
711	--	--	--	--
<u>Unaccompanied Personnel Housing (sf)</u>				
721	1,516,261	0	1,160	1,517,421
724	55,944	0	2,069	58,013
<u>Community Support (sf)</u>				
730	69,633	9,782	22,764	102,179
740	369,648	81,374	178,236	629,258

Since family housing is consolidated on the island of Oahu, the family housing units are shown only for the complex. Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**WHEELER ARMY AIRFIELD: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		200,171	0	0	200,171
<u>Aircraft Maintenance (sf)</u>					
211		42,063	0	0	42,063
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		0	0	4,100	4,100
<u>Command, Control, and Administrative (sf)</u>					
141		115	0	870	985
171		22,333	0	0	22,333
610		8,320	0	3,600	11,920
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		--	--	--	--
<u>Unaccompanied Personnel Housing (sf)</u>					
721		0	0	0	0
724		0	0	0	0
<u>Community Support (sf)</u>					
730		0	0	0	0
740		0	0	0	0

Since family housing is consolidated on the island of Oahu, the family housing units are shown only for the complex. Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**DILLINGHAM: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u> <u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	82,197	0	0	82,197
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	0	0	0	0
<u>Command, Control, and Administrative (sf)</u>				
141	4,345	0	1,628	5,973
171	0	0	0	0
610	4,274	0	3,132	7,406
72330	0	0	0	0
<u>Family Housing (units)</u>				
711	--	--	--	--
<u>Unaccompanied Personnel Housing (sf)</u>				
721	0	0	0	0
724	0	0	0	0
<u>Community Support (sf)</u>				
730	924	0	0	924
740	0	0	0	0

Since family housing is consolidated on the island of Oahu, the family housing units are shown only for the complex. Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**POHAKULOA TRAINING AREA: FACILITIES**

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	0	0	7,233	7,233
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	0	0	6,089	6,089
<u>Command, Control, and Administrative (sf)</u>				
141	148	0	25,789	25,937
171	227	0	640	867
610	0	0	3,893	3,893
72330	0	0	0	0
<u>Family Housing (units)</u>				
711	--	--	--	--
<u>Unaccompanied Personnel Housing (sf)</u>				
721	0	0	106,017	106,017
724	0	0	13,515	13,515
<u>Community Support (sf)</u>				
730	0	0	3,150	3,150
740	0	0	17,537	17,537

Since family housing is consolidated on the island of Oahu, the family housing units are shown only for the complex. Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here. The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

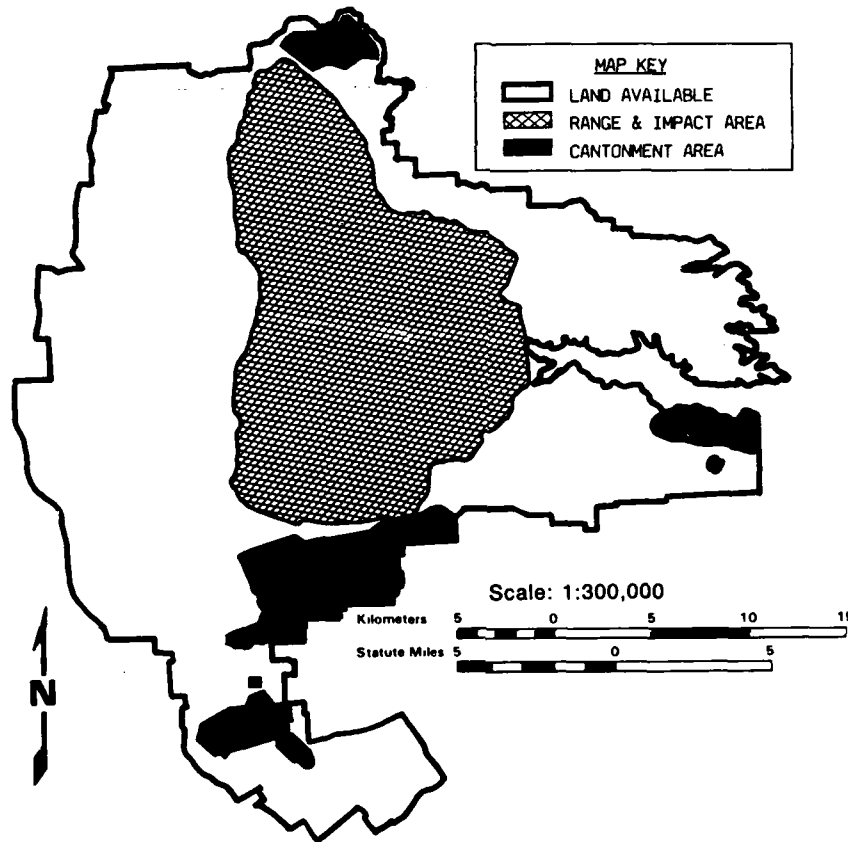
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ANNEX L

FORT HOOD

ANNEX L

FORT HOOD



Fort Hood is a FORSCOM installation and is the headquarters of the III Corps. It also serves as the division station for the 1st Cavalry Division and the 2nd Armored Division. Fort Hood is also the home of the 6th Cavalry (Air Combat) Brigade, 13th Corps Support Command, 3rd Signal Group, and the 88th and 504th Military Police Groups. Tenants include the OPFOR Training Detachment (Red Thrust) and the Combined Arms Test Activity. Fort Hood currently has a total post population of 45,274, of which 39,757 are military personnel.

Fort Hood is located near the geographical center of Texas in Bell and Coryell Counties. The cities of Temple and Waco lie southeast and northeast,

respectively. Austin is 62 miles south. The reservation covers 217,000 acres. US Highway 190 extends east-west through the reservation and is the main entrance into Fort Hood. Interstate 35 runs north-to-south about 21 miles to the east, and US Highway 281 runs north-to-south about 27 miles to the west. Fort Hood has a railhead on post. The installation has two airfields, one with a 10,000- by 200-foot runway, the other a 4,712- by 150-foot runway. Off post, Killeen Airport (5 miles away) has a 5,000-foot runway. The nearest major seaport is Houston, Texas, 175 miles from Fort Hood.

**FORT HOOD: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	6
Area (square miles)	2,111	5,987
<b>Population (1980)</b>		
Urban	141,336	285,341
Rural	47,591	127,957
Non-rural	25,729	78,442
Total	214,656	491,740
<b>Housing Units (1980)</b>		
Owned/Occupied	35,909	103,093
Owned/Vacant	908	2,674
Rented/Occupied	30,842	61,509
Rented/Vacant	5,273	7,883
Other/Vacant	2,523	7,680
Housing Value of Owner Occupied Units	39,590	40,489
Mean Contract Rent (\$/month)	175	173
<b>Employment (1982)</b>		
Total	113,789	232,209
<b>Government</b>		
Federal Civilian	8,479	11,532
Federal Military	42,637	43,754
State & Local	10,550	23,960
Construction	3,387	8,686
Manufacturing	7,525	27,558
Wholesale/Retail Trade	14,017	37,610
Finance, Insurance & Real Estate	2,415	8,086
Services	11,716	33,901
<b>Farm</b>		
Proprietors	3,249	9,493
Wage & Salary	399	1,547
<b>Income (1982) (\$M)</b>		
Non-farm	1,552	3,117
Private	659	1,961
Government	893	1,156
Personal	2,001	4,945
<b>Multipliers</b>		
Export Employment	1.6931	2.3866
Export Income	1.6055	2.2049
Export Sales	1.6931	2.3866

## FORT HOOD: ENVIRONMENT

**Climate:** Fort Hood is located near the boundary of two climatic zones. To the west, it is semi-arid; to the east, it is warm and rainy. The combination gives Fort Hood cool, rainy winters and hot, dry summers. In July and August, the mean daily high is 94°F. In December, January, and February, the mean low is 38°F. The average annual precipitation is 30 inches. The wettest month is September and the driest is July. Measurable amounts of snow occur from December through March, and the mean annual snowfall is 3.7 inches. Winds are from the north, northwest and northeast from September through February. The rest of the year is dominated by the Bermuda High which brings moist tropical air masses from the Gulf of Mexico. As a result, thunderstorm activity increases to a maximum frequency in May.

**Terrain:** The reservation lies within the southeastern margin of the Comanche Plateau, near the edge of the Gulf Coastal Plain. The surface configuration is predominantly the result of erosion of limestones and shales by small streams flowing from the plateau southeast onto the plain. The plateau is less dissected than in the higher areas to the west.

**Soils:** Silt and plastic clays are found over most of the reservation. Deep soils are found on flood plains and major stream beds. There are shallow soils on the uplands and the ridges. In eroded areas, bedrock has been exposed to direct weathering and ruts and steep slopes have developed.

**Water Resources:** All of the surface water drains southeastward into the Leon River. The major perennial tributaries on the reservation are the Cowhouse and North Nolan Creeks. There are also minor creeks which flow intermittently. Many of the streams have been dammed to form numerous small reservoirs throughout the reservation. Although streams usually flow most heavily in April and May, severe storms may cause unusually high water levels at almost anytime of the year.

**Vegetation:** The vegetation on Fort Hood consists of forests, scrub, and grasslands. Forests cover 43 percent of the reservation with juniper and Spanish oak. Mixed scrub covers about 14 percent of the area with juniper,

brush oaks, and mesquite. About 38 percent of the installation is grassland. Common grasses are switch, Indian, and rye. The remaining 5 percent of the surface area is unvegetated or covered by water.

## FORT HOOD: TRAINING

**Maneuver Area:** Total available maneuver area at Fort Hood is about 150,000 acres. In the west, the largest training area (69,000 acres) is 18 miles long and 6 miles wide. The majority of the reservation is open and cross-country mobility is good for both troops and vehicles.

**Cross-Country Movement:** Off-road movement of vehicles in open areas is generally fair to good for both track and wheeled vehicles. As the result of relatively moist soil and a raised water table, movement is impeded during wet periods. Severe thunderstorms, particularly during the springtime, often result in flash floods, which are extremely hazardous. Dense vegetation also impedes movement on the reservation.

**Ranges:** The ranges at Fort Hood are sufficient to satisfy the training requirements of two heavy divisions. The table below is based on information from FORSCOM headquarters.

### FORT HOOD: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

FORT HOOD: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	740,279	58,156	0	798,435
<u>Aircraft Maintenance (sf)</u>				
211	492,268	46,076	3,840	542,184
21740	3,520	0	0	3,520
<u>Vehicle Maintenance (sf)</u>				
214	970,511	39,825	448,394	1,458,730
<u>Command, Control, and Administrative (sf)</u>				
141	300,712	90,286	419,195	810,193
171	341,936	30,417	278,822	651,175
610	563,601	26,344	577,239	1,167,184
72330	630,781	8,488	64,128	703,397
<u>Family Housing (units)</u>				
711	5,257	0	0	5,257
<u>Unaccompanied Personnel Housing (sf)</u>				
721	5,123,415	0	169,920	5,293,335
724	187,147	0	2,080	189,227
<u>Community Support (sf)</u>				
730	98,761	5,597	146,371	250,729
740	1,096,754	20,123	284,111	1,400,988

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT HOOD**

Local Area

Surface area (square miles)	2,111
Total population	214,656

Commute Area

Total population	491,740
Total non-military employment	188,455
Total income (\$M)	11,179
Regional multiplier	2.4
Regional cost factor	0.86
Vacant housing units	18,237
Housing location factor	0.3
Variable housing allowance factor	0.197

Installation -- General

Installation area (acres)	216,923
Personnel stationed in FY 92 as in ASIP	
Officers	4,432
Enlisted	34,767
Students	295
Total military	39,494
Civilians	3,997

Installation -- Environmental

Land activity -- base-case units	395
Air activity -- base-case units	120
Water availability (excess capacity in persons)	0

Installation -- Training and Operations

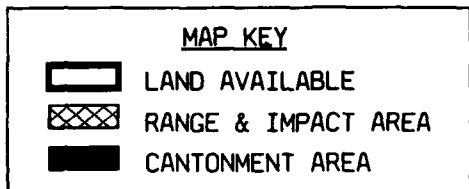
Average distance to sub-installations (miles)	0
Average distance to airport (miles)	1
Average distance to seaport (miles)	175
Seaport location	Gulf
Mission conflict with generic units	None
Designated maneuver area (acres)	153,291
Terrain suitability factor	
Light units	5.0
Heavy units	6.0
Training variety ratings	
Climate	6
Vegetation	7
Terrain	4
River crossings	3

LAST PAGE OF ANNEX L

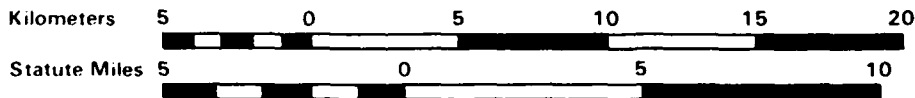
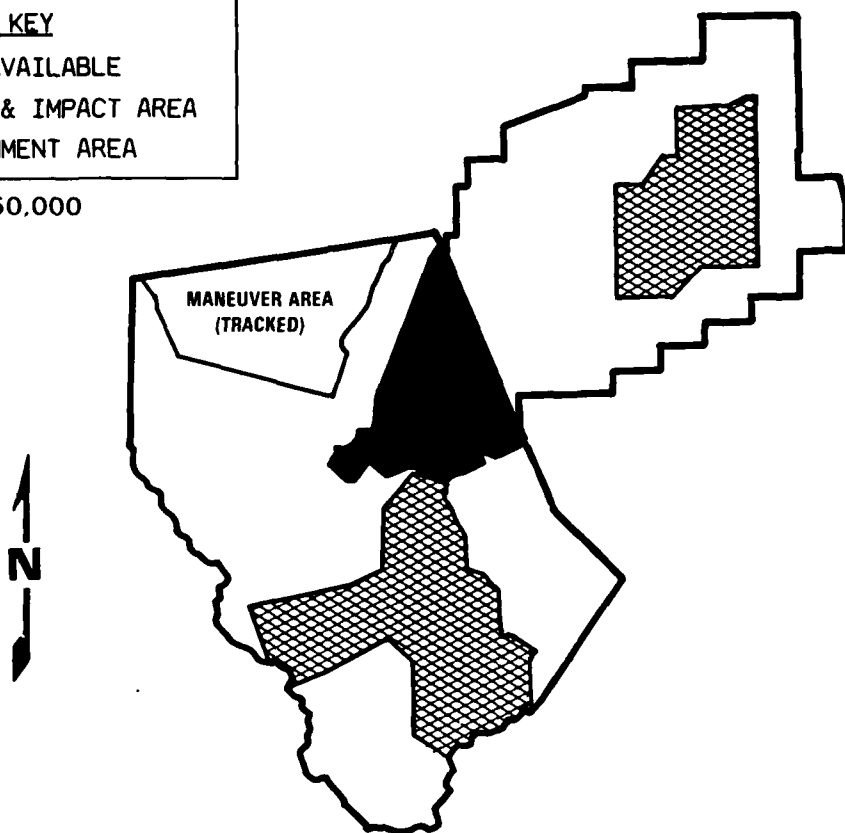
ANNEX M

FORT HUACHUCA

ANNEX M  
FORT HUACHUCA



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Fort Huachuca serves as the headquarters of the US Army Information Systems Command. It is also the home of Information Command units, e. g., the 11th Signal Brigade, and the US Army Intelligence Center and School. The post population is currently 11,320, of which 6,397 are military personnel.

Fort Huachuca covers 73,344 acres and is located in southern Arizona, 70 miles southeast of Tucson and 10 miles north of the Mexican border. The installation lies entirely within Cochise County. It has access to Interstate 10 by way of Arizona Highways 82 and 90, and US Highway 80. The 29,000-acre

Fort Willcox is northeast of Fort Huachuca, about 70 miles east of Tucson along Interstate 10. Fort Huachuca has two runways, one 5,000 feet by 100 feet, the other 4,665 feet by 100 feet. Both the nearest railhead and the nearest commercial airport are in Tucson, 70 miles away. The nearest airfield capable of handling heavy jets, Davis-Monthan Air Force Base, is also 70 miles away near Tucson. The closest seaport is 540 miles to the west in San Diego, California.

**FORT HUACHUCA: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	3
Area (square miles)	6,218	16,643
<b>Population (1980)</b>		
Urban	0	450,059
Rural	33,104	100,513
Non-rural	52,582	87,016
Total	85,686	637,588
<b>Housing Units (1980)</b>		
Owned/Occupied	19,257	152,081
Owned/Vacant	519	4,457
Rented/Occupied	9,720	78,354
Rented/Vacant	1,217	10,313
Other/Vacant	1,584	9,188
Housing Value of Owner Occupied Units	42,452	61,837
Mean Contract Rent (\$/month)	175	218
<b>Employment (1982)</b>		
Total	30,920	254,950
Government		
Federal Civilian	4,968	11,807
Federal Military	6,143	14,687
State & Local	3,933	37,695
Construction	719	12,769
Manufacturing	1,736	28,385
Wholesale/Retail Trade	3,756	49,556
Finance, Insurance & Real Estate	591	9,666
Services	2,981	50,827
Farm		
Proprietors	994	1,565
Wage & Salary	453	1,116
<b>Income (1982) (\$M)</b>		
Non-farm	455	4,071
Private	194	2,937
Government	261	1,134
Personal	717	6,551
<b>Multipliers</b>		
Export Employment	1.8520	2.6140
Export Income	1.6660	2.4266
Export Sales	1.8520	2.6140

## FORT HUACHUCA: ENVIRONMENT

**Climate:** Fort Huachuca has mild winters and relatively warm summers. Daily mean temperatures range from 47°F in January to 77°F in June; the average annual daily mean is 62°F. Between July and September, Fort Huachuca experiences monsoon-like weather (with a rise in humidity and a considerable number of thunderstorms). Most of the 14 inches of annual precipitation falls during this period. Fort Huachuca receives an average of 6.1 inches of snow, which falls from October to April. Prevailing winds are westerly or southwesterly at 7 miles per hour.

**Terrain:** Fort Huachuca lies at the north-end of the Huachuca Mountains, which extend southeast to the border of Mexico. Elevation varies from 3,900 to 8,700 feet above sea level. The southwestern portion of the post coincides with the watershed divide of the Huachuca Mountains. Slopes in the cantonment area are about 2 to 3 percent.

**Soils:** Fort Huachuca has primarily four soil types. On the valley floors is a deep, well-drained, light-colored, limy soil. On the valley slopes are deep, fine, well-drained soils. In the foothills, shallow, dark-colored, gravel-like soils overlay volcanic bedrock. In the mountains, shallow, dark, stony loam overlays limestone.

**Water Resources:** The primary source of water for Fort Huachuca is the regional ground water basin which is composed of a regional underground aquifer and a flood plain aquifer. The regional aquifer consists of the saturated portions of ancient alluvial deposits, while the flood plain aquifer consists of recent alluvial deposits. The aquifer is maintained by a mountain front recharge (from the Huachuca Mountains) and by ground water underflow. Conservative estimates place the capacity of this aquifer at 13.4 million acre-feet.

**Vegetation:** Most of the reservation is grasslands or desert scrub, which support velvet mesquite, whitethorn, mescal, sotol, and yucca. At 5,200 feet there is an abrupt change from a grassy desert plain to steep mountains

covered by brush and trees. The woodlands, which cover about 25 percent of the reservation, have ponderosa pine, chihuahua pine, apache pine, Mexican white pine, and Douglas fir.

## FORT HUACHUCA: TRAINING

**Maneuver Area:** Fort Huachuca has 52,951 acres available for maneuver and training. Maneuver area terrain varies from rolling hills to mountains. Vegetation is sparse. Two sections of extremely rugged terrain divide the maneuver area and make large-scale maneuver of heavy forces difficult. The lack of cover from aerial observation limits the post's usefulness for light unit maneuver. An additional training problem arises from the heavy use of radio frequencies by Fort Huachuca activities, which complicates communications between maneuvering units.

**Cross-Country Movement:** In the maneuver areas, the soils are thin and clayey. Except in the steeper areas (like Sycamore Canyon), erosion potential is usually not great. However, most vehicle trails are along the tops of ridges.

**Ranges:** Available master planning data indicates that Fort Huachuca has the following types of training ranges.

### FORT HUACHUCA: RANGE AVAILABILITY

Armor:	Unavailable
Infantry(MECH)/Cavalry:	Excellent
Anti-Armor:	Unavailable
Aviation:	Unavailable
Individual/Crew Weapons:	Excellent
Indirect Fire Weapons:	Marginal
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable

**FORT HUACHUCA: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u> (Units)	<u>Permanent</u>	<u>Semi-</u> <u>permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	190,293	0	0	190,293
<u>Aircraft Maintenance (sf)</u>				
211	71,586	0	0	71,586
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	82,567	0	43,349	125,916
<u>Command, Control, and Administrative (sf)</u>				
141	38,860	0	26,147	65,007
171	166,639	0	232,133	398,772
610	688,357	0	306,678	995,035
72330	24,168	0	10,703	34,871
<u>Family Housing (units)</u>				
711	1,955	0	0	1,955
<u>Unaccompanied Personnel Housing (sf)</u>				
721	546,941	0	148,307	695,248
724	148,049	0	104,763	252,812
<u>Community Support (sf)</u>				
730	72,526	0	23,255	95,781
740	504,699	0	138,625	643,324

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

For the sub-installation of Fort Willcox, IFS lists none of the above facilities.

SUMMARY OF KEY DATA: FORT HUACHUCA COMPLEX

Local Area

Surface area (square miles)	6,218
Total population	85,686

Commute Area

Total population	637,588
Total non-military employment	240,263
Total income (\$M)	14,693
Regional multiplier	2.6
Regional cost factor	1.15
Vacant housing units	23,958
Housing location factor	0.4
Variable housing allowance factor	0.092

Installation -- General

Installation area (acres)	102,500
Personnel stationed in FY 92 as in ASIP	
Officers	872
Enlisted	3,896
Students	1,677
Total military	6,445
Civilians	3,698

Installation -- Environmental

Land activity -- base-case units	6
Air activity -- base-case units	0
Water availability (excess capacity in persons)	46,500

Installation -- Training and Operations

Average distance to sub-installations (miles)	50
Average distance to airport (miles)	70
Average distance to seaport (miles)	540
Seaport location	Pacific
Mission conflict with generic units	Communications
Designated maneuver area (acres)	52,951
Terrain suitability factor	
Light units	1.0
Heavy units	6.0
Training variety ratings	
Climate	2
Vegetation	1
Terrain	9
River crossings	0

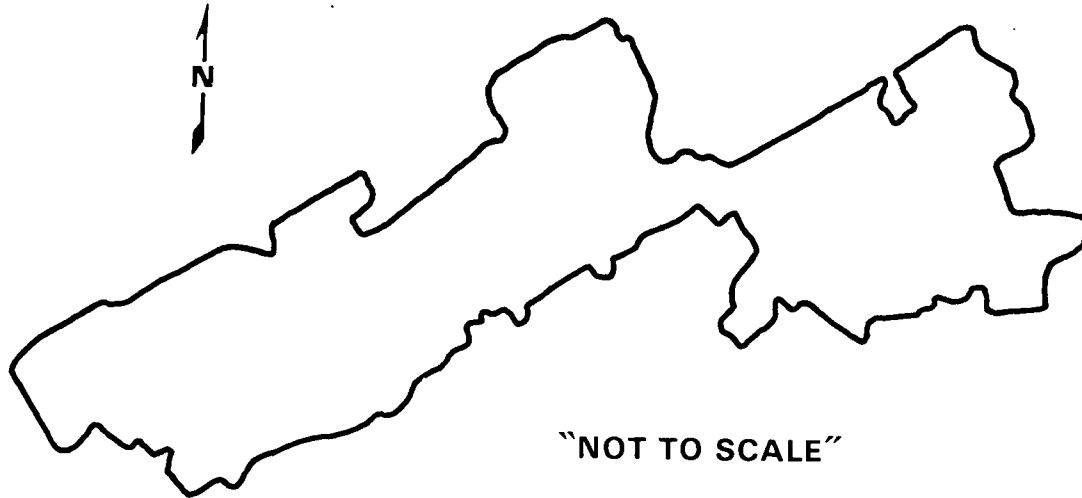
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ANNEX N

FORT INDIANTOWN GAP

ANNEX N

FORT INDIANTOWN GAP



Fort Indiantown Gap, a FORSCOM installation, is a sub-installation of Fort Meade, Maryland. It serves as a major training site for both the US Army Reserve and the Pennsylvania National Guard. Fort Indiantown Gap has a post population of 1,468, of which 430 are military personnel.

The Fort Indiantown Gap is located along Interstate 81 in south-central Pennsylvania, about 22 miles northeast of Harrisburg. The installation covers 18,065 acres of Dauphin and Lebanon Counties. There is no master planning data currently available on the environment around Fort Indiantown Gap. Fort Indiantown Gap has a railhead on post, plus a 3,320- by 100-foot runway. The closest commercial airport is Capital City Airport, 25 miles away in Harrisburg. The nearest airfield capable of handling heavy jets is 150 miles away at McGuire Air Force Base, New Jersey. The nearest seaport is Wilmington, Delaware, 75 rail miles from Fort Indiantown Gap.

**FORT INDIANTOWN GAP: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	16
Area (square miles)	363	8,305
<b>Population (1980)</b>		
Urban	8,567	949,686
Rural	64,027	960,123
Non-rural	35,988	298,120
Total	108,582	2,207,929
<b>Housing Units (1980)</b>		
Owned/Occupied	27,150	568,404
Owned/Vacant	388	8,709
Rented/Occupied	10,783	222,677
Rented/Vacant	669	13,664
Other/Vacant	653	21,427
Housing Value of Owner Occupied Units	42,286	46,091
Mean Contract Rent (\$/month)	166	185
<b>Employment (1982)</b>		
Total	43,296	1,032,419
Government		
Federal Civilian	2,753	22,818
Federal Military	797	12,640
State & Local	4,041	118,955
Construction	910	30,819
Manufacturing	13,233	279,276
Wholesale/Retail Trade	7,976	188,390
Finance, Insurance & Real Estate	1,126	35,631
Services	6,080	180,048
Farm		
Proprietors	1,156	19,047
Wage & Salary	387	13,068
<b>Income (1982) (\$M)</b>		
Non-farm	625	16,568
Private	508	14,061
Government	117	2,507
Personal	1,064	24,462
<b>Multipliers</b>		
Export Employment	2.0365	3.6996
Export Income	1.9096	3.5496
Export Sales	2.0365	3.6996

## FORT INDIANTOWN GAP: TRAINING

**Maneuver Area:** Fort Indiantown Gap has 12,254 acres of land available for maneuver. The terrain in the maneuver area varies from open plains in the east, to foothills and mountains in the west. The eastern third of the installation includes the cantonment area, airfield, and open training areas. Because the western two-thirds of the installation are heavily wooded and divided by an impact area and several ranges, the potential for mounting large-scale exercises is reduced.

**Ranges:** Based on information from FORSCOM headquarters, Fort Indiantown Gap has the following types of ranges.

### FORT INDIANTOWN GAP: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Not Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Not Adequate
Infantry Collective Skills:	Adequate

**FORT INDIANTOWN GAP: FACILITIES**

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	0	8,342	0	8,342
<u>Aircraft Maintenance (sf)</u>				
211	75,000	5,810	0	80,810
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	0	2,284	24,700	26,984
<u>Command, Control, and Administrative (sf)</u>				
141	0	27,623	174,207	201,830
171	178,926	20,022	82,960	281,908
610	16,012	59,146	181,348	256,506
72330	4,558	0	0	4,558
<u>Family Housing (units)</u>				
711	2	0	0	2
<u>Unaccompanied Personnel Housing (sf)</u>				
721	23,505	20,440	1,529,752	1,573,697
724	0	780	262,048	262,828
<u>Community Support (sf)</u>				
730	2,070	1,676	33,251	36,997
740	0	48,604	210,320	258,924

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT INDIANTOWN GAP**

Local Area

Surface area (square miles)	363
Total population	108,582

Commute Area

Total population	2,207,929
Total non-military employment	1,019,779
Total income (\$M)	57,598
Regional multiplier	3.7
Regional cost factor	0.95
Vacant housing units	43,800
Housing location factor	0.2
Variable housing allowance factor	0.150

Installation -- General

Installation area (acres) <sup>1</sup>	18,065
Personnel stationed in FY 92 as in ASIP	
Officers	34
Enlisted	193
Students	0
Total military	227
Civilians	223

Installation -- Environmental

Land activity -- base-case units	0
Air activity -- base-case units	0
Water availability (excess capacity in persons)	18,700

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	100
Average distance to seaport (miles)	75
Seaport location	Atlantic
Mission conflict with generic units	None
Designated maneuver area (acres)	12,254
Terrain suitability factor	
Light units	10.0
Heavy units	5.0
Training variety ratings	
Climate	8
Vegetation	8
Terrain	9
River crossings	0

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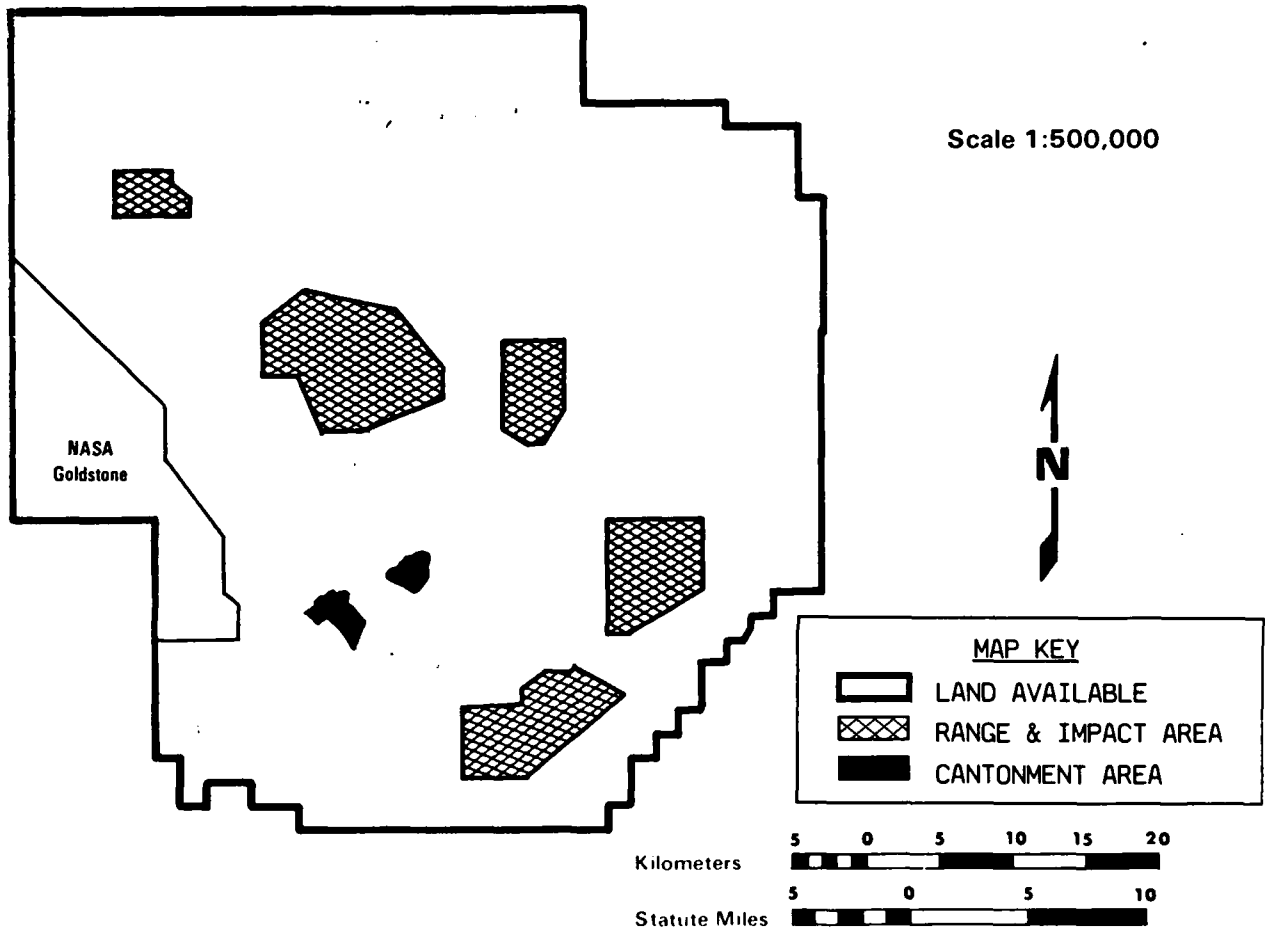
<sup>1</sup>Although the *FORSCOM Installation Guide* lists the installation acreage as 22,000 acres, ESC used the value listed in the *Real Property Inventory*.

ANNEX O

FORT IRWIN

ANNEX O

FORT IRWIN



Fort Irwin is a FORSCOM installation that serves as the home of the National Training Center. It has a current post population of 5,889, of which 3,693 are military personnel.

Fort Irwin is in the Mojave Desert of south-central California, about midway between Los Angeles and Las Vegas. The reservation covers about 636,000 acres of San Bernardino County. The cantonment area is in the southern portion of the reservation. Barstow Road from Interstate 15 is the only paved access to the post. The nearest railhead to Fort Irwin is at

Barstow, California, 35 miles away. Fort Irwin has two air strips: one is 9,700 feet by 200 feet; the other is 6,000 feet by 80 feet. The Barstow-Daggett commercial airport, 35 miles away, has two runways of 6,300 feet by 150 feet. The nearest major seaport is at Los Angeles, 130 miles away.

**FORT IRWIN: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	2
Area (square miles)	20,064	30,287
Population (1980)		
Urban	679,350	679,350
Rural	88,830	103,392
Non-rural	126,836	130,169
Total	895,016	912,911
Housing Units (1980)		
Owned/Occupied	210,997	215,694
Owned/Vacant	9,900	10,002
Rented/Occupied	97,646	100,163
Rented/Vacant	9,933	10,128
Other/Vacant	37,660	38,176
Housing Value of Owner Occupied Units	68,219	68,454
Mean Contract Rent (\$/month)	233	232
Employment (1982)		
Total	316,891	324,899
Government		
Federal Civilian	13,367	13,719
Federal Military	24,468	24,526
State & Local	46,564	48,170
Construction	11,304	11,467
Manufacturing	35,183	35,331
Wholesale/Retail Trade	62,841	64,632
Finance, Insurance & Real Estate	10,528	10,692
Services	60,584	61,969
Farm		
Proprietors	2,135	2,219
Wage & Salary	3,711	3,782
Income (1982) (\$M)		
Non-farm	5,128	5,239
Private	3,683	3,761
Government	1,446	1,479
Personal	9,373	9,570
Multipliers		
Export Employment	2.9188	2.9172
Export Income	2.7135	2.7091
Export Sales	2.9188	2.9172

## FORT IRWIN: ENVIRONMENT

**Climate:** Fort Irwin has a semi-arid climate, i. e., normally clear skies and warm to hot temperatures. Winter is characterized by cold nights and cool days with the average daytime temperature maximum of 57°F in the coldest month, January. The mean minimum temperature in January is just below freezing. The mean maximum temperature in the warmest month, July, is 103°F. Although the sky is generally clear, the rapid heating and high winds combine to produce large amounts of airborne dust and sandblast effects near the ground. Not only is annual precipitation only about 4 inches, but most of it falls in December through February. Snowfall averages 0.4 inches per year. In the dry summers, the scant rainfall often takes the form of thunderstorms.

**Terrain:** The basic landforms at Fort Irwin are: low and high plains, low and high hills, and mountains. The low and high plains cover about two-thirds of the reservation. The low plains are large depressions which are flat, smooth, barren, and sandy. Slopes are mainly less than 3 percent; local relief is 30 to 165 feet. The flattest surfaces are the floors of the ephemeral desert lakes (playas). The highest local relief is mainly on the outward edges of the low plains where they grade into the high plains or low hills. Although usually between 3 and 5 percent, the slopes of the incised banks of dry washes sometimes exceeds 30 percent. The low plains gradually slope upward to the high plains, which have rolling surfaces. In the west-central and southwest, large areas are strongly rolling and dissected. Slopes throughout average 3 to 10 percent. Where the high plains abut uplands, slopes increase to 10 to 25 percent. Local relief ranges from 164 to 429 feet. The remaining area of Fort Irwin is made up of low and high hills. The low hills are generally rough, barren, and dissected with moderately sharp crests. Slopes range from 10 to 30 percent. Local relief ranges from 500 to 1,000 feet. High hills are rough, barren, and highly dissected with sharp linear crests. Slopes are predominantly between 45 and 60 percent. Local relief generally ranges between 1,000 and 1,500 feet. The four small mountain areas of Fort Irwin are barren, rough, and highly dissected with sharp linear crests. Slopes are greater than 60 percent; local relief is between 2,000 and 2,300 feet.

**Soils:** Soils at Fort Irwin are typical of those found in very arid deserts. Soils on the playas are usually comprised of stratified clay loam to silty clay materials, which can be many feet deep. The most extensive soils are those which have developed on terraces from material washed down from the hills. These soils contain gravel, lime, fine sand, and loam. In some places, the soil is cement-like. The skeletal soils on the hills and mountains are seldom deeper than 10 inches. About 30 percent of this area is rock outcrop. Where they mantle bedrock, the thin soils consist of a high percentage of gravel or large rock fragments.

**Water Resources:** Although most runoff is rapidly absorbed into the porous ground, the remainder flows into 10 large depressions, which range in area from 40 to 1,300 acres. Rapid evaporation soon reduces the brackish lakes.

**Vegetation:** Creosote bush scrub, transitional shrub, shadscale scrub, and alkali sink comprise four vegetative communities on Fort Irwin. The plants in these communities are low-growing and widely-spaced.

## FORT IRWIN: TRAINING

**Maneuver Area:** The 484,000 acres of maneuver land at Fort Irwin are enough for any unit to conduct large-scale maneuvers. Most of the maneuver area allows unrestricted movement by either vehicles or ground troops. The lack of terrain variety and relative scarcity of concealment from air observation limits the usefulness of these areas for large-scale light unit maneuvers.

**Cross-Country Movement:** Off-road movement for most vehicles is fair to good over the low and high plains and the moderately sloping terrain. Of course, movement becomes poor or unsuitable in the dissected terraces and in the hills and mountains. Although weather does not usually affect cross-country movement, flash floods and temporary lakes can be hazards.

**Ranges:** Because most troop basic skills must be mastered prior to arriving at the National Training Center, some of the specialized ranges required for training divisions at their home stations are not available at Fort Irwin. According to FORSCOM headquarters, Fort Irwin has the following type of ranges.

## FORT IRWIN: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

FORT IRWIN: FACILITIES

<u>Facility Groups</u> <u>Category Codes</u> <u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	0	0	12,900	12,900
<u>Aircraft Maintenance (sf)</u>				
211	0	0	8,100	8,100
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	145,484	0	34,432	179,916
<u>Command, Control, and Administrative (sf)</u>				
141	0	3,600	58,247	61,847
171	33,718	11,520	39,480	84,718
610	30,938	87,052	134,171	252,161
72330	77,093	5,760	3,160	86,013
<u>Family Housing (units)</u>				
711	1,104	0	0	1,104
<u>Unaccompanied Personnel Housing (sf)</u>				
721	245,397	0	195,953	441,350
724	95,768	0	9,264	105,032
<u>Community Support (sf)</u>				
730	36,938	0	3,920	40,858
740	131,207	5,040	86,517	222,764

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT IRWIN

Local Area

Surface area (square miles)	20,064
Total population	895,016

Commute Area

Total population	912,911
Total non-military employment	300,373
Total income (\$M)	20,049
Regional multiplier	2.9
Regional cost factor	1.31
Vacant housing units	2,000
Housing location factor	0.4
Variable housing allowance factor	0.316

Installation -- General

Installation area (acres)	636,457
Personnel stationed in FY 92 as in ASIP	
Officers	494
Enlisted	3,113
Students	0
Total military	3,607
Civilians	687

Installation -- Environmental

Land activity -- base-case units	36
Air activity -- base-case units	3
Water availability (excess capacity in persons)	8,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	1
Average distance to seaport (miles)	130
Seaport location	Pacific
Mission conflict with generic units	NTC
Designated maneuver area (acres)	484,002
Terrain suitability factor	
Light units	1.0
Heavy units	10.0
Training variety ratings	
Climate	2
Vegetation	0
Terrain	9
River crossings	0

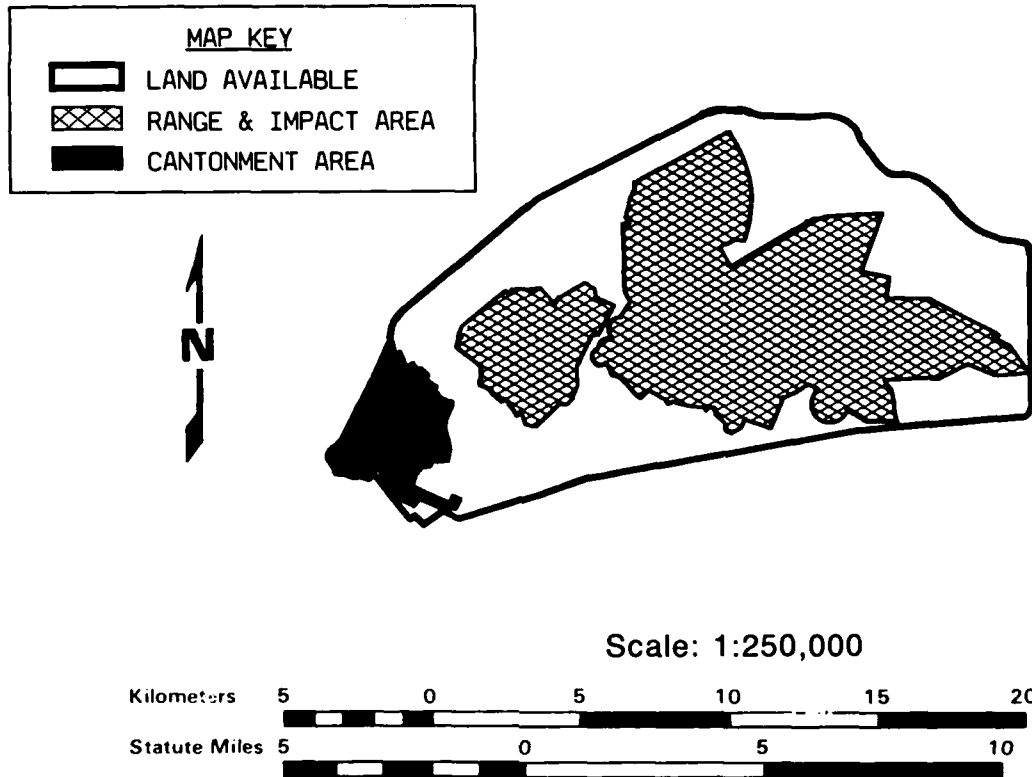
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ANNEX P

FORT JACKSON

ANNEX P

FORT JACKSON



Fort Jackson is a TRADOC installation which has the mission of providing basic and advanced individual troop training. It has a total post population of 20,366, of which 15,595 are military personnel.

Fort Jackson is located in Richland County, South Carolina, on the eastern outskirts of the city of Columbia. The 53,000-acre reservation extends 15 miles east-west and 7 miles north-south at its widest point. The cantonment area is at the western tip of the reservation. Interstate Highways 20, 26, and 77 junction at Columbia. Fort Jackson has a railhead on post, but it does not have an air strip. The nearest commercial airport with scheduled service is Columbia Metro Airport, 16 miles away. The nearest seaport is at Charleston, South Carolina, 110 rail miles from post.

**FORT JACKSON: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	11
Area (square miles)	762	7,722
<b>Population (1980)</b>		
Urban	234,870	372,994
Rural	34,865	370,105
Non-rural	0	118,586
Total	269,735	861,685
<b>Housing Units (1980)</b>		
Owned/Occupied	51,734	195,393
Owned/Vacant	1,291	3,542
Rented/Occupied	33,727	84,769
Rented/Vacant	2,656	7,802
Other/Vacant	2,301	11,669
Housing Value of Owner Occupied Units	48,787	41,811
Mean Contract Rent (\$/month)	174	149
<b>Employment (1982)</b>		
Total	171,110	410,106
Government		
Federal Civilian	7,468	10,132
Federal Military	17,034	27,643
State & Local	38,798	66,731
Construction	6,382	16,676
Manufacturing	12,967	89,066
Wholesale/Retail Trade	29,513	62,173
Finance, Insurance & Real Estate	13,913	18,857
Services	28,705	58,645
Farm		
Proprietors	562	9,745
Wage & Salary	386	6,219
<b>Income (1982) (\$M)</b>		
Non-farm	2,533	5,676
Private	1,633	4,259
Government	900	1,417
Personal	2,735	7,793
<b>Multipliers</b>		
Export Employment	2.3160	2.7571
Export Income	2.2370	2.5821
Export Sales	2.3160	2.7571

## FORT JACKSON: ENVIRONMENT

**Climate:** The climate of Fort Jackson is typical of the humid southeastern United States. In summer, the influx of warm moist air from the south causes the days to be hot and humid. The mean daily maximum temperature in July is 92°F. Because the Appalachian Mountains slow the approach of cold weather, winters are mild. January is the coldest month with a mean daily minimum temperature of 34°F. Annual precipitation is 46 inches. Heaviest rains fall in July and August. Snowfall averages 1.3 inches a year. Prevailing winds are from the southwest during most of the year.

**Terrain:** Fort Jackson is primarily in the Coastal Plain Province, a region of low to moderate relief and gently rolling plains. About 4 miles west of the reservation is the fall line, which marks the boundary of the Coastal Plain and the Piedmont Plateau. High plains dissected by the nearly flat alluvial plains of various streams predominate on the reservation. Low plains are found at the western boundary and in the cantonment area. Slopes are usually between 3 and 8 percent in the high plains and less than 3 percent in the low plain valleys. Local relief is from 165 to 250 feet on the high plains, and 40 to 100 feet on the low plains.

**Soils:** The soils are chiefly alluvial and marine deposits derived from the Tuscaloosa formation. Soil depth to the hard, crystalline bedrock exceeds 200 feet throughout the reservation. In the interstream areas, soils are well-drained, coarse sands and silty sands. In the west are found moderately-drained sands, silts, and clays. On the flood plains are poorly-drained, predominantly organic soils.

**Water Resources:** All streams flow either into the Wateree River or the Congaree River, both of which flow into the Santee River. The streams have broad valleys with gentle gradients. The basin of the southeast-flowing Colonels Creek covers the eastern half of reservation. In the western half, drainage is to the south and the southwest. High stream flows occur from December through April; low flows are from June to October. With the exception of Wildcat Creek, all streams flow in densely wooded, swampy, flood

plains (which are underlain by soft, organic soils). Because the vegetation restricts the stream flow, water remains in channels for long periods. Over 30 reservoirs are maintained for recreation and wildlife management. In the extreme south-central portion is the largest reservoir, the 173-acre Weston Pond.

**Vegetation:** Forests cover 75 percent of the reservation and are widely distributed throughout Fort Jackson. The plentiful conifers include loblolly, longleaf, slash, pond, and shortleaf pines. Coniferous stands are intensively managed for lumber and pulpwood. Upland hardwood stands of oak and hickory occur in small patches of 5 acres or less (always in moist, fertile soils). Scrub vegetation covers 13 percent of the installation, principally on forest tracts which are not managed. Dominant scrub species are scrub oak, turkey, blackjack, and dwarf post oak. Grasslands occur on small isolated areas (two percent of the surface area). The dominant grasses are broomsedge, millet, rye, and lespedezas. Wetlands cover 10 percent of the reservation.

## FORT JACKSON: TRAINING

**Maneuver Area:** Fort Jackson has 25,511 acres of land available for maneuver. Because the installation is relatively small, the range complex occupies a large proportion of the acreage. This maneuver area is too small to properly maneuver even one light brigade.

**Cross-Country Movement:** Most of Fort Jackson is classified as fair to poor for cross-country movement of vehicles. The classification is based primarily on the density of the vegetation. During wet periods, most of the area is unsuitable for wheeled vehicles. The poorly-drained flood plains (and numerous swamps) are unsuited for all vehicles.

**Ranges:** ESC could not find data to support a detailed analysis of the Fort Jackson range complex. From the information available, it appears that the installation has adequate ranges for small arms, crew-served weapons, and artillery of up to 155mm rounds. Only subcaliber tank tables exist, and no aviation ranges are available.

FORT JACKSON: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	0	0	0	0
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	48,217	0	130,391	178,608
<u>Command, Control, and Administrative (sf)</u>				
141	211,171	0	125,050	336,221
171	460,716	1,728	141,521	603,965
610	17,894	19,273	316,173	353,340
72330	149,546	0	5,782	155,328
<u>Family Housing (units)</u>				
711	1,149	0	0	1,149
<u>Unaccompanied Personnel Housing (sf)</u>				
721	2,298,892	0	737,970	3,036,862
724	83,045	0	3,735	86,780
<u>Community Support (sf)</u>				
730	68,880	445	138,929	208,254
740	665,043	0	313,167	978,210

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT JACKSON**

**Local Area**

Surface area (square miles)	762
Total population	269,735

**Commute Area**

Total population	861,685
Total non-military employment	382,463
Total income (\$M)	19,145
Regional multiplier	2.8
Regional cost factor	0.75
Vacant housing units	23,013
Housing location factor	0.4
Variable housing allowance factor	0.162

**Installation -- General**

Installation area (acres)	52,597
Personnel stationed in FY 92 as in ASIP	
Officers	616
Enlisted	3,452
Students	13,146
Total military	17,214
Civilians	2,420

**Installation -- Environmental**

Land activity -- base-case units	17
Air activity -- base-case units	0
Water availability (excess capacity in persons)	42,419

**Installation -- Training and Operations**

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	20
Average distance to seaport (miles)	110
Seaport location	Atlantic
Mission conflict with generic units	School
Designated maneuver area (acres)	25,511
Terrain suitability factor	
Light units	10.0
Heavy units	5.0
Training variety ratings	
Climate	2
Vegetation	6
Terrain	5
River crossings	3

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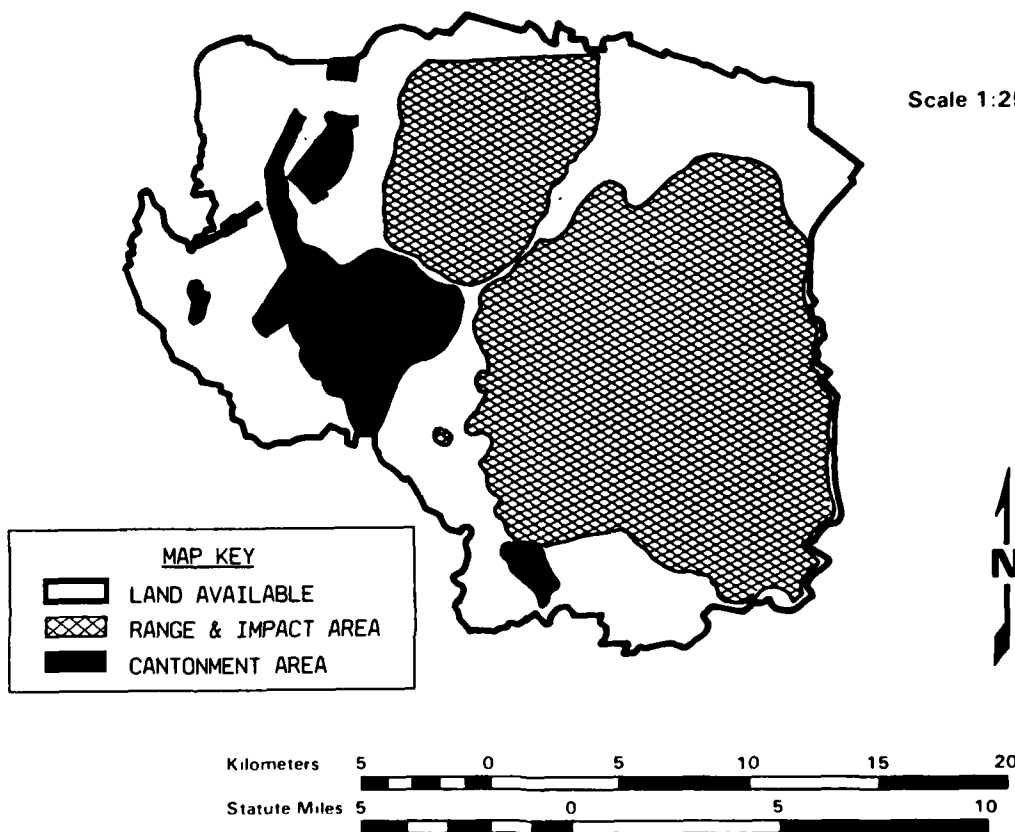
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FORT KNOX

ANNEX Q

FORT KNOX

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Fort Knox is a TRADOC installation that serves as the home of the US Army Armor School and the 194th Armored Brigade (Separate). As an Army training center, Fort Knox provides one unit station training for armor branch soldiers. Major tenants include the HQ, 2nd ROTC region, and the US Army Armor and Engineer Board. Fort Knox currently has a post population of 20,263, of which 12,756 are military personnel.

Fort Knox is in north-central Kentucky, about 30 miles south of Louisville. The 110,000-acre reservation extends about 16 miles east-to-west at and 14 miles north-to-south at its widest point. It includes parts of Bullitt, Hardin, and Meade counties. The cantonment area is in the western

portion of the reservation. US Highway 31 extends southeast through the western section of the post. The Ohio River forms part of the northern boundary of the reservation. On post, Fort Knox has a railhead and 5,185-, 5,000-, 4,750-, and 4,500-foot runways. Louisville's Staniford Field has 7,800-, 7,250-, and 5,000-foot runways. The nearest seaports are Chicago (320 miles) and Toledo, Ohio (350 miles). The nearest atlantic seaport is 550 miles away at the Port of Hampton Roads, Virginia.

**FORT KNOX: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	3	14
Area (square miles)	1,236	5,258
<b>Population (1980)</b>		
Urban	11,461	761,002
Rural	70,668	262,276
Non-rural	72,988	106,442
Total	155,117	1,129,720
<b>Housing Units (1980)</b>		
Owned/Occupied	30,933	272,463
Owned/Vacant	591	4,605
Rented/Occupied	13,786	122,665
Rented/Vacant	1,564	10,756
Other/Vacant	1,466	10,976
<b>Housing Value of</b>		
Owner Occupied Units	39,812	41,453
Mean Contract Rent (\$/month)	177	170
<b>Employment (1982)</b>		
Total	58,381	506,600
<b>Government</b>		
Federal Civilian	6,117	17,758
Federal Military	20,581	25,758
State & Local	3,873	47,622
Construction	981	18,336
Manufacturing	5,795	99,023
Wholesale/Retail Trade	6,599	100,352
<b>Finance, Insurance &amp;</b>		
Real Estate	1,039	26,473
Services	4,048	88,895
<b>Farm</b>		
Proprietors	3,825	16,637
Wage & Salary	527	3,160
<b>Income (1982) (\$M)</b>		
Non-farm	755	8,302
Private	332	6,909
Government	424	1,393
Personal	1,143	11,322
<b>Multipliers</b>		
Export Employment	1.5480	3.2381
Export Income	1.5190	2.8170
Export Sales	1.5480	3.2381

## FORT KNOX: ENVIRONMENT

**Climate:** The climate is humid continental and seasons are well-defined. The summers are generally hot and humid. The mean maximum temperature in July is 87°F. January has a mean minimum temperature of 24°F. Annual precipitation is 43.1 inches. Most precipitation falls during the spring and summer months as the result of storms moving in from the Gulf of Mexico. Snowfall averages 15 inches a year. Prevailing winds are from the south. The strongest winds, however, are usually associated with thunderstorms and are from the west or northwest.

**Terrain:** Fort Knox lies within portions of the Mississippian Plateau in the western and central part of the reservation and the Blue Grass section of the Interior Low Plateaus Province in the eastern part. The boundary between these two sections is marked by a series of escarpments which extend northwest-to-southeast across the eastern portion of the reservation. The western, west-central, and extreme eastern parts of the reservation are characterized by low plains which consist of gently rolling upland and flat alluvial surfaces drained by the northwesterly-flowing Salt and Rolling Fork Rivers. The western part contains numerous sink hole depressions developed in the underlying limestone. The sink holes average 200 feet in diameter and are generally less than 30 feet deep. Flanking the Salt River and Rolling Fork low plains, the high plains are rolling and occasionally deep dissected. The high plains are interrupted by a series of limestone-capped escarpments. Slopes vary between 15 and 45 percent with steeper slopes on the narrow valleys, bluffs, and escarpments. The rounded, steep-sided ridges have a moderate relief of up to 330 feet.

**Soils:** On Fort Knox, the soils are either relatively young materials which have developed on unconsolidated stream deposits, or residual soils formed on limestone, shale, siltstone, and sandstone. Alluvial deposits of silt and clay are widely distributed on the broad stream terraces which parallel the Salt River and Rolling Fork in the eastern portion of the reservation. A major portion of the reservation has fine-grained soils of silt and clay, overlain occasionally by gravel.

**Water Resources:** About 70 percent of the reservation is in the basin of the Salt River, a major Ohio River tributary. Although most of this basin is east of Fort Knox, the confluence of the Salt and Rolling Fork Rivers is on the reservation. The Salt River is subject to large-scale fluctuations in flow due to lack of base flow. During droughts, many streams almost dry up. The western portion of Fort Knox is in the basin of Otter Creek, another Ohio River tributary. Some runoff flows into sink holes and reaches the Ohio River through underground channels and springs. Intermittent ponds may form in the sinkholes during wet periods. There are some 30 lakes on the reservation, 28 of which are maintained for recreation and wildlife management. Many of the lakes are old farm ponds which were formed behind low earthen dams or by shallow excavation.

**Vegetation:** Forests compose 75 percent of the vegetative cover on the reservation. About half of the tree cover is oak and hickory which are found on ridgetops and southern slopes. The remainder is mainly ash, beech, black locust, cherry, elm, maple, walnut, and yellow poplar. In the bottom lands along creeks and rivers, the common species include black gum, cottonwood, elm, hickory, oak, river birch, silver maple, boxelder, sweetgum, sycamore, and willow. The northern and western parts of Fort Knox have been planted with cottonwood, sweetgum, and black walnut. There are small areas of deciduous broadleaf scrub and grassland. Agricultural lands planted to corn, soybeans, wheat, and hay border the reservation on the east, south, and west.

## FORT KNOX: TRAINING

**Maneuver Area:** Fort Knox has approximately 57,000 acres available for maneuver. Despite the heavy forest cover at Fort Knox, numerous tank trails allow for reasonably good movement by wheeled and tracked vehicles. The maneuver and range training activities of the Armor Center and School consume much of the available training time on the small portion of the post capable of supporting large-scale maneuver.

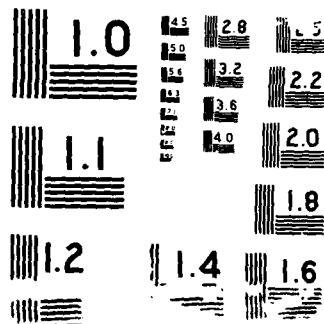
**Cross-Country Movement:** The fact that major portions of the reservation are taken up by impact areas limits vehicle and troop movement on Fort Knox. Slopes and vegetation reduce the movement rating for much of the reservation from fair to poor. This rating decreases during the wet periods. The installation's many escarpments are unsuitable for vehicle movement.

**Ranges:** The configuration of the Fort Knox range complex reflects the needs of the Armor Center and School. Master planning information lists the following types of ranges at Fort Knox.

## FORT KNOX: RANGE AVAILABILITY

Armor:	Excellent
Infantry(MECH)/Cavalry:	Good
Anti-Armor:	Unknown
Aviation:	Good
Individual/Crew Weapons:	Good
Indirect Fire Weapons:	Unknown
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable





**FORT KNOX: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		113,593	0	0	113,593
<u>Aircraft Maintenance (sf)</u>					
211		70,206	0	0	70,206
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		406,120	0	209,505	615,625
<u>Command, Control, and Administrative (sf)</u>					
141		88,948	6,101	52,907	147,956
171		765,849	65,353	389,971	1,221,173
610		686,060	13,041	467,176	1,166,277
72330		85,887	0	0	85,887
<u>Family Housing (units)</u>					
711		4,370	0	0	4,370
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,818,024	0	1,070,423	3,888,447
724		411,992	0	156,898	568,890
<u>Community Support (sf)</u>					
730		168,676	16,443	86,366	271,485
740		774,348	152,729	341,483	1,268,560

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT KNOX

Local Area

Surface area (square miles)	1,236
Total population	155,117

Commute Area

Total population	1,129,720
Total non-military employment	480,842
Total income (\$M)	27,926
Regional multiplier	3.2
Regional cost factor	1.05
Vacant housing units	26,337
Housing location factor	0.2
Variable housing allowance factor	0.060

Installation -- General

Installation area (acres)	109,250
Personnel stationed in FY 92 as in ASIP	
Officers	1,370
Enlisted	9,806
Students	8,819
Total military	19,995
Civilians	4,665

Installation -- Environmental

Land activity -- base-case units	200
Air activity -- base-case units	3
Water availability (excess capacity in persons)	95,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	30
Average distance to seaport (miles)	550
Seaport location	Atlantic
Mission conflict with generic units	School
Designated maneuver area (acres)	56,912
Terrain suitability factor	
Light units	9.0
Heavy units	7.0
Training variety ratings	
Climate	7
Vegetation	5
Terrain	5
River crossings	3

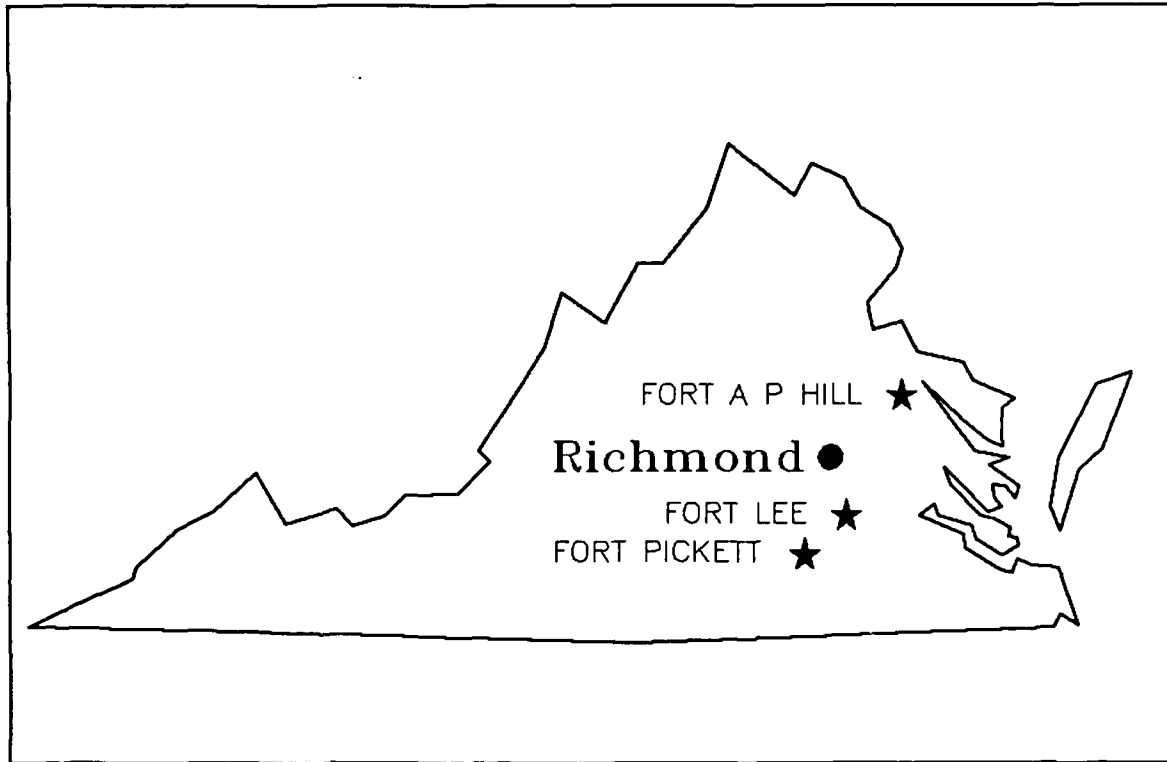
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ANNEX R

FORT LEE COMPLEX

ANNEX R

FORT LEE COMPLEX



For the purposes of this study, three Virginia installations are considered as one installation complex. The Fort Lee Complex consists of Fort Lee, Fort A. P. Hill, and Fort Pickett. Fort Lee is a TRADOC post. Forts Hill and Pickett are both former sub-installations of Fort Lee that have been recently transferred to the control of FORSCOM.

**FORT LEE COMPLEX: RANGE AVAILABILITY**

**Ranges:** By itself, Fort Lee has no significant ranges or maneuver areas. The range availability chart below combines the range complexes of both Forts Hill and Pickett, which are shown later in this annex on pages R-2-6 and R-3-5, respectively.

**FORT LEE COMPLEX: RANGE AVAILABILITY**

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

FORT LEE COMPLEX: TOTAL FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		30,277	0	5,232	35,509
<u>Aircraft Maintenance (sf)</u>					
211		0	12,810	0	12,810
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		30,531	79,864	161,216	271,611
<u>Command, Control, and Administrative (sf)</u>					
141		49,786	32,122	44,708	126,616
171		316,183	235,120	313,499	864,802
610		437,891	91,388	577,685	1,106,964
72330		13,654	1,728	35,276	50,658
<u>Family Housing (units)</u>					
711		1,468	0	0	1,468
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,250,870	274,167	1,122,835	2,647,872
724		322,465	260,243	48,786	631,494
<u>Community Support (sf)</u>					
730		52,714	12,219	24,853	89,786
740		322,395	184,564	229,708	736,667

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT LEE COMPLEX**

Local Area

Surface area (square miles)	1,624
Total population	80,905

Commute Area

Total population	2,990,251
Total non-military employment	1,209,540
Total income (\$M)	77,023
Regional multiplier	2.8
Regional cost factor	0.95
Vacant housing units	72,176
Housing location factor	0.2
Variable housing allowance factor	0.105

Installation -- General

Installation area (acres)	126,852
Personnel stationed in FY 92 as in ASIP	
Officers	795
Enlisted	2,770
Students	5,092
Total military	8,657
Civilians	4,284

Installation -- Environmental

Land activity -- base-case units	9
Air activity -- base-case units	2
Water availability (excess capacity in persons)	86,168

Installation -- Training and Operations

Average distance to sub-installations (miles)	53
Average distance to airport (miles)	45
Average distance to seaport (miles)	110
Seaport location	Atlantic
Mission conflict with generic units	None
Designated maneuver area (acres)	69,000
Terrain suitability factor	
Light units	10.0
Heavy units	6.0
Training variety ratings	
Climate	5
Vegetation	5
Terrain	4
River crossings	5

LAST PAGE OF ANNEX R




APPENDIX R-1

FORT LEE

APPENDIX R-1

FORT LEE



MAP KEY	
	LAND AVAILABLE
	RANGE & IMPACT AREA
	CANTONMENT AREA

Fort Lee is a TRADOC installation which is the home of the US Army Quartermaster Center and School, the US Army Logistics Center, the US Army Troop Support Agency, and the US Army Logistics Management Center (which is primarily a school). It has a current total post population of 11,922.

Fort Lee covers about 5,500 acres of the Virginia counties of Prince George and Dinwiddie and is adjacent to Petersburg. Fort Lee has access to Interstate 95 by way of Virginia Highways 36 or 460. The nearest railhead is in Petersburg. The nearest airport capable of handling large jets is 30 miles away in Richmond.

**FORT LEE/FORT PICKETT: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	20
Area (square miles)	266	5,713
<b>Population (1980)</b>		
Urban	10,056	609,215
Rural	15,677	235,813
Non-rural	0	13,400
Total	25,733	858,428
<b>Housing Units (1980)</b>		
Owned/Occupied	4,017	194,530
Owned/Vacant	66	3,640
Rented/Occupied	2,490	106,551
Rented/Vacant	132	7,837
Other/Vacant	237	9,223
Housing Value of Owner Occupied Units	49,461	49,633
Mean Contract Rent (\$/month)	218	193
<b>Employment (1982)</b>		
Total	14,064	463,083
Government		
Federal Civilian	4,911	15,395
Federal Military	5,524	10,768
State & Local	903	79,105
Construction	298	20,296
Manufacturing	166	72,004
Wholesale/Retail Trade	581	93,413
Finance, Insurance & Real Estate	42	30,729
Services	840	83,065
Farm		
Proprietors	300	7,197
Wage & Salary	133	3,751
<b>Income (1982) (\$M)</b>		
Non-farm	273	7,652
Private	26	5,999
Government	247	1,653
Personal	202	10,093
<b>Multipliers</b>		
Export Employment	1.1896	3.0414
Export Income	1.1446	2.8261
Export Sales	1.1896	3.0414

## FORT LEE: ENVIRONMENT

**Climate:** Fort Lee has a continental climate, with mild winters and warm, humid summers. Temperatures range from an average high of 89°F in July, to an average low of 24°F in January. The average annual precipitation is 40 inches, which is well-distributed throughout the year. Hurricanes occasionally move far enough inland to affect the area. Thunderstorms accompanied by severe lightning, high winds, and hail are frequent and can cause significant damage.

**Terrain:** The terrain of Fort Lee is gently rolling with a mean elevation of 95 feet above sea level. The highest ground formations are between 140 and 160 feet above sea level; the lowest formations (found along Bailey Creek) are about 50 feet above sea level. The relatively flat sections of the post are built up, while the hilly areas are still undeveloped forest.

**Soils:** Generally, the soil in the Fort Lee area is fairly dense. Soils in the flood beds of streams consist of recently mixed alluvium. The other soils in the area are agriculturally old, somewhat acidic, and have been extensively leached over the years.

**Water Resources:** Bailey Creek originates on Fort Lee and is the primary natural drainage channel for the post. Some runoff from the post also enters Blackwater Swamp, Harrison Creek, and Cabin Creek. Although ground water from underlying formations is abundant, potable water is purchased from the City of Petersburg and the Virginia American Water Company of Hopewell.

**Vegetation:** Approximately one-half of the installation area south of State Highway 36 is made up of woodlands about 25 years old. Most of these trees are 50 to 75 feet high with a crown density approaching 100 percent. Small areas of hardwood stands are found near the Blackwater Swamp along streams and in areas of poor drainage. Mixed stands of oak, hickory, maple, and pine are common.

FORT LEE: TRAINING

Fort Lee has no significant maneuver area or ranges of the type needed for large-unit training.

**FORT LEE: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		0	0	5,232	5,232
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		14,737	4,216	8,705	27,658
<u>Command, Control, and Administrative (sf)</u>					
141		17,698	0	9,305	27,003
171		298,031	222,888	297,577	818,496
610		432,767	0	461,872	894,639
72330		8,180	0	33,836	42,016
<u>Family Housing (units)</u>					
711		1,461	0	0	1,461
<u>Unaccompanied Personnel Housing (sf)</u>					
721		969,005	0	297,360	1,266,365
724		284,198	0	18,001	302,199
<u>Community Support (sf)</u>					
730		43,347	0	9,855	53,202
740		304,627	91,591	121,060	517,278

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

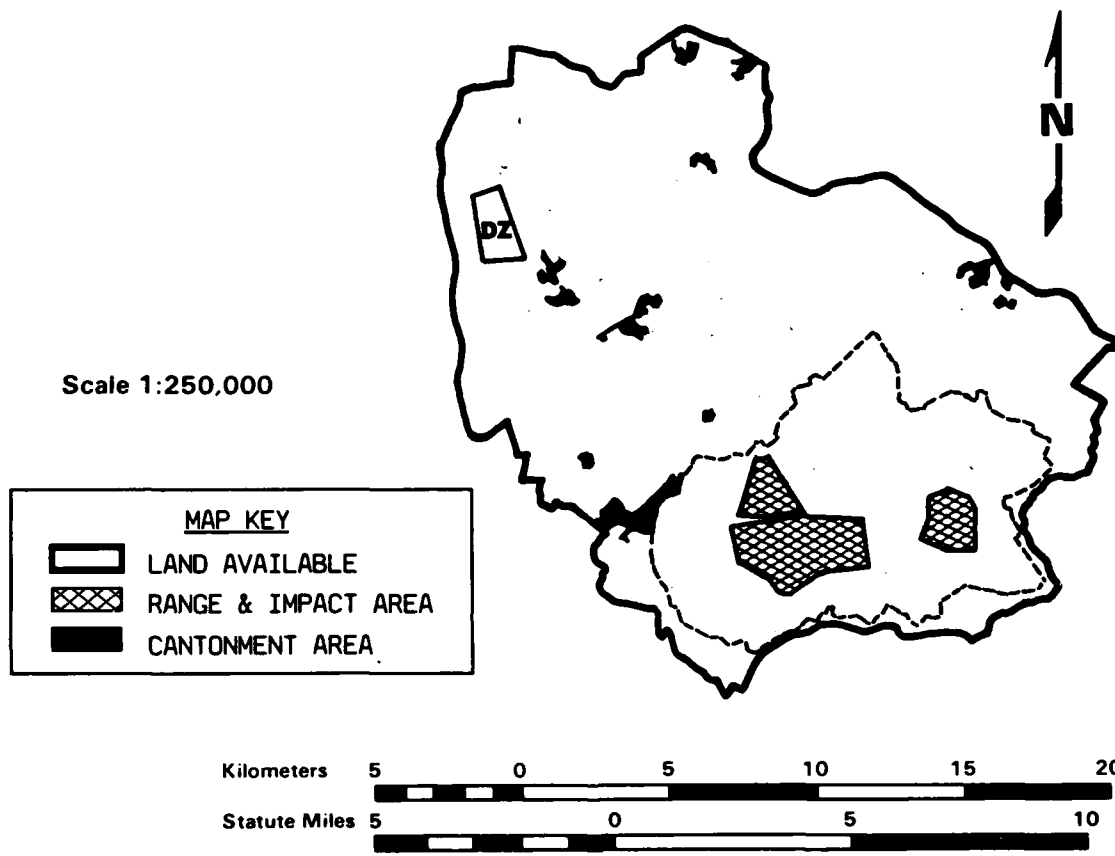
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APPENDIX R-2

FORT A. P. HILL

APPENDIX R-2

FORT A. P. HILL



Fort A. P. Hill is a FORSCOM post that is primarily used for training active and reserve components. Fort Hill is in the northeastern Virginia about 20 miles south of Fredericksburg and 40 miles north of Richmond. The reservation extends about 15 miles north-south, and 13 miles east-west at its widest point. It covers about 77,000 acres, all of which is in Caroline County. The main entrance is reached from US Route 301, which crosses the center of the reservation in a northeast-southwest direction. Much of the northeast boundary is along US Highway 17 and about half of the western boundary is along Virginia Route 2. Interstate 95 and US Highway 1 are easily accessible to the west. The scattered cantonment areas are in the southwest

portion of the reservation. The nearest railhead is in Fredericksburg, 12 miles from post. Although Fort Hill has a 2,100- by 50-foot landing strip, the closest commercial airport is Byrd International, 40 miles away in Richmond. Another airfield capable of handling heavy jets is 50 miles away at the Patuxent River Naval Air Station in Maryland. The closest seaport is the Port of Hampton Roads, 110 miles away in southeast Virginia.

**FORT A. P. HILL: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	3	55
Area (square miles)	1,358	18,756
Population (1980)		
Urban	4,909	1,855,831
Rural	46,639	890,902
Non-rural	3,624	206,250
Total	55,172	2,952,983
Housing Units (1980)		
Owned/Occupied	13,519	654,029
Owned/Vacant	178	12,674
Rented/Occupied	3,640	345,751
Rented/Vacant	270	22,438
Other/Vacant	1,173	37,064
Housing Value of Owner Occupied Units	36,057	65,655
Mean Contract Rent (\$/month)	116	245
Employment (1982)		
Total	17,639	1,244,890
Government		
Federal Civilian	713	76,374
Federal Military	438	48,255
State & Local	5,353	191,911
Construction	551	62,398
Manufacturing	1,948	138,017
Wholesale/Retail Trade	1,661	248,616
Finance, Insurance & Real Estate	337	61,435
Services	1,662	230,491
Farm		
Proprietors	1,832	29,197
Wage & Salary	853	14,108
Income (1982) (\$M)		
Non-farm	182	20,058
Private	96	14,407
Government	88	5,651
Personal	444	36,347
Multipliers		
Export Employment	1.62	2.81
Export Income	1.56	2.54
Export Sales	1.62	2.81

## FORT A. P. HILL: ENVIRONMENT

**Climate:** The climate at Fort Hill is very similar to the climate of Fort Lee. Temperatures range from an average high of 89°F in July to an average low of 24°F in January. The maximum precipitation is in August and the minimum is in February. The annual average is 40 inches precipitation; the average annual total snowfall is 16 inches. Southwest winds predominate, but during the cold months the winds are mainly from the north to northwest. Hurricanes occasionally move far enough inland to affect the area, but usually at reduced intensity. Thunderstorms accompanied by severe lightning, high wind, and hail, occur more frequently and produce the greatest amount of storm damage.

**Terrain:** The reservation lies within the Atlantic Coastal Plain Province. The terrain is a flat to moderately-rolling plain which is dissected by small streams with steep sides (slopes can be as high as 30 percent). Elevations range from 10 to 255 feet above mean sea level.

**Soils:** The sediments for the major portion of the reservation have a 40- to 80-foot thick veneer of mixed and layered terrace sands with some clay. The gently sloping uplands are well-drained, deep, sandy loam. The stream bottoms are poorly-drained, sandy clay and silt.

**Water Resources:** Most streams are perennial, originate on the reservation, and flow into the Mattaponi River to the west, or the Rappahannock River to the east. The streams average about 10 feet in width and 1 foot in depth. Beaver activity and swamps with trees are common in stream bottoms. Flooding is a minor problem and of short duration (usually after a short, intense rainfall). Water surfaces may freeze for short periods during January and February. The fort relies on ground water for its water supply.

**Vegetation:** Forests, scrub, grasslands, wetlands, and agricultural lands are the five major vegetation types on the reservation. Mixed forests cover about 80 percent of the area. The reservation has an active and intense forest management program. Favored deciduous species include yellow poplar, white oak, and northern red oak. Loblolly pine is the favored evergreen. Scrub

covers about 3 percent of the area. About 6 percent of the reservation is covered by short grasses which include fescue, bluegrass, bluestem, Johnson, broomsedge, crab, Bermuda, and orchard. Wetlands cover about 7 percent of the post. Broadleaf trees in the wetlands include willow, river birch, basswood, sycamore, yellow poplar, ash, sweet gum, and water oak. Agricultural lands take up about 1 percent of the area; mainly wheat, corn, and soybeans are grown.

**FORT A. P. HILL: TRAINING**

**Maneuver Area:** The total 44,000-acre maneuver area is split into a 36,400-acre parcel north of US Highway 301, and a 7,600-acre section south of the highway. The rolling terrain is covered by dense forests.

**Cross-Country Movement:** Primarily because of the medium to dense forest. Off-road movement of all vehicles is rated poor to unsuited over much of the reservation. The scattered grass and scrub areas are generally good for all vehicles.

**Ranges:** In its role as a training area, Fort Hill has a variety of training ranges. Based on information from FORSCOM headquarters, Fort Hill has the following types of ranges.

**FORT A. P. HILL: RANGE AVAILABILITY**

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Not Adequate

**FORT A. P. HILL: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u> (Units)	<u>Permanent</u>	<u>Semi-</u> <u>permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	0	0	0	0
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	9,306	0	0	9,306
<u>Command, Control, and Administrative (sf)</u>				
141	32,088	0	2,818	34,906
171	6,480	800	5,622	12,902
610	5,124	3,106	45,266	53,496
72330	0	1,728	1,440	3,168
<u>Family Housing (units)</u>				
711	0	0	0	0
<u>Unaccompanied Personnel Housing (sf)</u>				
721	274,663	56,765	21,125	352,553
724	38,267	8,089	27,798	74,154
<u>Community Support (sf)</u>				
730	4,480	5,171	710	10,361
740	17,768	8,696	30,497	56,961

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

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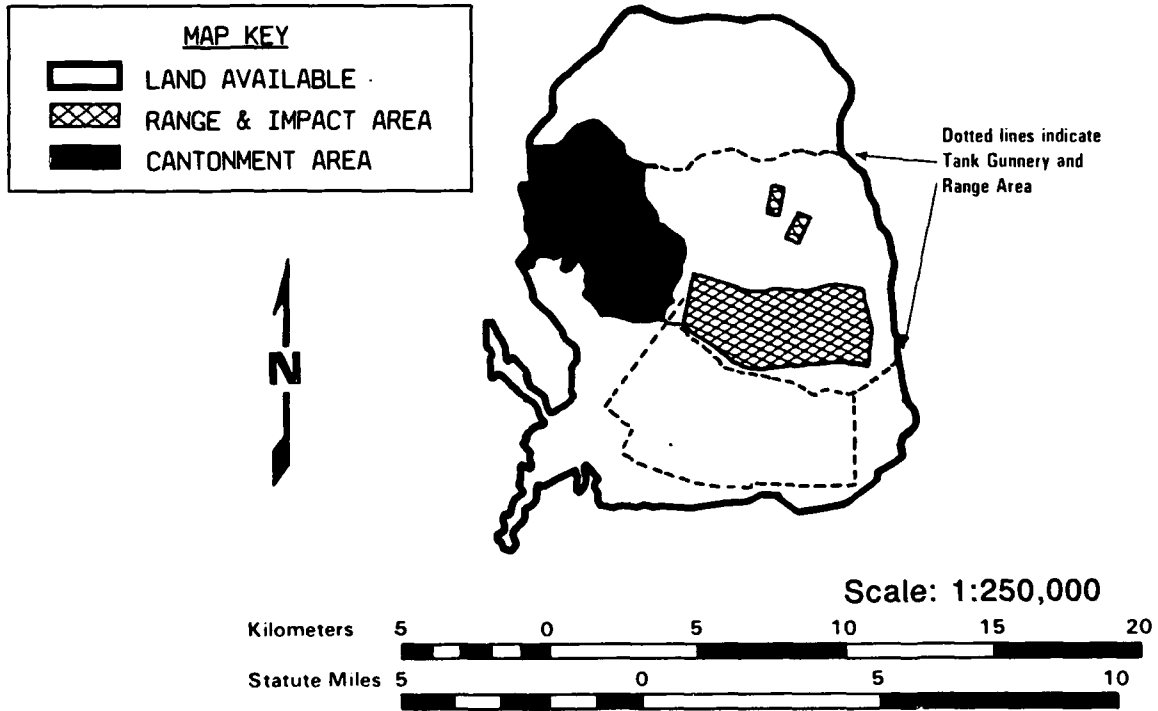
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APPENDIX R-3

FORT PICKETT

APPENDIX R-3

FORT PICKETT



Fort Pickett is currently a FORSCOM post. Until recently, it was a sub-installation of Fort Lee and served as a training area for Fort Lee units.

The 45,000-acre reservation is in southeastern Virginia, 25 miles southwest of Petersburg. Virginia Highways 40 and 46 pass through the reservation. Interstate 85 and US Highway 460 pass to the south and north, respectively. On post, Fort Pickett has a railhead and a 5,200- by 300-foot runway. The nearest commercial airport is Byrd International, 65 miles to the northeast in Richmond.

**FORT PICKETT/FORT LEE: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	20
Area (square miles)	266	5,713
<b>Population (1980)</b>		
Urban	10,056	609,215
Rural	15,677	235,813
Non-rural	0	13,400
Total	25,733	858,428
<b>Housing Units (1980)</b>		
Owned/Occupied	4,017	194,530
Owned/Vacant	66	3,640
Rented/Occupied	2,490	106,551
Rented/Vacant	132	7,837
Other/Vacant	237	9,223
Housing Value of Owner Occupied Units	49,461	49,633
Mean Contract Rent (\$/month)	218	193
<b>Employment (1982)</b>		
Total	14,064	463,083
Government		
Federal Civilian	4,911	15,395
Federal Military	5,524	10,768
State & Local	903	79,105
Construction	298	20,296
Manufacturing	166	72,004
Wholesale/Retail Trade	581	93,413
Finance, Insurance & Real Estate	42	30,729
Services	840	83,065
Farm		
Proprietors	300	7,197
Wage & Salary	133	3,751
<b>Income (1982) (\$M)</b>		
Non-farm	273	7,652
Private	26	5,999
Government	247	1,653
Personal	202	10,093
<b>Multipliers</b>		
Export Employment	1.1896	3.0414
Export Income	1.1446	2.8261
Export Sales	1.1896	3.0414

## FORT PICKETT: ENVIRONMENT

**Climate:** The climate at Fort Pickett is temperate -- relatively mild winters are followed by warm summers with occasional hot days. The temperature over the year averages 57°F. February is the coldest month, and July is the warmest. Fort Pickett gets an annual average of 42 inches of precipitation, which is evenly distributed throughout the year. The installation also averages 15 inches of snow per year (January has the heaviest snowfall). The prevailing winds come from the west.

**Terrain:** Fort Pickett has a rolling terrain. Elevations range from about 200 feet above sea level along the Nottoway River in the southeastern part of the post, to a high of 450 feet north of Blackstone Army Airfield along State Route 40.

**Soils:** Fort Pickett is located on the boundary between the Piedmont and Coastal Plain Provinces. Typically, 6 to 18 inches of quartz, sandy loam overlies a mica, clay loam. The surface soil structure is fairly poor due to high levels of sand and low organic matter. Because fragipan frequently occurs at the interface of the sand and clay layers, permeability is severely limited. Although soils are generally deep, there are a few rock outcrops.

**Water Resources:** Although there are three major river basins within the immediate region of the installation (James, Roanoke, and Chowan), most streams on post flow into the Nottoway River, which is part of the Chowan River system. Flooding on the reservation has not been a problem, except for infrequent flash floods. Although ground water is found at depths of about 150 feet, water can be found at only a 30-foot depth. The water table begins to fall in April and is replenished in the winter.

**Vegetation:** Except for the cantonment area and the airfield, much of Fort Pickett is wooded. The natural vegetation in the region consists of six types of mixed pine and hardwood forests: natural pine, pine hardwood, upland hardwood, bottomland hardwood, cove hardwood, and swamp hardwood. Loblolly and shortleaf pines constitute about 95 percent of the area's pine species.

## FORT PICKETT: TRAINING

**Maneuver Area:** Fort Pickett has a total of 25,000 acres of land available for maneuver and training. However, only 12,000 acres located in the northern portion of the installation are considered suitable for large-scale maneuver. This parcel has gently-rolling hills, dense woods, and some widely-scattered grass and scrub areas.

**Ranges:** Fort Pickett has a number of ranges for training a variety of troop units. According to FORSCOM, HQ, Fort Pickett has the following types of ranges on post.

### FORT PICKETT: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Not Adequate
Infantry Collective Skills:	Adequate

**FORT PICKETT: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u> (Units)	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	30,277	0	0	30,277
<u>Aircraft Maintenance (sf)</u>				
211	0	12,810	0	12,810
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	0	63,168	146,619	209,787
<u>Command, Control, and Administrative (sf)</u>				
141	0	32,122	32,585	64,707
171	11,672	11,432	10,300	33,404
610	0	88,282	70,547	158,829
72330	5,474	0	0	5,474
<u>Family Housing (units)</u>				
711	7	0	0	7
<u>Unaccompanied Personnel Housing (sf)</u>				
721	7,202	217,402	804,350	1,028,954
724	0	252,154	2,987	255,141
<u>Community Support (sf)</u>				
730	4,887	7,048	14,288	26,223
740	0	84,277	78,151	162,428

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

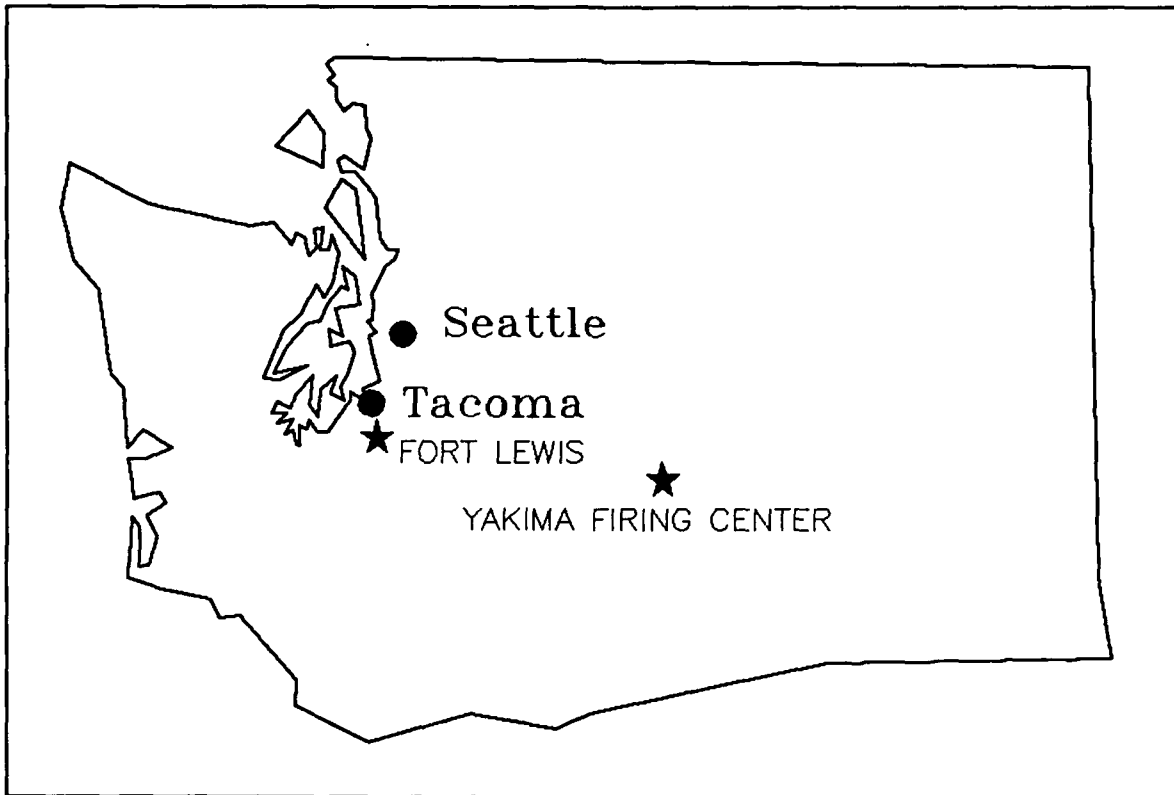
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ANNEX S

FORT LEWIS COMPLEX

ANNEX S

FORT LEWIS COMPLEX



For the purposes of this analysis, Fort Lewis and its sub-installation, Yakima Firing Center are evaluated as a single installation complex. Fort Lewis is located about 6 miles south of Tacoma, Washington. Yakima Firing Center is about 150 miles east of Fort Lewis.

**FORT LEWIS COMPLEX: RANGE AVAILABILITY**

**Ranges:** The range availability chart below combines the range complexes of both Fort Lewis and the Yakima Firing Center. Fort Lewis has weapons ranges sufficient for a light or heavy infantry division; Yakima provides training ranges for other types of heavy units. Based on information from FORSCOM headquarters, Fort Lewis and Yakima together have the following types of ranges.

**FORT LEWIS COMPLEX: RANGE AVAILABILITY**

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

FORT LEWIS COMPLEX: TOTAL FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		502,582	0	93,874	596,456
<u>Aircraft Maintenance (sf)</u>					
211		286,762	0	0	286,762
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		771,363	0	402,363	1,173,726
<u>Command, Control, and Administrative (sf)</u>					
141		231,576	0	304,394	535,970
171		113,838	0	671,503	785,341
610		469,804	12,000	450,987	932,791
72330		129,747	0	380,695	510,442
<u>Family Housing (units)</u>					
711		3,586	0	0	3,586
<u>Unaccompanied Personnel Housing (sf)</u>					
721		3,242,312	0	1,674,023	4,916,335
724		82,676	33,660	182,386	298,722
<u>Community Support (sf)</u>					
730		158,691	0	116,974	275,665
740		810,487	19,354	526,030	1,355,871

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT LEWIS COMPLEX**

**Local Area**

Surface area (square miles)	8,997
Total population	807,292

**Commute Area**

Total population	2,535,682
Total non-military employment	1,220,077
Total income (\$M)	79,797
Regional multiplier	2.7
Regional cost factor	1.20
Vacant housing units	61,763
Housing location factor	0.2
Variable housing allowance factor	0.177

**Installation -- General**

Installation area (acres)	347,627
Personnel stationed in FY 92 as in ASIP	
Officers	3,057
Enlisted	21,003
Students	137
Total military	24,197
Civilians	3,487

**Installation -- Environmental**

Land activity -- base-case units	97
Air activity -- base-case units	40
Water availability (excess capacity in persons)	51,570

**Installation -- Training and Operations**

Average distance to sub-installations (miles)	150
Average distance to airport (miles)	10
Average distance to seaport (miles)	70
Seaport location	Pacific
Mission conflict with generic units	None
Designated maneuver area (acres)	296,383
Terrain suitability factor	
Light units	10.0
Heavy units	6.0
Training variety ratings	
Climate	9
Vegetation	9
Terrain	8
River crossings	10

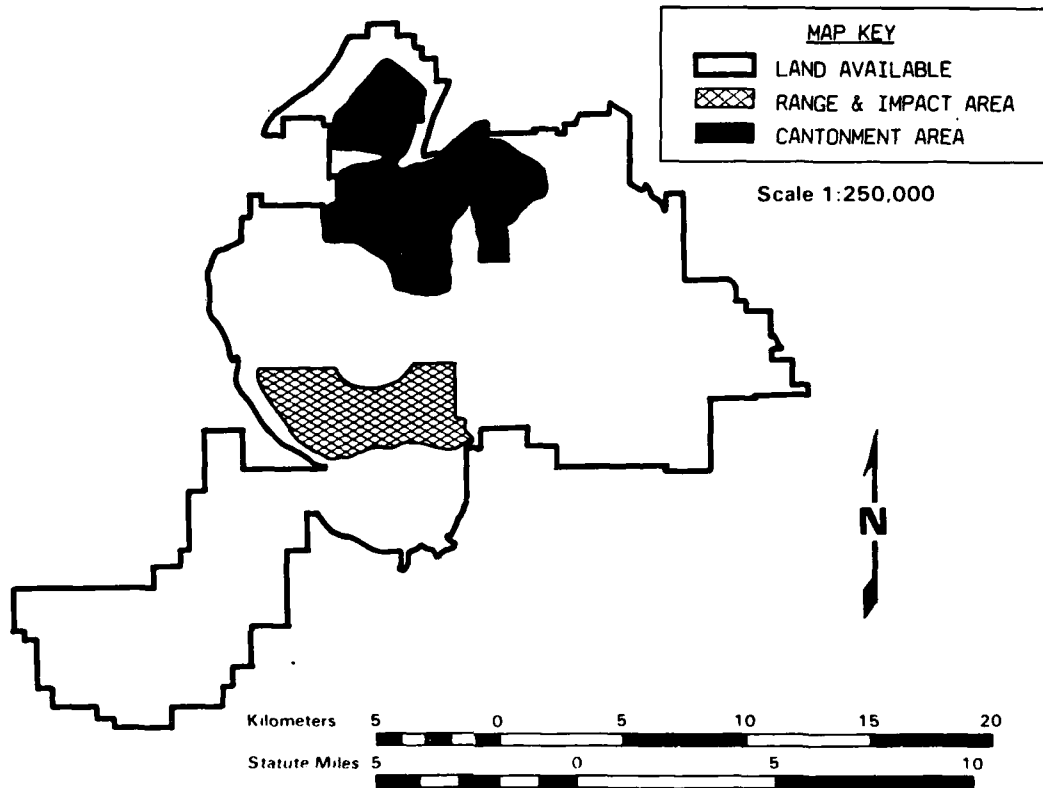
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APPENDIX S-1

FORT LEWIS

APPENDIX S-1

FORT LEWIS



Fort Lewis is a FORSCOM installation which is the headquarters for the I Corps. Fort Lewis is also the division station for the 9th Infantry Division (Motorized). Other units on-post include the 35th Air Defense Artillery Brigade, the 62nd Medical Group, the 75th Infantry Battalion (Ranger), the 1st Special Forces Group (Airborne), the 4th ROTC Region, and the US Army Development and Employment Agency. Fort Lewis has a total post population of 30,606, of which 25,259 are military personnel.

Fort Lewis is located about 16 miles south of Tacoma, Washington, which is at the southern tip of Puget Sound. Crossing the irregularly-shaped, 86,000-acre reservation at its narrowest point, the Nisqually River divides Fort Lewis into northeastern and southwestern sectors. The northeastern

sector (which includes the cantonment area) is in Pierce County. The southwestern sector is in Thurston County. Interstate 5 passes through the northeastern sector. Fort Lewis has a railhead and a 6,125- by 150-foot runway on-post. Fort Lewis can also receive air support from the adjacent McChord Air Force Base, which has a 10,000-foot runway. The nearest commercial airport and the nearest seaport are both in Tacoma, 20 miles to the north.

**FORT LEWIS: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	7
Area (square miles)	2,402	10,211
<b>Population (1980)</b>		
Urban	470,475	1,691,751
Rural	136,289	393,105
Non-rural	3,143	95,475
Total	609,907	2,180,331
<b>Housing Units (1980)</b>		
Owned/Occupied	141,348	526,850
Owned/Vacant	3,024	10,924
Rented/Occupied	79,259	301,444
Rented/Vacant	6,285	20,488
Other/Vacant	4,784	18,994
Housing Value of Owner Occupied Units	61,134	72,964
Mean Contract Rent (\$/month)	217	244
<b>Employment (1982)</b>		
Total	245,390	1,117,503
<b>Government</b>		
Federal Civilian	10,837	47,954
Federal Military	36,472	64,517
State & Local	41,245	139,154
Construction	7,432	42,503
Manufacturing	24,870	169,443
Wholesale/Retail Trade	42,482	226,751
Finance, Insurance & Real Estate	8,781	67,518
Services	40,871	203,055
<b>Farm</b>		
Proprietors	2,183	6,437
Wage & Salary	2,261	4,252
<b>Income (1982) (\$M)</b>		
Non-farm	3,987	21,308
Private	2,514	16,800
Government	1,473	4,508
Personal	6,678	28,592
<b>Multipliers</b>		
Export Employment	2.6900	3.3600
Export Income	2.5673	3.2395
Export Sales	2.6900	3.3600

## FORT LEWIS: ENVIRONMENT

**Climate:** The climate of Fort Lewis is characterized by warm, generally dry summers and mild, wet winters. Weather and climate are strongly affected by the imposing north-south barrier of the Cascade Mountains situated some 40 miles to the east and, to a lesser extent, by the steep Olympic Mountains about 50 miles to the northwest. January has a mean daily low temperature of 32°F. July has a mean daily high temperature of 75°F. The total annual precipitation is 41 inches. Only about one-sixth of the annual precipitation falls during the five months of May through September. The winter months are almost continually cloudy and on most days there is some precipitation. The average annual snowfall is 9.4 inches. The prevailing wind direction is southerly from September to February, gradually becoming westerly by July (wind speed is about 5 mph). The coastal range protects the area from the hurricane-force winds which sometimes accompany the fall and winter Pacific storms.

**Terrain:** Fort Lewis is situated on a glacial outwash plain bordering Puget Sound. The reservation has flat to gently-rolling terrain with isolated mounds rising sharply above the plains. The terrain is divided into three landform types: low plains, high plains, and escarpments. The low plains predominate on the reservation. Isolated, mounded glacial deposits rise 98 to 246 feet above the general surface level. Although there are few stream channels, numerous water-filled depressions are scattered throughout the low plains. Local relief is largely between 82 and 148 feet, while slopes are as high as 3 percent. The high plains of the region are moderately-rolling plains with isolated glacial mounds. Local relief is generally from 164 to 197 feet, while slopes are as much as 15 percent. The Nisqually River flood plain (about 0.6 miles wide) is a flat to gently-rolling alluvial surface separated from adjacent plains by steep escarpments.

**Soils:** Soils on Fort Lewis vary from excessively-drained, gravelly sands (which developed from glacial till) to highly-organic peat and muck (which occur in poorly-drained areas). In general, the depth of the glacially-

derived soil material is measured in tens of meters. Poorly-drained organic soils are found throughout the reservation.

**Water Resources:** Because of the glacial nature of the soils, precipitation readily infiltrates the soil. The only major perennial stream is the Nisqually River which originates from Mount Rainier. The Nisqually River has high flows from April to June. The second largest stream is Muck Creek, which receives the majority of the surface run-off. Portions of Muck Creek dry up during the summer. There are more than 30 glacial lakes (some as large as 1,123 acres). Since these lakes are fed primarily by ground water, some of the smaller ones occasionally dry up. Salt water intrusion is infrequent.

**Vegetation:** The three significant categories of vegetative cover at Fort Lewis are: forests, grasslands, and wetlands. Forest cover at Fort Lewis is predominantly coniferous, about two-thirds of the reservation is covered with Douglas fir. There are also small stands of western hemlock, western red cedar, ponderosa pine, and Pacific yew. Red alder is found on moist sites at the lower elevations; cottonwood is found along the stream banks. Several large prairie grass communities have developed on Fort Lewis. Some of the grasses that make up these prairies are rye, fescue, tall oat, orchard, quack, and bent. Wetlands occupy a small portion of the reservation. Marshes containing mostly grasses are scattered throughout the reservation, usually around natural lakes.

## FORT LEWIS COMPLEX: TRAINING

**Maneuver Area:** The Fort Lewis maneuver area consists of 63,000 acres of land. Because dense forests cover 60 percent of the reservation, large-scale maneuver and off-road travel are limited. The maneuver area is also broken up by ranges, impact areas, and rail and highway right-of-ways. The largest single usable maneuver area is 23,000 acres.

**Cross-Country Movement:** Movement conditions on the natural prairies and other open areas are good throughout the year. In these areas, the sandy or gravelly soils are well drained. Even when wet, the soil strength is sufficient to support numerous passes of most military vehicles. Due to closely-spaced trees, the forested tracts are largely impassable to vehicles. Swamps, marshes, and poorly-drained flats are also generally unsuited for vehicular movement.

**Ranges:** The combined range availability chart was presented on page S-2 of this annex.

FORT LEWIS: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	489,660	0	68,694	558,354
<u>Aircraft Maintenance (sf)</u>				
211	286,762	0	0	286,762
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	484,405	0	313,425	797,830
<u>Command, Control, and Administrative (sf)</u>				
141	229,976	0	277,155	507,131
171	93,228	0	661,590	754,818
610	465,371	12,000	447,861	925,232
72330	129,747	0	380,695	510,442
<u>Family Housing (units)</u>				
711	3,586	0	0	3,586
<u>Unaccompanied Personnel Housing (sf)</u>				
721	3,242,312	0	1,501,162	4,743,474
724	82,676	33,660	147,305	263,641
<u>Community Support (sf)</u>				
730	158,691	0	108,099	266,790
740	797,261	19,354	500,230	1,316,845

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

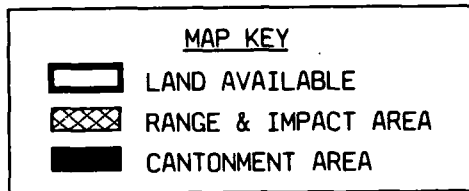
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APPENDIX S-2

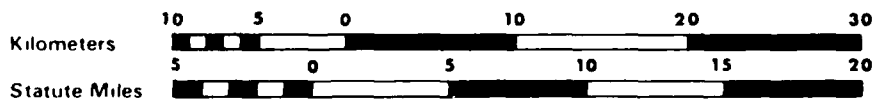
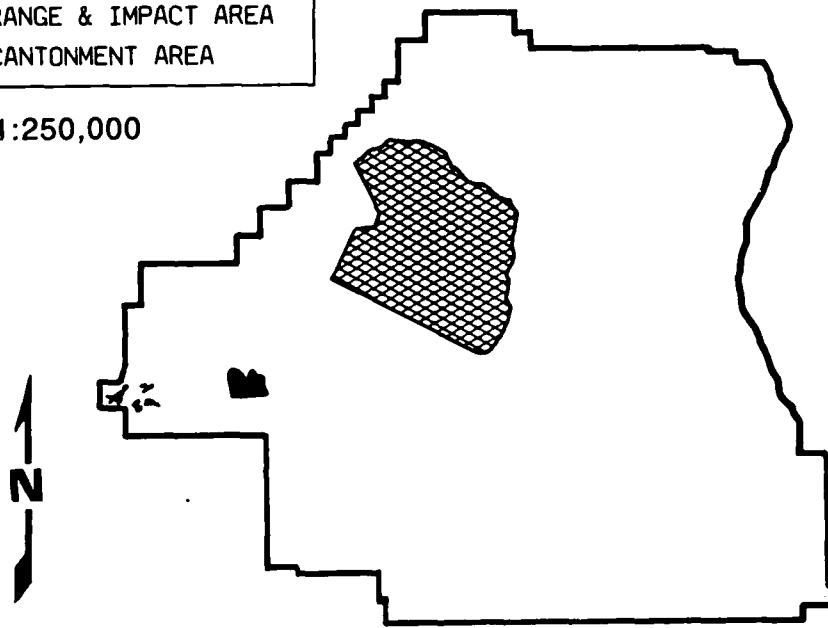
YAKIMA FIRING CENTER

APPENDIX S-2

**YAKIMA FIRING CENTER**



Scale: 1:250,000



The Yakima Firing Center is a major sub-installation of Fort Lewis and is located in south-central Washington, about 100 miles southeast of Fort Lewis. It has a post population of 153, which includes 72 military personnel. The reservation encompasses about 263,000 acres of Yakima and Kittitas counties and extends from the city of Yakima 24 miles eastward to the Columbia River. Interstate 82 passes along the reservation's western boundary. The cantonment area is at the southwest corner of the reservation. The nearest railhead is in Pomona, Washington, 3 miles from the post. Yakima has a 2,000-

by 50-foot runway and a 5,000- by 100-foot dirt tactical airstrip. The nearest commercial airport is Yakima Air Terminal, 11 miles away. The nearest seaport is in Seattle, 125 miles west of Yakima.

**YAKIMA FIRING CENTER: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	4
Area (square miles)	6,595	10,969
<b>Population (1980)</b>		
Urban	81,085	167,716
Rural	79,884	124,462
Non-rural	36,416	63,173
Total	197,385	355,351
<b>Housing Units (1980)</b>		
Owned/Occupied	46,304	84,324
Owned/Vacant	747	1,930
Rented/Occupied	24,533	42,645
Rented/Vacant	2,034	5,271
Other/Vacant	2,469	4,156
Housing Value of Owner Occupied Units	47,595	52,740
Mean Contract Rent (\$/month)	170	201
<b>Employment (1982)</b>		
Total	91,116	170,677
Government		
Federal Civilian	1,249	2,100
Federal Military	2,003	3,586
State & Local	10,735	21,287
Construction	1,945	11,231
Manufacturing	7,751	18,039
Wholesale/Retail Trade	18,306	29,622
Finance, Insurance & Real Estate	1,993	3,687
Services	14,438	29,386
Farm		
Proprietors	7,167	10,877
Wage & Salary	12,914	20,381
<b>Income (1982) (\$M)</b>		
Non-farm	998	2,400
Private	787	1,961
Government	211	439
Personal	1,920	3,789
<b>Multipliers</b>		
Export Employment	2.4936	2.4703
Export Income	2.3524	2.2716
Export Sales	2.4936	2.4703

## YAKIMA FIRING CENTER: ENVIRONMENT

**Climate:** The Yakima Firing Center lies in the shadows of the Cascade Mountains, midway between the mild maritime climate of the Washington coastal region (to the west) and the rigorous Rocky Mountain climate (to the east). As it is carried by the prevailing western winds over the Cascade Range, the maritime air from the Pacific loses much of its moisture and becomes warmer and drier as it descends the eastern slopes. Therefore, the climate is dry year round. Winters are cold and summers are warm. January has a mean daily low of 18°F. July has a mean high of 89°F. Although annual precipitation is 8.8 inches, less than an inch falls during July, August, and September. Annual snowfall is 27.7 inches. Snow remains on the ground from a few days to as long as eight weeks. Higher ridges retain snow for longer periods. The prevailing winds are from the west.

**Terrain:** Yakima Firing Center is on the western edge of the Columbia Plateau and is bounded by the Yakima River on the west, the Columbia River on the east, the Saddle Mountains on the north, and the Rattlesnake Hills on the south. The dominant topographic features are the three parallel basaltic ridges (the Saddle Mountains, the Umtanum Ridge, and the Yakima Ridge) which cross the reservation in a northwest-southeast direction. Water and wind erosion have removed several feet of the soft upper basalt layers from the ridges and have deposited sand and gravel in the broader valleys. Stream erosion has cut steep-sided valleys and deep canyons, especially in the eastern portion of the reservation. The largest part of the reservation consists of high plains and low hills. The high plains are moderately rolling with basaltic sand and gravel deposits. Local relief is generally from 180 to 476 feet. Slopes are mainly between 3 and 15 percent. The low hills are predominantly rounded. Local relief is largely 508 to 902 feet with slopes between 8 and 30 percent. There are also small areas of low plains and rounded mountains.

**Soils:** Soils range from limited areas of deep, well-drained alluvial loams in the bottomlands to extensive areas of shallow, stony, upland soils which overlay basalt. The development and properties of soils have been greatly

influenced by loess, a silty, wind-blown deposit. Although the loess is tens of meters thick in some areas, elsewhere erosion has left a very thin cover (or has even exposed the bedrock).

**Water Resources:** The Yakima and Columbia Rivers flow along the reservation's boundary. An irrigation canal flows around part of the cantonment area. Very little of the surface drainage is perennial. Most valleys and canyons have intermittent spring-fed seeps which flow for short distances. The areas near these springs are often marshy. Precipitation is generally so light that most of it is absorbed by the soil. Occasionally, cloudbursts cause flash floods. In February, warm winds (chinooks) flow over the snow-covered mountains and pick up moisture which falls as snow. Ground water is found in the fractured basalt rock.

**Vegetation:** Typical of eastern Washington, the vegetation is that of semi-arid and arid rangelands (characterized as a sagebrush-bunchgrass type). Although grasses and shrubs cover most of the area, scattered trees can be found in both the stream bottoms and the cantonment area. The dominant grass is the highly-flammable cheat. Common shrubs are big sagebrush, rabbit brush, and wild rose. Some areas have no vegetation and frequent fires burn off the cover of other areas.

**YAKIMA FIRING CENTER: TRAINING**

**Maneuver Area:** Yakima Firing Center has approximately 233,000 acres available for maneuver. The area is interlaced with several washes, gullies, and canyons which can restrict movement. There are few trees; vegetation is mostly shrubs and grasses. Yakima is excellent for conducting large-scale maneuvers. There is little cover for light unit training.

**Cross-Country Movement:** Conditions are fair to good for the major portion of the reservation. Movement is easy over large areas of nearly level to undulating terrain as long as slopes are less than 8 percent. However, high-speed maneuvers may generate large clouds of dust which reduce visibility. For very brief periods during winter rains or early spring thaws, movement is adversely affected by soft, miry, or slippery soils. As slopes increase, vehicular movement is more difficult. On very steep terrain, mainly in the entrenched canyon areas, movement is precluded at all times.

**Ranges:** The combined range availability chart was presented on page S-2 of this annex.

**YAKIMA FIRING CENTER: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi-</u> <u>permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		12,922	0	25,180	38,102
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		0	0	44,515	44,515
<u>Command, Control, and Administrative (sf)</u>					
141		1,600	0	27,239	28,839
171		20,610	0	9,913	30,523
610		4,433	0	3,126	7,559
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		0	0	0	0
<u>Unaccompanied Personnel Housing (sf)</u>					
721		0	0	172,861	172,861
724		0	0	35,081	35,081
<u>Community Support (sf)</u>					
730		0	0	8,875	8,875
740		13,226	0	25,800	39,026

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

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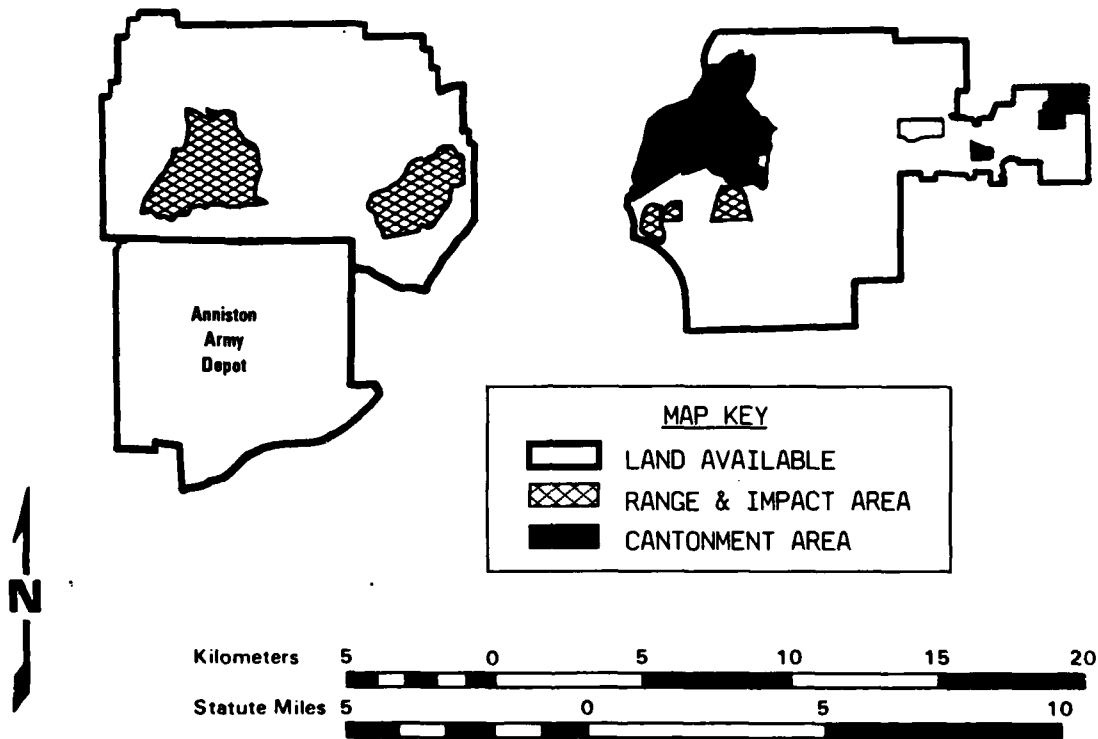
ANNEX T

FORT McCLELLAN

ANNEX T

FORT McCLELLAN

Scale 1:250,000



Fort McClellan is a TRADOC post and an Army training center that serves as the home of the US Army Military Police/Chemical Center, the US Army Chemical School, and the US Army Military Police School. The installation also has control of Pelham Range west of the main reservation. Fort McClellan has a post population of 12,367, of which 8,987 are military personnel.

Fort McClellan is in Calhoun County, in northeastern Alabama, near the town of Anniston. Alabama Highway 21 bounds the 19,000-acre reservation on the west. The Choccolocco Mountains extend around the other three sides. The 22,000-acre Pelham Range is 8 miles west of Fort McClellan. The installation has a railhead and a 3,000- by 150-foot runway. The nearest commercial

airport with scheduled service is Anniston-Calhoun Airport, which is 12 miles from Fort McClellan. The closest airfield capable of handling heavy jets is Birmingham Municipal Airport, which is 65 miles to the southwest. The nearest major seaport is 260 miles away on the gulf coast at Mobile, Alabama.

**FORT McCLELLAN: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	11
Area (square miles)	611	5,951
<b>Population (1980)</b>		
Urban	75,180	150,344
Rural	29,302	254,679
Non-rural	15,279	105,113
Total	119,761	510,136
<b>Housing Units (1980)</b>		
Owned/Occupied	27,522	127,798
Owned/Vacant	457	1,952
Rented/Occupied	12,129	46,237
Rented/Vacant	1,121	4,907
Other/Vacant	1,237	6,712
Housing Value of Owner Occupied Units	35,162	33,371
Mean Contract Rent (\$/month)	127	114
<b>Employment (1982)</b>		
Total	54,155	193,327
Government		
Federal Civilian	7,423	8,704
Federal Military	9,131	12,954
State & Local	6,126	25,828
Construction	984	4,336
Manufacturing	10,021	55,674
Wholesale/Retail Trade	8,051	26,132
Finance, Insurance & Real Estate	1,223	4,698
Services	5,256	21,012
Farm		
Proprietors	931	9,098
Wage & Salary	294	1,732
<b>Income (1982) (\$M)</b>		
Non-farm	756	2,537
Private	401	1,909
Government	355	629
Personal	983	4,000
<b>Multipliers</b>		
Export Employment	1.8645	2.3137
Export Income	1.8309	2.1928
Export Sales	1.8645	2.3137

## FORT McCLELLAN: ENVIRONMENT

**Climate:** Fort McClellan has a humid, warm, temperate climate characteristic of the southeastern United States. During summers, days are moderately hot and nights are fairly cool. Winters are mild and pleasant, although temperatures at night frequently fall below freezing. Precipitation is well-distributed throughout the year. Snow is not a common occurrence at Fort McClellan. The average annual precipitation is about 53 inches.

**Terrain:** The reservation is located in the foothills of the Appalachian Mountains. The terrain consists of mountainous areas, peaks average 1,500 feet. The valley is spotted with rolling hills about 100 feet in height. Small creeks are fed by springs which flow from underlying limestone strata.

**Soils:** The dominant soils on Fort McClellan are the Anniston, Allen Altavista, Masada, Clarkville, and Fullerton soil series. The hills and a large portion of the valleys are covered by an impervious clay topped by a thin layer of loam.

**Water Resources:** The two lakes on Fort McClellan, Reilly (8.5 acres) and Yahou (13.5), are used for both recreation and training. Cane and Cave Creeks are the largest streams on post. Pelham Range has also has two lakes which are used for recreation and conservation.

**Vegetation:** Longleaf and loblolly pines are the most important timber trees found on the reservation. Bottomland hardwoods occur in swamps and along streams. Open areas are covered by native weeds and grasses.

## FORT McCLELLAN: TRAINING

**Maneuver Area:** Approximately 29,500 acres of land are available at Fort McClellan for training and maneuver. About 10,800 acres is on the main post, 4,500 acres are in the Choccolocco Corridor, and 14,200 acres are at Pelham Range. The total amount of available maneuver land increases to 35,000 acres when the ranges are not in operation. The nearby Talladega National Forest could be used for training, although there are live-fire restrictions.

**Cross-Country Movement:** Because Fort McClellan is densely forested, with rolling-to-steep hills, heavy-unit maneuvers are quite difficult. The configuration of the maneuver area and the installation's heavy use of ranges, further limit the possibilities for conducting large-scale maneuvers.

**Ranges:** Fort McClellan has 18 ranges on post, and an additional 4 ranges at Pelham Range. The current range complex is designed to serve the installation's mission as an Army training center and the Military Police and Chemical Schools. According to master planning documents, the following types of ranges are available at Fort McClellan.

### FORT McCLELLAN: RANGE AVAILABILITY

Armor:	Unavailable
Infantry(MECH)/Cavalry:	Good
Anti-Armor:	Unavailable
Aviation:	Unavailable
Individual/Crew Weapons:	Unavailable
Indirect Fire Weapons:	Good
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable

FORT McCLELLAN: FACILITIES

<u>Facility Groups</u> <u>Category Codes</u> (Units)	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>				
113	15,617	0	0	15,617
<u>Aircraft Maintenance (sf)</u>				
211	0	0	0	0
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	35,062	7,722	20,448	63,232
<u>Command, Control, and Administrative (sf)</u>				
141	64,228	39,203	28,761	132,192
171	557,417	17,780	198,186	773,383
610	314,329	4,629	51,343	370,301
72330	0	0	0	0
<u>Family Housing (units)</u>				
711	571	0	0	571
<u>Unaccompanied Personnel Housing (sf)</u>				
721	1,441,510	238,788	165,693	1,845,991
724	123,255	10,016	6,168	139,439
<u>Community Support (sf)</u>				
730	63,067	8,032	29,343	100,442
740	492,894	6,125	126,826	625,845

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT McCLELLAN

Local Area

Surface area (square miles)	611
Total population	119,761

Commute Area

Total population	510,136
Total non-military employment	180,373
Total income (\$M)	9,075
Regional multiplier	2.3
Regional cost factor	0.84
Vacant housing units	13,571
Housing location factor	0.4
Variable housing allowance factor	0.000

Installation -- General

Installation area (acres)	41,639
Personnel stationed in FY 92 as in ASIP	
Officers	622
Enlisted	2,208
Students	6,794
Total military	9,624
Civilians	1,995

Installation -- Environmental

Land activity -- base-case units	10
Air activity -- base-case units	5
Water availability (excess capacity in persons)	65,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	65
Average distance to seaport (miles)	260
Seaport location	Gulf
Mission conflict with generic units	School
Designated maneuver area (acres)	29,500
Terrain suitability factor	
Light units	9.0
Heavy units	6.0
Training variety ratings	
Climate	4
Vegetation	6
Terrain	7
River crossings	0

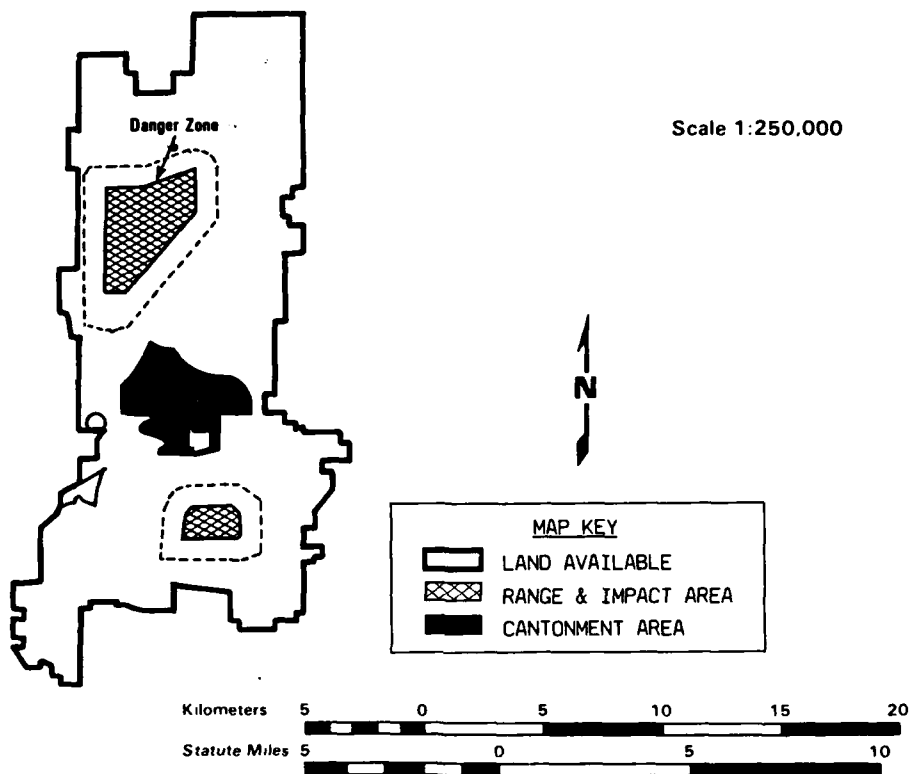
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ANNEX U

FORT McCOY

ANNEX U

FORT McCOY



Fort McCoy is a FORSCOM installation that serves as an Army Reserve readiness training center. It also has some tenants on post, e. g., the Wisconsin State Police Academy. Fort McCoy has a post population of 1,262, of which 171 are military personnel.

Fort McCoy is located in Monroe County in west-central Wisconsin, about 30 miles east of La Crosse and the Mississippi River. The 59,779-acre reservation stretches about 18 miles north-to-south and 8 miles east-to-west. The cantonment area is in the center of the reservation. Interstate 90 and Wisconsin Highway 21 pass through the reservation. On post, Fort McCoy has a railhead and two 4,200- by 100-foot runways. Twenty-five miles from Fort McCoy is a 9,000-foot runway at Camp Douglas' Volk Field. The nearest

commercial airport, La Crosse Municipal Airport (31 miles away), has an 8,500-foot and two 5,300-foot runways. Although the nearest major seaport is 175 miles away in Milwaukee, the closest atlantic seaport is 950 miles away in Philadelphia.

FORT McCOY: SOCIOECONOMIC DATA

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	13
Area (square miles)	904	9,960
Population (1980)		
Urban	0	67,966
Rural	20,936	272,052
Non-rural	14,138	120,531
Total	35,074	460,549
Housing Units (1980)		
Owned/Occupied	8,974	119,145
Owned/Vacant	100	1,420
Rented/Occupied	2,920	41,449
Rented/Vacant	158	2,478
Other/Vacant	429	6,155
Housing Value of Owner Occupied Units	38,619	42,306
Mean Contract Rent (\$/month)	147	162
Employment (1982)		
Total	16,357	215,894
Government		
Federal Civilian	2,163	4,070
Federal Military	279	2,107
State & Local	2,047	24,332
Construction	236	5,584
Manufacturing	1,922	38,289
Wholesale/Retail Trade	2,746	40,578
Finance, Insurance & Real Estate	330	4,782
Services	1,809	35,489
Farm		
Proprietors	1,996	21,263
Wage & Salary	689	8,247
Income (1982) (\$M)		
Non-farm	189	2,654
Private	109	2,223
Government	80	431
Personal	318	4,322
Multipliers		
Export Employment	1.9024	2.7186
Export Income	1.7915	2.5301
Export Sales	1.9024	2.7186

## FORT MCCOY: ENVIRONMENT

**Climate:** Fort McCoy has a continental climate. Winters are relatively long, cold, and snowy; summers are short, warm, and humid. Fall and spring are generally short and have rapid temperature changes. Since frontal systems frequently pass over the area, weather conditions are extremely variable. January has a mean daily low temperature of 7°F and July has a mean daily high temperature of 82°F. The annual precipitation is about 29 inches; the wettest month is July. Measurable amounts of snow occur from October to April. The annual snowfall is 39 inches. Wind chill presents particular hazards from December to February. Prevailing winds are from the northwest in winter and southerly during the remainder of the year. Thunderstorms occur an average of 43 days. Tornadoes occasionally appear.

**Terrain:** Fort McCoy is in the Central Lowland Province. In the southern portion of the reservation, rolling low plains and severely-dissected high plains are generally oriented east-to-west. The central section of the reservation has well-drained, low plains which lie between moderate- to highly-dissected high plains. The northern part consists of heavily-eroded, narrow, high plains and flat to gently-rolling swampy low plains (which are drained by northwesterly flowing streams). Low plains cover about 80 percent of the reservation and generally have 3 to 8 percent slopes. Flood plains have slopes less than 3 percent and the upper reaches of streams have slopes as high as 15 percent. Local relief ranges from 33 to 164 feet. Interstream ridges are generally between 250 and 350 feet above the valley bottoms. Although slopes in the high plains are generally between 15 and 30 percent, they can be as high as 45 percent.

**Soils:** Fort McCoy lies within the unglaciated area of southwest Wisconsin. The soils are very sandy and are underlain by sandstone. However, much of the soil has been reworked by water. Wind-blown silt (loess) and soils derived from dolomite occur locally along the eastern boundary of the reservation. The loess deposits range from less than 1 foot to more than 10 feet. Very poorly-drained, organic muck lays along many of the drainage areas and in old

lake basins. The muck is mostly thin and generally lies above stratified sandy soils. Most of the upland sandy soils are well drained.

**Water Resources:** The La Crosse River flows southwesterly across the central portion of the reservation for 11 miles. Swamps border both of its banks in the lower reaches. Silver Creek drains the southern part of Fort McCoy and joins the La Crosse River as it flows to the Mississippi River. The extreme northern part of the reservation drains to the northwest into the Black River. Since the alluvial material and sandstone bedrock are both extremely permeable, a large portion of the annual precipitation is rapidly absorbed. Ground water is plentiful. Fort McCoy has over a dozen small man-made lakes or ponds. Maximum runoff generally occurs from late March to mid-April, minimum runoff from July to August. In winter, ice up to 1.5 feet thick normally forms on the lakes and streams.

**Vegetation:** Forests occupy roughly 65 percent of the reservation; about three quarters of the trees are deciduous. The main deciduous types are red maple, quaking aspen, and oak. The common evergreen species are jack pine, red (Norway) pine, and white pine. The forests are managed both to harvest the timber and to prevent fires. About 10 percent of the reservation is covered by scrub, e. g., scrub oak, pin cherry, boxelder, and young pines. Grasses cover about 15 percent of the reservation (mostly in the north impact area). Less than 2 percent of the reservation could be described as wetlands. Most of these wetlands are swamps of deciduous trees and scrub.

## FORT McCOY: TRAINING

**Maneuver Area:** Fort McCoy has 42,032 acres available for maneuver. The largest single maneuver area is 28,488 acres. The amount of maneuver land on post is significantly less than the minimum requirements for training either a light or a heavy brigade. Fort McCoy does have a limited land use agreement for training on the 79,072 acres of forest land at nearby Black River State Park.

**Cross-Country Movement:** Because it is heavily forested, a large portion of the reservation is unsuited for cross-country movement of vehicles. Steep slopes also restrict movement in some areas. Nearly level grasslands and scrub areas provide fair to good areas for movement. Movement generally becomes difficult in winter because of snow.

**Ranges:** Fort McCoy has nearly all of the ranges required to support either one light or one heavy division, although some additional range construction would be necessary if a division or a separate brigade were stationed at this post. According to FORSCOM Headquarters, the following types of ranges are available at Fort McCoy.

## FORT McCOY: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Not Adequate
Infantry Collective Skills:	Adequate

FORT McCOY: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	15,968	0	14,583	30,551
<u>Aircraft Maintenance (sf)</u>				
211	9,754	0	4,000	13,754
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	6,000	0	195,233	201,233
<u>Command, Control, and Administrative (sf)</u>				
141	5,664	0	11,361	17,025
171	0	1,560	296,288	297,848
610	0	0	198,349	198,349
72330	0	0	555,757	555,757
<u>Family Housing (units)</u>				
711	16	0	0	16
<u>Unaccompanied Personnel Housing (sf)</u>				
721	14,700	0	2,368,170	2,382,870
724	0	0	439,086	439,086
<u>Community Support (sf)</u>				
730	356	152	89,362	89,870
740	45,414	10,130	275,196	330,740

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT McCOY

Local Area

Surface area (square miles)	904
Total population	35,074

Commute Area

Total population	460,549
Total non-military employment	213,787
Total income (\$M)	9,630
Regional multiplier	2.7
Regional cost factor	1.18
Vacant housing units	10,053
Housing location factor	0.4
Variable housing allowance factor	0.030

Installation -- General

Installation area (acres)	59,779
Personnel stationed in FY 92 as in ASIP	
Officers	24
Enlisted	76
Students	0
Total military	100
Civilians	954

Installation -- Environmental

Land activity -- base-case units	0
Air activity -- base-case units	0
Water availability (excess capacity in persons)	44,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	25
Average distance to seaport (miles)	950
Seaport location	Atlantic
Mission conflict with generic units	None
Designated maneuver area (acres)	42,032
Terrain suitability factor	
Light units	10.0
Heavy units	5.0
Training variety ratings	
Climate	8
Vegetation	6
Terrain	6
River crossings	10

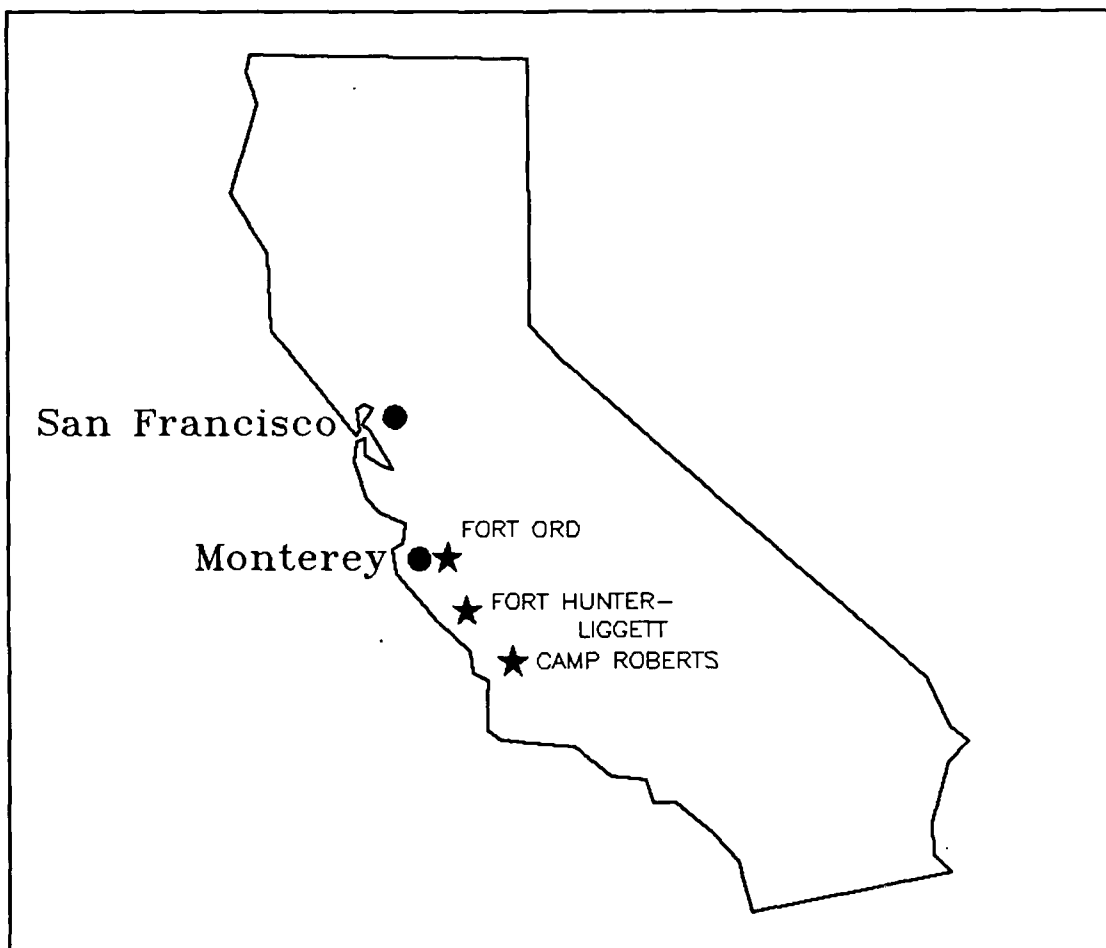
LAST PAGE OF ANNEX U

ANNEX V

FORT ORD COMPLEX

ANNEX V

FORT ORD COMPLEX



In the DBSS analysis, the Fort Ord Complex consists of Fort Ord and its sub-installations, Fort Hunter-Liggett (60 miles south of Fort Ord) and Camp Roberts (90 miles south of Ord).

**FORT ORD COMPLEX: RANGE AVAILABILITY**

**Ranges:** The table below shows the available ranges for the entire Fort Ord Complex, based on information from FORSCOM headquarters. The range facilities at Fort Ord (itself) are limited to small-arms firing only. Although Fort Hunter-Liggett does not have active ranges at this time, armor ranges are planned and artillery of any type can be fired into the central impact area. At Camp Roberts, ranges have been developed for most of the weapons in heavy and light units.

**FORT ORD COMPLEX: RANGE AVAILABILITY**

Armor:	Programmed
Infantry(MECH)/Cavalry:	Programmed
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Not Adequate
Infantry Collective Skills:	Adequate

FORT ORD COMPLEX: TOTAL FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		225,338	6,667	15,745	247,750
<u>Aircraft Maintenance (sf)</u>					
211		162,320	4,000	0	166,320
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		305,226	30,760	248,931	584,917
<u>Command, Control, and Administrative (sf)</u>					
141		128,591	51,333	470,592	650,516
171		140,926	22,085	336,050	499,061
610		142,460	21,403	745,566	909,429
72330		106,951	0	1,162	108,113
<u>Family Housing (units)</u>					
711		4,202	0	0	4,202
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,229,927	448,980	1,928,912	4,607,819
724		126,252	61,360	227,348	414,960
<u>Community Support (sf)</u>					
730		118,279	8,322	113,825	240,426
740		536,179	15,900	789,079	1,341,158

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT ORD COMPLEX**

Local Area

Surface area (square miles)	6,611
Total population	445,879

Commute Area

Total population	2,468,717
Total non-military employment	1,423,641
Total income (\$M)	82,256
Regional multiplier	2.8
Regional cost factor	1.28
Vacant housing units	31,052
Housing location factor	0.2
Variable housing allowance factor	0.574

Installation -- General

Installation area (acres)	235,040
Personnel stationed in FY 92 as in ASIP	
Officers	1,712
Enlisted	14,032
Students	168
Total military	15,912
Civilians	2,662

Installation -- Environmental

Land activity -- base-case units	32
Air activity -- base-case units	36
Water availability (excess capacity in persons)	53,998

Installation -- Training and Operations

Average distance to sub-installations (miles)	75
Average distance to airport (miles)	7
Average distance to seaport (miles)	165
Seaport location	Pacific
Mission conflict with generic units	None
Designated maneuver area (acres)	181,140
Terrain suitability factor	
Light units	5.0
Heavy units	6.0
Training variety ratings	
Climate	3
Vegetation	2
Terrain	8
River crossings	1

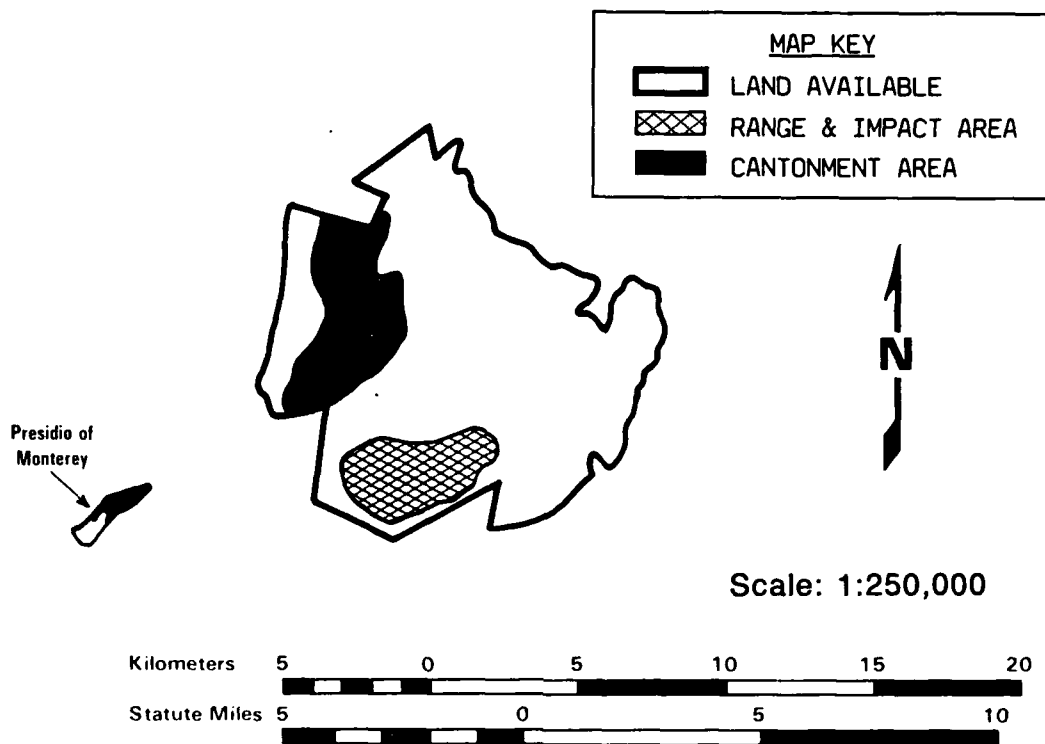
LAST PAGE OF ANNEX V

APPENDIX V-1

FORT ORD

APPENDIX V-1

FORT ORD



Fort Ord is a FORSCOM installation which is home to the 7th Infantry Division (Light) and other FORSCOM units. Tenants include the Combat Developments Experimentation Board. Fort Ord has a post population of 21,589, of which 17,957 are military personnel.

Fort Ord is located in the coastal area of central California, at the mouth of the Salinas Valley on Monterey Bay. The 28,000-acre reservation is in Monterey County, adjacent to the city of Monterey. The cantonment area is in the western portion of the reservation. California Highway 1 passes along the northern edge of Fort Ord. There is a railhead and a 3,000-foot runway on post. The nearest commercial airport is Monterey Peninsula Airport, which is 7 miles away. The nearest seaport is 115 miles to the north in San Francisco.

FORT ORD: SOCIOECONOMIC DATA

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	4
Area (Square Miles)	3,303	6,431
Population (1980)		
Urban	198,018	1,565,196
Rural	65,522	143,473
Non-rural	26,904	89,992
Total	290,444	1,798,661
Housing Units (1980)		
Owned/Occupied	50,794	371,639
Owned/Vacant	1,091	6,038
Rented/Occupied	44,940	262,289
Rented/Vacant	2,359	10,509
Other/Vacant	4,052	14,505
Housing Value of Owner Occupied Units	104,661	118,547
Mean Contract Rent (\$/month)	274	307
Employment (1982)		
Total	151,450	1,022,656
Government		
Federal Civilian	7,559	19,702
Federal Military	23,597	34,734
State & Local	15,479	98,190
Construction	3,091	26,973
Manufacturing	9,192	287,031
Wholesale/Retail Trade	24,305	169,305
Finance, Insurance & Real Estate	4,240	36,053
Services	23,245	209,353
Farm		
Proprietors	1,296	4,536
Wage & Salary	15,611	23,478
Income (1982) (\$M)		
Non-farm	2,042	20,015
Private	1,264	17,322
Government	778	2,693
Personal	3,961	26,437
Multipliers		
Export Employment	2.0358	2.7678
Export Income	1.8932	2.5764
Export Sales	2.0358	2.7678

## FORT ORD: ENVIRONMENT

**Climate:** The proximity of the Pacific Ocean tends to give Fort Ord a moderate climate year-round. A difference of 14°F separates the mean temperatures of the warmest month, September, and the coldest month, January. The mean daily maximum and minimum temperatures are 63°F and 46°F, respectively. Since more than 90 percent of the annual 14.2 inches of precipitation falls from November to April, summers are dry. Snowfall is extremely rare. From March to October, prevailing winds are from the northwest. During December and January, the prevailing winds are easterly. Fog and low clouds which move inland from the ocean are fairly frequent, especially on summer mornings. This cover generally dissipates before noon.

**Terrain:** Three landforms make up Fort Ord: low plains, low hills, and high plains. Low plains with flat to gently-rolling smooth surfaces predominate in the northern third of the reservation. The flattest areas are along the narrow sandy beach of Monterey Bay and along the Salinas River. Local relief reaches about 82 feet and slopes are less than 3 percent. Gently-rolling areas cover the remainder of the low plains and consist largely of recent dunes and hummocks behind the beach. Further inland are old stabilized dunes with numerous interdunal depressions. Local relief from the top of dunes to depressions is from 82 to 164 feet; slopes range between 3 and 8 percent. Low hills are smooth to moderately-dissected, gently- to strongly-rolling surfaces in most of the southern two-thirds of the reservation. Local relief is mainly between 230 and 475 feet; slopes are commonly from 3 to 15 percent. In the southeastern corner of the reservation, the high plains have rounded, low hills. Streams flow northeastward through narrow valleys. Rocks outcrop along the steeper valleys in the central part. Local relief is about 500 feet. Slopes are mainly between 15 and 30 percent.

**Soils:** Sand is predominant in the soils at Fort Ord. Almost the entire western-half of the reservation is covered with stabilized Pleistocene dunes or sand from old terrace deposits. Here the soil is sandy to great depths. The remainder of the reservation contains soil developed on sandy, gravelly alluvial, and terrace parent materials. Coarse-textured soils predominate.

Fine-grained materials (silts and clays) are found only in depressions, in valleys, and atop some of the sedimentary rocks in the eastern part.

**Water Resources:** The drainage pattern of the western part of Fort Ord is not well-developed since most of the runoff drains into the sand and gravel. In the eastern portion, ephemeral streams carry the occasional runoff northeastward to the Salinas River. Fort Ord has a number of small ponds and lakes that normally contain water from January to July and are used to water livestock on the reservation. Ground water is the sole source of water for all uses. Sea water intrusion into the ground water poses a real threat to existing wells.

**Vegetation:** Fort Ord has three major types of vegetative cover: forests, grasslands, and mixed scrub. About 30 percent of the reservation is deciduous forest (almost exclusively California live oak). Grasslands have the short grasses, e. g., wild oats, foxtail, rye, and forbs. About 40 percent of the reservation is covered with mixed scrub, e. g., coyote brush, manzanita, chaparral, chamise, and California sagebrush.

## FORT ORD: TRAINING

**Maneuver Area:** Fort Ord has 14,244 acres available for maneuver. The land varies from flat beach to rolling plateau. Overall, the terrain favors the training of light forces. The limited amount of maneuver area on Fort Ord restricts the training possibilities for heavy forces.

**Cross-Country Movement:** Off-road movement of tracked vehicles is generally fair to good for most of the reservation. Because of the sand, wheeled vehicles have poor mobility in the central part of the reservation and fair to good mobility on the grasslands in the northern and southern portions.

**Ranges:** The combined range availability chart was presented on page V-2 of this annex.

**FORT ORD: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		182,264	6,667	0	188,931
<u>Aircraft Maintenance (sf)</u>					
211		162,320	0	0	162,320
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		263,913	16,760	130,510	411,183
<u>Command, Control, and Administrative (sf)</u>					
141		128,591	940	319,365	448,896
171		140,926	20,995	290,618	452,539
610		90,359	3,840	633,645	727,844
72330		106,951	0	1,162	108,113
<u>Family Housing (units)</u>					
711		4,191	0	0	4,191
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,019,476	0	654,512	2,673,988
724		106,056	0	65,486	171,542
<u>Community Support (sf)</u>					
730		115,559	7,322	99,925	222,806
740		469,794	6,707	464,922	941,423

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

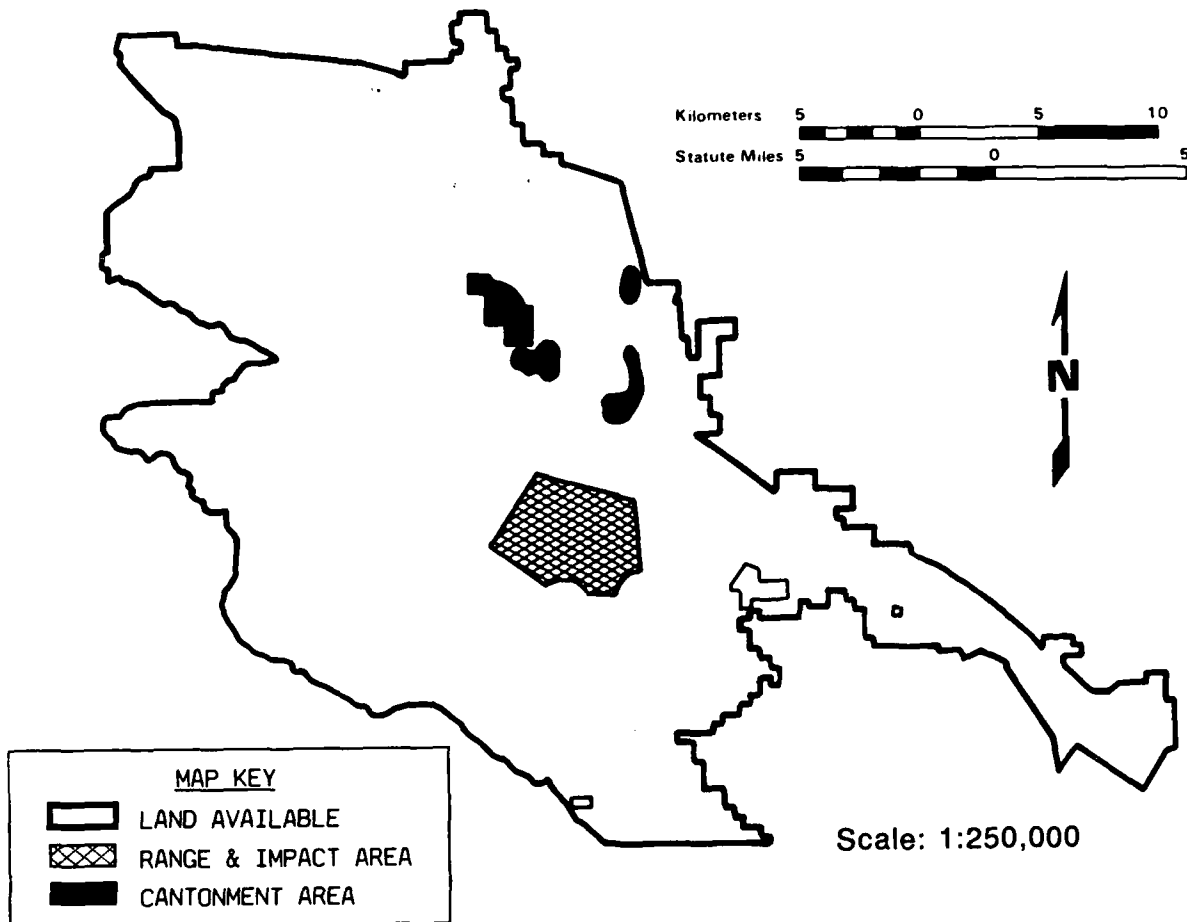
LAST PAGE OF APPENDIX V-1

APPENDIX V-2

FORT HUNTER-LIGGETT

APPENDIX V-2

FORT HUNTER-LIGGETT



Fort Hunter-Liggett is a sub-installation of Fort Ord and is a training site for the 7th Infantry Division (Light). The reservation has a current post population of 1,029, of which 855 are military personnel.

The 164,000-acre reservation is in southern Monterey County, 60 miles south of Fort Ord in the coastal area of central California. US Highway 101 runs through the Salinas Valley and passes to the east of the fort. The cantonment area is located in the northeastern portion of the reservation. On post, there is a 4,100-foot tactical airstrip.

**FORT HUNTER-LIGGETT/CAMP ROBERTS: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	3
Area (Square Miles)	6,611	12,589
Population (1980)		
Urban	198,018	529,569
Rural	103,046	214,566
Non-rural	144,815	216,365
Total	445,879	960,500
Housing Units (1980)		
Owned/Occupied	85,796	190,938
Owned/Vacant	2,209	5,024
Rented/Occupied	68,142	141,506
Rented/Vacant	3,682	9,525
Other/Vacant	9,477	13,833
Housing Value of Owner Occupied Unit	97,672	81,179
Mean Contract Rent (\$/month)	269	236
Employment (1982)		
Total	211,428	461,748
Government		
Federal Civilian	8,155	15,584
Federal Military	24,176	26,029
State & Local	26,048	58,869
Construction	5,773	14,013
Manufacturing	12,534	33,771
Wholesale/Retail Trade	37,691	83,602
Finance, Insurance & Real Estate	6,308	18,083
Services	34,726	75,362
Farm		
Proprietors	2,774	10,436
Wage & Salary	17,783	38,268
Income (1982) (\$M)		
Non-farm	2,838	6,232
Private	1,848	4,530
Government	990	1,702
Personal	5,624	11,370
Multipliers		
Export Employment	2.3346	2.8471
Export Income	2.1155	2.5268
Export Sales	2.3346	2.8471

## FORT HUNTER-LIGGETT: ENVIRONMENT

**Climate:** Fort Hunter-Liggett has two distinct seasons. The dry season extends from May to October and the wet season lasts from November to April. Average annual precipitation is 21 inches. Daily fluctuations in temperature exceeding 50°F are not uncommon in the valleys. Though close to the Pacific Ocean, the fort is barred from this modifying influence by the high Santa Lucia Coastal Range. During July, August, and September, the average high is 92°F. During December, January, and February, the average low is 32°F. Snow has been known to fall on the higher ranges in the northern and western regions of the reservation.

**Terrain:** Fort Hunter-Liggett is on the eastern (landward) side of the Santa Lucia Coastal Range. Landforms consist of low and high plains, and low and high hills. Low plains are flat to gently rolling surfaces located predominantly in the flood plains of the lower two-thirds of the San Antonio River (in the northeastern portion of the reservation). There is little stream dissection and few rock outcrops. Local relief is generally less than 164 feet. Slopes are less than 3 percent. The high plains, in the central and northeastern part of the reservation, are moderately rolling and smooth to moderately dissected. Local relief varies between 164 and 459 feet; slopes generally range from 3 to 15 percent (30 percent locally). Low hills, which are smooth to highly dissected and moderate to steep, are scattered in the central and eastern portions of the reservation. Slopes are between 15 and 45 percent. Local relief is generally between 590 and 722 feet, particularly in the narrow valleys and canyons. Rock outcrops are common here. High plains cover the western-third of the reservation and are moderately rounded to rugged crests with narrow, highly-dissected valleys. Rock outcrops are plentiful. Local relief varies from 1,148 to 2,460 feet and slopes are between 30 and 60 percent.

**Soils:** The soil at Fort Hunter-Liggett is predominately sand and sand mixtures which have developed from a variety of rock types. Although soil depths can reach many feet thick in the alluvial deposits, most of the reservation's soils are less than 16 inches in depth. Due to the topography,

the soil is unaffected by a seasonal high-water table (although some low-lying areas along major streams are occasionally flooded). The soil is primarily alkaline and has a low organic content.

**Water Resources:** The surface drainage consists of two river systems flowing parallel to each other in a southeasterly direction. The Nacimiento River drains the southwestern half, while the San Antonio River drains the northeastern half of the reservation. Both systems have relatively short western tributaries which flow through steep, narrow valleys. The eastern tributaries are generally longer and have wide, shallow valleys. During the summer months virtually all of the tributaries are dry except for occasional flow from springs. Even the two major rivers may be dry in some spots from July to October. Flash flooding may occur between November and April. Twenty-six small reservoirs dot the reservation and range in size up to 24 acres. The San Antonio Reservoir, at the eastern tip of the reservation, has a capacity of 350,000 acre-feet. The equally large Nacimiento Reservoir lies outside the reservation parallel to the San Antonio Reservoir. Ground water is the sole source of water for the reservation.

**Vegetation:** Three types of vegetation cover Fort Hunter-Liggett: forests, grasslands, and scrub. The forest cover is predominantly deciduous and includes canyon live oak, blue oak, valley white oak, California sycamore, and Fremont cottonwood. Undergrowth varies from fairly open areas of grass and forbs to dense patches of brush and scrub trees. The grasslands have rye, oxtail, and wild oats. About half of the reservation is covered by a mixture of deciduous and coniferous scrub. Species include chaparral, manzanita, chamise, mountain mahogany, buckbrush, and scrub oak.

## FORT HUNTER-LIGGETT: TRAINING

**Maneuver Area:** Fort Hunter-Liggett's 138,535 acres of maneuver area satisfies the requirements for either one light or one heavy division. The landforms include both plains and hills. Vegetation is sparse, allowing for good maneuver for all types of units. According to a 1963 agreement with the California State Wildlife Commission, much of the reservation is covered by conservation and wildlife management programs. The agreement also opened the post to civilian conservationists and hunters.

**Cross-Country Movement:** Movement is generally fair to good on the low and high plains of the river valleys. As slopes increase, the areas become unsuitable for wheeled vehicles and fair to poor for tracked vehicles. A large portion of the reservation, particularly the high plains, are unsuited for all vehicles and poor for foot troops.

**Ranges:** The combined range availability chart was presented on page V-2 of this annex.

**FORT HUNTER-LIGGETT: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		29,874	0	15,745	45,619
<u>Aircraft Maintenance (sf)</u>					
211		0	4,000	0	4,000
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		25,966	4,000	0	29,966
<u>Command, Control, and Administrative (sf)</u>					
141		0	960	1,300	2,260
171		0	1,090	0	1,090
610		52,101	10,124	17,916	80,141
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		9	0	0	9
<u>Unaccompanied Personnel Housing (sf)</u>					
721		210,451	0	0	210,451
724		20,196	0	15,775	35,971
<u>Community Support (sf)</u>					
730		2,720	1,000	4,192	7,912
740		66,385	9,193	10,592	86,170

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

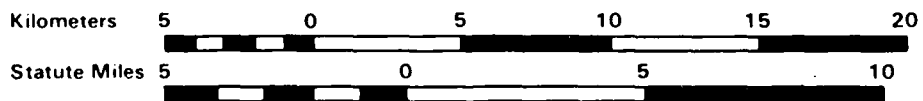
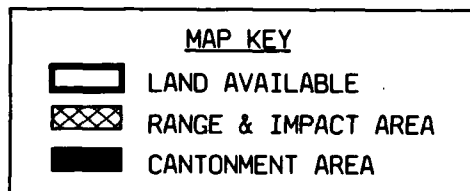
APPENDIX V-3

CAMP ROBERTS

APPENDIX V-3

CAMP ROBERTS

Scale 1:250,000



Camp Roberts is a sub-installation of Fort Ord that is currently leased to the state of California for reserve component training. It has a current population of 427, of which 171 are military personnel.

Camp Roberts is in central California, about 30 miles southeast of Fort Hunter-Liggett and about 20 miles from the coast. The city of Paso Robles lies immediately to the south. The 44,000-acre reservation straddles Monterey and San Luis Obispo Counties. US Highway 101 passes north-to-southeast through the reservation. The cantonment area is along US Highway 101 at the east-central area of the reservation. On post, there is a 2,740-foot runway.

**CAMP ROBERTS/FORT HUNTER-LIGGETT: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	3
Area (Square Miles)	6,611	12,589
<b>Population (1980)</b>		
Urban	198,018	529,569
Rural	103,046	214,566
Non-rural	144,815	216,365
Total	445,879	960,500
<b>Housing Units (1980)</b>		
Owned/Occupied	85,796	190,938
Owned/Vacant	2,209	?,???
Rented/Occupied	68,142	141,506
Rented/Vacant	3,682	9,525
Other/Vacant	9,477	13,833
Housing Value of Owner Occupied Unit	97,672	81,179
Mean Contract Rent (\$/month)	269	236
<b>Employment (1982)</b>		
Total	211,428	461,748
Government		
Federal Civilian	8,155	15,584
Federal Military	24,176	26,029
State & Local	26,048	58,869
Construction	5,773	14,013
Manufacturing	12,534	33,771
Wholesale/Retail Trade	37,691	83,602
Finance, Insurance & Real Estate	6,308	18,083
Services	34,726	75,362
Farm		
Proprietors	2,774	10,436
Wage & Salary	17,783	38,268
<b>Income (1982) (\$M)</b>		
Non-farm	2,838	6,232
Private	1,848	4,530
Government	990	1,702
Personal	5,624	11,370
<b>Multipliers</b>		
Export Employment	2.3346	2.8471
Export Income	2.1155	2.5268
Export Sales	2.3346	2.8471

## CAMP ROBERTS: ENVIRONMENT

**Climate:** The climate is mild at Camp Roberts. Mean maximum temperatures during July, August, and September average 92°F. Winter mean minimum temperatures average slightly above 32°F. Cold air from the mountains in the west settles in the valleys overnight and causes some large variations in temperatures. Precipitation is comparatively light and averages 11.1 inches per year (most of which falls during the winter). Snow is rare and invariably melts upon contact with the ground. Winds prevailing from the northwest are light throughout most of the year.

**Terrain:** Camp Roberts is in the upper Salinas River Basin in the California Coast Range. Landforms include low plains, high plains, and low hills. The low plains are flat to gently-rolling surfaces in the flood plains of the three rivers. Some stream dissection occurs on the edges of the flood plains, and sandy areas are common in braided dry channels of the rivers. No rock outcrops occur. Local relief reaches up to 82 feet and slopes are less than 3 percent. Slopes may reach 8 percent along edges of flood plains and in the more rolling areas. Adjacent to the flood plains, the high plains are gently- to strongly-rolling, with smooth to moderately-dissected surfaces. Some rock outcrops occur. Local relief is mainly between 164 and 246 feet; slopes are 8 to 15 percent. In the southwestern corner of the reservation, the low hills are round to moderately dissected. Some narrow valleys extend eastward and northeastward. Rock outcrops occur locally. Local relief is generally between 492 and 558 feet. Slopes are generally about 30 percent and locally 45 percent.

**Soils:** Soils are predominately loams and sands. The loams are formed in place from underlying soft shales and mudstones. Sandy soils are a product of weathering and water sorting of older alluvial deposits. The valleys or low plains are mainly sandy loam with alluvium of sand, gravel, and cobbles in the stream beds. Silty clay loams and granular loams occur in the high plains and low hills.

**Water Resources:** All of the installation's surface drainage flows into the Salinas River and its tributaries, the Nacimiento and San Antonio Rivers. The Nacimiento River drains about 70 percent of the reservation. This includes the western, southern, and central regions. The San Antonio forms about 3 miles of the northwest boundary of the reservation. The Salinas River passes through the eastern and northern region. The Salinas is a perennial stream that flows through a fairly wide, gradually-sloped, flood plain. The flows in the Nacimiento and the San Antonio Rivers are controlled by reservoirs just west of the reservation. During the summer months virtually all tributaries are dry except for the flow from an occasional spring. Flash flooding is not a problem. Much of the surface water percolates through the surface material and enters the underground aquifers. Ground water is the sole source of water at Camp Roberts.

**Vegetation:** Camp Roberts has three types of vegetative cover: forests, grasslands, and scrub. The deciduous forest covers 30 to 40 percent of the reservation. Oaks, sycamores, and cottonwoods are the dominant species. Forest undergrowth is almost non-existent. Grasslands cover 50 percent of the reservation. The primary species are foxtail, rye, and wild oats. Mixed deciduous and coniferous scrub is limited to the higher elevations in the western portion of the reservation.

## CAMP ROBERTS: TRAINING

**Maneuver Area:** Camp Roberts has a total of 28,361 acres available for maneuver. The landforms here are quite similar to those at Fort Hunter-Liggett and allow maneuver by all types of forces. However, the possibilities for large-scale maneuver are limited at Camp Roberts, because it has only a modest amount of open space.

**Cross-Country Movement:** Off-road movement of vehicles for most of the reservation is fair to good. The exception is the low-hills area in the southwestern corner of the reservation, where the terrain makes it poor to unsuitable for passage by both wheel and track vehicles.

**Ranges:** The combined range availability chart was presented on page V-2 of this annex.

**CAMP ROBERTS: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		13,200	0	0	13,200
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		7,333	0	118,421	125,754
<u>Command, Control, and Administrative (sf)</u>					
141		0	49,433	149,927	199,360
171		0	0	45,432	45,432
610		0	7,439	94,005	101,444
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		2	0	0	2
<u>Unaccompanied Personnel Housing (sf)</u>					
721		0	448,980	1,274,400	1,723,380
724		0	61,360	146,087	207,447
<u>Community Support (sf)</u>					
730		0	0	9,708	9,708
740		0	0	313,565	313,565

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

LAST PAGE OF APPENDIX V-3

ANNEX W

FORT POLK COMPLEX

ANNEX W

FORT POLK COMPLEX



For the purposes of this study, Fort Polk and two training areas, Peason Ridge and Horse's Head, are considered to be an installation complex. Fort Polk is located in the west-central part of Louisiana, 43 miles southwest of Alexandria. Peason Ridge and Horse's Head training areas are about 12 and 20 miles north of Fort Polk, respectively.

**FORT POLK COMPLEX: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		130,052	0	32,661	162,713
<u>Aircraft Maintenance (sf)</u>					
211		76,336	24,946	0	101,282
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		441,664	0	585,758	1,027,422
<u>Command, Control, and Administrative (sf)</u>					
141		200,324	120	420,193	620,637
171		31,663	146,854	273,398	451,915
610		0	36,898	405,160	442,058
72330		432,980	0	0	432,980
<u>Family Housing (units)</u>					
711		3,073	0	0	3,073
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,238,020	0	1,054,476	2,292,496
724		106,485	7,920	235,471	349,876
<u>Community Support (sf)</u>					
730		34,136	99	166,014	200,249
740		465,751	31,822	288,973	786,546

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in AR 415-28. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

For the sub-installations of Peason Ridge and Horse's Head training areas, IFS lists none of the above facilities.

**SUMMARY OF KEY DATA: FORT POLK**

**Local Area**

Surface area (square miles)	3,450
Total population	118,618

**Commute Area**

Total population	326,938
Total non-military employment	100,725
Total income (\$M)	5,605
Regional multiplier	2.4
Regional cost factor	0.97
Vacant housing units	16,291
Housing location factor	0.3
Variable housing allowance factor	0.000

**Installation -- General**

Installation area (acres)	198,375
Personnel stationed in FY 92 as in ASIP	
Officers	1,440
Enlisted	13,296
Students	100
Total military	14,836
Civilians	2,900

**Installation -- Environmental**

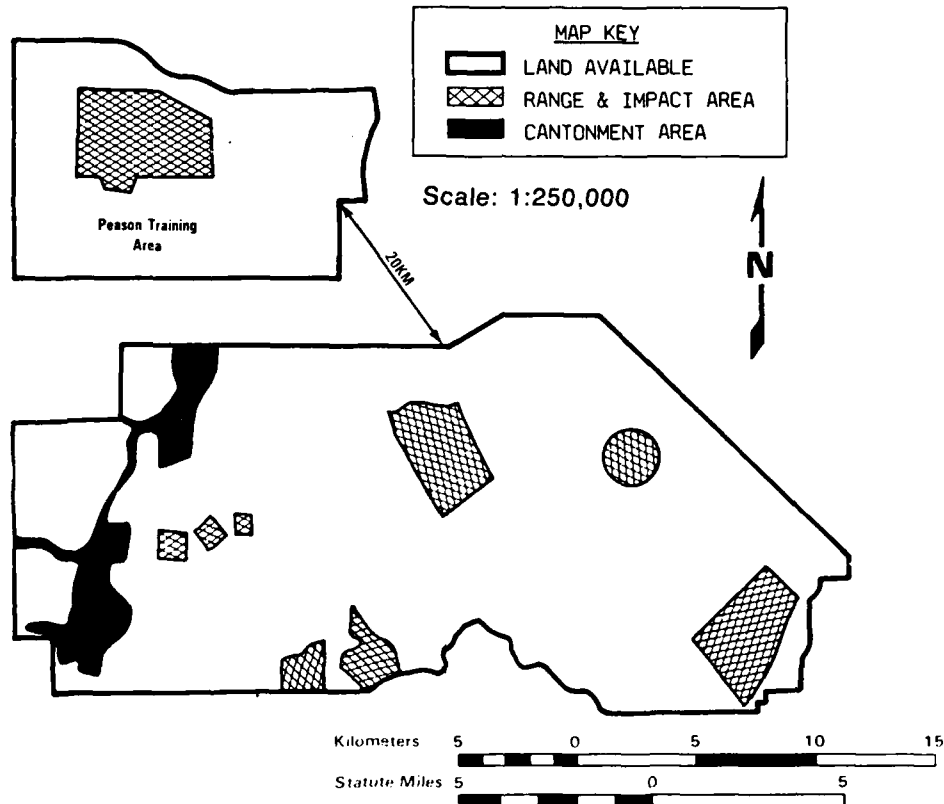
Land activity -- base-case units	119
Air activity -- base-case units	41
Water availability (excess capacity in persons)	38,000

**Installation -- Training and Operations**

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	56
Average distance to seaport (miles)	181
Seaport location	Gulf
Mission conflict with generic units	None
Designated maneuver area (acres)	123,697
Terrain suitability factor	
Light units	10.0
Heavy units	7.0
Training variety ratings	
Climate	3
Vegetation	5
Terrain	1
River crossings	0

ANNEX W

FORT POLK



Fort Polk is a FORSCOM installation. It is the home of the 5th Infantry Division (Mechanized), which is composed of two active component brigades and one reserve component brigade. Many small FORSCOM units are also stationed there. The total post population of Fort Polk is 17,428, of which 15,457 are military personnel.

Fort Polk is located in the west-central part of Louisiana, 43 miles southwest of Alexandria. The main installation consists of 151,780 acres owned by the Army and the US Forest Service. The cantonment area is in the western part of the reservation. Fort Polk is in Vernon Parish (a parish is equivalent to a county). US Highway 171 and Louisiana Routes 8, 28, and 117 provide access to the reservation. On post, Fort Polk has a railhead and a

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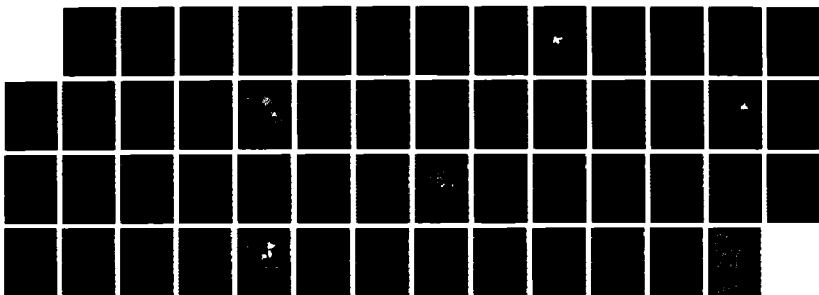
DIVISION AND BRIGADE STATIONING SYSTEM: INSTALLATION  
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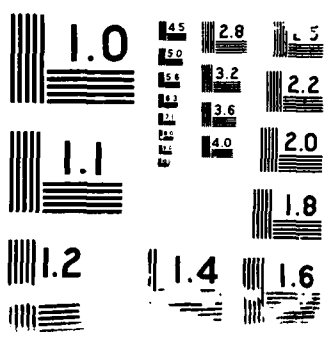
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4,100-foot runway. England Air Force base is 56 miles away. The nearest commercial airfield is De Ridder Municipal Airport, which is 22 miles from post. The closest seaports to Fort Polk are New Orleans, Louisiana (252 miles away) and Houston, Texas (181 miles away).

About 12 miles north of Fort Polk, Peason Ridge training area is composed of 33,490 acres of both Army and forest service land. An additional 10 miles north is the Horse's Head training area, which encompasses about 13,000 acres of limited-use forest service land. The two training areas are found in Vernon, Natchitoches, and Sabine Parishes.

**FORT POLK COMPLEX: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	3	8
Area (square miles)	3,450	8,141
<b>Population (1980)</b>		
Urban	0	92,742
Rural	73,812	168,575
Non-rural	44,806	65,621
Total	118,618	326,938
<b>Housing Units (1980)</b>		
Owned/Occupied	25,197	74,615
Owned/Vacant	427	1,083
Rented/Occupied	12,441	32,367
Rented/Vacant	1,590	3,734
Other/Vacant	4,616	11,474
Housing Value of Owner Occupied Units	34,804	35,904
Mean Contract Rent (\$/month)	134	131
<b>Employment (1982)</b>		
Total	45,583	119,695
Government		
Federal Civilian	3,427	6,098
Federal Military	14,906	18,970
State & Local	6,592	20,599
Construction	835	4,020
Manufacturing	2,480	9,017
Wholesale/Retail Trade	4,893	17,627
Finance, Insurance & Real Estate	768	3,562
Services	4,327	17,969
Farm		
Proprietors	2,494	6,063
Wage & Salary	489	1,582
<b>Income (1982) (\$M)</b>		
Non-farm	560	1,557
Private	213	900
Government	348	656
Personal	828	2,492
<b>Multipliers</b>		
Export Employment	1.8046	2.3549
Export Income	1.6587	2.1710
Export Sales	1.8046	2.3549

## FORT POLK COMPLEX: ENVIRONMENT

**Climate:** Because the climate is humid subtropical, Fort Polk has long, hot summers and mild winters. January has a mean low of 38°F; July has a mean high 93°F. Prevailing winds are from the south during much of the year. Northerly winds accompany cold fronts during the winter months. The warm, moist, maritime air from the Gulf of Mexico lessens the summer heat and the duration of cold air masses. Isolated severe storms, hailstorms, and tornadoes may occur, most frequently during the spring. Tropical cyclones have usually lost most of their intensity by the time they reach the reservation. Rainfall is generally heavy -- annual totals averaging 53 inches. Rainfall is most abundant during the winter and spring. Snowfall is scant and usually totals less than an inch.

**Terrain:** The reservation has a rolling and hilly surface with scattered prominent ridges. Gently rolling surfaces are separated by flat to gently-undulating areas along the major drainage features. Slopes are generally less than 3 percent; slopes vary between 15 and 30 percent on the rolling hilly plains and ridges. The highest local relief is 160 feet. The elevation varies from 200 to 425 feet above mean sea level.

**Soils:** In general, the reservation is mantled with a fine-grained silty sand. This topsoil is underlain at varying depths by a sandy, clay subsoil that may locally be underlain by fine-grained sandstone or siltstone. Scattered outcrops of sandstone occur at various locations. A relatively thick layer of plastic clay occurs in the northern third of the main post. The flood plains consist largely of silty and sandy soils that are underlain by silty clays. These excessively well-drained soils are subject to severe erosion. Although the soils of the flood plains and low terraces are generally well drained, large areas are poorly drained for prolonged periods during the rainy season.

**Water Resources:** The surface waters of Fort Polk flow into three drainage basins: the Sabine River, the Calcasieu River, and the Red River-Kisatchie Creek. Numerous small creeks dissect the area. There are no natural lakes within the reservation; but, there are several man-made ponds and lakes which

range from 2 to 35 acres. During periods of heavy rainfall, stream flows may damage or destroy roads and bridges. Major flood plains on the reservation are frequently flooded. Ground water is abundant everywhere on the reservation.

**Vegetation:** The four major vegetation patterns represented on the reservation are: forests, grasslands, agricultural lands, and wetlands. Forests cover about 95 percent of the installation. Nearly three-quarters of the forested area is coniferous; the major coniferous timber-producing species are loblolly, longleaf, and slash pine. Timber sales are made year round. The major deciduous timber-producing species are sweetgum, water oak, swamp chestnut oak, willow oak, swamp tupelo, and beech. They are also managed for special objectives such as stream filter and buffer strips, wetlands, and wildlife habitats. Grasslands, with grasses up to 3 feet in height, make up about 2 percent of the installation. Within the Fort Polk reservation is a small amount of privately-owned agricultural land. Wetlands, represented by a swamp area in the southwest portion of the main post, cover less than 1 percent of the reservation. The remaining surface area either has no vegetative cover or is covered by water.

## FORT POLK COMPLEX: TRAINING

**Maneuver Area:** Fort Polk has 101,377 acres of on-post maneuver area. The Peason Ridge and Horse's Head training areas add about 22,000 acres of maneuver land. About 85 percent of the Peason Ridge area is open, and is well suited for heavy unit maneuver.

**Cross-Country Movement:** Off-road movement of vehicles is generally fair throughout the reservation, primarily due to the low density of the vegetation. Densely wooded areas and flood plains are generally poor to unsuitable for movement. After heavy rains, movement may be degraded for short periods.

**Ranges:** Fort Polk has sufficient ranges to support the training requirements of one light or one heavy division. According to FORSCOM headquarters, the following ranges are available at Fort Polk.

### FORT POLK COMPLEX: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

**FORT POLK COMPLEX: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		130,052	0	32,661	162,713
<u>Aircraft Maintenance (sf)</u>					
211		76,336	24,946	0	101,282
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		441,664	0	585,758	1,027,422
<u>Command, Control, and Administrative (sf)</u>					
141		200,324	120	420,193	620,637
171		31,663	146,854	273,398	451,915
610		0	36,898	405,160	442,058
72330		432,980	0	0	432,980
<u>Family Housing (units)</u>					
711		3,073	0	0	3,073
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,238,020	0	1,054,476	2,292,496
724		106,485	7,920	235,471	349,876
<u>Community Support (sf)</u>					
730		34,136	99	166,014	200,249
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For the sub-installations of Peason Ridge and Horse's Head training areas, IFS lists none of the above facilities.

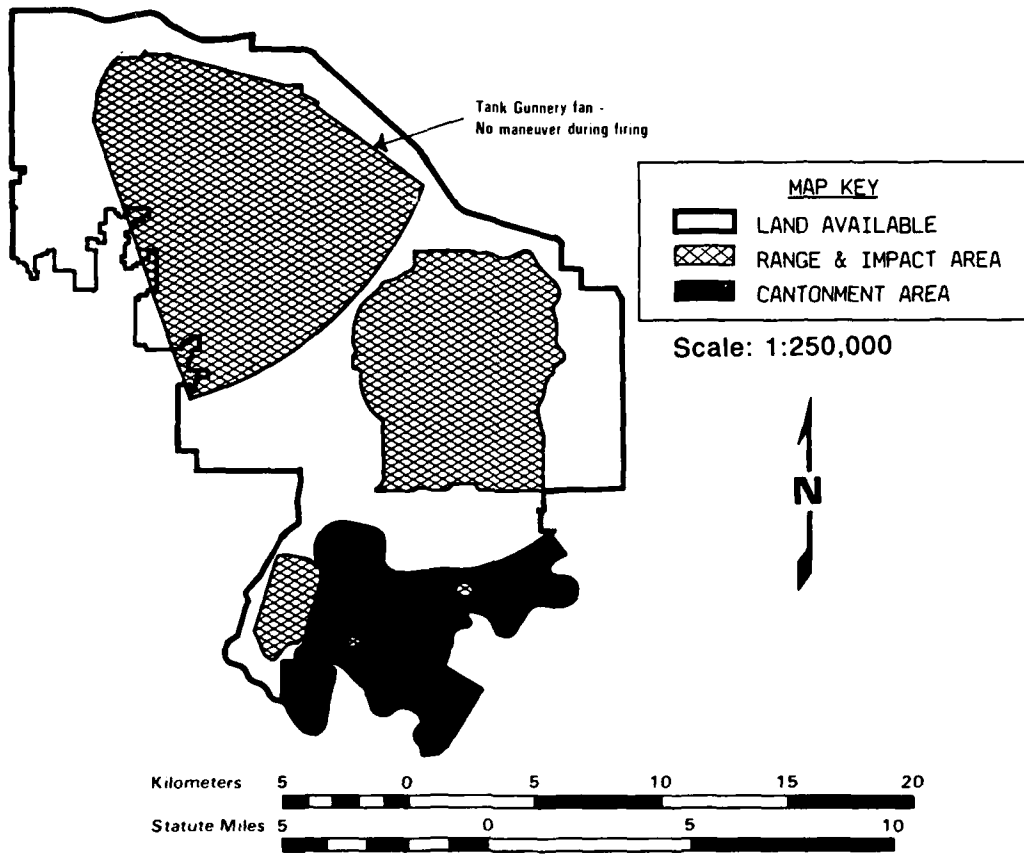
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ANNEX X

FORT RILEY

ANNEX X

FORT RILEY



Fort Riley is a FORSCOM installation. Although Fort Riley is the home of the 1st Infantry Division (Mechanized), one brigade is stationed in the Federal Republic of Germany. The 3rd ROTC Region, the 937th Engineer Group (Combat), the 716th Military Police Battalion, and an Army correctional activity are also stationed there. The total post population is 20,010, of which 16,546 are military personnel.

Fort Riley is located in northeastern Kansas adjacent to Junction City. It covers about 101,000 acres of Clay, Riley, and Geary Counties. The reservation extends about 18 miles north-south and 15 miles east-west. The cantonment area is at the south end of the reservation. Interstate 70, US

Highway 77, and Kansas Highway 18 serve the reservation. On post, Fort Riley has railhead and a 4,500- by 500-foot runway. Manhattan Municipal Airport, which has a 5,500-foot runway, is 8 miles from Fort Riley. The closest airfield capable of handling heavy jets is Forbes Air Force Base, which is 70 miles east. The nearest major seaport is at Houston, Texas, 738 rail miles from Fort Riley.

**FORT RILEY: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	3	8
Area (square miles)	1,602	5,492
<b>Population (1980)</b>		
Urban	0	0
Rural	30,338	71,729
Non-rural	72,821	85,644
Total	103,159	157,373
<b>Housing Units (1980)</b>		
Owned/Occupied	16,479	32,411
Owned/Vacant	318	747
Rented/Occupied	16,695	21,219
Rented/Vacant	1,310	1,976
Other/Vacant	1,288	2,755
Housing Value of Owner Occupied Units	44,335	38,451
Mean Contract Rent (\$/month)	180	169
<b>Employment (1982)</b>		
Total	58,911	83,358
Government		
Federal Civilian	4,421	4,682
Federal Military	19,542	19,976
State & Local	9,849	13,108
Construction	1,047	2,280
Manufacturing	1,831	3,794
Wholesale/Retail Trade	7,454	11,285
Finance, Insurance & Real Estate	1,493	2,052
Services	6,360	8,588
Farm		
Proprietors	1,807	6,235
Wage & Salary	512	1,524
<b>Income (1982) (\$M)</b>		
Non-farm	726	968
Private	255	455
Government	471	513
Personal	971	1,505
<b>Multipliers</b>		
Export Employment	1.9016	2.0331
Export Income	1.7539	1.9278
Export Sales	1.9016	2.0331

## FORT RILEY: ENVIRONMENT

**Climate:** Fort Riley has a temperate climate. Summers are hot and often wet, while winters are cool and dry. On most days during July and August, the temperature reaches 90°F or higher. January has average low temperature of 16°F. About 70 percent of the annual 31 inches of precipitation falls from April to September. Thunderstorms are common from April to October. In spring and early summer, there is also the threat of hail, strong winds, and tornadoes. Prevailing winds are from south to southwest. During February and March, winds typically come from the north. Average annual snowfall is about 20 inches.

**Terrain:** Fort Riley is located within the Osage Plains Section of the Central Lowlands Province. The reservation contains two landform types: low plains and high plains. The low plains include the gently-sloping, loess-covered plains and the level alluvial plains of the rivers. Local relief is between 25 and 60 feet. Although generally 3 to 8 percent, slopes can range from 1 to 15 percent. The high plains are the steep, dissected, residual limestone and shale areas between the uplands and the valley floors. Local relief is from 164 to 240 feet. Here, slopes vary from 20 to 35 percent. Steep escarpments have formed in portions of the valley walls of the major rivers (slopes are as high as 60 percent).

**Soils:** The area of Fort Riley is covered with about a foot of loess that rests upon alternating strata of weathered limestones and shales. The soil is mostly a crumbly, silty loam overlying clays. This shallow clay soil is almost impermeable.

**Water Resources:** The southern tip of Fort Riley is at the confluence of the Republican and Kansas Rivers. Milford Lake, a major reservoir on the Republican River, forms parts of the western border of the reservation. In general, the tributaries on Fort Riley flow high from April to July and low from September to January.

**Vegetation:** About 75 percent of Fort Riley is covered by grass (largely as tall grass prairies). Naturally occurring deciduous trees and shrubs are largely confined to drainage ways, flood plains, and their adjacent hillsides. Eastern red cedar is the only coniferous species on the reservation.

## FORT RILEY: TRAINING

**Maneuver Area:** Fort Riley has a total maneuver area of 67,351 acres, which decreases to about 30,000 usable acres when tank gunnery ranges are in operation. The terrain is rolling, open, and excellent for maneuver of heavy units. Only 15 percent of the maneuver area is wooded (mostly in the watershed defiles).

**Cross-Country Movement:** Off-road movement is good throughout the reservation except in the narrow and eroded tributaries.

**Ranges:** According to FORSCOM headquarters, the following types of ranges are available at Fort Riley.

## FORT RILEY: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

FORT RILEY: FACILITIES

Facility Groups Category Codes (Units)	Permanent	Semi- permanent	Temporary	Total
<u>Aircraft Parking (sy)</u>				
113	203,273	0	7,240	210,513
<u>Aircraft Maintenance (sf)</u>				
211	148,790	0	0	148,790
21740	0	0	0	0
<u>Vehicle Maintenance (sf)</u>				
214	557,466	0	132,783	690,249
<u>Command, Control, and Administrative (sf)</u>				
141	163,140	0	253,531	416,671
171	169,106	1,632	161,164	331,902
610	466,030	0	26,418	492,448
72330	233,226	0	0	233,226
<u>Family Housing (units)</u>				
711	2,938	0	0	2,938
<u>Unaccompanied Personnel Housing (sf)</u>				
721	2,175,792	0	697,904	2,873,696
724	167,945	0	11,235	179,180
<u>Community Support (sf)</u>				
730	112,982	0	63,236	176,218
740	668,635	4,320	176,558	849,513

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

SUMMARY OF KEY DATA: FORT RILEY

Local Area

Surface area (square miles)	1,602
Total population	103,159

Commute Area

Total population	157,373
Total non-military employment	63,382
Total income (\$M)	3,441
Regional multiplier	2.0
Regional cost factor	0.92
Vacant housing units	5,478
Housing location factor	0.4
Variable housing allowance factor	0.155

Installation -- General

Installation area (acres)	101,056
Personnel stationed in FY 92 as in ASIP	
Officers	1,556
Enlisted	13,904
Students	142
Total military	15,602
Civilians	2,089

Installation -- Environmental

Land activity -- base-case units	125
Air activity -- base-case units	41
Water availability (excess capacity in persons)	55,395

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	70
Average distance to seaport (miles)	738
Seaport location	Gulf
Mission conflict with generic units	None
Designated maneuver area (acres)	67,351
Terrain suitability factor	
Light units	5.0
Heavy units	7.0
Training variety ratings	
Climate	6
Vegetation	3
Terrain	3
River crossings	9

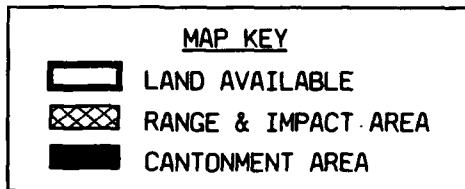
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ANNEX Y

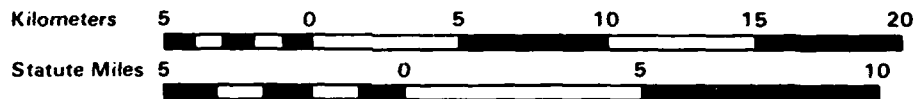
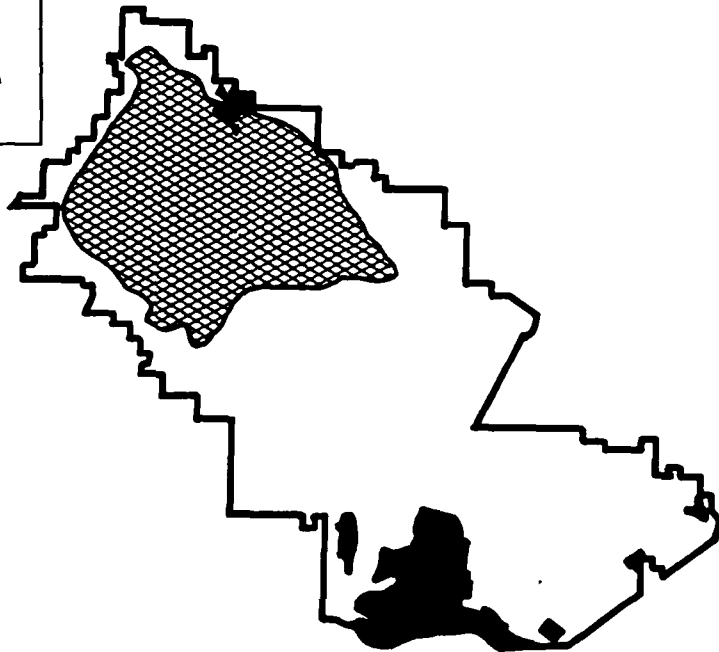
FORT RUCKER

ANNEX Y

FORT RUCKER



Scale 1:250,000



Fort Rucker is a TRADOC installation that serves as the home of the US Army Aviation Center and School. An combat heavy engineer battalion is also resident. Fort Rucker has a post population of 10,366, of which 4,440 are military personnel.

The 58,000-acre reservation is located in Dale and Coffee counties of southeast Alabama between the cities of Dothan, Enterprise, and Ozark. Off post, there are a number of owned and leased sites, which function as helicopter landing zones, helipads, and airfields. The 3,686-acre cantonment area is at the northern end of the reservation. US Highways 84 and 231 skirt the east

and west sides of the main post. Fort Rucker has a railhead, plus three 4,500-foot runways on post. The nearest major heavy-jet airfield is 90 miles away at Eglin Air Force Base, Florida. Ten miles from the post is the Enterprise Municipal Airport, which has two 3,500-foot runways. The nearest major seaport is 165 to the southwest in Mobile, Alabama.

**FORT RUCKER: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	11
Area (square miles)	1,242	7,587
<b>Population (1980)</b>		
Urban	2,935	51,976
Rural	34,661	182,484
Non-rural	48,758	123,724
Total	86,354	358,184
<b>Housing Units (1980)</b>		
Owned/Occupied	18,848	88,668
Owned/Vacant	287	1,438
Rented/Occupied	9,750	35,190
Rented/Vacant	968	3,837
Other/Vacant	1,237	5,998
Housing Value of Owner Occupied Units	37,070	32,617
Mean Contract Rent (\$/month)	137	110
<b>Employment (1982)</b>		
Total	39,020	152,446
Government		
Federal Civilian	4,022	5,029
Federal Military	8,199	10,599
State & Local	4,115	21,488
Construction	740	4,481
Manufacturing	7,958	31,606
Wholesale/Retail Trade	3,955	22,033
Finance, Insurance & Real Estate	689	3,797
Services	3,633	18,413
Farm		
Proprietors	2,259	12,743
Wage & Salary	415	3,238
<b>Income (1982) (\$M)</b>		
Non-farm	538	1,758
Private	275	1,254
Government	262	504
Personal	705	2,890
<b>Multipliers</b>		
Export Employment	1.6523	2.2503
Export Income	1.5303	2.1602
Export Sales	1.6523	2.2503

## FORT RUCKER: ENVIRONMENT

**Climate:** Typical of the southeastern United States, Fort Rucker has hot, humid summers and relatively mild winters. During the summer months, the daily highs often climb above 100°F. During the winter, daily temperatures rarely fall below freezing. Snow is extremely rare and seldom remains on the ground for more than a day.

**Terrain:** The terrain in and around Fort Rucker is gently rolling; some areas have moderately steep slopes. Elevations range from 150 to 450 feet.

**Soils:** The soils at Fort Rucker are loamy sands that are generally well drained. The surface soils are delicate, however, and lose their ability to re-establish a ground cover if they are disturbed too frequently. Since uncovered areas are quickly eroded, damage can be extensive if control measures are not taken.

**Water Resources:** Basically, Fort Rucker gets its water from six wells on post. A number of small waterways flow year round (a few continue to flow during extended dry periods). Fort Rucker also has the 69-acre Lake Tholocco, which is primarily used for recreation.

**Vegetation:** This part of southeastern Alabama supports a wide variety of trees and other native vegetation. In the ecological succession of the upland areas, native grasses and other plants are followed by thick stands of scrubby oak and blackjack oak. Upland areas are generally covered with slash pine and longleaf pine. On Fort Rucker, there is an intensive forest management program which includes contracted timber harvesting.

## FORT RUCKER: TRAINING

**Maneuver Area:** Although Fort Rucker has 40,525 acres of maneuver area, there are significant restrictions on its use. The Survival, Evasion, Resistance, Escape, and Rescue (SERER) training activities of the Aviation School takes up large parcels of land. In addition, the continuous helicopter operations on post (with their use of air space and communications frequencies) limits the possibilities of large scale, combined-arms maneuvers at Fort Rucker.

**Cross-Country Movement:** The terrain at Fort Rucker is gently rolling with a few moderately steep slopes. A network of trails and firebreaks throughout the training area permits cross-country movement of all classes of tactical vehicles. However, the installation's clay-sand soils limits movement during extended periods of wet weather. In such situations, unstabilized road surfaces can become rutted after only three vehicles pass by.

**Ranges:** The range complex at Fort Rucker is designed to support the training needs of the Aviation Center and School. As a result, the installation lacks a number of the ranges needed for combined-arms training. Based on master planning documents, Fort Rucker has the following types of ranges.

### FORT RUCKER: RANGE AVAILABILITY

Armor:	Unknown
Infantry(MECH)/Cavalry:	Unavailable
Anti-Armor:	Unavailable
Aviation:	Excellent
Individual/Crew Weapons:	Unavailable
Indirect Fire Weapons:	Unavailable
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable

**FORT RUCKER: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		514,788	0	0	514,788
<u>Aircraft Maintenance (sf)</u>					
211		306,498	16,000	0	322,498
21740		0	0	10,839	10,839
<u>Vehicle Maintenance (sf)</u>					
214		19,712	15,475	65,006	100,193
<u>Command, Control, and Administrative (sf)</u>					
141		15,366	10,568	9,670	35,604
171		518,046	20,556	108,808	647,410
610		48,243	14,640	722,233	785,116
72330		33,661	0	20,677	54,338
<u>Family Housing (units)</u>					
711		1,515	0	0	1,515
<u>Unaccompanied Personnel Housing (sf)</u>					
721		513,751	0	186,687	700,438
724		256,484	0	15,756	272,240
<u>Community Support (sf)</u>					
730		3,935	1,642	137,324	142,901
740		461,415	30,850	202,902	695,167

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT RUCKER**

Local Area

Surface area (square miles)	1,242
Total population	86,354

Commute Area

Total population	358,184
Total non-military employment	141,847
Total income (\$M)	6,406
Regional multiplier	2.3
Regional cost factor	0.82
Vacant housing units	11,273
Housing location factor	0.4
Variable housing allowance factor	0.042

Installation -- General

Installation area (acres)	58,410
Personnel stationed in FY 92 as in ASIP	
Officers	1,881
Enlisted	3,025
Students	2,509
Total military	7,415
Civilians	3,656

Installation -- Environmental

Land activity -- base-case units	30
Air activity -- base-case units	120
Water availability (excess capacity in persons)	25,600

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	90
Average distance to seaport (miles)	165
Seaport location	Gulf
Mission conflict with generic units	School
Designated maneuver area (acres)	40,525
Terrain suitability factor	
Light units	10.0
Heavy units	6.0
Training variety ratings	
Climate	2
Vegetation	5
Terrain	4
River crossings	0

LAST PAGE OF ANNEX Y

ANNEX 2

FORT SILL

ANNEX Z

FORT SILL



Fort Sill is a TRADOC installation that serves as the home of the US Army Field Artillery Center and School. As an Army training center, Fort Sill also provides one-unit station training for field artillery soldiers. Major units on the installation include: the III Corps Artillery, composed of the 75th, 212th, and 214th Field Artillery Brigades; a combat engineer battalion; and, a service and support battalion. Fort Sill has a current post population of 30,082, of which 23,139 are military personnel.

Fort Sill is in Comanche County of southwestern Oklahoma, about 100 miles southwest of Oklahoma City. Covering about 95,000 acres, the reservation is about 23 miles in length and 8 miles at its widest point. US Highways 62, 277, and 281 merge into a single north to south right-of-way through the eastern part of the reservation. The cantonment area is near the center of the reservation and north of the city of Lawton. Fort Sill has a

railhead and a 5,200-foot runway on post. The nearest airport suitable for heavy jets is 52 miles to the west at Altus Air Force Base, which has a 13,400-foot runway. The closest commercial airfield is 7 miles south at Lawton Municipal Airport, which has an 8,600-foot runway. The nearest seaport is Houston, Texas, which is about 400 rail miles from Fort Sill.

**FORT SILL: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	7
Area (square miles)	1,076	6,930
Population (1980)		
Urban	96,134	96,134
Rural	16,322	96,126
Non-rural	0	66,457
Total	112,456	258,717
Housing Units (1980)		
Owned/Occupied	21,619	63,099
Owned/Vacant	675	1,520
Rented/Occupied	13,523	26,478
Rented/Vacant	2,747	4,160
Other/Vacant	1,356	4,492
Housing Value of Owner Occupied Units	37,778	34,937
Mean Contract Rent (\$/month)	178	153
Employment (1982)		
Total	57,659	121,928
Government		
Federal Civilian	4,811	5,678
Federal Military	21,414	22,525
State & Local	5,820	13,105
Construction	1,342	2,791
Manufacturing	3,201	13,032
Wholesale/Retail Trade	8,014	17,935
Finance, Insurance & Real Estate	1,470	3,241
Services	5,078	11,802
Farm		
Proprietors	1,118	9,632
Wage & Salary	162	2,412
Income (1982) (\$M)		
Non-farm	797	1,635
Private	339	1,057
Government	458	578
Personal	1,027	2,616
Multipliers		
Export Employment	1.7404	1.9876
Export Income	1.6651	1.9767
Export Sales	1.7404	1.9876

## FORT SILL: ENVIRONMENT

**Climate:** The predominantly continental climate is characterized by pronounced daily and seasonal temperature changes and considerable variations in seasonal and annual precipitation. Summers are long and hot and accompanied by low humidity and southerly breezes. The mean daily high in July is 94°F. Nights are generally comfortable because clear skies and low humidity allow rapid cooling after sunset. Winters are comparatively mild and short. January has a mean daily low of 28°F. The average annual precipitation is about 31 inches. The wettest months are May, June, and October. Severe thunderstorms may be accompanied by tornadoes and damaging hail. Although snowfall averages 5.4 inches a year, the snow rarely remains on the ground more than a few days. The prevailing winds are southerly from April to October and northerly from November to March.

**Terrain:** Fort Sill lies in the Osage Plains Province. The Wichita Mountains extend into the central portion of the reservation. The reservation has three types of landforms: low plains, high plains, and low hills. The predominant low plains are nearly level to gently-rolling terrain. Slopes range from 3 to 8 percent and local relief is generally between 66 and 131 feet. In the northern part of the installation are the high plains which are discontinuous, gently- to moderately-rolling uplands. Slopes are generally between 8 and 15 percent in the northwestern part and between 15 and 30 percent in the central part. Slopes exceed 45 percent in the narrow, stream valleys and may locally approach 100 percent at rocky escarpments. Local relief is between 262 and 459 feet. Rolling low hills dominate the west-central portion of Fort Sill. These hills have steep, rocky slopes, sharp ridge flanks, and somewhat rounded crests. Slopes are generally between 30 and 45 percent and may locally exceed 60 percent. Local relief is predominantly between 590 and 722 feet.

**Soils:** The soil on Fort Sill consists largely of relatively young materials developed on unconsolidated stream deposits. Some soils have formed on limestone, shale, sandstone, conglomerate, granite, and rhyolite. In the low hills, the soil is sand, gravel, and cobbles with numerous rock outcrops. The western portion of the installation has silt and clay overlying sandy clay

(there are occasional gravel beds). In the south, the soils are a silty clay. The eastern part has sand and silt over silt-fine sand or sandy clay. Clay silt predominates in the stream valleys throughout the reservation.

**Water Resources:** Fort Sill lies within the Red River drainage basin. Many of the streams have headwaters in the Wichita Mountains and flow to the southeast across Fort Sill. Stream flow is likely to be highest in May, June, and October. Because many of the streams do not flow all year, fords are common and bridges are uncommon. Over 200 small man-made lakes and ponds provide water for wildlife and fighting fires (some also serve to control erosion).

**Vegetation:** Fort Sill has three vegetation types: broadleaf forests, scrublands, and grasslands. Comprising about 15 percent of the cover, broadleaf forests are found primarily in the flood plain areas. The broadleaf trees include elm, pecan, sugarberry, cottonwood, burr oak, and shumard oak. Primarily deciduous scrublands comprise 25 percent of the vegetation and include blackjack oak, post oak, mesquite, and eastern red cedar. Grasslands cover the remaining 60 percent of the reservation. Short grasses predominate in the western half of the reservation and tall grasses are abundant in the eastern half.

## FORT SILL: TRAINING

**Maneuver Area:** Fort Sill has 37,000 acres available for maneuver. As much as 55,480 acres are available if certain ranges are closed.

**Cross-Country Movement:** Off-road movement of vehicles on the grass prairies is generally fair to good. The moderately rolling uplands afford fair movement. As the density of the vegetation and the slope of the terrain increase, off-road movement becomes poor to unsuitable. Because of soft and slippery soils, movement is difficult for several days following heavy rains.

**Ranges:** Designed to meet the training needs of the Field Artillery Center and School, the Fort Sill range complex emphasizes the use of specialized artillery systems (rather than combined arms weapons). According to its master planning documents, Fort Sill has the following set of ranges.

### FORT SILL: RANGE AVAILABILITY

Armor:	Unavailable
Infantry(MECH)/Cavalry:	Good
Anti-Armor:	Unavailable
Aviation:	Unknown
Individual/Crew Weapons:	Unavailable
Indirect Fire Weapons:	Excellent
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable

**FORT SILL: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		137,075	0	0	137,075
<u>Aircraft Maintenance (sf)</u>					
211		138,606	0	9,231	147,837
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		224,117	57,664	187,258	469,039
<u>Command, Control, and Administrative (sf)</u>					
141		81,886	16,796	18,771	117,453
171		944,625	121,210	249,512	1,315,347
610		482,358	118,574	287,978	888,910
72330		57,207	0	69,750	126,957
<u>Family Housing (units)</u>					
711		1,416	0	0	1,416
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,749,404	140,484	829,454	3,719,342
724		466,775	0	31,426	498,201
<u>Community Support (sf)</u>					
730		140,470	2,799	29,166	172,435
740		608,965	47,318	228,833	885,116

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in Department of the Army Facility Classes and Construction Categories (Category Codes), AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT SILL**

Local Area

Surface area (square miles)	1,076
Total population	112,456

Commute Area

Total population	258,717
Total non-military employment	99,403
Total income (\$M)	5,886
Regional multiplier	2.0
Regional cost factor	0.94
Vacant housing units	10,172
Housing location factor	0.4
Variable housing allowance factor	0.119

Installation -- General

Installation area (acres)	94,270
Personnel stationed in FY 92 as in ASIP	
Officers	1,744
Enlisted	10,951
Students	9,247
Total military	21,942
Civilians	3,498

Installation -- Environmental

Land activity -- base-case units	219
Air activity -- base-case units	3
Water availability (excess capacity in persons)	50,000

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	5
Average distance to seaport (miles)	400
Seaport location	Gulf
Mission conflict with generic units	School
Designated maneuver area (acres)	37,260
Terrain suitability factor	
Light units	5.0
Heavy units	7.0
Training variety ratings	
Climate	5
Vegetation	4
Terrain	5
River crossings	0

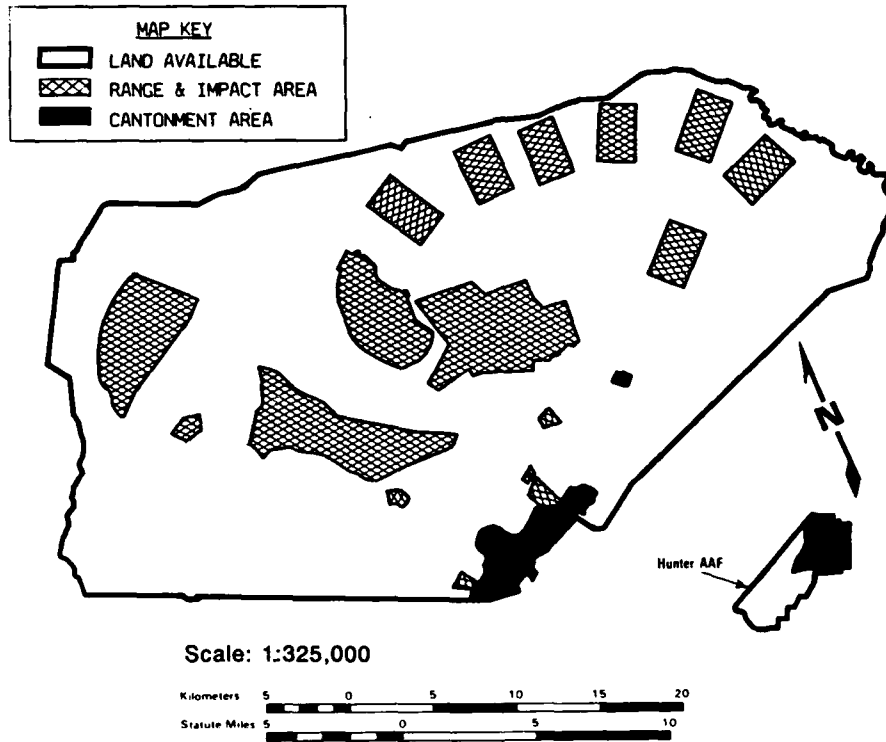
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ANNEX AA

FORT STEWART COMPLEX

ANNEX AA

FORT STEWART COMPLEX



The Fort Stewart complex consists of Fort Stewart and the nearby Hunter Army Airfield. Fort Stewart, a FORSCOM post, is the home of the 24th Infantry Division (Mechanized), the 1st Battalion (Ranger) -- 75th Infantry, and other FORSCOM units. Fort Stewart supports reserve component training and is a site for the maintenance and storage of National Guard equipment. Fort Stewart currently has a post population of 22,239, of which about 18,000 are military personnel.

Fort Stewart is in southeastern Georgia, about 41 miles southwest of Savannah. The 284,000-acre reservation is 32 miles in length and 17 miles in width. It extends over parts of Bryan, Evans, Long, Liberty, and Tattnall Counties. The reservation is readily accessible by major east-coast

thoroughfares, US 17, US 301, and Interstate 95. It is crossed north-south by Georgia Highway 119 and east-west by Highway 144. The cantonment area is at the southern tip of the reservation, adjacent to the town of Hinesville. On post, there is a railhead, two 5,000- by 100-foot, and two 2,000- by 100-foot runways. The nearest commercial airport is Travis-Savannah Airport, which is 42 miles from Fort Stewart. The closest seaport is 35 miles away in Savannah.

Located northeast of Fort Stewart, the 5,000-acre Hunter Army Airfield is adjacent to the city of Savannah. A former air force base, Hunter Army Airfield has a 11,375- by 200-foot runway.

FORT STEWART COMPLEX: TOTAL FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		2,185,373	0	41,333	2,226,706
<u>Aircraft Maintenance (sf)</u>					
211		9,604	0	7,406	17,010
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		675,951	26,771	144,058	846,780
<u>Command, Control, and Administrative (sf)</u>					
141		766,097	141,895	108,910	1,016,902
171		228,701	14,710	112,114	355,525
610		76,700	102,072	416,861	595,633
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		2,927	0	0	2,927
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,100,966	530,367	69,044	2,700,377
724		55,077	95,196	30,215	180,488
<u>Community Support (sf)</u>					
730		102,966	12,060	87,834	202,860
740		679,094	84,521	243,737	1,007,352

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT STEWART COMPLEX**

Local Area

Surface area (square miles)	958
Total population	47,758

Commute Area

Total population	423,096
Total non-military employment	170,377
Total income (\$M)	9,865
Regional multiplier	2.4
Regional cost factor	0.84
Vacant housing units	17,489
Housing location factor	0.2
Variable housing allowance factor	0.164

Installation -- General

Installation area (acres)	290,020
Personnel stationed in FY 92 as in ASIP	
Officers	1,867
Enlisted	16,437
Students	122
Total military	18,426
Civilians	4,481

Installation -- Environmental

Land activity -- base-case units	74
Air activity -- base-case units	62
Water availability (excess capacity in persons)	62,147

Installation -- Training and Operations

Average distance to sub-installations (miles)	40
Average distance to airport (miles)	41
Average distance to seaport (miles)	35
Seaport location	Atlantic
Mission conflict with generic units	None
Designated maneuver area (acres)	144,546
Terrain suitability factor	
Light units	10.0
Heavy units	6.0
Training variety ratings	
Climate	4
Vegetation	5
Terrain	5
River crossings	8

**FORT STEWART COMPLEX: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	2	11
Area (square miles)	958	5,292
<b>Population (1980)</b>		
Urban	0	186,546
Rural	21,418	146,157
Non-rural	26,340	90,393
Total	47,758	423,096
<b>Housing Units (1980)</b>		
Owned/Occupied	7,227	86,544
Owned/Vacant	122	1,413
Rented/Occupied	5,616	52,038
Rented/Vacant	501	6,893
Other/Vacant	706	9,183
Housing Value of Owner Occupied Units	37,738	44,220
Mean Contract Rent (\$/month)	183	172
<b>Employment (1982)</b>		
Total	28,026	207,675
Government		
Federal Civilian	3,414	8,196
Federal Military	16,813	37,298
State & Local	1,668	24,197
Construction	482	9,506
Manufacturing	934	23,877
Wholesale/Retail Trade	2,078	34,785
Finance, Insurance & Real Estate	268	6,844
Services	908	32,775
Farm		
Proprietors	229	4,201
Wage & Salary	52	2,661
<b>Income (1982) (\$M)</b>		
Non-farm	377	2,919
Private	73	1,925
Government	304	993
Personal	397	4,028
<b>Multipliers</b>		
Export Employment	1.2837	2.3783
Export Income	1.2507	2.2609
Export Sales	1.2837	2.3783

## FORT STEWART COMPLEX: ENVIRONMENT

**Climate:** Within the humid subtropics, Fort Stewart has mild winters and long, hot summers. The mean daily low temperature in December and January is 40°F. The mean daily high in July is 93°F. The summer heat is characterized by high humidity, solar radiation, and still air. The average annual precipitation is about 50 inches, half of which falls during the thunderstorm season of June through September. The driest month, November, has an average rainfall of only 1.7 inches. Snow is not uncommon. Under normal conditions, wind speeds rarely exceed 5 knots. High winds associated with a hurricane or tropical storm can be expected at least once a year.

**Terrain:** Fort Stewart is part of the Atlantic Coastal Plain Province. Much of the reservation is near sea level. Elevations range from about 3 feet above mean sea level in the east to 183 feet in the west. The surface configuration is controlled mainly by a large number of modest streams that have been superimposed on parts of three terraces. Surfaces are characterized by low escarpments, an old northeast-to-southwest barrier bar formation, and a small area of recent riverain sediments in the extreme east. These landforms of shallow marine and shoreline origin are underlain by predominantly unconsolidated marine sands, clays, and silts.

**Soils:** All soils at Fort Stewart have developed from unconsolidated coastal plain deposits. These soils range from excessively-drained sand to wet, mixed sandy-clay sediments (in the swamps). Due to the generally flat terrain and the low elevation, there is a seasonal high water table. Duration and depth of the water table are primarily a function of local relief, vegetation, and precipitation.

**Water Resources:** Wide swampy plains are associated with most of the streams on the reservation. Almost all of the surface waters drain into the Canoochee River and then into the Ogeechee River, which is on the east boundary of the reservation. Although July and August are the periods of heaviest rainfall, much of the moisture is lost to evaporation and vegetation transpiration. The

result is a low water flow. (April is the high-water month.) The reservation has several ponds, of which the largest is the 832-acre Canoochee Creek Lake.

**Vegetation:** The predominant vegetation patterns are coniferous forests, grasslands, and wetlands. Medium-to-dense stands of slash pine, longleaf pine, loblolly pine, and cypress cover about 30 percent of the reservation. These coniferous forests, and the less-frequent deciduous forests, are harvested on a regular basis. Swamp vegetation covers about 30 percent of the installation. This wetlands vegetation is closely spaced, predominantly deciduous brush, shrubs, and bottomland hardwood (e. g., blackgum, sweetgum, sweetbay, tupelo, swamp oak). Grasslands cover much of the reservation; the grasses are typically under 3 feet tall. Much of these grasslands are planted with winter rye for conservation purposes (and as cover and food for wild-life).

## FORT STEWART COMPLEX: TRAINING

**Maneuver Area:** The Fort Stewart reservation resembles an elongated pentagon with the long axis along an east-west line and the apex to the south. Since the cantonment area is at the apex, the bulk of the reservation is devoted to range and maneuver area. The artillery impact area is in the center of the reservation; small arms ranges are in the south; tank ranges are in the northwest; and, helicopter gunnery ranges are along the northern boundary. Fort Stewart has over 144,000 acres of maneuver area, the largest east of the Mississippi River. Use of the ranges limits maneuver area availability.

**Cross-Country Movement:** Off-road movement of vehicles is limited by both the density of vegetation and the presence of water. The major portion of the reservation is poor for all vehicles during dry periods and unsuited for all vehicles during wet periods. Movement is fair to good in the cleared areas or in the areas of scrub oak. When wet, these areas are also poor for cross-country movement of wheeled vehicles. Troop movement is generally fair for most of the reservation.

**Ranges:** Fort Stewart is one of the few installations where small arms, tank, artillery, and helicopters can fire simultaneously without interfering with each other. There are no major limitations on the firing of 8-inch howitzers, also the MLRS can be fully exercised. According to HQ FORSCOM, the following types of ranges are available on Fort Stewart.

### FORT STEWART COMPLEX: RANGE AVAILABILITY

Armor:	Adequate
Infantry(MECH)/Cavalry:	Adequate
Anti-Armor:	Adequate
Aviation:	Adequate
Individual/Crew Weapons:	Adequate
Indirect Fire Weapons:	Adequate
Air Defense Artillery:	Adequate
Infantry Collective Skills:	Adequate

FORT STEWART: FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		240,185	0	41,333	281,518
<u>Aircraft Maintenance (sf)</u>					
211		9,604	0	7,406	17,010
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		525,458	21,957	103,648	651,063
<u>Command, Control, and Administrative (sf)</u>					
141		588,801	127,681	76,572	793,054
171		191,964	12,960	108,390	313,314
610		27,363	43,585	351,048	421,996
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		2,439	0	0	2,439
<u>Unaccompanied Personnel Housing (sf)</u>					
721		1,633,285	498,197	35,863	2,167,345
724		37,902	95,196	30,215	163,313
<u>Community Support (sf)</u>					
730		101,067	2,412	63,667	167,146
740		457,322	4,199	208,313	669,834

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

HUNTER ARMY AIRFIELD: FACILITIES

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi-</u> <u>permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		1,945,188	0	0	1,945,188
<u>Aircraft Maintenance (sf)</u>					
211		0	0	0	0
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		57,294	0	40,409	97,703
<u>Command, Control, and Administrative (sf)</u>					
141		177,296	14,214	32,338	223,848
171		36,737	1,750	3,724	42,211
610		49,337	58,487	65,813	173,637
72330		0	0	0	0
<u>Family Housing (units)</u>					
711		488	0	0	488
<u>Unaccompanied Personnel Housing (sf)</u>					
721		467,681	32,170	33,181	533,032
724		17,175	0	0	17,175
<u>Community Support (sf)</u>					
730		1,899	9,648	24,167	35,714
740		221,772	80,322	35,424	337,518

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

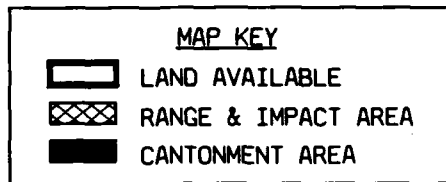
LAST PAGE OF ANNEX AA

ANNEX AB

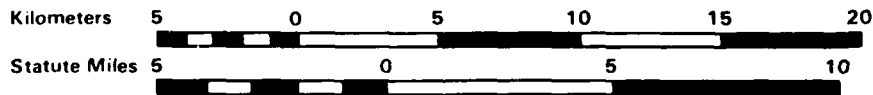
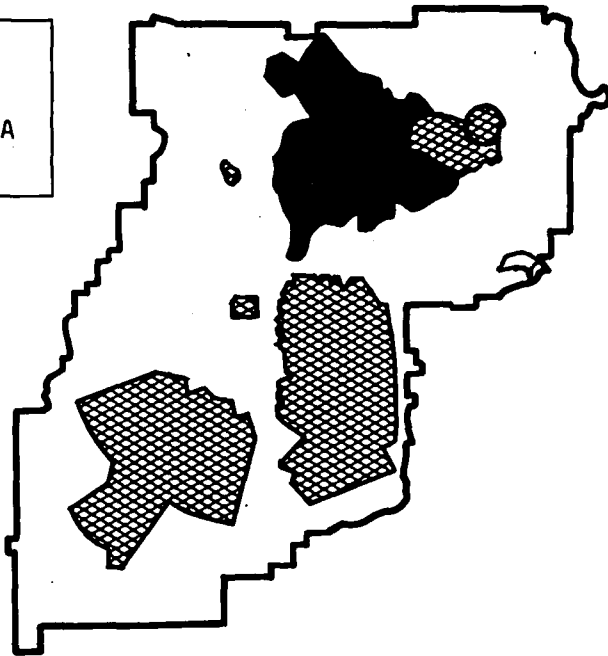
FORT LEONARD WOOD

ANNEX AB

FORT LEONARD WOOD



Scale: 1:250,000



Fort Leonard Wood is a TRADOC installation that currently is an Army training center for enlisted engineers. By FY 89, it will also be the home of the US Army Engineer Center and School. Fort Leonard Wood has a current post population of 19,445, of which 14,831 are military personnel.

Fort Leonard Wood is in southern Missouri, about 120 miles southwest of St. Louis and 73 miles northeast of Springfield, Missouri. The reservation extends about 13 miles north-south and 10 miles east-west at its widest point. The reservation encompasses 63,000 acres and lies almost entirely within Pulaski County (very small parts are in Laclede and Texas counties). The primary highway access is Interstate 44. The cantonment area is located in

the northeastern section of the reservation. On post, Fort Leonard Wood has a railhead and a 6,046-foot runway. Rolla National Airport, 23 miles to the northeast, has two 5,500-foot runways. The closest commercial airport is 81 miles southeast at the Springfield (Missouri) Municipal Airport. Heavy jet aircraft can be accommodated at Lambert-St. Louis International Airport, which is 138 miles northeast of Fort Leonard Wood. The nearest seaport is at Mobile, Alabama, which is about 600 rail miles from Fort Leonard Wood.

**FORT LEONARD WOOD: SOCIOECONOMIC DATA**

	<u>LOCAL</u>	<u>50-MILE</u>
Number of Counties	1	9
Area (square miles)	550	6,377
<b>Population (1980)</b>		
Urban	0	0
Rural	17,870	134,793
Non-rural	24,141	63,049
Total	42,011	197,842
<b>Housing Units (1980)</b>		
Owned/Occupied	5,703	49,891
Owned/Vacant	142	1,063
Rented/Occupied	4,822	18,077
Rented/Vacant	644	2,567
Other/Vacant	510	8,606
Housing Value of Owner Occupied Units	29,926	34,235
Mean Contract Rent (\$/month)	155	126
<b>Employment (1982)</b>		
Total	21,566	82,906
Government		
Federal Civilian	2,908	4,090
Federal Military	11,625	12,356
State & Local	1,215	10,543
Construction	104	1,645
Manufacturing	716	11,045
Wholesale/Retail Trade	1,614	12,143
Finance, Insurance & Real Estate	186	1,671
Services	1,100	8,062
Farm		
Proprietors	584	9,061
Wage & Salary	38	1,072
<b>Income (1982) (\$M)</b>		
Non-farm	258	847
Private	47	497
Government	210	350
Personal	274	1,430
<b>Multipliers</b>		
Export Employment	1.2470	1.9545
Export Income	1.2087	1.8875
Export Sales	1.2470	1.9545

## FORT LEONARD WOOD: ENVIRONMENT

**Climate:** The humid continental climate is characterized by well-defined seasons. Summers are warm with daytime highs often ranging 90° to 99°F during late June, July, and August. These high temperatures are accompanied by high humidity. Spring and fall temperatures are normally moderate and comfortable. Winters are cold, with some periods of mild weather. January has a mean daily minimum temperature of 23°F. Polar air masses occasionally penetrate the area and bring below-freezing temperatures. From April to August, more than half of the 40 inches of annual precipitation falls and there are frequent thunderstorms. May is the wettest month and January is the driest. Although snowfall averages 14 inches per year, snow rarely remains on the ground more than a few days. Prevailing winds are from the north. Strongest winds are usually associated with thunderstorms and are from the west or northwest. Severe thunderstorms are occasionally accompanied by tornadoes.

**Terrain:** Fort Leonard Wood is in the Springfield-Salem Plateau Section of the Ozark Plateau Province of the Interior Highlands. This section is an elevated plain and has been deeply eroded by stream action and includes caves, springs, underground rivers, and sinkholes. About 80 percent of the reservation is characterized as high plains. The terrain is rolling and moderately dissected. Slopes are typically 8 to 15 percent; along escarpments and deeply incised tributaries, slopes exceed 45 percent. Local relief is 180 to 260 feet. The low plains in the north-central part of the reservation are level to gently rolling and moderately dissected (with numerous sinkholes). Slopes there are generally less than 3 percent, and local relief ranges from 115 to 164 feet.

**Soils:** Fort Leonard Wood is made up primarily of residual soils formed on interbedded dolomite and sandstone. A limited area of relatively young alluvial deposits have developed on unconsolidated stream-deposited parent material. The alluvial materials are composed of gravel, sand, silt, and clay. The residual soils are chiefly cherty clays, sandy clays, and clay-silt loams of low organic content. Thick beds of cherty dolomite dominate the bedrock of the area.

**Water Resources:** The principal streams draining the reservation are the Big Piney River along the eastern boundary and Roubidoux Creek in the western portion. Both streams originate south of the reservation and flow northward to the Gasconade River. These two streams are also the only perennial streams on the reservation. Parts of Roubidoux Creek flow underground. The highest flows are in the spring; the lowest flows are in late summer and fall. Ground water is plentiful and numerous small reservoirs dot the reservation. Some are naturally occurring water-filled sinkholes. Others are man-made for sediment control or abandoned farm ponds (which are used for wildlife management and recreation). Aquifer recharge is sufficient and underlying geologic formations contribute to free movement of ground water.

**Vegetation:** Forests comprise 79 percent of the vegetative cover on the reservation. Most of the dominant tree cover is of the oak-hickory type found on the plateau and on ridges. The remaining forest cover consists mainly of bottomland hardwoods found on the flood plains. Evergreen needleleaf accounts for only a small percentage of the forests. Scrub comprises 11 percent of the vegetative cover and is generally found in the southern half of the reservation. Grasslands cover about 8 percent of the reservation with tall grasses that average 3 to 5 feet in height. The remaining surface area is unvegetated or covered by water.

## FORT LEONARD WOOD: TRAINING

**Maneuver Area:** Although Fort Leonard Wood has a total of 35,984 acres for maneuver, only about 19,500 acres is actually usable when the ranges are in operation. Safety zones, a forest reserve, access roads, private cemeteries, and public hunting areas tend to inhibit the free movement of tracked vehicles.

**Cross-Country Movement:** Cross-country movement of vehicles at Fort Leonard Wood is generally poor because much of the reservation is dense forest. Movement in grasslands and open areas is generally good. Movement conditions are degraded for a day or two following a heavy rain. Because the soil is moderately permeable and the evaporation rate is high, the ground dries quickly. Movement by foot troops is fair to good.

**Ranges:** Fort Leonard Wood lacks a number of ranges needed to support the training of major units. According to information from the installation's master planning documents, Fort Leonard Wood has the following types of ranges.

### FORT LEONARD WOOD: RANGE AVAILABILITY

Armor:	Unavailable
Infantry(MECH)/Cavalry:	Good
Anti-Armor:	Unavailable
Aviation:	Unknown
Individual/Crew Weapons:	Good
Indirect Fire Weapons:	Marginal
Air Defense Artillery:	Unavailable
Infantry Collective Skills:	Unavailable

**FORT LEONARD WOOD: FACILITIES**

<u>Facility Groups</u> <u>Category Codes</u>	<u>(Units)</u>	<u>Permanent</u>	<u>Semi- permanent</u>	<u>Temporary</u>	<u>Total</u>
<u>Aircraft Parking (sy)</u>					
113		844	19,919	0	20,763
<u>Aircraft Maintenance (sf)</u>					
211		9,600	0	0	9,600
21740		0	0	0	0
<u>Vehicle Maintenance (sf)</u>					
214		88,988	1,440	51,677	142,105
<u>Command, Control, and Administrative (sf)</u>					
141		71,627	1,813	111,224	184,664
171		300,037	201,574	211,626	713,237
610		59,398	12,736	288,257	360,391
72330		275,663	0	27,882	303,545
<u>Family Housing (units)</u>					
711		2,862	0	0	2,862
<u>Unaccompanied Personnel Housing (sf)</u>					
721		2,033,340	170,400	730,952	2,934,692
724		171,594	0	2,163	173,757
<u>Community Support (sf)</u>					
730		68,730	0	128,332	197,062
740		537,464	2,352	225,193	765,009

The number of adequate family housing units, as of the end of FY 87, was provided by the Housing Division of OACE. (Leased and programmed units are not shown here). All other data are extracted from the Headquarters Integrated Facilities System, as of June 1987. Programmed construction is not shown here.

The three- and five-digit category codes are defined in *Department of the Army Facility Classes and Construction Categories (Category Codes)*, AR 415-28, 1 November, 1981. Each three-digit code is a summary of two or more five-digit category codes, which begin with the same three numbers.

**SUMMARY OF KEY DATA: FORT LEONARD WOOD**

Local Area

Surface area (square miles)	550
Total population	42,011

Commute Area

Total population	197,842
Total non-military employment	70,550
Total income (\$M)	3,124
Regional multiplier	2.0
Regional cost factor	0.93
Vacant housing units	12,236
Housing location factor	0.4
Variable housing allowance factor	0.040

Installation -- General

Installation area (acres)	62,991
Personnel stationed in FY 92 as in ASIP	
Officers	792
Enlisted	5,197
Students	12,874
Total military	18,863
Civilians	4,940

Installation -- Environmental

Land activity -- base-case units	75
Air activity -- base-case units	3
Water availability (excess capacity in persons)	54,500

Installation -- Training and Operations

Average distance to sub-installations (miles)	0
Average distance to airport (miles)	138
Average distance to seaport (miles)	600
Seaport location	Gulf
Mission conflict with generic units	School
Designated maneuver area (acres)	35,984
Terrain suitability factor	
Light units	5.0
Heavy units	5.0
Training variety ratings	
Climate	6
Vegetation	5
Terrain	7
River crossings	6

LAST PAGE OF ANNEX AB

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